4000X Series

Automated Test Boards

The Premier Meter Testing Hardware

WECO 4050X/4050XT/4150X/4330X

Accuracy ▪ Convenience ▪ Versatility

RADIAN Research

Automated Test Board WECO 4050X, 4050XT, 4150X and 4330X

The WECO 4050X, 4050XT, 4150X, and 4330X automated test boards are the touchstone in meter testing hardware. Building on our tradition of delivering testing solutions that provide a powerful mix of accuracy, convenience, and versatility, these models add next generation features and cutting-edge technology. The NIST traceable RADIAN Research RX-30 series reference standard provides unparalleled accuracy to the testboards. The difference between the three models lies only in the current and the weight. Need a current range between 0.001A to 50.0A? The WECO 4050X is the testboard for you. The 4150X provides 0.001A to 150A. Should you need higher current capability the WECO 4330X provides a range of currents from 0.001A to 330.0A, Test meter start up current as low as 1mA. Open disconnect relays under full load conditions. Test a class 320 meter at class amps. Enjoy RADIAN's unmatched accuracy across the entire operating range of each.

The foundations for this revolutionary system are the features and innovations that have put RADIAN at the forefront of the industry for over thirty years. Low insertion force Smart Socket™ technology, fitted with high conduction silver and gold connections, and an electronic socket control, provide an excellent connection and extended hardware lifespan. A laser-based optics system employing high intensity light delivers highly accurate results from black marks or creep holes through even the dirtiest covers. Front mounted controls allow simple test selection and testboard control. An optional barcode scanner and printer cuts meter processing and data entry time. The optional OPTOCOM™ interface allows the meter to be tested and programmed without ever having to change the optical head.

Control Software

WATT-Net Basic Software supplied with 4000X was developed in a .NET environment with fully integrated SQL Express database and Winboard 3 meter test software. With Winboard 3, you can build advanced test sequences that allow you to control every parameter of a test, simplifying even complex tasks, and generate results that are compatible with all major databases (MS SQL, Oracle, Sybase). The WATT-Net family of data management solutions gives you unparalleled test result organization, reporting, and exporting abilities. The innovative 4000X automated test boards are designed to help utilities maneuver today's real world metering issues.

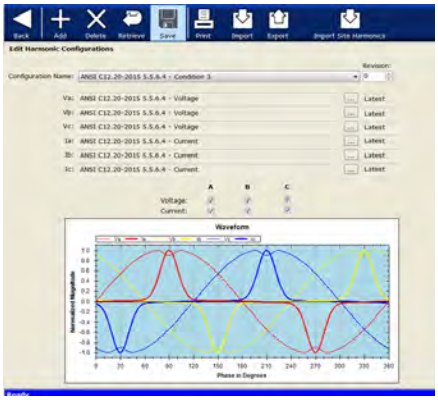
Require connectivity to a shared or enterprise database? WATT-Net Basic can upgrade seamlessly to our enhanced WATT-Net Express, Limited, and Plus software- the premier asset and smart grid device management database software solution for electric and gas utilities.

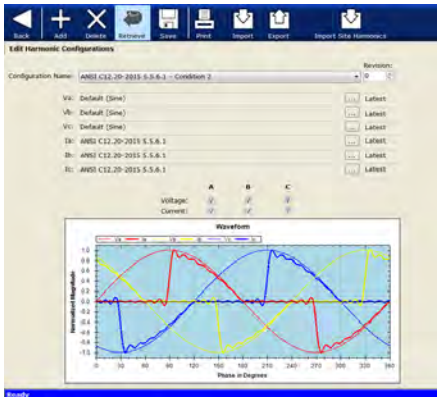
Harmonic Generation

The 4000X series of testboards has harmonic generation capabilities; you can now put various meter brands and meter technologies through a full harmonic analysis. With generation to the 60th harmonic and independent harmonic control in each of the current and voltage circuits (6 channels) as defined by order, magnitude, and phase, you can get the full picture of how a metering device is going to perform.

ANSI C12.20-2015 section 5.5.6 addresses harmonic influence, the effect of non-sinusoidal waveforms. These ANSI defined waveforms come predefined out of the box in any of the WATT-Net family of software. Bring confidence to your meter shop and customers that your meter population is accurately measuring energy using ANSI defined harmonic conditions.

WATT-Net provides the ability to bring real world field conditions back to the shop. Captured harmonic and/or trend data from the RW-30X can be played back allowing various meters to be tested under actual field load conditions. The load condition can be automatically played back from the captured data, providing an accuracy per meter "revolution" and the average accuracy of the entire test.





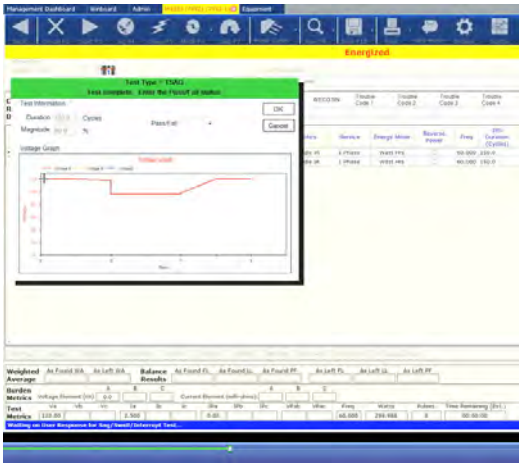
Power Quality

For many testboard users, meter testing has evolved to much more than Full Load, Light Load, and Power Factor tests. As energy meters become more advanced, the test equipment needs to keep pace. The 4000X series has done exactly that with capabilities to create and generate harmonic waveforms, simulate and test power quality events, and measure energy using the fundamental waveform only.

Voltage Interrupt/Sag/Swell Simulation and Testing

Create test sequences that simulate voltage interrupts, sags, and swells as defined by IEEE. These simulated events are labeled as Instantaneous, Momentary, or Temporary. These are used to simulate flicker, over/under voltage, and brown outs. Define the number of cycles and magnitude of voltage for each event. The test pauses after each step to verify that the power quality event flags are triggered on your meter. A Pass/Fail indication is provided that will be saved along with the meter accuracy test results.

Power Quality events are defined in the chart below.



Test Type	Description	Duration Limits (Cycles)	Magnitude Limits (% of Test Voltage)
ISAG	Instantaneous Sag	0.5 - 30	10% - 90%
ISWL	Instantaneous Swell	0.5 - 30	110% - 180%
MINT	Momentary Interruption	0.5 - 30	0% - 9%
MSAG	Momentary Sag	30 - 180 (30 Cycles to 3 Seconds)	10% - 90%
MSWL	Momentary Swell	30 - 180 (30 Cycles to 3 Seconds)	110% - 140%
TINT	Temporary Interruption	180-3600 (3 Seconds to 60 Seconds)	0% - 9%
TSAG	Temporary Sag	180-3600 (3 Seconds to 60 Seconds)	10% - 90%
TSWL	Temporary Swell	180-3600 (3 Seconds to 60 Seconds)	110% - 120%

***Note:** The min/max cycles vary based on test frequency. The values shown above are for a 60 Hz test condition.*

Fundamental Only Testing (Canada)

Canadian customers have requirements to test meters measuring the fundamental waveform only, even in the presence of harmonics. Choose from fundamental only energy modes Watt Hrs - Fundamental, VA Hrs - Fundamental, and VAR Hrs - Fundamental.

Multiple Socket Solution

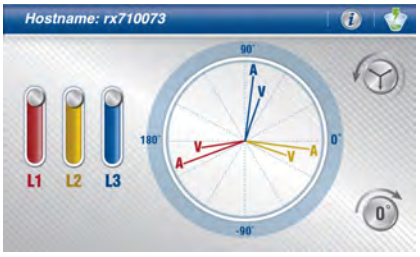
The WATT-Net family of software allows for the connection of multiple 4000X series sockets to one computer. Each socket can be used independently for maximum flexibility. This allows for high speed testing processes that can test different meter forms, using different test sequences, all at the same time.

Multiple VAR Test Types

There is more than one way to run a VAR test, and ANSI is constantly approving new calculation methods. Unlike other test systems, the 4000X series allows you to select from any ANSI approved calculation method to test a meter. This gives your utility the ability to choose the method that best fits its structure and needs, rather than having to accept the single method that a particular system is capable of testing. Available calculations include Voltage 90 degree shifted, Integral VAR, Integral VAR 50 Hz, Integral VAR 60 Hz, RMS VAR, and Fundamental VAR.

Front Panel Display

The 4000 family now features a color touch screen display built into the testboard front panel. This display provides information from the internal removable RX Reference Standard; including Energy Metrics, Vectors, Status, and more.

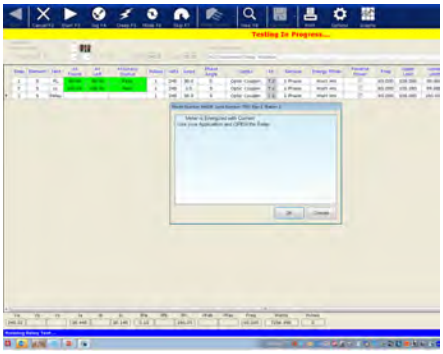


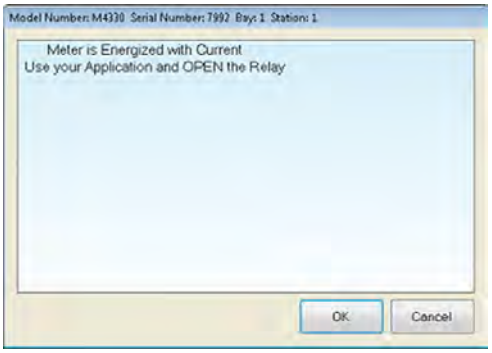
Fuseless Hardware Protection

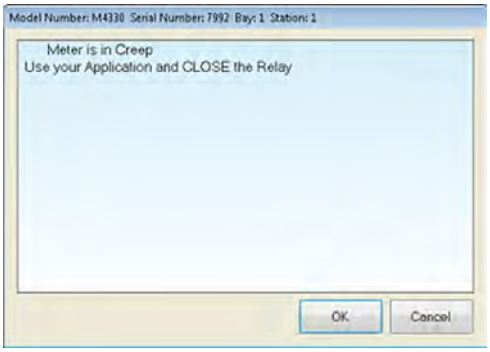
With this latest generation of test system, we build the most reliable hardware on the market. Voltage and current sources feature fuseless self-protection technology, providing hardware protection from short-circuit, thermal, and over-current fault conditions.

Meter Disconnect Relay Test

A relay test step allows you to step through the process of cycling your meter's disconnect relay. It determines the effectiveness of the disconnect relay based on generating current through each element to determine the status of the relay. Pass/Fail is determined, which is then saved along with your meter's accuracy test. This feature can be used in tandem with the Power Line Carrier input to test the PLC communications along with disconnect relay operation. Requires a user supplied method to communicate to the AMI Module, typically provided by the AMI vendor or meter manufacture.







Power Line Carrier Input

An outlet on the back of the testboard provides an input to communicate directly to a power line carrier module inside the meter. The outlet is configurable for each meter form and service type, to allow communications regardless of whether the module is powered phase to phase or phase to neutral. Use this feature in tandem with the disconnect relay test to verify module comms and disconnect relay operation. All test results are documented and saved with the meter accuracy test.

Recalibration

The 4000X series testboards give users the ability to maintain calibration on site. This provides the ability to maintain NIST traceability without interruption to workflow. Our WATT-Net family of software allows customizable test sequences to ensure traceability requirements. We have created standards compare adapters to allow connection to any model of master standard.

Ease of Maintenance

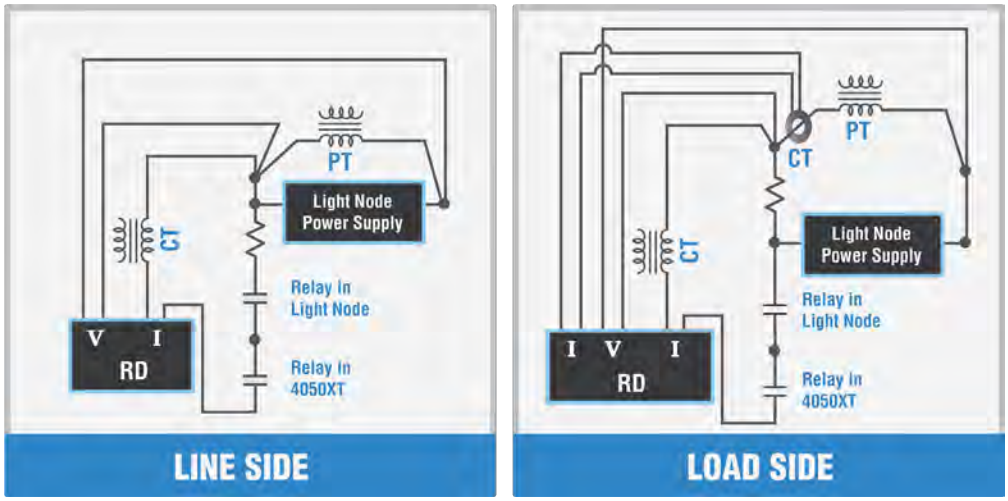
Our state-of-the-art card cage provides ease of maintenance. The labeled circuit boards easily plug into the cage. If necessary, the 4000X allows for simple and fast troubleshooting as boards can be swapped between phases to quickly to check for hardware failures. The card cage design has greatly reduced the need for internal wiring, reducing potential failure points to increase dependability.

Turbo Test™

We have worked hand-in-hand with the industry's leading meter manufacturers to bring you Turbo Test™ technology. Slash the amount of time it takes to test a supported meter on the 4000X series testboards to nearly one fifth of regular testing time. Save your shop valuable time and money with the Turbo Test™ option.

4050XT

The need for street light meter testing has exploded in recent years. With this new technology has come new testing requirements. One of the most fundamental changes has been load side powered street light meters. Traditionally, meters have been powered from the line side of the meter. The energy consumption of the meter is not measured by the meter itself, so that operational cost is not passed on to the customer. In street light metering, there has been a desire in certain applications for the meter to be powered from the load side of the meter. In this case, the meter measures the power consumed by the light, as well as the meter's own energy consumption. This gives the utility the full operating cost of the lighting system. If tested on a traditional meter testboard, the load side powered meter can give up to 6% error. This is an unacceptable amount of error. RADIAN resolved this issue with 4050XT. This testboard has load side meter forms pre-configured in the WATT-Nett software for ease of testing. The hardware can also be configured to measure the load on the voltage axis as well as the current axis when performing a phantom load test. This method of testing eliminates error when testing load side powered meters.



The diagram shows an example of how the load side testboard is configured for both line and load side powered meters:

The 4050XT has all the features and accuracy of a 4050X. It has simply added the hardware and custom forms to also test load side meters.

4050XT accessories

4050XT light node adapters

Part # AK0036 - Street light Adapter, 3 meters

Part # AK0038 - ANSI C136 Adapter, Street Light, Single Node

Continued Innovation

RADIAN fully understands our customers find new and exciting challenges every day. RADIAN is committed to partnering with you to overcome those challenges. We partner with customers to solve many new testing requirements, Type testing in environmental chambers, testing pre-wired meter cans through CTs and PTs already installed in the meter can and gang testing sub meters. These are just a few challenges RADIAN has helped our customers overcome.

We look forward to partnering with you!

RADIAN Research

Accessories

AX0030 - Dell™ standard business class Mini Tower computer or equivalent, with 24" Flat Screen Monitor and Microsoft Windows operating system (64 Bit / 8 GB RAM)

BK0075 - OPTOCOM Optical Port Data Head (One needed for each bay should multiple test stations be ordered)

BE0122 - Optocom Mount - retrofit to existing 4050X optics arm to retain Optocom head

AA0029 - Advanced I/O KYZ Breakout Cable, 18"

100086 - Advanced I/O KYZ Breakout Cable, 8'

AW0025 - Advanced I/O KYZ Breakout Cable, 12'

SW100300 - Turbo Test Option (Requires OPTOCOM Optics)(One needed for each bay should multiple test stations be ordered)

AK0001 - Single Phase A-Base Adapter

AK0003 - Poly Phase A-Base Adapter

AX0023 - 1D Barcode Scanner for RW/WE and Ethernet Testboards

AX0027 - Zebra ZM400 Bar Code Printer

SW101009 - Zebra Bar Code Printer Software

AL0052 - 50 Amp Standards Compare Adapter, 10 ft, External RD-3x/2x, Kit

AL0056 - 50 Amp 16S compatible, 27" cable length Standards Compare Adapter

AK0037 - IEC to Socket Adapter, Universal, Transformer Rated Meters (requires modification to front panel of testboard)

AL0030 - Standards Compare Adapter Kit, External RD-3X-XX2, Bolted Current (Recommended for true three-phase testing. Requires external RD-3X-XX2 or RD-3X-XX4 standard.)

AL0022 - Standards Compare Adapter, External RD-3X/2X or RX-3X. Supports testing up to 120 amps using external RD-3X or RX-3X standard. Supports up to 66 amps using external RD-2X standard

AL0014 - RD-SCA-3-Kit 225 Amp Std Compare Adapter Kit for RD Standards

AL0057 - 225 Amp Standards Compare Adapter MODEL SCA-3-RD w/4 ft leads

AL0058 - 225 Amp Standards Compare Kit for RD Standards SCA -3-RD-KIT w/4 ft Leads

AL0050 - M4X50 Standards Compare Adapter Kit ExternalRX-3X1/0CABLEandInsulatedConnectors

AL0005 - SCA-4, Socket to Panel Meter Adapter

AK0035 - IEC to Socket Adapter, Universal (requires modification to front panel of testboard)

AL0055 - 330 Amp Standards Compare, CT Sensed

AL0044 - 330 amp Adapter, Environmental Chamber, 16 ft Lead, 4/0 awg unterminated

AL0045 - SCA-4, Socket to Panel Meter Adapter, 16 Ft Leads,

AL0046 - 330 amp Adapter, Environmental Chamber, 6 ft Leads, 4/0 awg unterminated

Features

Test Voltage:
30–600V; independently programmable per phase in 0.01V steps, with four digits of resolution

True three-phase or single-phase

Voltage phase-angle setting relative to VA, 0-359.99° in 0.01° increment

Test Current:
4050X 0.001-50A; 4050XT 0.001-50A; 4150X: 0.001-150A; 4330X: 0.001-330A;
Independently programmable per phase in 0.001A steps, with four digits of resolution

Current phase-angle setting relative to VA, 0-359.99°, selectable in 0.01° increments per phase

Test Revolutions:
Selectable from 1–65,534

Test Time:
Selectable from 1–9999 seconds
(minimum of at least one energy pulse)

Demand (KW) Testing:
Standard revolutions (1–99999 revolutions)
Time run (up to 99 HRS, 59 MIN, 59 SEC)

VAR Testing:
All ANSI defined VAR calculation methods are supported.

Contact Device Testing:
Form “A” or “C” capability

Harmonic Generation:
Generation to the 60th harmonic, independent control in each current and voltage circuits, 6 channels

Analog Test:
Analog testing using a current loop configuration of voltage, current, phase, power factor, Watt, Var, and VA transducers

All analog devices with a maximum output of ±20mA are supported

Supports internal loop power or external loop power transducers

Voltage Interrupt/Sag/Swell Simulation and Testing:
Create test sequences that simulate voltage interrupts, sags, and swells as defined by IEEE. Define the number of cycles and magnitude of voltage for each event. Check that the power quality event flags are triggered on your meter to give a Pass/Fail indication that can be saved along with the meter accuracy test results

Automatic crossed stator wiring check during three-phase testing

Modulated laser optics for through hole and reflect disk sensing

Three IR Optical Pickups:
Top, bottom, and middle/center

Visual and audible (volume controlled) pulse indication for aid in aligning optical sensor.

LED bar graph for signal strength for mechanical meters

Easily removable reference standard for recertification or standard upgrade

PC Minimum System:
Dell™ standard business class Mini Tower PC, 17” flat screen monitor, Microsoft Windows® 7 Pro OS

RADIAN Research is committed to providing world-leading power and energy solutions. This mindset is what goes into all RADIAN products and services!

Specifications

Input Voltage:

90–264VAC (3 wire), 50 or 60Hz single-phase auto ranging

Input Power: 1500W Maximum

M4000 Series Power Consumption:

	Idle Current	Idle Watts	Test Condition	Current	Watts
M4050X	1.4A	153W	120v / 50A 3P	2.4A	275W
M4150X	1.4A	170W	120v/150A 3P	4.0A	462W
M4330X	1.6A	182W	120v/330A 3P	9.0A	1040W

System Accuracy: KWH +/– 0.04% at 1.0 P.F.
0.02% and 0.01% accuracy standards available

System accuracy is based upon the high accuracy of the NIST traceable RADIAN RX-30 series reference standard.

Test Frequency:

45 – 65Hz in 0.001Hz steps, accuracy 25ppm

Voltage and Current Harmonic Distortion:

Less than 1.0% THD (pure sine selected)

Voltage and Current Sources:

Features fuseless self-protection technology

Meter Forms Tested:

All current and future ANSI meter forms:
Except forms without a common current return (i.e. Form 7)

New meter forms can be added using the testboard utility included in the software package

Dimensions and Weight:

21"W × 20"H × 21"D
WECO 4050X: 120 LBS (Approximately)
WECO 4150X: 150 LBS (Approximately)
WECO 4330X: 160 LBS (Approximately)

Warranty:

Two (2) limited warranty (all parts and labor).
Manufacturer warranty on computer

Testboard Options:

OPTOCOM™: Optics coupler allows pulse testing and meter programming through the optical port of many solid state meters without changing the optics coupler

Barcode printer with software

Barcode reader with software

Multi-function testing capability

Higher accuracy reference standards available:
RX-31, accuracy 200ppm (±0.02%)
RX-33, accuracy 100ppm (±0.01%)
A unit with a RX-33-xxx standard requires a maximum ambient temperature of 30˚C to remain within specification

Computer memory, storage, and operating system upgrades

Bottom connected single stator adapter

Bottom connected multi stator adapter

Custom adapter designs available

Standards compare adapter for RM, RD or RX standards, single-phase or three-phase

Asset and Smart Grid Device Management Software
WATT-Net Basic, Express,
Limited and Plus™

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