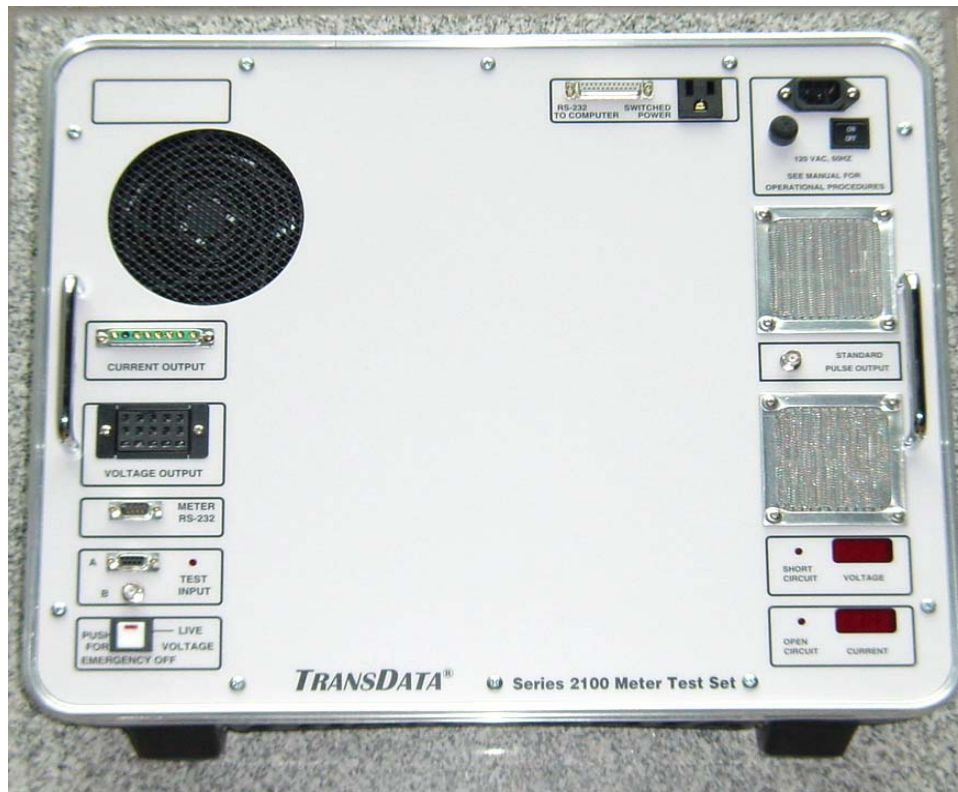


# 2130 Automated Meter Test Set

## Portable Meter Test Bench for On-Site Accuracy Certification of Revenue Metering Installations



Manufactured in the  
USA

## Designed for Testing High-Accuracy Multifunction Energy Meters in ISO Grid, Substation, Generation and Industrial Applications

- ▶ Automated Meter Test Bench with High-Accuracy ( $\pm 0.025\%$ ) Internal Multifunction Standard
- ▶ Computer Controlled with MS Windows Operating System and MS Access Database
- ▶ Accuracy Certification of KWh, KVARh, KQh, Volthours,  $V^2h$ , Amphours and  $A^2h$  Quantities
- ▶ Menu Driven Test Routines for Series and Per-Phase Full Load, Light Load and Power Factor Accuracy Tests with Expanded Modes for Complete Load Range and Specific Voltage Testing
- ▶ Extremely Precise Internal Current (0-30 Amps) and Voltage (0-600 Volts) Sources Provides Accurate and Repeatable Test Results, Especially on Loss Compensated Meters
- ▶ Used on California ISO, ERCOT (Texas ISO), New York ISO, New England ISO and PJM Grids

# Model 2130 Product Information

## *The Model 2130 is the Most Precise Means for On-site Certification of High-Accuracy, Transformer-Rated Revenue Metering Installations*

- ▶ On-site Accuracy Certification of KWh, KVARh, KQh, Volthours, Volt<sup>2</sup>hours, Amphours and Amp<sup>2</sup>hours Metering
- ▶ Infra-red LED Sensor, Disk Sensor and KYZ Relay Pulse test pick-ups available
- ▶ Simple for Field Personnel to Use with Automated Menu-Driven Test Routines
- ▶ High-Accuracy  $\pm 0.025\%$  Internal Multifunction Standard for Testing High Accuracy Meters
- ▶ Uses Industry Preferred "Active" Test Methodology with Built-in Current and Voltage Sources
- ▶ Expanded Rating Operating Test Range from 100 milliamps to 30 Amps and 0 to 600 Volts

### Product Description

Introduced in 1991, the TransData Model 2130 was the industry's first portable, self-contained automated meter test set developed for on-site revenue certification of high-accuracy, transformer-rated, multi-function energy meters typically used by utilities for inter-tie, substation, generation and large industrial applications.

The Model 2130 features built-in current and voltage sources and a high-accuracy, multi-function reference standard capable of providing on-site certification of revenue metering installations to less than 0.1% accuracy with extreme certainty. The Model 2130 is so accurate and precise, it outperforms many types of meter shop test benches when testing high-accuracy meters.

### Precision Regulated Current and Voltage Sources

Featuring built-in current and voltage sources, the Model 2130 generates 0-30 amps and 0-600 volts test signals just like the computer controlled test boards in utility meter shops.

The internal current and voltage sources are precision regulated to provide extremely stable signal levels during testing that are not prone to fluctuation with variations of the power supply voltage. The enhanced source stability of the Model 2130 provides extremely precise and repeatable test results, especially on transformer and line loss compensated meter installations.

### Preferred "Active" Testing Methodology

The Model 2130 is an "active technology" meter test set meaning it generates its own pure current and voltage sinusoidal waveform test signals to provide to the meter under test. Active technology is the preferred testing methodology for all revenue meters and is an extension of industry established, NIST-traceable test procedures performed by most meter manufacturers and utility meter shops. Active testing eliminates errors caused by inducing distorted waveform signals.

Passive technology meter test sets do not have internal sources and must instead rely on using the current and voltage signals present at the meter site which introduces distorted waveforms and harmonic frequencies into the reference standard. Many reference standards specify NIST-traceable accuracy is attained at 60 hertz ( $\pm 1$  Hz) with sinusoidal waveforms, passive testing methodology is not reliable for on-site accuracy certification of revenue meters.



*Removable High-Accuracy Internal Multi-function Reference Standard*

### High Accuracy, Multi-Function Internal Standard

TransData first began manufacturing high-accuracy energy reference standards for the utility industry in 1985. The high-accuracy internal standard used in the Model 2130 is an evolution of these earlier designs incorporating KWh, KVARh, KQh, Volthours, Volt<sup>2</sup>hours, Amphours and Amp<sup>2</sup>hours meter test functionality.

The 2130 precision reference standard has a NIST-traceable typical accuracy rating of  $\pm 0.025\%$ , with a  $\pm 0.05\%$  maximum allowable rating and includes provisions for testing against other standards while installed in the test set, or when removed.

*Includes Rugged Wheeled Transport Case with Extendable Handle*



# Model 2130 Operation

## Computer Controlled, Automated Meter Testing

The Model 2130 uses an IBM compatible computer with Microsoft Windows 98, 2000, NT or XP operating system to serve as its controller via an RS232 serial interface.

The PC controller serves a multi-purpose role by storing the predefined meter test routines and archiving the test results in Microsoft Access 2000 database. During testing, the PC controller automatically sequences the Model 2130 through test routines, compares the output of the meter to the reference standard, calculates the differential error, displays and archives the test results.

## Fast, Simple and Easy to Use

Using the Model 2130, a revenue metering installation can be fully tested and certified to revenue accuracy within a matter of minutes. The current and voltage leads are connected to the meter test switch or terminated to an A-Base adapter. Switchboard meters can be tested with a relay test paddle.

Available pick-up sensor options permit complete testing of the meter and its pulse initiator outputs. The optional LS1 infrared LED sensor pick-up is used with the infrared LED's on solid-state meters, the optional DS1 disk sensor pick-up for electro-mechanical meters and a KYZ pickup cable is included for relay pulse output testing.

Safety features include an emergency shutdown mode and internal fusing to protect the user during short or open circuit conditions.

## Operation

To test a meter, the user simply connects the current and voltage leads to the meter test switch, attaches the pick-up sensor, selects the appropriate test set-up from the user created library and the Model 2130 is ready to go. The PC controller takes over from there, automatically sequencing the Model 2130 through the user defined test routines. High capacity relays automatically switch the current and voltage signals between tests to perform series and per phase testing without the technician having to move any wires.

Meter test results are illustrated in familiar "As Found" and "As Left" formats, and are saved on the computer's hard disk in Microsoft Access 2000 for future retrieval or downloading into your meter management system. A portable printer can be interfaced to provide an on-site printout of the test results during witness testing.

**Meter Test**  
Test Setup Information:

File Name: Sample File Date: 4/ 1/03 Test Voltage: 120.0000  
 Company Name: TransData, Inc. Batch Number: 12345 Full Load Current: 2.500000  
 MFR. Serial No.: 33215546 Test Setup Name: Setup1 Test Constant: 1.200000  
 Operator: Lena Joy Form: 9S, 2EL Measured Quantity: Wh  
 Instrument Transformer Correction Factor: DISABLED - see System Setup to enable

Test Results:

Series	AS FOUND				AS LEFT			
	Full Load	Light Load	Power Factor	Special Test (%)	Full Load	Light Load	Power Factor	Special Test (%)
99.9982	100.2660	100.0244	0.0000	99.9819	100.2145	99.9729	0.0000	
A Phase	100.0366	100.1565	100.0391	0.0000	100.0440	100.1255	100.0342	0.0000
B Phase	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C Phase	99.9667	100.0937	99.9886	0.0000	99.8878	100.0831	99.9293	0.0000

Test Status:  \*\*\* DATE OF RECORD: \*\*\*

Buttons: As Found Test, As Left Test, Start Source, Stop Source, Save Results, Single Test, Print, Export Text, Get Setup, Options, Cancel

## User-Defined Test Routines

The Model 2130 supports accuracy testing of KWh, KVARh, KQh, Volthours, V<sup>2</sup>h, Amphours and A<sup>2</sup>h measured quantities found in most multi-function energy meters being produced today. A complete range of full load, light load, power factor, series phase and individual per-phase testing can be conducted on the supported measured quantities for both forward and reverse power flow at varied power factor levels to determine accuracy compliance.

The "Meter Test Setup" screen features drop-down menus to define the metered quantity, test resolution, meter form designation, meter test constants, power direction and more. Once created, the test routines are saved under a file name and stored on the PC controller for access when required.

**Meter Test Setup**

Test Variables:  
 Setup Name: Setup1  
 Description: Solid State, Ta = 2.5, 120 Volts, KYZ, 3EL  
 Test Constant: 0.090000 Test Frequency: 50 Hz 60 Hz  
 Resolution: 0.0010000 % OR Test Time: 0 s  
 Pickup Type: Form C Measured Quantity: Wh  
 Form: 9S, 3EL Percentage: %REG %ERR

Test Limits:  
 Full Load: +0.0200 -0.0200  
 Power Factor: +0.0200 -0.0200  
 Light Load: +0.0400 -0.0400  
 Special Test (%)

Test Setup Status: EM3EL120

For SF, SP, SL, AF, AP, AL, BF, BP, BL, CF, CP, CL:  
 Test Voltage: 120.000 Power Factor: 0.5  
 Full Load Current: 2.50000 Direction: Forward Reverse  
 Light Load Current: 0.25000 Phase: Lag Lead

For SX, AX, BX, CX (Custom Test Points):  
 Test Voltage: 0.00000 Direction: Forward Reverse  
 Test Current: 0.00000 Power Factor: 1.0 Phase: Lag Lead

Tests Performed:  SF  SP  AF  AP  BF  BP  CF  CP  
 SL  SX  AL  AX  BL  BX  CL  CX

Buttons: New Setup, Get Setup, Enter Counts, Enter Notes, Transformer Loss Compensation, Save, Cancel

## Expanded Test Mode Operation

The expanded test mode is an added feature that permits configuring specific tests to determine meter accuracy performance over a variety of load range, voltage variation and power factor conditions. This feature is especially useful for performing meter acceptance testing to confirm ANSI C12.20 accuracy requirements are met.

Precision accuracy testing can be performed across a meters complete operational load range to determine its overall accuracy compliance rating. Additionally, the expanded test mode permits testing at specific voltage and power factor levels to simulate actual conditions at the meter installation during energy audits.

**Expanded Test Mode**

Test Info:  
 File Name: File 1 Date: 4/ 1/03 Test Frequency: 50 Hz 60 Hz  
 Company No.: TransData, Inc. Batch Number: 12345 Percentage: %REG %ERR  
 MFR. Serial No.: 33215546 Test Setup Name: Expanded Setup Pickup Type: Form A/ Disk  
 Operator: Lena Joy Measured Quantity: Wh Form: 9S, 3EL  
 Resolution: 0.01 % OR Test Time: 0 s Test Constant: 1.0  
 Instrument Transformer Correction Factor: DISABLED Test Status:

Tests 1 - 8 Tests 9 - 16 Stop Test

Test	Test Voltage	Voltage A/B/C	Test Current	Current A/B/C	Forward / Reverse	Power Factor	Lead / Lag	Test Result
1	120.000	A	5.000	ABC	Forward	1.0	Lag	0.000
2			2.500					0.000
3			10.000					0.000
4			5.000		Reverse			0.000
5				A	Forward			0.000
6				B				0.000
7				C				0.000
8								0.000

Buttons: Run Test, Get Setup, Start Source, Stop Source, Options, Print Results, Export Text, Save Setup, Save Results, Cancel

# Model 2130 Specifications & Ordering Information

## Product Specifications

Operating Range	0.01 Amps (10mA) to 30 Amps	Phase Angle Accuracy	$\pm 0.002\text{PF}$ @ Unity, $\pm 0.5\text{deg}$ @ 0.5PF
NIST Certification Range	0.1 Amps to 30 Amps	Phase Angle Range	0–360 degrees in 1 degree steps
<i>Note- Testing below 0.1 amps falls outside NIST accuracy certification capabilities</i>			
Internal Multi-Function Reference Standard, Nominal at 23°C			
Wh, VARh, Qh Accuracy	$\pm 0.025\%$ typical @ 1.0PF, (0.25-30 Amps) $\pm 0.035\%$ typical @ 0.5PF, (0.25-30 Amps) $\pm 0.05\%$ maximum allowable $\pm 0.003\%$ of FL allowable below 0.25 amps	Source Distortion	<0.5% THD for steady state loads
Vh, V <sup>2</sup> h, Ah, A <sup>2</sup> h Accuracy	$\pm 0.05\%$ of Full Load	Source Frequency	60Hz, $\pm 0.01\%$
Voltage Source Range	0–600 Volts, 40VA maximum	Operating Temperature	0 to 40°C, or limits of computer
Voltage Source Resolution	0.1 Volt steps, 0–150 Volts 1.0 volt steps, 150–600 Volts	Vibration/shock	30 G, half-sine, 11mS duration
Current Source Range	0–30 Amps, 65 VA maximum	Dimensions	17" L x 21" W x 6" D
Current Source Resolution	0.01 Amp steps from 0–5 Amps 0.1 Amp steps from 5–30 Amps	Weight	35 lbs.
		Power Supply	120 VAC, 60Hz sine or square wave
		Computer Hardware Requirements-Minimum	IBM Compatible PC, Pentium 100mhz or better with 64MB RAM, RS232 Serial Port
		Computer Software Requirements	Windows 98, 2000, NT or XP Versions with Microsoft Access 2000 Database

## Ordering Information

Part Number	Description
Model 2130	Includes: 2130 Test Set with built-in current and voltage sources(0 to 30 Amps, 0-600 Volts), multifunction internal standard, 1 set of Current and Voltage test cables, serial port interface cable, KYZ relay pick-up cable, power cord, wheeled transport case, operating software and instruction manual.
Accessories	Description
LS2	Infrared LED Test Sensor Pickup, suction cup mount for Solid-State Meters with Dedicated IR test signal.
DS1	Disk Sensor Pickup for Socket & A-Base Electro-mechanical Meters
TP1	Switchboard Case Relay Test Paddle (GE Type)
TX1	Test Input Expander with TransData KYZ Input Cable <i>(Other cables can be custom made, consult factory)</i>
PD1	Test Input Pulse Divider <i>(For comparison with RM-10, SC10 standards)</i>
AP1	Analog to Pulse Converter, 0 - 1mA input, 0-10,000 counts per hour output, 120 VAC power <i>(For testing analog outputs)</i>



## Company Profile

*Serving the electric utility industry for over 38 years, TransData is a technology-based company specializing in the design and manufacture of advanced Energy Metering Systems, Wireless Automatic Meter Reading (AMR) Technologies, Isolation Relays, Power Transducers, Solid-State Demand Recorders and Portable Metering Test Equipment.*

*TransData's products are used for measuring and managing energy consumption by utilities and industry. TransData serves over 2000 customers in more than 25 countries worldwide, including all of the 50 largest U.S. electric utilities.*

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