

Watt-hour Meter and Calibration System

Precision Lab

DESCRIPTION

The Precision Lab is an advanced single position test system designed for fast and automated check of socket-type, single-phase electricity meters. Induction and solid state meters using forms 1S, 2S, 3S and 4S can be efficiently and accurately tested using the Precision Lab test system.



TEST BENCH FEATURES

Fully Automatic Operation

All operations of the Precision Lab test system are controlled by a Windows-based software developed to reduce the test preparation, system operation, test results presentation and storage and the total meter test time.

Outputs

The test system has one voltage and two current power outputs. Each output can be independently programmed and allows the simulation during the test of actual operating conditions normally found in the field by single-phase meter applications.

Optical Sensor

The scanner operates without the need to remove meter's cover. The following sensing methods can be used:

- Disk mark
- Infrared LED
- Disk hole

System Calibration

Calibration check of the Precision Lab test system can be performed using a single-phase external reference standard.

Harmonics Generation

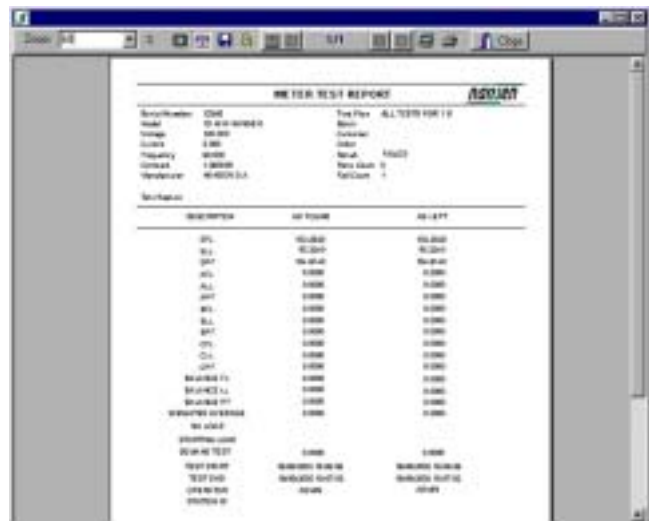
The test bench allows independent generation of voltage and current harmonics up to the 15th component. (optional)

Data Base of the System (Interbase 6.0)

Test results, test plans and meter data are stored in a data base (Interbase) allowing the generation of test reports as well as exporting of data as text files or spreadsheets in the Excel format. Integration with other application software is very easy.

The Interbase is a high-performance data base available for download as free software up to five users.

Example of meter test results report:



DESCRIPTION	SET POINTS	AD-SET
0%	0.0000	0.0000
1%	0.0000	0.0000
2%	0.0000	0.0000
3%	0.0000	0.0000
4%	0.0000	0.0000
5%	0.0000	0.0000
6%	0.0000	0.0000
7%	0.0000	0.0000
8%	0.0000	0.0000
9%	0.0000	0.0000
10%	0.0000	0.0000
11%	0.0000	0.0000
12%	0.0000	0.0000
13%	0.0000	0.0000
14%	0.0000	0.0000
15%	0.0000	0.0000
16%	0.0000	0.0000
17%	0.0000	0.0000
18%	0.0000	0.0000
19%	0.0000	0.0000
20%	0.0000	0.0000
21%	0.0000	0.0000
22%	0.0000	0.0000
23%	0.0000	0.0000
24%	0.0000	0.0000
25%	0.0000	0.0000
26%	0.0000	0.0000
27%	0.0000	0.0000
28%	0.0000	0.0000
29%	0.0000	0.0000
30%	0.0000	0.0000
31%	0.0000	0.0000
32%	0.0000	0.0000
33%	0.0000	0.0000
34%	0.0000	0.0000
35%	0.0000	0.0000
36%	0.0000	0.0000
37%	0.0000	0.0000
38%	0.0000	0.0000
39%	0.0000	0.0000
40%	0.0000	0.0000
41%	0.0000	0.0000
42%	0.0000	0.0000
43%	0.0000	0.0000
44%	0.0000	0.0000
45%	0.0000	0.0000
46%	0.0000	0.0000
47%	0.0000	0.0000
48%	0.0000	0.0000
49%	0.0000	0.0000
50%	0.0000	0.0000
51%	0.0000	0.0000
52%	0.0000	0.0000
53%	0.0000	0.0000
54%	0.0000	0.0000
55%	0.0000	0.0000
56%	0.0000	0.0000
57%	0.0000	0.0000
58%	0.0000	0.0000
59%	0.0000	0.0000
60%	0.0000	0.0000
61%	0.0000	0.0000
62%	0.0000	0.0000
63%	0.0000	0.0000
64%	0.0000	0.0000
65%	0.0000	0.0000
66%	0.0000	0.0000
67%	0.0000	0.0000
68%	0.0000	0.0000
69%	0.0000	0.0000
70%	0.0000	0.0000
71%	0.0000	0.0000
72%	0.0000	0.0000
73%	0.0000	0.0000
74%	0.0000	0.0000
75%	0.0000	0.0000
76%	0.0000	0.0000
77%	0.0000	0.0000
78%	0.0000	0.0000
79%	0.0000	0.0000
80%	0.0000	0.0000
81%	0.0000	0.0000
82%	0.0000	0.0000
83%	0.0000	0.0000
84%	0.0000	0.0000
85%	0.0000	0.0000
86%	0.0000	0.0000
87%	0.0000	0.0000
88%	0.0000	0.0000
89%	0.0000	0.0000
90%	0.0000	0.0000
91%	0.0000	0.0000
92%	0.0000	0.0000
93%	0.0000	0.0000
94%	0.0000	0.0000
95%	0.0000	0.0000
96%	0.0000	0.0000
97%	0.0000	0.0000
98%	0.0000	0.0000
99%	0.0000	0.0000
100%	0.0000	0.0000

Type of Tests

The test system is capable to perform the following tests:

- Load tests (Full Load, Light Load, Power Factor)
- Creeping test
- Starting Current
- Demand
- Repeatability tests (one test in the test sequence or all tests of the test sequence)

Test Plan

In order to control meter testing operations the test system includes standard test plans that are easily configured. The software includes default tests that can have its parameters modified by users in accordance with their needs. A test plan consists of a sequence of tests to be performed in the meter under test.

To perform a test the user simply selects a test plan and inform the meter serial number. The system software will then configure all test parameters for each test sequence. At the end of the test under execution the software will run the system to perform the next test in the sequence until all programmed tests are performed.



Specifications

- 1 - **Input Power:** 120VAC or 220VAC \pm 10%, 50Hz or 60 Hz, 800VA.
- 2 - **Output Voltage:** Software programmable from 60VAC to 600VAC with a resolution of 0.1V.
- 3 - **Output Current:** Software programmable from 10mA to 50A with a resolution of 0.001A.
- 4 - **Phase Angle:** Current and voltage outputs can be software adjusted for phase angle from 0° to 359.9° with a resolution of 0.1°.
- 5 - **Test Frequency:** 45Hz to 65 Hz with a resolution of 0,01Hz.
- 5 - **Voltage Accuracy:** +/- 0,5%
- 7 - **Current Accuracy:** +/- 0,5% + 2 digits
- 8 - **Phase Angle Accuracy:** 0.5%
- 9 - **Pulse Inputs:** 8 input channels are available for checking meters with KYZ outputs.

11 - Reference Standard:

The Precision Lab system uses the Radian Research model RD- 20 energy standard as internal reference thus assuring high metering accuracy and reliability.

The RD-20 standard uses the new Dytronic technology developed by Radian Research, based on a new integrating A/D converter specially designed for energy metering applications. Contrary to other standards that use off-the-shelf A/D converters, the Dytronic converter is optimized for power and energy metering offering high accuracy even in the case of distorted mains waveforms caused by overload or harmonics.

The RD-20 energy standard is capable of measuring active and reactive energy and power in four quadrants simultaneously.

12 - Protective Circuits:

If a current element is open or a voltage coil is shorted the Precision Lab system will shutdown the power amplifiers off and issue a warning message to call operator's attention.

13 - Precision Lab System Accuracy:

Measurement Type	System Accuracy
Wh 1.0 FP	\pm 0,05
Wh 0.5 FP	\pm 0,05
VARh 0 FP	\pm 0,05
VARh 0.866 FP	\pm 0,05

14 - Operating Temperature: +15°C to + 35°C

15 - Meter Types: Meter forms 1S, 2S, 3S and 4S can be tested

16 - Dimensions and Weight: 60 cm x 60 cm x 55 cm; 85 Kg

17 - Computer Configuration (not included):

The computer used as test system controller should have the following minimum configuration:

- 500MHz processor
- 100MB of free HDD space
- 3 1/2" floppy disk drive
- 1 RS-232 communication port dedicated to the Precision Lab System
- 1 parallel port
- 14", 800x600 SVGA video monitor
- Standard AT keyboard and mouse
- Ink jet printer
- Windows 98 OS or higher