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System efficiency is further enhanced using TCP/IP interface protocol making control and data access available from your company network. This control allows test data to be accessed at any local or remote terminal.

The RS-933 is based on Radian’s proven Syntron technology, continual development offers unparalleled performance across a wide range of functions.

Routine verification and system traceability can be achieved using the Radian RD-22 AC/DC transfer standard. Preprogrammed calibration routines within the software offer a simple but unique solution to reducing system downtime and costly maintenance.

A dedicated 20 MHz Reference Clock pulse output offers external measurement system synchronization. Furthermore, the system is able to synchronize to an external GPS Frequency Standard. The 1 pps external signal can be routed to any of the data outputs enabling simplified UUT time/frequency calibration.
The RS-933 Syntron Automated Calibration System

The RS-933 provides accuracy, precision, stability, along with efficiency in operation. The RS-933 features, diverse functionality and energy measurement accuracy deliver flexibility that meet the demands of today’s metrology laboratory.

**Optimum Testing Efficiency**

Increased productivity resulting from optimum testing efficiency make the RS-933 the ultimate approach to watthour reference standard testing. Automated results calculation, automated saving of data, unattended testing capabilities, and the ability to test up to 16 meters at one time will reduce test times from days to hours. Efficiency is further enhanced by the Test Group feature of the RS-933. This feature allows multiple test sheets to be run sequentially on the same device(s). Test Groups can also run unattended allowing for greater testing productivity even during non-working hours.

**Simple Operation**

While sophisticated in its internal functioning, the RS-933 system is very simple to operate. The system was designed so that a new user could be up and running after a brief training session. The intuitive Windows based RS-933 Control Program was developed with ease of use as a primary objective.

**Testing Standardization**

Utilizing Radian’s patented Syntron technology, the RS-933 serves as a sourcing standard by synthesizing voltage and current waveforms of extreme precision and accuracy. These waveforms are then amplified and applied to devices under test. This state of the art approach to watthour reference standardization allows for unsurpassed accuracy and linearity across the system’s entire operating range making it ideally suited as a working primary reference system. Traceability of the RS-933’s measurement accuracy is maintained directly through Radian’s NIST traceable calibration laboratory.

**Expansive Testing Capabilities**

The system not only has the ability to run accuracy certifications on watthour standards and evaluation testing of solid state meter designs, but it will also test various other devices such as Reference Standards, Digital Multimeters, Phase meter, Energy meters, Power meters, Revenue meters, Amp meters, Panel meters & Power Quality meters with extreme accuracy and precision. The RS-933’s expansive set of measurement functions streamlines the workings of electric utility laboratories. The ability for personnel to test many instruments on one central system and then access from any network terminal allows for optimization of test data storage, personnel resources and training times.

**The RS-933 with RD-22 Provide a Complete Automated Reference System**

For a complete automated AC reference test system, it is recommended that the RD-22 Dytronic Primary Transfer Standard be used in conjunction with the RS-933 Automated Calibration System.

A computer with Control Panel software is serially connected to the RD-22 and will receive processed measurement information from the standard. The portable standards being tested will have their pulse outputs connected to the Data Collection Module.

At the conclusion of the test, the Control Program software will display test results (in percent error or percent registration) comparing the RD-22 to the unit being tested, as well as results comparing the RS-933 to the RD-22.

In this manner, the RS-933 and RD-22 working together effectively serve as a check and balance to the proper functioning of the test sequence. If three RD-22s are used, then the RS-933 has the ability to average the three references as though they were one unit thus increasing the measurement integrity. In addition, primary references of DC Voltage, Resistance and Time can be tested against the RD-22. This is a useful feature for those laboratories that desire to perform a DC to AC transfer.
System Highlights

- 1mA minimum for new ANSI-compliant startup testing
- Automated Testing of 16 Meters Simultaneously
- Two Year Warranty
- Full Integration with the RD-22 Primary Standard for the Ultimate Calibration System
## NEW SYSTEM CONFIGURATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>New System Configuration Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>931/1G/120A</td>
<td>Single phase, 6 channel data collection, 120amp</td>
</tr>
<tr>
<td>931/1G/200A</td>
<td>Single phase, 8 channel data collection, 200amp</td>
</tr>
<tr>
<td>931/1G/200B</td>
<td>Single phase, 8 channel data collection, 200amp</td>
</tr>
<tr>
<td>931/1G/212A</td>
<td>Single phase, 16 channel data collection, 120amp</td>
</tr>
<tr>
<td>931/1G/212B</td>
<td>Single phase, 16 channel data collection, 200amp</td>
</tr>
</tbody>
</table>

## UPGRADE SYSTEM CONFIGURATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Booster Upgrade Only Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>751/1P/1G/120 BOOST</td>
<td>Single phase booster module, 120amp</td>
</tr>
<tr>
<td>751/1P/2G/200 BOOST</td>
<td>Single phase booster module, 200amp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Data Collection Upgrade Only Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPG931/1G/20A</td>
<td>16 channel data collection module</td>
</tr>
</tbody>
</table>

## OPTIONAL SYSTEM ACCESSORIES

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD-22</td>
<td>Primary Transfer Standard</td>
</tr>
<tr>
<td>RM-35/S</td>
<td>Meter/Link Sensor &amp; Signal Mount to test meters</td>
</tr>
<tr>
<td>RM-35/S5M</td>
<td>Meter/Link Sensor &amp; Signal Mount to test meters</td>
</tr>
<tr>
<td>RM-35/Y</td>
<td>Meter/Link Sensor &amp; Signal Mount to test meters</td>
</tr>
<tr>
<td>RM-35/PM</td>
<td>InfraRed Optical Pickup to test electronic meters</td>
</tr>
<tr>
<td>RM-10A</td>
<td>Optical Adapter for use with RM-10A to attach</td>
</tr>
<tr>
<td></td>
<td>10 mm-screw plug</td>
</tr>
<tr>
<td>RM-10Z</td>
<td>Pulse Input Adapter (5-pin: C contact) to test meters</td>
</tr>
<tr>
<td>RM-18</td>
<td>Signal Converter (connects output to display</td>
</tr>
<tr>
<td></td>
<td>... used to make TTL outputs compatible with RS-232)</td>
</tr>
</tbody>
</table>

## SYSTEM SPECIFICATIONS

### ACCURACY
- Power: ±0.005 %, Voltage: ±0.004 %, Current: ±0.008 %, Phase: ±0.008 %
- Traceable to NIST for fundamental waveforms
- This accuracy specification is limited to 900% of reading and applies across the entire voltage and current range and within a temperature range of 23°C ± 5°C.
- Accuracy also includes stability, power factor, and test system error.

### TEMPERATURE COEFFICIENT
- Power: +1 ppm/°C
- Current: 200 VAC, 50 A
- Voltage: 44-62 V
- Output range: 40-650 V at 60Hz; 65-525 V at 50Hz (10.5%) (not to exceed 670V)
- (0.001% input increments) (V = 4 V at 50 VDC and 60 VDC)
- Used to test 1100 VAC at 120V or higher
- 1mA to 200A

### FREQUENCY
- Current: 47-63 Hz (Fundamentals)
- Phase angle: 0-360 degrees (0.0001° increments)
- Power: ±3.0035%, Voltage: ±0.0029%, Current: ±0.0044%
- 1V/100V to 5dB/100V
- Voltage Range: 1V to 10V Maximum, Frequency: <0.001%, Minimum Frequency: 2 mHz, Maximum Frequency: 10 kHz
- Resolution: 10ppm

### PHYSICAL DESCRIPTION

| SIZE       | (68.7) X (47.0) X (35.7) D |
| BASE SYSTEM WEIGHT | 775 lbs |
| SHIPMENT DIMENSIONS | Same as overall dimensions (height: shipment) |

## OVERVIEW

The RS-933 automated energy calibration system calibrates a range of test equipment including Energy Reference Standards, Digital Multimeters, Power Meters, Current Meters, Amp Meters, Panel Meters, and Power Quality Meters. Its ability to deliver 1mA to 200A from one single output offers a versatile solution that reduces test time by eliminating the need to reconfiguration test leads. Radian’s direct drive current output technology improves stability, repeatability, and settling time without the need for measurement feedback found on older equipment.

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