RM-17 Certification Testing
Reduce Costs & Improve Efficiencies

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Introduction

Certification of the RM17 is the last step in the metrological traceability process whereby the results can be related to a reference standard through a documented unbroken chain of calibrations from the field test equipment all the way to National Institute of Standard and Technology (NIST). Certification provides the proof to the customer that the Watthour on the bill is fair and accurate. The typical certification cycle for testing equipment is recommended annually. High volume testing environments limit risk by performing certifications daily, weekly or monthly.

Challenge – Reduce Cost & Improve Efficiency

Continuous improvement is a common term used in board meetings today always leading to the common question "How can we reduce cost and improve operational efficiencies while improving quality and safety?" The following will review traditional certification methods that are time consuming and costly, then review Radian's solution to reducing cost and improved efficiencies with the RM-17.

Traditional Options

Outside laboratories provide certification traceable to NIST, but require test equipment to be transported or shipped to a of site location. Disadvantages are risk of damage equipment while transporting or shipping, loss productivity while test equipment is out for certification and customer satisfaction suffers because high bill requests are on hold till equipment returns. Operational budget costs increase because of overtime to catch up backlog of customer high bill work orders. Contractor provided onsite certification requires the scheduling of personnel to travel and perform certification.

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Disadvantages are increase in certification documentation, delays in certification based on travel of the contractor and backlog of customer high bill work orders. Increase in operational cost do to overtime to catch up work backlogs and increase maintenance costs to provide onsite certification contracting.

A typical method to improve customer satisfaction and eliminate overtime is to increase capital costs by purchasing duplicate test equipment. But this method will increase maintenance cost by doubling certification costs, doubling inventory costs and doubling operational cost to handle additional equipment.

Radian Research "Delivers a Solution"

The RM-17will provides a simple automated method of certification while maintaining the highest degree of certification accuracy with simple documentation for traceability. This results in no back log of work, no risk to equipment during shipping, no additional capital and complete safety during certification.

Benefit 1

Customer satisfaction will improve by eliminating down time of equipment and performing high-bill accuracy testing in an efficient and cost effective method.

Benefit 2

Improve cost effective certification of the RM17.

Benefit 3

Reduce additional capital costs associated by carrying less additional spare equipment.

Benefit 4

Reduce additional maintenance costs of equipment held in inventory.

Benefit 5

Improve the overall utilization of existing equipment providing better return on investment for your stock holder and owners.

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Certification

Equipment required:
1. RM-TS - RM-17 Test Socket for connection to potential source
2. RM-17 unit w/ handheld
3. RD-TJ - RM-17 Test Jack for connection to RD- Standard
4. BNC Cable
5. RD 21/23 – Standard
6. Aux Power Cable

Test Setup
1. Connect hardware as shown above for calibration of RM-17 portable field unit.
   1.1. The RM-17 first plugs into the RM-TS test stand.
   1.2. Plug the RD-TJ test jack into face of the RM-17 unit.
   1.3. The RD-21 or RD-23 external standard must be used because it has a greater accuracy (+/- 0.02%, +/- 0.01%) than the RM-17 (+/-0.05%) The standard should be 10 times more accurate (Handbook for Electricity Metering-Accuracy Ratios) therefore a RD-23 would be the preferred choice.
2. Connect the RD standard to the current leads of the RD-TJ adapter. Note the current inputs of the RD correspond to the TJ's polarity of "O" and "50"terminals to the B & C Phase of the RD unit.

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3. Connect the potential leads from the TJ adapter to the RD standard Potential (POT) input terminals with BLK=0.
4. Connect the BNC cable from the output Port B of the RD standard to the BNC input/output of the RM-17 handheld controller. *Helpful Hint:* Default setup of the RD output port 2 is pulse = 0.00001 & +Wh.
5. Connect the controller cable from the RM-17 Handheld to the RM-17 Socket Adapter. *Helpful Hint:* Install fresh 9 volt battery into the handheld for testing or plug into a 9 volts DC power source.
6. Connect Aux power to the RD standard, AUX Power terminals 60- 630VAC.
7. Apply 120 VAC to the Potential (POT) terminals of the RM-TS test stand via external power; followed by 208, 240 and 480 volts. *Helpful Hint:* This can connect to the AUX power of the RD standard as in the picture above. Using a manual voltage that goes to zero volts in between steps, then run each voltage step and print results then go to next voltage step, run and print. Stable voltages provide best results for as found testing.

Developing Certification Points

1. From the main menu, select *Preferences (4)* followed by *Calibration (6)* and finally *Setup* (**3**). *Helpful Hint:* Press the number 4 key followed by 6 then 3 to navigate the hand held menu much faster.
2. Based on Company Standards - Develop test points for voltages, currents, power factor (UN = unity and PF = 0.5) and time (seconds) duration using the up/down and left/right arrow keys. *Helpful Hint:* To skip a test point, enter 0 in the time field and the automatic certification test will skip this point.
3. Example:

Volts	AMPS	PF	Time
120 V	15A	UN	10 sec
120 V	15A	PF	10 sec
120 V	30A	UN	10 sec
120 V	30A	PF	10 sec
208 V	15A	UN	10 sec
208 V	15A	PF	10 sec
208 V	30A	UN	10 sec
208 V	30A	PF	10 sec
240 V	15A	UN	10 sec
240 V	15A	PF	10 sec
240 V	30A	UN	10 sec
240 V	30A	PF	10 sec

4. Select ENTER to save the new test points configured.
5. Select CANCEL to return to the main menu.

Certification Test

1. Select option *(4), Run as Found.*

2. The unit will prompt you to physically switch the voltage source from 120, 208 and 240 volts which you must do by changing the dial setting on external power source before proceeding. Press ENTER to acknowledge after completion.
3. When test is completed, select CANCEL to return to the main menu.

View Certification

1. Select *View (option 1).*
2. Scroll down through the list to see the results for each test point.
3. Check that the accuracy percent error does not exceed specs: Unity PF = 0.01% typical, 0.05% MAX, 0.5 PF = 0.01% typical, 0.05% MAX *Helpful Hint: Results are in % Error.*

Summary

The RM-17 is the most accurate and portable field set in the industry. With the addition of PCA Link the RM-17 system will perform as a shop testing system including logging all of your important data requirements. The Radian RM-17 provides the ability to steam line operations, reduce capital, operating and maintenance costs. The self certification ability built in the RM-17 system provides a consistent easy method of insuring that proper certification is always up to date and traceable to NIST.