Accuracy Tests for Substation and Generation Watthour Metering



1. Scope

This work practice covers the required accuracy tests for substation, generation, interchange electric watthour meters, and associated equipment. This standard applies to all Seattle City Light (SCL) substation and generation facilities.

2. Application

This work practice is for SCL Stations Meter Electricians who perform watthour meter accuracy tests. This standard will be used to determine the accuracy tests to be performed on all new watthour metering equipment as well on existing equipment as part of a maintenance program.

3. Introduction

All applicable SCL watthour meters shall be required to have the accuracy tests performed as stated in the tables in Section 4. Not all tests are required for each meter. The set of tests that are to be performed are dependent upon the meter construction type, system being measured, and the programmed functions of the meter. These accuracy tests are based on ANSI C12.1 and ANSI C12.20 requirements.

For acceptable accuracy requirements and limits of these tests, See SCL 2505.14; Accuracy Limits for Substation and Generation Watthour Meters."

For the purposes of this work practice, "watthour meter" and "revenue meter" are equivalent terms.

Standards Coordinator Laura Vanderpool



Standards Supervisor John Shipek

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Unit Director Andrew Strong

4. Test Sequences

The test sequence(s) to be used when performing accuracy tests shall be determined by the Stations Meter Electrician Crew Chief and be based on the functionality of the metering as designed/programmed. The following tables outline the test sequences to be performed for each metering application or function.

Test sequences are categorized by meter construction type, metering elements, measurement quantities, and programming. These customized test sequences help ensure that each meter is tested in a manner that emulates its functionality as installed, and will maintain accuracy, reliability, and repeatability of test results. Each test sequence is identified by a Station Meter Testing Programs (SMTP) unique identifier.

SMTPs are categorized into three types:

- Revenue Meter Tests (RMT): Test sequences used for meter accuracy tests performed against a meter disk or front panel LED calibration pulses.
- Pulse Meter Tests (PMT): Test sequences used for testing KYZ outputs.
- Transducer Meter Tests (TMT): Test sequences used for testing analog outputs.

All tests shall be performed singe phase at 60 Hz.

Test voltages and amperes are obtained from the meter nameplate.

Table	Test Type	Accuracy Test Description
4.1	Electro-Mechanical Meter	3 wire watthour meters; delivered watthours only
4.2	11	3 wire watthour meters; bi-directional watthours
4.3	11	4 wire watthour meters; delivered watthours only
4.4	II	4 wire watthour meters; bi-directional watthours
4.5	Electronic Meter	3 wire watt/varhour meters; delivered watthours, bi- directional varhours
4.6	II	3 wire watt/varhour meters; delivered watthours only
4.7	n	3 wire watt/varhour meters; 4 quadrant metering
4.8	11	4 wire watt/varhour meters; delivered watthours, bi- directional varhours
4.9	11	4 wire watt/varhour meters; delivered watthours only
4.10	n	4 wire watt/varhour meters; 4 quadrant metering
4.11	Pulse	watts; bi-directional
4.12	II	watts; delivered only
4.13	n	vars; bi-directional
4.14	11	vars; delivered only
4.15	Analog	watts; bi-directional
4.16	II	watts; delivered only
4.17	II	vars; bi-directional
4.18	II	vars; delivered only
4.19	EIM Electronic Meter	3 and 4 wire watt/varhour meters; 4 quadrant series only

Table 4. Accuracy Test Table Reference

Table 4.1. Accuracy Test for 3-Wire Electromechanical Watthour Meters

Test sequence SMTP-RMTM3: Revenue meter test mechanical 3-wire

Purpose: To test mechanical, 2-element meters with delivered active power flow, watthours only

Step	Element	Test	Test Revs	% Test Volts	% Test Amps	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	II	100	0	II
3	S	LL	2	II	10	0	II
4	S	LL	2	II	10	0	II
5	S	PF	10	II	100	60	II
6	S	PF	10	II	100	300	II
7	А	FL	10	II	100	0	II
8	А	PF	10	II	100	60	II
9	А	PF	10	II	100	300	II
10	С	FL	10	II	100	0	II
11	С	PF	10	II	100	60	II
12	С	PF	10	II	100	300	II

Table 4.2. Accuracy Test for 3-Wire Electromechanical Watthour Meters

Test sequence SMTP-RMTM4Q3: Revenue meter test mechanical 4-quadrant 3-wire **Purpose**: For testing mechanical 2-element meters w/ delivered and received active power flow, watthours only

Sten	Floment	Tost	Test Rove	% Test Volts	% Test Amps	Phase Angle	Measured Quantity
1	C C	1030	5	100	100	0	Watthours
-	3			100	100	0	"
2	5	FL	10		100	0	
3	S	LL	2	"	10	0	•
4	S	LL	2	II	10	0	II
5	S	PF	10	"	100	60	"
6	S	PF	10	"	100	300	"
7	А	FL	10	"	100	0	"
8	А	PF	10	II	100	60	II
9	А	PF	10	II	100	300	II
10	С	FL	10	II	100	0	II
11	С	PF	10	II	100	60	II
12	С	PF	10	II	100	300	II
13	S	AO	5	"	100	180	II
14	S	FL	10	II	100	180	II
15	S	LL	2	n	10	180	II
16	S	LL	2	II	10	180	II
17	S	PF	10	II	100	240	II
18	S	PF	10	II	100	120	II
19	А	FL	10	II	100	180	II
20	А	PF	10	II	100	240	II
21	А	PF	10	"	100	120	II
22	С	FL	10	II	100	180	II
23	С	PF	10	11	100	240	"
24	С	PF	10	"	100	120	"

Table 4.3. Accuracy Test for 4-Wire Electromechanical Watthour Meters

Test sequence SMTP-RMTM4: Revenue meter test mechanical 4-wire

Purpose: For testing mechanical 2.5- and 3-element meters w/ delivered active power flow, watthours only

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	II	100	0	II
3	S	LL	2	II	10	0	II
4	S	LL	2	II	10	0	II
5	S	PF	10	II	100	60	II
6	S	PF	10	II	100	300	II
7	А	FL	10	II	100	0	II
8	А	PF	10	II	100	60	II
9	А	PF	10	II	100	300	II
10	В	FL	10	II	100	0	II
11	В	PF	10	II	100	60	II
12	В	PF	10	II	100	300	II
13	С	FL	10	II	100	0	II
14	С	PF	10	II	100	60	II
15	С	PF	10	II	100	300	II

Table 4.4. Accuracy Test for 4-Wire Electromechanical Watthour Meters

Test sequence SMTP-RMTM4Q4: Revenue meter test, mechanical, 4-quadrant, 4-wire **Purpose**: For testing mechanical 2.5- and 3-element meters w/ delivered & received active power flow, watthours only

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	II	100	0	II
3	S	LL	2	II	10	0	"
4	S	LL	2	II	10	0	"
5	S	PF	10	II	100	60	II
6	S	PF	10	II	100	300	11
7	А	FL	10	II	100	0	"
8	А	PF	10	II	100	60	II
9	А	PF	10	II	100	300	"
10	В	FL	10	II	100	0	"
11	В	PF	10	II	100	60	"
12	В	PF	10	II	100	300	II
13	С	FL	10	II	100	0	"
14	С	PF	10	II	100	60	"
15	С	PF	10	II	100	300	"
16	S	AO	5	II	100	180	11
17	S	FL	10	II	100	180	"
18	S	LL	2	II	10	180	11
19	S	LL	2	II	10	180	"
20	S	PF	10	"	100	240	n
21	S	PF	10	II	100	120	"
22	А	FL	10	II	100	180	"
23	А	PF	10	II	100	240	II
24	А	PF	10	II	100	120	"
25	В	FL	10	II	100	180	II
26	В	PF	10	II	100	240	"
27	В	PF	10	II	100	120	"
28	С	FL	10	II	100	180	11
29	С	PF	10	II	100	240	11
30	С	PF	10	"	100	120	II

Table 4.5. Accuracy Test for 3-Wire Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTE3: Revenue meter test, electronic 3-wire

Purpose: For testing electronic 2-element meters w/ delivered, active, and reactive power flow, watthours and varhours

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	"	100	0	II
3	S	PF	10	"	100	60	H
4	S	PF	10	"	100	300	II
5	S	LL	2	II	10	0	II
6	А	FL	10	"	100	0	II
7	А	PF	10	II	100	60	II
8	А	PF	10	"	100	300	II
9	С	FL	10	"	100	0	II
10	С	PF	10	"	100	60	II
11	С	PF	10	"	100	300	II
12	S	AO	5	"	100	270	Varhours
13	S	FL	10	"	100	90	II
14	S	FL	10	II	100	270	II
15	S	PF	10	II	100	30	"
16	S	PF	10	II	100	330	"
17	S	LL	2	II	10	90	II
18	S	LL	2	II	10	270	"
19	А	FL	10	II	100	90	"
20	А	FL	10	II	100	270	II
21	А	PF	10	II	100	30	"
22	А	PF	10	II	100	330	"
23	С	FL	10	II	100	90	II
24	С	FL	10	H	100	270	II
25	С	PF	10	"	100	30	II
26	С	PF	10	II	100	330	II

Table 4.6. Accuracy Test for 3-Wire Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTE3B: Revenue meter test electronic 3-wire basic **Purpose**: For testing electronic 2-element meters w/ delivered, active power flow, watthours only

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	II	100	0	II
3	S	LL	2	н	10	0	II
4	S	PF	10	н	100	60	II
5	S	PF	10	н	100	300	II
6	А	FL	10	н	100	0	II
7	А	PF	10	н	100	60	II
8	А	PF	10	н	100	300	II
9	С	FL	10	н	100	0	II
10	С	PF	10	н	100	60	II
11	С	PF	10	н	100	300	H

Table 4.7. Accuracy Test for 3-Wire Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTE4Q3: Revenue meter test, electronic, 4-quadrant, 3-wire **Purpose**: For testing electronic, 2-element meters w/ delivered and received, active and reactive power flow, watthours and varhours

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1	S	AO	5	100	100	0	Watthours
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2	S	FL	10	"	100	0	11
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	3	S	PF	10	"	100	60	II
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	4	S	PF	10	II	100	300	11
	5	S	LL	2	"	10	0	II
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6	А	FL	10	II	100	0	11
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	A	PF	10	"	100	60	"
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	А	PF	10	II	100	300	II
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	9	С	FL	10	"	100	0	"
11 C PF 10 " 100 300 " 12 S AO 5 " 100 270 Varhours 13 S FL 10 " 100 90 " 14 S FL 10 " 100 270 " 15 S PF 10 " 100 300 " 16 S PF 10 " 100 330 " 17 S LL 2 " 10 90 "	10	С	PF	10	"	100	60	II
12 S AO 5 " 100 270 Varhours 13 S FL 10 " 100 90 " 14 S FL 10 " 100 270 " 15 S PF 10 " 100 30 " 16 S PF 10 " 100 330 " 17 S LL 2 " 10 90 "	11	С	PF	10	II	100	300	II
13 S FL 10 " 100 90 " 14 S FL 10 " 100 270 " 15 S PF 10 " 100 30 " 16 S PF 10 " 100 330 " 17 S LL 2 " 10 90 "	12	S	AO	5	"	100	270	Varhours
14 S FL 10 " 100 270 " 15 S PF 10 " 100 30 " 16 S PF 10 " 100 330 " 17 S LL 2 " 10 90 "	13	S	FL	10	"	100	90	Ш
15 S PF 10 " 100 30 " 16 S PF 10 " 100 330 " 17 S LL 2 " 10 90 "	14	S	FL	10	"	100	270	"
16 S PF 10 " 100 330 " 17 S LL 2 " 10 90 "	15	S	PF	10	"	100	30	II
17 S LL 2 " 10 90 "	16	S	PF	10	"	100	330	11
	17	S	LL	2	"	10	90	II
18 S LL 2 " 10 270 "	18	S	LL	2	"	10	270	II
19 A FL 10 " 100 90 "	19	A	FL	10	"	100	90	II
20 A FL 10 " 100 270 "	20	A	FL	10	"	100	270	11
21 A PE 10 " 100 30 "	21	A	PF	10	"	100	30	11
22 A PE 10 " 100 330 "	22	A	PF	10	"	100	330	"
23 C El 10 " 100 90 "	23	C	FI	10	"	100	90	"
24 C El 10 " 100 270 "	24	C C	FI	10	"	100	270	"
25 C PE 10 " 100 30 "	25	<u>с</u>	PF	10	п	100	30	11
26 C PE 10 " 100 330 "	26	C C	PF	10	"	100	330	"
27 S AQ 5 " 100 180 Watthours	27	S	AO	5	"	100	180	Watthours
28 S FL 10 " 100 180 "	28	S	FI	10	п	100	180	"
29 S PE 10 " 100 240 "	29	S	PF	10	"	100	240	11
<u>30 S PE 10 " 100 120 "</u>	30	S	PF	10	II	100	120	11
<u>31 S II 10 " 10 180 "</u>	31	S	11	10	"	10	180	11
<u>32 A El 10 " 100 180 "</u>	32	A	FI	10	"	100	180	11
<u>33</u> A PE 10 " 100 240 "	33	A	PF	10	"	100	240	"
<u>34 A PE 10 " 100 120 "</u>	34	A	PF	10	"	100	120	"
<u>35 C El 10 " 100 180 "</u>	35	C	FI	10	II	100	180	11
36 C PE 10 " 100 240 "	36	C C	PF	10	"	100	240	"
<u>37 C PE 10 " 100 120 "</u>	37	С.	PF	10	II	100	120	Ш
<u>38 S AO 5 " 100 270 Varbours</u>	38	S	AO	5	II	100	270	Varhours
<u>39 S PE 10 " 100 150 "</u>	30	<u> </u>	PF	10	"	100	150	"
40 S PF 10 " 100 210 "	40	 S	PF	10	"	100	210	"
<u>41 A PF 10 " 100 150 "</u>	41	Δ	PF	10	"	100	150	"
$A_2 \qquad \Delta \qquad PF \qquad 10 \qquad " \qquad 100 \qquad 210 \qquad "$	42	Δ	PF	10	"	100	210	"
<u>43</u> C PF 10 " 100 150 "	43	 C	PF	10	"	100	150	"
<u>44 C PF 10 " 100 210 "</u>	44	C	PF	10	"	100	210	II

Table 4.8. Accuracy Test for 4-Wire Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTE4: Revenue meter test, electronic, 4-wire

Purpose: For testing electronic 2.5 and 3-element meters w/ delivered, active, and reactive power flow, watthours and varhours

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	"	100	0	II
3	S	PF	10	"	100	60	II
4	S	PF	10	II	100	300	"
5	S	LL	2	II	10	0	II
6	А	FL	10	H	100	0	11
7	А	PF	10	II	100	60	II
8	А	PF	10	II	100	300	II
9	В	FL	10	H	100	0	11
10	В	PF	10	II	100	60	"
11	В	PF	10	II	100	300	II
12	С	FL	10	H	100	0	11
13	С	PF	10	II	100	60	"
14	С	PF	10	II	100	300	"
15	S	AO	5	H	100	270	Varhours
16	S	FL	10	II	100	90	"
17	S	FL	10	II	100	270	"
18	S	PF	10	H	100	30	"
19	S	PF	10	II	100	330	"
20	S	LL	2	II	10	90	"
21	S	LL	2	II	10	270	II
22	А	FL	10	II	100	90	"
23	А	FL	10	II	100	270	"
24	А	PF	10	II	100	30	II
25	А	PF	10	II.	100	330	"
26	В	FL	10	II	100	90	II
27	В	FL	10	II.	100	270	II
28	В	PF	10	II	100	30	II
29	В	PF	10	"	100	330	II
30	С	FL	10	II.	100	90	II
31	С	FL	10	"	100	270	"
32	С	PF	10	"	100	30	"
33	С	PF	10	"	100	330	"

Table 4.9. Accuracy Test for 4-Wire Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTE4B: Revenue meter test, electronic, 4-wire basic **Purpose**: For testing electronic 2.5- and 3-element meters w/ delivered, active power flow, watthours only

Ston	Elomont	Tost	Tost Povs	% Test Volts	% Tost Amporos	Phase Angle	
Step	Liement	1621	Test nevs		76 Test Amperes	(degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10	II	100	0	II
3	S	LL	2	II	10	0	II
4	S	PF	10	II	100	60	II
5	S	PF	10	II	100	300	II
6	А	FL	10	II	100	0	II
7	А	PF	10	II	100	60	II
8	А	PF	10	II	100	300	II
9	В	FL	10	II	100	0	II
10	В	PF	10	II	100	60	II
11	В	PF	10	II	100	300	II
12	С	FL	10	II	100	0	II
13	С	PF	10	II	100	60	"
14	С	PF	10	II	100	300	"

Table 4.10. Accuracy Test for 4-Wire Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTE4Q4: Revenue meter test, electronic, 4-quadrant, 4-wire **Purpose**: For testing electronic 2.5- & 3-element meters w/ delivered and received, active and reactive power flow, watt and varhours

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FI	10	"	100	0	"
3	S	PF	10	н	100	60	н
4	S	PF	10	н	100	300	H
5	S	11	2	"	10	0	H
6	Δ	FI	10	"	100	0	"
7	A	DE	10	н	100	60	н
0	A		10	"	100	200	н
0	A		10	"	100		н
9			10	"	100	0	"
10			10		100	60	
11	В		10		100	300	
12	<u> </u>	<u>FL</u>	10		100	0	
13	С	PF	10		100	60	
14	С	PF	10	"	100	300	•
15	S	AO	5	"	100	270	Varhours
16	S	FL	10	I	100	90	"
17	S	FL	10	"	100	270	"
18	S	PF	10	"	100	30	"
19	S	PF	10	"	100	330	н
20	S	LL	2	н	10	90	"
21	S	LL	2	"	10	270	II
22	A	FI	10	н	100	90	н
23	A	FI	10	н	100	270	н
24	Δ	PF	10	"	100	30	"
25	Δ	PF	10	"	100	330	п
20	R		10		100	00	н
20	P		10	"	100	30	н
21			10		100	270	"
28	В	PF	10		100	30	"
29	В		10		100	330	
30	<u> </u>	FL	10		100	90	
31	С	FL	10		100	270	
32	C	PF	10	"	100	30	
33	С	PF	10	"	100	330	"
34	S	AO	5	"	100	180	Watthours
35	S	FL	10	"	100	180	"
36	S	PF	10	I	100	240	n
37	S	PF	10	"	100	120	"
38	S	LL	10	н	10	180	II
39	А	FL	10	н	100	180	"
40	A	PF	10	н	100	240	II
41	A	PF	10	н	100	120	II
42	В	FL	10	"	100	180	"
43	 B	PF	10	н	100	240	II
44	 B	PF	10	п	100	120	н
45	<u> </u>	FI	10	"	100	180	"
46	0	PF	10	"	100	240	"
/7	C	DE	10	н	100	120	"
41	<u> </u>		5	н	100	270	Varbours
40	<u> </u>			"	100	210	Varhouro
49	3		10		100	150	varnours
50	5		10		100	210	
51	A	PF	10		100	150	"
52	A	PF	10	"	100	210	11
53	В	PF	10	"	100	150	"
54	В	PF	10	"	100	210	"
55	С	PF	10	"	100	150	"
56	С	PF	10	II	100	210	н

Table 4.11. Pulse Test, Watts, Bi-Directional

Test sequence SMTP-PMTWPN: Pulse meter test, watthours

Purpose: For testing KYZ output delivered and received, active power flow, watthours.

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	FL	10	100	100	0	Watthours
2	S	FL	10	100	100	180	Watthours

Table 4.12. Pulse Test, Watts, Delivered Only

Test sequence SMTP-PMTWP: Pulse meter test, watthours **Purpose**: For testing KYZ output delivered, active power flow, watthours

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	FL	10	100	100	0	Watthours

Table 4.13. Pulse Test, Vars, Bi-Directional

Test sequence SMTP-PMTVPN: Pulse meter test, varhours **Purpose**: For testing KYZ output delivered & received, reactive power flow, varhours

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	FL	10	100	100	90	Varhours
2	S	FL	10	100	100	270	Varhours

Table 4.14. Pulse Test, Vars, Delivered Only

Test sequence SMTP-PMTVP: Pulse meter test, varhours **Purpose**: For testing KYZ output delivered, reactive power flow, varhours

Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	Phase Angle (degrees)	Measured Quantity
1	S	FL	10	100	100	90	Varhours

Table 4.15. Analog Test Watts, Delivered Only

Test sequence SMTP-TMTWP: transducer meter test watthours Purpose: For testing analog output delivered, active power flow, watthours

Step	Element	Test Voltage	Test Amperes	Phase Angle (degrees)
1	S	120	4.167	0
2	S	120	3.333	0
3	S	120	2.5	0
4	S	120	1.667	0
5	S	120	0.833	0

Table 4.16. Analog Test, Watts, Bi-Directional

Test sequence SMTP-TMTWPN: transducer meter test, watthours **Purpose**: For testing analog output delivered & received, active power flow, watthours

Step	Element	Test Voltage	Test Amperes	Phase Angle (degrees)
1	S	120	4.167	0
2	S	120	3.333	0
3	S	120	2.5	0
4	S	120	1.667	0
5	S	120	0.833	0
6	S	120	4.167	180
7	S	120	3.333	180
8	S	120	2.5	180
9	S	120	1.667	180
10	S	120	0.833	180

Table 4.17. Analog Test, Vars, Delivered Only

Test sequence SMTP-TMTVP: Transducer meter test, varhours **Purpose**: For testing analog output delivered, reactive power flow, varhours

Step	Element	Test Voltage	Test Amperes	Phase Angle (degrees)
1	S	120	4.167	90
2	S	120	3.333	90
3	S	120	2.5	90
4	S	120	1.667	90
5	S	120	0.833	90

Table 4.18. Analog Test, Vars, Bi-Directional

Test sequence SMTP-TMTVPN: Transducer meter test varhours **Purpose**: For testing analog output delivered and received, reactive power flow, varhours

Step	Element	Test Voltage	Test Amperes	Phase Angle (degrees)
1	S	120	4.167	90
2	S	120	3.333	90
3	S	120	2.5	90
4	S	120	1.667	90
5	S	120	0.833	90
6	S	120	4.167	270
7	S	120	3.333	270
8	S	120	2.5	270
9	S	120	1.667	270
10	S	120	0.833	270

Table 4.19. Accuracy Test for 3 and 4-Wire EIM Electronic Watthour and Varhour Meters

Test sequence SMTP-RMTEIME: Revenue meter test, EIM electronic

Purpose: For testing EIM electronic 2, 2.5, and 3 element meters w/ delivered and received, active and reactive power flow, watt and varhours

						Phase Angle	
Step	Element	Test	Test Revs	% Test Volts	% Test Amperes	(degrees)	Measured Quantity
1	S	AO	5	100	100	0	Watthours
2	S	FL	10		100	0	"
3	S	PF	10	"	100	60	"
4	S	PF	10		100	300	"
5	S	LL	2	"	10	0	"
6	S	FL	10		100	180	"
7	S	PF	10		100	240	"
8	S	PF	10	н	100	120	"
9	S	LL	2	"	10	180	"
10	S	AO	5		100	90	Varhours
11	S	FL	10	н	100	90	"
12	S	PF	10	"	100	30	"
13	S	PF	10		100	150	"
14	S	LL	2	"	10	90	"
15	S	FL	10		100	270	"
16	S	PF	10	"	100	210	"
17	S	PF	10		100	330	"
18	S	LL	2		10	270	n

5. References

SCL Work Practice 2505.14; "Accuracy Limits for Substation and Generation Watthour Metering"

ANSI C12.1-2008; Electric Meters Code for Electricity Metering

ANSI C12.20-2010; Electricity Meters - 0.2 and 0.5 Accuracy Classes

6. Sources

Eltrich, Patrick; Station Meter Electrician and subject matter expert for 2505.15 (patrick.eltrich@seattle.gov)

Everist, Arlen; Station Meter Electrician, subject matter expert, and originator of 2505.15 (arlen.everist@seattle.gov)