



70068067-TDT 6353-10

Partial type test of a transformer connected
electronic three-phase four-wire energy meter,
made by Zhuhai Pilot Technology Co., Ltd.
type PMAC903, class 0,5S

Arnhem, May 26, 2010

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By order of Zhuhai Pilot Technology Co., Ltd.

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Summary

The energy meter as described in chapter 2, meets the requirements of

- clause 8.1, Limits of error due to variation of the current,
- clause 8.3.2, Test of no-load condition and
- clause 8.3.3, Starting

of

- IEC 62052-11 (2003) : Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Metering equipment
- IEC 62053-22 (2003) : Electricity metering equipment (a.c.) - Static meters for active energy (classes 0,2S and 0,5S)
- IEC 62053-23 (2003) : Electricity metering equipment (a.c.) - Static meters for reactive energy (classes 2 and 3)

Based on a non-recurrent examination.

1 Introduction

The type test was carried out in the Calibration Laboratory of KEMA, in May 2010, on behalf of Zhuhai Pilot Technology Co., Ltd. on the meter as described in chapter 2.

The energy meters were tested in respect of the following requirements:

- clause 8.1, Limits of error due to variation of the current,
- clause 8.3.2, Test of no-load condition and
- clause 8.3.3, Starting

of

- IEC 62052-11 (2003) : Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Metering equipment
- IEC 62053-22 (2003) : Electricity metering equipment (a.c.) - Static meters for active energy (classes 0,2S and 0,5S)
- IEC 62053-23 (2003) : Electricity metering equipment (a.c.) - Static meters for reactive energy (classes 2 and 3)

2 Data related to the energy meters tested and marking

Applicant	: Zhuhai Pilot Technology Co., Ltd.
Contact person	: Jackey Zhou
Address	: No.15 Keji 6 Road, Chuangxin Haian. Tangjia High-tech Zone.
Postal code, Place	: Zhuhai, Guangdong 519085
Country	: China

Production site	: Zhuhai Pilot Electronics Co., Ltd.
Address	: No.15 Keji 6 Road, Chuangxin Haian. Tangjia High-tech Zone.
Postal code, Place	: 519085, Zhuhai, Guangdong
Country	: China

Instrument	: Electronic three-phase four-wire energy meter Transformer connected
Mark - Type	: PMAC903
Register	: LCD
Accuracy Class	: 0,5S
Measurement range	: 220/380 V 5(6) A 50 Hz 3600 imp./kWh

Sample identification: 10010989, 10010990, 10004627 and 10004628.

The nominal current and the reference voltage of the meter are standardised values.

All tests are performed at reference voltage and reference frequency, unless mentioned otherwise.

The tests were carried out in conformity with IEC 62052-11 and IEC 62053-22/23 using a static energy standard. The measurements are carried out with standards that are traceable to international standards. The results in this report relate only to the items tested.

3 Results of the type test

3.1 Accuracy measurement at different loads

These tests were carried out with meter no. 10010989, 10010990, 10004627 and 10004628.

The meters were examined at an ambient temperature of $(23 \pm 2) ^\circ\text{C}$ and after the voltage circuits had been connected to reference voltage for at least 1 hour.

The measuring conditions were as specified in section 8.5 of IEC 62053-22. The measurements were made with an accurate static energy standard.

The percentage error of the meter can be expressed as follows:

$$p = \frac{PM - PA}{PA} \times 100\%$$

in which p = percentage error
PM = energy recorded by meter
PA = actual energy.

The values for the errors registered at different currents and various values for $\cos/\sin \varphi$, at reference voltage and reference frequency, can be found in annex A. The results show that the static energy meters, under the reference conditions given in section 8.5 of IEC 62053-22, meet the requirements given in section 8.1 of the relevant publication.

3.1.1 Interpretation of test results

There was no need to displace the zero line to bring the errors of the energy-meters within the limits.

3.1.2 Test of meter constant

A test has been carried out to prove that the relation between the test output and the registered energy (display) is correct.

3.1.3 Starting current

The minimum load at which the energy meters tested recorded at reference voltage, reference frequency and $\cos \varphi = 1$ was less than 0,1 % of I_n (req. $\leq 0,1 \% I_n$).

3.1.4 Test of no load condition

At zero current, reference frequency and a voltage of 115 % U_n , no pulse was generated by the energy meters tested.

The meter meets the requirements.

3.1.5 Register and output device

The meter has an LCD register and records in kWhs and kvarhs.

On the front of the meter optical (LED) output is available for Wh measurements.

A pulse output (S0) is available for Wh and varh measurements.

Annex A. Accuracy test results

Accuracy test results, serial number 10010989.

I in % of I _n	3/1 ph	Percentage error at cos φ =					Wh
		1	0,5 ind	0,8 cap	0,25 ind	0,5 cap	
1	3ph	0,04%					
1 *	3ph	0,01%					
2	3ph	0,01%	0,39%	-0,14%			
5	3ph	0,02%					
5	1ph,1	0,00%					
5	1ph,2	0,04%					
5	1ph,3	0,03%					
10	3ph	0,01%	0,39%	-0,14%	0,87%	-0,36%	
10	1ph,1		0,42%				
10	1ph,2		0,40%				
10	1ph,3		0,38%				
20	3ph	0,02%	0,39%	-0,13%	0,84%	-0,35%	
50	3ph	0,01%	0,34%	-0,13%	0,77%	-0,32%	
100	3ph	0,00%	0,29%	-0,12%	0,64%	-0,29%	
100 *	3ph	0,00%	0,28%	-0,12%			
100	1ph,1	-0,07%	0,21%				
100	1ph,2	0,02%	0,31%				
100	1ph,3	0,04%	0,34%				
I _{max}	3ph	-0,01%	0,26%	-0,12%	0,59%	-0,27%	
I _{max}	1ph,1	-0,08%	0,18%				
I _{max}	1ph,2	0,01%	0,28%				
I _{max}	1ph,3	0,04%	0,32%				

* Reverse energy

Accuracy test results, serial number 10010990.

I in % of I _n	3/1 ph	Percentage error at cos φ =					Wh
		1	0,5 ind	0,8 cap	0,25 ind	0,5 cap	
1	3ph	-0,02%					
1 *	3ph	-0,12%					
2	3ph	-0,03%	0,29%	-0,15%			
5	3ph	-0,01%					
5	1ph,1	0,00%					
5	1ph,2	0,00%					
5	1ph,3	-0,08%					
10	3ph	-0,04%	0,28%	-0,17%	0,66%	-0,35%	
10	1ph,1		0,31%				
10	1ph,2		0,34%				
10	1ph,3		0,16%				
20	3ph	-0,03%	0,26%	-0,16%	0,64%	-0,33%	
50	3ph	-0,04%	0,24%	-0,16%	0,60%	-0,32%	
100	3ph	-0,05%	0,22%	-0,15%	0,53%	-0,30%	
100 *	3ph	-0,05%	0,21%	-0,16%			
100	1ph,1	-0,07%	0,21%				
100	1ph,2	-0,04%	0,27%				
100	1ph,3	-0,03%	0,15%				
I _{max}	3ph	-0,04%	0,19%	-0,16%	0,50%	-0,29%	
I _{max}	1ph,1	-0,07%	0,19%				
I _{max}	1ph,2	-0,03%	0,26%				
I _{max}	1ph,3	-0,03%	0,14%				

* Reverse energy

Accuracy test results, serial number 10004627.

I in % of I _n	3/1 ph	Percentage error at sin φ =					varh
		1	0,5 ind	0,5 cap	0,25 ind	0,25 cap	
2	3ph	0,02%					
2 *	3ph	-0,02%					
5	3ph	0,00%	-0,35%	0,39%			
5	1ph,1	0,03%					
5	1ph,2	0,00%					
5	1ph,3	0,00%					
10	3ph	0,00%	-0,36%	0,37%	-0,76%	0,84%	
10	1ph,1		-0,41%				
10	1ph,2		-0,27%				
10	1ph,3		-0,37%				
20	3ph	0,00%	-0,33%				
50	3ph	-0,01%	-0,36%				
100	3ph	-0,03%	-0,33%	0,25%	-0,71%	0,67%	
100 *	3ph	-0,03%	-0,33%	0,29%			
100	1ph,1	0,00%	-0,40%				
100	1ph,2	-0,01%	-0,25%				
100	1ph,3	-0,03%	-0,34%				
I _{max}	3ph	-0,03%	-0,30%	0,22%	-0,63%	0,55%	
I _{max}	1ph,1	-0,04%	-0,32%				
I _{max}	1ph,2	-0,02%	-0,25%				
I _{max}	1ph,3	-0,03%	-0,33%				

* Reverse energy

Accuracy test results, serial number 10004628.

I in % of I _n	3/1 ph	Percentage error at sin φ =					varh
		1	0,5 ind	0,5 cap	0,25 ind	0,25 cap	
2	3ph	0,03%					
2 *	3ph	-0,12%					
5	3ph	0,00%	-0,29%	0,39%			
5	1ph,1	0,03%					
5	1ph,2	0,05%					
5	1ph,3	-0,06%					
10	3ph	-0,01%	-0,34%	0,36%	-0,67%	0,81%	
10	1ph,1		-0,31%				
10	1ph,2		-0,34%				
10	1ph,3		-0,34%				
20	3ph	-0,01%	-0,30%				
50	3ph	-0,02%	-0,33%				
100	3ph	-0,04%	-0,32%	0,20%	-0,67%	0,59%	
100 *	3ph	-0,05%	-0,32%	0,23%			
100	1ph,1	-0,02%	-0,37%				
100	1ph,2	0,00%	-0,27%				
100	1ph,3	-0,09%	-0,33%				
I _{max}	3ph	-0,06%	-0,29%	0,16%	-0,60%	0,46%	
I _{max}	1ph,1	-0,07%	-0,30%				
I _{max}	1ph,2	-0,01%	-0,27%				
I _{max}	1ph,3	-0,10%	-0,33%				

* Reverse energy

Annex B. Photographs of the meter





