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SOUTH CHINA NATIONAL CENTER OF METROLOGY

GUANGDONG INSTITUTE OF METROLOGY

TEST REPORT

No. XNZ202402125

Name of Sample:	Power Quality Monitor
Model / Type:	APView 3×220/380 V 0,01-1(6) A 50 Hz
Sample Number:	02124070800057
Applicant:	Acrel Co., Ltd.
Manufacturer:	Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
Test Type:	Commission
Date Issued:	2024-08-02

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（1）Basic Information

Name of Sample	Power Quality Monitor	Trade Mark	--
Model / Type	APView 3×220/380 V 0,01-1(6) A 50 Hz	Class	Class 0,2S (Active)
Sample No.	02124070800057	Sample quantity	1
Applicant	Acrel Co., Ltd.		
Address	No. 253, Yulv Road, Jiading, Shanghai, China		
Manufacturer	Jiangsu Acrel Electrical Manufacturing. Co., Ltd.		
Test Site	EMC Lab of Dongguan Branch		
Test Conditions	Temperature: (23±2) ℃ Humidity: (50~60) %RH		
Date Received	Jul. 10, 2024	Commission No.	WT20241113
Test Date	Jul. 10, 2024 to Jul. 29, 2024	Test Type	Commission
Test Item	See “Test Results Summary”		
Test Standard	1. IEC 62052-11 (Edition 2.0): 2020 Electricity metering equipment – General requirements, tests and tests conditions – Part 11:Metering equipment 2. IEC 62053-22 (Edition 2.0): 2020 Electricity metering equipment – Particular requirements – Part 22: Static meters for AC active energy (classes 0,1S, 0,2Sand 0,5S)		
Conclusion	PASS (Seal of Report)		
Remarks	Other meter specification: Transformer-operated, 3 phases 4 wires, 14000 imp/kWh.		

Tested by: Checked by: Approved by:

（2）Test Results Summary

No.	Test Item	Test Standard	Sample No.	Pass（P）	Fail（F）
1	Meter constant	IEC 62052-11 (Edition 2.0): 2020 IEC 62053-22 (Edition 2.0): 2020	02124070800057	P	
2	Initial start-up of the meter	IEC 62052-11 (Edition 2.0): 2020 IEC 62053-22 (Edition 2.0): 2020	02124070800057	P	
3	Test of no-load condition	IEC 62052-11 (Edition 2.0): 2020 IEC 62053-22 (Edition 2.0): 2020	02124070800057	P	
4	Starting current test	IEC 62052-11 (Edition 2.0): 2020 IEC 62053-22 (Edition 2.0): 2020	02124070800057	P	
5	Repeatability test	IEC 62052-11 (Edition 2.0): 2020 IEC 62053-22 (Edition 2.0): 2020	02124070800057	P	

（3）Sample Photo



General picture of sample appearance



General picture of sample nameplate

（4）Main Metrology Instrument and Test Equipment

No.	Name of Instrument/Model	Serial No.	Certificate No. /Due Date	Technical Characteristic
1	Three-phase intelligent watt-hour meter verification device/CL3000EMC	05793	DBN202200825 /2024-10-12	Class 0,05

（5）Test Result

1 Meter constant

Technical requirement:
The relationship between the test output and the indication on the indicating display, if present, and/or the meter energy register content read through the communications interface, shall comply with the value of the meter constant. The difference between the value determined (or calculated) from the test output and the value on the indicating display, or the register content read via data communications port shall not exceed ±1/10th of the intrinsic error limit for the relevant accuracy class, except for meters with accuracy class 0,1S. For meters with accuracy of class 0,1S this difference may be larger, but shall not exceed ±0,02 %.

Test method:
Record the number of pulses and the energy registered by meter under the below conditions:

$$U=U_n \qquad I=I_{max} \qquad \cos\varphi = 1 \text{ (or } \sin\varphi = 1)$$

Check the relation between the test output and the indication on the display according to the next formulation:

$$e_c = \frac{N / k - E}{E} \times 100\ \%$$

where

e_c is the percentage difference between energy registered and LED test output
N is the number of pulses in imp
E is the energy registered by meter in kWh (resp. kvarh)
k is the meter constant in imp/kWh (or imp/kvarh)

Test equipment: CL3000EMC

Test result:
Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz, for active energy, import

Sample No.	N (imp)	k (imp/kWh)	LED Test Output (kWh)	E (kWh)	e_c (%)	Limit of e_c (%)
02124070800057	71270	14000	5.0907	5.091	-0.01	±0,02

Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz, for active energy, export

Sample No.	N (imp)	k (imp/kWh)	LED Test Output (kWh)	E (kWh)	e_c (%)	Limit of e_c (%)
02124070800057	71290	14000	5.0921	5.093	-0.02	±0,02

Conclusion: Pass

2 Initial start-up of the meter

Technical requirement:
The meter shall start to register energy after the start-up time $t_{start-up}$ specified by the manufacturer. Generally, the start-up time of the meter shall be not more than 10 s, except for multi-function meters.

Test method:
a) Initially, the voltage circuits and the auxiliary power supply circuits shall not be energized; the current circuits shall be carrying the meter's maximum current I_{max}.
b) Subsequently, the voltage circuits and the auxiliary power supply circuits shall be energized with their nominal voltages Un and cos φ = 1 (for active energy meters) or sin φ = 1 (for reactive energy meters). If the meter is rated for more than one nominal voltage, the lowest nominal voltage shall be used.
c) $t_{start-up}$ is the time measured from the moment of energizing the voltage circuits and the auxiliary power supply circuits, until the moment the test output produces the first pulse.

Test equipment: CL3000EMC

Test result:

Sample No.	Test result
021240708000 57	The meter start to register energy after the start-up time $t_{start-up}$ = 5 s.

Conclusion: Pass

3 Test of no-load condition

Technical requirement:
When the voltage is applied to the voltage circuits and if present, to the auxiliary power supply circuit, with no current flowing in the current circuits, the test output of the meter shall not produce more than one pulse.

Test method:
The current circuit shall be open-circuit and a voltage of 1,1 U_n (110 % of the nominal voltage) shall be applied to the mains port. For meters rated for multiple nominal voltages, the highest rated nominal voltage shall be used.

The minimum test time Δt, in minutes, is calculated according to the formula given below:

$$\Delta t \geq \frac{240 \times 10^3}{k \times m \times U_{test} \times I_{start}} \quad [\text{min}]$$

where

U_{test} is maximum specified operating voltage, 1,1 U_n, in Volts,
k is the meter constant for static meters, in impulses per kWh or impulses per kvarh,
m is the number of elements,
I_{st} is the meter starting current, in Amperes,

Test equipment: CL3000EMC

Test result:
Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz

Test condition	Test result
	02124070800057
110% of U_n No current 24 min	The test output of the meter do not produce pulse.

Conclusion: Pass

4 Starting current test

Technical requirement:
The meter shall start and continue to register at the starting current values specified for the accuracy class in the relevant particular requirements (accuracy class) standards.

Test method:
Check if the meter start and continue to register at the starting current values.

The lowest specified nominal voltage of the meter shall be used.
For active energy:

Meters for	Starting current I_{st}			Power factor cos φ
	class 0,1S	class 0,2S	class 0,5S	
Connection through current transformers	0,001 I_n	0,001 I_n	0,001 I_n	1

Test equipment: CL3000EMC

Test result:
Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz

Test condition		Test result
		02124070800057
Voltage: U_n Current: 0,001 I_n cos φ= 1	Import	The meter can start and continue to register.
	Export	The meter can start and continue to register.

Conclusion: Pass

5 Repeatability test

Technical requirement:
The application of the same signal to be measured, under the same conditions of measurement, shall result in the close agreement of successive measurements. The repeatability shall be less than, or equal to 1/5th of the absolute intrinsic error limit for the relevant accuracy class, except for meters with accuracy class 0,1S. For meters with accuracy class 0,1S the repeatability shall not exceed 0,04 %.

Test method:
Three measurements shall be done at each of the test points, at the same test conditions and in close succession, after the meter under test has achieved thermal stability.
The lowest specified nominal voltage of the meter shall be used.

Test equipment: CL3000EMC

Test result:
Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz, for active energy, balanced loads

cos φ	Current	Error (%)						Max. relative error change (%)	Limit of Error Change (%)		
		02124070800057									
		Import			Export				Class 0,1S	Class 0,2S	Class 0,5S
		1	2	3	1	2	3				
1	I_{min}	-0,18	-0,19	-0,19	-0,27	-0,27	-0,27	0,01	0,04	0,08	0,2
	0,05I_n	-0,15	-0,15	-0,14	-0,18	-0,16	-0,17	0,02	0,04	0,04	0,1
	I_n	-0,10	-0,10	-0,10	-0,08	-0,08	-0,08	0,00			
	I_{max}	-0,05	-0,07	-0,07	-0,14	-0,14	-0,14	0,02			
0,5L	0,05I_n	+0,01	+0,02	+0,02	-0,02	-0,01	-0,03	0,02	0,04	0,1	0,2
	I_n	-0,04	-0,05	-0,04	+0,02	+0,02	+0,01	0,01	0,04	0,06	0,12
	I_{max}	-0,26	-0,27	-0,26	-0,18	-0,18	-0,16	0,02			
0,8C	0,05I_n	-0,20	-0,18	-0,18	-0,22	-0,22	-0,21	0,02	0,04	0,1	0,2
	I_n	-0,21	-0,20	-0,20	-0,12	-0,11	-0,11	0,01	0,04	0,06	0,12
	I_{max}	-0,10	-0,10	-0,11	0,00	0,00	0,00	0,01			

Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz
For active energy, carrying a single-phase load but with balanced voltages (phase A)

cos φ	Current	Error (%)						Max. relative error change (%)	Limit of Error Change (%)		
		02124070800057							Class 0,1S	Class 0,2S	Class 0,5S
		Import			Export						
		1	2	3	1	2	3				
1	I_{min}	0,00	0,00	-0,01	-0,35	-0,35	-0,35	0,01	0,04	0,08	0,2
	$0,05I_n$	-0,13	-0,12	-0,12	-0,15	-0,16	-0,15	0,02	0,04	0,04	0,1
	I_n	-0,04	-0,07	-0,07	-0,08	-0,08	-0,08	0,03			
	I_{max}	+0,01	-0,01	-0,01	-0,02	-0,03	-0,04	0,02			
0,5L	$0,05I_n$	+0,06	+0,06	+0,06	-0,10	-0,09	-0,11	0,02	0,04	0,1	0,2
	I_n	+0,02	-0,04	-0,04	-0,04	-0,04	-0,04	0,02	0,04	0,06	0,12
	I_{max}	-0,07	-0,09	-0,08	-0,05	-0,05	-0,05	0,02			
0,8C	$0,05I_n$	-0,13	-0,13	-0,13	-0,22	-0,22	-0,23	0,01	0,04	0,1	0,2
	I_n	-0,09	-0,09	-0,07	-0,14	-0,13	-0,12	0,02	0,04	0,06	0,12
	I_{max}	-0,03	-0,04	-0,03	-0,13	-0,10	-0,09	0,04			

Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz
For active energy, carrying a single-phase load but with balanced voltages (phase B)

cos φ	Current	Error (%)						Max. relative error change (%)	Limit of Error Change (%)		
		02124070800057							Class 0,1S	Class 0,2S	Class 0,5S
		Import			Export						
		1	2	3	1	2	3				
1	I_{min}	-0,26	-0,24	-0,25	-0,37	-0,37	-0,38	0,02	0,04	0,08	0,2
	$0,05I_n$	-0,04	-0,06	-0,07	-0,13	-0,14	-0,14	0,03	0,04	0,04	0,1
	I_n	-0,10	-0,11	-0,11	-0,05	-0,04	-0,05	0,01			
	I_{max}	-0,04	-0,04	-0,05	-0,05	-0,07	-0,06	0,02			
0,5L	$0,05I_n$	+0,42	+0,42	+0,42	+0,23	+0,24	+0,25	0,02	0,04	0,1	0,2
	I_n	-0,01	-0,01	-0,01	-0,07	-0,07	-0,07	0,00	0,04	0,06	0,12
	I_{max}	-0,28	-0,27	-0,26	-0,25	-0,20	-0,21	0,05			
0,8C	$0,05I_n$	-0,20	-0,20	-0,20	-0,34	-0,33	-0,34	0,01	0,04	0,1	0,2
	I_n	-0,08	-0,08	-0,06	-0,09	-0,08	-0,09	0,02	0,04	0,06	0,12
	I_{max}	-0,13	-0,15	-0,16	-0,11	-0,12	-0,09	0,03			

Test conditions: 3×220/380V, 0,01-1(6)A, 50Hz
For active energy, carrying a single-phase load but with balanced voltages (phase C)

cos φ	Current	Error (%)						Max. relative error change (%)	Limit of Error Change (%)		
		02124070800057									
		Import			Export				Class 0,1S	Class 0,2S	Class 0,5S
		1	2	3	1	2	3				
1	I_{min}	+0,38	+0,40	+0,40	+0,30	+0,28	+0,28	0,02	0,04	0,08	0,2
	$0,05I_n$	-0,07	-0,07	-0,07	-0,13	-0,12	-0,13	0,01	0,04	0,04	0,1
	I_n	-0,10	-0,10	-0,10	-0,09	-0,08	-0,07	0,02			
	I_{max}	-0,03	-0,04	-0,03	-0,01	-0,02	-0,02	0,01			
0,5L	$0,05I_n$	+0,06	+0,06	+0,06	-0,03	-0,03	-0,03	0,00	0,04	0,1	0,2
	I_n	-0,05	-0,11	-0,05	-0,08	-0,03	-0,03	0,06	0,04	0,06	0,12
	I_{max}	-0,04	-0,03	-0,04	+0,03	+0,02	+0,03	0,01			
0,8C	$0,05I_n$	-0,08	-0,08	-0,08	-0,13	-0,13	-0,15	0,02	0,04	0,1	0,2
	I_n	-0,07	-0,07	-0,06	-0,14	-0,14	-0,15	0,01	0,04	0,06	0,12
	I_{max}	-0,13	-0,11	-0,14	-0,02	-0,02	-0,01	0,03			

Conclusion: Pass