



SOUTH CHINA NATIONAL CENTER OF METROLOGY
GUANGDONG INSTITUTE OF METROLOGY

TEST REPORT

No. XNZ202301004

Name of Sample: Medical Intelligent Insulation Monitor/Insulation fault locator

Model / Type: AIM-M300/AIL160

Sample Number: SYZ21100930002/SYZ22110400002

Applicant: Acrel CO.,LTD.

Manufacturer: Acrel CO.,LTD.

Test Type: Commission

Date Issued: 2023-01-28



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(1) Basic Information

Name of Sample	Medical Intelligent Insulation Monitor/Insulation fault locator	Trade Mark	——
Model / Type	AIM-M300/AIL160	Class	——
Sample No.	SYZ21100930002/SYZ2211040000 2	Sample quantity	1
Applicant	Acrel CO.,LTD.		
Address	No.253, Yulv Road, Jiading District, Shanghai, China		
Manufacturer	Acrel CO.,LTD.		
Test Site	Environment Lab of Dongguan Branch		
Test Conditions	Temperature: (20±5) °C Humidity: ≤65%RH		
Date Received	Dec 6, 2022	Commission No.	WT20221167
Test Date	Dec 23, 2022 to Jan. 28, 2023	Test Type	Commission
Test Item	See Test Results Summary		
Test Standard	1.IEC 61557-1:2019(Edition 3.0)Electrical safety in low voltage distribution systems up to 1000V AC and 1500V DC - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements 2.IEC 61557-8:2014(Edition 3.0)Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 8: Insulation monitoring devices for IT systems 3.IEC 61557-9:2014(Edition 3.0)Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 9: Equipment for insulation fault location in IT systems		
Conclusion	PASS (Seal of Report)		
Remarks	——		

Tested by: 王润涛

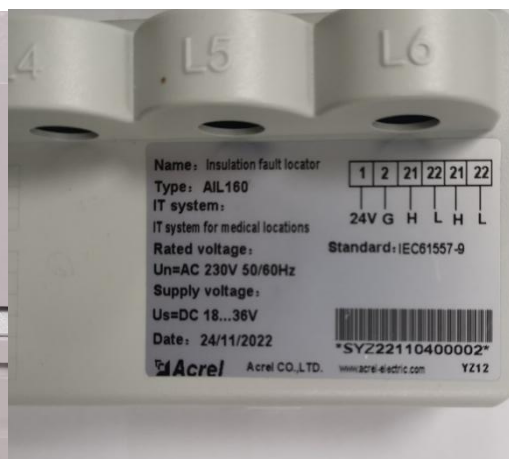
Checked by: 徐煜

Approved by: 周晓锦

(2) Test Results Summary

No.	Test Item	Sample No.	Pass (P)	Fail (F)
1	Test of response values and response sensitivity of the sample and climatic environmental conditions	SYZ21100930002/SYZ22110400002	P	
2	Test of response time t_{an}	SYZ21100930002/SYZ22110400002	P	
3	Test of peak value of the measuring voltage U_m	SYZ21100930002/SYZ22110400002	P	
4	Test of peak value of the measuring current I_m	SYZ21100930002/SYZ22110400002	P	
5	Test of internal d.c. resistance R_i and internal impedance Z_i	SYZ21100930002/SYZ22110400002	P	
6	Test of facilities for indicating the insulation resistance R_F	SYZ21100930002/SYZ22110400002	P	
7	Test of permanently admissible nominal voltage U_n	SYZ21100930002/SYZ22110400002	P	
8	Test of permanently admissible extraneous voltage U_{ig}	SYZ21100930002/SYZ22110400002	P	
9	Test of supply voltage U_s	SYZ21100930002/SYZ22110400002	P	
10	Test of the local transformer monitoring warning(LTMW)	SYZ21100930002/SYZ22110400002	P	
11	Test of the remote transformer monitoring warning(RTMW)	SYZ21100930002/SYZ22110400002	P	
12	Voltage tests	SYZ21100930002/SYZ22110400002	P	
13	Inspection of the marking and operating instructions	SYZ21100930002/SYZ22110400002	P	
14	Shock and vibration test	SYZ21100930002/SYZ22110400002	P	
15	Test of the IP requirements	SYZ21100930002/SYZ22110400002	P	
16	Test of the locating current I_L	SYZ21100930002/SYZ22110400002	P	
17	Test of the local warning and the indication of the insulation value	SYZ21100930002/SYZ22110400002	P	

(3) Sample Photo



(4) Main Metrology Instrument and Test Equipment

No.	Name of Instrument/Model	Serial No.	Certificate No. /Due Date	Technical Characteristic
1	Damp dry cycle test chamber / CZ-A-80G	ZH20435	RZD202250568 /2023-10-23	$\pm 2^{\circ}\text{C}$, $\pm 3\%\text{RH}$
2	Megohm-meter Verification Device/ GZX92E	88274	DYQ202200249 /2023-02-08	Class: 0,2
3	Electronic stopwatch /SW8019	BY01	WSP202200381 /2023-03-02	$\pm 0,5\text{s/d}$
4	D probe /ZLT-I04T	I04T1611	CJC202207998 /2023-06-07	$\Phi 1\text{mm}$
5	Digital multimeter /34461A	MY53224109	DBB202206262 /2023-03-03	DCV: $U_{\text{rel}}=0,001\%$ DCI: $U_{\text{rel}}=0,015\%$ ACV: $U_{\text{rel}}=0,01\%$ ACI: $U_{\text{rel}}=0,02\%$ ($k=2$)
6	Bump test equipment/SKM-1000	L2008081	SSD202300022 /2024-01-08	MPE: $\pm 20\%$
7	Vibration test equipment /MPA12/L620M	SH1201003	SSD202201385 /2023-05-26	$\pm 10\%$
8	Digital caliper /(0~150)mm/0,01mm	K15G148544	CDJ202200878 /2023-03-03	MPE: $\pm 0,03\text{mm}$
9	Standard test finger /ZLT-I02T	I02T1617	CJC202208001 /2023-06-07	$\Phi 12_{-0,05}^{+0,05}\text{mm}$
10	D probe /ZLT-I04T	I04T1611	CJC202207998 /2023-06-07	$\Phi 1_{+0,05}^{+0,05}\text{mm}$
11	Comprehensive calibration device for electrical measuring instruments /KS833	202004002	DBB202209542 /2023-08-28	Class: 0,05
12	High-precision DC test system/TD1510	1518122851	DBB202210004 /2023-10-23	Class: 0,05
13	Withstanding voltage tester/7122	1240841	DYQ202200443 /2023-03-06 DYQ202200444 /2023-03-06	Class 5

(5) Test Result

1. Test of response values and response sensitivity of the sample

1.1. Reference conditions for tests in operation

(1) Technical requirement: The sample works normally, the relative percentage uncertainty of sample is not less than $\pm 10\%$ or $\pm 10\text{k}\Omega$.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.1 and 6.2, IEC 61557-9:2014 item 6.1 and 6.2

Exposed to the cold temperature: -5°C ;

Exposed to the cold duration: 96h;

Exposed to the dry heat temperature: $+45^{\circ}\text{C}$;

Exposed to the dry heat duration: 96h.

(3) Test equipment: CZ-A-80G, GZX92E

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	Standard value ($\text{k}\Omega$)	Indication value ($\text{k}\Omega$)	Error		Limit of Error	
			(%)	($\text{k}\Omega$)	(%)	($\text{k}\Omega$)
$U_n = 198\text{V}$ $f = 50\text{Hz}$ $U_s = 24\text{V}$ $T = -5^{\circ}\text{C}$ $C_e = 1\mu\text{F}$	50	50	0,0	0	± 10	± 10
	200	200	0,0	0	± 10	± 10
	400	398	-0,5	-2	± 10	± 10
	600	596	-0,7	-4	± 10	± 10
	800	799	-0,1	-1	± 10	± 10
	990	992	+0,2	+2	± 10	± 10

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $T = -5^{\circ}C$ $C_e = 1\mu F$	50	50	0,0	0	± 10	± 10
	200	200	0,0	0	± 10	± 10
	400	398	-0,5	-2	± 10	± 10
	600	596	-0,7	-4	± 10	± 10
	800	799	-0,1	-1	± 10	± 10
	990	992	+0,2	+2	± 10	± 10

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 264.5V$ $f = 50Hz$ $U_s = 24V$ $T = -5^{\circ}C$ $C_e = 1\mu F$	50	50	0,0	0	± 10	± 10
	200	200	0,0	0	± 10	± 10
	400	398	-0,5	-2	± 10	± 10
	600	596	-0,7	-4	± 10	± 10
	800	799	-0,1	-1	± 10	± 10
	990	992	+0,2	+2	± 10	± 10

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 198V$ $f = 50Hz$ $U_s = 24V$ $T = +45^{\circ}C$ $C_e = 1\mu F$	50	50	0,0	0	± 10	± 10
	200	201	+0,5	+1	± 10	± 10
	400	398	-0,5	-2	± 10	± 10
	600	595	-0,8	-5	± 10	± 10
	800	796	-0,5	-4	± 10	± 10
	990	986	-0,4	-4	± 10	± 10

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $T = +45^{\circ}C$ $C_e = 1\mu F$	50	51	+2,0	+1	± 10	± 10
	200	201	+0,5	+1	± 10	± 10
	400	398	-0,5	-2	± 10	± 10
	600	595	-0,8	-5	± 10	± 10
	800	796	-0,5	-4	± 10	± 10
	990	987	-0,3	-3	± 10	± 10

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 264,5V$ $f = 50Hz$ $U_s = 24V$ $T = +45^{\circ}C$ $C_e = 1\mu F$	50	51	+2,0	+1	± 10	± 10
	200	201	+0,5	+1	± 10	± 10
	400	398	-0,5	-2	± 10	± 10
	600	595	-0,8	-5	± 10	± 10
	800	796	-0,5	-4	± 10	± 10
	990	987	-0,3	-3	± 10	± 10

(5) Conclusion: Pass

1.2. Reference conditions for storage test

(1) Technical requirement: After the test, the sample works normally and without any damage, the relative percentage uncertainty of sample is not less than $\pm 10\%$ or $\pm 10k\Omega$.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.2, IEC 61557-9:2014 item 6.2.2

Exposed to the cold temperature(product not powered): $-25^{\circ}C$;

Exposed to the cold duration: 96h;

Exposed to the dry heat temperature(product not powered): $+70^{\circ}C$;

Exposed to the dry heat duration: 96h.

(3) Test equipment: CZ-A-80G, GZX92E

(4) Test result(SYZ21100930002/SYZ22110400002):

After the cold storage test

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $C_e = 1\mu F$	50	50	0,0	0	±10	±10
	200	199	-0,5	-1	±10	±10
	400	396	-1,0	-4	±10	±10
	600	593	-1,2	-7	±10	±10
	800	793	-0,9	-7	±10	±10
	990	983	-0,7	-7	±10	±10

After the dry heat storage test

Test condition	Standard value (kΩ)	Indication value (kΩ)	Error		Limit of Error	
			(%)	(kΩ)	(%)	(kΩ)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $C_e = 1\mu F$	50	50	0,0	0	±10	±10
	200	199	-0,5	-1	±10	±10
	400	396	-1,0	-4	±10	±10
	600	594	-1,0	-6	±10	±10
	800	794	-0,8	-6	±10	±10
	990	984	-0,6	-6	±10	±10

Test condition	Leakage capacitances $C_e(\mu F)$	Standard value (k Ω)	Indication value (k Ω)	Error		Limit of Error	
				(%)	(k Ω)	(%)	(k Ω)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$	0	50	50	0,0	0	± 10	± 10
	0,5	50	50	0,0	0	± 10	± 10
	1	50	50	0,0	0	± 10	± 10
	3	50	50	0,0	0	± 10	± 10

(5) Conclusion: Pass

2. Test of response time t_{an}

(1) Technical requirement: The response time t_{an} shall be below 5s.

(2) Test method: IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.3.

(3) Test equipment: GZX92E, SW8019

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	Specified response value $R_{an}(k\Omega)$	t_{an} (s)	Limit value (s)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $C_e = 1\mu F$	50	2,8	5

(5) Conclusion: Pass

3. Test of peak value of the measuring voltage U_m

(1) Technical requirement: The peak value of the measuring voltage U_m shall be below 15VDC.

(2) Test method: IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.4.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	U_m (V)	Limit value (V)
$U_n = 253V$ $f = 50Hz$ $U_s = 26,4V$ $C_e = 1\mu F$ $R_{an} = \infty$	12,7	15

(5) Conclusion: Pass

4. Test of peak value of the measuring current I_m

(1) Technical requirement: The peak value of the measuring current I_m shall be below 1mA.

(2) Test method: IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.5.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	Insulation resistance $R_F(k\Omega)$	I_m (mA)	Limit value (mA)
$U_n = 253V$ $f = 50Hz$ $U_s = 26,4V$ $C_e = 1\mu F$	0	0,05	1

(5) Conclusion: Pass

5. Test of internal d.c. resistance R_i and internal impedance Z_i

(1) Technical requirement: The a.c. internal impedance Z_i shall be at least 100 k Ω , the d.c. internal resistance R_i shall be at least 15 k Ω .

(2) Test method: IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.6.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	R_i (k Ω)	Limit value (k Ω)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $C_e = 1\mu F$ $R_{an}=50\text{ k}\Omega$	176	15

Test condition	Z_i (k Ω)	Limit value (k Ω)
$U_n = 230V$ $f = 50Hz$ $U_s = 24V$ $C_e = 1\mu F$ $R_{an}=50\text{ k}\Omega$	480	100

(5) Conclusion: Pass

6. Test of facilities for indicating the insulation resistance R_F

(1) Technical requirement: The relative percentage uncertainty of sample is not less than $\pm 10\%$ or $\pm 10\text{k}\Omega$.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.7, IEC 61557-9:2014 item 6.2.6.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	Standard value (k Ω)	Indication value (k Ω)	Error		Limit of Error	
			(%)	(k Ω)	(%)	(k Ω)
$U_n = 230V$	50	50	0,0	0	± 10	± 10
$f = 50Hz$	200	199	-0,5	-1	± 10	± 10

$U_s = 24V$ $C_e = 1 \mu F$	400	396	-1,0	-4	± 10	± 10
	600	594	-1,0	-6	± 10	± 10
	800	794	-0,8	-6	± 10	± 10
	990	984	-0,6	-6	± 10	± 10

(5) Conclusion: Pass

7. Test of permanently admissible nominal voltage U_n

(1) Technical requirement: The relative percentage uncertainty of sample is not less than $\pm 10\%$ or $\pm 10k\Omega$.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.9.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	Standard value (k Ω)	Indication value (k Ω)	Error		Limit of Error	
			(%)	(k Ω)	(%)	(k Ω)
$U_n = 264,5V$ $f = 50Hz$ $U_s = 24V$ $C_e = 1 \mu F$	50	50	0,0	0	± 10	± 10
	200	199	-0,5	-1	± 10	± 10
	400	397	-0,8	-3	± 10	± 10
	600	593	-1,2	-7	± 10	± 10
	800	793	-0,9	-7	± 10	± 10
	990	984	-0,6	-6	± 10	± 10

(5) Conclusion: Pass

8. Test of permanently admissible extraneous voltage U_{fg}

(1) Technical requirement: The extraneous voltage U_{fg} shall be not below 280VDC.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.10.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The extraneous voltage U_{fg} is 280VDC	Pass

(5) Conclusion: Pass

9. Test of supply voltage U_s

(1) Technical requirement: The relative percentage uncertainty of sample is not less than $\pm 10\%$ or $\pm 10k\Omega$.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.11.

(3) Test equipment: GZX92E,34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test condition	Standard value (k Ω)	Indication value (k Ω)	Error		Limit of Error	
			(%)	(k Ω)	(%)	(k Ω)
$U_n = 230V$ $f = 50Hz$ $U_s = 18V$ $C_e = 1\mu F$	50	50	0,0	0	± 10	± 10
	200	200	0,0	0	± 10	± 10
	400	397	-0,8	-3	± 10	± 10
	600	594	-1,0	-6	± 10	± 10
	800	796	-0,5	-4	± 10	± 10
	990	986	-0,4	-4	± 10	± 10

Test condition	Standard value (k Ω)	Indication value (k Ω)	Error		Limit of Error	
			(%)	(k Ω)	(%)	(k Ω)
$U_n = 230V$ $f = 50Hz$ $U_s = 36V$ $C_e = 1\mu F$	50	50	0,0	0	± 10	± 10
	200	200	0,0	0	± 10	± 10
	400	397	-0,8	-3	± 10	± 10
	600	594	-1,0	-6	± 10	± 10

	800	796	-0,5	-4	±10	±10
	990	986	-0,4	-4	±10	±10

(5) Conclusion: Pass

10. Test of the local transformer monitoring warning(LTMW)

(1) Technical requirement: The sample can simulate overload current of the transformer and simulate over-temperature of the transformer.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.7 and 6.2.12.2.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The sample can simulate overload current and over-temperature of the transformer and display it.	Pass

(5) Conclusion: Pass

11. Test of the remote transformer monitoring warning(RTMW)

(1) Technical requirement: The sample can simulate overload current of the transformer and simulate over-temperature of the transformer.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.7 and 6.2.12.3.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The sample can simulate overload current of the transformer and simulate over-temperature of the transformer.	Pass

(5) Conclusion: Pass

12. Voltage tests

(1) Technical requirement: The IMD can provide class I.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.13, IEC 61557-9:2014 item 6.2.8, IEC 61557-9:2014 item 6.2.11.

(3) Test equipment:7122, (0~150)mm/0.01mm

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The sample can provide class I, and functional earth connection(FE) can used to the protective conductor connection. The clearance and creepage distance between the terminals of front panel are 2,4mm.	Pass

(5) Conclusion: Pass

13. Inspection of the marking and operating instructions

(1) Technical requirement: Inspection of the marking and operating instructions

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.15, IEC 61557-9:2014 item 6.2.12.

(3) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The nameplate of the sample meets the requirements of the standard.	Pass

(4) Conclusion: Pass

14. Shock and vibration test

(1) Technical requirement: During the test, the sample works normally, without malfunction and performance deterioration. After the test, the sample is without any damage.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.16.1, IEC 61557-9:2014 item

6.2.13.1.

(3) Test equipment: MPA12/L620M, SKM-1000

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
During the test, the sample works normally, without malfunction and performance deterioration. After the test, the sample is without any damage.	Pass

(5) Conclusion: Pass

15. Test of the IP requirements

(1) Technical requirement: The front panel of the sample is IP40, the housing excepting front panel is IP2X.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-8:2014 item 6.2.16.2, IEC 61557-9:2014 item 6.2.13.2.

(3) Test equipment: ZLT-I04T, ZLT-I02T

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The front panel of the sample is IP40, the housing excepting front panel is IP2X.	Pass

(5) Conclusion: Pass

16. Test of the locating current I_L

(1) Technical requirement: The locating current shall be limited to 1mA peak.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-9:2014 item 6.2.3.

(3) Test equipment: GZX92E, 34461A

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The locating current is 0,4mA.	Pass

(5) Conclusion: Pass

17. Test of the local warning and the indication of the insulation value

(1) Technical requirement: The sample contains a visual warning device, the sample can display the insulation value.

(2) Test method:

IEC 61557-1:2007 item 6, IEC 61557-9:2014 item 6.2.5 and 6.2.6.

(3) Test equipment: GZX92E

(4) Test result(SYZ21100930002/SYZ22110400002):

Test result	Conclusion
The sample contains a visual warning device, the sample can display the insulation value.	Pass

(5) Conclusion: Pass
