



## KFA310 Relay Test Set

KINGSINE

Item	KFA310	Remark
Voltage	4x300V	
Accuracy	$<\pm 0.02\%rd + 0.03\%rg$	
Voltage Power	22.5VA Max	
Current range	0-10A, LN 0-20A, LL-N 0-30A, LLL-N	Optional upgrade current range to 3x0~20A LN Max 0~50A LLL-N
Current Power	130VA Max	
Phase	0°~360°	
Frequency	10-1000Hz	
Harmonic	2~60th	
GPS, IRIG-B	Support	
Binary IN/OUT	4 Binary IN/OUT	
USB Port	1*USB3.0	
WIFI, Blue Tooth	Support	
Low-Level Output	Support	
Energy Meter	Support	

## Total Function

## Special Points

B5 paper size, **built-in battery design**, for on-site maintenance and testing of **non-electric environment**, protection relay testing, secondary circuit inspect and secondary voltage and current testing.

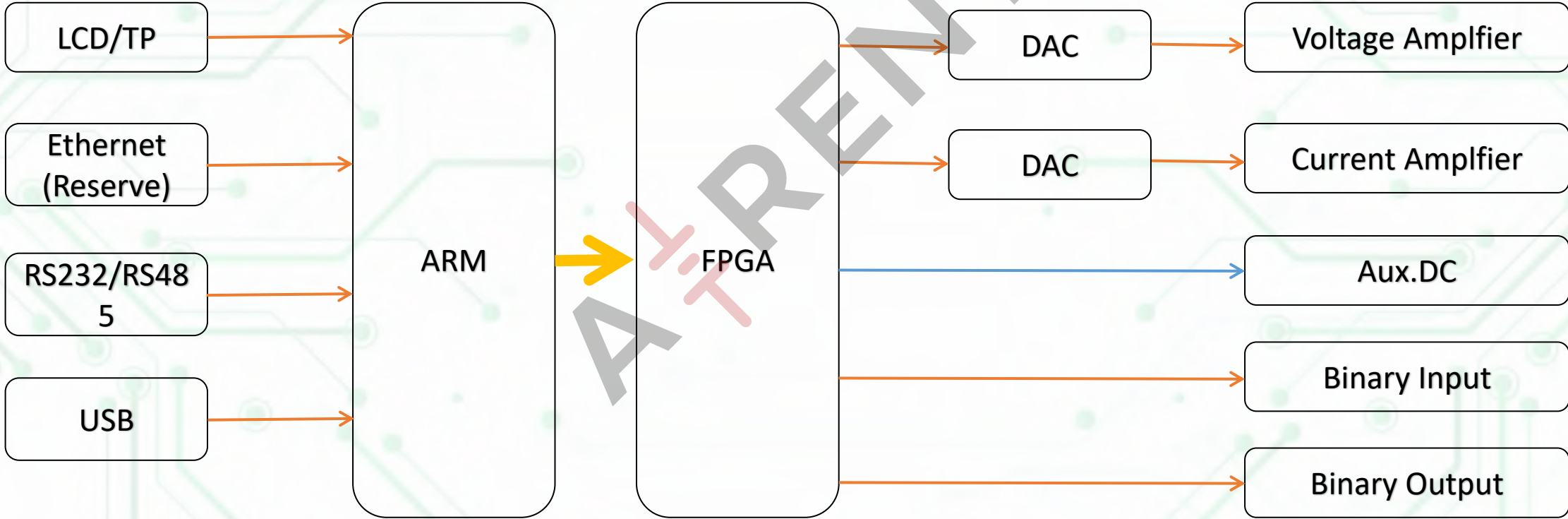


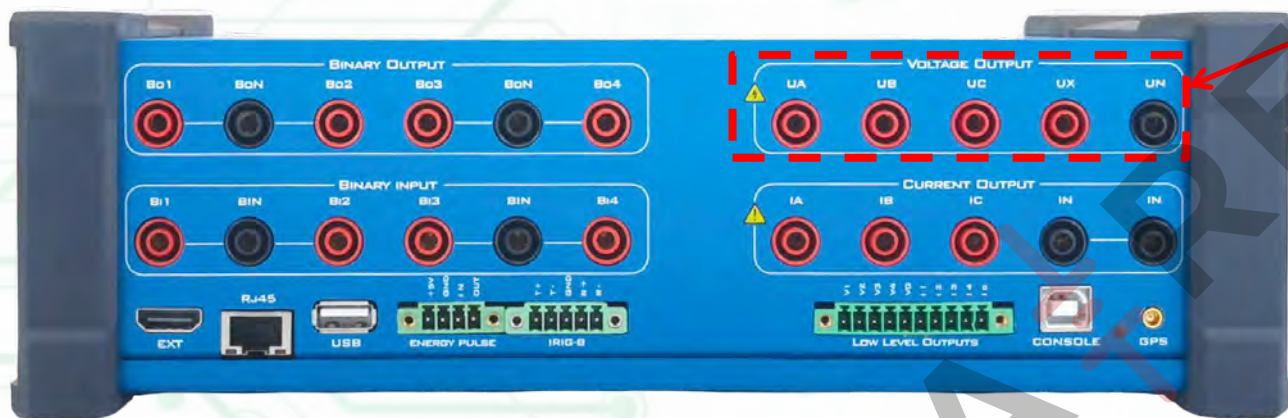
## Technical Benifit

- Device Size: IPAD size, aluminum alloy case, Very small and light.
- Device Weight: 3.7kg, Beautiful and light, easy to carry and use.
- Operational performance: high-performance FPGA, 32-bit ARM microprocessor 1000MHz, smooth operation, 7.0-inch LED capacitive touch screen, full touch operation, mobile phone operation habits, display light transmission, non-reflective contrast, clear display for outdoor
- Equipment self-protection function: voltage output short-circuit, current output open-circuit, temperature overheat protection.



Hardware design Diagram





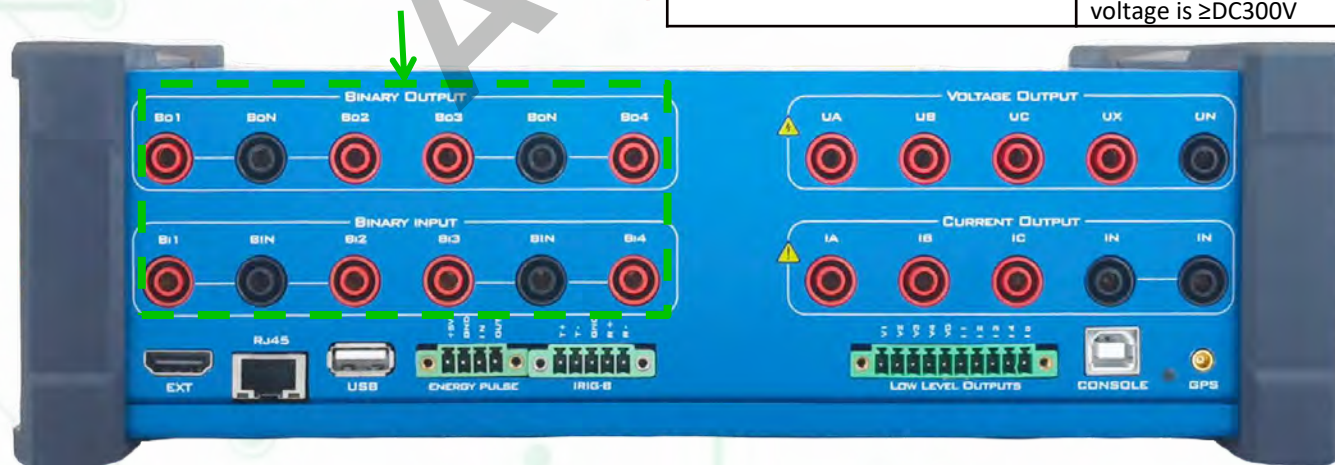
AC Voltage Outputs		
Output Range & Power	4x300 V ac (L-N)	22.5 VA max each@300V
		21 VA max each@200V
		12.5 VA max each@100V
		7 VA max each@63.5V
		6.65 VA max each@57.7V
		1.1 VA max each@10V
Accuracy	$<0.015\%R_d + 0.005\%R_g$ Typ. $<0.02\%R_d + 0.03\%R_g$ Guar.	
Resolution	0.001V	
DC Offset	$<5\text{mV}$ Typ. $<60\text{mV}$ Guar	
Distortion	$<0.05\%$ Typ. / $<0.1\%$ Guar.	
Ascends/Descent response	$<100\mu\text{s}$	
DC Voltage Outputs		
Source Channels	4	
DC voltage output range	0~300 V (L-N)	
DC voltage output power	22.5W Max	
DC voltage accuracy	$<0.03\%R_d + 0.01\%R_g$ Typ. $<0.04\%R_d + 0.06\%R_g$ Guar.	
Ascends/Descent response	$<100\mu\text{s}$	
Resolution	1mV	



AC current outputs	
Source Channels	3
AC current output range	0~10A, L-N / (Can be optional as 0~20A)
	0~20A, LL-N / (Can be optional as 0~40A)
	0~30A, LLL-N / (Can be optional as 0~50A)
AC current output power(Max)	75VA Max for 10A L-N/130VA Max for 20A L-N/LLL-N
AC current output accuracy	<0.015%Rd+0.01%Rg Typ.<0.02%Rd+0.03%Rg Guar.
DC Offset	<1mA Typ.<2mA Guar
Distortion	<0.05%Typ. / <0.1% Guar.
Ascends/Descent response	<100us
Resolution	1mA
DC current outputs	
Source Channels	1
DC current output range	0~10A, L-N
DC current output power	138W
DC current accuracy	<0.03%Rd+0.01Rg Typ.<0.04%Rd+0.06Rg Guar.
Resolution	1mA

Binary input and time accuracy	
Binary input logarithm	4 pairs
Trigger mode	Try/Wet contact
Input voltage range	0 V ~ 300Vdc
Timing accuracy	< ±1ms @ 0.001~1s, < ±0.1% @ >1s
Timing resolution	36us
Max time limit	infinity

Binary output(Relay Contacts)	
Binary output pairs	2pairs(DO-1 and DO-2)
Type	Potential free relay contacts, software controlled
Break capacity AC	Vmax: 380V (AC) / Imax: 8A/ Pmax: 2000VA
Break capacity DC	Vmax: 240V (DC) / Imax: 5A/ Pmax: 150W
Responce time	≤ 10ms
Binary output(Fast eSSR)	
Binary output pairs	2pairs(DO-3 and DO-4)
Circuit Breaker Simulate	Can be define as Open or Close status
Break capacity AC	Vmax: 250V (AC) / Imax: 0.5A
Break capacity DC	Vmax: 250V (DC) / Imax: 0.5A
Responce time	<100us
Contact performance	Open the dry contact output using opto-coupler relay, the max on-resistance is ≤6Ω (Typically ≤1Ω), and the shut-off withstand voltage is ≥DC300V

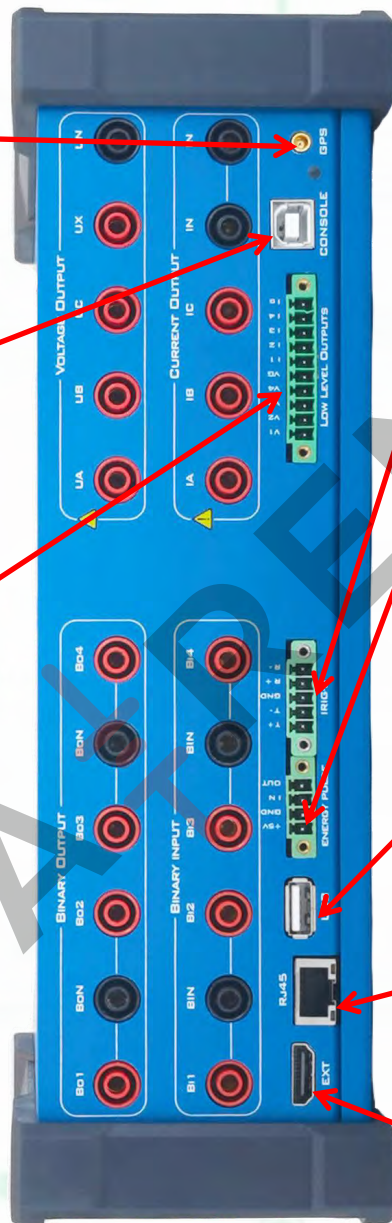


## Hardware Introduce

**GPS Port**  
 Can connect to external antenna, for end-to-end test on line differential or other synchronize testing.  
 When GPS synchronize works, LED beside port will light up.

**USB**  
 USB Port 2.0, use for report upload and software update.

Low level outputs	
Number of outputs	8
Setting range	0~8Vrms
Max. output current	Rating 2mA, 10mA transient max.
Accuracy	(0.01~0.8 Vrms):<0.05% Typ. / <0.1% Guar. (0.8~8 Vrms): <0.02% Typ. / <0.05% Guar.
Resolution	250 $\mu$ V
Distortion (THD+N)	< 0.05% Typ. / <0.1% Guar.
Connection interface	Phoenix terminal



IRIG-B Synchronization Port	
Port define	Use for IRIG-B synchronize, or can be set as time clock source.
Time accuracy	5us

Energy Pulse Port	
Sensor Usage	Mechanical meters / Electronic meters
Sensor Output	High level:>4.5V, Low level:<0.2V
Pulse Input	1 pulse input port, 5Vdc high level valid only.
Pulse Range	500KHz pulse input Max.
Pulse Output	1 Transistor output, Open-collector, 5Vdc/5mA

**USB**  
 USB Port 3.0, use for report upload and software update.

Communication	
RJ45 (Reserve)	Ethernet port, TCP/IP protocol, use for communication with PC for operation control

Ext	
Data bus	Use for hardware function extension, such as Binary input/output numbers, external measurement, LVPT, LPCT testing.



**Power switch**  
Power on or power off device

Aux.DC	
Use for power supply of under test device.	
Output range	12~350V
Output power	40W max
Accuracy	<1%

**Grounding port**  
Use for grounding

AC/DC Charger	
Input	100~240Vac, 50/60Hz, Max2.5A
Output	33.6Vdc, 5.0A (168W)

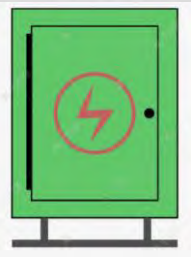


3.7Kg



Dimensions(W x D x H):288x185x95 (mm)

# Extremely light



Distribution test



Oil and Gas  
Platforms



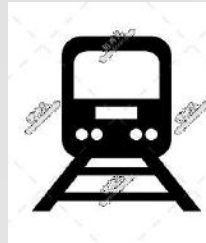
Substations



Industry



Photovoltaic plants



Rail and Metro



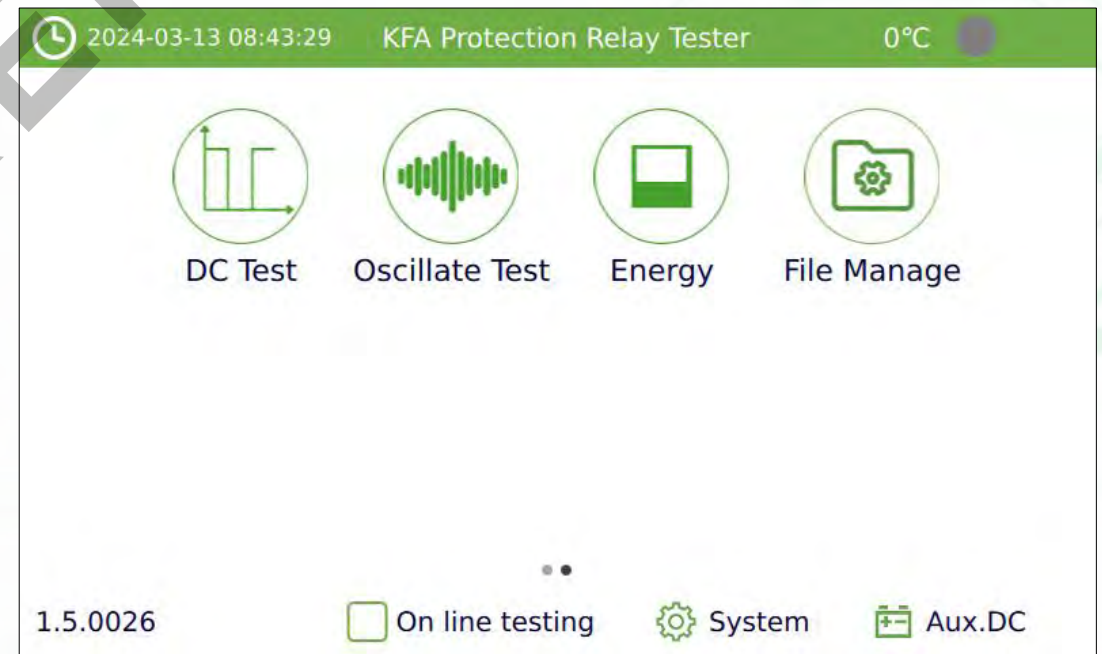
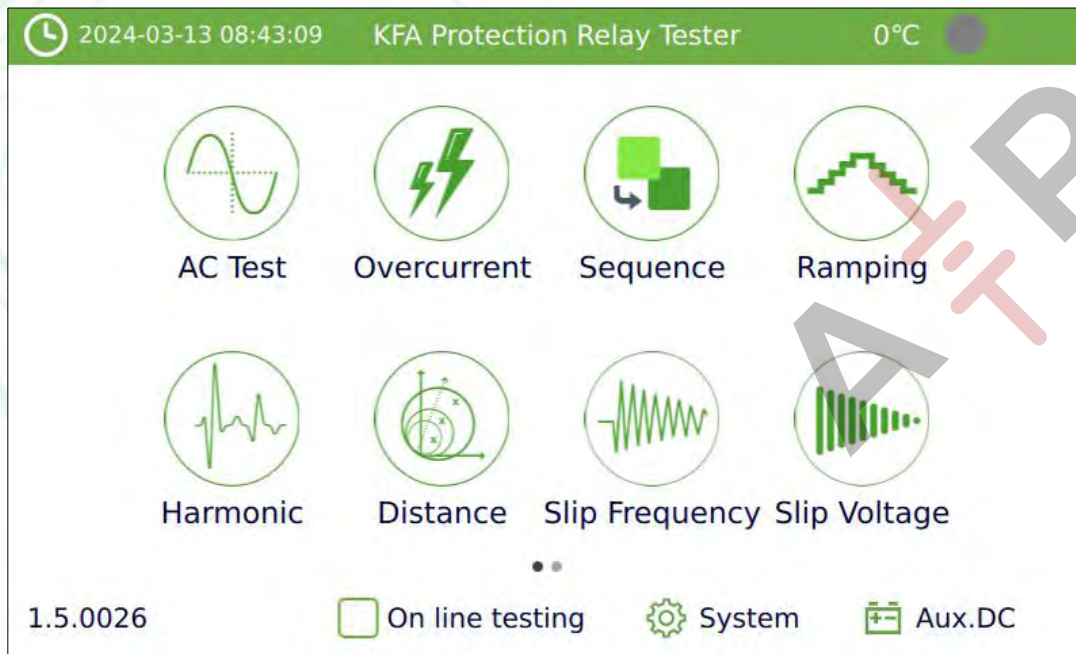
Wind Farm

# Standard source



Because the output signal of KFA310 has high precision and high stability, it can be used as a 3-phase standard and a calibration signal source for instruments.

Software interface



AC test module interface

2022-09-08 10:52:34 AC Test

UA:	57.735 V	0.000 °	50.000 Hz
UB:	57.735 V	240.000 °	50.000 Hz
UC:	57.735 V	120.000 °	50.000 Hz
IA:	1.000 A	0.000 °	50.000 Hz
IB:	1.000 A	240.000 °	50.000 Hz
IC:	1.000 A	120.000 °	50.000 Hz

Parameter Setting

Start: 0.000 V +

End: 57.735 V -

Step: 1.000 V

Auto 1.000 s

Variable: UA

TestItem: Amplitude

Mode: From-to

Trip Value

Trip Time

Return.Coeff

Calc

Start

DI:1 2 DO:1 2

Report

Fault-Calc

Fault Parameter		Short-Circuit Impedance	
Mode	Const I	Fault-I	1.000 A
F-Type	A-N	Load-I	0.000 A
CT Dir.	Line	Load-θ	0.000 °
PT Dir.	Line	Grounding Factor	
Fault Dir.	Forward	Mode	KL
		KL Range	0.670
		KL Angle	0.000 °

|Z| 0.000 Ω R 0.000 Ω

θ 75.000 ° X 0.000 Ω

OK

Cancel

Distance module interface

2022-09-08 10:57:14 Distance

Parameter Setting

|Z| 0.000 Ω R 0.000 Ω Add  
 θ 75.000 ° X 0.000 Ω Delete  
 Fault A-N Clear  
 Fault Dir. Forward Time 1.000 s

UA	0.000V	0.000°
UB	57.735V	240.000°
UC	57.735V	120.000°
IA	1.000A	0.000°
IB	0.000A	0.000°
IC	0.000A	0.000°

Impedance Factor  
 0.70  0.95  1.05  1.20

Test Result

Fault	Fault Dir.	Z	Zθ	T.nom	Dev	Trip Time	DI	Result

Start DI:1 2 DO:1 2 Report

2022-09-08 10:57:29 Distance

Parameter Setting

Mode Const I Fault-I 1.000 A Grounding KL  
 CT Dir. Line Load-I 0.000 A KL Range 0.670  
 PT Dir. Line Load-θ 0.000 ° KL Angle 0.000 °

T.Prefault 3.000 s T.Interval 1.000 s

Start DI:1 2 DO:1 2 Report

### Ramping module interface

2022-09-08 10:58:05 Ramping

Voltage Current Parameter Setting

UA: 0.000 V 0.000 ° 50.000 Hz  
 UB: 57.735 V 240.000 ° 50.000 Hz  
 UC: 57.735 V 120.000 ° 50.000 Hz

Start: 0.000 V End: 57.735 V  
 Step: 1.000 V Time: 1.000 s  
 Variable: UA TestItem: Amplitude  
 Mode: Phase Function: 50  
 T.Prefault: 1.000 s  Output Once  
 T.Interval: 0.200 s

Variable	Function	T.nom	Dev	Trip Time	DI	Result

DI:1  2  DO:1  2

### Harmonic test module interface

2022-09-08 10:57:43 Harmonic

Order: 1 [1/5] Setting

UA: 57.735 V 0.000 °  
 UB: 57.735 V 240.000 °  
 UC: 57.735 V 120.000 °  
 IA: 1.000 A 0.000 °  
 IB: 1.000 A 240.000 °  
 IC: 1.000 A 120.000 °

Start: 0.000 V End: 57.735 V +  
 Step: 1.000 V  From-to -  
 Auto 1.000 s Order: 1  
 Variable: UA TestItem: Range  
 THD:  Amplitude  Percentage  
 T.nom: 1.000 s Dev: 0.100 s

Variable	T.nom	Dev	Trip Time	DI	Result
UA	1.000s	0.100s			NoTest

DI:1  2  DO:1  2

### Overcurrent module interface

2024-03-13 08:47:13 Overcurrent 0°C

Parameter Setting Trigger Chart

Inst.	Overcurrent(50)	Time Overcurrent(51)	Test Point
Pick-up:	1.000 A	Pick-up:	1.000 A
Time Dial:	1.000 s	Time Dial:	0.500
		Curve:	IEC
		IEC/BS142 NI	
		I-test:	3.000 A
		Function:	51
		FaultType:	A-N
			Add
			Multi

Test Result

3	FaultType	ABS	Function	T.nom	T.min	T.max	Trip Time	DI	Result
1	A-N	3.000A	51	3.151s	2.858s	3.464s			NoTest
2	A-N	5.000A	51	2.140s	1.969s	2.318s			NoTest
3	A-N	2.000A	50	1.000s	0.950s	1.050s			NoTest

Start DI:1 2 3 4 DO:1 2 3 4 File

2024-03-13 08:47:58 Overcurrent 0°C

Parameter Setting Trigger Chart

IEC/BS142 NI

Start DI:1 2 3 4 DO:1 2 3 4 File

State Sequencer module interface

2022-09-08 10:53:21 Sequence

State [ 1 / 3 ]

	Voltage	Current
UA:	57.735 V	0.000 ° 50.000 Hz
UB:	57.735 V	240.000 ° 50.000 Hz
UC:	57.735 V	120.000 ° 50.000 Hz

Trip: Time  
 Angle: Phase  
 Time: 1.000 s  
 Logic:  And  Or  
 DI:  1  2  
 DO:  1  2

Calc

Test Result Assessment

State	DI 1	DI 2
1	NoTest	NoTest
2	NoTest	NoTest
3	NoTest	NoTest

Start DI:1  2  DO:1  2  Report

2022-09-08 10:53:45 Sequence

State [ 1 / 3 ]

	Voltage	Current
IA:	1.000 A	0.000 ° 50.000 Hz
IB:	1.000 A	240.000 ° 50.000 Hz
IC:	1.000 A	120.000 ° 50.000 Hz

Trip: Time  
 Angle: Phase  
 Time: 1.000 s  
 Logic:  And  Or  
 DI:  1  2  
 DO:  1  2

Calc

Test Result Assessment Add Delete Clear

	Start	Stop	T.nom	Dev	Act Time	Result

Start DI:1  2  DO:1  2  Report

### Slip Frequency

2024-03-13 08:50:34 Slip Frequency 0°C

Parameter Setting

Frequency     Time     df/dt  
 Under-I Latch     Under-U Latch

F. From:  Hz    F. To:  Hz    F. Step:  Hz  
 df/dt:  Hz/s

Add  
Delete  
Clear

Test Result

3	Item	Trip Value	Time
1	Frequency	NoTest	NoTest
2	Time	NoTest	NoTest
3	df/dt	NoTest	NoTest

UA	57.735V	0.000°
UB	57.735V	240.000°
UC	57.735V	120.000°
UX	0.000V	0.000°
IA	0.000A	0.000°
IB	0.000A	240.000°

Start    DI:1 2 3 4    DO:1 2 3 4    File

### Slip Voltage

2024-03-13 08:51:49 Slip Voltage 0°C

Parameter Setting

Voltage     Time     dv/dt  
 Under-I Latch

dv/dt From:  V/s    dv/dt To:  V/s  
 dv/dt Step:  V/s    U From:  V    U To:  V

Add  
Delete  
Clear

Test Result

3	Item	Trip Value	Time
1	Voltage	NoTest	NoTest
2	Time	NoTest	NoTest
3	dv/dt	NoTest	NoTest

UA	57.735V	0.000°
UB	57.735V	240.000°
UC	57.735V	120.000°
UX	0.000V	0.000°
IA	0.000A	0.000°
IB	0.000A	240.000°

Start    DI:1 2 3 4    DO:1 2 3 4    File

### Oscillate Test

### DC Test

2024-03-13 08:53:36 Oscillate Test 0°C

UA:	57.735 V	0.000 °	50.000 Hz	Setting	Trigger
UB:	0.000 V	0.000 °	50.000 Hz	Percentage:	50.000 %
UC:	0.000 V	0.000 °	50.000 Hz	Phase:	0.000 °
IA:	5.000 A	0.000 °	50.000 Hz	Frequency:	3.000 Hz
IB:	0.000 A	0.000 °	50.000 Hz	Variable:	UA
IC:	0.000 A	0.000 °	50.000 Hz		

Trip Value  No Action  
 Trip Time  No Action

Start DI:1  2  3  4  DO:1  2  3  4  File

2024-03-13 08:54:51 DC Test 0°C

UA:	57.735 V	90.000 °	0.000 Hz	Setting	Trigger
UB:	57.735 V	90.000 °	0.000 Hz	Step:	1.000 V +
UC:	57.735 V	90.000 °	0.000 Hz	End:	57.735 V
IA:	1.000 A	90.000 °	0.000 Hz	-	
IB:	1.000 A	90.000 °	0.000 Hz	<input checked="" type="checkbox"/> Auto	1.000 s
IC:	1.000 A	90.000 °	0.000 Hz	Variable:	UA
				TestItem:	Amplitude
				Mode:	From-to-From

Trip Value   
 Trip Time   
 Return.Coeff

Start DI:1  2  3  4  DO:1  2  3  4  File