

# KFA310 Relay Test Set

**KINGSINE**



# KFA310 Relay Test Set



Item	KFA310	Remark
Voltage	4x300V	
Accuracy	<math>\pm 0.02\%rd + 0.03\%rg</math>	
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.

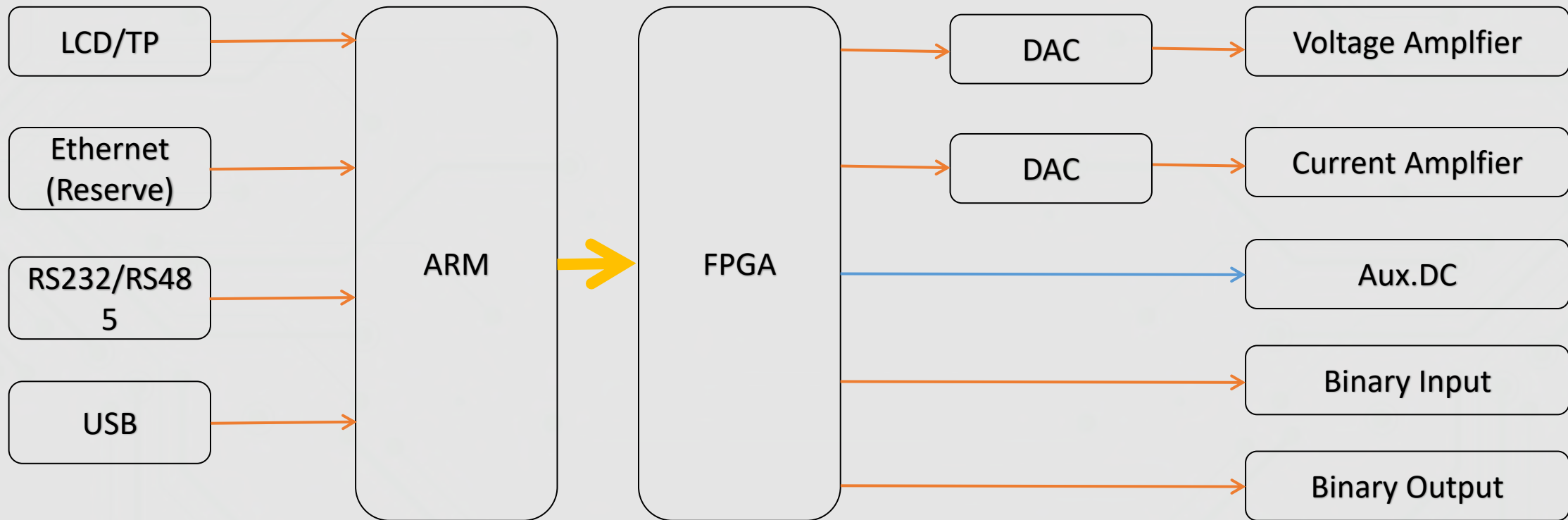


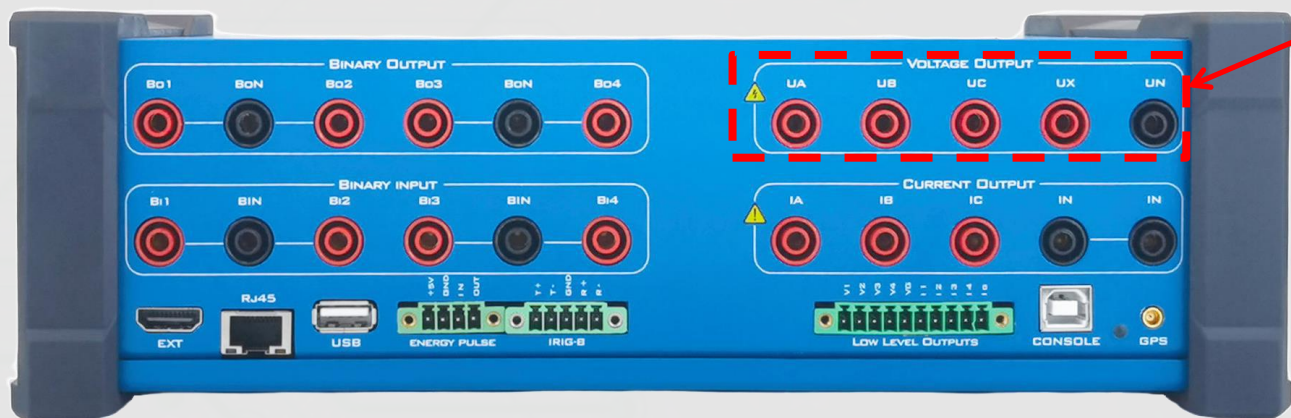
## Technical Benifit

- 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.

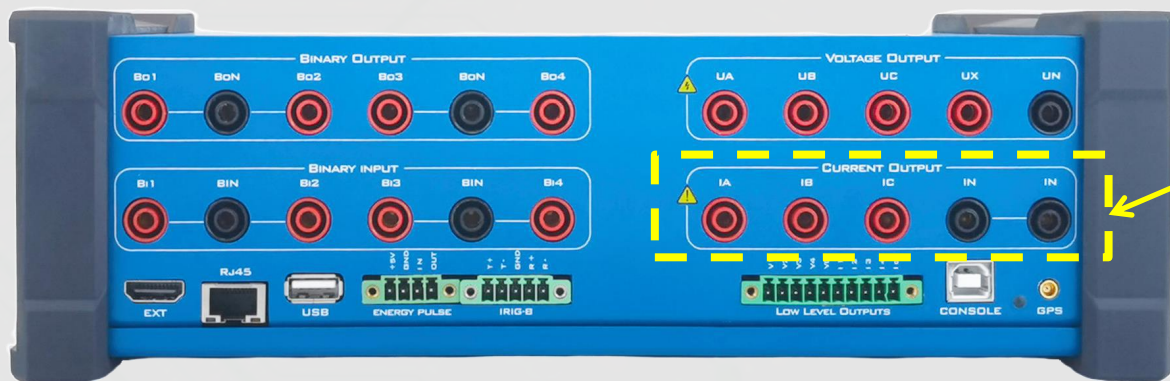


Hardware design Diagram





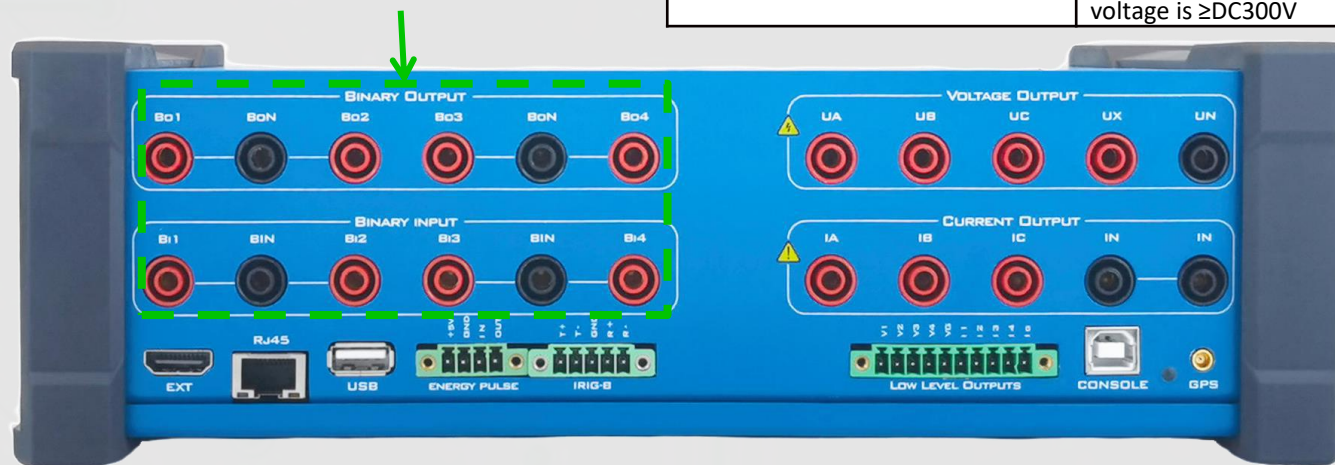
AC Voltage Outputs		
Output Range & Power	4x300 V ac (L-N)	22.5 VA max each@300V
		21 VA max each@200V
		12.5 VA max each@100V
		7 VA max each@63.5V
		6.65 VA max each@57.7V
		1.1 VA max each@10V
Accuracy	<0.015%Rd+0.005%Rg Typ.<0.02%Rd+0.03%Rg Guar.	
Resolution	0.001V	
DC Offset	<5mV Typ.<60mV Guar	
Distortion	<0.05%Typ. / <0.1% Guar.	
Ascends/Descent response	<100us	
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%Rd+0.01Rg Typ.<0.04%Rd+0.06Rg Guar.	
Ascends/Descent response	<100us	
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



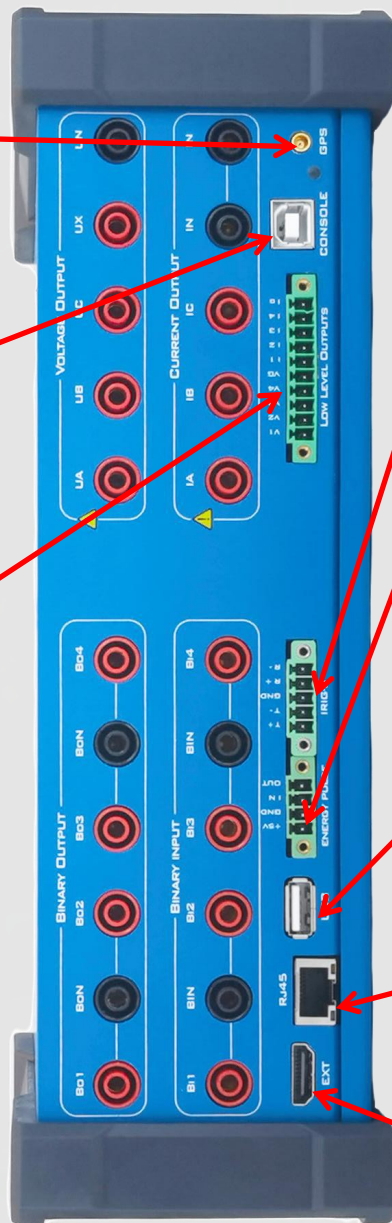


## Hardware Introduce

**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

Grounding port
Use for grounding

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

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



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

3.7Kg



# Extremely light



Distribution test



Oil and Gas  
Platforms



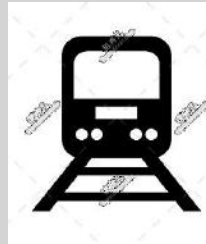
Substations



Industry



Photovoltaic plants

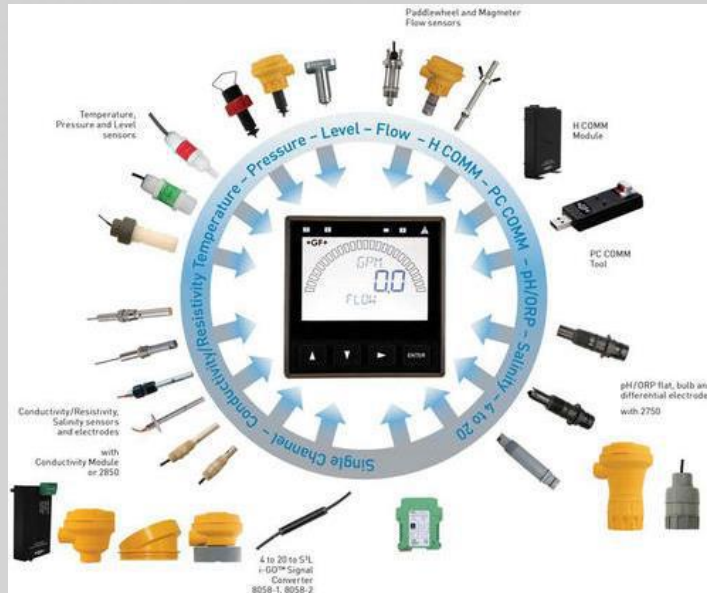


Rail and Metro



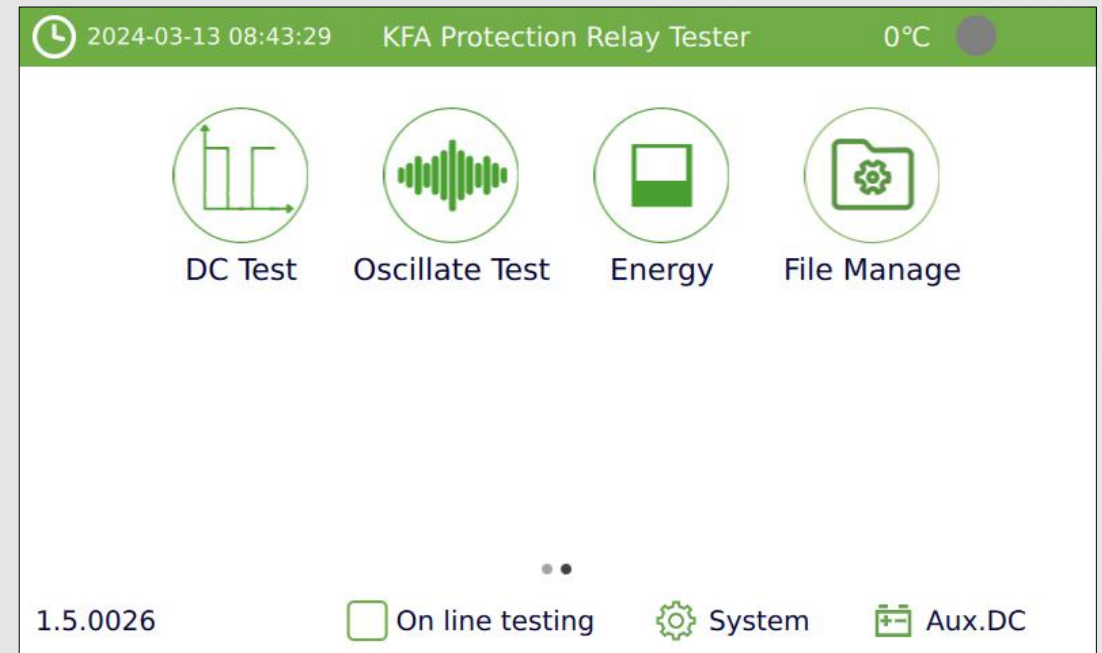
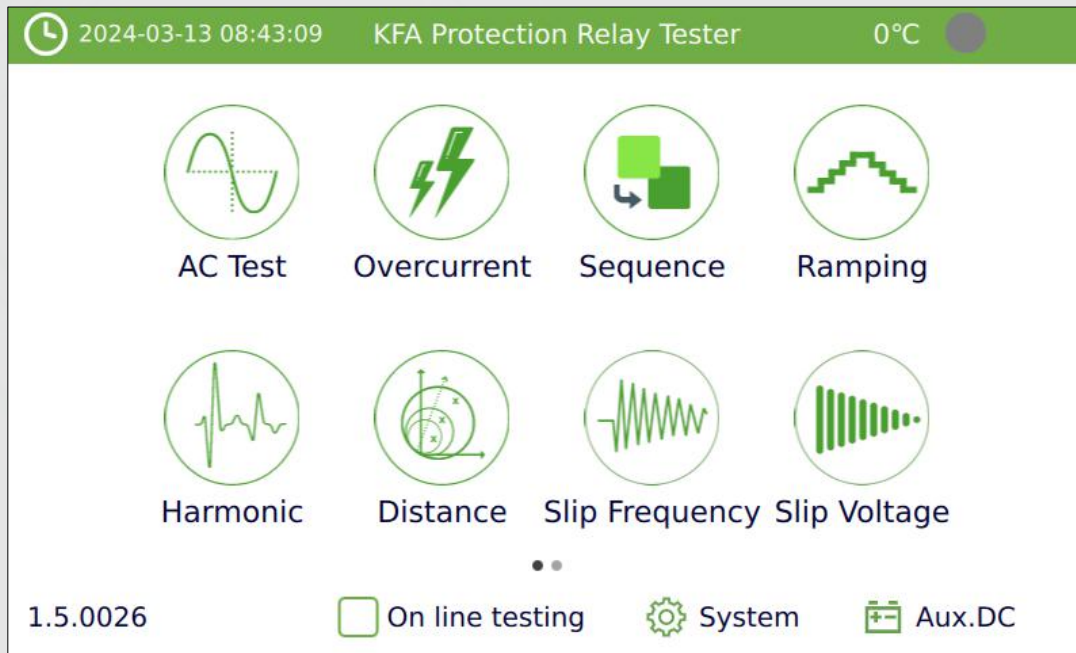
Wind Farm

# 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	<b>Parameter Setting</b> Start: <input type="text" value="0.000"/> V <span style="border: 1px solid gray; padding: 2px;">+</span> End: <input type="text" value="57.735"/> V <span style="border: 1px solid gray; padding: 2px;">-</span> Step: <input type="text" value="1.000"/> V <input type="checkbox"/> Auto <input type="text" value="1.000"/> s Variable: <input type="text" value="UA"/> <span style="border: 1px solid gray; padding: 2px;">v</span> TestItem: <input type="text" value="Amplitude"/> <span style="border: 1px solid gray; padding: 2px;">v</span> Mode: <input type="text" value="From-to"/> <span style="border: 1px solid gray; padding: 2px;">v</span>
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	

Trip Value

Trip Time

Return.Coeff

Calc

Start
DI:1 ○ 2 ⚡
DO:1 ⚡ 2 ○
Report

**Fault-Calc**

Fault Parameter	Short-Circuit Impedance
Mode <input type="text" value="Const I"/> <span style="border: 1px solid gray; padding: 2px;">v</span> F-Type <input type="text" value="A-N"/> <span style="border: 1px solid gray; padding: 2px;">v</span> CT Dir. <input type="text" value="Line"/> <span style="border: 1px solid gray; padding: 2px;">v</span> PT Dir. <input type="text" value="Line"/> <span style="border: 1px solid gray; padding: 2px;">v</span> Fault Dir. <input type="text" value="Forward"/> <span style="border: 1px solid gray; padding: 2px;">v</span>	Fault-I <input type="text" value="1.000"/> A Load-I <input type="text" value="0.000"/> A Load-θ <input type="text" value="0.000"/> °  Z  <input type="text" value="0.000"/> Ω R <input type="text" value="0.000"/> Ω θ <input type="text" value="75.000"/> ° X <input type="text" value="0.000"/> Ω
<b>Grounding Factor</b> Mode <input type="text" value="KL"/> <span style="border: 1px solid gray; padding: 2px;">v</span> KL Range <input type="text" value="0.670"/> KL Angle <input type="text" value="0.000"/> °	

OK
Cancel

Distance module interface

2022-09-08 10:57:14 Distance

Parameter	Setting
Z	0.000 Ω R 0.000 Ω
θ	75.000 ° X 0.000 Ω
Fault	A-N
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

DI:1 2 DO:1 2

2022-09-08 10:57:29 Distance

Parameter	Setting
Mode	Const I
Fault-I	1.000 A
CT Dir.	Line
Load-I	0.000 A
PT Dir.	Line
Load-θ	0.000 °
Grounding	KL
KL Range	0.670
KL Angle	0.000 °
T.Prefault	3.000 s
T.Interval	1.000 s

DI:1 2 DO:1 2



### 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

Test Result

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 Time Dial: 1.000 s

Pick-up: 1.000 A Time Dial: 0.500 Curve: IEC IEC/BS142 NI

I-test: 3.000 A Function: 51 FaultType: A-N Add Multi

Test Result Delete Clear

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

### Slip Voltage

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

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 Percentage: 50.000 % Phase: 0.000 ° Frequency: 3.000 Hz Variable: UA
UB:	0.000 V	0.000 °	50.000 Hz	
UC:	0.000 V	0.000 °	50.000 Hz	
IA:	5.000 A	0.000 °	50.000 Hz	
IB:	0.000 A	0.000 °	50.000 Hz	
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 Step: 1.000 V + End: 57.735 V <input checked="" type="checkbox"/> Auto 1.000 s Variable: UA TestItem: Amplitude Mode: From-to-From
UB:	57.735 V	90.000 °	0.000 Hz	
UC:	57.735 V	90.000 °	0.000 Hz	
IA:	1.000 A	90.000 °	0.000 Hz	
IB:	1.000 A	90.000 °	0.000 Hz	
IC:	1.000 A	90.000 °	0.000 Hz	

Trip Value:   
Trip Time:   
Return.Coeff:

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

Kingsine Electric Automation Co., Ltd. has been specializing in Research & Development, production and sales of Electric Testing & Measurement Instruments since 1999 foundation who is also honored as the High-tech enterprise certification and Software enterprise certificate recognized by China authority. With about high development speed every year, Kingsine win the Chinese top manufacturer for electric test equipment in the domestic relay-tester market.

## Research & development:

Kingsine also own the strong technicians and experts and is capable of providing electric power test solution in conformity with customer's specifications, With his creative All-in-One design idea and many patents, Kingsine's product has been well approved and recommended by China National Institute of Metrology and power research institutes of each provincial as well as CE certificate.

## Marketing & Service:

Now Kingsine's products are approved by over 80 countries worldwide in many industries of electrical power, metallurgy, petrochemical, railway mining and relative scientific research institution as well as same trade of meter and protective relays factories, and getting the warm welcome from the world large Electricity & Energy Exhibition such as POWER-GEN International of USA, Middle East Electricity of Dubai, HANNOVER MESSE of Germany and FIEE Electrical of Brazil. Its Relay-Tester is suitable working for many world famous relay protection devices such as ABB, SIMENS, ALSTOM, TOSHIBA, SCHNEIDER, AREVA, SEL, GE etc and Kingsine also give the full service with his distribution net from many countries partners of European, Asia and Middle East.

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## Manufacture:

With ISO 9001:2000 certified and Located the High-tech Zone downtown of Shenzhen neighbor Hong Kong, Kingsine integrates all precision processing and advancing manufacture method around mainly on Protection Relay Test Set, Standard Power, Power Calibrator, RTU-Tester & Multifunctional Power Meter, which ensure his products with 3-year quality warranty on free repair.

