

Mini Universal Protection Relay Tester

KFA320



Specs Overview

CHARACTERISTIC		SPECIFICATION	
Voltage Outputs	Output Power	4×300V ac (L-N)	35VA Max each@300V
		4×300V dc (L-N)	40W Max each@300V
	Accuracy	<0.015%Rd+0.005%Rg Typ. <0.02%Rd+0.03%Rg Guar.	
Current Outputs	Output Power	6×0~20A ac,L-N	180VA Max each@20A
		1×0~60A ac,LLL-N	200VA Max@60A
		3×0~10A dc,(L-N)	25W Max each@10A
	Accuracy	<0.015%Rd+0.01%Rg Typ. <0.02%Rd+0.03%Rg Guar.	
Time Synchronization	GPS/BD, IRIG-B	<1us	
Phase		-360°~360°	
Interface Port		RJ45 Ethernet, USB Port, Wifi	
Device Output Time in Battery Mode		10A/2 Hours, 5A /4 Huors	

Product Highlights

Mini

▶ **3.8kg**



▶ **Handheld**



95mm

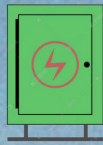
288mm

185mm

Product Highlights

**Multi-
functional**

- ▶ Supports IEC61850 SV/GOOSE, LPIT simulation, energy meter testing, low-level output, and transducer calibration.
- ▶ Testing of protection relays, circuit breakers, smart substation equipment, PV/Wind power protection devices, etc.



Distribution
Test



Oil and Gas
Platforms



Substations



Industry



Photovoltaic
Plants



Wind Farm



Rail & Metro

Product Highlights



**Highly
Efficient**

- ▶ 10.1 inch touch screen, standalone testing capability (no computer required).
- ▶ No external power needed—built-in high-capacity battery.
- ▶ Adopts 230+ and ever-expanding test templates, supporting XRIO/RIO import for ABB, SIEMENS, SCHNEIDER, GE, ALSTOM, AREVA, SEL, etc.

Product Highlights

**High
Precision**

- ▶ 0.05 class high precision, can be used as a 3-phase standard and a calibration signal source for instruments.

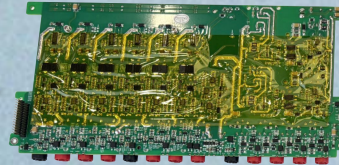


Product Highlights

Reliable

- ▶ **Extremely simple internal structure, ensure high quality and reliability.**

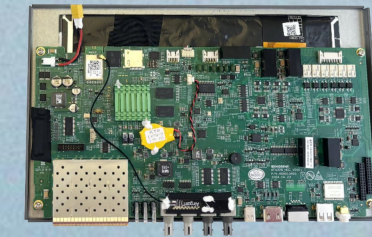
Current Amplifier



Voltage Amplifier



Power Management
+ Samsung Battery



Control Board
+ Display

- ▶ **All devices are rigorously endurance-tested for multiple days prior to delivery.**

Hardware Introduction



AC Voltage Outputs

Output Range & Power	4×300Vac (L-N)	35 VA max each@300V
		28 VA max each@3x300V
		23 VA max each@200V
		12 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	40W max
DC Voltage Accuracy	<0.03%Rd+0.01%Rg Typ. <0.04%Rd+0.06%Rg Guar.
Ascends/Descent Response	<100us
Resolution	1mV

Hardware Introduction



AC Current Outputs

Source Channels	6
AC Current Output Range	6 x 0~20A, L-N
	3 x 0~40A, LL-N
	1 x 0~60A, LLL-N
AC Current Output Power (Max)	180VA max for 20A L-N 200VA max for >20A LL-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	3
DC Current Output Range	0~10A, L-N
DC Current Output Power	145W
DC Current Accuracy	<0.03%Rd+0.01%Rg Typ. <0.04%Rd+0.06%Rg Guar.
Resolution	1mA

Hardware Introduction

Binary Output (Relay Contacts)

Binary Output Pairs	2 pairs (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
Response Time	≤ 10ms

Binary Output (Fast eSSR)

Binary Output Pairs	2 pairs (DO-3 and DO-4)
Circuit Breaker Simulate	Can be define as Open or Close status
Break Capacity AC	Vmax: 250V(AC) / Imax: 0.2A
Break Capacity DC	Vmax: 250V(DC) / Imax: 0.5A
Response Time	<100us
Contact Performance	Open the dry contact output using opto-coupler relay, the on-resistance is ≤ 6Ω, and the shut-off withstand voltage is ≥DC300V

Binary Input and Time Accuracy

Binary Input Logarithm	4 pairs
Trigger Mode	Try/Wet contact
Input Voltage Range	0V ~ 300Vdc
Timing Accuracy	< ±1ms @ 0.001~1s < ±0.1% @ >1s
Timing Resolution	36us
Max Time Limit	infinity



Hardware Introduction



4 Pairs of LC Optical Network Ports

Arbitrarily configurable as SMV for 9-1/9-2, transmitter and receiver for GOOSE.

Optical Port Indicator

The LC optical module Link is always on, and the ACT is flashing.

FT3 Interface, 2 Send, 2 Send Harvest

TX sends, RX receives, and can be configured arbitrarily as the send and receive ports for FT3 messages or the IIRIG B code/PPS second pulse.

Console

Serial console Port, internally debug purpose.

Hardware Introduction



1 Pair of Electrical Pulse Inputs

Used for the calibration of electric energy meter.

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.

Communication

RJ45
(Reserve)

Ethernet port, TCP/IP protocol, use for communication with PC for operation control.

USB

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

Ext

Data Bus

Use for hardware function extension, such as Binary input/output numbers, external measurement, LPVT, LPCT testing.

Hardware Introduction

AC/DC Charger

Input	110~240Vac, 50/60Hz, Max 2A
Output	USB-C, 20V max, 5A max, 100W max

Aux. DC (Extension)

Used for power supply of under test device.

Output Range	12~350V
Output Power	40W max
Accuracy	<1%



Grounding Port

Used for grounding

Power Switch

Power on or power off device

Optional Features



Low-Level Outputs (Extend Optional)

Number of Outputs	10
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 μ V
Distortion (THD+N)	< 0.05% Typ. / <0.1% Guar.
Connection Interface	Combination terminal

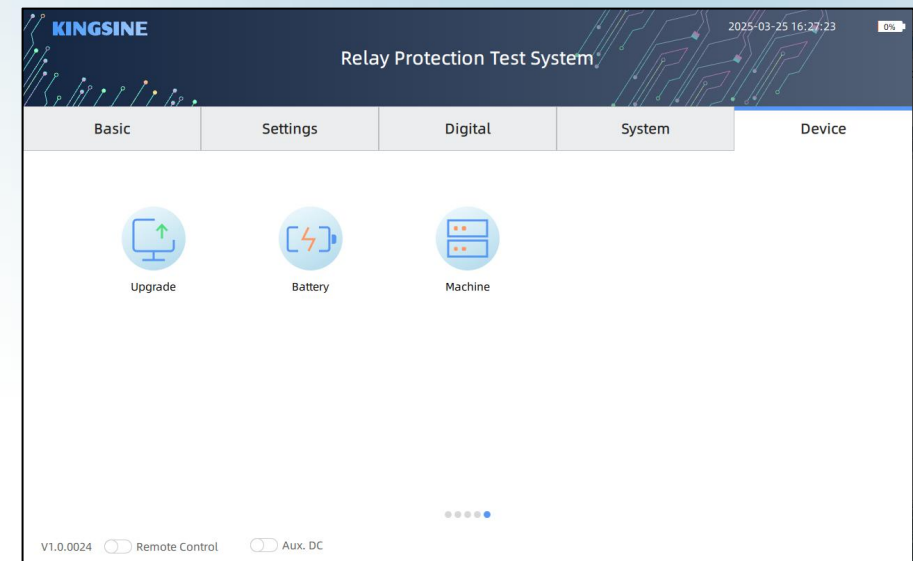
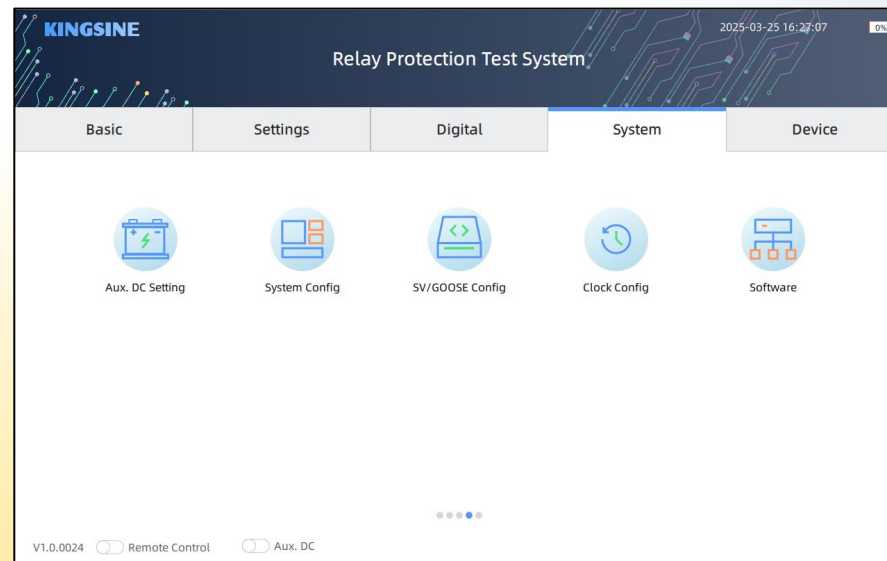
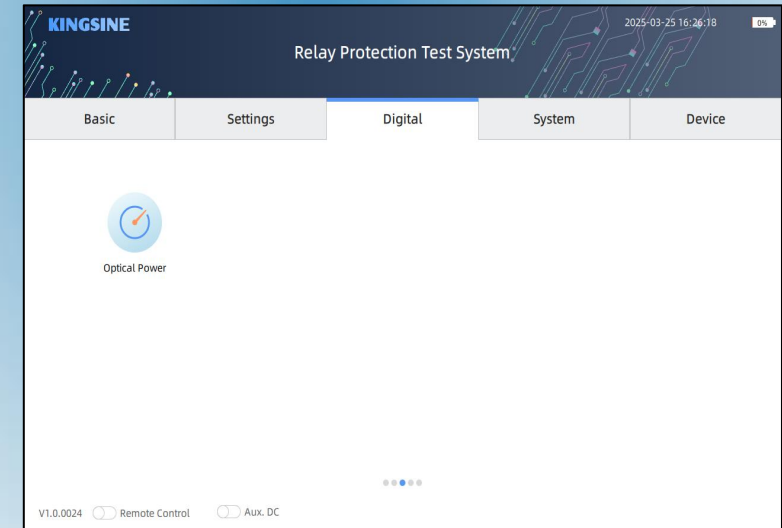
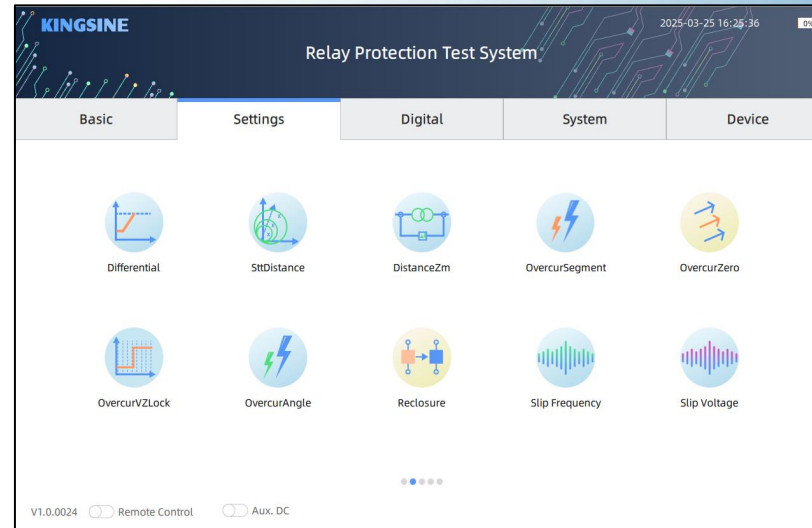
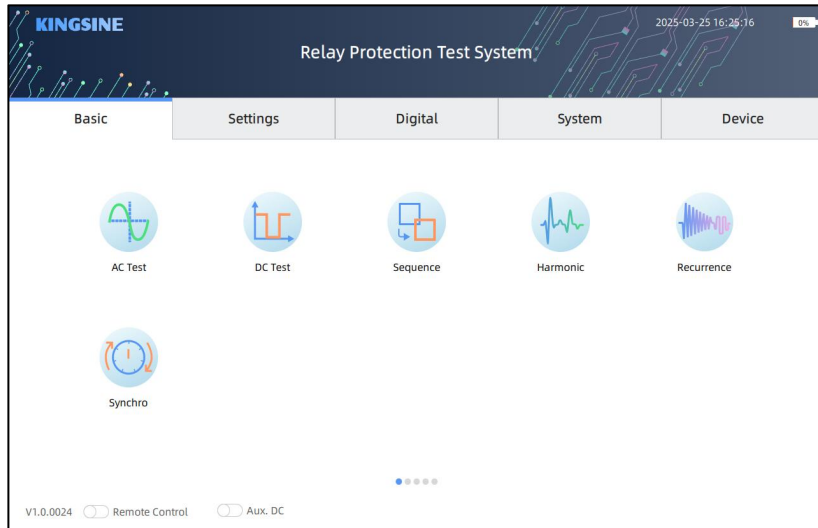
Energy Meter Calibration (Optional)

Sensor Usage	Mechanical meters / Electronic meters
Pulse Input	1 pulse input port, 5Vdc high level valid only.
Pulse Range	500KHz pulse input Max.

IEC61850 SV&GOOSE (Optional)

LC Type	4 x 100 Base-Fx (100Mbit, full duplex) wave-length 1310nm
ST Type	2 transmitting, 2 receiving wave-length 850nm

Software Interface



Software Interface - AC Module

Relay Protection System [AC Test] 2025-03-25 17:10:30 0°C 0%

Output & Variable

Group 1 Group 2

☒ Earthphase ☐ Interphase ☐ Sequence ☐ Power

	Range	Angle	Frequency	Variable
VAN	57.735V	0.000°	50.000Hz	☒
VBN	57.735V	240.000°	50.000Hz	☐
VCN	57.735V	120.000°	50.000Hz	☐
IAN	0.000A	0.000°	50.000Hz	☐
IBN	0.000A	240.000°	50.000Hz	☐
ICN	0.000A	120.000°	50.000Hz	☐

Var. ☒ Amp. ☐ Angle ☐ Freq.

From 10.000V To 1.000V Step 1.000V

☐ Auto 1.000s ☒ Action Stop ☐ Prefault 1.000s ☐ Test Return

Bin.In 1 2 3 4 Bin.Out 1 2 3 4

Start Binary Settings IEC61850 System Parameter Report Exit

Vector View - Group 1 - P To N

	Value	Angle
VAN	57.735V	0.000°
VBN	57.735V	240.000°
VCN	57.735V	120.000°
IAN	0.000A	0.000°
IBN	0.000A	240.000°
ICN	0.000A	120.000°

List of result

Bin.In	Action Time	Return Time

Variable	Action Value	Return Value	Return Factor

Clear

Fault model calc.

Falut Paremeter

Calc. Model ☒ I Constant ☐ V Constant ☐ Z Constant

Fault Type A-N

CT direction ☒ Dir. Line ☐ Dir. Bus

PT position ☒ Line ☐ Bus

Direction ☒ Positive ☐ Negative

Fault Current 1.000A

Fault Voltage 30.000V

Load Current 0.000A

Load Angle 75.000°

Zl

|Z| 0.000Ω R 0.000Ω

Phi 0.000° X 0.000Ω

Zl Grouding Factor

☒ Kl ☐ Re/RI Xe/Xl ☐ Z0/Z1

Range 0.000 Angle 0.000°

Setting Angle 0.000°

Zs

|Z| 0.000Ω R 0.000Ω

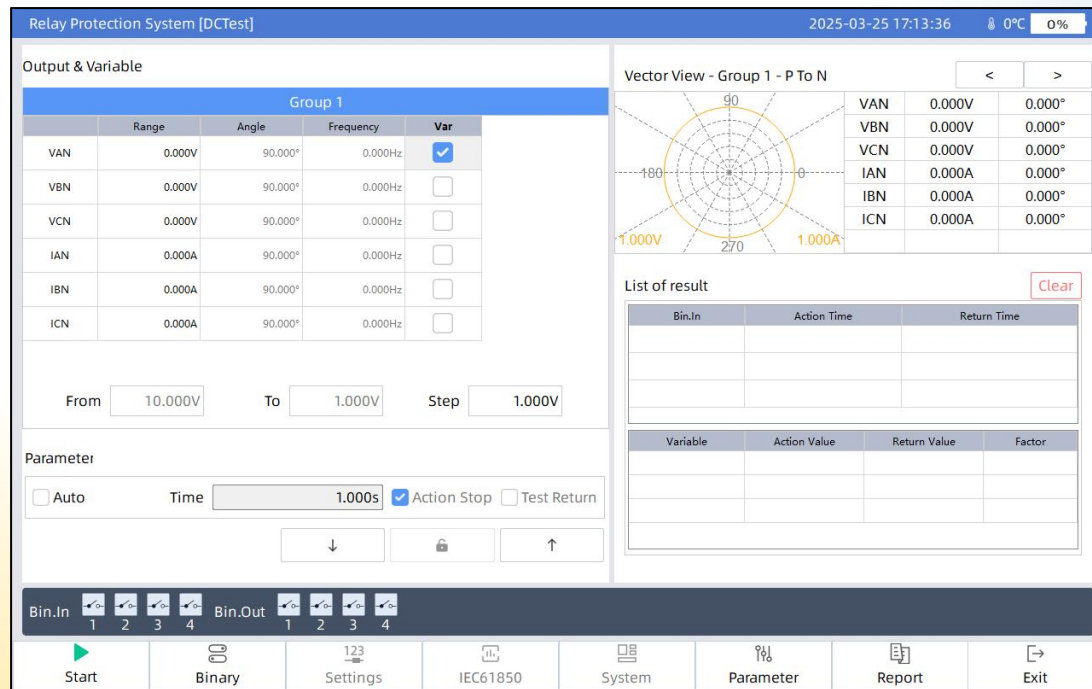
Phi 0.000° X 0.000Ω

Zs Grouding Factor

Range 0.000 Angle 0.000°

OK Cancel

Software Interface - DC Module



Binary Input and Binary Output Config

Bin. In Enable Setting

Trigger Logic ☒ Or ☐ And

☒ 1 ☒ 2 ☒ 3 ☒ 4 ☒ All

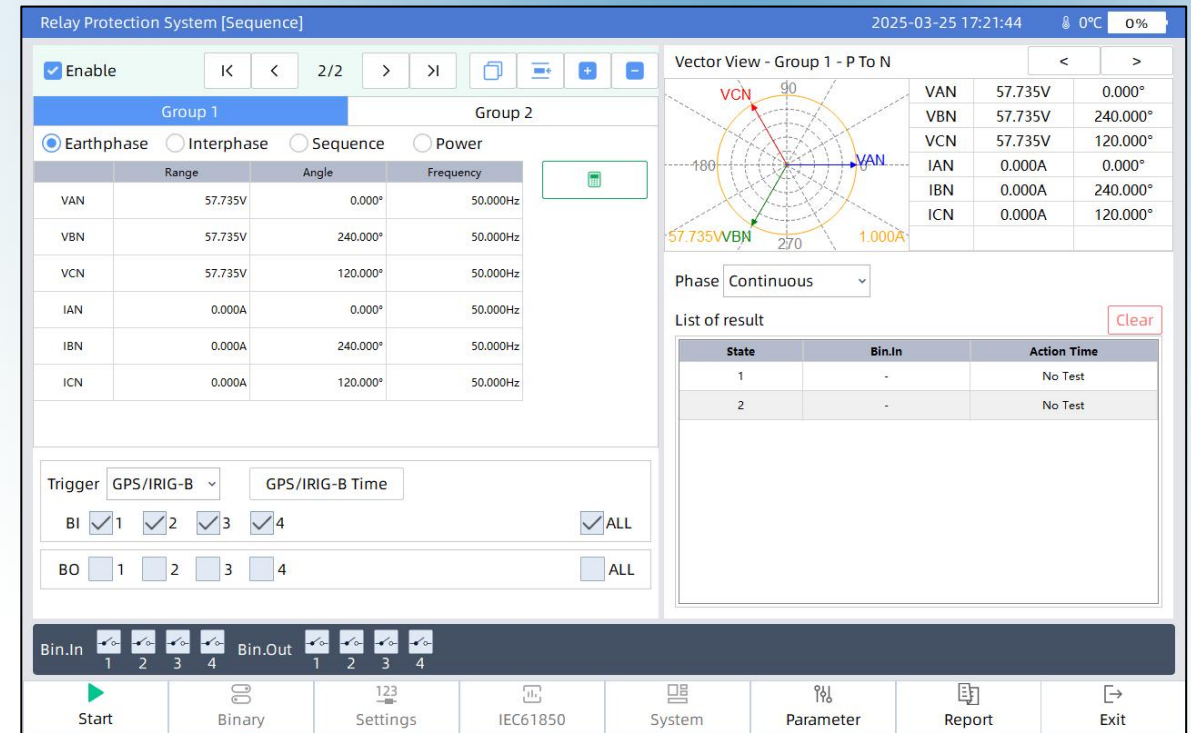
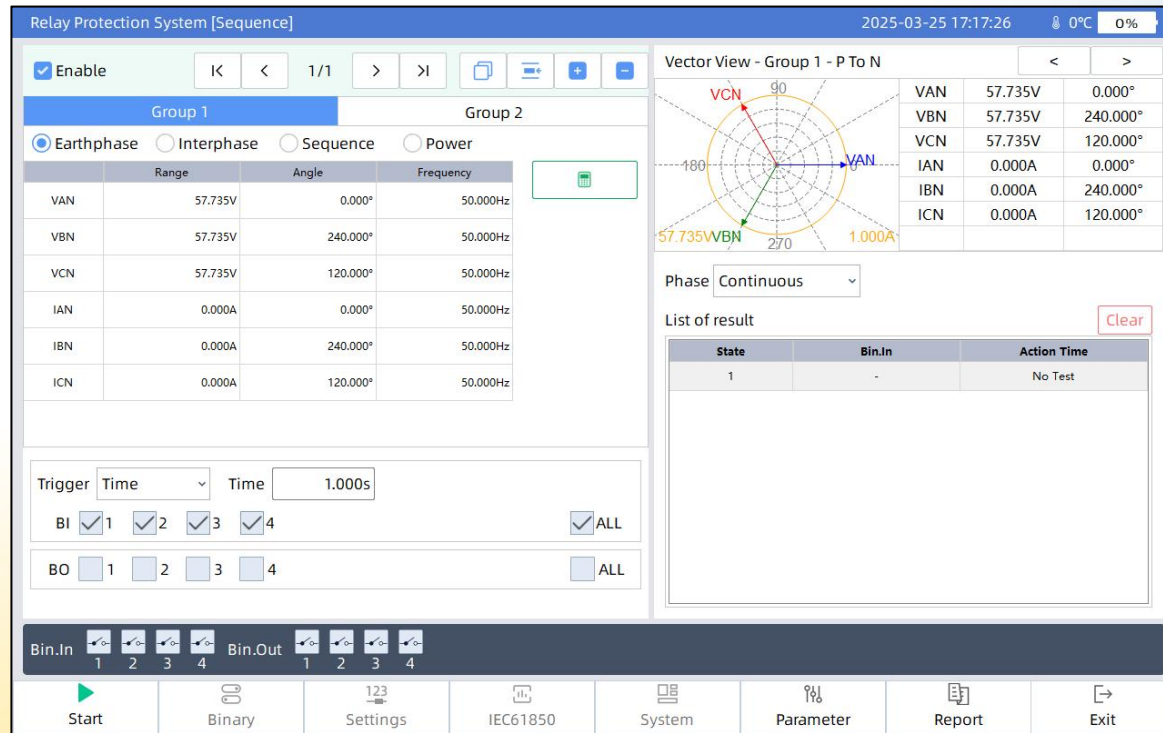
Bin. Out State Setting

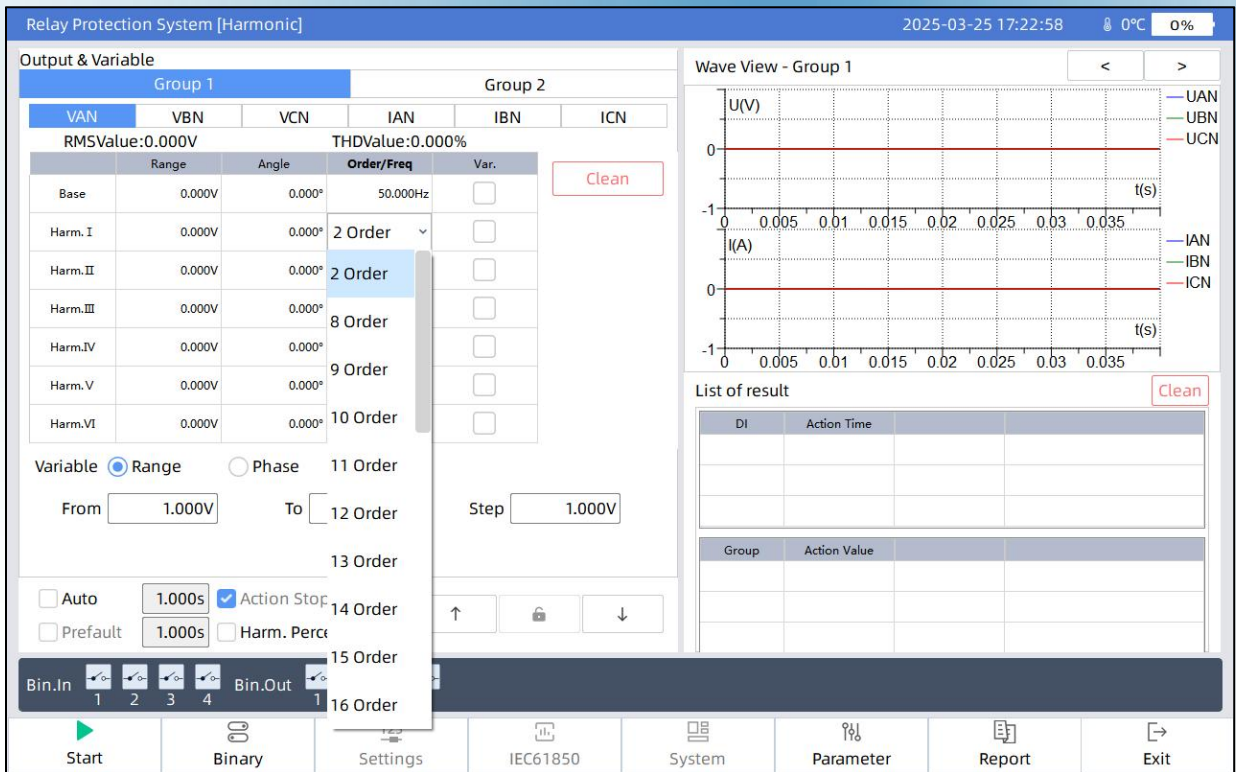
	Reference Mode	Refer Bin.	Delay Time	Hold Time
☐ 1	Reference Fault	2	0.000s	0.000s
☐ 2	Reference Fault	2	0.000s	0.000s
☐ 3	Reference Fault	2	0.000s	0.000s
☐ 4	Reference Fault	2	0.000s	0.000s

☐ All

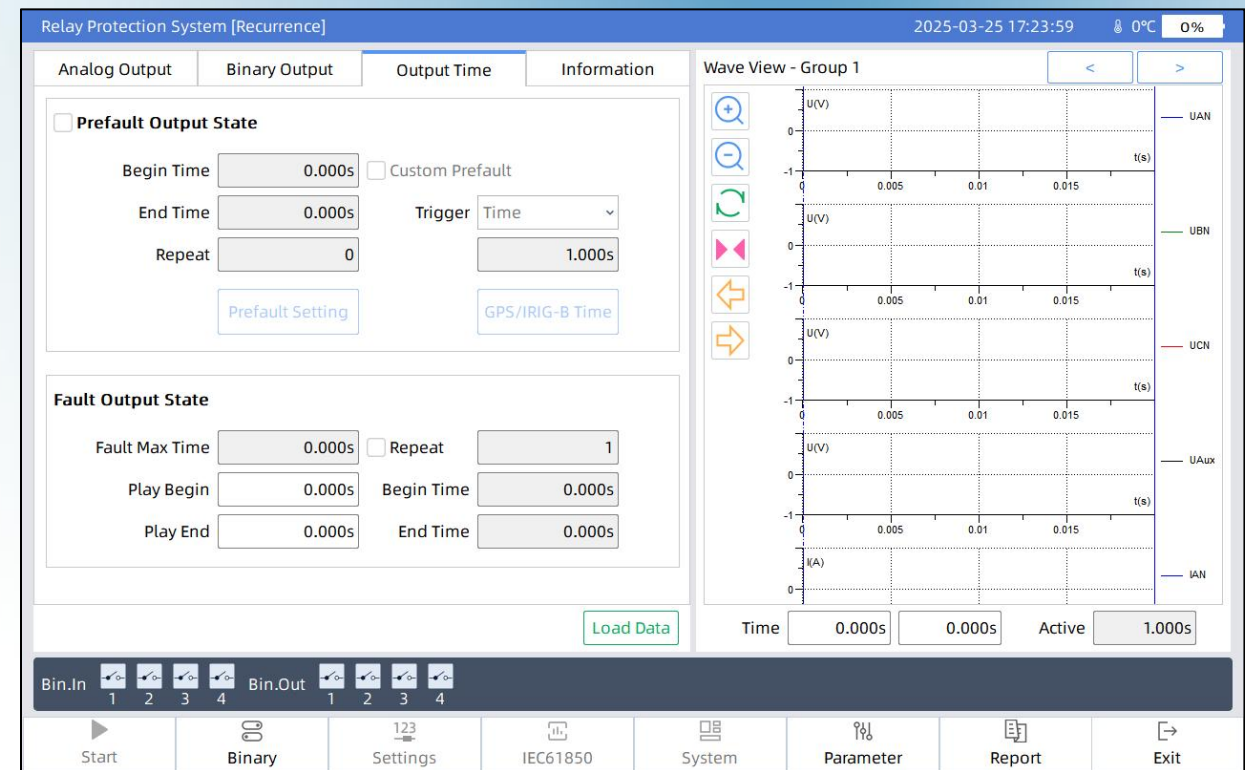
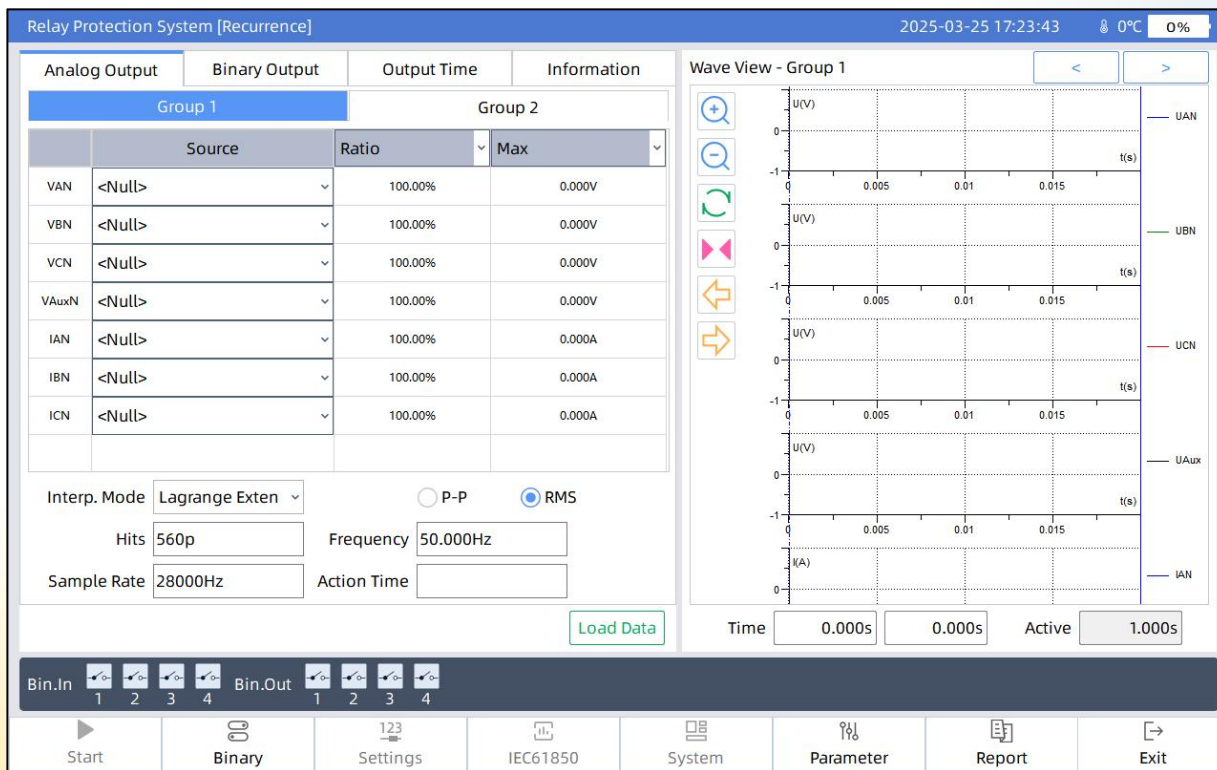
Close

Software Interface - State Sequencer Module

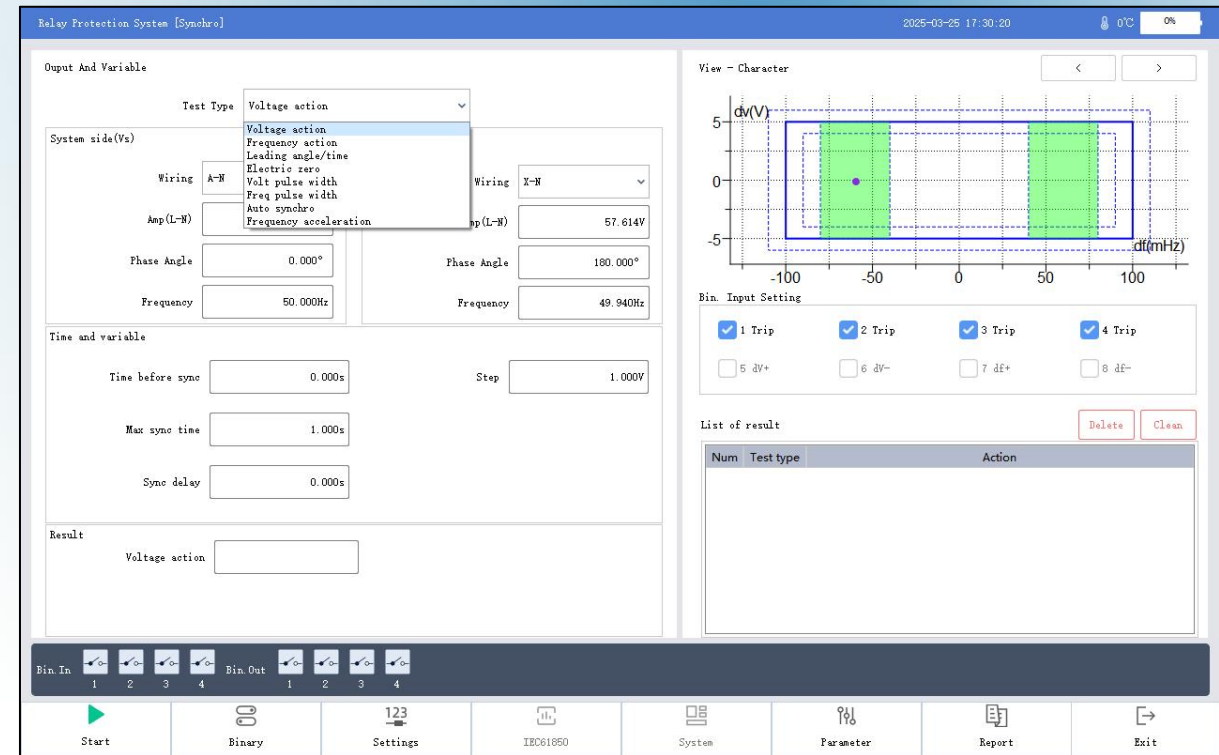
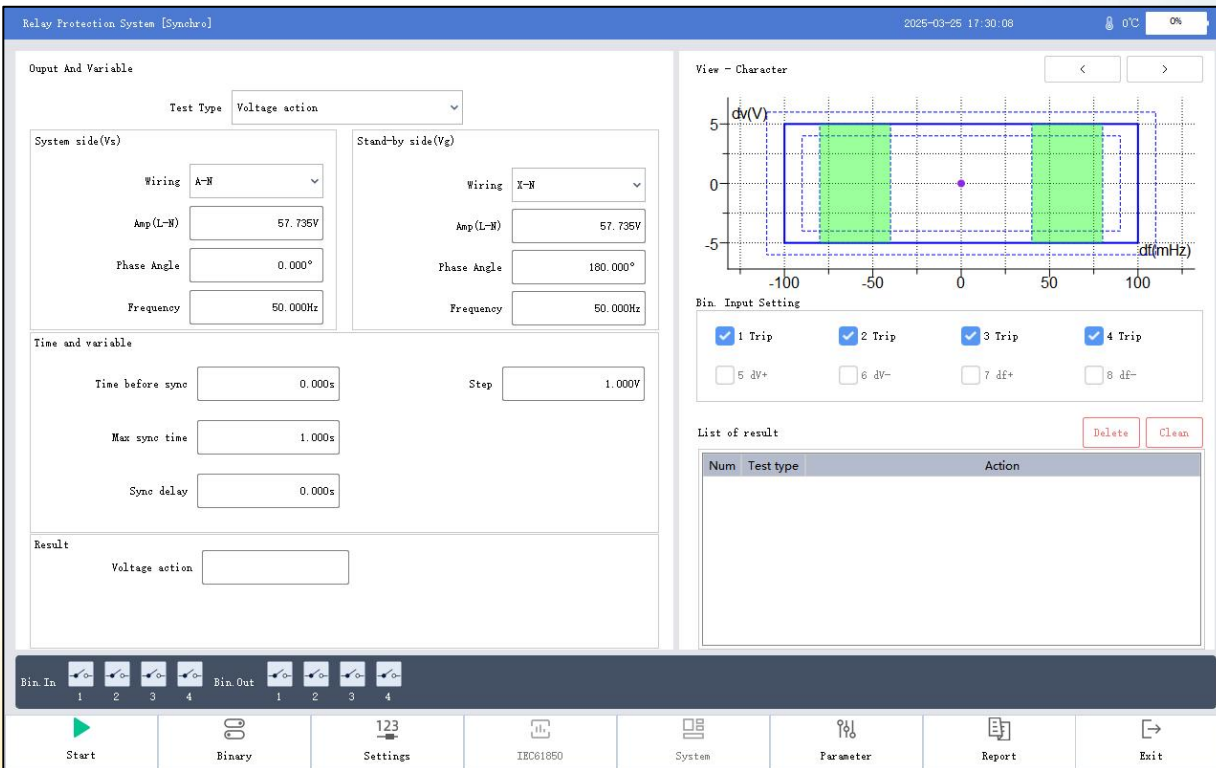




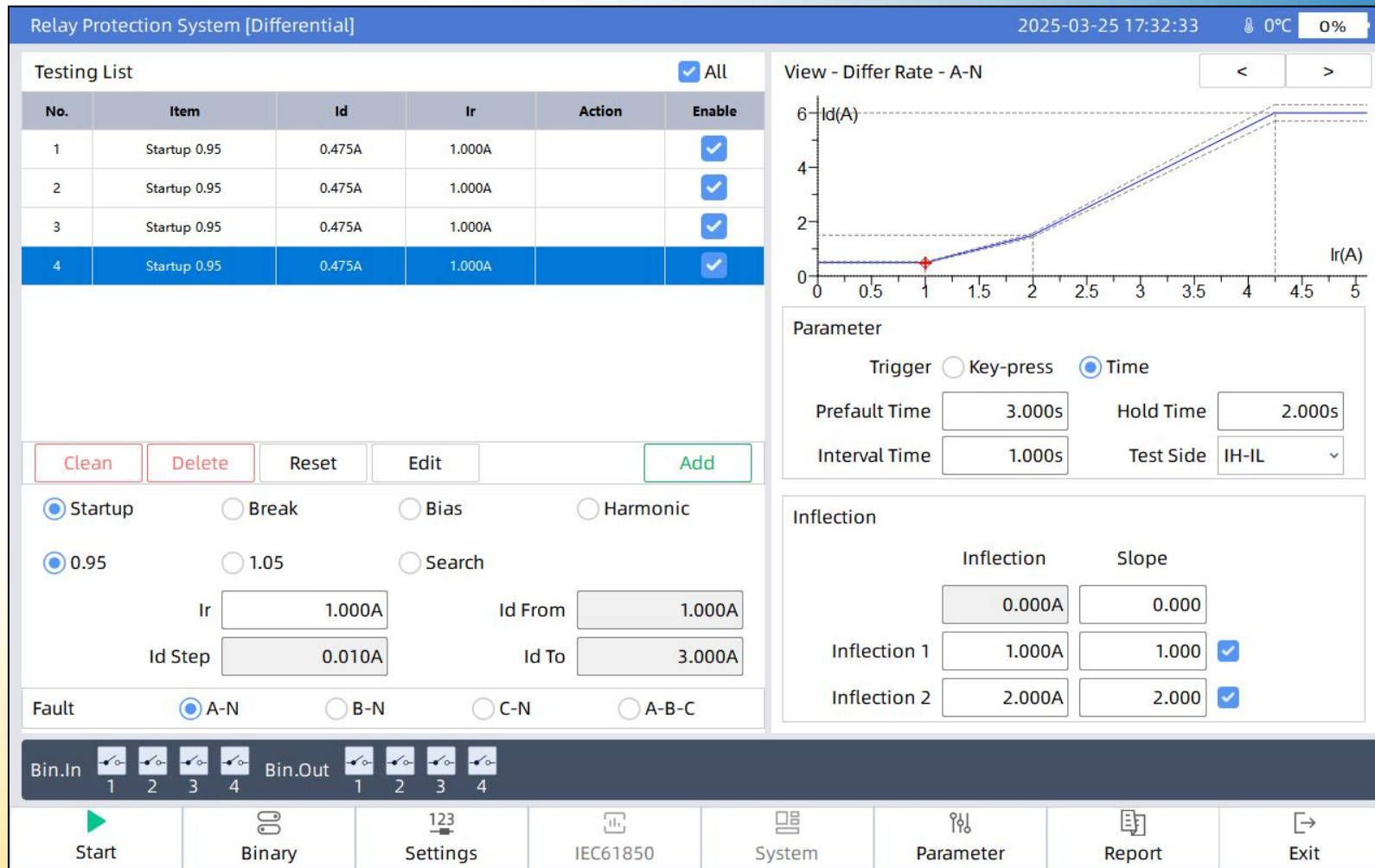
Software Interface - Recurrence Module



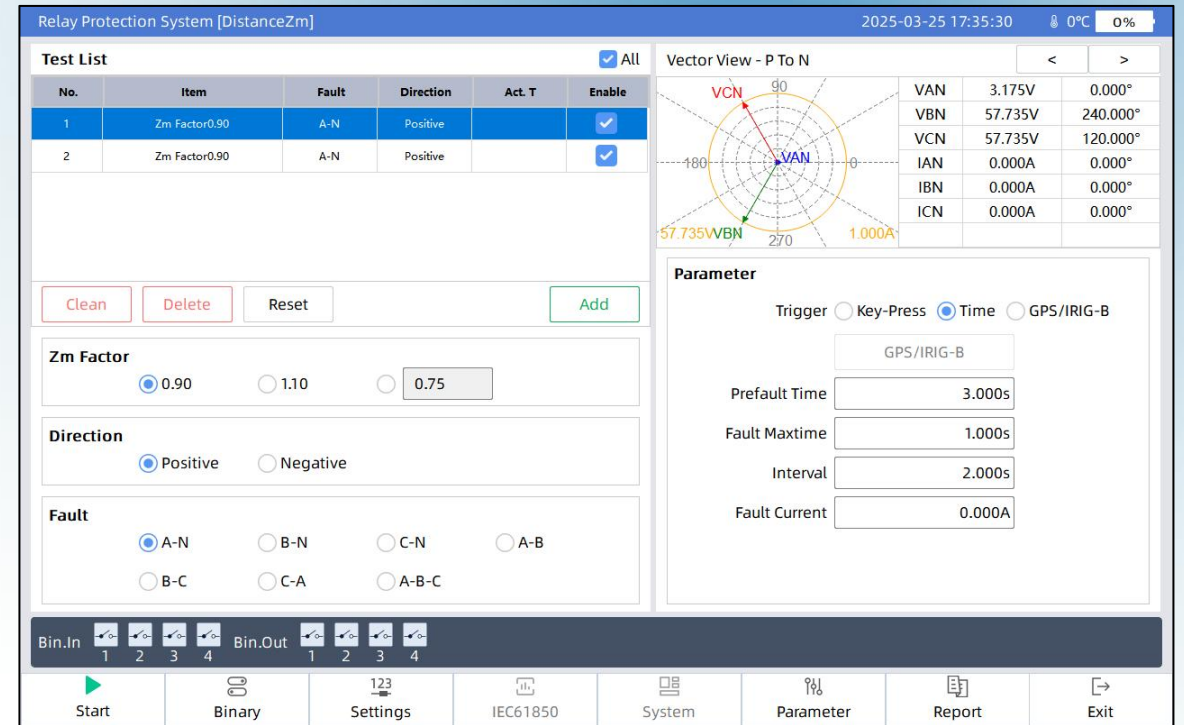
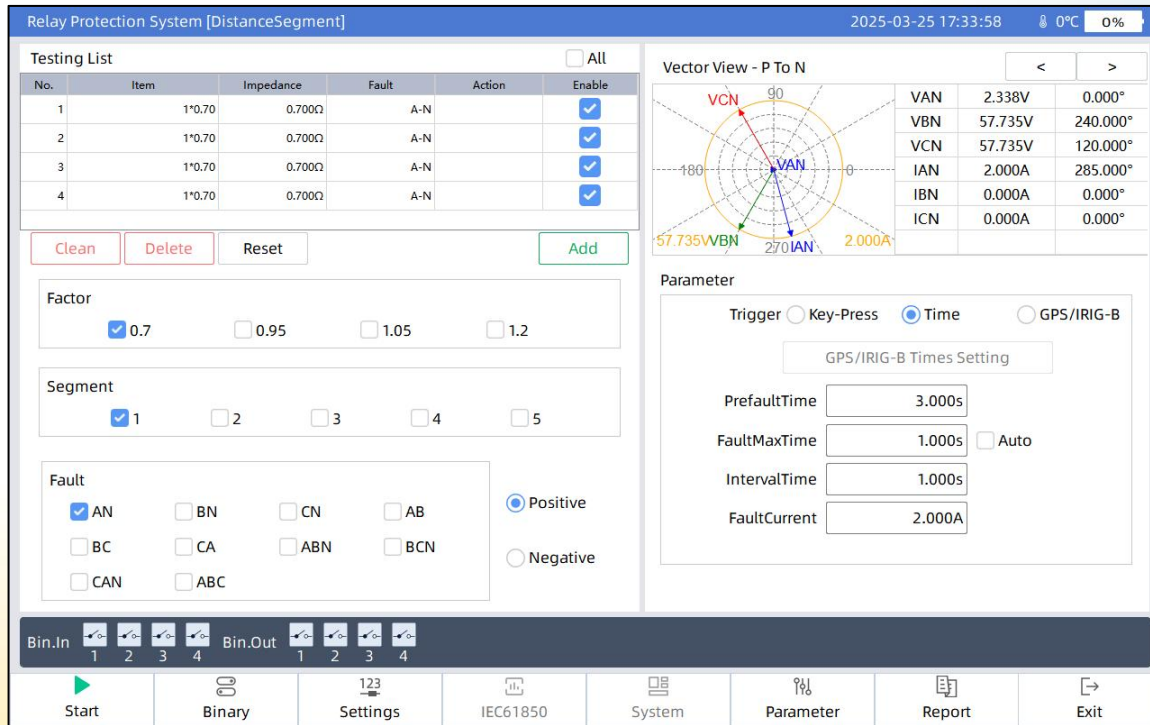
Software Interface - Synchro Test Module



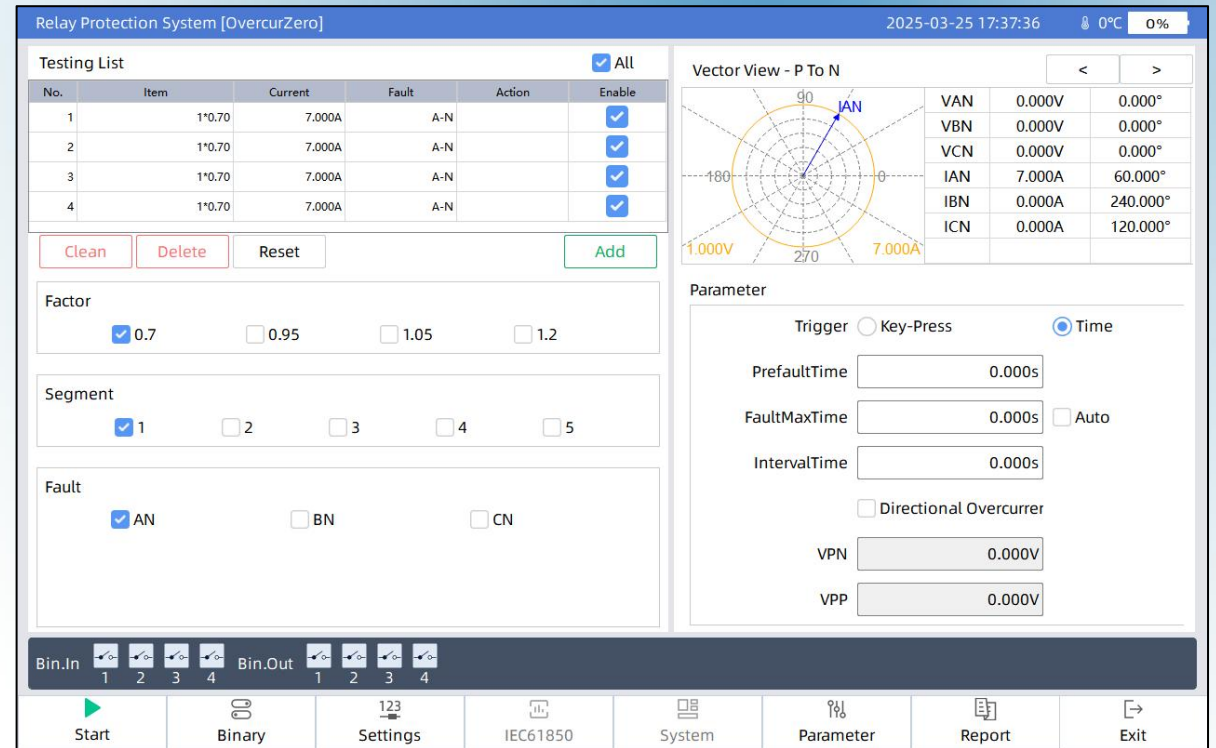
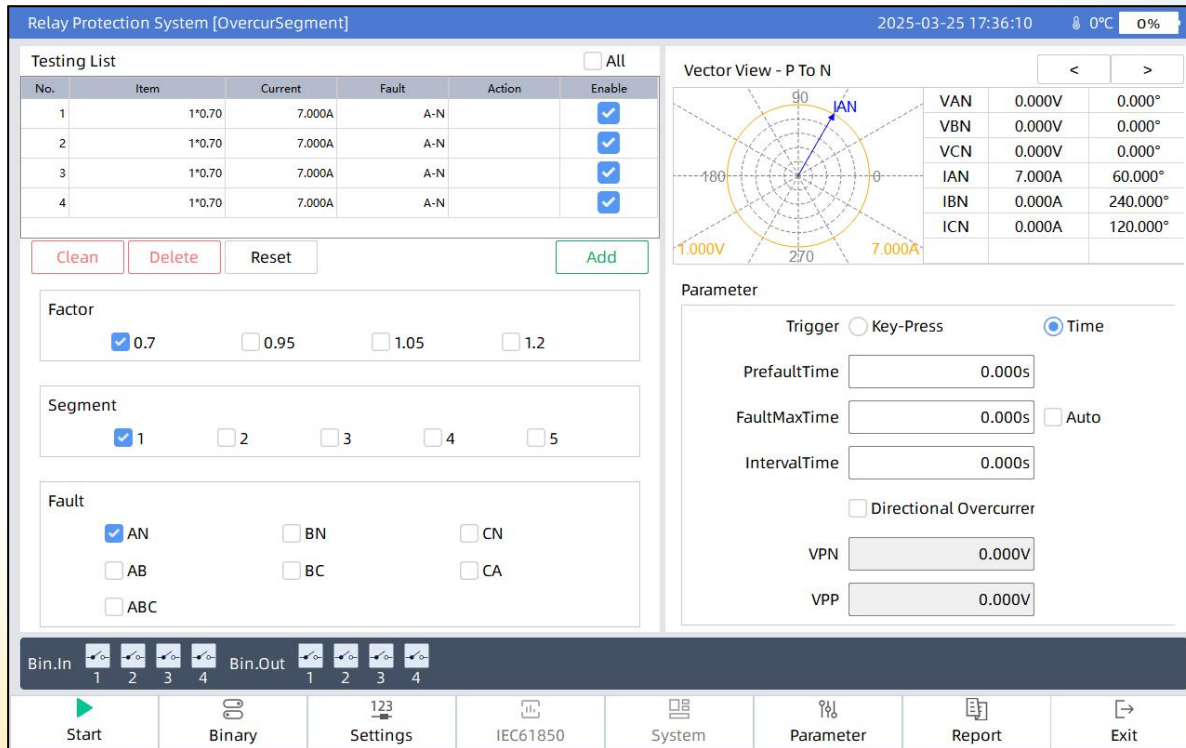
Software Interface - Differential Module



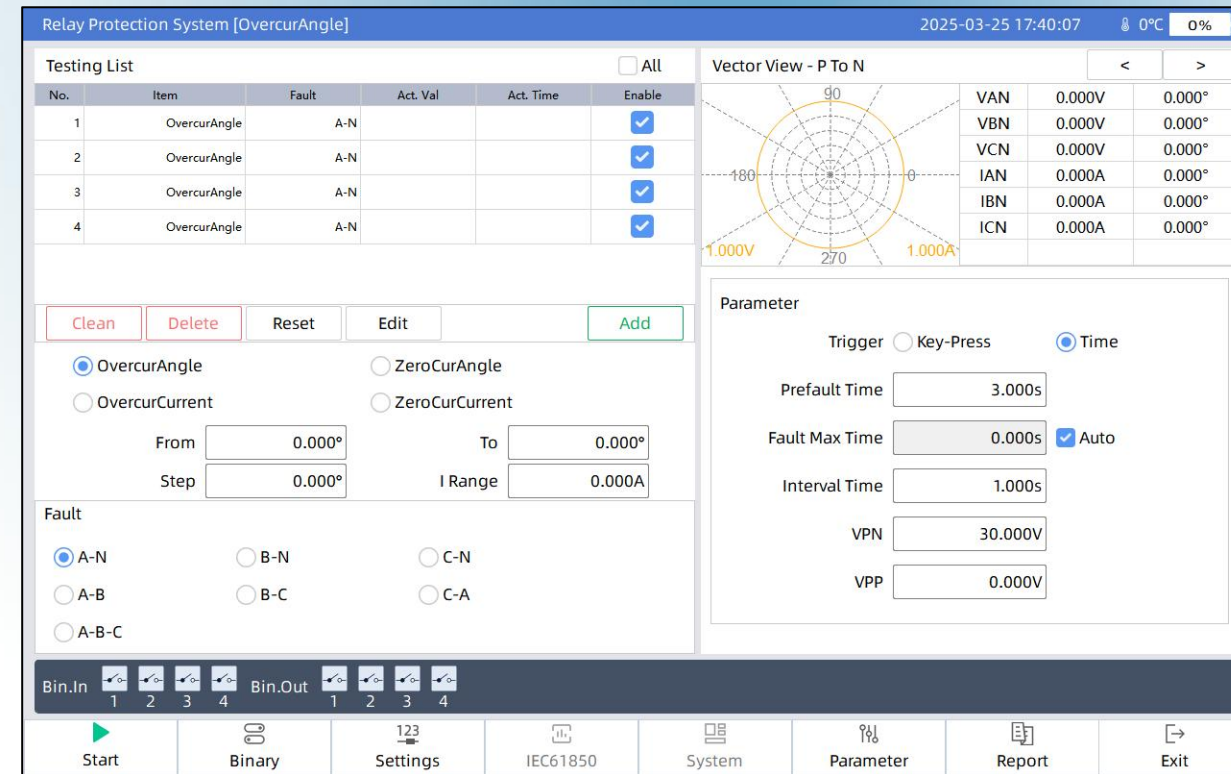
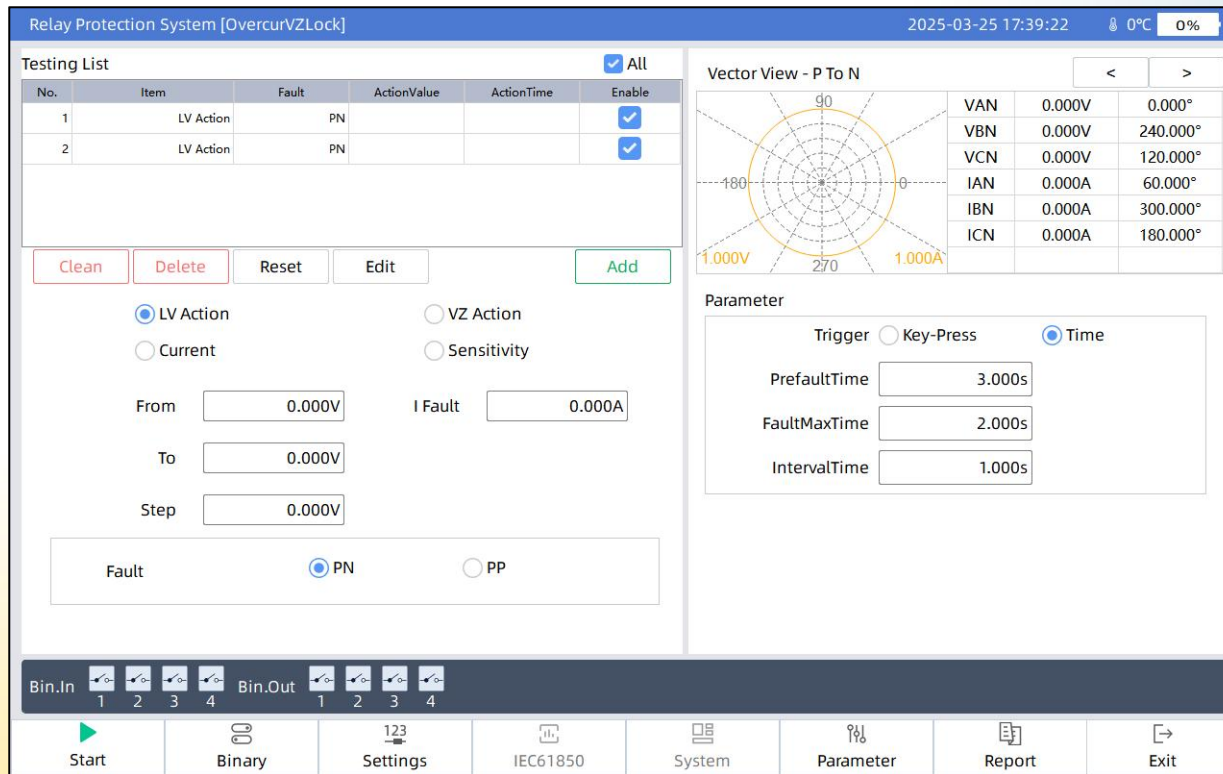
Software Interface - Distance Module



Software Interface - OvercurSeg&Overcur Zero Module



Software Interface - OvercurVZLock&OvercurAngle



Software Interface - Reclosure Test Module

Relay Protection System [Reclosure] 2025-03-25 17:41:07 0°C 0%

Testing List

No.	Item	TripA	TripB	TripC	Reclose	Sec.Trip
1	DistanceA-N					
2	DistanceA-N					

Clean Delete Reset Edit Add

☒ Distance ☐ Overcurrent ☐ OvercurZero

ZShort R ☒ 0.95 ☐ 1.05

Angle X ☒ Pos. ☐ Neg.

Model ☐ Trans. Fault Trans. Setting

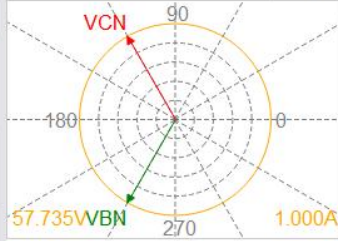
IShort ☒ Temporary ☐ Permanent

☒ A-N ☐ B-N ☐ C-N ☐ A-B

Fault ☐ B-C ☐ C-A ☐ A-B-N ☐ B-C-N

☐ C-A-N ☐ A-B-C

Vector View - P To N



	Load	Fault	Rec.	Trans.	Inter.
VAN		0.000V			0.000°
VBN		57.735V			240.000°
VCN		57.735V			120.000°
IAN		0.000A			0.000°
IBN		0.000A			0.000°
ICN		0.000A			0.000°

Parameter

GPS/IRIG-B Time Setting

Trigger Normal T

Fault Max T Interval T

Close Angle ☐ Set Close

Atten Const ☐ DC Offset

Bin. In 1 Bin. In 2

Bin. In 3 Bin. In 4

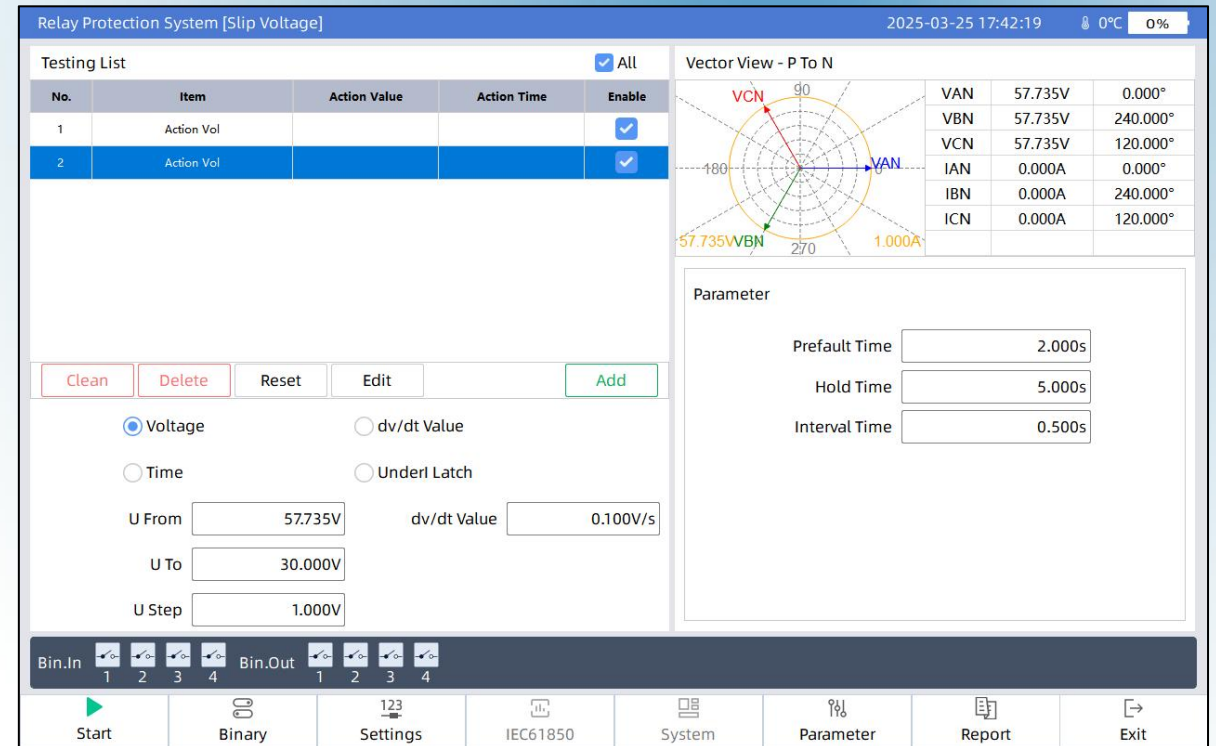
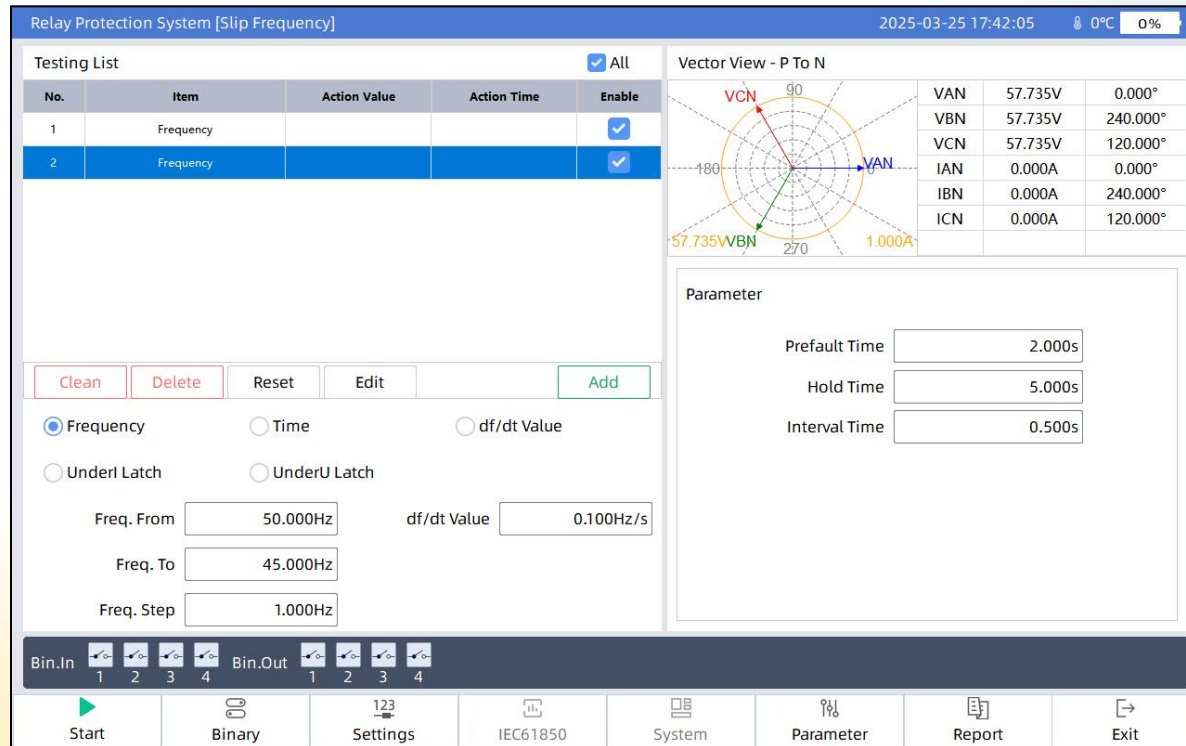
UX Setting

Bin.In ☐ ☐ ☐ ☐ Bin.Out ☐ ☐ ☐ ☐

1 2 3 4 1 2 3 4

Start Binary Settings IEC61850 System Parameter Report Exit

Software Interface - Slip Frequency & Slip Voltage



Software Interface - Optical Power Test Module

Relay Protection System [Optical Power]2025-03-25 17:44:080°C0%

SPF Info

SPF	Temperature	Tx Power	Rx Power
1	0.000 °C	0.000 dbm	0.000 dbm
2	0.000 °C	0.000 dbm	0.000 dbm
3	0.000 °C	0.000 dbm	0.000 dbm
4	0.000 °C	0.000 dbm	0.000 dbm

XADC Info

XADC	Rx Power
1	0.000 dbm
2	0.000 dbm

Exit

Software Interface - System Config

Relay Protection System [Configure] 2025-03-25 17:47:53 0°C 0%

Output Type ☒ IEC61850 Ed 1.0 ☐ IEC61850 Ed 2.0 Binary Type ☒ Relay Contact ☐ GOOSE

☒ Power Amp. ☐ Low-Level ☐ IEC61850-9-2

Power Amp.

Current Open Circuit Alarm Detection

Alarm Threshold 0.020A Power Manage Power save Output Link Type Continue Dither Time 0.015s

Current Port 6*20A Voltage Port 7*300V

Group-1 Group-2

L1 L2 L3 N L1-2 L2-2 L3-2 N-2

CL CURRENT OUT UT VOLTAGE OUT UT

Load from... Save as... Apply Exit

Relay Protection System [Configure] 2025-03-25 17:48:02 0°C 0%

Output Type ☐ Power Amp. ☒ Low-Level ☐ IEC61850-9-2 Binary Type ☒ Relay Contact ☐ GOOSE

Low-Level

Group 1 Group 2

☒ Sync Ports for Current Group ☒ Sync Ports for All Groups

	Setting Value	Output Value
VAN	8.000V	8000.0mV
VBN	8.000V	8000.0mV
VCN	8.000V	8000.0mV
IAN	8.000A	8000.0mV
IBN	8.000A	8000.0mV
ICN	8.000A	8000.0mV
VAuxN	8.000V	8000.0mV

Load from... Save as... Apply Exit

Relay Protection System [Configure] 2025-03-25 17:48:09 0°C 0%

Output Type ☐ Power Amp. ☐ Low-Level ☒ IEC61850-9-2 Binary Type ☒ Relay Contact ☐ GOOSE

IEC61850-9-2

Group 1 Group 2 Group 3 Group 4 Group 5 Group 6

☒ Sync Ports for Current Group ☒ Sync Ports for All Groups

	Setting 1st Value	Setting 2nd Value	Reference Value	Sample Value
VAN	110.000kV	100.000V	10.0mV	1
VBN	110.000kV	100.000V	10.0mV	1
VCN	110.000kV	100.000V	10.0mV	1
IAN	100.000A	1.000A	1.0mA	1
IBN	100.000A	1.000A	1.0mA	1
ICN	100.000A	1.000A	1.0mA	1
VAuxN	110.000kV	100.000V	10.0mV	1

Load from... Save as... Apply Exit

Software Interface - SV&GOOSE Config

Relay Protection System [SV/GOOSE Configure] 2025-03-25 17:49:54 0°C 0%

SV Output GOOSE Sub GOOSE Pub

☒ Output 1st Val. ☒ Output Zero Val. ☐ IEC61850-9-2LE Sample Rate Sync Mode

No.	APPID	IED Description	Channels	Delay	Select	Port	Detail
-----	-------	-----------------	----------	-------	--------	------	--------

Map To Group 1 Group 2 Group 3 Group 4 Group 5 Group 6 Edit Quality Set Inspect Non Quality

No.	Name	Type	Map	Quality Hex
-----	------	------	-----	-------------

SCD Import Scout Import Load Save Delete Clear Apply Exit

Relay Protection System [SCL Load] 2025-03-25 17:50:09 0°C 0%

Type ☒ SV ☐ GOOSE Clean

No.	APPID	IED Description	Type	Channels	Port	Verify	Select
-----	-------	-----------------	------	----------	------	--------	--------

DataSets Detail ☐ Ratio Sync. Changed ☐ Auto Ratio

No.	Name	Type	Primary	Secondary	Value	Quality
-----	------	------	---------	-----------	-------	---------

Start SCD Import Add to GOOSE Sub Add to GOOSE Pub Add to SV Output Exit

About KINGSINE

Established in **1999**, Kingsine Electric Automation Co., Ltd. has been dedicated to R&D, producing, and selling a range of high-quality electrical testing equipment. KINGSINE's product line includes Protection Relay Test Sets, CT Analyzers, Reference Power Sources and Calibrators, Voltage and Current Amplifiers, Electricity Monitoring Systems, and Instrumentation.

Over **13,000 units** of KINGSINE relay testers are running and highly praised in over **90 countries** such as USA, Germany, France, Canada, Italy, Japan, Dubai, Australia etc.

KINGSINE has successfully served clients including **ABB/EATON/GE/SEL/SIEMENS** etc. KINGSINE's products not only achieve globally recognized certifications such as CE and UL, but also come with a **3-year free warranty** and a targeted **product lifespan of over 15 years**.

KINGSINE Protection Relay Test Sets are compatible with world-renowned relay protection devices such as ABB, SIEMENS, ALSTOM, MITSUBISHI, Schneider, AREVA, SEL, GE, and others.

To better serve customers, KINGSINE have established a distribution network with partners in the Americas, Europe, Asia, the Middle East, and other countries, providing comprehensive services to meet the needs of clients.

www.kingsine.com

