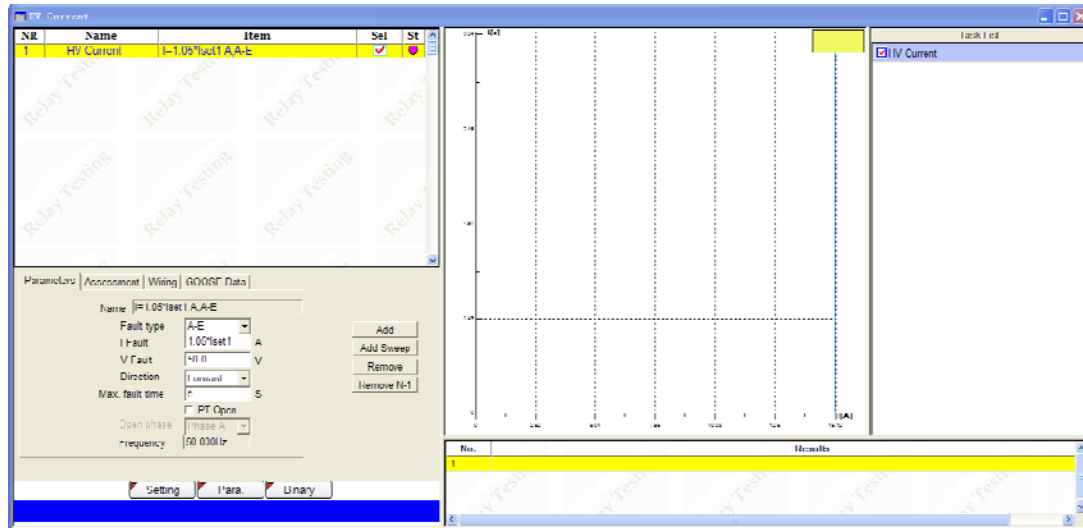


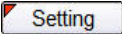
HV Current

This module is used to check over-current protection of high voltage relay.

It verifies the trip situation of over-current in every section (Such as $1.05 \times I_{set}$ and $0.95 \times I_{set}$). And it tests tripping time by a tripping current value (such as $1.2 \times I_{set}$). Also it tests PT open and voltage blocking value.



Set group settings

Click  button to enter into group setting page

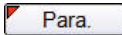
Group setting page is shown bellow

Name	Value	Variable
Iset1	8.000A	Iset1
Iset2	7.000A	Iset2
Iset3	6.000A	Iset3
Iset4	5.000A	Iset4
Iset5	3.000A	Iset5

Here we can set the values based on actual relay settings under test.

Iset1-Iset5: The 1st section to 5th section of current value

Set group parameters

Click  button to enter into group parameter page. Group test parameter page along with default settings is shown bellow

Name	Value	Variable
TPrefault	15.000S	PreFaultTime
Trigger Mode	Time	FaultTrigMode
PT at	Busbar	PTCON
CT Side	Line	CTPOINT
CB Sim.	No	BCSIMULATION
OpenTime	200ms	TripTime
CloseTime	100ms	CloseTime
Test Mode	IConst	TestMode
KE Mode	RERL_XEYL	K0Mode
KE or Re(KE)	0.670	K0A
Phi(KE) or Im(KE)	0.670	K0B
Zs	1.000Ohm	Zs
Phis	90.00deg	Phis
Ks Magnitude	0.670	Ks
Ks Angle	0.000	PhKs

Name	Value	Variable
Tprefault	30.000Sec	PreFaultTime
Tpostfault	2.000Sec	PostFaultTime
Trigger Con.	Time	FaultTrigMode
PT at	Busbar	PTCON
CT Polarity	Line	CTPOINT
CB Simu.	No	BCSIMULATION
Topen	200ms	TripTime
Tclose	100ms	CloseTime
Fault Inception Mode	random	FaultIncMode
Fault Angle	90.00deg	FaultAngle

TPrefault

Prefault time setting.

During this time the test set will supply normal system balance voltage.

Tpostfault

Postfault time setting.

During this time the test set will supply normal

system balance voltage.

Trigger Mode

There are four trigger modes can be selected here.

- Time
- Manual
- Bin. Input
- GPS

Time: Fault status comes immediately after prefault time is over

Manual: Fault status comes after we press



Bin. Input: Fault status comes immediately after binary input **H** senses the trigger signal

GPS: Fault status comes immediately after GPS pulse signal is received.

Note: GPS controlled test is available with optional **PGPS-2 GPS Synchronization Device**.

Please contact the manufacture for more information

PT at

Select it according to the actual PT installation position

- Busbar side
- Line side

CT polarity

Select it according to the actual CT polarity

- Busbar: polarity is toward busbar side
- Line: polarity is toward line side

CB Sim.

When optional **Circuit Breaker Simulator** is used we can need to select **Yes** here.

Open Time

Related to **CB Sim.**

Close Time

Related to **CB Sim.**

Note: Please contact the manufacture for more information about the optional **Circuit Breaker Simulator** and its application

Fault Inception Mode

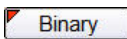
We can select the follow test modes.

- random: Random angle
- fixedangle: Fixed angle (fault Angle)

Fault Angle

The fixed angle of fault angle at beginning

Configure binary inputs

Click  button to enter into binary input configuration page

Name	Value	Variable
Bin. In1	TripA	KA
Bin. In2	TripB	KB
Bin. In3	TripC	KC
Bin. In4	Reclose	KD
Bin. In5	TripA	KE
Bin. In6	TripB	KF
Bin. In7	TripC	KG
Bin. In8	Reclose	KH
Trip Sel.	1234	KBinary

To simplify the wiring operation and reduce the preparation time before the test we have assigned each binary input here to a dedicated purpose.

Bin. In1	● TripA ● TripABC	
Bin. In2	● TripB	
Bin. In3	● TripABC	
Bin. In4	● Reclose	
Bin. In5	● TripA ● TripABC	
Bin. In6	● TripB ● TripABC	
Bin. In7	● TripC ● TripABC	
Bin. In8	● Reclose	
Trip Sel	● 1234 ● 5678	Select to use binary 1234 or 5678

TripA, TripB or TripC

Trip A	Criterion for phase A tripping
Trip B	Criterion for phase B tripping
Trip C	Criterion for phase C tripping
Rec	Criterion for reclosing
Sec. trip	Criterion for tripping after reclosing

If we select them then test set will sense the binary inputs for **TripA**, **TripB** and **TripC** separately and record their tripping time in the result.

Example: tripping time record with selection of **TripA**, **TripB** and **TripC**

No.	Results
1	Trip A=6.084s Trip B=8.697s Trip C=10.635s Reclosing=2.226s

In this example we can see the tripping time difference for phase A, B and C

TripABC

If we select them then test set will sense the binary inputs for **TripA**, **TripB** and **TripC** separately and record the latest tripping time as the tripping time for all three phase tripping

Example: tripping time record with selection of **TripABC**

No.	Results
1	Trip A=9.000s Trip B=9.000s Trip C=9.000s Reclosing=3.374s

In this example the tripping time is same for phase A, B and C

Set assessment criterion

Click **Assessment** to enter into criterion setting page

Parameters		Assessment	Wiring	Characteristic	Report Setting
Name	Setting	Criterion			
Trip A ☐ Ta<	0.2 AND ☐ Ta>	S			
Trip B ☐ Tb<	0.2 AND ☐ Tb>	S			
Trip C ☐ Tc<	0.2 AND ☐ Tc>	S			
Rec. ☐ Tr<	0.2 AND ☐ Tr>	S			
Sec. trip ☐ Ts<	0.2 AND ☐ Ts>	S			
Trip A	Reclose	Tf			
Trip B	Sec. trip	Tg			
Trip C	Te	Th			

Example 1:

Trip A ☒ Ta< AND ☐ Ta>

If phase tripping time is smaller than 0.2s the test result will be regarded as **Passed**

Example 2:

Trip A ☒ Ta< AND ☐ Ta> ☒ Ta>

If phase A tripping time meets the criterion of smaller than 0.2s and larger than 0.1s at the same time (**AND** logic) then the test result will be regarded as **Passed**

Example 3:

Trip A ☒ Ta< AND ☐ Ta>

If phase A does not have tripping then it will be regarded as **Passed**

Note: The value of 0 (or 0.001) represents **No Tripping**

Example 4:

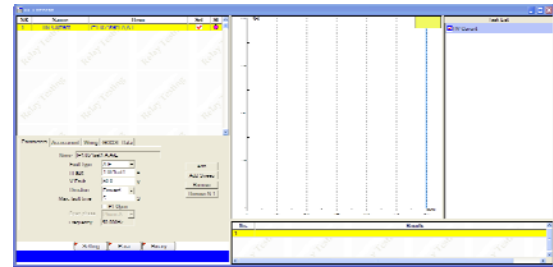
Trip A ☒ Ta< OR ☐ Ta> ☒ Ta>

If phase does not trip or if tripping time is larger than 5s (**OR** logic) then the test result will be regarded as **Passed**.

Above mentioned logic will happen when we test the relay with back up protection. If we set a very long fault time the back up protection may be activated. With this criterion we can still get the test result marked as **Passed**

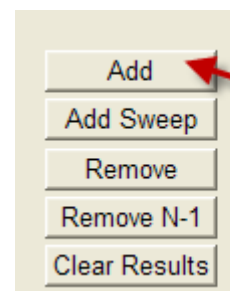
Add test point

One default test point will be added to the test list when we open the module.



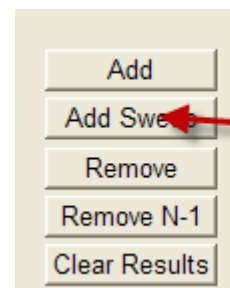
Direct Add

In the parameter page click **Add** to add a new test point



Click to add a new test point

Quick Add



Click to enter **sequence** page

Then we can see the following display window

At this moment the setting of the newly added point is same as the first one

Then we need to edit the setting for the newly added test point

NR	Name	Item	Sel	St
1	HV Current	I=1.05*Iset1 A,A-E	✓	●
2		I=5 A B-E	✓	●

Here we can select the test point by giving the percentage of the relay setting.

Example:

Here we have selected two points:

- **0.95**: 95% of the relay setting
- **1.05**: 105% of the relay setting

Note: The other settings and selections here are related to the test parameters. See [Set test parameters](#) bellow

Editing the added point

When we add a new test point we follow the procedure of **first add then edit**.

Example:

There is one existing test point before we add a new one

NR	Name	Item	Sel	St
1	HV Current	I=1.05*Iset1 A,A-E	✓	●

After we add one new point we can see it in the test list

NR	Name	Item	Sel	St
1	HV Current	I=1.05*Iset1 A,A-E	✓	●
2		I=1.05*Iset1 A,A-E	✓	●

Set test parameters

Editing from parameter page

For each test point we can set its test parameters on the parameter setting area

Name: I=1.05*Iset1 A,A-E

Fault type: A-E

I Fault: 1.05*Iset1 A

V Fault: 50.0 V

Direction: Forward

Max. fault time: 5 S

PT Open: ☐

Open phase: Phase A

Frequency: 50.000Hz

Buttons: Add, Add Sweep, Remove, Remove N-1, Clear Results

Fault type	Here we select the fault we want to simulate
I Fault	Here we set the I setting
V Fault	Here we set the angle of Z
Direction	● Forward: fault occurs in the forward direction ● Reversed: fault occurs in the reversed direction
Max. Fault time	This time includes three parts 1. time for the first fault 2. time for reclosing 3. time for the second fault time after reclosing
PT Open	Select PT open
Open phase	Select PT open phase
Frequency	Power frequency