FREJA 400-series
Relay Test System

- **Fully automated testing using FREJA Win software**
- **PC operated or stand alone using the intuitive graphic touch screen**
- **High current, high power output (60 A / 300 VArms) per phase**
- **FREJA 409 provides 3 x 120 A in three-phase configuration mode**
- **FREJA 406 provides 6 currents, and FREJA 409 provides 9 currents for transformer differential testing**
- **IEC 61850 test capabilities**

Description

The FREJA 400-series is a new member of the relay testing equipment from Megger, quick and easy to use. The rugged hardware design is built for field use over a wide temperature range, with the possibilities of intelligent software to perform rapid testing.

The instruments have the "smart" combination of high compliance voltage and high current to test all electromechanical, solid-state and numerical-based overcurrent relays, including voltage controlled, voltage restraint and directional overcurrent.

With three current generators and four voltage generators the instruments provides a complete three-phase test system for commissioning of three phase protection systems. The FREJA 406 can provide 6 current generation and FREJA 409 can provide 9 current generation by converting the voltage channels to currents. The generators also provide high power in both the voltage and current channels to test virtually all types of protection relays.

The FREJA 400-series test system has the ability to be manually controlled from the FREJA local, available as touch screnn interface. The local HMI, with its large, full color, high resolution, TFT LCD touch screen allows the user to perform manual, steady-state and dynamic testing quickly and easily using the manual test screen, as well as using built-in preset test routines for automatic testing. Menu screens and touch screen function buttons are provided to quickly and easily select the desired test function. Tests results can be saved in FREJA local memory and downloaded to a USB memory stick for transfer or print test reports.

For full automatic testing the FREJA Win software will be used with a PC. There are number of instrument programs to test any protection. Since the test set-ups/results are saved via regular Microsoft Explorer display, you can create your own test object structure.

Application

FREJA 400-series is intended primarily for secondary testing of protection relays. Virtually all types of protection relays can be tested.

Examples of what FREJA can test	ANSI® No.
Distance protection relay	21
Overfluxing relays	24
Synchronising or synchronism-check relays	25
Undervoltage relays	27
Directional Power relays	32
Undercurrent or underpower relays	37
Loss of field relays	40
Negative sequence overcurrent relays	46
Phase sequence voltage relays	47
Overcurrent-/ ground fault relays	50
Inverse time overcurrent-/ ground fault relays	51
Power factor relays	55
Overvoltage relays	59
Voltage or current balance relays	60
Directional overcurrent relays	67
DC overcurrent relays	76
Phase-angle measuring or out-of-step protection relays	78
Automatic reclosing devices	79
Frequency relays	81
Carrier or pilot wire	85
Differential protection relays	87
Directional voltage relays	91
Voltage and power directional relays	92

Current and voltage outputs

Each current channel is rated for 30 A at 200 VA continuous, up to 60 A at 300 VA for short durations. It has a unique flat power curve from 4 to 30 A that insures maximum compliance voltage to load at all times. Three currents in parallel provide up to 180 A at 900 VA for instantaneous operation tests. With a maximum compliance voltage of 50 V per phase, with just two channels in series provides 100 V of compliance voltage to test high impedance relays.

Each voltage channel can provide variable outputs of 0 to 300 V at 150 VA of output power, and has a unique flat power curve from 30 to 150 V insuring maximum output power to the load at all times. With the voltage channel converted to current, a FREJA 406 can provide 6 currents and a FREJA 409 can provide 9 currents for testing three phase current differential relays, including harmonic restraint transformer differential relays.

FREJA Local - without PC

The most significant feature of the Local HMI is its ability to provide the user with a very simple way to manually test, for both commissioning and maintenance, from the simple overcurrent relay to the most complex relays manufactured today. Manual operation is simplified through the use of a built-in computer operating system and the touch screen.

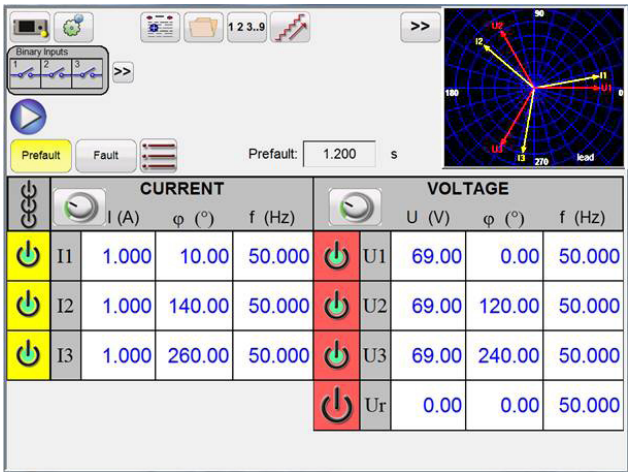
The FREJA Local eliminates the need for a computer when testing virtually all types of relays. Intuitive menu screens and touch screen buttons are provided to quickly and easily select the desired test function. The FREJA Local includes non-volatile built-in data storage for saving tests and test results. An USB port is provided for transferring test results by memory stick from your PC

Manual test screen

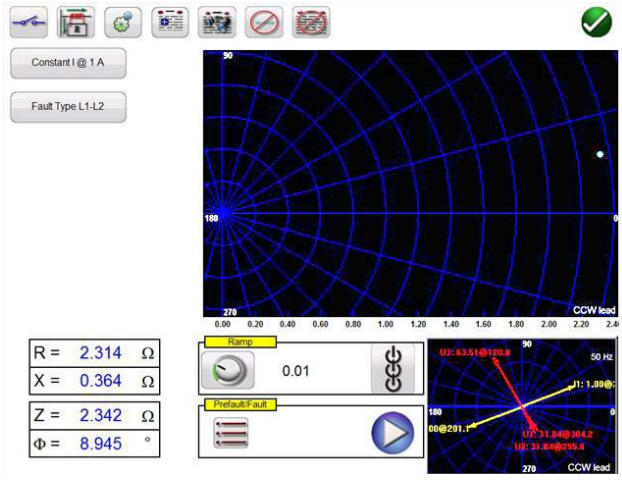
In the following manual test screen the pre-selected outputs are set using the touch screen, or power-up preset default values maybe automatically set from the user defined configuration screen. The user can select from a variety of test options including manual control using the control dial, a dynamic sequence of tests to include trip and auto reclose operations, an automatic ramp, pulse ramp, or pulse ramp binary search to determine pickup or drop out of relay contacts, or perform relay specific timing tests. By pressing the ON button, the selected output indicators will change colors indicating which outputs are energized.

A vector graph indicates the relative phase angles of all of the outputs. The user may select to have all output amplitudes metered to provide real time verification of all of the selected outputs, or have setting values displayed.

In the manual test screen the user can set prefault and fault values. The user can toggle back and forth between the two values to monitor contact activity. To do a simple timing test the user can set prefault time duration in seconds, and then press the blue play button. The prefault values will be applied for the prefault time, then change to the fault values and start the Timer running. When the relay trips, it will stop the timer, and may turn selected outputs off depending on the user set post-fault time.



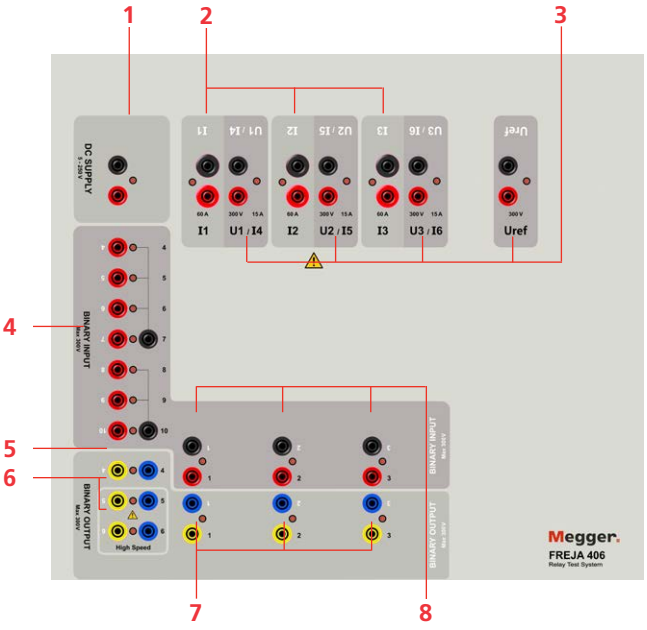
FREJA Local – Interface manual test screen, prefault – fault.

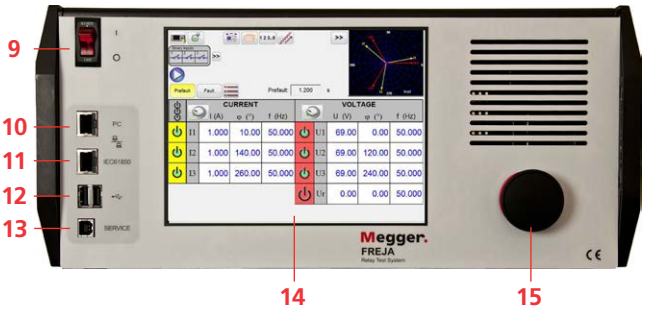


FREJA Local – Impedance menu

Features and benefits

1. **DC supply** Variable 5 to 250 V DC output at 100 W (4 A maximum).
2. **Current outputs**
   - FREJA 403
     Up to three channels 60 A at 300 VA per phase.
   - FREJA 406
     Up to 6 channels (3 x 60 A and 3 x 15 A).
   - FREJA 409
     Up to 9 channels (6 x 60 A and 3 x 15 A).
3. **Voltage outputs**
   - FREJA 403/406/409
     Up to four channels 300 V at 150 VA
   - FREJA 406/409
     Three channels convertible to currents 15 A at 120 VA per phase.
4. **Binary inputs 4, 5, 6, 7, 8, 9, 10.** Provides seven additional monitor circuits.
5. **Binary output 4** Rated for 300 V AC/DC, 8 A
6. **Binary outputs 5 and 6** High speed, AC/DC voltage rating of 400 volts peak, 1 ampere.
7. **Binary outputs 1, 2 and 3** Rated for 300 V AC/DC, 8 A
8. **Binary inputs 1, 2 and 3** Rated 5 to 300 V AC/DC.
9. **POWER ON/OFF switch** Illuminates when power is on.
10. **Ethernet port** The primary PC connection port.
11. **IEC61850** This port may also be used for connecting to the IEC 61850 substation bus for testing IEC 61850 devices.
12. **USB ports** Upgrade and retrive test report from local HMI.
13. **SERVICE port**
14. **Local HMI** TFT LCD , full color touch screen.
15. **Dial**
16. **Mains inlet socket** 100 to 240 V, 50/60 Hz.
17. **Protective earth terminal**





Generator configuration

	Current generators	Voltage generators	Operation modes
FREJA 403	3	4	4 voltages 3 currents (3 x 60 A)
			4 voltages 1 current (180 A)
FREJA 406	3 (6)*	4 (1)*	4 voltages 3 currents (3 x 60 A)
			4 voltages 1 current (180 A)
			1 voltage 6 currents (3 x 60 A + 3 x 15 A)
FREJA 409	6 (9)*	4 (1)*	4 voltages 6 currents (6 x 60 A)
			4 voltages 3 currents (3 x 120 A)
			4 voltages 2 currents (2 x 180 A)
			1 voltage 9 currents (6 x 60 A + 3 x 15 A)

* Three voltage channels converted to current (by configuration setting in local HMI)

FREJA Win

In FREJA™ Win, the all-round General instrument program serves as a convenient, easy to understand, user-friendly toolbox. On the Connect page, you can enter information about how to connect the relay, including pictures if so desired.

On the Sequence page, you can vary all generator parameters independently. You can have up to 25 different states (prefault, fault1, prefault, fault2, prefault, fault3 etc.). This is useful when testing autoreclose relays or motor protection. It's also possible to generate up to the 25th harmonic.

On the Ramp page, you can ramp all generator parameters independently. Amplitudes and angles are shown on a vector diagram, and values can be set using the knob on FREJA or the PC keyboard and mouse, on-line as well.

Distance instrument

Configuration page

The Distance instrument program is designed to test distance relays. On the Configuration page, you enter the number of zones that are to be tested and also the time and impedance tolerances, thereby creating an automatic test. No programming is needed. Later, when you recall this object via the Control center, all settings are re-established so that you can start testing immediately.

Connect page

On the Connect page you enter information about how to make connections to the relay, including pictures if so desired. Since this information is saved together with the object in the Control center, it can be displayed again the next time you want to test this relay.

Zt page

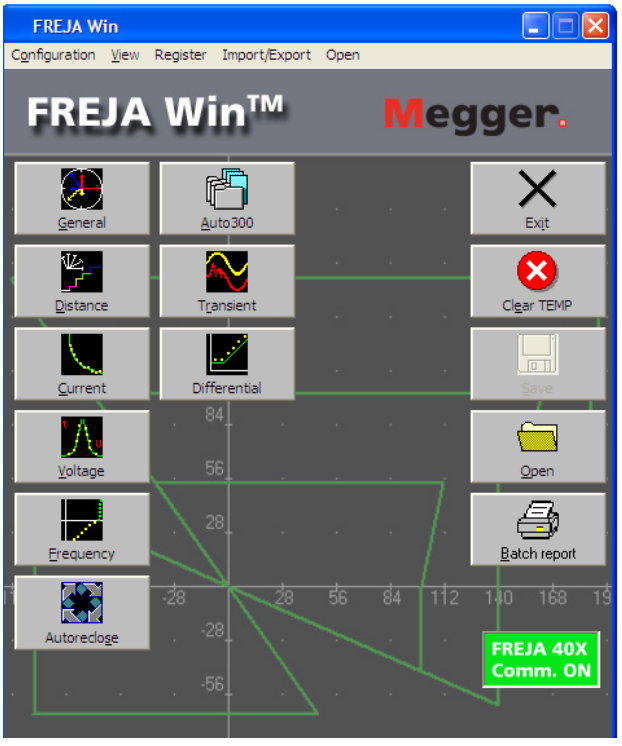
The Zt page is designed for time testing of a distance relay. Normally, you test one type of fault at a time when testing relays. With FREJA Win, however, you can test all seven fault types automatically if so desired. All you have to do is press the <Start> button. FREJA will test all seven fault types automatically and then compare the readings with the theoretical values that you entered on the Configuration page. If the readings are OK, a green lamp lights. If not, a red lamp lights. If you want to check the reverse direction, the test can start below zero ohms in the 3rd quadrant.

RX-ramp page

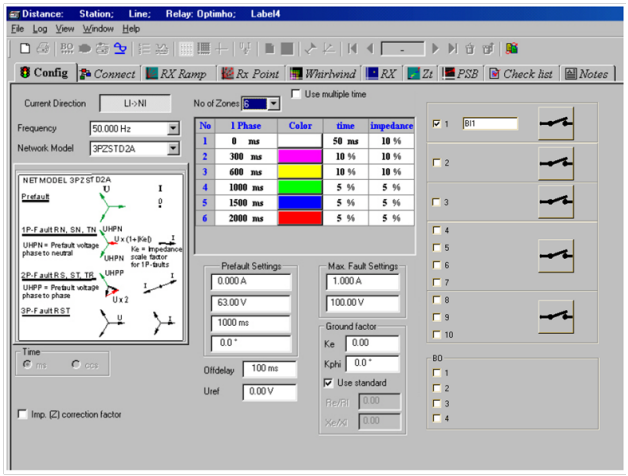
The RX-ramp page, which is part of the Distance instrument program, is designed to test the reach of a distance relay. First, you define the start and stop angles and the delta phi between the ramps. Then press the <Start> button and relax. FREJA will automatically test all seven types of faults using the timesaving "search-half" method. You can also define your own ramps, using the mouse to specify starting and ending points wherever desired. If you have defined a theoretical reference graph, the program will compare the actual test result with your graph and check for any deviations from the tolerances entered on the Configuration page. If the results are OK, a green lamp lights. If not, a red lamp lights.

RX page

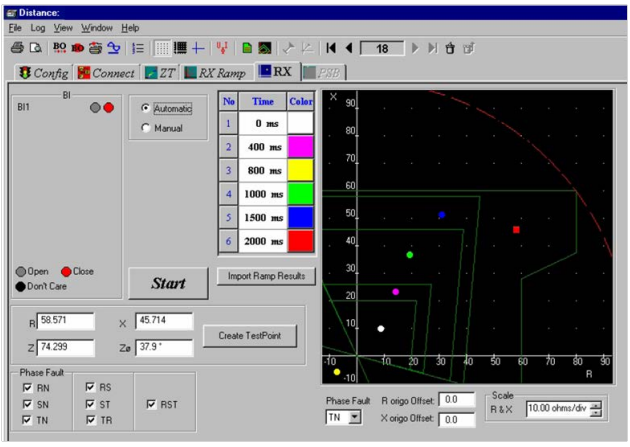
The RX page enables you to define test points manually. You can define different points on the oscilloscope using the mouse or keyboard. Select the automatic mode and press the <Start> button. FREJA will test all points for the selected fault types. The points will be assigned different colors, depending on the trip time. If you select the manual mode, you can use the dial to search for a boundary.



Control center



Distance, Config



Distance, Rx

Reference graphs

Efficient testing and performance analysis require well-defined reference values. FREJA can automatically create the IEC and IEEE® standard curves for overcurrent relays. It is also possible to create reference graphs in the impedance plane using the included library of distance relays made by major manufacturers and/or create other characteristics using the standard circular lens and linear elements (including mho, quadrilateral and ice-cream cone shapes).

The cut and paste buttons make it easy to take copies of the first zone and then edit these copies by inserting zone 2 and zone 3 values.

Some relay manufacturers can create a RIO-file with the settings of the relay. Using the FREJA RIO-converter you can create reference graphs based on these settings.

A feature is the ready-made current curves available for many relay types.

Current instrument

The Current testing instrument is designed to test all types of current relays, from electro-mechanic with or without an induction disc to modern numerical relays.

The Config page is where the relay settings will be entered.

In the Pick-up page the system will not just get the pick-up value (start current) but also the drop out and it will also calculate automatically the hysteresis.

The time test, check the trip time at different current values, will be done in the Time test page. A reference curve can be created in the same way as in Distance, by choosing the corresponding time curve and entering the settings. The time test can be run also in a logarithmic scale, time, current or both.

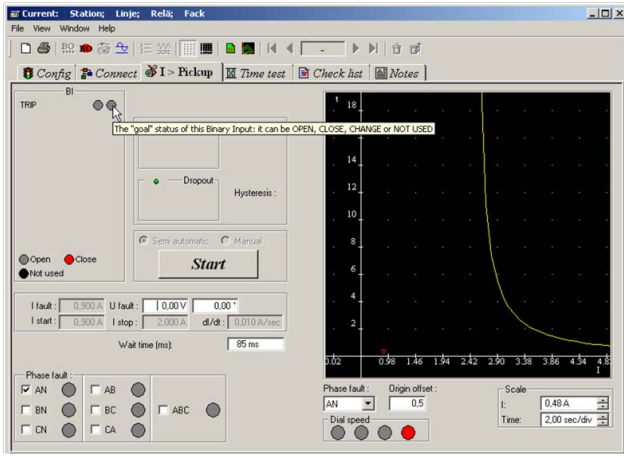
Voltage instrument

The Voltage testing instrument is designed to test all types of voltage relays, from electro-mechanic to modern numerical relays.

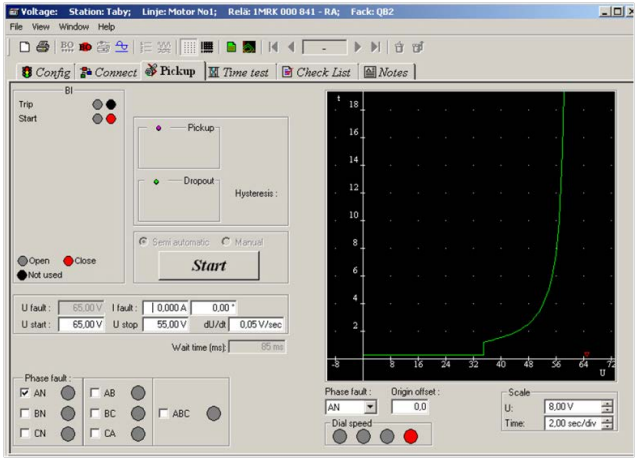
The Config page is where the relay settings will be entered.

In the Pick-up page the system will not just get the pick-up value (start voltage) but also the drop out and the hysteresis will be calculate automatically.

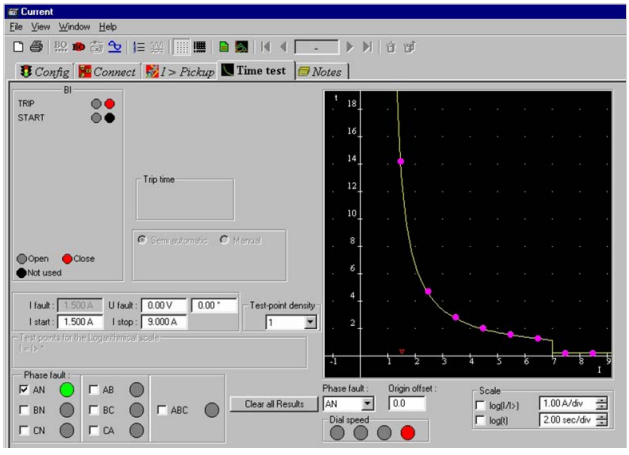
The time test, check the trip time at different voltage values, will be done in the Time Test page. A reference curve can be created in the same way as in Distance, by choosing the corresponding time curve and entering the settings. The time test can be run also in a logarithmic scale, time, current or both.



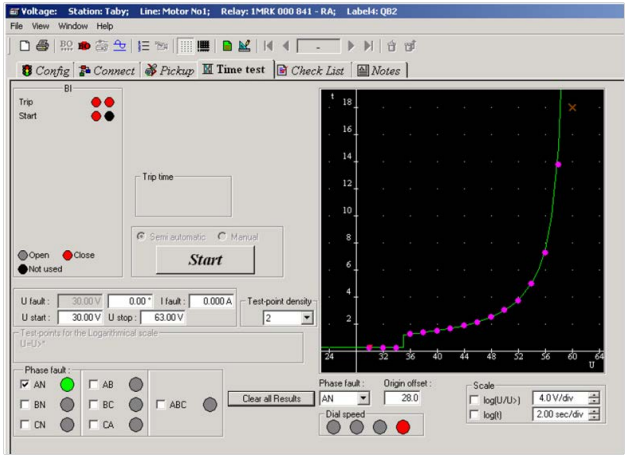
Current instrument, Pick-up



Voltage instrument, Pick-up



Current instrument, Time test



Voltage instrument, Time test

Frequency instrument

In the Frequency instrument a pre-fault an fault frequency can be generated manually in Manual page as well as an automatic sequence of pre-fault, fault, from a set start value to set stop value to Scan the trip time at different frequency values, useful for relays with two stages.

The Ramp mode will find the set fault frequency.

Autoreclose instrument

The Autoreclose instrument is a combination between Sequence in General and RX in Distance. This is just because it is easier to simulate pre-fault, energizing and dead times as vectors and in the same way it is easier to simulate a fault in a impedance plane.

This instrument will test any autorecloser function on today's modern relays.

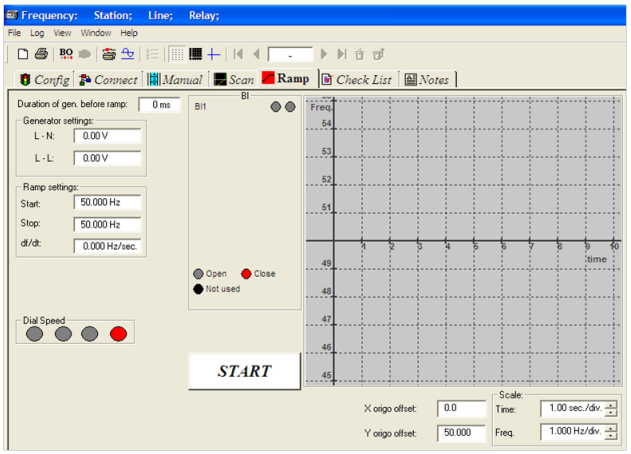
Auto 300

If we take as an example a modern distance relays has several functions activated, besides the distance elements.

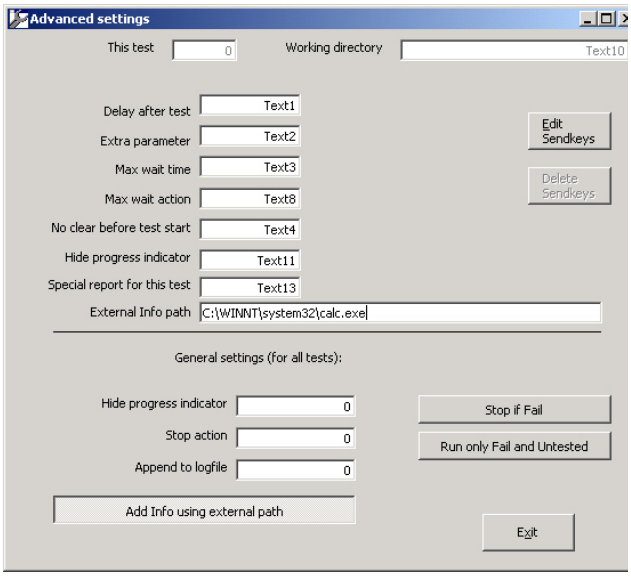
By using Auto 300 we can link together different tests made in different instruments, to create an automatic test sequence, so at the end we will have on test containing elements from Distance, Current, Sync and Voltage, for example.

Transient instrument

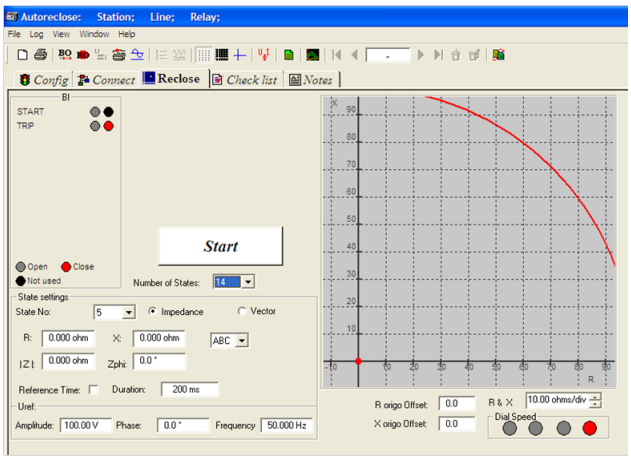
With the help of Transient, FREJA will generate (playback) a waveform recorded by a disturbance recorder. The file formats supported by Transient are COMTRADE, ASCII, EMTP WAX, EMTP PC and Inductic 65.



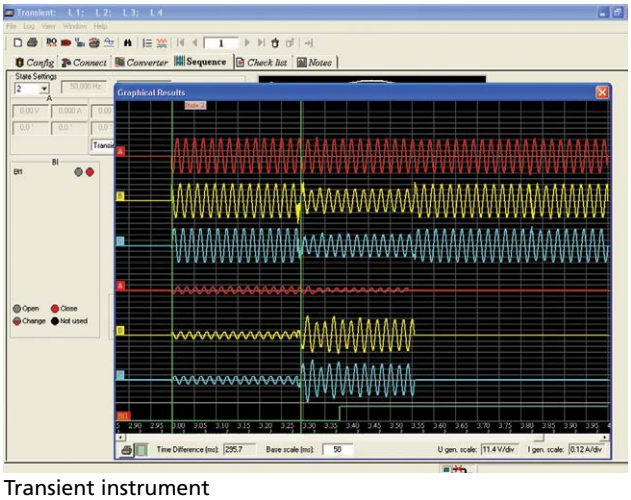
Frequency instrument, Ramp



Auto 300



Autoreclose instrument



Transient instrument

Differential instrument

The Differential instrument is designed to test transformer protection relays and works with FREJA 406, as it makes use of 6 current generators.

It can be used to test multi winding transformer protection relays, by testing a pair of windings at a time.

FREJA Differential can also be used to test differential generator protection relays and line differential protection relays.

The data for the protected power transformer are entered in a very intuitive way that cannot be misunderstood by the user. This is done by using buttons and icons that immediately show to the user the effect of his choices. The injected currents are shown both in primary and secondary values, depending on the entered current transformers information and star point earthing.

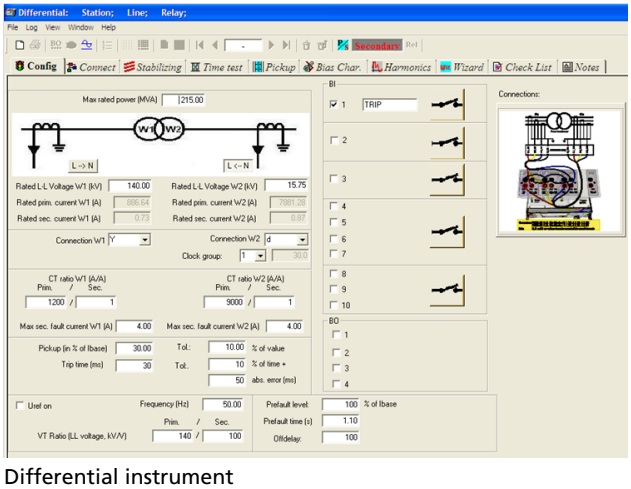
The Stabilizing page has the purpose of verifying that the connections and settings in FREJA are correct by generating external faults and verifying that the relay is stable. The operator is also requested to read the measured values by the relay and enter them in the test page. The values will then be reported in the final report.

The Time Test page allows to verify the operate time of the differential relay. Several fault injections can be programmed and the page reports the statistics of the measured operate times (minimum, maximum and average values).

The Pick-up page allows the test of the minimum operating current of the differential relay for each winding, which is a test on the sensitivity of the relay. This test also makes use of pseudo-continuous ramp injections.

In the page Bias Characteristic it is possible to test the operating relay characteristic by running pseudo-continuous ramps (for testing the static accuracy of the relay) or ramps done by sequences of pre-fault and fault steady state simulations, called as “binary search”, more suitable for commissioning tests. The characteristic can be tested with or without making use of the reference graph.

The Harmonics page verifies the relay capability of not issuing the trip signal for faults in the trip area of the restrained characteristic, when a certain level of harmonics is present in the fault currents, for each winding of the power transformer. The purpose of this feature is to keep the relay stable during transformer energising or during transformer overexcitation



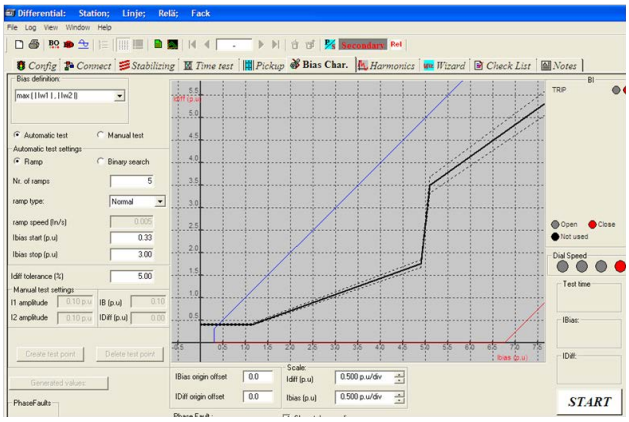
Differential instrument

A very important test, introduced by Programma for the first time, is called Wizard. It will help discovering wrong settings for the differential transformer relays that might cause unwanted trip for external ground faults.

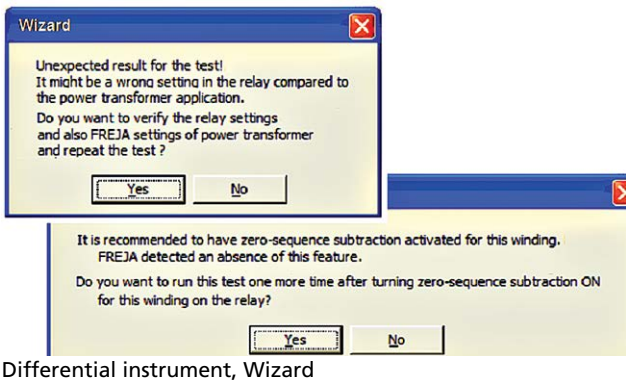
The Wizard will ask important and clear application questions to the relay engineer and will perform some simple tests on the relay in a semi-automatic manner. Depending on the application information entered by the user, the Wizard will report if the relay seems to be correctly set or not with a clear information to the user.

IEC 61850 GOOSE

The FREJA with the GOOSE enabled, in conjunction with the Megger GOOSE Configurator (MGC) software, can be used in the testing or commissioning of IEC 61850 compliant devices.



Differential instrument, Bias Char.



Differential instrument, Wizard

Specifications FREJA 400-series

Specifications are valid for resistive load, nominal voltage supply and ambient temperature +25°C ±3°C, (77°F ±5.4°F) after 30 minutes warm up time. All hardware data are for full scale values. Specifications are subject to change without notice.

Environment

Application field	For use in high-voltage substations and industrial environments.
Temperature	
Operating	0°C to +40°C (32°F to +104°F)
Storage & transport	-25°C to +70°C (-13°F to +158°F)
Humidity	5% – 90% RH, non-condensing
Altitude (operational)	3000 m Full duty cycle up to 2000 m. Duty cycle limitation based on internal over temperature protection for altitudes >2000 m.

CE-marking

EMC	EN 61326:2006
LVD	EN/IEC 61010-1:2001 (Second Edition)

General

Mains input	100 – 240 V AC, 50–60 Hz
Power consumption	2400 VA
Dimensions	
Instrument	400 x 175 x 420 mm (15.7" x 6.9" x 16.5")
Transport case	514 x 499 x 280 mm (20" x 19.7" x 11")
Weight	
Instrument (403, 406)	18 kg (39 lbs)
Instrument (409)	21 kg (46 lbs)
Transport case	10 kg (22 lbs)
Display	LCD
Available languages	English, French, German, Spanish,
Communication Interfaces	Ethernet

Measurement section

Binary inputs – Start/Stop/Monitor gate

To monitor operation of relay contacts or trip SCR, continuity light is provided for the input gate. Upon sensing continuity the lamp will glow. In addition to serving as wet/dry contacts the Binary Inputs may be programmed to trigger binary output sequence(s).

Input Rating	< 300 V AC / DC

Timer

The Timer-Monitor Input is designed to monitor and time-tag inputs, like a sequence of events recorder. In addition, the binary input controls enable the user to perform logic AND/OR functions, and conditionally control the binary output relay to simulate circuit breaker, trip, reclose and carrier control operation in real-time. The Timer function displays in Seconds or Cycles, with the following range and resolution:

Seconds	0.0001 to 99999.9 (Auto Ranging)
Cycles	0.01 to 99999.9 (Auto Ranging)
Inaccuracy	
Typical	±0.001% of reading
Maximum	±2 least significant digit, ±0.005% of reading from 0 to 40°C

Binary outputs

Independent, galvanically isolated, output relay contacts to accurately simulate relay or power system inputs to completely test relays removed from the power system. The binary output simulates normally open/normally closed contacts for testing breaker failure schemes. The binary output can be configured to change state based on binary input logic.

High current output relays: Output 1,2 and 3.

AC Rating (maximum values)	400 V, 8 A, 2000 VA
DC Rating (maximum values)	300 V, 8 A, 80 W
Response Time	< 10ms

High speed output relays

AC/DC Rating	400 V peak, 1 A (max)
Response Time	< 1 ms typical

DC supply

The FREJA 406 includes a battery simulator with a variable DC output voltage ranging from 5 to 250 V at 100 W, 4 A max, providing capability to power up relays with redundant power supplies. Voltage output is controlled via FREJA Local

Generation section

Each output channel can generate a variety of output waveforms such as: DC; sine wave; sine wave with percent harmonics at various phase angles; half waves; square waves with variable duty cycles; exponential decays; periodic transient waveforms from digital fault recorders, relays with waveform recording capability or EMTP/ATP programs, which conform to the COMTRADE standard format.

Protection

Voltage outputs are protected from short circuits and thermally protected against prolonged overloads.
Current outputs are protected against open circuits and thermally protected against prolonged overloads.

Metering

Measured output quantities such as AC/DC V/A, and time may be simultaneously displayed on the large, color TFT LCD touch screen. The AC and DC outputs display the approximate voltage/current output prior to initiation of the outputs.

AC Voltage amplitude

Inaccuracy	±0.05 % reading + 0.02 % range typical, ±0.15 % reading + 0.05 % range maximum
Resolution	0.01
Measurements	AC RMS
Ranges	30, 150, 300 V

AC Current amplitude

Inaccuracy	±0.05 % reading + 0.02 % range typical, ±0.15 % reading + 0.05 % range maximum
Resolution	0.001 / 0.01
Measurements	AC RMS
Ranges	30, 60 A

DC Voltage amplitude

Inaccuracy	0.1% range typical, 0.25% range maximum
Resolution	0.01
Measurements	RMS
Ranges	30, 150, 300 V

DC Current amplitude

Inaccuracy	
Typical	*±0.05 % reading + 0.02 % range*
Maximum	*±0.15 % reading + 0.05 % range*
Resolution	*0.001 / 0.01*
Measurements	*RMS*
Ranges	*30 A*

Convertible source in AC Current mode

Inaccuracy	
Typical	*±0.05 % reading + 0.02 % range*
Maximum	*±0.15 % reading + 0.05 % range or ±12.5 mA whichever is greater*
Resolution	*0.001*
Measurements	*ACrms*
Ranges	*5 A, 15 A*

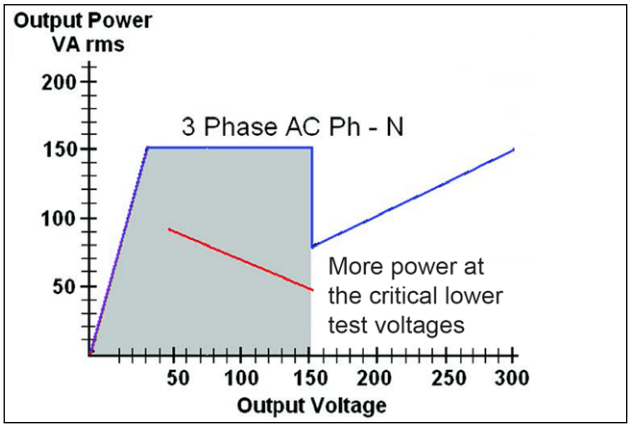
Outputs

All outputs are independent from sudden changes in mains voltage and frequency, and are regulated so changes in load impedance do not affect the output. All amplifier outputs are galvanically isolated.
FREJA 406 with 3 convertible voltage to current generators can provide up to six current sources; three high current/high power, and three convertible channels providing lower current/high power.

Voltage outputs

Range (AC)	*Power (VA)*	*Current (max)*	*Duty Cycle*
30 V	150 VA	5 A	Continuous
150 V	150 VA	Variable*	Continuous
300 V	150 VA	0.5 A	Continuous
Range (DC)	*Power (W)*		*Duty Cycle*
0 – 300 V	150		Continuous

* PowerV™ voltage amplifier output current varies depending on the voltage setting on the 150 Volt range, see curve.



"PowerV" Voltage amplifier output power curves

PowerV™ Voltage amplifier - Extended power range

The FREJA voltage amplifier provides a flat power curve from 30 to 150 V in the 150 V range to permit testing of high current applications such as panel testing.

Voltage amplifier in current mode (FREJA 406/409)

The voltage amplifier is convertible to a current source with the following output capability. Output power ratings are specified in rms values and peak power ratings.

Output (A)	Power (VA)	Voltage (max)	Duty cycle
5	150 (212 peak)	30.0 Vrms	Continuous
15	120	8.0 Vrms	90 Cycles

Phase angle

Range	*0.00° to 359.99° counter clock wise, or clock wise rotation or 0.00° to ±180.00°*
Inaccuracy (at 50/60 Hz)	*±0.02° typical ±0.25° max*

Frequency

The output modules provide a variable frequency output with the following ranges and accuracy.

Ranges

DC	0.001 to 1000.000 Hz

Output amplifiers can provide transient signals with a range of DC to 10 kHz for transient playback using COMTRADE files.

*Resolution**	0.0001/0.001 Hz
Frequency inaccuracy 0° to 40°C, at 50/60 Hz	*Typical 2.5 ppm Maximum 25 ppm*
Total harmonic distortion at 50/60 Hz	*< 0.1% typical 2% maximum*

Current outputs

The per channel output current and power ratings are specified in ACrms values and peak power ratings.

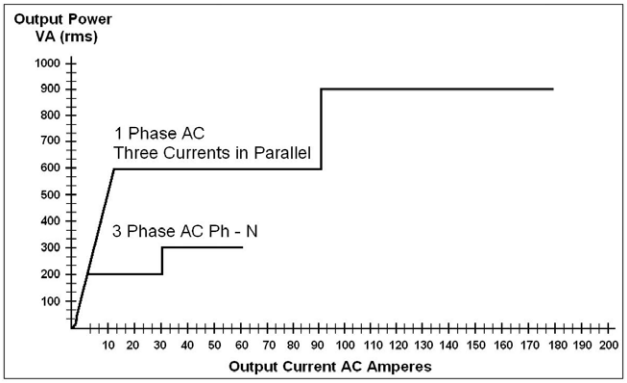
Output (AC)	*Power (VA)*	*Vrms (max)*	*Duty Cycle*
1 A	15	15.0	Continuous
4 A	200 (282 peak)	50.0	Continuous
15 A	200 (282 peak)	13.4	Continuous
30 A	200 (282 peak)	6.67	Continuous
60 A	300 (424 peak)	5.00	90 cycles
120 A*	600 (848 peak)	5.00	90 cycles
Output (DC)	**Power (VA)**		**Duty Cycle**
0 – 30 A	200 W		Continuous

With three currents in parallel

Output (A)	Power (VA)	Vrms (max)	Duty Cycle
12	600 (848 peak)	50.0	Continuous
45	600 (848 peak)	13.4	Continuous
90	600 (848 peak)	6.67	Continuous
180	900 (1272 peak)	5.00	90 cycles

With two currents in series

The compliance voltage doubles to provide 4.0 A at 100 Vrms.



Current amplifier output power curve

Current Amplifier - Extended Power Range

The FREJA current amplifier provides a unique flat power curve from 4 to 30 A per phase to permit testing of electromechanical high impedance relays, and other high burden applications, with an extended operating range up to 60 A at 300 VArms.

* 3 x 120 A only for FREJA 409

Optional accessories

Test lead set, GA-00033

GPS200 – MGTR GPS unit with accessories

Ordering information

Item	Art. No.
FREJA 403 Standalone Excl. FREJA Win, excl. soft case, excl. test leads	CF-39000
FREJA 403 (with soft case) Incl. FREJA Win, soft case, test leads (GA-00033)	CF-39090
FREJA 403 (with flightcase) Incl. FREJA Win, flightcase, test leads (GA-00033)	CF-39091
FREJA 406 Standalone Excl. FREJA Win, excl. soft case, excl. test leads	CF-49000
FREJA 406 (with soft case) Incl. FREJA Win, soft case, test leads (GA-00033)	CF-49090
FREJA 406 (with flightcase) Incl. FREJA Win, flightcase, test leads (GA-00033)	CF-49091
FREJA 409 Standalone Excl. FREJA Win, excl. soft case, excl. test leads	CF-59000
FREJA 409 (with soft case) Incl. FREJA Win, soft case, 2x test leads (GA-00033)	CF-59090
FREJA 409 (with flightcase) Incl. FREJA Win, flightcase, 2x test leads (GA-00033)	CF-59091
Optional	
FREJA Win Software	CF-8203X
FREJA Win upgrade	CF-8282X
MGC IEC 61850 Megger GOOSE configuration software	CF-8401X

Item	Art. No.
Optional accessories	
Multicable	GA-00105
Flight case	GD-00265
Soft case	GD-00315
Test lead set With touch-proof contacts. 4 x 0.25 m (0.8 ft) / 2.5 mm^2 2 x 0.5 m (1.6 ft) / 2.5 mm^2 10 x 2 m (6.5 ft) / 2.5 mm^2 Weight**:** 1 kg (2.2 lbs).	GA-00033
GPS200 – MGTR The GPS receiver GPS200 – MGTR makes it possible to synchronize two or more FREJA to conduct end-to-end testing. End-to-end testing provides quick, reliable results showing how two or more protection relay systems interact. The unit comes with a 15 m (50 ft) cable and an allweather antenna. Longer cables can be ordered.	CF-90150
Cable organizer Velcro straps, 10 pcs.	AA-00100

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