NOJA POWER®

ITS-04 Example Configuration Guide

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Revision History

Rev	Author	Date	Comment
00	BM	14/8/2018	Initial release

General Information

The Interface Test Set (ITS-04) is used as a link between an OSM Controller and a separate Secondary injection test source. The device applies transformations to mimic the output of the Recloser Current and Voltage sensors of the 310, 300 and 210 series OSM reclosers. It can be connected to the OSM Control Cubicle and OSM Tank for testing purposes. When used in conjunction with a power system and three phase test set, it can be used to conduct various protection and commissioning tests.

This document describes an example connection setup to run basic secondary injection tests of Current and Voltage into a NOJA Power RC controller configured for an OSM15 (11kV).

The setup shown is an example only and a variations may be required for specific testing or device applications.

Equipment and Tools Required

- RC10 or RC15 controller
- ITS-04 Interface Test Set with the supplied short unarmoured Control Cable.
- Secondary injection source. Ideally a 3 phase Current and 3-6 channel Voltage capability.
- Appropriately rated leads with banana connections.
- Compatible CMS software and PC

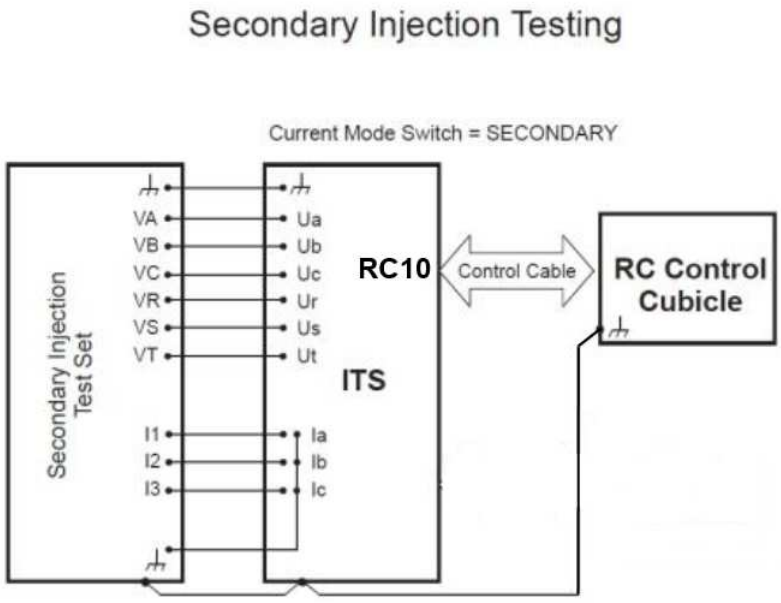
Procedure

Warning: Do not inject current into the ITS unit unless the control cable is connected to the ITS and OSM Control Cubicle.

Follow all local Electrical laws and regulations.

Connect equipment as per the below diagram.

For this example the Controller and Protection Relay settings will be under test.
The OSM tank will not operate and the OSM CTs and Sensors will not be used.

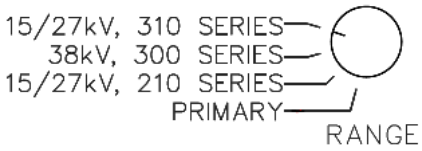


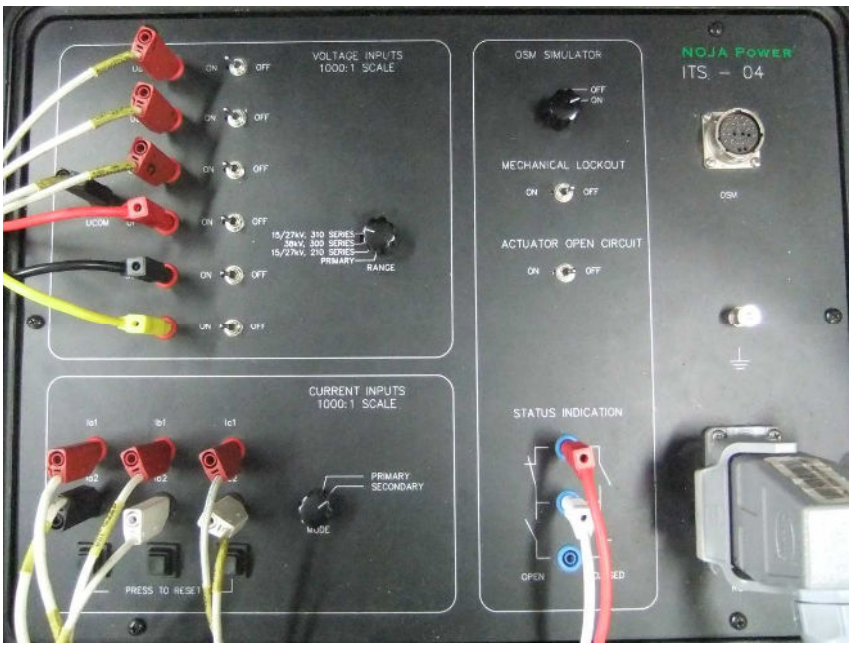
Recommended default settings for OSM15 RC testing.

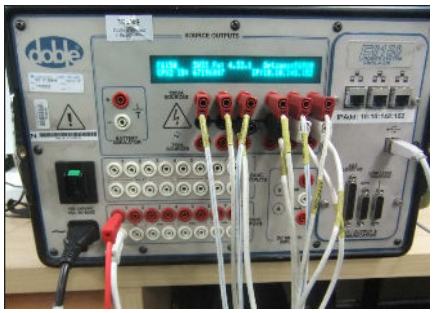
Setting	Recommended position
Voltage Input Range	15/27kV, 310 series
Voltage Channel Switches	ON
Current Input Mode	Secondary
OSM Simulator	ON
Mechanical Lockout	OFF
Actuator Open Circuit	OFF

- Injection ratio = 1000:1 scale
- Inject 6.4 Volts for 11kV phase to phase Voltage. Do *Not* inject above 50V.
- Inject 0.1 Amp for 100A Current. Max current = 16A for 3 seconds.
- Tank Simulator Operating Time <50ms (same as an OSM Tank)

- Status indications report open or closed signals to the injection set, which will stop or start the test steps.

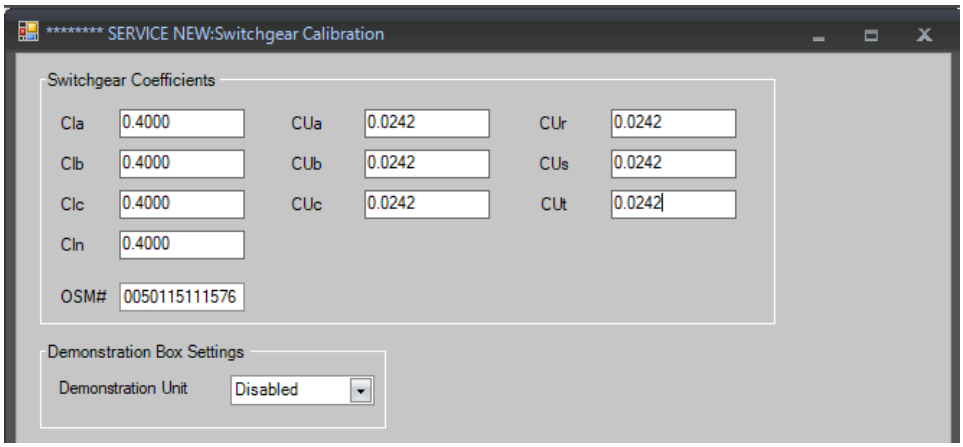






Calibration data for the paired tank is configured during factory routine testing.
An example of UPLOADED Switchgear Calibration for an OSM15-310 series recloser tank.

The calibration data applies to the OSM tank and RC not the ITS. If the correct OSM range is selected then calibration is accurate enough for standard testing. How to calibrate to an ITS is covered at the end of the document.



Inject some Normal Current and Voltage values (no fault) for a metering check and verify on Panel they are in the expected range.

Panel Navigation

[Turn Panel ON] ⇒ [SYSTEM STATUS]

[Measurements] ⇒

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CURRENTS AND VOLTAGES

Voltages (kV):
A    6.3    B    6.3    C    6.3
R    6.3    S    6.3    T    6.3

AB   11.0   BC   11.0   CA   11.0
RS   11.0   ST   11.0   TR   11.0

Currents (A):
A    100    B    100    C    100
N     0
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- The device must be Closed for Current to flow.
- The Device position can be confirmed from the RC Panel or CMS software.
  Open or Close can be made from the Panel or CMS Software.
- If the OSM Simulator is ON, the device must be Open when testing Mechanically Lockout. If the device in a closed position prior to setting Mechanically Lockout then the "OSM Limit Switch Fault" malfunction will be displayed and both the Open and Closed LEDs go Off.
- The device must be Open for all 6 voltage sensors to be active.
- Injected values should accurately simulate real feeder conditions.
  For example, Stop Current injection when the devices opens. Use 6 Voltage inputs for best results if using Voltage dependant features such as ABR, ZSC, UV elements, VRC. Be wary of bridging ABC Voltage to RST side as Voltage will still be present on the Load side when device is open. This would not be realistic in a Radial network situation.
- Look for the 'AR Reset' to appear in Event log before injecting an Auto Reclose sequence test.

Ratings	
Frequency	50/60Hz
Operating Temperature	0-55°C
Humidity	98%
Altitude	1000m
Degree of Protection	IP40
Weight	15.0kg
Dimensions	490x365x190mm
Tank Simulator Operating Time	<50ms
Current Channels	
Current Simulation Channels	3
Input Current Range AC	0-16A (3 seconds max)
Rated Short-Time Thermal Current (1sec)	16A
Secondary Injection Conversion Ratio	1A - 1kA
Voltage Channels	
Voltage Simulation Channels	6
Input Voltage Range AC	0-50V max
Voltage Conversion Ratio	1V - 1kV

Calibrating to an ITS

For some very high accuracy tests calibrating the RC controller to the ITS can be done.

Existing OSM calibration data should be *Uploaded* as a first step. These settings will need to be reloaded into the Controller at the end of the testing so correct measurements are reported by the controller and OSM Tank in the field.

Inject a known quality of Current and Voltage into the ITS from a *Calibrated* source.

Base Frequency		50 Hz
Amplitude	Phase	Frequency
6.35 V	0.0°	50 Hz
6.35 V	240.0°	50 Hz
6.35 V	120.0°	50 Hz
0.500 A	0.0°	50 Hz
0.500 A	240.0°	50 Hz
0.500 A	120.0°	50 Hz

Calculate the correct switchgear Coefficients through the following equation:

$$C_{Calibrated} = \left(\frac{C_{Current}}{A_{Panel}}\right) A_{Desired}$$

where:

$C_{Calibrated}$ = *The corrected calibration coefficient to be downloaded to the RC10*
$C_{Current}$ = *The current calibration coefficient already loaded into the device*
A_{Panel} = *The voltage or current reading taken from the panel during injection*
$A_{Desired}$ = *The voltage or current value which is injected*

Download the calculated coefficients and then test the measurements report as expected. Adjust if required.

Conduct test then reload original OSM tank calibration once complete.