Synchronization Check Relay ARGUS 7

Prepared by Qaisar Wali Khan, Testing Engr., ThyssenKrupp Xervon.

Table of Contents

Secondary injection tests:

1. Connect Red phase of FREJA as your “Line” voltage.
2. Connect “Uref” of FREJA as your “BUS” voltage.
3. Insert your test plug and make connections as per drawing.
4. Go to the HMI of the relay press DOWN arrow and scroll through the menu to change different settings of parameters.
5. To change settings of any parameter, press RIGHT arrow and you will enter in a specific setting menu.
6. Now press enter and you can change its value.
7. Now use up, down and right arrow to change any value to a specific value.

Phase Angle Test:

CS PHASE ANGLE:

1. Make the settings under menu “CHECK SYNCH MENU”.
2. Set the angle as per format.
3. Keep “System Split” disable.
4. Now to configure O/P contact on CS (Check Synchronization), go to HMI of the relay and press DOWN arrow 6 times unless you reach “O/P relay configuration”. Now configure any contact on “Check Synchro” and connect your buzzer on this contact.
5. Now inject in such a way that frequency of “Uref” and “R” is kept at 60 Hz and voltage at rated i.e. 63.5 and angle of “LINE” i.e. our red phase is increased from zero to a value greater than setting.
6. Now decrease the angle of LINE voltage and note the pick up value of O/P contact. Now increase the value of angle such that contact D/O. Note this value as well.
7. Now keep the LINE angle at zero and change BUS angle i.e. “Uref” from zero to a value greater than set value and now decrease to note the P/U value and again increase to note the D/O value.

SS PHASE ANGLE:

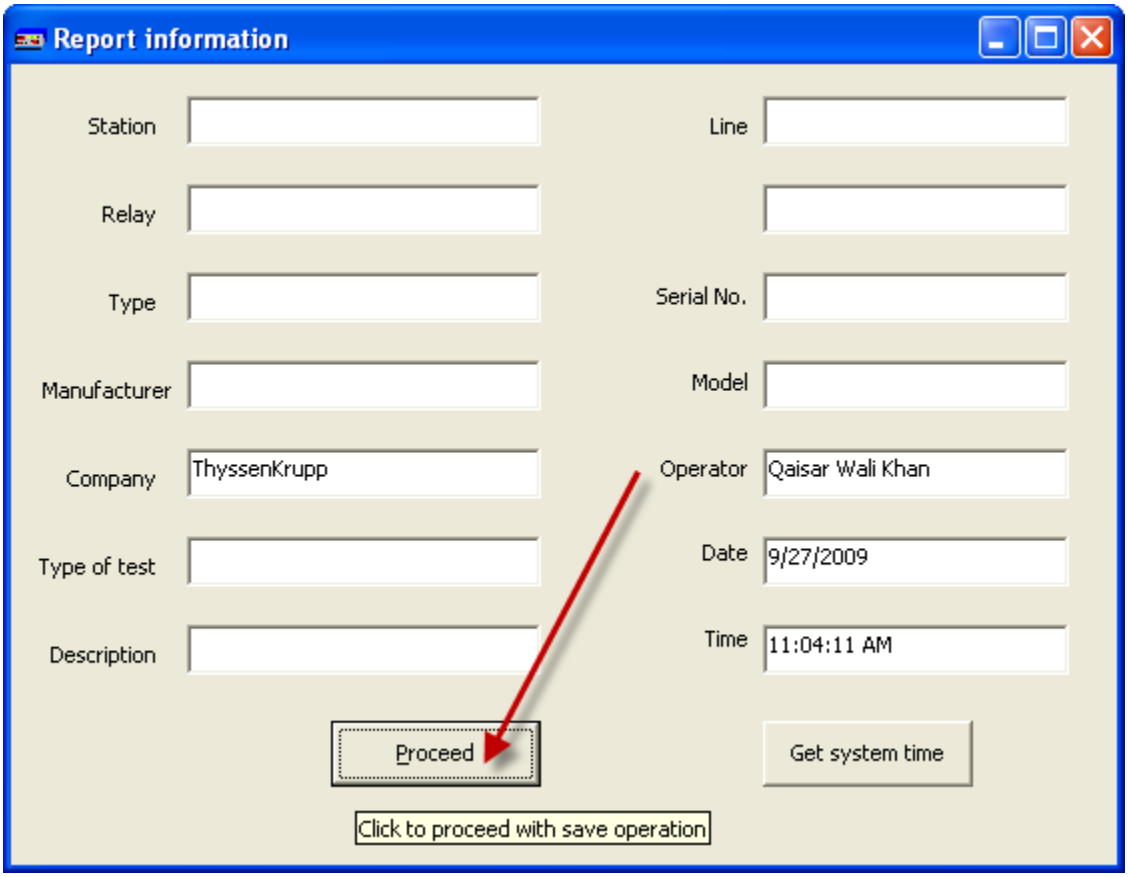
1. Go to “CHECK SYNCH MENU” and make “SYSTEM SPLIT” enable and make the angle 90 degree e.g.
2. Now to make the setting of “SYSTEM SPLIT” go to menu “SYSTEM SYNC” and set your values here.
3. Now again to configure O/P contact go to HMI of the relay and press DOWN arrow until you reach “O/P RELAY CONFIG” press right arrow to enter and on any relay e.g. on “REL4” press “ENTER” and now select this output on “SYSTEM SYNC”.
4. Now increase first LINE angle and make it greater than 90 degree or whatever the angle setting for “SS” such that SYSTEM SPLIT LED appears on the relay.
5. Now decrease the angle so that our contact picks up. Note this value.
6. For SYSTEM SPLIT PHASE ANGLE no D/O value exists.

SLIP FREQUENCY TEST:

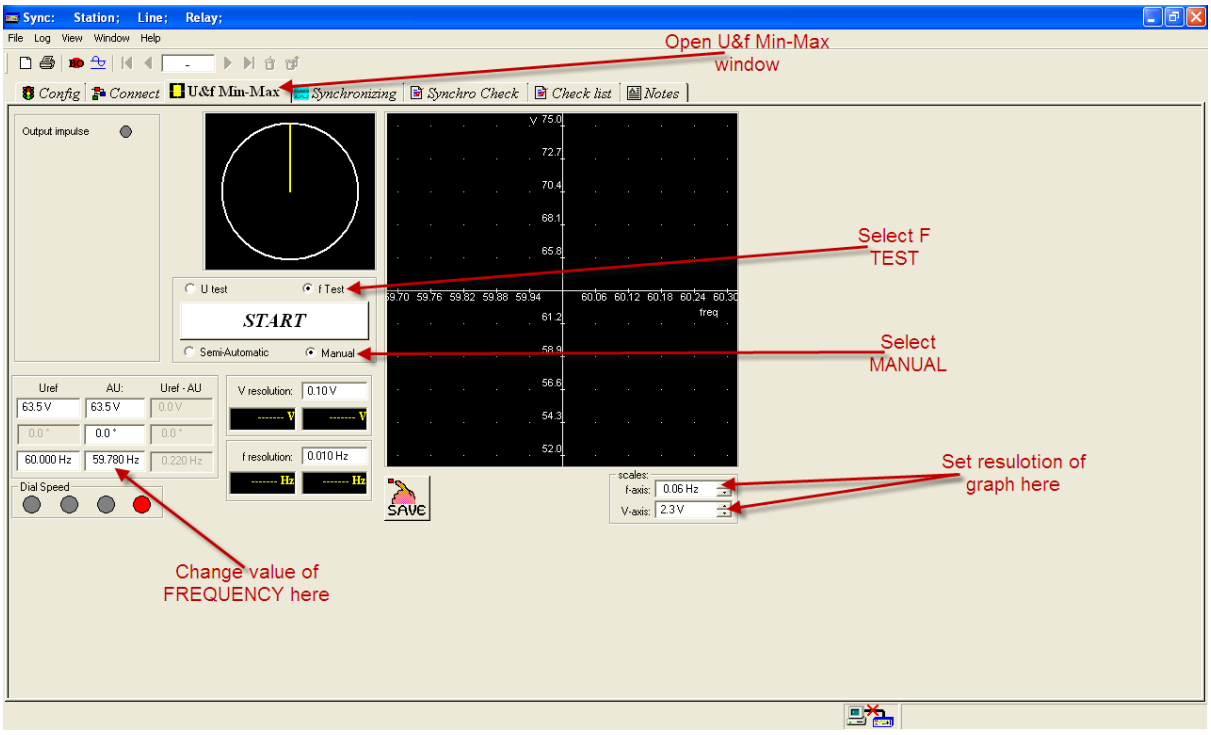
CS SLIP FREQUENCY:

1. Go to “CHECK SYNCH” menu and make the SYSTEM SPLIT detector OFF.
2. Now set the value of frequency as per your format.
3. Make the O/P contact on “CS”. And connect a buzzer with this contact.
4. Go to FREJA WIN software. And click on SYNC.

5. Click on PROCEED.



6. Now click on "U & f MAX – MIN" window. Here do the following settings as shown in the picture.



7. Now make the frequency value of “AU” out of the set value. Now decrease this value slowly until your O/P contact picks up.
8. Now decrease the value of frequency until O/P contact D/O.
9. For now we will keep line frequency constant and change the BUS frequency.
10. So connect BUS voltage connection to the red phase of freja and connect LINE voltage connection on Uref.
11. Now again increase frequency beyond set value and start decreasing it to note the P/U value and now increase it again to note the D/O value.

SS SLIP FREQUENCY:

1. Go to CHECK SYNCH menu and make the SYSTEM SPLIT detector ON and make its value 90 degree.
2. Now go to SYSTEM SPLIT menu and set its value as per format.
3. Now on same page of FREJA WIN do the same procedure to measure P/U and D/O value.

SYSTEM SPLIT ANGLE:

1. Go to CHECK SYNCH menu and make the SYSTEM SPLIT detector ON and make its value as per your format.
2. Now go to FREJA instrument and keep BUS angle at zero and increase LINE angle above set value unless RED LED of SYSTEM SPLIT appears. This is our P/U value for SS ANGLE.

TIMING TEST:

CS SLIP TIMER:

1. Go to CHECK SYNCH menu. Make SYSTEM SPLIT OFF, make its angle e.g. 15 degree and set CS timer as per your format.
2. On freja instrument 1st page keep the angle b/w your LINE and BUS i.e. the Uref and RED phase of freja more than 15 degree i.e. make it out of CHECK SYNC angle setting.
3. On 2nd page of freja make angle b/w the two voltages equal to zero.
4. On 3rd page of FREJA, run 1st page for 2 sec and make 2nd page time more than the set value for CS SLIP TIMER.
5. O/P relay should be configured on “CS” and it should be connected in the BI of FREJA.
6. Now start the FREJA and note the time.

CS CONTACT RESET TIME:

1. On freja instrument 1st page keep the angle b/w your LINE and BUS i.e. the Uref and RED phase of freja more than 15 degree i.e. make it out of CHECK SYNC angle setting.
2. On 2nd page of freja make angle b/w the two voltages equal to zero.
3. On 3rd page of FREJA, run 1st page for 2 sec and make 2nd page time more than the set value for CS SLIP TIMER.
4. Now connect the START contact of TM200 timer with the CS O/P contact and short the START and STOP contact of TM200. Make start contact from OFF to ON and STOP contact ON to OFF.
5. Press the start button of FREJA and measure the time on TM200.

SS SLIP TIMER:

1. Go to CHECK SYNCH menu and make SYSTEM SPLIT ON and make its setting lets say 90 degree.
2. Now go to SYSTEM SYNCH menu and set its timer.
3. On freja instrument 1st page keep the angle b/w your LINE and BUS i.e. the Uref and RED phase of freja more than 90 degree i.e. make it in SYSTEM SPLIT condition.
4. On 2nd page of freja make angle b/w the two voltages equal to zero.
5. On 3rd page of FREJA, run 1st page for 2 sec and make 2nd page time more than the set value for SS SLIP TIMER.
6. O/P relay should be configured on "SS" and it should be connected in the BI of FREJA.
7. Now start the FREJA and note the time.

SS CLOSE PULSE TIMER:

1. Go to SYSTEM SYNCH menu and set the SS CLOSE PULSE TIMER.
2. On freja instrument 1st page keep the angle b/w your LINE and BUS i.e. the Uref and RED phase of freja more than 90 degree i.e. make it in SYSTEM SPLIT condition.
3. On 2nd page of freja make angle b/w the two voltages equal to zero.
4. On 3rd page of FREJA, run 1st page for 2 sec and make 2nd page time more than the set value for SS SLIP TIMER.
5. Now connect the START contact of TM200 timer with the SS O/P contact and short the START and STOP contact of TM200. Make start contact from OFF to ON and STOP contact ON to OFF.
6. Press the start button of FREJA and measure the time on TM200.

SPLIT TIMER:

1. Go to "CHECK SYNCHRO" menu and set the SPLIT TIMER setting.
2. On freja instrument 1st page keep the angle b/w your LINE and BUS i.e. the Uref and RED phase of freja more than 90 degree i.e. make it in SYSTEM SPLIT condition.
3. On 2nd page of freja make angle b/w the two voltages equal to zero.
4. On 3rd page of FREJA, run 1st page for 2 sec and make 2nd page time more than the set value for SS SLIP TIMER.
5. Now connect the START contact of TM200 timer with the SYSTEM SPLIT O/P contact and short the START and STOP contact of TM200. Make start contact from OFF to ON and STOP contact ON to OFF.
6. Press the start button of FREJA and measure the time on TM200.

VOLTAGE ELEMENT TESTS:

VOLTAGE DETECTOR TEST:

1. Go to HMI of the relay. Press DOWN arrow unless you reach VOLTAGE SETTING menu.
2. In this menu press DOWN arrow unless you reach LIVE LINE & DEAD LINE setting.
3. Make these settings as per your format.
4. Configure O/P contact to LIVE LINE.
5. Now keep BUS voltage at 63.5 V and increase LINE voltage from zero to a level when your O/P contact picks up. Now decrease it unless your O/P contact drops off. Do the same procedure for LIVE BUS & DEAD BUS.

UNDER VOLTAGE TEST:

1. Go to HMI of the relay. Press DOWN arrow unless you reach VOLTAGE SETTING menu.
2. In this menu press DOWN arrow unless you reach LINE UNDER VOLTAGE setting. Now set this value as per your format.
3. Configure O/P contact for LINE UNDER VOLTAGE.
4. Now keep BUS voltage at 63.5 V and increase the LINE voltage from zero unless your contact drops off. Now decrease your voltage unless this contact picks up.
5. Do the same for BUS UNDER VOLTAGE.

DIFFERENTIAL VOLTAGE TEST:

1. Go to HMI of the relay. Press DOWN arrow unless you reach VOLTAGE SETTING menu.
2. In this menu press DOWN arrow unless you reach DIFFERENTIAL VOLTAGE setting. Now set this value as per your format.
3. Configure O/P contact for DIFFERENTIAL VOLTAGE OP.
4. First keep the BUS voltage constant at 63.5 V and decrease LINE voltage from 63.5 V and note the pick up and drop off value of the contact.
5. Then keep LINE voltage constant at 63.5 V and decrease BUS voltage from 63.5 V and note P/U and D/O value of the contact.

VOLTAGE MEASUREMENT TEST:

1. Go to HMI of the relay. Press down arrow and you will see SETTINGS MODE press RIGHT arrow and you can see INSTRUMENTS MODE. Press DOWN arrow and you will see BUS VOLTAGE and LINE voltage. This is the primary voltage. Press DOWN arrow again and you will again see BUS VOLTAGE and LINE VOLTAGE. This is the secondary value.
2. Now you inject from FREJA as per your format and note the values from HMI.

O/P RELAYS OPERATION:

1. Go to HMI of the relay. Press down arrow until you will see O/P RELAY configuration menu.
2. Here configure each O/P relay on LINE/ BUS UNDER VOLTAGE. Since without injection this O/P is high so contact will pick up. And you can check the continuity of the contact.

STATUS I/P OPERATION:

1. Go to HMI of the relay. Press down arrow and you will see SETTINGS MODE press RIGHT arrow and you can see INSTRUMENTS MODE. Press DOWN arrow and you will see STATUS INPUTS.
2. Now ask SHANKER to connect +ve supply with the positive of I/P contact and negative with –ve of the I/P contact.
3. Now look at HMI of the relay corresponding I/P will become “1”.