

SAARC Training Workshop 'Power System Studies for Synchronization of Multiple Systems'

Case Modifications

Day-1-I

Kabul, Afghanistan

20-22 October 2014



SAARC Energy Centre, Islamabad
www.saarcenergy.org



hassan@powerplannersint.com
www.powerplannersint.com

Adding Reactive Compensation

Shunt Compensation

- Fixed Capacitor Banks
- Switched Shunt Capacitor Banks
- Switched Shunt Reactors
- SVC

Switched Shunt Data Record



Power Flow | Short Circuit

Basic Data

Bus Number

152

Bus Name

MID500 500.00

Remote Bus

0

Remote Bus Name

☒ In Service

Control Mode

1 - Discrete, cntr voltage

VSC Name

None

Adjustment Method

0 - Sequential input order

Switched Shunt Data

Vhi (pu)

1.0450

Vlo (pu)

0.9550

Contributed
Vars (%)

100.00

Binit (Mvar)

-233.00

Block 1
Steps

1

Block 1
Bstep (Mvar)

-15.00

Block 2
Steps

2

Block 2
Bstep (Mvar)

-5.00

Block 3
Steps

3

Block 3
Bstep (Mvar)

-10.00

Block 4
Steps

4

Block 4
Bstep (Mvar)

-8.00

Block 5
Steps

5

Block 5
Bstep (Mvar)

-7.00

Block 6
Steps

6

Block 6
Bstep (Mvar)

-5.00

Block 7
Steps

7

Block 7
Bstep (Mvar)

-7.00

Block 8
Steps

8

Block 8
Bstep (Mvar)

-4.00

OK

Cancel

Switched Shunt Model

Power Planners International



Scaling

Scaling can be applied to selected sub-system or to the whole model.

- Generation
- Load

P/Q Ratio may be selected:

- Keep existing P/Q ratio
- Specify new value MVA_r or PF.

Line Tapping

When an existing line is looped into an intermediate substation – use Tap Line.

Tap Line

Non-transformer line to tap

From bus (number) To bus (number) Circuit ID

50.00 %

New bus location as percent of line

Circuit ID

New bus identification

Number Name Base kV

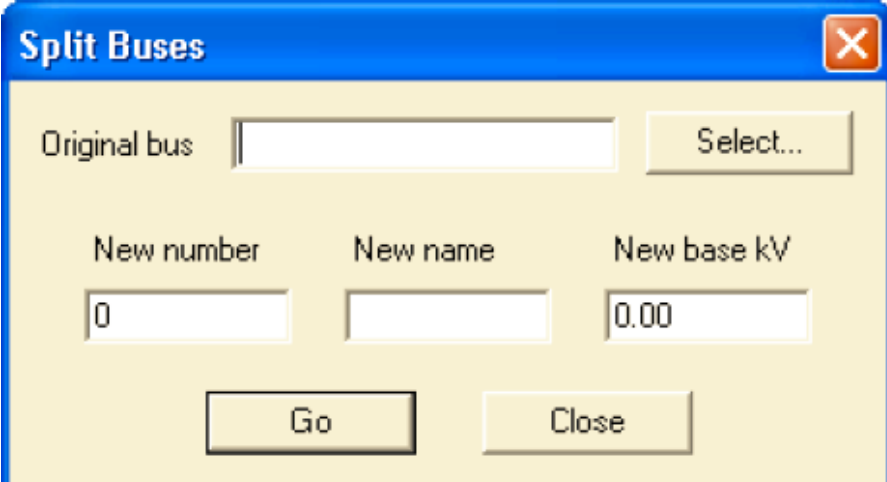
0 0.00

OK Cancel

Splitting and Joining Buses

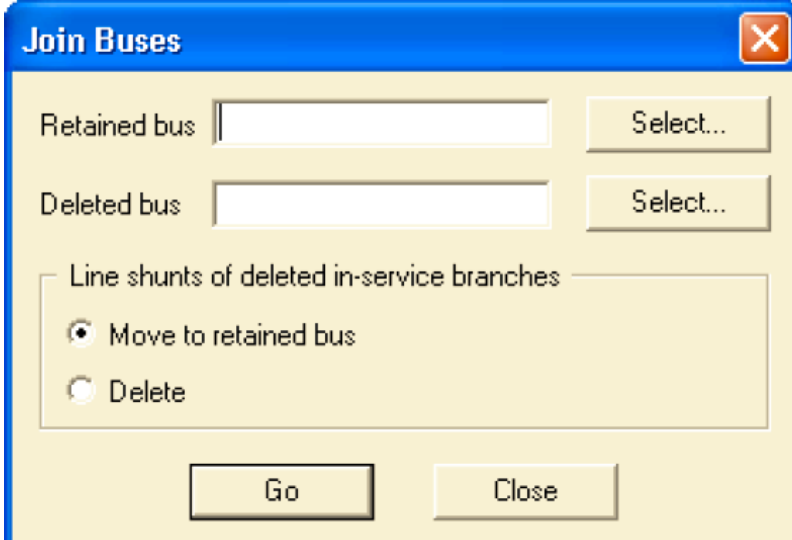
A new bus is required to move a part of equipment from the existing one, e.g. substation splitting.

Join two buses.



The 'Split Buses' dialog box is used to create a new bus from an existing one. It features a title bar with a close button (X). The main area contains three input fields: 'Original bus' with a 'Select...' button, 'New number' (containing '0'), 'New name' (empty), and 'New base kV' (containing '0.00'). At the bottom are 'Go' and 'Close' buttons.

Original bus	New number	New name	New base kV
Select...	0		0.00



The 'Join Buses' dialog box is used to merge two buses. It features a title bar with a close button (X). The main area contains two input fields: 'Retained bus' and 'Deleted bus', each with a 'Select...' button. Below these is a section titled 'Line shunts of deleted in-service branches' with two radio buttons: 'Move to retained bus' (selected) and 'Delete'. At the bottom are 'Go' and 'Close' buttons.

Retained bus	Deleted bus
Select...	Select...

Line shunts of deleted in-service branches

- ☒ Move to retained bus
- ☐ Delete

More Changes in Grid Element

- **Move Any Grid Element**
 - Drag and Drop a terminal of an element
- **Disconnect/Reconnect**
 - Temporary disconnect: can be reconnected
 - Switch Off/On
- **Delete/Purge**
 - Permanent removal of
Bus/Branch/Transformer/Generator etc.

Making Equivalents

Equivalents are created to simplify the big system for the ease of solution

- **Netting of Generator with Load**
 - Activity GNET: Removes generator along with a load of equal value
- **Equivalent of Radial System**
 - Activity EQRD/RDEQ : Create a lumped equivalent at a bus from where the radial system originated
- **Build Equivalent of a Sub-System**
 - Activity EEQV : Creates equivalent of a sub system i.e. Area, Zone, Range of kV

Reporting

- Produce PDF from the Diagram View (SLD).
- Copy/Paste to Word file.