2018

BusWIN

Trailer Consultation
www.trailerwin.com

2/16/2018

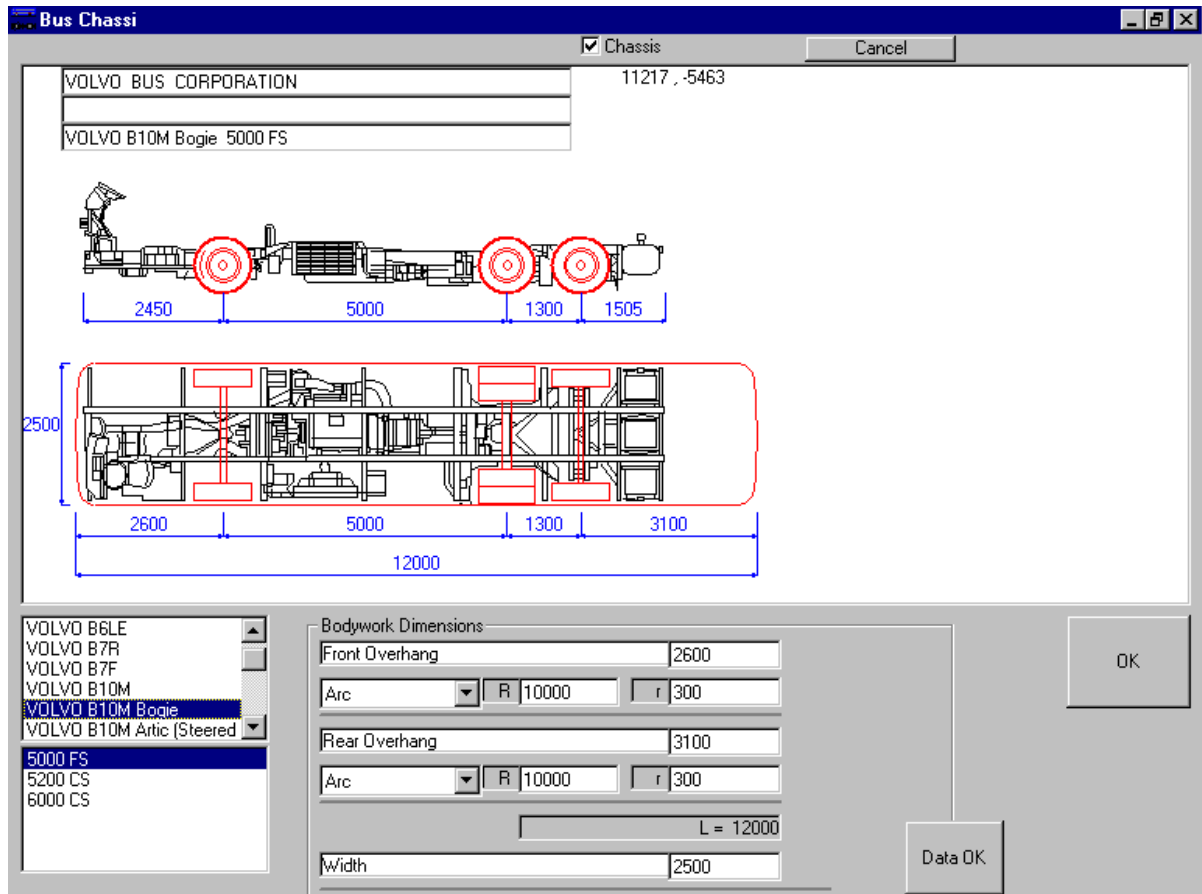![TrailerWIN - Trailer Consultation logo]

BusWIN manual

BusWIN

Program for Bus turning calculations and simulations.

Software from:

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                  www.trailerwin.com

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BusWIN

Computer program for Bus turning calculations.

Bus Chassis window
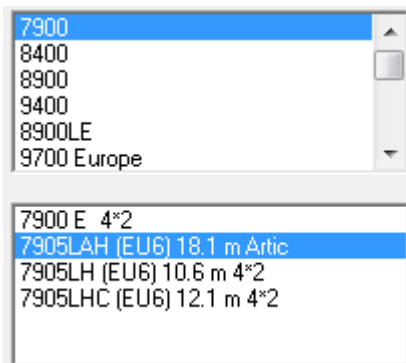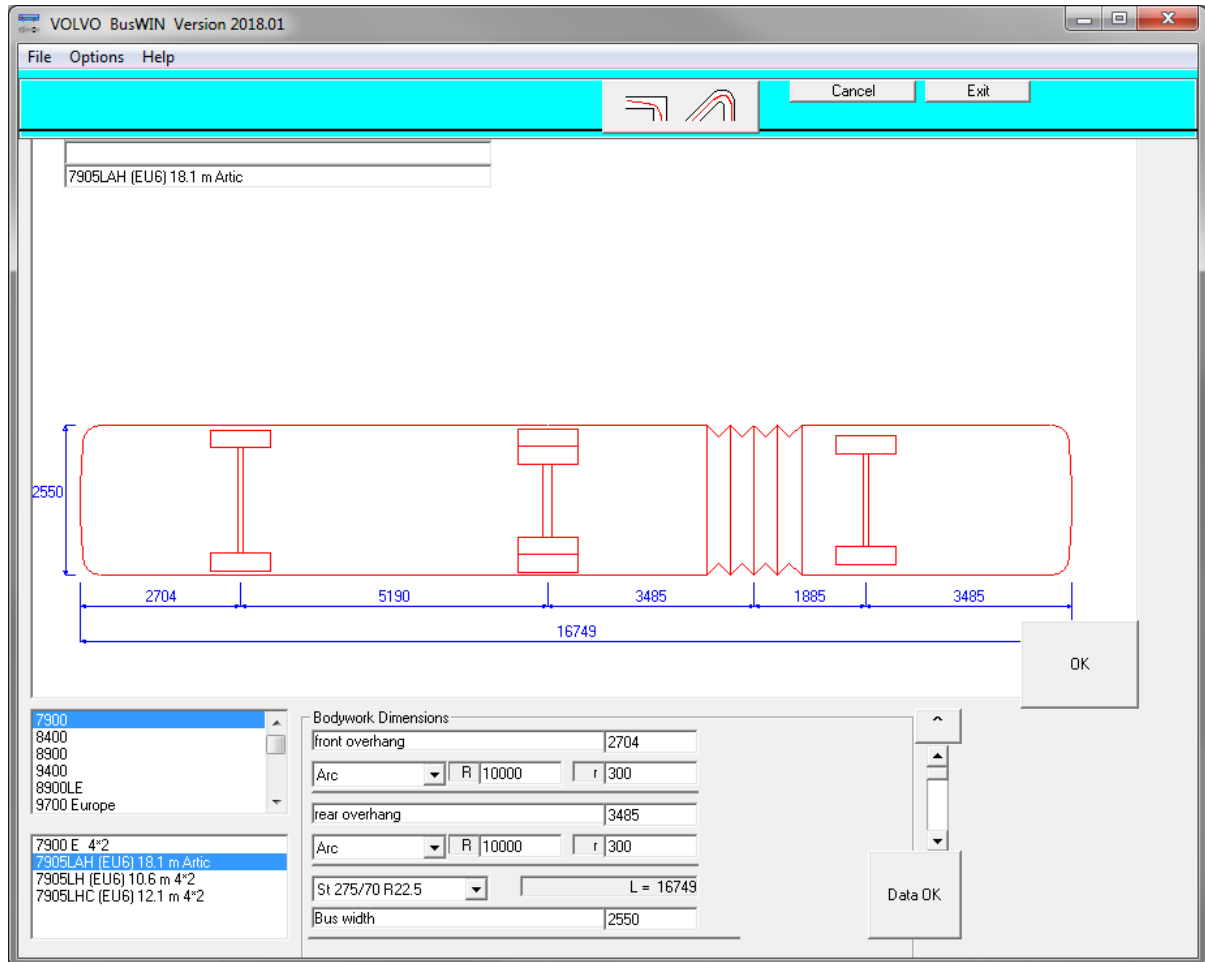
From the first listbox below you can choose bus chassis model group. As last choice in the list you can find a group named xxx, this means default chassis that can be used for simulating different new types.

The second listbox shows different wheelbase- and other model variants for the group selected.

Coordinates on Bus drawing picture   6390 , 3472

Coordinate-Window (top on the picture) shows the current cursor position.
Origo (X=0, Y=0) is on front axle the vehicle. With these coordinates you can measure dimensions directly from the picture.

Coordinate-Window as measuring tool (Bus drawing)
You can measure dimensions in the picture.   Move the cursor into the start point.   Press the mouse button, hold it down , and then drag the cursor.
Coordinate-Window shows the moved dimensions in x-direction and in y-direction. For example 500 , 1200 means that cursor has moved 500 mm in x-direction and 1200 mm in y-direction.
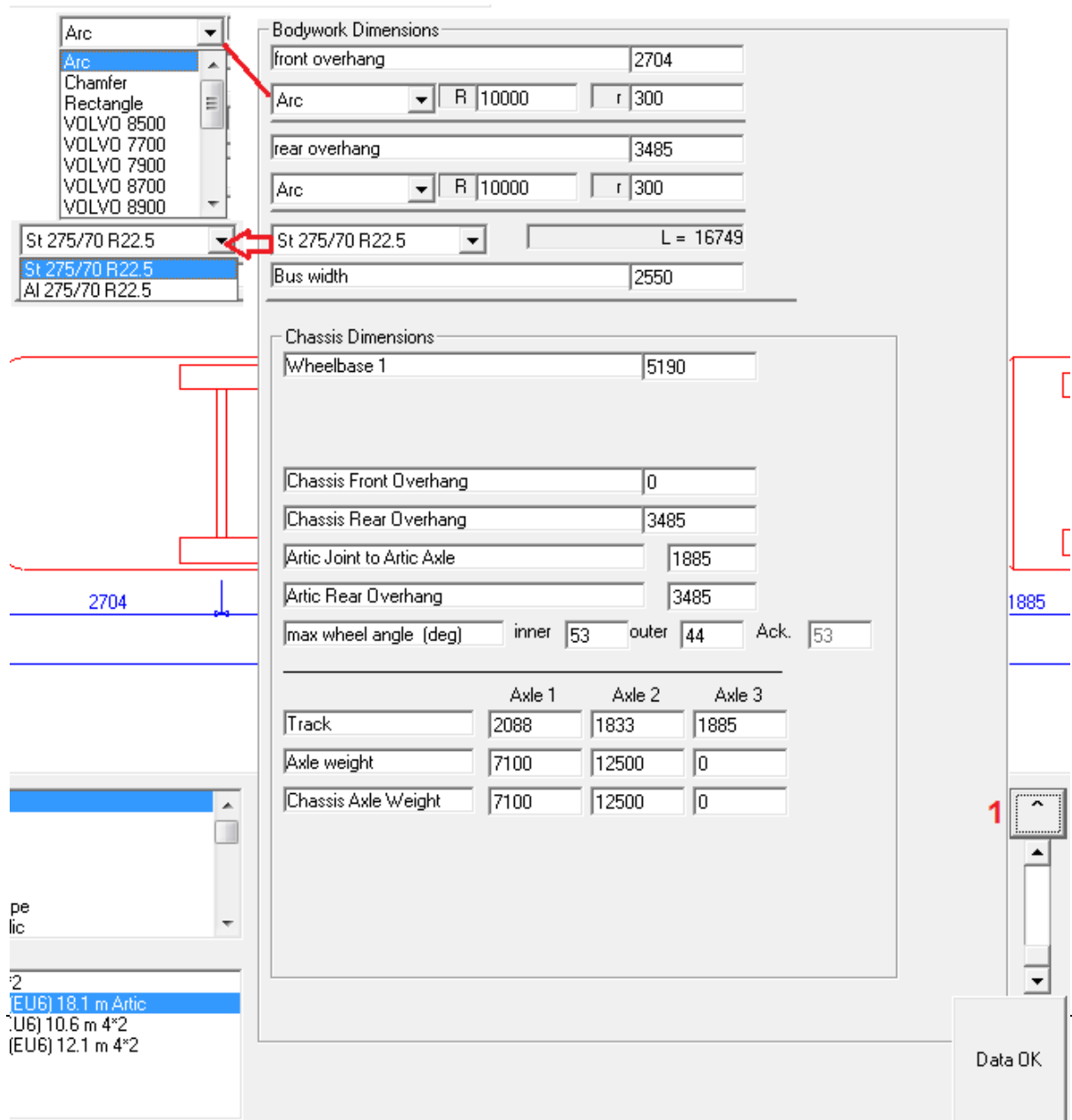
Bodywork Dimensions
By default this window is minimized at the bottom. To open up all the fields press the button "^" marked with a red "1" at the right side.
Bodywork, chassis dimensions can be edited in all textboxes.:

There are textboxes for
- Front overhang
- Rear overhang
- Width

You can also choose different **bodywork front end and rear end forms**.
Forms available:

ARC

The form contains from two arcs. Arc with big Radius **R** and Arc on the Corner with minor radius **r**. You can change both radius. Default R = 10000mm and r = 300mm.
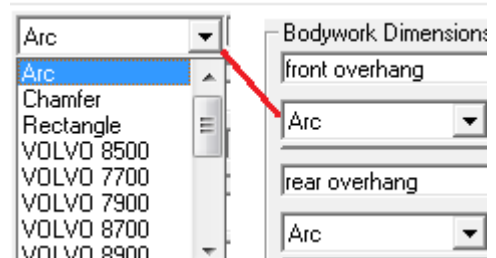
TYRE / RIM

You have a listbox with available tyre/rim combinations for the chosen chassis. The rim-types are:

St = Steel rim
Al = Aluminium rim
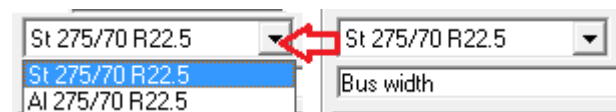
For tyres you will see the tyre-size in standard format. By selecting different rim/tyre the values for maximum steering angles and track on front axle will be automatically updated.

CHAMFER

Chamfered corner. You can give chamfer distance **dx** on length direction and chamfer distance **dy** on query direction.

RECTANGLE

Rectangle corner without rounding or chamfering.

Forms from specific BODYWORK

Some real forms from specific Bodyworks:
Forms are modified from real model drawings to mathematical models.
Carrus , …

Max wheel angle

Here you can see the max steering angle for inner and outer wheel, these values will be used for turning calculations.

Track / Weights

Here are the values for track and axle weights for the selected bus. Front track will affect on the steering geometry and is used for calculating the steering.

Menu on Chassis window

Menu File on Window "BusChassi"
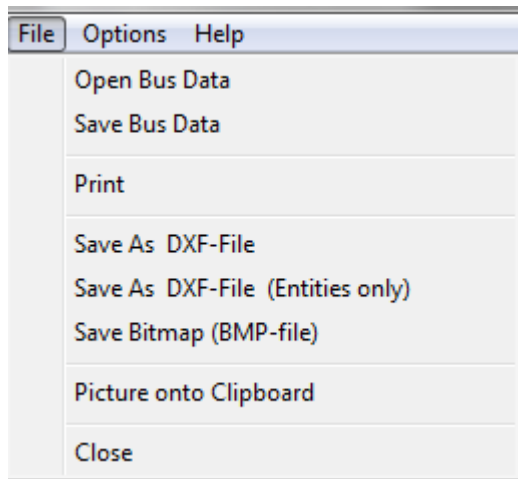
From Menu File You can choose printing and picture save functions for Bus Chassis drawing.
See Menu File

Menu Options - Language
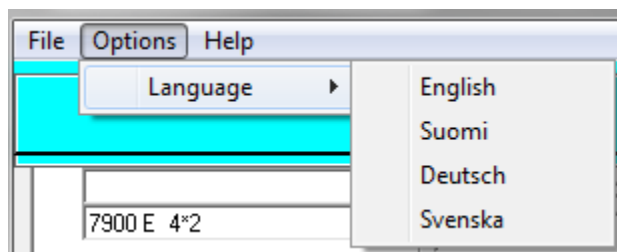
In this menu you can select language in the program and on outprints.

Menu Help
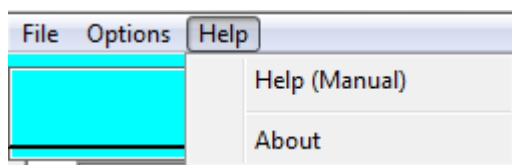
In this menu you will find a shortcut to this manual and information about the software developer.

Buttons in Chassis window

Turning and simulation window

By clicking this button you will be moved into the turning window for turning calculations.
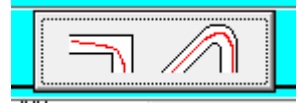
Menu in turning window

File
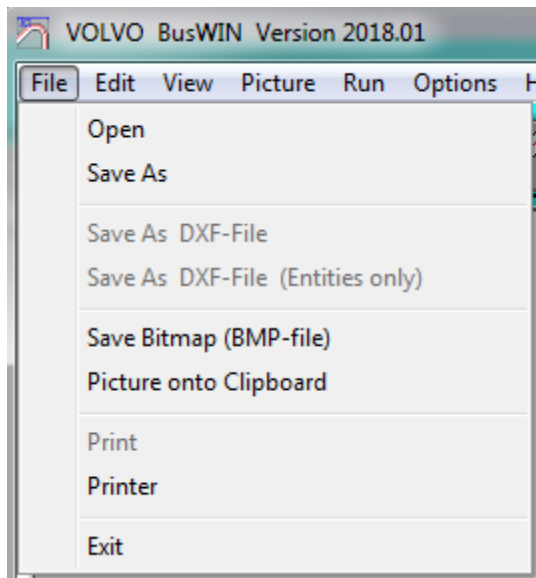
Open

Open a saved BusWIN Calculation

Save As
Save a BusWIN Calculation

Save as DXF-FILE
You can save a picture as DXF-File and later import this file in CAD-programs.
Many text programs as Word for Windows can read DXF-files. It is easier to transport pictures between windows-programs by using clipboard.

Save as DXF-FILE   (Entities only)
You can save DXF-files in Entities only format. This format includes in the file only picture-objects (entities) : lines, circles, texts but no information about other drawing parameters; limits, font sizes, layers etc.
If you can't see dimension numbers in CAD-drawing, you have to change dimension textsize (in AutoCAD   DIMSCALE / UPDATE)
When running SETUP, a directory "PIC" is made for your Picture-Datafiles.

Save as Bitmap (.BMP-file)
You can save a picture as BMP-File = Windows Bitmap file.
Almost all Windows Text programs and Drawing programs can take pictures in BMP-format.

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Picture onto Clipboard
With this function you can copy the picture onto the clipboard.
If you want to copy the whole screen onto the clipboard, push the button PrtSc (PrintScreen) on the keyboard. The active Window you can copy screen onto the clipboard by pushing the buttons Alt + PrtSc (PrintScreen)

Print
Printing Calculation. You are able to choose Printer line width on the picture from Menu Options - Picture.

Printer
Selecting default printer for printing. Note that this will set the printer as default in all Windows applications.

Exit
Close the program.

Menu Edit

From this menu you can choose **Turning Mode** or go to **Bus Chassis Model**, you can also use the buttons:

Edit	View	Picture	Run
Corner mode			
Vehicle Data			
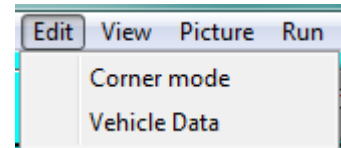
View

Result as text
See Calculation values on separate window

Window Size
This function is most useful when you want to transfer BusWIN smaller screen pictures to other programs.
If your monitor has bigger resolution, you can resize BusWIN Windows so that Window resolution on BusWIN Window is 640x480 (EGA Screen) or 800x600 (=VGA Screen) .
Menu Maximize makes program Window to maximum size.
Resize can not use bigger resolution than you have in your monitor.

Resize do not change picture size automatically. When you make new calculation it will be scaled into new Windows size.

View
Result as text
Window Size ▸ 	640x480 EGA
800x600
Maximize

Zoom 20 %
Zoom 40 %

Zoom 50 %
Zoom 60 %
Zoom 70 %
Zoom 80 %
Zoom 90 %
✓ Zoom 100 %

Zoom 120 %
Zoom 150 %
Zoom 200 %
Zoom 250 %
Zoom 300 %
Zoom 400 %
Zoom 500 %
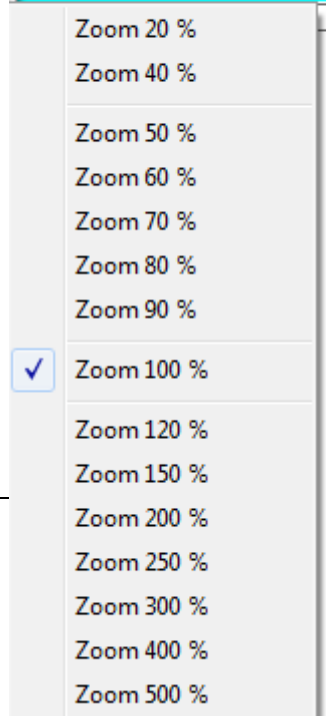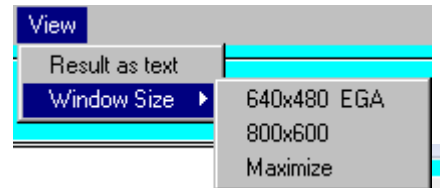
Picture

Here you will find different options for screen and outprint.

Picture	Run	Options	H
Clear Picture			
Clear Picture			
Zoom		▸	
Colors			

Clear picture
With this you can re-set the bus to it´s original position and clear the

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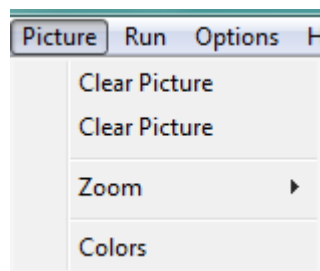
previous simulation

Zoom
You can set the zoom for the picture from the meny or from the drop down list on top of the screen. This setting will be for both screen and outprints.

Colors
In this window you can select colors for different parts of the bus and also the background on the picture. To change a color, first select an option from the list and press on "Change color" button.
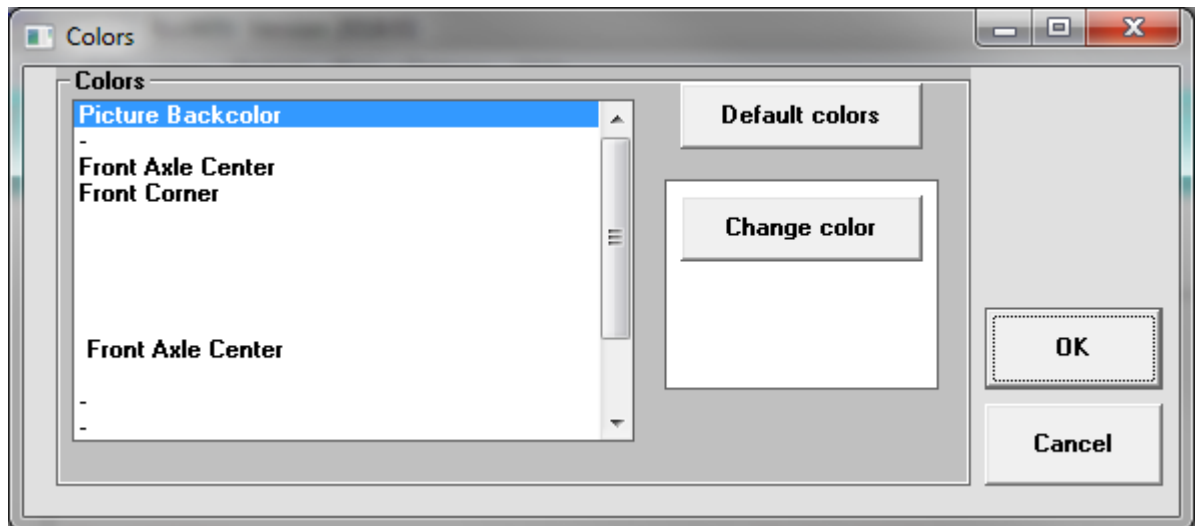
Now you can select color from the color selection window.

To go back to BusWIN original color layout, press the "Default colors"-button.
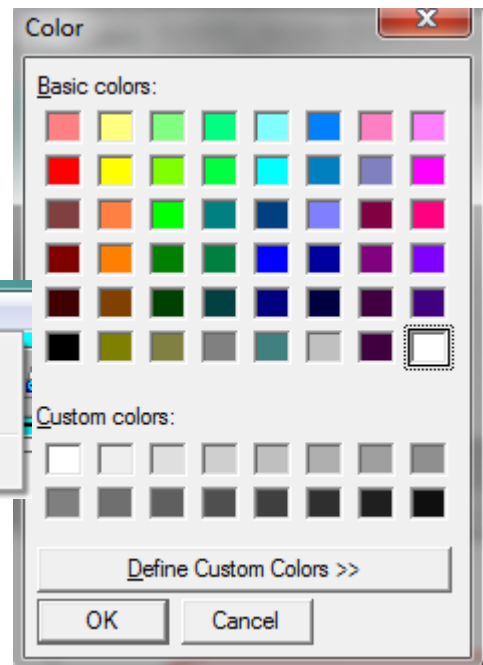
Run

Go
This will start a simulation, you can also press the

button

Stop
This will stop a simulation, you can also use the button

The Go-button will automatically become Stop-button when simulation starts.
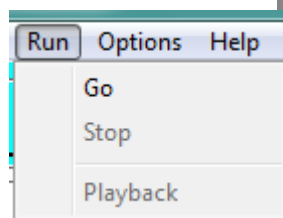
Playback
To run a simulation again, you can also use button

Options

Picture

Choosing picture drawing distance in meter. So can you choose how often vehicle pictures are drawn when vehicle moves on the screen in simulations.

Screen
Line width
Pictures will be drawn using two line types, light and heavy lines. You can choose line width in pixels. The result on the paper is depending on printer resolution.

Printer
Here you can select the line widths the same way as for screen.
You can also select option

Coordinates
From this Menu point You can turn coordinates Windows on/off.

Coordinates on Bus Chassis picture   6390 , 3472
Coordinate-Window (top on the picture) shows the current cursor position.
On Bus Chassis picture the Origo (X=0, Y=0) is on front axle the vehicle.
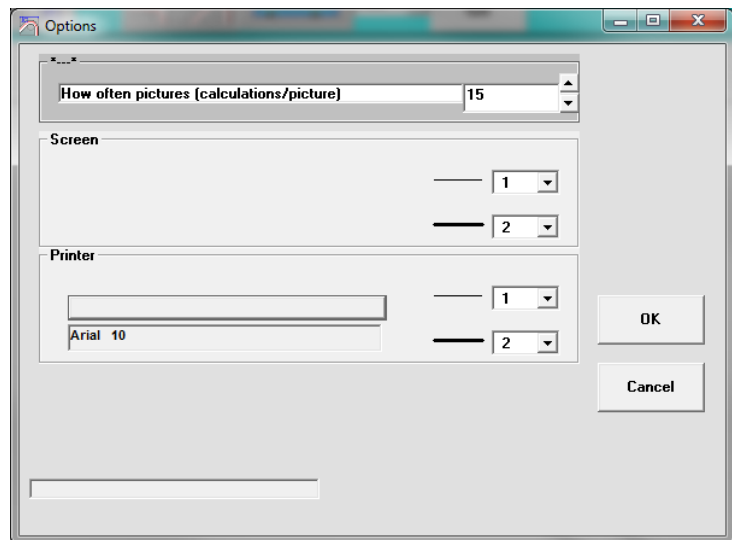With these coordinates you can measure dimensions directly from the picture.

Coordinates on Turning picture
Coordinate-Window (top on the picture) shows the current cursor position using polar coordinates. On most turning mode pictures the Origo (X=0, Y=0) is on the turning centre and direction 0 is upwards.

7981 < 121

With these coordinates you can measure dimensions directly from the picture.

Coordinate-Window as measuring tape
You can measure dimensions in the picture.   Move the cursor into the start point.   Press the mouse button, hold it down , and then drag the cursor.
Coordinate-Window shows in Bus Chassis picture x-direction and in y-direction. For example 500 , 1200 means that cursor has moved 500 mm in x-direction and 1200 mm in y-direction.
In Turning picture it shows the moved dimensions as distance and direction.
For example 7981 < 121 means that cursor has moved 7981 mm in direction 121 degrees.

Languages

In BusWIN you can choose language for a calculation, this will change both menus and outprint language. Note that the default language for the program will not change, that means that next startup the language setting will go back to original setting.

User option

In this menu you can set some default settings for the program. These settings will be saved as default settings for the program.
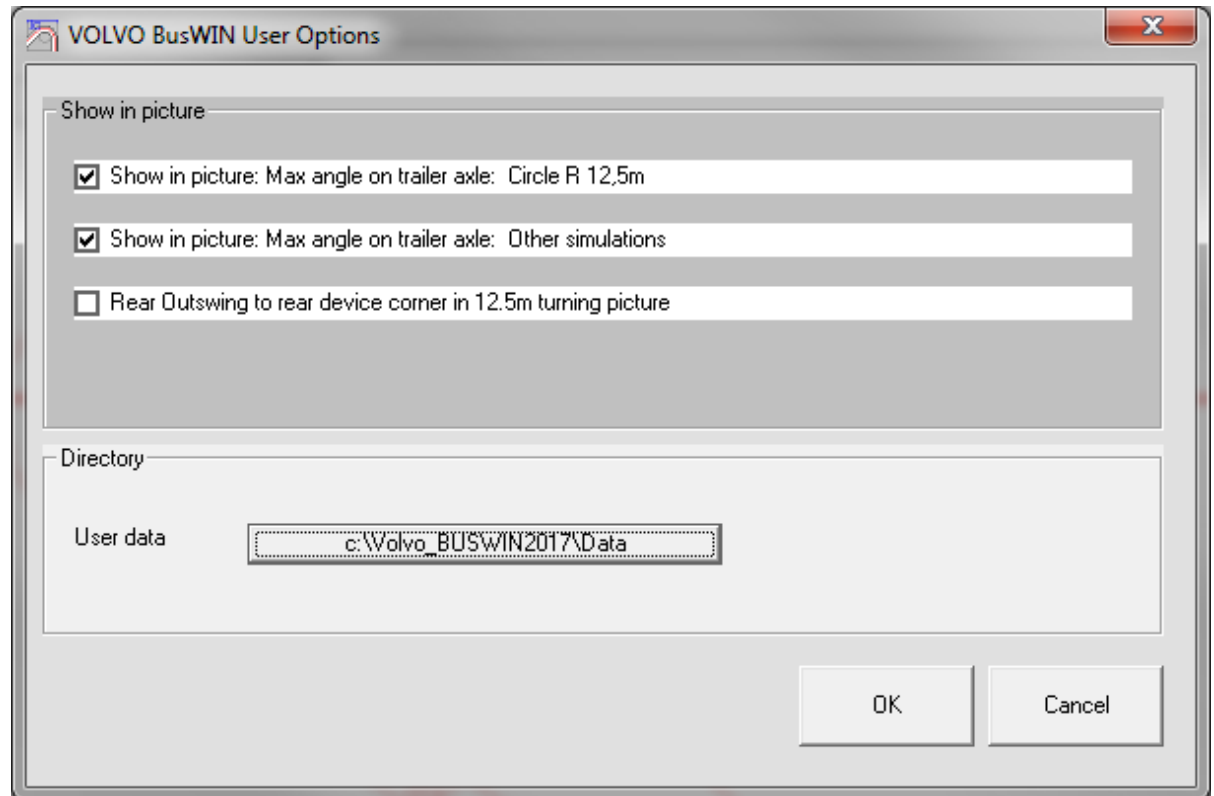
Measures and angles on drawing
You have 3 different checkboxes for how the angles on steered axles is to be shown on the drawing
- Max angle on trailer axle: Circle R 12,5m, this option will show theoretical turning angles on EU Circle turning picture. The angles will be shown on all steered axles calculated with Ackermann principle.
- Max angle on trailer axle: Other simulations. This is the same as previous but when checked it will show angles in other simulations.
- Rear outswing to rear device corner in 12,5m picture. This will show the calculated theoretical rear outswing in EU 12,5m circle

Directory
This will give you possibility to set a new default directory for user files. To change directory, click on the button where you can see the current setting. This will open up a selection for drive & directory. Click on the directory to "open" it and confirm by pressing the "Ok" button on user options.
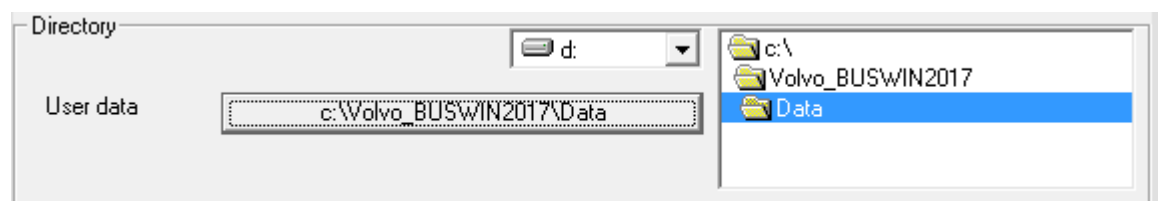
Buttons on turning window

Below you can see a complete list of buttons in turning window

1- **Print** [printer icon] turning calculation
Result as text

Turning calculation modes and simulations
2- Back to **Bus Chassis window**

3- **Coordinates on Bus drawing picture** 6390 , 3472
4- Starting a simulation **Go**
6a- Optional **Stop** button when simulation is running to stop the sequence
5- **Playback** a simulation
6- **Exit** program

Turning calculation modes and simulations

From this menu you can choose the type of the turning calculation.
For many of the alternatives you can set own values for R out and R in
directly to the textboxes.
The alternative corner modes are as follows:

- Circle 12.5 m   (EU-Circle)
  - Outer Radius 12.5m , inner Radius 5.3m
- Minimum turning radius
- 90 Degrees Swedish Standard
- Austroads Arterial Road Swept Path
- Austroads Major Arterial Road Swept Path
- 90 Degrees Arc
- 120 Degrees Arc
- 180 Degrees Arc
- 360 Degrees Circle
  - Direct to circle , drive trough the circle and direct out.
- Arc
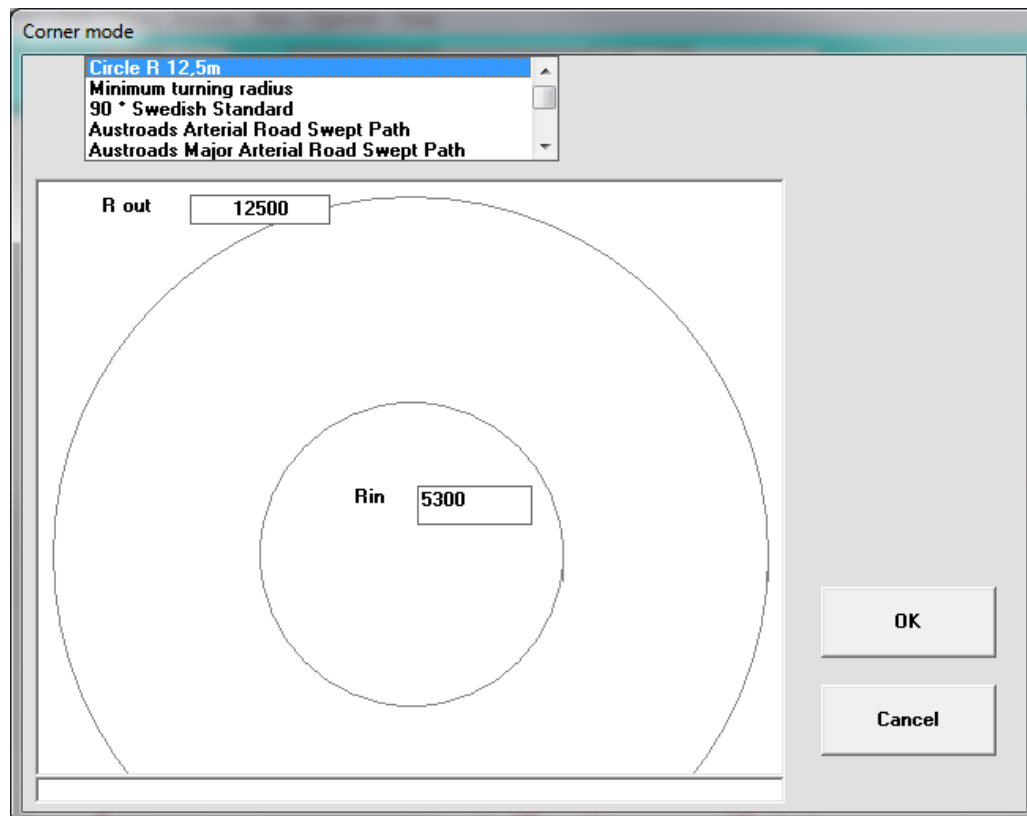 - Drive in sector. You choose Radius and sector angle.
- Circle
  - Continuous drive in a circle
- Pull
  - Simulate driving on a map (DXF-file can be used)

Coordinates on Turning picture

Coordinate-Window (top on the picture)   shows the current cursor
position using polar coordinates. On most turning mode pictures the Origo (X=0, Y=0) is on
the turning centre and direction 0 is upwards.
With these coordinates you can measure dimensions directly from the picture.

Coordinate-Window as measuring tool (Turning picture)

You can measure dimensions in the picture.   Move the cursor into the start point.   Press the mouse button, hold it down , and then drag the cursor.

Coordinate-Window shows the moved dimensions as distance and direction.

For example 7981 < 121 means that cursor has moved 7981 mm in direction 121 degrees.

Static turning calculations

Minimum Radius

From this menu you can choose the type of the turning calculation.
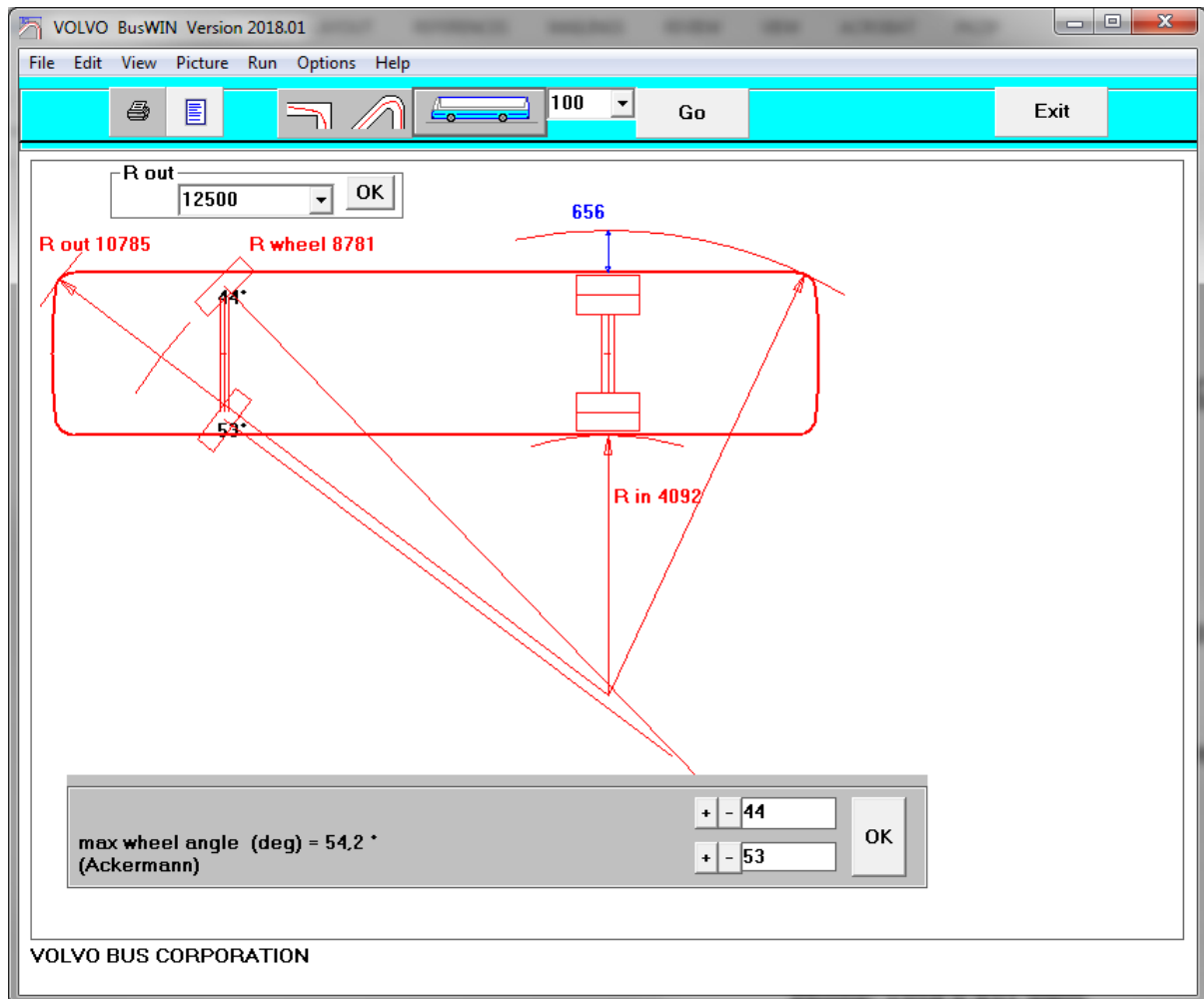
Calculating R out (Radius to the front corner of the vehicle) and R wheel (Radius to the center of front wheel) with chosen steering angle. From the text boxes below you can adjust the steering angles for inner & outer wheels separately. The default values comes from chassis data. You can also edit the values by using "+" and "-" buttons.

Polar Coordinates from 0-point   3134 < 156

959

Rear end movement

Radius to front corner
Rout 10274

Radius to wheel
Rw 8405

51°
Front wheel angle

Rin 4156
Radius to inside

0-point
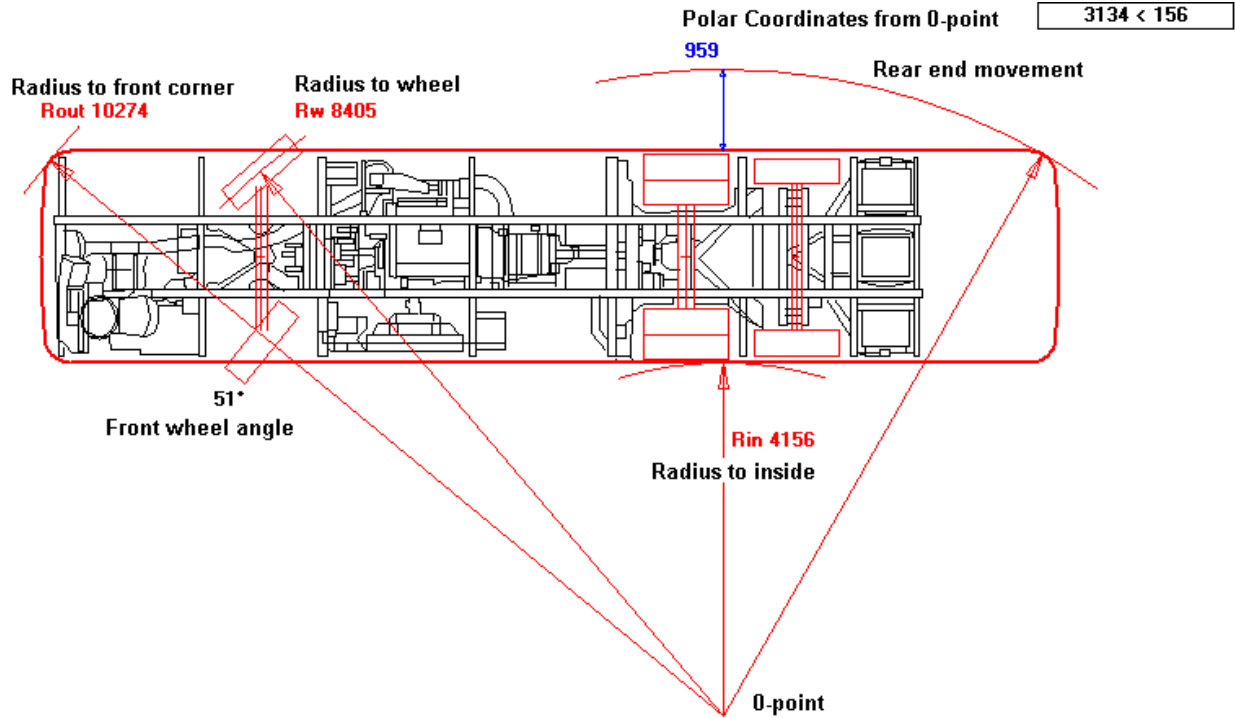
This Combo box on the upper corner of the screen gives the possibility to choose **R out**.
The program calculates then corresponding front wheel angle and **R in** and Rear end movement
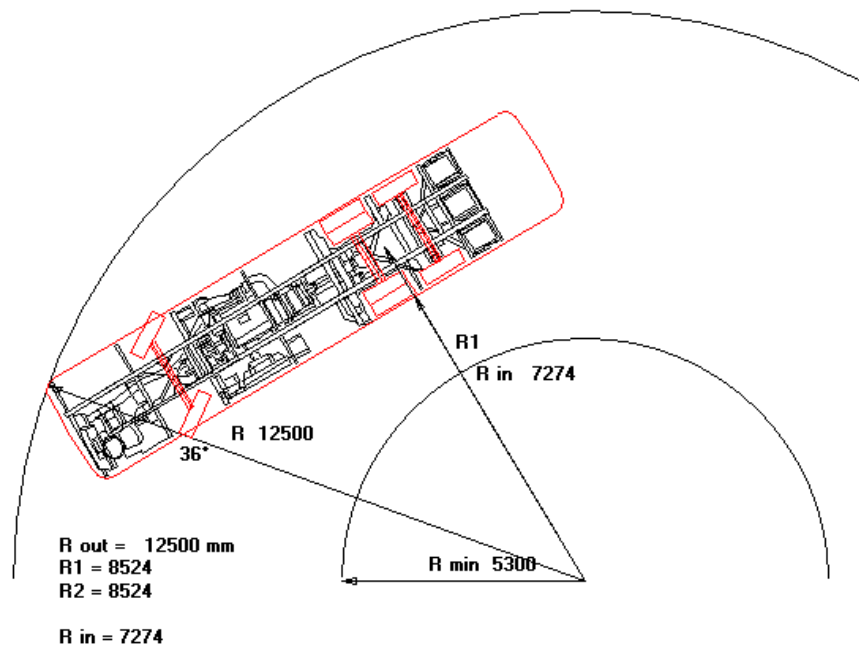
R out
12500   ▼   **OK**

EU Circle
Calculating turning in EU circle.
Outer radius in circle is 12.5 m and inside circle is 5.3 m.
The vehicle runs so that the front corner is on the outer circle. All parts of vehicle must be between these two circles.

R1
R in 7274

R 12500
36°

R out = 12500 mm
R1 = 8524
R2 = 8524

R in = 7274

R min 5300

Simulation modes

These following options will simulate the bus driving in different situations.
The simulations modes requires that you press the "Go"-button in order to start the simulation. The result will be shown when the bus has driven the whole distance.

Simulating Corner 90 degrees

Calculating 90 deg rectangular corner. (Swedish rule).
The vehicle is driving on right side of the street, makes turning using maximum steering angle, and then follows the right side of the street. Default Street width is 8.5meter.
The Program calculates the minimum distance to the inner corner.

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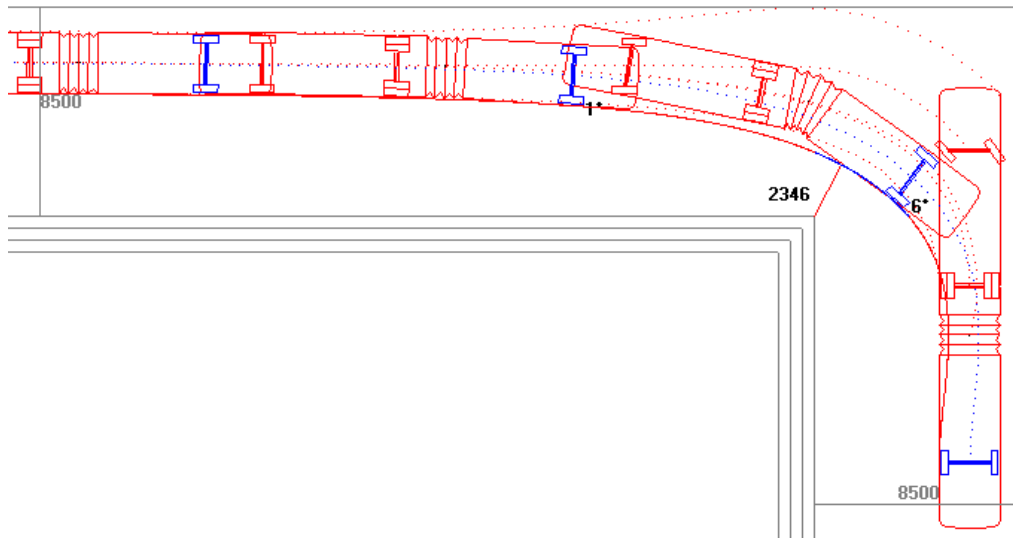
## Simulating turning 360 degrees
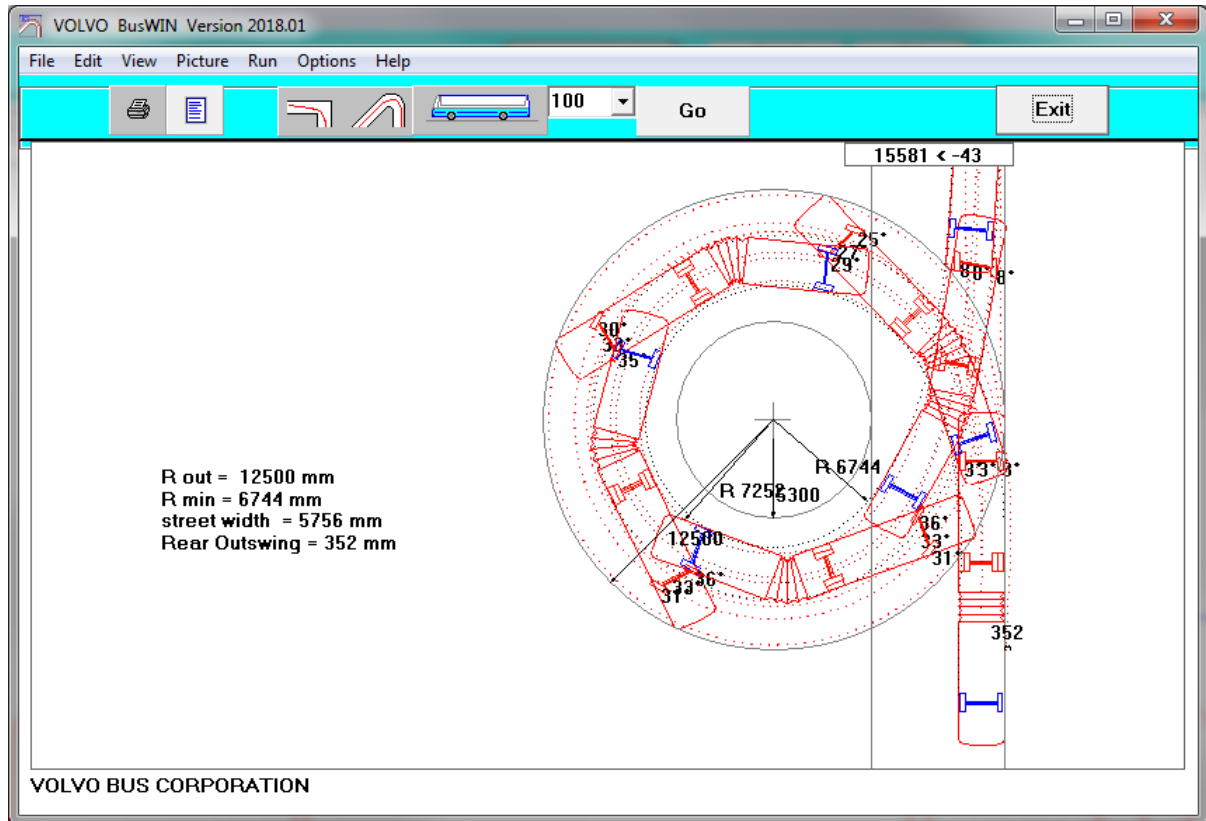
Turning in 360 deg arc. The vehicle comes direct, tangential to the circle, drives full circle, 360 degrees, following the outer side of the circle and then drives tangential out.
The default radius is 12.5 m.
The Program calculates the minimum radius Rin to the vehicle inside.

The result is not identical with the result in EU-Circle or Circle turning modes.
The long vehicle do not get the same position (angles between truck and trailer, etc.) what is the position when the vehicle is running continuous in the circle.

Simulating turning in Arc 90..120..180..degrees

Simulating turning in 90-180 deg arc. The vehicle comes direct, tangential to the circle, drives full circle, 90-180 degrees, following the outer side of the circle and then drives tangential out. From this simulation you can also see how much outswing on rear end of the bus will be.

When you select this mode you can also alter the outer circle and the swept area (road width).

BusWIN manual
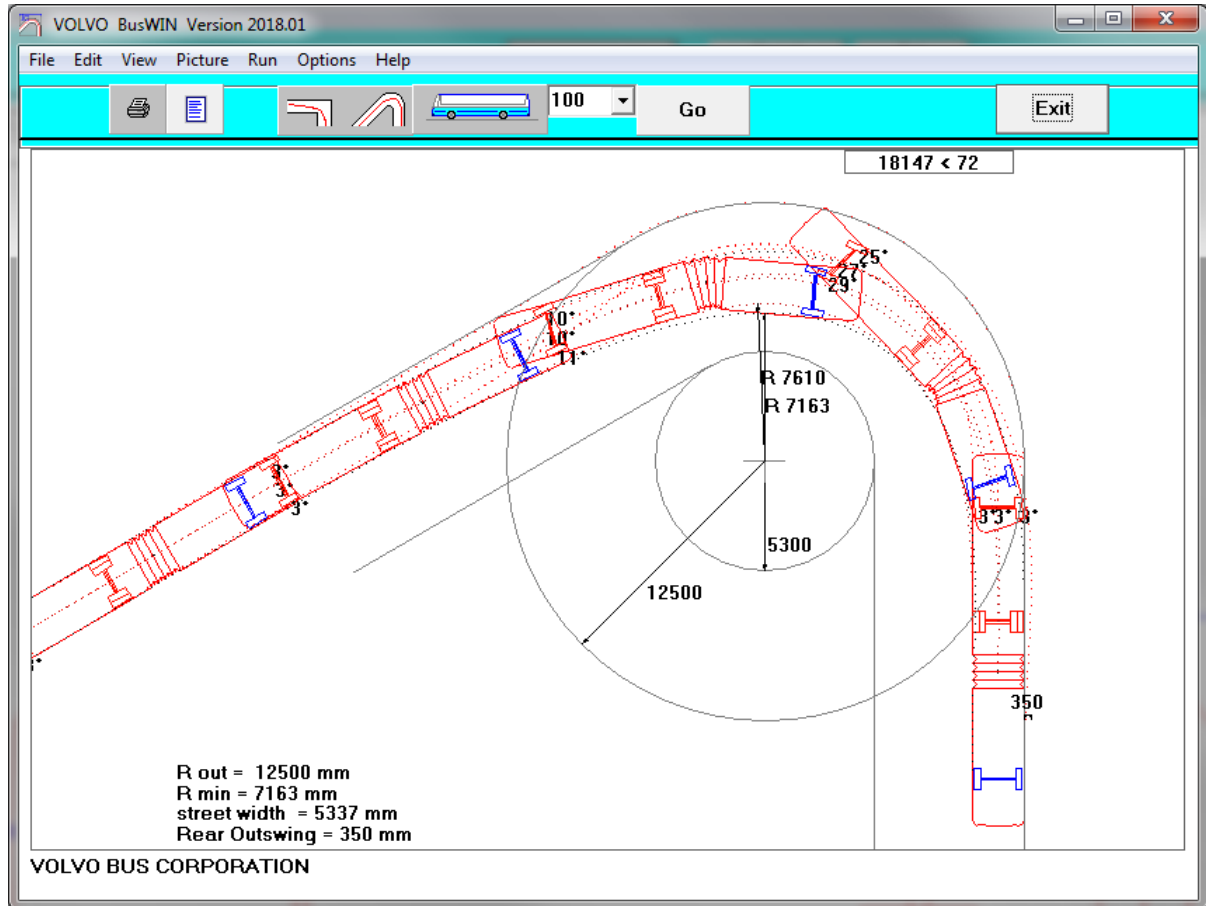
Circle

Driving in circle continuously.
The default radius is 12.5 m.
The Program calculates the minimum radius
R in to the vehicle inside.
The result should be almost identical with
the result in EU-Circle.

(This is not the same thing as calculating
turning in 360 deg arc.)
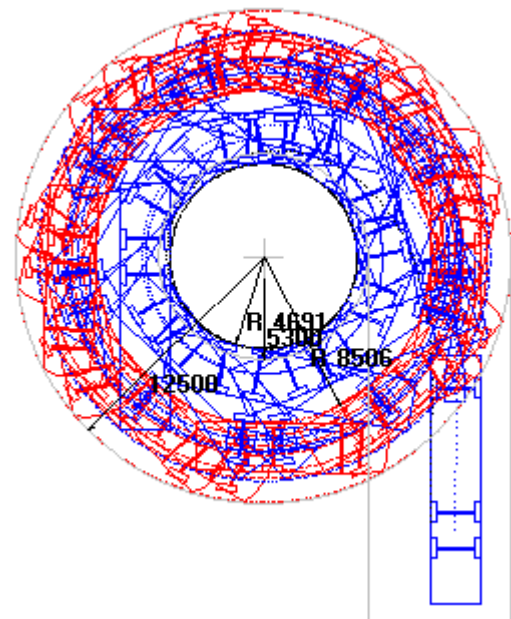
Pull Vehicle
When you have chosen the map , you see the following screen.
The vehicle is on default place.
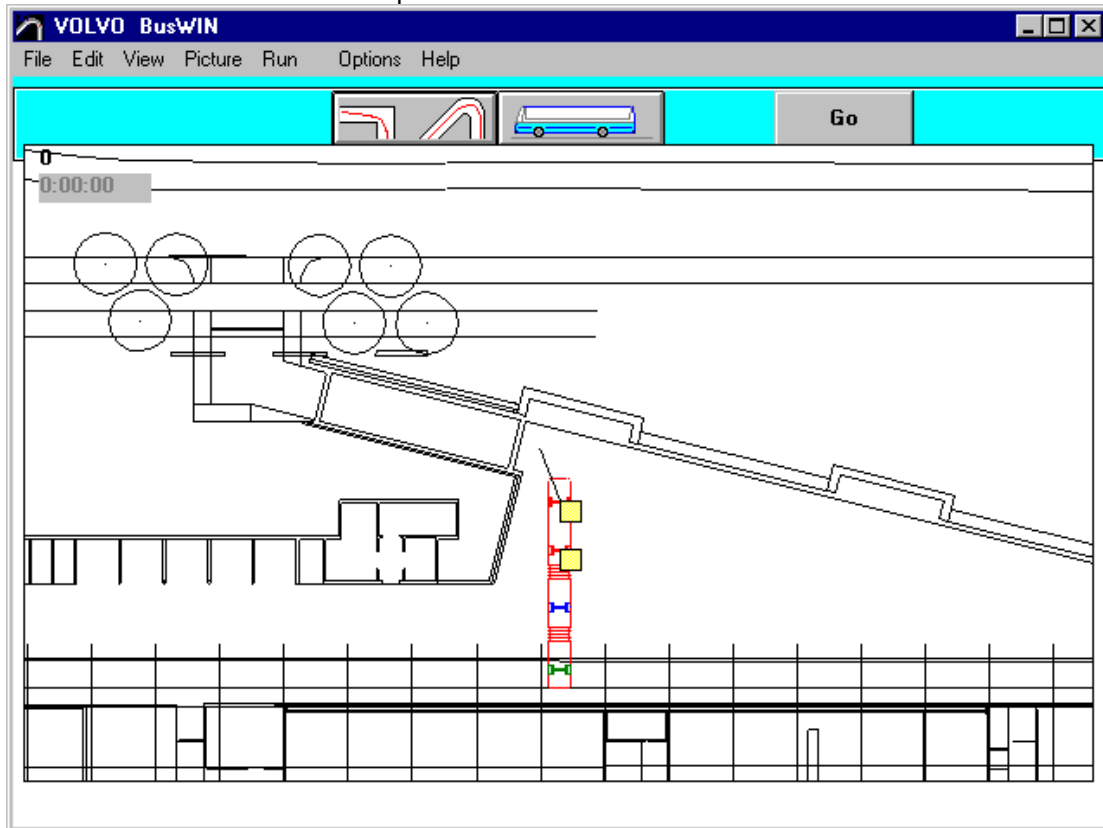
You can drag the vehicle on the correct starting point. Set the cursor on the first yellow square by the front axle of the vehicle. Push mouse left button and keep it down. Drag the cursor with this square on the wanted starting place and release the mouse button. In the picture from point 1. To point 2. . The direction of the vehicle you choose dragging the second yellow square fare in this direction where you like to have the rear of the vehicle, in the example picture from point 3. .to point 4.

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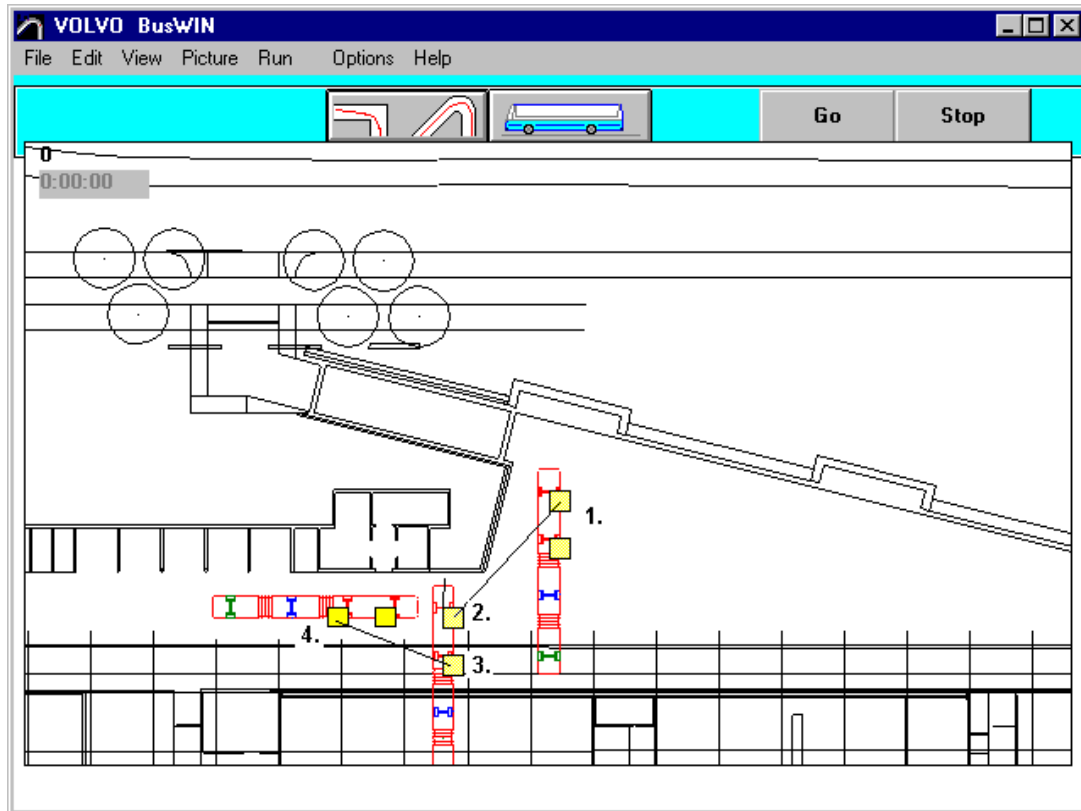
When starting position is OK, you can begin to drive the vehicle on the map.
  Click button GO on the toolbox.
When you now move the mouse, you will see the line from the cursor to the front of the vehicle.
Think this line as rubber wire, which is pull the vehicle.
When you now push down the left mouse button (mouse down) , the vehicle begins to move to the direction of this line. The vehicle stops when you release the mouse button (mouse up).

BusWIN manual
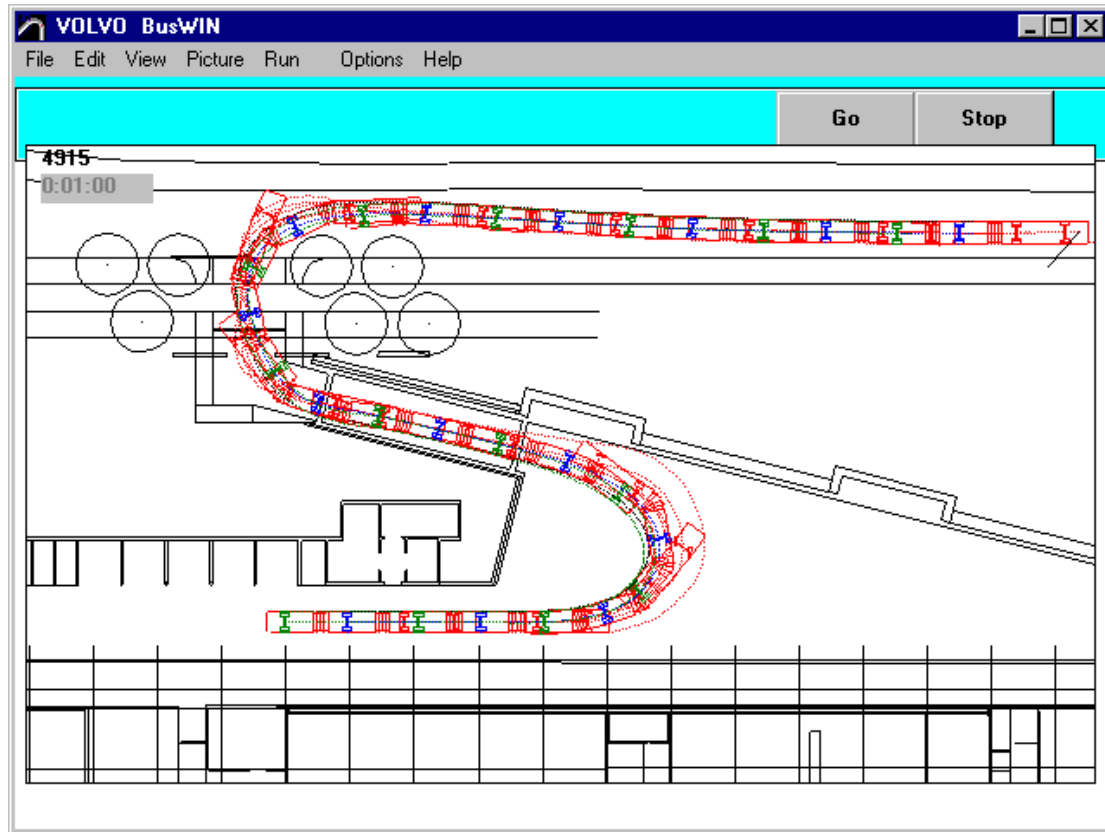
When you want not to drive more, click the STOP button on the toolbox.

Pull on "Editable Maps"
When you choose "pull", the map listbox appears.
You can choose background "map" from this listbox.

Corner mode

120 °	Empty area
360 °	Cross-ruled paper
Arc	Intersection of the streets
Circle	Traffic Circle 1
Pull	Traffic Circle 2
	Traffic Circle 3

W2

W = 10000

OK

Cancel
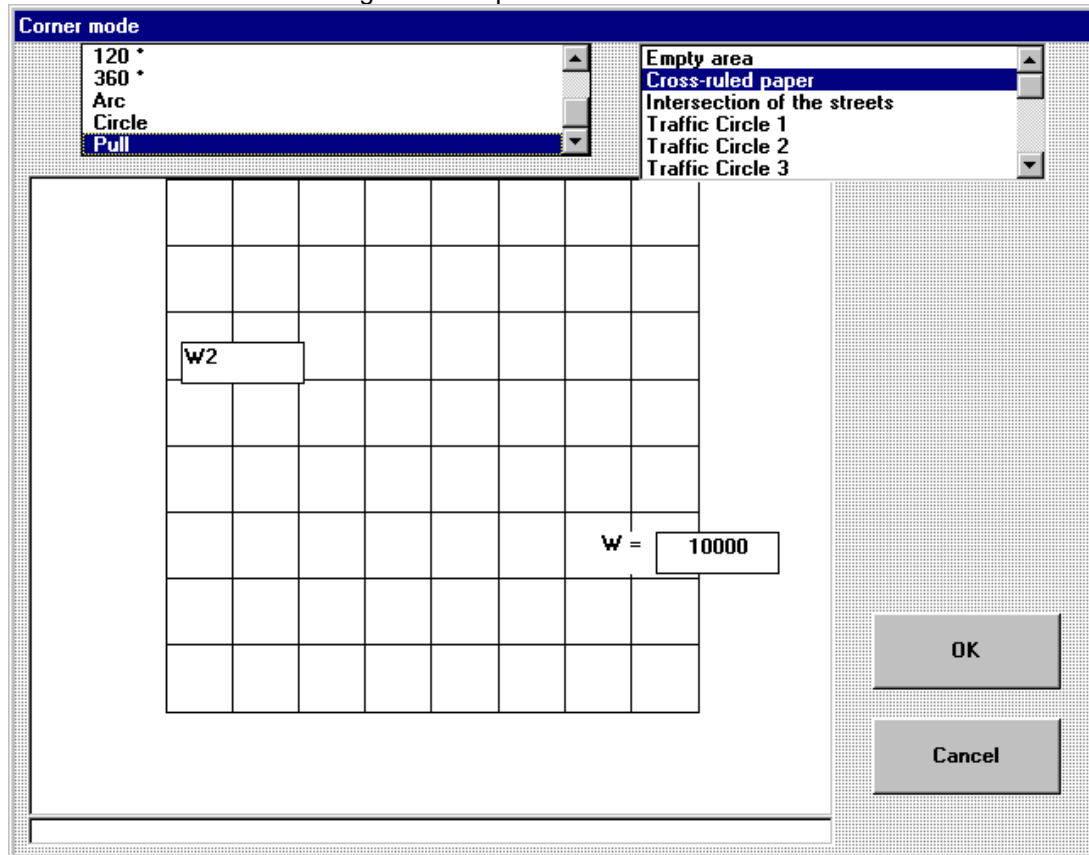
Some of maps are editable:
Editable maps: Intersection of the streets, Traffic circle 1

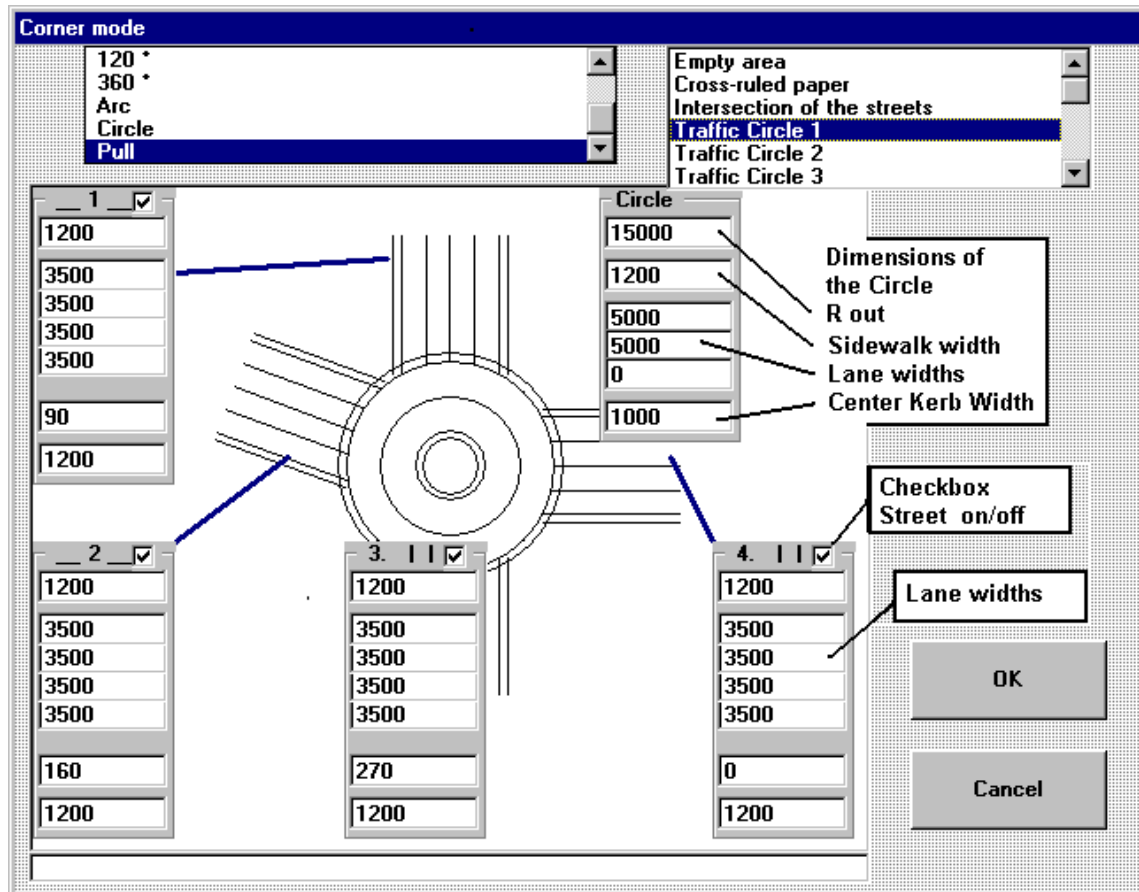## Intersection of the streets
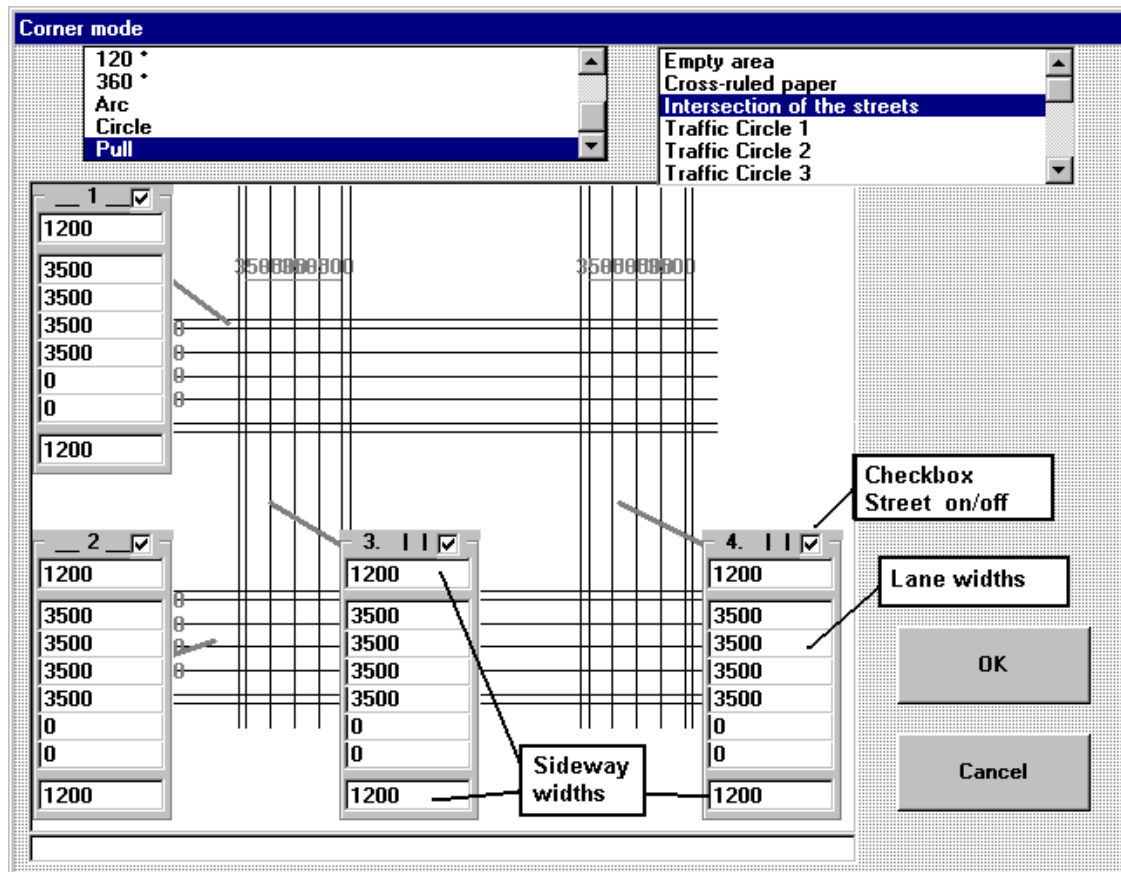
Using Checkboxes : "Street on/off" You can choose if you have all four streets on picture.
You are also able to change lane widths and sidewalk widths.
If you will have two-lane street; give width for two lanes, and type width of other lanes to 0.
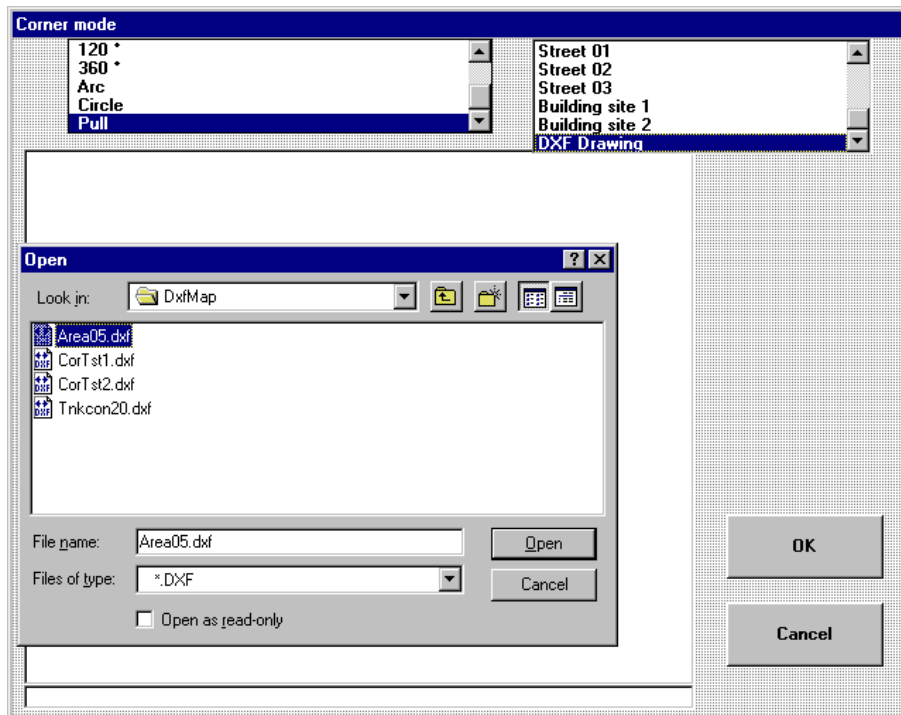
Traffic circle 1

Using Checkboxes : "Street on/off" You can choose if you have all four streets on picture.
You are also able to change lane widths and sidewalk widths.
If you will have two-lane street; give width for two lanes, and type width of other lanes to 0.
You can also change dimensions of the circle.

DXF Drawing as Map drawing

If you choose **DXF Drawing** as map, you will get a file open dialog for choosing a DXF drawing.

The default directory for map drawings is subdirectory **DXFMAP**, the whole path for example: **C:\TRAILERW\DXFMAP** .
If you will use own DXF drawing as map in CornerWIN, then save DXF files in this directory .
The Drawing must be simple drawing. Use only basic drawing items: lines, circles, arcs.
If your original drawing includes blocks, you have to explode blocks before making DXF-file.

BusWIN manual
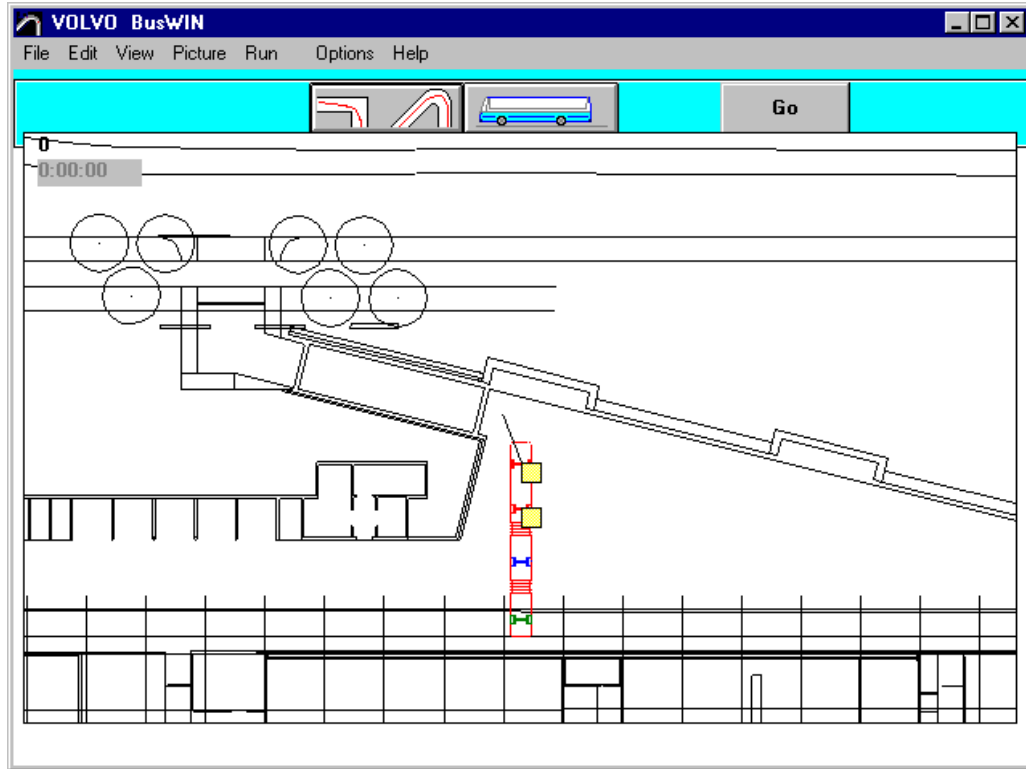
Drawing tools
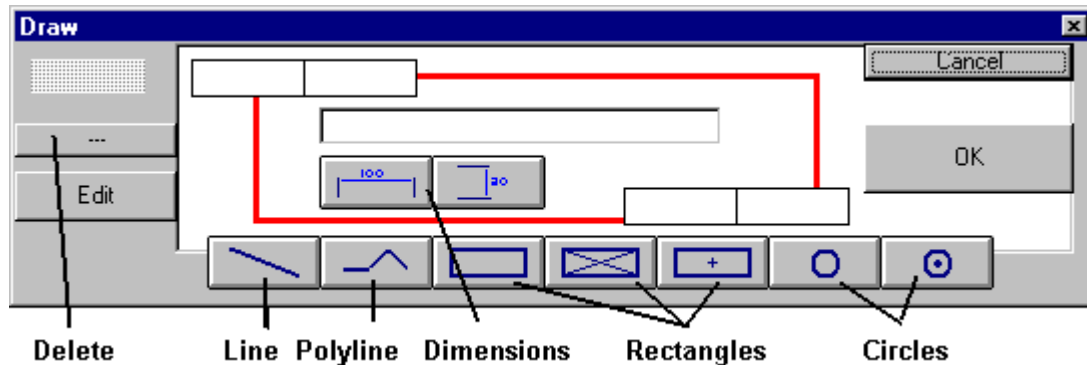## Add drawing objects on the map

Drawing different objects:

Line

Click the Line Button.
Move the mouse cursor on the starting point of the line and push link mouse button down and hold it down.
Move mouse to the endpoint of this line and release the mouse button.

Polyline

Click the Polyline Button.
Move the mouse cursor on the starting point of the polyline and push the link mouse button down and hold it down.
Move mouse to the second point of this line and release the mouse button.
Move mouse to the following point of the polyline and click with left mouse button.
Move mouse to the following point of the polyline and click with left mouse button.
…. continue so, you can have maximum 30 node points on one polyline.
When polyline is ready, then click the Polyline Button again;

it is now End Polyline Button.

Rectangles

Click on of the Rectangle Buttons.
Move the mouse cursor on the first corner point of the rectangle and push link mouse button down and hold it down.
Move mouse to the opposite corner point of this rectangle and release the mouse button.

Circles

Click on of the Circle Buttons.
Move the mouse cursor on the center point of the circle and push link mouse button down and hold it down.
Move mouse to some point on the circle (radius distance) and release the mouse button.

Dimensions: horizontal and vertical.

Click on the horizontal or vertical dimension button;

When You draw a dimension with mouse, you will get the correct dimension text automatically. You can anyway change the dimension text; you only write a new text on the dimension editing box , and click the small ok button on the right side of the editing box.
If you later edit this dimension with the mouse, you get again automatically new dimension text.

You can choose arrow position with direction, when you are drawing a dimension with dragging mouse.
The example shows the result and the mouse movement direction, from point 1 to point 2.

Edit Drawing Objects

Click Edit Drawing Objects Button
Small rectangles appear on all drawing objects.
You can move these rectangles with mouse, and so change the drawing.

Delete Drawing Objects

Click Delete Drawing Objects Button
Small rectangles appear on all drawing objects.
Click this small rectangle on this object, which you want to delete.
Confirm deleting.