

CS-Studio: Probe

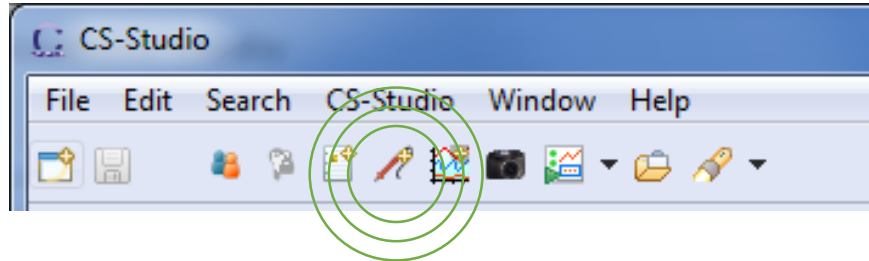
Probe

- A simple application to connect to pv's
 - Monitor pv's (caget, camonitor)
 - Write to pv's (caput)

- Opening probe

- Menu:
CSS → Diagnostic Tools →  Probe

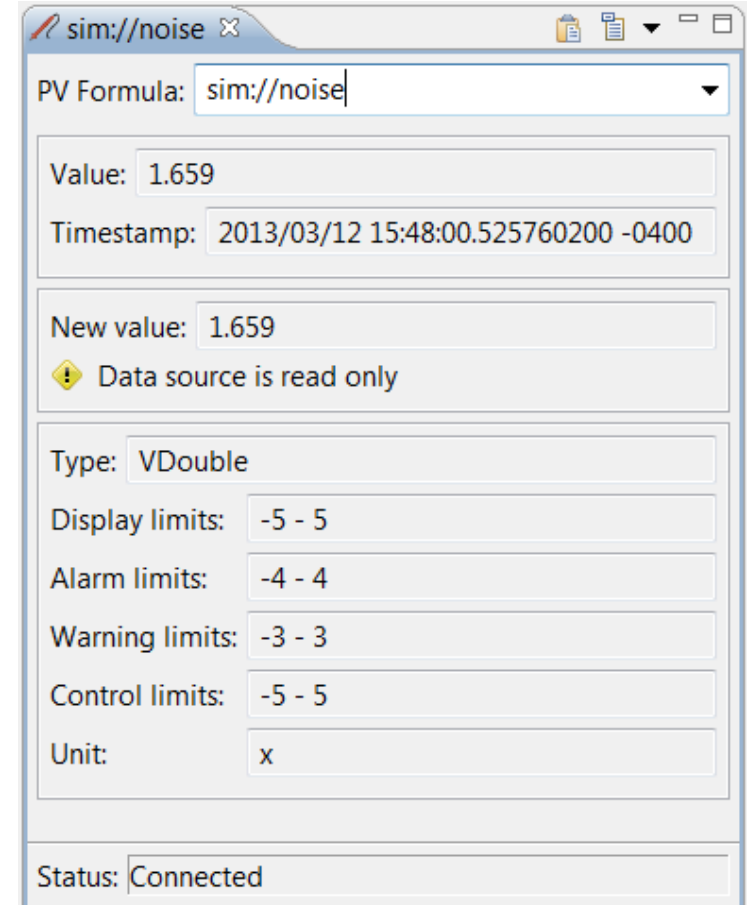
- Toolbar:



- Context Menu*:
Process Variable → Probe

Probe - getting started

- Connect to a simple scalar pv (simulation)
 - In the PV Formula field type “sim://noise” and hit the return key
- Connect to a simple scalar pv (softIOC)
 - In the PV Formula field type “XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV” and hit the return key

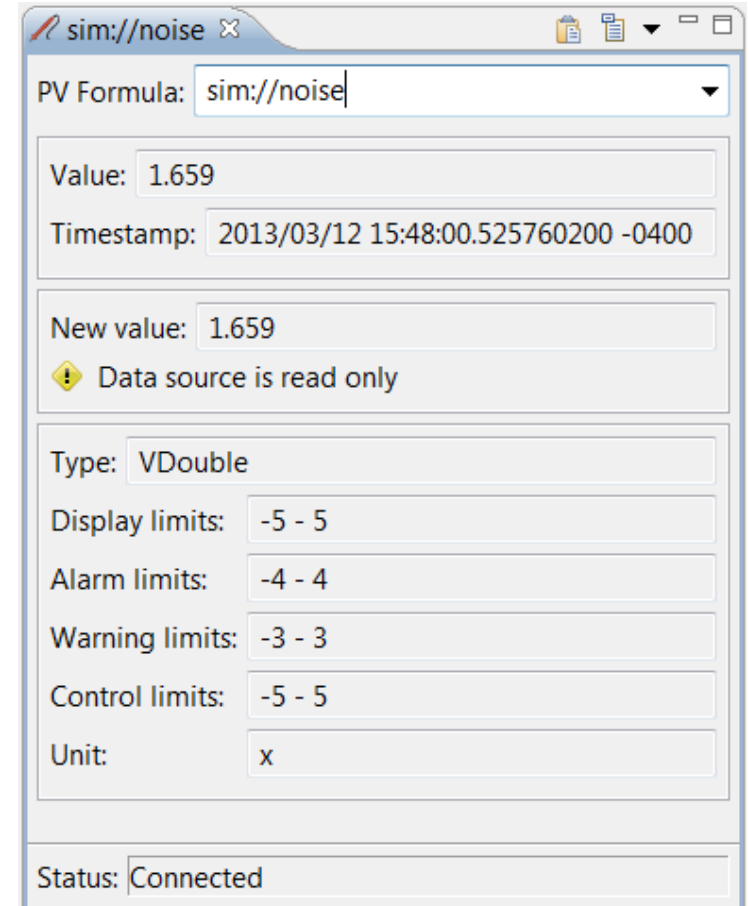


The screenshot shows a window titled "sim://noise" with a tab icon and standard window controls. The "PV Formula:" field contains "sim://noise". Below this, the "Value:" is 1.659 and the "Timestamp:" is 2013/03/12 15:48:00.525760200 -0400. A "New value:" field also shows 1.659, with a yellow warning icon and the text "Data source is read only" below it. The "Type:" is VDouble. The "Display limits:" are -5 - 5, "Alarm limits:" are -4 - 4, "Warning limits:" are -3 - 3, and "Control limits:" are -5 - 5. The "Unit:" is x. At the bottom, the "Status:" is Connected.

PV Formula:	sim://noise
Value:	1.659
Timestamp:	2013/03/12 15:48:00.525760200 -0400
New value:	1.659
⚠ Data source is read only	
Type:	VDouble
Display limits:	-5 - 5
Alarm limits:	-4 - 4
Warning limits:	-3 - 3
Control limits:	-5 - 5
Unit:	x
Status:	Connected

Probe - deciphering the data

- Value:
Shows the current value of the pv and the timestamp associated with it
- Change Value:
The new value field is used to write new values to the pv
If the pv is read only this field is disabled
- MetaData:
Additional information about the pv Type, Display limits, Alarm limits, units.....

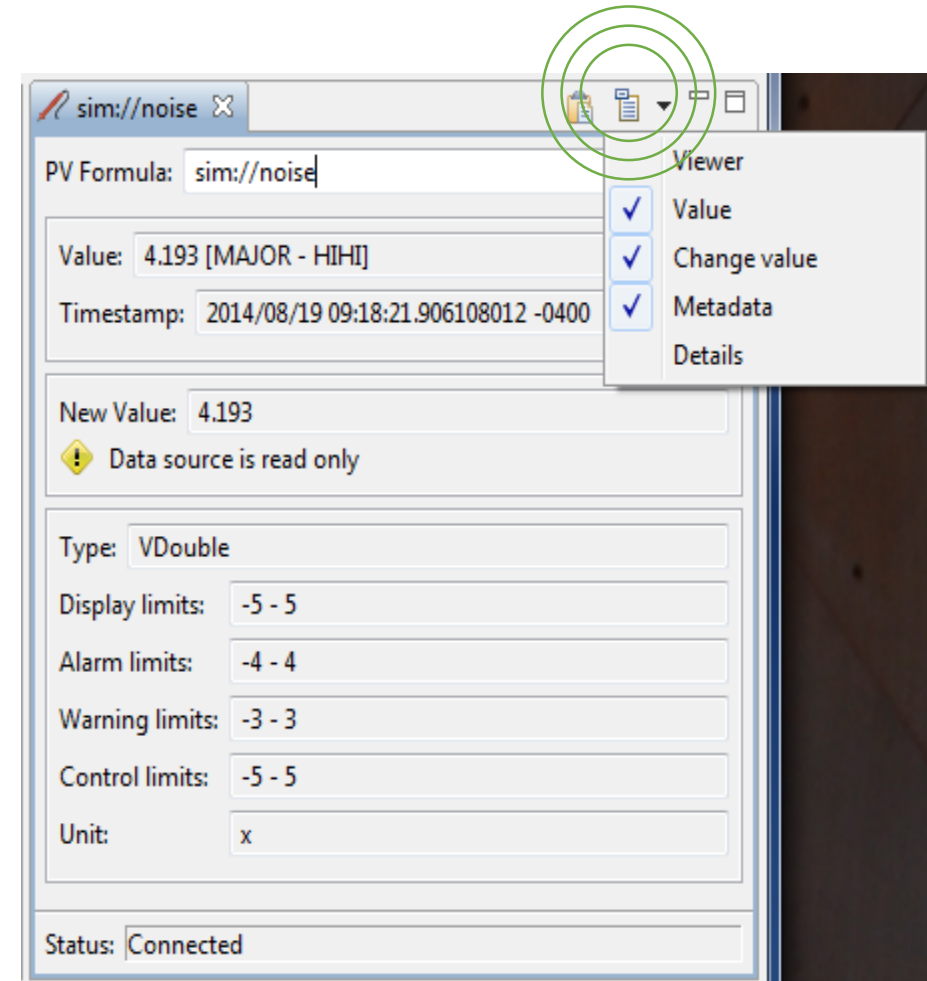


The screenshot shows a window titled 'sim://noise' with a standard toolbar. The 'PV Formula' dropdown is set to 'sim://noise'. Below this, the 'Value' field displays '1.659' and the 'Timestamp' field shows '2013/03/12 15:48:00.525760200 -0400'. A 'New value' field also contains '1.659', but it is disabled, indicated by a yellow warning icon and the text 'Data source is read only'. The 'Type' is set to 'VDouble'. Below this are several limit fields: 'Display limits' (-5 - 5), 'Alarm limits' (-4 - 4), 'Warning limits' (-3 - 3), and 'Control limits' (-5 - 5). The 'Unit' field is set to 'x'. At the bottom, the 'Status' field shows 'Connected'.

PV Formula:	sim://noise
Value:	1.659
Timestamp:	2013/03/12 15:48:00.525760200 -0400
New value:	1.659
⚠ Data source is read only	
Type:	VDouble
Display limits:	-5 - 5
Alarm limits:	-4 - 4
Warning limits:	-3 - 3
Control limits:	-5 - 5
Unit:	x
Status:	Connected

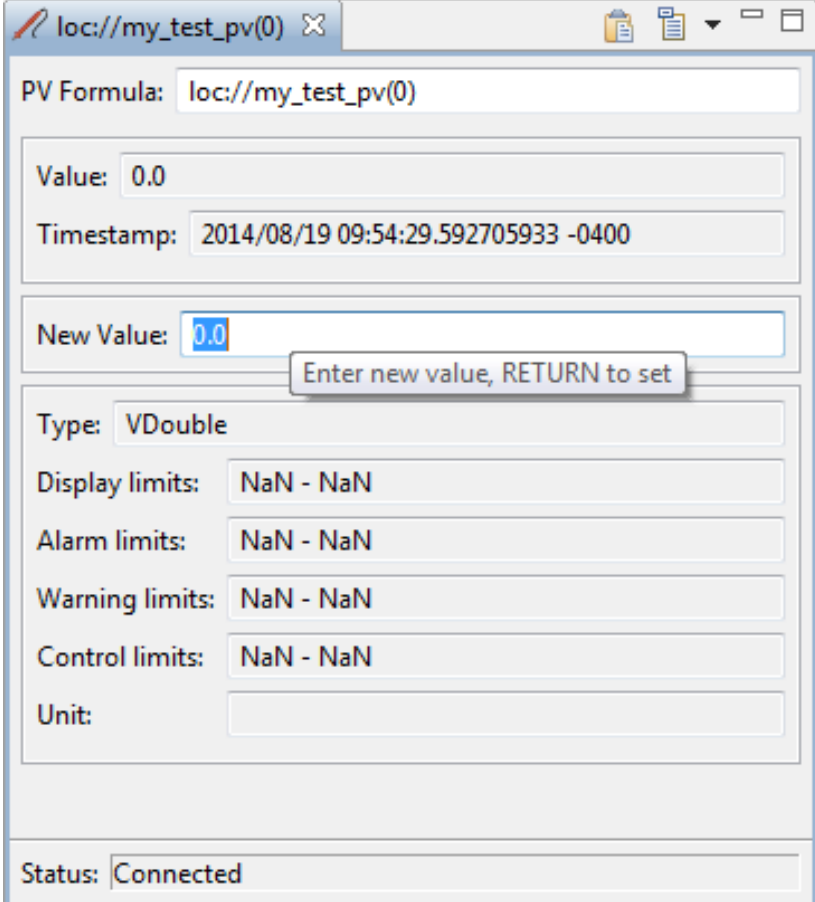
Probe - deciphering the data

- The drop down menu allows you to select the additional information about the pv and the connection to be displayed
 - Viewer
 - Value
 - Change value
 - Details



Probe - writing a value

- Connect to a simple scalar pv (local)
 - In the *PV Formula*: field type “loc://my_test_pv(0)” and hit RETURN
 - In the *New Value*: field enter any valid number and hit RETURN



The screenshot shows a software window titled "loc://my_test_pv(0)". It contains several input fields and a status bar. The "PV Formula:" field is set to "loc://my_test_pv(0)". The "Value:" field shows "0.0" and the "Timestamp:" field shows "2014/08/19 09:54:29.592705933 -0400". The "New Value:" field is highlighted with a blue border and contains "0.0", with a tooltip that says "Enter new value, RETURN to set". Below this, the "Type:" is set to "VDouble", and "Display limits:", "Alarm limits:", "Warning limits:", and "Control limits:" are all set to "NaN - NaN". The "Unit:" field is empty. The "Status:" bar at the bottom shows "Connected".

PV Formula:	loc://my_test_pv(0)
Value:	0.0
Timestamp:	2014/08/19 09:54:29.592705933 -0400
New Value:	0.0
Type:	VDouble
Display limits:	NaN - NaN
Alarm limits:	NaN - NaN
Warning limits:	NaN - NaN
Control limits:	NaN - NaN
Unit:	
Status:	Connected



Probe - writing a value

- Open 2 probes
- Move the probe views so that they can be both viewed simultaneously
- In the first probe enter the setpoint pv
PV: *XF:31IDA-OP{Tbl-Ax:X1}Mtr*
- In the second probe enter the Readback pv
PV: *XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV*
- Set a new motor position (-100 and 100)

The image shows two probe windows from a control system interface.

Top Window: XF:31IDA-OP{Tbl-Ax:X1}Mtr

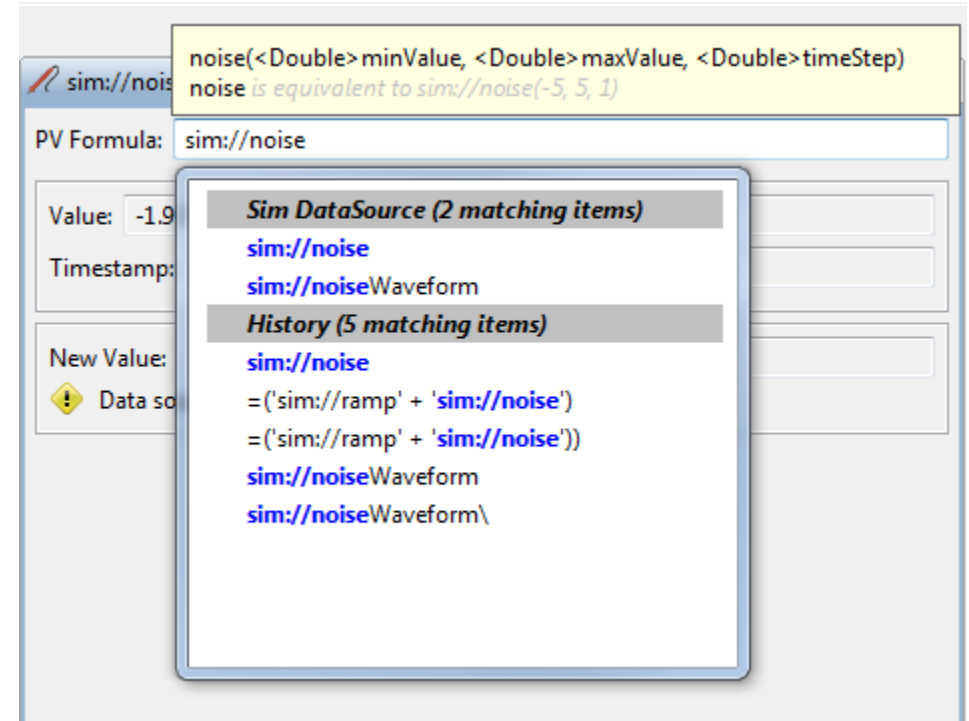
- PV Formula: XF:31IDA-OP{Tbl-Ax:X1}Mtr
- Value: 0.00000
- Timestamp: 2014/08/21 10:58:08.449357588 -0400
- New Value: 0
- Status: Connected

Bottom Window: XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV

- PV Formula: XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV
- Value: 0.00000
- Timestamp: 2014/08/21 10:58:13.583489483 -0400
- New Value: 0.00000
- Warning: 'XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV' is read-only
- Status: Connected

Probe - Autocomplete

- Autocomplete
 - History
 - ChannelFinder
 - Predefined simulation pv's (Datasources)
 - Formula functions



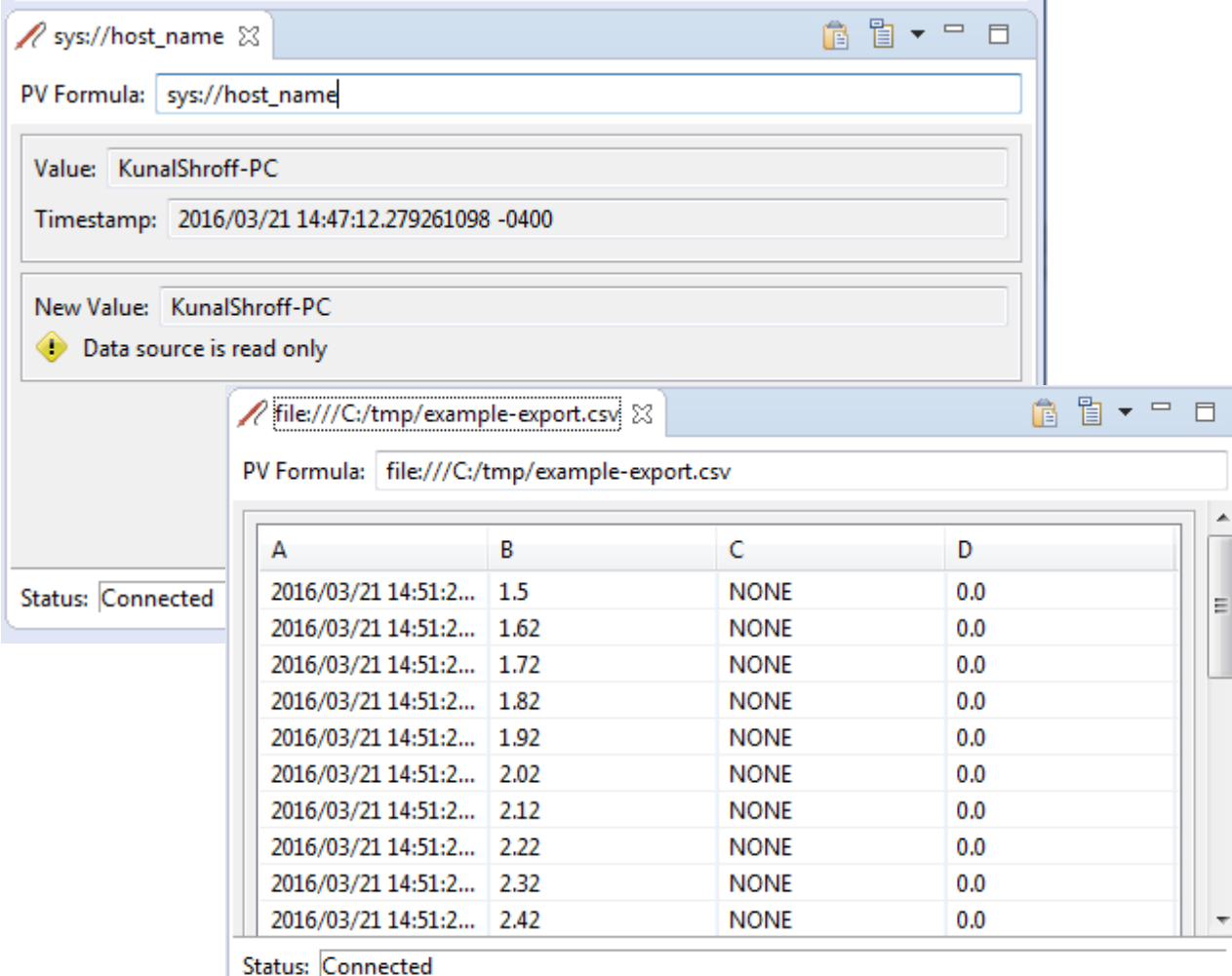
Probe - Help

- Help → Help Content
CSS Applications → Diagnostic Tools → Probe

Probe – process variable (Datasource)

type://some_pv_name

- Datasources
 - System (*sys://*)
 - Local (*loc://*)
 - Simulation (*sim://*)
 - File (*file://*)
 - PVAccess (*pva://*)
- Help
 - CSS Core → Process Variables

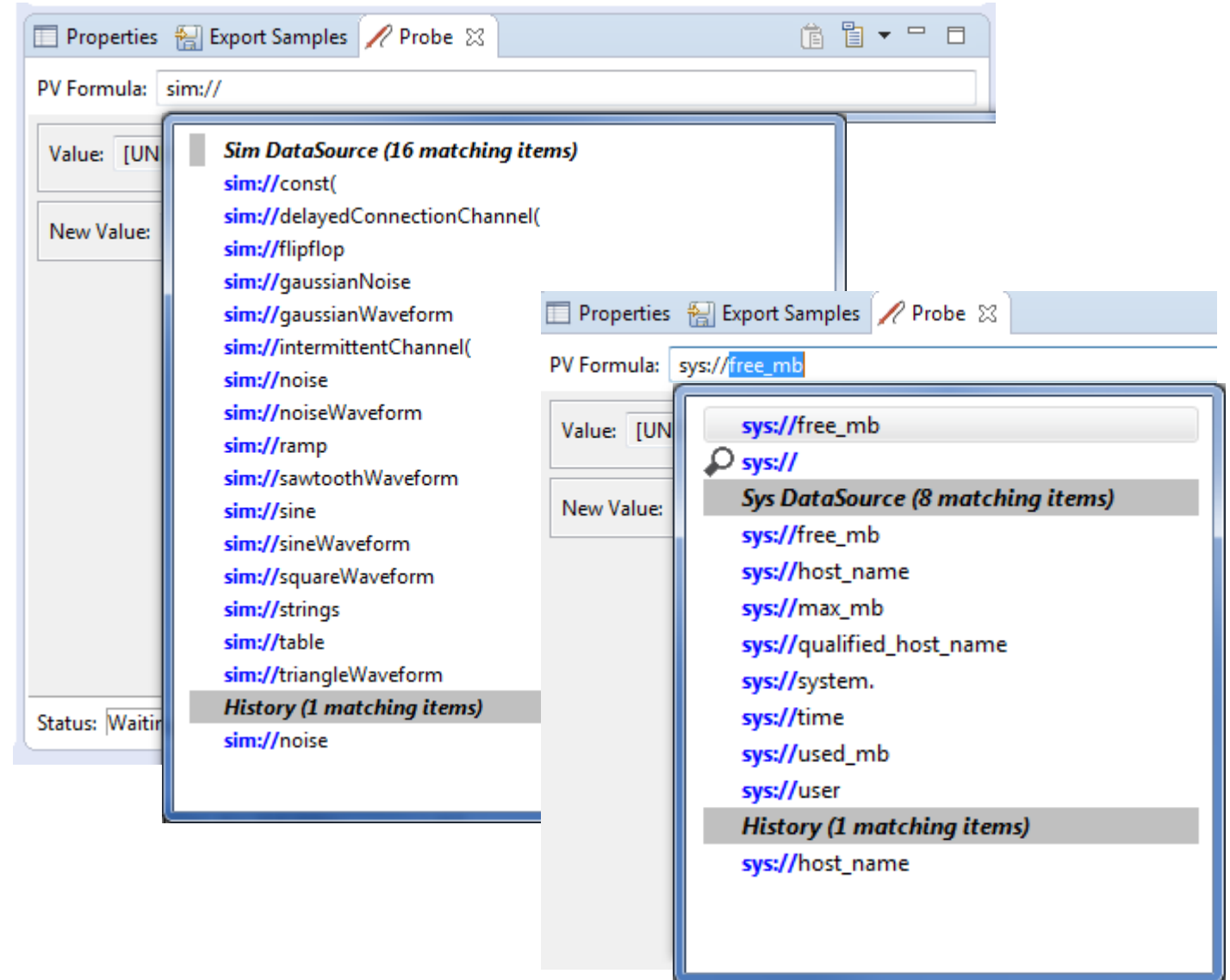


The screenshot displays two windows from a software interface. The top window, titled 'sys://host_name', shows a 'PV Formula' field with the value 'sys://host_name'. Below this, the 'Value' is 'KunalShroff-PC' and the 'Timestamp' is '2016/03/21 14:47:12.279261098 -0400'. The 'New Value' is also 'KunalShroff-PC', and a warning icon indicates 'Data source is read only'. The status at the bottom is 'Connected'. The bottom window, titled 'file:///C:/tmp/example-export.csv', shows a 'PV Formula' field with the value 'file:///C:/tmp/example-export.csv'. It contains a table with four columns: A, B, C, and D. The table has 10 rows of data. The status at the bottom is 'Connected'.

A	B	C	D
2016/03/21 14:51:2...	1.5	NONE	0.0
2016/03/21 14:51:2...	1.62	NONE	0.0
2016/03/21 14:51:2...	1.72	NONE	0.0
2016/03/21 14:51:2...	1.82	NONE	0.0
2016/03/21 14:51:2...	1.92	NONE	0.0
2016/03/21 14:51:2...	2.02	NONE	0.0
2016/03/21 14:51:2...	2.12	NONE	0.0
2016/03/21 14:51:2...	2.22	NONE	0.0
2016/03/21 14:51:2...	2.32	NONE	0.0
2016/03/21 14:51:2...	2.42	NONE	0.0

Probe - Autocomplete Datasources

- Autocomplete will list the various pv's available for a particular datasource



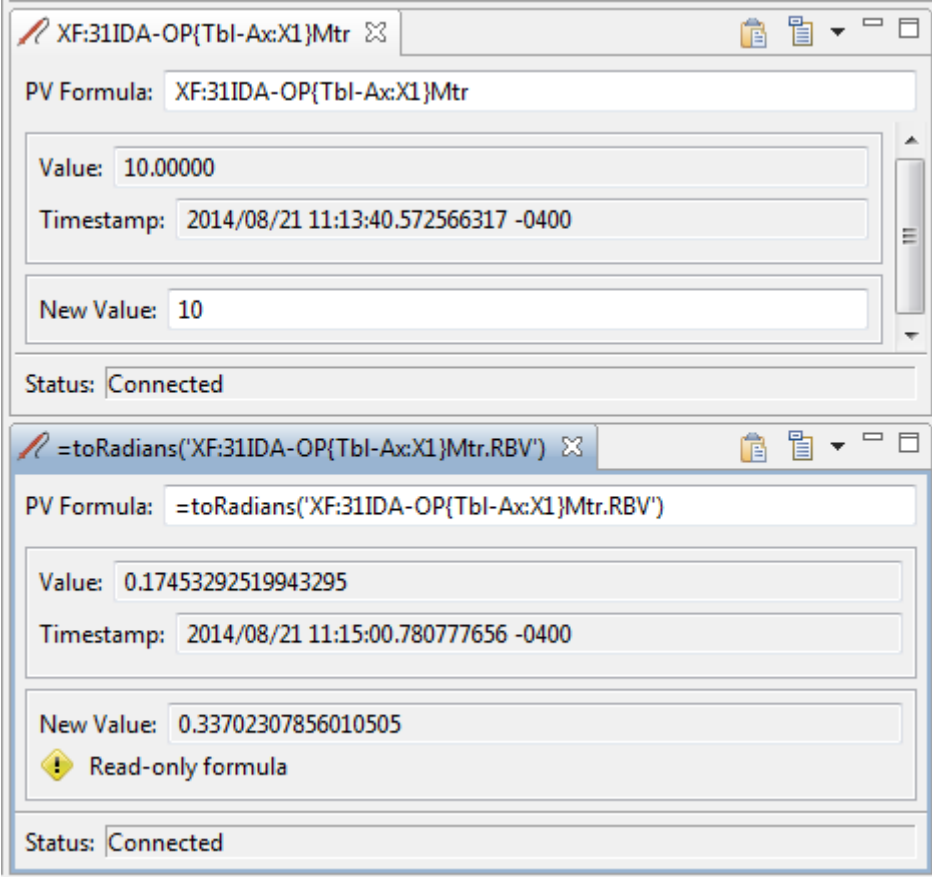
The image displays two overlapping screenshots of the 'Probe' window in a software application, demonstrating the autocomplete functionality for datasources.

Left Screenshot: The 'PV Formula' field contains 'sim://'. The autocomplete list shows 16 matching items under the heading 'Sim DataSource (16 matching items)'. The items are: `sim://const`, `sim://delayedConnectionChannel`, `sim://flipflop`, `sim://gaussianNoise`, `sim://gaussianWaveform`, `sim://intermittentChannel`, `sim://noise`, `sim://noiseWaveform`, `sim://ramp`, `sim://sawtoothWaveform`, `sim://sine`, `sim://sineWaveform`, `sim://squareWaveform`, `sim://strings`, `sim://table`, and `sim://triangleWaveform`. Below these, there is a section for 'History (1 matching items)' with the item `sim://noise`.

Right Screenshot: The 'PV Formula' field contains 'sys://free_mb'. The autocomplete list shows 8 matching items under the heading 'Sys DataSource (8 matching items)'. The items are: `sys://free_mb`, `sys://host_name`, `sys://max_mb`, `sys://qualified_host_name`, `sys://system.`, `sys://time`, `sys://used_mb`, and `sys://user`. Below these, there is a section for 'History (1 matching items)' with the item `sys://host_name`.

Probe - pv's and formulas

- Formulas
 - Mathematical operations
 - Logical operations
 - Array operations
 - Create/modify tables and arrays
- Start with a '='
- Don't use formulas for things that should be done in the IOC



The screenshot displays two windows from a probe configuration tool. The top window, titled 'XF:31IDA-OP{Tbl-AxcX1}Mtr', shows a 'PV Formula' field with the text 'XF:31IDA-OP{Tbl-AxcX1}Mtr'. Below this, the 'Value' is 10.00000 and the 'Timestamp' is 2014/08/21 11:13:40.572566317 -0400. A 'New Value' field contains the number 10. The status at the bottom is 'Connected'. The bottom window, titled '=toRadians('XF:31IDA-OP{Tbl-AxcX1}Mtr.RBV')', shows a 'PV Formula' field with the text '=toRadians('XF:31IDA-OP{Tbl-AxcX1}Mtr.RBV')'. Below this, the 'Value' is 0.17453292519943295 and the 'Timestamp' is 2014/08/21 11:15:00.780777656 -0400. A 'New Value' field contains the number 0.33702307856010505. A yellow warning icon and the text 'Read-only formula' are visible below the 'New Value' field. The status at the bottom is 'Connected'.



Probe - pv's and formulas

CSS →

Debugging →

Formula Functions

f() Formula Functions	
Name	Description
▶ array	
▲ math	
abs(VNumber arg): VNumber	Absolute value
acos(VNumber arg): VNumber	Arc cosine
asin(VNumber arg): VNumber	Arc sine
atan(VNumber arg): VNumber	Arc tangent
cbrt(VNumber arg): VNumber	Cubic root
ceil(VNumber arg): VNumber	Ceiling function
cos(VNumber arg): VNumber	Cosine
cosh(VNumber arg): VNumber	Hyperbolic cosine
exp(VNumber arg): VNumber	Exponential
floor(VNumber arg): VNumber	Floor function
integrate(VNumber value): VNumber	Integrates the given signal in time
log(VNumber arg): VNumber	Natural logarithm
log10(VNumber arg): VNumber	Base 10 logarithm
signum(VNumber arg): VNumber	Sign function
sin(VNumber arg): VNumber	Sine
sinh(VNumber arg): VNumber	Hyperbolic sine
sqrt(VNumber arg): VNumber	Square root
tan(VNumber arg): VNumber	Tangent
tanh(VNumber arg): VNumber	Hyperbolic tangent
toDegrees(VNumber arg): VNumber	Converts radians to degrees
toRadians(VNumber arg): VNumber	Conerts degrees to radians
▶ numericOperators	
▶ string	
▶ table	

Probe - Autocomplete formula

- Figure 1:
Autocomplete will list the formula functions matching your text.
- Figure 2:
Autocomplete will help you fill the formula function with the correct parameters.

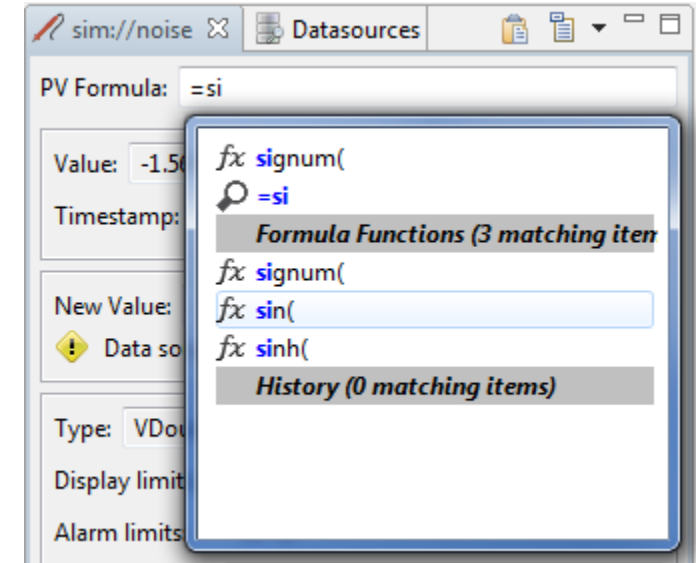


Figure 1

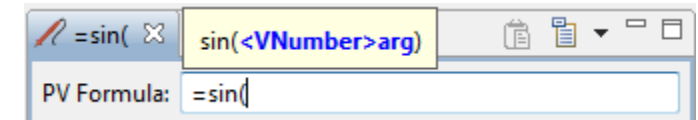


Figure 2