

Technical Information Sheet

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TIS#: 239, Issue 1

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Subject

This document describes how to use the Eurotherm iTools OPC Server with the Wonderware InTouch SCADA software to create InTouch windows displaying any Eurotherm instrumentation supported by the Eurotherm iTools OPC Server.

Software and Hardware Used

Eurotherm iTools V5.00, EuroMBus, Eurotherm iTools Controls
Wonderware InTouch, Version 8.0.1
Eurotherm 3216, V1.05
Dell Inspiron 8200
Microsoft Windows XP Pro, Version 2002, SP1

Introduction

This Technical Information Sheet (TIS) describes how the Eurotherm iTools OPC Server EuroMBus and how to use it as an OPC Server with Wonderware's OPCLink and InTouch software.

Wonderware InTouch is not an OPC Client program and uses the Wonderware OPCLink application program as a software communications protocol converter. It communicates as an OPC client to EuroMBus and supports DDE, FastDDE, or SuiteLink™ to InTouch or other 3rd party compatible software.

The communications mechanism used by the Eurotherm controls is OPC (Object linking and embedding for Process Control). The OPC Server used is EuroMBus from iTools V5. iTools may be downloaded from www.eurotherm3.com/iTools. When communicating to a 3rd party OPC client program, the Open OPC Server option – OPC – must be specified or EuroMBus times out in 30 minutes. It may be restarted for continuing 30 minute intervals.

It is assumed that the reader has as a prerequisite a competency in Wonderware InTouch development.

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Configuring iTools/EuroMbus

iTools, now known as iTools Engineering Studio in V5, contains the iTools shell, an OPC Server – EuroMbus and Instrument Descriptor Modules (IDM's) that contain inherent knowledge of Eurotherm instrumentation. The iTools shell is an OPC Client and interfaces to EuroMbus using OPC. EuroMbus in turn communicates to Eurotherm instrumentation through serial ports or Ethernet and uses the IDM files to automatically build a browseable instrument database for 1 or essentially unlimited instruments that are connected to or simulated in the PC.

A Eurotherm 3216 with EIA-232 comms, a 3216 and 3504 simulation in iTools was used to provide the controller views. To create the simulated 3216 and 3504 in iTools under **File**, a **New Clone File** was created. This is shown in Figure 1 below. For the live controller view, a 3216 with the EIA-232 comms option was connected to a PC serial port, and the **Scan** icon in the iTools **Main Toolbar** was clicked. This caused iTools to automatically scan the serial network and locate and build the database for any Eurotherm controllers connected to serial ports.

Note that the live controller has yellow values while the simulated controllers have values displayed in white.

The images of the controllers in the Panel View pane in Figure 1 represent the Series2000Panel control. This control supports full faceplate functionality for the following Series 2000 product family; the 2216e, 2208e, 2204e, 2416, 2408 and 2404; and, for the Series 3000; 3216, 3508 and 3504. In iTools, use your mouse to click on any of the pushbuttons in the controller faceplate views and notice that they emulate the functionality of a real controller. See TIS-238 for additional application support on the iTools controls.

To view EuroMbus, from the menu bar select Options/Advanced/Show Server. Figure 2 shows EuroMbus with a 3216 connected through COM1 and the **Monitor** mode enabled by selecting **Network/Monitor**.

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iTools - [COM1.ID002-3216 - Parameter Explorer (INPUT)]

File Device Explorer View Options Window Help

New File Open File Load Save Print Scan Add Remove Access Views

Parameter Explorer Flash Memory Device Panel Watch/Recipe OPC Scope iTools Secure Device Help

Name	Description	Address	Value
Type	Input Type	12290	J TC (0)
Units	Display Units	516	°F (1)
DecimalPoi	Decimal Point Position	525	NNNN (0)
RangeHigh	Range High Limit	12	2192.0
RangeLow	Range Low Limit	11	-346.0
PVOffset	PV Offset	141	0.0
FilterTime	Input Filter Time	101	1.6
CJCType	CJC Type	12291	AUTO (0)
SBriKType	Sensor Break Type	578	ON (1)
CJCTemp	CJC Temperature	215	84.8
PVInValue	PV Input Value	1	84.8
MVInValue	Electrical Input Value	202	0.0
CommsPVV	Comms PV Value	203	0.0

INPUT - 13 parameters (2 hidden)

COM1.ID002-3216 and Settings\MDemick\My Documents\Work\Controls\IToo C:\...\Controls\ITools\3504spp.UIC

Level 2 (Engineer) 3216 v. E1.06

Figure 1

OPC Path

In the left pane of Figure 2, note the hierarchical tree view of the connected controller. This tree is important as it represents the OPC Path name used by OPC Clients (OPCLink here) to establish Item connections to the OPC Server. An Item is the name of the parameter in the Eurotherm instrument that ultimately we wish to display in InTouch on a window and is the Item in the Application | Topic!Item addressing used by InTouch to communicate to OPCLink. The Application is OPCLink, the Topic(s) are defined in OPCLink and the Item is the OPC Path name.

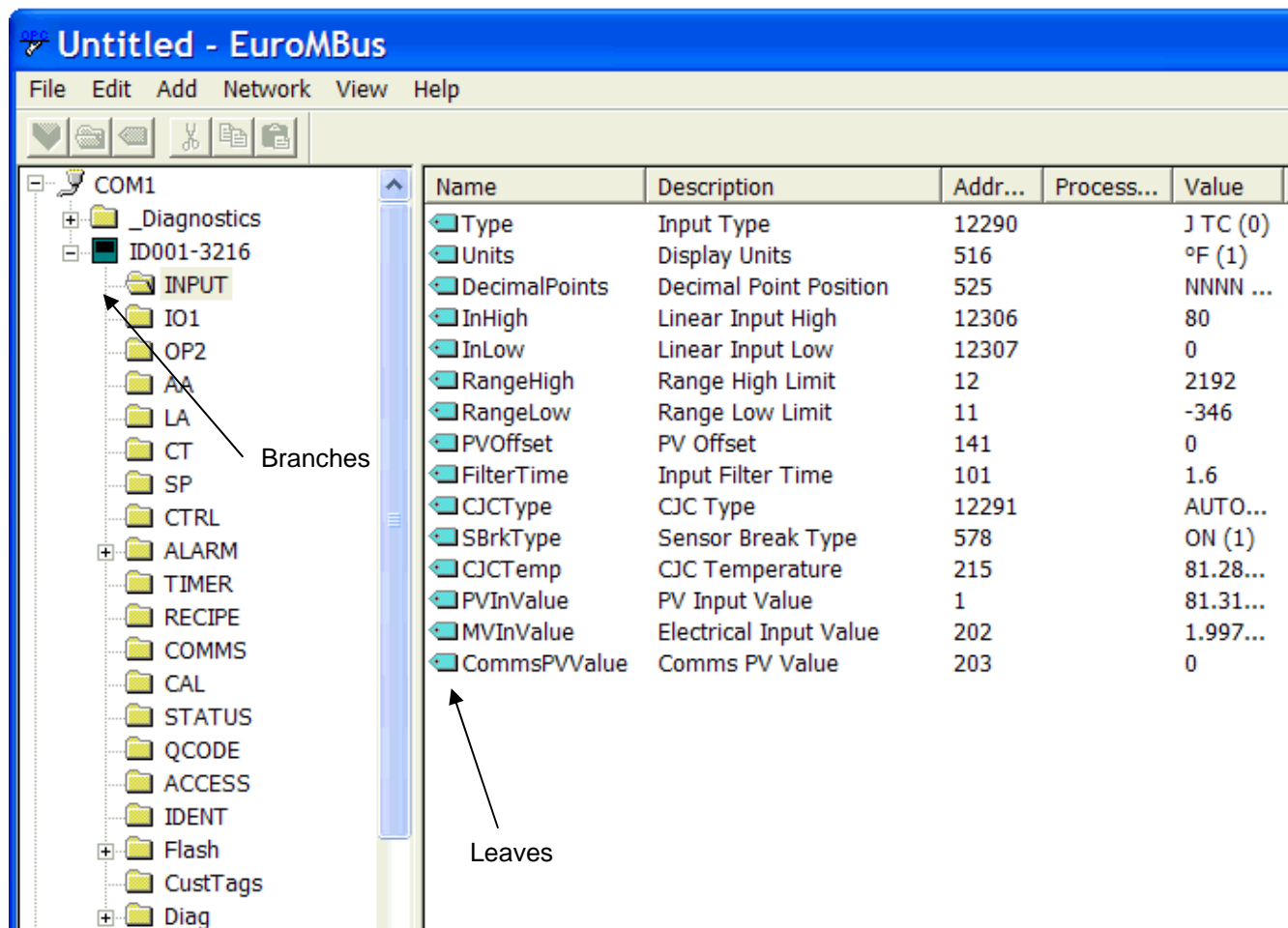


Figure 2

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The OPC Path name is derived from the hierarchical tree view of the instrumented shown in Figure 2. The root is COM1, followed by one or more branches ending with leaves. The branches for Eurotherm instrumentation typically start with the instrument ID (ID001-3216 shown) followed by one or more branches that represent logical parameter folders (INPUT, IO1 ... shown) ending with leaves (Type, Units ... shown) that are the parameters within the folders.

The 3216 shown has one level of branches or parameter folders while other Eurotherm instrumentation may have two or more branches of parameter folders before reaching the leaves or parameters.

A fully qualified **OPC Path** or **Item** name for the process value in the 3216 would be: **COM1.ID001-3216.INPUT.PVInValue** as can be seen in Figure 2. OPC Client programs use this fully qualified name to request the value of a specific Item from an OPC Server. The dot (.) is used to delimit each part in the **OPC Path** name.

When entering **OPC Path** and **Item** names into OPCLink and InTouch WindowMaker, the **OPC Path** name is normally split up into two parts. In a hierarchical address space the first part of a full **OPC Path** is typically the root and every branch without the leaf. This is the **OPC Path** name used by OPCLink in our example: '**COM1.ID001-3216.INPUT.**'.

The Tagname Definition in InTouch WindowMaker then completes the OPC Path by defining the leaf or parameter name. By combining the parameter name as the second part to the first part, the fully qualified **OPC Path** name to that parameter in EuroMbus is constructed. OPCLink combines the **OPC Path** part and the leaf part to construct the fully qualified OPC Path name. This method enables access in WindowMaker to every parameter within that OPC Path name defined for a specific Topic.

Note that with the OPC Path as it has been defined it would not be possible to have access to any other parameters in any other parameter folder for example, the CTRL parameter folder. The solution to this is to change the OPC Path to: '**COM1.ID001-3216.**'. Now when the Tagname Definitions are defines in WindowMaker, the Item must include the branch or parameter folder name as well as the leaf or parameter name.

Configuring Wonderware InTouch - OPCLink

InTouch does not directly support OPC therefore, you must use Wonderware's OPCLink software communication protocol converter. For each instrument that is to be displayed one or more **Topic Definition(s)** must be defined in OPCLink. Configuring OPCLink automatically saves the data in a configuration file.

Open OPCLink from the start menu and select **Configure/Topic Definition...** to open the **Topic Definition** dialog box. Click on the New... button to create and open the **OPCLink Topic Definition** dialog box as shown in Figure 3.

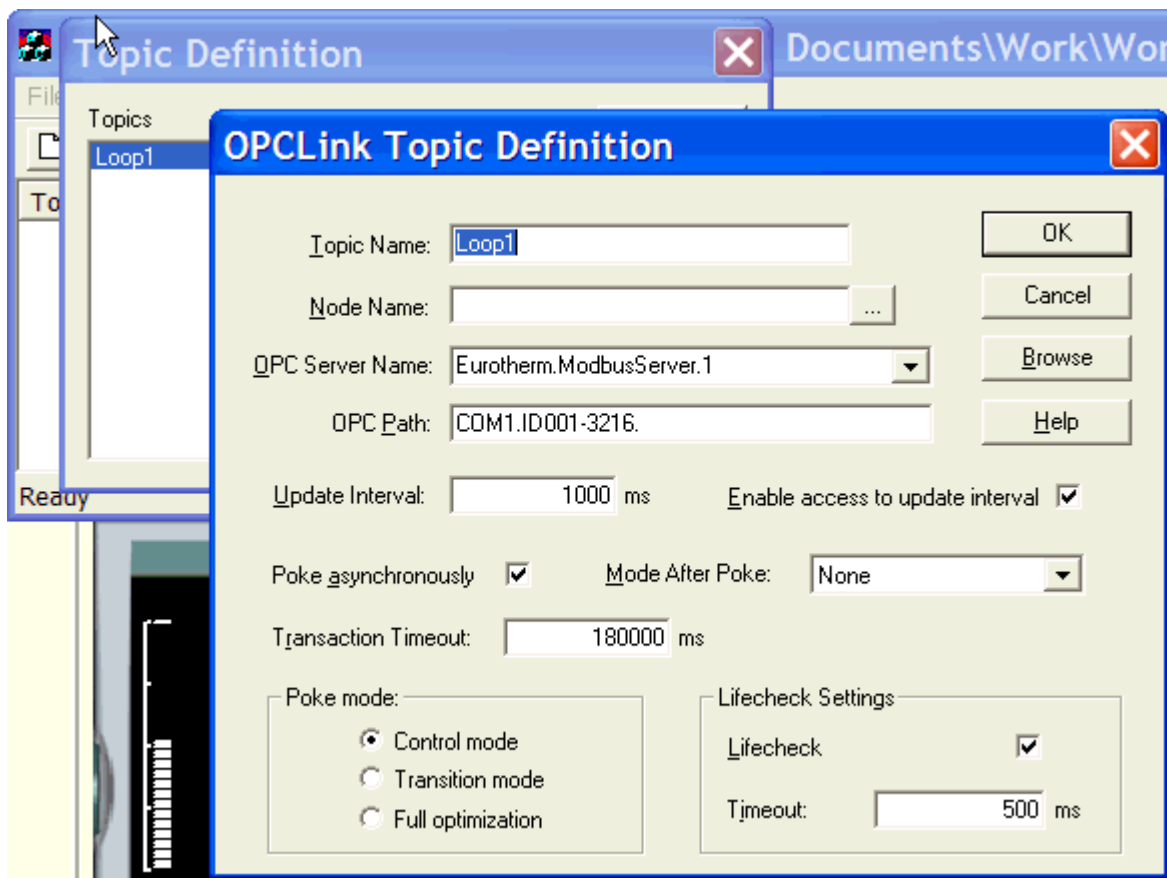


Figure 3

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The **Topic Name** represents the tag for the connected instrument. As such it should represent a meaningful name shown here simply as 'Loop1'. Each **Topic Name** must be unique and when defining the **Access Name** in InTouch this exact name must be used.

The **Node Name** text box entry is the name of the remote computer when the OPC Server is running on a remote computer. The technology behind this is DCOM and requires running the DCOMCNFG from the start/run dialog on the remote computer to allow OPCLink clients access. **Node Name** is blank here as the OPC Server (EuroMbus) is running locally.

The **OPC Server Name** is the name of the OPC Server that is used by this Topic. The list box displays the names of registered local or remote OPC Servers available. Eurotherm.ModbusServer.1 is the **OPC Server Name** for the Eurotherm iTools OPC Server, EuroMbus.

The **OPC Path** represents the first part of a full OPC path item name string that will be used by this topic as described previously: 'COM1.ID001-3216.'. This **OPC Path** allows the parameter folder and parameters within that folder to be accessed using a single **Topic**.

The **Update Interval** sets the frequency that OPCLink will acquire data from the OPC Server for the defined Items/Parameters associated with this Topic. Setting this value to zero (0) will disable the acquisition of data.

By checking **Enable access to update interval** the OPC Client (InTouch) can read and write the **Update Interval** using the Item name 'UPDATEINTERVAL'. If not checked, the OPC Client can only read it.

Checking **Poke asynchronously** process all pokes (writes) as asynchronous. Most if not all OPC Servers support synchronous and asynchronous pokes. Setting to asynchronous is recommended as it means the OPCLink does not have to wait for a write response from the OPC Server before issuing other requests.

Selecting None for **Mode After Poke** is the recommended setting. This setting has to do with a poke or write that may not actually occur due to for example writing above a setpoint limit and the OPC Server potentially not reporting back the value before the poke. This would mean WindowViewer could be displaying the poke or write value that is not what is actually in the target instrument as it would have been rejected. This is not an issue with EuroMbus.

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The **Poke mode** enables tuning the poking or writing behaviour to the external instrument. This setting affects the order in how multiple writes are sent to the OPC Server and in turn the external instrument. If the order of writes is important, then select **Control mode** and all writes are processed in the order they are received from the OPC Client. If write order is not important then the default **Transition mode** is recommended. For the highest performance and write order is not required, select **Full optimization**.

The **Lifeclock Settings** when checked, enable OPCLink to check regularly if it receives data from an OPC Server. If data is not being received in the **Timeout** interval, OPCLink forces a refresh through an asynchronous call. If this call fails or the OPC Server fails to respond in the timeout interval (= Update Interval + Lifeclock Timeout) the Topic status is set to Bad (0).

OPC allows the address space of the OPC Server to be exposed. Click in the Browse button as shown in Figure 2 to open the **OPC Browser** dialog box as shown in Figure 4.

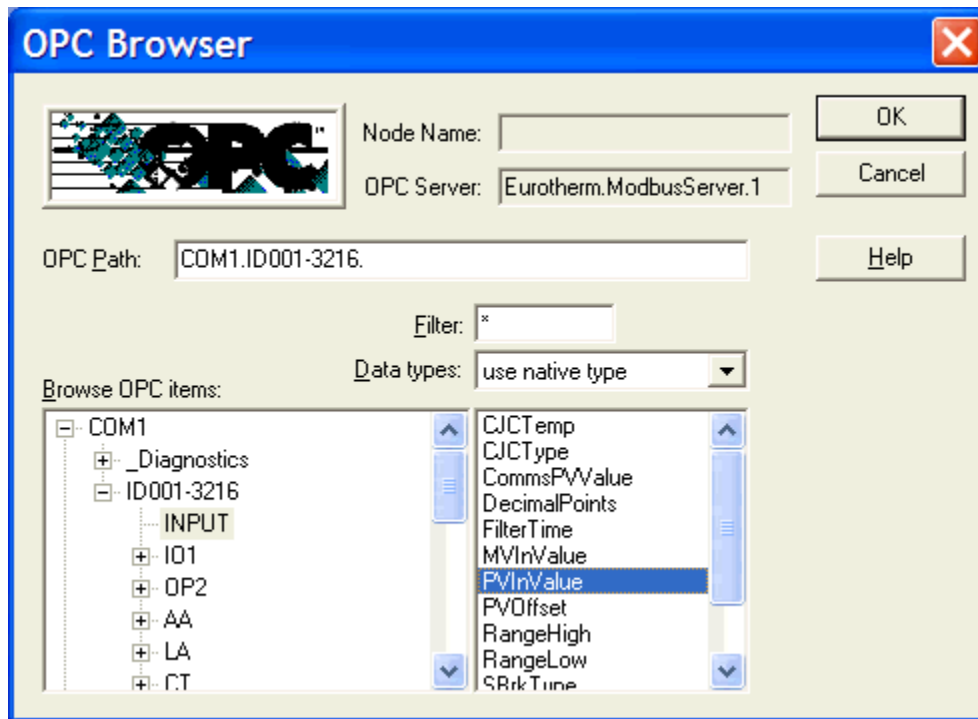


Figure 4

The address space of the OPC Server is shown in the Browse OPC items pane. By clicking on the innermost branch, the OPC Path may be automatically filled in and then modified manually if

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necessary. The leaves or parameters within a folder are displayed in the pane to the right of the hierarchical tree.

For additional Help on the Wonderware OPCLink program click Help/Contents.

Wonderware InTouch WindowMaker/WindowViewer

Now that the OPCLink Topics have been created, tags can now be created in WindowMaker. In Figure 5 are shown 4 tags that are to be configured for read and write (except Process Value) access using OPCLink Topic Loop1 and EuroMBus. The ActiveX faceplate control shown is described in TIS-238.

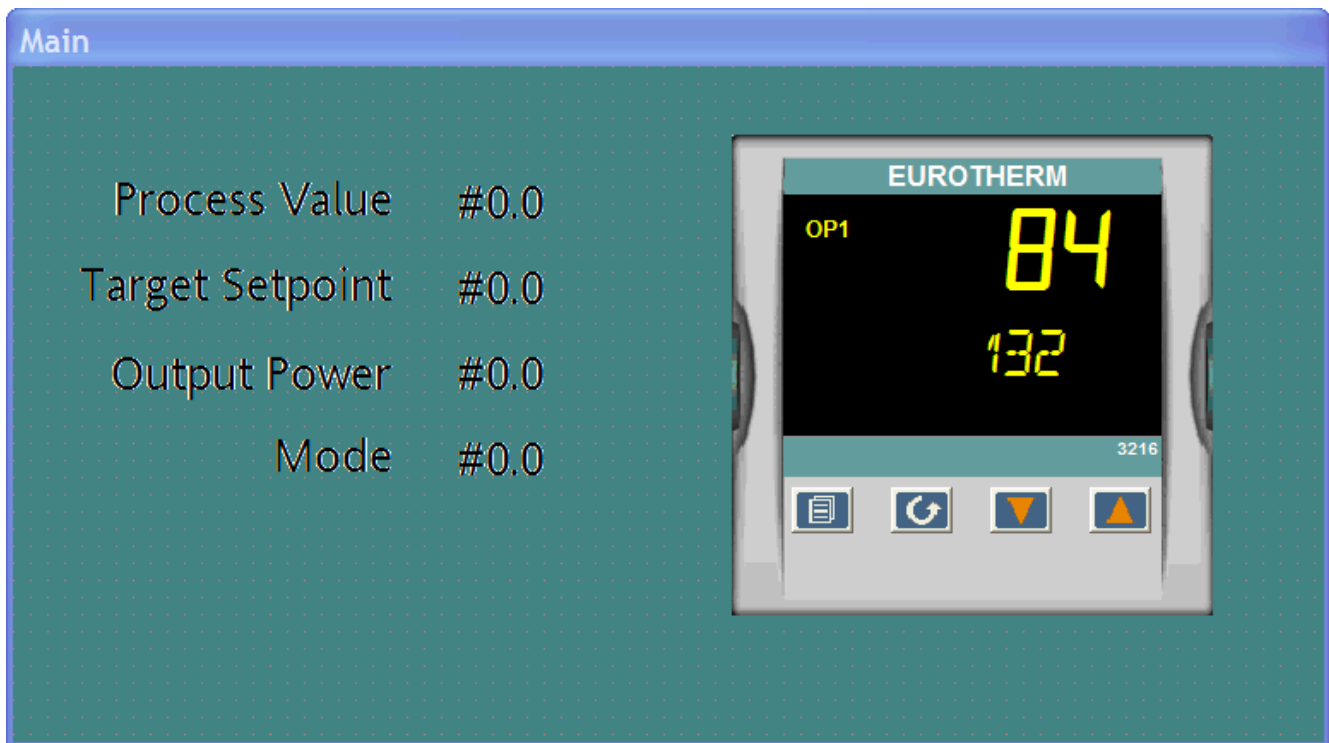


Figure 5

The first step in an existing or new InTouch application is to create the Access Names. In WindowMaker from the menu bar select **Special/Access Names** to open the **Access Names** dialog box. Click on Add to create a new Access Name or Modify to edit an existing one.

Modify brings up the **Modify Access Name** dialog box as shown in Figure 6. Here the **Access name** is 'Loop1', the **Node Name** is blank as the Application is running locally, the **Application Name** is 'OPCLINK', and the **Topic Name** is that which we created in OPCLink 'Loop1'. The **Access name** does not have to be the same name as the **Topic Name** however; the **Topic Name** must match exactly the Topic defined in OPCLink. A separate **Access name** is required for each **Topic**.

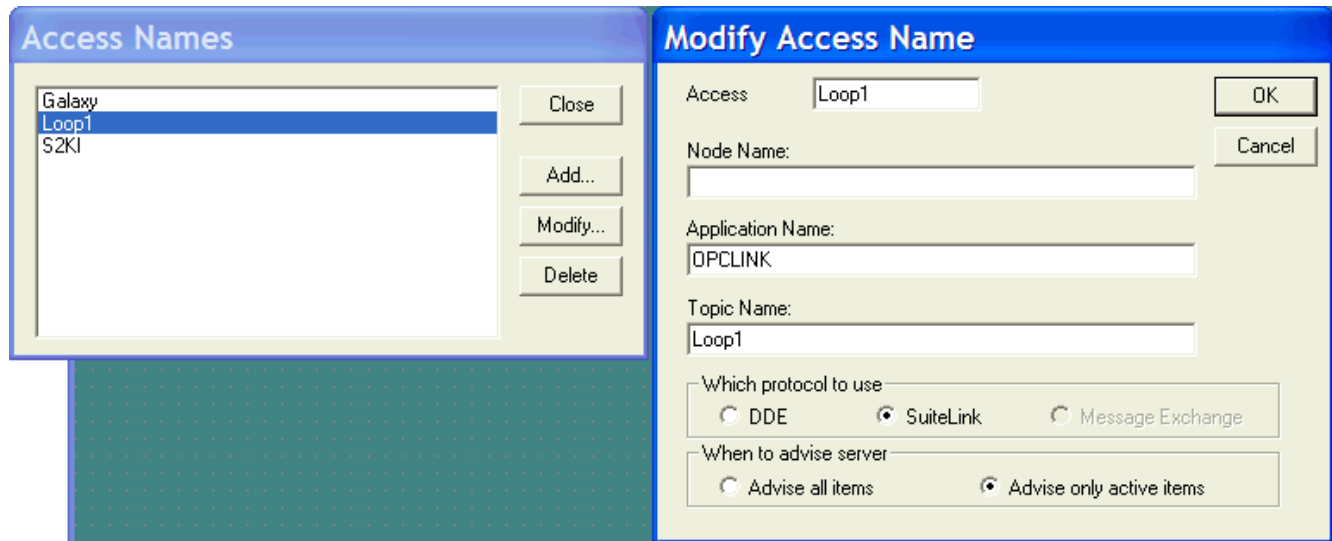
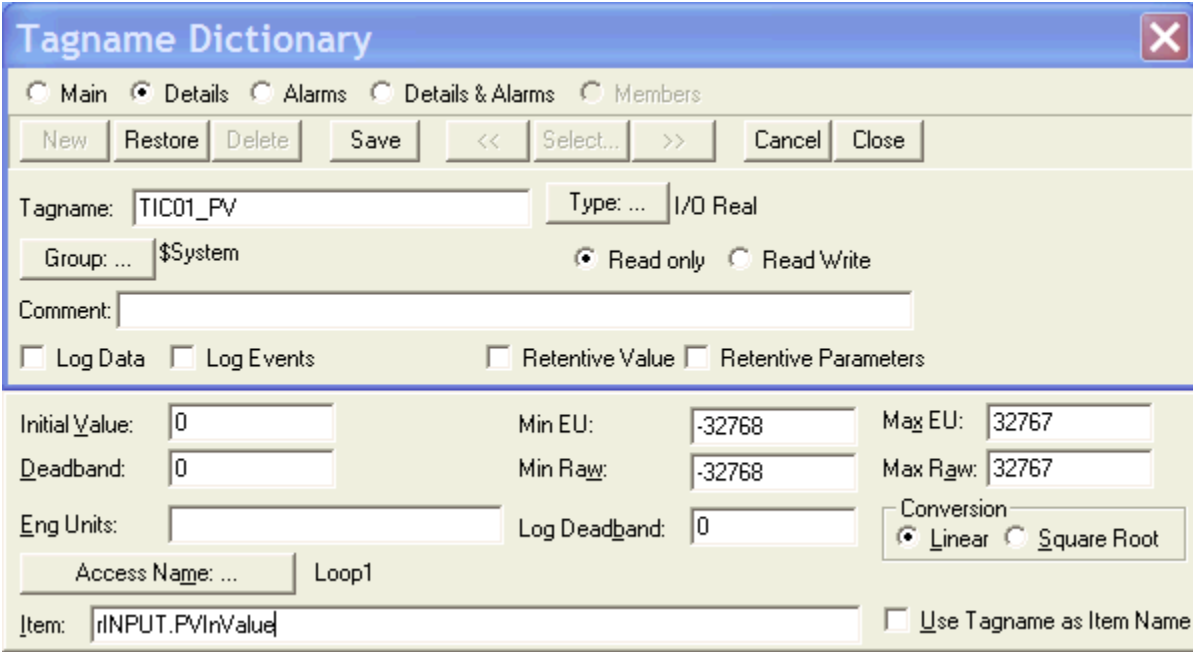


Figure 6

With **Access Names** defined **Tagname(s)** can now be defined. Figure 7 shows the process value **Tagname Definition** dialog box. It is an analog Value Display object type of data type I/O Real. This is because all numbers returned by EuroMbus are single precision reals. The data type could be I/O Integer and the rounded whole number value would be displayed.

The OPCLink item syntax follows the following rules. Each item name must start with a prefix: d (discrete value); I (integer value); r (real value); and m (message value).

The item names added to the OPC path of the topic without the heading type letter must give a fully qualified OPC item name for the OPC server of the topic. For example the OPC Path in OPCLink was '**COM1.ID001-3216.**' and the Item name shown in Figure 7 is '**rINPUT.PvInValue**'. By combining these 2 parts as OPCLink will do, without the heading letter type results in the fully qualified OPC Path of '**COM1.ID001-3216.INPUT.PvInValue**'.



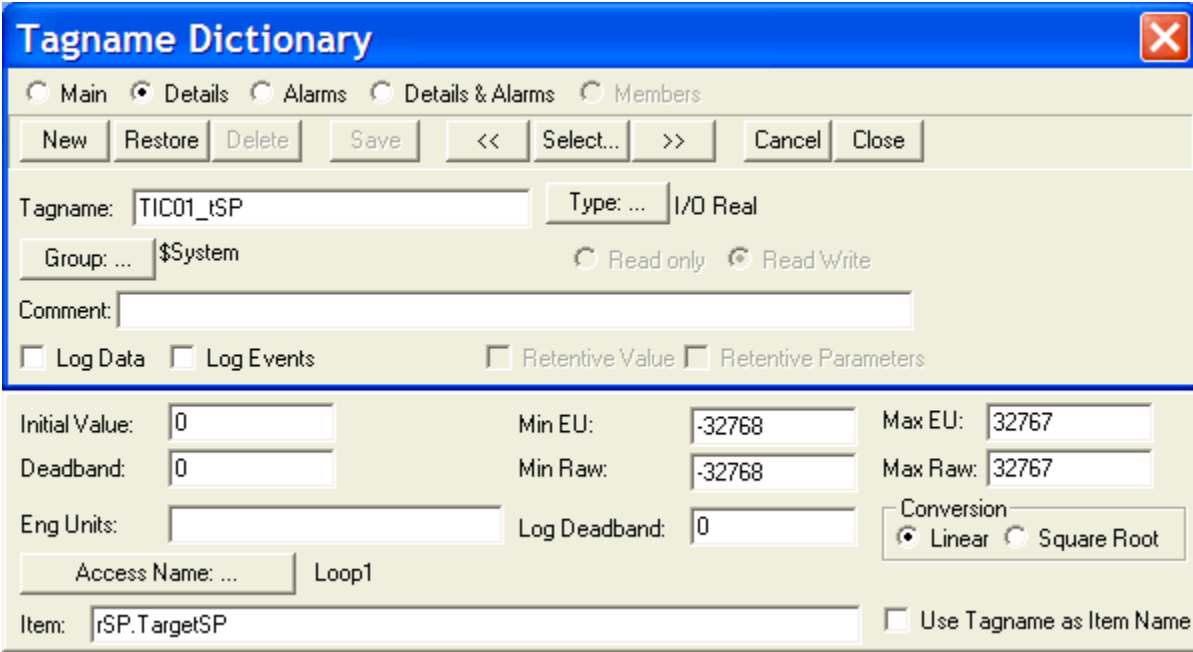
The screenshot shows the 'Tagname Dictionary' dialog box with the following configuration:

- Tab: Details
- Buttons: New, Restore, Delete, Save, Select..., Cancel, Close
- Tagname: TIC01_PV
- Type: I/O Real
- Group: \$System
- Permissions: Read only (selected), Read Write
- Comment: (empty)
- Options: Log Data, Log Events, Retentive Value, Retentive Parameters (all unchecked)
- Initial Value: 0
- Min EU: -32768
- Max EU: 32767
- Deadband: 0
- Min Raw: -32768
- Max Raw: 32767
- Eng Units: (empty)
- Log Deadband: 0
- Conversion: Linear (selected), Square Root
- Access Name: Loop1
- Item: rINPUT.PVInValue
- Use Tagname as Item Name: (unchecked)

Figure 7 – Process Value Tag Definition

In Figures 8, 9 and 10 are the Tagname definitions for the target setpoint, target output power and mode. Note that mode has a data type of I/O Integer. This is because mode has 3 valid states; 0: Auto mode, 1: Manual mode, and 2: Off or Standby mode.

You use the hierarchical tree view from EuroMbus, iTools or OPCLink to resolve the parameter OPC Path name. These OPC Path names may not be consistent in the Eurotherm instrumentation and recorder family of products.



The screenshot shows the 'Tagname Dictionary' dialog box with the 'Details' tab selected. The 'Tagname' field contains 'TIC01_ISP' and the 'Type' is 'I/O Real'. The 'Group' is '\$System' and 'Read Write' is selected. The 'Initial Value' is 0, 'Deadband' is 0, 'Min EU' is -32768, 'Max EU' is 32767, 'Min Raw' is -32768, and 'Max Raw' is 32767. 'Eng Units' is empty, 'Log Deadband' is 0, and 'Conversion' is 'Linear'. The 'Access Name' is 'Loop1' and the 'Item' is 'rSP.TargetSP'. The 'Use Tagname as Item Name' checkbox is unchecked.

Tagname Dictionary

Main Details Alarms Details & Alarms Members

New Restore Delete Save << Select... >> Cancel Close

Tagname: TIC01_ISP Type: ... I/O Real

Group: ... \$System Read only Read Write

Comment:

Log Data Log Events Retentive Value Retentive Parameters

Initial Value: 0 Min EU: -32768 Max EU: 32767

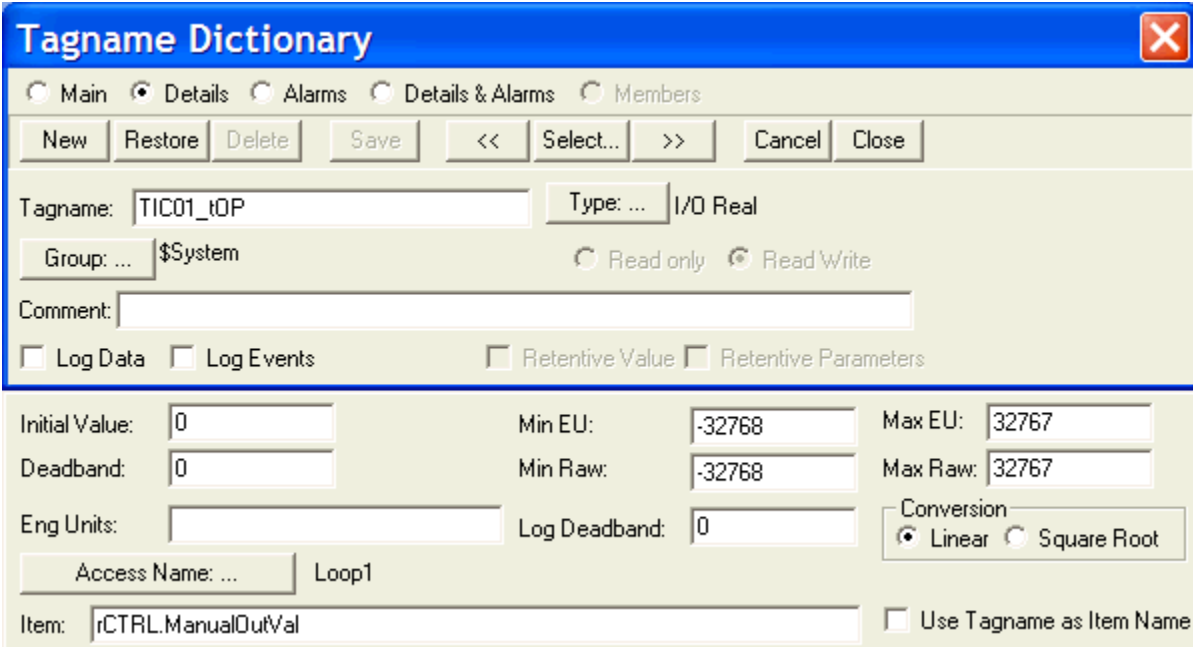
Deadband: 0 Min Raw: -32768 Max Raw: 32767

Eng Units: Log Deadband: 0 Conversion: Linear Square Root

Access Name: ... Loop1

Item: rSP.TargetSP Use Tagname as Item Name

Figure 8 – Target Setpoint Tag Definition



The screenshot shows the 'Tagname Dictionary' dialog box with the 'Details' tab selected. The 'Tagname' field contains 'TIC01_tOP' and the 'Type' is 'I/O Real'. The 'Group' is '\$System' and 'Read Write' is selected. The 'Initial Value' is 0, 'Deadband' is 0, 'Min EU' is -32768, 'Max EU' is 32767, 'Min Raw' is -32768, and 'Max Raw' is 32767. 'Eng Units' is empty, 'Log Deadband' is 0, and 'Conversion' is 'Linear'. The 'Access Name' is 'Loop1' and the 'Item' is 'rCTRL.ManualOutVal'. The 'Use Tagname as Item Name' checkbox is unchecked.

Tagname Dictionary

Main Details Alarms Details & Alarms Members

New Restore Delete Save << Select... >> Cancel Close

Tagname: TIC01_tOP Type: ... I/O Real

Group: ... \$System Read only Read Write

Comment:

Log Data Log Events Retentive Value Retentive Parameters

Initial Value: 0 Min EU: -32768 Max EU: 32767

Deadband: 0 Min Raw: -32768 Max Raw: 32767

Eng Units: Log Deadband: 0 Conversion: Linear Square Root

Access Name: ... Loop1

Item: rCTRL.ManualOutVal Use Tagname as Item Name

Figure 9 – Target Output Tag Definition

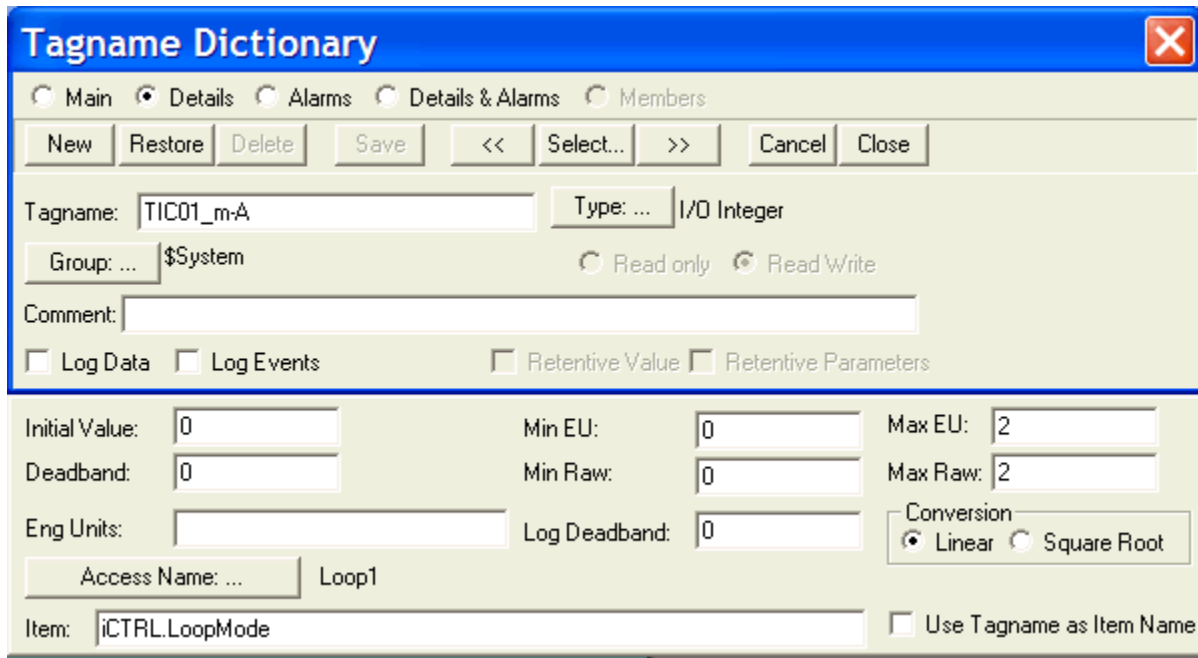


Figure 10 – Mode (Auto/Manual) Tag Definition

In Figure 11 is a picture of OPCLink once WindowViewer is active. As can be seen, the active Topic name is displayed, the Status and the number of Items being requested from the OPC Server. This view is useful for troubleshooting WindowViewer runtime issues. For example, if no topics are listed or the number of Items does not match that expected, then it points to a configuration problem in those areas.

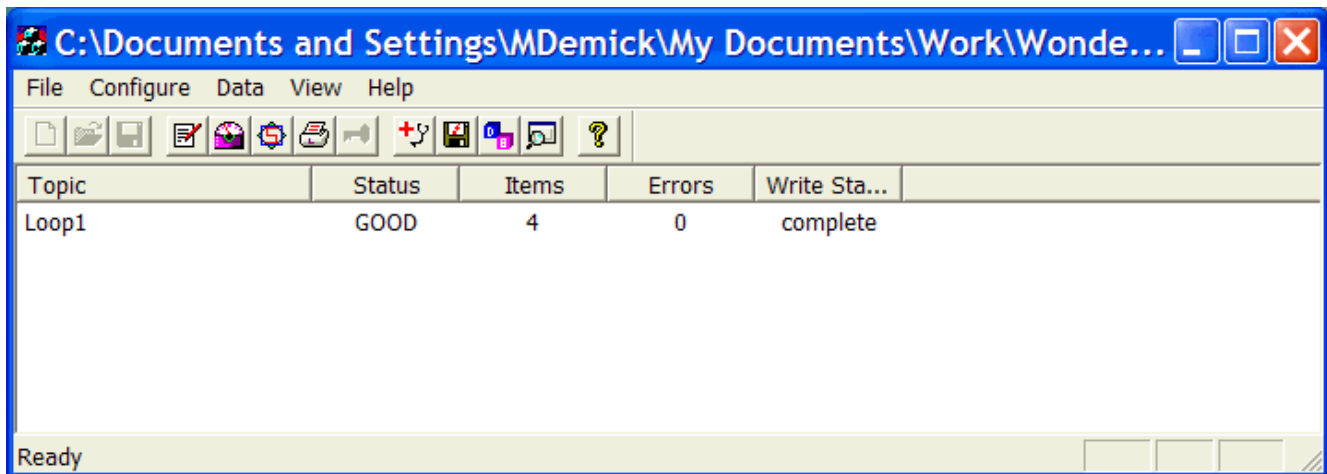


Figure 11

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And finally, in Figure 12, the completed WindowViewer runtime display. The four (4) parameters are displayed next to the iTools Series2000Panel ActiveX control. The Process Value is read only while the Target Setpoint, Output Power and Mode are read/write.

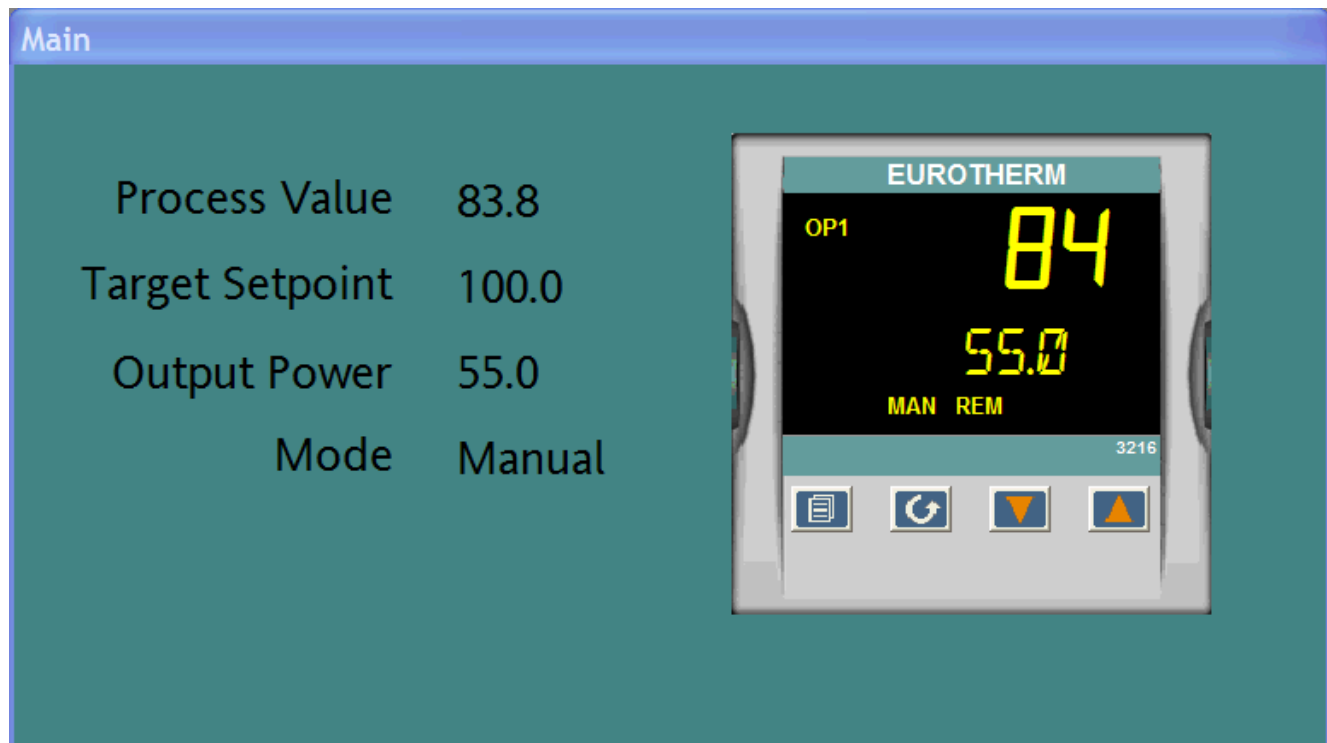


Figure 12

The discussion herein applies to all Eurotherm temperature and process controllers, indicators, power controllers and Eurotherm Chessell recorders supported by iTools or capable of Ei-Bisynch, Modbus RTU or modbus/TCP Ethernet communications.

Visit <http://www.eurotherm.com> for a product listing and further documentation.