

PI Updater Workbook



Updater Workbook for Entering Values into PI

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1 Introduction

This workbook allows the update of values to tags in a PI 3 system and includes a primitive audit trail mechanism by means of a dedicated audit trail tag and messages added to the PI message log. The audit trail tag required by this utility must already exist in the connected PI server; OSIsoft provide tools for the purpose of creating tags; this utility can only update tags values (not tags or their attributes).

2 Requirements

This application requires the PI-SDK to be installed on the machine in use.

Most OSIsoft PI products will deliver PI-SDK as part of its installation. Since this utility is an Excel based tool, other OSIsoft Excel PI products may also be installed. PI-Datalink and PI-SMT are two such very useful products.

This application has been tested using the 64-bit version of Excel Office 365 against a 32-bit version of PI-SDK 2018 version 1.4.7



Figure 1, About PI-SDK

3 PI access

In normal operation, the Windows account is used to access PI; it follows, therefore, that the Windows account will need to be added to the PI security database for the user to be able to update PI tags.

It is suggested that a **ManualInput** group be added to PI, and then the Windows account (as a PI user) be added to this group.

Tags that can be updated by this application should be given the following attributes, though security will ultimately depend on site policy: -

- PtOwner = **piadmin**
- PtGroup = **piadmin**
- PtAccess = **o:rw,g:r,w:r**
- DataOwner=**piadmin**
- DataGroup=**ManualInput**
- DataAccess = **o:rw,g:rw,w:r**
- Pointsource=**M** (this can be changed based on site-specific needs or left blank for access to any tag)

The intention is to restrict this application to updating tag **data**, not to updating tag **attributes** or editing the tags themselves in any way (use PI-SMT for this ability).

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The Windows account used in this application should not have wider access to PI; e.g. by using the Windows account to edit tags using PI-SMT, unless this is separately authorised.

Other tag attributes that should be considered include: -

- Shutdown = 0 (manual input tags should not receive shutdown events)
- ExcDev = 0 (every update should be recorded)
- ExcDevPercent = 0

The *UpdaterAudit* tag should also be given similar attributes; this application will not allow updates to this tag through normal procedures, though it will allow reads. Other attributes for this tag that will need configuring are: -

- PtType = **string**
- Step = **1**
- Compressing = **0**

4 Start-up

When the workbook is first opened, it may be necessary to enable macros for the toolbar to be created; without the toolbar, the features added by this workbook will not be available. Macros may be disabled until action is taken; check near the formula bar for a security warning message. Once macros are enabled, the user may then wish to save the spreadsheet as a macro-enabled workbook with an extension of **.xlsm**.

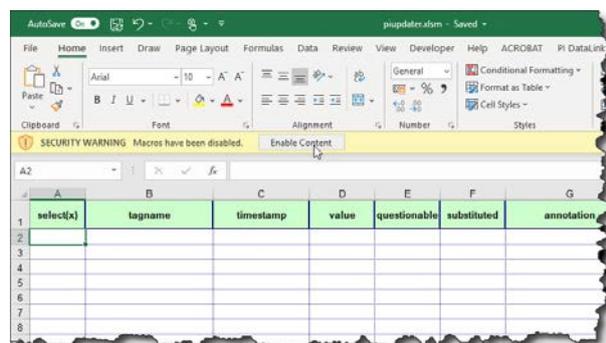


Figure 2, Enable macros

With the ribbon bar created, the worksheet will be initialised; this includes adding titles, named ranges, colours and borders, setting a non-scrolling region then protecting certain cells against mishaps. The spreadsheet and workbook have been protected without passwords in order to prevent mistakes that would affect the functionality of the macros; the macros, however, are password protected.

5 Security

This version of the spreadsheet has increased security measures, designed to enhance the auditing facilities in PI.

Updating PI tag values requires a privileged account in PI. It is suggested that for audit purposes that selected Windows accounts are added to the PI security database for this purpose.

Reading PI tag values will probably not require such a privileged account, but this will depend on site policy.



6 Worksheet columns

The worksheet is restricted to 8 useful columns; other columns are hidden for ease and presentation purposes.

The number of rows is limited only by the version of Excel being used; a 32-bit version will limit the rows to 32768 whereas a 64-bit version allows in excess of a million. Each row will correspond to a tag value to be read from or written to PI.

6.1 *Select(x)*

Placing any character in this cell will mark the tags with which to work. If a value already exists at that time, then this will update the value already in PI. Putting the word “**delete**” (no abbreviations, not case-sensitive) in this cell will prompt to see if you wish to delete the **value** at the given timestamp (it will not delete the tag) rather than update the value.

6.2 *Tagnames*

This is a list of PI tag names on which to work. The user is free to add tags to this list, but the tags should belong to the appropriate manual input point source as defined for the site. The **tagnames** list is processed until an empty cell is found, so the list must be contiguous. It is expected that the tagnames in this column are unique though there is no enforcement of this; however, duplicate tagnames will be highlighted and all occurrences of the duplicates except the last will have the *Select(x)* column cleared, meaning that only the last entry will be effective.

6.3 *Timestamp*

The **timestamp** field will recognise windows timestamps as well as PI format relative time formats (such as “TODAY”, “*-1h”, where “*” is current time). An empty timestamp field will be populated with the current time or the most recent snapshot timestamp.

6.4 *Value*

The value field will accept numeric and text strings. It is assumed that text will be a digital state in PI, or that the point type is a string; errors may occur if the string is not recognised.

6.4.1 *Blob tags*

If the tag has a point type of blob (binary large object), the value(s) may be delimited (with a default of semi-colon) and will be considered as a string, with each delimited value being numeric and assigned to the blob in order as a byte array (an individual value cannot therefore exceed a value of 255).

6.5 *Questionable*

This value is 'x' if the value has been marked as questionable. It may also be used to update the tag value by entering anything in this column, though 'x' is preferred. Tag

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values may also be marked as questionable and updated in this application. Such action will be audited; the annotation will record who, when, why and the previous setting. A message is also recorded in the PI message log.

6.6 *Substituted*

This read-only value is 'x' if the value has been substituted by this application or any other process. The substituted attribute cannot be changed by this application, even though the user may change the values in this column. Changing the questionable attribute causes the substituted attribute to be set, even though the value may not have changed.

6.7 *Annotations*

This read-only attribute will display the most recent annotation associated with a tag value (later versions of PI server allow a collection of annotations). This application uses this field to maintain an audit of tag value changes, so the user cannot update this field in PI; this application will ignore this column data.

7 **Operation**

7.1 *Bulk read and write*

If many values are to be read from or written to PI for a single tag, it is sufficient to enter the **tagname** once and populate the **timestamps** column with all the relevant times.

7.2 *User accounts*

The standard supplied **pidemo** account is usually enough to read values from PI, but a more privileged account may be necessary to be able to update tags; this account name is usually site-specific; contact the PI system manager for details.

7.3 *Auditing*

This spreadsheet allows primitive auditing, provided an audit tag exists in the PI system where the tags are to be updated. The tag name for this event can be set on the *Updater Parameters* form. If this tag exists in the selected PI system, the tag will automatically be updated whenever any updates are made via this spreadsheet. The tag type needs to allow text to be entered (a PI string tag is required), since it records the **windows account** name (not necessarily the account shown on the toolbar, which may include generic PI accounts) along with details on the update being made.

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The information recorded on the *UpdaterAudit* tag takes the form of a comma-separated list: -

- Tag name that was edited
- Audit timestamp of the tag edit (not the timestamp of the tag value)
- Windows account (username)
- Action taken, including the previous value (the value replaced)
- The reason for the edit

Similar information is also written to the PI message log.

Be aware that since the user can specify the timestamp for the updates, the audit timestamp (the current time) may not match the tag update timestamp.

Any activity in this spreadsheet that involves a connection to PI will result in a message being written to the PI message log file detailing a count of reads, updates, inserts and deletes against the Windows account.

8 Manual Input ribbon bar

This ribbon bar offers all the features that were previously available in the **Add-ins** tab. Each of the buttons on the ribbon are described separately below.

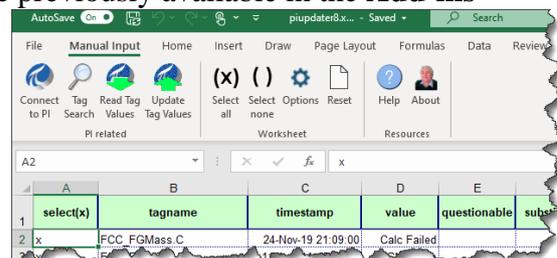


Figure 3, Manual Input ribbon

8.1 Connect to PI

This button should be used first to establish a connection to the appropriate PI server.

This is achieved by using the PI connection item in the drop-down menu. Only one active connection to PI is supported in this workbook. Select the appropriate PI server from the list of available servers, then provide a user ID and password to connect. If the user ID has a PI trust configured it may not be necessary to supply a username or password. Disconnection requires only a selected PI server.

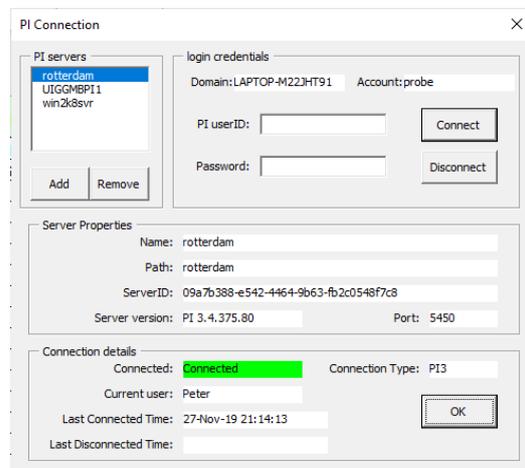


Figure 4, PI connection

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8.2 Tag Search

A tag search can only be made against an active PI connection. The banner at the top will be coloured red if there is no connection and green otherwise.

Clicking on the Tag search button will provide a tag search dialog from which the appropriate tags can be selected. The selection criteria can be made by tagname, pointsource and descriptor; wildcard searches can be made. Tags that meet the search criteria are added to the listbox, from where they may be selected; the selected tags will be used to populate the spreadsheet when the **OK** button is clicked, appending the tags to those already on the spreadsheet, and mark the *select(x)* column with an 'x' for later processing.

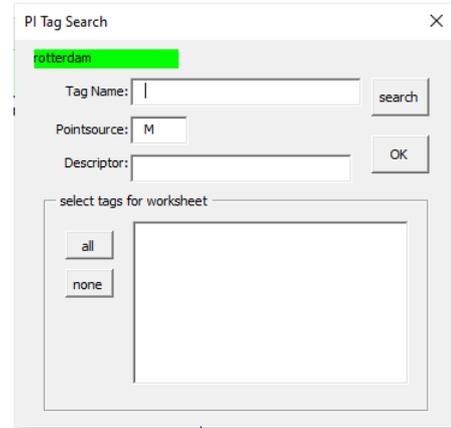


Figure 5, PI tag search

8.3 Read Tag Values

Clicking this button will check for tags to be read on the *ManualInputData* spreadsheet. A dialog box will pop up asking whether to read snapshot or archive values. Snapshot (or timestamped) values will be read from PI for those tags marked with 'x' in the *select(x)* column. Selecting archive values will expand the dialog box so that the mode for reading archive data can be determined. The values returned will be dictated by the times and mode selected in the dialog bog shown here. A summary report will be displayed at the end of the procedure.

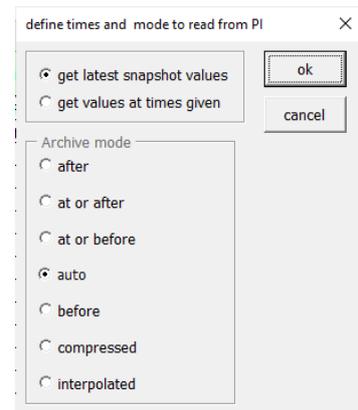


Figure 6, times and archive mode

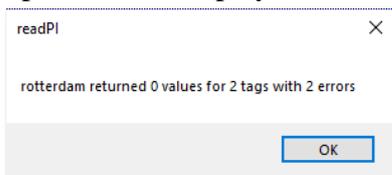


Figure 7, summary report

An entry will be also made in the result column for any tag that returned an error; no news is good news.

8.4 Archive mode methods

Values can be returned from the PI archives with timestamps based on certain rules or modes. The modes are described below

8.4.1 After

Returns the first recorded value after the passed time.

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8.4.2 At or After

Returns a recorded value at the passed time or if no value exists at that time, the next recorded value.

8.4.3 At or Before

Returns a recorded value at the passed time or if no value exists at that time, the previous recorded value.

8.4.4 Auto

For a continuous point (step attribute = 0) treat as Interpolated
For a discrete point (step attribute = 1) treat as At or Before

8.4.5 Before

Return the first recorded value before the passed time.

8.4.6 Compressed

Return a recorded value at the passed time or return an error if none exists.

8.4.7 Interpolated

Return an interpolated value for this time. Discrete points (step attribute = 1) will simply carry the previous value forward.

8.5 Update Tag Values

Clicking this button will process the selected tags (those marked with 'x' in the *select(x)* column) and either add/update or delete values accordingly; the substituted and annotation columns will be ignored, but the questionable column will be processed.

It will be necessary to supply a reason for the update; this text will form part of the annotation of the tag(s) and will also be entered in the PI message log.

Tags for update are restricted to the PointSource specified on the Options form; if this field is blank or contains a wildcard ("*") no restriction is made. It is assumed that sufficient PI security has been applied to restrict any updates as appropriate; see the advice in this document regarding security.

Tags that are edited will have annotations applied detailing the change made: -

- By whom the change is made (the Windows account)
- When the change was made
- The new value added, amended or deleted
- The value it replaces

A similar message will also be added to the PI message log, thus offering a primitive form of audit trail.

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Date: 28/11/2019 21:51

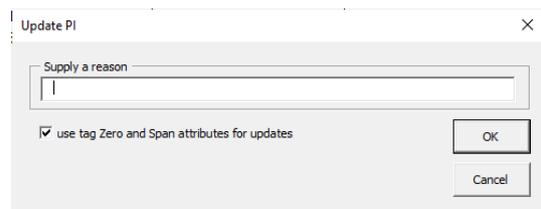


Figure 8, supplying a reason

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8.6 Select all

This button will populate the *Select(x)* column with an 'x' in every cell that has a tag in the *Tagname* column.

8.7 Select none

This button will clear the *Select(x)* column.

8.8 Options

This form allows the name of the audit tag to be set or changed. A blank tag name will prevent an audit trail being recorded in a tag, but a message will always be logged in the PI message log.

Figure 9, options

The PointSource is used to define which tags can be

updated by this utility; a blank or wildcard ("*") will potentially allow updates to any or all tags, depending on the PI security.

The default delimiter for blob objects is a semi-colon. Use this item to change the default character.

This workbook will convert between the PI format (an array of bytes with a limit of 976 elements) and a delimited string.

8.9 Reset

This button will reset the *ManulaInputData* worksheet to its initial state, with the correct headings, colours, formats and columns. It will not affect any settings or options that have been modified.

8.10 Help

This will display this document if it exists in the same folder as the spreadsheet.

8.11 About

This will display the version details of this workbook.

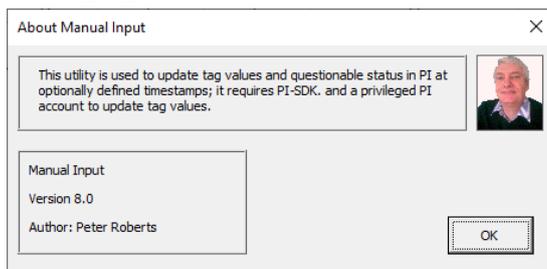


Figure 10, About Manual Input