Honeywell

Uniformance®

Process History Database

User Guide

R310

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Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	**ATTENTION:** Identifies information that requires special consideration.
	**TIP:** Identifies advice or hints for the user, often in terms of performing a task.
	**REFERENCE - EXTERNAL:** Identifies an additional source of information outside of the bookset.
	**REFERENCE - INTERNAL:** Identifies an additional source of information within the bookset.

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1. Introducing PHD

1.1 About this Guide

This user guide provides a description of PHD tag definitions and other configuration forms.

REFERENCE - INTERNAL

For PHD system configuration and management and an in-depth description of the overall PHD system, refer to the *Uniformance - Process History Database System Manual* (pim0301.pdf).

1.2 PHD Overview

Honeywell's Process History Database (PHD) provides real-time data capture, historization, and intelligent process data retrieval required for plant information system support. The result of extensive experience with interfacing real-time systems with plant information systems, PHD forms a comprehensive platform that supports Honeywell's entire family of integrated plant information system modules.

PHD incorporates flexible configuration capabilities into its major functions. Combining ease of use with the ability to specify detailed processing attributes when they are required. The major PHD functions are as follows:

- Tag definitions with class attribute inheritance.
- Real-time data collection from multiple networked real-time computers.
- Extensive front-end data processing and compression options.
- A multi-file and multi-layer long-term archive system.
- Intelligent data retrieval and manipulation facilities for support of information system requirements.
- Transparent Client and Server facilities for multiple computer environments.
- Virtual tag value calculations.
- Central system control using PHD management control program.

1.3 PHD Data Representation

The key to PHD's ability to support transaction-oriented information systems is the way it represents captured process data history. Stored process data is considered a continuous series of linear segments of variable durations, each with an associated confidence factor of 0 to 100. The value of a process variable is defined for any time as a point on the linear segment corresponding to that time. This representation has the following advantages over conventional constant-interval averaging methods:

- Applications may query data for times that are independent of any point scan rates or storage intervals. Accurate measurements for operations transactions can be determined regardless of the transaction times or durations.
- Optimized data compression to store only enough data to reconstruct the linear segments (to within specified tolerances). The effective storage sample rate of the tag automatically varies according to how dynamic the data is.
- Effective missing-data handling. If data for a tag is temporarily unavailable, its value is automatically estimated as a linear interpolation between known data points.
- Highly accurate data reduction calculations such as averages, minimum, maximum, totalization, regression, and so on.
- Accurate composite confidence factor estimations. Time-weighted averages of confidence factors are used in data reduction calculations. The confidence factor for data reduction containing a missing data interpolation is weighted according to the relative amount of missing data. (For example, 25% missing data duration gives a 75% confidence factor).

1.4 PHD Engineering Units

Engineering units are user-configurable. You can units and conversion factors using the Engineering Unit Configuration form.

ATTENTION

In the previous releases, the PHD Configuration Tool was referred to as TPI.

With the default installation, all units are uppercase letter only, but you can change this. Units can be made case sensitive with the PHD parameter DBMENGRUNITCASE. The values for this parameter can be sensitive, insensitive or both. If you set the value to

BOTH and a case sensitive comparison fails to find the input engineering units, a case insensitive attempt is made.

The PHD base engineering unit codes and descriptions are accessible through the Lookup Report or Lookup configuration forms in the PHD Configuration Tool.

REFERENCE - INTERNAL

For information about Lookup forms and reports, refer to the *Uniformance Plant Reference Model User Guide* (pim0501.pdf).

The following describes conventions of engineering units supported by PHD.

REFERENCE - EXTERNAL

For details about SI nomenclature, refer to http://physics.nist.gov/cuu/Units/prefixes.html

- Codes are based on American standard and SI (metric or Standard International) standard abbreviations where possible, as shown in the following examples:

  For SI units:

  K denotes thousands

  M denotes thousandths for large units or millions for small units, such as

  mA = Milliampere
  mg = Milligrams
  MJ = MegaJoules

  G denotes billions, such as

  GJ = GigaJoules

  For Imperial units:

  M denotes thousand, such as

  MBBL = Thousand barrels

- Unique engineering units not directly represented by the base engineering units can be constructed with constants, or with combinations of other base engineering units.

  Convention for use of constants:

  “constant”“base engineering unit”/“constant”

1000BBL = thousand barrels
"BBL" requests will increase values by 1000 fold

Convention for use of base engineering unit:

"base engineering unit"/"base engineering unit"

BBL/LB = barrels per pound
$/BBL = dollars per barrel
$/D = dollars per day

Convention for use of base engineering unit with constants:

"*constant*""base engineering unit"/"*constant*""base engineering unit"

1000BBL/10LB = thousand barrels per ten pounds
1000$/BBL = thousand dollars per barrel

1.5 PHD Character Time Formats

The character time format used by PHD with most Windows desktop tools uses the date and time format specified in the Windows Control Panel.

You can also express character time as a relative time using the following keywords:

Keyword	Description
TODAY	Today at midnight.
YESTERDAY	Yesterday at midnight.
TOMORROW	Tomorrow at midnight.
NOW	Current time.
YEAR	January 1st at midnight of the current year.
MONTH	The 1st day of the current month at midnight.
HOUR	The top of the current hour.

You can also combine these keywords with a delta time format, which uses the subtraction symbol (-) to indicate prior times, and the addition symbol (+) to indicate later times.

The delta time format is as follows: days:hours:minutes:seconds

For example:

`TODAY+365`	(365 days from today)
`NOW-::30`	(30 minutes ago)

An alternative delta time format uses offset keywords as follows:

Keyword	Description
Y	Year (same month, day, and time of the year).
MO	Month (same day and time of the month).
W	Week (same date and time of the week).
D	Day (same time of the day).
H	Hour (same minutes, seconds of the hour).
M	Minute (same seconds of the minute).
S	Second (same second).

The following are examples of the use of offset keywords:

Keyword	Description
NOW-1W	One week ago from the current time.
TODAY-1W4H	A week and 4 hours prior to today at midnight.
TODAY-1M	The same day of the previous month.
NOW-1D+1M	Current date/time less a day plus a minute.
TODAY-1D+1S	Yesterday at 12:00:01 AM

ATTENTION

Starting with Uniformance 200, you can combine offsets to make more sophisticated relative time expressions.

In PHD, MO = 30 days.

1.6 PHD Functionality

This section describes the major PHD functions for configuration, storage, and retrieval of data.

Tag Definitions with Class Attribute Inheritance

PHD tag definition supports the use of Class Tags as templates, which other tags may reference as their parent. Any tag attributes not specifically defined for a tag are inherited from its parent Class Tag (a Class Tag may in turn inherit values from another Class Tag).

If you modify a Class Tag attribute, any tags that inherit the attribute dynamically reflect the change. This type of class attribute inheritance permits you to configure the system with intelligent default tag attributes. Initial tag definition and ongoing tag maintenance is simplified, since changing the parent Class Tags may easily alter behavior of entire tag classes.

Real-Time Data Collection

PHD collects process data using multiple collection processes, any of which may be a client/server pair for collecting data from a remote system. Real-time performance is achieved using memory-resident data caching techniques. Scan rates are configurable per tag (or Class Tag) down to a one-second resolution.

Front-End Data Processing and Compression Options

Data processing options are configurable on a per tag or Class Tag basis. Techniques used include:

- Statistical gross error elimination. Gross errors are detected and eliminated by analyzing surrounding data to determine whether values exceed specified standard deviation thresholds.

- Data smoothing and gating. You can smooth incoming data containing noise using a first-order exponential filter. In addition, you can specify gate thresholds below which residual values are damped to zero.

Data Elimination Compression

Since data is represented as a series of linear segments between points, you can eliminate intermediate values if you can estimate them to within a specified error tolerance. A constrained-slope data compression method developed by Honeywell attains maximal compression while ensuring that eliminated points always fall within specified tolerances.

Compression techniques include the following:

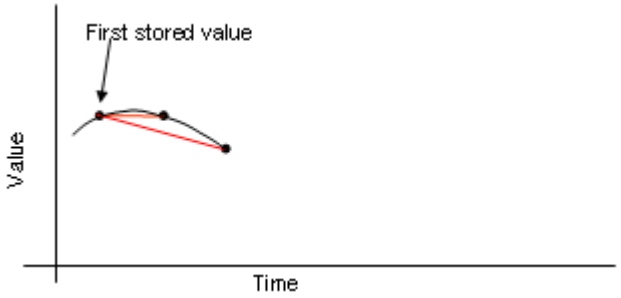
- Data quantizing and scaling. Floating point numbers are scaled and quantized using low and high extreme limits specified for the tag or Class Tag. This allows you to store values as compact 16-bit integers, accurate to within 0.0015% of the low-high data range, rather than storing the full 32-bit floating-point representation. This compression technique is also utilized for Double Precision type floating point value tags.
- Storage format compression. In addition to the scaling and quantizing of floating points, all information in the PHD archives is stored in a highly compressed format. A variety of optimization techniques are used such that only the minimal information necessary to reconstruct the data is actually stored.

Constrained slope data compression process

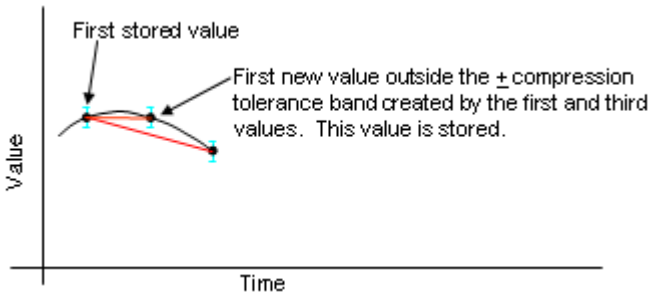
PHD calculates the compression tolerance using the values entered for the Tolerance and Compression Tolerance Factor tag configuration parameters:

Compression Tolerance = Tolerance x Compression Tolerance Factor

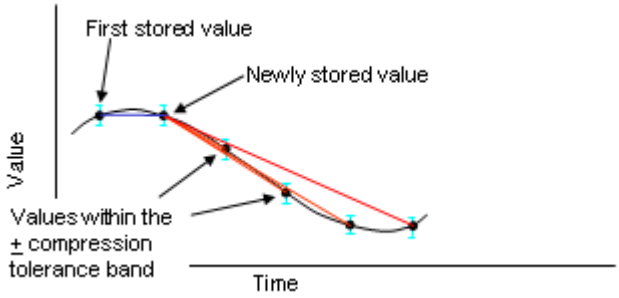
PHD draws a line from the first stored value to each new value that is received.



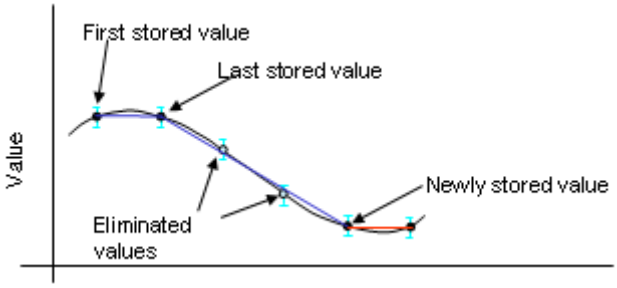
Next, PHD checks each new value that is received to determine whether it falls outside the + compression tolerance band. PHD stores the first value found that falls outside the band.



Then PHD draws a line from the newly stored value to each new value that is received. Values within the + compression tolerance band can be successfully interpolated from the stored values and are eliminated.



Finally, PHD draws a new line from the newly stored value back to the last stored value and checks all values between to ensure they are within the compression tolerance band. Values within the band can be successfully interpolated from the stored values and are eliminated. The process then begins again from the newly stored value.



Multi-File and Multi-Layer Archive System

The PHD archive system provides maximal flexibility using a multiple-file system that permits overlapping time-ranges between archives. This system has the following advantages:

- Data from one archive can be resampled (for example, on a ten-minute basis) and stored in another archive to reduce the space requirements of online data storage. Depending on your site requirements, you can employ a number of archives with various storage resolutions.
- Archives with overlapping date ranges are layered to ensure that higher resolution data takes priority over resampled lower resolution data.
- A backup of an archive can be restored at any time and can be connected to the system. Any programs querying data from the appropriate date range automatically access the recovered archive.

Collected archive data is stored to one of the following default logical archives:

- SCAN archives - Contain non-character data (float and integer)
- CHAR archives- Contain character, binary, and Unicode data
- MANV archives - Contain manual input data.

A fourth type of logical archive can be defined to contain resampled data.

Intelligent Data Retrieval and Manipulation Facilities

PHD provides application programs with built-in data manipulations and calculations that greatly reduce the need for programs to perform such functions. Having these functions built into PHD simplifies application development and maintenance. These functions include the following:

- Automatic engineering unit conversions: An application program can request data from PHD and can specify the units it requires. PHD returns data in the converted units, regardless of whether the stored data is a flow rate or an absolute value. For example, if a program performs a volume balance it may request total M3 (cubic meters) for a tag that measured in BBL/ HR. PHD performs both the conversion factor and the totalizing functions.

- Automatic missing data interpolation and extrapolation: PHD performs linear interpolation estimates for missing data segments between known values. Extrapolation for times prior to or after known data uses exponential damping between the last known slope of the data and the overall data trend. These extrapolation characteristics are configured on a per tag or Class Tag basis.
- Data reduction calculations: Supported calculations include minimum, maximum, delta (the difference between first and last value), average, linear regression, and standard deviation. These calculations return a reduction value, a tolerance, or precision estimate, and a composite confidence factor based on the source data's reliability.

Transparent Client/Server Facilities

PHD supports today's distributed LAN environment by providing client/server interfaces as follows:

- Real-time data collection interfaces (RDIs) are commonly distributed among various systems in a LAN environment. PHD's transparent RDI client/server architecture allows easy resident data capture on distributed machines.
- PHD's application programming client/server interface allows application programs to access PHD archive data resident on a remote node. The client/server communications are transparent to the application program regardless of the node the program is running on.

Virtual Tag Value Calculations

PHD provides a system of easily managed calculated tag definitions. Each calculation is simply specified using its source tag names, such as TAG1*(TAG2+TAG3). You can use these virtual tags for the following:

- Filling in missing instrumentation.
- Providing redundant measurements and actual vs. theoretical comparisons.
- Performing continuous mass and volume conversions.
- Tracking unit and furnace efficiencies or other complex calculations.

Central System Control Using PHD's Management Control Program

The PHDMAN program performs system-wide configuration and control functions for PHD. This includes a comprehensive set of system parameters that can control the behavior of programs accessing PHD in a distributed environment. This program uses a command prompt interface to facilitate the configuration and control functions.

1.7 PHD System Components

A typical PHD system includes several major components shown in the following block diagram. The PHD components appear in solid lines and other components appear in dashed lines.

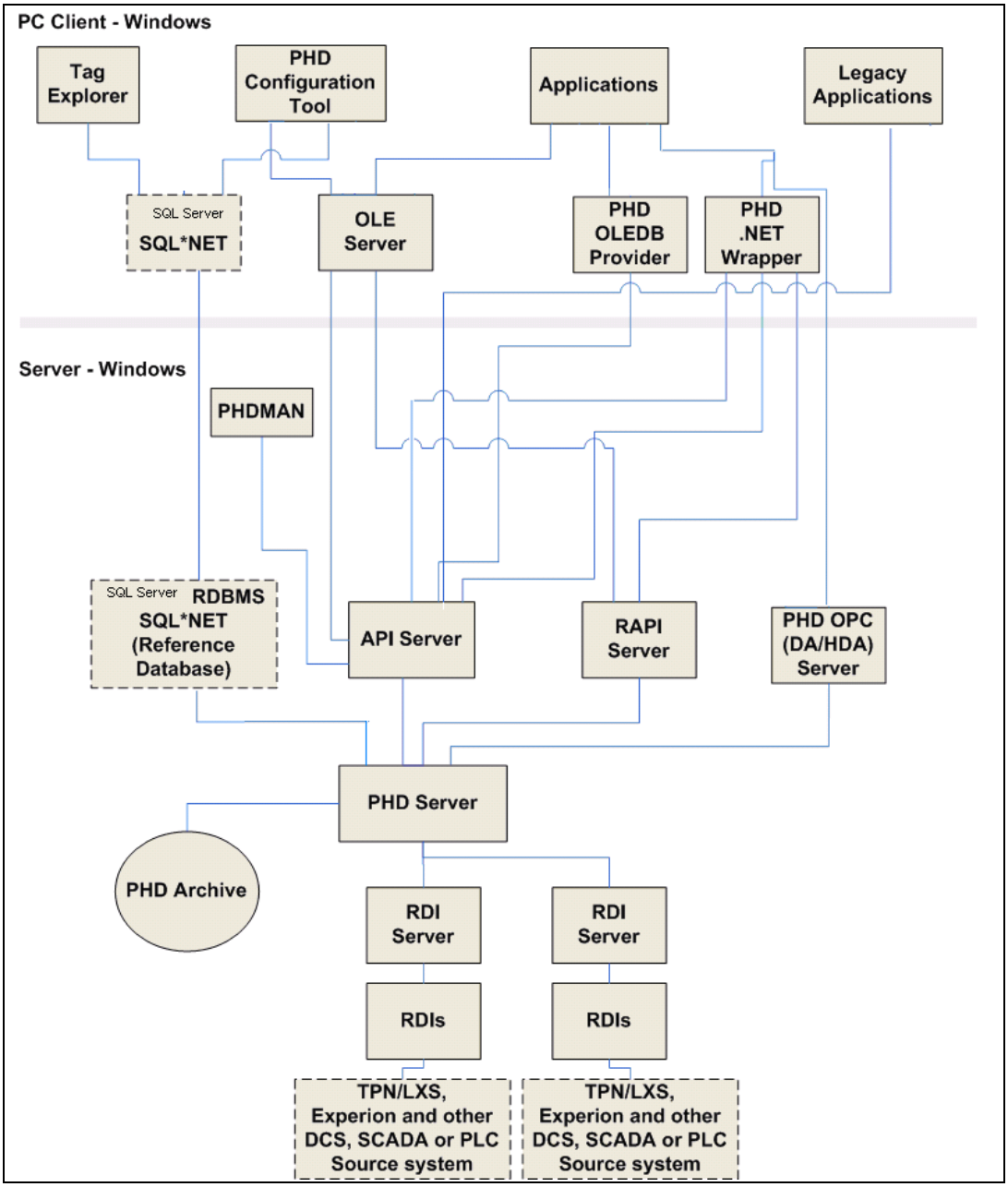
The PHD server and client components communicate through a Local Area Network (LAN) that supports TCP/IP.

In addition to PHD components, SQL Server stores all non-real-time data such as tag definitions, tag sets, virtual (calculated) tag definitions, and so on.

Third-party desktop tools such as Microsoft Office and Visual Basic can access PHD real-time and history data.

Additional information on the PHD system components can be found in the PHD documentation set.

Figure 1 – PHD System Components



The major PHD Server components include the following:

Component	Description
API Server	The service that provides application access to PHD Server functionality.
PHD Archive	The set of archive files that store the real-time data in a format highly optimized for fast data retrieval and processing.
PHD OPC Server	Implements OPC interfaces compliant with OPC DA and OPC HDA standards to enable client access to a PHD Server.
PHD Server	The main PHD history engine.
PHDMAN	The PHD Management utility is used for monitoring and managing the PHD system.
RAPI Server	Remote API Server – provides remote user access from non-trusted domains or through firewalls. The OLE Server, .NET wrappers, and the Desktop applications can be configured to use either the API Server or the RAPI Server.
RDI Server	The service that performs data collection from source systems through DLLs and sends the collected data to the PHD Server.
RDIs and Links	The interface-specific code that collects data from each type of DCS or other system. Each RDI (Real-time Data Interface) Server can execute multiple interfaces (RDIs and Links).

The major PHD client PC components include the following:

Component	Description
PHD .NET wrapper	PHD 2xx and 150 API wrappers for .NET development.
PHD Configuration Tool (previously named TPI)	Provides forms and reports for user access to PHD functions including tag configuration, virtual (calculated) tag configuration, manual data entry, configuration reports, and other PHD functions. The PHD Configuration Tool includes the Uniformance Plant Reference Model application.
PHD OLEDB Provider	PHD provider
Tag Explorer	A tag directory browser for locating PHD tags for use in other applications.

1.8 API Server Information Utility (apisrvinfo)

APISRVINFO is a utility that allows you to check the statistics of the API Server.

You can check the following list of statistics.

- Current connections
- Peak connections
- Client connections
- Telnet connections
- Server Up-Time

2. Using PHD Configuration Forms

2.1 Interface Configuration

There are various software components in the PHD application. Interfaces exist for each of these components. You can specify the interfaces that exist between PHD and the control system or an external application using the PHD Configuration Tool.

PHD supports a Link interface and a Real-time data interface. Both these interfaces are executed by the Uniformance RDI Server and perform the function of collecting data.

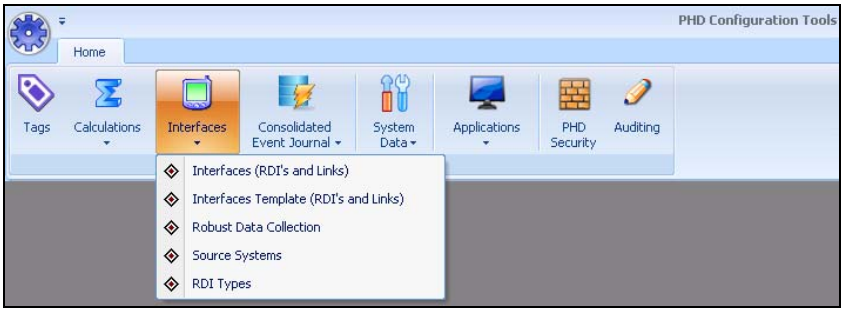
This form is derived by combining elements of the RDI Specification form and the PHD Links Configuration form.

2.1.1 Interfaces

Defining a new interface

To configure a new interface, perform the following steps:

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Interfaces > Interfaces (RDI's and Links)** from the PHD Configuration Menu.



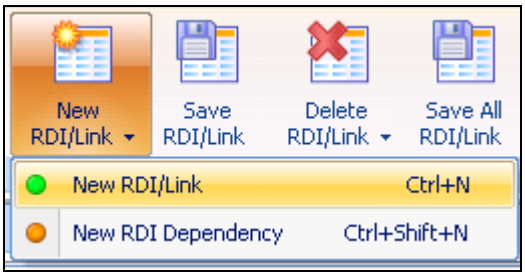
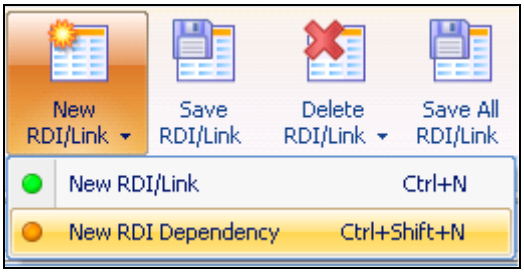
The **Interfaces (RDI's and Links)** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

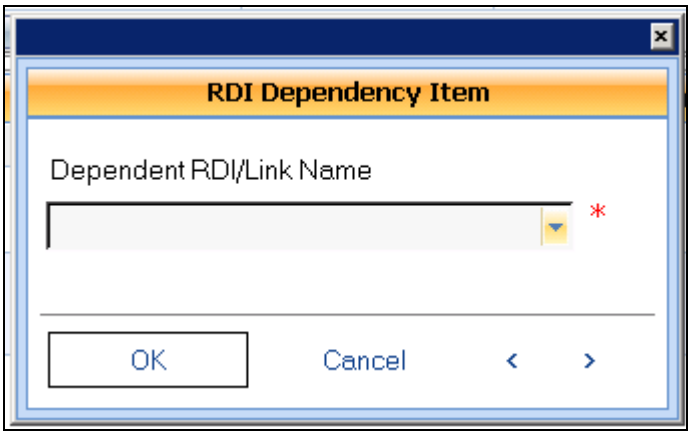
Use the Current List to navigate between records

Selecting a record in the "Current list of Interface (RDI/Link) records" displays the individual fields in the "Selected Interface (RDI/Link) record" area.

Step	Action
2	To define a new RDI/Link, choose **New RDI/Link** > **New RDI/Link** from the Data Entry group on the **Interfaces (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.  A new record is created.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list. But in case of RDI/Link Name drop-down list, you can either select from the drop-down list or enter a name that is not available in the list. • The **Remote RDI Type Name** drop-down box is only enabled for the Gateway RDI.
3	To define a new RDI Dependency, choose **New RDI/Link** > **New RDI Dependency** from the Data Entry group on the **Interfaces (RDI's and Links)** ribbon bar tab. The RDI dependency allows you to configure an RDI to start after a list of RDI, by adding the respective RDI in the **(RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item. 

Step	Action

The following dialog box is displayed:

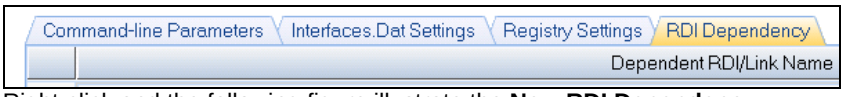


Select a dependent RDI from the **Dependent RDI/Link Name** drop-down list. Click **OK**.

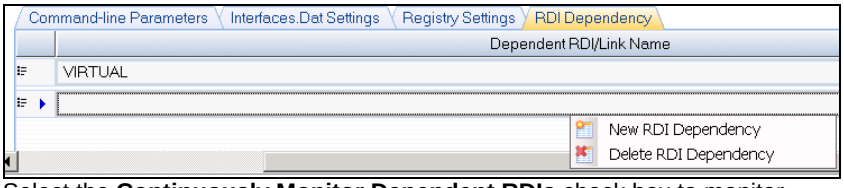
Follow the same steps to add more RDI Dependency entries, if required.

You can also define RDI Dependency from the **RDI Dependency** tab.

Click **RDI Dependency** tab. The following figure is displayed.



Right-click and the following figure illustrate the **New RDI Dependency**.

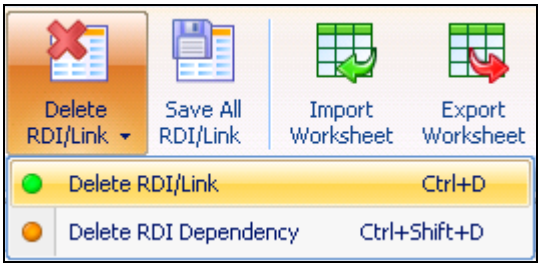


Select the **Continuously Monitor Dependent RDIs** check box to monitor dependent RDIs continuously.

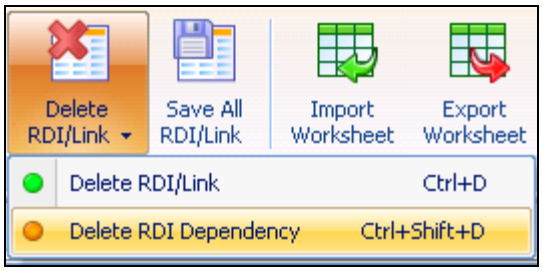
4 In the **Selected Interface (RDI/Link) record** section of the configuration form, complete the information related to the interface.

Based on the RDI type name that you select from the **RDI Type Name** drop-

Step	Action
	down list, the **Retrieve Parameters from Template** drop-down list displays the corresponding templates already configured in the **Interfaces Template (RDI's and Links)** form. The Interfaces Template assists in the ease of RDI and Link configuration. For more information on Interfaces Template (RDI's/Link), refer to Interfaces Template.
5	Click **Retrieve Parameters** to populate the Command-line parameters grid with the default RDI Parameters. • In the **Value** column, enter the "data" portion of the command-line parameter. **Note**: You need not enter the command-line switch nor the equals sign (=) when you enter the "data value". The RDI Configuration Tool retrieves that information from the RDI Parameters table and adds the required logical expressions. • In the **Include** column, select the check box if you want the parameter to be included in the Command-line generated by the RDI Configuration Tool. **Note**: All mandatory RDI Parameters have the Include check box selected by default.
6	Select the **Interfaces.DAT Settings** tab and fill in the appropriate fields.
7	Select the **RDI Dependency** tab and fill in the appropriate fields.
8	To save the data related to the Interface (including Parameters and Settings), click **Save RDI/Link** from the Data Entry group on **the Interfaces (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
9	If you are creating an OLEDB RDI, click **Retrieve Parameters** in order to retrieve the default query text. Following that, click the **Registry Settings** tab and modify the text by entering actual host names and parameter values.

Step	Action
	You must save the RDI again after making these updates.
10	After completing the details of the Interface, run the PHD RDI Configuration utility on the machine executing the Interface.
	REFERENCE – INTERNAL For more information about the PHD RDI Configuration utility, refer to sections 2.5, 2.6 and 2.7 of the *Basic RDI Installation Guide (in0701.pdf)*.
11	To modify the details related to an Interface, first select the target RDI/Link from the Current list of Interface records and then update the fields as appropriate. **Note**: Some fields are locked after saving the Interface and cannot be modified. After completing the modifications, save the interface to commit the changes to the database.
12	To delete the details related to an Interface (including the Parameters and Settings), choose **Delete RDI/Link** > **Delete RDI/Link** from the Data Entry group on the **Interfaces (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.  To delete the RDI dependency, click **Delete RDI Dependency** from the Data Entry group on the **Interfaces (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



This task deletes the Parameters and Settings as well as the main interface data.

You can also perform the following tasks from this screen:

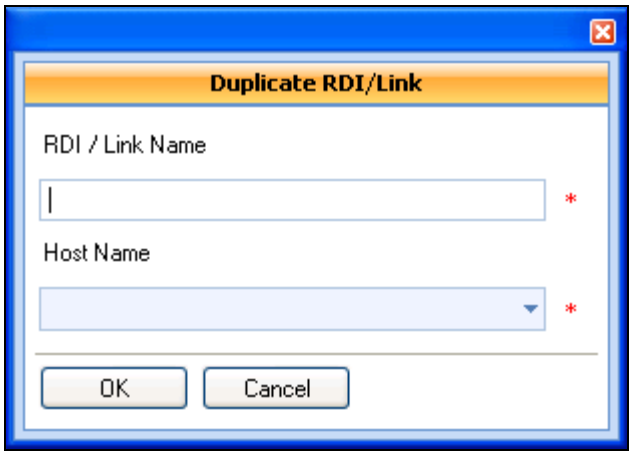
- Save all RDI/Link. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

16 To duplicate an RDI/Link, click **Duplicate RDI/Link** from the Data Entry group on the **Interfaces (RDI's and Links)** ribbon bar tab.

The following figure illustrates the menu item.

The following dialog box appears.

Step	Action



Enter an **RDI/Link Name** and select the **Host Name** that the Interface runs on. Click **OK**.

A new RDI/Link is created. Modify the necessary fields (like description and command-line parameter values) and **Save** when finished.

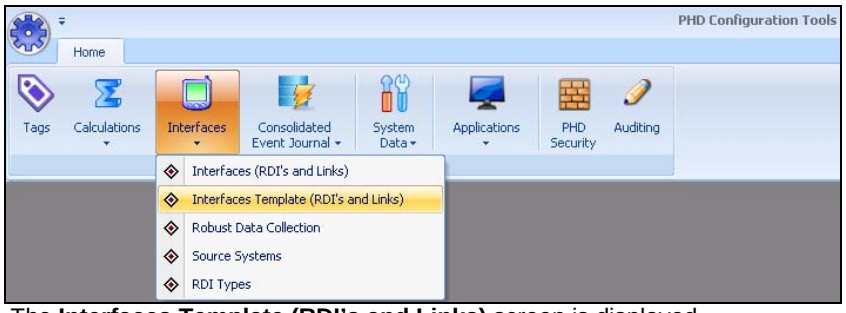
2.1.2 Interfaces Template

Interfaces Template enables the product administrators to define common parameters for a set of interface. Interfaces Template minimizes the effort to specify the same value for multiple interfaces and reduces the effort to enter large amount of data while creating multiple interfaces. The product administrators can only configure interfaces from the Interface Template and define default values for an RDI Type.

Defining a new interface template

To configure a new interface template, perform the following steps:

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Interfaces > Interfaces Template (RDI's and Links)** from the PHD Configuration Menu.



The **Interfaces Template (RDI's and Links)** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

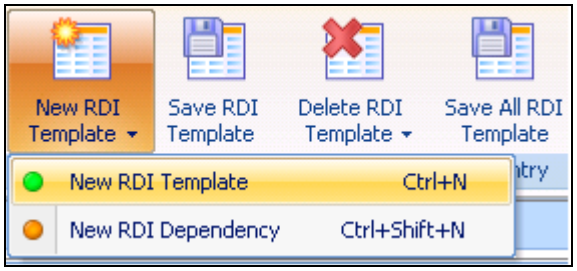
TIP

Use the Current List to navigate between records

Selecting a record in the "Current list of Interface (RDI/Link) template records" displays the individual fields in the "Selected Interface (RDI/Link) template record" area.

2	To define a new RDI template, choose **New RDI Template** > **New RDI Template** from the Data Entry group on the **Interfaces Template (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.

Step	Action

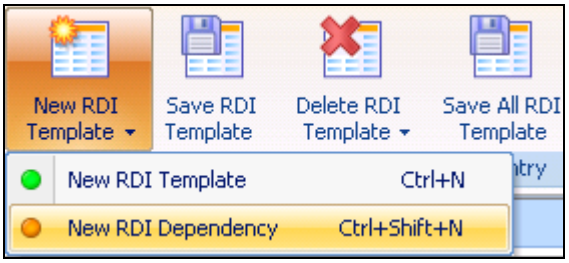


A new record is created.

In the **Selected Interface (RDI/Link) template record** section of the configuration form, complete the information related to the interface.

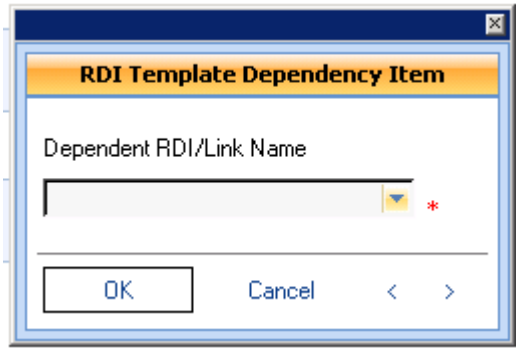
3 To define a new RDI Template Dependency, choose **New RDI Template** > **New RDI Dependency** from the Data Entry group on the **Interfaces Template (RDI's and Links)** ribbon bar tab.

The following figure illustrates the menu item.



The following dialog box is displayed:

Step	Action



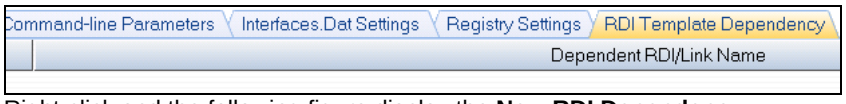
Select the name of the dependent RDI/Link template from the **Dependent RDI/Link Name** drop-down box.

Click **OK**.

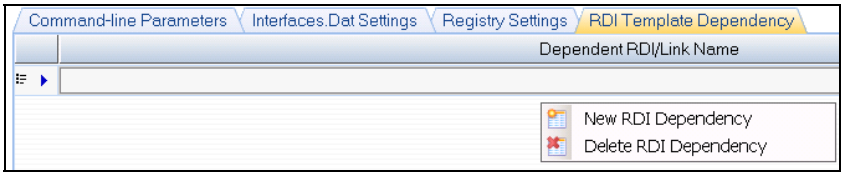
Follow the same steps to add more RDI Template Dependency entries, if required.

You can also define RDI Dependency from the **RDI Template Dependency** tab.

Click **RDI Template Dependency** tab. The following figure is displayed.



Right-click and the following figure display the **New RDI Dependency**.

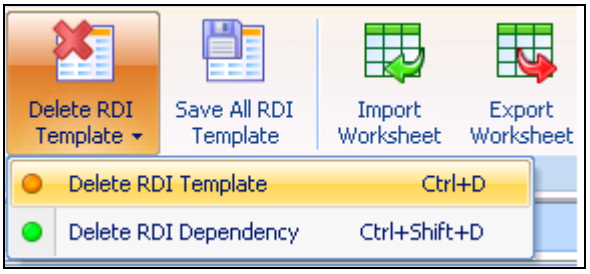


Select the **Continuously Monitor Dependent RDIs** check box to monitor the dependent RDIs continuously.

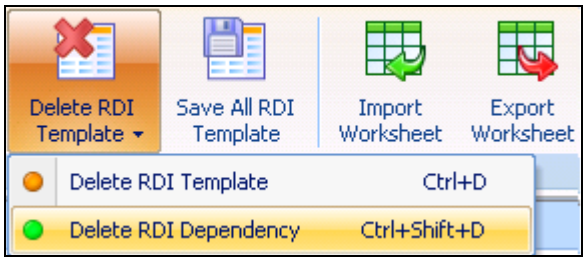
ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or

Step	Action
	instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
4	Click **Retrieve Parameters** to populate the Command-line parameters grid with the default RDI Parameters. • In the **Value** column, enter the "data" portion of the command-line parameter. **Note**: You need not enter the command-line switch nor the equals sign (=) when you enter the "data value". The RDI Configuration Tool retrieves that information from the RDI Parameters table. • In the **Include** column, select the check box if you want the parameter to be included in the Command-line when generated by the RDI Configuration Tool. **Note**: All mandatory RDI Parameters have the **Include** check box selected by default.
5	Select the **Interfaces.DAT Settings** tab and fill in the appropriate fields.
6	Select the **RDI Dependency** tab and fill in the appropriate fields.
7	To save the data related to the Interface (including Parameters and Settings), click the **Save RDI Template** from the Data Entry group on the **Interfaces Template (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the "**Selected Interface (RDI/Link) template record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
8	If you are creating an OLEDB RDI template, click **Retrieve Parameters** in order to retrieve the default query text. Select the **Registry Settings** tab and modify the text by entering actual host names and parameter values. You must save the RDI template again after making these updates.
9	After completing the details of the Interface, run the PHD RDI Configuration

Step	Action
	utility on the machine executing the Interface. After creating a template, the template that you created appears in the **Interface (RDI/Link**) form.
	REFERENCE – INTERNAL For more information about the PHD RDI Configuration utility, refer to sections 2.5, 2.6 and 2.7 of the *Basic RDI Installation Guide (in0701.pdf)*.
10	To modify the details related to an Interface template, first select the target RDI/Link template from the Current list of Interface (RDI/Link) template records and then update the fields as appropriate. **Note**: Some fields are locked after saving the Interface template and cannot be modified. After the modifications are complete, you must save the interface template to commit the changes to the database.
11	To delete the details related to an Interface (including the Parameters and Settings), choose **Delete RDI Template** > **Delete RDI Template** from the Data Entry group on the **Interfaces Template (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the Parameters, Settings, Dependency as well as the main interface data. To delete RDI dependency, choose **Delete RDI Template** > **Delete RDI Dependency** from the Data Entry group on the **Interfaces Template (RDI's and Links)** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



This task deletes selected RDI Template Dependency.

You can also perform the following tasks from this screen:

- Save all RDI Template. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

2.1.3 Robust Data Collection

Defining Robust Data Collection

Robust Data Collection (RDC) is a set of interfaces which work together to move data from buffer nodes up to a shadow server.

ATTENTION

Prerequisite

- Complete the necessary **Interfaces (RDI's/Links)** for each RDI or Link required in an RDC scheme.
- The RDI/Link Name for the Shadow RDI must be the same as the RDI/Link Name for the Buffer RDI's.

The RDC configuration form enables you to configure following RDC modes:

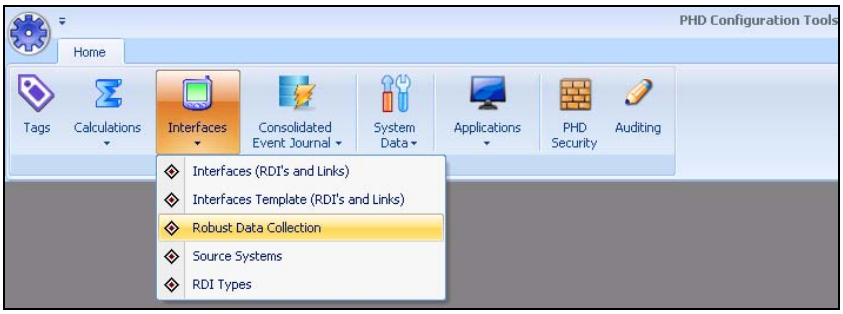
For RDI's

- Single buffer to Shadow Node
- Dual buffer to Shadow Node

For Links

- Single buffer to Shadow Node

To configure Robust Data Collection, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Interfaces > Robust Data Collection** from the PHD Configuration Menu.  The **Robust Data Collection** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	**TIP** ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Robust Data Collection records" displays the individual fields in the "Selected Robust Data Collection record" area.
2	To define a new RDC scheme, click **New RDC Configuration** from the Data Entry group on the **Robust Data Collection** ribbon bar tab. The following figure illustrated the menu item.  A new record is created. In the **Selected Robust Data Collection record** section of the configuration

Step	Action
	form, complete the following information related to the RDC scheme.
	ATTENTION • An asterisk (*) indicates a mandatory field. • For IP port numbers, the values may vary from 1025 through 65534. • The Shadow/Active port must be different from the Shadow/Standby port. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list. • Use a tag only once as a Watch Dog tag. • The Watch Dog tag must be active and have Collection and Put Download enabled. The tag may not be a Class Tag. The Source Tag Type for the Watch Dog tag must be integer or float. • The Watch Dog tag must have a Collector name configured. The Collector name must match the RDI/Link name selected in the RDC form.
3	To save the data related to an RDC scheme, click **Save RDI/Link** from the Data Entry group on the **Robust Data Collection** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	After completing the details of the Robust Data Configuration, run the PHD RDI Configuration utility on each machine in the RDC scheme.
	REFERENCE – INTERNAL For more information about the PHD RDI Configuration utility, refer to sections 2.5, 2.6 and 2.7 of the *Basic RDI Installation Guide (in0701.pdf)*.
5	To modify the details related to an RDC scheme, first select the target RDC record from the Current list of Robust Data Collection records and then update the fields as appropriate.

Step	Action
	Note: Some fields are locked after saving the RDC scheme and cannot be modified. After completing the modifications, you must save the RDC scheme to commit the changes back to the database.
6	To delete the details related to the RDC scheme, first select the target RDC record from the Current list of Robust Data Collection records. Click **Delete RDC Configuration** from the Data Entry group on the **Robust Data Collection** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected RDC record. You can also perform the following tasks from this screen: • Save all RDC Collection. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace. For more information, see Finding and Replacing data.

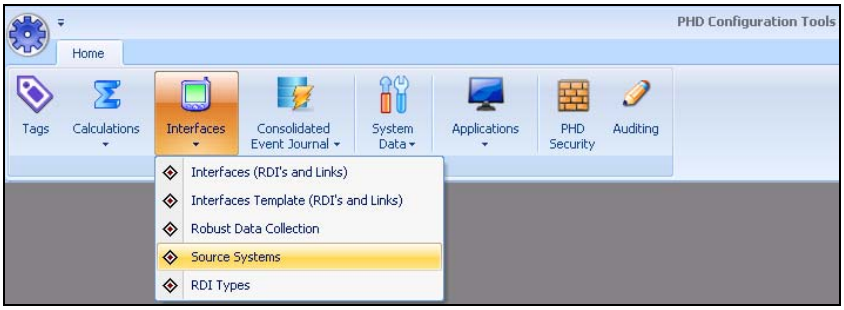
2.1.4 Source Systems

Defining a source system

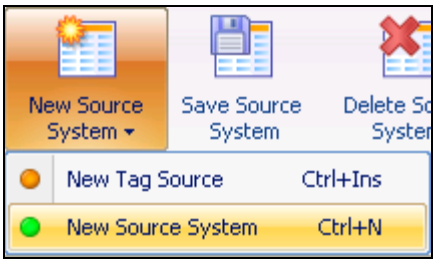
Source System configuration defines the data mapping between the Digital Control System (DCS) and PHD. When creating new tags, the tag source ensures that the tags collect the correct information from the DCS by providing a list of what is available from the DCS. The tag source helps correlate data types on the DCS and how they are represented within PHD. Multiple tag sources can be defined per Source System.

In earlier versions of this tool, the form was known as Tag Source Configuration.

To configure a source system, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Interfaces > Source Systems** from the PHD Configuration Menu.  The **Source System** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Source System records" displays the individual fields in the "Selected Source System record" area.
2	To define a new Source System, choose **New Source System > New Source System** from the Data Entry group on the **Source Systems** tab. The following figure illustrates the menu item.

Step	Action



A new record is created.

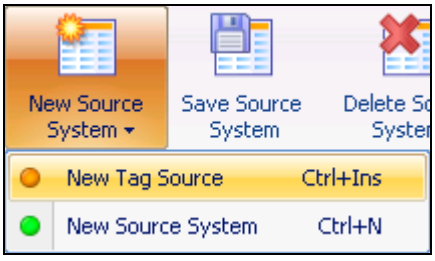
In the **Selected Source System record** section of the configuration form, complete the information related to the system.

ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.

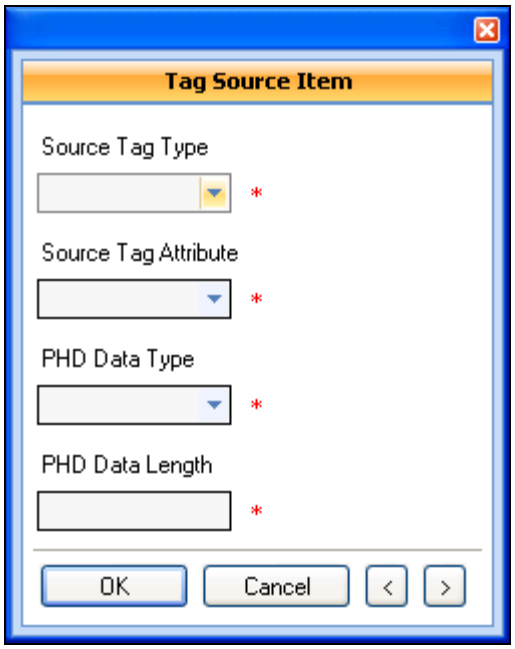
3 To create a new Tag Source, choose **New Source System > New Tag Source** from the Data Entry group on the **Source Systems** ribbon bar tab.

The following figure illustrates the menu item.



The following dialog box is displayed:

Step	Action

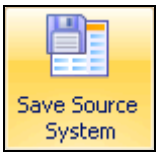


Enter a **Source Tag Type**, a **Source Tag Attribute**, the associated **PHD Data Type,** and **PHD Data Length**. Click **OK**.

Follow the same steps to add additional Tag Source entries.

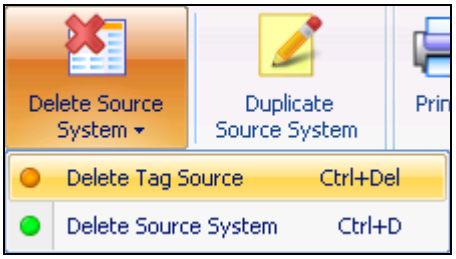
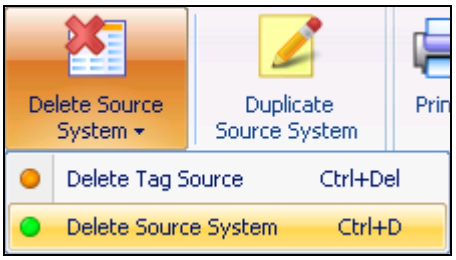
4 To save the data related to a Source System (including all the Tag Source details, click **Save Source System** from the Data Entry group on the **Source Systems** ribbon bar tab.

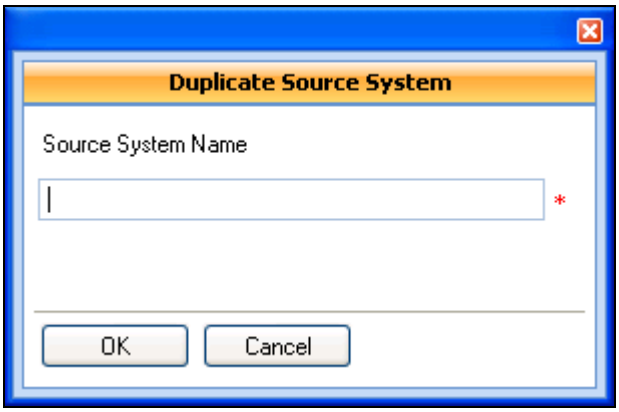
The following figure illustrates the menu item.



Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to a Source System, first select the target Source System from the Current list of Source System records and then

Step	Action
	update the fields as appropriate. After completing the modifications, you must save the Source System to commit the changes back to the database.
6	To delete the details related to the Tag Source, first select the target Source System from the Current list of Source System records. Select the target Tag Source row from the Tag Sources grid. Choose **Delete Source System > Delete Tag Source** from the Data Entry group on the **Source Systems** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected Tag Source row. Follow the same steps to add more rows, if required.
7	To delete the details related to a Source System (including all Tag Sources), choose **Delete Source System > Delete Source System** from the Data Entry group on the **Source Systems** tab. The following figure illustrates the menu item.  This task deletes the Tag Sources plus the main Source System data. You can also perform the following tasks from this screen:

Step	Action
	• Save All Source System. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace. For more information, see Finding and Replacing data.
9	To duplicate a Source System, click **Duplicate Source System** from the Data Entry group on the **Source Systems** ribbon bar tab. The following figure illustrates the menu item.  The following dialog box appears.  Enter the new **Source System Name**. Click **OK**. A new Source System is created. Modify the necessary fields (like description and tag source values) and click **Save**.

2.1.5 RDI Types

Defining RDI types

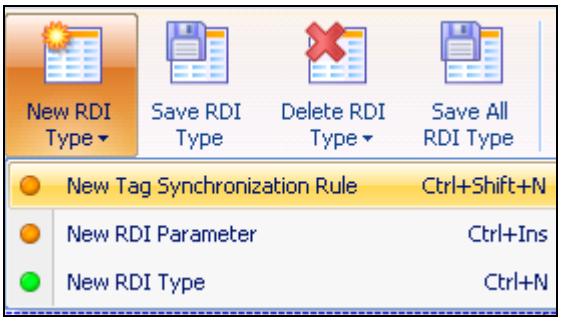
RDI Type configuration provides the starting point for creating PHD interfaces. This includes the name of the DLL that the RDI Server loads when an Interface is commissioned, the command-line parameters that are used by the RDI Setup tool and default rules for RDI's that interact with the Tag Synchronization service.

The system now ships with seed data for all Type A and Type B RDI's. Type C RDI's will have to be configured as needed. Additionally, the system also ships Tag Synchronization rules for Experion, OPC and Peer RDI types.

To configure RDI Types, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Interfaces > RDI Types** from the PHD Configuration Menu.  The **RDI Type** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of RDI Type records" displays the individual fields in the "Selected RDI Type record" area.
2	To define a new Tag Synchronization Rule, choose **New RDI Type > New Tag Synchronization Rule** from the Data Entry group on the **RDI Types** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



The following dialog is displayed.

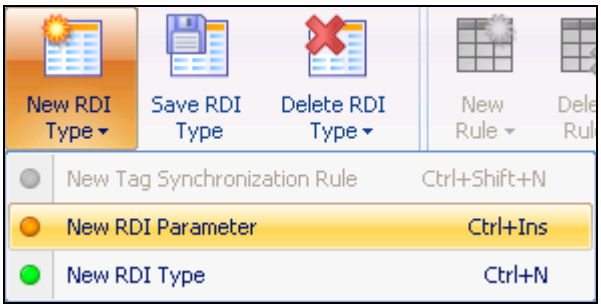
Enter the new **Rule Name**. Click **OK**.

If the Tag Synchronization Rules tab is not in the forefront of the Selected RDI Type section of the configuration form, click it and bring it to the forefront. This displays the list of configured rules. Selecting a rule from the list of configured rules displays the rule text and the predefined variables.

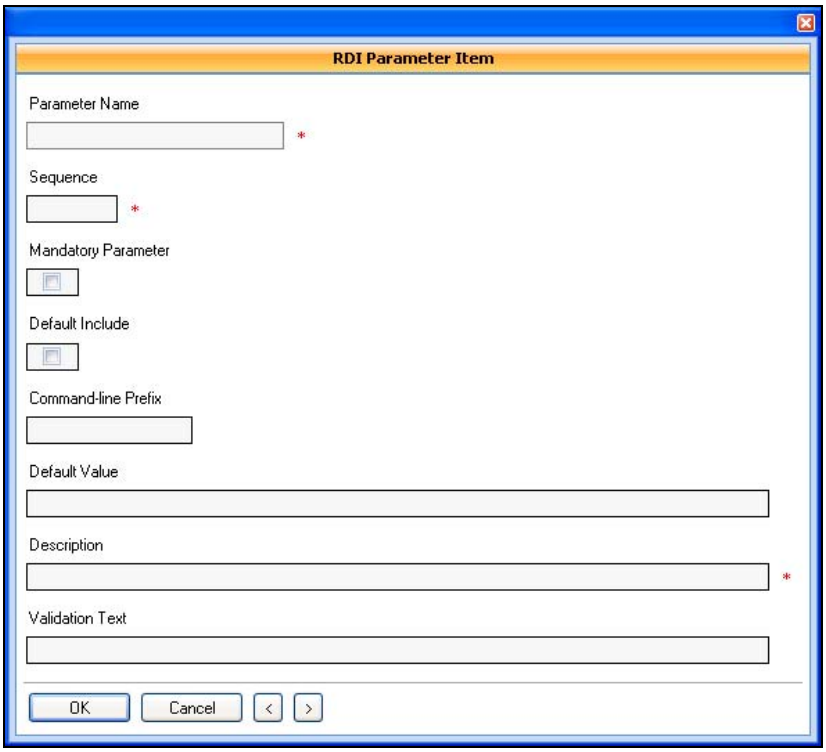
To alter the order of precedence that rules are evaluated on, click the following buttons:

Select the **Enabled** checkbox to make the rule active.

Enter **Rule Text** based on the programming syntax provided in *section 4* of this manual.

Step	Action
	Enter the **Predefined Variables** and **Match Expressions** as required by the programming syntax in the rule text.
	ATTENTION **Tag Synchronization Rules** menu and configuration access are only available for the EXPERION, the OPC and the PEER RDI types. Tag Synchronization rules contain conditions that are evaluated by the Tag Synch service. If all the conditions in the rule are met, the rule text is executed. If the conditions are not met, the Tag Synch service inspects the next rule in the list.
3	To define a new RDI Parameter, choose **New RDI Type** > **New RDI Parameter** from the Data Entry group on the **RDI Types** ribbon bar tab. The following figure illustrates the menu item.  The following dialog box is displayed.

Step	Action



Enter the **Parameter Name**, the **Sequence** (for example, command-line position), and the **Description**.

If it is mandatory that the parameter be included in the command-line, check the **Mandatory Parameter** checkbox.

If the parameter is not mandatory, but you want to include it in the command-line, check the **Default Include** checkbox.

If the parameter uses a command switch or flag in the command-line (like '/d='), include the switch in the **Command-line Prefix** textbox.

> **Note**: Do not include the value with the switch in the Command-line Prefix. You must enter the value when you create the RDI.

If you wish that the parameter started with an initial value when you create the RDI, enter that value in the **Default Value** textbox. When creating an RDI the system retrieves and uses this entry.

If you wish that the parameter value be compared against an accepted value

Step	Action

or range of accepted values when you save the RDI, enter in a **Validation Text**.

Note: Validation Text follows XML format conventions.

Examples of Validation Text are as follows:

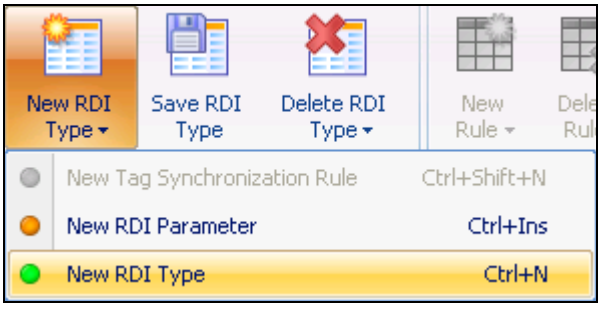
- <integer min="0" max="10"/>
- <boolean/>
- <string maxLength="8">C:Cache;D:Device</string>
- <string maxLength="3">Yes;No</string>
- <string maxLength="32"/>
- <file maxLength="128"/>

Click **OK** to add the parameter.

Follow the same steps to add additional RDI Parameter entries.

4 To define a new RDI Type, choose **New RDI Type > New RDI Type** from the Data Entry group on the **RDI Types** ribbon bar tab.

The following figure illustrates the menu item.

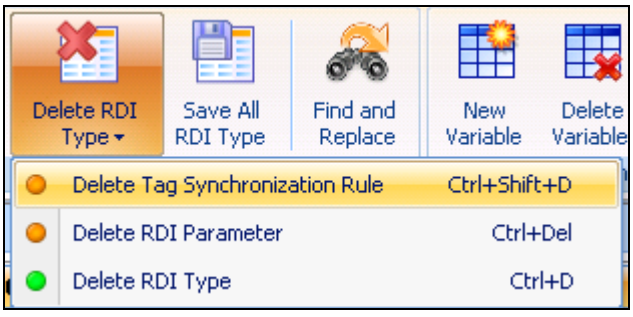


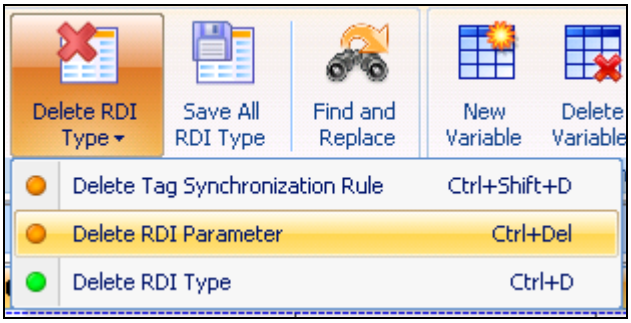
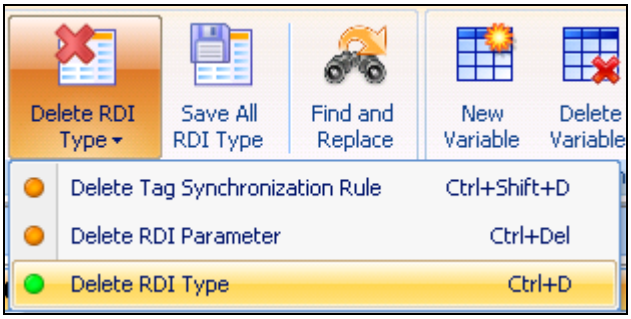
A new record is created.

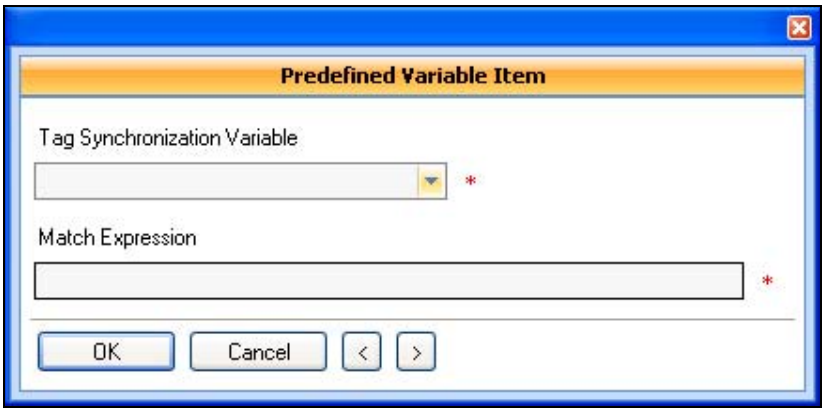
In the **Selected RDI Type** record section of the configuration form, complete the information related to the type.

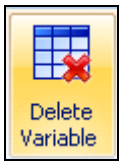
ATTENTION

- All Type A and Type B RDIs are provided in the list of RDI Types.
- An asterisk (*) indicates a mandatory field.

Step	Action
	• Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
5	To save the data related to an RDI Type (including all RDI Parameters and Tag Synchronization rules), click **Save RDI Type** from the Data Entry group on the **RDI Types** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
6	To modify the details related to an RDI Type, first select the target RDI Type from the Current list of RDI Type records and then update the fields as appropriate. **Note**: some fields are locked and cannot be modified. After completing the modifications, you must save the RDI Type to commit the changes back to the database.
7	To delete the data related to a Tag Synchronization Rule, select the rule you wish to delete and choose **Delete RDI Type > Delete Tag Synchronization Rule** from the Data Entry group on the **RDI Types** tab. The following figure illustrates the menu item.  This task deletes all the Predefined Variables as well as the selected Rule

Step	Action
	data. Follow the same steps to add additional Predefined Variables, if required.
8	To delete the data related to an RDI Parameter, select the Parameter you wish to delete and choose **Delete RDI Type > Delete RDI Parameter** from the Data Entry group on the **RDI Types** tab. The following figure illustrates the menu item.  This task deletes the currently selected Parameter. Follow the same steps to delete additional Parameters, if required. If the Parameter is used in an Interface record, a message appears and the Parameter is not deleted.
9	To delete the data related to an RDI Type (including all RDI Parameters and Tag Synchronization Rules), choose **Delete RDI Type > Delete RDI Type** from the Data Entry group on the **RDI Types** tab. The following figure illustrates the menu item.  This task deletes all the Parameters, all the Rules and all the Predefined

Step	Action
	Variables as well as the selected RDI Type. You can also perform the following tasks from this screen: • Save all RDI Type. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace. For more information, see Finding and Replacing data.
12	To create a new **Predefined Variable** for a rule, choose **New Variable** from the Tag Synchronization group on the **RDI Types** ribbon bar tab.  The following dialog is displayed.  Select a **Tag Synchronization Variable** from the list provided and enter a regular expression as the **Match Expression**. Click **OK**.
13	To delete the data related to a Predefined Variable, select the rule you wish to modify and then select the Predefined Variable row you wish to delete. Click **Delete Variable** from the Tag Synchronization group on the **RDI Types** ribbon bar tab. The following figure illustrates the menu item.

Step	Action
	 This task deletes the currently selected Predefined Variable. Follow the same steps to delete additional Predefined Variable rows.
14	To export a rule to a Visual Basic class file, first select the target RDI Type from the Current list of RDI Type records. Click the **Tag Synchronization** tab to display all the rules for the selected RDI Type. Select the desired rule whose text you wish to export and then click **Export Rule** from the Tag Synchronization group on the **RDI Types** ribbon bar tab. The following figure illustrates the menu item.  The resulting text file can be loaded by Visual Studio and compiled using the VB.Net compiler into a DLL for use by Third-party applications.

2.2 Tag Configuration

The Tag configuration forms enable you to add tags and modify tag configuration details.

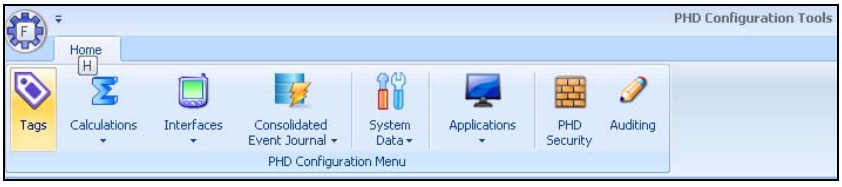
Tags are classified into four groups:

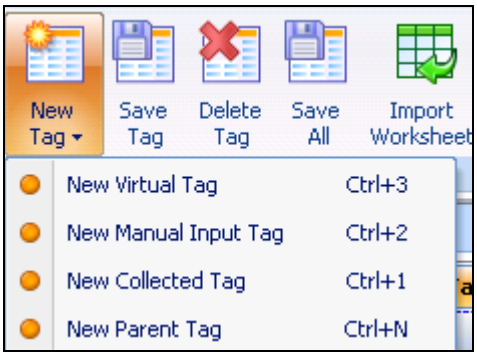
- Virtual Tags – tags that provide data that is calculated based on collected tag values, manual input tag values and/or other virtual tag values.
- Manual Input Tags – tags which store data that is manually entered by a user.
- Collected Tags – tags, which store data, collected from PHD interfaces.
- Parent Tags – templates that can be used when creating one of the other four classes of tags.

2.2.1 New Collected Tag

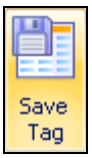
Defining a new collected tag

To configure a new collected tag, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Tags** from the PHD Configuration Menu.  The **Tags** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Tag records" displays the individual fields in the "Selected Tag record" area.
2	To define a new collected tag, choose **New Tag > New Collected Tag** from

Step	Action
	the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  A new collected tag record is created. In the **Selected Tag record** section of the configuration form, complete the information related to the tag. Note: Ensure that the name of the tags, 1D Correlation, 2D Correlation, 3D Correlation, and Function Definitions are unique. The configuration form contains three tabs. Each tab reveals different data fields. The **Collected Tag Configuration** tab displays the most common fields for this tag type.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list. • The icon beside a field indicates the value inherited from a parent tag. • The icon beside a field indicates the inherited value was overridden. The icon contains a tool tip showing the inherited value. • Check boxes have three states: Null, True, False. Null permits inheritance and True/False overrides inheritance.
3	To save the data related to the Collected Tag, click **Save Tag** from the Data Entry group on the **Tags** ribbon bar tab.

Step	Action
	The following figure illustrates the menu item.



Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

4 To modify the details related to a collected Tag, first select the target Tag from the Current list of Tag records and then update the fields as appropriate.

Note: Some fields are locked and cannot be modified.

After completing the modifications, you must save the Tag to commit the changes back to the database.

5 To delete the details related to the collected Tag, click **Delete Tag** from the Data Entry group on the **Tags** ribbon bar tab.

The following figure illustrates the menu item.

This task deletes the currently selected Tag. To instruct PHD that the tag is no longer in use, click **Send Tag Def to PHD** from the PHD group on the **Tags** ribbon bar tab.

If the Tag is used on a Security record, an error message is displayed and the Tag is not deleted.

ATTENTION

- New Tags can be created in the following manner:
  1. Export a Tag Definition to Microsoft Excel.
  2. Copy and paste a Microsoft Excel row.
  3. Remove the RecordID and Tag Number from the all the rows.

Step	Action
	4. Change the Tag Name on all the rows. 5. Change all the other fields as required. 6. Import the new tags. • Updates to existing Tags can be made in the following manner: 1. Export a Tag Definition to Microsoft Excel. 2. Leave the RecordID and Tag Number unchanged. 3. Change all the other fields as required. 4. Import the updated tag.
9	To duplicate a tag, click **Duplicate Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  The following dialog is displayed.  Enter the new **Tag Name**. Click **OK**. A new tag is created. All fields (excluding the Tag Name and Tag Number) are copied from the target tag to the new tag. The name you entered in the dialog box is used as the name of the new tag. Modify the necessary fields and **Save** when finished. You can also perform the following tasks from this screen:

Step	Action
	• Save all. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace. For more information, see Finding and Replacing data.
11	To access all the PHD tags in the database, click **Tag Explorer** from the Tag Explorer group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
12	To instruct PHD to make the new collected Tag available for use, click **Send Tag Def to PHD** from the PHD group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  A dialog box is displayed showing the status of the Send routine. Click **Close** when you complete reading the status message.

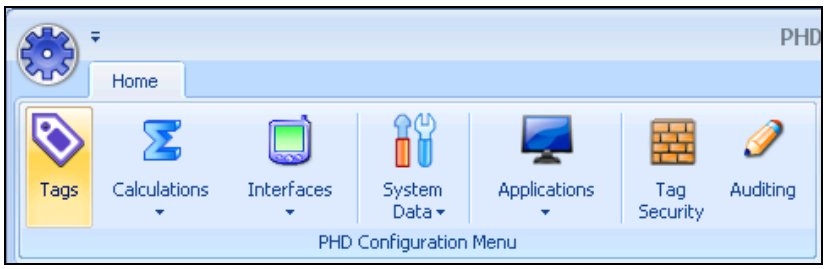
ATTENTION

- From the time you open the Tag Configuration form until the time you close it, a list of saved Tags are tracked by the system.
- Clicking **Send Tag Def to PHD** will process this list.
- Upon successfully processing this “Saved Tag” list, the list is cleared.
- Subsequent saves will add to the list and the “Saved Tag” tracking starts anew.

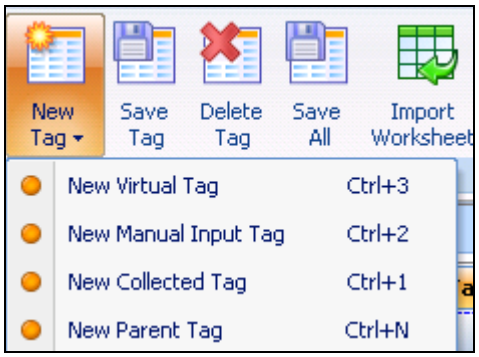
2.2.2 New Manual Input Tag

Defining a new manual input tag

To configure a new manual input tag, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Tags** from the PHD Configuration Menu.  The **Tags** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	**TIP** ***Use the Current List to navigate between records*** Selecting a record in the “Current list of Tag records” displays the individual fields in the “Selected Tag record” area.
2	To define a new manual input tag, choose **New Tag > New Manual Input Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



A new manual input tag record is created.

In the **Selected Tag record** section of the configuration form, complete the information related to the tag.

The configuration form contains three tabs. Each tab reveals different data fields. The **Manual Input Tag Configuration** tab displays the most common fields for this tag type.

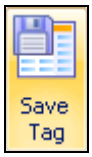
ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- The icon beside a field indicates the value was inherited from a parent tag.
- The icon beside a field indicates the inherited value was overridden. The icon contains a tool tip showing the inherited value.
- Checkboxes have three states: Null, True, False. Null permits inheritance and True/False overrides inheritance.

3 To save the data related to the Manual Input Tag, click **Save Tag** from the Data Entry group on the **Tags** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action



Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

4 To modify the details related to a Manual Input Tag, first select the target Tag from the Current list of Tag records and then update the fields as appropriate.

Note: Some fields are locked and cannot be modified.

After completing the modifications, you must save the Tag to commit the changes back to the database.

5 To delete the details of a Manual Input Tag, click **Delete Tag** from the Data Entry group on the **Tags** ribbon bar tab.

The following figure illustrates the menu item.

This task deletes the currently selected Tag. To instruct PHD that the tag is no longer in use, click **Send Tag Def to PHD** from the PHD group on the **Tags** ribbon bar tab.

If the Tag is used on a Security record, an error message is displayed and the Tag is not deleted.

ATTENTION

- New Tags can be created in the following manner:
  1. Export a Tag Definition to Microsoft Excel.
  2. Copy and paste a Microsoft Excel row.
  3. Remove the RecordID and Tag Number from the all the rows.
  4. Change the Tag Name on all the rows.
  5. Change all the other fields as required.

Step	Action
	6. Import the new tags.
	• Updates to existing Tags can be made in the following manner:
	1. Export a Tag Definition to Microsoft Excel.
	2. Leave the RecordID and Tag Number unchanged.
	3. Change all the other fields as required.
	4. Import the updated tag.
9	To duplicate a tag, click **Duplicate Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  The following dialog is displayed.  Enter the new **Tag Name**. Click **OK**. A new tag is created. All fields (excluding the Tag Name and Tag Number) are copied from the target tag to the new tag. The name you entered in the dialog box is used for the name of the new tag. Modify the necessary fields and **Save** when finished.
10	You can also perform the following tasks from this screen: • Save All. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data.

Step	Action
	• Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
11	To access all the PHD tags in the database, click **Tag Explorer** from the Tag Explorer group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
12	To instruct PHD to make the new Manual Input Tag available for use, click **Send Tag Def to PHD** from the PHD group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  A dialog box is displayed showing the status of the Send routine. Click **Close** when you complete reading the status message.

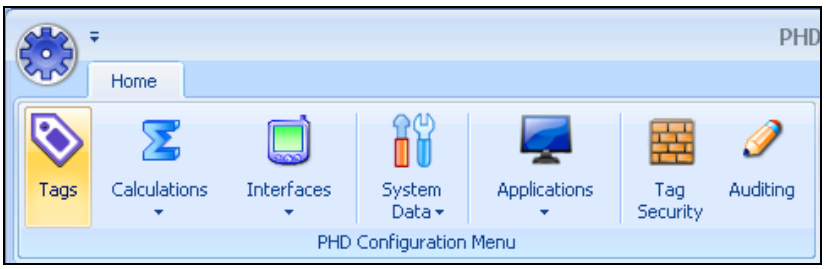
ATTENTION

- From the time you open the Tag Configuration form until the time you close it, a list of saved Tags is tracked by the system.
- Clicking **Send Tag Def to PHD** will process this list.
- Upon successfully processing this “Saved Tag” list, the list is cleared.
- Subsequent saves will add to the list and the “Saved Tag” tracking will start anew.

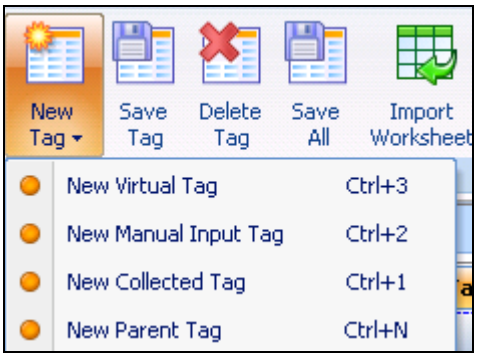
2.2.3 New Virtual Tag

Defining a new virtual tag

To configure a new virtual tag, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Tags** from the PHD Configuration Menu.  The **Tags** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Tag records" will display the individual fields in the "Selected Tag record" area.
2	To define a new Virtual Tag, choose **New Tag > New Virtual Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



A new virtual tag record is created.

In the **Selected Tag record** section of the configuration form, complete the information related to the tag.

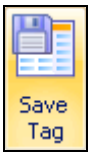
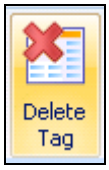
The configuration form contains three tabs. Each tab reveals different data fields. The **Virtual Tag Configuration** tab displays the most common fields for this tag type. The **Virtual Calculation** tab displays the field used to store the calculation.

Note: If the entity name of tag, 1D, 2D, 3D or Function Definition contain any special characters, insert backslash (\) before the special character while using the entity name in the calculation. PHD does not support special characters such as space, single quotes, and double quotes.

ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- The icon beside a field indicates the value was inherited from a parent tag.
- The icon beside a field indicates the inherited value was overridden. The icon contains a tool tip showing the inherited value.
- Checkboxes have three states: Null, True, False. Null permits inheritance and True/False overrides inheritance.

3 To save the data related to a Virtual Tag (including the calculation), click

Step	Action
	Save Tag from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a Virtual Tag, first select the target Tag from the Current list of Tag records and then update the fields as appropriate. **Note**: Some fields are locked and cannot be modified. After completing the modifications, you must save the Tag to commit the changes back to the database.
5	To delete the details related to the Virtual Tag (including the calculation), click **Delete Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the calculation as well as the main Tag data. To instruct PHD that the tag is no longer in use, click **Send Tag Def to PHD** from the PHD group on the **Tags** ribbon bar tab. If the target Tag is used on a Security record, an error message is displayed and the Tag is not deleted.

ATTENTION

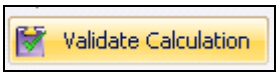
- New Tags can be created in the following manner:
  1. Export a Tag Definition to Microsoft Excel.
  2. Copy and paste a Microsoft Excel row.

Step	Action
	3. Remove the RecordID and Tag Number from the all the rows. 4. Change the Tag Name on all the rows. 5. Change all the other fields as required. 6. Import the new tags. • Updates to existing Tags can be made in the following manner: 1. Export a Tag Definition to Microsoft Excel. 2. Leave the RecordID and Tag Number unchanged. 3. Change all the other fields as required. 4. Import the updated tag. • Calculations are not exported to Microsoft Excel. Just the Tag definition is exported when you click this menu item.
9	To duplicate a Virtual Tag, click **Duplicate Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  The following dialog is displayed.  Enter the new **Tag Name**. Click **OK**. A new tag is created. All fields (excluding the Tag Name and Tag Number) are copied from the target tag to the new tag. The name you entered in the

Step	Action
	dialog box is used for the name of the new tag. The calculation is updated as it is copied from the target tag to the new tag during the duplication process. Modify the necessary fields and **Save** when completed. You can also perform the following tasks from this screen: • Save All. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
11	To access all the PHD tags in the database, click **Tag Explorer** from the PHD group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
12	To instruct PHD to make the new Virtual Tag available for use, click **Send Tag Def to PHD** from the PHD group on the **Tags** tab. The following figure illustrates the menu item.  A dialog box is displayed showing the status of the Send routine. Click **Close** when you are finished reading the status message.

ATTENTION

- From the time you open the Tag Configuration form until the time you close it, a list of saved Tags is tracked by the system.
- Clicking **Send Tag Def to PHD** will process this list.

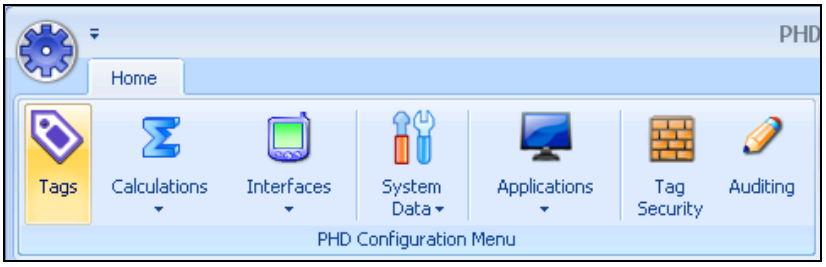
Step	Action
	• Upon successfully processing this “Saved Tag” list, the list is cleared. • Subsequent saves will add to the list and the “Saved Tag” tracking will start anew.
13	To validate the calculation syntax of the Virtual Tag, click **Validate Calculation** from the PHD group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  The system packages the calculation into a format usable by PHD and sends the contents to the server. A dialog box is displayed and indicates whether the validation was successful. • If the validation was successful, the status of the calculation is set to **Validated**. • A calculation must be validated before the PHD server can load it. • If the validation was not successful, the status of the calculation is set to **Work in Progress**.
14	To instruct PHD to make the calculation available for use, click **Send Calc to PHD** from the PHD group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  The system packages the calculation into a format usable by PHD and loads it into the server memory. Additionally, the system copies the calculation to a “Production” table. On server restarts, PHD reads the records in the “Production” table and loads the calculations found there. A dialog box is displayed and indicates whether the load was successful. • If the load was successful, the status of the calculation is set to **In Production** and the calculation is copied to the production table. • If PHD cannot load the calculation, the status of the calculation is set to **Work in Progress** and the calculation is not copied to the production table.

Step	Action
	ATTENTION • The PHD server only loads Virtual Tag calculations that are in the "Production" table. • Updating a Virtual Tag calculation where the status is **In Production** causes the status to be set to **Work in Progress** and causes the calculation to be removed from the "Production" table.

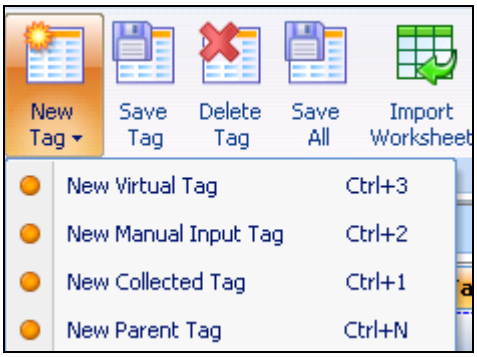
2.2.4 New Parent Tag

Defining a new parent tag

To configure a new parent tag, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Tags** from the PHD Configuration Menu.  The **Tags** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Tag records" will display the individual fields in the "Selected Tag record" area.
2	To define a new parent tag, choose **New Tag > New Parent Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



A new parent tag record is created.

In the **Selected Tag record** section of the configuration form, complete the information related to the tag.

The configuration form contains three tabs. Each tab reveals different data fields. The **Parent Tag Configuration** tab displays the most common fields for this tag type.

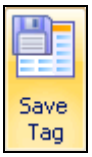
ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- The icon beside a field indicates the value was inherited from a parent tag.
- The icon beside a field indicates the inherited value was overridden. The icon contains a tool tip showing the inherited value.
- Checkboxes have three states: Null, True, False. Null permits inheritance and True/False overrides inheritance.

3 To save the data related to a Parent Tag, click **Save Tag** from the Data Entry group on the **Tags** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action



Alternatively, you can click the save button located in the "**Selected record**" section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

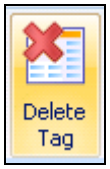
4 To modify the details related to a Parent Tag, first select the target Tag from the Current list of Tag records and then update the fields as appropriate.

Note: Some fields are locked and cannot be modified.

After completing the modifications, you must save the Tag to commit the changes back to the database.

5 To delete the details related to a Parent Tag, click **Delete Tag** from the Data Entry group on the **Tags** ribbon bar tab.

The following figure illustrates the menu item.



This task deletes the currently selected Tag.

ATTENTION

- New Tags can be created in the following manner:
  1. Export a Tag Definition to Microsoft Excel.
  2. Copy and paste a Microsoft Excel row.
  3. Remove the RecordID and Tag Number from the all the rows.
  4. Change the Tag Name on all the rows.
  5. Change all the other fields as required.
  6. Import the new tags.
- Updates to existing Tags can be made in the following manner:

Step	Action
	1. Export a Tag Definition to Microsoft Excel. 2. Leave the RecordID and Tag Number unchanged. 3. Change all the other fields as required. 4. Import the updated tag.
9	To duplicate a Parent Tag, click **Duplicate Tag** from the Data Entry group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  The following dialog is displayed.  Enter the new **Tag Name**. Click **OK**. A new tag is created. All fields (excluding the Tag Name and Tag Number) are copied from the target tag to the new tag. The name you entered in the dialog box is used for the name of the new tag. Modify the necessary fields and **Save** when completed.
	You can also perform the following tasks from this screen: • Save All. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing

Step	Action
	data.
11	To access all the Parent Tags in the database, click **Tag Explorer** from the PHD group on the **Tags** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
12	To instruct PHD to make the new Parent Tag available for use, click **Send Tag Def to PHD** from the PHD group on the **Tags** tab. The following figure illustrates the menu item.  A dialog box is displayed showing the status of the Send routine. Click **Close** when you complete reading the status message.

2.3 Calculations

2.3.1 1D Correlation

Defining the 1D Correlation function

You can use the 1D Correlation configuration form to define functions based on a one-dimensional table. These tables are treated as curves composed of a set of linear segments, with a pair of XY coordinates defining the start and end of each segment. The X coordinates are the source values and the Y coordinates are the result values.

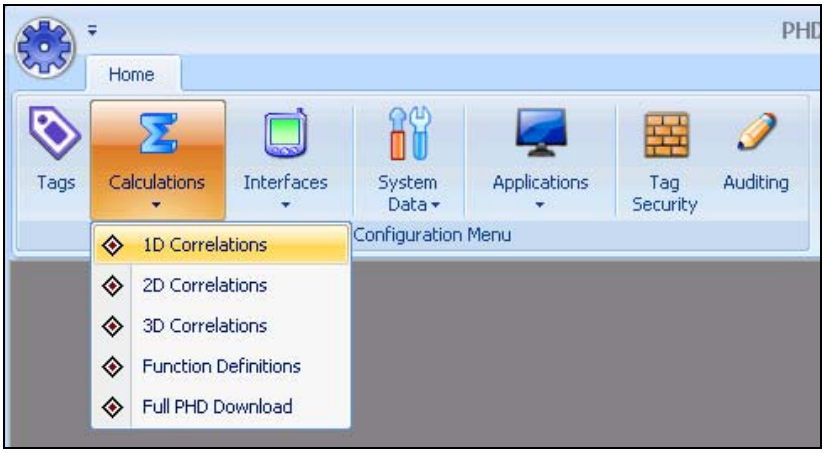
A minimum of two XY coordinates are required to define a single linear segment. The function can include upper and lower X limits that cause the function to return a null value and a confidence of -1 if the limits are exceeded. If limits are not specified, and the function is called with a value outside the range of source values in the XY records, the nearest linear segment is used for extrapolating the result.

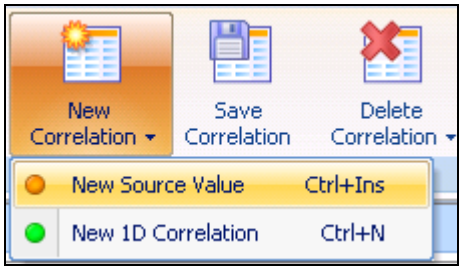
PHD uses linear interpolation between coordinate values to calculate the result for an X value provided.

You can use the Function Group in conjunction with the PHD Security form, to restrict which users can modify, insert, and delete 1D Correlations.

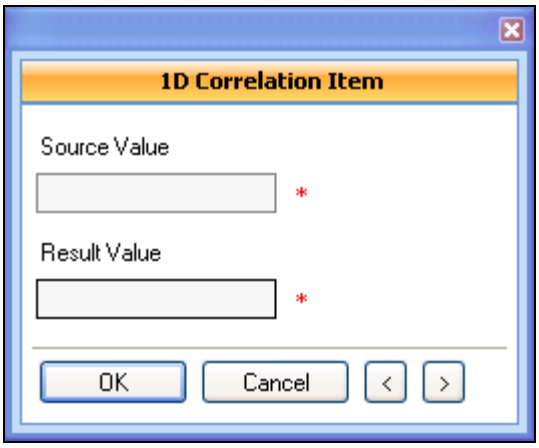
To define a 1D Correlation function, perform the following steps:

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Calculations > 1D Correlations** from the PHD Configuration Menu.



Step	Action
	The **1D Correlations** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	**TIP** ***Use the Current List to navigate between records*** Selecting a record in the "Current list of 1D Correlation records" displays the individual fields in the "Selected 1D Correlation record" section of the configuration form.
2	To define a new Source Value, choose **New Correlation > New Source Value** from the from the Data Entry group on the **1D Correlations** ribbon bar tab. The following figure illustrates the menu item.  The following dialog box is displayed.

Step	Action



Enter both the **Source Value** and the **Result Value**. Click **OK**.

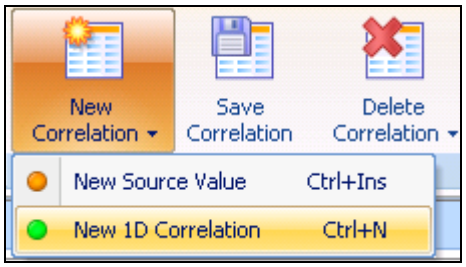
Follow the same steps to add additional Source Value entries, if required.

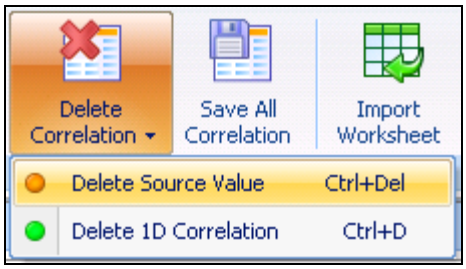
ATTENTION

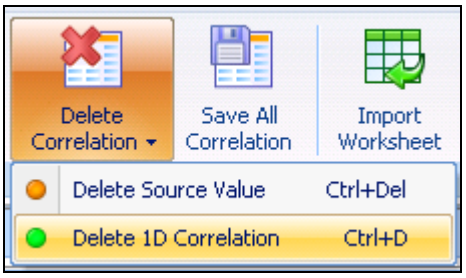
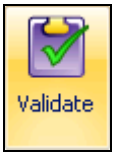
- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- The status (Validated/In Production/Work in Progress) of the 1D Correlation function is displayed on the screen automatically.

3 To define a new 1D Correlation function, choose **New Correlation > New 1D Correlation** from the from the Data Entry group on the **1D Correlations** ribbon bar tab.

The following figure illustrates the menu item.



Step	Action
	A new record is created. In the **Selected 1D Correlation record** section of the configuration form, complete the information related to the function. Note: Ensure that the name of the tags, 1D Correlation, 2D Correlation, 3D Correlation, and Function Definitions are unique.
4	To save the data related to the 1D Correlation (including all the Source Values), click **Save Correlation** from the Data Entry group on the ribbon **1D Correlations** bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
5	To modify the details related to a 1D Correlation (including the Source Values), first select the target correlation record from the Current list of 1D Correlation records, and then update the fields as appropriate. After completing the modifications, you must save the correlation to commit the changes back to the database.
6	To delete the details related to the Source Value, choose **Delete Correlation** > **Delete Source Value** from the Data Entry group on the **1D Correlations** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected Source Value row.

Step	Action
	Follow the same steps to delete additional rows.
7	To delete the details related to the 1D Correlation (including the Source Values), choose **Delete Correlation > Delete 1D Correlation** from the **1D Correlations** ribbon bar tab. The following figure illustrates the menu item.  This task deletes all the Source Values plus the main Correlation record. You can also perform the following tasks from this screen: • Save All Correlations. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
10	To validate the syntax of the 1D Correlation, click **Validate** from the PHD group on the **1D Correlations** ribbon bar tab. The following figure illustrates the menu item.  The system packages the correlation into a format usable by PHD and sends the contents to the server. A dialog box is displayed and indicates whether the validation was successful. • If the validation was successful, the status of the correlation is set to **Validated**.

Step	Action
	• A correlation must be validated before it can be loaded by PHD server. • If the validation was not successful, the status of the correlation is set to **Work in Progress**.
	ATTENTION • From the time you open the 1D Correlation configuration form until the time you close it, a list of validated correlations are tracked by the system. • Clicking Send to PHD processes the existing list of validated correlations. • Upon successfully processing of the validated correlation list, you must clear the list. • Subsequent validations will add to this list and the correlation tracking starts anew.
11	To instruct PHD to make the 1D Correlation available for use, click **Send to PHD** from the PHD group on the **1D Correlations** ribbon bar tab. The following figure illustrates the menu item.  The system packages the function into a format usable by PHD and loads it into the server memory. Additionally, the system copies the contents of the correlation to a “Production” table. On server restarts, PHD reads the contents of this “Production” table and loads the calculations found there. A dialog box is displayed and indicates whether the load was successful or not. • If PHD successfully loads the correlation, the status of the calculation is set to **In Production** and the 1D correlation is copied to the production table. • If PHD cannot load the correlation, the status of the calculation is set to **Work in Progress** and the 1D correlation is not copied to the production table.
	ATTENTION • The PHD Server only loads 1D Correlations that are in the “Production”

Step	Action
	table. • Updating a 1D Correlation where the status is **In Production** causes the status to be set to **Work in Progress** and causes the calculation to be removed from the “Production” table.

2.3.2 2D Correlation

Defining the 2D Correlation function

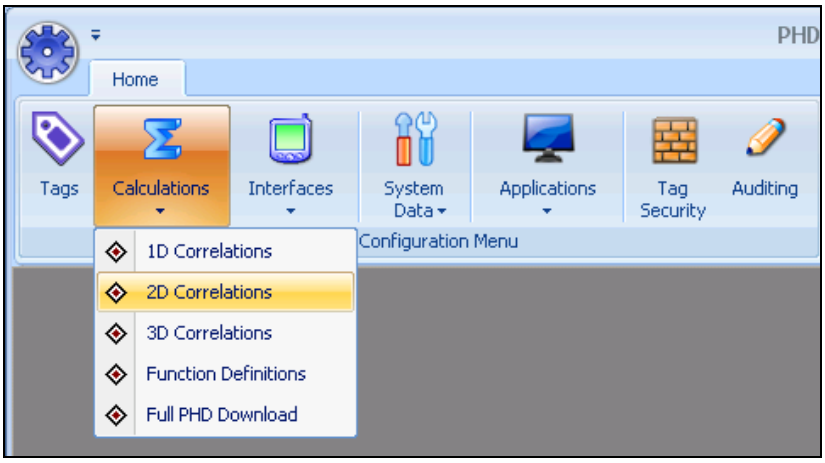
You can use the 2D Correlation form to define functions based on two-dimensional tables. The function and the table coordinate values are defined using the 2D Correlation configuration form.

PHD performs linear interpolation similar to the 1D Correlation tables. This is to determine results from coordinate values when they are not identical to those defined. You must enter many coordinate pairs to obtain greater accuracy.

You can use the Function Group in conjunction with the PHD Security form to restrict which users can modify, insert, or delete functions.

To define the 2D Correlation function, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Calculations > 2D Correlations** from the PHD Configuration Menu.



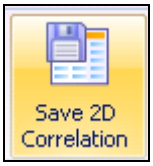
The **2D Correlations** screen is displayed.

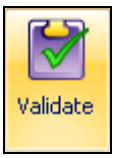
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

Use the Current List to navigate between records

Step	Action
	Selecting a record in the “Current list of 2D Correlations records” will display the individual fields in the “Selected 2D Correlation record” section of the configuration form.
2	To define a new 2D Correlation function, choose **New Correlation** > **New 2D Correlation** from the Data Entry group on the **2D Correlation** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected 2D Correlation record** section of the configuration form, complete the information related to the function. Note: Ensure that the name of the tags, 1D Correlation, 2D Correlation, 3D Correlation, and Function Definitions are unique.
	**ATTENTION** • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list. • The status (Validated/In Production/Work in Progress) of the 2D Correlation function is displayed on the screen automatically.
3	To define the correlation data, the top row and the first column on the correlation grid are used. It allows you to enter label values and to establish the size of the table. • Click on the cell, enter a value, and press tab. • Once you have established the column and row labels, fill in the values where the row and column intersect. • A column outlier and a row outlier are automatically created to resize the table later. • The upper left cell is left blank.
4	To save the data related to the 2D Correlation function, click **Save 2D**

Step	Action
	Correlation from the menu. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
5	To modify the details related to a 2D Correlation, first select the target correlation from the Current list of 2D Correlation records and then update the fields as appropriate. After completing the modifications, you must save the correlation to commit the changes back to the database.
6	To delete the details related to a 2D Correlation, click **Delete Correlation** from the Data Entry group on the **2D Correlations** ribbon bar tab. The following figure illustrates the menu item.  This task deletes all the data in the correlation grid as well as the main correlation record. If the correlation is used in a 3D Correlation, a message appears and the 2D Correlation is not deleted. You can also perform the following tasks from this screen: • Save All 2D Correlations. For more information, see Saving all data. • Find and replace data. For more information, see Finding and Replacing data.
9	To validate the syntax of the correlation, click **Validate** from the PHD group on the **2D Correlations** ribbon bar tab.

Step	Action
	The following figure illustrates the menu item.  The system packages the correlation into a format usable by PHD and sends the contents to the server. A dialog box is displayed and indicates whether the validation was successful. • If the validation was successful, the status of the correlation is set to **Validated**. • A correlation must be validated before it can be loaded by PHD server. • If the validation was not successful, the status of the correlation is set to **Work in Progress**.
	ATTENTION • From the time you open the 2D Correlation configuration form until the time you close it, a list of validated correlations will be tracked by the system. • Clicking Send to PHD will process the existing list of validated correlations. • Upon successfully processing the validated correlation list, the list is cleared. • Subsequent validations will add to this list and the correlation tracking starts anew.
10	To instruct PHD to make the 2D Correlation available for use, click **Send to PHD** from the PHD group on the **2D Correlations** ribbon bar tab. The following figure illustrates the menu item.  The system packages the function into a format usable by PHD and loads it

Step	Action
	into the server memory. Additionally, the system copies the contents of the correlation to a “Production” table. On server restarts, PHD reads the contents of this “Production” table and loads the calculations found there. A dialog box is displayed and indicates whether the load was successful. • If PHD successfully loads the correlation, the status of the calculation is set to **In Production** and the correlation is copied to the production table. • If PHD cannot load the correlation, the status of the calculation will be set to **Work in Progress** and the correlation is not copied to the production table.

ATTENTION

- The PHD Server only loads 2D Correlations that are in the “Production” table.
- Updating a 2D Correlation where the status is **In Production** will cause the status to be set to **Work in Progress** and will the calculation to be removed from the “Production” table.

2.3.3 3D Correlation

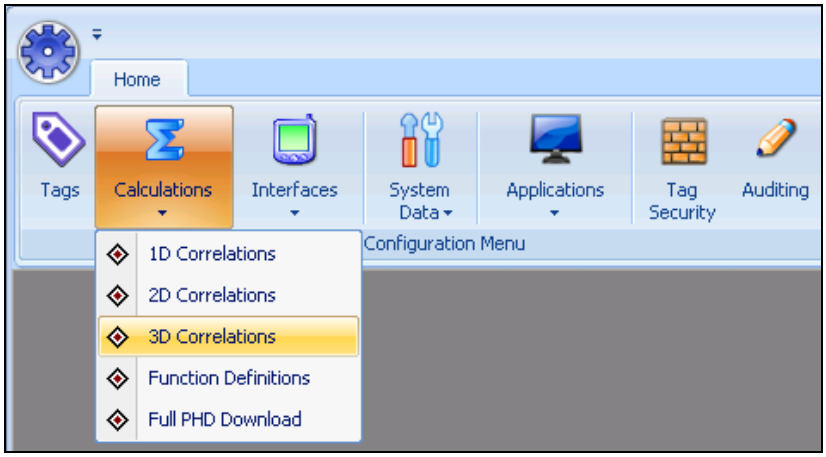
Defining the 3D Correlation function

The 3D Correlation configuration form uses previously defined 2D Correlation tables to return results. These results are used as X coordinates for a one-dimensional table. PHD performs a linear interpolation among the point pairs to determine the result.

You can use the Function Group in conjunction with the PHD Security form to restrict which users can modify, insert, or delete functions.

To define the 3D Correlation function, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Calculations > 3D Correlations** from the PHD Configuration Menu.



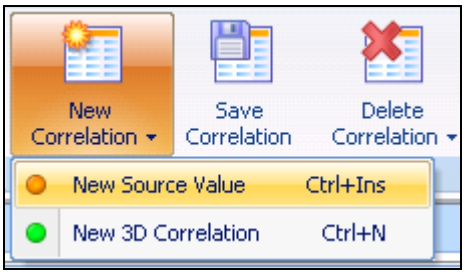
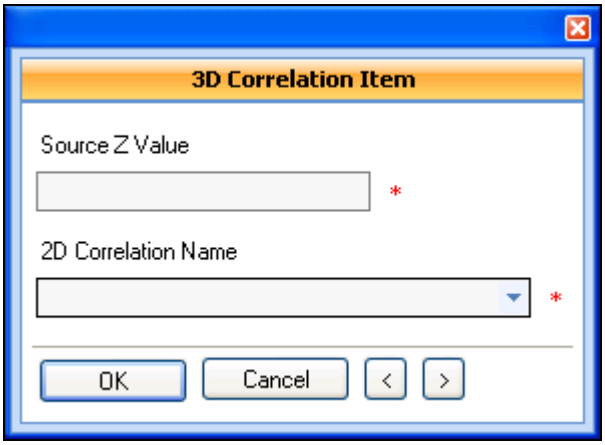
The **3D Correlations** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

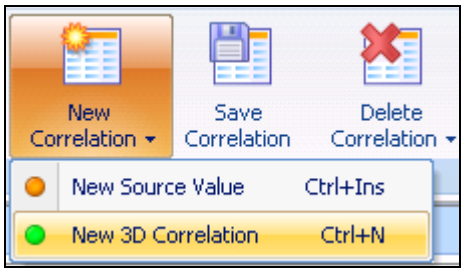
Use the Current List to navigate between records

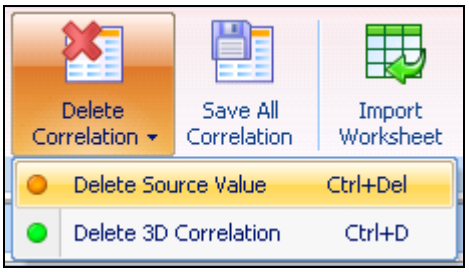
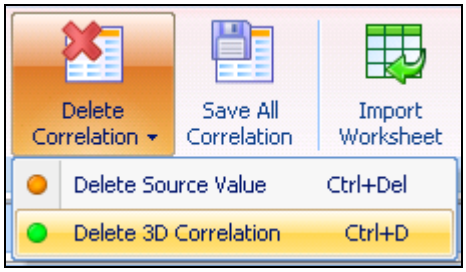
Selecting a record in the “Current list of 3D Correlation records” displays the individual fields in the “Selected 3D Correlation record” section of the configuration form.

Step	Action
2	To define a new Source Value, choose **New Correlation > New Source Value** from the Data Entry group on the **3D Correlations** ribbon bar tab. The following figure illustrates the menu item.  The following dialog box is displayed.  Enter a **Source Z Value** and select a **2D Correlation Name**. Click **OK**. Follow the same steps to add additional entries.

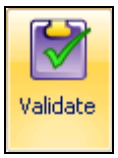
ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- The status (Validated/In Production/Work in Progress) of the 3D Correlation function is displayed on the screen automatically.

Step	Action
3	To define a new 3D Correlation function, choose **New Correlation > New 3D Correlation** from the Data Entry group on the **3D Correlations** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected 3D Correlation** record section of the configuration form, complete the information related to the function. Note: Ensure that the name of the tags, 1D Correlation, 2D Correlation, 3D Correlation, and Function Definitions are unique.
4	To save the data related to a 3D Correlation function, click **Save Correlation** from the Data Entry group on the **3D Correlations** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the **Save** button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
5	To modify the details related to a 3D Correlation, first select the target correlation from the Current list of 3D Correlation records and then update the fields as appropriate. After completing the modifications, you must save the correlation to commit the changes back to the database.
6	To delete the details related to a Source Value, choose **Delete Correlation > Delete Source Value** from the Data Entry group on the **3D Correlations**

Step	Action
	ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected Source Value row. Follow the same steps to delete additional rows.
7	To delete the details related to a 3D Correlation (including all Source Values), choose **Delete Correlation > Delete 3D Correlation** from the Data Entry group on the **3D Correlations** ribbon bar tab. The following figure illustrates the menu item.  This task deletes all the Source Values plus the main Correlation record. You can also perform the following tasks from this screen: • Save all the data. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
10	To validate the syntax using of the 3D Correlation, click **Validate** from the Data Entry group on the **3D Correlations** ribbon bar tab**.**

Step	Action
	The following figure illustrates the menu item.



The system packages the correlation into a format usable by PHD and sends the contents to the server. A dialog box displayed and indicates whether the validation was successful or not.

- If the validation was successful, the status of the correlation is set to **Validated**.
- A correlation must be validated before it can be loaded by PHD server.
- If the validation was not successful, the status of the correlation is set to **Work in Progress**.

ATTENTION

- From the time you open the 3D Correlation configuration form until the time you close it, a list of validated correlations is tracked by the system.
- Clicking Send to PHD will process the existing list of validated correlations.
- Upon successfully processing of the validated correlation list, the list is cleared.
- Subsequent validations will add to this list and the correlation tracking starts anew.

11 To instruct PHD to make the 3D Correlation available for use, click **Send to PHD** from the Data Entry group on the **3D Correlations** ribbon bar tab.

The following figure illustrates the menu item.

The system packages the function into a format usable by PHD and loads it into the server memory. Additionally, the system copies the contents of the

Step	Action
	correlation to a “Production” table. On server restarts, PHD reads the contents of this “Production” table and loads the calculations found there. A dialog box is displayed and indicates whether the load was successful. • If PHD successfully loads the correlation, the status of the calculation is set to **In Production** and the correlation is copied to the production table. • If PHD cannot load the correlation, the status of the calculation is set to **Work in Progress** and the correlation is not copied to the production table.

ATTENTION

- The PHD Server only loads 3D Correlations that are in the “Production” table.
- Updating a 3D Correlation where the status is **In Production** will cause the status to be set to **Work in Progress** and will the calculation to be removed from the “Production” table.

2.3.4 Function Definition

Defining a function

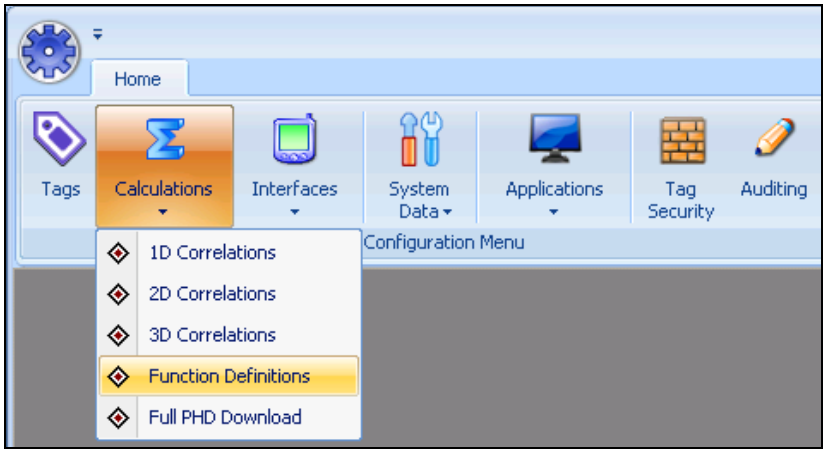
You can use the Function Definition form to create and modify functions used by PHD.

Functions and parameter names must start with an alphanumeric character and may contain any combination of alphanumeric characters, underscores (_) or periods (.) up to a maximum of 32 characters. Names that may be confused with existing tag names, reserved keywords, or numeric constants are not allowed. The CHAR keyword prior to a parameter name indicates the function requires a character string as an argument.

You can use the Function Group in conjunction with the PHD Security form to restrict which users can modify, insert, or delete functions.

To define a function, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Calculations > Function Definitions** from the PHD Configuration Menu.



The following **Function Definitions** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

Use the Current List to navigate between records

Selecting a record in the “Current list of Function Definition records” displays

Step	Action
	the individual fields in the “Selected Function Definition record” section of the configuration form.
2	To define a new Function Definition, click **New Function** from the Data Entry group on the **Function Definitions** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected Function Definition record** section of the configuration form, complete the information related to the function. Note: Ensure that the name of the tags, 1D Correlation, 2D Correlation, 3D Correlation, and Function Definitions are unique.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list. • The status (Validated/In Production/Work in Progress) of the Function Definition is displayed on the screen automatically.
3	The function code represents the text executed by PHD. • The maximum number of characters allowed in this field is 30,000. • Building the function can be aided by using the Expression library. Expanding a node in the library reveals individual expressions. Using drag-and-drop techniques, you can place the expression text in your function. Note: If the entity name of tag, 1D, 2D, 3D or Function Definition contain any special characters, insert backslash (\) before the special character while using the entity name in the calculation. PHD does not support special characters such as space, single quotes, and double quotes.
4	To save the data related to a **Function Definition**, click **Save Function** from the Data Entry group on the **Function Definitions** ribbon bar tab.

Step	Action
	The following figure illustrates the menu item.

Alternatively, you can click the save button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to a Function Definition, first select the target function from the Current list of Function Definition records and then update the fields as appropriate.

After completing the modifications, you must save the function to commit the changes back to the database.

6 To delete the details related to a **Function Definition**, first select the target function from the Current list of Function Definition records and then click **Delete Function** from the Data Entry group on the **Function Definitions** ribbon bar tab.

The following figure illustrates the menu item.

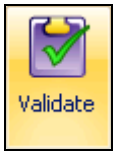
This task deletes all the data associated with the function.

You can also perform the following tasks from this screen:

- Save all the data. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

11 To access all the function definitions in the database, click **Tag Explorer** from the PHD group on the **Function Definitions** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action
	
	In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
12	To validate the syntax of the Function Definition, click **Validate** from the PHD group on the **Function Definitions** ribbon bar tab.
	The following figure illustrates the menu item.
	
	The system packages the Function into a format usable by PHD and sends the contents to the server. A dialog box is displayed and indicates whether the validation was successful. • If the validation was successful, the status of the Function is set to **Validated**. • A function must be validated before it can be loaded by PHD server. • If the validation was not successful, the status of the Function is set to **Work in Progress**.
	ATTENTION • From the time you open the Function Definition configuration form until the time you close it, a list of validated Functions will be tracked by the system. • Clicking Send to PHD will process the existing list of validated Functions. • Upon successfully processing the validated Function list, the list is cleared. • Subsequent validations will add to this list and the Function tracking starts anew.
13	To instruct PHD to make the Function Definition available for use, click **Send**

Step	Action
	to PHD from the PHD group on the **Function Definitions** ribbon bar tab. The following figure illustrates the menu item.  The system packages the function into a format usable by PHD and loads it into the server memory. Additionally, the system copies the contents of the function to a “Production” table. On server restarts, PHD reads the contents of this “Production” table and loads the calculations found there. A dialog box is displayed and indicates whether the load was successful or not. • If PHD successfully loads the Function, the status of the calculation will be set to **In Production** and the Function is copied to the production table. • If PHD cannot load the Function, the status of the calculation is set to **Work in Progress** and the Function is not copied to the production table.

ATTENTION

- The PHD Server only loads Function Definitions that are in the “Production” table.
- Updating a Function Definition where the status is **In Production** will cause the status to be set to **Work in Progress** and will the calculation to be removed from the “Production” table.

2.3.5 Full PHD Download

Sending changes to PHD using Full PHD Download

You can validate calculations and move them into production using **Full PHD Download**. This form allows you select a group of calculations based on their status and their type. The system then goes through the process of validating the syntax of each calculation and if successful, moving the calculation into the production table.

The calculation statuses you can load are as follows:

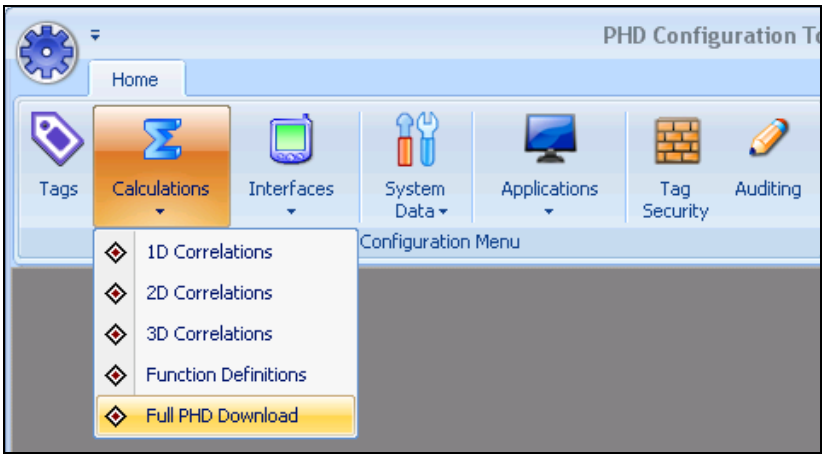
- Work in Progress
- Validated

The calculation types you can load are as follows:

- 1D Correlation
- 2D Correlation
- 3D Correlation
- Function Definition
- Virtual Tags

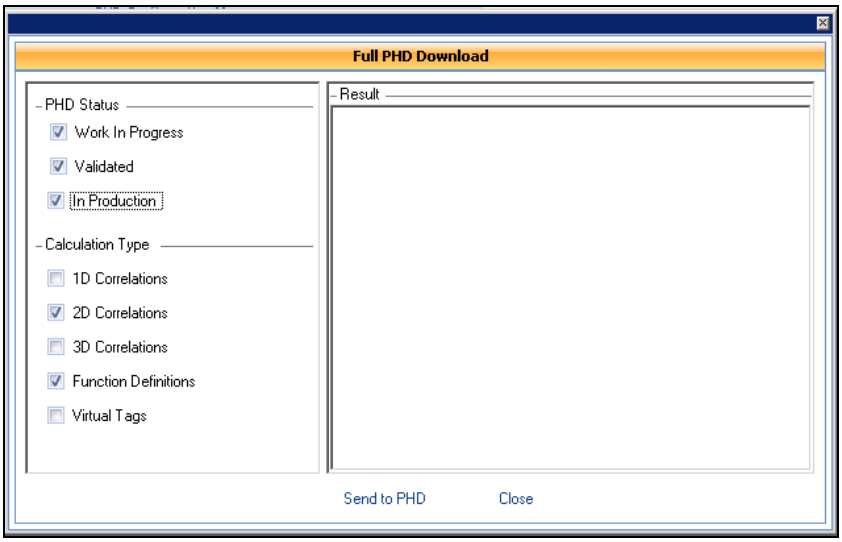
To perform batch processing of selected calculation types, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Calculations > Full PHD Download** from the PHD Configuration Menu.



The following dialog box is displayed.

Step	Action



2 Specify the combination of **PHD Status** and **Calculation Type** you want to process by selecting the appropriate check boxes. Click **Send to PHD**.

The status of all items that are successfully sent to PHD is updated to **In Production**. The status of all items that fail to be sent to PHD is set to **Work In Progress**.

2.4 Consolidated Event Journal

The Consolidated Event Journal (CEJ) application collects journal records from event sources (LCN History Module, Experion, any OPC Alarms and Events, or CEJ Peer) and stores them in the database. The PHD Configuration Tool allows you to configure the type of event journals that you want to collect.

2.4.1 CEJ Event Types

Defining CEJ Event Types

Event Journal Collection supports the following Event Journal Types.

- Operator Messages
- System Error Messages
- Process Alarms
- System Maintenance
- Process Changes
- System Notification
- Sequence of Events
- System Status

Experion supports the following Event Types.

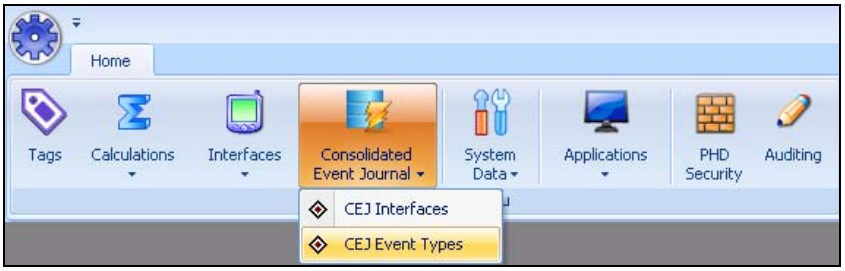
- Experion Events
- Experion Operator Comments

OPC A&E supports the following Event Types.

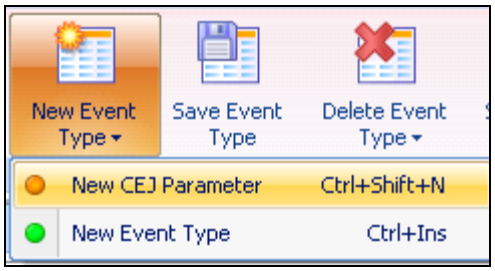
- Simple
- Condition
- Tracking
- Creation
- Simulated
- CEJ Peer supports the CEJ Peer Events.

The categories of event types that OPC A&E supports are server specific. You can specify the event type category based on the server selected.

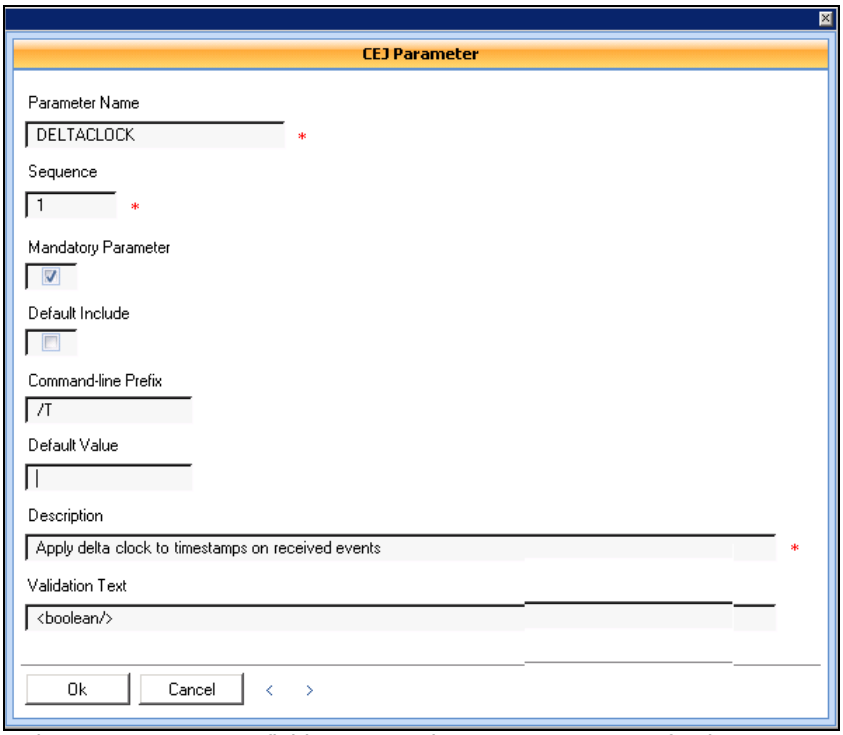
To define CEJ Event Types, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Consolidated Event Journal > CEJ Event Types** from the PHD Configuration Menu.  The **CEJ Event Types** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the **Current list of CEJ Type records** displays the individual fields in the **Selected CEJ Type record** section of the configuration form.
2	To define a new CEJ parameter, choose **New Event Type > New CEJ Parameter** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab. The following figure illustrates the menu.

Step	Action



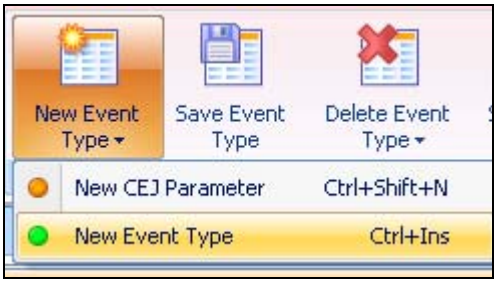
The following dialog box is displayed.



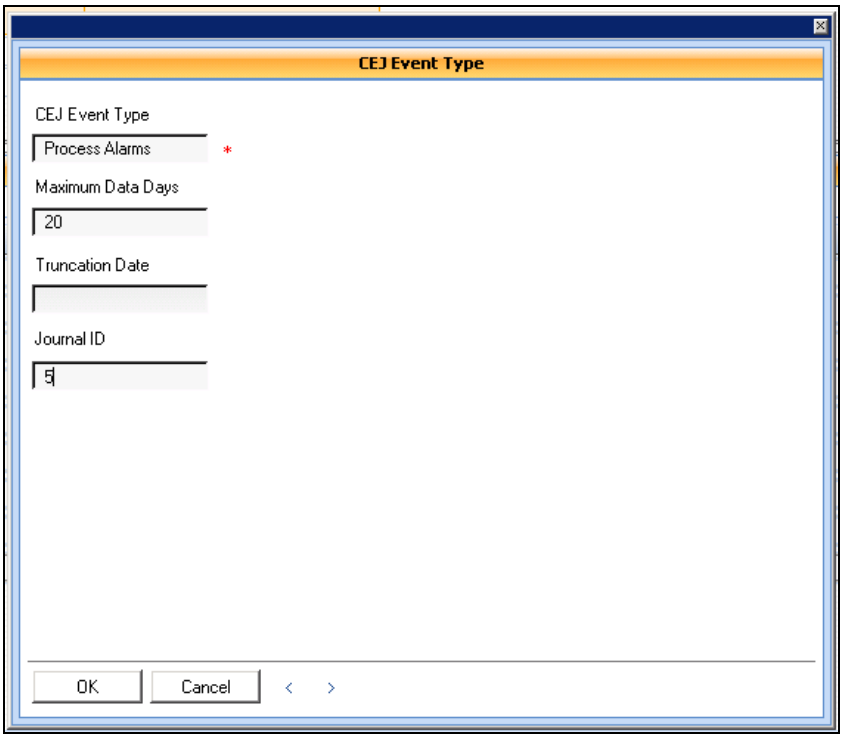
In the **Parameter Name** field, enter a unique parameter name for the CEJ event type.

In the **Sequence** field, enter the position of the parameter in the CEJ event type command line.

Select the **Mandatory Parameter** check box if the parameter is mandatory for the CEJ event type.

Step	Action
	Select the **Default Include** check box to include the parameter in the CEJ command line. In the **Command-line Prefix** field, enter the command-line prefix (for example, /d=) if the parameter has a command switch or flag in the command line. In the **Default Value** field, enter a value to the variable portion of the parameter if you want the parameter to begin with a default value. In the **Description** field, enter the description for the parameter. In the **Validation Text** field, enter a parameter value to compare with an accepted value or range of accepted values. The Validation Text follows an XML format. For example, <integer min="0" max="10"/>. Click **OK** to add the parameter. Follow the same steps to add additional CEJ parameters.
3	To define a new event type, choose **New Event Type** > **New Event Type** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab. The following figure illustrates the menu.  The **CEJ Event Type** dialog box is displayed. The following dialog box appears if you want to create an event type for Event Journal Collection (EJC).

Step	Action



In the **CEJ Event Type** field, enter the event type that you want to collect.

In the **Maximum Data Days** field, enter the maximum number of days the journal data must be available in the CEJ database.

In the **Truncation Date** field, enter the date to truncate the event records from the event table.

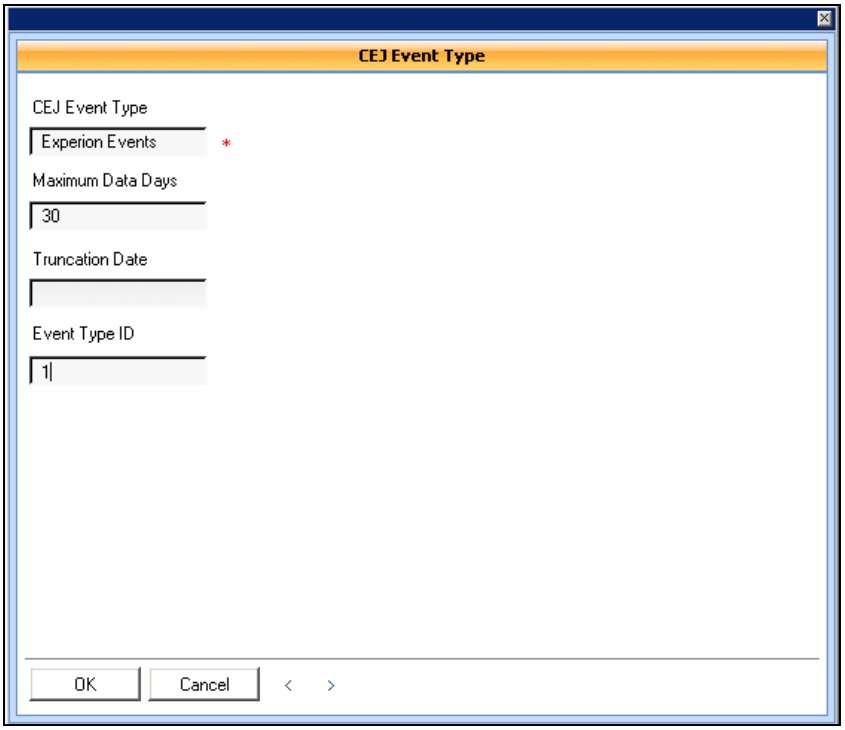
Note: The **Journal ID** is automatically populated. This is the numeric value of the event type. In the EJC event, the event type is indicated in the Event Type column of the event message,

Click **OK**.

Repeat these steps to add additional event types.

Step	Action

The following dialog box appears if you want to create an event journal type for Experion.



In the **CEJ Event Type** field, enter the type of event that you want to collect.

In the **Maximum Data Days** field, enter the maximum number of days that the journal data must be available in the CEJ database.

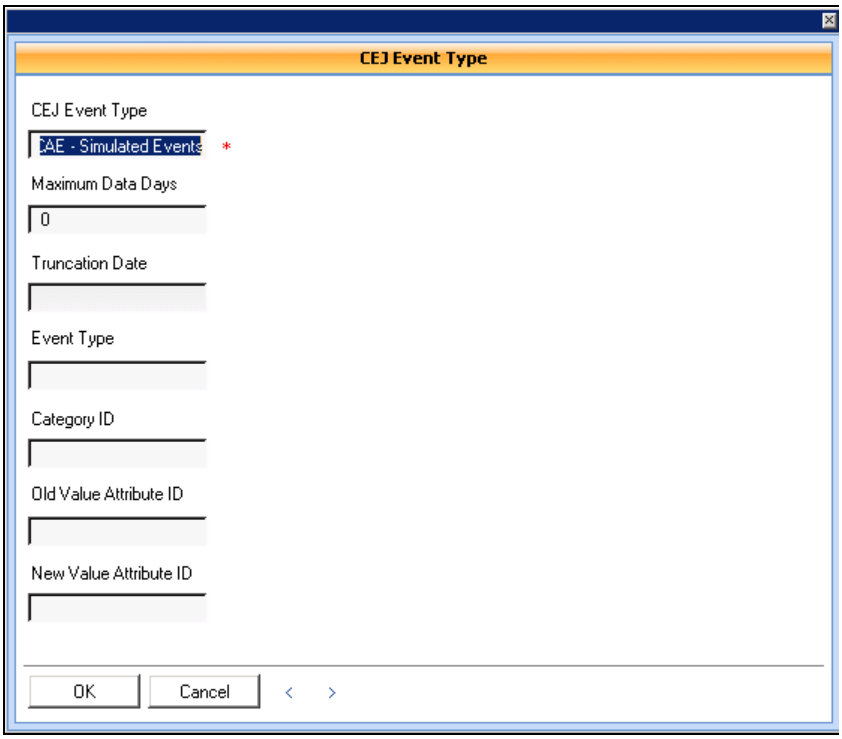
In the **Truncation Date** field, enter the date to truncate the event records from the event table.

Note: The **Event Type ID** is automatically populated. The Event Type ID denotes the Experion table to retrieve the event types. In Experion Collector, the Event Type ID 1 represents the Experion event table and Event Type ID 2 represents the Experion Comment table.

Repeat these steps to add additional event types.

The following dialog box appears if you want to create an event journal type for OPC A&E.

Step	Action



In the **CEJ Event Type** field, enter the type of journal that you want to collect.

In the **Maximum Data Days** field, enter the maximum number of days that the journal data must be available in the CEJ database.

Note: The **Truncation Date** field is automatically filled in, Events earlier than the truncation date are automatically deleted.

In the Event Type field, enter the ID of the OPC A&E table to retrieve the event types.

In the **Category ID** field, enter the category ID of the OPC A&E event.

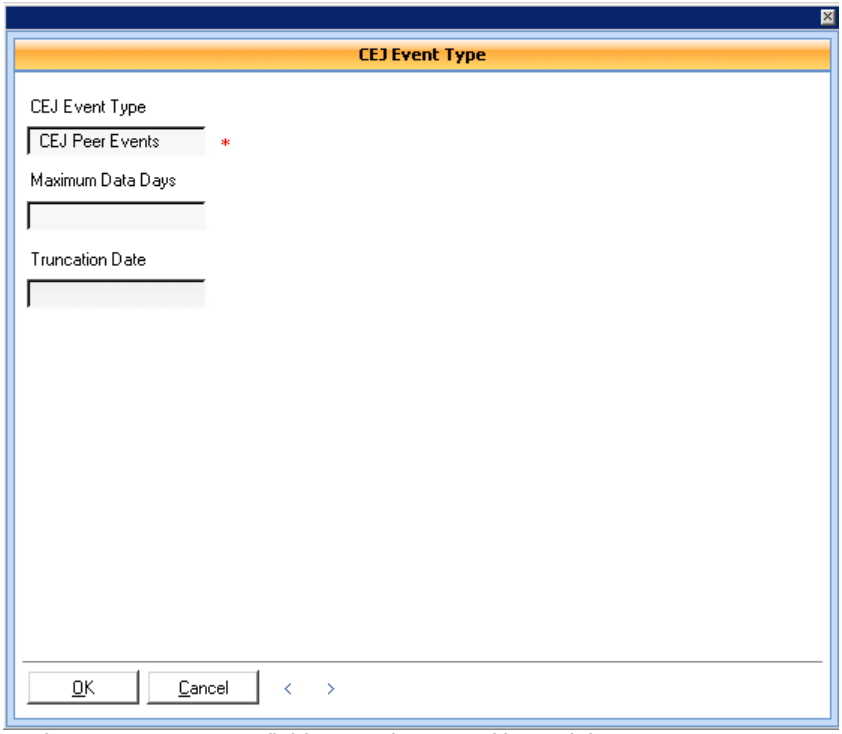
In the **Old Value Attribute ID** field, enter the OPC Attribute ID containing the old value.

In the **New Value Attribute ID** field, enter the OPC Attribute ID containing the new value.

Repeat these steps to add additional event types.

Step	Action

The following dialog box appears if you want to create an event journal type for CEJ Peer.



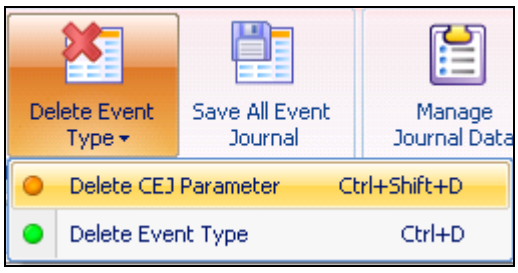
In the **CEJ Event Type** field, enter the type of journal that you want to collect.

To delete the CEJ Peer events, you must enter the maximum data days for respective CEJ Type. Based on the maximum data days entered for the individual Event Types in the **Maximum Data Days** field, the CEJ Peer events are deleted.

Note:You can also delete events based on the value entered in the **Global Maximum Data Days** field of the Manage Journal Data. If you have specified a value for the maximum number of days for individual CEJ event type, that value overrides the value specified in the global maximum data days.

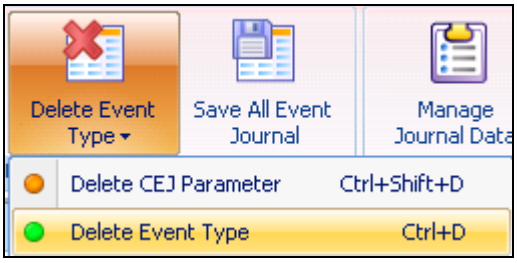
The **Truncation Date** field is automatically filled in, Events earlier than the truncation date are automatically deleted. Repeat these steps to add additional event types.

4 To save the data related to the CEJ parameter and event type, click **Save**

Step	Action
	Event Type from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab. The following figure illustrates the menu.  Alternatively, you can click the save button located in the **Selected CEJ Type record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
5	To modify the details related to CEJ parameters and CEJ event types, select the target record from the **Current list of CEJ Type records** section, and then update the fields as appropriate. After completing the modifications, you must save the CEJ event types record to commit the changes back to the database.
6	To delete the details of a CEJ parameter, first select the target CEJ parameter from the **CEJ Parameters Configuration** grid. Choose **Delete Event Type > Delete CEJ Parameter** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab. The following figure illustrates the menu.  This task deletes the currently selected CEJ parameter row.
7	To delete the details related to an event type, first select event type row from the CEJ Event Type Configuration grid. Choose **Delete Event Type > Delete Event Type** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab.

Step	Action

The following figure illustrates the menu.



This task deletes the currently selected event type row.

Follow the same steps to delete additional rows.

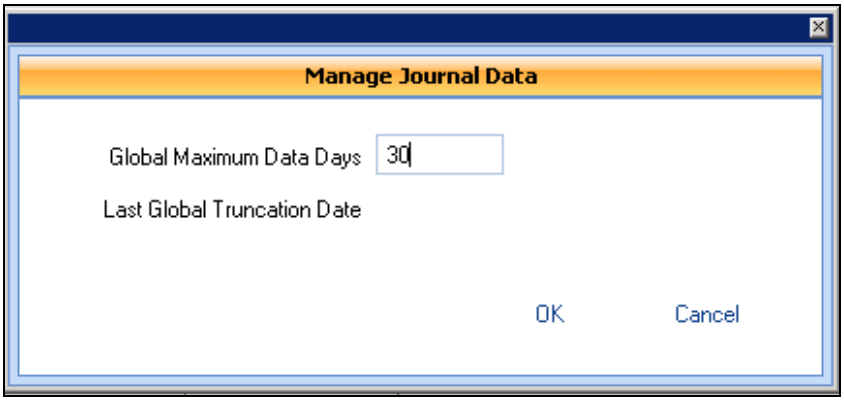
You can also perform the following tasks from this screen:

- Save all the data. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

8 To manage CEJ data retention in the PHDAPP database, click **Manage Journal Data** from the Journal Types group on the **Consolidated Event Journal** ribbon bar tab.

The following figure illustrates the menu.

Step	Action
	The following dialog box is displayed.



In the **Global Maximum Data Days** field, enter the number of days to retain the data in the CEJ database. This is applicable to all the CEJ journal requests.

The **Last Global Truncation Date** field is automatically populated based on the Global Maximum Data Days entered.

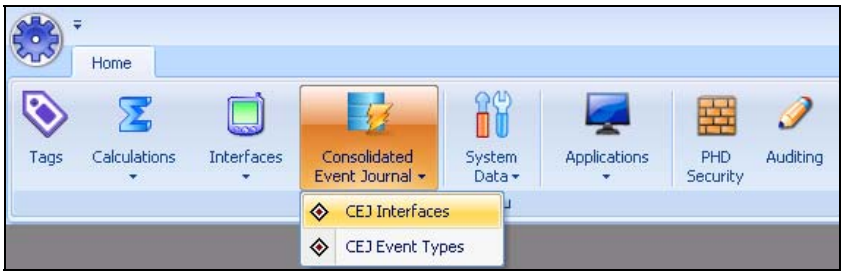
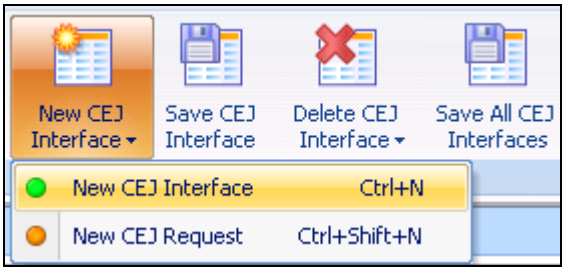
Click **OK** to save the details.

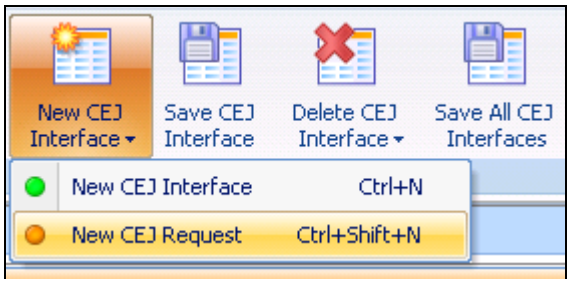
2.4.2 CEJ Interfaces

Defining CEJ Interfaces

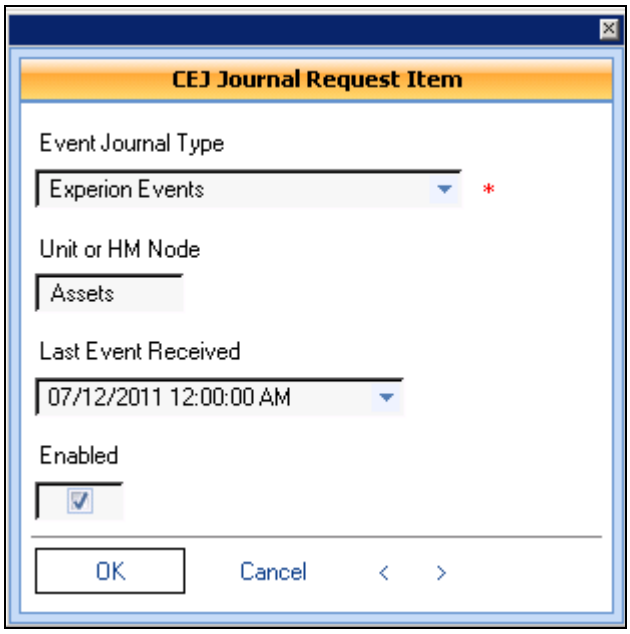
To define CEJ Interfaces, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Consolidated Event Journal > CEJ Interfaces** from the PHD Configuration menu.

Step	Action
	 The **CEJ Interfaces** screen is displayed. • If there is data in the table, the first journal record is selected and displayed. • If there is no data in the table, a blank journal record is displayed.
	**TIP** Selecting a record in the **Current list of CEJ Interface records** displays the individual fields in the **Selected CEJ Interface record** section of the configuration form.
2	To define a new CEJ interface, choose **New CEJ Interface > New CEJ Interface** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab. The following figure illustrates the menu.  A new record is created. In the **Selected CEJ Interface record** section of the configuration form, complete the information related to the CEJ interface.

Step	Action
	REFERENCE - INTERNAL For more information on the CEJ interface, refer to *Application Server User Guide (pim275)*.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction.
3	To define a new CEJ request for the collector, choose **New CEJ Interface** > **New CEJ Request** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab. The following figure illustrates the menu.  The following dialog box is displayed.

Step	Action



In the **Event Journal Type** drop-down list, select the type of event journal you want to collect.

In the **Unit or HM Node** field, enter the unit ID to retrieve event information.

In the **Last Event Received** drop-down list, Select the date and time from when the interface must start collecting events. If you are configuring the Server for the first time, you can select a date prior to the current date, which retrieves the events generated earlier.

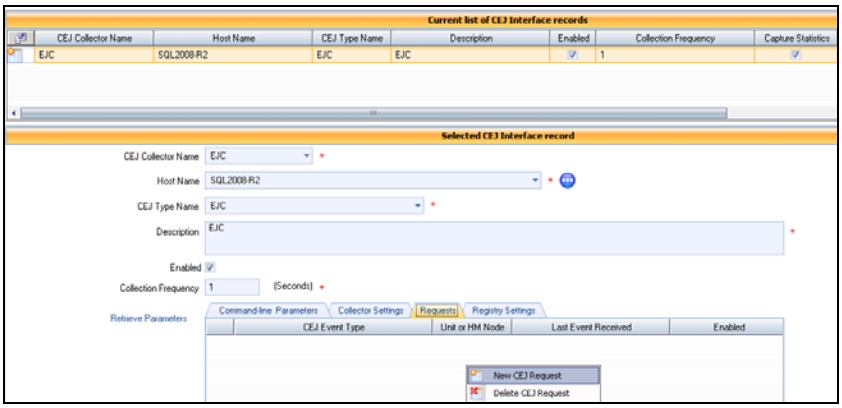
Select the **Enabled** check box if you want to enable or activate the interface for collecting events from the Server. Clear the check box if you want the interface to stop collecting the events.

Click **OK** to save the details or click **Cancel** to discard the details.

Follow the same steps to add additional CEJ requests.

You can also create CEJ request from the **Selected CEJ Interface record** of the configuration form. Right-click and select **New CEJ Request** to create a new CEJ request.

Step	Action



4 To save the data related to the CEJ interface (including CEJ requests), click **Save CEJ Interface** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab.

The following figure illustrates the menu.

Alternatively, you can click the **Save** button located in the **Selected CEJ Interface record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 After completing the details of the CEJ interface, run the PHD RDI Configuration utility on the machine where CEJ Server is installed.

REFERENCE – INTERNAL

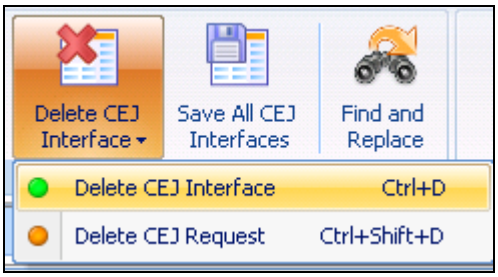
For more information about the PHD RDI Configuration utility, refer to sections 2.5, 2.6 and 2.7 of the *Basic RDI Installation Guide (in0701.pdf)*.

6 To delete the details of a CEJ Interface, select the target CEJ interface from the **Current list of CEJ Interface records** section.

Choose **Delete CEJ Interface > Delete CEJ Interface** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab.

The following figure illustrates the menu.

Step	Action

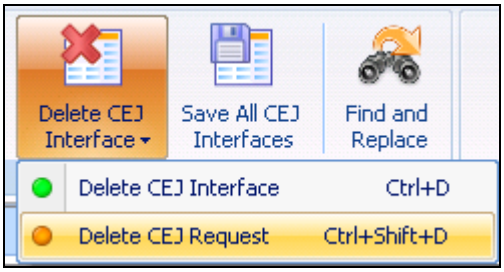


This task deletes the CEJ interface.

7 To delete the details related to a CEJ request, select the CEJ request row from the **CEJ Request Configuration** grid.

Choose **Delete CEJ Interface > Delete CEJ Request** from the Data Entry group on the **Consolidated Event Journal** ribbon bar tab.

The following figure illustrates the menu.



This task deletes the currently selected CEJ request row.

Follow the same steps to delete additional rows.

You can also perform the following tasks from this screen:

- Save all the data. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

8 To view reports on the collected Journal data, click **View Event Data** and select the desired CEJ request from the **Journal Types** group on the **Consolidated Event Journal** ribbon bar tab.

Step	Action

The following figure illustrates the menu.

The **Event Journal** dialog box appears displaying the parameters necessary to filter the data.

Click **Get Data** to generate the report.

REFERENCE - INTERNAL

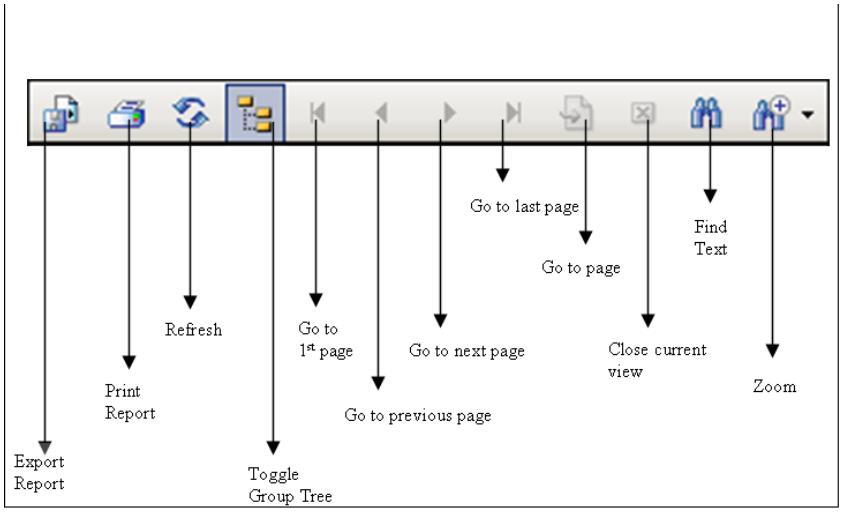
For more information on generating reports, refer to the *Application Server User Guide (pim275)*.

ATTENTION

The fields on the **Event Journal** dialog box vary depending on the selected CEJ request.

9 You can export, print, refresh, switch between different display modes, find text, or zoom using the following menu options available on the Main Report.

Step	Action


Export Report
Print Report
Refresh
Toggle Group Tree
Go to 1st page
Go to previous page
Go to next page
Go to last page
Go to page
Close current view
Find Text
Zoom

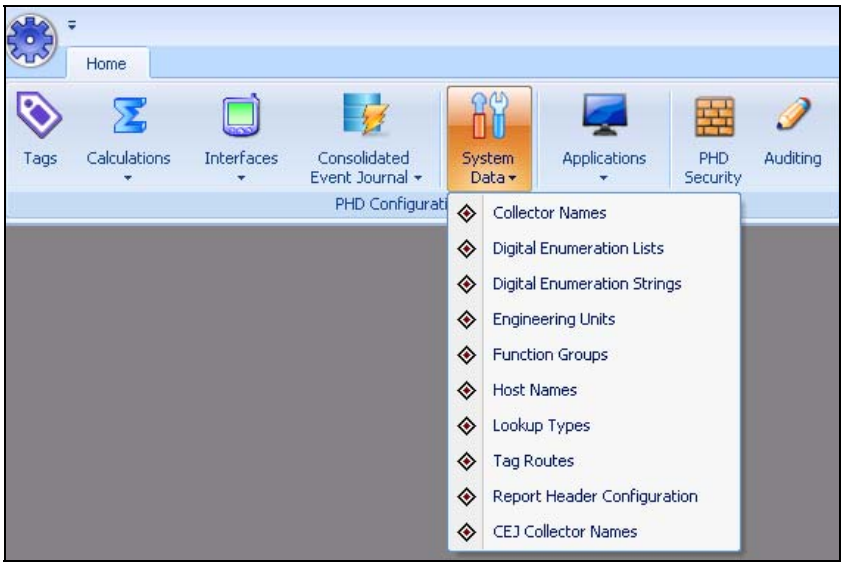
2.5 System Data Configuration

2.5.1 Collector Names

Defining collector names

Collector names are the names assigned to PHD interfaces. Traditionally, the collector name is created when you define a new Interface. To update an existing name or create a name that can be used later, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **Collector Names** from the PHD Configuration Menu.



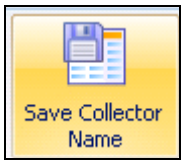
The **Collector Names** screen is displayed.

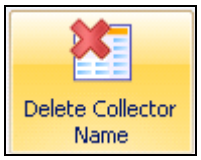
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

Use the Current List to navigate between records

Selecting a record in the “Current list of Collector Name records” will display the individual fields in the “Selected Collector Name record” section of the

Step	Action
	configuration form.
2	To define a new Collector Name, click **New Collector Name** from the Data Entry group on the **Collector Names** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected Collector Name record** section of the configuration form, complete the information related to the collector.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to a Collector Name, click **Save Collector Name** from the Data Entry group on the **Collector Names** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a Collector Name, first select the target collector from the Current list of Collector Name records and then update the fields as appropriate. After completing the modifications, you must save the Collector Name to commit the changes back to the database.
5	To delete the details related to a Collector Name, click **Delete Collector**

Step	Action
	Name from the Data Entry group on the **Collector Names** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected Collector Name. If the Collector Name is in use by an Interface, an error message is displayed and the Collector Name is not deleted. You can also perform the following tasks from this screen: • Save All Collector Name. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.5.2 Digital Enumeration Lists

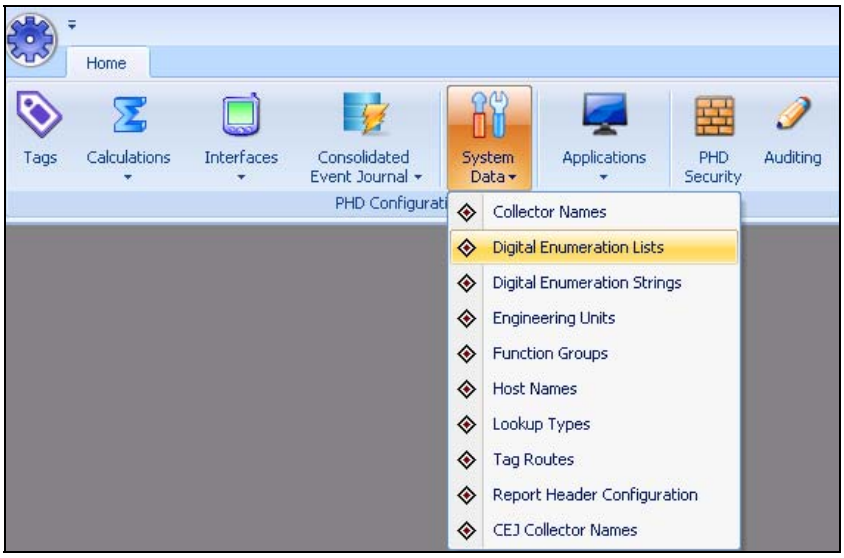
Defining digital enumeration lists

Use the digital enumeration list form to define a cross-reference table for ordinal integer values and their corresponding enumeration text strings. After creating a list, it can be assigned to a PHD tag.

To configure a digital enumeration list, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **Digital Enumeration Lists** from the PHD Configuration Menu.

Step	Action



The **Digital Enumeration List** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

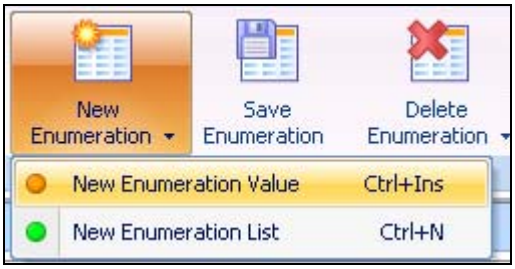
Use the Current List to navigate between records

Selecting a record in the "Current list of Enumeration List records" displays the individual fields in the "Selected Enumeration List record" section of the configuration form.

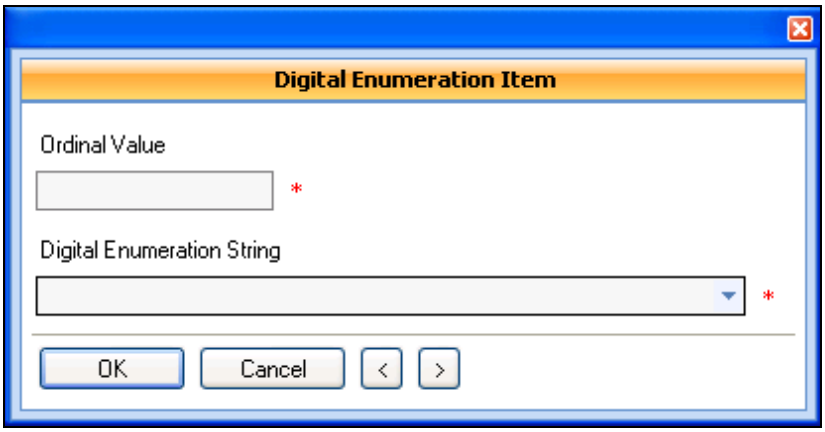
2 To define a new Enumerated Value, choose **New Enumeration > New Enumeration Value** from the Data Entry group on the **Digital Enumeration Lists** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action



A following dialog box is displayed.



Enter the **Ordinal Value** and select the **Digital Enumeration String**. Click **OK**.

Follow the same steps to add additional enumerated values.

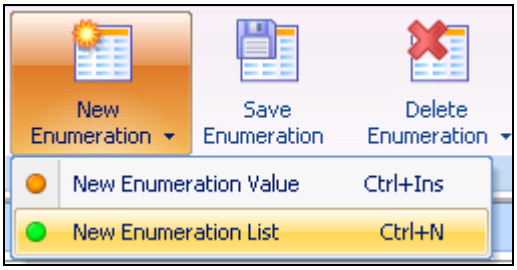
ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- Digital Enumeration Lists can only be configured for tags with integer or long integer data types.

3 To define a new Enumeration List, choose **New Enumeration > New Enumeration List** from the Data Entry group on the **Digital Enumeration Lists** ribbon bar tab.

Step	Action

The following figure illustrates the menu item.

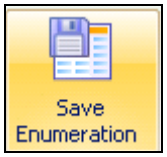


A new record is created.

In the **Selected Enumeration List record** section of the configuration form, complete the information related to the list.

4 To save the data related to an Enumeration List (including all enumerated values), click **Save Enumeration** from the Data Entry group on the **Digital Enumeration Lists** ribbon bar tab.

The following figure illustrates the menu item.



Alternatively, you can click the save button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to an Enumeration List (including the Enumeration Values), first select the target enumeration list from the Current list of Enumeration List records, and then update the fields as appropriate.

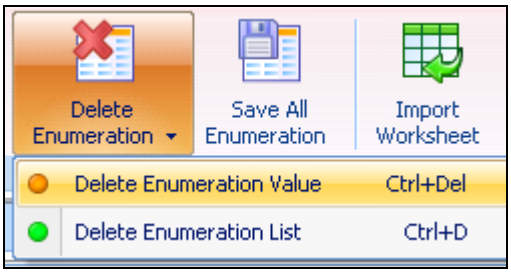
After completing the modifications, you must save the list to commit the changes back to the database.

6 To delete the details related to an Enumerated Value, select the target Enumerated Value row from the Enumeration Values grid.

Choose **Delete Enumeration > Delete Enumeration Value** from the Data Entry group on the **Digital Enumeration Lists** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action

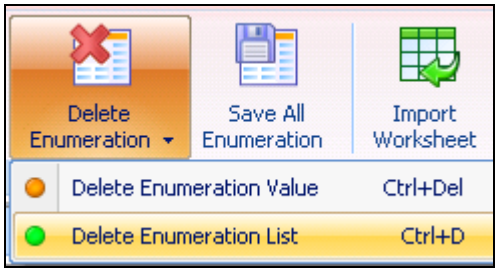


This task deletes the currently selected Enumerated Value row.

Follow the same steps to delete additional rows.

7 To delete the details related to an Enumeration List, choose **Delete Enumeration > Delete Enumeration List** from the Data Entry group on the **Digital Enumeration Lists** ribbon bar tab.

The following figure illustrates the menu item.



This task deletes all the Enumerated Values plus the main Enumeration List record in.

You can also perform the following tasks from this screen:

- Save All Enumeration. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

10 To instruct PHD to make the Enumeration List available for use, click **Send to PHD** from the PHD group on the **Digital Enumeration Lists** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action
	 The **Send to PHD** dialog box appears with a message. After reading the status message, click **Close**.

2.5.3 Digital Enumeration Strings

Defining digital enumeration strings

Enumeration strings can be used in multiple enumeration lists. To accommodate this approch, the system provides a configuration form for defining all the strings that may be used by enumeration lists.

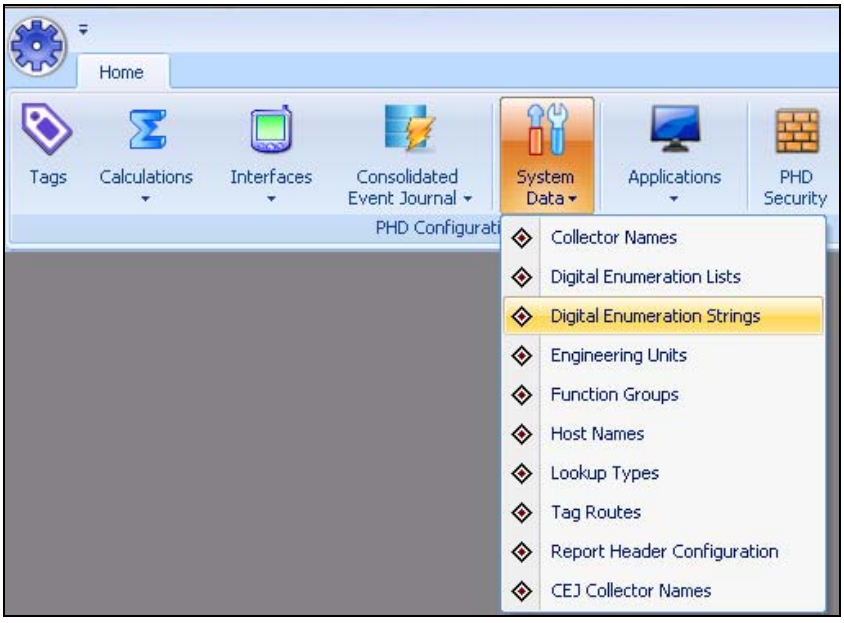
Once a string is defined, it can be assigned to a list using the Digital Enumeration List configuration form.

REFERENCE - INTERNAL

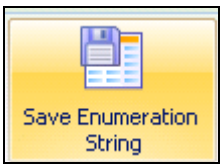
For more information about Enumeration Lists, refer to sections 2.4.2 of this guide.

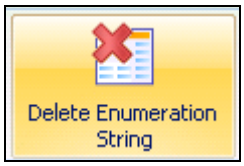
To configure digital enumeration strings, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **Digital Enumeration Strings** from the PHD Configuration Menu.



The **Digital Enumeration Strings** screen is displayed.

Step	Action
	• If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	**TIP** ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Enumeration String records" displays the individual fields in the "Selected Enumeration String record" section of the configuration form.
2	To define a new Enumeration String for use in Enumerated Lists, click **New Enumeration String** from the Data Entry group on the **Digital Enumeration Strings** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected Enumeration String record** section of the configuration form, complete the information related to the string.
	**ATTENTION** • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to an Enumeration String, click **Save Enumeration** from the Data Entry group on the **Digital Enumeration Strings** ribbon bar tab. The following figure illustrates the menu item. 

Step	Action
	Alternatively, you can click the save button located in the **"Selected record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to an enumeration string, first select the target enumeration string from the Current list of Enumeration String records and then update the fields as appropriate. After completing the modifications, you must save the enumeration string to commit the changes back to the database.
5	To delete the details related to the Enumerated String, first select the target enumeration string from the Current list of Enumeration String records. Click **Delete Enumeration String** from the Data Entry group on the **Digital Enumeration Strings** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected Enumerated String. Follow the same steps to delete additional Strings, if required. If the Enumeration String is used in an Enumeration List, an error message is displayed and the Enumeration String is not deleted. You can also perform the following tasks from this screen: • Save all the data. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

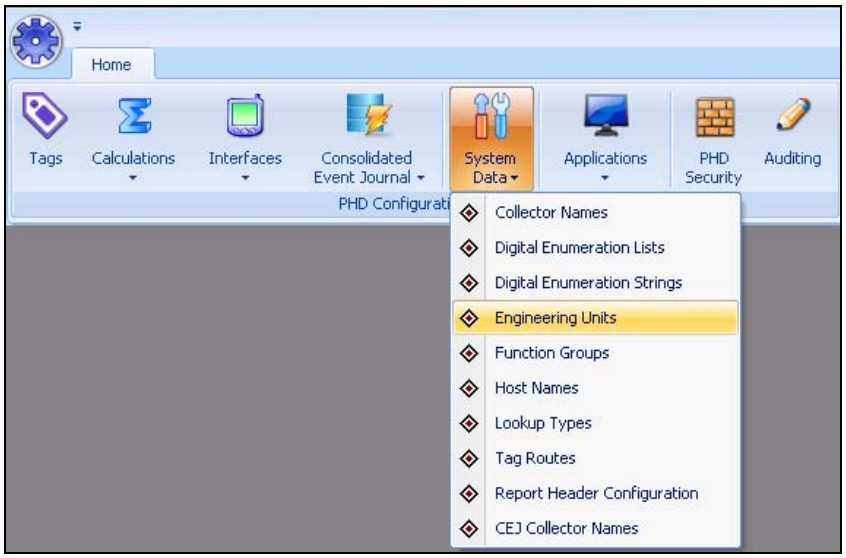
2.5.4 Engineering Units

Defining engineering units

The engineering unit configuration form is used to create, modify, and delete Engineering Units used by PHD. It also provides the means of linking multiple units back to a common type of unit.

To configure an engineering unit, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **Engineering Units** from the PHD Configuration Menu.



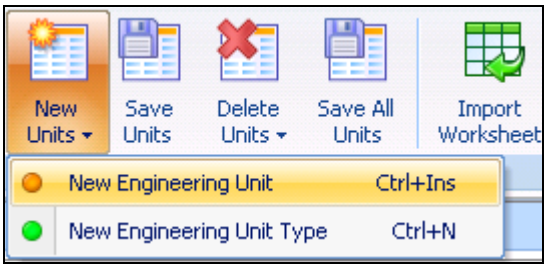
The **Engineering Unit Type** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

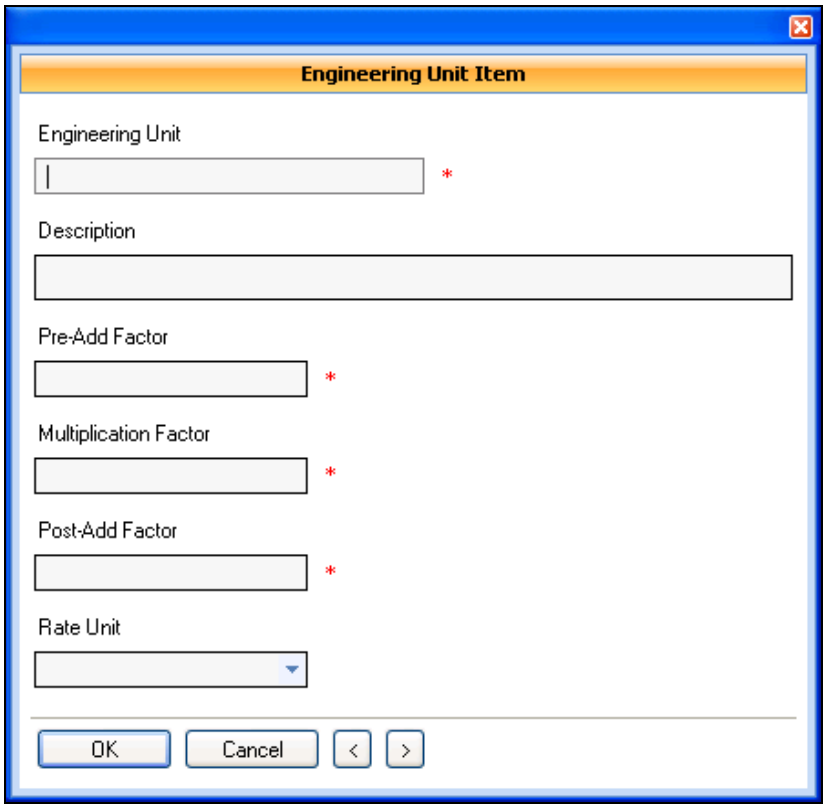
TIP

Use the Current List to navigate between records

Selecting a record in the "Current list of Engineering Unit Type records" displays the individual fields in the "Selected Engineering Unit Type record"

Step	Action
	section of the configuration form.
2	To define a new Engineering Unit, choose **New Units > New Engineering Unit** from the Data Entry group on the **Engineering Units** ribbon bar tab. The following figure illustrates the menu item.  The following dialog box is displayed.

Step	Action



Enter an **Engineering Unit Name**, the **Pre-Add Factor**, the **Multiplication Factor**, the **Post-Add Factor,** and optionally the **Rate Unit**. Click **OK**.

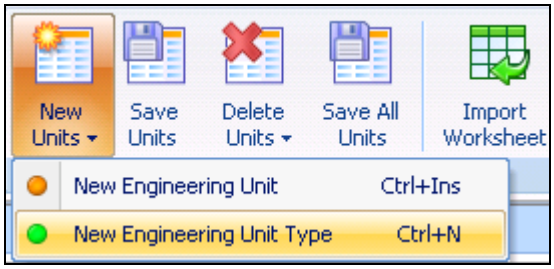
Follow the same steps to add additional Engineering Units to the Engineering Unit Type.

Note: The Pre-Add Factor, Multiplication Factor, and Post-Add Factor are used to determine how the unit relates to the Base Unit. The linear equation is as follows:

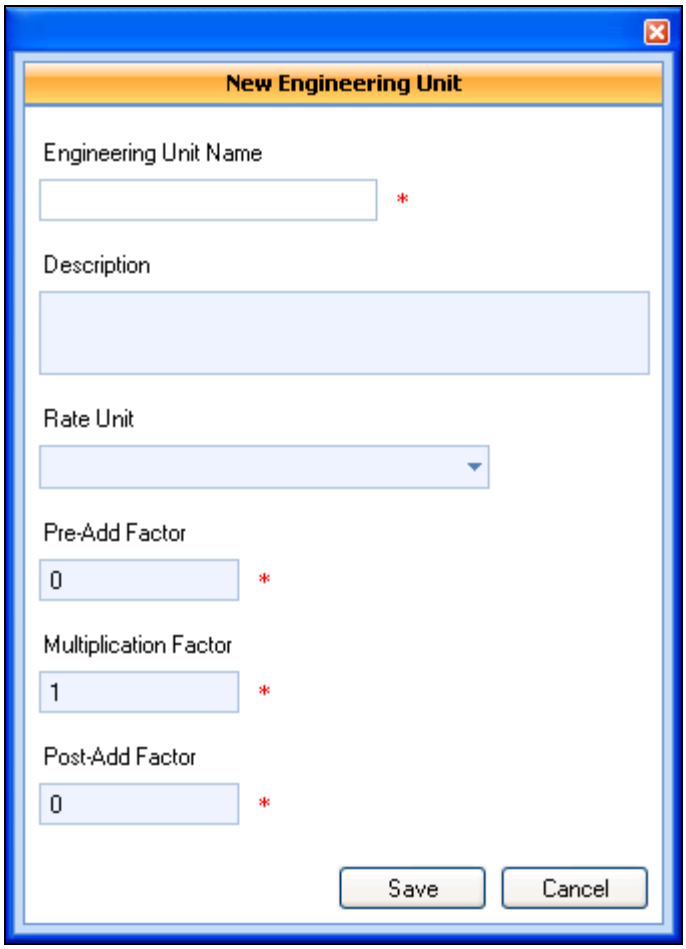
(((Unit Value + Pre-Add Factor) * Multiplication Factor) + Post-Add Factor)

ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates

Step	Action
	that you need to select data from a list.
3	To define a new Engineering Unit Type, choose **New Units > New Engineering Unit Type** from the Data Entry group on the **Engineering Units** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the Selected Engineering Unit Type record section of the configuration form, complete the information related to the Unit Type.
4	To define the **Base Unit** for an Engineering Unit Type, click the **Create Base Unit** button. The following figure illustrates the button.  The following dialog box is displayed.

Step	Action



Enter the **Engineering Unit Name** and optionally a **Description**. Click **Save**.

Note: If the base unit has a time base, select that time base from the Rate Unit list.

5 To save the data related to the Engineering Unit Type (including base unit and engineering units), click **Save Units** on the **Engineering Units** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action

Alternatively, you can click the save button located in the **"Selected Engineering Unit Type record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

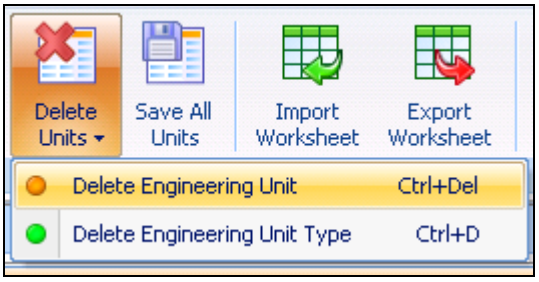
6 To modify the details related to an Engineering Unit Type (including individual Engineering Units), first select the target Engineering Unit Type from the Current list of Engineering Unit Type records and then update the fields as appropriate.

After completing the modifications, you must save the Unit Type to commit the changes back to the database.

7 To delete the details related to an Engineering Unit, select the target Engineering Unit row from the Engineering Units grid.

Choose **Delete Units > Delete Engineering Unit** from the Data Entry group on the **Engineering Units** ribbon bar tab.

The following figure illustrates the menu item.

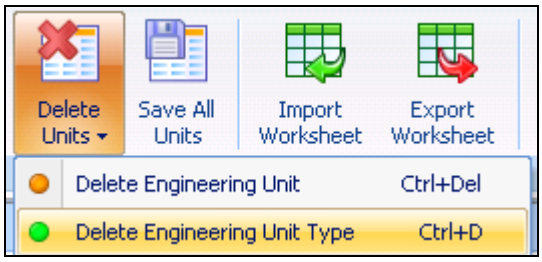


Follow the same steps to delete additional engineering units.

8 To delete the details related to an Engineering Unit Type (including individual Engineering Units), first select the target Engineering Unit Type from the Current list of Engineering Unit Type records and then choose **Delete Units > Delete Engineering Unit Type** from the Data Entry group on the **Engineering Units** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action



This task deletes all the Engineering Units plus the main Engineering Unit Type record.

You can also perform the following tasks from this screen:

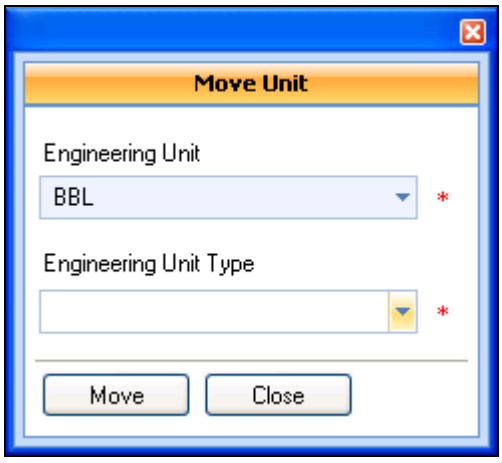
- Save all the data. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

11 To move an engineering unit from one Unit type to another, click **Move Unit** from the Engineering Units group on the **Engineering Units** ribbon bar tab.

The following figure illustrates the menu item.

The following dialog box is displayed.

Step	Action



Select the engineering unit that you want to move from the **Engineering Unit** drop-down list.

Select the engineering unit type where you want to move the unit from the **Engineering Unit Type** drop-down list.

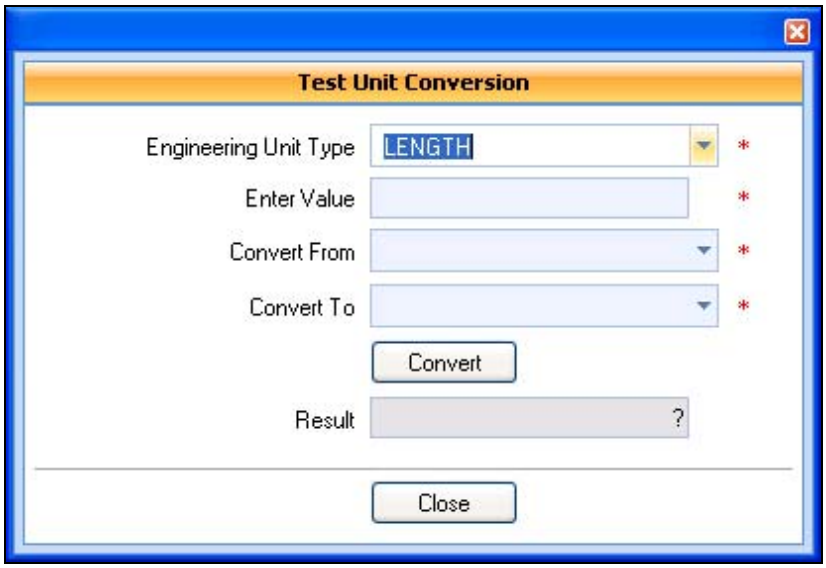
Click **Move**.

12 To test Engineering Unit conversions, click **Test Conversion** from the Engineering Units group on the **Engineering Units** ribbon bar tab.

The following figure illustrates the menu item.

The following dialog box is displayed.

Step	Action



Select the engineering unit type to retrieve the engineering units from the **Engineering Unit Type** drop-down list.

Enter a unit value in the **Enter Value** field.

Select the engineering unit that you want to convert the value from the **Convert From** drop-down list.

Select the engineering unit that you want to convert the value to, from the **Convert To** drop-down list.

Click **Convert** to calculate the result.

Click **Close**.

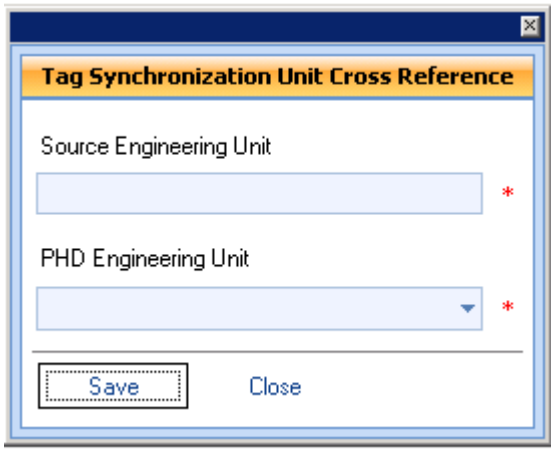
13 To define the mapping of source system units to PHD units by the Tag Synchronization service, click **New Tag Synch Unit Mapping** from the Engineering Units group on the **Engineering Units** ribbon bar tab.

The Tag Synchronization service populates the Source Units based on values that it receives from the Experion Server that do not match the existing PHD Units.

The following figure illustrates the menu item.

Step	Action

The following dialog box is displayed.



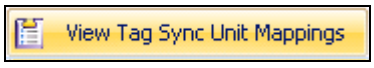
Enter an engineering unit of the source system database in the **Source Engineering Unit** field.

Select a unit that the PHD tag definition uses from the **PHD Engineering Unit** drop-down list.

Click **Save**.

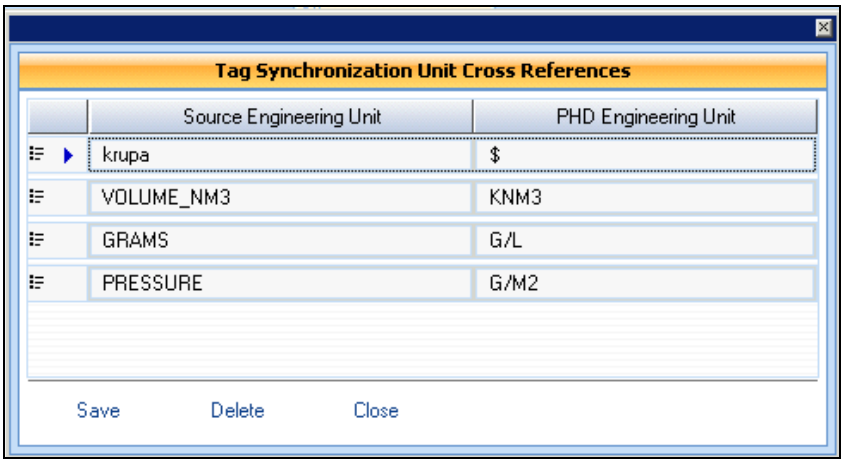
14 To view the mapping of source system units to PHD units by the Tag Synchronization service, click **View Tag Synch Unit Mappings** from the Engineering Units group on the **Engineering Units** ribbon bar tab.

The following figure illustrates the menu item.



The following dialog box is displayed.

Step	Action



The source system units that are mapped to the PHD unit only appear in the **Tag Synchronization Unit Cross References** dialog box.

15 To instruct PHD to make the Engineering Units available for use, click **Send to PHD** from the menu.

A dialog box is displayed and indicates whether the load was successful.

Click **Close**.

2.5.5 Function Groups

Defining function groups

Function Groups are an optional feature available for calculations. They are used in conjunction with Tag security to restrict update and delete permissions on calculations.

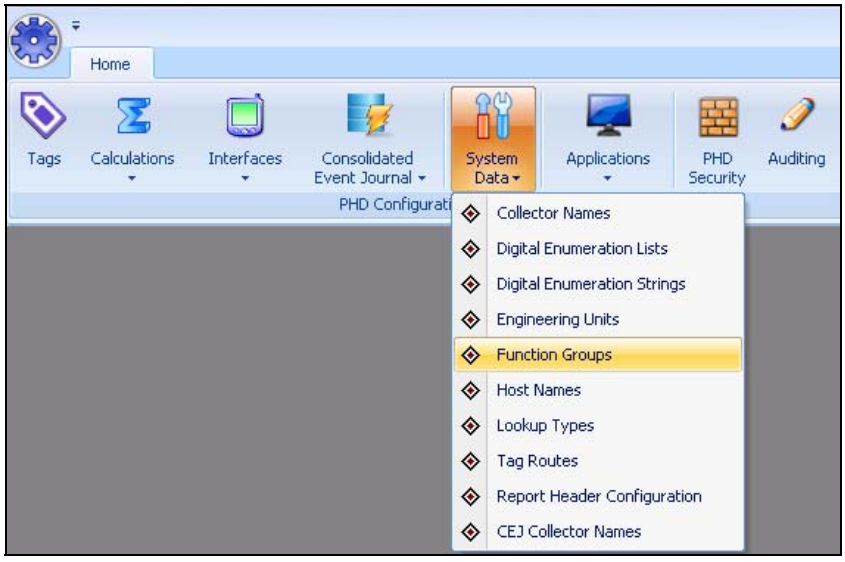
After creating a function group, it can be assigned to a 1D Correlation, a 2D Correlation, a 3D Correlation or a Function Definition. Next, the function group can be assigned to a Windows group using the Tag Security form. When completed, the user must be in the Windows group assigned to a function group before they have configuration permissions on a calculation assigned to the same function group.

REFERENCE - INTERNAL

For more information about creating Function Security, refer to sections 2.6.1 of this guide.

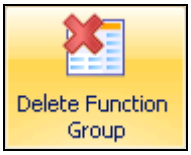
To configure a function group, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **Function Groups** from the PHD Configuration Menu.



The **Function Groups** screen is displayed.

Step	Action
	• If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	**TIP** ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Function Group records" will display the individual fields in the "Selected Function Group record" section of the configuration form.
2	To define a new Function Group, click **New Function Group** from the Data Entry group on the **Function Groups** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected Function Group record** section of the configuration form, complete the information related to the group.
	**ATTENTION** • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided.
3	To save the data related to the Function Group, click **Save Function Group** from the Data Entry group on the **Function Groups** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **"Selected Function Group record"** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

Step	Action
4	To modify the details related to a Function Group, first select the target group from the Current list of Function Group records and then update the fields as appropriate. After completing the modifications, you must save the group to commit the changes back to the database.
5	To delete the details related to a Function Group, first select the target function group from the Current list of Function Group records. Click **Delete Function Group** from the Data Entry group on the **Function Groups** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected function group. If the Function Group is used on a security record, an error message is displayed and the Function Group is not deleted. You can also perform the following tasks from this screen: • Save All Function Group. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

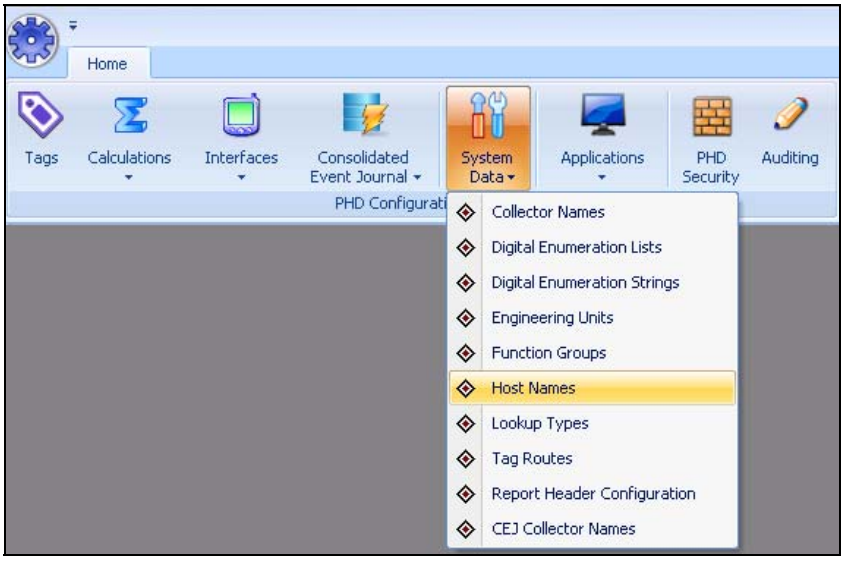
2.5.6 Host Names

Defining a host name

Host names are the names assigned to computers used by PHD.

To configure a host name, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **Host Names** from the PHD Configuration Menu.



The **Host Names** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

Use the Current List to navigate between records

Selecting a record in the “Current list of Host Name records” displays the individual fields in the “Selected Host Name record” section of the configuration form.

Step	Action
2	To define a new Host Name, click **New Host Name** from the Data Entry group on the **Host Names** ribbon bar tab. The following figure illustrates the menu item.  A blank configuration form is displayed. In the **Selected Host Name record** section of the configuration form, complete the information related to the host.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided.
3	To save the data related to the Host Name, click **Save Host Name** from the Data Entry group on the **Host Names** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **Selected Host Name record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a Host Name, first select the target host name from the Current list of Host Name records and then update the fields as appropriate. After completing the modifications, you must save the Host Name to commit the changes back to the database.
5	To delete the details related to a Host Name, first select the target host name from the Current list of Host Name records. Click **Delete Host Name** from the Data Entry group on the **Host Names**

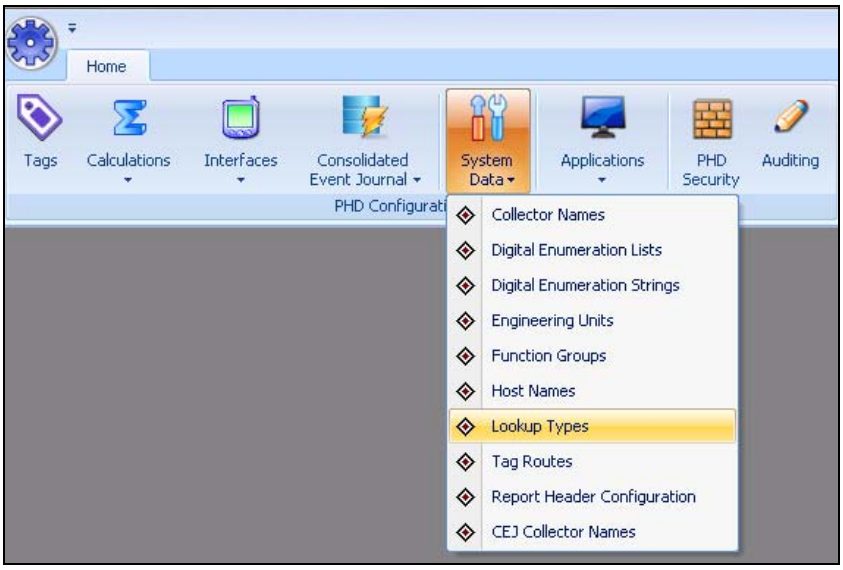
Step	Action
	ribbon bar tab. The following figure illustrates the menu item.  If the host name is used by an Interface, an error message is displayed and the host name is not deleted. You can also perform the following tasks from this screen: • Save All Host Name. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.5.7 Lookup Types

Defining a lookup type

To configure a lookup type, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data > Lookup Types** from the PHD Configuration Menu.



The **Lookup Types** screen is displayed.

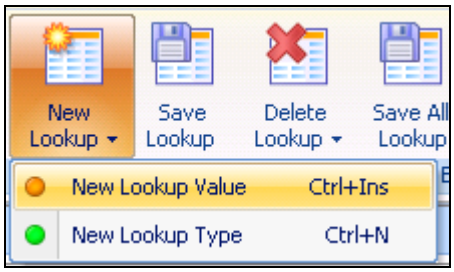
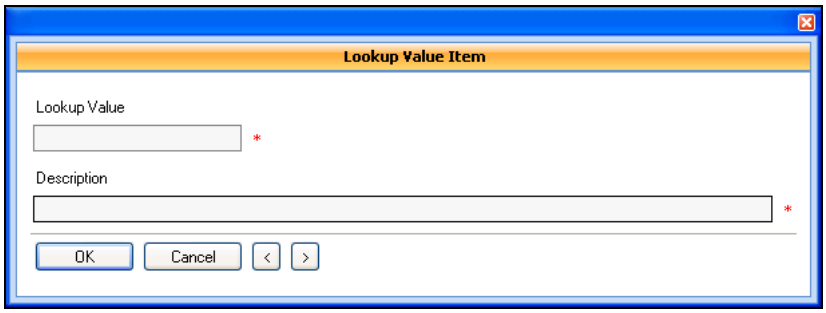
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

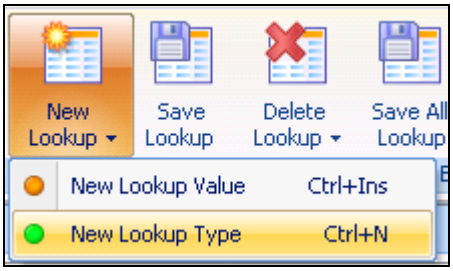
Use the Current List to navigate between records

Selecting a record in the "Current list of Lookup Type records" will display the individual fields in the "Selected Lookup Type record" section of the configuration form.

2	To define a new Lookup Value for the Lookup Type, choose **New Lookup > New Lookup Value** from the Data Entry group on the **Lookup Types** ribbon

Step	Action
	bar tab. The following figure illustrates the menu item.  The following dialog box is displayed.  Enter a **Lookup Value** and **Description**. Click **OK**. Follow the same steps to add additional values to the Lookup Type.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided.
3	To define a new Lookup Type, choose **New Lookup > New Lookup Type** from the Data Entry group on the **Lookup Types** ribbon bar tab. The following figure illustrates the menu item.

Step	Action

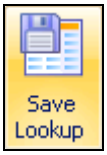


A new record is created.

In the **Selected Lookup Type record** section of the configuration form, complete the information related to the type.

4 To save the data related to the Lookup Type (including all Lookup Values), click **Save Lookup** from the Data Entry group on the **Lookup Types** ribbon bar tab.

The following figure illustrates the menu item.



Alternatively, you can click the save button located in the **Selected Lookup Type record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to a Lookup Type (including the Lookup Values), first select the target Lookup Type from the Current list of Lookup Type records and then update the fields as appropriate.

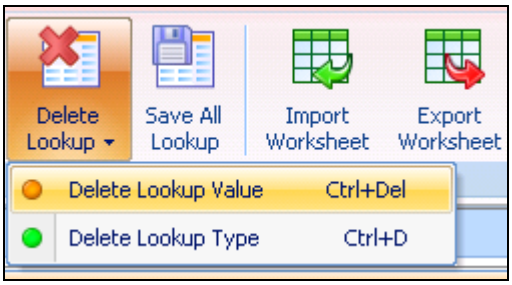
After completing the modifications, you must save the Lookup Type to commit the changes back to the database.

6 To delete the details of a Lookup Value, first select the target Lookup Value from the Lookup Values grid.

Choose **Delete Lookup > Delete Lookup Value** from the Data Entry group on the **Lookup Types** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action



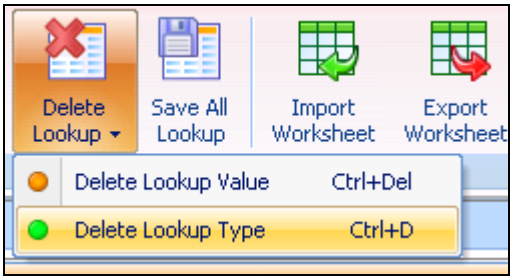
This task deletes the selected Lookup Value.

Follow the same steps to delete additional rows.

7 To delete the details of a Lookup Type (including all Lookup Values), first select the target Lookup Type from the Current list of Lookup Type records.

Choose **Delete Lookup > Delete Lookup Type** from the Data Entry group on the **Lookup Types** ribbon bar tab.

The following figure illustrates the menu item.



This task deletes all the Lookup Values plus the main Lookup Type record.

You can also perform the following tasks from this screen:

- Save all the data. For more information, see Saving all data.
- Import Worksheet. For more information, see Importing data.
- Export Worksheet. For more information, see Exporting data.
- Find and replace data. For more information, see Finding and Replacing data.

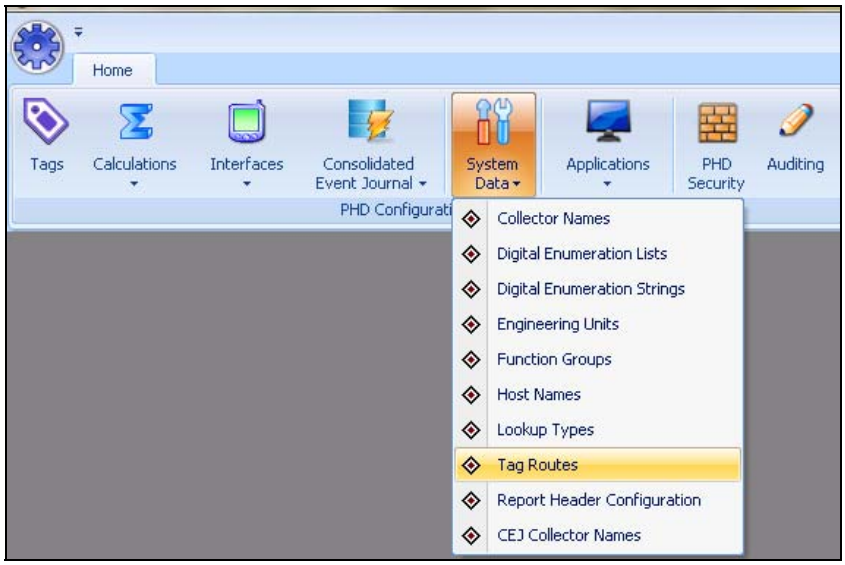
2.5.8 Tag Routes

Defining tag routes

Use this form to define the routing of PHD tag data from a source tag to a destination tag.

To configure a tag route, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data > Tag Routes** from the PHD Configuration Menu.



The **Tag Routes** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

Use the Current List to navigate between records

Selecting a record in the “Current list of Tag Route records” displays the individual fields in the “Selected Tag Route record” section of the configuration form.

Step	Action
2	To define a new Tag Route, click **New Tag Route** from the Data Entry group on the **Tag Routes** ribbon bar tab. The following figure illustrates the menu item.  A new record is created. In the **Selected Tag Route record** section of the configuration form, complete the information related to the route.
	**ATTENTION** • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
	**REFERENCE - INTERNAL** For more information about configuring tags, refer to the *Tag Configuration* section of this guide.
2	To save the data related to the Tag Route, click **Save Tag Route** from the Data Entry group on the **Tag Routes** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **Selected Tag Route record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
3	To modify the details related to a Tag Route, first select the target route from the Current list of Tag Route records and then update the fields as appropriate. **Note**: Some fields are locked after saving the Route and cannot be modified.

Step	Action
	After completing the modifications, you must save the Tag Route to commit the changes back to the database.
4	To delete the details related to a Tag Route, first select the target route from the Current list of Tag Route records and then click **Delete Tag Route** from the Data Entry group on the **Tag Routes** ribbon bar tab. The following figure illustrates the menu item.  Follow the same steps to delete additional routes. You can also perform the following tasks from this screen: • Save All Tag Route. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
9	To access all the source or destination tags in the database, click **Tag Explorer** from the Tag Explorer group on the **Tag Routes** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
10	To instruct PHD to make the routes available for use, click **Send to PHD** from the PHD group on the **Tag Routes** ribbon bar tab. The following figure illustrates the menu item.

Step	Action
	
	A dialog box is displayed and indicates whether the load was successful.
	Click **Close** when finished reading the dialog message.

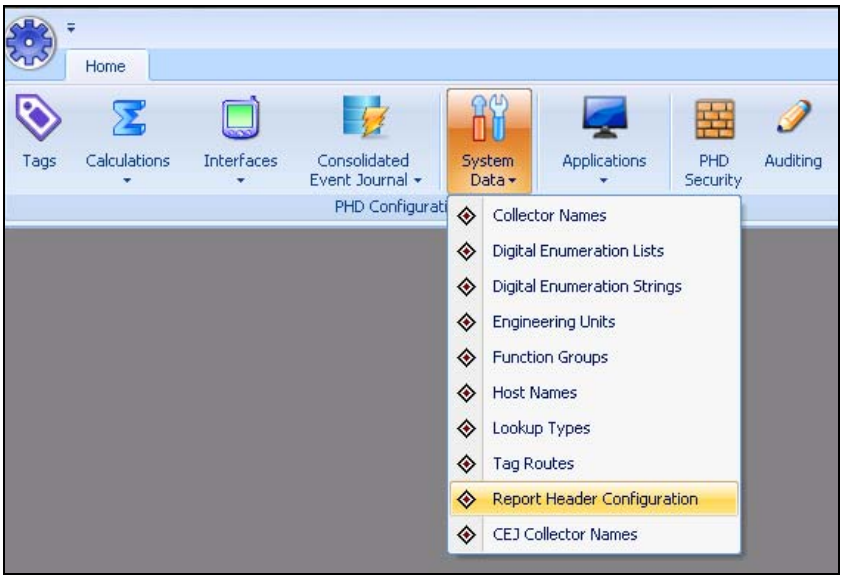
2.5.9 Report Header Configuration

Configuring a report header

Use this form to customize the look of the standard PHD reports.

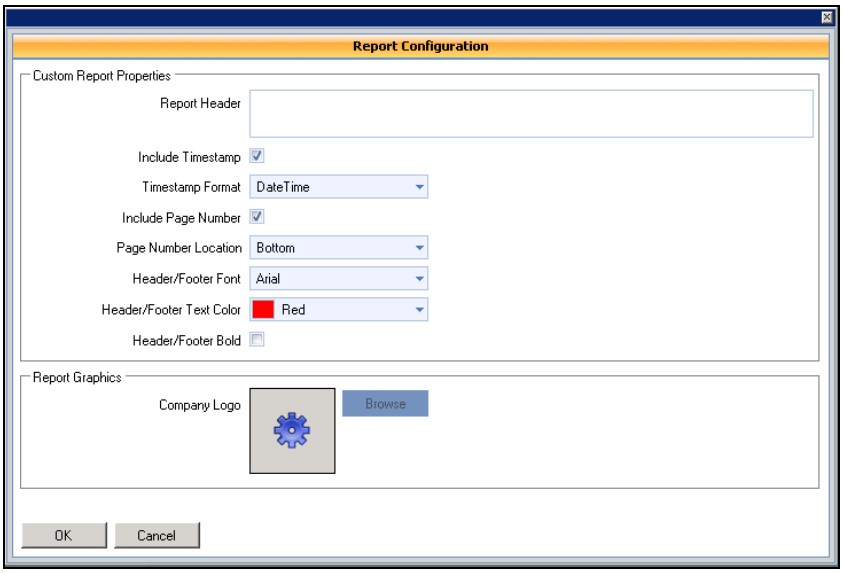
To configure a report header, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data > Report Header Configuration** from the PHD Configuration Menu.



The following dialog box is displayed.

Step	Action



2 To add a header, click the **Header** tab.

The **Header Text** appears at the top of every report.

The **Format Text** fields control the color and font of the header and footer text.

The **Configure Report** fields control the date/time and page number locations on the report.

The **Company Logo** field allows you to import a graphic and display it at the bottom of the report.

3 Click **OK** to save the changes.

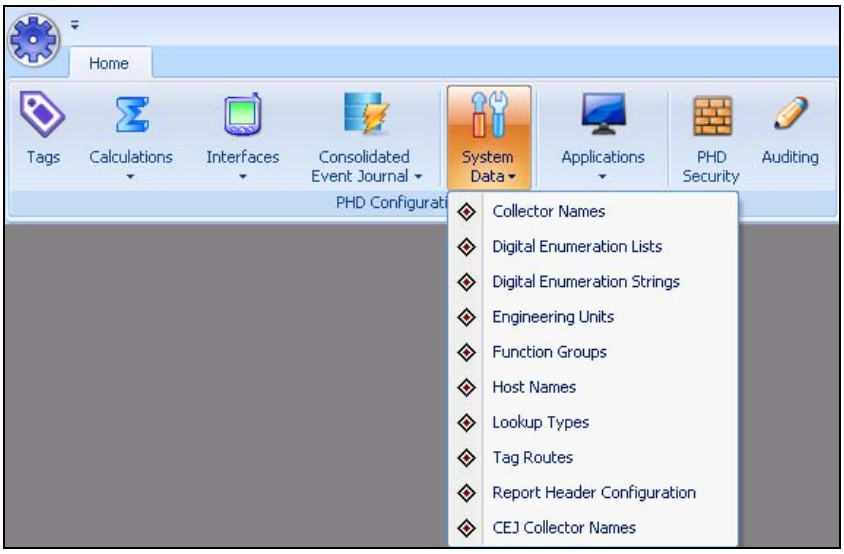
2.5.10 CEJ Collector Names

Defining CEJ collector names

CEJ Collector Names are the names assigned to CEJ interfaces to collect CEJ events. While defining a new CEJ interface, the CEJ collector name is created.

To define a CEJ collector name, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **System Data** > **CEJ Collector Names** from the PHD Configuration Menu.



The **CEJ Collector Names** screen is displayed.

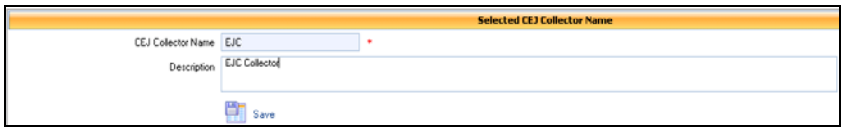
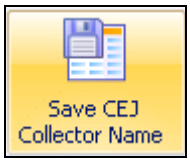
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

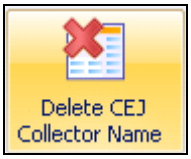
TIP

Use the Current List to navigate between records

Selecting a record in the **CEJ Collector Names** displays the individual fields in the **Selected CEJ Collector Name** section of the configuration form.

2	To define a new collector name, choose **New CEJ Collector Name** from the Data Entry group on the **CEJ Collector Names** ribbon bar tab. The following figure illustrates the menu item.

Step	Action
	
	A following dialog box is displayed.
	
	Enter a name for the CEJ collector in the **CEJ Collector Name** field. Enter a description for the CEJ collector in the **Description** field. Click **Save**.
	Follow the same steps to add additional CEJ collectors.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to a CEJ collector name, click **Save CEJ Collector Name** from the Data Entry group on the **CEJ Collector Names** ribbon bar tab. The following figure illustrates the menu item.  Alternatively, you can click the save button located in the **Selected CEJ Collector Names** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a CEJ collector name, select the target collector name from the CEJ Collector Names grid, and then update the fields

Step	Action
	as appropriate. After completing the modifications, you must save the list to commit the changes back to the database.
5	To delete the details related to CEJ collector names, select the target Collector Name row from the CEJ Collector Names grid. Choose **Delete CEJ Collector Name** from the Data Entry group on the **CEJ Collector Names** ribbon bar tab. The following figure illustrates the menu item.  This task deletes the currently selected CEJ Collector Name row. Follow the same steps to delete additional rows. You can also perform the following tasks from this screen: • Save all the data. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.6 Applications Configuration

The Uniformance applications are configured through forms located in the PHD Configuration Tool.

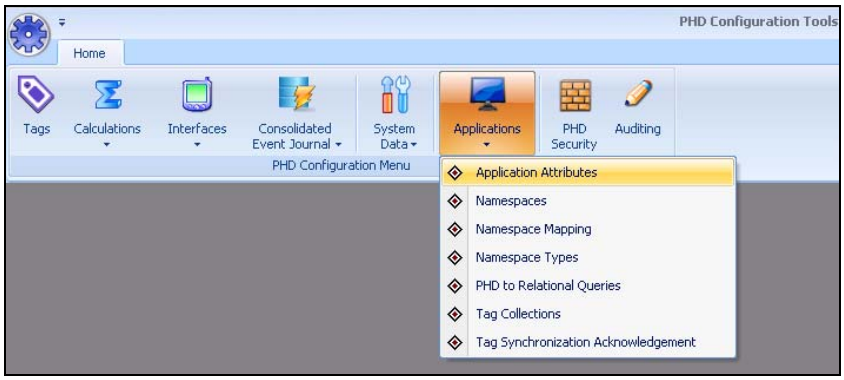
Each application functions according to the configuration information stored in the Uniformance Database and in the registry settings on the node where the application runs. For more information on Application Configuration, refer to Application Server User Guide (pim275).

2.6.1 Application Attributes

Defining application attributes

To configure application attributes, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Application Attributes** from the PHD Configuration Menu.

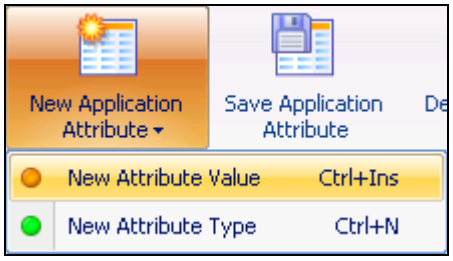
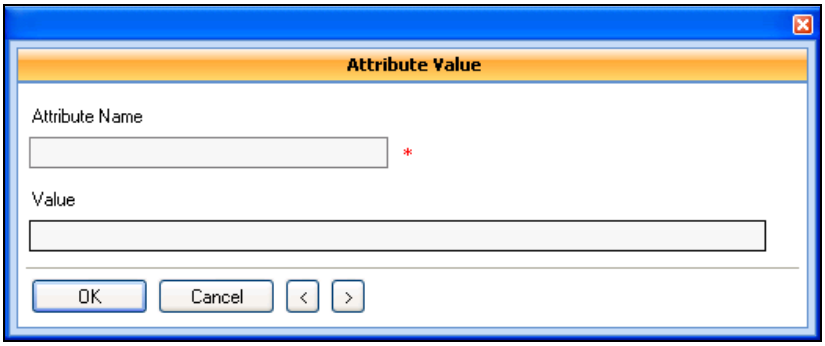


The **Attribute Type** screen is displayed.

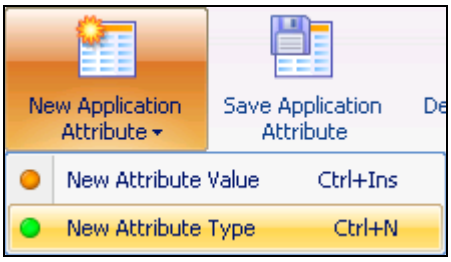
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

TIP

Use the Current List to navigate between records

Step	Action
	Selecting a record in the “Current list of Attribute Type records” displays the individual fields in the “Selected Attribute Type record” section of the configuration form.
2	To define a new Attribute Value for the Attribute Type, choose **New Application Attribute > New Attribute Value** from the Data Entry group on the **Application Attributes** ribbon bar tab. The following figure illustrates the menu.  The following dialog box is displayed.  Enter an **Attribute Name** and optionally enter a **Value**. Click **OK**. Follow the same steps to add more entries, if required.
3	To define a new application attribute, choose **New Application Attribute > New Attribute Type** from the Data Entry group on the **Application Attributes** ribbon bar tab. The following figure illustrates the menu item.

Step	Action



A new record is created.

In the **Selected Attribute Type record** section of the configuration form, complete the information related to the route.

ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided.

4 To save the data related to an Attribute Type (including all Attribute Values), click **Save Application Attribute** from the Data Entry group on the **Application Attributes** ribbon bar tab.

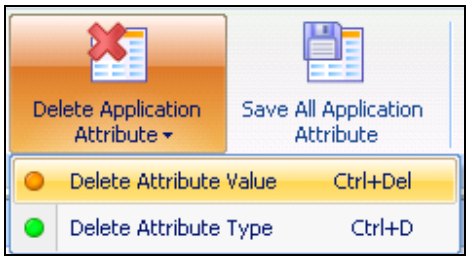
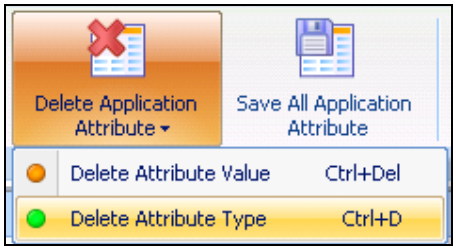
The following figure illustrates the menu.

Alternatively, you can click the save button located in the **Selected Attribute Type record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to an Application Attribute, first select the target attribute from the Current list of Application Attribute records and then update the fields as appropriate.

After completing the modifications, you must save the attribute to commit the changes back to the database.

6 To delete the details of an Attribute Value, first select the target Attribute Value row from the Attributes grid.

Step	Action
	Choose **Delete Application Attribute > Delete Attribute Value** from the Data Entry group on the **Application Attributes** ribbon bar tab**.** The following figure illustrates the menu.  The selected attribute value is deleted. Follow the same steps to delete additional rows.
7	To delete the details of an Attribute Type (including all Attribute Values), first select the target Attribute Type from the Current list of Attribute Type records. Choose **Delete Application Attribute > Delete Attribute Type** from the Data Entry group on the **Application Attributes** ribbon bar tab**.** The following figure illustrates the menu.  This task deletes all the Attribute Values along with the main Attribute Type record. You can also perform the following tasks from this screen: • Save all the data. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.6.2 Namespaces

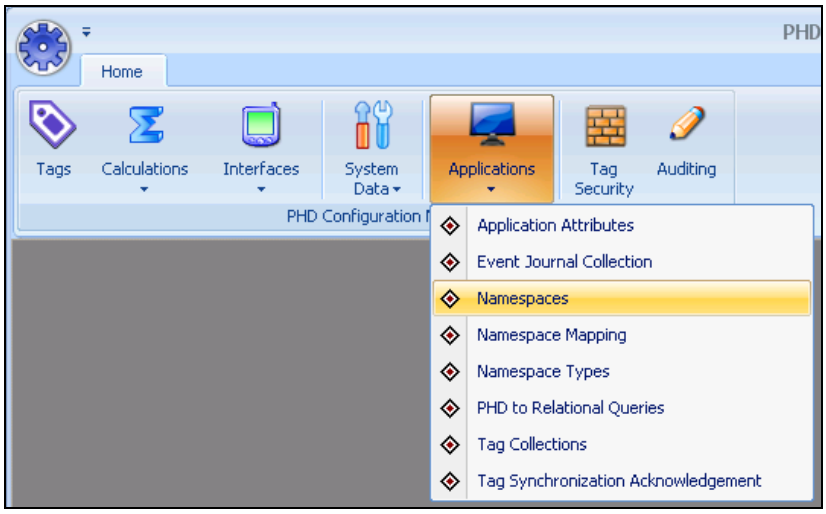
Defining namespaces

The namespace server maps the PHD tags to control system points. You might gain access to data on the PHD server using source system tag names instead of PHD tag names. A namespace maps the source system tag names to PHD tag names.

The integration of the namespace server with the PHD server enables the use of non-PHD tags in the Uniformance Desktop applications. The purpose is to access historical values from the PHD server. The PHD server is configured to notify the namespace server when changes are made to the tag details. The tag mapping on the namespace server is updated.

To configure namespaces, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Namespaces** from the PHD Configuration Menu.



The **Namespaces** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

Step	Action
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Namespace records" displays the individual fields in the "Selected Namespace record" section of the configuration form.
2	To define a new namespace, click **New Namespace** from the Data Entry group on the **Namespaces** ribbon bar tab. The following figure illustrates the menu.  A new record is created. In the **Selected Namespace record** section of the configuration form, complete the information related to the namespace.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to a namespace, click **Save Namespace** from the Data Entry group on the **Namespaces** ribbon bar tab. The following figure illustrates the menu.  Alternatively, you can click the save button located in the **Selected Namespace record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

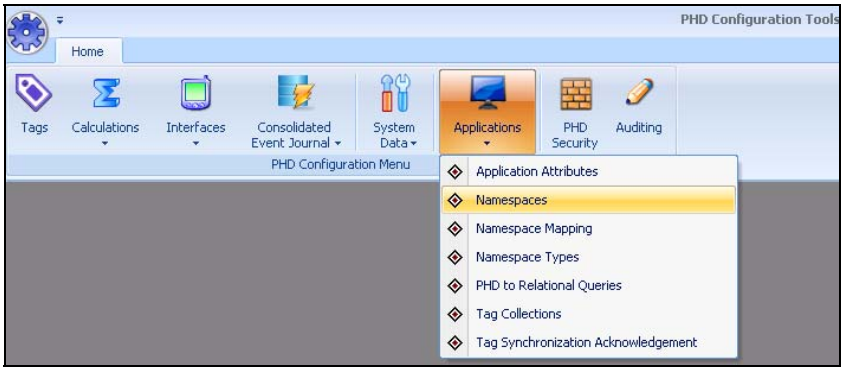
Step	Action
4	To modify the details related to a namespace, first select the target namespace from the Current list of Namespace records and then update the fields as appropriate. After completing the modifications, you must save the namespace to commit the changes back to the database.
5	To delete the details related to a namespace, first select the target namespace from the Current list of Namespace records. Click **Delete Namespace** from the Data Entry group on the **Namespaces** ribbon bar tab. The following figure illustrates the menu.  This task deletes the currently selected Namespace. If the Namespace Mapping uses the Namespace, an error message is displayed and the Namespace is not deleted. You can also perform the following tasks from this screen: • Save all the data. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.6.3 Namespace Mapping

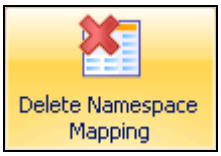
Defining namespace mapping

Use this form to view the mapping between the tag/point-dot-parameter namespaces. Records are auto-populated by the Namespace server.

To configure namespace mapping, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Namespace Mapping** from the PHD Configuration Menu.  The **Namespace Mapping** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of Namespace Mapping records" displays the individual fields in the "Selected Namespace Mapping record" section of the configuration form.
2	To define a new namespace mapping, click **New Namespace Mapping** from the Data Entry group on the **Namespace Mapping** ribbon bar tab. The following figure illustrates the menu.

Step	Action
	 A new record is created. In the **Selected Namespace Mapping record** section of the configuration form, complete the information related to the mapping.
	ATTENTION • ***Namespace Mapping records are not created manually using the configuration form. They are created by the Namespace Server and viewed through the configuration form.*** • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to the namespace mapping, click **Save Namespace Mapping** from the Data Entry group on the **Namespace Mapping** ribbon bar tab. The following figure illustrates the menu.  Alternatively, you can click the save button located in the **Selected Namespace Mapping record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a namespace mapping, first select the target mapping record from the Current list of Namespace Mapping records and then update the fields as appropriate. After completing the modifications, you must save the namespace mapping to commit the changes back to the database.
5	To delete the details related to a namespace mapping, first select the target mapping record from the Current list of Namespace Mapping records.

Step	Action
	Click **Delete Namespace Mapping** from the Data Entry group on the **Namespace Mapping** ribbon bar tab. The following figure illustrates the menu.  This task deletes the currently selected Namespace mapping row.
	ATTENTION ***Namespace Mapping records are not generally deleted manually using the configuration form. The Namespace Server will remove unnecessary mapping records.***
	You can also perform the following tasks from this screen: • Save all the data. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.6.4 Namespace Types

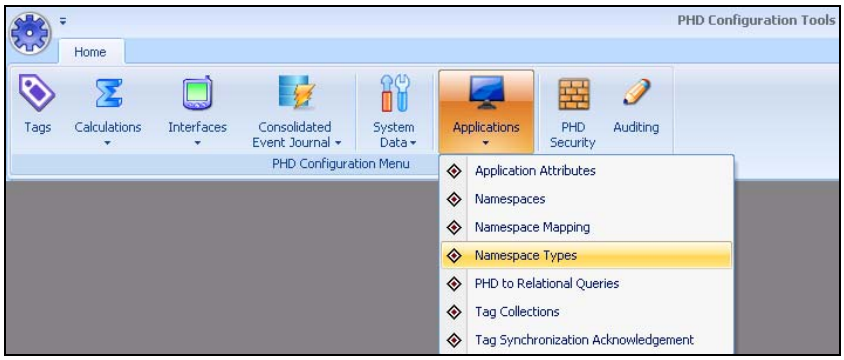
Defining namespace types

Use this form to identify the different namespaces supported by the PHD system. The Namespace Type categorizes the types, the number of items defining the namespace and the delimiters used between the items.

The system provides the configuration data for the most common namespace types.

To configure a namespace type, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Namespace Types** from the PHD Configuration Menu.



The **Namespace Types** screen is displayed.

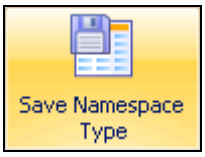
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

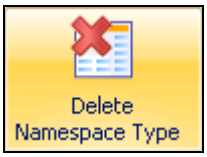
TIP

Use the Current List to navigate between records

Selecting a record in the “Current list of Namespace Type records” to display the individual fields in the “Selected Namespace Type record” section of the configuration form.

2	To define a new namespace type, click **New Namespace Type** from the Data Entry group on the **Namespace Types** ribbon bar tab. The following figure illustrates the menu.

Step	Action
	
	A new record is created. In the **Selected Namespace Type record** section of the configuration form, complete the information related to the type.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to a namespace type, click **Save Namespace Type** from the Data Entry group on the **Namespace Types** ribbon bar tab. The following figure illustrates the menu.
	
	Alternatively, you can click the save button located in the **Selected Namespace Type record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a namespace type, first select the target namespace type from the Current list of Namespace Type records and then update the fields as appropriate. After completing the modifications, you must save the namespace type to commit the changes back to the database.
5	To delete the details related to a namespace type, first select the target namespace type record from the Current list of Namespace Type records. Click **Delete Namespace Type** from the Data Entry group on the **Namespace Types** ribbon bar tab. The following figure illustrates the menu.

Step	Action
	 This task deletes the currently selected Namespace Type. If the type is in use by a Namespace, an error message is displayed and the Namespace Type is not deleted. You can also perform the following tasks from this screen: • Save All Namespace Type. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.

2.6.5 PHD to Relational Queries

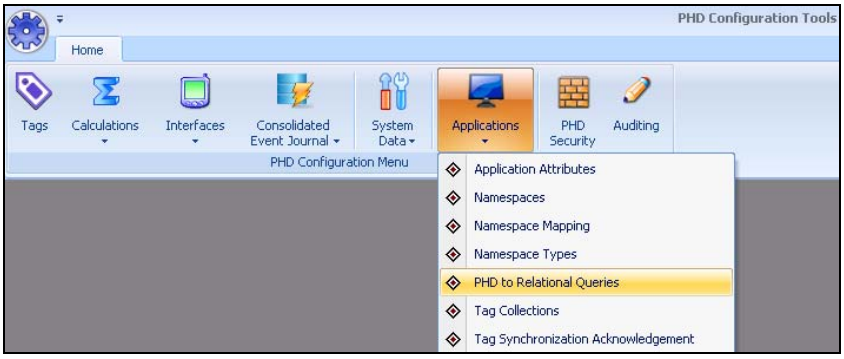
Defining PHD to Relational Queries

The PHD to Relational function stores selected PHD tag information in the SQL server relational database tables. Selection criteria identifying the tags, frequency, and other parameters are entered using the PHD to Relational Queries configuration form.

You can use this form to add a query, edit or delete a query, or retrieve detailed information about a query. When a new query is executed, it retrieves data starting from the **Last Execution Time**.

To configure PHD to Relational Queries, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > PHD to Relational Queries** from the PHD Configuration Menu.



The **PHD to Relational Queries** screen is displayed.

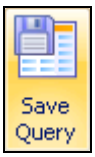
- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

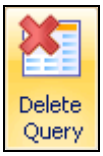
TIP

Use the Current List to navigate between records

Selecting a record in the "Current list of PHD to Relational Query records" displays the individual fields in the "Selected PHD to Relational Query record" section of the configuration form.

2	To define a new PHD to Relational query, click **New Query** from the Data

Step	Action
	Entry group on the **PHD to Relational Queries** ribbon bar tab. The following figure illustrates the menu.  A new record is created. In the **Selected PHD to Relational Query record** section of the configuration form, complete the information related to the query.
	ATTENTION • An asterisk (*) indicates a mandatory field. • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
3	To save the data related to the PHD to Relational query, click **Save Query** from the Data Entry group on the **PHD to Relational Queries** ribbon bar tab. The following figure illustrates the menu.  Alternatively, you can click the save button located in the **Selected PHD to Relational Query record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a query, first select the target query from the Current list of PHD to Relational Query records and then update the fields as appropriate. After completing the modifications, you must save the query to commit the changes back to the database.
5	To delete the details related to a query, first select the target query from the Current list of PHD to Relational Query records. Click **Delete Query** from the Data Entry group on the **PHD to Relational**

Step	Action
	Queries ribbon bar tab. The following figure illustrates the menu.  This task deletes the currently selected query. You can also perform the following tasks from this screen: • Save All Query. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
10	To access all the PHD tags in the database, click **Tag Explorer** from the Tag Explorer group on the **PHD to Relational Queries** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.

2.6.6 Tag Collections

Defining tag collections

The tag collection configuration form enables you to classify tags into groups. You can logically group the tags into sets and assign them to collection name.

To configure tag collections, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Tag Collections** from the PHD Configuration Menu.

The **Tag Collections** screen is displayed.

- If there is data in the table, the first record is selected and displayed.
- If there is no data in the table, a blank record is displayed.

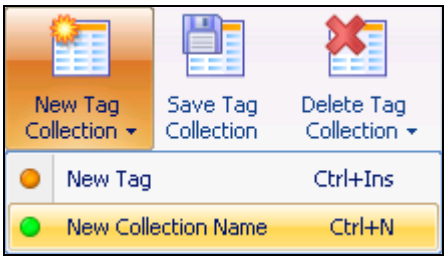
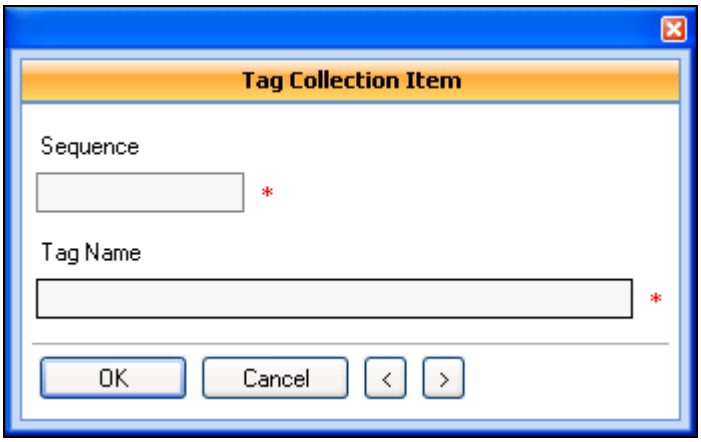
TIP

Use the Current List to navigate between records

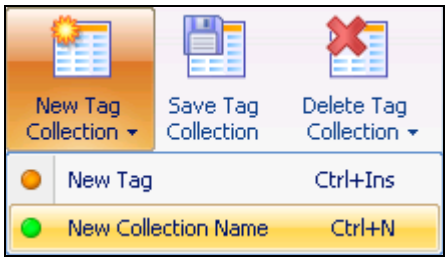
Selecting a record in the “Current list of Tag Collection records” displays the individual fields in the “Selected Tag Collection record” section of the configuration form.

ATTENTION

- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided.

Step	Action
2	To define a new tag for the collection, choose **New Tag Collection > New Tag** from the Data Entry group on the **Tag Collections** ribbon bar tab. The following figure illustrates the menu.  The following dialog box is displayed.  Enter the order of the sequence in the **Sequence** field. The sequence name must be a positive integer value. Enter the name of the tag in the **Tag Name** field. Click **OK**.
3	To define a new tag collection, choose **New Tag Collection > New Collection Name** from the Data Entry group on the **Tag Collections** ribbon bar tab. The following figure illustrates the menu.

Step	Action



A new record is created.

In the **Selected Tag Collection record** section of the configuration form, complete the information related to the collection.

4 To save the data related to the tag collection (including all tag entries), click **Save Tag Collection** from the Data Entry group on the **Tag Collections** ribbon bar tab.

The following figure illustrates the menu.

Alternatively, you can click the save button located in the **Selected Tag Collection record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to a tag collection, first select the target tag collection from the Current list of Tag Collection records and then update the fields as appropriate.

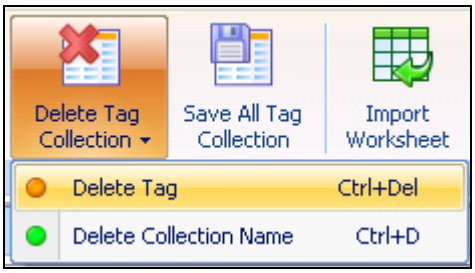
After completing the modifications, you must save the tag collection to commit the changes back to the database.

6 To delete a tag from the collection, first select the target Tag row from the Tag List grid.

Choose **Delete Tag Collection > Delete Tag** from the Data Entry group on the **Tag Collections** ribbon bar tab.

The following figure illustrates the menu.

Step	Action

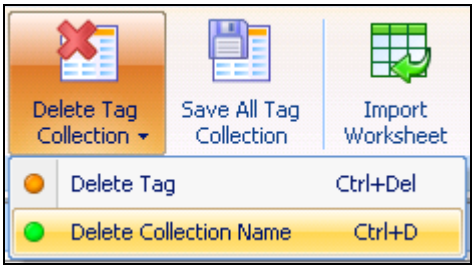


This task deletes the currently selected Tag row.

Follow the same steps to delete additional rows.

7 To delete the details related to a Tag Collection (including all tag rows), choose **Delete Tag Collection > Delete Collection Name** from the Data Entry group on the **Tag Collections** ribbon bar tab.

The following figure illustrates the menu.



This task deletes all the Tag rows plus the main Tag Collection record.

You can also perform the following tasks from this screen:

- Save all the data. For more information, see Saving all data.
- Find and replace data. For more information, see Finding and Replacing data.

10 To access all the tags in the database, click **Tag Explorer** from the PHD group on the **Tag Collections** ribbon bar tab.

The following figure illustrates the menu item.

Step	Action

In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.

2.6.7 Tag Synchronization Acknowledgement

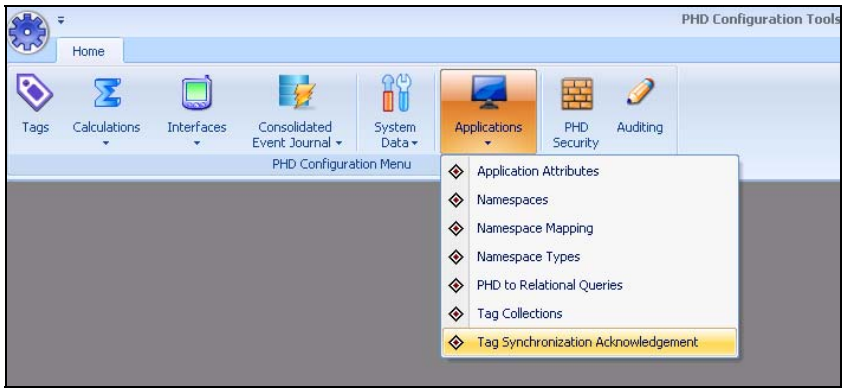
Using tag synchronization acknowledgement

The staging table consists of tag definitions created by Tag Synchronization. You can use the Tag Synchronization Acknowledgement form to acknowledge, reprocess, or discard the tag definitions.

You can view synchronized tags in the staging table before sending tag definitions to PHD. By default, Tag Synchronization does not automatically acknowledge the synchronized tag definitions in the staging table. The staging table is viewed through the PHD Tag Synchronization Acknowledgement form.

To configure tag synchronization acknowledgement, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Tag Synchronization Acknowledgement** from the PHD Configuration Menu.



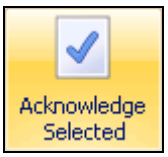
The **Tag Synchronization Acknowledgement** screen is displayed.

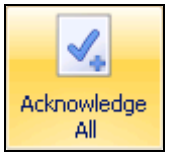
- If there is data in the staging table, the first record is selected and displayed.
- If there is no data in the staging table, a blank parent tag record is displayed.

TIP

Use the Current List to navigate between records

Selecting a record in the “Current list of Staging Tag records” displays the

Step	Action
	individual fields in the “Selected Staging Tag record” section of the configuration form.
	TIP ***Use the multi-select with Acknowledge, Reprocess or Discard*** Multiple records can be selected in the “Current list of Staging Tag records” by using the “Click – Shift+Click” approach. • Click a row in the Current list to select the first Staging Tag. • Use the scroll bars to move the view to another record. • Hold the Shift key down and click another row in the Current list. • All rows in between the first row and last row are selected.
	ATTENTION • All tag data is read-only. • The icon beside a field indicates the value was inherited from a parent tag. • The icon beside a field indicates the inherited value was overridden.
	REFERENCE - INTERNAL For more information about the Tag Synchronization service, refer to the appropriate sections related to *Tag Configuration* in this guide.
2	To acknowledge that the Tag Synchronization service has created a valid tag definition, click **Acknowledge Selected** from the Acknowledgement group on the **Tag Synchronization Acknowledgement** ribbon bar tab. The following figure illustrates the menu.  This task marks the selected staging tag as “acknowledged” and allows the Tag Synchronization service to create or update a PHD tag based on the staging tag data.
3	To acknowledge all the valid tag definitions without reviewing each

Step	Action
	individually, click **Acknowledge All** from the Acknowledgement group on the **Tag Synchronization Acknowledgement** ribbon bar tab. The following figure illustrates the menu.  This task marks the all the valid staging tag as “acknowledged” and allows the Tag Synchronization service to create or update a PHD tags based on the staging tag data.
4	If you or the Tag Synchronization service identifies errors in the data associated with a staging table tag, click **Reprocess Selected** from the Acknowledgement group on the **Tag Synchronization Acknowledgement** ribbon bar tab. You must reprocess the data associated with a staging table tag, if the errors can be fixed by changing the configuration of a Tag Synchronization Rule. The following figure illustrates the menu.  This task instructs the Tag Synchronization service to regenerate the tag definition in the staging table. It assumes that you have updated the Rule or Parent Tag to address the data error issue.
5	To discard a staging table tag, click **Discard Selected** from the Acknowledgement group on the **Tag Synchronization Acknowledgement** ribbon bar tab. The following figure illustrates the menu.  This task addresses the situation where there is a tag in the staging table but it is of no interest to PHD. When a tag is discarded, the Tag Synchronization

Step	Action
	service does not create or update an associated PHD tag. The discarded tag remains in the staging table so the service does not identify it as missing from the source system and attempt to recreate it.

2.7 PHD Security Configuration

2.7.1 PHD Security

Defining PHD security

You can assign PHD security roles by object. An object can be a Collector name, a Function Group name, a Tag name, or an Event Collector name. (Function Groups are groupings of PHD Function Definitions and 1D, 2D, 3D Correlation Table Functions.) You can access PHD based on the roles assigned to you.

If you are not a member of at least one role matching the list of required roles, the attempt to access the PHD is denied. You can be assigned to any or all of the following roles.

- Read data for tags
- Write data for tags
- Configure data for tags and functions

To write data to a PHD tag, specific Enable Flags must be set to allow the operation. The functions for writing data to PHD include the following:

- Put Data
- Modify Data
- Remove Data

The ability to perform the preceding functions is controlled by the following flags on the Tag configuration form.

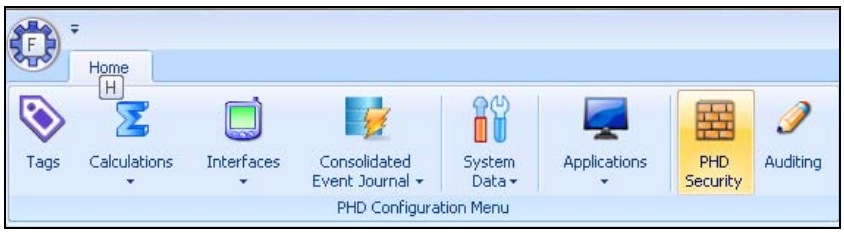
- Put Download
- Manual Input
- Data Edit

The options available for the **Object Type** include the following:

- C - PHD Collector (Real-time Data Interface) name
- F - PHD Function Group name
- T - Tag name

- E – Event Collector name

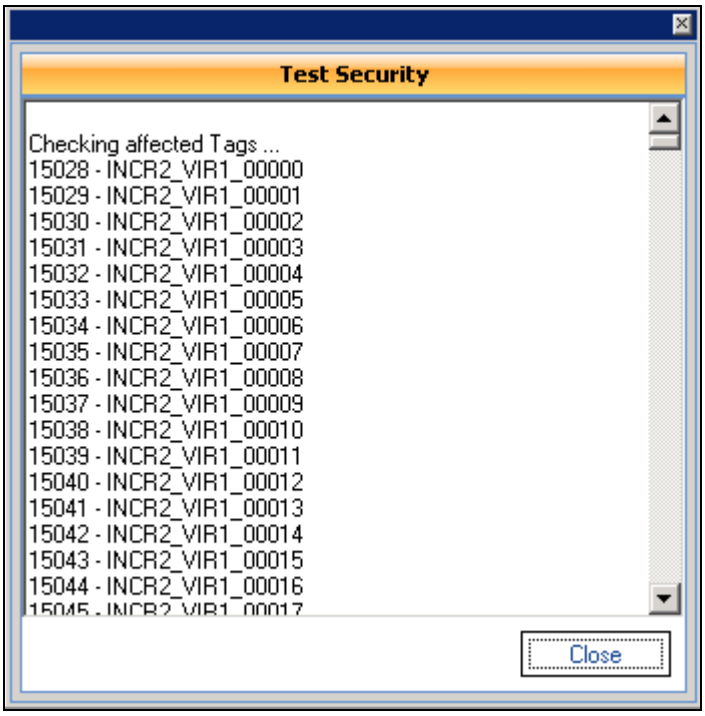
To configure PHD security, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **PHD Security** from the PHD Configuration Menu.  The **PHD Security** screen is displayed. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	TIP ***Use the Current List to navigate between records*** Selecting a record in the "Current list of PHD Security records" displays the individual fields in the "Selected PHD Security record" section of the configuration form.
2	To define a new security record, click **New PHD Security** from the Data Entry group on the **PHD Security** ribbon bar tab. The following figure illustrates the menu.  A new record is created. In the **Selected PHD Security record** section of the configuration form, complete the information related to the security record.
	ATTENTION • An asterisk (*) indicates a mandatory field.

Step	Action
	• Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
	REFERENCE - INTERNAL For more information about Tag Security Model Concepts, refer to the *PHD System Manual (pim0301)*.
3	To save the data related to a security record, click **Save PHD Security** from the Data Entry group on the **PHD Security** ribbon bar tab. The following figure illustrates the menu.  Alternatively, you can click the save button located in the **Selected PHD Security record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.
4	To modify the details related to a security record, first select the target security record from the Current list of PHD Security records and then update the fields as appropriate. **Note**: Some fields are locked after saving and cannot be modified. After completing the modifications, you must save the security record to commit the changes back to the database.
5	To delete the details related to a security record, first select the target security record from the Current list of PHD Security records. Click **Delete PHD Security** from the Data Entry group on the **PHD Security** ribbon bar tab. The following figure illustrates the menu.  This task deletes the currently selected security record.

Step	Action
	You can also perform the following tasks from this screen: • Save All PHD Security. For more information, see Saving all data. • Import Worksheet. For more information, see Importing data. • Export Worksheet. For more information, see Exporting data. • Find and replace data. For more information, see Finding and Replacing data.
10	To access all the PHD tags in the database, click **Tag Explorer** from the Tag Explorer group on the **PHD Security** ribbon bar tab. The following figure illustrates the menu item.  In Tag Explorer, you can search tags using search filters and then drag these tags into your own directories. The Match String filter limits the selection of tags, helping you locate the tags you need.
13	To get information on the impact of security, click **Test Security** from the PHD group on the **PHD Security** ribbon bar tab. The following figure illustrates the menu item.  The following dialog box appears with the details on the impact of security.

Step	Action



Click **Close**.

14 To instruct PHD to update its security details, click **Send to PHD** from the PHD group on the **PHD Security** ribbon bar tab.

The following figure illustrates the menu.

The **Send to PHD** dialog box appears with a message. After reading the status message, click **Close**.

2.8 Auditing Configuration

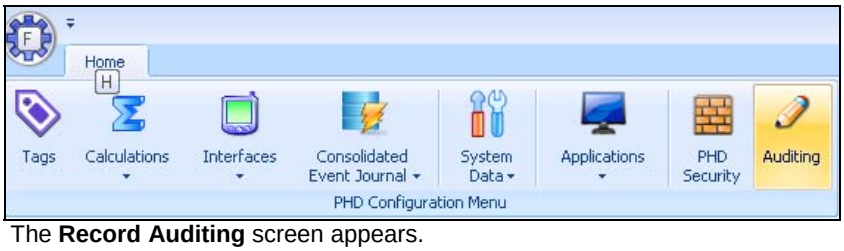
2.8.1 Audit Record

Defining audit records

The **Audit Record** configuration form helps you to monitor changes made to data in the SQL server database. An audit record includes the following information.

- Name of the person who changed the data
- Action performed (Insert/Update/Delete)
- Previous value of the data
- New value
- Timestamp when the data was changed

To configure an audit record, perform the following steps.

Step	Action
1	On the **Home** tab of the ribbon bar, choose **Applications > Auditing** from the PHD Configuration Menu.  The **Record Auditing** screen appears. • If there is data in the table, the first record is selected and displayed. • If there is no data in the table, a blank record is displayed.
	**TIP** ***Use the Current List to navigate between records*** Selecting a record in the “Current list of Audit records” displays the individual fields in the “Selected Audit record” section of the configuration form.
2	To define a new table you want to audit, choose **New Audit Record > New Table** from the Data Entry group on the **Record Auditing** ribbon bar tab.

Step	Action
	The following figure illustrates the menu.

A new record is created.

In the **Selected Audit record** section of the configuration form, complete the information related to the audit record.

After completing the audit record, be sure to update the audit triggers.

ATTENTION

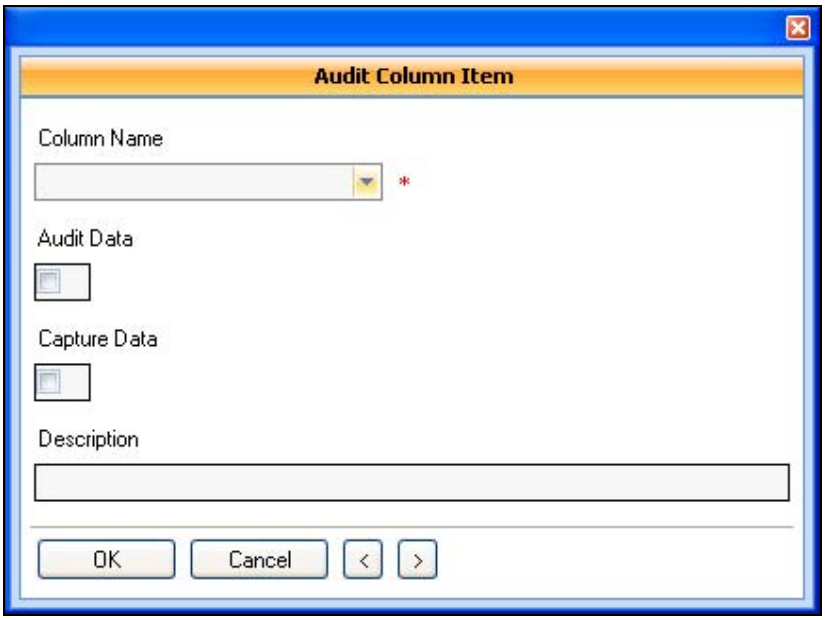
- An asterisk (*) indicates a mandatory field.
- Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list.
- The system always audits updated and deleted data. To audit inserted data, select the **Audit Inserts** check box in the **Selected Audit Record** section.

3 To define a column in the table you want to audit, choose **New Audit Record > New Column** from the Data Entry group on the **Record Auditing** ribbon bar tab.

The following figure illustrates the menu.

The following dialog box is displayed.

Step	Action



Select the **Column** you want to be audit.

Select the **Audit Data** checkbox if you wish to capture the changes to the audited column.

Select the **Capture Data** checkbox if you wish to capture additional field information when an audited column is changed.

Note: You cannot save a record if you do not select either the **Audit Data** field or **Capture Data** field.

Enter an optional **Description**.

Click **OK**.

Follow the same steps to add additional audited columns.

When finished adding columns, be sure to update the audit triggers.

4 To save the data related to the audit record, click **Save Audit Record** from the Data Entry group on the **Record Auditing** ribbon bar tab.

The following figure illustrates the menu.

Step	Action

Alternatively, you can click the save button located in the **Selected Audit record** section of the configuration form or you can use the hotkey combination of **CTRL+S** to perform this task.

5 To modify the details related to an audit record, first select the target audit table from the Current list of Audit records and then update the fields as appropriate.

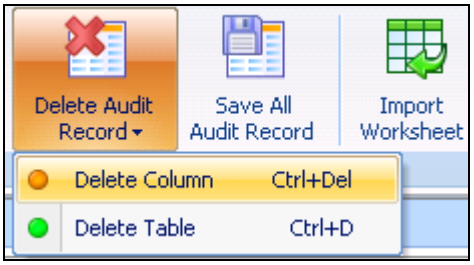
Note: Some fields are locked and cannot be modified once a record is saved.

After completing the modifications, you must save the audit record and the audit triggers updated.

6 To delete the details related to an audit column, select the target audit column from the Audited Columns grid.

Choose **Delete Audit Record > Delete Column** from the Data Entry group on the **Record Auditing** ribbon bar tab.

The following figure illustrates the menu.



This task deletes the currently selected audit column.

Follow the same steps to delete additional rows.

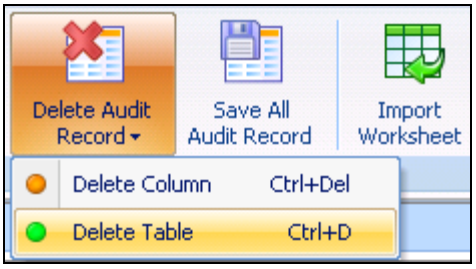
After completion, be sure to update the audit triggers.

7 To delete the details related to an audit table (including audit columns), first select the target audit table from the Current list of Audit records.

Choose **Delete Audit Record > Delete Table** from the Data Entry group on the **Record Auditing** ribbon bar tab.

Step	Action

The following figure illustrates the menu.



This task deletes all the Audited Columns along with the main Audit Table record.

After completion, be sure to update the audit triggers.

You can also perform the following tasks from this screen:

- Save all the data. For more information, see Saving all data.
- Find and replace data. For more information, see Finding and Replacing data.

10 To generate audit triggers for tables configured for generic auditing, click **Update Audit Triggers** from the Audited Data group on the **Record Auditing** ribbon bar tab.

The following figure illustrates the menu.

This task updates the triggers in the PHDCFG database.

11 To view reports on the Audit Data, click **View Audited Data** from the Audited Data group on the **Record Auditing** ribbon bar tab and select the desired Report from the menu.

The following figure illustrates the menu.

Step	Action

You can view the following reports:

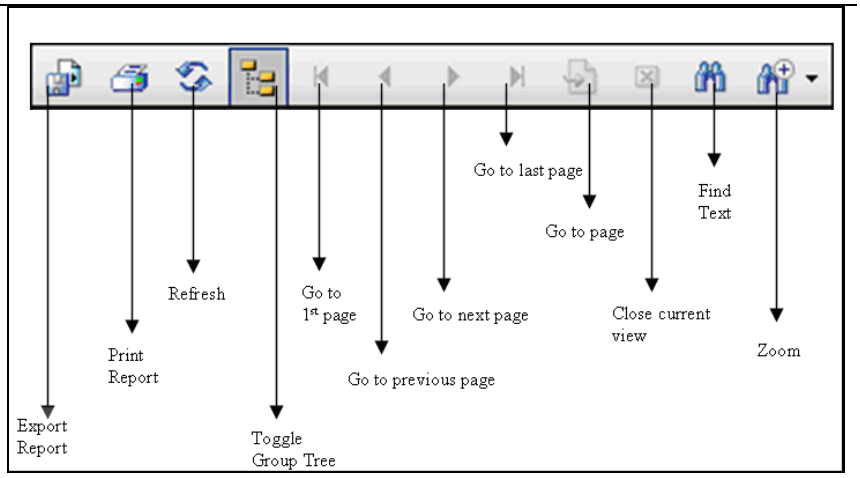
- View Detail Report – Displays the changes made during PCT configuration.
- View Summary Report –Displays the details of the PCT console and session
- View Detail PHD Data Report – Displays the details of the modified tags in the PCT.

A report specific dialog box is displayed.

Provide the parameters necessary to filter the data and click **Get Data** to generate the report.

12 The corresponding **Report** appears. You can export a report, print, refresh, switch between different display modes, find text or zoom using the following menu options available on the **Report** screen.

Step	Action


Export Report
Print Report
Refresh
Toggle Group Tree
Go to 1st page
Go to previous page
Go to next page
Go to last page
Go to page
Close current view
Find Text
Zoom

2.9 General Information

2.9.1 Save All

Saving all data

Allows you to save all the data into the PHD Configuration Tool.

1 Click **Save All** from the Data Entry group.

Note: The name of this button changes according to the type of record that you want to save. For example, in the **Interfaces Template (RDI's and Links)** screen this button appears as **Save All RDI Template**, whereas in the **Function Groups** screen, this button appears as **Save All Function Group**.

2.9.2 Export Worksheet

PHD Configuration Tool allows you to export data to Microsoft Excel format. Exporting items such as Tags, Robust Data Collection, Tag Routes, Function Definitions and so on in PHD Configuration Tool, creates a single worksheet. However, exporting items such as Interfaces (RDI's and Links), Source Systems, RDI Types, Digital Enumeration Lists, Engineering Units, Application Attributes, Namespace Mapping and so on, creates multiple worksheets.

The first worksheet is for the main item and one each for the dependent data. For example, while exporting Application Attributes in PHD Configuration Tool, the excel workbook has multiple worksheets such as ApplicationAttributeTypeEntity (main item) and ApplicationAttributeCollection (dependent data).

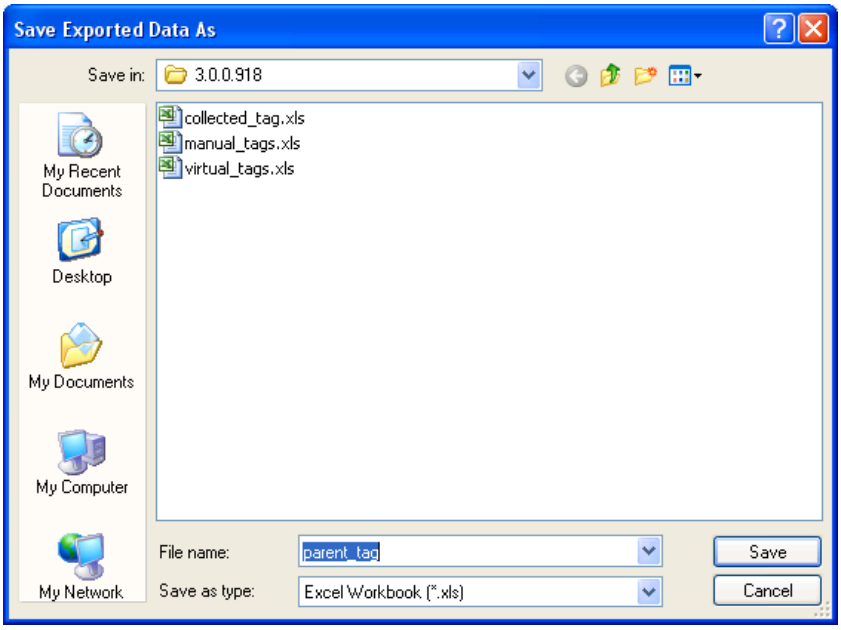
Exporting data

Perform the following steps to export data from PHD Configuration tool.

1 Click **Export Worksheet** on the ribbon bar tab.

The following figure illustrates the menu item.

The following dialog is displayed.



2 Enter a **File name** for the excel file.

3 Click **Save**.

If you have Microsoft Excel installed on the workstation, the excel file containing the data gets displayed.

Working with Excel Workbook

After exporting data from PHD Configuration Tool, you can open the excel workbook and perform the following tasks:

- Add or delete rows from the excel sheet. Ensure that you add data after the last row in the sheet.
- Delete one or more rows from the excel sheet. If you are working with an excel workbook with multiple worksheets and if you are deleting a row from the first worksheet, ensure that you also delete dependent rows from the subsequent worksheets.
- Modify data in the existing rows. Ensure that you do not modify the column names.

2.9.3 Import Worksheet

PHD Configuration Tool allows you to import data from an excel workbook. The formats of the worksheets that you want to import and the formats of the worksheets that you exported from PHD configuration tool must be the same. While importing data you must retain the order of the worksheets.

Prerequisite

The data that you want to import must be available in the first worksheet of the workbook or in the first few worksheets in case of multiple worksheets.

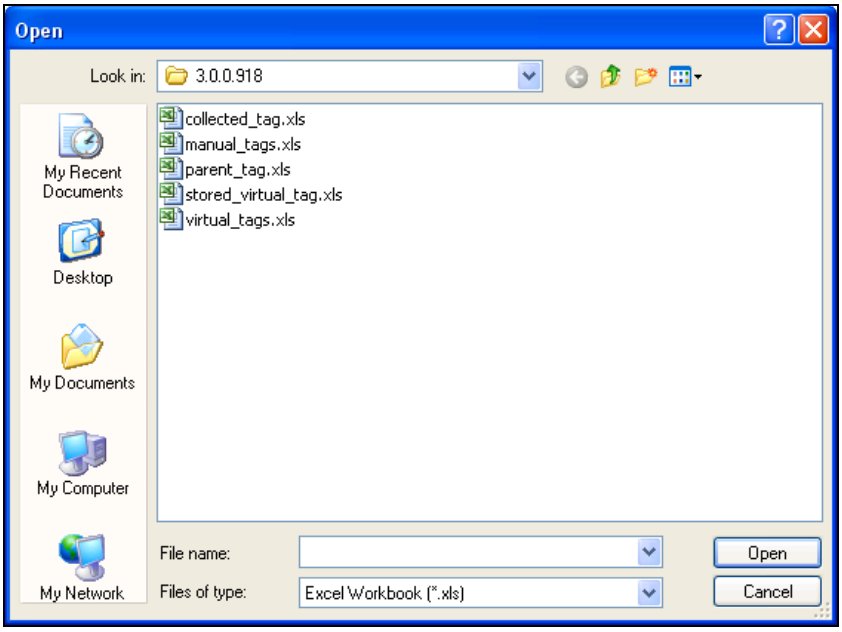
Importing data

Perform the following steps to import data into the PHD Configuration tool.

1 Click **Import Worksheet** on the ribbon bar tab.

The following figure illustrates the menu item.

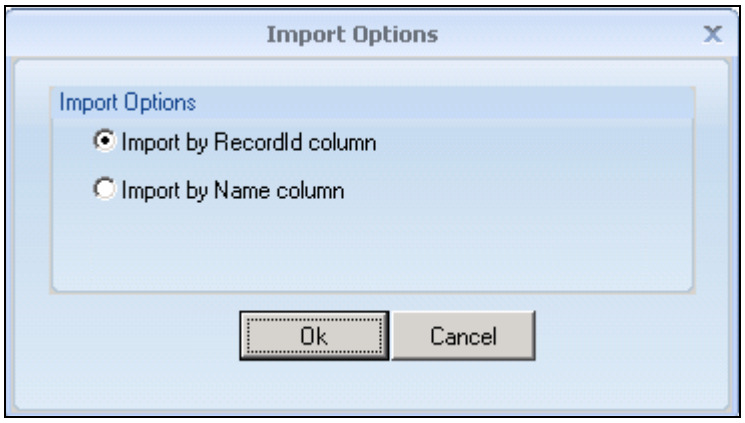
The following dialog is displayed.



2 Use the **Look in** drop-down box to browse to your excel file.

3 Click on the excel file and click **Open**.

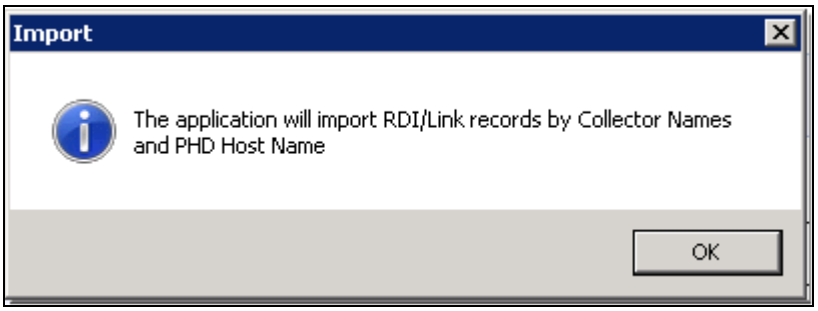
The **Import Options** dialog box appears.



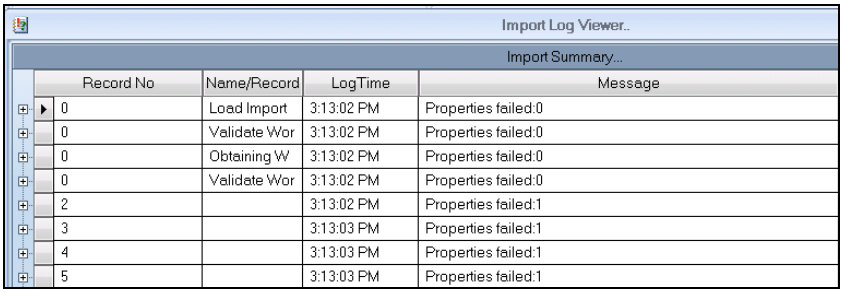
Note: While importing new data with **Import by RecordId column** option, ensure that the RecordId in the first worksheet of the workbook is left blank. However, while importing existing data with **Import by RecordId column**

option, you must retain the RecordId.

In case of the **Interfaces (RDI's and Links),** the following dialog box appears.



You can either import the tags by Record ID, Name, or Tag Number. Similarly, you can import RDI/Link records by Collector Names and PHD Host Name. Select the appropriate import method.



Record No	Name/Record	LogTime	Message
0	Load Import	3:13:02 PM	Properties failed:0
0	Validate Wor	3:13:02 PM	Properties failed:0
0	Obtaining W	3:13:02 PM	Properties failed:0
0	Validate Wor	3:13:02 PM	Properties failed:0
2		3:13:02 PM	Properties failed:1
3		3:13:03 PM	Properties failed:1
4		3:13:03 PM	Properties failed:1
5		3:13:03 PM	Properties failed:1

5 Click **OK**.

After the import is complete, the **Import Log Viewer** dialog box is displayed.

ATTENTION

You must correct the imported data that appear as failed in the Import Log Viewer. The Import Log Viewer dialog box displays the status of the import. If the import was successful, the message is Properties failed:0 and if the import failed, the message is Properties failed:1. After correcting, save the record.

2.9.4 Find and Replace

Finding and Replacing data

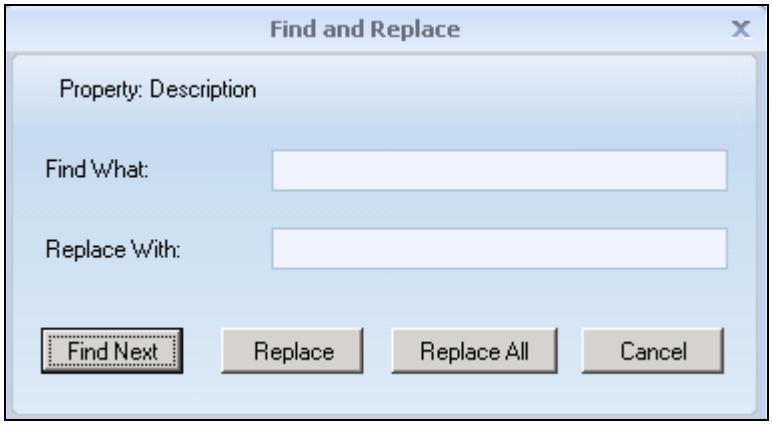
Allows you to find and replace data in the PHD Configuration Tool.

1 To find and replace data, first select the field information that you want to find

and replace. Click **Find and Replace.** Alternatively, use the hotkey combination of **CTRL+F** to perform this task.

The following figure illustrates the menu item.

The following dialog is displayed.



2 Enter the value of the field that you want to find in the **Find What** field.

3 Enter the value of the field that you want to replace in the **Replace With** field.

4 Do one of the following:

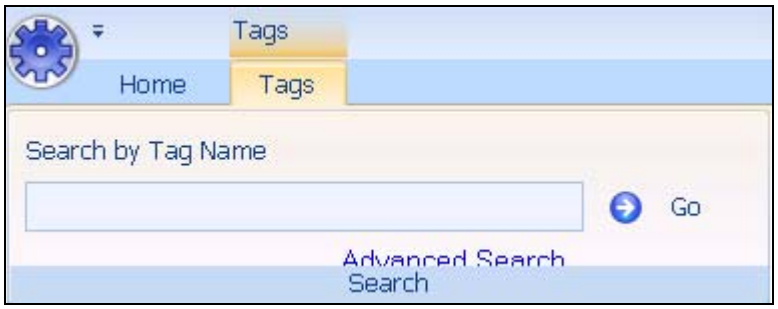
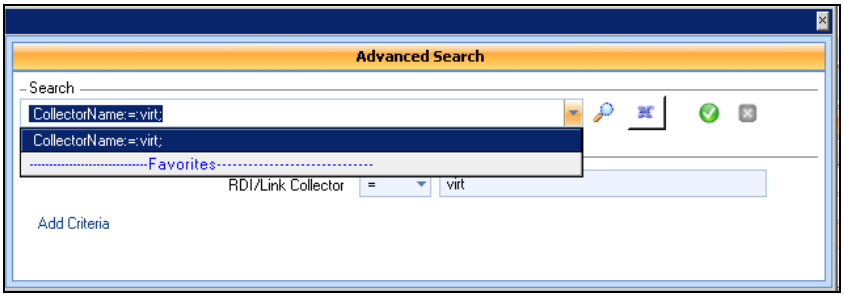
- Click **Find Next** to find the next occurrence of the selected field value that you want to replace.
- Click **Replace** to find and replace the next occurrence of the selected field.
- Click **Replace All** to replace the values of all the fields.
- Click **Cancel** to cancel the find and replace operation.

2.9.5 Advanced Search

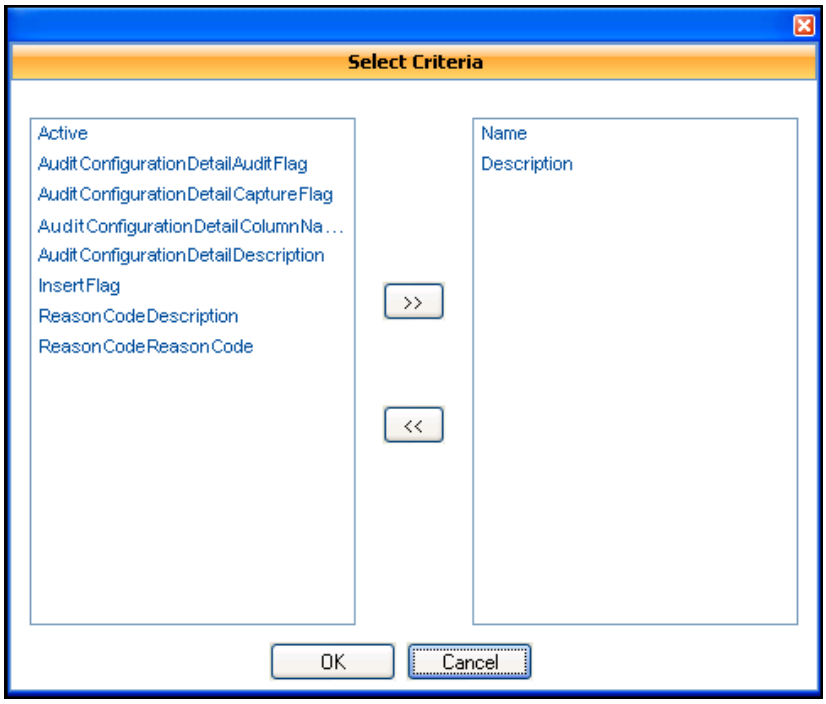
Searching for details

The PHD Configuration Tool enables you to perform a search based on the entry in the box provided.

To conduct a search, perform the following steps.

Step	Action
1	On the **PHD Configuration Tool** menu, type the search criteria in the box provided and click **Go**. The search results appear in the navigation grid and the screen.
2	To use additional search filters matching your search criteria, click **Advanced Search** as illustrated in the following menu item.  The **Advanced Search** dialog box is displayed. 
3	In the **Advanced Search** box, select the criteria matching your search.

Step	Action
	ATTENTION • Move the pointer over a field to read the corresponding description or instruction provided. The downward arrow provided in a field indicates that you need to select data from a list. • If the tag name has special characters such as @ or *, then the'\' character must precede the special character while performing a search. For example, consider the tag name TAG@001. When you want to search the tag name TAG@001,you must enter '\' in the search (TAG\@001).
4	In the **Build Query Text** section, complete the information matching your search criteria. Some of the examples are: 3a) Name 3b) Description
5	To add a criterion, click **Add Criteria**. The **Select Criteria** box appears.
6	In the **Select Criteria** dialog box, select the preferred fields from the left



Step	Action
	pane. Click  or  to move the fields to the right or left pane. The fields on the right pane are displayed in the **Build Query Text** section. Click **OK** to save the details or click **Cancel** to discard the details. The **Advanced Search** box with the selected criteria is displayed.
7	In the **Build Query Text** section, complete the details in the text boxes provided. For each criterion, complete the following: 6a) Select one of the following options in the first text box. – = – LIKE – NOT 6b) Enter the search string in the second text box.
8	Click **Go**. The detailed search results are displayed in the navigation grid and the screen.
9	To save the search criteria or search string details, click  .
10	To delete the search string details, click  .
11	To reset the fields in the **Advanced Search** box, click **Go**.

Step	Action
	**ATTENTION** Guidelines for performing queries • The basic search method enables you to perform a query using a field name that identifies the records in the database. For example, Tag Name, Collector Name, Unit Type, and so on. • The advanced search method enables you to click multiple fields and enter additional criteria to identify and filter records available in the database. • Wild card characters are permitted in the text box with the asterisk (*) replacing multiple characters and the question mark (?) replacing single characters. • As you enter the search criteria, a string is created in the **Search** box. You can save the search string or run the search again.

2.9.6 Print

Printing a report

You can print reports using the PHD Configuration Tool.

To print a report, perform the following steps.

Step	Action
1	Perform a search and select a report from the navigation grid.
2	On the **PHD Configuration Tool** menu, click  . The selected report is printed.

2.9.7 Print Preview

Generating a print preview of a report

You can generate the print preview of reports using the PHD Configuration Tool.

To generate the print preview of a report, perform the following steps.

Step	Action
1	Perform a search and select a report from the navigation grid.
2	On the **PHD Configuration Tool** menu, click  . The print preview of the selected report is generated.

2.9.8 Modify a Group of Tags

Modifying/Updating a group of tags

You can modify the details of a group of tags using the PHD Configuration Tool.

To modify the details of a group of tags, perform the following steps.

Step	Action
1	Perform a search using appropriate search criteria to filter the tags. You can use matching search strings such as **Collector Name**. The search results are displayed in the selected row in the navigation grid and the corresponding screen.
2	Press and hold down the CTRL key to select multiple tags and export the details to a file. To export the tag details to a Microsoft Excel worksheet, click  and specify a location to place the file.
3	Edit or replace the necessary details and click  to save the details.
4	To import the worksheet to PHD, click  and browse to select the file. **Save** the details of the tags.
5	To send the details of the changes to PHD, click  . The **Send to PHD** dialog box appears with a message. After reading the message, click **Close**. The modified tag details are saved in the PHD database.

ATTENTION

After exporting data to a worksheet, do not rename it. A specific matching name is essential to import the worksheet. If the name of the worksheet is modified, you cannot import the data.

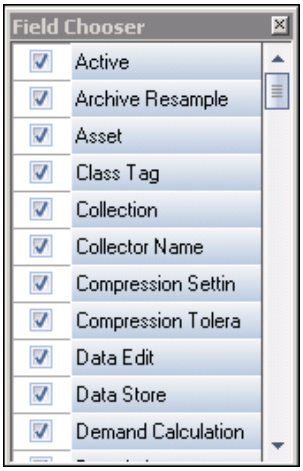
Step	Action
	Prerequisite to import data from a workbook
	The data must be available in the first sheet of a workbook.

2.9.9 Choose Fields

Customizing the display on the navigation grid

You can select the fields to be displayed on the navigation grid.

To select the fields to be displayed on the navigation grid, perform the following steps.

Step	Action
1	On the left of the navigation grid, click  .
2	The **Field Chooser** box is displayed as follows: 
3	Select or clear the check boxes as required and close the box. You can view the chosen fields in the navigation grid.

2.9.10 Untrusted database connection in Tag Explorer

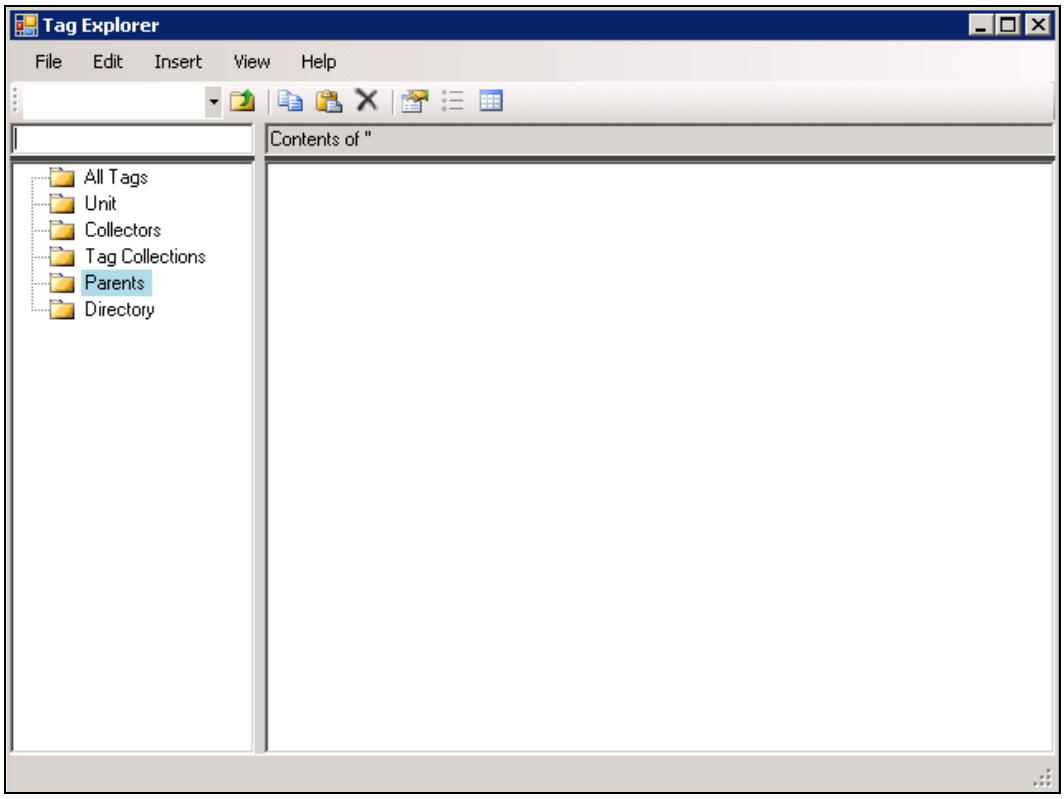
Configuring untrusted database connection in Tag Explorer

Tag Explorer uses the untrusted database connection information to connect to the database.

Perform the following to configure an untrusted database connection in Tag Explorer.

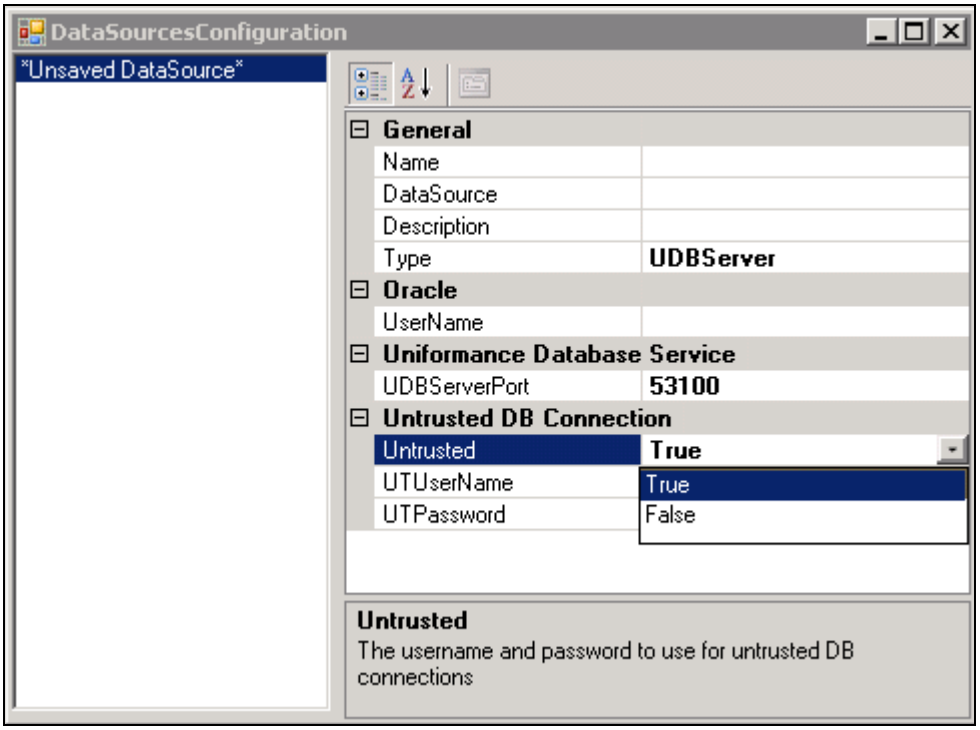
1. Click **Tag Explorer**.

   The Tag Explorer dialog box appears.



2. Choose **File** > **Datasource Configuration**.

   The **DataSourcesConfiguration** dialog box appears.



3. In the **General** section, perform the following:

   a. Enter the unique name of the data source in the **Name** field.

   b. Enter the host name of the Uniformance Database Service in the **DataSource** field.

   c. Enter the description of the data source in the **Description** field.

   d. Select the type of data source from the **Type** drop-down list.

4. In the Oracle section, enter the user name to log into Oracle data source when you select data source type as Oracle in the **UserName** field.

5. In the Uniformance Database Service section, enter the Uniformance Database Service port number in the **UDBServerPort** field. This field is applicable only when you select data source type as UDBServer.

6. In the **Untrusted DB Connection** section, perform the following:

   a. Select True from the **Untrusted** drop-down box, if you want to set the untrusted database connection.

b. Enter a username for the untrusted database connection in the **UTUserName** field.

c. Enter a password for the untrusted database connection in the **UTPassword** field.

3. Configuring Virtual Tags

3.1 Creating and Loading Virtual Tags

Virtual tags are now created using the Tag Configuration form. When selecting an existing virtual tag or creating a new virtual tag, the configuration form displays both the fields required to define the tag and to define the calculation.

Calculation text is mandatory for all virtual tags.

Tag names may contain special characters. Supported special characters are:
`~ ! @ # $ % ^ & * ( ) _ + = / \ { } [ ] : ; < > , ?`

When creating a virtual tag, you must send the tag definition to PHD before the calculation is validated and loaded into PHD.

To send the tag definition to PHD, click  .

To validate the calculation using PHD, click  .

To send the calculation to PHD, click  .

3.2 General Syntax Rules for Virtual Tag Calculations

General syntax rules are as follows:

- Upper and lower case differences are ignored except in quoted strings.
- Text following the comment delimiter of two slashes (//) is treated as a comment and is ignored.

- Line breaks are ignored but must fall between keywords, identifiers, or operators.
- Blank lines are ignored.
- You must use a backslash (\) which is a marker (escape) character for special characters embedded in tag names. For example, tag names can use + or –. The Virtual tag syntax normally interprets these characters as the addition and subtraction operators. The Virtual tag syntax interprets + or – as special characters of the tag name when preceded by a backslash (\) in the calculation.

ATTENTION

Square brackets [ ] in this document are used for indicating optional syntax. They are not part of the calculated tag grammar.

3.3 Referencing Tag names in Virtual Tag Calculations

In the calculation text, standard tag names are referenced directly.

Example:

If the tag name to be referenced is: ABC001

Then the following virtual tag syntax is used for the tag:

```
RETURN ABC001
```

Considerations when referencing tag names that contain special characters

Tag names may contain special characters. Supported special characters are:

```
~ ! @ # $ % ^ & * ( ) _ + = /  \ { } [  ] : ; < > , ?
```

In the calculation text, if the tag name contains special characters, add a backslash (\) to precede each special character.

Example:

If the tag name to be referenced is: `A*B`
Then the following virtual tag syntax is used for the tag:

```
RETURN A\*B
```

In the calculation text, if the tag name contains a backslash, then precede the backslash with another backslash (\\).

Example:

If the tag name to be referenced is: `C\D`
Then the following virtual tag syntax is used the tag:

```
RETURN C\\D
```

3.3.1 Consequence of renaming Virtual Tags – error message

Renaming a Virtual Tag does not update all calculations where a virtual tag is used.

If a virtual tag calculation refers to a PHD tag that no longer exists, then after a Coldstart of the PHD Server, the following error appears in the phdserver.log (if DEBUG is ON for the PHDServer service):

```
".[10/06/2004 13:28:05.906] [06503] Line 165: [06010] No such tag <xxx>".
```

If you do not perform a reparse and revalidation of every calculation after a tag name change, the above type of error occurs. The error message provides an indication of the error. You can then make appropriate fixes to make the calculation valid again.

3.4 Virtual Tag Statements

Valid statements are as follows:

```
IF expression THEN
   statements
ELSEIF expression THEN
   statements
ELSE
   statements
ENDIF

RETURN expression
```

The `RETURN` statement returns the value of the expression as the value of the tag or function.

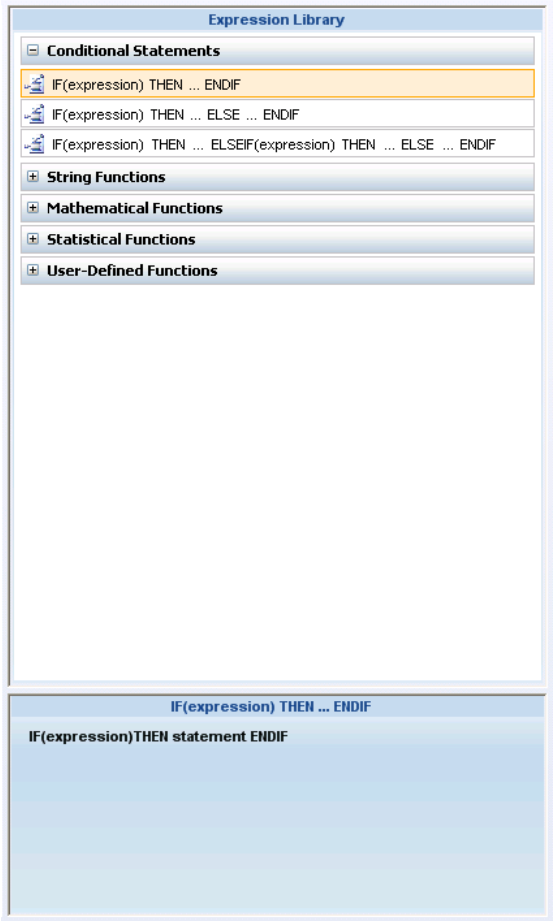
An expression is evaluated as true if its result is non-zero.

Using the Expression Library

A collection of intrinsic PHD functions appears on the right side of the calculation text box. The functions are grouped by categories that can be expanded if you click the header to reveal the individual expressions.

Moving the mouse over an expression highlights it.

If you double click the highlighted expression or drag and drop the expression, the calculation text box inserts the expression at the point where the cursor is currently located.



PHD Function Definitions that are validated and moved to Production, show up as User-Defined Functions.

3.5 Virtual Tag Expressions

An expression consists of a string of identifiers and operators, with parentheses indicating precedence of calculation. Identifiers may be any of the following:

- Numeric Constants
- Tag Specifications
- Function References
- Argument References
- String Constants

3.5.1 Numeric Constants

Numeric constants consist of constant numeric values, with optional decimals.

Example:

45.3

105

3.5.2 Tag Specifications

A tag specification is a tag name or a tag name with options in the following format:

```
TAGNAME {["units"] [, TIME_DELTA_TAG] [, START_OFFSET][, END_OFFSET,  "rcode"]}
```

Where:

Option	***Definition***
Units	The desired engineering units for the tag values.
time_delta_tag	A tag name that holds a PHD integer time as a value. If specifying a time_delta_tag, the value for the tag is the delta between the value of the tag at the current tag timestamp processed, and the value of the tag at the time specified by the time_delta_tag value.
start_offset	A constant integer number of seconds on which PHD offsets values for the tag from the current timestamp. In the example tfn002{,,-60}, PHD uses the tag value 60 seconds before the current tag timestamp, allowing

Option	*Definition*
	comparisons between values for a tag at various offset times. Note: PHD applies the start offset after completing any time_delta_tag processing. Alternatively, if you are also specifying an end_offset, PHD interprets start_offset as an offset for the start range of a reduction specified by rcode.
end_offset	A constant integer number of seconds that specifies the end of a time range that a data reduction is performed over. PHD interprets the end_offset as an offset from the current tag timestamp being processed.
Rcode	A text string indicating the required PHD data reduction over the time range specified by start_offset and end_offset.

Valid "rcode" values are:

Reduction Code	Description
FIRST	The value at the start time of the specified time range.
LAST	The value at the end time of the specified time range.
AVG	The average of time range.
DELTA	Value at end_offset minus value at start_offset.
MAX	Maximum value in time range.
MIN	Minimum value in time range.
REGSLOPE	Linear regression slope of values in time.
STDEV	Standard deviation over time range.
RAVG	Raw average over time range.

Note: Reductions are supported for Integer tags with the exception of Standard Deviation and Regression Slope that are supported for F and D tags.

If you use an integer tag as the input data for a REGSLOPE or STDEV reduction calculation, no data is returned and returns the End-Of-Data error. For example, the following calculation returns the E-O-D error when INTTAG is defined as integer tag type: `RETURN INTTAG{,,-10,0,"REGSLOPE”}`

Confidence of calculated data and EOD errors

A Demand Calculation (virtual) tag does not have stored values that you can retrieve similar to a Collection tag. The values do not exist for a calculation tag until you run a successful calculation. When you query a calculation tag, you must specify a time interval for the calculation:

- For data request intervals that permit the calculation to generate values, PHD indicates good values with 100% confidence and bad values with a 0% confidence.
- For intervals where the calculation cannot generate any values, PHD returns an EOD (End-Of-Data) error message.

Tag specification examples and guidelines

Following is an example of a rolling ten-minute standard deviation around the current tag timestamp being processed:

```
TFN002{,,-300,300,"STDEV"}
```

Following is an example of a rolling one-hour average for the hour prior to the current tag timestamp being processed:

```
TFN002{,,-3600,0,"AVG"}
```

The valid options for various tag data types are as follows:

This option…	Is valid for these tag data types…
Units	F (floating) and D (double precision) data type tags
TIME_DELTA_TAG	F (floating) and D (double precision) data type tags
START_OFFSET	tags of any data type
END_OFFSET	F, D, L or I data type tags only
Rcode	F (floating) and D (double precision) data type tags[See Note] Reduction processing may not be specified for tag requests with TIME_DELTA_TAG.

Note: If you use an integer tag as the input data for a REGSLOPE or STDEV reduction calculation, no data is returned and it returns the End-Of-Data error. For example, the following calculation returns the E-O-D error when INTTAG is defined as integer tag type: `RETURN INTTAG{,,-10,0,"REGSLOPE”}`

Integer, Long, Double Precision, and Floating data type tags are handled as numeric and may be intermixed in expressions. The restrictions are stated in the previous table.

Tag Specification allows nested calculated tags (a module may reference another calculated tag as part of its specification).

Example:

```
FIC0032

FIC0035{"M3"}

FIC0045{"M3",TIM0045}

FIC0043{,TIM0043,-300}
```

Recursive calculations can be permitted with the parameter `TAG_CIRCLE=1`.

ATTENTION

Care must be taken when using calculations that are circular in nature. If a circular calculation does not properly resolve, it can cause unstable operation, high CPU usage, or system crashes in the PHD Server.

3.5.3 Function References

Functions are referenced as: FUNCTION_NAME ([expression][,expression]...)
The number of expressions given as arguments must match the function declaration for the specified function. Since function arguments are any valid expression, function calls may be nested as arguments.

Example:

```
MASSCOMP(FIC0032, TCC0032)

CFACTR(FIN0034*1.05)
```

Intrinsic (built-in) Functions

ASCII Time Conversion

The ASCII time conversion function returns internal integer time as an ASCII formatted string. The function is formatted as follows:

```
$ASCTIM(integer time expression [, time format code
[, gmt conversion]])
```

Where:

Value	***Description***
integer time expression	An expression that results in an integer time.
time format code	An optional integer code specifying the ASCII time format:

Code	***Return***	***For***
0 =	DD-MM-YY HH:MM:SS	Oracle type format
1 =	DD-MMM-YY HH:MM:SS	This is the default
2 =	YYYY-MM-DD HH:MM:SS	Sortable format
3 =	YYMMDDHHMMSS	Compressed-Sortable
4 =	MM/DD/YY HH:MM:SS	Sortable format
5 =	YY/MM/DD HH:MM:SS	Sortable format

gmt conversion — An optional integer code specifying the type of conversion to be applied to the integer time value:

Code	***Return***
0 =	No conversion performed. This is the default.
1 =	Convert integer time as local time to GMT time.
2 =	Convert integer time as GMT time to local time.

Other intrinsic functions

The following table lists the other valid intrinsic functions.

ATTENTION

All mathematical functions interpret angles as radians.

Function	Description
`$MIN(expression, expression [,expression]...)`	Gives the minimum value from the variable list of expressions. Character string data is allowed. String and numeric data types may not be mixed.
`$MAX(expression, expression [,expression...])`	Gives the maximum value from the variable list of expressions. Character string data is allowed. String and numeric data types may not be mixed.

`$TIME()`
or
`$TIME("dd-mmm-yy hh:mm:ss")`
	With no argument, this function gives the current data timestamp being processed.
	
	With a time specification, this function gives the equivalent integer timestamp matching the specification. Keywords such as TODAY, NOW, and YESTERDAY are supported.
	
	Time is given as the number of seconds since Midnight, January 1, 1970.

`$LOOKUP(expression, X1:Y1, X2:Y2,...Xn:Yn)`	Returns a linear interpolated Y value for the specified X expression, given X and Y pairs that describe a continuous segmented function. For an expressed value outside the provided X:Y pair range, PHD extrapolates based on the slope of the nearest segment. Examples: `$LOOKUP(5,0:1,1:2,10:20)` returns the value 10. `$LOOKUP(-1,0:1,1:2,10:20)` returns the value 0.
`$CONF(expression)`	Gives the confidence factor (0-100) for the expression.
`$ABS(expression)`	Absolute value of the expression.
`$EXP(expression)`	Natural log base *e* raised to the power of the expression.

Function	Description
`$LOG(expression)`	Natural logarithm of the expression.
`$LOG10(expression)`	Base 10 logarithm of the expression.
`$SIN(expression)`	Sine of the angle given by the expression.
`$COS(expression)`	Cosine of the angle given by the expression.
`$TAN(expression)`	Tangent of the angle given by the expression.
`$ASIN(expression)`	Arc-sine angle of the expression value.
`$ACOS(expression)`	Arc-cosine angle of the expression value.
`$ATAN(expression)`	Arc-tangent angle of the expression value.

String processing intrinsic functions:

`$LEN(expression)`	Returns the length of the given character string expression as an integer.
`$PAD(expression1 [,expression2])`	Pads expression1 with trailing characters. If the optional expression2 is given, the first character in expression2 pads expression1, otherwise blanks (spaces) are used as pad characters. If expression1 is given as a simple tag name, the tag value is padded to the defined length of the tag name. If expression1 is not a simple tag name, it is padded out to the maximum allowable data length (parameter MAX_VALLEN).
`$TRIM(expression1 [,expression2])`	Strips trailing characters from expression1. If the optional expression 2 is given, the first character in expression2 is considered to be the padding character to be stripped - otherwise, blanks (spaces) are stripped.

Function	Description
`$SUBSTR(expression, position_expression, length_expression)`	Extracts a substring from a character string expression. The first (leftmost) character is considered to be in position 1. Position and length values larger than 100 may give unpredictable results. For example: `$SUBSTR("AB"+"C",2,2) gives "BC"`
`$AVG(tag1,…,tagn)`	Performs an average calculation for all the entered tags. "n" must be less than 32.
`$SSTDEV(tag1,…,tagn)`	Performs a standard deviation calculation for the list of tags. "n" must be less than 32. Can only be used with F (floating) and D (double precision) data type tags.

`CONF value`	Used for setting the confidence for a returned value.
	
	An expression like the following allows a virtual tag to return a value with confidence 0:
	
	`"`
	
	`CONF 0`
	
	`RETURN (value that you want)`
	
	`"`

`$RAVG(tag1,…,tagn)`	Performs a non-weighted, raw average calculation for all the entered tags. "n" must be less than 32.
`$LSTIME(tag)`	Returns the timestamp of the last raw value stored for a particular tag. The return value is an integer timestamp value. This value can be converted to a string using the $ASCTIM function. **Note:** This function is used primarily with manual data, such as lab values or manually input readings, to report the age of the data.

3.5.4 Argument References

An argument declared in a function may be referenced as a value identifier within that function. The argument is passed as a single value to the function.

In the following example, MYTAG is a function argument:

```
FUNCTION DOUBLE(MYTAG)
RETURN MYTAG * 2
ENDFUNCTION
```

Here is an example of illegal use of a function argument:

```
FUNCTION ILLEGAL_USE_OF_ARG(MYTAG)
RETURN MYTAG{"M3"} // !
ENDFUNCTION
```

3.5.5 String Constants

A string constant is specified as an identifier by enclosing a text string within double quotes (mixed upper/lower case is allowed). For example: `“Active”`

3.6 Virtual Tag Operators

Expression operators are listed as follows (A and B denote identifiers or expressions):

Operator	*Description*
A + B	Addition (or string concatenation).
A – B	Subtraction.
A * B	Multiplication.
A / B	Division.
A % B	Remainder of A/B (zero if B is zero).
A ^ B	Raise A to the power of B.
A & B	1 if both A and B are non-zero, otherwise 0.
A | B	1 if either A or B are non-zero, otherwise 0.
A = B	1 if A equal to B, otherwise 0.
A != B	1 if A not equal to B, otherwise 0.
A > B	1 if A greater than B, otherwise 0.
A >= B	1 if A greater than or equal to B, otherwise 0.
A < B	1 if A less than B, otherwise 0.
A <= B	1 if A less than or equal to B, otherwise 0.
! A	Logical negate, 1 if A is zero, otherwise 0.
- A	Unary negative.
+ A	Unary positive.

The resultant confidence factor of any operations involving two identifiers is assigned as the lesser of the two confidence factors.

The comparison operators (`=, !=, >, >=, <, <=`) may be used on character string data. PHD performs the comparison on a character-by-character basis, with the left-justified characters being of highest precedence. The result of such a comparison is a numeric 1 (true) or 0 (false).

Example:

```
(CHARTAGA = "BLUE") & (CHARTAGB = "RED")
```

If both comparisons are true, this equates to 1 & 1, which gives a net result of 1.

The other operators may not be directly applied to character string data, except for the + operator, which may be used for concatenating two character strings.

Implied operator precedence is listed in increasing precedence as follows:

Operator	Description
`&, |`	Logical and, or.
`<, <=, =, !=, >=, >`	Logical comparison.
`+, -`	Addition, subtraction.
`*, /, %`	Multiplication, division, or remainder.
`^`	Raise to power.
`!, -, +`	Logical negate, unary positive, or negative.
`( )`	Parenthesis.

ATTENTION

Expressions with logical operators must contain parenthesis if the precedence is ambiguous. For example, `A & B | C` must be specified as

(A & B) | C

Or

A & (B | C)

3.7 Virtual Tag Syntax Examples

A flow switch tag, FLOWSW:

```
RETURN FIC0002{"BPD"} > 0.5 & !SWTAG2
```

A correct silo inventory tag, SILOINV:

```
IF INFLOWTAG > OUTFLOWTAG THEN
       RETURN LEVELTAG * 145.2 + 109
ELSE
       RETURN LEVELTAG * 145.2 - 109
ENDIF
```

A switch state character function, SWCODE, with one input argument, INSWSTATE:

```
IF ! INSWSTATE THEN
       RETURN "OPEN"
ELSEIF INSWSTATE = 1 THEN
       RETURN "OPENING"
ELSEIF INSWSTATE = 2 THEN
       RETURN "CLOSING"
ELSE
       RETURN "CLOSED"
ENDIF
```

A particular switch code tag, SW002CODE uses the above function (SWCODE):

```
RETURN SWCODE (SW002STS)
```

A particular tag, FN0002EFF:

```
IF $TIME() < $TIME("TODAY") THEN
       RETURN 0 // Nothing happened before today
ELSE
       RETURN FN0002EFF
ENDIF
```

A derived inventory for silo tag, CALC_INVENTORY:

```
RETURN BASETAG{"KG"} + INFLOWTAG{"KG",BASETIMETAG} -
       OUTFLOWTAG{"KG",BASETIMETAG}
```

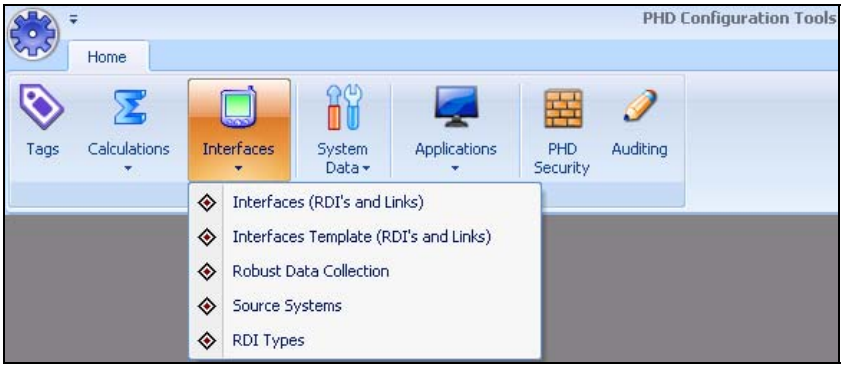
A rolling last 24-hour average tag, TF0034_24HR:

```
RETURN TF0034{"DEGC",,-86400,0,"AVG"}
```

4. Configuring PHD Tag Synchronization Rules

4.1 Creating Rules

PHD Tag Synchronization Rules can be created interactively using the RDI Types Configuration form.



Rules are configurable for EXPERION, OPC, and PEER RDI Types. Selecting one of these three types will activate the Tag Synchronization Rules tab and allow you to create or modify rules.

Tag synchronization rules follow the VB.Net syntax.

Each Tag Sync rule executes as a method of a tag definition. Within this tag definition, there are a set of member variables and methods that are common to all system types. There is also a set of member variables that are specific to the RDI type. You can use rules to configure common and system-specific variables.

4.2 TagDef Common Member Variables

The TagDef class contains the following common member variables (properties) that can be referenced. They are defined for all source system types.

```
String      TagName
Long        TagNo
Boolean     Active
Boolean     ClassTag
String      TagUnits
String      ParentTagName
Long        ParentTagNo
String      Description
Boolean     Collection
```

```
Boolean      DemandCalculation
Boolean      ManualInput
Boolean      PutDownload
Boolean      AllowDataStore
Boolean      AllowDataEdit
Boolean      ArchiveResample
String       SourceTag
Long         SourceTagIndexA
Long         SourceTagIndexB
Long         SourceTagIndexC
Long         SourceTagIndexD
String       SourceSystem
String       SourceTagType
String       SourceTagAttrib
String       SourceTagUnits
String       RDI/LinkCollector
Long         ScanFrequency
Double       SourceDeadband
String       ScanTimestampUnit
Double       Tolerance
String       ToleranceType
Double       GrossErrorSigmaLimit
Long         GrossErrorSamples
Double       SmoothingConstant
Double       NoiseGateLevel
Double       CompressionToleranceFactor
Double       MinimumCompressionTolerance
Double       HighExtreme
Double       LowExtreme
Double       Quantum
Long         SpecQueueSize
String       ResampleMethod
Long         ExtrapolationDamping
String       InterpolationMethod
Long         PercentRecordFill
String       UserDefined1
String       UserDefined2
Double       HIHILimit
Double       HILimit
Double       LOLimit
Double       LOLOLimit
Boolean      HIHIEnable
Boolean      HIEnable
Boolean      LOEnable
```

```
Boolean      LOLOEnable
Boolean      SubSecondEnable
Boolean      DigitalEnumEnable
Long         DigitalEnumListID
Boolean      SynchronizationEnable
String       PointName
String       Parameter
String       Asset
String       Item
DateTime     TimeStamp
String       MachineName
String       RuleName
String       Function
Long         Status
```

4.3 TagDef Methods

The TagDef class contains the following methods that can be referenced.

Substr

```
Public Function Substr( String input, Integer StartLoc,
Integer Count, Char pad ) As String
```

Returns the substring of a string that begins at the *StartLoc* character and is of length *Count*, padded with *pad* characters if necessary. *StartLoc* must be positive. Startloc is a zero based index. If count is omitted, sub-string to the end of input is assumed. If Startloc is omitted, then the input is duplicated.

Obsolete: This functionality is provided by the VB.Net String.Substring method.

Examples:

```
Substr( 'abcde', 1, 2 )          == 'bc'
Substr( 'abcde', 1, 6, '.' )     == 'bcde..'
Substr( 'abcde', 2 )             == 'cde'
```

LoadTemplate

```
Public Sub LoadTemplate( String tagname )
```

The Loadtemplate function loads all of the non-blank and non-zero fields from the specified tag into the relevant variables for the current tag.

Length

```
Public Function Length( String str ) As Integer
```

Returns the number of characters in the string *str*.

Obsolete: This functionality is provided by the VB.Net String.Length member.

Output

```
Public Sub Output( )
```

Writes the current PHD tag definition structure to the staging table.

TagExists

```
Public Function TagExists( Boolean load ) As Boolean
```

Searches tag table for tag. If it exists, returns True, else returns False. If *load* is True, it is loaded as if LoadTemplate has been called.

Note: If you do not want any changes to occur when a tag already exists in the database, you can use the following syntax as an alternative to regular expression matching:

```
If tagExists(True) then

//do nothing

Else

//do what is needed for new tag

End If
```

Acknowledge

```
Public Sub Acknowledge( )
```

Implicitly acknowledges the tag so that it is not required to be implicitly acknowledged using the Tag Synchronization Acknowledgement form.

Discard

```
Public Sub Discard( )
```

Discards the tag definition so that no tag is created in PHD but the tag is flagged as processed so that it is not continually sent from the source system.

GetTag

```
Public Function GetTag( String tagname ) As TagDef
```

Searches tag table for the specified tag. If no tag name is specified, the tag table is searched for a tag, which matches the tag currently being processed. If the tag is found, its definition is returned.

A Uniformance.PHD.DB.NoSuchTagException is thrown if the tag does not exist in the database.

A Uniformance.PHD.DB.MultipleSyncTagsException is thrown if no tagname is specified and multiple synchronization tags exist in the database that matches the definition of the tag currently being processed.

Note: If you do not want any changes to occur when a tag already exists in the database, you can use the following syntax as an alternative to regular expression matching:

```
Dim ExistingTag as TagDef
…
Try
  ExistingTag = GetTag()
  …
Catch ex As Exception
  ExistingTag = Nothing
End Try
…
```

4.4 Experion-Specific Member Variables

Rule execution can be based on any of the following variables shown in bold.

4.4.1 Experion-specific member variables

The following member variables provide additional information for an Experion tag:

```
String      EXPDESCRIPTION
String      RANGE_LO
String      RANGE_HI
String      HISTORYINTERVAL
String      EXTENDEDHIGHRANGE
String      EXTENDEDLOWRANGE
String      ASSET                 (is inherited)
String      ENTITYTYPE
String      DISPLAYTYPE
String      ITEM                  (is inherited)
String      MACHINENAME           (is inherited)
String      PARAMETER
String      POINTNAME
String      SOURCETAGATTRIB       (is inherited)
String      SOURCETAGTYPE         (is inherited)
```

4.4.2 Pre-initialized common member variables

For an Experion tag, TagSync populates the following common variables with the appropriate values to help minimize the configuration that you need to place in the rule:

```
SourceSystem      "EXPERION"
MachineName       Experion Server Name
PointName         Experion Point
Parameter         Experion Parameter
TimeStamp         Time of definition change on Experion
Description       Experion point description
Asset             Experion Asset
Item              Experion Item
TagUnits          Units for Experion Point.Parameter
LowExteme         Experion Minimum Range
HighExtreme       Experion Maximum Range
ScanFrequency     Experion History Interval
                  (in seconds if possible)
ScanTimeStampUnit Set to "ms" if ScanFrequency in ms
SourceTagType     "I4" – Integer Datatype
                  "L8" – Long Integer Datatype
                  "US" – String Datatype
```

	"F4" – Floating Point Datatype
	"EN" – Enumeration Datatype
SourceTagAttrib	"VALUE80" – String Datatype
	"VALUE" – All other Datatypes

4.5 PEER-Specific Member Variables

All of the common member variables relating to the PEER RDI Type are either initialized or cleared out prior to the execution of the rule. For the rule to utilize this information, it is copied into an equivalent set of member variables which have their names prefixed with ***Original***.

String	CLASSTAG	(is inherited)
String	ORIGINALTAGNO	
String	ORIGINALTAGNAME	
String	ORIGINALSOURCESYSTEM	
String	ORIGINALSOURCETAG	
String	ORIGINALSOURCETAGTYPE	
String	ORIGINALSOURCETAGATTRIB	
String	ORIGINALSOURCETAGTAGUNITS	
String	ORIGINALSOURCETAGINDEXA	
String	ORIGINALSOURCETAGINDEXB	
String	ORIGINALSOURCETAGINDEXC	
String	ORIGINALSOURCETAGINDEXD	
String	ORIGINALPOINTNAME	
String	ORIGINALPARAMETER	
String	ORIGINALCOLLECTORNAME	
String	ORIGINALASSET	
String	ORIGINALITEM	
String	SOURCETAGATTRIB	(is inherited)
String	SOURCETAGTYPE	(is inherited)
String	TAGUNITS	(is inherited)

4.5.1 Pre-initialized Common Member Variables

SourceSystem	"LOCAL"
MachineName	PHD Server Name
Tagno	Empty (Seen as 0)
Tagname	Empty (Seen as "")
SourceTag	Empty (Seen as "")
SourceTagType	PHD Datatype of source tag ("F", "D", "I", "L", "C", "U", "B")
SourceTagAttrib	Appropriate attribute for SourceTagType
SourceTagUnits	Empty (Seen as "")

```
PointName          Empty (Seen as “”)
Parameter          Empty (Seen as “”)
CollectorName      Empty (Seen as “”)
Asset              Empty (Seen as “”)
Item               Empty (Seen as “”)
```

4.6 OPC and CSV-Specific Member Variables

The following member variables provide additional information for an OPC tag:

```
String       ARRIGHTS
String       DESCRIPTOR
String       EULABEL
String       HIGHEU
String       ITEMID
String       LOWEU
String       SCANRATE
String       VTYPE
```

4.6.1 Pre-initialized Common Member Variables

```
SourceSystem       “OPC”
```

4.7 Regular Expressions

4.7.1 Definition

A rule uses regular expressions to examine returned variables. If the item being examined matches its corresponding regular expression, then the Rule Text is executed.

The Uniformance Tag Synchronization service uses Microsoft’s .NET Framework regular expression engine to process the matching. The regular expression syntax is documented in the Microsoft Developer Network (MSDN):

REFERENCE - EXTERNAL

- *.NET Framework Developer’s Guide*, “.NET Framework Regular Expressions”:

  http://msdn2.microsoft.com/en-us/library/hs600312(vs.71).aspx

- Regular Expression Syntax (Scripting) - .NET Framework 2.0:

  http://msdn2.microsoft.com/en-us/library/1400241x(vs.80).aspx

- Regular Expression Syntax (Scripting) - .NET Framework 3.0:

  http://msdn2.microsoft.com/en-us/library/1400241x.aspx

4.8 Templates and Parent Tags

Specifying a Parent Tag in the Rule puts the specified tag name in the Parent Tag Name field of the PHD tag definition structure, allowing the parent's definitions to be inherited:

```
(ParentTagName = ('<tagname>')
```

Loading an existing PHD tag as a Template loads all that tag's fields that are non-blank or non-zero into the tag definition structure, except the tagname and number:

```
(LOADTEMPLATE ('<tagname>')
```

4.9 Default Tag Synchronization Rule for Experion

```
'Set the Parent Tagname to the default Experion Parent tag. Also
'set the tagname to the point.parameter UNLESS the combination
'of these two is greater than 32 characters. In this case, let TagSync
'define the tagname which can be updated later.
ParentTagName = "EXP_PARENT"
TagName = PointName + "." + Parameter
If (Tagname.Length > 32) Then
  Tagname = Nothing
End If

'If this is an enumeration, set the attribute to a string.
If (SourceTagType = "EN") Then
  SourceTagAttrib = "STRING"
End If

'By default the rules are implicitly acknowledged. Delete the following
'line if this is not desired.
Acknowledge()
```

4.10 Default Tag Synchronization Rule for Peer

```
'The default rule for parent tags prepends "GTWY_" to the parent
'tagname. This assumes that all lower level PHD Systems share
'common definitions of parent tags. If this is not the case, this needs
'to be modified.
if (ParentTagname <> "") then
  ParentTagname = "GTWY_"+ParentTagname
End If

'Appropriate logic is required to set the tagname for the tag. The default
'here is to use the same tagname as on the source system.
Tagname=SourceTag

'Appropriate collector name logic is required here
'Typically multiple collectors will be established for each PHD Server

CollectorName = MachineName

'By default the rules are implicitly acknowledged. Delete the following
'line if this is not desired.
Acknowledge()
```

4.11 Class Tag Synchronization Rule for Peer

```
'Prepends "GTWY_" to the parent tagname. This assumes that all
'lower level PHD Systems share common definitions of parent tags.
'If this is not the case, this needs to be modified, as does the
'DEFAULT rule.
Tagname = "GTWY_"+SourceTag

'Prepend 'GTWY_' to the parent tagname.
```

```
if (ParentTagname <> "") then
   ParentTagname = "GTWY_"+ParentTagname
End If

'If parent tags are replicated from lower level PHD Systems, it is
'essential that the parent tags be implicitly acknowledged. If they
'are not, the system cannot validate the individual tags properly.
Acknowledge()
```

4.12 Default Tag Synchronization Rule for OPC

```
'This rule has been written for a CSV file containing column names that
'correspond to the names used within the browse interface. Specifically,
'it requires the RDITYPE, COLLECTORNAME, ITEMID, DESCRIPTOR, EULABEL, HIGHEU, LOWEU,
' SCANRATE and VTYPE. Also, the SOURCESYSTEM column must specify "OPC".
'The VTYPE column can have one of two formats, either the name of the variant
'type (i.e. "VT_I4", "VT_R4") or the numeric value of the variant type.

Dim dataType As System.Runtime.InteropServices.VarEnum
Dim dataStr As String

Collection = True
DataStore = True

'If the length of the ItemID is greater than 32 use the Parameter to hold
'the source tag information. Otherwise, use the SourceTag field and also
'set the Tagname.
If (ItemID.Length > 32) Then
    ExtendedSourceTag = ItemID
Else
    SourceTag = ItemID
```

```
    Tagname = ItemID
End If

Description = Descriptor
TagUnits = EULabel
HighExtreme = HighEU
LowExtreme = LowEU
ScanFrequency = ScanRate

'Determine the variant type from the VTYPE column. First, assume that
'the column is an integer representing the variant type. If converting the
'integer fails, assume that it is a string representation (i.e. "VT_I4").
Try
    dataType = CInt(VType)
    dataStr = dataType.ToString()
Catch ex As System.Exception
    dataStr = VType
End Try

SourceTagAttrib = "VALUE"
Select Case dataStr
    Case "VT_BSTR", "VT_LPWSTR"
        SourceTagType = "US"
        SourceTagAttrib = "VALUE80"
    Case "VT_I1", "VT_I2", "VT_I4", "VT_INT", "VT_UI1", "VT_UI2", "VT_UI4", "VT_UINT"
        SourceTagType = "I4"
    Case "VT_I8", "VT_UI8"
        SourceTagType = "L8"
    Case "VT_R4"
        SourceTagType = "F4"
```

```
    Case "VT_R8"
        SourceTagType = "D8"
    Case "VT_LPSTR"
        SourceTagType = "AS"
        SourceTagAttrib = "VALUE80"
    Case Else
        SourceTagType = "AS"
        SourceTagAttrib = "VALUE80"
End Select

'By default the rules are implicitly acknowledged. Delete the following
'line if this is not desired.
Acknowledge()
```

Glossary

ACS

Advanced Control System

DCS

Digital control system.

PHD

Honeywell's Process History Database (PHD) provides for the real-time data capture, historization, and intelligent data retrieval of process data required for support of plant information systems. The result of extensive experience in interfacing real-time systems with plant information systems, PHD forms a comprehensive platform that supports an entire family of integrated plant information system modules.

RDC

Robust Data Collection. The methodology for transferring data from a PHD collector node to a PHD shadow node. RDC also provides the ability to configure a standby collector node to handle collection of data from the source system should the active collector node fail or be taken out of service – this application of RDC is used for RDIs (such as the TDC_LXS RDI) that do not have source system history recovery capability.

Tag Name

A tag name identifies storage location for data in the PHD data historian. It may correspond to a process variable or set point on a distributed control system, a calculation or function of several other tag name values, quality information from the laboratory, or conditions from environmental monitoring.

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