uniformance

# PHD Tag Configuration and Tuning

# Lesson Objective

## Objective

Configure PHD tags and identify and correct tag configuration errors.

## Topics

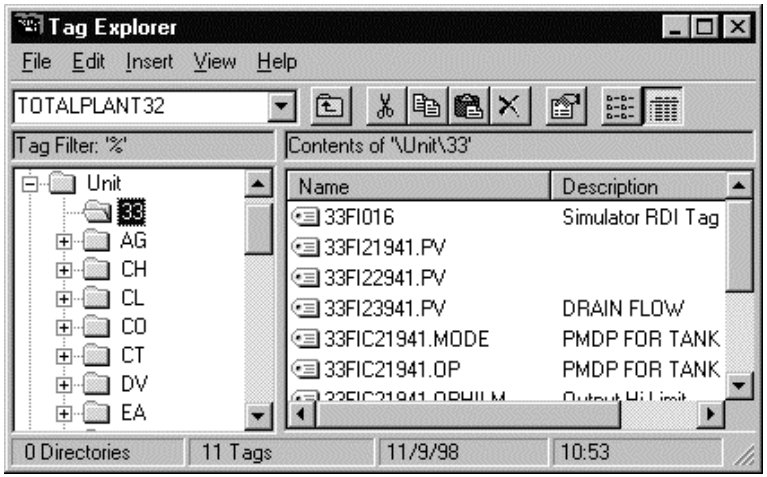
- Configuring tags
  - tags and tag classes
  - tag definition fields
- Tag tuning and tag monitoring
  - tag data monitoring
  - tuning objectives
  - statistical PHDMAN reporting

# PHD Terminology

- **Tag**
  - Point.Parameter
  - TIC100.PV, TIC100.SP
- **Attribute**
  - Parameter
- **Parent Tag** (template)
  - Point Class
  - Used for simplification of initial configuration and ongoing maintenance through dynamic inheritance.

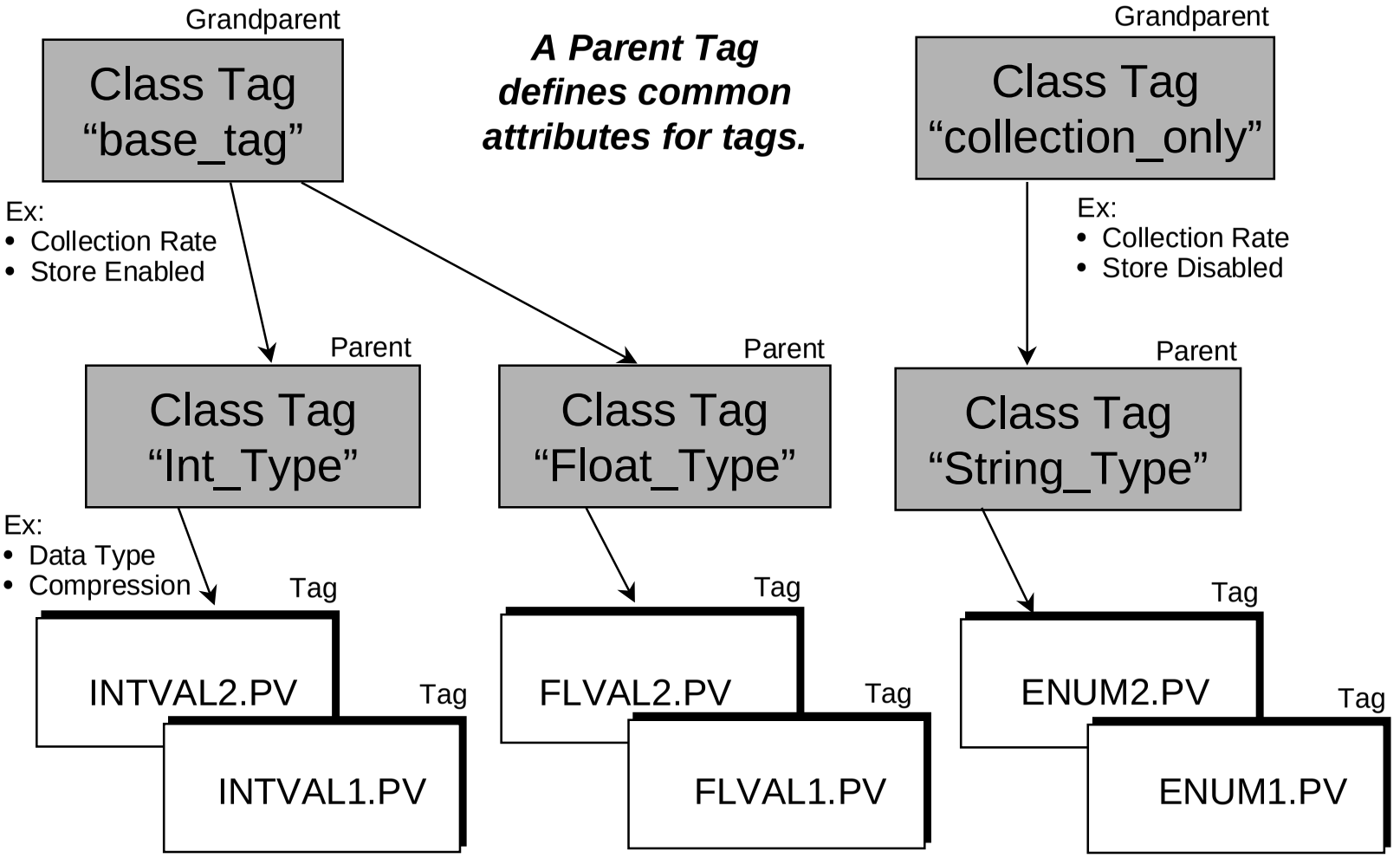
# PHD Tag Definitions

- All PHD Data is referenced by tag name. Tag Ids(numbers) are used internally
- Tagnames can be the same as DCS or can be different (Not recommended)
- Tagnames are case sensitive. It is a good idea to make Tagnames all capital letters.
- Tagnames can include a prefix and/or suffix
  Ex. LCN1.F131.PV
  Ex. SRC_A.F131
- Do not use special characters in Tagnames (such as brackets and asterisk).
- There can be several PHD tags for a DCS point
  Ex. F131.PV, F131.SP, F131.OP
- Tags can be used for collected data, manually entered data, and calculated (Virtual Tag) data.
- Helpful Hint: The Tag Explorer desktop application (used by end users to locate PHD tags) automatically creates “unit” directories from the first two characters of the tagnames.



# Class Tags and Inheritance (templates)

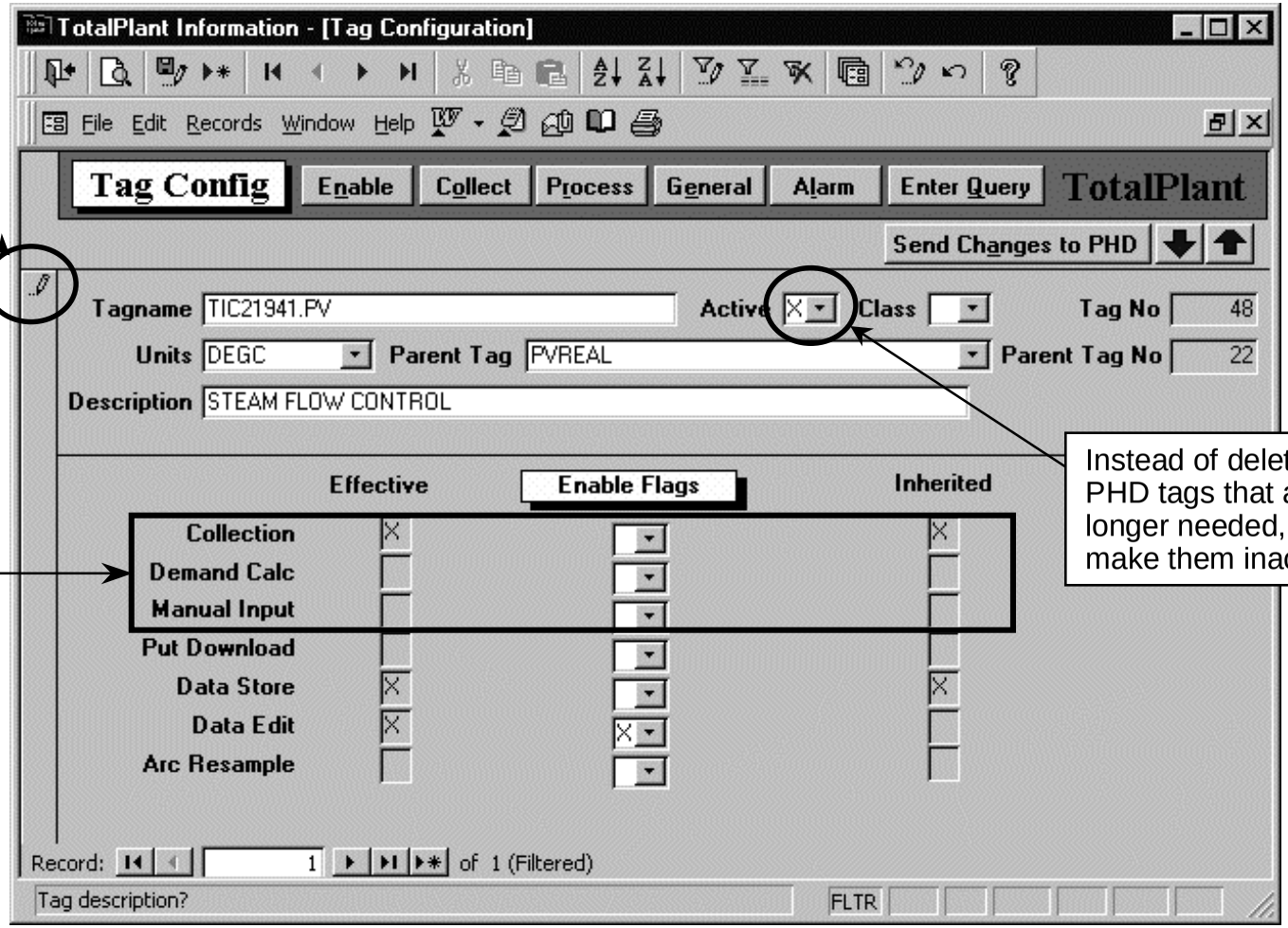
In general terms, class tags should be defined for each set of tags having similar data processing requirements. Ex. Flows with .5% tolerance, Temps with 1 degree absolute tolerance.



# Class Tags and Inheritance, continued

- Any tag attributes that are 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 a class-tag attribute is modified, any tags that inherit the attribute dynamically inherit the change. This permits the system to be configured with a set of intelligent default tag attributes.
- Initial tag definition as well as ongoing tag maintenance is simplified, as behavior of entire classes of tags can be altered by modification of the parent class-tag.
- On a per tag basis, users can override inherited tag definitions for tags that may have unique requirements within a class.
- Class tags can identify tag types such as temperatures, orifice flows, set points, or tag usage such as optimization tags.

# Tag Configuration Form



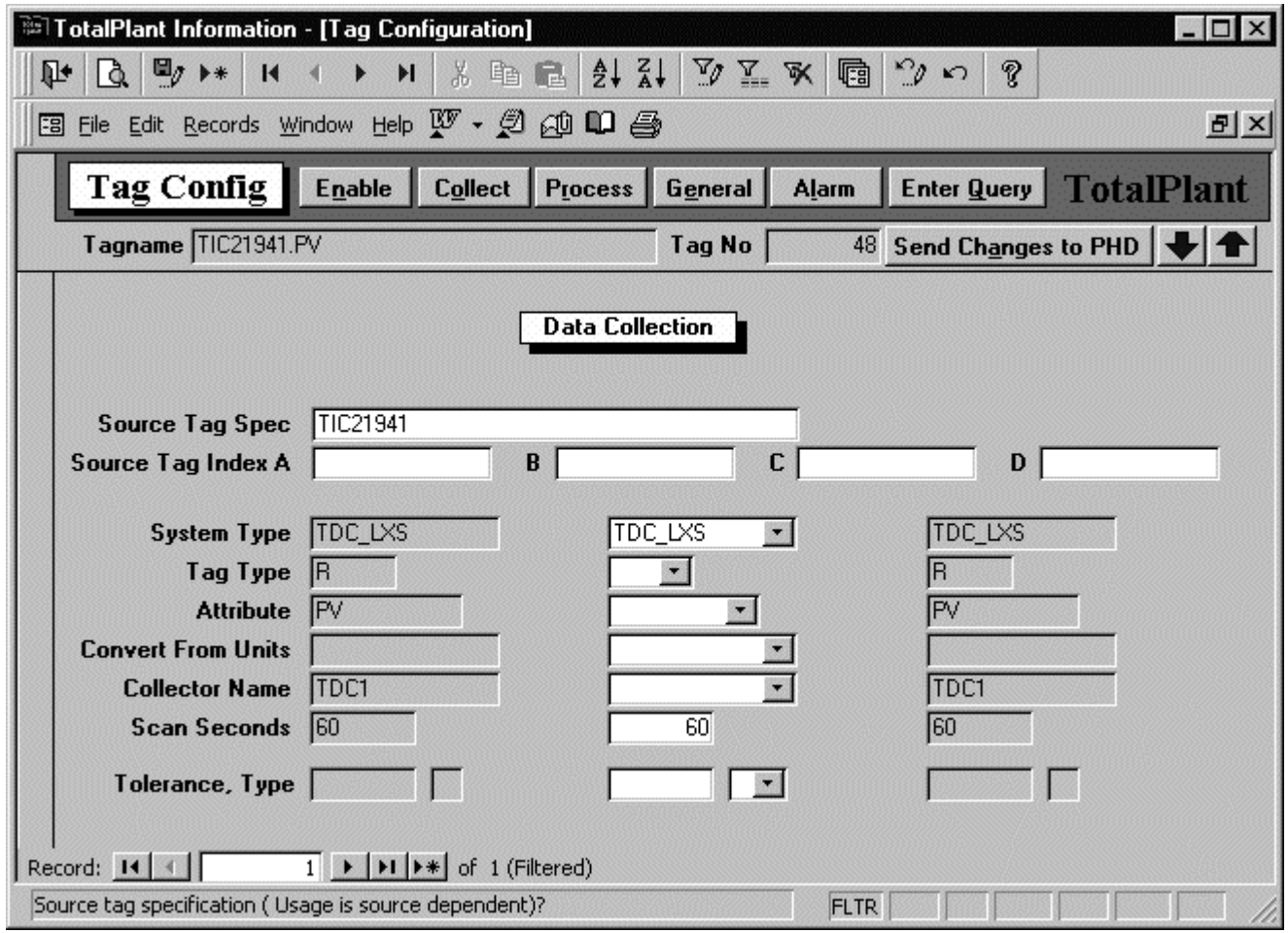

Pencil indicates unentered data. Click side bar on any page to enter data. Pencil appears on first page only.

Three types of PHD tags

Instead of deleting PHD tags that are no longer needed, you make them inactive.

For definitions of each field, refer to *PHD User Guide,* Forms.

# Tag Configuration Form, Data Collection

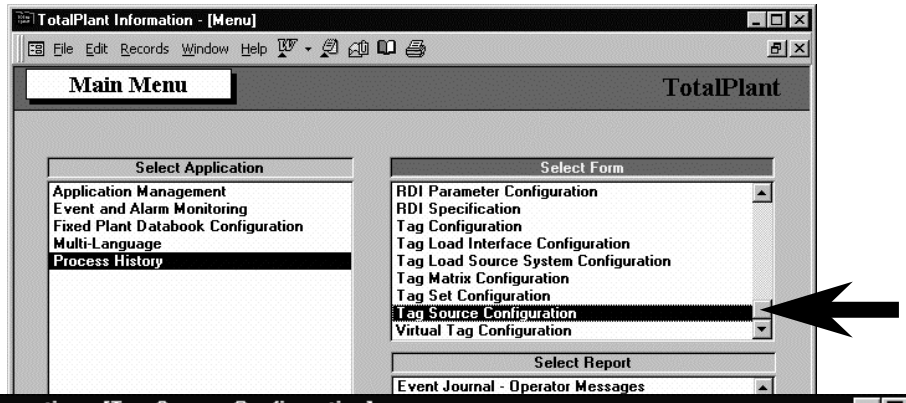


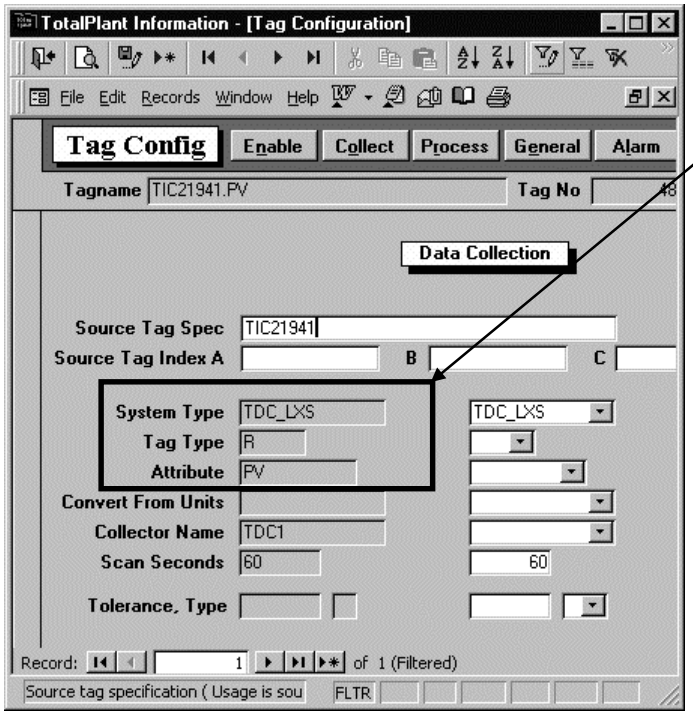

For definitions of each field, refer to *PHD User Guide,* Forms.

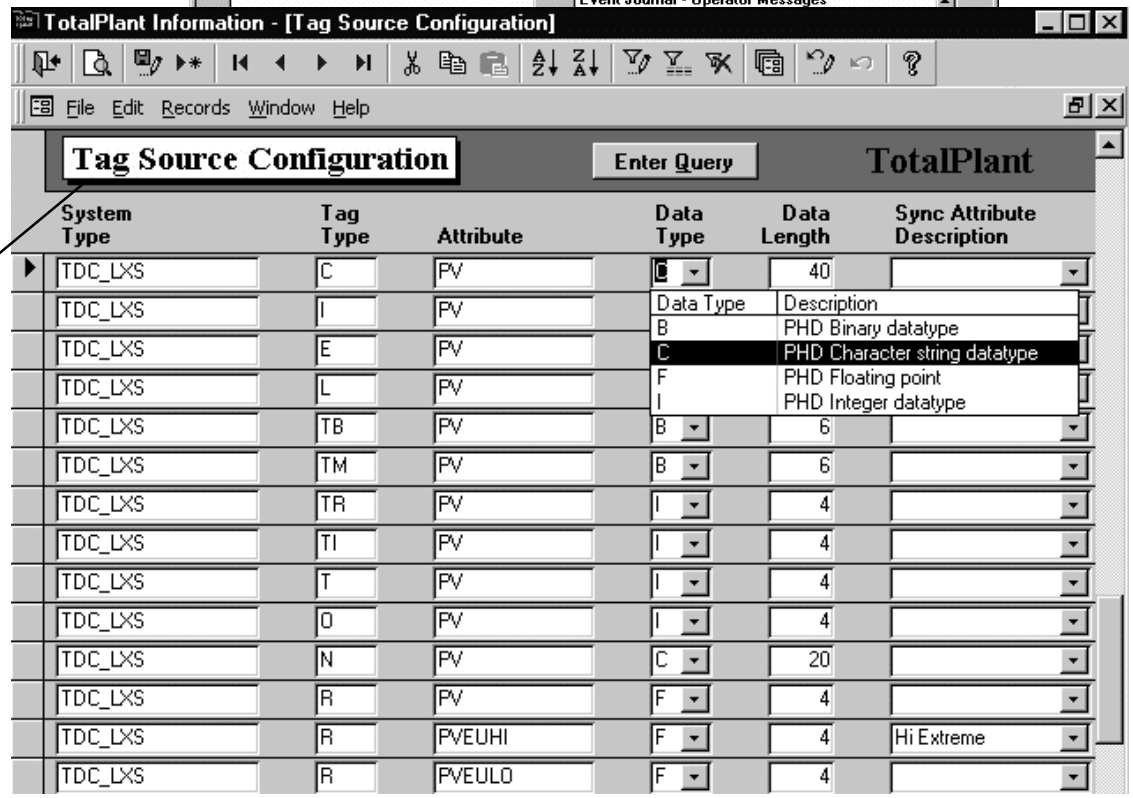
# System Type, Tag Type, and Attribute

Before configuring tags, you should check the Tag Source Configuration form. For each type of system interfacing to PHD, this form should contain all the parameter names to be collected. The form maps the parameter's tag type to the corresponding PHD data type, and defines the parameter (attribute) name and length.

The form "builds" the content of the pulldown lists for System Type, Tag Type, and Attribute in the Tag Configuration form.



# Convert From Units

**DCS Tag Configuration:**
EUDESC=BBL ⟶ M3

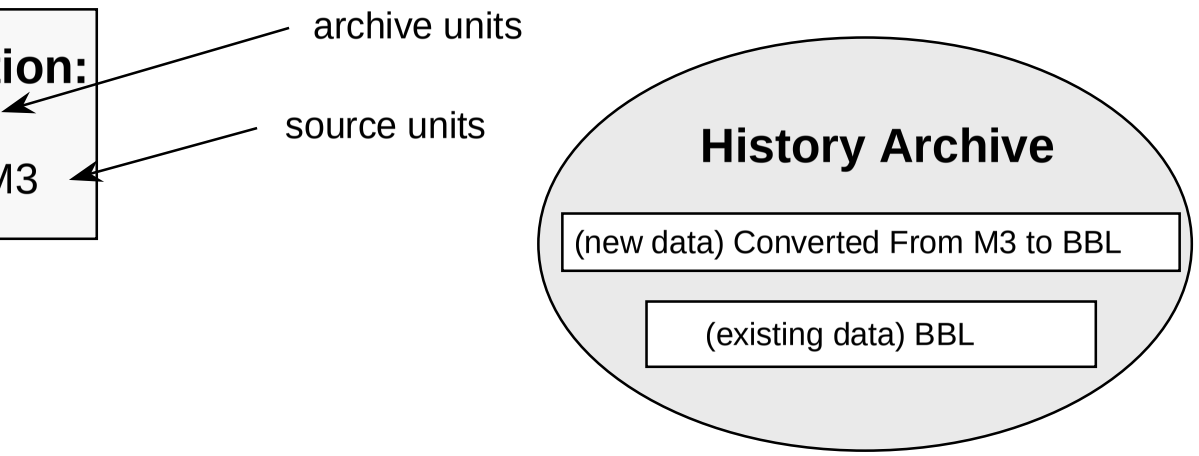
(Changed from BBL to M3)

When an instrument change is made on the DCS that changes the measurement units of the tag, modify the PHD source units for the tag, not the overall units.

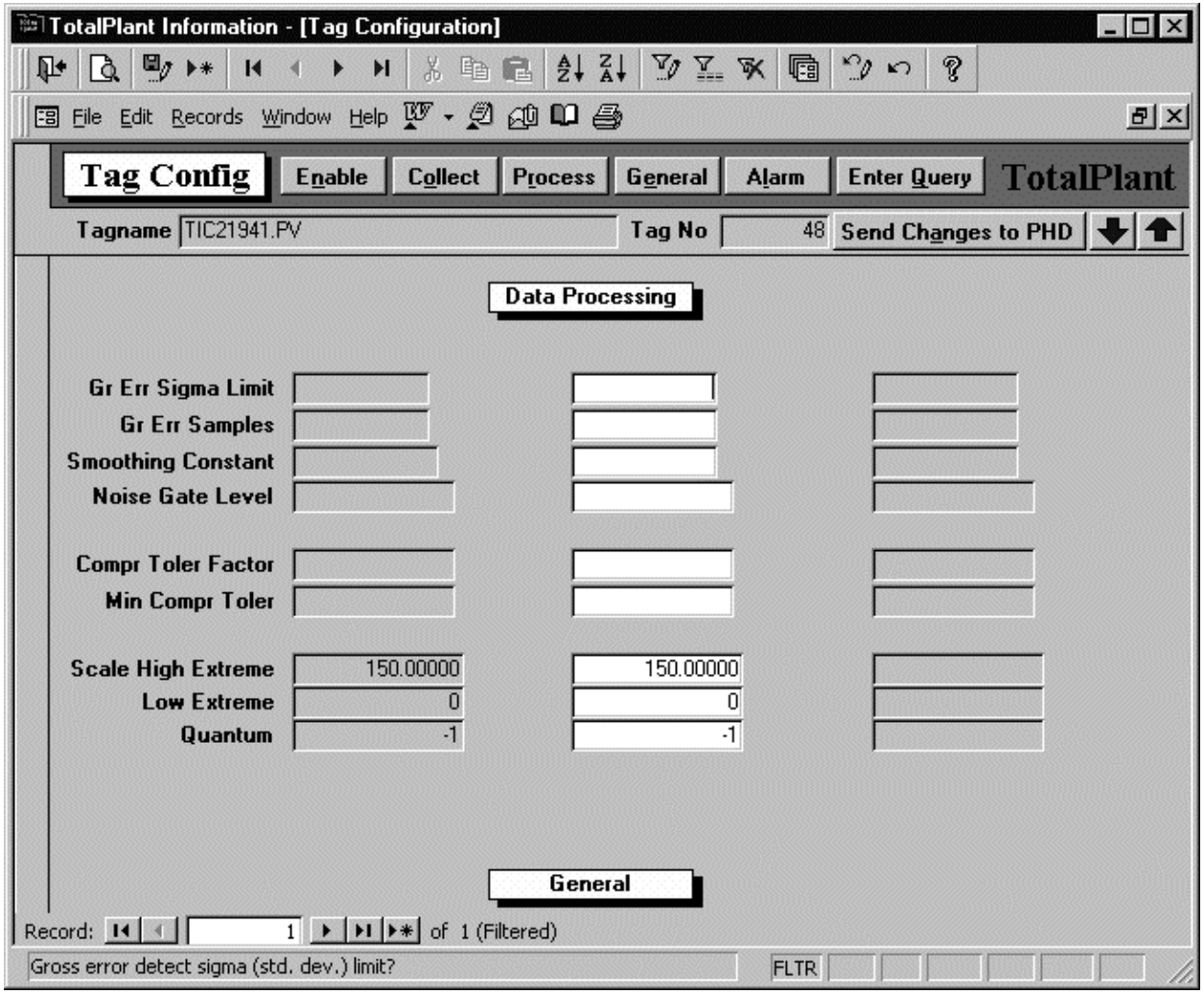
In the example shown here, if the UNITS for the PHD tag are changed to M3, all of the existing PHD data will be reported incorrectly, as if it had been collected in cubic meters, not barrels.

**Old PHD Tag Configuration:**
UNITS=BBL

**New PHD Tag Configuration:**
UNITS=BBL
CONVERT FROM UNITS=M3

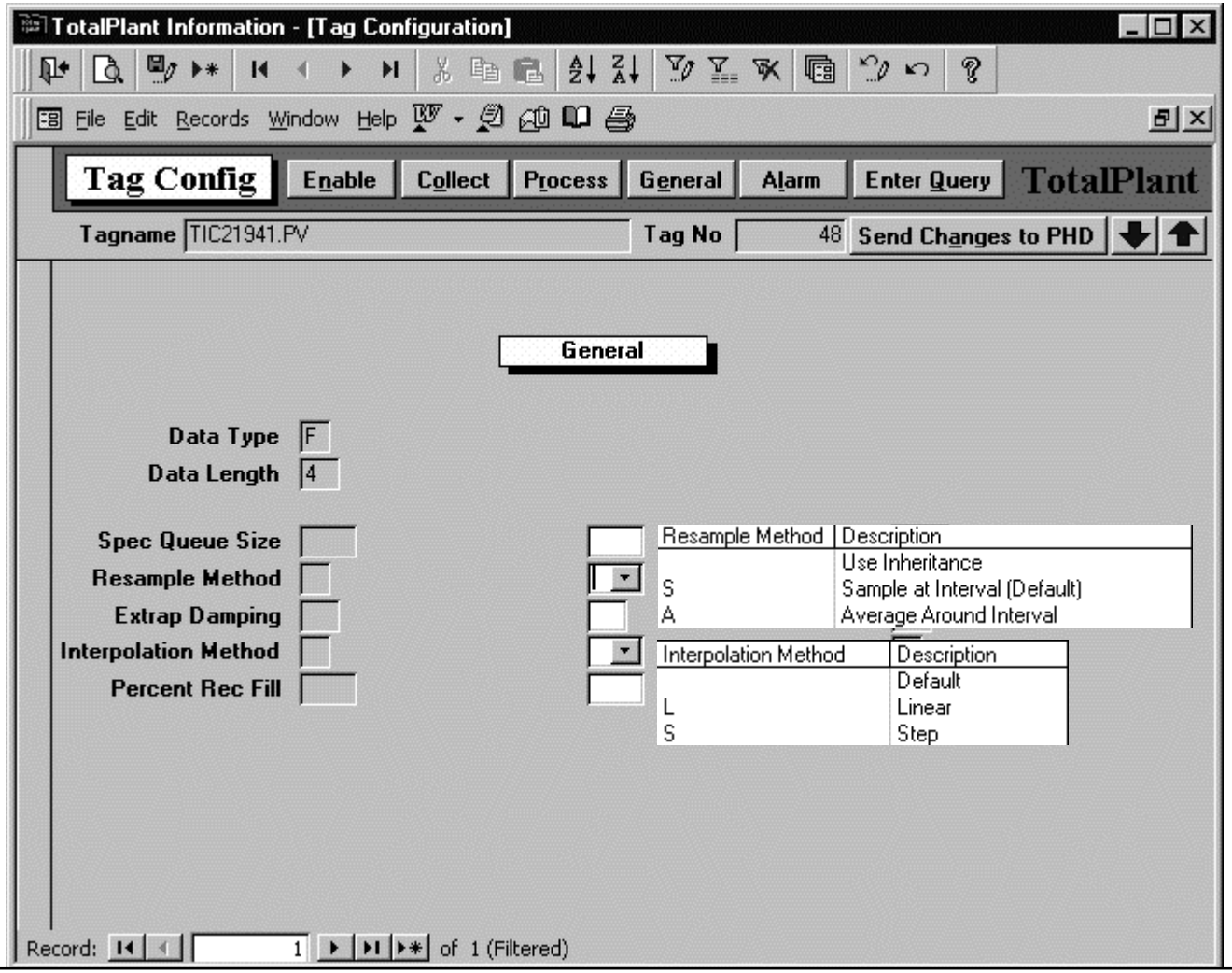


# Tag Configuration Form, Data Processing




For definitions refer to the 'PHD Data Processing Overview' training module.
For additional reference information, refer to *PHD User Guide,* Forms.

# Tag Configuration Form, General




For definitions of each field, refer to *PHD User Guide,* Forms.
For additional reference information, refer to the 'PHD Data Processing Overview' training module.

# Data Resample Method

Data resampling provides a means of retrieving data from PHD as samples or averages at constant time intervals. PHD resamples data on demand by an application program when requesting data for a tag (retrieve data for multiple tags, specifying the same resampling interval for each tag).

Methods of Data Resampling (configurable per tag):

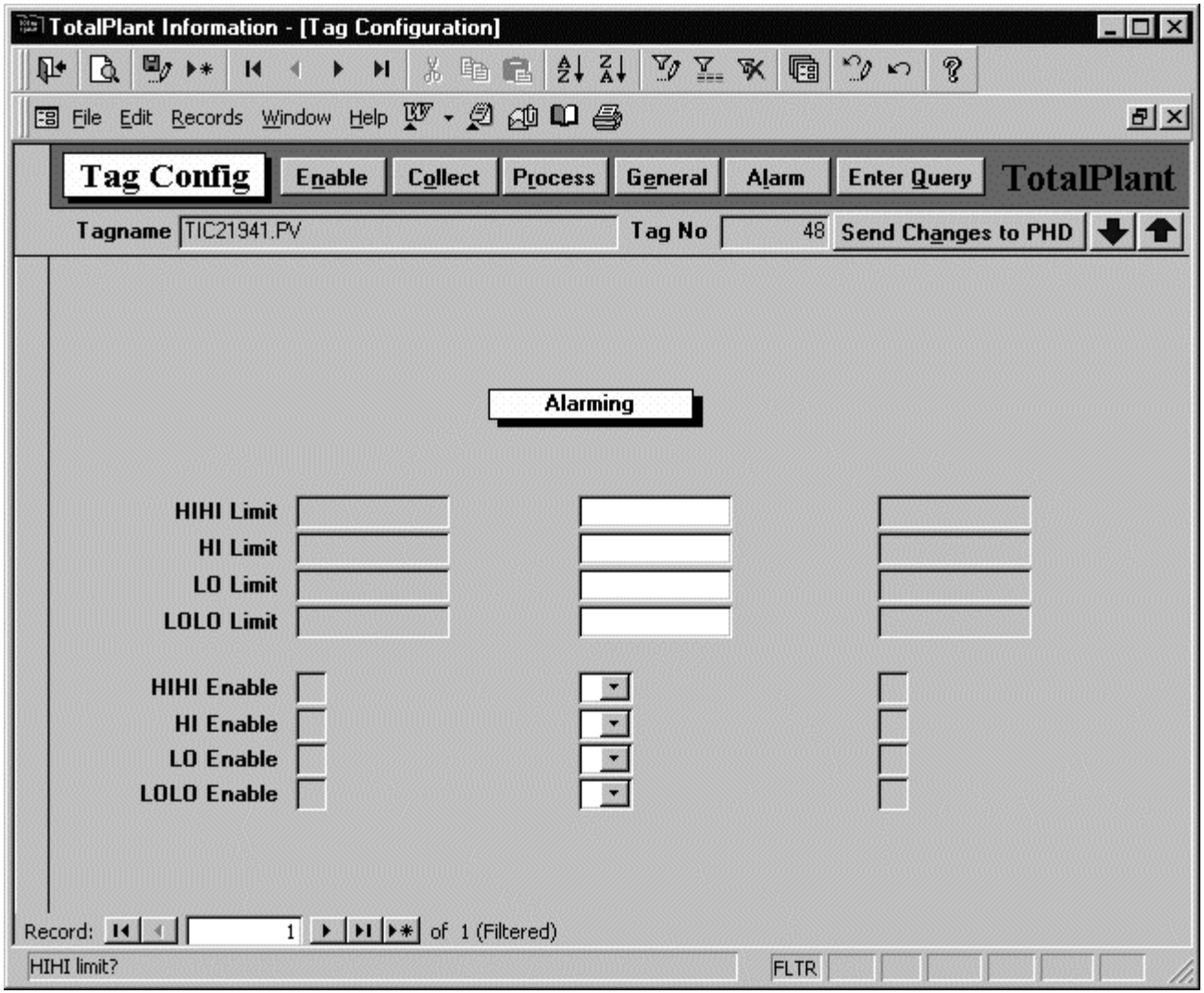
**Time Sampled**—Resultant values are value of tag at the particular point in time of each sample.

**Time Averaged**—Resultant values are a time weighted average of the tag value.
Uses each sample time as the center of a data region that is time averaged. If the resampled data is on an hourly basis, then a sample for 2:00 holds the time weighted average of data from 1:30 to 2:30.

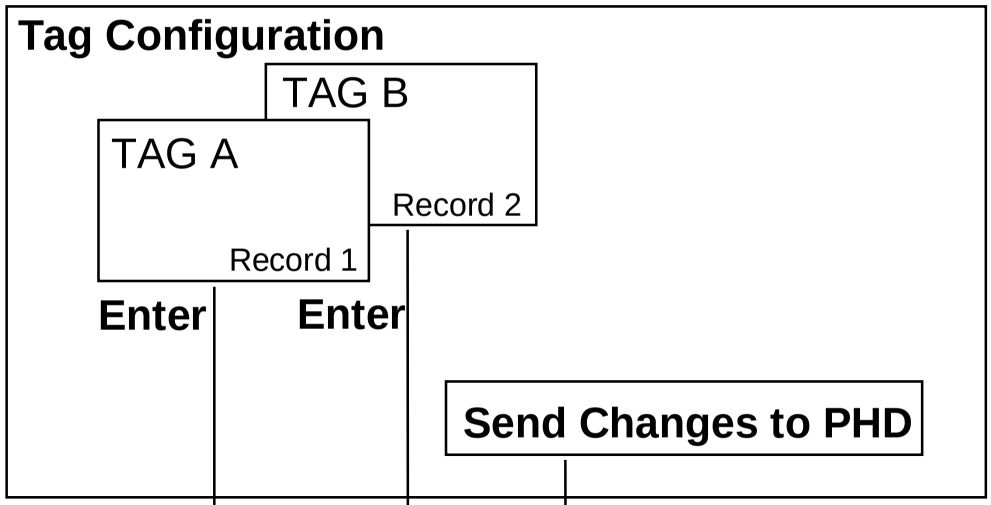
In general, inventory type tags are defined as time sampled, and other process variables are defined as either time sampled or time averaged.

Refer to *PHD System Manual*, Data Resampling

# Tag Configuration Form, Alarming

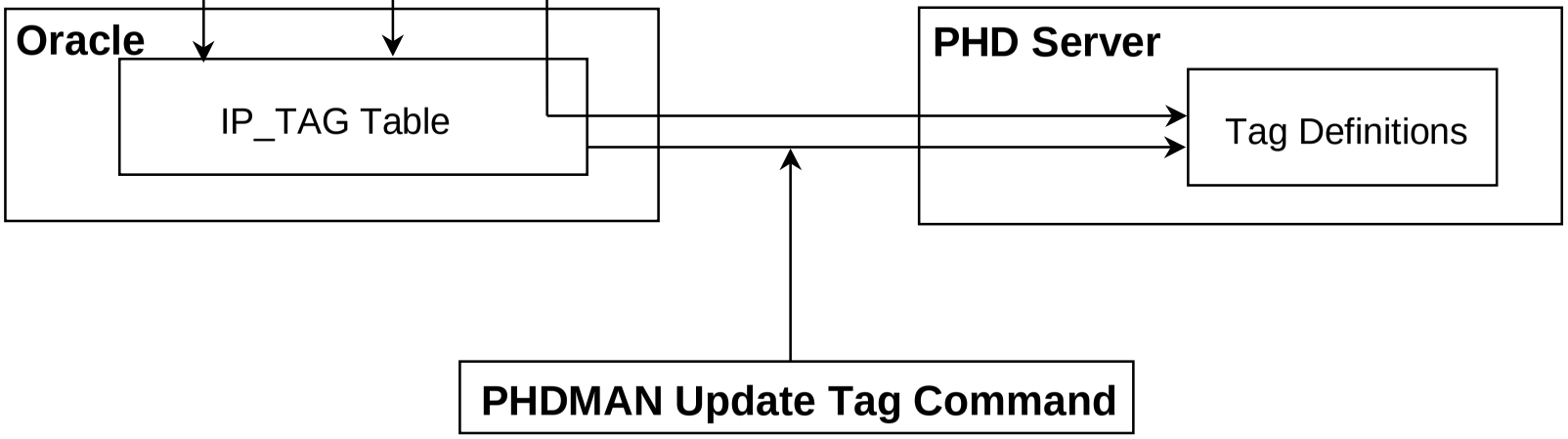


# Sending Changes to PHD




The Send Changes button and the Tagup command update the server with definitions of ACTIVE tags.

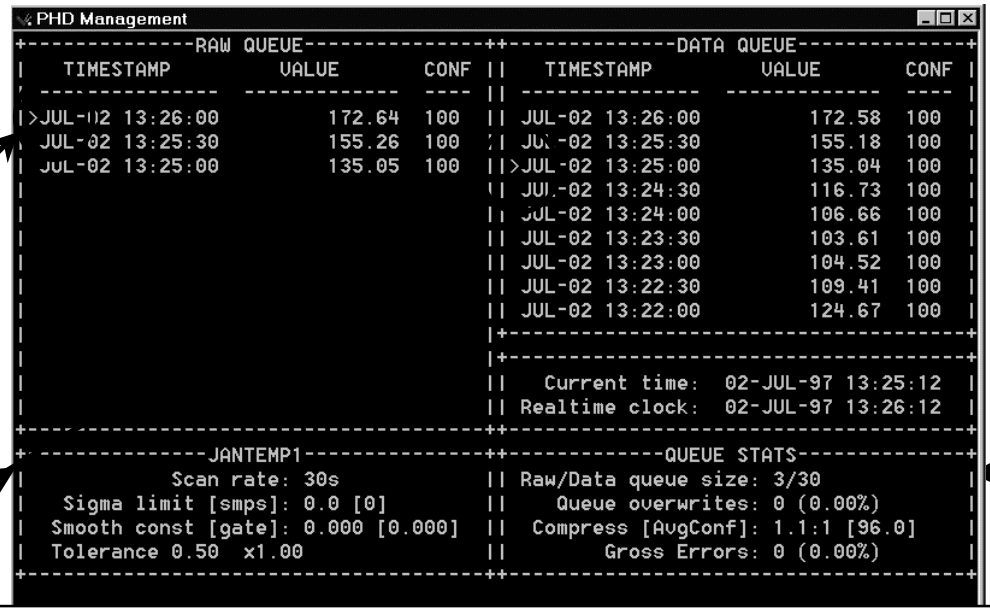
Send Changes/Update Tag can create a lot of overhead on the system, so be judicious about using the command.



# Tag Data Monitoring

Use PHDMAN SHOW QUEUE and MONITOR QUEUE commands to examine incoming data for a particular tag.

```
PHDMAN> SHO QUE TAGNAME OR TAG NUMBER
PHDMAN> MON QUE TAGNAME OR TAG NUMBER
```




Raw Queue:
> indicates the last value moved to data queue with processing applied.

Data Queue:
> indicates the last value extracted by continuous store process for storage in permanent archive file.

Queue size (3 and 15 minutes) - Memory is allocated based on this tag's 30 second scan.

For definitions, refer to *PHD System Manual,* Tag Data Queue Monitoring.

# Tuning for Performance

The objective of Tag Tuning is to reduce amount of stored data by doing the following:

- Increase compression
  - Do not disable compression or scaling.
  - Use larger quantums where possible.
  - Use smoothing for noisy data.

- Increase scan interval
  - Provides better optimization in storage format (delta intervals)
  - Decreases loading on system during data collection
  - Speeds Virtual tag calculations

# Hands-on Exercise

**Tag Configuration - Exercise 1**
*In this exercise, you build a parent and a normal tag, then print a report of the tag configuration.*

**Reference:** *PHD User Guide,* Tag Configuration Forms
**Instructions**

1. Create a temperature class tag as defined below.

| | |
|---|---|
| Tagname | Gnn.TEMP.PV (where nn is your machine number) |
| Class | X |
| Description | Temperature PV Parent Tag |
| Collection | X |

(Do not turn on Data Store yet, so you can observe the resulting behavior of the tag's data queue later in exercise 2.)

(To move between pages of the Tag Configuration Form, use the blue arrows in the upper right corner of the screen or the buttons—Enable, Collect, Process, General).

| | |
|---|---|
| System Type | TDC_LXS |
| Tag Type | R |
| Attribute | PV |
| Collector Name | TDC1 (we are assuming an RDI named TDC1 exists) |
| Scan Seconds | 5 |
| Tolerance Type | Absolute |
| Compr Toler Factor | .5 |
| Scale High Extreme | 1000 |
| Low Extreme | 0 |
| Quantum | -1 |

*After specifying the above configuration, click in the column on the left side of the page(the record marker) to save the tag record from memory to the IP_TAG table in the Oracle reference database. (The first page of the tag record should no longer have a pencil showing in the left column.)*

# Hands-on Exercise, continued

2. The bottom left of the screen are arrows for navigating between tag records.
   Use the right > arrow to go to the next record, which should be an empty form.

3. Create a tag using the temperature class-tag as its parent.

| | |
|---|---|
| Tagname | Gnn.TI.PV (where nn is your machine number) |
| Active | X |
| Units | DEGC (just start typing in the port) |
| Parent tag | Gnn.TEMP.PV (where nn is your machine number) |
| Description | (your choice) |
| Source Tag Spec | TIC21### (where ### refers to your assigned number) |

4. Save the tag record to Oracle (click bar on leftside of form).

5. Send the tag record to the PHD Server (select button "Send Changes to PHD").

6. To verify that the tag is in the PHD history engine database, examine the online definition of the tag using the PHDMAN utility:
   At a Command Prompt, enter PHDMAN.
   Enter the command SHO TAG Gnn.TI.PV
   The tag's configuration should be displayed.

7. Return to the Main Menu and print (to the classroom printer) the report of Tag Configuration for your new tag (select Tag Configuation from the bottom of the Main Menu under "Select Reports").

**END OF EXERCISE 1**

# Hands-on Exercise, continued

**Current Data Queues - Exercise 2**

*In this exercise, you use MODTAG, PHDREAD, and PHDMAN to view tag data in the current data queues.*
*PHDREAD and PHDMAN - Utilities available on the PHD Server.*
*MODTAG - VB application available with the VisualPHD component of the Uniformance Desktop.*
*(MODTAG is available on R130 and later.)*

**Reference:** *PHD System Manual,* Tag Data Queue Monitoring

**Instructions**

1. Use ModTag to fetch the data being collected for tag Gnn.TI.PV (Start\Programs\TPI\VisualPHD\ModTag).
   Start Date = now-::5 (0 days, 0 hours, 5 minutes)
   End Date = now
   Type = RAW

2. Use PHDREAD to display the data being collected for tag Gnn.TI.PV (Start\Programs\TPI Server\PHD Read).
   Start time = now-::5 (0 days, 0 hours, 5 minutes)
   End time = now

   The resulting display shows the values and each value's confidence factor.

3. Exit PHDREAD.

4. From a Command Prompt, use PHDMAN to display the tag's data queues:

```
PHDMAN> SHO QUE or MON QUE Gnn.TI.PV
```

   Notes:
   The > indicator in the *raw* queue indicates the last value moved to the data queue.
   Why is there no > indicator in the *data* queue to indicate the last value moved to the archive file?

# Hands-on Exercise, continued

5. Return to your tag configuration and configure the tag to store its data.

6. The > indicator in the tag's data queue should now indicate the last value moved to the archive file.

```
PHDMAN> SHO QUE Gnn.TI.PV
```

7. Observe the incoming values transfer from the raw queue to the data queue.

8. Return to the tag configuration form and set the tag's quantum to 2.

9. Return to PHDMAN and repeatedly show the queue. Observe that fewer values are transferred to the data queue.

```
PHDMAN> MON QUE Gnn.TI.PV
```

You may see values clear from the queues as the server performs compression and eliminates values.

**END OF EXERCISE 2**

# Hands-on Exercise, continued

**Tag Tuning Reports - Exercise 3**

*In this exercise, you use PHDMAN to view tag statistics, then tune the tag configuration. Tag Tuning objectives are to*

- *eliminate range errors,*
- *eliminate PHD data queue overwrites,*
- *eliminate false gross error detection,*
- *optimize data compression vs. accuracy, and*
- *optimize stored data precision.*

**Reference:** *PHD System Manual,* Tag Tuning Reports

**Instructions**

1. Use PHDMAN to view all of the statistics reports for 20 tags. Determine the tags with the worst compression. Speculate as to what makes the compression worse for those tags.

```
PHDMAN> REPORT reportname [ntags] [outfile]
```

Command Examples:

```
PHDMAN> REP COM 20
PHDMAN> REP CON 20
PHDMAN> REP GRO 20
PHDMAN> REP OVE 20
PHDMAN> REP RAN 20
PHDMAN> REP SUM [outfile]
PHDMAN> REP *
```

(If you do not have a scrollbar on your PHDMAN window, right click its title bar, select Properties/Layout, and set the screen buffer size to 80w x 500h.)

# Hands-on Exercise, continued

## Tag Tuning Reports - Exercise 3, continued

2. Read the following additional information on the Report command.

```
PHDMAN> REPORT reportname [ntags] [outfile]
```

`reportname`:

| | |
|---|---|
| COMpression | Tags with worst data compression |
| CONfidence | Tags with worst average confidence factors |
| GROsserrors | Tags with the most gross errors detected |
| OVErwrites | Tags with the most queue overwrites detected |
| RANge | Tags with data exceeding scaling range limits |
| SUMmary | Average statistics for all tags |

- If `reportname` is given as an asterisk (*) then all statistics reports are generated.
- The `ntags` (default value 10) specifies number of tags to report on (used by all reports except summary).
- If `outfile` is specified, then reports go to specified file rather than being displayed.
- The reports use statistics collected since the last coldstart or the last time the user Cleared the statistics using the command `PHDMAN> CLEAR STATISTICS`

> The PHD administrator at your site should monitor these reports. Monitor gross errors to locate instrument problems. Monitor range errors to determine when the DCS range was changed, but not yet updated on PHD.

For future reference, see the *PHD System Manual*, Tag Tuning Reports

# Hands-on Exercise, continued

## Tag Tuning Reports - Exercise 3, continued

Report Example:

```
PHDMAN> REPORT SUMMARY

                        PHD TAG STATISTICS REPORT
          Collected from 19-SEP-97 15:26:33 to 19-SEP-92 15:53

                              SYSTEM SUMMARY

              Number of tags sampled:       1009
         Total queue overwrite tags:          1
             Total range error tags:          6

                                AVERAGE       MIN          MAX
                               ----------  ----------  -------
    Analog data compression:     30.207       1.000      50.28
  Discrete data compression:     93.881       3.286     118.57
            Data confidence:     66.842       0.000      96.87
    Percentage gross errors:      0.101%      0.000%     16.66
```

# Hands-on Exercise, continued

## Tag Tuning Reports - Exercise 3, continued

Report Example:

```
PHDMAN> REPORT COMPRESS 5

                        PHD TAG STATISTICS REPORT
          Collected from 19-SEP-92 15:26:33 to 19-SEP-92 15:54:02

                     WORST 5 DATA COMPRESSION TAGS

      TAGNO  TAGNAME                              COMPRESSION
      -----  -------------------------------  ------------
  1)   1349  TAG1349                                1.000:1
  2)   1507  TAG1507                                1.000:1
  3)   1838  TAG1838                                1.000:1
  4)   1840  TAG1840                                1.000:1
  5)   1855  TAG1855                                1.000:1
```

# Hands-on Exercise, continued

**Tag Tuning Reports - Exercise 3, continued**

3. From the TPI Tag Configuration form for Gnn.TI.PV, change the tag's HI_EXTREME range value from 1000 to 50.

4. Check the PHDMAN Range report for range errors. `PHDMAN> REP RAN`

5. Output all of the reports to a file.

```
PHDMAN> REP * 20 C:\TEMP\DOCnn
```

6. Print the file to the classroom printer.

**END OF EXERCISE 3**

### Tag Configuration Audit Log - Exercise 4

*In this exercise, you locate all parent tags, change the configuration of one parent, then view the audit log of database changes.*

### Instructions

1. Return to the Tag Configuration form.

2. Use the Enter Query button to retrieve all parents in the database. (Class Tag Check = X).
   Note: The query defaults to =, so you do not have to select =.

3. The bottom left of the tag configuration form indicates the number of records (tags) returned.

4. Page through the records (click on >) to locate your parent tag Gnn.TEMP.PV.

5. Select Data Edit for Gnn.TEMP.PV, then enter and send the changes to PHD.

6. Use ModTag to check the Tag Definition of the child tag Gnn.TI.PV. It should reflect the change made to the parent tag.

7. Return to the Main Menu (from Window pulldown menu).

8. Select the report Tag Configuration Audit Log. Query for tagnames like Gnn*. Print the log to the classroom printer. (Note: If you print to a file, the file is located in TPI/R_TAG_AU.log.)

**END OF EXERCISE 4**

# Hands-on Exercise, continued

**Collecting Status Values - Exercise 5**

*In this exercise, you will create PHD tags to collect mode and digital input status.*

**Instructions**

1. Return to the Tag Configuration form and create a tag named Gnn.MODE to collect the mode (manual, automatic, cascade) of source tag FIC21### on the training DCS (where ### refers to your assigned number).

2. Create another tag named Gnn.DIGPV to collect the enumerated PV of the digital composite point FVL21### (where ### refers to your assigned number).

3. How have the MODE and enumeration PV parameters (attributes) been configured in the **Tag Source Configuration form** for the TDC_LXS system type?

| | Tag Type | Data Type | Data Length |
|---|---|---|---|
| MODE: | | | |

| | Tag Type | Data Type | Data Length |
|---|---|---|---|
| PV: | | | |

4. Go to ModTag to look at the last five minutes of data for each tag; Gnn.MODE and Gnn.DIGPV

5. Go to PHDMAN and look at the queue for each tag. `PHDMAN> MON QUE <tagname>`

**END OF EXERCISE 5**

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