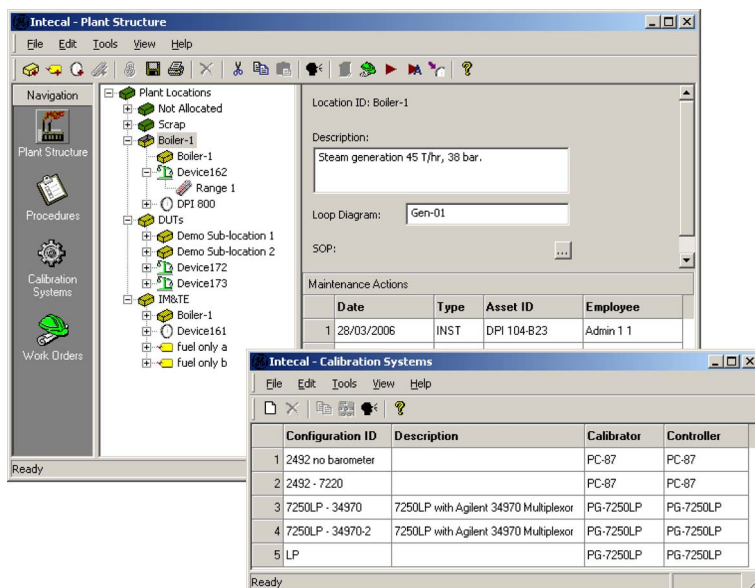


Intecal Calibration software

User manual - K0420



Safety

Before you use Intecal, make sure that you read and understand all the related data. This includes: the applicable local safety procedures, the instructions for the equipment you are using with Intecal, and this publication.

When you use equipment with Intecal, make sure that it is serviceable and that it is in its normal condition for safe operation.

Before you start an operation or procedure in this publication, make sure that you have the necessary skills (if necessary, with qualifications from an approved training establishment). Follow good engineering practice at all times.

Copyright

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Trademarks

All product names are trademarks of their respective companies.

Software purpose

Intecal is available as a multi-lingual calibration software program that you can use on a Windows® PC (Chapter 1). You can use Intecal for these tasks:

- Manage the maintenance and calibration of all the measurement devices for a specified business location.
- Set up a schedule of calibration work for different employees.
- Upload and download data to and from portable calibrators that have a serial communications function (Druck, Ruska, or devices with a Field Calibrator Interface - FCINTF).
- Manage the calibration records for devices that do not have a serial communications function (*Manual Data Entry*).
- Inspect your calibration history records. You can also make a permanent record of each calibration report. For example: For ISO 9000 quality control procedures.
- (Intecal-Advanced only) Set up automatic calibration systems to make full use of your GE Digital Pressure Controllers (Ruska and Druck).
- (Intecal-Advanced only) Calibrate a device or a group of devices that have a serial communications function (Druck, Ruska, or FCINTF).
- (Intecal-Advanced only) Make calibration adjustments to a device or a group of devices that have a serial communications function (Druck, Ruska, or FCINTF).

Registration

The Intecal Calibration software (from a CD or downloaded from the Web) is available for you to try as a fully functional product, with no obligation, for a period of 30 days. The trial period starts on the day it is first used - not on the day it is installed.

To change the 30 license to a full license, please purchase an unlock key from the GE Sensing sales team at: www.gesensing.com.

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Chapter 1: Installation

System specification

To use Intecal, this is the minimum specification for your computer:

- Operating system: Windows® 2000, NT 4.0 or XP
- 66 MHz processor (Pentium® recommended)
- 128 MB of RAM (256 MB recommended)
- Hard disk space: 40 MB for the installation, then 10 MB to permit expansion of the database
- CD-ROM drive or DVD-ROM drive

Install Intecal

You can install the Intecal software from a CD or from the Internet.

Before you install Intecal, close all other Windows® applications.

Install Intecal from a CD:

1. Insert the CD into the CD-ROM drive

Note: If your computer is not set up to open a CD automatically, you must open the file from the CD yourself.

Double-click the file setup.exe

2. When the InstallShield Wizard opens on your computer, follow the on-screen instructions.

Install Intecal from the Web:

1. Follow the instructions on the Web page to save the specified *File name* (Example: Intecal***.exe) to your computer.

*Note: *** represents the applicable software version.*

2. When the *File Download* is complete, open the file from the specified *Save in* location.
3. When the InstallShield Wizard opens on your computer, follow the on-screen instructions.

Intecal updates

If a software update becomes available, you can download it from the Internet (www.gesensing.com).

Use these steps to install the Intecal update:

1. On the Windows taskbar, click on the *Start* button and select *Programs > GE Intecal > Intecal Uninstall* (Figure 1-1).
2. Select the option “Want to upgrade ...” and follow the on-screen instructions.

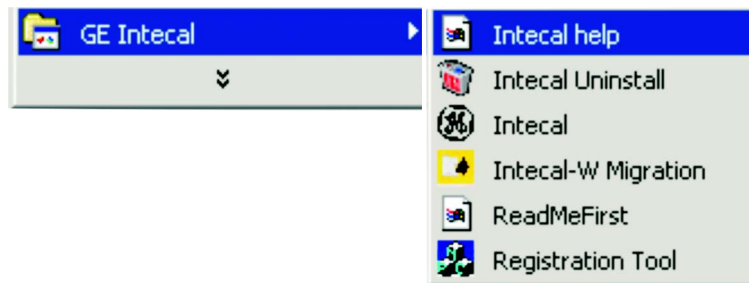


Figure 1-1: *Intecal program group*

Intecal-W versions

If you have the old Intecal-W version of the software, the installation includes a software program (Migrator.exe) to help convert the Intecal-W database. When the new installation is complete, read the Migrator Readme file.

After installation

When the installation is complete, you can start Intecal (Refer to Chapter 2).

Intecal uninstall

To remove Intecal from your computer:

1. On the Windows taskbar, click on the *Start* button and select *Programs > GE Intecal > Intecal Uninstall* (Figure 1-1).
2. Select the option “Want to Uninstall” and follow the on-screen instructions.

Chapter 2: Getting started

Introduction

This chapter gives a description of these items:

- How to start Intecal for the first time
- The general structure of the screens you will see.
- The general structure of the Intecal program.
- How to set up your *Employee* data and control the tasks they can do in Intecal.
- How to change Intecal to a different language.

Start Intecal

To start Intecal for the first time, use this log-in procedure:

1. Double-click on the Desktop icon.



2. When the log-in window opens, enter “1” in the *User Name* box. Leave the *Password* box empty.



3. Click on OK.

Note: You can also start intecal from the Intecal program group (Figure 1-1).

After you log in, you can use the *Employee Manager* to set up a database of *Employees* and/or change your own password. Refer to “Employee Manager”.

Screen structure

When you start Intecal, Figure 2-1 gives an example of the window that opens. These items are common to all the main program functions:

1 - Navigation bar: Use this to move between the different program functions (Plant structure, Procedures ...)

2 - Menu bar: Use this to select a task from a menu list.

3 - Tool bar: Use this to select a task with an icon.

The Menu bar and Tool bar include common items and special items for the program function you are using.

The common items include: *Save, Exit, Employee Manager, Language Selection, Intecal Help, and Registration.*

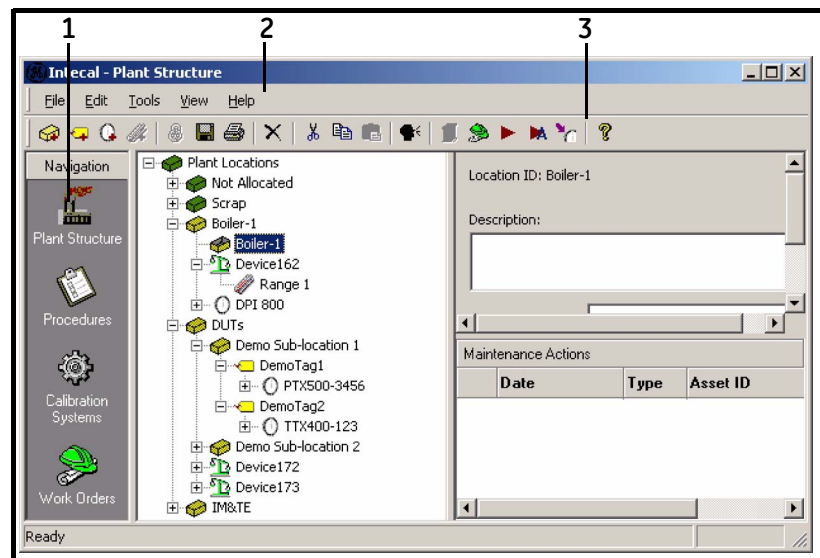


Figure 2-1: Screen structure - Common items

Program structure

Intecal has four main program functions:

Plant Structure: To manage and organize your database of devices.

Procedures: To manage the calibration procedures in your database. A calibration procedure contains the values a calibration uses (test points, ramp time).

Calibration Systems (Intecal-Advanced only): To manage the hardware configurations you use to do your calibrations.

Work Orders: To manage your calibration work.

Use the Navigation Bar to move between the different program functions.

Employee Manager

Use the *Employee Manager* (Figure 2-2) to set up and maintain a list of your *Employees*. You can then use Intecal to show the *Employees* related to each task and calibration.

You can use the *Employee Manager* to do these tasks:

- Create a new *Employee*. To use Intecal, this must include a *Login ID* and one of four permission levels.
- Delete an *Employee*, change the status (Active/Not active) or change the *Employee* data.
- Change your own password.

Permission levels

The *Permission Level* that you set up for an *Employee* (Refer to “Set up Employee data”) controls the tasks they can do in Intecal:

Administrator: You can do all the program tasks.

Supervisor: You can do all the program tasks but you cannot change the user *Permission Level*.

Technician: You can do all the daily operations but you cannot set up or change *Procedures* or *Calibration Systems*.

Auditor: You can read the Intecal data and change your own *Employee* data.

Set up Employee data

You must have the necessary *Permission Level* for this task.

To set up a new *Employee*:

1. Select *Tools > Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-2), click on the *New* button

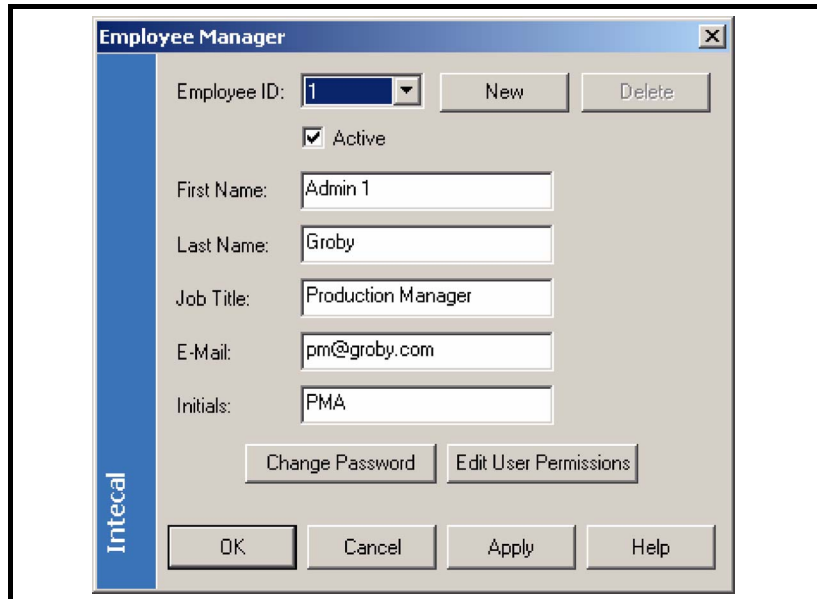


Figure 2-2: *Employee Manager* window

3. When the new *Employee ID* window opens (Figure 2-3), enter a unique number and click on OK.

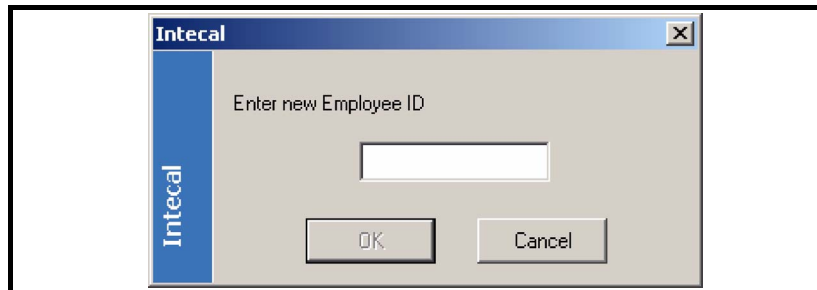


Figure 2-3: *New Employee ID* window

4. In the *Employee Manager* window (Figure 2-2), click on the *Active* check-box. This sets the status (active or not active).
5. Enter the applicable values in these boxes: *First Name*, *Last Name* (Mandatory), *Job Title*, *Email*, *Initials*.
6. (*Administrator* only) Click on the *Edit User Permissions* button.

7. When the *Edit User Permissions* window opens (Figure 2-4), enter applicable values for these items:

Login ID: An *Employee* can only use Intecal if they have a Login ID.

Permission Level: Select the applicable *Permission Level* from the drop-down list. Refer to “Permission levels”.

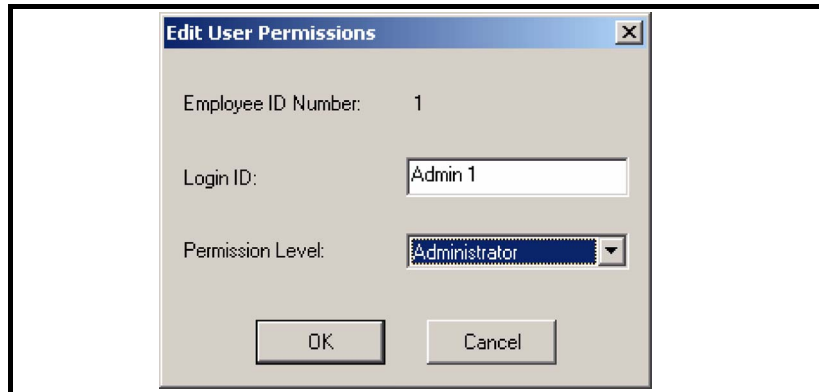


Figure 2-4: *Edit User Permissions* window

8. When the *User Permissions* data is set up, click on OK. Then click on the applicable button in the *Employee Manager* window:

OK: To confirm the data and leave the *Employee Manager* window.

Cancel: To cancel the data and leave the *Employee Manager* window.

Apply: To apply the data and continue to use the *Employee Manager* window.

Change Employee data

You must have the necessary *Permission Level* for this task. Refer to “Permission levels”.

To change the *Employee* data:

1. Select *Tools > Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-2), select the applicable *Employee ID* from the drop-down list.
3. Change the applicable data. Refer to “Set up Employee data”, steps 4 to 8.

Set up your password

You can only set up or change your own password. To set a password:

1. Select *Tools > Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-2), select the applicable *Employee ID* from the drop-down list.
3. Click on the *Change Password* button.
4. When the *Change Password* window opens (Figure 2-5), enter the applicable password.



Figure 2-5: *Change Password* window

5. When you confirm the password in the second box, click on OK.

Delete an Employee

You must have the necessary *Permission Level* for this task. Refer to “Permission levels”.

Note: If you cannot delete an *Employee ID* because it is used in a calibration, you can set it to not active.

To delete an *Employee*:

1. Select *Tools > Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-2), select the applicable *Employee ID* from the drop-down list.
3. Click on the *Delete* button.

You must confirm that you want to delete the *Employee ID*.

Select a language



Intecal can operate in a number of different languages.

To change to a different language, use one of these methods:

- Click on the *Language Selection* button in the tool bar.
- Select *Tools > Language Selection* from the menu bar.

When the *Language Selection* window opens (Figure 2-6), select the applicable language and click on OK.

Note: When you click on OK, Intecal restarts.

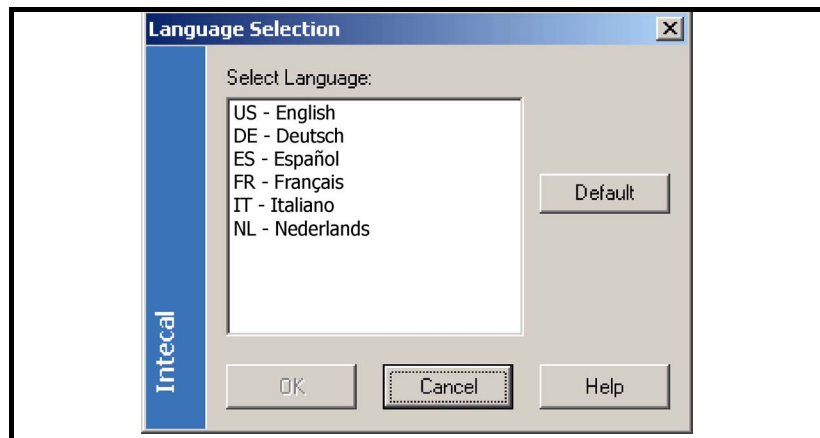


Figure 2-6: *Language Selection window*

Chapter 3: Plant Structure

Introduction

Use Intecal *Plant Structure* to manage and organize your database of devices in the same way as you use Windows® Explorer to organize files and folders. Figure 3-1 shows the *Plant Structure* window.

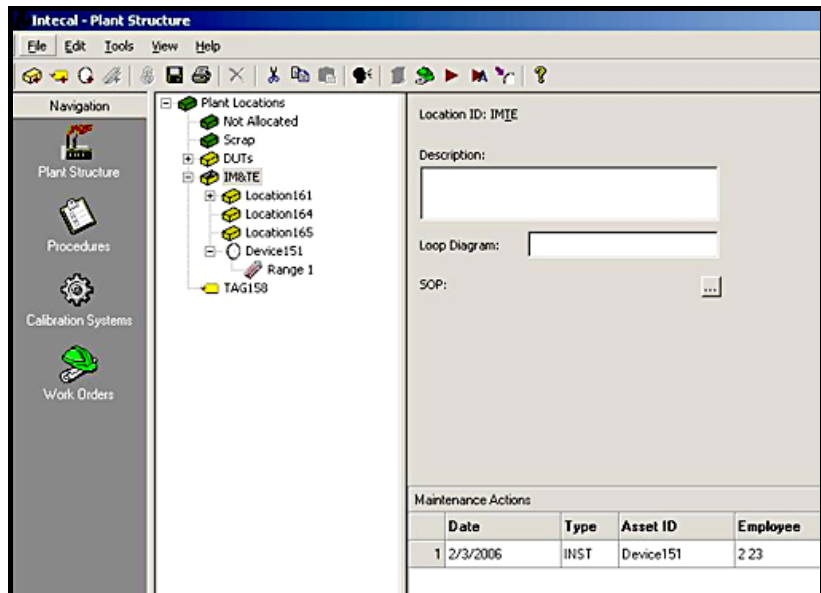


Figure 3-1: *Plant Structure* window

The tree structure lets you represent all the physical locations and devices for your site in a single view. You can set up: sub-locations, tags, devices and device ranges.

When you click on an item in the tree structure, the screen shows the related data. For example:

- the data set up for the *Location*, *Tag* or *Device* and the related *Maintenance Actions*
- the range calibration data and the related *Calibration History*

You can use the *Plant Structure* function to do these tasks:

- To set up or change the sub-locations, tags, devices and device ranges.
- To set up or change the related *Maintenance Actions*.
- Chapter 6: To add items to a *Work Order*.
- Chapter 7: To see the calibration history for a *Device* or *Range*.
- Chapter 7: (Intecal-Advanced only) To calibrate a *Device* or to make calibration adjustments.

Locations

A location or sub location usually represents a physical location on your site (Example: a building or room) but you can set up any alternative group structure (Example: Druck, Ruska). You can put more than one device in a location

Create a Sub-location



To create a *Sub-location*, click on an applicable location or sub-location and use one of these methods:

- Click on the new *Sub-Location* button in the tool bar
- Select *File > New > Sub-Location* from the menu bar.
- Right-click and select *New > Sub-Location*.

Edit a Sub-location

When you create a *Sub location*, Intecal gives it the next *Location ID* in the sequence (Figure 3-2).

Figure 3-2: *Location Detail View*

Description: Up to 123 characters.

Loop Diagram: Up to 255 characters.

SOP (Standard Operating Procedure): Use this to set up a link to a file on your computer system (Example: PDF, TIFF, TXT, DOC).

Rename a Sub-location

To change the *Location ID*, click on it in the *Plant Structure* tree, and then use one of these methods:

- Select *File > Rename* from the menu bar.
- Right click and select *Rename*.

A location cannot have two sub-locations at the same level with the same *Location ID* (Maximum: 50 characters).

Delete a Sub-location



Before you can delete a sub-location, you must remove all the related items. You can then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File > Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Tags

A tag is similar to a location but a tag can only hold one device at a time. For example: You can set up a tag for a unique device operation. If you calibrate the related device, there is a link to the device and the tag.

Create a Tag



To create a *Tag*, click on an applicable location or sub-location and use one of these methods:

- Click on the new *Tag* button in the tool bar
- Select *File > New > Tag* from the menu bar.
- Right-click and select *New > Tag*.

Edit a Tag

When you create a *Tag*, Intecal gives it the next *Tag ID* in the sequence (Figure 3-3):



Figure 3-3: Tag Detail View

Description: Up to 123 characters.

Loop Diagram: Up to 255 characters.

SOP (Standard Operating Procedure): Use this to set up a link to a file on your computer system (Example: PDF, TIFF, TXT, DOC).

Rename a tag

To change the *Tag ID*, click on it in the *Plant Structure* tree, and then use one of these methods:

- Select *File > Rename* from the menu bar.
- Right click and select *Rename*.

A location cannot have two tags at the same level with the same *Tag ID* (Maximum: 50 characters).

Delete a tag



You cannot delete a tag if it has a *Device* or a calibration record. You must remove all the related items. You can then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File > Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Devices

A *Device* has one or more measurement ranges. For example: pressure sensors, or measurement and test equipment. Each *Device* must have a unique *Asset ID*.

Create a device (Manual method)



To create a *Device* manually, select the applicable location or tag for the *Device*, and then use one of these methods:

- Click on the new *Device* button in the tool bar.
- Select *File > New > Device* from the menu bar.
- Right-click and select *New > Device*.

You can then edit the necessary device data (Figure 3-5)

Create a device (New Device Wizard method)



(Intecal *Advanced only*) If the *Device* has a digital communication interface that Intecal supports, you can use the *New Device Wizard* (Figure 3-4) to set up the necessary data.

1. Connect the *Device* to the computer (refer to the user manual for the applicable *Device*).
2. Select the applicable *Location* or *Tag* for the *Device*, and then use one of these methods:
 - Click on the *New Device Wizard* button in the tool bar
 - Select *Tools > New Device Wizard* from the menu bar.

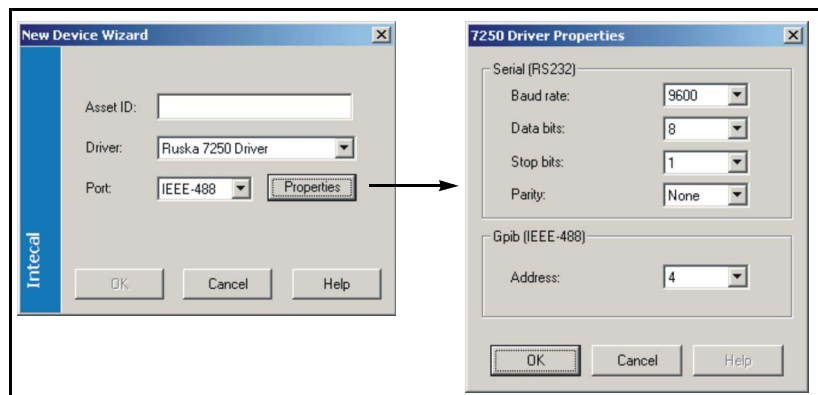


Figure 3-4: *New Device Wizard* views

3. When the *New Device Wizard* opens, set up the necessary data.

Asset ID: Enter a unique *Asset ID* (Maximum: 50 characters).

Driver: Click on the drop-down list and select the applicable device driver.

Port: Click on the drop-down list and select the communication *Port* for the *Device*.

Properties: Set the applicable communication properties (refer to the user manual for the applicable device).

4. To start the data transfer, click on the OK button in the device wizard.

If the device does not support all the data in the Intecal *Device* view (Figure 3-5), these data items stay empty. But, before you calibrate the *Device*, make sure that all the data is correct. This includes the *Device* data and the related *Ranges* (Figure 3-7).

Edit a Device

When you create a *Device* manually, Intecal gives it the next *Asset ID* in the sequence (Figure 3-5):

| | | | |
|----------------|--|---------------|-------------------|
| Reference: | PG-7250LP | Driver: | Ruska 7250 Driver |
| Asset ID: | Device151 | Hook up Diag: | |
| Serial Number: | 607651 | Remarks: | |
| Model Number: | 7250i | | |
| Manufacturer: | Ruska Instrument | | |
| | <input checked="" type="checkbox"/> Calibrator | | |

Figure 3-5: Device Detail view

Reference: Intecal uses the *Reference* name in the *Plant Structure* tree. When it is first set up, it is the same as the *Asset ID* but you can change it in the *Plant Structure* tree (Refer to Rename a Device).

Asset ID: A unique identifier for the *Device* (Maximum: 50 characters). If you change the Asset ID, use the Intecal *Save* facility to save it.

Note: If the *Device* has a related *Work Order* or a *Calibration History*, you cannot change the *Asset ID*.

Serial Number: The serial number specified by the manufacturer.

Model Number: The model number specified by the manufacturer.

Manufacturer: The manufacturer.

Driver: If applicable, click on the drop-down list and select the applicable *Device Driver*. The *Devices* you use in a *Calibration System* (Chapter 5) must have a *Driver*.

Hook up Diag: Use this for reference data (Up to 255 characters).

Remarks: Use this for reference data (Up to 70 characters).

Calibrator: If you use the *Device* in a hardware configuration to calibrate other *Devices* (Chapter 5), click on this box. This includes *Calibrators*, *Controllers*, *Auxiliary Devices*.

When you create a *Device*, Intecal automatically adds a *Maintenance Action* (Figure 3-6) and a *Range* (Figure 3-7).

Rename a device

To change the *Reference* name for a *Device*, click on it in the *Plant Structure* tree, and then use one of these methods:

- Select *File > Rename* from the menu bar.
- Right click and select *Rename*.

You can use the same *Reference* name for more than one device (Maximum: 50 characters).

Delete a Device



You cannot delete a *Device* if it has a calibration record. You must remove all the related records. You can then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File > Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Maintenance actions

When you create a *Device*, Intecal automatically adds a *Maintenance Action* (Figure 3-6).

Edit a maintenance action

To edit a *Maintenance Action*, use one of these methods:

- Double-click on the row.
- Click on the row and press the Enter key.

- Right-click on the row and select *Edit Row*.

Figure 3-6 shows an example of the Edit view:

| Maintenance Actions | | | | |
|---------------------|--|------|----------|-----------|
| | Date | Type | Location | Employee |
| 1 | <input checked="" type="checkbox"/> 03/04/2006 | INST | Boiler-1 | Admin 1 1 |

Figure 3-6: Maintenance Action - Edit view

Date: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date. Use the check-box to show it is complete.

Type: Click on the drop-down list to select the type of *Maintenance Action*:

| | | | |
|---------------|-----------|--------------|---------|
| UNDEF: | Undefined | REM: | Remove |
| INST: | Install | INSP: | Inspect |
| CAL: | Calibrate | | |

Location: Click on the drop-down list to select an applicable *Location*.

Employee: Click on the drop-down list to select an applicable *Employee*.

Create a maintenance action

To create a *Maintenance Action*, use one of these methods:

- Select *File > New > Maintenance Action* from the menu bar.
- Click under *Maintenance Actions* and press the Insert key.
- Right-click under *Maintenance Actions* and select *Add Row*.

Delete a maintenance action

To delete a *Maintenance Action*, use one of these methods:

- Click on the row and press the Delete key on the keyboard.
- Right-click on a row and select *Delete Row*.

Ranges

When you create a *Device*, Intecal automatically adds a *Range* (Figure 3-7). A *Range* describes the measurement capabilities of the *Device*. You can add more ranges but the minimum is one.

Create a Range



If you create a *Device* with the *New Device Wizard* (Refer to *Devices*), Intecal can create the applicable number of ranges and set up the necessary data.

To create more ranges, click on the *Device* in the *Plant Structure* tree, and then use one of these methods:

- Click on the *New Range* button in the tool bar.
- Select *File > New > Range* from the menu bar.
- Right click and select *New > Range*.

Edit a Range

A Range has four tabs (Figure 3-7 to Figure 3-10):

General tab: To set up how and when the calibration is done.

Input tab and Output tab: To set up the applicable input/output values that the device uses.

Relationship tab: To set up the relationship between the input/output values.

General Tab

This tab lets you set up how and when the calibration is done. Figure 3-7 shows the data on the *General* tab:

| Criteria | |
|------------------------|------------|
| Pass/Fail | Adjustment |
| % Span: 1 | 0.5 |
| (Whichever is Greater) | |
| % Reading: 0 | 0 |

Figure 3-7: Range General Tab

Calibration Due Date: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date. Use the check-box to show it is active and/or complete.

Calibration Interval (days): Enter the number of days between each calibration.

Criteria: Enter the necessary calibration limits for Pass/Fail and the permitted amount of *Adjustment*. Intecal uses the largest value (*% Span* or *% Reading*).

Procedure: You cannot add a *Device* to a *Work Order* if it does not have a *Procedure*. Click on the drop-down list and select the necessary calibration *Procedure* (Chapter 4). To change how the *Procedure* works, click on the *Edit* button.

Note: More than one *Device* can use a *Procedure*. Make sure that the changes you make are applicable to all the related *Devices*.

Driver Range: (Reference data) Enter an applicable value.

Input/Output Tab

These tabs let you set up the applicable input/output values that the device uses. Figure 3-8/3-9 shows an example of the *Input* tab and the *Output* tab for a pressure device that gives a mA output.

| Field | Value |
|-------------------|----------|
| Parameter | Pressure |
| Reference Mode | Gauge |
| Measurement Units | psi |
| Minimum | 0 |
| Maximum | 100 |
| Settling Time (s) | 0 |

Figure 3-8: Range Input tab

| Field | Value |
|-------------------|---------|
| Parameter | Current |
| Measurement Units | mA |
| Minimum | 4 |
| Maximum | 20 |
| Settling Time (s) | 0 |

Figure 3-9: Range Output tab

The Input/Output tabs always include these items:

Parameter: Click on the drop-down list and select the applicable *Parameter*. The parameters include:

- Current
- Density
- Frequency
- Humidity
- Pressure
- Resistance
- Temperature
- RTD
- Thermocouple
- Voltage

Intecal adds more data items to the tab if they are necessary for the specified *Parameter*. Example: *Probe Type* for an RTD or Thermocouple.

Measurement Units: Click on the drop-down list and select the applicable units.

Minimum/Maximum: Enter applicable values for the *Device*.

Settling Time (s): Enter an applicable value (in seconds) that lets the *Device* give a stable reading. Refer to the user manual for the *Device*.

Relationship Tab

This tab let you set up the relationship between the input/output values. Figure 3-10 shows an example *Relationship* tab:

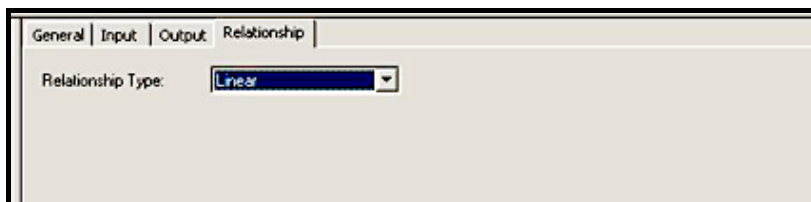


Figure 3-10: Range Relationship tab

Relationship Type: Click on the drop-down list and select the applicable type. These include:

- Linear: A typical straight-line relationship.
- Square Root: Flow calculations use this type of relationship. The data includes the option to set a *Break Point*.
- Table: A relationship specified by a table of values.
- Switch: For switches only.

Delete a Range



A *Device* must have one *Range*. You cannot delete it. Also, if a *Range* has calibration records, you must remove all the related records before you can delete it. You can then use one of these methods:

- Click on the *Delete* button in the tool bar.
- Select *File > Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Copy/move items

Similar to Windows® Explorer, you can cut, copy and paste these items in the Plant Structure tree: Sub-Locations, Devices, Ranges. You can also use your mouse to drag and drop these items.

If the item includes a sub-structure, the cut, copy and paste operation will include these items as well.

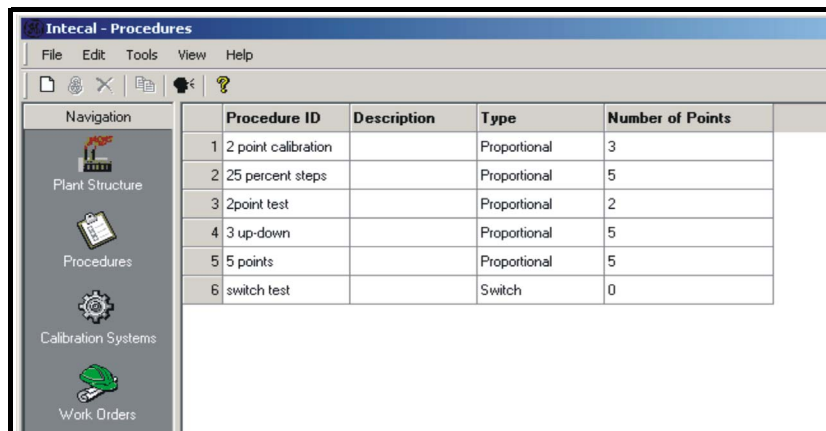
Chapter 4: Calibration procedures

Introduction

Use Intecal *Procedures* to set up and manage the calibration *Procedures* in your database. A calibration *Procedure* contains the values a calibration uses (test points, ramp time). You can then use the same calibration *Procedure* for all the applicable *Devices* under test. Figure 4-1 shows the *Procedures* window.

You can use the *Procedures* function to do these tasks:

- create a *Procedure*
- edit, copy, delete or rename a *Procedure*



The screenshot shows the 'Intecal - Procedures' window with a menu bar (File, Edit, Tools, View, Help) and a toolbar. A navigation pane on the left contains icons for Plant Structure, Procedures, Calibration Systems, and Work Orders. The main area displays a table with the following data:

| Procedure ID | Description | Type | Number of Points |
|--------------|---------------------|--------------|------------------|
| 1 | 2 point calibration | Proportional | 3 |
| 2 | 25 percent steps | Proportional | 5 |
| 3 | 2point test | Proportional | 2 |
| 4 | 3 up-down | Proportional | 5 |
| 5 | 5 points | Proportional | 5 |
| 6 | switch test | Switch | 0 |

Figure 4-1: *Procedures* window

Create a procedure



To create a *Procedure*, use one of these methods:

- Click on the *New Procedure* button in the tool bar.
- Select *File > New Procedure* from the menu bar.
- Right-click and select *New Procedure*.

This opens the “*Procedure Creation Wizard*” (Figure 4-2).

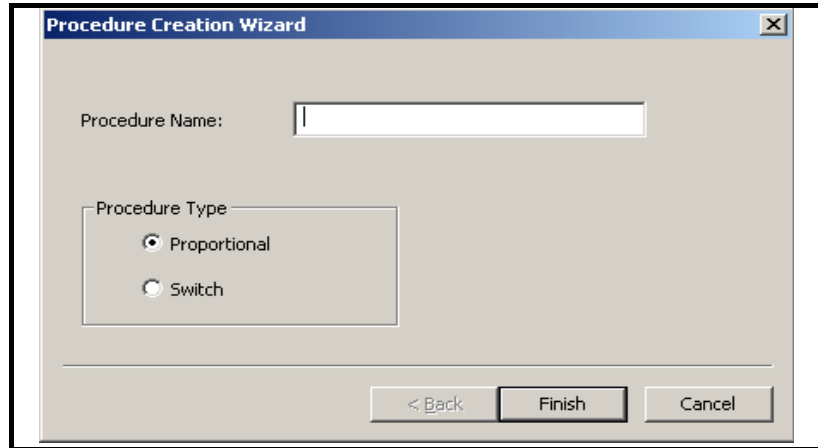


Figure 4-2: Procedure creation wizard

1. Enter a unique *Procedure Name* (maximum 50 characters).
2. Select the *Procedure Type*:

Proportional: For *Procedures* with a set of test points.

Switch: To do a switch test on a portable calibrator.

3. Click on the *Finish* button.

Edit a procedure

Note: More than one device can use a *Procedure*. Make sure that the changes you make are applicable to all the related *Devices*.

To edit a *Procedure*, select the *Procedure* in the list, and then use one of these methods to edit it:

- Select *Tools > Procedure Editor* from the menu bar.
- Right-click and select *Procedure Editor*.
- Double-click on the *Procedure*.

This opens the *Procedure Editor* (Figure 4-3/4-4). It has two tabs:

General tab: To set up how the *Procedure* works.

Affected Devices tab: This shows a list of devices that use the procedure.

Procedure editor for
proportional procedures

Figure 4-4 shows an example of the *General* tab when the *Procedure* has a set of test points:

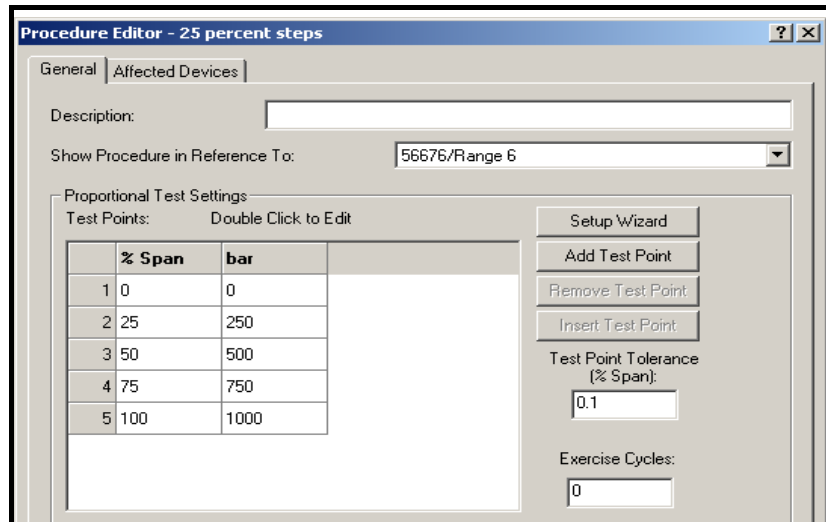


Figure 4-3: Procedure Editor for proportional procedures

Description: Up to 255 characters.

Show Procedure in Reference To: If you select one of the *Affected Devices* from the drop-down list, Intecal adds another column of test points. The new test point values are in the measurement units of the specified *Device*.

Test Points: This shows each test point as a percentage of Span. To add another column of test points, use *Show Procedure in Reference To*. To edit a test point, double-click on the value.

Setup Wizard: Click on this button to open the *Procedure Point Wizard*. Use this to create a set of test points.

Add/Remove/Insert Test Point: Click on the applicable button to add, remove or insert one test point.

Test Point Tolerance: To set an applicable calibration tolerance.

Exercise Cycles: To set the number of calibration cycles.

Procedure Editor for switch procedures

Figure 4-4 shows an example of the *General* tab when the *Procedure* is for a switch test.

Note: The Switch test is for portable calibrators only.

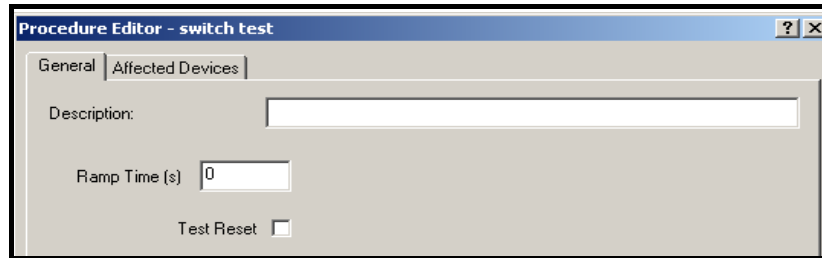


Figure 4-4: Procedure Editor for a switch test

Description: Up to 255 characters.

Ramp Time: Set the period (in seconds) for the portable calibrator to go from the low value to the high value.

Test Reset: Select this option to see if the switch resets correctly.

Rename a procedure

To rename a *Procedure*, select the *Procedure* in the list, and then use one of these methods to rename it:

- Select *File > Rename* from the menu bar.
- Right-click and select *Rename*.

Copy a procedure



To copy a *Procedure*, select the *Procedure* in the list, and then use one of these methods to copy it:

- Click on the *Copy* button in the tool bar.
- Select *Edit > Copy* from the menu bar.
- Right-click and select *Copy*.

A window opens for you to enter a new *Procedure ID*.

Delete a procedure



To delete a *Procedure*, select the *Procedure* in the list, and then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File > Delete* from the menu bar.
- Right-click and select *Delete*.
- Press the delete key on the keyboard.

You must confirm that you want to delete the *Procedure*.

Note: If a Device uses the Procedure, you cannot delete it.

Chapter 5: Calibration systems

(Intecal-Advanced only)

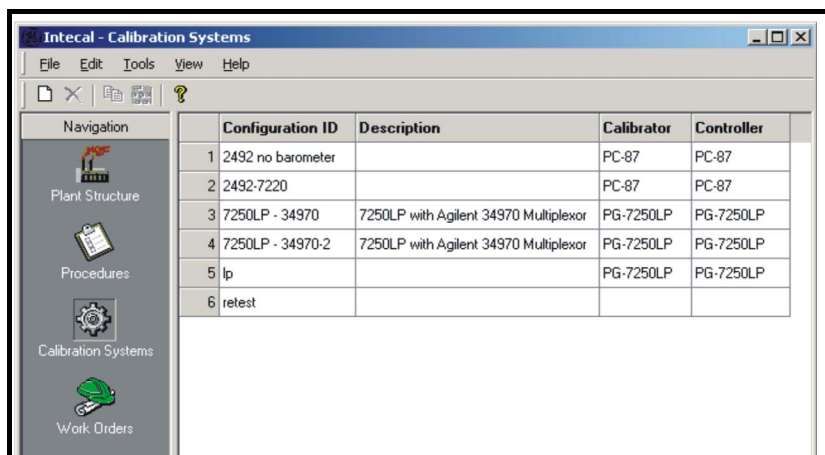
Introduction

Use Intecal *Calibration Systems* to manage the hardware configurations you use to do your calibrations. A *Calibration System* includes the *Devices* you use in the hardware configuration and the applicable *Device Variables* that control the calibration.

You can then use the same *Calibration System* for all the applicable *Devices* under test (Chapter 7). Figure 5-1 shows the *Calibration Systems* window.

You can use the *Calibration Systems* function to do these tasks:

- create a *Calibration System*
- edit, copy, delete or rename a *Calibration System*



The screenshot shows the 'Intecal - Calibration Systems' window. It has a menu bar with 'File', 'Edit', 'Tools', 'View', and 'Help'. Below the menu bar is a toolbar with icons for file operations and help. A navigation pane on the left contains icons for 'Plant Structure', 'Procedures', 'Calibration Systems', and 'Work Orders'. The main area displays a table with the following data:

| Configuration ID | Description | Calibrator | Controller |
|------------------|-------------------|---------------------------------------|------------|
| 1 | 2492 no barometer | PC-87 | PC-87 |
| 2 | 2492-7220 | PC-87 | PC-87 |
| 3 | 7250LP - 34970 | 7250LP with Agilent 34970 Multiplexor | PG-7250LP |
| 4 | 7250LP - 34970-2 | 7250LP with Agilent 34970 Multiplexor | PG-7250LP |
| 5 | lp | PG-7250LP | PG-7250LP |
| 6 | retest | | |

Figure 5-1: Calibration Systems window

Create a Calibration System



To create a *Calibration System*, use one of these methods:

- Click on the *New Calibration System* button in the tool bar.
- Select *File > New Calibration System* from the menu bar.
- Right-click and select *New Calibration System*.
- When you start a calibration (Chapter 7), click on the *New Calibration System* button.

This opens the “*Calibration System Creation Wizard*” (Figure 5-2).

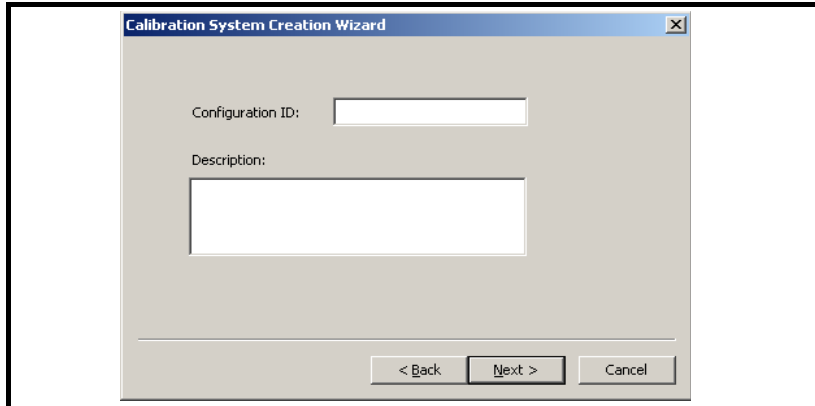


Figure 5-2: Calibration System Creation Wizard - Page 1

1. Enter a unique *Configuration ID* (Maximum: 50 characters).
2. If necessary, enter a *Description* (Maximum: 164 characters)
3. Click on the *Next* button (Figure 5-3).

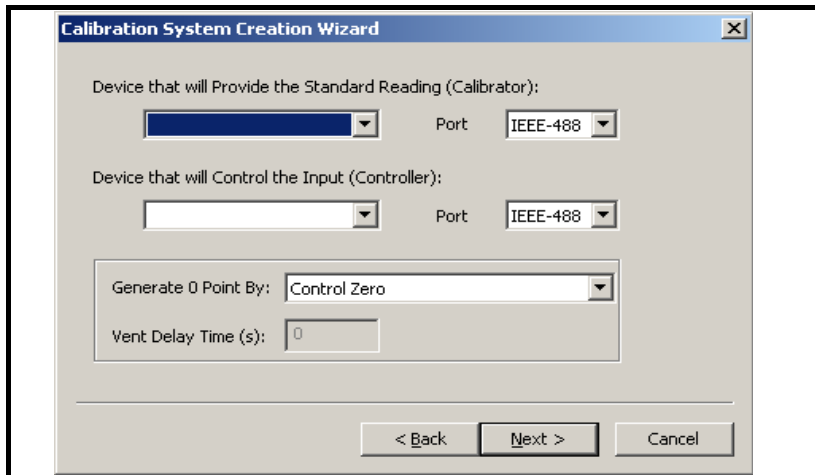


Figure 5-3: Calibration System Creation Wizard - Page 1

1. Enter the applicable values:

Device ... (Calibrator): Click on the drop-down list and select the applicable *Calibrator Device* (Chapter 3): This is the *Device* that reads the standard values used in the calibration.

Device ... (Controller): Click on the drop-down list and select the applicable *Controller Device* (Chapter 3): This is the *Device* that controls the standard values used in the calibration.

Note: The Calibrator and the Controller can be the same Device.

Port: Click on the drop-down list and select the communication *Port* for each *Device*.

Generate 0 Point By: If applicable, click on the drop-down list and select the method to set a zero pressure value:

- *Control Zero:* The *Controller* takes the pressure to zero.
- *Vent:* The *Controller* vents the pressure to atmospheric pressure.

Vent Delay Time (s): If applicable, enter the time interval (in seconds) before the system vents to atmospheric pressure.

- *Draw Vacuum:* A vacuum pump reduces the pressure to an approximate absolute zero.

2. When the values are set up, click on the *Next* button (Figure 5-4).

Wizard – Page 3

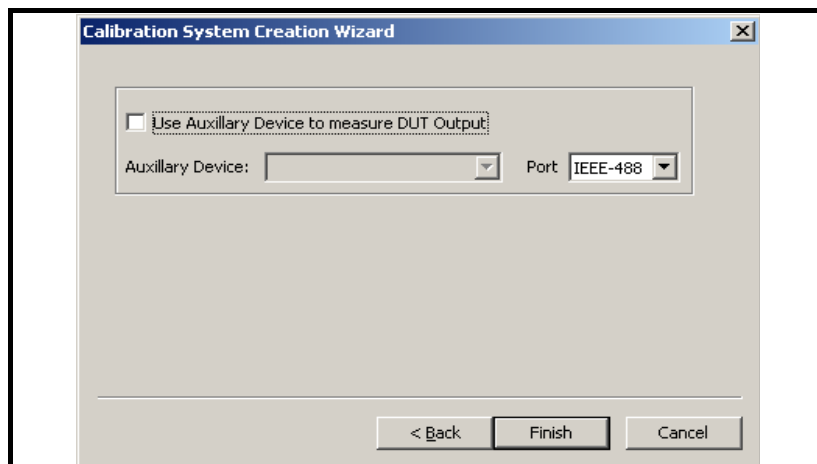


Figure 5-4: Calibration System Creation Wizard - Page 3

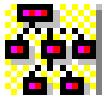
Enter the applicable values or click on the *Finish* button:

Use Auxiliary Device ... Output: If there is an auxiliary *Device* (Example: a multimeter) to read the output of the device under test (DUT), click on this check-box.

Auxiliary Device: Click on the drop-down list and select the applicable *Calibrator Device* (Chapter 3).

Port: Click on the drop-down list and select the communication *Port* for the *Device*.

Edit a Calibration System



Note: More than one Device can use a Calibration System. Make sure that the changes you make are applicable to all the related Devices.

To edit a *Calibration System*, select the applicable *Calibration System* in the list, and then use one of these methods to edit it:

- Click on the *Cal System Configurator* button in the tool bar.
- Select *Tools > Cal System Configurator* from the menu bar.
- Right-click and select *Cal System Configurator*.
- Double-click on the *Calibration System*.

This opens the *Calibration System Configurator* (Figure 5-5).

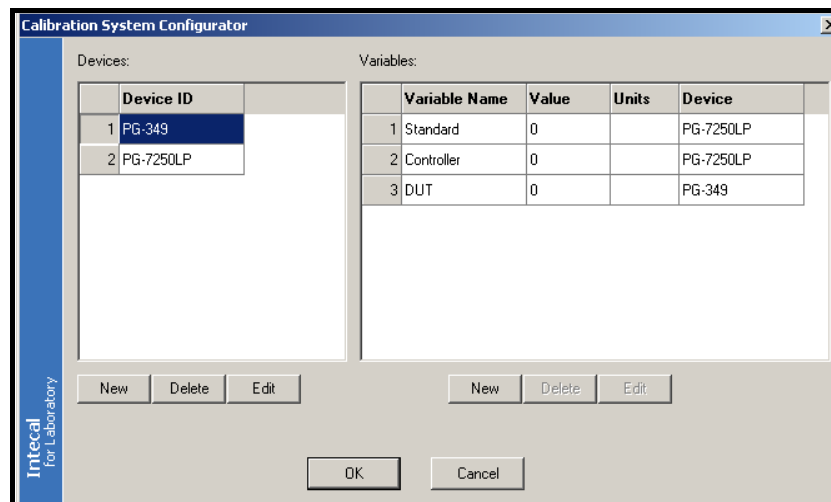


Figure 5-5: *Calibration System Configurator*

There are two lists:

Devices: Use this list to set up and change the *Devices* you use to do the calibration.

Variables: Use this list to set up and change how the *Calibration System* uses the *Variables* to do the calibration.

Add, edit, delete
calibration devices

To change the *Devices* in the *Calibration System*, click the applicable button to add, edit, or delete a *Device*. To edit an item, you can also double-click on it.

Each *Device* must have a specified communications port. Use the drop-down list to select one.

Note: When you edit a *Device* to change the communications port, *Intecal-Advanced* tries to communicate with it. Make sure that the *Device* has a connection to the PC.

Add, edit, delete
calibration variables

To change the *Variables* in the *Calibration System*, click the applicable button to add, edit, or delete a *Variable*. To edit an item, you can also double-click on it.

Figure 5-6: Data for a Variable

Variable Name: Enter a unique *Name* (maximum 50 characters).

Type: Click on the drop-down list and select the applicable type for this *Variable*. These include:

- Automated: A specified *Device* supplies the *Variable* value (Specified in *Device*:).
- Constant: It is a constant value (Specified in *Default Value*:).
- Manual: During the calibration a *Prompt* asks you to supply the necessary value (The text is specified in *Prompt*:).

Device: (Automated Variables only). Click on the drop-down list and select the applicable *Calibrator Device* (Chapter 3).

Parameter: Click on the drop-down list and select the applicable *Parameter*. The parameters include:

- Current
- Density
- Frequency
- Humidity
- Pressure
- Resistance
- Temperature
- RTD
- Thermocouple
- Voltage

Range: (Automated Variables only). Enter the permitted range that the *Device* can supply. Example: For 20 bar, enter 20.

Units: Click on the drop-down list and select the applicable units.

Default Value: (Constant Variables only) Enter an applicable constant value.

Prompt: (Manual Variables only) Enter the applicable text to ask the operator for a value during the calibration.

Rename a calibration system

To rename a *Calibration System*, select the *Calibration ID* in the list, and then use one of these methods to rename it:

- Select *File > Rename* from the menu bar.
- Right-click and select *Rename*.

Copy a calibration system



To copy a *Calibration System*, select the *Calibration ID* in the list, and then use one of these methods to copy it:

- Click on the *Copy* button in the tool bar.
- Select *Edit > Copy* from the menu bar.
- Right-click and select *Copy*.

A window opens for you to enter a new *Configuration ID*.

Delete a calibration system



To delete a *Calibration System*, select the *Configuration ID* in the list, and then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File > Delete* from the menu bar.
- Right-click and select *Delete*.
- Press the delete key on the keyboard.

You must confirm that you want to delete the *Calibration System*.

Chapter 6: Work Orders

Introduction

Use Intecal *Work Orders* to manage your calibration work. Figure 6-1 shows the *Work Orders* window.

You can use the *Work Orders* function for these tasks:

- Create a new *Work Order* and set up a schedule of work for specified employees. To help you, a Query function can show you all the calibrations that are due in a specified period.
- Change the *Work Order* or delete it.
- Upload and download data (*Procedures*, calibration results) to and from portable calibrators that have a serial communications function (Druck, Ruska, or FCINTF).
- Chapter 7: Manage the calibration records for *Devices* that do not have a serial communications function (*Manual Data Entry*).
- Chapter 7: (Intecal-Advanced only) Calibrate a *Device* or a group of *Devices* that have a serial communications function (Druck, Ruska, or FCINTF).

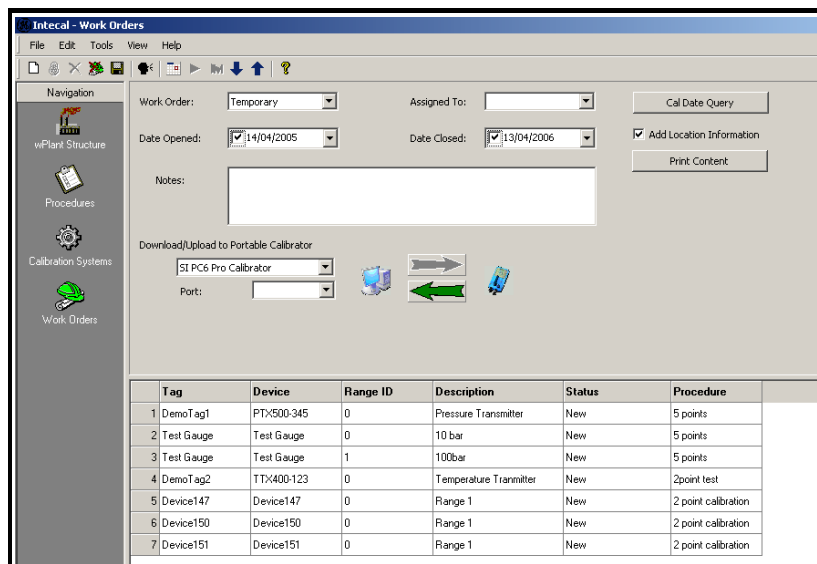


Figure 6-1: Work Order window

Create a new Work Order



To create a *Work Order*, use one of these methods:

- In the *Work Order* window, click on the *New* button in the tool bar.
- In the *Work Order* window, select *File > New* from the menu bar.
- In the *Plant Structure* window:
 - a. Right-click on an item and select *Add to Work Order*.
 - b. When the *Add to Work Order* window opens, click on the *New Work Order* button.

You must enter a unique *New Work Order ID* and click on the OK button. You can then set up your *Work Order* data.

Set up your Work Order data.

Add Devices to a Work Order



To set up what is done in a *Work Order* you need to add *Devices* to it. You can also add employee data and work instructions.

You can add *Devices* to a *Work Order*, from the *Work Order* window or from the *Plant Structure* window.

In the *Work Order* window, select *Tools > Get Overdue Items* from the menu bar. Intecal uses the *Calibration Due Date* for each *Device* to add the applicable items.

In the *Plant Structure* window, you must select an item from the *Plant Structure* tree (*Location, Sub-Location, Tag, Device, Range*), and then use one of these methods:

- Click on the *Add To Work Order* button in the tool bar.
- Select *Tools > Add To Work Order* from the menu bar.
- Right-click on the item and select *Add to Work Order*.

A drop-down list lets you add the item to an applicable *Work Order*. When you click on the OK button, Intecal adds all the related *Devices* to the specified *Work Order*.

Note: If a *Device* is not set up with the necessary *Range* data (*Parameter, Procedure*), Intecal ignores it.

Add instructions to a Work Order

In the *Work Orders* window (Figure 6-1), select the applicable *Work Order* from the drop-down list. You can then add the necessary instructions:

Assigned to: Click on the drop-down list to select an applicable *Employee*.

Date Opened/Closed: To set a schedule for the work, click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date. Use the check-box to show it is active and/or complete.

Notes: Up to 260 characters.

Delete items from a Work Order



To delete an item from a *Work Order*:

1. Select the applicable *Work Order* from the drop-down list.
2. Click on the applicable item in the *Work Order* list, then use one of these methods to delete it:
 - Click on the *Delete* button in the tool bar.
 - Select *File > Delete* from the menu bar.

Delete a Work Order



To delete a *Work Order*, Select the applicable Work Order from the drop-down list, and then use one of these methods to delete it:

- Click on the *Delete Work Order* button in the tool bar.
- Select *File > Delete Work Order* from the menu bar.

Upload/download data

To upload and download data (*Procedures*, calibration results) to and from a portable calibrator, connect the *Device* to the applicable communication port (COM port or IEEE-488).

Note: The portable calibrator must have the necessary serial communications function (Druck, Ruska, or FCINTF).

Then:

1. In the *Work Order* window (Figure 6-1), select the *Work Order* from the drop-down list.
2. In *Download/Upload to ...*, click on the applicable drop-down list and select the necessary portable calibrator driver and the communication port.
3. Click on the download button to download the procedure.



Download button in the tool bar



Download button in the *Work Order* window

4. Do the necessary calibration:
 - Intecal-Advanced calibration - Refer to Chapter 7.
 - Local calibration methods - Refer to the applicable local calibration procedures.
5. Click on the upload button to upload the results.



Upload Button in the tool bar



Upload Button in the *Work Order* window

Chapter 7: Calibration

Introduction

You can use Intecal for these calibration tasks:

- To see the *Calibration History* for a *Device* or *Range*. You can also make a permanent record of each calibration report. For example: For ISO 9000 quality control procedures.
- To manage the calibration records for *Devices* that do not have a serial communications function (*Manual Data Entry*).
- (Intecal-Advanced only) To calibrate a *Device* or a group of *Devices* that have a serial communications function (Druck, Ruska, or FCINTF).
- (Intecal-Advanced only) To make calibration adjustments to a *Device* or a group of *Devices* that have a serial communications function (Druck, Ruska, or FCINTF).

Calibration history



If a *Device* or *Range* has a *Calibration History*, you can see each set of results on the screen. You can also make a permanent record of each calibration report with an applicable address and/or company logo.

To see the *Calibration History*:

1. Click on the related *Tag*, *Device* or *Range* in the Plant Structure window.
2. Use one of these methods to see the *Calibration History*:
 - Click on the *Calibration History* button in the tool bar.
 - Select *Tools > Calibration History* from the menu bar.

Figure 7-1 shows an example of the *Calibration History* window.

| | Input (bar) | Output (mA) | Input Units | Absolute Error | %Reading | %Span |
|---|-------------|-------------|-------------|----------------|----------|--------|
| 1 | 0 | 4.01 | 0.006 | 0.009 | 0.25 | 0.062 |
| 2 | 2.502 | 8.01 | 2.506 | 0.006 | 0.085 | 0.042 |
| 3 | 5.03 | 12.02 | 5.012 | -0.028 | -0.232 | -0.176 |
| 4 | 7.498 | 16 | 7.5 | 0.003 | 0.02 | 0.02 |
| 5 | 10 | 20.01 | 10.006 | 0.01 | 0.05 | 0.062 |

| | Maximum Deviation | Standard Deviation |
|---|-------------------|--------------------|
| 1 | -0.028000 | 0.016120 |

Figure 7-1: Calibration History

- Click on the drop-down list (left-hand side) and select the calibration record you want to see.

Calibration History records

A typical *Calibration History* record includes these items:

As Found/As Left: Use the check-boxes to show what the results are:

- As Found:* The values before adjustment.
- As Left:* The values after the checks/adjustments are complete.

Report Style: There are two types:

- Proportional:* The report includes all the calibration data.
- Proportional-Blank:* The report shows the *Device* data but no calibration data.

Input (...), Output (...): The type of *Device*, and the *Procedure* you use controls the type of data in the calibration record. To calculate the error values for each test point (Absolute Error, %Reading, %Span), Intecal uses the specified *Device* pass/fail and adjustment criteria (Chapter 3).

Intecal has three categories for the calibration results:

- *Passed*: The test point values have a white background.
- *Needs Adjustment*: The test point values have a yellow background.
- *Failed*: The test point values have a red background.

Status: *Passed* (Green) - All the test points are in the specified limits for the *Device*.

Needs Adjustment (Yellow) - Some of the test points are not in the specified limits but they are in the limits for adjustment.

Failed (Red) - The equipment is unserviceable. For example: It must go back to the manufacturer or to a calibration laboratory.

Maximum/Standard Deviation: Intecal calculates these values for information only.

Calibrated by: The *Employee* that did the calibration.

Approved by: Click on the drop-down list and select the *Employee* that gives approval to these calibration results.

Report: Click on this button to make a permanent record of the calibration report (electronic or paper). For a blank report, use *Report Style* to set the type of report.

Calibration History reports When you click on the *Report* button in Figure 7-1, the Intecal *Report* window opens (Figure 7-2). If the *Report Style* is set to *Proportional*, there are two pages:

- Page 1 has the necessary *Device* and calibration data.
- Page 2 shows the calibration results in a graph.

You can use the report function for these tasks:

- To print the report
- To export the file in a different format: Portable Document Format (PDF), MS Word, MS Excel, Text file (with tab separators).

To use a different logo on your report (a company logo or a company address), replace the file “logo.bmp” in the Intecal folder on your PC. For example: In folder C:\Program Files\... \Intecal.

Note: You must use a bitmap file with the same file name (“logo.bmp”).

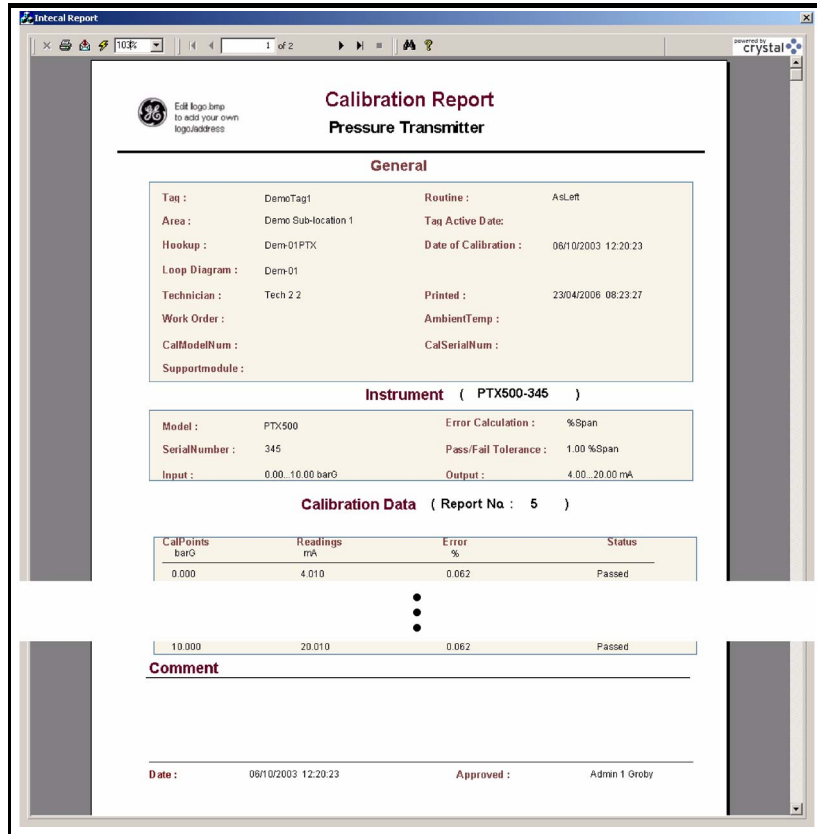


Figure 7-2: Example calibration report

Calibration - Manual Data Entry



If you are using a calibrator that does not have a serial communications function, you can add calibration results to your Intecal database manually:

1. In the *Work Order* window (Figure 7-3), select a *Work Order* from the drop-down list.

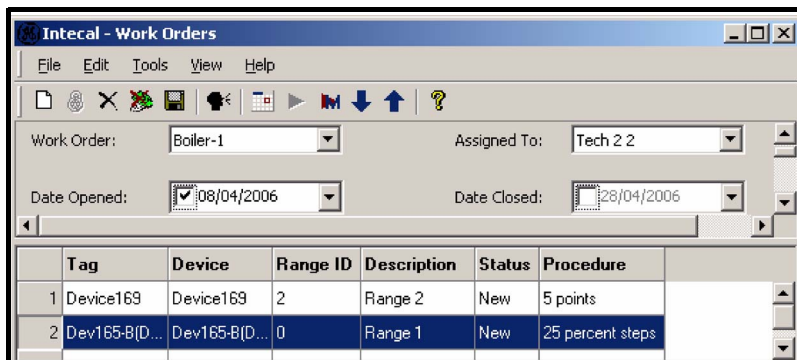


Figure 7-3: Work Order - Manual Data Entry

2. Select the applicable *Device* from the *Work Order* list of *Devices*.
3. Click on the *Manual Data Entry* button in the tool bar. This opens the *Manual Data Entry* window (Figure 7-4).

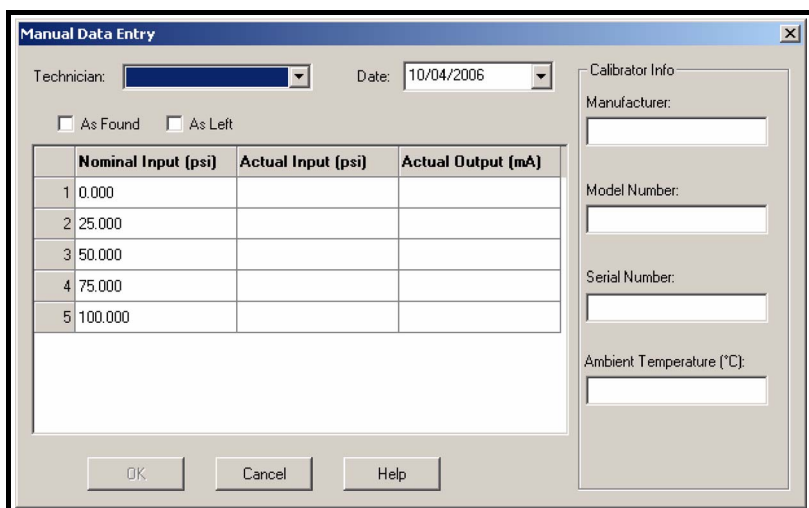


Figure 7-4: Manual Data Entry window

4. Add the necessary data:

Technician: Click on the drop-down list to select an applicable *Employee*.

Date: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date.

As Found/As Left: Use the check-boxes to show what the results are:

- *As Found:* The values before adjustment.
- *As Left:* The values after the checks/adjustments are complete.

Nominal Input (...), Actual Input (...): The type of *Device*, and the *Procedure* you use controls the type of data in the calibration record. Click on a box and enter the applicable values.

Calibrator Info: To make sure that the calibration is traceable to the necessary standards, identify the calibrator used to do the calibration (Manufacturer, Model Number ...).

Calibration - Automatic

(Intecal-Advanced only) Use this function to calibrate one *Device* or a group of *Devices*.

Before you start:

- Read and understand the “Safety” section.
- Make sure each *Device* is set up with the necessary *Range* data (Chapter 3).
- Make sure that there is a connection between the PC communications port and the applicable test equipment.

When all the connections are correct, you can do the automatic calibration from the *Plant Structure* window or from the *Work Order* window.

Automatic calibration -
Plant Structure window



To do a calibration from the *Plant Structure* window (Chapter 3):

1. Select an item in the *Plant Structure* tree, and use one of these methods to start the calibration:
 - Click on the *Calibrate* button in the tool bar.
 - Select *Tools > Calibrate...* from the menu bar.
 - Right-click and select *Calibrate...* .

Note: If you select a *Sub-Location* that includes more than one *Device*, Intecal calibrates all the *Devices*.

- When the *Select Calibration System* window opens (Figure 7-5), select an applicable *Calibration System* from the drop-down list or click on the *New Calibration System* button.

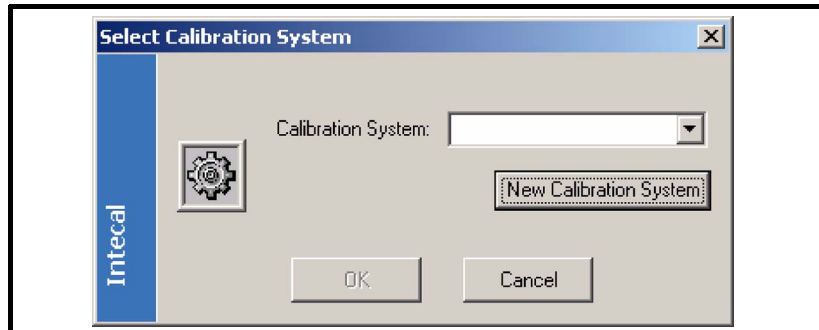


Figure 7-5: *Select Calibration System* window

Note: A *Calibration System Creation Wizard* (Chapter 5) helps you set up a new *Calibration System*.

- When the *Calibration System* is correct, click on OK. This opens the “*Calibration*” window (Figure 7-6).

Automatic calibration -
Work Order window



To do a calibration from the *Work Order* window (Chapter 6):

- Select the *Work Order* from the drop-down list.
- Use these methods to select the applicable items from the *Work Order*:
 - Select *Edit > Select All (Deselect All)* from the menu bar. All selections have a green background.
 - Click on an item and, if necessary, select *Edit > Select (Deselect)* from the menu bar.
- Use one of these methods to start the calibration:
 - Click on the *Calibrate* button in the tool bar.
 - Select *Tools > Calibrate...* from the menu bar.
- When the *Select Calibration System* window opens (Figure 7-5), select an applicable *Calibration System* from the drop-down list or click on the *New Calibration System* button.

Note: A *Calibration System Creation Wizard* (Chapter 5) helps you set up a *New Calibration System*.

- When the *Calibration System* is correct, click on OK. This opens the “*Calibration*” window (Figure 7-6).

Calibration window

Figure 7-6 shows the *Calibration* window that opens:

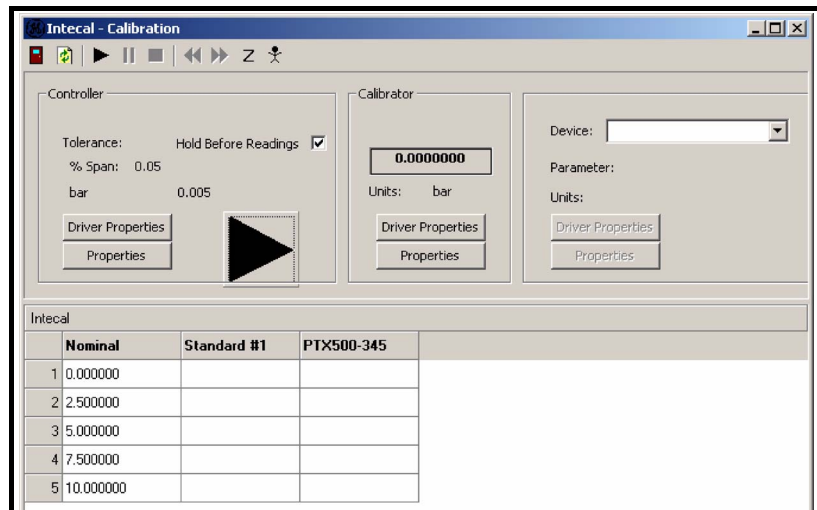


Figure 7-6: Calibration window

Controller/Calibrator: Specified by the *Calibration System* (Chapter 5).

Tolerance: Specified by the *Procedure* set up for the *Device Range* (Chapter 3).

Hold Before Readings: If you want to stop and examine the data before each reading, click on this check-box.










Device: Click on the drop-down list and select the *Device* you want to calibrate.

Driver Properties: To examine or change the applicable communication properties (Controller, Calibrator, Device), click on this button. Refer to the user manual for the applicable *Device*.

Properties: To examine the applicable *Device* properties (Controller, Calibrator, Device), click on this button.

The large “Play” button and the tool bar at the top of the screen lets you select the applicable calibration task (Table 7-1).

Table 7-1: Calibration window - Tool bar

| Item | Operation |
|---|---|
|  | Exit: Leave the calibration screen. |
|  | Refresh: Update the data on the screen. |
|  | Play: Start the calibration. |
|  | Pause: Stop the calibration temporarily. To continue, click on “Pause” again. |
|  | Stop: Stop the calibration completely. |
|  | Redo: Go back and do the previous test point again. |
|  | Skip: Go to the next test point. |
|  | Zero: Set the <i>Device</i> to zero. |
|  | Exercise: Make sure that the <i>Device</i> works correctly. |

The bottom half of the screen shows the calibration results:

Nominal: Shows the calibration values specified by the *Procedure* (Chapter 3).

Standard: Shows the applied calibration values.

XXX: (Applicable *Device ID*) Shows the reading that the specified *Device* gives back.

Calibration - Adjustment



(Intecal-Advanced only) Use this function to make calibration adjustments for one *Device* or a group of *Devices*.

Before you start:

- Read and understand the “Safety” section.
- Make sure each *Device* is set up with the necessary *Range* data (Chapter 3).
- Make sure that there is a connection between the PC communications port and the applicable test equipment.

To make calibration adjustments:

1. Select an item in the *Plant Structure* tree (Chapter 3), and use one of these methods to start the *Adjustment Cycle*:

- Click on the *Adjustment Cycle* button in the tool bar.
- Select *Tools > Adjustment Cycle* from the menu bar.

Note: If you select a *Sub-Location* that includes more than one *Device*, *Intecal* lets you make adjustments to all the *Devices*.

2. When the *Select Calibration System* window opens (Figure 7-5), select an applicable *Calibration System* from the drop-down list or click on the *New Calibration System* button.

Note: A *Calibration System Creation Wizard* (Chapter 5) helps you set up a new *Calibration System*.

3. When the *Calibration System* is correct, click on OK. This opens the “*Calibration*” window (Figure 7-7).

Calibration window
(Adjustment)

Figure 7-7 shows the *Calibration* window for the *Adjustment Cycle*. This is almost the same as the normal *Calibration* window. Refer to Figure 7-6 and the related text.

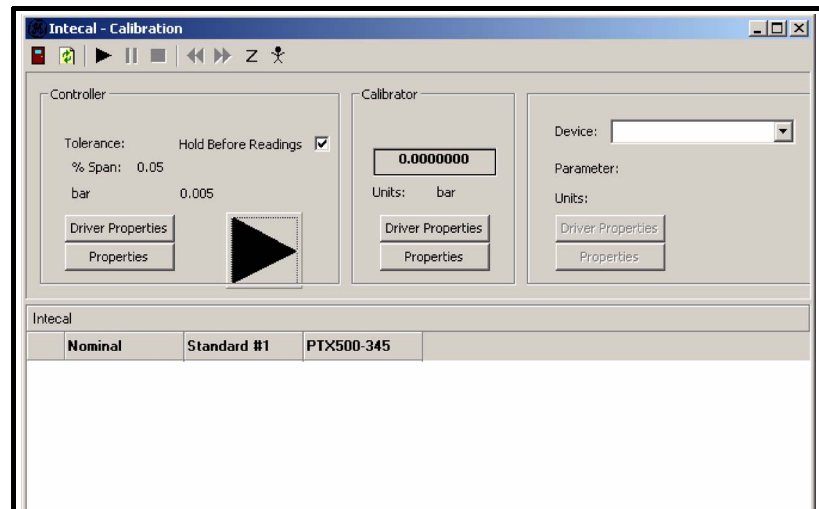


Figure 7-7: Calibration window (Adjustment)

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