Wiring Module

Overview

The Wiring module provides the means to efficiently define and manage the creation of panels of different types, connections and routing of all interconnecting devices for instrument signals and/or the required system wiring. The concept of panel is used throughout the Wiring module to represent devices to which wires are connected (that is, device panels, junction boxes, marshaling racks, cabinets).

The functionality of the Wiring module is divided into the following basic concepts:

- Panels, Terminal Strips, and Terminals
- Device Panels
- Cables, Cable Sets, and Wires
- The Connection Concept
- Local Signals
- I/O Assignment: An Overview
- Cross Wiring Overview
- Foundation Fieldbus and Profibus: An Overview
- Intrinsic Safety

Principles of Wiring Operations

The Wiring module creates and keeps track of wiring routing and connections by identifying the wires and their connection points.

The wires and the entities to which they are connected are arranged hierarchically: cable-cable set-wire and panel-terminal strip-terminal. These terms are described in detail in the relevant help topics.

The Wiring module is designed so that you can make connections between or within any of the <units> in a <plant>. **Reference cables** and **panels** are, however, available for all the <plants> in the domain.

The following sequence of operations is necessary for the creation of a wiring scheme:

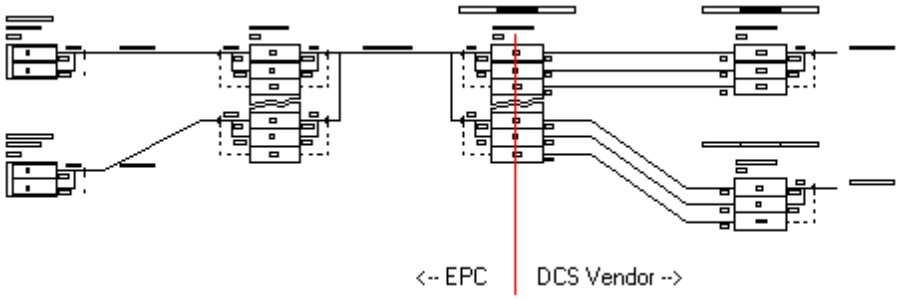
- Creation of panels, terminal strips, and terminals
- Creation of cables, cable sets, and wires
- Connecting wires to terminals

In addition, tagged instruments may be wired so that their wiring routing is automatically tracked and wire names are automatically propagated. This is described in the topics Device Panels and I/O Assignment: An Overview.

Splitting the Wiring Design Among Several Teams

There are projects in which, for various reasons, several teams work on the wiring design of the same project. These teams can be located at the same site or be at different geographical locations.

A good example of such a project is when the main contractor designs the field instrumentation wiring up to the marshaling racks while the DCS vendor is responsible for the DCS design and also for the design of the wiring from the marshaling panel to the terminals of the I/O cards that they supply, as shown below:



At the end of the project, or at any intermediate stage, there is a need to integrate both designs into one database to complete the wiring from the field to the DCS and then generate the complete loop diagrams and the wiring reports.

At this time, the boundary or the scope of the design that each party is responsible for can vary from project to project. Usually, the intersection point would be somewhere around a marshaling panel, either at the field side of a terminal strip and the control system terminal strip side. This issue is usually discussed between the parties and they agree where this line is drawn.

In SmartPlant Instrumentation, we recommend the following strategy to handle this split wiring design:

1. The main contractor or the EPC starts with the creation of an AsBuilt domain and then creates a project for each of the working parties involved in the overall design. In the example mentioned above, the main contractor works on the main AsBuilt plant and defines the projects for the DCS vendors.

2. All the teams work on the same database using Citrix. However, it is also possible to work offline.

Using this approach for splitting the design has the following advantages:

- Provides the ability to see the current AsBuilt data while connecting to the data (not the other way around).
- Enables good control of new tag numbers and subcomponents.
- Retains the uniqueness of rules when adding various subcomponents such as terminals on a terminal strip.
- Enables the comparison of AsBuilt loops and project loops.

Note that the members of the various teams working on the projects have to be informed of the changes made in AsBuilt so that they can update their databases. Consequently, based on data maturity, teams should coordinate among themselves

when to transfer their wiring data to the rest of the projects.

Creating a Wiring Scheme

After the System Administrator initializes and creates a domain, SmartPlant Instrumentation creates the following items:

- Reference cables
- Reference device panels with terminal strips
- Connection types

These reference entities suffice for the most common connections to device panels. For more sophisticated combinations, you should create your own reference entities for these items.

For example, for a 2-wire device you need to create:

- A device panel with a two-terminal strip named DEFAULT 2W DEVICE PANEL in the **Reference Explorer**.
- A cable with a shielded twisted pair (cable + one shielded pair), named DEFAULT 2W CABLE in the **Reference Explorer**.
- A connection device that connects two wires from a pair one after the other named 2 IN A ROW.

Note

- The above reference entities can then be selected for the **Wiring** profile to define the reference wiring properties for a given instrument type.

When you start a new wiring scheme, the folders in the **Wiring Explorer** are empty. You can right-click the one of the panel folders in the **Wiring Explorer** and on the shortcut menu, point to **New** and then click the required option. The **Reference Explorer** contains several reference panels and cables that are provided as shipped data that you can copy to the **Domain Explorer** (or the **Wiring Explorer**).

Caution

- You must have appropriate access rights to alter the reference entities.

Starting the Wiring Module

The following procedure explains how to start the Wiring module.

➢ To start the Wiring module

- Do one of the following:
  - On the **Modules** menu, click **Wiring**.
  - On the SmartPlant Instrumentation toolbar, click  .

Note

- You can open more than one module, if needed, and keep several modules running simultaneously. The number of modules that you can run simultaneously depends, of course, on your computer resources.

Moving, Copying, and Duplicating Wiring Entities

SmartPlant Instrumentation allows you to copy, move, and duplicate wiring entities in the **Domain Explorer** or **Reference Explorer**. Also, you can copy wiring entities from the **Reference Explorer** to the **Domain Explorer** or from the **Domain Explorer** to the **Reference Explorer**. You copy or move an entity by dragging it to its destination. You duplicate an entity by using a shortcut menu command.

The following procedures explain how to perform these actions as well as the terminology used by the software for these actions.

Moving a Wiring Entity

This feature allows you move a wiring entity from one parent entity to another within the **Domain Explorer**. This can be very helpful when, for example, you want to move a terminal strip to another panel. If you are moving an entity that contains sub-entities, the software moves the entity and all its sub-entities.

Note that the same rules apply when you want to move an entity in the **Reference Explorer**. If you drag an entity from the **Reference Explorer** to the **Domain Explorer** or vice versa, SmartPlant Instrumentation creates a copy of that entity and retains the selected entity in its original place. If you open another instance of the **Domain Explorer** and drag an entity from one **Domain Explorer** window to another, the same rules apply as if you are dragging it within the same **Domain Explorer** window.

➢ To move a wiring entity to another parent entity in the Domain Explorer

1. In the **Domain Explorer**, expand a hierarchy to display the entity that you want to move.

2. Drag your selection to the required destination in the **Domain Explorer**.

➢ To move a wiring entity to another parent entity in the Reference Explorer

1. In the **Reference Explorer**, expand a hierarchy to display the entity that you want to move.

2. Drag your selection to the required destination in the **Domain Explorer**.

Duplicating a Wiring Entity

You use this action to create a duplicate entity within the same parent hierarchy. That is, the software creates another copy of the selected entity under the immediate parent entity. For example, if you need to insert an apparatus within an existing apparatus group, expand an apparatus group and duplicate an apparatus. You can then change the sequence numbers of the apparatuses to re-arrange them on the strip the way you require.

Furthermore, if you are duplicating a panel or another entity that contains sub-entities, the software duplicates the entity in its entirety. That is, SmartPlant Instrumentation creates the new entity with exactly the same sub-entities as the original panel. Note that in this case, the software also retains all the existing internal connections if you selected the **Copy internal connections** wiring preference. For details, see Copying Internal Connections.

➢ To duplicate a wiring entity

1. In the **Domain Explorer** or **Reference Explorer**, expand a hierarchy to display the entity that you want to duplicate.

2. Right-click the entity you are duplicating and then on the shortcut menu, click **Duplicate**.

Associating a Wiring Entity

SmartPlant Instrumentation enables you to associate terminals and pins with wiring equipment channels. Note that these terminals must belong to a terminal strip which is a sub-entity of the parent wiring equipment. Also, if you wan to associate pins, the pins must belong to a connector which is a sub-entity of the parent wiring equipment.

After you drag a terminal or a pin to a wiring equipment channel, the software retains it in its original place from which you dragged it. However, after expanding the destination hierarchy, the software also shows the terminal or pin that you dragged. This means that the terminal or pin is physically located in its original place but it is associated with the entity to which it was dragged.

➢ To associate a terminal with a wiring equipment channel

1. In the **Domain Explorer**, expand a hierarchy to display the terminal that you want to associate.

2. Drag your selection to the required wiring equipment channel in the **Domain Explorer**.

➢ To associate a pin with a wiring equipment channel

1. In the **Domain Explorer**, expand a hierarchy to display the pin that you want to associate.

2. Drag your selection to the required wiring equipment channel in the **Domain Explorer**.

Copying a Wiring Entity

Copying a wiring entity entails copying it from the **Reference Explorer** to the **Domain Explorer** or from the **Domain Explorer** to the **Reference Explorer**. For details, see Copying Reference Entities.

Note that SmartPlant Instrumentation allows you to preserve the internal connections within a copied entity. This means that the software retains the cables and cross wires that connect among the various terminal strips within the entity that you are copying. For details, see Creating and Copying Reference Entities with Internal Connections.

Also, if you are copying a panel or another entity that contains sub-entities, the software duplicates the entity in its entirety, including all the existing sub-entities.

Working with Reference Entities

Creating Reference Entities

The **Reference Explorer** contains predefined panel and cable configurations that you can copy directly to your <plant>.

We recommend that you create as many reference entities as possible for each required use, for example fuse, power supply, barrier, PLC connectors, DCS connectors, cables, and so forth. This enables you to save time by copying these existing reference entities to the **Domain Explorer** or **Wiring Explorer** and then renaming them and modifying their configuration as required.

➢ To create a reference entity

1. Press F8 to open the **Reference Explorer**.
2. Double-click a folder to display other folders or entities.
3. Right-click a sub-folder and then on the shortcut menu, point to **New** and click an option.

Note

- If a folder does not contain sub-folders, right-click the main folder.

Copying Reference Entities

The **Reference Explorer** contains predefined panel and cable configurations that you can copy directly to your <plant>. SmartPlant Instrumentation features an easy way to copy panel and cable information by using the drag-and-drop technique common to all Windows-based applications.

Tips

- We recommend that you create as many reference entities as possible for each required use, for example fuse, power supply, barrier, PLC connectors, DCS connectors, cables, and so forth. This enables you to save time by copying these existing reference entities to the **Domain Explorer** or **Wiring Explorer** and then renaming them and modifying their configuration as required.
- SmartPlant Instrumentation allows you to preserve the internal connections within a copied entity. While copying a panel or any other entity that contains internal connections, the software also copies the cables and cross wires that connect among the various terminal strips within the entity that you are copying and this way the internal connections are copied too. For details, see Creating and Copying Reference Entities with Internal Connections.

➢ To copy a reference entity

1. Press F7 to open the **Domain Explorer** and then press F8 to open the **Reference Explorer**.

   Caution

   - You can open the **Wiring Explorer** instead of the **Domain Explorer** if you want to see the wiring entities only. To open the **Wiring Explorer**, in the Wiring module, click **Wiring Explorer** on the **View** menu.

2. In the **Reference Explorer**, expand the hierarchy and select a reference entity.

3. Drag your selection to the required destination level in the **Domain Explorer** (or the **Wiring Explorer**).

4. In the appropriate properties dialog box (depending on the wiring entity that you are copying), change the values as needed.

   Notes

   - The name of a wire copied from the **Reference Explorer** to the **Domain Explorer** (or the **Wiring Explorer**) changes to SPARE; it does not carry a signal.

   - If you are working under cable type dependency, various fields in the **Cable Properties**, **Cable Set Properties**, and **Wire Properties** dialog boxes are not enabled for editing. For more information, see context help for these dialog boxes. The System Administrator can enable cable type dependency when making domain definitions.

Creating and Copying Reference Entities with Internal Connections

You can create reference entities that contain internal connections. SmartPlant Instrumentation allows you to preserve the internal connections within an entity that you copy to or from the **Reference Explorer**. While copying a panel or any other entity that contains internal connections, the software also copies the cables and cross wires that connect among the various terminal strips within the entity that you are copying and this way the internal connections are copied too.

➢ To create a reference entity with internal connections and copy it to the Domain Explorer

1. Do the following to enable the copying internal connections feature:

   a) On the **File** menu, click **Preferences**.

   b) In the tree view of the **Preferences** dialog box, expand the **Wiring** preferences and click **Copy Entities**.

   c) In the right pane, select the **Copy internal connections** check box.

2. In the **Domain Explorer** (or in the **Wiring Explorer**), select a panel or any other entity that contains internal connections.

   Tip

   - Since it is impossible to make any connections within reference entities, first create a typical configuration with all the required connections in the **Domain Explorer**.

3. Press F8 to open the **Reference Explorer**.

4. In the **Reference Explorer**, double-click a folder to display the required destination folder.

5. Drag the entity that you selected from the **Domain Explorer** to an appropriate destination folder in the **Reference Explorer**.

6. After creating the reference entity, you can copy this entity back to the **Domain Explorer** to create plant entities.

Note that SmartPlant Instrumentation performs the operation described when duplicating an entity or when copying entities from the **Reference Explorer** to the **Domain Explorer** or from the **Domain Explorer** to the **Reference Explorer** as follows:

- **Cross wires and cross-cables** — The software does not duplicate or copy any cross wires or cables whose wires are also used to connect terminal strips that are located outside of the terminal strip that you are copying.
- **System cross-cables** — Internal connections that use system cross-cables are duplicated even when other wires belonging to that cable are connected to other entities.
- **User-created cross cables** — Internal connections that use cross cables created by users will be duplicated as long as all the wires of the user-created cross cable are connected internally to the selected entity. If there are wires connected to another entity, the user-created cross cable will not be duplicated.
- **Cables** — Cables connected only on one end and not connected on their other end will be duplicated when copying an entity to which the cable is connected. For example, when copying a junction box, the connected cable will be duplicated if the multi-pair cable that is connected on the terminal strip is not connected on its other end.
  Device cables will not be duplicated if they are connected to device panels.
- **Jumpers** — When duplicating jumpers, your **Duplicate jumpers** preference setting overrides all other settings. Therefore, the software duplicates jumpers only if you select the **Duplicate jumpers** preference.
- **Naming conventions** — When the software creates a copy of a cable during a duplication of an entity, it uses the following naming convention: Copy of +<source cable name>.

Name and Sequence Uniqueness of Wiring Entities

When creating or editing the properties of a wiring entity, SmartPlant Instrumentation validates that the wiring entity has a unique name and sequence. The software applies the following validation rules:

Entity sequence uniqueness

If SmartPlant Instrumentation detects that the sequence of a wiring entity is not unique, the software displays an appropriate message and does not create the entity until you enter a unique sequence.

The software validates sequence uniqueness according to the following rules:

- In an Operating owner domain, the software validates sequence uniqueness in AsBuilt and all the projects belonging to the current Operating owner domain.
- Panels, cables, and connectors do not require any sequence.
- Terminals must have a sequence which is unique at the terminal strip level.
- All the other wiring entities must have a sequence which is unique at the level of the immediate parent entity under which the entity exists.

Entity name uniqueness

If SmartPlant Instrumentation detects that an entity does not have a unique name, the software displays a warning message, after which you proceed depending on the setting you made on the **General** page of the wiring preferences. You can set the software to proceed without changing the entity name if you do not select the **Enforce name uniqueness** wiring preference option on the **General** page. If you select the **Enforce name uniqueness** check box, you must rename the entity in order to proceed with your work.

The software validates name uniqueness according to the following rules:

- In an Operating owner domain, the software validates name uniqueness in AsBuilt and all the projects belonging to the current Operating owner domain.
- For panels and cables, SmartPlant Instrumentation checks for name uniqueness at the level of the current <plant>.
- Wires do not require name uniqueness.
- The software checks for terminal name uniqueness at the terminal strip level.
- For all the other wiring entities, SmartPlant Instrumentation checks for name uniqueness at the level of the immediate parent entity under which the entity exists.
- If you try to create a wiring entity that has no name, the software prompts you to enter a name. If you select the **Enforce name uniqueness** wiring preference option, the software treats entities without names according to the validation rules stated above. If you do not select this wiring preference option, the software allows you to create wiring entities without names.
- When moving an entity to another parent entity, the software validates the name uniqueness at the target level. If you did not select the **Enforce name uniqueness** wiring preference option, the software moves the entity and retains its name. If you selected the **Enforce name uniqueness** wiring preference option, the software does not allow you to move the entity if the entity name violates the validation rules.

Renaming Wiring Entities According to Naming Conventions

The software allows you to rename individual wiring entities and multiple entities according to the naming conventions set for the current unit by the Domain Administrator.

To rename a single wiring entity, open the **Properties** dialog box of the pertinent entity and select the **Apply naming convention** check box.

The following procedure deals with renaming multiple wiring entities.

➢ To rename multiple wiring entities according to the existing naming conventions

1. In either the **Domain Explorer** or the **Wiring Explorer**, select the entities you want to rename.

   Tip

   - You cannot select multiple entities in the **List** or **My List** pane.

2. Right-click the entities you selected.
3. On the shortcut menu, point to **Actions** and then click one of the following:

   - **Apply Naming Conventions to Selected Entities** – to rename only the entities you selected without renaming the child entities that exist on the lower hierarchy level of these entities.
   - **Apply Naming Conventions to Selected Entities and Sub-Entities** – to rename the entities you selected and all the child entities that exist on the lower hierarchy level of these entities.

Note

- The software renames all the selected entities applying the existing naming conventions. If for some reason, some of the entities are not renamed, SmartPlant Instrumentation displays an appropriate message.

Conventional Panels

Panels, Terminal Strips, and Terminals

The Wiring module enables you to create and configure all panels, terminal strips, I/O cards, and terminals to meet your hardware requirements.

Before connecting any wire in a panel, the panel itself, a terminal strip, and at least one terminal must exist. You can create panels, terminal strips, and terminals using one of the following methods:

- Creating them from scratch.
- Copying from existing reference panels, terminal strips, and terminals, and then renaming them as required.
- Duplicating existing plant panels, terminal strips, and terminals, and renaming them as required.

Although it is possible to create panels, terminal strips, and terminals from any <unit> within the <plant>, it is recommended that you create the panels in the <unit> where they are to be physically located. This is helpful when you want to filter the panels in the current <unit>.

Tip

- As a time saver, it is recommended that you create reference entities for the panel, terminal strip, and terminal arrangements you intend to use frequently. You drag these reference entities from the **Reference Explorer** to the **Domain Explorer** (or the **Wiring Explorer**) to create plant entities on the fly. For more information, see Copying Reference Entities.

Entering Power Supply Data for Panels and Instrument Tags

You can enter power supply data for the following SmartPlant Instrumentation entities:

- Conventional, fieldbus, and telecom instrument tags.
- Marshaling racks, cabinets, PLC, and DCS panels.

Although power supply data is not essential for SmartPlant Instrumentation functionality, it is indicated for the interface with the SmartPlant electrical application. (For more information about this interface, see SmartPlant Electrical Interface Overview.)

Note

- To modify a particular list, click ... to open a supporting table where you can add, edit, or delete items that appear on the list.

➢ To maintain power supply data for panels and instrument tags

1. Do one of the following:
   - To open the **Tag Number Properties** dialog box for an instrument tag that you are creating or editing, follow one of the following procedures:
     - Creating New Tag Numbers
     - Editing Tag Number Properties
   - To open a panel properties dialog box, see the relevant procedure in the Conventional Panels section of the Wiring module Online Help.
2. On the **General** tab, make sure that **Requires power supply** is selected.
3. Click the **Power Supply** tab.
4. Under **Criticality**, select the criticality, which is used in SmartPlant Electrical to determine whether the current instrument requires UPS power or regular power.
5. Under **Rated voltage**, select a value that indicates the voltage at which the instrument is designed to operate.

6. If the instrument runs on alternating current, under **Power supply type** click **AC** and do the following:

   a) Under **Frequency**, select the operating frequency of the instrument.

   b) Under **Number of phases**, select the number of phases in the power supply to the instrument.

   c) Under **Power factor full load**, enter a value between 0 and 1 for the ratio of active to apparent power at 100% of the rated power.

7. If the instrument runs on direct current, under **Power supply type**, click **DC**.

8. Under **Rated active load**, type the full load power consumption in kilowatts.

9. Type the following values in amperes:

   a) **Full load current**.

   b) **Starting current**.

10. In the **Coincidence factors** group box, do one of the following:

    - Under **Operating mode**, select Continuous, and under **X – continuous**, type a value between 0 and 1.
    - Under **Operating mode**, select Intermittent, and under **Y – intermittent**, type a value between 0 and 1.
    - Under **Operating mode**, select Spare, and under **ZZ – spare**, type a value between 0 and 1.
    - Under **Operating mode**, select Standby, and under **Z – stand by**, type a value between 0 and 1.

 **Note**

- The fields under **Power distribution board data** group box display data that is determined within SmartPlant Electrical. On the **Power Supply** tab, click **Help** for more information.

Creating PLC Panels

The following procedure explains how to create a new PLC panel. You can create a new PLC panel either in the **Domain Explorer** or in the **Wiring Explorer**.

If you are creating a PLC panel that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous PLC panels on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new PLC panel frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create a PLC panel

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **PLC Panel**.
   - Double-click the **Panels by Category** folder, right-click the **PLC Panels** folder and then on the shortcut menu point to **New** and click **PLC Panel**.
3. In the **Programmable Logic Controller (PLC) Properties** dialog box, on the **General** tab, do one of the following to define the name of the new panel:
   - Clear the **Apply naming convention** check box and under **Panel**, type the name of the new panel. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Panel**.
   - Keep the **Apply naming convention** check box selected if you want the software to name the new panel automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
4. In the **Address 1** and **Address 2** fields, type the required PLC definitions.

   Tip

   - You can change the **Address 1** and **Address 2** field headers to reflect manufacturer-specific terminology.

5. Select the required values from the **Type**, **Manufacturer**, **Model**, **Area classification**, and **Location** lists. If the required value is not available, click ... next to the relevant list arrow to open the appropriate supporting table.

6. Under **Maximum number of racks**, type a value to set the maximum number of racks that can be created in this panel.

7. Select the **Enable DP Profibus** check box so that you can associate this panel with a DP Profibus segment.

Tip

- Under **DP Profibus node**, type a node for the new panel.

8. If you need to enter power supply properties, select the **Requires power supply** check box and then click the **Power Supply** tab. For details, see Entering Power Supply Data for Panels and Instrument Tags.

9. Click the **Associate Symbols** tab to associate a symbol for this panel that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

10. Click **Revisions** to manage the revisions of the new panel if needed.

11. Click **OK** to accept your definitions for the new PLC panel and close this dialog box

Tip

- To create a PLC panel that contains both terminals and plug-and-socket connections, see Creating Panels with Terminals and Connectors.

Creating DCS Panels

The following procedure explains how to create a new DCS panel. You can create a new DCS panel either the **Domain Explorer** or the **Wiring Explorer**.

If you are creating a DCS panel that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous DCS panels on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new DCS panel frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create a DCS panel

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **DCS Panel**.
   - Double-click the **Panels by Category** folder, right-click the **DCS Panels** folder and then on the shortcut menu point to **New** and click **DCS Panel**.
3. In the **Distributed Control System (DCS) Properties** dialog box, on the **General** tab, do one of the following to define the name of the new panel:
   - Clear the **Apply naming convention** check box and under **Panel**, type the name of the new panel. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Panel**.
   - Keep the **Apply naming convention** check box selected if you want the software to name the new panel automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
4. In the **Highway or network** and **Device or node** fields, type the required DCS definitions.

   Tip

   - You can change the **Highway** and **Device** field headers to reflect manufacturer-specific terminology.

5. Select the required values from the **Type**, **Manufacturer**, **Model**, **Area classification**, and **Location** lists. If the required value is not available, click ... next to the relevant list arrow to open the appropriate supporting table.

6. Under **Maximum number of racks**, type a value to set the maximum number of racks that can be created in this panel.

7. Select the **Enable DP Profibus** check box so that you can associate this panel with a DP Profibus segment.

Tip

- Under **DP Profibus node**, type a node for the new panel.

8. If you need to enter power supply properties, select the **Requires power supply** check box and then click the **Power Supply** tab. For details, see Entering Power Supply Data for Panels and Instrument Tags.

9. Click the **Associate Symbols** tab to associate a symbol for this panel that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

10. Click **Revisions** to manage the revisions of the new panel if needed.

11. Click **OK** to accept your definitions for the new DCS panel and close this dialog box

Tip

- To create a DCS panel that contains both terminals and plug-and-socket connections, see Creating Panels with Terminals and Connectors.

Creating a Conventional Device Panel from the Domain Explorer

This procedure explains how to create a conventional device panel that is not linked to any tag number and not connected to any device cable.

If you are creating a device panel that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous device panels on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new device panel frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

Note

- Creating a device panel using the procedure described below enables you to create a device panel that is not linked to any tag number and not connected to any device cable. You can use another feature that enables you to create a new device panels and cables on the fly. You can then link the new panels to tag numbers, create the required device cables, and connect them to the device panels you are creating. For details, see Device Panels.

➢ To create a device panel from the Domain Explorer

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **Device Panel (Conventional)**.
   - Double-click the **Panels by Category** folder, right-click the **Device Panels** folder and then on the shortcut menu point to **New** and click **Device Panel (Conventional)**.

3. In the **Device Panel Properties** dialog box, on the **General** tab, do one of the following to define the name of the new panel:

   - Clear the **Apply naming convention** check box and under **Panel**, type the name of the new panel. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Panel**.

   - Keep the **Apply naming convention** check box selected if you want the software to name the new panel automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.

4. In the **Address 1** and **Address 2** fields, type the required definitions.

   Tip

   - You can change the **Address 1** and **Address 2** field headers to reflect manufacturer-specific terminology.

5. Select the required values from the **Type**, **Manufacturer**, **Model**, **Area classification**, and **Location** lists. If the required value is not available, click ... next to the relevant list arrow to open the appropriate supporting table.

6. Under **Dimensions**, type a value for the marshaling rack dimensions if needed.

7. Under **Mounting**, type a value if needed.

8. Select the **Set as intrinsically safe** check box if this device panel has intrinsic safety certification.

9. Click the **Associate Symbols** tab to associate a symbol for this panel that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

10. Click **Revisions** to manage the revisions of the new panel if needed.

11. Click **OK** to accept your definitions for the new device panel and close this dialog box

Creating Cabinets

The following procedure explains how to create a new cabinet.

If you are creating a cabinet that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous cabinets on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new cabinet frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create a cabinet

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **Cabinet**.
   - Double-click the **Panels by Category** folder, right-click the **Cabinets** folder and then on the shortcut menu point to **New** and click **Cabinet**.
3. In the **Cabinet Properties** dialog box, on the **General** tab, do one of the following to define the name of the new panel:
   - Clear the **Apply naming convention** check box and under **Panel**, type the name of the new panel. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Panel**.
   - Keep the **Apply naming convention** check box selected if you want the software to name the new panel automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
4. Select the required values from the **Type**, **Manufacturer**, **Model**, **Area classification**, and **Location** lists. If the required value is not available, click … next to the relevant list arrow to open the appropriate supporting table.
5. Under **Dimensions**, type a value for the marshaling rack dimensions if needed.
6. Under **Maximum number of racks**, type a value to set the maximum number of racks that can be created in this panel.
7. Under **Mounting**, type a value if needed.
8. Under **Backplane**, type a value if needed.

9. Select the **Set as intrinsically safe** check box if this cabinst has intrinsic safety certification.

10. If you need to enter power supply properties, select the **Requires power supply** check box and then click the **Power Supply** tab. For details, see Entering Power Supply Data for Panels and Instrument Tags.

11. Click the **Associate Symbols** tab to associate a symbol for this cabinet that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

12. Click **Revisions** to manage the revisions of the new cabinet if needed.

13. Click **OK** to accept your definitions for the new cabinet and close this dialog box

Tip

- To create a cabinet that contains both terminals and plug-and-socket connections, see Creating Panels with Terminals and Connectors.

Creating Marshaling Racks

The following procedure explains how to create a new marshaling rack. You can create a marshaling rack either in the **Domain Explorer** or in the **Wiring Explorer**.

If you are creating a marshaling rack that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous marshaling racks on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new marshaling rack frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create a marshaling rack

1. Do one of the following:

   - Press F7 to open the **Domain Explorer**.

   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.

2. Do one of the following:

   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **Marshaling Rack**.

   - Double-click the **Panels by Category** folder, right-click the **Marshaling Racks** folder and then on the shortcut menu point to **New** and click **Marshaling Rack**.

3. In the **Marshaling Rack Properties** dialog box, on the **General** tab, do one of the following to define the name of the new marshaling rack:

   - Clear the **Apply naming convention** check box and under **Panel**, type the name of the new marshaling rack. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Panel**.

   - Keep the **Apply naming convention** check box selected if you want the software to name the new panel automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.

4. Select the required values from the **Type**, **Manufacturer**, **Model**, **Area classification**, and **Location** lists. If the required value is not available, click … next to the relevant list arrow to open the appropriate supporting table.

5. Under **Dimensions**, type a value for the marshaling rack dimensions if needed.

6. Under **Maximum number of racks**, type a value to set the maximum number of racks that can be created in this panel.

7. Under **Mounting**, type a value if needed.

8. Under **Backplane**, type a value if needed.

9. Select the **Set as intrinsically safe** check box if this marshaling rack has intrinsic safety certification.

10. If you need to enter power supply properties, select the **Requires power supply** check box and then click the **Power Supply** tab. For details, see Entering Power Supply Data for Panels and Instrument Tags.

11. Click the **Associate Symbols** tab to associate a symbol for this marshaling rack that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

12. Click **Revisions** to manage the revisions of the new marshaling rack if needed.

13. Click **OK** to accept your definitions for the new marshaling rack and close this dialog box

Tip

- To create a marshaling rack that contains both terminals and plug-and-socket connections, see Creating Panels with Terminals and Connectors.

Creating Junction Boxes

The following procedure explains how to create a generic junction box. You can create a generic junction box either in the **Domain Explorer** or in the **Wiring Explorer**.

If you are creating a junction box that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous junction boxes on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new junction box frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create a generic junction box

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **Junction Box (Generic)**.
   - Double-click the **Panels by Category** folder, right-click the **Junction Boxes** folder and then on the shortcut menu point to **New** and click **Junction Box (Generic)**.
3. In the **Junction Box Properties** dialog box, on the **General** tab, do one of the following to define the name of the new junction box:
   - Clear the **Apply naming convention** check box and under **Panel**, type the name of the new junction box. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Panel**.
   - Keep the **Apply naming convention** check box selected if you want the software to name the new panel automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
4. Select the required values from the **Type**, **Manufacturer**, **Model**, **Dimensions**, **Area classification**, and **Location** lists. If the required value is not available, click ... next to the relevant list arrow to open the appropriate supporting table.
5. Under **Dimensions**, type a value for the marshaling rack dimensions if needed.

6. Under **Maximum number of racks**, type a value to set the maximum number of racks that can be created in this panel.

7. Under **Mounting**, type a value if needed.

8. Under **Backplane**, type a value if needed.

9. Select the **Set as intrinsically safe** check box if this junction box has intrinsic safety certification.

10. Click the **Associate Symbols** tab to associate a symbol for this junction box that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

11. Click **Revisions** to manage the revisions of the new junction box if needed.

12. Click **OK** to accept your definitions for the new junction box and close this dialog box

Tip

- To create a junction box that contains both terminals and plug-and-socket connections, see Creating Panels with Terminals and Connectors.

Creating Panels with Terminals and Connectors

The following procedure explains how to create a panel that contains both terminals and plug-and socket connections. Some Fieldbus and Telecom devices have inputs via a plug-and-socket arrangement and outputs via terminated wires on terminals. To provide for this need, SmartPlant Instrumentation allows you to add a connector under any panel type (except for device panels) and then make the required connections either through the terminals or the connectors.

➢ To create a panel with terminals and connectors

1. In the **Domain Explorer** or **Reference Explorer**, create or select a panel.

   Note

   - You can select or create any type of panel except for device panels.

2. Right-click the panel you selected and then on the shortcut menu, point to **New** and click **Connector**.
3. In the **Connector Properties** dialog box, under **Connector**, type the name of the new connector.
4. Under **Connector type**, do one of the following:
   - From the list, select a connector type with pins.
   - To modify or create a connector type, click ... . For details, see Managing and Configuring Connector Types.
5. Under **Male/female** select Male or Female as needed.
6. Click **OK**.

Creating Racks

The following procedure deals with the creation of racks. Racks are panel sub-entities. Therefore, you can add a new rack under any panel.

If you are creating a rack that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous racks on the fly. For details, see Creating Reference Entities.

If you do not intend to use the configuration of the new rack frequently, we recommend that you create it in the **Domain Explorer** in the <unit> and under the panel where it is to be physically located.

➢ To create a rack

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Expand the **Panels by Location** folder and navigate to the panel that you require. Then, right-click the selected panel and on the shortcut menu click **New > Rack**.
   - Expand the **Panels by Category** folder and navigate to the panel that you require. Then, right-click the selected panel and on the shortcut menu click **New > Rack**.
3. In the **Rack Properties** dialog box, on the **General** tab, do one of the following to define the name of the new rack:
   - Clear the **Apply naming convention** check box and under **Rack**, type the name of the new junction box. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Rack**.
   - Keep the **Apply naming convention** check box selected if you want the software to name the new rack automatically according to the naming conventions that are set for racks in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
4. In the **Details** group box, type a description and sequence as you require.
5. Click **Slots** to add some slots for the current rack.
6. In the **Batch Slot Creation** dialog box, type the number of new slots that you want to add in the new rack.

7. Do the following to define the slot numbering:

   a) Type a prefix for the slot name.

   b) Enter a value in the **Start from number** and **Increment by** fields.

8. Click **OK** and to add the new slots return to the **Rack Properties** dialog box.

   Tip

   - In the **Rack Properties** dialog box, the software now displays the number of slots that you added.

9. Click the **Associate Symbols** tab to associate a symbol for this rack that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

10. Click **OK** to accept your definitions for the new junction box and close this dialog box

Note

- When duplicating a rack that contains child entities, the software duplicates the rack together with its child entities.

Plug-and-Socket Boxes

Creating a Plug-and-Socket Junction Box

Use the following procedure to create a new plug-and-socket junction box.

➢ To create a plug-and-socket junction box

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, right-click a location and then on the shortcut menu point to **New** and click **Junction Box (Plug-and-Socket)**.
   - Double-click the **Panels by Category** folder, right-click the **Junction Boxes** folder and then on the shortcut menu point to **New** and click **Junction Box (Plug-and-Socket)**.
3. In the **Plug-and-Socket Box** wizard, follow all the instructions carefully and then click **Next** until you complete the wizard.

Tips

- You can click ... next to a list arrow to access the appropriate supporting table. This allows you to add, edit, or delete drop-down list items.
- When defining the plug-and-socket box connectors, under **Connector type definition display**, SmartPlant Instrumentation displays the connector sequence, the appropriate pin number, and the pin polarities according to the configuration of the connector than you selected.

Modifying the Properties of a Plug-and-Socket Junction Box

Use the following procedure to modify certain properties of an existing plug-and-socket junction box, such as type, manufacturer, model, and layout.

Note

- The software does not allow you to modify port and connector configurations of an existing plug-and-socket junction box.

➢ To modify the properties of a plug-and-socket junction box

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, navigate to a panel, and then on the shortcut menu click **Properties**.
   - Double-click the **Panels by Category** folder, right-click the **Junction Boxes** folder and then on the shortcut menu click **Properties**.
3. In the **Plug-and-Socket Box** wizard, follow all the instructions carefully and then click **Next** until you complete the wizard.

   Tips

   - You can click ... next to a list arrow to access the appropriate supporting table. This allows you to add, edit, or delete drop-down list items.
   - When defining the plug-and-socket box connectors, under **Connector type definition display**, SmartPlant Instrumentation displays the connector sequence, the appropriate pin number, and the pin polarities according to the configuration of the connector than you selected.

Modifying the Properties of a Plug-and-Socket Device Panel

Use the following procedure to modify certain properties of an existing plug-and-socket device panel, such as type, manufacturer, model, and connectors.

Note

- The software does not allow you to modify port and connector configurations of an existing plug-and-socket device panel.

➢ To modify the properties of a plug-and-socket device panel

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, navigate to a panel, and then on the shortcut menu click **Properties**.
   - Double-click the **Panels by Category** folder, right-click the **Device Panels** folder and then on the shortcut menu click **Properties**.
3. In the **Plug-and-Socket Box** wizard, follow all the instructions carefully and then click **Next** until you complete the wizard.

   Tips

   - You can click ... next to a list arrow to access the appropriate supporting table. This allows you to add, edit, or delete drop-down list items.
   - When defining the plug-and-socket box connectors, under **Connector type definition display**, SmartPlant Instrumentation displays the connector sequence, the appropriate pin number, and the pin polarities according to the configuration of the connector than you selected.

Wiring Equipment

Overview

SmartPlant Instrumentation enables you to create and manage various types of wiring equipment. Wiring equipment is a generic name for different termination objects that can handle multiple input and output signals (channels). These entities need an external power supply and they usually have several terminals to feed the electronic components. Examples of wiring equipment are barriers, isolators, trip amplifiers, relays, and so forth. I/O cards, I/O termination entities, and various terminal strips also belong to the group called wiring equipment.

Prior to Version 7, the software provided for this type of objects only by letting you create an apparatus. However, apparatus did not deal with certain aspects of wiring equipment such as electric properties. Apparatus provided a "flat" structure that could only group terminals on an apparatus strip under a position name. Wiring equipment, however, introduces a structured object which you can remove, add, and copy. You can accurately define wiring equipment properties such as category, manufacturer, model, and so forth.

Wiring equipment is a much wider feature which allows you to create various types of termination objects and define their electric properties. You can use wiring equipment whenever you need to define any type of card, or piece of hardware that you need to buy separately, count the number of units you need (BOM), install it inside a panel, and make connections.

SmartPlant Instrumentation enables you to create and manage wiring equipment entities that:

- Contain various terminal strips or combination of terminals strips.
- Serve multiple tags or channels.
- Contain terminal strips and connectors.
- Require custom properties for each wiring equipment category.
- Require a specific presentation using special custom symbols.

Wiring equipment entities are classified according to various categories. SmartPlant Instrumentation is shipped with a number of these categories. You can customize your own wiring equipment categories and create various wiring equipment entities belonging to these customized categories. For more information, see Customizing and Using Wiring Equipment Categories and Adding User-Defined Wiring Equipment Category Properties.

When designing a Foundation Fieldbus or Profibus system, you can create a wiring equipment entity belonging to the Fieldbus brick category. Then, under a Fieldbus brick you can add a Fieldbus apparatus. This compound object provides for the creation and management Fieldbus termination objects required for your Foundation Fieldbus or Profibus system. For details, see Fieldbus Bricks: An Overview.

Also, note the following features of wiring equipment:

- Wiring equipment can encapsulate multiple objects, terminal strips, and channels.
- Since every wiring equipment is a separate entity, the **Connection** window cannot display multiple objects as it does for an apparatus strip. Nor is it possible to connect a cable to multiple wiring equipment entities in one step.
- Using wiring equipment in combination with custom symbols, provides for a better representation of loop drawings.
- Wiring equipment information does not appear in loop drawing generation. In most cases, it is possible to add macros and retrieve information or use custom symbols.
- Wiring reports do not show wiring equipment. All reports continue to show panels, terminal strips, and terminals.

Customizing and Using Wiring Equipment Categories

SmartPlant Instrumentation provides you with a number of predefined wiring equipment categories. However, you can customize your own wiring equipment categories for wiring entities that do not belong to any existing category.

The following procedure explains how to customize a wiring equipment category and add a customized property to a category. Also, some of the shipped wiring equipment categories have predefined properties. You can add your own customized properties to the shipped categories as well as to the customized ones.

Note

- The software does not allow you to delete or rename the shipped wiring equipment categories. Nor can you delete or rename any of the predefined properties belonging to the shipped wiring equipment categories.

After customizing a new wiring equipment category, it becomes available in the **Categories** list of the **New Wiring Equipment** dialog box and you can create new wiring equipment entities belonging to this category.

➢ To customize and use a new wiring equipment category

1. With the **Wiring Module** window open, click **Tables > Wiring Equipment > Categories**.
2. In the **Wiring Equipment Category** dialog box, click **New**.
3. In the **New Wiring Equipment Category** dialog box, type a category name and description.
4. To select a user-defined icon for the current wiring equipment category, under **Icon file name**, click **Browse** to navigate to the icon file that you require. The icon that you select will appear in the **Domain Explorer** and the **Reference Explorer** next to each wiring equipment entity belonging to the current category.
5. In the **Properties** group box, click **Add**.
6. Under **Header**, type the text that will appear as the property name on the **Category Properties** tab of the appropriate wiring equipment properties dialog box.

7. From the **Type** list, select the type of value for the new customized category property. You will then be able to enter a value for this new property on the **Category Properties** tab of the appropriate wiring equipment properties dialog box. The values can be numeric, text, or date/time.

8. Click **Add** again to define a new property or click **OK** to accept your definitions and close this dialog box.

9. Create a new wiring equipment entity (in the **Domain Explorer**, right-click a panel or a panel sub-entity, and then on the shortcut menu, point to **New** and click **Wiring Equipment**.)

10. In the **New Wiring Equipment** dialog box, from the **Category** list, select the newly created category, type the wiring equipment entity name, and click **OK**.

11. On the **General** tab of the **Properties** dialog box, define wring equipment properties as you require and click the **Category Properties** tab.

12. On the **Category Properties** tab, enter the values for each property as you require,

13. Continue defining the properties of the new wiring equipment entity as you need.

Adding User-Defined Wiring Equipment Category Properties

This feature allows you to add user-defined properties to existing wiring equipment categories. This option applies to the categories that you have created as well as to those that have been supplied with SmartPlant Instrumentation.

Note

- You cannot delete or rename any of the predefined properties belonging to the shipped wiring equipment categories.

After adding a category property, it becomes available on the **Category Properties** tab of the appropriate wiring equipment properties dialog box.

➢ To add a user-defined category property

1. In the **Wiring Module** window, click **Tables -> Wiring Equipment -> Categories**.
2. In the **Wiring Equipment Category** dialog box, select a category and click **Properties**.
3. To select a user-defined icon for the current wiring equipment category, under **Icon file name**, click **Browse** to navigate to the icon file that you require. The icon that you select will appear in the **Domain Explorer** and the **Reference Explorer** next to each wiring equipment entity belonging to the current category.
4. In the **Wiring Equipment Category Properties** dialog box click **Add**.
5. Under **Header**, type the text that will appear as the property name on the **Category Properties** tab of the appropriate wiring equipment properties dialog box.
6. From the **Type** list, select the type of value for the new customized category property. You will then be able to enter a value for this new property on the **Category Properties** tab of the appropriate wiring equipment properties dialog box. The values can be numeric, text, or date/time.
7. Click **Add** again to define a new property or click **OK** to accept your definitions and close this dialog box.

Creating Wiring Equipment Entities

The following procedure explains how to create a wiring equipment entity that belongs to any wiring equipment category except for I/O cards and I/O terminations. For details about the creation of I/O cards and I/O terminations, see Creating I/O Cards and Creating I/O Terminations.

Notes

- You can add a new wiring equipment entity either in the **Domain Explorer** or in the **Wiring Explorer**.
- If the new wiring equipment entity is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous entities on the fly. For details, see Creating Reference Entities.
- If you do not intend to use the configuration of the new wiring equipment entity frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create a wiring equipment entity

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - On the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Expand the **Panels by Location** hierarchy and navigate to a wiring entity under which you want to create a new wiring equipment entity.
   - Expand the **Panels by Category** folder, hierarchy and navigate to a wiring entity under which you want to create a new wiring equipment entity.

Note

- There is a lot of flexibility in creating a wiring hierarchy in SmartPlant Instrumentation. There is no rigid structure like "panel – terminal strip – terminal" that limits your wiring design. Therefore, you can create wiring equipment entities under various types of entities. To see examples of possible wiring hierarchy structures, see Wiring Hierarchy Examples.

3. Right-click a wiring entity under which you want to create new wiring equipment and then on the shortcut menu, point to **New** and select **Wiring Equipment**.

4. In the **New Wiring Equipment** dialog box, from the **Category** list, select a category to which the new entity belongs.

   Tip

   - If you need to create an I/O card or an I/O termination, see Creating I/O Cards and Creating I/O Terminations.

5. Under **Name**, type the name of the entity and click **OK**.

6. In the **Wiring Equipment Properties** dialog box, on the **General** tab, do one of the following to define the name of the new equipment:

   - Select the **Apply naming convention** check box selected if you want the software to name the new equipment automatically according to the naming conventions that are set for this type of equipment in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.

   - Clear the **Apply naming convention** check box and under **Name**, type the name of the new equipment. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Name**.

7. Select the **Double width** check box if the entity occupies a double width slot.

8. In the **Details** group box do the following as you require:

   a) Type a description.

   b) Select an entity type, model, and manufacturer. If the required value is not available on the list, click ... to define a new one.

   c) Enter a sequence if you need to define the sequence of the new entity in its parent entity. This sequence also determines the order in which wiring entities appear under their parent entity in the **Domain Explorer** tree view.

9. Click the **Category Properties** tab.

   Note

   - If you are creating a miscellaneous wiring equipment entity, the **Category Properties** tab is not available.

10. Revise and modify category property values as you require. Click the value for each property and modify it as needed.

Tip

- Wiring equipment categories that are shipped with SmartPlant Instrumentation have predefined properties. You cannot delete or rename any of these categories or their properties. You can only edit their values. However, you can add user-defined properties to any categories which you can rename or delete as you wish. For details, see Adding User-Defined Wiring Equipment Category Properties.

11. Click the **Associated Symbols** tab to associate a symbol for this entity. The software will use this symbol in the Enhanced Report Utility. For details, see Associating Symbols.

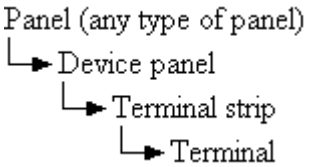
12. Click **OK** to accept your settings and close the dialog box.

Wiring Hierarchy Examples

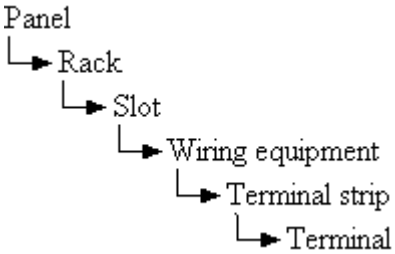
There is a lot of flexibility in creating a wiring hierarchy in SmartPlant Instrumentation. There is no rigid structure like "panel – terminal strip – terminal" that limits your wiring design. Therefore, you can create wiring equipment entities under various types of entities.

The following examples show a number of different structures that you can create in the **Panels by Category** folder of the **Domain Explorer** or **Wiring Explorer**.

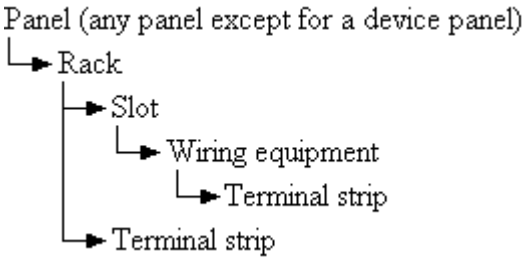
Example 1:



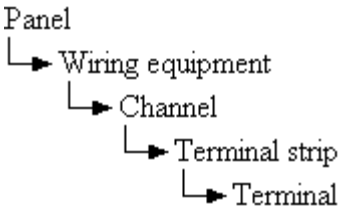
Example 2:



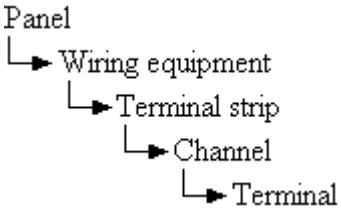
Example 3:



Example 4:

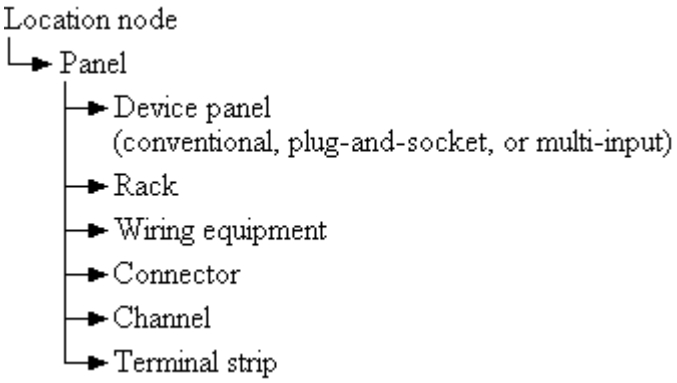


Example 5:



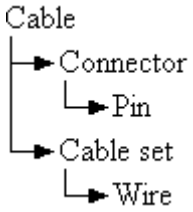
Example 6:

This example shows the wiring entities that can exist in the **Panels by Location** folder.



Example 7:

This example shows the entities that can exist in the **Cables** folder.



For a better understanding of the **Domain Explorer** and **Wiring Explorer**, see the following topics in the SmartPlant Instrumentation Explorer Help:

Domain Explorer: An Overview

Wiring Explorer: An Overview

Creating I/O Cards

The following procedure explains how to create an I/O card. As a rule, I/O cards reside in slots. Therefore, you have to navigate to a particular rack and select a slot where you want to create a new I/O card.

Note that I/O cards may or may not have built-in termination blocks. If an I/O card does not have a built-in termination block, you need to associate it with an I/O termination.

To define an I/O card that has a built-in termination block, create an I/O card and then add a terminal strip with channels under this I/O card.

For an I/O card with a built-in terminal block, you need to create a terminal strip with channels under an I/O card to be able to effect I/O assignment and make connections.

You can create a new I/O card either in the **Domain Explorer** or in the **Wiring Explorer**.

Notes

- If the new I/O card is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous I/O cards on the fly. For details, see Creating Reference Entities.

- If you do not intend to use the configuration of the new I/O card frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create an I/O card

1. Do one of the following:

   - Press F7 to open the **Domain Explorer**.

   - On the **View** menu, click **Wiring Explorer**.

2. Do one of the following:

   - Expand the **Panels by Location** hierarchy and navigate to the panel that you require.

   - Expand the **Panels by Category** folder, hierarchy and navigate to the panel that you require.

3. Double-click a panel and then a rack till you see the existing slots.

Note

- Usually, I/O cards reside in rack slots, therefore you have to navigate to a slot where you want to add a new I/O card. However, SmartPlant Instrumentation allows you to create flexible wiring hierarchies and therefore you can add an I/O card to a number of various entity types. To see examples of possible wiring hierarchy structures, see Wiring Hierarchy Examples.

4. Right-click a slot or any other wiring entity under which you want the new card to reside and then on the shortcut menu, point to **New** and select **Wiring Equipment**.

5. In the **New Wiring Equipment** dialog box, from the **Category** list, select I/O Card.

6. Under **Name**, type the name of the new I/O card and click **OK**.

7. In the **Wiring Equipment Properties - I/O Card** dialog box, on the **General** tab, do one of the following to name the new I/O card:

   - Select the **Apply naming convention** check box selected if you want the software to name the new card automatically according to the naming conventions that are set for this type of equipment in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.

   - Clear the **Apply naming convention** check box and under **Name**, type the name of the new card. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Name**.

8. Select the **Double width/Redundant** check box if the card occupies a double width slot or if the I/O card has an adjacent redundant I/O card.

9. In the **Details** group box do the following as you require:

   a) Type a description.

   b) Select an I/O card type, model, and manufacturer. If the required value is not available on the list, click  to define a new one.

   c) Enter a sequence if you need to define the card sequence in the parent entity. This sequence also determines the order in which wiring entities appear under their parent entity in the **Domain Explorer** tree view.

10. Click the **Control System** tab.

11. In the **Control system details** group box, under **System I/O type**, select a system I/O type to determine the actual function of the new I/O card. For example, AI, AO, DI, DP, Fieldbus, Profibus, and so forth. You can add more values to this list in the **System I/O Type** supporting table in the Instrument Index module. (See the caution at the end of this procedure.)

12. Under **Module**, type the software address that this card is assigned to.

Tip

- **Module**, **Controller/Processor**, **Rack**, and **Slot** are labels specific to panel manufacturers. Selecting a different manufacturer when editing the parent panel displays the headings used by the panel manufacturer selected for the current panel. **Module**, **Controller/Processor**, **Rack**, and **Slot** are default labels.

13. From the **Controller/Processor** list, select an I/O card controller. If the required controller is not available on the list, click ... to define a new one.

14. To view the list of all I/O terminations associated with the current I/O card, click the **I/O Terminations** button.

15. Click the **Category Properties** tab.

16. Revise and modify the category property values as you require. Click the value for each property and modify it as needed.

Tip

- **I/O card** is a wiring equipment category that is shipped with SmartPlant Instrumentation. You cannot delete or rename any of the category properties that have been shipped with the software. However, when editing I/O card properties, you can add user-defined properties which you can rename or delete as you wish. For details, see Adding User-Defined Wiring Equipment Category Properties.

17. Click the **Associated Symbols** tab to associate a symbol for this entity. The software will use this symbol in the Enhanced Report Utility. For details, see Associating Symbols.

18. Click **OK** to accept your settings and close the dialog box.

Caution

- In a redundant system configuration, an I/O card can function as a primary or secondary I/O card and can be associated with several I/O terminations. Therefore, an I/O termination can serve multi-paired redundant I/O cards. However, in these redundant I/O card configurations, the I/O termination can be associated only with one pair of primary and secondary I/O cards. Also, an I/O card cannot function as both a primary and secondary I/O card for the same I/O termination.

- If an I/O card functions as a primary I/O card, the **Control System** tab of the **Wiring Equipment Properties - I/O Card** dialog box displays the secondary I/O card data and the primary I/O card data properties remain blank. If an I/O card functions as a secondary I/O card, the **Control System** tab displays the primary I/O card data and the secondary I/O card data properties remain blank.

Changing the Controller/Processor Header in the I/O Card Properties Dialog Box

This option enables you to make the **Controller/Processor** list header on the **Control System** tab of the **I/O Card Properties** dialog box dependant on the panel manufacture to which the current I/O card belongs.

➢ To customize the Controller/Processor list header on the Control System tab of the I/O Card Properties dialog box

1. In the **Domain Explorer**, navigate to a panel.
2. Right-click the selected panel and then on the shortcut menu, click **Properties**.
3. On the **General** tab of the **Properties** dialog box, click  beside the **Manufacturer** list.
4. In the **Panel Manufacturers** supporting table, select a manufacturer and then scroll to the right to display the **Controller/Processor** header.
5. Click in the **Controller/Processor** field and type the text that you want to appear instead of the **Controller/Processor** list header on the **Control System** tab of the **I/O Card Properties** dialog box.
6. Click **OK** to close the **Panel Manufacturers** supporting table.
7. Click **OK** in the **Panel Properties** dialog box.

Creating I/O Terminations

The following procedure explains how to create an I/O termination.

I/O terminations are wiring equipment entities that are used to connect I/O cards and other wiring entities that do not have built-in termination blocks. You associate an I/O termination with an I/O card that does not have a built-in termination block and then make the required connections to the I/O termination. You can also associate an I/O termination with several I/O cards if there are redundant I/O cards.

Also, you can create an I/O termination when you need to define a distant I/O card that resides in a different panel or rack.

You need to create a terminal strip with channels under an I/O termination to be able to effect I/O assignment and make connections.

You can add a new I/O termination either in the **Domain Explorer** or in the **Wiring Explorer**.

Notes

- If the new I/O termination is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** so that you can copy it to the **Domain Explorer** and then change its name. This way you can create numerous I/O terminations on the fly. For details, see Creating Reference Entities.

- If you do not intend to use the configuration of the new I/O termination frequently, we recommend that you create it in the **Domain Explorer** and in the <unit> where it is to be physically located. This is helpful when filtering the panels in the current <unit>.

➢ To create an I/O termination

1. Do one of the following:

   - Press F7 to open the **Domain Explorer**.

   - On the **View** menu, click **Wiring Explorer**.

2. Do one of the following:

   - Expand the **Panels by Location** hierarchy and navigate to the panel that you require.

   - Expand the **Panels by Category** folder, hierarchy and navigate to the panel that you require.

Note

- Usually, I/O terminations reside in DCS panels or marshaling racks. However, SmartPlant Instrumentation allows you to create flexible wiring hierarchies and therefore you can add an I/O termination to a number of different entity types. To see examples of possible wiring hierarchy structures, see Wiring Hierarchy Examples.

3. Right-click a wiring entity under which you want to create the new I/O termination and then on the shortcut menu, point to **New** and select **Wiring Equipment**.

4. In the **New Wiring Equipment** dialog box, from the **Category** list, select I/O Termination.

5. Under **Name**, type the name of the new I/O termination and click **OK**.

6. In the **Wiring Equipment Properties - I/O Termination** dialog box, on the **General** tab, do one of the following to name the new I/O termination:

   - Select the **Apply naming convention** check box selected if you want the software to name the new card automatically according to the naming conventions that are set for this type of equipment in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.

   - Clear the **Apply naming convention** check box and under **Name**, type the name of the new card. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Name**.

7. In the **Details** group box do the following as you require:

   a) Type a description.

   b) Select an I/O termination type, model, and manufacturer. If the required value is not available on the list, click ... to define a new one.

   c) Enter a sequence if you need to define the I/O termination sequence in the parent entity. This sequence also determines the order in which wiring entities appear under their parent entity in the **Domain Explorer** tree view.

8. Click the **Control System** tab.

9. In the **Control system details** group box, under **System I/O type**, select an I/O type to determine the actual function of the new I/O termination. For example, AI, AO, DI, DP, Fieldbus, and so forth. You define the values in this list in the **System I/O Type** supporting table in the Instrument Index module.

10. To set the I/O termination in a distant cabinet or to associate the I/O termination with an I/O card that resides in another panel or cabinet, select the **Set within a distant cabinet** check box and then select a cabinet in the **Primary I/O card** group box.

11. In the **Primary I/O card** group box, select the required options to associate the current I/O termination with an I/O card that does not have a built-in termination block.

    Tip

    - The **I/O card** list contains only those I/O cards that have been created under a rack and a slot. Fore more information, see Associating an I/O Card with an I/O Termination.

12. Do the following to define the current I/O termination as an I/O termination that serves two redundant I/O cards:

    a) Select the **Define a redundant I/O card** check box.

    b) Select the required options in the **Secondary I/O card** group box.

13. Click the **Category Properties** tab.

14. Revise and modify the category property values as you require. Click the value for each property and modify it as needed.

Tip

- **I/O termination** is a wiring equipment category that is shipped with SmartPlant Instrumentation. You cannot delete or rename any of the category properties that have been shipped with the software. However, when editing I/O termination properties, you can add user-defined properties which you can rename or delete as you wish. For details, see Adding User-Defined Wiring Equipment Category Properties.

15. Click the **Associated Symbols** tab to associate a symbol for this entity. The software will use this symbol in the Enhanced Report Utility. For details, see Associating Symbols.

16. Click **OK** to accept your settings and close the dialog box.

Associating an I/O Card with an I/O Termination

I/O terminations function as termination blocks for I/O cards that do not have built-in termination blocks. Therefore, you need to associate an I/O termination with an I/O card that needs a built-in termination block.

You can associate only those I/O cards that have been created in a particular rack and slot.

Caution

- In a redundant system configuration, an I/O card can function as a primary or secondary I/O card and can be associated with several I/O terminations. Therefore, an I/O termination can serve multi-paired redundant I/O cards. However, in these redundant I/O card configurations, the I/O termination can be associated only with one pair of primary and secondary I/O cards. Also, an I/O card cannot function as both a primary and secondary I/O card for the same I/O termination.

- If an I/O card functions as a primary I/O card, the **Control System** tab of the **Wiring Equipment Properties - I/O Card** dialog box displays the secondary I/O card data and the primary I/O card data properties remain blank. If an I/O card functions as a secondary I/O card, the **Control System** tab displays the primary I/O card data and the secondary I/O card data properties remain blank.

➢ To associate an I/O card with an I/O termination

1. In the **Domain Explorer** or **Reference Explorer**, create an I/O card under a particular panel, rack, and slot.

2. Create or navigate to an I/O termination that you want to associate with an I/O card.

3. In the **Wiring Equipment Properties - I/O Termination** dialog box, click the **Control System** tab.

   Tip

   - To open the **Wiring Equipment Properties - I/O Termination** dialog box, right-click an I/O termination and then on the shortcut menu, click **Properties**.

4. Select the **Set within a distant cabinet** check box if you want to associate an I/O card that resides in another panel or cabinet and then in the **Primary I/O card** group box, select a cabinet or a panel.

Caution

- Note that the system I/O type of both the I/O card and the I/O termination must be the same. If the system I/O type of the I/O termination differs from the system I/O type of the I/O card, the software displays a warning.

5. In the **Primary I/O card** group box, select rack.
6. Select a slot.
7. Select an I/O card.
8. Under **System cable**, type a system cable name if needed.
9. Continue defining the I/O termination properties if needed.

Note

- To be able to effect I/O assignment and make connections, create a terminal strip with channels under the I/O termination you are editing.

Apparatus: An Overview

Apparatus is a wiring entity that pertains to different types of multi-purpose I/O devices. These devices accept wires and signals, for example, barriers, opto-couplers, relays, repeaters, isolators, and so forth. You also use this feature to create a fieldbus termination block whose configuration is different from an apparatus configuration.

SmartPlant Instrumentation allows you to create a group of apparatuses or a single apparatus. An apparatus group constitutes an apparatus strip (that is, a terminal strip) with a number of apparatuses created according to a selected apparatus configuration.

Adding a new apparatus group to a panel or a wiring equipment entity starts with configuring the new apparatuses: setting the number of apparatuses on an apparatus strip, defining the apparatus terminal numbering pattern, signal propagation, and the color of the terminals. After defining an apparatus configuration, you can proceed with the creation of an apparatus group. The software opens the **Terminal Strip Properties** dialog box so that you can define an apparatus strip for the new apparatus group. After defining the apparatus strip properties in the **Terminal Strip Properties** dialog box, the software creates the apparatus strip and the apparatuses according the selected configuration.

SmartPlant Instrumentation also allows you to add a single apparatus to an apparatus group . In this case, you do not define an apparatus configuration. Then, you can select the new apparatus and add the required terminals.

Once you have created a new apparatus group or a single apparatus, SmartPlant Instrumentation displays it in the **Domain Explorer** showing the terminals belonging to the apparatus.

Note that apparatus is a wiring entity. Therefore, you can define apparatus properties, duplicate, or delete an apparatus, and assign it a special symbol. The software uses this symbol in the Enhanced Report Utility.

Defining an Apparatus Configuration

You need to create an apparatus configuration before you can add an apparatus group to a selected panel or wiring equipment entity. An apparatus group constitutes an apparatus strip (that is, a terminal strip) with a number of apparatuses created according to a selected apparatus configuration.

When defining an apparatus configuration, you define the apparatus profile (name, description, manufacturer, and model), the number of apparatuses, the apparatus terminal configuration, and the position numbering.

➢ To define an apparatus configuration

1. Do one of the following:

   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
   - Press F8 to open the **Reference Explorer**.

   Note

   - To facilitate fast creation of apparatus groups with various configurations, we recommend that you create several apparatus configurations in the **Reference Explorer** so that you can create different reference apparatus groups that can be copied to the **Domain Explorer**.

2. Do one of the following:

   - Double-click the **Panels by Location** folder, and navigate to a panel.
   - Double-click the **Panels by Category** folder, and navigate to a panel.

3. Right-click a panel to which you want to add an apparatus and then on the shortcut menu, point to **New** and click **Apparatus**.

4. In the **Apparatus** dialog box, click **New**.

5. In the **Apparatus profile** group box, do the following:

   a) In the **Configuration name** field, type the name of the new apparatus configuration.

   b) In the **Description** field, type a short description for the new configuration.

   c) From the **Manufacturer** list, select the appropriate apparatus manufacturer. If the required value is not available, click ... next to the list arrow to add or edit values for this list.

   d) From the **Model** list, select the appropriate apparatus model. If the required value is not available, click ... next to the list arrow to add or edit values for this list.

   e) Use the **Number of apparatuses** spinner or type the required number of apparatuses to be added. This way you can have a block of more than one apparatuses. SmartPlant Instrumentation displays this number as a default setting when adding a new apparatus to an apparatus strip.

Note

- If you need to create a configuration for a fieldbus brick, select the **Fieldbus apparatus** check box. Note that the apparatus configuration for a fieldbus brick differs from the conventional one. For details, see Configuring a Fieldbus Brick.

6. In the **Apparatus numbering** group box, do the following to customize the apparatus name and set the apparatus numbering:

   a) In the **Prefix** field, type the apparatus name if required. Apparatus names can be 15-character long. This name appears in the **Domain Explorer** within the new apparatus group, in the **Connection** window, and in the appropriate reports.

   b) Select the **Numbered** check box to number the apparatuses.

Note

- You can also change the sequence of a specific apparatus in an existing apparatus group if needed.

7. In the **Apparatus configuration** group box, define the apparatus terminal configuration as follows:

   a) Select the required terminal pattern:

   - **Left / Right** — an apparatus that has two sides: input and output.
   - **Left** — an apparatus that has wires on the left side only.
   - **Right** — an apparatus that has wires on the right side only.
   - **Regular** — a conventional terminal that functions as a single unit.

   b) Click in the left and/or right terminal side text box and type the required terminal name, for example A1:

   c) Select the required color of the terminal side from the list, for example, red:

Tip

- The line between the terminal sides represents the internal relation between the input and output terminals.

   d) Repeat steps b) and c) for the other terminal side if appropriate.

   e) Click **Add Terminal** to add another terminal to this apparatus configuration if needed and then repeat steps a) through d).

   f) Click **Delete Terminal** if you need to delete a selected terminal from the current configuration.

8. Click **Save** and then **Close**.

Note

- You can now add the required apparatus to a selected panel.

Creating an Apparatus Group

SmartPlant Instrumentation allows you to add an apparatus group to a panel or a wiring equipment entity.

An apparatus group constitutes an apparatus strip (that is, a terminal strip) with a number of apparatuses created according to a selected apparatus configuration. You can add an apparatus group to a panel or a wiring equipment entity.

The software adds an apparatus group after selecting an appropriate apparatus configuration.

You can add a new apparatus group after creating an apparatus configuration. When adding a new apparatus to a panel, the software also creates a new apparatus (terminal) strip on which the apparatus is created. You can add an apparatus to a panel or to a wiring equipment entity. It is also possible to add a single apparatus to another apparatus.

➢ To create an apparatus group

1. Do one of the following:
   - Press F7 to open the **Domain Explorer** or F8 to open the **Reference Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Double-click the **Panels by Location** folder, and navigate to a panel.
   - Double-click the **Panels by Category** folder, and navigate to a panel.
3. Right-click a panel to which you want to add an apparatus and then on the shortcut menu, point to **New** and click **Apparatus group**.
4. In the **Apparatus** dialog box, select the required configuration from the **Configuration name** list.

   Note

   - If you do not have an appropriate configuration, create one.

5. Use the **Number of apparatuses** spinner or type the required number of apparatuses to be added. This way you can have a block of more than one apparatus. The number displayed by default is the one you set when you defined the selected configuration.

6. Click **Create**.

Note

- SmartPlant Instrumentation automatically assigns sequential position numbers to each apparatus. You can edit them later if required. For details, see Editing Apparatus Terminal Properties.

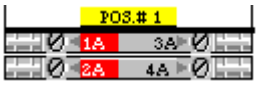
7. In the **Terminal Strip Properties** dialog box, define the new apparatus strip as required and click **OK**.

8. Click **Close** in the **Apparatus** dialog box.

Note

- The new apparatus appears in the **Domain Explorer** within the new terminal strip.

9. Connect the apparatus to the appropriate cables. Select the apparatus group you want to connect and click . The **Connection** window opens displaying the apparatus terminals in yellow:



Adding an Apparatus to an Apparatus Group

SmartPlant Instrumentation allows you to add a single apparatus to an apparatus group. The software creates a new apparatus without any terminals and adds it at the bottom of the apparatuses in the current apparatus group. If needed, you can then change apparatus sequence within the group and add the required terminals.

➢ To add an apparatus to an apparatus group

1. In the **Domain Explorer** or **Reference Explorer**, right-click an apparatus group.
2. On the shortcut menu, point to **New** and click **Apparatus**.
3. In the **Apparatus Properties** dialog box, enter the apparatus properties as you require and click **OK**.

Editing the Properties of an Apparatus Terminal

The following procedure explains how to edit the properties of an apparatus terminal.

➢ To edit apparatus terminal properties

1. In the **Domain Explorer**, select the terminal that you want to edit.
2. Right-click the selected terminal and click **Properties** on the shortcut menu.
3. In the **Terminal Properties** dialog box, on the **General** tab, from the **Terminal configuration** list, select the required orientation of the current apparatus terminal.
4. Define the terminal name by typing values in the **Left terminal** and **Right terminal** boxes as you require. The combined name of the terminal will then appear in the **Domain Explorer**.
5. In the **Sequence** field, type a unique terminal sequence number. This number designates the physical position of the terminal on the strip. The software assigns this number automatically when you add a new terminal to the selected terminal strip. If you change the sequence number of a terminal, be sure to change the sequence numbers of the other terminals on the apparatus strip to avoid duplicate values, which may interfere with the termination process.
6. Define the color as required.

7. Under **Details**, from the **Position** list, select the appropriate terminal position number from this list. If the required value is not available, click ... next to the list arrow to open the **Apparatus Positions** dialog box where you can add additional items to the **Position** list.

8. From the **Manufacturer** list, select the required terminal manufacturer. If the required value is not available, click ... next to the list arrow to open the **Terminal Manufacturer** dialog box where you can add additional items to the **Manufacturer** list.

9. From the **Model** list, select the required terminal model. If the required value is not available, click ... next to the list arrow to open the **Terminal Model** dialog box where you can add additional items to the **Model** list.

10. From the **Type** list, select the appropriate terminal type to which the new terminal belongs. If the required type is not on the list, click ... next to the list arrow to open the **Terminal Type** dialog box where you can add additional items to the **Type** list. The **Terminal Type** dialog box, also allows you to replace the default image of terminal side icons for single and multiple connections.

11. In the **Note** text box, type, if required, a brief note or a remark about this terminal.

12. Click **OK** to create the new terminal.

Terminal Strips

Creating Terminal Strips

The following procedure explains how to create a new terminal strip. You can add a new terminal strip to a panel either in the **Domain Explorer** or in the **Reference Explorer**.

- If you are creating a terminal strip that is going to have a frequently used configuration, we recommend that you create it in the **Reference Explorer** (for instance, in a reference junction box) so that you can copy it to the **Domain Explorer** (or the **Wiring Explorer**) and then change its name. This way you can create numerous terminal strips on the fly. For details, see Creating Reference Entities.
- If you do not intend to use the configuration of the new terminal strip frequently, we recommend that you create it in the **Domain Explorer** (or in the **Wiring Explorer**) and in the panel of the <unit> where it is to be physically located. This is helpful when you want to filter the panels in the current <unit>.

➢ To create a terminal strip

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Expand the **Panels by Location** hierarchy and navigate to the panel that you require.
   - Expand the **Panels by Category** folder, hierarchy and navigate to the panel that you require.
3. Right-click the panel that you selected and then on the shortcut menu, point to **New** and click **Terminal Strip**.
4. In the **Strip Terminal Configuration** dialog box, select an appropriate terminal configuration from the **Configuration name** list or create a new one. The configuration you choose determines the type of strip you are about to create.
5. If the new terminal strip is going to be part of your fieldbus system, select the **Fieldbus strip** check box.
6. Click **Create**.
7. In the **Terminal Strip Properties** dialog box, on the **General** tab, under **Terminal strip** type the name of the new terminal strip.
8. From the **Type** list, select the strip type. If the required terminal strip type is not available on the list, click ... to define a new one.

9. Under **Dimensions**, type the strip dimensions as necessary.
10. Under **Rail**, type the rail description as necessary.
11. Under **Mounting**, type the mounting description as necessary.
12. From the **Manufacturer** list, select the strip manufacturer. If the required manufacturer is not available on the list, click  to define a new one.
13. From the **Model** list, select the strip model. If the required model is not available on the list, click  to define a new one.
14. Under **Sequence**, enter a number to define the sequence of the current terminal strip in the parent entity.
15. To manage the revisions of the terminal strip, click **Revisions**.
16. Click the **Associate Symbols** tab to associate a symbol for this strip that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.
17. Click **OK** to create the new terminal strip.

Creating a Strip Terminal Configuration

When creating a terminal strip, you are required to use a basic repeating numbering pattern (configuration) to enable logical terminal numbering. You can select an existing configuration or create a new one. Creating a terminal configuration affects only the creation of new terminal strips. Existing terminal strips retain their previous terminal configuration.

Note

- A **pattern** identifies the basic numbering system, or stepping method used for terminals in a terminal strip. Set **+1,-1,+2,-2**, for example, has a pattern of two, while the Set **1,2,3SH,4,5,6SH** has a pattern of three.

You can label the terminals on a terminal strip according to any numbering system that you require (up to ten characters in length). To facilitate logical terminal numbering, SmartPlant Instrumentation requires you to configure the basic repeating numbering pattern (configuration) for the terminals in the new terminal strip **before** defining that terminal strip.

When creating a strip in an I/O card or I/O termination, you use configurations that include channels.

If you want to create a terminal strip without channels in one of these panels, set the number of terminals per channel to zero.

➢ To create a strip terminal configuration

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Expand the **Panels by Location** hierarchy and navigate to the panel that you require.
   - Expand the **Panels by Category** folder, hierarchy and navigate to the panel that you require.
3. Right-click the panel that you selected and then on the shortcut menu, point to **New** and click **Strip**.
4. In the **Strip Terminal Configuration** dialog box, click **New**.

5. In the **Terminals in Pattern** dialog box, type or select a number to define the number of terminals to be repeated in the pattern.

Note

- This number determines the number of rows (terminals) that will constitute the basic repeating numbering pattern.

6. Click **OK** to close the **Terminals in Pattern** dialog box.

Note

- The number of terminals in the pattern that you set in the **Terminals in Pattern** dialog box determines the number of lines in the **Terminal Numbering** data grid.

7. Under **Configuration name**, type the name of the new configuration.
8. If you are creating a configuration for a fieldbus, select **Fieldbus**.
9. Under **Configuration description**, type an optional description of the new configuration.
10. Type or select the total number of terminals required in the terminal strip.
11. Select the starting number for the first terminal in the terminal strip.
12. Select the required number of terminals per channel or segment.
13. Select the first channel or segment number.

Caution

- If the new configuration is to be used to create I/O cards, the value in the **Number of terminals per channel** and **First channel** fields must be larger than zero. Otherwise, the terminals on the terminal strip are created without channels and you will not be able to create an I/O card.

14. In the **Terminal Numbering** data grid, do the following:

    a) Type a prefix in the **Prefix** field if required.

    b) Select the **Incremented** check box if you want the terminal number to be incremented within the pattern.

    c) Select the **Numbered** check box if you want the number of the terminal to appear between the prefix and the suffix.

    d) Type a suffix if required.

15. Click **Save**.

Tip

- If the required number of terminals is not exactly divisible by the number of terminals in a pattern, the remaining terminals are labeled SPARE.

Moving a Terminal Strip to Another Panel

This option enables you to move a terminal strip with connected cables to another panel. The software retains all the connection definitions.

➢ To move a terminal strip that has connected cables to another panel

1. Press F7 to open the **Domain Explorer**.
2. Navigate to a terminal strip that you want to move
3. Drag the terminal strip to a target panel.

Tip

- You can open another **Domain Explorer** window and place it beside the one that's already open to make the drag-and-drop procedure easy.

Restrictions:

You cannot move a terminal strip with connected cables to another panel if:

- the terminal strip is associated with an instrument type
- the terminal strip is used by an auto-wiring task
- the terminal strip has connected terminals or channels that are associated with CS tags
- the terminal strip hasn't been claimed for a project
- the terminal strip is associated with a local or general signal
- the target panel is a plug-and-socket box

Editing a Strip Terminal Configuration

This option enables you to modify an existing terminal strip configuration. Remember that terminal configuration affects only the creation of new terminal strips. Existing terminal strips retain their previous configurations.

Caution

- Note that you can change all the configuration components except for one: you **cannot** change the number of terminals in the terminal configuration pattern.

➢ To modify a terminal strip configuration

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Do one of the following:
   - Expand the **Panels by Location** hierarchy and navigate to the panel that you require.
   - Expand the **Panels by Category** folder, hierarchy and navigate to the panel that you require.
3. Right-click the panel that you selected and then on the shortcut menu, point to **New** and click **Terminal Strip**.
4. In the **Strip Terminal Configuration** dialog box, select the required configuration from the **Configuration name** list.
5. Click **Edit**.
6. Under **Strip configuration name**, edit the configuration name.
7. Under **Configuration description**, edit the configuration description.
8. Select the total number of terminals required in the terminal strip.
9. Select the starting number for the first terminal in the terminal strip.
10. Select the required number of terminals per channel. Remember that this option is available only for I/O cards.
11. Select the first channel number. (This option is available only for I/O cards.)

12. In the **Strip Terminal Numbering** group box, do the following:

    a) Type a prefix in the **Prefix** field if required.

    b) Select the **Incremented** check box if you want the terminal number to be incremented within the pattern.

    c) Select the **Numbered** check box if you want the number of the terminal to appear between the prefix and the suffix.

    d) Type a suffix if required.

13. Click **Save**.

14. Click **Create**.

    Tip

    - If the required number of terminals is not exactly divisible by the number of terminals in a pattern, SmartPlant Instrumentation labels the remaining terminals as SPARE.

15. Continue defining the new terminal strip as you require.

Terminal Strip Configuration Examples

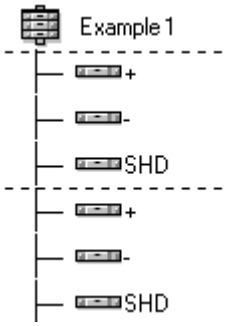
Each of the following examples demonstrates how various features of the strip configuration operate. In each case, the terminal strip has a repeating sequence of three terminals, and a total of 8 terminals (the last 2 terminals are designated SPARE, and are not shown).

Input data and explanation

Resultant Terminal configuration

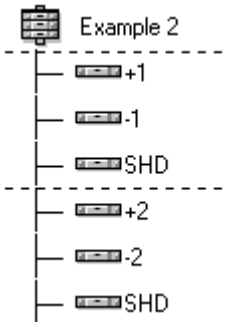
Strip Terminal Numbering			
Prefix	Incremented	Numbered	Suffix
+	☐	☐	
-	☐	☐	
SHD	☐	☐	

No numbering



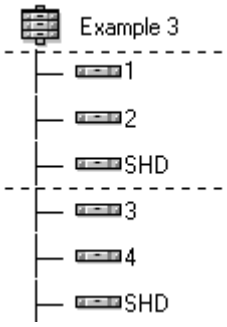
Strip Terminal Numbering			
Prefix	Incremented	Numbered	Suffix
+	☒	☒	
-	☐	☒	
SHD	☐	☐	

+/- terminals numbered, with numbers incremented for first terminal of each repeating sequence.



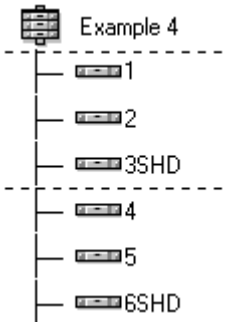
Strip Terminal Numbering			
Prefix	Incremented	Numbered	Suffix
	☒	☒	
	☒	☒	
SHD	☐	☐	

+/- terminals are numbered, with numbers incremented for all numbered terminals.



Strip Terminal Numbering			
Prefix	Incremented	Numbered	Suffix
	☒	☒	
	☒	☒	
	☒	☒	SHD

All terminals are numbered and incremented (note also use of suffix).



Terminals

Adding a Terminal to a Terminal Strip

The following procedure explains how to add a terminal to a terminal strip. You can add a terminal without channels to any terminal strip belonging to a junction box, marshaling rack, device panel, or cabinet.

➢ To add a terminal to a terminal strip

1. In the **Domain Explorer** or the **Wiring Explorer**, double-click the **Panels by Location** or **Panels by Category** folder.
2. Navigate to the panel that you require.
3. Expand the panel hierarchy to display the existing terminal strips.
4. Right-click a terminal strip and then on the shortcut menu, point to **New** and click **Terminal**.
5. In the **Terminal Properties** dialog box, on the **General** tab, do one of the following to define the name of the new terminal:
   - Clear the **Apply naming convention** check box and under **Terminal**, type the name of the new terminal. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Terminal**.
   - Keep the **Apply naming convention** check box selected if you want the software to name the new terminal automatically according to the naming conventions that are set for this terminal type in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
6. In the **Sequence** field, type a unique terminal sequence number. This number designates the physical position of the terminal on the terminal strip. It is assigned automatically when you add a new terminal to the selected terminal strip. If you change the sequence number of a terminal, be sure to change the sequence numbers of the other terminals on the terminal strip to avoid duplicate values, which may interfere with the termination process.
7. Select a terminal color as needed.
8. In the **Details** group box, enter a channel number.
9. If the current terminal is in a channel which in turn is a wiring equipment sub-entity, enter a sequence number with in the current channel.
10. Define the terminal type, manufacturer, and model as you require. If the required value is not available, click  next to the list arrow to open the appropriate supporting table where you can add additional items to the lists.
11. In the **Note** text box, type, if required, type a brief note or a remark about this terminal.

12. Click the **Associate Symbols** tab to associate a symbol for this terminal that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

13. Click **OK** to create the new terminal.

Adding a Group of Terminals

The following procedure explains how to create a group of terminals on an existing terminal strip. You can add the new group of terminals to a terminal strip either on terminal strip in the **Domain Explorer** or on a reference terminal strip in the **Reference Explorer**. (For details about creating reference entities, see Creating Reference Entities.)

➢ To create terminals on an existing terminal strip

1. In the **Domain Explorer** or in the **Wiring Explorer**, double-click the **Panels by Location** or **Panels by Category** folder.

2. Navigate to the panel that you require.

3. Expand the panel hierarchy to display the existing terminal strips.

4. Right-click a terminal strip and then on the shortcut menu, point to **New** and click **Add terminal group**.

5. In the **Add Terminals** dialog box, select an appropriate terminal configuration from the **Configuration name** list. The configuration you choose determines the labeling of the terminals you are about to create.

   Tip

   - If the required configuration is not available, close this dialog box and create a new terminal configuration.

6. Do one of the following:

   - If the reference data from the selected configuration is suitable, click **Apply**.

   - Change the reference values according to your requirements for adding the terminals as described in the remaining steps of this procedure.

   Note

   - You cannot save any changes you make to an existing configuration in this dialog box.

7. In the **Total number of terminals** spin box, enter the total number of new terminals required.

8. In the **First terminal of added group** spin box, enter the number of the next incremented terminal.

   Note

   - To continue the numbered sequence of the existing terminals, you should enter the next numerical value of the terminal, and not the ordinal sequence. For example, if you already have 48 terminals arranged in groups of three, where the last 3 terminal labels are +16, -16, and SH, the value in the **First terminal of added group** spin box must be 17 and not 49.

9. In the **Terminal Numbering** group box, do the following:

   a) Type a prefix in the **Prefix** field if required.

   b) Select the **Incremented** check box if you want the terminal number to be incremented within the pattern.

   c) Select the **Numbered** check box if you want the number of the terminal to appear between the prefix and the suffix.

   d) Type a suffix if required.

10. Click **Apply** to create the new group of terminals on the strip.

11. When done, click **Close**.

Editing the Properties of a Terminal

The following option enables you edit the properties of terminals located on a terminal strip without channels.

➢ To edit the properties of a terminal on a terminal strip

1. In the **Domain Explorer** or the **Wiring Explorer**, double-click the **Panels by Location** or **Panels by Category** folder.

2. Navigate to the panel that you require.

3. Expand the panel hierarchy to display the existing terminal strips and terminals.

4. Right-click a terminal and then on the shortcut menu, click **Properties**.

5. In the **Terminal Properties** dialog box, on the **General** tab, do one of the following to define the name of the new terminal:

   - Clear the **Apply naming convention** check box and under **Terminal**, type the name of the new terminal. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Terminal**.

   - Keep the **Apply naming convention** check box selected if you want the software to name the new terminal automatically according to the naming conventions that are set for this type of panel in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.

6. In the **Sequence** field, type a unique terminal sequence number. This number designates the physical position of the terminal on the terminal strip. It is assigned automatically when you add a new terminal to the selected terminal strip. If you change the sequence number of a terminal, be sure to change the sequence numbers of the other terminals on the terminal strip to avoid duplicate values, which may interfere with the termination process.

7. Select a terminal color as needed.

8. In the **Details** group box, select a position, type, channel, manufacturer, and model. If the required value is not available, click  next to the list arrow to open the appropriate supporting table where you can add additional items to the lists.

9. In the **Note** text box, type, if required, type a brief note or a remark about this terminal.

10. Click the **Associate Symbols** tab to associate a symbol for this terminal that the software will use in the Enhanced Report Utility. For details, see Associating Symbols.

11. Click **OK** to create the new terminal.

Changing the Terminal Side Graphic Image

This option enables you to replace the default graphic image of terminal sides that appears in the **Connection** window and the appropriate reports. You select the required graphic image for terminal sides according to their terminal type, that is., all terminal sides belonging to that particular terminal type will be designated by the selected image. You can select a different image for terminal sides with single connections and terminal sides with multiple connections. The selected graphic images replace the default blue and gray screw heads.

➢ To replace the default graphic image of terminal sides

1. Start the Wiring module.
2. On the **Tables** menu, point to **Terminal** and click **Types**.
3. In the **Terminal Types** dialog box, select the required terminal type or define a new one.
4. Click **Edit**.
5. Click in the **G1** box to select an image file for terminal sides with single connections.
6. In the **Select File** dialog box, navigate to the required image file.
7. Click in the **G2** box to select an image file for terminal sides with multiple connections.

Tips

- The selected image appears in the **G1** and/or **G2** box. The size of the **G1** and **G2** boxes represents the actual size of the icons that appear in the **Connection** window.
- If you do not select anything in the **G1** or **G2** box, SmartPlant Instrumentation displays the default images: (gray) for terminal sides with single connections and (turquoise) for terminal sides with multiple connections.

Cables, Cable Sets, and Wires

Overview

The following help topics explain the creation of cables, cable sets (pairs, triads, and so forth within a cable), and wires for both reference and plant use.

You can add cables, cable sets, and wires using one of the following methods:

- Creating them from scratch.
- Copying from existing reference cables, sets, and wires, and renaming them as required.
- Duplicating existing plant cables, cable sets, and wires, and renaming them as required.

You create cables that include the required cable sets and wires by selecting an existing cable configuration that you define as needed. You can then add new cable sets and wires manually if required.

Creating Cables

The following procedure deals with creating new cables. When creating a new cable, you select an existing cable configuration that includes a particular arrangement of cable sets (pairs, triads, and so forth within a cable) and wires to be built with the cable. You can then add additional cable sets and wires to that cable if required.

As a time saver, it is recommended that you create reference entities for the cable, cable set, and wire arrangements you intend to use frequently. You create these reference cables in the **Reference Explorer**. You can then drag them to the **Domain Explorer** and this way create numerous cables on the fly. For details about creating reference items, see Creating Reference Entities.

Caution

- When creating a cable by copying from a reference entity, make sure that you create the cable in the <unit> where it is required, as you will not be able to move it to another <unit> later. This is important when you want to filter a large number of cables, and you select the **Display current <unit> data only** filtering option.

➢ To create a cable

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Right-click the **Cables** folder on the shortcut menu point to **New**, and then click **Cable**.
3. In the **Cable Configuration** dialog box, select an existing cable configuration or create a new one.

4. Click **Create**.

5. In the **Cable Properties** dialog box, under **Cable**, type the cable name.

   Note

   - If you are working under cable type dependency, your selection of cable type determines the reference cable name.

6. Under **Description**, type the new cable description as needed.

7. Select one of the following under **Cable class**:

   - To create a conventional cable, accept the default setting Conventional.
   - To create a fieldbus spur, select Conventional.
   - To create a fieldbus home-run cable, select Fieldbus home-run.
   - To create a telecom cable, select Telecom.

8. Under **Type**, select the required cable type if needed. If the required type is not available, click ... next to the list arrow to add the required item to the list.

9. Select the cable manufacturer, model, color as appropriate. If the item that you need is not on the list, click ....

10. Type the end one and end two locations of the cable.

11. Type the cable length and select the unit of measure.

12. To assign this cable to a cable drum, select values from the **Pulling area** list and from the **Cable drum** list.

13. To define a cable harness, select the cable harness from the list. If the item that you need is not on the list, click ....

14. To name the wires ends in this cable according to a naming convention, select the appropriate naming convention from the **Wire end naming convention** list.

15. To define the cable as intrinsically safe, select **Set as intrinsically safe**.

16. To define glands for the cable, from the **Glands** group box, select the **End 1** and/or **End 2** cable glands. If the required gland is not available, click ....

    - Note the use of icons that represent the cable glands:

     A cable with no glands.

     A cable with a gland on one of its sides.

     A cable with a gland on both sides.

17. To create connectors for the cable and manage connector-wire assignments, click **Connectors**.

18. In the **Cable Properties** dialog box, click **OK**.

19. In the **Cable Configuration** dialog box, click **OK**

Defining a Cable Configuration

This option allows you to create a new cable configuration. Cables are based on a particular cable configuration. Such a configuration includes a cable set (pairs, triads, and so forth within a cable) and wire arrangement. Therefore, when creating a new cable, SmartPlant Instrumentation creates the required cable sets and wires within that cable automatically based on the configuration that you define. You can add more cable sets and wires to that cable manually later if needed.

➢ To define a cable configuration

1. Do one of the following:

    - Press F7 to open the **Domain Explorer**.
    - In the Wiring module, on the **View** menu, click **Wiring Explorer**.

2. Right-click the **Cables** folder, and on the shortcut menu point to **New** and then click **Cable**.

3. In the **Cable Configuration** dialog box, click **New**.

4. In the **New Cable Configuration** dialog box, enter the total number of sets (pairs, triads, and so forth) that SmartPlant Instrumentation will create automatically when a new cable is based on this new configuration. Add an additional cable set for an overall shield.

5. From the **Default cable set type** list, select the appropriate cable type. The selected cable type determines whether cables based on this configuration have multiple wires, pairs, triads, and so forth.

6. Click **OK** to return to the **Cable Configuration** dialog box.

7. In the **Cable Configuration** dialog box, type the name of the new configuration in the **Cable Configuration** data field.

8. In the **Description** text field, type a brief description of the new configuration.

   Tip

   - This means that every time you create a new cable based on this new configuration, SmartPlant Instrumentation uses this default setting to name the new cable. You can then modify this name as needed when you define the cable in the **Cable** dialog box.

9. Click in the **Cable Set** text field and type the name of each cable set that is defined in this configuration. You can rename the individual cable sets later if needed when editing the cable set in the **Cable Set Properties** dialog box.

10. For each cable set, in the **Cable Set Type** field, accept the displayed value (the cable set type you selected in the **New Cable Configuration** dialog box) or select another one if needed.

11. For each first cable set of a given cable set type, do the following under **Cable set details**:

    a) Click in the **Wire Tag** text field and type the names of the individual wires within the cable sets. You can accept the displayed value if needed.

    b) From the **Wire Color** list, select a color for each wire. If the required value is not available, you can add it in the **Wire Color** dialog box that you access from the **Tables** menu in the **Wiring Module** window.

    c) From the **Wire Type** list, select a type for each wire. If the required value is not available, you can add it in the **Wire Type** dialog box that you access from the **Tables** menu in the **Wiring Module** window.

    d) From the **Polarity** list, select the appropriate polarity or shield for each wire.

12. For additional cable sets based on a cable set type for which you already entered settings under **Cable set details**, do one of the following:

    - To copy the values from a selected cable set to all sets based on the current cable set type, click **Apply**. You can select the **Exclude wire tags** check box before you click **Apply** if you do not wish to copy the wire tags while copying wire color, wire type, and polarity details.

    - Enter the settings individually for each cable set.

13. Click **Save**.

Editing a Cable Configuration

The following procedure explains how to modify an existing cable configuration. For more information about the purpose of cable configurations, see Defining a Cable Configuration.

➢ To edit a cable configuration

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Right-click the **Cables** folder, and on the shortcut menu point to **New** and then click **Cable**.
3. In the **Cable Configuration** dialog box, select the cable configuration that you want to modify.
4. Click **Edit**.
5. In the **Cable Configuration** text field, edit the name of the configuration as needed.
6. In the **Description** text field, edit the description as needed.
7. In the **Cable default name** text field, type a cable default name if needed.

   Tip

   - This means that every time you create a new cable based on this new configuration, SmartPlant Instrumentation will use this default setting to name the new cable. You can then modify this name as needed when you define the cable in the **Cable** dialog box.

8. Click the **Cable Set** field and type the name of each cable set that is defined in this configuration. You can rename the individual cable sets later if needed when editing the cable set in the **Cable Set Properties** dialog box.
9. In the **Cable Set Type** field, edit the value as needed.

10. For each first cable set of a given cable set type that you want to edit, do the following under **Cable set details**:

    a) Click in the **Wire Tag** text field and type the names of the individual wires within the cable sets. You can accept the displayed value if needed.

    b) From the **Wire Color** list, select the appropriate color for each wire. If the required value is not available, you can add it in the **Wire Color** dialog box that you access from the **Tables** menu in the **Wiring Module** window.

    c) From the **Wire Type** list, select the appropriate type for each wire. If the required value is not available, you can add it in the **Wire Type** dialog box that you access from the **Tables** menu in the **Wiring Module** window.

    d) From the **Polarity** list, select the appropriate polarity or shield for each wire.

11. For additional cable sets that you want to edit based on a cable set type for which you already entered settings under **Cable set details**, do one of the following:

    - To copy the values from a selected cable set to all sets based on the current cable set type, click **Apply**.
    - Enter the settings individually for each cable set.

12. Click **Save**.

Deleting a Cable Configuration

The following procedure explains how to delete a cable configuration. For more information about the purpose of cable configurations, see Defining a Cable Configuration.

➢ To delete a cable configuration

1. Do one of the following:
    - Press F7 to open the **Domain Explorer**.
    - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Double-click the **Cables** folder to display the existing cables.
3. Right-click the cable you want to delete and then on the shortcut menu, click **Delete**.
4. Click **Yes** to confirm the deletion.

Note

- You can also delete a cable while editing it. In the **Cable Properties** dialog box, click **Delete**.

Editing Cable Properties

This option enables you to modify the properties of a selected cable.

➢ To edit cable properties

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Double-click the **Cables** folder to display the existing cables.
3. Right-click the cable you want to edit and then on the shortcut menu, click **Properties**.
4. In the **Cable Properties** dialog box, edit the cable using the procedure for creating a new cable.

Note

- If you are working under cable type dependency, and have already created plant cables based on a reference cable that you are editing, certain reference cable fields are not enabled for editing. For more information, see context help for the **Cable Properties** dialog box. The System Administrator can enable cable type dependency when making domain definitions.

Adding a Cable Set

SmartPlant Instrumentation adds cable sets (pairs, triads, and so forth within a cable) automatically when you create a new cable based on a cable configuration. The procedure below describes how you can add another cable set to an existing cable that already contains a number of cable sets.

Note

- If you are working under cable type dependency, and have already created plant cables based on a given reference cable, the software does not allow you add cable sets to such a reference cable. Further, you cannot add cable sets to a plant cable created under cable type dependency. The System Administrator can enable cable type dependency when making domain definitions.

➢ To add a cable set to a cable

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Double-click the **Cables** folder to display the existing cables.
3. Right-click the cable to which you want to add a cable set and then on the shortcut menu, point to **New** and click **Cable Set**.
4. In the **Cable Set Properties** dialog box, type the cable set name in the **Cable set** text field.
5. In the **Cable set sequence** text field, type the sequence of the cable set in the cable.

   Caution

   - Typically, the cable set sequence is determined by the manufacturer. If you change the sequence number of a cable set, make sure that you also change the sequence number of the other cable sets in the cable as appropriate to avoid duplicate values and erroneous terminations.

6. Click **OK** to add the new cable set.

   Note

   - You can now add the required wires to the new cable set.

Adding a Wire to a Cable Set

SmartPlant Instrumentation adds wires automatically when you create a new cable based on a cable configuration. The procedure below describes how you can add another wire to an existing cable set. You can add a wire either to a cable set created automatically or to a cable set that you added manually.

Note

- If you are working under cable type dependency, and have already created plant cables based on a given reference cable, the software does not allow you add cable sets or wires to such a reference cable. Further, you cannot add cable sets or wires to a plant cable created under cable type dependency. The System Administrator can enable cable type dependency when making domain definitions.

➢ To add a wire to a cable set

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Expand the **Cables** folder and then double-click the cable you require.
3. Right-click a cable set and then on the shortcut menu, point to **New** and click **Wire**.
4. In the **Wire Properties** dialog box, under **Wire**, type the wire tag.

   Note

   - By default, wire tags are based on the signal that they carry. To name wires based on user input, the Domain Administrator needs to select **Do not propagate tag name** in the **Plant** dialog box.

5. In the **Details** group box, under **Wire sequence in set**, accept the automatically assigned value that determines the numbering sequence of the wire in the cable set.

   Note

   - The values that SmartPlant Instrumentation suggests under **Wire sequence in set** are unique throughout AsBuilt and all engineering projects where the current cable set appears.

6. From the **Polarity** list, select the signal polarity or shield.

Note

- When you create a cable for the first time, or when you copy from reference cables, check for the existence of shield indication wherever needed. Shield indication is important when SmartPlant Instrumentation propagates signals through wires. In this case, the software does not overwrite the wire tag with the tag signal. You can also define a wire as an overall shield if required.

7. From the **Type** list, select the required wire type. If the required type is not on this list, click ... next to the list arrow to open a dialog box where you can add, modify, or delete items from the **Wire Type** list.

8. From the **Color** list, select the required wire color. If the required color is not on this list, click ... next to the list arrow to open a dialog box where you can add, modify, or delete items from the **Wire Color** list.

9. In the **Note** text field, type a brief note if needed.

10. To set wire end names, do one of the following:

- To name the wire ends according to a naming convention, select the appropriate naming convention from the **Wire end naming convention** list. Note that this check box is available only if the Domain Administrator has enabled it in the **Wire End Naming Conventions** dialog box.

- To name the wire ends not according to a naming convention, do the following:

a) Select **Override naming convention**.

b) Under **Wire end 1**, type the first wire end name.

c) Under **Wire end 2**, type the second wire end name.

Note

- To manage revisions for the current wire, click **Revisions**.

Editing Wire Properties

The following procedure explains how to modify the properties of a selected wire.

Note

- If you are working under cable type dependency, and have already created plant cables based on a selected reference cable, certain fields are not enabled for editing. Further, certain wire fields are not enabled for editing within a plant cable created under cable type dependency. For more information, see context help for the **Wire Properties** dialog box. The System Administrator can enable cable type dependency when making domain definitions.

➢ To edit a wire

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Expand the **Cables** folder and then double-click the cable and cable set that you require.
3. Right-click a wire and then on the shortcut menu, click **Properties**.
4. In the **Wire Properties** dialog box, under **Wire**, type the wire tag.

   Note

   - By default, wire tags are based on the signal that they carry. To name wires based on user input, the Domain Administrator needs to select **Do not propagate tag name** in the **Plant** dialog box.

5. In the **Details** group box, under **Wire sequence in set**, accept the automatically assigned value that determines the numbering sequence of the wire in the cable set.

   Note

   - The values that SmartPlant Instrumentation suggests under **Wire sequence in set** are unique throughout AsBuilt and all engineering projects where the current cable set appears.

6. From the **Polarity** list, select the signal polarity or shield.

Note

- When you create a cable for the first time, or when you copy from reference cables, check for the existence of shield indication wherever needed. Shield indication is important when SmartPlant Instrumentation propagates signals through wires. In this case, the software does not overwrite the wire tag with the tag signal. You can also define a wire as an overall shield if required.

7. From the **Type** list, select the required wire type. If the required type is not on this list, click ... next to the list arrow to open a dialog box where you can add, modify, or delete items from the **Wire Type** list.

8. From the **Color** list, select the required wire color. If the required color is not on this list, click ... next to the list arrow to open a dialog box where you can add, modify, or delete items from the **Wire Color** list.

9. In the **Note** text field, type a brief note if needed.

10. To set wire end names, do one of the following:

- To name the wire ends according to a naming convention, select the appropriate naming convention from the **Wire end naming convention** list. Note that this check box is available only if the Domain Administrator has enabled it in the **Wire End Naming Conventions** dialog box.

- To name the wire ends not according to a naming convention, do the following:

a) Select **Override naming convention**.

b) Under **Wire end 1**, type the first wire end name.

c) Under **Wire end 2**, type the second wire end name.

Note

- To manage revisions for the current wire, click **Revisions**.

Managing Connector - Wire Assignments for a Given Cable

You need connectors for fieldbus home-run cables, telecom cables, and other cables that require connectors. Use these procedures to create connectors and to assign connector pins to cable wires. You define, assign pins, and delete connectors from a supporting table that is specific to a given cable. SmartPlant Instrumentation allows you to build your wiring system with any of the following connector implementations:

- Connector at one or both cable ends
- Connector at end of a single cable set
- Connector at end of wires from different cable sets

For any of the procedures below, do the following:

1. In the **Domain Explorer** or **Reference Explorer**, do one of the following:
   - To create a new cable, right-click the **Cables** folder and on the shortcut menu point to **New**, and then click **Cable**.
   - Right-click an existing cable, and on the shortcut menu click **Properties**.
2. Modify cable properties as needed.
3. Click **Connectors**.
4. In the **Connector Assignments** dialog box, do one of the following:
   - To manage connector-wire associations for end 1 of the cable, click on the **End 1** tab.
   - To manage connector-wire associations for end 2 of the cable, click on the **End 2** tab.

➢ To create a connector

1. In the **Connector Assignments** dialog box, click **New**.
2. In the **Connector Properties** dialog box that opens, under **Connector**, type the name of the new connector.
3. Under **Connector type**, do one of the following:
   - From the list, select a connector type as configured.
   - To modify or create a connector type, click ... . For details, see Managing and Configuring Connector Types.
4. Under **Male/female** select Male or Female as needed.
5. Click **OK** to return to the **Connector Assignments** dialog box.

➢ To associate connector pins with cable wires

1. Do one of the following:
   - To validate that pin polarities that you set for this cable end are consistent with wire polarities, select **Polarity validation**.
   - To skip polarity validation, clear **Polarity validation**.
2. Do the following for each connector pin:
   a) Under **Wires per Pin**, select the number of wires that you want to assign to the pin.
   b) Under **Cable Set**, select the **Cable Set** from which you are assigning a wire to the current pin.
   c) Under **Wire**, select the wire that you assign to the pin.

Notes

- The value that you enter under **Wires per Pin** determines the number of rows displayed for a given pin.
- The software does not allow you to edit pin-wire assignment properties of a connector that is connected (in the **Connection** window).

➢ **To delete a connector**

Note

- The software does not allow you to delete a connector that is connected (in the **Connection** window).

1. In the data window, select the connectors that you want to delete.
2. Click **Delete**.

Managing and Configuring Connector Types

A connector type contains pin configuration and other properties for a connector model of a specific manufacturer. When you create a connector for a specific cable, selecting a connector type copies these properties for the cable connector. These procedures explain how to create, configure, edit, and delete connector types

For any of the procedures below, to open the **Connector Types** dialog box, do the following:

- In the **Wiring Module** window, on the **Tables** menu, point to **Connector** and then click **Types**.

➢ **To define or edit a connector type**

1. In the **Connector Types** dialog box, do one of the following:
   - To create a new connector type, click **New**.
   - To edit an existing connector type, click in the field that you want to edit.
2. Under **Connector Type**, type a unique name.
3. To specify the connector type for a specific manufacturer, model, and part number, do any of the following:
   - Under **Manufacturer**, select the connector manufacturer.
   - Under **Model**, select the model.
   - Under **Part Number**, type the part number.
4. To edit the connector type pin configuration, see the next procedure.

➢ To define or edit a connector type pin configuration

1. In the **Connector Types** dialog box, select the connection type that you want to configure, and click **Configure**.

2. In the **Connector Type Configuration** dialog box, do one of the following for each pin that you want to configure:

   - To add a new pin, click **New**.
   - To delete a pin, select the row that you want to delete and click **Delete**.
   - To edit a pin field, click the field.

3. To change the displayed pin sequence, under **Sequence**, type the new unique number.

4. To set the pin name, under **Name**, type the unique name.

5. To set the pin polarity, under **Polarity**, select the value that you require.

➢ To delete a connector type

Caution

- SmartPlant Instrumentation removes the item that you delete from the **Connector Types** dialog box from the **Connector type** list.

1. In the **Connector Types** dialog box, select the connector type that you want to delete.

2. Click **Delete**.

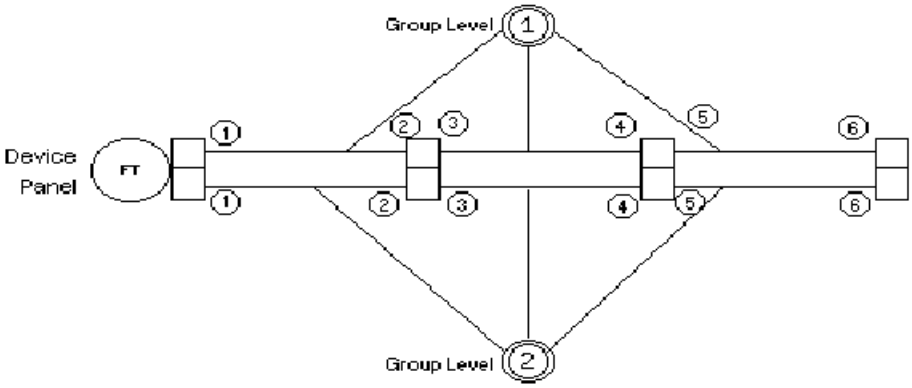
Device Panels and Cables

Overview

A device panel is an instrument that has wiring and instrument tag information. Most device panels are field devices by nature that is, transmitters, transducers, sensors, and so forth.

Wiring information consists of Wire Group, Group Level, and Group Sequence. A Wire Group is a group of wires that carry a signal associated with a particular tag number. Within each Wire Group, the individual wires are further identified by their Group Level and Group Sequence.

The following diagram indicates how a device panel is associated with an instrument. You may then continue the wiring routing as required.



Each Group Level defines a signal routing associated with a particular loop. It is possible to have up to 99 Group Levels within a Wire Group.

The Group Sequence represents, in ascending or descending increments, the connection point of each wire at the same Group Level to the terminal.

Note

- SmartPlant Instrumentation automatically tracks signals and assigns the Wire Group, Group Level, and Group Sequence when a device panel is created.

SmartPlant Instrumentation provides you with an easy to use mechanism to create these elements directly from the Instrument Index module. Alternatively, you can create the connection information in the **Device Panel** window, including the terminals, the cable, and the connections between them.

Note

- The **Device Panel** window can help create the connection information needed in most cases where a ‘single’ cable is connected to the terminals of the instrument.

Principles of Creating Device Panels

Creating a device panel requires you to define the reference entities that SmartPlant Instrumentation will use in the Instrument Index module. These references are the panel, cable, and connection type. When adding a new tag by creating a device panel, the software will automatically check if the tag that is being added needs to have a device panel, and based on the given default settings, it will create the panel, the cable, and the connections between them. SmartPlant Instrumentation will also:

- Name the cable after the tag number, when the name is preceded by C-".
- Automatically propagate tag numbers and relations between the wires.

The software creates device panels and device cables according to the appropriate naming conventions defined in the Administration module.

Rapid Creation of Device Panels

The basic mechanism of creating device panels is based on the profile information defined in the Instrument Index module (see Defining Instrument Type Default Settings).

Examining the wiring profile information in the **Instrument Type Profile** dialog box, three list boxes provide the reference panel and cable names, and the connection definition between the cable and the panel.

Connection assumes the following:

- The default connection is on the right side of the device.
- There is only one terminal strip in the panel.
- The connection begins at the first terminal in the terminal strip.

SmartPlant Instrumentation offers the following options for device panel creation:

- Create an individual device panel in the **Domain Explorer**. This device panel will not be associated with any tag number and will not have a device cable.
- Create a device panel for an existing tag number and configure its connection manually or automatically.
- Create a new tag number with a linked device panel and device cable. You can configure the connection automatically or manually as desired.

Creating a New Tag Number in the Wiring Module

This option allows you to create a new tag number in the **Device Panels** window so that you do not need to switch to the Instrument Index module. This way you can stay in the **Device Panels** window in the Wiring module and create a new tag.

SmartPlant Instrumentation creates the new tag number according to the wiring profile defined for it in the Instrument Index module. Make sure that you have set all the required instrument type profiles before you start creating new tag numbers. See Defining Instrument Type Default Settings for details.

You can choose one of the following options when creating a new tag in the **Device Panels** window:

- Create a tag number without a device panel or device cable. In this case, the software creates the new tag that will not be linked to any device panel.
- Create a tag number with a linked and automatically configured device panel and device cable. In this case, SmartPlant Instrumentation automatically creates a device panel and a device cable and configures the required connection for you. The software does not be prompt you to select a reference panel, reference cable, a connection type. SmartPlant Instrumentation gives the device panel the same name as the new tag number.
- Create a tag number with a linked device panel and device cable then manually configure the required connection. In this case, the software prompts you to select a reference panel, reference cable, a connection type, and you can name the new device panel as needed.

Creating a Tag Number without a Device Panel

This option enables you to create a new tag in the **Device Panels** window without creating a device panel or a device cable. You can then select an existing device panel and link it with the new tag number. You can also create a new device panel for the new tag number if needed. Note that SmartPlant Instrumentation creates the new tag number according to the wiring profile defined for it in the Instrument Index module. Make sure that you set all the required instrument type profiles before you start creating new tag numbers. For details, see Defining Instrument Type Default Settings.

➢ To create a tag number without a device panel

1. Deactivate the instrument type default settings as follows:
   a) On the **File** menu, click **Preferences**.
   b) In the tree view pane, to expand the tree, click ⊞ beside **Instrument Index**.
   c) Click **Profile**.
   d) Under **Activate instrument type profile options**, clear the **Wiring** check box.
   e) Click **OK**.
2. In the **Wiring Module** window, do one of the following:
   - Click  .
   - On the **Actions** menu, click **Device Panels**.
3. In the **Device Panels** window, do one of the following:
   - Click  .
   - On the **Actions** menu, click **New Tag**.

4. In the **New Tag Number** dialog box, do the following:

   a) Type the new tag number name in the text field. It is possible for tag numbers and panels to have the same names if needed. Make sure that you follow the naming conventions for the new tag number.

   Note

   - If you are working with the **Free** naming conventions, select the **Select Instrument Type** check box to open a pop-up window that allows you to select the appropriate instrument type.

   b) Select the **Fieldbus Tag Number** check box if the new tag number is going to be a fieldbus instrument.

   c) Click **OK** to create the new tag number.

5. If more than one function identifiers exist for the current instrument type acronym, select the required instrument type in the **Select Instrument Type** dialog box and click **OK**.

   Note

   - If the tag number does not correspond to an existing loop name, the software prompts you to enter a loop name based on the tag number you have entered. SmartPlant Instrumentation automatically associates the new tag number with the loop if the loop identifier already matches an existing loop.
     If the loop convention includes the loop function parameter, the prompt always appears. In this case, you have to complete the loop number.
     If a profile exists for the selected instrument type, the software creates the new tags for that instrument type according to the selected default settings. For details, see Defining Instrument Type Default Settings.

6. In the **Loop Name** dialog box, do one of the following:
   - Type the loop number that the new tag is associated with.
   - Accept the displayed value.
7. Do one of the following:
   - Click **OK** to create the loop number.
   - Click **Cancel** to create the tag number without a loop association.

Tips

- If a loop with the same name exists, the tag number is automatically associated with it, without creating a new loop.
- The new tag number appears in the **Tag Number** list in the **Device Panels** window. The **Device Panel** field next to it is black indicating that this tag number is not linked with any device panel.

Creating a Tag Number with an Automatically Configured Device Panel

This option enables you to create a new tag number with a linked device panel and device cable. In this case, SmartPlant Instrumentation automatically creates a device panel and a device cable and automatically configures the required connection for you. SmartPlant Instrumentation does not prompt you to select a reference panel, reference cable, and a connection type. The software selects the default configuration for the new device panel, device cable, and connection type that you have defined in the **Wiring and I/O Profile** group box of the **Instrument Type Profile** dialog box in the Instrument Index module. The new device panel will have the same name as the new tag number. SmartPlant Instrumentation will create the new tag number according to the wiring profile defined for it in the Instrument Index module. Make sure that you set and activate all the required instrument type profiles before you start creating new tag numbers. For details, see Defining Instrument Type Default Settings.

➢ To create a tag number with an automatically configured device panel

1. Activate the instrument type default settings as follows:
   a) On the **File** menu, click **Preferences**.
   b) In the tree view pane, to expand the tree, click ⊞ beside **Instrument Index**.
   c) Click **Profile**.
   d) Under **Activate instrument type profile options**, select the **Wiring** check box.
   e) Click **OK**.
2. In the **Wiring Module** window, do one of the following:
   - Click  .
   - On the **Actions** menu, click **Device Panels**.
3. In the **Device Panels** window, clear the **Manual configuration** check box.
4. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **New Tag**.

5. In the **New Tag Number** dialog box, do the following:

   a) Type the new tag number name in the text field. It is possible for tag numbers and panels to have the same names if needed. Make sure that you follow the naming conventions for the new tag number.

   Note

   - If you are working with the **Free** naming conventions, select the **Select Instrument Type** check box to open a pop-up window that allows you to select the appropriate instrument type.

   b) Select the **Fieldbus Tag Number** check box if the new tag number is going to be a fieldbus instrument.

   c) Click **OK** to create the new tag number.

6. If more than one function identifier exists for the current instrument type acronym, select the required instrument type in the **Select Instrument Type** dialog box and click **OK**.

   Note

   - If the tag number does not correspond to an existing loop name, SmartPlant Instrumentation prompts you to enter a loop name based on the tag number you have entered. The software automatically associates the new tag number with the loop if the loop identifier already matches an existing loop.
     If the loop convention includes the loop function parameter, the prompt always appears. In this case, you have to complete the loop number.
     If a profile exists for the selected instrument type, the software creates the new tags for that instrument type according to the selected reference entities. For details, see Defining Instrument Type Default Settings.

7. In the **Loop Name** dialog box, do one of the following:

   - Type the loop number that the new tag is associated with.
   - Accept the displayed value.

8. Do one of the following:

   - Click **OK** to create the loop number.
   - Click **Cancel** to create the tag number without a loop association.

   Tips

   - If a loop with the same name exists, the tag number is automatically associated with it, without creating a new loop.
   - The new tag number appears in the **Tag Number** list in the **Device Panels** window. The **Device Panel** field next to it is black indicating that this tag number is not linked with any device panel.

Creating a Tag Number with a Manually Configured Device Panel

This option enables you to create a new tag number with a linked device panel and device cable. In this case, SmartPlant Instrumentation creates a device panel and a device cable and lets you manually configure the required connection. The software prompts you to select a reference panel and reference cable that will be used to create the new device panel and cable. SmartPlant Instrumentation copies the definitions for the new device panel and cable from the selected reference panel and cable that you defined in the **Reference Explorer**. You can also select an existing connection type and you can name the new device panel as needed.

SmartPlant Instrumentation creates the new tag number according to the wiring profile that you defined in the Instrument Index module. Make sure that you set and activate all the required instrument type profiles before you start creating new tag numbers. See Defining Instrument Type Default Settings for details.

➢ To create a tag number with a manually configured device panel

1. Activate the instrument type default settings as follows:

   a) On the **File** menu, click **Preferences**.

   b) In the tree view pane, expand the **Instrument Index** preferences.

   c) Click **Profile**.

   d) Under **Activate instrument type profile options**, select the **Wiring** check box.

   e) Click **OK**.

2. In the **Wiring Module** window, do one of the following:

   - Click  .
   - On the **Actions** menu, click **Device Panels**.

3. In the **Device Panels** window, select the **Manual configuration** check box.

4. Do one of the following:

   - Click  .
   - On the **Actions** menu, click **New Tag**.

5. In the **New Tag Number** dialog box, do the following:

   a) From the **Tag class** list, select the desired tag class according to whether you want to create a conventional, Foundation Fieldbus, HART instrument tag, and so forth.

   b) Type a tag number name in the **Tag Number** field. It is possible for tag numbers and panels to have the same names if needed. Make sure that you follow the naming conventions for the new tag number. For details of how to name a new tag number, see Naming a New Tag Number.

   Note

   - If you are working with the **Free** naming conventions, select the **Select Instrument Type** check box to open a pop-up window that allows you to select the appropriate instrument type.

   c) Click **OK** to create the new tag number.

6. If more than one function identifier exists for the current instrument type acronym, select the required instrument type in the **Select Instrument Type** dialog box and click **OK**.

   Note

   - If the tag number does not correspond to an existing loop name, SmartPlant Instrumentation prompts you to enter a loop name based on the tag number you have entered. The software automatically associates the new tag number with the loop if the loop identifier already matches an existing loop.
     If the loop convention includes the loop function parameter, the prompt always appears. In this case, you have to complete the loop number.
     If a profile exists for the selected instrument type, SmartPlant Instrumentation creates the new tags for that instrument type according to the selected default settings. For details, see Defining Instrument Type Default Settings.

7. In the **Loop Name** dialog box, do one of the following:

   - Accept the displayed value.
   - Type the loop number that the new tag is associated with.
   - Click **Cancel** to create the tag number without a loop association.

8. In the **Create Device Panel and Cable** dialog box, under **Device panel**, accept or edit the displayed panel name.

9. From the **Reference device panel** list, select the reference panel that you want to use as a basis for the new device panel.

   Notes

   - The displayed reference panel is the one that you defined in the Instrument Index module, in the **Instrument Type Profile** dialog box, under **Wiring and I/O Profile**.
   - The properties of the reference panel that you select determine whether one or both of the **Conventional connections** and **Plug-and-socket connections** group boxes are enabled, and the values that are initially displayed.

10. In the active group boxes, to define the device cables, do the following as necessary:

    - To modify the properties of a selected device cable connection, click **Properties**, and in the dialog box that opens, change the values as necessary.
    - To add an additional device cable connection, click **New**, and in the dialog box that opens, enter the appropriate values.
    - To delete selected cable connections, click **Delete**.

11. Click **OK** to complete the process.

    Note

    - The new device panel appears next to the selected tag number in the **Device Panels** window. SmartPlant Instrumentation displays a cable icon next to the new device cable indicating that a device cable is connected to it.

Creating a Device Panel for a Selected Tag Number

This option enables you to create a device panel associated with a selected a tag number. This process also includes the creation of the required device cables that will be connected to the new device panel. You can let SmartPlant Instrumentation configure the connection for you or you can choose the manual configuration option that allows you to configure the connection:

- **Automatic configuration** – the software creates a device panel, a device cable, and automatically configures the required connection for you. SmartPlant Instrumentation does not prompt you to select a reference panel, reference cable, or a connection type. Instead, the software selects the reference configuration for the new device panel, device cable, and connection type that you have defined in the **Wiring and I/O Profile** group box of the **Instrument Type Profile** dialog box in the Instrument Index module. The new device panel will have the same name as the new tag number. Make sure that you set and activate all the required instrument type profiles before you start creating new tag numbers. For details, see Defining Instrument Type Default Settings.
- **Manual configuration** – SmartPlant Instrumentation creates a device panel and a device cable and lets you manually configure the required connection. The software prompts you to select a reference panel and reference cable that will be used to create the new device panel and cable. SmartPlant Instrumentation copies the definitions for the new device panel and cable from the selected reference panel and cable that you defined in the **Reference Explorer**. You can also select an existing connection type and name the new device panel as needed.

➢ To create a device panel for a selected tag number

1. Start the Wiring module.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **Device Panels**.
3. In the **Device Panels** window, do one of the following:
   - To define the definitions of the device panel and device cable manually, select the **Manual configuration** check box.
   - To make the definitions of the device panel and device cable automatically, clear the **Manual configuration** check box.
4. Select the tag numbers for which you want to create device panels. You can use the **Ctrl** or **Shift** keys to select multiple rows.

5. Do one of the following to start the creation process:

   - On the module toolbar, click  .
   - On the **Actions** menu, click **Create**.

   Note

   - If you cleared the **Manual configuration** check box, SmartPlant Instrumentation creates and configures the device panel automatically. The creation process ends at this point and the new device panel appears next to the selected tag number in the **Device Panels** window. the software displays a cable icon  next to the new device panel indicating that a device cable is connected to it. If you selected the **Manual configuration** check box, the creation process continues.

6. In the **Create Device Panel and Cable** dialog box, under **Device panel**, accept or edit the displayed panel name.

7. From the **Reference device panel** list, select the reference panel that you want to use as a basis for the new device panel.

   Notes

   - The displayed reference panel is the one that you defined in the Instrument Index module, in the **Instrument Type Profile** dialog box, under **Wiring and I/O Profile**.
   - The properties of the reference panel that you select determine if one or both of the following group boxes are active, and the values initially displayed:
     - **Conventional connections**
     - **Plug-and-socket connections**

8. In the active group boxes, to define the device cables, do the following as necessary:

   - To modify the properties of a selected device cable connection, click **Properties**, and in the dialog box that opens, change the values as necessary.
   - To add an additional device cable connection, click **New**, and in the dialog box that opens, enter the appropriate values.
   - To delete selected cable connections, click **Delete**.

9. To apply the values that you set to all of the tags with incomplete profiles that you selected in the **Device Panels** window, select **Apply to all selected tags with incomplete profile**.

Linking Tags with Device Panels

This option enables you to associate a tag number with a device panel. This feature is useful when, for instance, you create a number of device panels in the **Domain Explorer** by copying a reference entity from **Reference Explorer**. The device panels you create in the **Domain Explorer** are not associated with any tag numbers and they are not connected to device cables. A device panel must be associated with a tag number before you can create a device cable for it.

➢ To link a tag number to a device

1. Start the Wiring module.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **Device Panels**.
3. In the **Device Panels** window, select the required tag number and do one of the following:
   - Click  .
   - On the **Actions** menu, click **Link**.
4. In the **Select Device Panels** dialog box, select the required device panel and click **OK**.

 **Note**

- The device panel you just selected appears next to the tag number you selected in the **Device Panels** window. You can now create a device cable for this device panel.

Creating a Device Cable

This option enables you to create a new device cable and connect it to a selected device panel. This feature is useful when you created a device panel in the **Domain Explorer**, associated it with a tag number in the **Device Panels** window, but have not yet defined a device cable for it. You can configure the cable and its connection type manually or you can let SmartPlant Instrumentation select the reference cable and connection type automatically.

➢ To create a device cable

1. Start the Wiring module.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **Device Panels**.
3. In the **Device Panels** window, do one of the following:
   - To define the definitions of the device cable and the connection type manually, select **Manual configuration.**
   - To define the definitions of the device cable and the connection type automatically, clear **Manual configuration**.
4. Select the device panels — associated with tag numbers — for which you want to create device cables.
5. Do one of the following to start the creation process:
   - Click  .
   - On the **Actions** menu, click **Create**.

 **Note**

- If you cleared the **Manual configuration** check box, SmartPlant Instrumentation creates and configures the device cable automatically. The creation process ends at this point. A cable icon  is displayed next to the selected device panel indicating that a device cable is connected to it. If you selected the **Manual configuration** check box, the creation process continues.

6. In the **Create Device Panel and Cable** dialog box, in the active group box (**Conventional connections** or **Plug-and-socket connections**) do the following for each device panel — associated with a tag number.

   a) Click **New**.

   b) In the dialog box that opens, enter the appropriate values.

   c) Click **OK**.

7. In the **Create Device Panel and Cable** dialog box, click **OK**.

Note

- The new device cable appears next to the selected tag number in the **Device Panels** window.

Deleting Device Panel Associations

This feature enables you to dissociate a tag number from a device panel. When carrying out this procedure, SmartPlant Instrumentation automatically disconnects single cables associated with that device panel. Furthermore, the software renames the single cables that were connected to that panel to '**?**-' plus <name>. For example, a cable named 'C-FT -2221' is renamed to '?-C-FT -2221'.

SmartPlant Instrumentation renames the cable to draw your attention to the fact that the cable is not connected to any device. In addition, the software renames the wires to SPARE throughout the signal run.

➢ To unlink a device panel from a tag number

1. Start the Wiring module.

2. Do one of the following:

   - Click  .

   - On the **Actions** menu, click **Device Panels**.

3. In the **Device Panels** window, select the required tag number and do one of the following:

   - Click  .

   - On the **Actions** menu, click **Unlink**.

Renaming Device Cables in Batch Mode

This option enables you to select a panel with device cables (cables connecting a device panel and any other panel) and rename all the device panel cables connected to this panel in batch mode.

➢ To rename device cables in batch mode

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Expand the **Panels by Location** or the **Panels by Category** folder and select a junction box.
3. Right-click the selected junction box and then on the shortcut menu, point to **Actions** and click **Rename Device Cables**.
4. In the **Rename Device Cables** dialog box, make sure that the **Rename** tab is active.
5. In the **Cable Name** data window, select the check boxes next to the cables that you want to rename or select the **Select All** check box to select all the cables displayed in this data window.
6. Click the **Convention** tab to define the cable name template, that is, the rules how the cable names will change. (If a name template has been defined, it is displayed in the **Current Convention** field.)
7. Insert and define as many conventions as required.
8. Select the **Use as default** check box to use the convention row definitions as your default naming conventions.
9. Click **Rename** when done.

Note

- You can modify the device panel name according to your needs. Device cable names are, however, not editable in this dialog box. You can rename device cables in the **Domain Explorer**.

Creating a Multi-Input Instrument with Plug-and-Socket Connections for a Serial Interface Loop

Use this procedure to create a plug-and-socket connection multi-input instrument tag — and the instrument tags that feed into it — for a serial interface wiring loop. After you conclude this procedure, you can do the following:

- View the assignments of the source signals to I/O channels
- Generate an enhanced report for the wiring loop

➢ To create a multi-input instrument with plug-and-socket connections for a serial interface loop

1. In the **Reference Explorer**, create reference panels for the instrument tags that feed into the multi-input device panel.

2. In the **Reference Explorer**, create a reference multi-input device panel with plug-and-socket connections.

3. In the **Reference Explorer**, create the reference device cables that you will use when creating the two instrument types for device panels (multi-input and those that feed into the multi-input).

   Notes

   - For both types, in the **Cable Properties** dialog box, under **Cable class**, select Conventional.
   - Use the same connector type required for the device panels.
   - Set the male/female property for coupling with the device panels.
   - For the instrument type that you will use with the multi-input device panel, create one connector only (for the device panel end). Leave the second end without a connector, for terminal connection to the DCS I/O card.

4. In the Instrument Index module, create instrument type profiles for the following:

   - The instrument with the plug-and-socket multi-input serial interface device panel
   - The instruments that feed into the multi-input device panel

Notes

- For the instrument type upon which you base the multi-input instrument tag, make sure that on the **General** tab of the **Instrument Type Profile** dialog box, under **System I/O type**, you select Serial Interface.
- For each instrument type, on the **Wiring and Control System** tab, select the reference device panel and reference cable that you created for each type.

5. In the Instrument Index module, create the following, based on the instrument types that you defined:
   - Create the instrument tags that feed into the multi-input instrument tag.
   - Create the multi-input instrument tag.

   Note

   - For the multi-input device panel tag, in the **New Tag Number** dialog box, make sure that under **Tag class** you select Conventional.

6. In the **Domain Explorer**, right click the multi-input device panel that was created, and on the shortcut menu, point to **Actions** and click **Connection**.
7. In the **Plug-and-Socket Connection** window, do the following to connect the input device cables to the multi-input device panel.
   a) In the **Cable Manager**, expand the device cables that feed into the multi-input device panel.
   b) Drag the appropriate cable connectors to the in-ports of the multi-input device.
8. In the **Domain Explorer**, right-click the DCS panel to which you connect the output of the multi-input device panel, and on the shortcut menu, point to **Actions** and then click **Connection**.

   Note

   - Make sure that the system I/O type of the I/O card to which you connect the multi-input device is SI.

9. In the **Connection** window, connect the output cable of the multi-input device panel to the DCS.
10. To view the I/O assignment of the signals, on the **Actions** menu, click **I/O Assignment**.

Creating a Multi-Input Device Panel with Terminal Connections for a Serial Interface Loop

Use this procedure to create a terminal connection multi-input device panel — and the instrument tags that feed into it — for a serial interface wiring loop. After you conclude this procedure, you can do the following:

- View the assignments of the source signals to I/O channels
- Generate an enhanced report for the wiring loop

➢ To create a multi-input instrument with terminal connections for a serial interface loop

1. In the **Reference Explorer**, create reference panels for instrument tags that feed into the multi-input device panel.

2. In the **Reference Explorer**, create a reference multi-input device panel with terminal connections.

3. In the **Reference Explorer**, create a reference device cable.

   Notes

   - In the **Cable Properties** dialog box, under **Cable class**, select Conventional.

   - Do not create connectors for this reference cable.

4. In the Instrument Index module, create instrument type profiles for the following:

   - The multi-input terminal-connection instrument with serial interface device panel

   - The instrument tags that feed into the multi-input instrument

   Notes

   - For the multi-input instrument type, make sure that on the **General** tab of the **Instrument Type Profile** dialog box, under **System I/O type**, you select Serial Interface.

   - For each instrument type, on the **Wiring and Control System** tab, select the reference device panel and reference cable that you created for each type.

5. In the Instrument Index module, create the following, based on the instrument types that you defined:

   - Create the instrument tags that feed into the multi-input instrument.
   - Create the multi-input instrument tag.

   Note

   - For all of the tags, in the **New Tag Number** dialog box, make sure that under **Tag class** you select Conventional.

6. In the **Domain Explorer**, right click the multi-input device panel that was created, and on the shortcut menu, click **Connection**.
7. In the **Connection** window, connect the input device cables to the multi-input device panel.
8. In the **Domain Explorer**, right-click the DCS panel to which you connect the output of the multi-input device panel, and then on the shortcut menu, point to **Actions** and click **Connection**.

   Note

   - Make sure that the system I/O type of the I/O card to which you connect the multi-input device is SI.

9. In the **Connection** window, connect the output cable of the multi-input instrument to the DCS.
10. To view the I/O assignment of the signals, on the **Actions** menu, click **I/O Assignment**.

Connections

The Connection Concept

SmartPlant Instrumentation employs two methods for implementing cable terminations - direct visual connection, and a more advanced technique called 'Connection Type'. The connection concept behind these methods is based on the simple idea of letting you work as you would in the field, meaning that if you install a wire and connect it to a panel, for example, you can do exactly the same on the screen. The following procedures illustrate the Connection Concept.

The process of connecting wires is an important function of the Wiring module. The drag-and-drop feature and the use of predefined wiring patterns makes this process fast and efficient. You make all connections in the **Connection** window.

You can make the following connections:

- **Connect cables and cable sets to terminals in single mode** — this option allows you to connect cables one by one to the appropriate terminals.
- **Connect cables and cable sets to terminals in batch mode** — this option allows you to simultaneously connect cables to the appropriate terminals and define their connections.

Tips

- You can keep more than one **Connection** window open at the same time. This can be useful when viewing the wiring routing.
- Dragging a cable, cable set, or wire to the required terminal not currently visible in the **Connection** window will make the screen scroll up or down until the required terminal is displayed.
- If your monitor width allows it, you can follow the course of a cable from one terminal strip to the other (provided that the cable is connected between two terminal strips). You can view the cable continuation between two terminal strips by resizing the open **Connection** window and clicking  (or selecting **Adjacent** on the **Actions** menu) to simultaneously display both terminal strips.

Defining Connection Types

This option allows you to select, create, or edit a connection type that facilitates rapid cable set connections. You define a connection type that contains a connection pattern. A connection type contains the definition of the pattern by which wires will be connected on a strip, and allows automatic creation and connection of jumpers between successive cable sets. Once a wiring pattern has been defined, it can be selected whenever desired and will determine how the connections are made.

Caution

- Connection types can only be defined for plant panels, not reference.

➢ To create a connection type

1. Open the **Wiring Module** window or the **Connection** window and click  .
2. In the **Connection Type** dialog box, click **New** to create a new connection type.
3. In the **New Connection Type** dialog box, configure the new connection type by selecting the number of wires and jumpers that the new connection type will contain.
4. Click **OK** to return to the **Connection Type** dialog box.
5. In the **Connection type** text field, type the name of the new connection type.
6. In the **Description** text field, type a short description if needed.
7. In the **Skip between sets** field, enter the number of terminals that will be skipped between the first terminals of each cable set.
8. In the **Wires** group box, do the following:
   a) Click in the **Skip** text field and type the number of terminals to skip before connecting this wire in the cable set. The skip is always relative to the first terminal to which a wire in the cable set is connected. Enter the number of terminals to be skipped according to your needs. In most cases, this value is incremented for successive wires. You can accept the displayed value if suitable.
   b) In the **Side** field, click the **A** – Active or **O** – Opposite option button to select the terminal side to which you want to connect each wire. The side that is currently active depends on the side you start to connect.
   c) Click in the **Land** field to connect a wire. A screw head  appears indicating that a connection has been configured.

Note

- The **Wire** field displays a specific wire in the cable set. The displayed W00x values represent the wire names and are used to illustrate the current connection type configuration. This field is not editable.

9. To configure a jumper connection, do the following in the **Jumpers** group box:

Note

- The options in this group box become available if you have selected jumpers to be configured in the **New Connection Type** dialog box.

a) From the **Type** list, select the jumper type from this list. The values in this list are determined in the **Wire Type** supporting table.

b) From the **Color** list, select the required jumper color.

c) Click in the **End 1 and End 2** fields to connect to a jumper. A screw head shows up indicating that a connection has been configured.

d) Click in the **Skip** text field and type the number of terminals to skip for the jumper in the cable set for landing. You can accept the displayed value if appropriate. Repeat the same procedure for the other end.

e) In the **Side** fields, click the **A** – Active or **O** – Opposite option button to select the terminal side where the jumper will be connected. The side that is currently active depends on which side you start to connect.

Note

- The terminals to which the ends of a jumper are connected must reside on the same strip. Both ends of a jumper must be connected for it to appear in the display region.

10. Click **Save**.

Tip

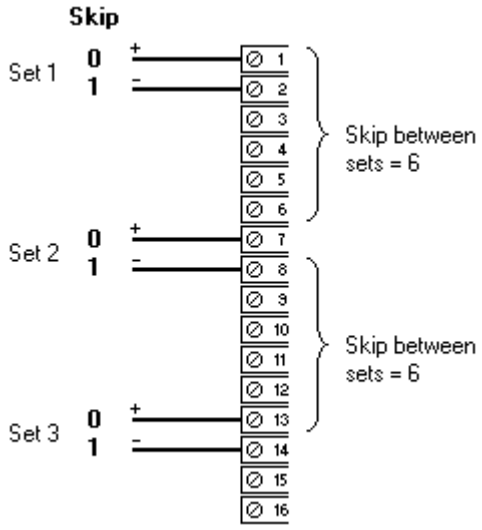
- The preview group box displays how the terminals, wires, and jumpers are connected. It also indicates, with different colors, the active and opposite sides. The preview window is not editable.

You can now proceed with the connections.

Connection Type Examples

Example 1: (a two-wire cable set)

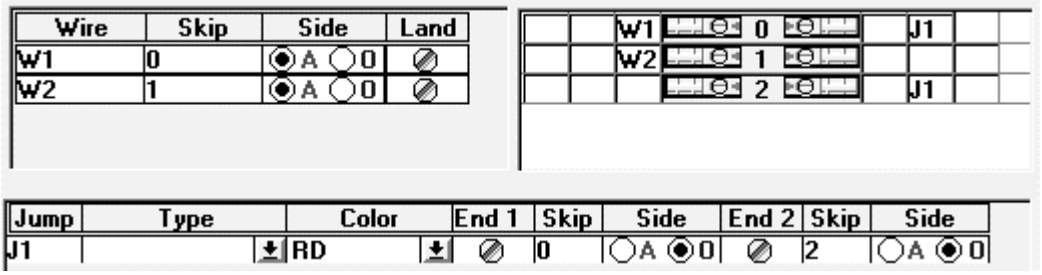
The following connection type example illustrates how the connections are made for a 2-wire cable set when the skip between cable sets is 6:



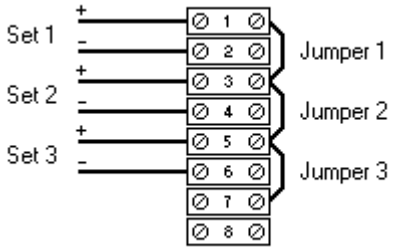
The position of the **+** wire in each cable set to be connected has been assigned a skip of 0. The **–** wire of Set 1 has been assigned a skip of 1. The **–** wires of Sets 2 and 3 have each been assigned a skip of 6.

Example 2: (two wires with a jumper)

The following example illustrates how you can connect a single pair to a strip and create a jumper on the opposite side between the first and third terminals. The next pair will be connected to the third terminal, if the **skip between sets** parameter was set to 2.



The outcome of this operation, when terminating multiple pairs, will be pairs connected sequentially where every first wire in a set is connected by a jumper to the one that follows, as illustrated below:



Connecting a Cable or a Cable Set to a Terminal Strip

The following procedure explains how to connect a cable or cable set to a terminal strip. Note that you can connect only **Plant** cables and panels and not reference panels and cables. However, while the **Connection** window open, you can copy a reference entity from the **Reference Explorer** to the **Domain Explorer** and drag it to a terminal in the **Connection** window.

➢ To connect a cable or a cable set to a terminal strip

1. Press F7 to open the **Domain Explorer**.
2. Select one of the following entities:
   - a cable
   - a cable set
   - a panel
   - a terminal strip
3. Right-click the entity you selected and then on the shortcut menu, point to **Actions** and click **Connection**.
4. In the **Connection** window, select the required terminal strip from the **Strip** list.

   Tip

   - If the terminal strip that you need does not exist in the **Domain Explorer**, you can copy a reference terminal strip from **Reference Explorer** to the **Domain Explorer** while the **Connection** window is open. Press F8 to open the **Reference Explorer**.

5. In the **Domain Explorer**, select the cable or cable set that you want to connect. (Press F7 to open the **Domain Explorer**.)

6. Drag the selected cable or cable set to the appropriate terminal in the data window.

7. Drop the cable or cable set on the required terminal (outer side of the screw head) to open the **Cable Connection Definition** dialog box.

8. In the **Cable Connection Definition** dialog box, do the following:

   a) Select **End 1** or **End 2** for the side of the cable that you want to connect.

   b) To change the terminal number where the first wire is to be connected, from the **Start at terminal** list, select the required terminal.

   c) In the **Cable set connection details** data window, select the cable sets that you want to connect, or select **Select all cable sets**.

   d) From the **Connection Type** list, select the connection type for each cable set that you are going to connect.

   e) Select **L** (left) or **R** (right) for the physical side of the terminal where the cable set enters.

   Note

   - A screw head indicates that the cable set is already connected on the selected cable end.

   f) Click **Connect** to connect the selected cable sets and return to the **Connection** window.

   Notes

   - SmartPlant Instrumentation connects the individual wires automatically in accordance with the selected connection type.

   - You can double-click a cable, cable set, wire, terminal, or strip header in the **Connection** window to edit it.

Connecting Device Cables to a Terminal Strip in Batch Mode

Use this procedure to connect device cables or cable sets to a terminal strip in batch mode. Note that these are device cables that are already connected to device panels.

➢ To connect device cables in batch mode

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Expand the **Panels by Location** or the **Panels by Category** folder to display the existing panels and terminal strips.
3. Select a terminal strip to which you want to connect device cables, and then on the shortcut menu, point to **Actions** and click **Batch Connection**.
4. In the **Batch Device Cable Connection** window, in the **Device Cable Manager**, select the required cables or cable sets.

   Notes

   - To set parameters for cables displayed in the **Device Cable Manager**, see Pre-Assigning Junction Boxes to Device Panels.
   - To open a pop-up window that displays which terminals are connected, click  .
5. On the **Device Cable Manager** toolbar, click  to move the selected cables to the data window.

   Notes

   - The settings displayed in the **Starting Terminal** column are determined by the automatic implementation of connection type definitions for the cables that you move to the data window.
   - You can change the order of cables in the data window by dragging them up or down.
6. To change the connection type for a given cable set, from the **Connection Type** list, select an appropriate connection type.

7. When changing the connection type for the first cable set, in response to the 'Do you want to change the connection type for all cable sets?' prompt, do one of the following:

   - To change the connection type for all of the cable sets displayed in the data window, click **Yes**. Note that this also results in automatic renumbering of the starting terminals for all of the cable sets.

   - To change the connection type for the given cable set only, click **No**. Note that this results in no automatic renumbering of starting terminals.

8. To change the cable set starting terminals, do one of the following:

   - To change the starting terminal for a given cable set, select a value from the **Starting Terminal** list.

   - To automatically renumber starting terminals according to cable type definitions, from the selected cable set and below, on the **Actions** menu, click **Reassign**.

9. Under **Terminal Side** accept the default setting **L** to connect the device cables to the left side of the panel, or select **R** to connect the cables to the right side.

10. Under **Connect all shields to**, do one of the following:

    - Do not select any terminal. Use this option to connect the shields according to the configuration of the active cable types.

    - Select a common terminal to which you connect all of the shields.

11. Under **Connect all overall shields to**, do one of the following:

    - Do not select any terminal. Use this option to connect the overall shields according to the configuration of the active cable types.

    - Select a common terminal to which you connect all of the overall shields.

12. Do one of the following:

    - To prepare for connection of the all of the device cables displayed in the data window, clear **Connect selected rows only**.

    - To prepare for connection of some of the device cables displayed in the data window, do the following:

      a) Select the rows that you want to connect.

      b) Select **Connect selected rows only**.

13. To connect the devices cables to the terminal strip according to your settings, do one of the following:

    - On the **Actions** menu click **Connect**.

    - On the module toolbar click  .

Connecting a Wire to a Terminal Strip

The following procedure explains how to connect a wire to a terminal strip.

➢ To connect a wire to a terminal strip

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Expand the **Panels by Location** or the **Panels by Category** folder to display the existing panels and terminal strips.
3. Right-click a panel or a terminal strip and then on the shortcut menu, point to **Actions** and click **Connection**.
4. Select a terminal strip (where applicable) from the **Strip** list, if you did not already do so in the **Domain Explorer**.
5. In the **Domain Explorer**, select a cable and expand its hierarchy to display its wires.
6. Select a wire in the **Domain Explorer** and drag it to a terminal on the required terminal strip.

   Tip

   - Click to find a specific terminal or the next available terminal. SmartPlant Instrumentation marks your terminal with
7. In the **Wire Connection Options** dialog box, select the required wire end and click **OK**.

   Notes

   - If you are connecting more than one wire in a cable or cable set to a group of terminals on a strip, make sure that the wire end that you connect is the same for all the wires. This is important to ensure that the connections appear correctly in reports.
   - If one end of the wire is already connected, SmartPlant Instrumentation selects the loose end by default.

Disconnecting Cables, Cable Sets, and Wires

You can easily disconnect a given cable or selected cable sets and wires from a terminal strip.

➢ To disconnect a cable, cable set, or wire from a terminal strip

1. In the **Connection** window, select the cable, cable sets, or wires you want to disconnect.

   Tip

   - SmartPlant Instrumentation automatically selects the wiring entities in the hierarchy below the entity that you select.

2. Do one of the following:

   - Right-click the selected wiring entity and click **Disconnect** on the shortcut menu.
   - On the **Connection** menu, click **Disconnect**.
   - Click  .

   Tips

   - If a terminal strip or terminal is connected to more than one cable, only wires which are unique to a terminal or which belong to a cable at the top level layer (at the front) will be disconnected by SmartPlant Instrumentation.
   - SmartPlant Instrumentation uses  to represent terminals on which multiple wires are connected
   - To ensure disconnection of the correct cables or cable sets, first move the cable you want to disconnect to front by selecting it from the **Cable name** list.

Moving Cables, Cable Sets, and Wires

After making initial connections to terminal strip terminals, SmartPlant Instrumentation lets you relocate cables, cable sets, and wires to another terminal. You can move a wiring entity using the drag-and-drop feature.

➢ To move a cable, cable set, or wire from one terminal to another

1. In the **Connection** window, select the appropriate cables, cable sets, or wires.
2. Drag and drop the selected items to another terminal. If you are moving a cable or a cable set, the **Cable Connection Definition** dialog box opens. If you are moving a wire, the **Wire Connection Options** dialog box opens.
3. Select the required definitions in the **Cable Connection Definition** dialog box or in the **Wire Connection Options** dialog box and then click **Connect** or **OK** respectively.

Notes

- The **Connection** window reopens showing the new connections.
- You should ensure that there are sufficient terminals to accept all the wires to be relocated.
- You can connect any number of wires to a single terminal.
- If you are connecting more than one wire in a cable or cable set to a group of terminals on a strip, make sure that the wire end that you connect is the same for all the wires. This is important to ensure that the connections appear correctly in reports.

Assigning Wire Designations

The **Terminal Connection** dialog box opens when you click a screw head on the terminal in the **Connection** window. This dialog box shows the Wire Group, Group Level, and Group Sequence of the wires connected to the selected terminal.

When you click on Wire Group, Group Level, or Wire Sequence data, you can reassign the wire designation by selecting the required value from the appropriate lists.

You can assign a **new** signal name to more than one terminal without having to browse through the **Wire Group** list for each terminal. You use this feature only with terminals whose Wire Group is currently undefined (that is, the **Wire Group** data field displays asterisks).

First, you need to assign a **new** signal name to a terminal whose **Wire Group** is currently undefined. After assigning the new signal to the current terminal, select another terminal (click the up or down arrow or select a terminal in the **Terminal name** list). If you now click in the **Wire Group** data field, the list opens with the new signal name selected by default. Clicking the terminal name enables you to navigate quickly.

Tip

- If you want to reassign wire designations in the **Terminal Connection** dialog box, it is advisable to plan your changes in advance on paper, to avoid conflicting Wire Group, Group Level, and Group Sequence data.

Updating Connection Data

Multiple users can work on the same module. In most cases, you may not edit data that is being edited by another user, however, under certain circumstances, other users may have made changes that affect the data in the **Connection** window. For example, another user has added a new plant cable. This cable does not appear in the **Domain Explorer** until you refresh the window display. Click to do so.

The **Connection** window is automatically refreshed only when you open it. However, SmartPlant Instrumentation does not refresh the data in the **Connection** window, if you have several instances of the **Connection** window open and you switch from one **Connection** window to another.

Viewing Cable Connection Destinations

This option enables you to view the connection destinations of a cable that you select in the **Domain Explorer** or **Wiring Explorer**. When you select this option, you see the junction boxes and terminals that the selected cable is connected to.

➢ To view cable connection destinations

1. Start the Wiring module.
2. In the **Domain Explorer** or **Wiring Explorer**, double-click the **Cables** folder and then select the required cable.
3. Right-click the selected cable and then on the shortcut menu, point to **Actions** and click **Destination**.

Note

- The **Cable Destination** pop-up window displays individual connections for the selected cable. Note the each line shows a connection to a different panel.

Displaying Adjacent Cable Connections

When you are working on wiring connections for a specific panel, you can follow the wiring routing to an adjacent panel.

➢ To display adjacent connections

1. In the **Connection** window, select a cable, cable set, or wire whose routing you want to trace on the required terminal side. If you select a cable or cable set, SmartPlant Instrumentation displays the adjacent connection for the first wire. You can follow the routing for the other wires by selecting panels from the list.
2. Do one of the following:
   - On the **Actions** menu, select **Open Adjacent Connection**.
   - Right-click the selected entity and then select **Open Adjacent Connection** on the shortcut menu.
   - Click  on the lower toolbar.

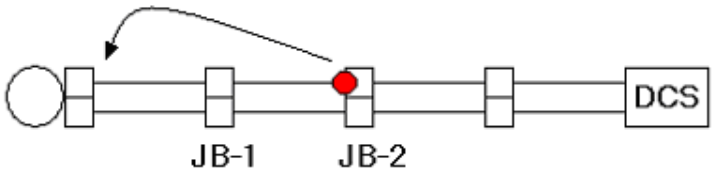
Note

- The **Connection** window opens, showing the adjacent panel which is the continuation of the wiring routing.

Displaying the Farthest Cable Connections

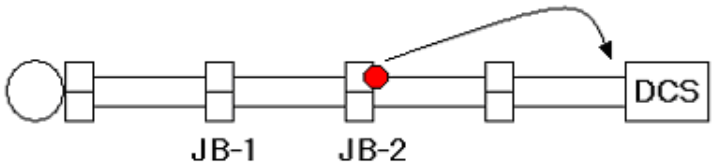
While working in the **Connection** window, in addition to displaying the adjacent connection of a cable or a wire, you can also open the farthest connection. This means that the software switches to the end of the wiring routing of the current wire and displays the last panel on that end. If a signal exists in the direction that you chose to switch to, SmartPlant Instrumentation follows the signal to the end. If there is no signal, the software shows the panel that is connected at the end of the wiring routing.

Example 1:



In this example, you selected the left side connections of JB-2. Therefore, SmartPlant Instrumentation will display the connection of the device panel.

Example 2:



In this example, you selected the right side connections of JB-2. Therefore, the software will display the connection of the DCS or the I/O card.

➢ To display the cable end connection

1. In the **Connection** window, select a wire whose routing you want to trace on the required terminal side.

2. Do one of the following:

   - On the **Actions** menu, select **Open Farthest Connection**.

   - Right-click the selected entity and then select **Open Farthest Connection** on the shortcut menu.

   Note

   - The **Connection** window opens, showing the farthest panel at the end of the wiring routing.

Tracing Signals in Point-to-Point Wiring Diagrams

You can follow a signal along a sequence of wires. SmartPlant Instrumentation uses wire groups, group level and group sequence data to follow a signal along a series of wires and check for any discontinuity. The wire group is the signal name representing the tag number from which the signal originates.

The result is displayed in a point-to-point wiring diagram that you can print.

➢ To display a point-to-point wiring diagram from the Connection window

1. Open the **Connection** window for a selected cable, cable set, panel, or terminal strip, and complete the connection details.
2. From the **Terminal strip** list, select the terminal strip to which you want to trace the signal path.
3. From the **Cable** list, select the cable containing the wire for which you want to trace the signal path.
4. Select the wire for which you want to trace the signal path.

Note

- Click  to locate a specific terminal.

5. Do one of the following to generate the **Point to Point Wiring Diagram** report:
   - On the module toolbar, click  .
   - On the **Reports** menu, click **Point to Point Wiring Diagram**.
   - Right-click the selected wire and on the shortcut menu click **Point to Point Wiring Diagram**.
6. To preview the **Point to Point Wiring Diagram,** click **Yes** in the **Print Preview** prompt. To print it out without displaying it on your screen, click **No**.

Notes

- To view the point-to-point diagram legend, scroll down to the lower part of the preview.
- To hide the default notation of level and sequence of the signals and tags, on the **View** menu, click **Show Level/Sequence**. To display the notation, click again.

➢ **To display a point-to-point wiring diagram from the I/O Assignment window**

1. In the Wiring module, open the **I/O Assignment** window, and complete the assignment details.
2. Under **Channel Assignment**, select a channel associated with a tag number.

Note

- You can click  to search for a specific channel.

3. Do one of the following to prepare the **Point to Point Wiring Diagram** report:
   - On the module toolbar, click  .
   - On the **Actions** menu, click **Point to Point Wiring Diagram**.
4. To preview the **Point to Point Wiring Diagram,** click **Yes** in the **Print Preview** prompt. To print it out without displaying it on your screen, click **No**.

Notes

- To view the point-to-point diagram legend, scroll down to the lower part of the preview.
- To hide the default notation of level and sequence of the signals and tags, on the **View** menu, click **Show Level/Sequence**. To display the notation, click again.

Resizing the Cable Name and Set Name Fonts

Use this procedure to set the font size used to for the names of cables and cable sets displayed in **Point to Point Wiring Diagram**.

➢ **To resize the cable and cable set name fonts**

1. Open the **Point to Point Wiring Diagram** print preview.
2. On the **View** menu, click **Font Size**.
3. Do one of the following:
   - In the **Size** field, type the required font size of the cable and cable set names.
   - Use the spinner to increase or decrease the font size.
4. Click **OK** to close the **Resize Fonts** dialog box and return to the **Point to Point Wiring Diagram** print preview where you see the changes you made to the cable and cable set name fonts.

Generating a Connection Report from the Connection Window

While in the **Connection** window, you can generate a connection report for the current terminal strip. The report lists all the cables connected to the selected terminal strip and shows all the cable-sets within each cable, the wire tags, their color, and terminal number. This report does not show adjacent connections.

➢ To generate a connection report

1. In the **Connection** window, do one of the following:
   - On the **Reports** menu, click **Connection**.
   - Click  .
2. In the **Print Preview** prompt, click **Yes** to display the report print preview or click **No** to print out the report without displaying its print preview.

I/O Assignment

Overview

The I/O assignment feature enables you to assign a channel to a specific tag number. I/O assignment is performed in two stages:

1. Associating (coupling) an instrument tag with a control system tag.
2. Assigning a channel to the coupled pair.

The following I/O assignment options are available:

- Assign a tag to a channel where the terminals connect two or more **whole** cable sets to the same channel. The software propagates the signal through all the wires.
- Assign a set to more than one channel. In this case, software propagates the signal through the wires in the first channel and the wires in the second channel are shown as "Spare".
- Assign an entire cable set and additional wires from another cable set to the same channel, where the other wires from the second cable set are assigned to another channel. In this case, the software effects the I/O assignment, but not the signal propagation.
- I/O assignment is performed automatically with signal propagation when wiring that originates from the device panel or as a tag signal from a terminal strip is connected at the terminal strip with I/O channels.

Prior to effecting out I/O assignment, you must have:

- a DCS or a PLC cabinet with racks.
- an I/O card.

Note

- You can set the available tag system I/O types by using the **Preferences** dialog box. For details, see the following topics:
  - Setting I/O Assignment Tag Preferences
  - Setting Control System Tag Preferences
  - Setting I/O Card Rack Position Preferences

Effecting I/O Assignment

I/O assignment is essentially assigning a control system tag to a free channel. To start an I/O assignment you must have a defined DCS or PLC cabinet and an I/O card.

➢ To implement an I/O assignment

1. Press F7 to open the **Domain Explorer**.
2. Do one of the following:
   - Select one or more DCS or PLC cabinets.
   - Select one or more I/O cards with terminal strip with I/O channels.
3. Right-click the selected entities and then on the shortcut menu, point to **Actions** and click **I/O Assignment**.

   Notes

   - The software allows you to open the **I/O Assignment** window without selecting anything in the **Domain Explorer**. In the **Wiring Module** window toolbar, click .
   - You can also open the **I/O Assignment** window for an I/O card from the **Connection** window. On the **Connection** menu, click **I/O Assignment**.

4. If the **I/O Assignment Type** dialog box opens, select **I/O assignment**.

   Note

   - For fieldbus I/O assignment, select **Segment I/O assignment**.

5. If you did not select a panel or an I/O card in the **Domain Explorer** before opening the **I/O Assignment** window, do one of the following:
   - Open the **Find Channel** dialog box, where you find and select channels to display in the **I/O Assignment** window.
   - In the **I/O card details** pane, click ... beside the **I/O card** list to open the **Wiring Explorer** where you select the required DCS/PLC cabinets and I/O cards, then click **OK** to add them to the **I/O card list**.

6. From the **I/O termination** list, select a terminal strip for which you want to implement I/O assignment.

   Tip

   - The system I/O type of the selected terminal strip determines the initial tag system I/O type displayed in the **Tag number system I/O type** list. You can select a different system I/O type from this list if required. The list of tags displayed in the **Tag coupling** data grid depends on the system I/O type that you select from the **Tag number system I/O type** list. If the system I/O type selection is MIXED, tags of all system I/O types are shown. If any other system I/O type is selected, only the tags of the selected system I/O type are shown.

7. If required, select a different tag system I/O type, which enables you to use a tag for the I/O assignment whose system I/O type is different from the terminal strip system I/O type. To do this, do one of the following:

   - If the I/O type selection is MIXED, select the required tag system I/O type from the **Tag number system I/O type** list.
   - If the I/O type selection is **not** MIXED, change the definitions to make the **Tag number system I/O type** list available at all times. Do the following:
     - Open the **Preferences** dialog box for the Wiring module and in the **I/O Assignment Tags** tab, select **All system I/O types**. (For details, see Setting I/O Assignment Tag Preferences.)

8. Assign an instrument tag to a free channel to effect the I/O assignment.

   Note

   - Several assignment options are available.

Assigning an Instrument to a Channel

The essence of I/O assignment is assigning an instrument to a channel. SmartPlant Instrumentation provides several options for this purpose. You can choose one of the following options for I/O assignment:

- Select an instrument tag coupled with a control system tag and assign both of them to a free channel.
- Couple a instrument tag with an existing control system tag and then assign them to a free channel.
- Assign an uncoupled control system tag to a free channel.
- Assign an uncoupled tag to a free channel. You will have to create a new control system tag in the process. The coupling will be done automatically.
- Assign an uncoupled tag to a channel to which a control system tag has already been assigned.

➢ To assign an instrument to a channel

1. Open the **I/O Assignment** window.
2. In the **Tag coupling** data grid, do one of the following:
   - Select an instrument tag coupled with a control system tag.
   - Select an instrument not coupled with a control system tag.
   - Select a control system tag not coupled with an instrument.
3. Drag the selected entity to a free channel in the **Channel assignment** pane.
4. If you selected an instrument not coupled with a control system tag, do the following:
   a) In the **Control System Tag** dialog box, type the name of the control system tag that SmartPlant Instrumentation creates automatically.
   b) Click **OK** in the **Control System Tag** dialog box to complete the I/O assignment.

Managing Channels

These procedures allow you to maintain the contents of the **Channels** supporting table. Note that each I/O card has its own unique **Channels** supporting table.

To open the **Channels** dialog box for a given I/O card, do one of the following:

- In the **Terminal** dialog box, beside **Channel**, click ....
- In the **I/O Assignment** window, on the **Actions** menu, click **Channels**.

From the **Channels** dialog box, you can perform the following procedures:

➢ To define a channel

1. Click **New** to append a new data row.
2. Under **Channel**, type the required and unique channel name.
3. Under **Enable**, select Yes or No if needed.
4. Under **Address**, type the software address if needed.
5. Under **System I/O Type**, select the system I/O type if needed.
6. Under **Channel Type**, select the channel type from the list if needed.

Note

- You can modify the **Channel Type** list.

➢ To edit an existing channel

1. In the data window, select the row that you want to edit.

Tip

- If you have a long list of items in the data window, type the required value in the **Find channel** box to select the row that you are looking for.

2. Modify the values as needed.

➢ **To delete a channel**

Caution

- SmartPlant Instrumentation removes channels that you delete in the **Channels** dialog box from the active I/O card.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Creating Additional Channels

The following procedure deals with the creation of channels. The software allows you to add new channels to terminal strips with channels and to I/O cards or I/O terminations.

➢ **To create additional channels**

1. In the **Domain Explorer**, navigate to an I/O card, I/O termination, or a terminal strip with channels.
2. Right-click the entity to which you want to add a channel and then on the shortcut menu, point to **New** and click **Channel**.
3. In the **Channel Properties** dialog box, on the **General** tab, type a channel name, description and sequence as you require.
4. If you are adding a channel on a terminal strip under an I/O card or I/O termination, click the **I/O Properties** tab.
5. On the **I/O Properties** tab, select the channel type, system I/O type, and signal type.
6. Type a value in the **Address** field as you require.
7. Type a minimum and maximum range and select a unit of measure for the range values.
8. Select the **Enable for use with external DCS interfaces (DeltaV)** check box to make these channel property values available for use with a DCS interface such as DeltaV.
9. Click the **Associate Symbols** tab to associate a symbol (.sym) file with the new channel.
10. Click **OK**.

Creating a New Control System Tag

This option allows you to create a new control system tag. Note that control system tag names must be unique. If you are using a DCS, the uniqueness applies per <plant>. If you are using a PLC, the uniqueness applies per cabinet / panel.

➢ To create a new control system tag

1. In the **I/O Assignment** window, on the **Actions** menu, click **Add Control System Tag**.
2. In the **Control System Tag** dialog box, type the name of the new control system tag and click **OK**

   Tip

   - You can now add additional Control System point configuration if needed.

3. To document additional DCS/PLC data, on the SmartPlant Instrumentation toolbar click  .

   Note

   - The **Browser Manager** opens (if you have a predefined Wiring default browser and a default view, the **Browser View** opens by default).

4. Do the following in the **Browser Manager**:

   a) Expand the **Control System** browser group by clicking the **+** next to its icon or double-clicking the icon.

   b) To view the control system tag data, create a browser view for one of the available browsers in the **Control System Tag Browser** group:

      - Select an appropriate browser in the **Control System group** and click  .
      - Define the browser view, filter, and sorting sequence as required.

   c) After defining the required browser view, click  to view the selected field data in the **Browser View**.

   d) If required, you can do any of the following:

      - edit the displayed data (in the data fields which are not selected in color).
      - sort, change the sequence of, and resize the displayed columns.
      - search through the displayed data.
      - return to the **Browser Manager** to modify the current settings or define new settings.

Renaming a Control System Tag

You can change the name of an existing control system tag, for example, if you replace an existing one with a newer model.

➢ To rename a control system tag

1. In the **I/O Assignment** window, select the control system tag you want to rename. You can select the required control system tag in the **Tag coupling** data window or in the **Channel assignment** pane.
2. Click  or on the **Actions** menu, click **Rename Control System Tag**.
3. In the **Control System Tag** dialog box, type the new name of the control system tag.
4. Click **OK**.

Coupling an Instrument Tag with a Control System Tag

One of the ways to implement I/O assignment is to assign to a free channel a control system tag coupled with an instrument tag.

➢ To couple an instrument tag with a control system tag

1. Open the **I/O Assignment** window.
2. In the **Tag Coupling** data grid, select the free instrument tag that you want to couple.
3. On the **Actions** menu, click **Couple Tags**.
4. Select the control system tag you want to couple with the instrument tag you have selected.
5. Click **OK**.

 **Note**

- The instrument tag and the control system tag appear coupled in the **Tag coupling** data grid.

Decoupling an Instrument and a Control System Tag

The following procedure explains how to decouple an instrument tag and a control system tag where the instrument is no longer connected.

➢ To decouple a control system tag from an instrument tag

1. Open the **I/O Assignment** window.
2. In the **Tag coupling** pane, select the coupled instrument tag and control system tag that you want to decouple.
3. Click  or click **Decouple Tag No. from SC Tag** on the **Actions** menu to decouple the selected pair.

   Tip

   - The instrument tag and the control system tag appear separately in the **Tag coupling** data window.

Deleting Control System Tags

Use the following procedure to delete a control system tag that you no longer need.

➢ To delete a control system tag

1. In the right pane of the **I/O Assignment** window, select the required control system tags.
2. Click  or click **Delete Control System Tag** on the **Actions** menu.
3. Click **Yes** to confirm the deletion of the control system tag.

Filtering Control System Tags

This option enables you to determine which instrument tags and control system tags you want SmartPlant Instrumentation to display in the **Tag Coupling** data window of the **I/O Assignment** window.

➢ To filter control system tags

1. In the **I/O Assignment** window do one of the following to open the **I/O Assignment Filter** dialog box:
   - On the **Actions** menu, click **Filter**.
   - Click  .
2. Under **Criteria**, select the filter option to determine which instrument tags and control system tags will be displayed in the **I/O Assignment** window. Do one of the following:
   - Select one or more of the following options:
     - **Unassigned tags coupled with control system tags** - display tag numbers that have not yet been assigned to channels but have already been coupled with control system tags.
     - **Uncoupled control system tags** - display control system tags that have not been coupled with control system tags.
     - **Uncoupled tags** - display tag numbers that have not been coupled with control system tags.
   - Select **Assigned tags coupled with control system tags** to display only assigned tags coupled with control system tags. Selecting this option disables the other three options.
3. To further filter the data, enter a filter expression in the data grid.
4. Select **Save Filter** if you want to keep the current filter settings for the next time you open this dialog box.
5. Click **OK** to apply your filter settings to the data in the **I/O Assignment** window.

Canceling I/O Assignment

Canceling I/O assignment involves a simple procedure of removing the instrument assignment (unassigning) an instrument from a channel.

➢ To cancel I/O assignment

1. Open the **I/O Assignment** window.
2. In the **Channel assignment** pane, select the required channel.
3. Do one of the following:
   - On the **Actions** menu, click **Unassign from a Channel**.
   - Click  .

Note

- The selected channel becomes vacant as the instrument and its control system tag move to the **Tag coupling** window.

Generating an I/O Tag Assignment Report

This option enables you to generate a report showing I/O assignments for the current terminal strip.

➢ To generate an I/O tag assignment report

1. Open the **I/O Assignment** window.
2. Select the required I/O card from the **I/O card name** list.
3. Click  to generate and display the report.
4. Click **Yes** to open the print preview of the report or click **No** to send the report to your default printer.

Viewing and Editing Channel Data

This option enables you to view the channels of a selected DCS/PLC panel or all DCS/PLC panels in the current <plant>. You can also modify the control system tag names if required.

Caution

- If you are editing entities that must be compatible with Emerson DeltaV, see Crucial Fields for the DeltaV Interface.

➢ To view and edit channel data

1. Open the **I/O Assignment** window.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **Show I/O Data**.

   Note

   - If you open the **I/O Assignment** window without selecting anything in the **Domain Explorer**, the **I/O Data** dialog box shows the control system tags of the DCS/PLC cabinet you selected last.
3. To rename a control system tag, do the following:
   a) Select the required row and click **Edit CS Tag**.
   b) In the **Control System Tag** dialog box, type a new name as needed and click **OK**.
4. To filter the data display in the **I/O Data** dialog box, do the following:
   a) Click **Filter** to open the **Filter I/O Data** dialog box.
   b) In any data field, type the value according which to filter the channels in the **I/O Data** dialog box.

   Note

   - You can include any letter or number combination, You can include letter or number combinations, as well as wildcards. For example, an underscore (_) can substitute a single character and percent (%) can substitute multiple characters. The search is not case-sensitive.

   c) From the drop-down lists, select the value according which to filter the channels in the **I/O Data** dialog box.

d) In the **Show channels** group box, choose one of the following filtering options to determine which channels to display in the **I/O Data** dialog box:

- **Spares only** — show only spare channels in the **I/O Assignment** window.
- **Exclude spares** — exclude all spare channels from the channels displayed in the **I/O Assignment** window.
- **All** — show all channels in the **I/O Assignment** window.

e) Select the **Save** check box to save the criteria specified for the next time you open the **I/O Data** dialog box.

f) Click **OK** to accept your filter settings and return to the **I/O Data** dialog box.

5. To sort the displayed channels in the **I/O Data** dialog box, do the following:

a) Click **Sort** to open the **Sort I/O Data** dialog box.

b) In the **Column Name** list, select the column according which the channels displayed in the **I/O Data** dialog box will be sorted.

c) Select **Ascending** to sort the channels displayed in the **I/O Data** dialog box in ascending order; clear the check box to sort the channels displayed in the **I/O Data** dialog box in descending order.

d) To add a new sorting parameter, select an existing sorting parameter after which you want to add the new sorting parameter and then click **Insert**.

e) To delete a sorting parameter, select the required sorting parameter and click **Delete**.

f) Click **Clear** to discard all the sorting settings.

g) Select the **Save** check box if you want to save the current settings for the next time you open the **I/O Data** dialog box.

Note

- Deleting or clearing parameters does not affect the sorting parameters that you have previously saved (by checking the **Save** check box).

h) Click **OK** to accept your settings and return to the **I/O Data** dialog box.

6. To print out the data in the **I/O Data** dialog box, click **Report**.

7. Click **Close** to return to the **I/O Assignment** window.

Searching for I/O Cards

This option enables you to search DCS or PLC panels in the current <plant> for I/O cards and individual channels according to required criteria. SmartPlant Instrumentation then displays these channels in the **I/O Assignment** window, and you can use them to implement an I/O assignment, for example.

➢ To search for I/O cards

1. To open the **I/O Assignment** window, do one of the following:
   - On the **Actions** menu, click **I/O Assignment**.
   - On the module toolbar, click  .
2. In the **I/O Assignment** window do one of the following to open the **Find Channels** dialog box:
   - On the **Actions** menu, click **Find Channels**.
   - Click  .
3. Under **Search parameters**, type values according to which SmartPlant Instrumentation displays channels in the **Search results** data window. If you leave a field blank, it will not limit the search. Leave all fields blank in order to display all channels.

    **Notes**

   - You can include letter or number combinations, as well as wildcards. For example, an underscore (_) can substitute a single character, and percent (%) can substitute multiple characters. The search is not case-sensitive.
4. Under **Show channels**, choose one of the following search options:
   - **Spares only** — show only spare channels in the **Search results** data window.
   - **Exclude spares** — do not display any spare channels in the **Search results** data window.
   - **All** — show all spare and assigned channels in the **Search results** data window.
5. To save the current search parameters as the channel search default, select **Save**.

6. Click **Find** to search using the current settings.

7. In the **Search results** data window, select the I/O cards that you want to be available in the **I/O Assignment** window, and click **OK**.

Note

- If you select a channel rather than an I/O card, SmartPlant Instrumentation displays the card to which the channel belongs in the **I/O Assignment** window.

8. In the **I/O Assignment** window, under **I/O card name**, select the required card. the software displays its channels in the **Channel assignment** data window.

Cross Wiring

Overview

Cross wiring in SmartPlant Instrumentation allows you to connect two terminal strips by using a cross-wiring cable. You can cross wire two terminal strips that belong to two different panels or the same panel.

You can choose one of the following cross-wiring options:

- **Manual Cross Wiring** – This is the default cross wiring mode, where you select the terminals on the strips to be cross-wired.
- **Semiautomatic Cross Wiring** – SmartPlant Instrumentation automatically finds potential targets for the signal that it will propagate. You can accept the suggested terminals and carry out the cross wiring or select different terminals to be cross-wired.
- **Automatic Cross Wiring** – SmartPlant Instrumentation automatically finds matching signals and performs the cross wiring for you.

See the following topics for details:

Manual Cross Wiring

Semi-Automatic Cross Wiring

Automatic Cross Wiring

Creating Cross-Wiring Cables

Generating a Panel Strip Report

Manual Cross Wiring

Manual cross wiring is the default mode for cross wiring. In this mode, you select the terminals that you want to cross wire, select the required cross-wiring cable and then carry out the cross wiring.

➢ To cross wire two terminal strips manually

1. Press F7 open the **Domain Explorer** and select one or more terminal strips for potential cross wiring. You can also select a panel or several panels if required.

2. Right-click the entities you selected and then on the shortcut menu, point to **Actions** and click **Cross Wiring**.

3. In the **Cross Wiring** window, select the required terminal strip from the **Primary strip** list.

   Tip

   - To add terminal strips that do not appear on the list, click ... beside the **Primary terminal strip** list arrow, select the required terminal strips in the **Wiring Explorer**, then click **OK** to add them to the **Primary strip** list.

4. Under **Primary connection side**, click **Left** or **Right** to select the appropriate side of the secondary terminal strip that you want to connect.

   Note

   - This option is not available if the current secondary terminal strip is a terminal strip with channels (belonging to a DCS or PLC panel). In this case you can connect the left side only.

5. From the **Secondary terminal strip** list, select the required terminal strip that you want to cross wire.

   Tip

   - To cross wire two terminal strips belonging to different panels where you did not select one of the panels in **Cross Wiring**., click ... beside the **Secondary terminal strip** list arrow, select the required terminal strip in the **Wiring Explorer** and click **OK** to add it to the **Secondary terminal strip** list.. Then, select that terminal strip from the **Secondary terminal strip** list for cross wiring.

6. Under **Secondary connection side**, click **Left** or **Right** to select the appropriate side of the secondary terminal strip that you want to connect.

Note

- This option is not available if the current secondary terminal strip is a terminal strip with channels (belonging to a DCS or PLC panel). In this case you can connect the left side only.

7. From the **Cross-wiring cable** list, do one of the following to define a cross-wiring cable:

   - Select CROSS WIRE to cross wire the terminals with wires that the software creates during the cross-wiring process.

   - Select the required cross-wiring cable. If the cross wiring cable that you need is not on this list, click ... beside the list arrow to open the **Wiring Explorer**. Select a cable and click **OK** to add it to the list. Note that you can also create a new cross wiring cable if the one you need does not exist in the **Wiring Explorer**.

8. Select the **Prompt for cross operation message** check box to be prompted by SmartPlant Instrumentation to confirm the cross wiring. If you do not select this check box, cross wiring of the selected terminals proceeds without messages and SmartPlant Instrumentation propagates all the existing signals.

9. In the **Primary Terminal Strip** pane, click the required terminal to be cross-wired.

10. In the **Secondary Terminal Strip** pane, click the required terminal to be cross-wired.

11. If you selected the **Prompt for cross operation message** check box, click **Yes** to confirm the cross wiring.

Tip

- For an example and information about the conventions used to represent various entities and connections in the **Cross Wiring** window, see the Online Help for the Cross Wiring window, specifically the Primary Terminal Strip and Secondary Terminal Strip topics.

Now you can do any of the following:

- In the **Primary Terminal Strip** pane, select the required cross-wired terminal, and then click to open the **Point-to-Point Wiring Diagram**.
- Click to open the **Terminal Connection** window. You can also double click to get the same result.
- Click to remove the cross wiring between two terminals after selecting the cross-wired terminals (shown connected by a solid black line).
- Click to generate a report that shows all the wiring connections of the primary strip on both sides. (For more details, see Generating a Panel Strip Report.)

Semi-Automatic Cross-Wiring

Semiautomatic cross wiring enables you to find matching signals between two terminal strips (primary and secondary). In other words, SmartPlant Instrumentation can find for you a potential target for the signal that the software propagates after the cross wiring. You can then use this potential target to quickly effect the required cross wiring.

Note

- The terminal that SmartPlant Instrumentation finds for you in the secondary terminal strip is a recommendation only and you are free to accept it or select a different terminal as you require.

➢ To effect semiautomatic cross wiring

1. Press F7 to open the **Domain Explorer** and select one or more terminal strips for potential cross wiring. You can also select a panel or several panels if required.

2. Do one of the following to open the **Cross Wiring** window:

   - Click .
   - On the **Actions** menu, click **Cross Wiring**.

3. In the **Cross Wiring** window, select the required terminal strip from the **Primary strip** list.

   Tip

   - To add terminal strips that do not appear on the list, click ... beside the **Primary terminal strip** list arrow, select the required terminal strips in the **Wiring Explorer**, and then click **OK** to add them to the **Primary terminal strip** list.

4. From the **Secondary terminal strip** list, select the required terminal strip that you want to cross wire.

   Tip

   - To cross wire two terminal strips belonging to different panels where you did not select one of the panels in the **Domain Explorer**, click ... beside the **Secondary terminal strip** list arrow, select the required terminal strip in the **Wiring Explorer** then click **OK** to add it to the **Secondary terminal strip** list. Then, select that terminal strip from the **Secondary terminal strip** list for cross wiring.

5. Under **Secondary connection side**, click **Left** or **Right** to select the appropriate side of the secondary terminal strip that you want to connect.

Note

- This option is not available if the current secondary terminal strip is a terminal strip with channels (belonging to a DCS or PLC panel). In this case you can connect the left side only.

6. From the **Cross-wiring cable** list, do one of the following to define a cross-wiring cable.

- Select CROSS WIRE to cross wire the terminals with wires that the software creates during the cross-wiring process.
- Select the required cross-wiring cable. If the cross wiring cable that you need is not on this list, click ... beside the list arrow to open the **Wiring Explorer**. Select a cable and click **OK** to add it to the list. Note that you can also create a new cross wiring cable if the one you need does not exist in the **Wiring Explorer**.

7. Select the **Prompt for cross operation message** check box to be prompted by SmartPlant Instrumentation to confirm the cross wiring. If you do not select this check box, cross wiring of the selected terminals proceeds without messages and the software propagates all the existing signals..

8. In the **Primary Terminal Strip** pane, click the required terminal to be cross-wired.

9. Do one of the following to find a matching target signal for potential cross wiring:

- On the **View** menu, click **Target Signal**.
- Click  .

Notes

- SmartPlant Instrumentation searches for a matching signal in the current <plant> and adds the terminals that it finds in the **Secondary Terminal Strip** pane. SmartPlant Instrumentation indicates each of the potential terminals by placing an arrow beside it in the **Secondary Terminal Strip** pane.

10. Select the required terminal in the **Secondary Terminal Strip** pane to cross wire with the selected terminal in the primary terminal strip.

Tip

- For an example and information about the conventions used to represent various entities and connections in the **Cross Wiring** window, see the Online Help for the Cross Wiring window, specifically the Primary Terminal Strip and Secondary Terminal Strip topics.

Now you can do any of the following:

- In the **Primary Terminal Strip** pane, select the required cross-wired terminal, and then click to open the **Point-to-Point Wiring Diagram**.
- Click to open the **Terminal Connection** window. You can also double click to get the same result.
- Click to remove the cross wiring between two terminals after selecting the cross-wired terminals (shown connected by a solid black line).
- Click to generate a report that shows all the wiring connections of the primary strip on both sides. (For more details, see Generating a Panel Strip Report.)

Automatic Cross Wiring

Automatic cross wiring enables you to instruct SmartPlant Instrumentation to automatically find matching signals for you and cross-wire the relevant terminals in a single operation.

Two signals match if:

- The signals are between two strips belonging to the same panel.
- Both signals are on the same level.
- The first signal comes to the first terminal from a device panel (the signal sequence is less than 50) and the second signal comes from a control system (the signal sequence is greater than 50.)

Note

- You can set the default definitions for matching signals by using the **Preferences** dialog box.

➢ To cross-wire the terminals between two strips automatically

1. Press F7 to open the **Domain Explorer** and select one or more terminal strips for potential cross wiring. You can also select a panel or several panels if required.
2. Do one of the following to open the **Cross Wiring** window:
   - Click  .
   - On the **Actions** menu, click **Cross Wiring**.
3. In the **Cross Wiring** window, select the required terminal strip from the **Primary strip** list.

   Tip

   - To add terminal strips that do not appear on the list, click  beside the **Primary strip** list arrow, select the required terminal strips in the **Wiring Explorer** and then click the selected entity to the **Primary strip** list.
4. Under **Primary auto cross-wiring side**, click **Left** or **Right** to select the appropriate side of the primary terminal strip that you want to connect.

5. From the **Secondary terminal strip** list, select the required terminal strip that you want to cross wire.

   Tip

   - To cross wire two terminal strips belonging to different panels where you did not select one of the panels in the **Domain Explorer**, click ... beside the **Secondary terminal strip** list arrow, select the required terminal strip in the **Wiring Explorer** and then click **OK** to add it to the **Secondary terminal strip** list. Then, select that terminal strip from the **Secondary terminal strip** list for cross wiring.

6. Under **Secondary connection side**, click **Left** or **Right** to select the appropriate side of the secondary terminal strip that you want to connect.

   Note

   - This option is not available if the current secondary strip is a strip with channels (belonging to a DCS or PLC panel). In this case you can connect the left side only.

7. From the **Cross-wiring cable** list, do one of the following to define a cross-wiring cable.

   - Select CROSS WIRE to cross wire the terminals with wires that the software creates during the cross-wiring process.

   - Select the required cross-wiring cable. If the cross wiring cable that you need is not on this list, click ... beside the list arrow to open the **Wiring Explorer**. Select a cable and click **OK** to add it to the list. Note that you can also create a new cross wiring cable if the one you need does not exist in the **Wiring Explorer**.

8. Select the **Prompt for cross operation message** check box to be prompted by SmartPlant Instrumentation to confirm the cross wiring. If you do not select this check box, cross wiring of the selected terminals proceeds without messages and SmartPlant Instrumentation propagates all the existing signals.

9. Do one of the following to find matching signals:

   - Click  .
   - On the **Actions** menu, click **Auto**.

   Note

   - SmartPlant Instrumentation finds and selects the matching signals and the terminals that it can cross-wire automatically. The **Secondary Terminal Strip** pane does not appear.

10. Do one of the following:

    - Click  to cross wire the selected terminals. SmartPlant Instrumentation replaces the selection with a solid black line indicating that the cross wiring has been done.
    - Click  to discard the selection made by the software and return to manual mode.

11. After the software has cross wired the terminals, click  to return to manual mode.

    Tip

    - For an example and information about the conventions used to represent various entities and connections in the **Cross Wiring** window, see the Online Help for the Cross Wiring window, specifically the Primary Terminal Strip and Secondary Terminal Strip topics.

Now you can do any of the following:

- In the **Primary Terminal Strip** pane, select the required cross-wired terminal, and then click  to open the **Point-to-Point Wiring Diagram**.
- Click  to open the **Terminal Connection** window. You can also double click to get the same result.
- Click  to remove the cross wiring between two terminals after selecting the cross-wired terminals (shown connected by a solid black line).
- Click  to generate a report that shows all the wiring connections of the primary strip on both sides. (For more details, see Generating a Panel Strip Report.)

Creating Cross-Wiring Cables

The following procedure explains how to create a new cross-wiring cable and use it in your current cross wiring operation. If you do not want to create your own cross-wing cables and let SmartPlant Instrumentation create a cable for you, in the **Cross Wiring** window, select CROSS WIRE from the **Cross-wiring cable** list.

➢ To create a cross-wiring cable and use it in the current cross wiring operation

1. In the **Cross Wiring** window, click  beside the **Cross-wiring cable** list arrow to open the **Wiring Explorer**.
2. Right-click the **Cross Cables** folder, and on the shortcut menu, point to **New** and then click **Cross Cable**.
3. In the **Cable Properties** dialog box, enter the required values and click **OK**.
4. Select the new cable in the **Wiring Explorer** and click **OK** to add this cable to the **Cross-wiring cable** list.
5. Select the new cable in the **Cross-wiring cable** list to be used in the cross wiring operation.

Generating a Panel Strip Report from the Cross-Wiring Window

This option enables you to generate a panel – strip report that displays the connections and adjacent connections for the terminal strip you selected from the **Primary terminal strip** list in the **Cross Wiring** window.

➢ To generate a panel – strip report for the current primary strip

1. Do one of the following in the **Cross Wiring** window:
   - On the **Reports** menu, click **Panel-Strip**.
   - Click  on the module toolbar.
2. Click **Yes** to open the report print preview or click **No** to print out the report without displaying it on your screen.

Signal Propagation

Automatic Tag Signal Propagation

When you connect or disconnect a cable, cable set, or wire, SmartPlant Instrumentation automatically updates the wire tags (depending on your Wiring module preferences) and the signals that are carried by the wires. Tag propagation takes place automatically, with consequent updating of wire names, and signal sequences.

Jumpers, however, do not propagate the signal as regular wires do. Assigning a wire group to a jumper can be done manually in the **Terminal Connection** dialog box.

Tips

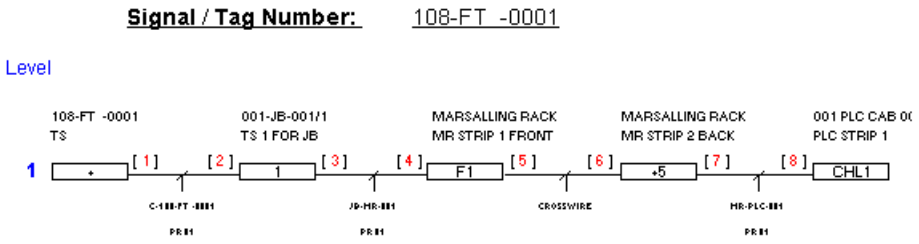
- Tag signal propagation for a shield takes place automatically without having to connect that shield to a device panel terminal.
- Tag signal propagation stops if it reaches a point where multiple optional paths exist.
- You can re-propagate or force propagation of tag signals.
- You can intervene at any point of the wire path and change tag number propagation manually. For details, see Manual Signal Propagation.

You can generate a point-to-point wiring diagram and view the signal path after you finish assigning an instrument tag to a channel in an I/O card. For information about point-to-point diagrams, see Tracing Signals in Point-to-Point Wiring Diagrams.

Four situations can occur after I/O assignment.

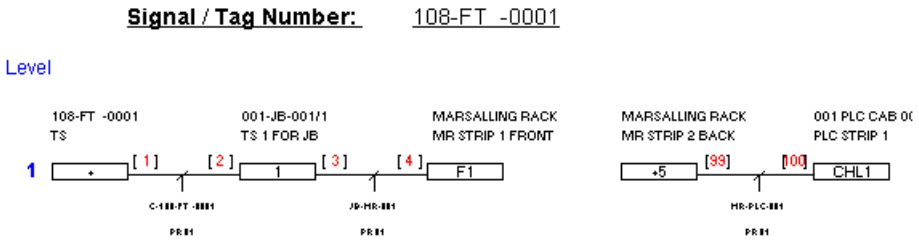
Example One

The signal sequence is connected from the device panel up to the PLC cabinet with all the wiring:



Example Two

The connection sequence starts from the device panel and continues to the PLC cabinet, however, there is a discontinuity between Strip 1 and Strip 2 of the marshaling rack:

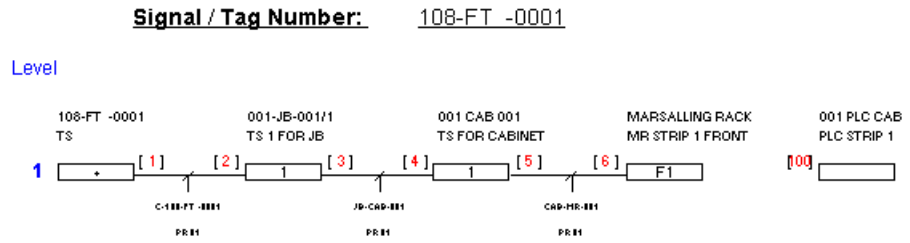


Note that the wiring sequence can be different depending on the completeness of the connection:

- From 1 to 8 (as in the first case) — connected from the Device Panel to the PLC.
- From 1 to 4 and from 99 to 100 (as in the second case) — there is a break in the middle of the connection.

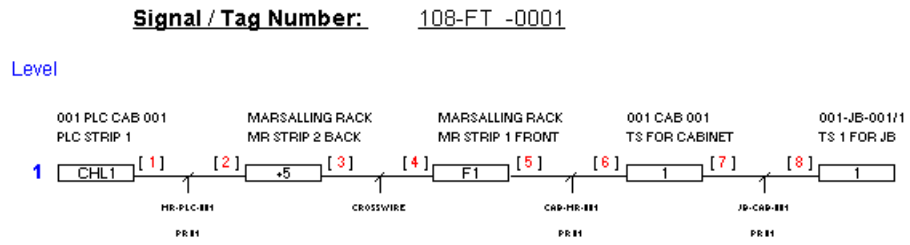
Example Three

The signal sequence is from the device panel to the PLC cabinet however, there is a discontinuity between the marshaling rack and the PLC cabinet.



Example Four

The connection sequence starts from the PLC cabinet and continues to the junction box. The device panel is absent.



Semi-Automatic Tag Signal Propagation

During your wiring design, situations can arise in which tag signal propagation does not occur automatically. SmartPlant Instrumentation offers you the two following options for semi-automatic propagation of a selected tag signal:

- **Re-propagating a Tag Signal**
  This option propagates the tag signals from the selected device panels, through all connected cables and panels, until it encounters a different signal. After it encounters a different signal, no further changes are made in the propagation.
- **Forcing Tag Signal Propagation**
  This option propagates the tag signals from the selected device panels, through all connected cables and panels, overriding all existing signals.

➢ To re-propagate a tag signal

1. In the **Domain Explorer**, right-click the device panel from which the signal originates.
2. On the shortcut menu, click **Repropagate Signal**.

➢ To force propagation of a tag signal

1. In the **Domain Explorer**, right-click the device panel from which the signal originates.
2. On the shortcut menu, click **Force Signal Propagation**.

Manual Signal Propagation

During your wiring design, situations can arise in which tag signal propagation does not occur automatically. SmartPlant Instrumentation lets you effect signal propagation at terminal strip level by manually entering or changing a signal or its level at any point along the wiring path.

The following are examples of when you need to set signal propagation manually:

- When there is a split in the wiring path.
- When there are terminal strips that emulate barriers.
- When you cross-wire two terminals, one of which already receives a signal.
- When you remove a signal that is stopping tag number propagation.
- When you add another signal level at an exit point of one of the terminal strips.

Notes

- If you remove a signal at any point of the wiring path, SmartPlant Instrumentation stops the signal propagation at that point. However, if there is an I/O card is at the other end of that signal path, the software stops the tag propagation at the break point and assigns a new connection sequence (100, 99, 98 …) starting from the I/O card.

- If you replace one signal with another at any point along the wiring path, the software stops the propagation of the old signal at the point where you made the change and propagates a new signal from that point onward to the end of the signal path.

Use the following procedure for each panel strip for which you need manual signal propagation.

➢ To set signal propagation manually

1. Do one of the following:

   - In the **Connection** window, under **Strip**, select the strip for which you want to set signal propagation manually.

   - In the **Cross Wiring** window, under **Primary strip**, select the strip for which you want to set signal propagation manually.

2. Next to a wired terminal, click .

3. In the **Terminal Connection** dialog box, under **Signal**, select the signal that you want to propagate.

4. Under **Signal Level**, select the signal level.

   Tip

   - You can also select zero to indicate that a signal has a signal level designated as zero.

5. Under **Sequence,** select a connection sequence.

6. Click **Save** to propagate the signal.

7. To navigate to other terminals for which you need to change propagation settings, do one of the following:

   - Click **Next** or **Previous**.

   - Under **Terminal number**, select the terminal that you want to edit.

Multiplexing and Demultiplexing Tag Signals

SmartPlant Instrumentation allows you to create general signals (unique wire groups) that carry multiple tag signals. At any given strip, you can choose among the following:

- Combine tag signals into a general signal that you propagate (multiplex signals)
- Combine signals from incoming general signals with independent tag signals into a new general signal that you propagate (additional multiplexing)
- Separate tag signals from a general signal (demultiplexing) for individual propagation
- Propagate independent tag signals

Tips

- Before you manage the signals within a given strip, create and connect the cables that serve the strip.
- You can only multiplex tag signals that are wired into the strip.

For multiplexing and for demultiplexing, do the following to open the **Terminal Connection** dialog box:

1. In the **Domain Explorer**, right-click the given panel or strip, and on the shortcut menu, click **Connection**.
2. Next to a terminal in the wire group into which you want to multiplex or demultiplex a signal, click  .

➢ To multiplex tag signals

1. In the **Terminal Connection** dialog box, click **Signal** to open the **Local Signals** dialog box.
2. Create a unique general signal.
3. Link the general signal to the signals that you want to multiplex.
4. In the **Terminal Connection** dialog box, do the following for each terminal in the wire group that you are associating with the general signal:
   a) Under **Signal**, select the general signal that you want to propagate.
   b) Under **Sequence,** select the a sequence.
   c) Under **Signal Level**, select a signal level.

5. To navigate to other terminals for which you need to change propagation settings, do one of the following:

   - Click **Next** or **Previous**.
   - Under **Terminal number**, select the terminal that you want to edit.

6. Click **Save**.

➢ To demultiplex tag signals

1. In the **Terminal Connection** dialog box, do the following for each terminal in a wire group that you are associating with one of the demultiplexed signals:

   a) Under **Signal**, select the tag signal that you want to propagate.

   b) Under **Sequence,** select a connection sequence.

   
   Note

   - Increment the sequence according to the original tag signal, rather than according to the general signal with which it was linked.

   c) Under **Signal Level**, select a signal level.

2. To navigate to other terminals for which you need to change propagation settings, do one of the following:

   - Click **Next** or **Previous**.
   - Under **Terminal number**, select the terminal that you want to edit.

3. Click **Save**.

Local Signals

On any terminal strip, you can create signals that are not related to device panels but rather originate from that strip, for example, a local relay, a signal conditioner, or a barrier. This is one type of local signal.

You can also use local signals as follows:

- You can create a local tag signal by assigning a local signal to a wiring tag that does not yet have a signal of its own.
- You can create a general signal and link it to signals that are wired into the strip. A linked general signal has two typical functions:
  - Representing the common connection for single or multiple loop power supply.
  - Combining signals into a wire group for transmitting multiple signals that are multiplexed through it.

Note that all propagation rules apply to local signals.

Creating a Local Tag Signal

This procedure allows you to generate a tag signal — at any terminal strip — for a tag number that is not linked to a device panel or pre-assigned to an I/O channel.

Note

- For cross wiring with independent wiring from the local strip and I/O card ends, create local tag signals before assigning I/O channels.

➢ To create a local tag signal

1. In the **Connection** window, on the **Actions** menu, click **Local Signal**.
2. In the **Local Signal** dialog box, select a wiring tag that has not yet been associated with a signal (a tag that has no signal name next to it).
3. Click **Create**.
4. Click **Close**.

Filtering Tags for Local Signals

This procedure enables you to filter tag numbers for assigning to local signals.

➢ **To filter the tags in the Local Signal dialog box**

1. In the **Local Signal** dialog box, click **Filter** to open the **Signal Filter** dialog box.

2. Define a conditional expression as follows:

   a) From the **Column Name** list, select the appropriate tag number attribute according to which you want to filter the data.

   b) From the **Operator** list, select the required comparison operator to determine how the tag number attribute selected in the **Column Name** field will relate to the expression you enter in the **Value** field.

   c) From the **Value** data list, select or type the required value to determine how the tag number attribute selected in the **Column Name** field will be specified. You can use wildcards such as **%** (percent) and **_** (underscore) to set the value.

   d) From the **Logical** list, select the required logical operator to determine how the next filter expression will relate to the current one (if applicable).

3. Click **New** to add another data row for an additional filter expression if needed. Make sure you select the appropriate logical operator (**And**, **Or**) at the end of the previous row.

4. To retrieve tag numbers that were imported from SmartPlant Electrical, select **SmartPlant Electrical signals only**.

5. To retrieve tag numbers that were imported from SmartPlant Electrical and that already have an association with a specified power distribution board (PDB) in SmartPlant Electrical, select **Pre-assigned signals only**. This option is available only when you select **SmartPlant Electrical signals only**.

6. To save the filter condition settings so that the next time you open the **Signal** dialog box SmartPlant Instrumentation filters the data accordingly, select **Save filter**.

    **Note**

   - Click **Restore** to revert to the filter condition that you saved the last time.

7. Click **Verify** to check the correctness of your filter.

8. Click **OK**.

Creating a General Signal

A general signal is a signal that you create and then link to tag signals. You then use a general signal to treat several tag signals as a group that share common wires.

Use this procedure to create a general signal.

➢ To create a general signal

1. In the **Connection** window, do one of the following:

   - On the **Actions** menu, click **Local Signal**.
   - Click  .

   Note

   - You can also access the **Local Signal** dialog box by clicking **Signal** in the **Terminal Connection** dialog box.

2. In the **Local Signal** dialog box, under **General signal**, click **New** in the group box.
3. In the **New General Signal** dialog box, under **Signal name**, type a unique name.
4. To associate the new general signal with all the tag signals in the current terminal strip, select **Apply to all tag signals of the current strip**.
5. Click **OK** to create and propagate the new general signal.

   Notes

   - The new general signal name appears in the **Signal** column with no tag next to it. This indicates that this is a **general signal** that originated in the current terminal strip.
   - You can change the general signal name at any time by clicking **Edit** after selecting the required general signal.
   - If this general signal is used in a loop drawing, make sure that the general signal name is changed in the loop macro definitions too.

Linking Tag Signals to General Signals

This procedure allows you to link tag signals to a general signal that you create on a given strip. You need this functionality for the following:

- To use a power supply to power tag signal circuits.
- To multiplex tag signals into a general signal.
- To recombine tag signals that you previously multiplexed.

➢ To link tag signals to a general signal

1. In the **Connection** window, on the **Actions** menu, click **Local Signal**.
2. To create a local tag signal, see Creating a Local Tag Signal.
3. To create a new general signal, see Creating a General Signal.
4. In the **Local Signal** dialog box, under **Signal**, select the general signal to which you want to link tag signals, and click **Link**.
5. In the **Link Tag Signals to General Signal** dialog box, under **Link**, select the check boxes for the tag signals that you want to link to the general signal.
6. Click **Close** to return to the **Local Signal** dialog box.

Tip

- Since a general signal does not directly connect to a tag, you need a different way to find the data for the signal's tag numbers. In the drawing block, the macros (tags / attributes) that contain the data for these signals should start with a prefix that reflects the name of the signal.

Auto-Wiring

Auto-Wiring Overview

Auto-wiring allows you to make automatic batch connections between specified terminal strips. This feature facilitates faster and more efficient wiring design especially when working on a grass-roots project where the required wiring entities already exist and you need to connect them. The essence of this feature is that you create an auto-wiring routing task where you define a cable that will connect two designated panels.

You can define an auto-wiring task for two different kinds of connection:

- A connection between two existing panels (junction boxes, marshaling racks, and so forth).
- A connection between a panel and a control system that will create cross wires (or cross cables).

There are two prerequisites for auto-wiring routing tasks:

- The required panels and terminal strips must already exist.
- The required reference cables and connection types must be defined and ready for use.

Furthermore, for cross wiring auto-wiring routing tasks, you must also ensure the following before you start defining your task:

- The required tag numbers and their field devices already exist and they are connected to their junction boxes.
- There are tag numbers with pre-assigned to I/O points – essential for cross-wiring tasks.
- There are defined reference wiring profiles for the required instrument types.

Caution

- You cannot create an auto-wiring task for panels defined as Fieldbus or Telecom panels.

Auto-Wiring Flow of Activities

The following is a suggested flow of auto-wiring activities. The sequence in which you perform these activities depends on your work preferences. In any case, make sure that you perform the first four steps in the following list before proceeding further.

1. Define a view profile for a new **Auto-Wiring Routing Task** browser in the **Wiring** group of the **Browser Manager**.
2. Add and define a new view for the **Auto-Wiring Routing Task** browser.
3. If needed, define a view profile for the **JB Pre-Assignment** browser in the **Instrument Index** group of the **Browser Manager**.
4. If needed, add and define a new view for the **JB Pre-Assignment** browser.
5. Pre-assign the required junction boxes to tag numbers.
6. Connect the junction boxes to the device panels using one of the following methods:
   - Use the **Device Cable Batch Connection** feature.
   - Execute the auto-wiring routing task.
   - Connect the junction boxes manually.
7. Continue connecting the rest of the junction boxes.
8. Create and run a new auto-wiring routing task to connect the last junction box to the control system (or another type of panel).

Pre-Assigning Junction Boxes

You use this option to pre-assign specific junction boxes to selected device panels. This pre-assignment then allows you to define an auto-wiring routing task and facilitate a faster and more efficient batch connection of pre-assigned device cables.

➢ To pre-assign a junction box to a tag numbers

1. Open the **Browser Manager** and expand the **Instrument Index** browser group.

   Tip

   - Also, you can click **Auto-Wiring** on the **Actions** menu and open the **JB Pre-Assignment Browser View** window, where you can click on the toolbar.

2. Select the **JB Pre-assignment** browser and add a new browser view to this browser.

   Caution

   - Make sure that you set the browser view as default (select the **Set as default view** check box) and select all the available fields to be included in the browser view style.

3. Click to open the new view.

4. In the **Browser View** window, select the required tag number to which you want to assign a junction box.

5. Click in the **Junction Box Name** field and select the appropriate junction box to pre-assign it to the selected tag number.

   Note

   - If a junction box has already been connected to a field device, the **Junction Box Name** field displays the junction box name. You cannot change this name.

6. Click in the **Strip name** field and select the required terminal strip in the pre-assigned junction box.

7. Repeat the previous three steps for each device panel to which you want to pre-assign a junction box.

8. Edit the data in the **Browser View** window as required and close the **Browser View** window. Save the data when prompted.

Tip

- You can now switch to the Wiring module and select the appropriate junction boxes for connection. In the Wiring module, connect the device cables in batch mode. You can also open the **Explore Filter** dialog box and select the **Display pre-assigned cables only** check box. After closing the **Explorer Filter** dialog box, the **Domain Explorer** only displays the pre-assigned device cables and you can start connecting them on the fly.

Defining and Executing Auto-Wiring Tasks

An auto-wiring task is a list of commands that SmartPlant Instrumentation runs according to pre-selected parameters. You define the End 1 and End 2 connections as well as the cable that SmartPlant Instrumentation uses to make the connection. The cable that the software uses to make the connection is automatically created by the software. The definition of this cable is based on the reference cable that you select. the software checks whether a cable based on the selected reference cable exists in the **Domain Explorer** and whether this cable has a sufficient number of unconnected cable sets. If not, SmartPlant Instrumentation creates a new cable based on the selected reference cable to accommodate the required connections. You can customize the cable name as needed or accept the suggested names. the software proposes cable end names based on the names of the panels to be connected to End 1 and End 2. Any additional cables that the software creates have identical names with a numeric suffix that is incremented by one for each new cable; for example XYZ.1, XYZ.2, and so forth.

You can define the following auto-wiring tasks:

- **Connecting two junction boxes or marshaling racks** — When defining an auto-wiring task for two junction boxes, you need to define the End 1 and End 2 connections as well as the cable that SmartPlant Instrumentation uses to connect the two panels.
- **Connecting a junction box or a marshaling rack to a control system** — When defining this kind of auto-wiring task, you define the End 1 connection and the auto-wiring cable. The End 2 connection options are not available as SmartPlant Instrumentation checks for available DCS or PLC panels with matching signals. This means that you have to pre-assign the required control system tags to the tag numbers (see I/O Assignment: An Overview for details). At this point, you also need to select an appropriate cross wiring option to connect the control system. After the software executes the task, open the **Connection** window for the selected junction box and display the adjacent connection to make sure that the software has executed the auto-wiring task correctly.
- **Connecting a pre-assigned junction box to another junction box or a control system** — In this case, you need to make sure that you have carried out the required I/O assignment for the control system you are going to connect and that you pre-assigned the necessary junction box and its terminal strip to the required field device. Then, you proceed to define the End 2 connection or select to connect the pre-assigned junction box to a control system.

Note that you define and execute auto-wiring tasks in the **Auto-Wiring Browser View** window.

You can define and execute the following tasks:

- Defining and Executing Auto-Wiring Tasks for Two Panels
- Defining and Executing Auto-Wiring Tasks for Pre-Assigned Junction Boxes
- Defining and Executing Auto-Wiring Tasks for Control Systems
- Task Statuses

Defining and Executing Auto-Wiring Tasks for Two Panels

The following procedure explains how to define and execute an auto-wiring task for two panels (regardless of their signals). Note that you must make all the required preparations prior to defining and executing a task. (For details, see Auto-Wiring Overview.)

➢ To define and execute an auto-wiring task for two panels

1. Start the Wiring module.
2. On the **Actions** menu, click **Auto-Wiring**.
3. In the **Browser View** - **New Auto-Wiring Routing Task** window, do one of the following:
   - Click  .
   - On the **Actions** menu, click **New**.
4. In the **Auto-Wiring Routing Task** dialog box, define the **End 1 connection** as follows:
   a) Click  next to the **Panel** field to select for the required panel in the **Domain Explorer**.
   b) In the **Domain Explorer**, select the required panel and click **OK**.

    **Caution**

   - Remember that the selected panel must contain at least one terminal strip with unconnected terminals.

   c) Select the required terminal strip from the **Strip** list.
   d) Select the required first terminal from the **First terminal** list.
   e) Select the required terminal side from the **Terminal side** list.
   f) Select the required connection type from **Connection type** list.
   g) If required, select the appropriate overall shield terminal connection.

5. In the **End 2 connection** group box, do the following to define the end 2 connection of the auto-wiring cable:

   a) Click ... next to the **Panel** field to select the required panel.

   b) In the **Domain Explorer**, select the required panel and click **OK**.

   Caution

   - Remember that the selected panel must contain at least one terminal strip with unconnected terminals.

   c) Select the required terminal strip from the **Strip** list.

   d) Select the required first terminal from the **First terminal** list.

   e) Select the required terminal side from the **Terminal side** list.

   f) Select the required connection type from the **Connection type** list.

   g) If required, select the appropriate overall shield terminal connection.

6. Use the options in the **Cable** group box to define the cable to connect the two panels:

   a) From the **Reference cable** list, select the appropriate reference cable for SmartPlant Instrumentation to use as a source for the creation of a cable that will connect the two panels. The software duplicates the new cable in the **Domain Explorer**.

   b) In the **Cable name** data field, accept or type the name of the cable that SmartPlant Instrumentation will create to connect the two panels. The cable names suggested by the software are composed of the End 1 and End 2 panel names. Additional cables have their names incremented by one, for example XYZ.1, XYZ.2, and so forth.

7. Click **OK** to complete the task definition and return to the **Auto-Wiring Browser View** window.

8. In the **Auto-Wiring Browser View** window, click  .

   Note

   - After notifying you that the task has been executed successfully, the task status changes to **Done**. For details, see Task Statuses.

Defining and Executing Auto-Wiring Tasks for Pre-Assigned Junction Boxes

The following procedure explains how to define and execute an auto-wiring task for a pre-assigned junction box. Note that you must pre-assign the required junction box and make all the required preparations prior to defining and executing a task. For details, see Auto-Wiring Overview.

➢ To define and execute an auto-wiring task for a pre-assigned junction box

1. In the **Browser Module**, pre-assign a junction box to a field device.

   Caution

   - Make sure that you select an appropriate terminal strip belonging to the pre-assigned junction box.

2. Close the **JB Pre-assignment Browser View** window and save the changes.
3. Switch to the Wiring module.
4. On the **Actions** menu, click **Auto-Wiring**.
5. In the **Browser View** - **New Auto-Wiring Routing Task** window, select the new task and do one of the following:

   - Click  .
   - On the **Actions** menu, click **Edit Task**.

   Note

   - The **Auto-Wiring Routing Task** dialog box opens where all the **End 1 connection** options except for the **Connection type** and **Overall shield terminal connection** have been defined you can accept the displayed values or modify them as needed.

6. In the **Auto-Wiring Routing Task** dialog box, complete the **End 1 connection** definition as follows:

   a) Select the required connection type from **Connection type** list.

   b) If required, select the appropriate overall shield terminal connection.

7. In the **End 2 connection** group box, select one of the following options:

   - Select the **Control system** check box if you want to connect the pre-assigned junction box to a DCS or PLC cabinet. (For details, see Defining and Executing Auto-Wiring Tasks for Control Systems.)

   - Do not select the **Control system** check box to connect the pre-assigned junction box to another junction box or marshaling rack. Then, define the end 2 connection of the auto-wiring cable as follows:

   a) Click ... next to the **Panel** field to select the required panel.

   b) In the **Domain Explorer**, select the required panel and click .

   Caution

   - Remember that the selected panel must contain at least one terminal strip with terminals.

   c) Select the required terminal strip from the **Strip** list.

   d) Select the required first terminal from the **First terminal** list.

   e) Select the required terminal side from the **Terminal side** list.

   f) Select the required connection type from the **Connection type** list.

   g) If required, select the appropriate overall shield terminal connection.

8. Use the options in the **Cable** group box to define the cable that SmartPlant Instrumentation will use to connect the two panels:

   a) From the **Reference cable** list, select the appropriate reference cable that SmartPlant Instrumentation will use as the source for the creation of a cable that will connect the two panels.

   b) In the **Cable name** data field, accept or type the name of the cable that SmartPlant Instrumentation will create to connect the two panels. The cable names suggested by the software are composed of the End 1 and End 2 panel names. Additional cables have their names incremented by one, for example XYZ.1, XYZ.2, and so forth.

9. Click **OK** to complete the task definition and return to the **Auto-Wiring Browser View** - **New Auto-Wiring Routing Task** window.

10. In the **Browser View** - **New Auto-Wiring Routing Task** window, click .

    Note

    - After notifying you that the task has been executed successfully, the task status changes to **Done**. For details, see Task Statuses.

Defining and Executing Auto-Wiring Tasks for Control Systems

The following procedure explains how to define and execute an auto-wiring task for a control system. Note that prior to defining such a task, you must assign the required control system I/O channels to specific tag numbers and make all the other required preparations. (For details, see Auto-Wiring Overview.)

For auto-wiring tasks that connect pre-assigned junction boxes to control systems, see Auto-Wiring Tasks for Control Systems Connected to Pre-Assigned Junction Boxes.

➢ To define and execute an auto-wiring task for a control system

1. Start the Wiring module.
2. On the **Actions** menu, click **Auto-Wiring**.
3. In the **Browser View** - **New Auto-Wiring Routing Task** window, do one of the following:
   - Click  .
   - On the **Actions** menu, click **New**.
4. In the **Auto-Wiring Routing Task** dialog box, define the **End 1 connection** as follows:
   a) Click  next to the **Panel** field to select the required panel.
   b) In the **Wiring Explorer**, select the required panel and click **OK**.

   Caution

   - Remember that the selected panel must contain at least one terminal strip with unconnected terminals.

   c) Select the required terminal strip from the **Terminal strip** list.
   d) Select the required first terminal from the **First terminal** list.
   e) Select the required terminal side from the **Terminal side** list.
   f) Select the required connection type from the **Connection type** list.
   g) If required, select the appropriate overall shield terminal connection.

5. Under the **End 2 connection** group box, select the **Control system** check box.

   Tip

   - Selecting the **Control system** check box disables all the options in the **End 2 connection** group box (except for **Connection type**) so that SmartPlant Instrumentation can search for an available DCS or PLC panel with a matching signal.

6. From the **Connection type** list, select the required End 2 connection type.

7. Under the **Cross wiring** group box, select an appropriate cross wiring option to connect the control system to the junction box:

   - **Single cross wires** – connect the control system using a single wire created by SmartPlant Instrumentation automatically during the auto-wiring process.

   - **Cables created from reference** – connect the control system using a cable that SmartPlant Instrumentation creates by duplicating the reference cable that you select from the **Reference cable** list in the **Cable** group box. The software checks whether such a cable exists in the **Wiring Explorer** and if so, whether this cable is connected to the panel selected in the **End 1 connection** group box. If this cable has unconnected cable sets, the software connects them and then creates additional cables so that all the terminals are connected. Note that in this case, the software connects all the cable sets whether they are required or not. Therefore, for this option to work properly, you must create appropriate reference cables and connection types before starting auto-wiring.

   - **One cable per tag** – connect the control system using a separate cable for each tag. The software creates each cable by duplicating the reference cable that you select from the **Reference cable** list in the **Cable** group box. SmartPlant Instrumentation creates the required number of cables according to the number of tag signals it detects. The software names each cable according to the signal name. You can add a prefix and a suffix to the cable name by typing the required string in the **Cable name** prefix and **Cable name** suffix fields.

8. Use the options in the **Cable** group box to define the cable for connecting the pre-assigned junction box to the control system (not available if you selected the **Single cross wires** option):

   a) From the **Reference cable** list, select the appropriate reference cable that SmartPlant Instrumentation uses as the source for the creation of a cable that will connect the two panels. The software duplicates the new cable in the **Wiring Explorer**.

   b) In the **Cable name** data field, the software suggests a cable name composed of the End 1 and End 2 panel names. Accept this name or type a name of your choice for the cable that SmartPlant Instrumentation will create to connect the two panels. Any additional cables that the software creates have identical names with a numeric suffix that is incremented by one for each new cable; for example XYZ.1, XYZ.2, and so forth.

9. Click **OK** to complete the task definition and return to the **Browser View** - **New Auto-Wiring Routing Task** window.

10. Click  .

Note

- After notifying you that the task has been executed successfully, the task status changes to **Done**. (For details, see Task Statuses.) Also, you can open the **Connection** window for the selected junction box to display the adjacent connection to make sure that the auto-wiring task has been executed correctly.

Auto-Wiring Tasks for Control Systems Connected to Pre-Assigned Junction Boxes

The following procedure explains how to define and execute an auto-wiring task for a control system that is to be connected to a pre-assigned junction box. Note that prior to defining such a task, you must assign the required control system to specific tag numbers and make all the other required preparations. (For details, see Auto-Wiring Overview.)

For auto-wiring tasks involving a connection to a junction box that has not been pre-assigned, see Defining and Executing Auto-Wiring Tasks for Control Systems.

➢ To define and execute an auto-wiring task for a control system connected to a pre-assigned junction box

1. In the Browser module, pre-assign a junction box to a field device.

   Caution

   - Make sure that you select an appropriate strip belonging to the pre-assigned junction box.

2. Close the **JB Pre-assignment Browser View** window and save the changes.
3. Switch to the Wiring module.
4. On the **Actions** menu, click **Auto-Wiring**.
5. In the **Browser View** - **New Auto-Wiring Routing Task** window, select the new task and do one of the following:

   - Click  .
   - On the **Actions** menu, click **Edit Task**.

   Note

   - The **Auto-Wiring Routing Task** dialog box opens with definitions for all the **End 1 connection** properties except for the **Connection type** and **Overall shield terminal connection**.

6. Complete the **End 1 connection** definition as follows:

   a) From the **Connection type** list, select the required connection type.

   b) If required, select an overall shield terminal connection.

7. Under the **End 2 connection** group box, select the **Control system** check box.

   Tip

   - Selecting the **Control system** check box disables all the options in the **End 2 connection** group box (except for **Connection type**) so that SmartPlant Instrumentation can search for an available DCS or PLC panel with a matching signal.

8. From the **Connection type** list, select the required End 2 connection type.

9. Under the **Cross wiring** group box, select an appropriate cross wiring option to connect the control system to the pre-assigned junction box:

   - **Single cross wires** – connect the control system using a single wire created by SmartPlant Instrumentation automatically during the auto-wiring process.

   - **Cables created from reference** – connect the control system using a cable that the software creates by duplicating the reference cable that you select from the **Reference cable** list in the **Cable** group box. The software checks whether such a cable exists in the **Wiring Explorer** and if so, whether this cable is connected to the panel selected in the **End 1 connection** group box. If this cable has unconnected cable sets, SmartPlant Instrumentation connects them and then creates additional cables so that all the terminals are connected. Note that in this case, the software connects all the cable sets whether they are required or not. Therefore, for this option to work properly, you must create appropriate reference cables and connection types before starting auto-wiring.

   - **One cable per tag** – connect the control system using a separate cable for each tag. The software creates each cable by duplicating the reference cable that you select from the **Reference cable** list in the **Cable** group box. SmartPlant Instrumentation creates the required number of cables according to the number of tag signals it detects. The software names each cable according to the signal name. You can add a prefix and a suffix to the cable name by typing the required string in the **Cable name** prefix and **Cable name** suffix fields.

10. Use the options in the **Cable** group box to define the cable for connecting the pre-assigned junction box to the control system (not available if you selected the **Single cross wires** option):

    a) From the **Reference cable** list, select the appropriate reference cable that SmartPlant Instrumentation uses as the source for the creation of a cable that will connect the two panels. The software duplicates the new cable in the **Wiring Explorer**.

    b) In the **Cable name** data field, the software suggests a cable name composed of the End 1 and End 2 panel names. Accept this name or type a name of your choice for the cable that SmartPlant Instrumentation will create to connect the two panels. Any additional cables that the software creates have identical names with a numeric suffix that is incremented by one for each new cable; for example XYZ.1, XYZ.2, and so forth.

11. Click **OK** to complete the task definition and return to the **Browser View** - **New Auto-Wiring Routing Task** window.

12. Click  .

Note

- After notifying you that the task has been executed successfully, the task status changes to **Done**. (For details, see Task Statuses.) Also, you can open the **Connection** window for the selected junction box to display the adjacent connection to make sure that the auto-wiring task has been executed correctly.

Task Statuses

After you define an auto-wiring task, SmartPlant Instrumentation assigns it a status. Tasks can have different statuses that are set according to the task definitions. You can change certain task statuses if needed. The following table defines the various task statuses and explains which statuses you can change.

Status	Description	Can be Changed To
New	A newly created task that has not yet been executed.	Hold
Hold	A task that has been put on hold. This task cannot be executed until you change its status to Execute.	Execute
Execute	A task whose status has been changed from Hold. This task can be executed.	Cannot be changed
Done	A task that has already been executed. Such a task cannot be executed again.	Cannot be changed

➢ To change a task status

1. In the **Auto-Wiring Browser View** window, select the required task.
2. Right-click the selected task.
3. On the shortcut menu, point to **Task Status** and click the required option.

Jumpers

Working with Jumpers

SmartPlant Instrumentation enables you to carry out the following activities with jumpers:

- Add a new jumper to the existing wiring.
- Remove a jumper from your wiring.

Caution

- Jumpers do not propagate the signal as regular wires do. Assignment of a Wire Group for a jumper can be done manually in the **Terminal Connection** dialog box.

Adding a New Jumper to a Terminal Strip

The following procedure explains how to add a jumper to a terminal strip.

➢ **To add a new jumper to an existing terminal strip**

1. Do one of the following:
   - Press F7 to open the **Domain Explorer**.
   - In the Wiring module, on the **View** menu, click **Wiring Explorer**.
2. Expand the **Panels by Location** or the **Panels by Category** folder to display the existing panels and terminal strips.
3. Right-click a panel or a terminal strip and then on the shortcut menu, point to **Actions** and click **Connection**.
4. In the **Connection** window, select the wire connected to the terminal to which you want to connect one side of the new jumper.
5. Do one of the following:
   - On the **Connection** menu, click **Connect Jumper**.
   - Click  .

Note

- If you did not select a terminal side prior to adding a jumper, the **Jumper** dialog box shows the upper left terminal as the first terminal.

6. In the **Jumper** dialog box, do the following:

   a) In the **Jumper name** box, type the name of the new jumper, or accept the default setting.

   Note

   - By default, SmartPlant Instrumentation suggests a name for a new jumper of the format J<first terminal name>/<second terminal name>. You can change the preferences so as not to display a suggested jumper name.

   b) From the **First terminal** list, select a terminal for end one jumper connection, and for the terminal side, click Left or Right.

   c) From the **Second terminal** list, select a terminal for end one jumper connection, and for the terminal side, click Left or Right.

   d) Select the required jumper color.

   e) Click **OK**.

   Note

   - Your new jumper appears in the **Connection** window.

Removing a Jumper

The following procedure explains how to remove a jumper.

➢ To remove a jumper from the wiring

1. In the **Connection** window, select the jumper you want to remove.
2. Do one of the following:
   - Right-click the selected wiring entity and click **Disconnect** on the shortcut menu.
   - On the **Actions** menu, click **Disconnect**.
   - Click  .

   Notes

   - The jumper will exist in the database as long as it is connected. A disconnected jumper is removed from the database.
   - You cannot move a jumper. Instead, disconnect the jumper you do not need and add a new jumper as required.

Intrinsic Safety

Calculating Intrinsic Safety

This option allows you to calculate the maximum permissible cable length between the hazardous and non-hazardous areas based on three main criteria:

- Resistance
- Capacitance
- Inductance

The calculations are made at the domain level, not at the <plant>, <area>, or <unit> level.

Note

- To calculate intrinsic safety for circuits that have more than two cables in the signal path, or for which you want a pass/fail result that also considers L/R, see Calculating Intrinsic Safety for a Loop.

➢ To calculate intrinsic safety

1. Start the Wiring module and do one of the following:
   - On the **Actions** menu, click **Intrinsic Safety**.
   - Click  .
2. In the **Intrinsically Safe Circuit** dialog box, from the **Circuit type** list, select the appropriate circuit type.

   Notes

   - The remaining fields in the dialog box are filled in automatically with the data for the circuit type you select.
   - If the required circuit type is not on the list, create a new one or edit an existing circuit type. For more information, see Editing or Creating an Intrinsically Safe Circuit Type.
3. Click **OK**.
4. In the **Intrinsically Safe Data Input** dialog box, under **Non-hazardous area loop components**, enter the relevant data for the non-hazardous devices, such as barrier, isolator, and so forth. Note that you must define the **R1**, **C2**, and **L2** values.

5. Under **Hazardous area loop components**, enter the relevant data for the hazardous devices, such as transmitters, I/P converters, and so forth. Note that you must define the **R1**, **C2**, and **L2** values.

6. Define the cable parameters between the junction box and the marshaling rack.

7. Define the cable parameters between the device panel and the junction box (if the cable exists). If the field instrument is connected directly to the marshaling rack, specify the cable length (B) = 0.

8. Click **Calculate** to calculate the limit criteria (resistance, inductance, or capacitance) and the maximum permissible cable length between the junction box and the marshaling rack (Cable A) based on the values you entered.

   Notes

   - The **Intrinsically Safe Calculation Results** dialog box opens where you can view the calculation results, change the units of measure, and save the results with the different units.

   - The maximum permissible length must be less than the actual length of the cable used (Cable A" - connecting the hazardous and non-hazardous areas).

9. Click **OK** to return to the **Intrinsically Safe Data Input** dialog box.

10. If needed, you can do any of the following:

    - To view and enter revisions, click **Revisions**.

    - To enter intrinsic safety notes, click **Notes**.

    - To generate and print a report that shows all the data that you entered and the calculation results, click **Print**.

Calculating Intrinsic Safety for a Loop

Follow these procedures to calculate if the tags in a given loop are intrinsically safe. For details, see:

- Tag Definition for Intrinsic Safety Loop Calculation
- Cable Definition for Intrinsic Safety Loop Calculation
- Calculating Intrinsic Safety for a Loop

Tag Definition for Intrinsic Safety Loop Calculation

Before calculating intrinsic safety for a loop, you must perform this procedure for each tag in the loop.

➢ **To define tags for intrinsic safety loop calculation**

1. In the Instrument Index module, open the instrument tag.
2. In the **Tag Number Properties** dialog box, beside **Intrinsically safe circuit type**, click ....
3. In the **Intrinsically Safe Circuit Types** dialog box, select the required row, and then click **Properties**.

   Note

   - You can also create a new intrinsically safe circuit type.

4. In the **Intrinsically Safe Data Input** dialog box, in both group boxes, make sure that you express the following parameters in the following units of measure:
   - **Resistance** — ohm
   - **Inductance** — mH
   - **Capacitance** — µF (microFarad)
   - **L/R** — mH/ohm
5. Click **OK** to close the **Intrinsically Safe Data Input** dialog box.
6. Make sure that the row that you require is selected and then click **OK** to close the **Intrinsically Safe Circuit Types** dialog box.
7. In the **Tag Number Properties** dialog box, click **OK**.

Cable Definition for Intrinsic Safety Loop Calculation

Before calculating intrinsic safety for a loop, you must perform this procedure for each cable in the circuit.

➢ **To define circuit cables for intrinsic safety loop calculation**

1. In the **Domain Explorer**, right-click the cable, and on the short-cut menu, click **Properties**.
2. In the **Cable Properties** dialog box, beside the **Type** list, click ....
3. In the **Cable Types** dialog box, select the required row, and then click **Properties**.

   Note

   - You can also create a new intrinsically safe circuit type.

4. In the **Cable Type Properties** dialog box, make sure that you express the following parameters in the following units of measure:
   - **Capacitance** — nF (nanoFarad) /km
   - **Resistance** — Ohm/km
   - **Inductance** — mH/km
5. Click **OK** to close the **Cable Type Properties** dialog box.
6. Make sure that the row that you require is selected and then click **OK** to close the **Cable Types** dialog box.
7. In the **Cable Properties** dialog box, under **Unit of measure**, select meter.
8. Under **Length**, define the cable length.
9. Select the **Set as intrinsically safe** check box, and then click **OK**.

Performing Intrinsic Safety Calculations for a Loop

After you define loop tags and circuit cables as required, use this procedure to perform the loop intrinsic safety calculation.

➢ **To perform intrinsic safety calculations for a loop**

1. In the **Wiring Module** window, on the **Actions** menu, click **Intrinsic Safety Loop Calculation**.

2. In the **Enter Loop Number** dialog box, type the loop number, or click **Find** to search for the loop for which you want to calculate intrinsic safety.

3. Click **OK** to open the **Intrinsically Safe Loop Data** dialog box.

    **Notes**

   - In the data window, if you select a tag for which you did not define an intrinsically safe circuit type, nothing is displayed in the lower group box.

   - If you select a tag for which you defined an intrinsically safe circuit type, SmartPlant Instrumentation displays non-hazardous area and hazardous area loop components below the data window.

4. In the **Intrinsically Safe Loop Data** dialog box, click **Calculate**.

5. In the **Intrinsically Safe Calculation Results** dialog box, select each tag for which you want to display intrinsic safety data.

6. To preview reports for all of the tags in the current loop, click **Print**.

Editing or Creating an Intrinsically Safe Circuit Type

If the type of circuit you need is not on the **Circuit Type** list of the **Intrinsically Safe Circuit** dialog box, you can create a new one for your calculation, or, if the need arises, you can modify an existing one.

Note

- You can create a new circuit type or edit an existing one only if you have been granted the appropriate access rights by your Domain Administrator.

➢ To edit or create an intrinsically safe circuit type

1. On the **Actions** menu, click **Intrinsic Safety**.
2. In the **Intrinsically Safe Circuit** dialog box, do one of the following:
   - To define a new circuit type, click **New**.
   - To modify an existing circuit type, select it, and click **Edit**.
3. Enter the following information:
   a) Type the required circuit type in the **Circuit Type** data field and the circuit type description in the **Circuit Description** data field.
   b) From the **System I/O Type** list, select the appropriate area system I/O type.
   c) From the **Area Classification** list, select the appropriate area classification.
4. Click **Save**.
5. In the **Drawing Number** dialog box, enter an appropriate drawing number name and click **OK**.

   Note

   - The modified or new circuit type is saved and the **Intrinsically Safe Circuit** dialog box opens. You can now select the newly created type from the **Circuit Type** list.

6. To set parameters for the current intrinsic safety circuit type, see Calculating Intrinsic Safety.

Cable Routing

The Cable Routing feature provides the ability to set up a flexible, modular model of the cable routing in your <plant>. Cable routing sections are divided into several categories that enable you to set up a complete cable routing sequence. These categories match the different <plant> regions as follows:

Category	Category Description and Location in the <Plant>
Trunk	Standard sections that include all the cable routing that does not pass through a built area. These sections are actually legs passing through the <plant> with junction points that function as ports, where cables enter and exit the routing. Trunks contain trays conveying the positions through which the cables pass.
Building	Sections that pass through a built area. Building sections do not contain trays or positions.
Panel - routing Distance	This in fact, is not a section category but a variable distance added to the total cable routing length. It is the distance between an instrument and the routing starting point.

Cable Routing Flow of Activities

The cable routing feature allows you to create modular cable routing sections. The sections convey the cables in your <plant>, and they subdivide into two main categories:

- A Trunk is a standard section that can be utilized in all non-enclosed plant areas. Trunks contain positions, fixed on trays.
- A Building is a section that passes through an enclosed area, and does not contain positions.

You plan your cable routing system according to the following flow of activities:

1. Set the cable routing options, such as cable length and position width units of measure, cable spare length, and so forth.
2. Create named standard widths. You will use these later to create positions in the Trunk routing sections.
3. Create standard positions. Positions convey the cables within the Trunk sections.
4. Define the maximum number of cables for each standard position, according to the position width. This is how you assure that the number of cables does not exceed the position cable capacity.
5. Create the routing sections.
6. Associate cables with sections. The association can be performed in single or batch mode. The association includes the following activities:
    - Selecting the cables to which you add the cable routing
    - Setting the order of the routing sections per cable
    - Selecting the active positions for each section

Setting the Cable Routing Options

Use this procedure to set the options for the cable routing throughout a specific <plant>. SmartPlant Instrumentation applies your selections to existing cables and sections and to all future routing elements.

Notes

- You need appropriate access rights to set the cable routing options.
- When you change the **Length unit of measure**, the software automatically recalculates values of routing elements that currently exist in your plant and expresses them in the new units of measure.

The routing elements that SmartPlant Instrumentation recalculates after a change in the **Cable Routing Options** dialog box are listed in the following table.

Modification Name	Recalculated Routing Element
Length unit of measure	Cable length
	Panel-routing distance
	Section length

➢ To set the cable routing options

1. In the **Wiring Module** window, on the **Actions** menu, click **Cable Routing Options**.
2. In the **Cable Routing Options** dialog box, from the **Length unit of measure** list, select the required unit of measure.
3. In the message box that opens, click **OK** to confirm calculation in the new unit of measure.
4. From the **Position width unit of measure** list, select the required unit of measure.

   Caution

   - Set the **Position width unit of measure** at initialization, and do not change it. Although changing the length unit of measure recalculates length values in the new unit of measure, changing the position width unit of measure changes the label without recalculating the value of the position width!

5. In the message box that opens, click **OK** to confirm the position width unit of measure.

6. In the **Cable spare length** group box, to calculate the spare cable length for all the cables in the <plant>, do one of the following:

   - Select **Fixed length** and type its value in the box to the right.
   - Select **Fixed percentage**, and type or select a percent value in the box to the right.

   Note

   - For cable drums with status Design or Purchased, if you change cable spare length, SmartPlant Instrumentation recalculates the cable length, but not for drums with status 'Locked'.

7. Under **Panel to routing distance**, type the distance from a junction box or marshaling rack to the beginning of a routing section.

8. To customize cable routing terminology, next to **Customize terminology**, select the check box and then click ... .

Customizing Cable Routing Terminology

Use this procedure to change cable routing terminology to terms that you define. You can change any or all of the following terms: trunk, building, position, section, and tray. Changes that you make are implemented in all relevant dialog boxes and reports.

➢ To customize cable routing terminology

1. On the **Actions** menu, click **Cable Routing Options**.
2. In the **Cable Routing Options** dialog box, select **Customize terminology** and then click ... .
3. In the **Cable Routing Customized Terminology** dialog box, for each term that you want to customize, do the following:

   a) Click under **Customized Name Singular**, and type the customized name.

   b) Click under **Customized Name Plural**, and type the customized name.

4. Click **OK** to close the **Cable Routing Customized Terminology** dialog box.
5. Click **OK** to close the **Cable Routing Options** dialog box.

Adding and Editing Standard Widths

The standard width is a value that you enter and which SmartPlant Instrumentation uses to define the width of the routing positions that the sections comprise. This procedure explains how to add a standard width to your current <plant> or edit an existing one (on the <plant> level).

Note

- A standard width is not necessarily associated with a position. It only provides the ability to associate the width with positions.

➢ To add or edit a standard width

1. In the **Wiring Module** window, on the **Tables** menu, point to **Cable Routing** and click **Standard Widths**.
2. In the **Standard Widths** dialog box, do one of the following:
   - To add a new standard width, click **New**.
   - To edit an existing standard width, click the field that you want to edit.
3. Type the required standard width.
4. Repeat steps 1-3 for all the standard widths you want to enter.
5. Click **OK** to save your changes and close the dialog box.

Deleting Standard Widths

Use this procedure to delete an existing standard width

➢ To delete a standard width

1. In the **Wiring Module** window, on the **Tables** menu, point to **Cable Routing** and click **Standard Widths**.
2. In the **Standard Widths** dialog box, highlight the required standard width or in the **Find** field, type the width that you want to delete, and click **Delete**.
3. Click **OK** to save your changes and close the dialog box.

Adding and Editing Standard Positions

Routing positions are the wiring elements that convey the cables in your <plant> and separate the different cable groups inside the routing sections. You associate the standard routing positions with the trunk sections in your <plant> and adjust their widths to fit those positions. This way you do not have to define new positions for every new trunk that you add.

➢ To add or edit a standard routing position

1. In the **Wiring Module** window, on the **Tables** menu, point to **Cable Routing** and click **Standard Routing Positions**.
2. In the **Standard Routing Positions** dialog box, do one of the following:
   - To add a new standard position, click **New**.
   - To edit an existing standard position, click the field that you want to edit.
3. Type the position name and the description as required.
4. Click **OK** to save your changes and close the dialog box.

Setting the Maximum Number of Cables for the Standard Positions

The maximum number of cables is a value that you define to limit the number of cables that you can associate with a position within a trunk. You can add positions to trunks only if you predefined a maximum number of cables per position. In other words, you define the number of cables for a standard position and only then the position becomes available to include in a trunk.

Note

- See Cable Routing Flow of Activities to check that you did everything necessary to prepare for this step.

➢ **To set the maximum number of cables for the standard positions**

1. In the **Wiring Module** window, on the **Tables** menu, point to **Cable Routing** and click **Maximum Number of Cables**.

2. In the **Maximum Number of Cables** dialog box, click a field and type the required data.

   Note

   - The **Maximum Number of Cables** dialog box comprises a grid. The grid displays the standard positions and standard widths that you have added to your current <plant>. Enter the maximum number of cables in the width column of the required position.

3. Click **OK** to save your changes and close the dialog box.

Adding New Routing Sections

Routing sections are the wiring elements that convey the cables in your <plant>. They subdivide into two main categories:

- Trunk — a standard section that can be utilized in all non-enclosed <plant> areas. Trunks contain positions.
- Building — a section that passes in an enclosed area and does not contain positions.

You define a standard position with a standard width to fit the section that includes it.

➢ **To add a new routing section**

1. In the **Wiring Module** window, on the **Tables** menu, point to **Cable Routing** and click **Routing Sections**.

2. In the **Routing Sections** dialog box, do one of the following:

   - To base the new routing section on an existing routing section, click **Duplicate**.

   - To create a new routing section not based on an existing section, click **New**.

3. In the **Routing Section Properties** dialog box, do the following:

   a) In the **Routing section** field, type the new section name or accept the default.

   Note

   - The initial All or Trunk default is T-1, and the initial Building default is B-1. Defaults for succeeding entries revise the previous name in a given category by adding a 1 or incrementing the previous suffix by 1.

   b) In the **Length** field, type the section length. (To change the unit of measure, see Setting the Cable Routing Options)

   c) From the **Routing category** list, select Trunk or Building.

   d) If you selected Trunk, SmartPlant Instrumentation displays the **Position** and **widths** grid. Select a defined width for each active position.

   Note

   - When you define a maximum number of cables for a standard position, the position at the specific defined width becomes available for association with sections. In the **Position–Width** grid of the **New Section** dialog box, the available positions and widths are marked with a check box. Although a position can have more than one available standard width, you can select only one standard width per position.

4. Click **OK** to enter the new section and close the dialog box.

Editing Routing Sections

Use this procedure to edit an existing routing section.

➢ To edit a routing section

1. In the **Wiring Module** window, on the **Tables** menu, point to **Cable Routing** and click **Routing Sections**.

2. In the **Routing Sections** dialog box that opens, filter the routing sections by selecting Trunk or Building, or accept the default All.

3. Highlight a routing section and click **Properties**.

4. In the **Routing Section Properties** dialog box, you have the following options:

   - To modify the routing section name
   - To modify the length (unless the cable assigned to this section is on a locked drum)
   - To change the section category, from the **Routing category** list, if the section is not in use.
   - For routing category Trunk, to select a width for each position from the **Position and widths** grid (unless the cable assigned to this section is on a locked drum)

5. Click **OK** to save your changes and close the **Routing Section Properties** dialog box.

Associating Cable Routing with Cables

The last stage in setting up cable routing is associating the different sections that you have created with the cables in your <plant>. Once the association is completed, SmartPlant Instrumentation calculates and sets the total length of the routing, and the cable routing of your <plant> is ready.

➢ To associate sections with cables

1. In **Domain Explorer**, highlight the cables with which you want to associate cable routing sections, and do one of the following:

   - Right-click the highlighted cables, and select **Cable Routing** on the shortcut menu.
   - On the **Actions** menu, click **Cable Routing**.

2. In the **Cable Routing** dialog box, from the **Cable** list, select a cable.

3. In the **Available sections** window, highlight the available sections that you want to associate with the selected cable, and do one of the following:

   - Click  .
   - Drag the sections to the **Assigned sections** pane.

4. From the **Routing Position** list of the required section, select the position that will convey the cable.

   Tip

   - Change the order of the assigned sections by highlighting an assigned section and clicking **Move Up** or **Move Down**.

5. Type the panel-routing distance, or accept the default.

Note

- Repeat steps 2 through 5 for each cable in the **Cable** list.

Editing a Cable Routing

You created a cable routing by associating sections with cables in your <plant>. You can later change the sections associated with a cable, change their order, or change the panel-routing distance.

➢ To edit a cable routing

1. In **Domain Explorer**, highlight the cables you want to edit, and do one of the following:

   - Right-click the highlighted cables, and select **Cable Routing** on the shortcut menu.
   - On the **Actions** menu, click **Cable Routing**.

2. In the **Cable Routing** dialog box, from the **Cable** list, select a cable.

3. To add additional sections to the named cable:
   In the **Available sections** window, highlight the available section or sections that you want to associate with the named cable, and do one of the following:

   - Click  .
   - Drag the selected section or sections from the **Available Sections** window to the **Assigned sections** window.

4. To remove sections from the named cable:
   In the **Assigned Sections** window, highlight the section or sections you want to remove from the named cable, and do one of the following:

   - Click  .
   - Drag the selected section or sections from the **Assigned Sections** window to the **Available Sections** window.

5. Change the position of a section, as necessary, from the **Routing Position** list.

6. Change the order of assigned sections, as necessary, by highlighting a section and clicking **Move Up** or **Move Down**.

7. Edit the panel-routing distance, as necessary, by changing the value in the **Panel-routing distance** box.

   Note

   - You have the option of repeating steps 3 through 7 for each cable in the **Cable Name** list.

Copying Routing Data to a Cable

After you create a cable routing, you can copy the routing data to other cables, thus saving redefinition time for similar cables.

Note

- If you copy routing data to a cable with existing routing, the new routing overwrites the existing routing data.

➢ To copy routing data

1. In **Domain Explorer**, select the cables from which you want to copy routing data.

2. Do one of the following:

   - Right-click the highlighted cables and select **Copy Cable Routing** on the shortcut menu.
   - On the **Actions** menu, click **Copy Cable Routing**.

3. In the **Copy Cable Routing** dialog box, select a cable from the **Source cable** list.

   Tip

   - A source cable is a trunk cable for which you have already defined cable routing options, created the routing sections, and associated cables with these sections. SmartPlant Instrumentation displays the routing data for the source cable you select in the **Source routing data** grid.

4. In **Domain Explorer**, highlight target cables, and drag them to the **Destination cables** group box.

5. Select the cables to which you want to copy the routing data of the source cable in one of the following ways:

   - Select the check box to the left of each cable.
   - Select **Select all cables without routing**. Use this option to avoid overwriting existing routing data.
   - Select **Select all** to enable overwriting of existing routing data on the destination cables.

6. Click **Copy**.

Note

- To copy routing data to additional cables, repeat steps 3 through 6.

Appending Routing Data to a Cable

You can append the routing properties of an existing source cable to a destination cable or cables. This can be an efficient way of adding sections to an existing routing.

- A source cable is a trunk cable for which you have already defined cable routing options, created the routing sections, and associated cables with these sections.
- A destination cable is a trunk cable to which you want to add the routing data of the source cable.

➢ To append routing data

1. In **Domain Explorer**, select the cables that will be your source for appending.
2. Do one of the following:
   - Right-click the highlighted cables and select **Append Cable Routing** on the shortcut menu.
   - From the **Actions** menu, click **Append Cable Routing**.
3. In the **Append Cable Routing** dialog box, select a cable from the **Source cable** list.

   Tip

   - In the **Source routing data** group box, SmartPlant Instrumentation displays the routing data for the selected cable.

4. In **Domain Explorer**, highlight the target cables, and drag them to the **Destination cables** group box.
5. Select cables to which you want to append the routing data of the source cable in one of the following ways:
   - Select the check box to the left of each cable.
   - Select **Select all cables without routing**. Use this option to avoid overwriting existing routing data.
   - Select **Select all** to enable overwriting of existing routing data on the destination cables.

6. Click **Append** to addthe routing properties of the source cable to the selected cables.

Notes

- To append routing to additional cables, repeat steps 3 through 6.
- SmartPlant Instrumentation appends the new sections after the original sections of the destination cable, if there were any. You can change the order of these sections by opening the destination cable in the **Cable Routing** dialog box.

Cable Drum

Overview

The cable drum feature allows you to efficiently utilize cable drums, and setup an organized method of cable drum assignment. The cable drum feature handles both the optimization of existing cable drum allocations (purchased drums) and the assignment of new cable drums when necessary (Design drums). The cable drum feature allows you to perform cable drum assignment both automatically and manually. The cable drum feature requires that you define pulling areas in your <plant> where the cable drums are concentrated. From these areas you perform the assignment of cable drums for the cables.

 **Note**

- The pulling area that you define here does not have the same functionality as the <areas> in SmartPlant Instrumentation plant hierarchy (<plant>, <area>, <unit>). The pulling area is designated for cables and cable drums only.

Cable Drum Flow of Activities

This topic provides the steps required to set up a fully functional cable drum assignment. First, you have to define the pulling areas where the cable drums are placed. Second, you associate cables with the predefined pulling areas. Third, you define drum attributes for cable types. Fourth, you create the cable drums that will eventually be assigned to your cables. This includes both adding the cable drums that already exist in your <plant> and adding the cable drums that you need to purchase to complete your required cable drum inventory.

 **Note**

- This can also be performed automatically in a cable drum assignment.

Fifth, you select the cables that you want to assign to the cable drums that you have created (even if the drums have not been purchased yet). The last stage is to assign cables to cable drums. At this stage the cable drum feature automatically adds new cable drums as required.

Adding and Editing Pulling Areas

The pulling area is the plant area where you concentrate cable drums. This procedure explains how to add a new pulling area to your <plant>. Use this procedure to edit existing pulling area data.

Note

- The pulling area that you define here does not have the same functionality as the <areas> in SmartPlant Instrumentation plant hierarchy <plant>, <area>, <unit>). The pulling area is designated for cables and cable drums only.

➢ To add or edit a pulling area

1. In the **Wiring Module** window, on the **Tables** menu, click **Pulling Areas**.
2. In the **Pulling Areas** dialog box, do one of the following:
   - To create a new pulling area, click **New**.
   - To edit a pulling area, click the field that you want to edit.
3. Type the pulling area name (required) and description in the respective fields.
4. Click **OK**.

Deleting Pulling Areas

Use this procedure to delete an existing pulling area from your <plant>.

➢ To delete a pulling area

1. In the **Wiring Module** window, on the **Tables** menu, click **Pulling Areas**.
2. In the **Pulling Areas** dialog box, select the pulling area that you want to delete, and click **Delete**.
3. Click **OK** to save your changes and close the **Pulling Areas** dialog box.

Associating Cables with Pulling Areas

Use this procedure to associate cables with the pulling areas in your <plant>. You must perform the cables-pulling area association prior to assigning cables to drums.

➢ To associate cables with pulling areas

1. In **Domain Explorer**, select and right click the cable that you want to associate with a pulling area.
2. On the shortcut menu, click **Properties**.
3. In the **Cable Properties** dialog box, from the **Pulling Areas** list, select the pulling area that you want the selected cable to be associated with.

   Note

   - You can use the **Pulling Areas** dialog box to add new pulling areas or edit existing.

4. Click **OK** to save your changes and close the **Cable Properties** dialog box.

Defining Cable Drum Attributes for Cable Types

This procedure explains how to define cable drum attributes for cable types. This is required because each cable type has its minimum and maximum length. The cable drums that you will create will then be based on the cable drum attributes that you define here.

➢ **To define cable drum attributes for cable types**

1. In the Wiring module window, on the **Tables** menu, point to **Cable** and click **Types**.
2. In the **Cable Types** dialog box, click **Properties**.
3. In the **Cable Type Properties** dialog box, type the appropriate data in the following fields:
   - **Maximum. drum length** — type the maximum cable drum length for this cable type.
   - **Minimum drum length** — type the minimum cable drum length for this cable type.
   - **Length UOM** — select the length unit of measure.
   - **Drum spare length percent** — enter the percent of the used cable drum length to allocate to spare cable length. (The spare and the used length combine to the total length.)
4. Click **OK** to save your changes and close the **Cable Type Properties** dialog box.
5. Click OK to close the **Cable Types** dialog box.

Adding and Editing Cable Drums Manually

This procedure explains how to create cable drums manually and set their attributes. SmartPlant Instrumentation creates cable drums automatically when you assign cables to cable drums and additional cable drums are required. There are three categories of drums:

- Design — Cable drums that you intend to purchase in the future and you want to design to fit your cables.
- Purchased — Cable drums that already exist in your <plant> and you want to include in a cable-drum optimization.
- Locked — Cable drums that exist in your <plant> and are not included in a cable-drum optimization.

➢ To add or edit a cable drum

1. In the Wiring module window, on the **Tables** menu, click **Cable Drums**.
2. From the **Cable type** list, select a cable type.
3. Click **New,** or click the cable drum field that you want to edit.
4. In the data grid, type the data in the fields or select the data from the lists according to the following table:

Column name	Column description
Name	Type the cable drum name.
Description	Type the cable drum description if required.
Pulling Area	Select the pulling area where the cable drum is located.
Length	Type the total cable drum length (utilized + spare).
Utilized Length	Displays the utilized cable length of the total drum length.
Length UOM	Select the unit of measure used to measure the drum length.
Drum Status	Select one of the following: Design — cable drum in the design stage (not purchased yet); available for cable-drum optimizations. Purchased — a purchased cable drum of defined length that you want to include in cable-drum optimizations. Locked — a purchased cable drum that is assigned to a cable and locked against reassignment (cable drum optimizations).
Spare Length Percent	Type the percent of the used cable drum length to allocate to spare cable length.

5. Click **OK** to save your changes and close the **Cable Drums** dialog box.

Deleting Cable Drums

Use this procedure to delete existing cable drums.

➢ To delete a cable drum

1. In the Wiring module window, on the **Tables** menu, click **Cable Drums**.
2. In the **Cable Drums** dialog box, select the cable drum that you want to delete, and click **Delete**.
3. Click **OK** to save your changes and close the **Cable Drums** dialog box.

Assigning Cables to Drums Automatically (with Optimization)

You can perform an automatic cable-drum assignment and optimization in single or in batch mode. The optimization process matches cables and the cable drums that fit them with minimum waste of cable drum length, using the following algorithm:

- The highest priority is to utilize cable drums that are purchased but not yet locked. Optimization may assign new cables to these drums.
- The second priority is to optimize the drum cable length for drums whose status is design. The guiding parameters are minimum drum length and maximum. drum length.
- The third priority is to create new cable drums of a given cable type.

Note

- The procedure below will only work if you created a cable and assigned a pulling area.

➢ To assign cables to drums

1. In the Wiring module, on the **Actions** menu, select **Cable–Drum Assignment**.
2. In the **Cable–Drum Assignment** dialog box, select the following filtering criteria:
   - Cable type
   - Pulling area
3. Do one of the following:
   - Select **Include assigned cables** to displaying cables that are already assigned to cable drums, in addition to those not yet assigned.
   - Clear **Include assigned cables** to avoid displaying assigned cables.

4. Click **Find**.

   The cables that match your filtering criteria are displayed In the **Results** group box.

5. Select the cable or cables that you want to include in the cable drum assignment

   Note

   - If you selected **Include assigned cables** in step 3 above, optimizing can change existing cable assignments.

6. Click **Optimize**.

Assigning Cables to Drums Manually (without Optimization)

This procedure explains how to assign a cable to a cable drum manually. This action requires that you predefine the following for this cable:

- A cable type
- At least one pulling area
- A cable drum associated with the cable type and with the pulling area

The manual cable drum assignment is performed without optimization, which means that the designated cable drum is not necessarily the optimum for the selected cable.

➢ To manually assign a cable to a cable drum

1. In **Domain Explorer** right click the required cable and select **Properties**.
2. In the **Cable Properties** dialog box, do the following:

   a) From the **Pulling Area** list, select the pulling area that the designated cable drum is associated with.

   b) Make sure that the cable type is selected from the **Type** list.

   c) From the **Cable Drum** list, select the cable drum to which you want to assign the selected cable.

   Note

   - Click ... to add any required items that are not on the list.

3. Click **OK** to save your changes and close the **Cable Properties** dialog box.

Panel Locations

Managing Panel Locations

Panel location is a panel property that you define when creating or editing a panel or a cabinet. You can set multiple location levels, for example, building – floor – room. You can use each level to define a panel location.

The following procedures allow you to maintain the contents of the **Panel location** list.

Do one of the following to open the **Location Manager** dialog box:

- On the **View** menu, click **Location Manager**.
- Click  next to the **Location** list arrow in any appropriate **Properties** dialog box.

Defining a New Panel Location

This option allows you to define a new panel location. You can then select this location when defining panel properties.

➢ To define a new panel location

1. Do one of the following to open the **Location Manager**:
   - On the **View** menu, click **Location Manager**.
   - Click  next to the **Location** list arrow in any appropriate **Properties** dialog box.
2. Do one of the following In the **Location Manager**:
   - To define a location on the highest hierarchy level, right-click **Location**, and then on the shortcut menu, click **New**.

      **Tip**

   - You can define a new location on the highest hierarchy level directly from the **Domain Explorer**. Right-click the **Panels by Location** folder, and then on the shortcut menu, point to **New** and click **Location**.
   - To define a location under an existing location definition, expand one of the existing location levels, then right-click a location and on the shortcut menu, click **New**.
3. In the **Location Properties** dialog box, type the location name and description as you require.
4. Click **OK**.

Modifying Location Properties

This option allows you to modify the properties of a panel location. You can rename a location and change its description.

➢ To rename a location

1. Do one of the following to open the **Location Manager**:
   - On the **View** menu, click **Location Manager**.
   - Click … next to the **Location** list arrow in any appropriate **Properties** dialog box.
2. Right-click a location and then on the shortcut menu, click **Properties**.
3. In the **Location Properties** dialog box, type a new name and description as you require.
4. Click **OK**.

Deleting a Location

This option allows you to delete a location in the **Location Manager**.

➢ To delete a location

1. Do one of the following to open the **Location Manager**:
   - On the **View** menu, click **Location Manager**.
   - Click … next to the **Location** list arrow in any appropriate **Properties** dialog box.
2. Right-click a location and then on the shortcut menu, click **Delete**.

Tip

- You can delete a location directly from the **Domain Explorer** without opening the **Location Manager**. In the **Domain Explorer**, expand the **Panels by Location** folder. Then, right-click a location and then on the shortcut menu, click **Delete**.

Changing the Location of a Panel

You can change the location of a panel either in the **Domain Explorer** by dragging a panel to another location in the **Panels by Location** folder or in the **Location Manager**.

➢ To change the location of a panel

1. In the **Properties** dialog box of a panel, click ... next to the **Location** list arrow.
2. In the **Location Manager**, highlight a new location.

   Tip

   - To dissociate a panel from a location without assigning another location, click **Dissociate**.

3. Click **OK** to close the **Location Manager**.

Note

- Also, you can change the location of a panel in the **Domain Explorer** without opening the **Properties** dialog box for a panel. Expand the **Panels by Location** folder and select a panel. Drag it to another location as you require.

Dissociating a Panel from a Location

While defining panel properties, you can dissociate a panel from a location.

➢ To dissociate a panel from a location

1. In the **Domain Explorer**, right-click a panel and then on the shortcut menu, click **Properties**.
2. Click ... beside the **Location** list arrow.
3. In the **Location Manager**, click **Dissociate**.

Maintaining Supporting Tables

Supporting tables are dialog boxes that allow you to define and edit the properties of various entities. You can use the supporting tables to control the content of various drop-down lists in the Wiring module dialog boxes. For example when creating or editing a panel, the values that you select from the lists are held in the relevant supporting tables.

To access a supporting table, click  next to the list arrow in the relevant dialog box, or in the **Wiring Module** window, on the **Tables** menu, click the relevant command.

Note

- In a multi-user installation, SmartPlant Instrumentation allows only one user at a time to edit a given supporting table record.

Managing and Configuring Connector Types

A connector type contains pin configuration and other properties for a connector model of a specific manufacturer. When you create a connector for a specific cable, selecting a connector type copies these properties for the cable connector. These procedures explain how to create, configure, edit, and delete connector types

For any of the procedures below, to open the **Connector Types** dialog box, do the following:

- In the **Wiring Module** window, on the **Tables** menu, point to **Connector** and then click **Types**.

➢ To define or edit a connector type

1. In the **Connector Types** dialog box, do one of the following:
   - To create a new connector type, click **New**.
   - To edit an existing connector type, click in the field that you want to edit.
2. Under **Connector Type**, type a unique name.
3. To specify the connector type for a specific manufacturer, model, and part number, do any of the following:
   - Under **Manufacturer**, select the connector manufacturer.
   - Under **Model**, select the model.
   - Under **Part Number**, type the part number.
4. To edit the connector type pin configuration, see the next procedure.

➢ To define or edit a connector type pin configuration

1. In the **Connector Types** dialog box, select the connection type that you want to configure, and click **Configure**.

2. In the **Connector Type Configuration** dialog box, do one of the following for each pin that you want to configure:

   - To add a new pin, click **New**.

   - To delete a pin, select the row that you want to delete and click **Delete**.

   - To edit a pin field, click the field.

3. To change the displayed pin sequence, under **Sequence**, type the new unique number.

4. To set the pin name, under **Name**, type the unique name.

5. To set the pin polarity, under **Polarity**, select the value that you require.

➢ To delete a connector type

Caution

- SmartPlant Instrumentation removes the item that you delete from the **Connector Types** dialog box from the **Connector type** list.

1. In the **Connector Types** dialog box, select the connector type that you want to delete.

2. Click **Delete**.

Managing Cable Colors

Cable color is a cable attribute that you define when creating or editing a cable. These procedures allow you to maintain the contents of the **Cable Color** dialog box.

Do one of the following to open the **Cable Color** dialog box:

- On the **Tables** menu, point to **Cable** and click **Color**.
- Click  next to the **Cable color** list arrow in any appropriate dialog box.

From the **Cable Color** dialog box, you can perform the following procedures:

➢ To define a new cable color

1. Click **New** to append a new data row.
2. Type the cable color values in the appropriate fields as needed.

➢ To edit an existing cable color

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find color** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a cable color

Caution

- SmartPlant Instrumentation removes items that you delete in the **Cable Color** dialog box from the **Cable color** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Cable Glands

Cable glands is a cable attribute that you define when creating or editing a cable. These procedures allow you to maintain the contents of the **Cable glands** list.

Do one of the following to open the **Cable Glands** dialog box:

- On the **Tables** menu, point to **Cable** and click **Glands**.
- Click ... next to the **Cable glands** list arrow in any appropriate dialog box.

From the **Cable Gland** dialog box, you can perform the following procedures:

➢ To define a cable gland

1. Click **New** to append a new data row.
2. Type the cable gland values in the appropriate fields as needed.

➢ To edit an existing cable gland

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find gland** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a cable gland

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Cable Glands** dialog box from the **Cable glands** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Cable Harnesses

Cable harness is field that you can define when creating or editing a cable. These procedures allow you to maintain the contents of the **Cable harness** list.

Do one of the following to open the **Cable Harnesses** dialog box:

- On the **Tables** menu, click **Cable Harnesses**.
- In the **Cable Properties** dialog box, next to the **Cable harness** list arrow, click  .

From the **Cable Harnesses** dialog box, you can perform the following procedures:

➢ To define a cable harness

1. Click **New** to append a new data row.
2. Type the cable harness values in the appropriate fields as needed.

➢ To edit an existing cable harness

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find cable harness** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a cable harness

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Cable Harnesses** dialog box from the **Cable harness** list.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Cable Manufacturers

A cable manufacturer is an attribute that you define when creating or editing any cable. These procedures allow you to maintain the contents of the **Cable manufacturer** list in the **Cable** dialog box.

Do one of the following to open the **Cable Manufacturer** dialog box:

- On the **Tables** menu, point to **Cable** and click **Manufacturer**.
- Click ... next to the **Cable manufacturer** list arrow in any appropriate dialog box.

From the **Cable Manufacturer** dialog box, you can perform the following procedures:

➢ To define a cable manufacturer

1. Click **New** to append a new data row.
2. Type the cable manufacturer values in the appropriate fields as needed.

➢ To edit an existing cable manufacturer

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find manufacturer** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a cable manufacturer

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Cable Manufacturer** dialog box from the **Cable manufacturer** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Cable Models

Cable model is a cable attribute that you define when creating or editing a cable. These procedures allow you to maintain the contents of the **Cable model** list.

Do one of the following to open the **Color Model** dialog box:

- On the **Tables** menu, point to **Cable** and click **Model**.
- Click  next to the **Cable model** list arrow in any appropriate dialog box.

From the **Cable Model** dialog box, you can perform the following procedures:

➢ To define a cable model

1. From the **Manufacturer** list, select the required cable manufacturer.
2. Click **New** to append a new data row.
3. Type the cable model values in the appropriate fields as needed.

➢ To edit an existing cable model

1. From the **Manufacturer** list, select the required cable manufacturer.
2. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find model** box to select the row that you are looking for.

3. Modify the values as needed.

➢ **To move a model to a different manufacturer**

Caution

- The changes that you effect using this procedure affect all of the lists that contain the model for which you are changing the manufacturer.

1. From the **Manufacturer** list, select the current manufacturer.
2. In the data window, select the model for which you want to change the manufacturer.
3. Click **Change Manufacturer**.
4. In the **Cable Manufacturer** dialog box, select the new manufacturer.
5. Click **OK**.

➢ **To delete a cable model**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Cable Model** dialog box from the **Cable model** lists.

1. From the **Manufacturer** list, select the required cable manufacturer.
2. In the data window, select the row that you want to delete.
3. Click **Delete**.

Managing Cable Types

Cable type is a cable attribute that you define when creating or editing a cable. These procedures allow you to maintain the contents of the **Cable Type** dialog box.

Do one of the following to open the **Cable Type** dialog box:

- On the **Tables** menu, point to **Cable** and click **Type**.
- Click ... next to the **Type** list arrow in any appropriate dialog box.

From the **Cable Type** dialog box, you can perform the following procedures:

➢ To define a new cable type

1. Click **New**.
2. In the **Cable Type Properties** dialog box, enter values in the appropriate fields.
3. Click **OK** to return to the **Cable Type** dialog box.

➢ To edit the properties of a cable type

1. In the data window of the **Cable Type** dialog box, select the required row.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find cable type** box to select the row that you are looking for.

2. Click **Properties**.
3. In the **Cable Type Properties** dialog box, modify the values as needed.
4. Click **OK** to return to the **Cable Type** dialog box.

➢ To delete a cable type

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Cable Type** dialog box from the **Cable type** lists.

1. In the data window of the **Cable Type** dialog box, select the required row.
2. Click **Delete**.

Managing Channel Types

Channel type is an I/O channel attribute that is associated with a given I/O strip type. You select the channel type when creating or editing an I/O card. (Strip type is constant for all of the channels on a given I/O card.) These procedures allow you to maintain the contents of the **Channel Type** list.

Caution

- The **Channel Types** supporting table is crucial for the DeltaV interface. Only I/O strip types and channel types that you download from DeltaV are acceptable values for SmartPlant Instrumentation entities that you will be publishing for DeltaV. Be careful not to edit or delete these values. For more information, see Crucial Fields for the DeltaV Interface.

To open the **Channel Types** dialog box, in the **Wiring Module** window, on the **Tables** menu click **Channel Types**.

In the **Channel Types** dialog box, you can perform the following procedures:

➢ To define a channel type

1. From the **Strip type** list, select the required I/O card strip type.
2. Click **New** to append a new data row.
3. Under **Channel Type**, type the unique and required channel type name.
4. Under **Description**, type the channel type description as necessary.

➢ To edit an existing channel type

1. From the **Strip type** list, select the required I/O card strip type.
2. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find strip type** box to select the row that you are looking for.

3. Modify the values as necessary.

➢ **To delete a channel type**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Channel Type** dialog box from the **Channel type** list in the **Channels** dialog box.

1. From the **Strip type** list, select the strip type from which you want to delete a channel type.
2. In the data window, select the row that you want to delete.
3. Click **Delete**.

Managing Channels

These procedures allow you to maintain the contents of the **Channels** supporting table. Note that each I/O card has its own unique **Channels** supporting table.

To open the **Channels** dialog box for a given I/O card, do one of the following:

- In the **Terminal** dialog box, beside **Channel**, click ....
- In the **I/O Assignment** window, on the **Actions** menu, click **Channels**.

From the **Channels** dialog box, you can perform the following procedures:

➢ **To define a channel**

1. Click **New** to append a new data row.
2. Under **Channel**, type the required and unique channel name.
3. Under **Enable**, select Yes or No if needed.
4. Under **Address**, type the software address if needed.
5. Under **System I/O Type**, select the system I/O type if needed.
6. Under **Channel Type**, select the channel type from the list if needed.

Note

- You can modify the **Channel Type** list.

➢ **To edit an existing channel**

1. In the data window, select the row that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find channel** box to select the row that you are looking for.

2. Modify the values as needed.

➢ **To delete a channel**

Caution

- SmartPlant Instrumentation removes channels that you delete in the **Channels** dialog box from the active I/O card.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Connector Manufacturers

Connector manufacturer is an attribute that you define when creating or editing a connector. These procedures allow you to maintain the contents of the **Manufacturer** list in the **Connector Type** dialog box.

To open the **Connector Manufacturers** dialog box: on the **Tables** menu, point to **Connector** and click **Manufacturers**.

From the **Connector Manufacturers** dialog box, you can perform the following procedures:

➢ **To define a connector manufacturer**

1. Click **New** to append a new data row.
2. Type the connector manufacturer name and description in the appropriate fields as needed.

➢ **To edit an existing connector manufacturer**

1. Click the value that you want to edit.

Tip

- If you have a long list of items in the data window, type the required value in the **Find manufacturer** box to select the row that you are looking for.

d) Modify the values as needed.

➢ **To delete a connector manufacturer**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Connector Manufacturer** dialog box from the **Connector manufacturer** list.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Connector Models

Connector model is an attribute that you define when creating or editing a connector. These procedures allow you to maintain the contents of the **Model** list in the **Connector Types** dialog box.

To open the **Connector Models** dialog box: on the **Tables** menu, point to **Connector** and click **Models**.

From the **Connector Models** dialog box you can perform the following procedures:

➢ **To define a connector model**

1. From the **Manufacturer** list, select the required connector manufacturer.
2. Click **New** to append a new data row.
3. Type the connector model values in the appropriate fields as needed.

➢ To edit an existing connector model

1. From the **Manufacturer** list, select the required connector manufacturer.
2. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find model** box to select the row that you are looking for.

3. Modify the values as needed.

➢ To move a model to a different manufacturer

Caution

- The changes that you effect using this procedure affect all of the lists that contain the model for which you are changing the manufacturer.

1. From the **Manufacturer** list, select the current manufacturer.
2. In the data window, select the model for which you want to change the manufacturer.
3. Click **Change Manufacturer**.
4. In the **Connector Manufacturer** dialog box, select the new manufacturer.
5. Click **OK**.

➢ To delete a connector model

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Connector Model** dialog box from the **Connector model** list.

1. From the **Manufacturer** list, select the required connector manufacturer.
2. In the data window, select the row that you want to delete.
3. Click **Delete**.

Managing Controllers

The I/O card controller is the processor hardware that controls and supervises I/O cards. Use these procedures to create new I/O controllers, to edit the properties of existing controllers, or to delete controllers.

Do one of the following to open the **Controllers** dialog box:

- In the **Slot Properties** dialog box, click ....
- On the **Control System** tab of the **I/O Card Properties** dialog box, click ... next to the **Controller/Processor** list arrow.

From the **Controllers** dialog box, you can perform the following procedures:

➢ To define a controller

1. In the **Controllers** dialog box, click **New**.
2. Under **Controller**, type the required controller name.
3. Under **Description**, type the controller description as necessary.
4. From the **Redundant** list, do one of the following:
   - Accept the default null value.
   - If this controller is redundant, select Yes.
   - If this controller is not redundant, select No. (Note that controller redundancy is independent of I/O card redundancy.)
5. From the **Manufacturer** list, select the controller manufacturer as necessary.
6. Click **OK** to confirm the controller definitions and close the **Controllers** dialog box.

➢ To edit a controller

1. In the **Controllers** dialog box, click each controller field for which you want to change definitions.
2. Under **Controller**, edit the unique and required controller name.
3. Under **Description**, edit the controller description as necessary.
4. From the **Manufacturer** list, select the controller manufacturer as necessary.
5. Click **OK** to confirm the controller definitions and close the **Controllers** dialog box.

➢ **To delete a controller**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Controllers** dialog box from the **Controller/Processor** list.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Customizing Manufacturer-Specific Field Headers

Some field headers in the **Distributed Control System (DCS)** dialog box, **Programmable Logic Controller (PLC)** dialog box, **I/O Card Properties** dialog box, and some appropriate reports use manufacturer-specific terminology. Therefore, these dialog boxes display field headers according to the panel manufacturer you select from the **Manufacturer** list when editing panel properties. The procedure below outlines how to customize these field headers according to manufacturer-specific terminology.

Note

- This procedure does not affect the labels in the **Racks** dialog box.

➢ **To customize field headers that use manufacturer-specific terminology**

1. Do one of the following to open the **Panel Manufacturers** dialog box:
   - On the **Tables** menu, point to **Panel** and click **Manufacturers**.
   - Click ... next to **Manufacturer** in the appropriate dialog box: **Distributed Control System (DCS) Properties**, **Programmable Logic Controller (PLC) Properties**, or **I/O Card Properties**.
2. To add a new manufacturer, in the **Panel Manufacturers** dialog box, click **New**.
3. In the **Manufacturer** field, type the unique and required manufacturer name, for example, Fisher, Honeywell, Rosemount, and so forth.
4. In the **Description** field, type the manufacturer description.

5. In the **Nest/File/Rack Header** field, type the value that will appear as this field header in the **I/O Card Properties** dialog box. If you leave it blank, the default is Nest.

6. In the **Position/Slot Header** field, type the required value that will appear as this field header in the **I/O Card Properties** dialog box. If you leave it blank, the default is Position.

7. In the **Address1/Device/Node Header** field, type the required value that will appear as this field header in the **Distributed Control System (DCS)** dialog box, and **Programmable Logic Controller (PLC)** dialog box. If you leave it blank, the default is Address 1.

8. In the **Address2/Device/Node Header** field, type the required value that will appear as this field header in the **Distributed Control System (DCS)** dialog box, and **Programmable Logic Controller (PLC)** dialog box. If you leave it blank, the default is Address 2.

9. In the **Channel/Subslot Header** field, type the required value that will appear as this field header in the appropriate reports. If you leave it blank, the default is Channel.

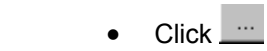
10. In the **Module Header** field, type the required value that will appear as this field header in the **I/O Card Properties** dialog box. If you leave it blank, the default setting is Module.

11. Click **OK** to accept your values and close this dialog box.

Managing Panel Area Classes

Panel area class is a panel attribute that you define when creating or editing a panel or cabinet. You can use this table to classify the panels in your <plant> in any way you require, for example, according to the physical location of the panels in the <plant>. These procedures allow you to maintain the contents of the **Panel area class** list.

Do one of the following to open the **Panel Area Class** dialog box:

- On the **Tables** menu, point to **Panel** and click **Area Class**.
- Click  next to the **Panel area class** list arrow in any appropriate dialog box.

From the **Panel Class** dialog box, you can perform the following procedures:

➢ To define a panel area class

1. Click **New** to append a new data row.

2. Type the panel area class values in the appropriate fields as needed.

➢ **To edit an existing panel area class**

1. Click the value that you want to edit.
2. Modify the values as needed.

➢ **To delete a panel area class**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Panel area class** dialog box from the **Panel area class** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Panel Locations

Panel location is a panel property that you define when creating or editing a panel or a cabinet. The following procedures allow you to maintain the contents of the **Panel location** list.

Do one of the following to open the **Location Manager** dialog box:

- On the **View** menu, click **Location Manager**.
- Click ... next to the **Location** list arrow in any appropriate **Properties** dialog box.

Managing Panel Manufacturers

The **Panel Manufacturers** supporting table holds your current panel manufacturer information. It allows you to maintain the contents of the **Panel manufacturer** list. Panel manufacturer is a panel attribute that you define when creating or editing any panel or cabinet. The **URL** feature on the **Panel Manufacturers** dialog box allows you to type a URL that you double-click to launch your default internet browser to go to the pertinent Web site if you are connected to the Internet. The **Panel Manufacturers** dialog box also allows you to customize the field headers that use manufacturer-specific terminology in the following dialog boxes:

Distributed Control System (DCS) Properties

Programmable Logic Controller (PLC) Properties

Junction Box Properties

Marshaling Rack Properties

Cabinet Properties

Do one of the following to open the **Panel Manufacturers** dialog box:

- On the **Tables** menu, point to **Panel** and click **Manufacturers**.
- Click ... next to the **Panel manufacturer** list arrow in any appropriate dialog box.

From the **Panel Manufacturer** dialog box, you can perform the following procedures:

➢ To define a panel manufacturer

1. Click **New** to append a new data row.
2. Type the panel manufacturer definitions in the appropriate fields as needed:
   - **Manufacturer** – type the required manufacturer name. For example, Fisher, Honeywell, Rosemount, and so forth. The manufacturers that you enter here consequently becomes available in the **Manufacturer** list in the dialog boxes listed above.
   - **Description** – type the manufacturer description if required.
   - **Nest/File/Rack Header** – type the required value that replaces the default header for the **Nest** field in **I/O Card Properties** dialog box. If you leave it blank, the header remains Nest. See Customizing Manufacturer-Specific Field Headers for details.
   - **Position/Slot Header** – type the required value that replaces the default header for the **Position** field the **I/O Card Properties** dialog box. If you leave it blank, the header remains Position. See Customizing Manufacturer-Specific Field Headers for details.

- **Address1/Highway/Network Header** – type the required value that replaces the default header for the **Highway or network** field in the **Distributed Control System (DCS)** dialog box or the header for the **Address 1** field in the **Programmable Logic Controller (PLC)** dialog box. If you leave it blank, the header remains Highway/Network in the **Distributed Control System (DCS)** dialog box and Address 1 in the **Programmable Logic Controller (PLC)** dialog box. See Customizing Manufacturer-Specific Field Headers for details.

- **Address2/Device//Node** – type the required value that replaces the default header for the **Device or node** field in the **Distributed Control System (DCS)** dialog box or the header for the **Address 2** field in the **Programmable Logic Controller (PLC)** dialog box. If you leave it blank, the header remains Device or node in the **Distributed Control System (DCS)** dialog box and Address 2 in the **Programmable Logic Controller (PLC)** dialog box. See Customizing Manufacturer-Specific Field Headers for details.

- **Channel/Subset Header** – type the required value that replaces the default header for the **Channel** field in the appropriate reports. If you leave it blank, header remains Channel. See Customizing Manufacturer-Specific Field Headers for details.

- **Module Header** – type the required value that replaces the default header for the **Module** field in the **I/O Card Properties** dialog box. If you leave it blank, the header remains Module. See Customizing Manufacturer-Specific Field Headers for details.

- **URL** – type a URL that to make a hyperlink to the required Web site. Double-clicking this link launches the Internet Explorer and, if you are connected to the Internet, opens the pertinent site.

➢ To edit an existing panel manufacturer

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find** box to select the row that you are looking for.

2. Modify the values as needed.

➢ **To delete a panel manufacturer**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Panel Manufacturer** dialog box from the **Panel manufacturer** list.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Panel Models

Panel model is a panel attribute that you define when creating or editing a panel or cabinet. These procedures allow you to maintain the contents of the **Panel model** list.

Do one of the following to open the **Panel Model** dialog box:

- On the **Tables** menu, point to **Panel** and click **Model**.
- Click ... next to the **Panel model** list arrow in any appropriate dialog box.

From the **Panel Models** dialog box, you can perform the following procedures:

➢ **To define a panel model**

1. From the **Manufacturer** list, select the required panel manufacturer.
2. Click **New** to append a new data row.
3. Type the panel model values in the appropriate fields as needed.

➢ **To edit an existing panel model**

1. From the **Manufacturer** list, select the required panel manufacturer.
2. Click the value that you want to edit.

Tip

- If you have a long list of items in the data window, type the required value in the **Find model** box to select the row that you are looking for.

3. Modify the values as needed.

➢ To move a model to a different manufacturer

Caution

- The changes that you effect using this procedure affect all of the lists that contain the model for which you are changing the manufacturer.

1. From the **Manufacturer** list, select the current manufacturer.
2. In the data window, select the model for which you want to change the manufacturer.
3. Click **Change Manufacturer**.
4. In the **Panel Manufacturer** dialog box, select the new manufacturer.
5. Click **OK**.

➢ To delete a panel model

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Panel Model** dialog box from the **Panel model** lists.

1. From the **Manufacturer** list, select the required panel manufacturer.
2. In the data window, select the row that you want to delete.
3. Click **Delete**.

Managing Panel Types

Panel type is a panel attribute that you define when creating or editing a panel or cabinet. These procedures allow you to maintain the contents of the **Panel type** list.

Do one of the following to open the **Panel Type** dialog box:

- On the **Tables** menu, point to **Panel** and click **Types**.
- Click  next to the **Panel type** list arrow in any appropriate dialog box.

From the **Panel Types** dialog box, you can perform the following procedures:

➢ To define a panel type

1. Click **New** to append a new data row.
2. Type the panel type values in the appropriate fields as needed.

➢ To edit an existing panel type

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find panel type** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a panel type

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Panel Type** dialog box from the **Panel type** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Terminal Strip Manufacturers

Terminal strip manufacturer is a terminal strip attribute that you define when creating or editing a terminal strip. These procedures allow you to maintain the contents of the **Terminal strip manufacturer** list.

Do one of the following to open the **Terminal Strip Manufacturers** dialog box:

- On the **Tables** menu, point to **Terminal strip** and click **Manufacturers**.
- Click … next to the **Terminal strip manufacturer** list arrow in any appropriate dialog box.

From the **Terminal Strip Manufacturer** dialog box, you can perform the following procedures:

➢ To define a terminal strip manufacturer

1. Click **New** to append a new data row.
2. Type the terminal strip type values in the appropriate fields as needed.

➢ To edit an existing terminal strip manufacturer:

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find manufacturer** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a terminal strip manufacturer

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Strip Manufacturers** dialog box from the **Terminal strip manufacturer** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Terminal Strip Models

Terminal strip model is a terminal strip attribute that you define when creating or editing a terminal strip. These procedures allow you to maintain the contents of the **Terminal strip model** list.

Do one of the following to open the **Terminal Strip Models** dialog box:

- On the **Tables** menu, point to **Terminal strip** and click **Models**.
- Click ... next to the **Terminal strip model** list arrow in any appropriate dialog box.

From the **Terminal Strip Model** dialog box, you can perform the following procedures:

➢ To define a terminal strip model

1. From the **Manufacturer** list, select the required terminal strip manufacturer.
2. Click **New** to append a new data row.
3. Type the terminal strip model values in the appropriate fields as needed.

➢ To edit an existing terminal strip model

1. From the **Manufacturer** list, select the required terminal strip manufacturer.
2. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find model** box to select the row that you are looking for.

3. Modify the values as needed.

➢ To move a model to a different manufacturer

Caution

- The changes that you effect using this procedure affect all of the lists that contain the model for which you are changing the manufacturer.

1. From the **Manufacturer** list, select the current manufacturer.
2. In the data window, select the model for which you want to change the manufacturer.
3. Click **Change Manufacturer**.
4. In the **Terminal Strip Manufacturer** dialog box, select the new manufacturer.
5. Click **OK**.

➢ To delete a terminal strip model

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Strip Models** dialog box from the **Terminal strip model** lists.

1. From the **Manufacturer** list, select the required terminal strip manufacturer.
2. In the data window, select the row that you want to delete.
3. Click **Delete**.

Managing Terminal Strip Types

Terminal strip type is a terminal strip attribute that you define when creating or editing a terminal strip. These procedures allow you to maintain the contents of the **Terminal strip type** list.

Do one of the following to open the **Terminal Strip Types** dialog box:

- On the **Tables** menu, point to **Terminal strip** and click **Types**.
- Click  next to the **Terminal strip type** list arrow in any

From the **Terminal Strip Types** dialog box, you can perform the following procedures:

➢ To define a terminal strip type

1. Click **New** to append a new data row.
2. Type the terminal strip type values in the appropriate fields as needed.

➢ To edit an existing terminal strip type

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find terminal strip type** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a terminal strip type

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Strip Types** dialog box from the **Terminal strip type** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Terminal Colors

Terminal color is an attribute that you define when creating or editing a terminal. These procedures allow you to maintain the contents of the **Terminal color** list.

Note

- In this dialog box, you can also set graphical color representation of the color name that you select.

Do one of the following to open the **Terminal Color** dialog box:

- On the **Tables** menu, point to **Terminal** and click **Color**.
- Click … next to the **Terminal color** list arrow in any appropriate dialog box.

From the **Terminal Color** dialog box, you can perform the following procedures:

➢ To define a terminal color

1. Click **New** to append a new data row.
2. Type the new terminal color and description in the appropriate fields.
3. Click in the **Color** field, and customize a color in the **Edit Color** dialog box.

➢ To edit an existing terminal color

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find color** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a terminal color

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Color** dialog box from the **Terminal color** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Terminal Manufacturers

Terminal manufacturer is an attribute that you define when creating or editing a terminal. These procedures allow you to maintain the contents of the **Terminal manufacturer** list.

Do one of the following to open the **Terminal Manufacturer** dialog box:

- On the **Tables** menu, point to **Terminal** and click **Manufacturer**.
- Click ... next to the **Terminal manufacturer** list arrow in any appropriate dialog box.

From the **Terminal Manufacturer** dialog box, you can perform the following procedures:

➢ To define a terminal manufacturer

1. Click **New** to append a new data row.
2. Type the terminal manufacturer values in the appropriate fields as needed.

➢ To edit an existing terminal manufacturer

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find manufacturer** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a terminal manufacturer

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Manufacturer** dialog box from the **Terminal manufacturer** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Terminal Models

Terminal model is an attribute that you define when creating or editing a terminal. These procedures allow you to maintain the contents of the **Terminal model** list.

Do one of the following to open the **Terminal Model** dialog box:

- On the **Tables** menu, point to **Terminal** and click **Model**.
- Click  next to the **Terminal model** list arrow in any appropriate dialog box.

From the **Panel Model** dialog box, you can perform the following procedures:

➢ To define a terminal model

1. From the **Manufacturer** list, select the required terminal manufacturer.
2. Click **New** to append a new data row.
3. Type the terminal model values in the appropriate fields as needed.

➢ To edit an existing terminal model

1. From the **Manufacturer** list, select the required terminal manufacturer.
2. Click the value that you want to edit.

    **Tip**

   - If you have a long list of items in the data window, type the required value in the **Find model** box to select the row that you are looking for.

3. Modify the values as needed.

➢ To move a model to a different manufacturer

 **Caution**

- The changes that you effect using this procedure affect all of the lists that contain the model for which you are changing the manufacturer.

1. From the **Manufacturer** list, select the current manufacturer.
2. In the data window, select the model for which you want to change the manufacturer.
3. Click **Change Manufacturer**.
4. In the **Terminal Manufacturer** dialog box, select the new manufacturer.
5. Click **OK**.

➢ **To delete a terminal model**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Model** dialog box from the **Terminal model** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Terminal Types

Terminal type is an attribute that you define when creating or editing a terminal. These procedures allow you to maintain the contents of the **Terminal type** list.

Note

- You can choose a graphic image to replace the default screw head icon that represents a terminal in the Connection window or any appropriate report.

Do one of the following to open the **Terminal Types** dialog box:

- On the **Tables** menu, point to **Terminal** and click **Type**.
- Click … next to the **Terminal type** list arrow in any appropriate dialog box.

From the **Terminal Types** dialog box, you can perform the following procedures:

➢ **To define a terminal type**

1. Click **New** to append a new data row.
2. Type the terminal type values in the appropriate fields as needed.

Caution

- For a terminal type that you intend to display in an enhanced report, verify that the terminal type name matches its associated symbol file name.

➢ To edit an existing terminal type

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find terminal type** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a terminal type

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Terminal Type** dialog box from the **Terminal type** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Wire Colors

Wire color is a wire attribute that you define when creating or editing a wire. These procedures allow you to maintain the contents of the **Wire color** list.

Do one of the following to open the **Wire Color** dialog box:

- On the **Tables** menu, point to **Wire** and click **Color**.
- Click ... next to the **Wire color** list arrow in any appropriate dialog box.

From the **Wire Color** dialog box, you can perform the following procedures:

➢ To define a wire color

1. Click **New** to append a new data row.
2. Type the wire color values in the appropriate fields as needed.

➢ **To edit an existing wire color**

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find color** box to select the row that you are looking for.

2. Modify the values as needed.

➢ **To delete a wire color**

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Wire Color** dialog box from the **Wire color** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Managing Wire Types

Wire type is a wire attribute that you define when creating or editing a wire. These procedures allow you to maintain the contents of the **Wire type** list.

Do one of the following to open the **Wire Type** dialog box:

- On the **Tables** menu, point to **Wire** and click **Type**.
- Click ... next to the **Wire type** list arrow in any appropriate dialog box.

From the **Wire Type** dialog box, you can perform the following procedures:

➢ **To define a wire type**

1. Click **New** to append a new data row.
2. Type the wire type values in the appropriate fields as needed.

➢ To edit an existing wire type

1. Click the value that you want to edit.

   Tip

   - If you have a long list of items in the data window, type the required value in the **Find wire type** box to select the row that you are looking for.

2. Modify the values as needed.

➢ To delete a wire type

Caution

- SmartPlant Instrumentation removes the item that you delete in the **Wire Type** dialog box from the **Wire type** lists.

1. In the data window, select the row that you want to delete.
2. Click **Delete**.

Wiring Reports

Printing Documents

Depending on the options you selected, printing is available directly when you select a document for printing, or you can print a document from a print preview. This procedure refers to general printing. For details of batch printing to .pdf files, see Batch Printing Documents to PDF Files.

Note

- If your default printer is Acrobat PDFWriter, you must perform the following operation in the Registry Editor: in the registry path HKEY_CURRENT_USER\Software\Adobe\Acrobat PDFWriter, set the SZ Busy key value to NULL.

➢ To print documents

1. Select the desired items from which you can print reports, and on the appropriate main menu or, if available, on a shortcut menu, click the report that you want to print.
2. If a print preview prompt appears, do one of the following:
   - Click **Yes** to display a print preview of one or more reports.
   - Click **No** to print the reports directly to a printer or a file.
3. To print a report from a print preview to a printer or a file, do one of the following:
   - In the **Print Preview** window, click  to print the currently selected report.
   - In the **Print Preview** window, click  to print all the retrieved reports or documents in batch mode.

Note

- If you choose to directly print a report without previewing it, and the particular report usually includes printing parameters when viewed in the **Print Preview** window (for example, selection of a group separator), a dialog box opens to enable you to select those same parameters prior to printing.

Generating a Connection Report from the Connection Window

While in the **Connection** window, you can generate a connection report for the current terminal strip. The report lists all the cables connected to the selected terminal strip and shows all the cable-sets within each cable, the wire tags, their color, and terminal number. This report does not show adjacent connections.

➢ To generate a connection report

1. In the **Connection** window, do one of the following:
   - On the **Reports** menu, click **Connection**.
   - Click  .
2. In the **Print Preview** prompt, click **Yes** to display the report print preview or click **No** to print out the report without displaying its print preview.

Generating a Panel Strip Report from the Cross-Wiring Window

This option enables you to generate a panel – strip report that displays the connections and adjacent connections for the terminal strip you selected from the **Primary strip** list in the **Cross Wiring** window.

➢ To generate a panel – strip report for the current primary strip

1. Do one of the following in the **Cross Wiring** window:
   - On the **Reports** menu, click **Panel-Strip**.
   - Click  on the module toolbar.
2. Click **Yes** to open the report print preview or click **No** to print out the report without displaying it on your screen.

Generating Panel-Strip Reports as PDF Files

Use this procedure to generate panel-strip reports for multiple strips or multiple panels as single .pdf files.

Notes

- Set your .pdf generator preferences to prompt for a .pdf file destination.
- From the Windows **Start** menu, navigate to **Settings** > **Printers**, and then define your .pdf generator as the default printer.

➢ To print panel-strip reports into a PDF file

1. In the **Domain Explorer**, do one of the following:
   - Select strips and I/O cards for which you want to generate panel-strip reports.
   - Select panels for which you want to generate panel-strip reports.
2. Right-click on a selected entity, and on the shortcut menu point to **Panel-Strip Reports**, and then click one of the following:
   - **With Adjacent Connections**
   - **Without Adjacent Connections (Style 1)**
   - **Without Adjacent Connections (Style 2)**
3. When prompted to preview the printed documents, click **No**.

Generating Enhanced Reports

Using the Enhanced Report Utility, you can generate reports in single or batch mode.

Note

- When printing enhanced reports to .pdf files in batch mode, you must use GNU Ghostscript or Acrobat Distiller. For further details, see SmartPlant Instrumentation Server Installation Guide, SmartPlant Instrumentation Server Configuration.

Among the available enhanced reports are the following:

- Enhanced SmartLoop
- Cable Layout
- Panel-Strip
- Wiring Equipment Connections
- Fieldbus Segment Wiring
- Telecom Communication Line
- Fieldbus Loop
- Telecom Network Class
- Strip Signals
- Telecom Single Speaker
- Telecom PA Amplifier
- Cable Harness