



HIRSCHMANN

A **BELDEN** BRAND

User Manual

Generator for Product-Specific Modules (PSM)

HiFusion 04.1.00



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1 Introduction

Manufacturers have defined various useful MIB variables for their devices that are missing in a standard SNMP Get request. Therefore, Hirschmann Automation and Control GmbH's Network Management System also allows you to integrate manufacturer-specific MIB variables from third-party devices into the Management-Software, Industrial HiVision. For this you create product-specific modules (PSM). When creating a PSM, you name the device, define a range of variables, and assign an image to the device. The execution of the process is largely automated. If you integrate the finished PSM in Industrial HiVision, the properties defined by you are available in Industrial HiVision. Network Management System works as an independent application, regardless of whether Industrial HiVision is installed. The program works without a license. The only prerequisite for incorporating non-Hirschmann Automation and Control GmbH MIB variables, is that the devices support version 1 or version 3 of the Simple Network Management Protocol (SNMP).

In this user manual, you find the following release notes:

- ▶ A guide to working with the software
- ▶ A description of the program user interface and its functions
- ▶ Step-by-step instructions for creating a PSM

The user manual teaches you the following skills:

- ▶ Creating your own PSMs
- ▶ Adapting existing PSMs
- ▶ Testing PSMs

Note: For readability purposes, this documentation uses the classic Windows view for screen shots.

2 Installation

This chapter describes

- ▶ [System Requirements](#)
- ▶ [Installation under Windows](#)
- ▶ [Installation under Linux](#)
- ▶ [Maintenance](#)
- ▶ [Deinstallation under Windows](#)
- ▶ [Deinstallation under Linux](#)

2.1 System Requirements

Network Management System has the following requirements with regard to the hardware and the operating system of your computer.

■ Hardware

- ▶ x86-compatible processor, 1 GHz or higher
- ▶ At least 1 GB of RAM, 2 GB recommended
- ▶ Disk space
2 GB free
- ▶ Monitor resolution of 1024 x 768 pixels

■ Operating system

- ▶ Windows 7 (64 Bit)
Windows 8.1 Professional (64 Bit)
Windows 10 Version 1803 (64 Bit)
- ▶ PC Linux (64 Bit: Kernel 3.10, libc 6)
Debian 8
Debian 9
Debian 10
Red Hat 7
Red Hat 8

Note: Debian Linux: Install the packages libmono2.0-cil and libmono-winforms2.0-cil.

2.2 Installation under Windows

- Log in with administration rights.
- Insert the installation CD/DVD.
- Select "Installation".
- Follow the instructions in the installation wizard

2.3 Installation under Linux

Prerequisite:

- ▶ Network Management System is a 32-bit application. Before you install Network Management System under x64 Linux, you need the `ia32-libs` package.
 - Install the `ia32-libs` package.
- Logon with the `su` command so that you have root access rights.
- To install Network Management System, insert the installation CD/DVD.
- Mount the CD/DVD (some Linux systems mount the CD/DVD automatically) in the directory assigned to it, e.g. directory `/mnt/cdrom`. If you have mounted the CD/DVD in another directory, you replace this part of the path with the directory that applies for you.
- Start the installation script with the command

```
sh /mnt/cdrom/Tools/hifusion/linux/install.sh
```
- Answer the questions of the installation script and follow its instructions. If you do not answer a question of the installation script, the installation script selects the default answer.

2.4 Deinstallation under Windows

- Quit the Network Management System program before you start the deinstallation.
- To deinstall Network Management System, select `Start:Control Panel:Software`.
- Select the Network Management System program.
- Click "Change/Remove" and follow the instructions of the deinstallation routine.

2.5 Deinstallation under Linux

- Quit the Network Management System program before you start the deinstallation.
- Logon with the `su` command so that you have root access rights.
- Delete the `/opt/hifusion1.0` directory with the command `rm -rf /opt/hifusion1.0`

2.6 Maintenance

Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet (<http://www.hirschmann.com>).

3 Starting the application

3.1 Starting under Windows

To start the program, double-click the program icon on the desktop. Alternatively, you can find a link to the program in the Start menu and in the installation directory.

3.2 Starting under Linux

- You start the program with the command
`/opt/hifusion1.0/bin/hifusion`

4 Interface of the program

This chapter describes the program interface of Network Management System. It provides you with an overview of the buttons to help you find your way through the graphical interface. At the same time, this chapter explains a number of principles to you on which the program is based.

After reading this chapter, you will be familiar with the following subjects:

- ▶ the interface of the program,
- ▶ the buttons and their functions,
- ▶ a number of principles on which the program is based.

You control the functions of Network Management System using tabs and menus. The following chapters describe the tabs and menus and their functions.

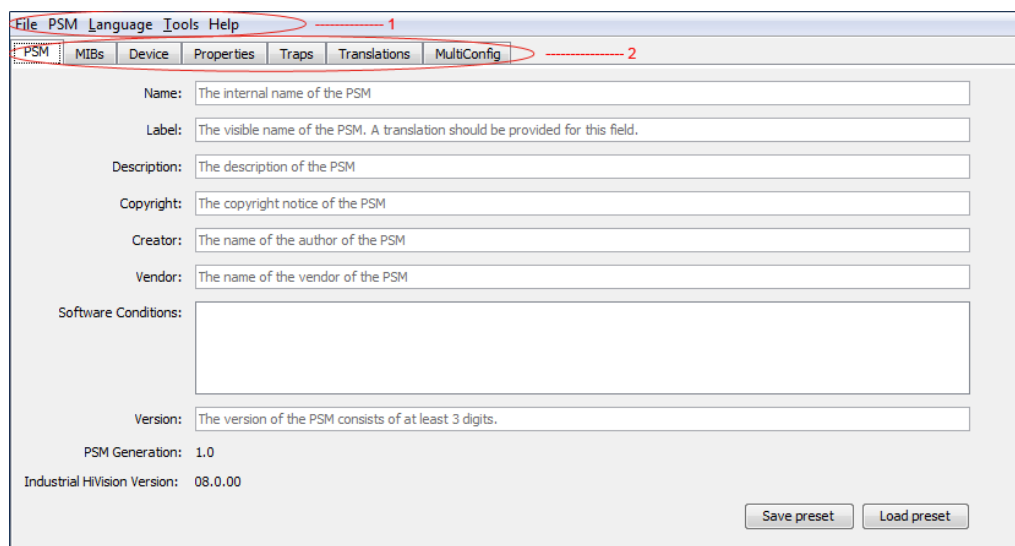


Figure 1: Menu bar and tabs of Network Management System
1 – Menu bar
2 – Tabs

4.1 Menu bar

Network Management System has a menu bar with multiple menus. You use the menu bar to control the functions of the program.

The following menus are available to you:

- ▶ File
- ▶ PSM
- ▶ Language
- ▶ Tools
- ▶ Help

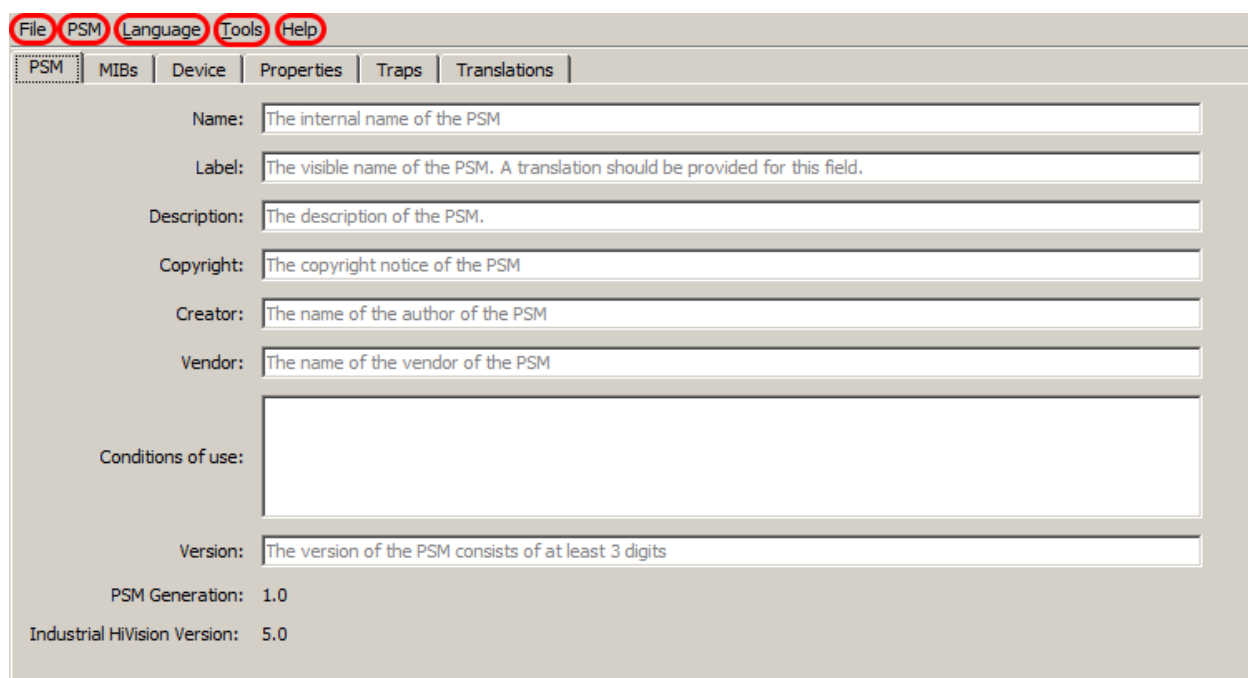


Figure 2: Menu bar

4.1.1 File

When you have several PSMs to create, the "File" menu allows you to create new PSMs without restarting the Network Management System program. Furthermore, the menu also allows you to open previously saved PSMs projects.

The following buttons are available to you in the File menu:

- ▶ **New PSM**
This button allows you to start creating a new PSM without restarting the Network Management System program.
- ▶ **Open**
Using this button allows you to browse to the location an existing PSM project saved during a previous session and open the PSM project.
- ▶ **Save**
You save an ongoing PSM/PSM project. The first time you save the file Network Management System opens a browsing window allowing you to save the file in a selected location. You save subsequent changes to this file. The file is saved as a zip file.
- ▶ **Save as**
You save an ongoing PSM/PSM project in a selected location. The file is saved as a zip file. It is strongly recommended that the file name remain the same as it is displayed in the dialog. The digits at the end of the file name are the digits you entered as the PSM version number.
- ▶ **Exit**
You exit the Network Management System PSM Generator, any unsaved work is lost.
When you click "Exit" the application exits without confirmation only if there are no changes.
If you open and modify a PSM and you click "Exit", a popup dialog opens allowing you to select save changes, discard or cancel.

4.1.2 PSM

The PSM menu contains options that allow you to verify that the PSM you created, functions properly.

The following buttons are available to you in PSM menu:

► Check PSM

Checks whether the created PSM is plausible. Network Management System checks, for example, whether you have filled in the relevant fields. When Network Management System detects an error in the PSM, then the program displays the "Errors and Warnings" dialog describing the severity, reason and location for the detected error.

After you correct and recheck the detected errors, Network Management System displays a message window informing you that the PSM is ready for testing.

► Testing PSMs

Opens the "Test PSM" dialog containing the following radio buttons used for testing your PSM in different environments:

– "Virtual Device"

Network Management System includes a built-in test environment. This means that you can test your PSM without using Industrial HiVision. If you use Industrial HiVision to test your PSM save the Industrial HiVision configuration.

The option, "Internal agent" uses the MIB dump created in the current PSM project.

If you have a MIB dump of a device from the same family, then you can also test the file by selecting the file in the "Custom agent dump file" field.

– "IP of real device"

In the text field, specify the IP address of a device which uses the same MIBs as contained in your PSM project. After creating the PSM you can test the PSM with a real device. If you changing the values in the device, then the values in the table change after a "Rescan". The "Kernel" dialog contains the "Rescan" button.

– The dialog contains the following buttons:

"Test"

Application generates a virtual PSM, then opens the "Kernel" dialog allowing you to view the parameters and their values.

When testing the PSM using the virtual agent, Network Management System reads the values that are present in PSM dump file.

When testing the PSM using a real device, Network Management System reads the values of the device.

"Close"

Exits the "Test PSM" window.

▶ Generate PSM

Opens the "Generator Settings" dialog, allowing you to save the PSM project and generate the PSM. It is strongly recommended that you do not change the file name. The digits at the end of the file name are the digits you entered as the PSM version number.

The dialog contains the following fields:

– "Save PSM project"

Checkbox marked, saves the PSM project and generates the PSM.

The text field allows you to specify the desired location for your PSM zip file.

Checkbox unmarked, only generates the PSM.

– "PSM Location"

The text field allows you to specify the desired location for your PSM file. The extension of the PSM is "ihvpsm".

4.1.3 Language

Network Management System allows you to set the interface dialog to several different languages. Select the language that best suites you from the menu.

The following languages are available:

- ▶ English
- ▶ Italian
- ▶ Korean
- ▶ Portuguese
- ▶ Greek
- ▶ Indonesian
- ▶ Spanish
- ▶ French
- ▶ Japanese
- ▶ German
- ▶ Russian
- ▶ Chinese

4.1.4 Tools

The menu allows you to view the values of MIB variables available on device.

The following list describes the available options:

- ▶ MIB Viewer
 - The menu item opens the MIB variable selector dialog allowing you to verify the MIBs that you entered into the PSM project. The MIB Viewer has a copy and paste function making it possible to copy any cell in the dialog, and then paste that information into a planning tool.
 - "Search"
 - The text field allows you to search through the table for a specific MIB variable.
 - The table lists the MIB information in the following columns:
 - "MIB variable name", identifies the name of the MIB object.
 - "Value", the value of the variable.
 - "Type", lists the MIB object type.
 - "Description", the description of the MIB variable as defined in the MIB.
 - "MIB", displays the name of the MIB.
- ▶ Update Dump
 - The menu item opens a browser allowing you to navigate to an existing dump file saved during a previous session. After a firmware update, new OIDs are available for the device. Updating an existing dump file allows you to include the new OIDs in an existing project.

4.1.5 Help

The following menu items are available to you in the Help menu:

- ▶ Online help
 - Opens the online help menu allowing you to search through the various subjects.
- ▶ Belden website
 - Opens your browser and navigates to the Belden website.
- ▶ About this program
 - Opens a text window which displays the latest program information for example, the release level.

4.2 Tabs

The tabs allow you to view and change the various properties in the PSM project.

The following tabs are available to you:

- ▶ PSM
- ▶ MIBs
- ▶ Device
- ▶ Properties
- ▶ Traps
- ▶ Translations
- ▶ MultiConfig™

The screenshot shows the 'Properties' tab selected in the PSM-Generator application. The interface includes a menu bar (File, PSM, Language, Tools, Help) and a tab bar with tabs for PSM, MIBs, Device, Properties, Traps, and Translations. The main area contains several text input fields with placeholder text: Name (The internal name of the PSM), Label (The visible name of the PSM. A translation should be provided for this field.), Description (The description of the PSM.), Copyright (The copyright notice of the PSM), Creator (The name of the author of the PSM), Vendor (The name of the vendor of the PSM), Conditions of use (a large empty text area), and Version (The version of the PSM consists of at least 3 digits). At the bottom, it shows 'PSM Generation: 1.0' and 'Industrial HiVision Version: 5.0'.

Figure 3: Tabs

4.2.1 PSM

The "PSM" tab contains basic parameters of your PSM. You define the parameters when you create a PSM. Industrial HiVision displays some of the parameters after importing the PSM into the program.

The parameters contained in the tab include:

- ▶ "Name"
Specify the name of the new PSM. When specifying the name of the PSM either write the words together, or use an underscore "_" for separation. Furthermore, when creating the name, the same characters restrictions apply as when you name a folder in a directory.
- ▶ "Label"
Specify the PSM name which Industrial HiVision displays.
- ▶ "Description"
The description allows your to readily identify the PSM.
- ▶ "Copyright"
To maintain the copyright of your PSM, specify the legal or natural person who owns the copyright. The copyright is a composition of the manufacturer name and the current year.
- ▶ "Creator"
Specify the author of the PSM.
- ▶ "Vendor"
The manufacturer of the device for which the author generated the PSM. The program does not allow Hirschmann to be identified as the manufacturer. Industrial HiVision displays this parameter.
- ▶ "Conditions of use"
Specify the conditions under which other people are allowed to use the PSM.

- ▶ "Version"
Specifies the version number of the PSM. Enter a three digit number, without a point “. “. Industrial HiVision adds the point automatically. For example, Industrial HiVision displays 100 as 1.00. Use the version number to keep track of each edition of your PSM. To maintain an overview of your PSMs, create a list containing the appropriate information regarding your PSMs.
Industrial HiVision displays this parameter.
- ▶ The PSM tab contains the following buttons:
 - "Save Preset"
Opens a browser allowing you to save the information entered in the "PSM" tab in a location of your chose. Extension of this file is "hud" (Industrial HiVision User Data).
 - "Load Preset"
Opens a browser allowing you to navigate to a ".hud" file and populate the "PSM" tab with information saved in the ".hud" file.

4.2.2 MIBs

The Management Information Base (MIB) describes the information that the network management protocol reads via an SNMP Get request. MIBs have a tree structure. The tree structure consists of two areas: a standardized area and a manufacturer-specific private area (private MIB). In the private MIBs, manufacturers create separate MIB branches with manufacturer-specific properties.

Note: Every manufacturer sets up their own private MIB(s) and defines their own variables and tree structures. Manufacturers make the MIB(s) that relate to their devices for example, as a download on their devices or via the manufacturer website. Save the manufacturer-specific MIB(s) locally when creating a PSM for a device from this manufacturer.

The tab contains the following items:

- ▶ MIB Table
The table displays the MIBs loaded in the PSM project.
- ▶ Buttons
 - "Add"
Opens the "Choose MIBs" dialog allowing you to navigate to the location where you saved a MIB which you load into the PSM project for example, a manufacturer-specific MIB.
 - "Remove"
Removes the selected MIB from the PSM project.

4.2.3 Device

Industrial HiVision displays the values specified in the tab allowing you to identify the device.

The dialog contains the following frames:

- ▶ "Identification and Images"
Specifies the device
 - Table
 - "Sys OID"
Displays the system object identifier of the MIB object. Industrial HiVision uses the parameter to identify the device type if no additional device identification is present.
 - "Product Name"
Specifies the name of the device which Industrial HiVision displays. Network Management System retrieves the product name directly from the device.
 - "Image"
Displays the image of the device which Industrial HiVision displays.
 - "Additional device identification"
Displays addition information used to identify the device. Using the "Edit" button you specify the parameter. You can use the wild card character "*" in the identifier.
 - "Vendor Name"
Specifies the name of the device manufacture. When you specify the vendor name, Industrial HiVision displays the value.
 - The "Edit" button opens the "Device identification" dialog, allowing you to specify individual device parameters displayed in the "Identification and Images" table.
- ▶ "SNMP Access Parameters" (Default Settings)
The frame displays the detected communication protocols and the SNMP access parameters. Industrial HiVision displays these passwords as clear text in the Preferences - Device Credentials dialog. To avoid a possible security risk, change the access parameters to the default settings

Note: Network Management System stores these parameters in the generated PSM. Enter only the default passwords of the device.
- ▶ "Protocols"
Specifies the communication protocols and the SNMP access parameters:
 - Management Protocols
Industrial HiVision adds the management protocols to the Protocols frame.
 - Supported Protocols
Industrial HiVision uses the support protocols for enabling menu entries like CLI and GUI Interfaces for the device.

4.2.4 Properties

After a device request, you will see the supported device parameters. The tab allows you to edit the following areas:

- ▶ "Device tree"
- ▶ "Features"
- ▶ "Property type"
- ▶ "Mapping"
- ▶ "Advanced settings"

You activate the "Advanced settings" fields by marking the checkbox.

■ Device tree

In the "Device tree" area of the "Property" tab, you create new and remove properties in your PSM.

Right clicking on an item displays a menu allowing you perform the following tasks:

- ▶ "New Property", add a property to the device.
- ▶ "Remove", delete a property from the device.
- ▶ "Expand all", displays the complete list of properties on a device.
- ▶ "Collapse all", hides every device property except the first sub-level.

■ Features

The "Features" frame in the "Property" tab contains the features supported by your device. You only change the supported features if you know that your device has a property that Industrial HiVision has detected incorrectly.

■ Property type

In the "Property type" area on the "Property" tab, you define the following:

- ▶ "Name"
You specify an internal name for the property. Network Management System displays the translation of the associated token in the "Device Tree".
- ▶ "Token"
Specifies the device token associated with the property. You can change the token description in the "Translations" tab.

- ▶ "Image"
The text field displays the image assign to the property.
The "Select" button allows you to navigate to an image and assign the image to the property.
- ▶ "MIB variable"
The test field displays the MIB variable assign to the property.
The "Select" button opens the MIB selector dialog allowing you to select an MIB object and assign the object to the property.
- ▶ "Instance"
 - ▶ Fixed assignment: You enter a fixed value.
 - ▶ Variable: From the drop-down list, you select a variable from which Network Management System contains the instance.
- ▶ "Data type"
 - ▶ "String"
A text value for example, system name.
 - ▶ "Integer"
A whole number.
 - ▶ "Float"
A decimal number for example, 1.6.
 - ▶ "Enum"
The value allows you to map the outcome of an operation into a meaningful answer for example, 0=No Error, 1=Error.
 - ▶ "MAC address"
Specifies the data type as a MAC address.
 - ▶ "IP address"
Specifies the data type as an IP address.

Note: The selection in the "Data type" field restricts or expands your options for the following input fields on the "Properties" tab. Network Management System proposes a data type for the selection of an MIB variable. You only change the data type if you know that the variable has another data type.

■ Mapping

The "Mapping" frame gives you the following options:

- ▶ Map a received value to the displayed value:
The MIB variable contains a selection of possible (numeric) values that cannot be interpreted in pure form. During the mapping, you assign various interpretable statuses to the various numeric values. Only the "Enum" data type enables a mapping to be created.
- ▶ Convert figures using factor and offset:
The MIB variable supplies figures in a specific format, but you require the figures in a different format. Only the "Integer" and "Float" data types allow you to convert the figures. The program uses the linear equation ($y = a \times x + b$) for the calculations. Here "a" is the factor, "b" the offset, "x" the value in the agent, and "y" the value in Network Management System.

■ Advanced settings

The "Advanced settings" frame allows you to specify how Industrial HiVision monitors and displays the PSM.

When you mark the "Advanced settings" checkbox, the functions in the frame are read-write.

The frame has the following buttons and checkboxes:

- ▶ "Visible"
Specifies whether a property is visible.
- ▶ "Variable"
Specifies whether you can change the way Industrial HiVision handles a property.
When you select the "Variable" checkbox, Network Management System allows you to change the "Change after trap", "Default polling interval", "Status configuration" and "Calc status by default" functions.
- ▶ "Change after trap"
Specifies whether you have the option to select the property and update it using traps on the "Traps" tab.
- ▶ "Default polling interval"
Specifies whether a property activates its polling after Industrial HiVision discovers a device, and at what interval.
Values have the following meanings:
 - ▶ Value = 0: off
 - ▶ Values > 0: interval in seconds

- ▶ "Status configuration"
Specifies whether you create a status configuration. Only variable properties have a status configuration.
- ▶ "Calc status by default"
Specifies whether a property calculates its status. To calculate the status, the property requires a status configuration.
- ▶ "Writable"
If the property is writable, then the property dialog in Industrial HiVision enables the "Write" button. The user can set the MIB variable on the device.
- ▶ "Bubble help propagation"
Specifies the number of levels on which Industrial HiVision propagates the value of this property. The more levels you enter here, the earlier you see the value in the bubble help.

4.2.5 Traps

The tab displays the traps that Network Management System found in the MIBs after a successful upload.

If you know the connection between an MIB variable and a trap, this tab allows you to change the value of the properties using traps.

Network Management System allows you to change traps that you set "Change after trap" as active in the "Advanced settings" in the "Properties" tab.

- Monitor the trap that is important for your MIB variable.

Note: As an advanced user, you disable the superfluous standard error messages.

4.2.6 Translations

Network Management System adds the English explanatory text defined in the MIB to the traps found. The "Translations" tab displays the explanatory text when after you queried the device. Network Management System allows you to translate or modify the English explanatory text and save the translation. The PSM then contains the translation. Network Management System also allows you to translate the properties defined by you. You have the option of translating both the designation of the property and the values.

4.2.7 MultiConfig™

The MultiConfig™ tab enables you to configure your PSM for MultiConfig™ dialogs of third party devices and ports. Network Management System displays the MultiConfig™ tab only for PSMs compatible with release 08.0.00 or above.

The MultiConfig™ function allows you to perform the following tasks:

- ▶ “New property”, create a new property for the device or port.
- ▶ “Remove”, delete a property from the device or port.
- ▶ “Edit image”, to edit the icon image of a property.
- ▶ “Import from PSM”, import properties from another PSM.
- ▶ “Expand”, displays the complete list of properties “Collapse”, hides every device property except the first sub-level.

5 Creating a PSM

Hirschmann protects the PSMs delivered in Industrial HiVision by default. Industrial HiVision lists the PSM, depending on the manufacture, as “Trusted”. Furthermore, Industrial HiVision prohibits you from overwriting the PSMs from the manufacture with PSMs you create yourself. You can, however, create PSMs for devices without PSMs and import them into Industrial HiVision.

Creating a simple PSM is fairly easy, but to develop a more complex PSM requires knowledge of the following subjects:

- ▶ The Simple Network Management Protocol (SNMP),
- ▶ the structure of Management Information Bases (MIB) in general,
- ▶ the structure of the manufacturer-specific MIB from which you incorporate manufacturer-specific variables into your PSM.

This chapter gives you step-by-step instructions for creating a PSM. Before you import a PSM into your operational Industrial HiVision system, save the Industrial HiVision project file. You can do this under the menu "File -> Save as" in Industrial HiVision.

This main chapter contains the following sub-chapters:

- ▶ “New PSM wizard”
- ▶ “Define basic parameters”
- ▶ “SysOID and image”
- ▶ “Define properties”
- ▶ “Save a PSM project”
- ▶ “Create translations (optional)”
- ▶ “Check and test the PSM”
- ▶ “Change an existing PSM”
- ▶ “Make MultiConfig™ dialogs for PSMs”

5.1 New PSM wizard

Network Management System provides you with a wizard to help create PSMs. When you start the Network Management System program you have the option of starting the wizard or opening an existing PSM. The wizard allows you to create a PSM by retrieving the MIB variables values from a dump or from a device. Advanced users can create a PSM from scratch, defining every MIB variable included in the PSM, but uploading a dump file into the wizard greatly simplifies the task.

This chapter describes the work steps used when creating a PSM with the New PSM wizard:

- ▶ Start the New PSM wizard and load the device MIB(s).
- ▶ Manage the SNMP access parameters.
- ▶ Enter the IP address.
- ▶ Perform the device request.

5.1.1 Start the New PSM wizard

The wizard allows you to extract the dump file and MIBs variables directly from a device. The extracted file, dump file, can be helpful when creating PSMs for devices of the same family. When a device is unavailable, before you begin, obtain the manufacturer-specific MIB(s) variables from a suitable, official source then save the MIB(s) locally.

To create a new PSM, perform the following work steps:

- Start the Network Management System program. After the program starts, the following options are available:
 - "Create a new PSM"
 - "Open an existing PSM"
 - "Close Network Management System"

- Open the New PSM wizard, click "Create a new PSM".
Network Management System opens the "New PSM Wizard" dialog. The dialog allows you to specify the following parameters:
 - "Industrial HiVision Version"
Specifies the Industrial HiVision start version for which the PSM is being created.
 - "IP address"
Specifies an IP address of a device available for MIB and "Dump file" extraction. After Network Management System completes the extraction Network Management System loads the device parameters in your PSM project and the wizard closes.
 - "Dump file"
Specifies the location of the device dump file, in xml format, obtained from the manufacture.
 - "Private MIBs"
Displays the manufacturer-specific MIB(s) and location of the MIB file saved previously.
 - "SNMP Access Parameters"
The dialog allows you to specify the SNMP login parameters.
To activate the "Encryption" frame, select v3 from the "SNMP Version" drop down menu. You can select either No Encryption, DES or AES encryption.
- When you extract the MIB variables from a device Network Management System loads the MIBs variables directly into your PSM project. To load the manufacturer-specific MIB(s) in the New PSM wizard, proceed as follows:
 - Click "Add"
Network Management System opens the "Choose MIBs" window allowing you to navigate to the location of the manufacturer-specific MIB(s) that saved previously.
 - Select the MIB(s) to enter in your project by either double clicking on the file, or highlighting the file(s) then clicking "Open".
Network Management System closes the wizard and opens the Device tab.

Note: A MIB may possibly have dependencies on other MIBs. Network Management System tries to resolve these dependencies itself by looking for the required MIB(s) in the same directory. If Network Management System does **not** find the MIB(s) causing the dependency, Network Management System outputs an error message with the name of the MIB(s). To resolve the error displayed, you make the MIB(s) available.

5.1.2 SNMP access parameter management

The wizard allows you to change the SNMP access parameters if necessary. The frame allows you to manage SNMP parameters as follows:

- ▶ add new SNMP parameters,
- ▶ edit existing SNMP parameters,
- ▶ delete existing SNMP parameters.

To add a new set of SNMP access parameters, you perform the following steps:

- Click "Add".
The "Add SNMP Credentials" dialog opens.
- Enter the user name or the password, or both.
- Click "Add".
Network Management System deletes the entry from the table.

Note: For SNMPv3 you require a user name and a password. For SNMPv1, leave the user name text field blank and enter the community name in the password field.

To edit an existing set of SNMP parameters, you perform the following steps:

- Select the entry to be edited.
Network Management System highlights the row in blue.
- Click "Edit"

- Change the user name or the password, or both.
- Click "OK".
Network Management System shows the changed SNMP access parameters in a table.

To delete an existing set of SNMP parameters, you perform the following steps:

- Select the entry.
Network Management System highlights the row in blue.
- Click "Delete"
Network Management System deletes the set of SNMP parameters from the table.

5.1.3 Enter the IP address

For the PSM new wizard of Network Management System to identify your device, the PSM new wizard requires the IP address of the device.

- Enter the IP address (v4) of your device.
- Click "Next".
After you click "Next", Network Management System opens the "Testing device reachability" window. Network Management System checks the reachability and the supported protocols of the device.
After the check, Network Management System opens the "SNMP Parameters" dialog with the discovered SNMP parameters.

Note: Network Management System allows you to change the SNMP parameters. Change the SNMP parameters only if you are very familiar with the device and know that the device has SNMP parameters different from the parameters that Network Management System discovered.

5.1.4 Perform the device request

To now request the device information, you perform the following step:

- Click "Finish"

Network Management System opens the "Perform request" window.

Note: Requesting the device information can take several minutes. In some cases, an agent has 40,000 values or more.

When you have carried out the steps described in this chapter and have performed a successful request, Network Management System displays the following information:

- ▶ "PSM" tab, displays the creation, edition, and identification parameters.
- ▶ "Device" tab, displays the detected device and the associated SysOID.
- ▶ "Properties" tab, displays the detected device properties.
- ▶ "Traps" tab, displays the detected traps.
- ▶ "Translations" tab, displays the English descriptions of the traps.

5.2 Define basic parameters

This chapter describes how to define basic parameters of your PSM, for example, the name of the device. The "PSM" tab contains the basic parameters referred to in this chapter.

You have carried out the steps described in the previous chapter.

To define basic parameters of your PSM, you proceed as follows:

- Open the "PSM" tab.
- Specify the internal name of the PSM.
- Enter the visible name of the PSM.
- Enter the description of the PSM.
- Enter the copyright of the PSM.
- Enter the author name of the PSM.
- Enter the manufacturer name.
- Enter the version of the PSM.

Note: If you have forgotten a parameter in a mandatory field, Network Management System reminds you of the empty field when you use the "Check PSM" or "Test PSM" function.

5.3 SysOID and image

After Network Management System loads the MIB variable values of a device, the System Object Identification (SysOID) of this device is shown here. You can change the SysOID and the device icon (image) in the "Device" tab. Changing the SysOID allows you to create PSMs for entire device groups.

Network Management System allows you to change the SysOID. Delete numbers from the existing SysOID allows you to create device groups.

If the SysOID you have entered ends with a point, this entry is valid for the devices whose SysOID begins with the value in front of the point for example:

- ▶ SysOID of device family: 1.3.6.10
- ▶ Device A: 1.3.6.10.2
- ▶ Device B: 1.3.6.10.3
- ▶ Device C: 1.3.6.11.5
- ▶ Devices A and B are within the range of the PSM, and device C is outside of the range.

5.3.1 Add a SysOID and image to the PSM

Network Management System allows you to add a SysOID and an image. When you select a representative image for every device family of a manufacturer, this increases the recognizability in Industrial HiVision. The images in Network Management System have the dimensions 64 px × 64 px. When you install Network Management System, numerous icons are available to you in various categories.

To add a SysOID and an image, you proceed as follows:

- Open the "Device" tab.
The tab displays the product name, the SysOID, the SNMP access parameters, the management protocols, and supported protocols of your device.
- Click "Add".
Network Management System opens the "Device identification" window.
- Enter the SysOID and the product name.
- Click "Select".
Network Management System opens the "Select" window.
- Navigate to the image of your choose. To enlarge the image, click on it.
- Highlight the image.
- Click "Select".
Network Management System now displays the image in the "Device identification" dialog.
- Click "OK".
Network Management System displays the changes in the table of the "Device" tab.

Note: Assign an image to the SysOID(s).

5.3.2 Changing the SysOID and image

When you select a representative image for every device family of a manufacturer, this increases the recognizability in Network Management System. Images in Network Management System have the dimensions 36 px × 36 px.

If you have not assigned an image to the SysOID(s) so far, perform this step now. If you have already assigned an image, Network Management System allows you to replace the image. If you only intend to assign or replace an image, you leave the SysOID and the product name unchanged. If you do not intend to replace the image, skip to the relevant step.

To change the SysOID and replace the image, you proceed as follows:

- Open the "Device" tab.
The "Device" tab displays the identification and images, the SNMP access parameters, and the protocols of your device.
- Select the row to edit in "Identification and Images" table.
- Click "Edit".
Network Management System opens the "Device identification" dialog.
- Change the SysOID.
- You can use any MIB variable for additional device identification, however, using sysDescr.0 is recommended. Marking the "Additional device identification" checkbox activates the following fields:
 - MIB Variable
 - Instance
 - Value
 - Vendor

Use the following steps to assign or replace an image:

- Click on the image.
Network Management System opens the "Select image" window.
- Navigate to the image of your choose.
- Select the image.
- Click "Select".
Network Management System displays the file name of the new image next to "Image" in the "Device identification" dialog.

The last work step completes the process and enters the changes in the PSM project.

- Click "OK".
Network Management System displays your changes in the table.

5.3.3 Deleting the SysOID

To delete an entry from the table, you proceed as follows:

- Select the row.
- Click "Delete".
Network Management System deletes the entry from the list.

5.4 Define properties

Network Management System allows you to assign multiple properties to every PSM. In turn, you assign to every property a MIB variable, which you then configure according to your requirements.

The prerequisite for completing the work steps in this chapter is that you have carried out the work steps described in the previous chapters.

5.4.1 Create or remove a property

When you create a PSM in Network Management System, the program displays the discovered properties device tree (left side panel) of the "Properties" tab. You can add a property to the PSM project as long as the associated MIB is available in the same project.

To create a new property, you proceed as follows:

- Open the "Properties" tab.
- Right-click a property or folder in the property tree.
- Select `New property` from the drop-down list.
Network Management System opens the "Input" window.
- Enter the name of the property in the `New property` field.
- Click "OK".
Network Management System creates the new property as a sub-property in the device tree.

After you create the new property, you can configure the PSM to display a specific attribute in the "Devices" tab of Industrial HiVision.

To have the PSM display the desired attribute in Industrial HiVision, you proceed as follows:

- Select the new property in the property tree.
- In the "Property type" field, mark the "Bind to" checkbox.
- Select the desired attribute from the "Bind to" drop-down list. You can select from the following attributes:
 - chassis number
 - serial number
 - firmware version
 - MAC Address
 - Configuration Signature

Note: You can specify only 1 attribute per property.

Optional: to select an image for the property, you proceed as follows:

- Select the property that you want to edit in the device tree.
- In the "Properties type" frame, next to the "Image" text field, click "Select".
- Navigate to the folder containing your image.
- Select the image.

The window displays a larger image allowing you to verify that you selected the proper image.
- Click "Select".

Network Management System displays the file name of the image in the "Image" field.

To remove a property, you proceed as follows:

- Right-click a property or folder in the device tree.
- Select "Remove" from the drop-down menu.

Network Management System opens the "Remove" message window.
- Click "Yes".

Network Management System deletes the property from the device tree.

5.4.2 Available Features

In addition to the information imported into the MIBs tab, your PSM can contain other information about the device. The Features frame of the Properties tab allows you to select what device information your PSM contains.

Note: Verify that the MIB values are correct for your PSM after MIB importation.

■ The Standard MultiConfig™ Dialogs Feature

After you create and import a PSM into Industrial HiVision, Industrial HiVision allows you to specify the basic parameters. Basic parameters are, System Name, System Location, and System Contact information.

The Standard MultiConfig™ Dialogs feature allows you to include additional dialogs in the PSM. When you activate the feature, the PSM includes the following dialogs and properties.

- ▶ Switching> Global dialog
 - Aging time
- ▶ Switching> Multicast> GMRP dialog
 - GMRP
- ▶ Switching> VLANs> Table
 - VLAN ID
 - VLAN name
 - GVRP
- ▶ Redundancy> Rapid Spanning Tree dialog
 - Version
 - Priority
 - Hello Time
 - Forward Delay
 - Maximum Age
 - Tx Hold Count
- ▶ Diagnostics> Status Configuration> Global dialog
 - Authentication Trap
- ▶ Port -> Port Configuration -> Manual configuration dialog

- ▶ Port -> Port Configuration -> Automatic configuration dialog
 - Autonegotiation
- ▶ Port -> Port Prioritization dialog
 - Priority
- ▶ Port -> Rapid Spanning Tree dialog
 - Stp Active
 - Port Path Cost
 - Port Priority
 - Admin Edge Port
 - Auto Edge Port
- ▶ Port -> VLANs -> Settings dialog
 - Port VLAN ID
 - GVRP
 - Ingress Filtering
 - Acceptable Frame Types

Note: If you create a new PSM in HiFusion and activate the Standard MultiConfig™ Dialogs feature, then the dialogs are displayed in Industrial HiVision after you import the PSM. This way you can configure other third party devices using the same PSM.

5.4.3 Add a MIB variable to a property

In order for the PSM to display information associated with the property in Industrial HiVision, the PSM searches the device for the MIB variable and retrieves the information contained in the device.

To create a MIB variable for the new property, you proceed as follows:

- Select the property that you want to edit in the device tree.
Network Management System displays the name and the token for the property.
- In the "Properties type" frame, next to the "MIB Variable" text field, click "Select".
Network Management System opens the "MIB variable selector" dialog.

- In the search field you enter the name of the MIB variable, part of the name, or a search term.
- Double-click the row in the table.
Network Management System displays the name of the selected MIB variable in the "Properties type" frame, "MIB variable" text field.

5.4.4 Reconfigure MIB variables

In order to tailor MIB variables to your requirements, Network Management System allows you to reconfigure and change the content in the MIB variables.

The following options are available to you:

- ▶ convert the values of a MIB variable,
- ▶ create mapping,
- ▶ create status configuration.

Additionally, Network Management System allows you to perform many other settings on the "Properties" tab.

Note: The selection in the "Data type" field restricts or expands your options for the following input fields in the "Properties" tab. Industrial HiVision proposes a data type for the selection of a MIB variable. You only change the data type if you know that the variable has another data type.

■ Convert figures

Network Management System allows you to convert values linearly ($y = a \times x + b$). An example of such an operation is the conversion from °C to °F.

This example defines the values for temperature conversion:

- ▶ Factor = $a = 1.8$
- ▶ Offset = $b = +32$

- ▶ Value in the agent = x , for example, 50 °C
 - ▶ Value in Network Management System = y
- When you enter the values in the equation, $y = 1.8 \times 50 + 32 = 122$, Industrial HiVision returns the value output: 122 °F.

■ Create mapping

Some values defined in the MIB variable are numerical. In order to create a meaningful output of the values Network Management System allows you to map the output to a word.

This is an example of mapping using the `ifAdminStatus` variable:

- ▶ Output from the agent = 1
Meaning = `up`
- ▶ Output from the agent = 2
Meaning = `down`
- ▶ Output from the agent = 3
Meaning = `testing`

The mapping assigns the meaning to the numeric value.

Note: If you have loaded the relevant MIB for the MIB variable, Industrial HiVision creates the mapping automatically for MIB variables of the Enum type.

■ Create status configuration

When you select the data type option, Network Management System allows you to specify a particular status configuration. The status configuration allows you to specify parameter condition monitoring.

The following list displays which data type Network Management System associates with which status configuration:

- ▶ `String`: comparison with a reference text.
- ▶ `Integer`: comparison with upper and lower thresholds.
- ▶ `Float`: comparison with upper and lower thresholds.
- ▶ `Enumeration`: a status can be assigned to every possible value.
- ▶ `MAC Address`: comparison with a reference text.
- ▶ `IP Address`: comparison with a reference text.

The following list describes the procedure for the status configuration of an integer data type:

- Mark the "Advanced settings" checkbox.
- Mark the "Status configuration" checkbox.
- Click "Edit".
Network Management System opens the "Status configuration" dialog.
- In "Threshold 1:" enter 10.
- In "Threshold 2:" enter 40.
- Using the drop-down menu next to the "Value Below threshold 1:" text field, select `Error`.
- Using the drop-down menu next to the "Value Below threshold 2:" text field, select `Warning`.
- Using the drop-down menu next to the "Value Below threshold 3:" text field, select `OK`.
- Click "OK".
You return to the "Properties" tab.

Now when Industrial HiVision monitors the property, it displays the icon background in the various colors depending on the actual value in the device.

5.5 Save a PSM project

Undoing changes to the PSM project can sometimes be difficult, or cause a lot of work. For this reason, save the project often.

Network Management System gives you the following options to save a PSM project:

- ▶ Save as
- ▶ Save

Note: If you only generate the **PSM** you no longer have the option of editing the PSM. If you save the **PSM project** you still have this option. Similarly, anyone to whom the PSM project is available can edit the PSM project. You can save the project by generating a PSM. Network Management System saves the project with the correct file name and the version number appended. Start with a version number of 001, and increment the version number after every save, so that you can go back to a previous version. Reserve 100 for the final version.

5.5.1 Save as

The "Save as" option allows you to save your project in a specific location.

- When saving the project for the first time, click File> Save as.
Network Management System opens the "Select location for saving" window allowing you to navigate to a particular location and save your project.
- When subsequently saving the project, click File> Save (Ctrl+S).
Saves your PSM project in the previously selected location.

5.5.2 Save

When you save your PSM project for the first time, Network Management System follows the same procedure as for Save as. Otherwise, Save (Ctrl+S) saves your PSM project in the last location used.

- Click File> Save (Ctrl+S).
 - You have saved your PSM project.

5.6 Create translations (optional)

The "Traps" tab displays the SNMP traps that Network Management System imported when you loaded the project load. The imported traps contain the English descriptions for the traps as seen in the "Translations" tab. Network Management System allows you to change the English descriptions and create descriptions for the other languages.

The prerequisite for editing the descriptions is that you have carried out the steps described in the previous chapters.

To create a description or descriptions for the various languages, you proceed as follows:

- Open the "Translations" tab.
- To edit descriptions for a single language or multiple languages, in the right-side panel, mark the "Use" checkbox for each required language. Network Management System creates a column in the table for each language selected.
- Select the row with the description that you want to translate.
- Click "Edit".
- Fill each empty field with the trap description.
- Click "Save".

Network Management System displays your description in the table.

Note: Fill in every empty field. Otherwise, Network Management System detects a warning and displays a message, and Network Management System aborts the PSM creation.

5.7 Check and test the PSM

After you enter the necessary information to create a basic PSM, the next step is to check the PSM to verify that the required information is indeed present in the PSM. Network Management System detects and displays any mistakes or missing information.

After creating a PSM, Network Management System allows you to verify the contents of PSM project with the following options:

- ▶ Check PSM
- ▶ Test PSM

The prerequisite for checking the PSM project is that you have carried out the steps described in the previous chapters.

5.7.1 Checking the PSM

Network Management System checks whether you have filled the mandatory fields. Network Management System also checks whether the values entered fulfill the specifications for example, no spaces in the PSM name. You get feedback from the program in the "Errors and Warnings" window. The window displays the detected missing information or mistakes found during the check. Furthermore, Network Management System automatically checks the PSM before creating a PSM project.

The message window displays information about the following detected error conditions:

- ▶ the severity of the error or warning,
- ▶ the location of the error or warning,
- ▶ the reason for the error or warning.

Network Management System allows you to check the PSM at any time. When saving the PSM, Network Management System automatically performs a check.

To check the PSM, you proceed as follows:

- Click PSM> Check PSM.
Network Management System opens a message window which displays the results of the check.
- When Network Management System displays the message window "No errors or warnings found", click "OK". The PSM project is ready for testing.
- If Network Management System displays the "Errors and Warnings" window, change the entries accordingly and recheck the PSM.

5.7.2 Testing the PSM

For the testing the PSM project, Network Management System starts a test environment similar to Industrial HiVision. Network Management System loads the PSM into this test environment.

The following options are available to test the PSM:

- ▶ Virtual test environment
Network Management System accesses data stored in the PSM project and simulates the Industrial HiVision program:
 - "Internal agent": the agent simulated by Network Management System only supports SNMPv1. This means the SNMPv3 always displays the agent as unreachable.
Furthermore, the MIB of the simulated agent is a snapshot, the MIB values are static.
 - "Custom agent dump": allows you to test a MIB dump of a device from the same family.
- ▶ Directly on the device
When the device that the PSM represents is available in the network, Network Management System allows you to enter the IP address of the device so that you can test the PSM directly on the device.

■ Test PSM with the internal agent

To test the PSM with the internal agent, you proceed as follows:

- Click PSM> Test PSM.
Network Management System opens the "Test PSM" window.
- Verify that the "Virtual device" radio button is active (default: active).
- Verify that the "Internal agent" radio button is active (default: active).
- Click "Test".
Network Management System opens the "Loading test kernel" message, and checks your PSM. After Network Management System completes the check, the "Kernel" dialog opens. The dialog displays your properties in the same position on the device tree as when you created them. At this time note the IP address and SNMP Port number. You use the information later when importing the PSM into Industrial HiVision.
- Click "Close".
Network Management System returns you to the program window.

■ Test PSM with an external agent

To test the PSM on an actual device, you proceed as follows:

- Click PSM> Test PSM
Network Management System opens the "Test PSM" dialog.
- Click the "IP of real device" radio button.
Network Management System activates the IP address text field.
- Enter the IP address of the relevant device.
- Optional: Click "Port" and enter a port number.
- Click "Test".
Network Management System opens the "Loading test kernel" message, and checks your PSM. After Network Management System completes the check, the "Kernel" dialog opens. The dialog displays your properties in the same position on the device tree as when you created them. At this time note the IP address and SNMP Port number. You use the information later when importing the PSM into Industrial HiVision.
- Click "Close".
You return to the program window.

Network Management System retrieves the values displayed in the "Kernel" dialog directly from the device. To change the values in the "Kernel" dialog, you can change any value in the device and conduct a "Rescan".

5.8 Generating a PSM

Generating a PSM allows you to incorporate the device into the Industrial HiVision network management system. Whenever Industrial HiVision discovers the relevant device, Industrial HiVision uses the PSM to display the device information.

The prerequisite for generating the PSM is that you have carried out the steps described in the previous chapter.

To generate a PSM, you proceed as follows:

- Click `PSM> Generate PSM`.
Network Management System checks the PSM and returns an error message if a field has been filled incorrectly.
Network Management System opens the `Generator Settings` window.
- Optional: To only create the PSM, remove the mark from the "Save PSM project" checkbox.
- Optional: Select a path for the location to which the program saves the PSM project.
The file is saved as a zip file. It is strongly recommended that you do not change the file name. The digits at the end of the file name are the digits you entered as the PSM version number.
- Select a path to which the program saves the PSM.
It is strongly recommended that you do not change the file name, as Industrial HiVision uses this naming format and file extension.
- Click "Generate".
Network Management System opens the "Message" window. You receive a message stating that Network Management System has successfully created the PSM.
- Click "OK".
You return to the program.

5.9 Change an existing PSM

Network Management System allows you to change existing PSMs so that you can create different PSMs for other devices.

The prerequisite for changing an existing PSM is that you have a PSM, and the required MIBs saved locally.

To change an existing PSM project, perform the following steps:

- If you already have the Network Management System program open, then click `File> Open`.
Otherwise, open the Network Management System program, click `Open an existing PSM`.
Network Management System opens the `Open PSM project` window
- Navigate to your existing PSM project.
- Click "Open".
You see the various entries on the various tabs.
- Edit the PSM project according to your requirements.

5.10 Make MultiConfig™ dialogs for PSMs

The MultiConfig™ tab allows you to make a MultiConfig™ dialog that Network Management System saves in the PSM. If your PSM includes the MultiConfig™ dialog, then you can use MultiConfig™ to configure several devices at the same time.

5.10.1 Create or remove a MultiConfig™ dialog

Network Management System allows you to change and remove the MultiConfig™ dialogs when your device changes.

Note: The port configurations do not work for devices with modules.

To define a new dialog in the MultiConfig™ tree for a PSM you previously defined, proceed as follows:

- To create a new property node for devices, in the “Configuration” tree, right-click the “Device settings” object. To create a new property node for ports, right-click the “Port” object.
- Click the “New Property” option.
- Enter the name of the dialog.
- Click the “OK” button.
After you click the “OK” button, HiFusion opens the dialog.
- To configure the new property, click the “Add config” button.
- In the first blank text field, enter a label name for the property. HiFusion automatically generates and adds the token in the “Translations” tab.

- In the second blank text field, enter the MIB variable for the property.
Optional: To select a MIB variable from the MIB variable selector, click the “Select” button.
- Select the property type from the drop down list:
 - ▶ Integer
 - ▶ String
 - ▶ Boolean
 - ▶ Option
- Click the “Select” button.
HiFusion opens the “MIB variable selector” dialog
 - ▶ In the “Search” field, you enter the name of the MIB variable, part of the name, or a search term.
 - ▶ Double-click the row in the table.
HiFusion displays the name of the selected MIB variable in the “MIB variable” text field.

To remove a property from the MultiConfig™ tree, proceed as follows:

- Right-click the dialog that you want to remove in the “Configuration” tree.
- Click the “Remove” button.

HiFusion deletes the entry from the MultiConfig™ tree.

5.10.2 Change the dialog icon

When you select a representative image for every property, this increases the recognizability in HiFusion. Images in HiFusion have the dimensions 36 px × 36 px.

To assign or replace an image, use the following steps:

- Right-click the property.
- Select the “Edit Image” option.
HiFusion opens the “Select” dialog.
- Navigate to the image you wish to change.
- Highlight the image, click the “Select” button.

5.10.3 Import a dialog from another PSM

To import a dialog from another PSM to the MultiConfig™ tree, proceed as follows:

- Right-click the “Device settings” object or “Port” object in the “Configuration” tree.
- Click the “PSM Import” button.
HiFusion opens the “Open” dialog.
- Navigate to the property that you wish to import.
- Select the property, click the “Open” button.
- Navigate to the property that you wish to import.
- Select the property, click the “Open” button.

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B Readers' Comments

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Hirschmann Automation and Control GmbH
Department 01RD-NT
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C Further support

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A list of local telephone numbers and email addresses for technical support directly from Hirschmann is available at <https://hirschmann-support.belden.com>.

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