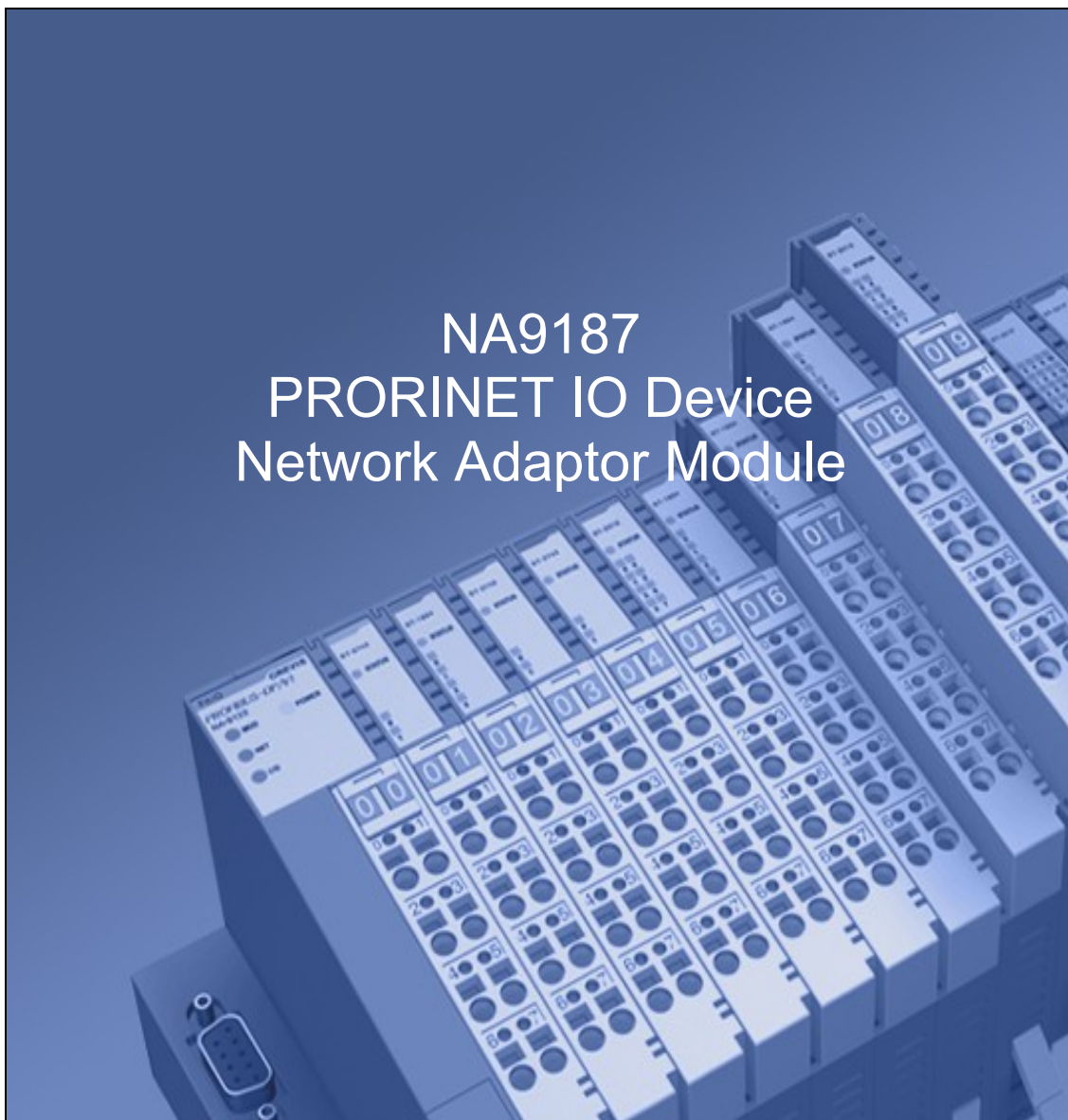


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# NA9187 PRORINET IO Device Network Adaptor Module

**FnIO S-Series**  
The modular fieldbus system for

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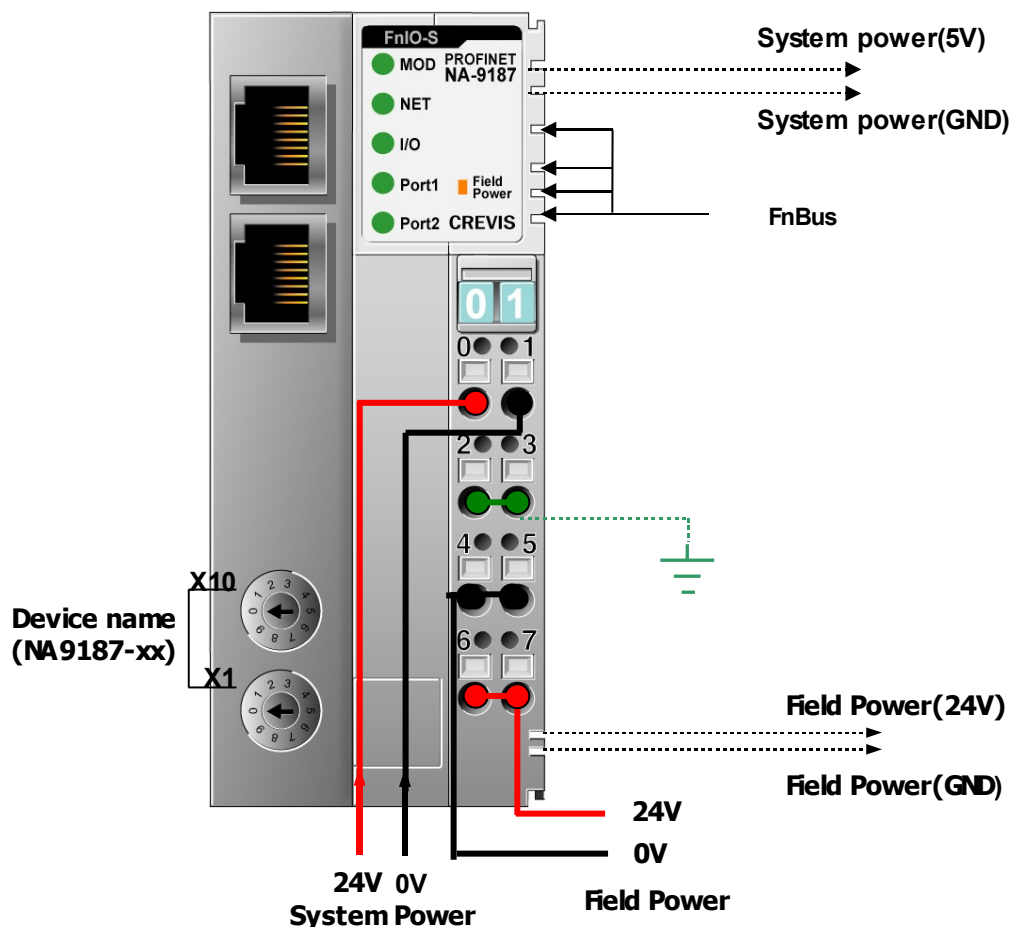
## I. Specification

### 1. NA-9187 description

#### 1.1. Technical specification

<b>Items</b>	<b>NA-9187 PROFINET IO Network Module</b>
<b>Communication Interface Specifications</b>	
Protocol	PROFINET IO RT,DCP,SNMP,LLDP
Station type	PROFINET IO Device
Topology	Line or Star topology
Number of Nodes	Limited by the IP address
Number of Expansion I/O slots	Max. 32 slots
I/O Data Size	252 Bytes inputs/252 Bytes outputs
Indicators	1 green/red MOD Status Indicator 1 green/red NET Status Indicator 1 green/red IO Status Indicator 1 green Port1 Link/Active Status Indicator 1 green Port2 Link/Active Status Indicator 1 green Field Power Status indicator
Communication Rate	100Mbps Full-Duplex
Module Location	Starter module - left side of FnIO system
<b>General Specification</b>	
System Power	Supply voltage : 24Vdc nominal Voltage range : 11~28.8Vdc, Protection : Output Current Limit (Min. 1.5A) Reverse Polarity protection
Power dissipation	115mA typical @24Vdc
Isolation	System power : Non- isolation System to Logic : Isolation
Field Power	Supply voltage : 24Vdc nominal Voltage range : 11~28.8Vdc
Protection class	IP20
Operating temperature	0°C... +55°C
Storage temperature	-25°C... +85°C
Humidity	90% no condensation
Current in jumper contacts	DC 10A maximum

## 1.2.Exterior view



## 1.3.Parameterization by rotary switch

Value	Description	Initial settings
0	- Name of station will be read from flash memory. (For example,NA9187-1) - IP address will be read from flash memory.	- Name of station : NA9187 - IP address :192.168.0.254
1~99	- Name of station will be NA9187-xx. (xx is the value of Rotary Switch) - IP address will be read from flash memory.	- Subnet mask : 255.255.255.0 - Gateway : 192.168.0.1

## 1.4.Reset to Factory settings(via rotary switch)

Value	Description
0	- The name of stations to empty string("") - The IP address,the subnet mask and the standard gateway to 0.0.0.0 - All other parameters to the default settings
1~99	- Name of station will be NA9187-xx. (xx is the value of Rotary Switch) - The IP address,the subnet mask and the standard gateway to 0.0.0.0 - All other parameters to the default settings

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## 1.5. Indication

### 1.5.1.MOD Led

Status	Meaning
Off	- Power off - HW fault
Red on	- Invalid bootimage header(Flash),ROM Bootloader
Red Blinking(1S)	- Invalid RAM Image
Red Blinking(0.2S)	- OS Fatal error is occurred
Green Blinking(0.2S)	- OS handle unexpected exceptions
Green/Red Blinking(1S)	- When the DCP flash frame is received (Both MOD and NET Leds have same status)
Green Blinking(1S)	- IP address is 0.0.0.0
Green On	- Normal operation

### 1.5.2.NET Led

Status	Meaning
Off	- Power off - No connection has been established with IO-controller.
Red Blinking(0.2s)	- Invalid configuration.
Green Blinking(0.2s)	- PROFINET IO connection has been established. - Wait parameters.
Red on	- PROFINET IO connection is aborted after a data exchange has taken place.
Red Blinking(1s)	- PROFINET IO connection is aborted before a data exchange has taken place.
Green/Red Blinking(1S)	- When the DCP flash frame is received (Both MOD and NET Leds have same status)
Green Blinking(1s)	- PROFINET IO Data Exchange stop
Green On	- PROFINET IO Data Exchange Run

### 1.5.3.IO Led

Status	Meaning
Off	- Power off - No expansion module
Red on	- FnBus Init error
Red Blinking(1s)	- FnBus IO Update error
Green Blinking(1s)	- FnBus IO Data Exchange stop
Green On	- FnBus IO Data Exchange Run

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#### **1.5.4.Port1,Port2 Led : Link and activity**

<b>Status</b>	<b>Meaning</b>
Green on	- Link is up(Physical connection is established)
Green Blinking	- Active is present
Off	- Link is down

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## 2. NA9187 Parameter

<b>Parameter</b>	<b>Setting</b>	<b>Description</b>
<b>Word data type</b>	MOTOLORA *	Big Endian format(MSB-LSB)
	INTEL	Little Endian format(LSB-MSB)
<b>Stop action</b>	Clear output image to 0 *	All outputs are set to 0.
	Hold last valid output image	All outputs are remain the last value.
	Depends on IO's fault action parameters	Stop the FnBus communication.
<b>Reaction on FnBus error</b>	Clear input image	The input image is clear to 0.
	Hold last image	The input image remain the last valid value.
	Auto reset *	NA-9187 performs reset.
	Disconnect PROFINET	Stop the communication with Controller.
* : Default settings		

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### 3. NA-9187 PROFINET IO Characteristics

#### 3.1. Device identity

Item	Value
Vendor	CREVIS
Vendor ID	<b>0x0140</b>
Product family	CREVIS FnIO System
Device-ID	<b>0x9187</b>
Details	NA-9187 PROFINET IO Device

#### 3.2. Device Access Points

Item	Value
Module Ident Number	0x00009187
Details	NA-9187 PROFINET IO Device
Vendor Name	CREVIS
Order Number	NA-9187
Category	FnIO Network Adapter
Software Version	V1.010
Hardware Version	V1.02
Maximal Input Length	252 Bytes
Maximal Output Length	252 Bytes
Physical Slots	0..32
Minimal Device Interval	4 ms
Based on	NS9360
DNS Compliant Name	NA9187-address
Supports Extended Assignment of IP Address	No
Fixed in Slots	0
Instance Field of the Object UUID	1
Supports Multiple Write	No
Requires IOPS/IOCS	Yes
Requires Engineeringtool which supports at least GSDML Version	V2.0

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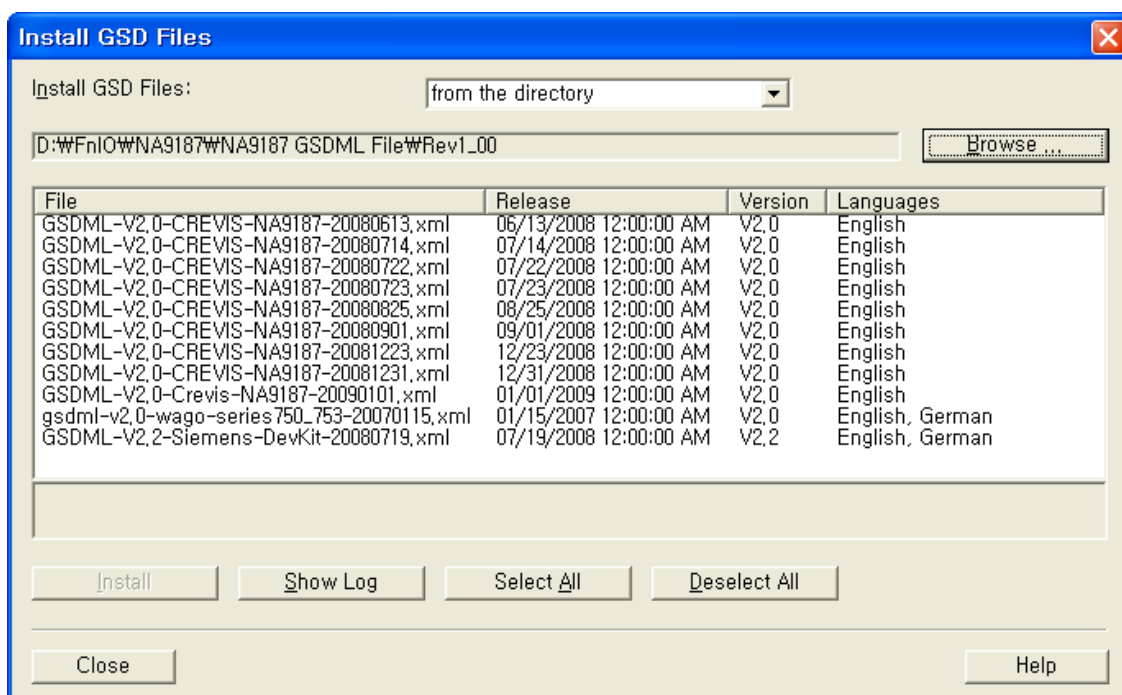
## II. Configuration guide

### 1. Install GSDML file

Copy GSDML file GSDML-V2.0-Crevis-NA9187-yyyyymmdd.xml and bitmap file and GSDML\_002A\_NA\_NA9187.bmp to your hard drive in the same directory.  
(yyyyymmdd : year,month,day)

Start STEP 7 HW Config and install the GSDML file.(**Options->Install GSD File...**)  
Select option for "install GSD files" as "from the directory".

**Caution :** The bit map file must be in the same folder as the GSDML file.



#### ● "Browse" button

Click the "Browse" button to navigate to the GSDML file.  
The field below the button displays the GSDML files in this folder with file name, release number, version as well as the languages available the GSDML file.

#### ● "Install" button

Click the "Install" button to start to install the NA9187 GSDML file.

#### ● "View Log" button

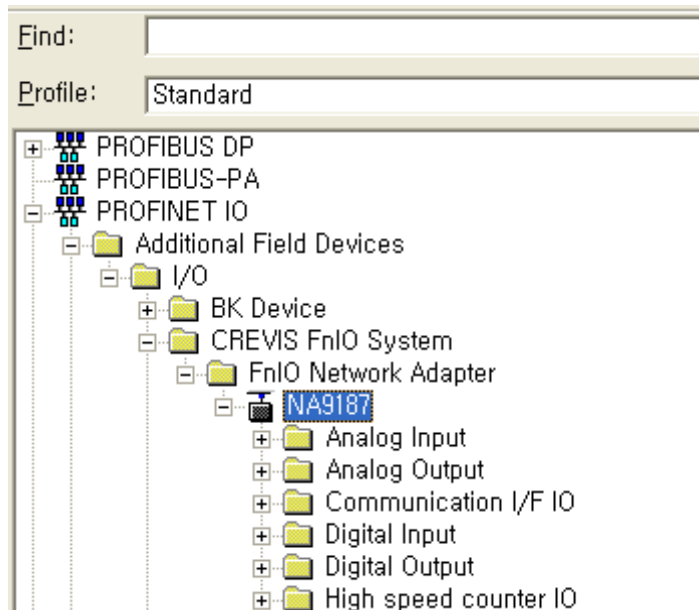
Click the "View Log" button to display a log of the previous installation procedure.  
During the installation, STEP 7 creates a log file in which all the files selected for installation are listed along with their statuses. If one or more GSDML files were already available or errors occurred during the installation, this information is listed in the log file.



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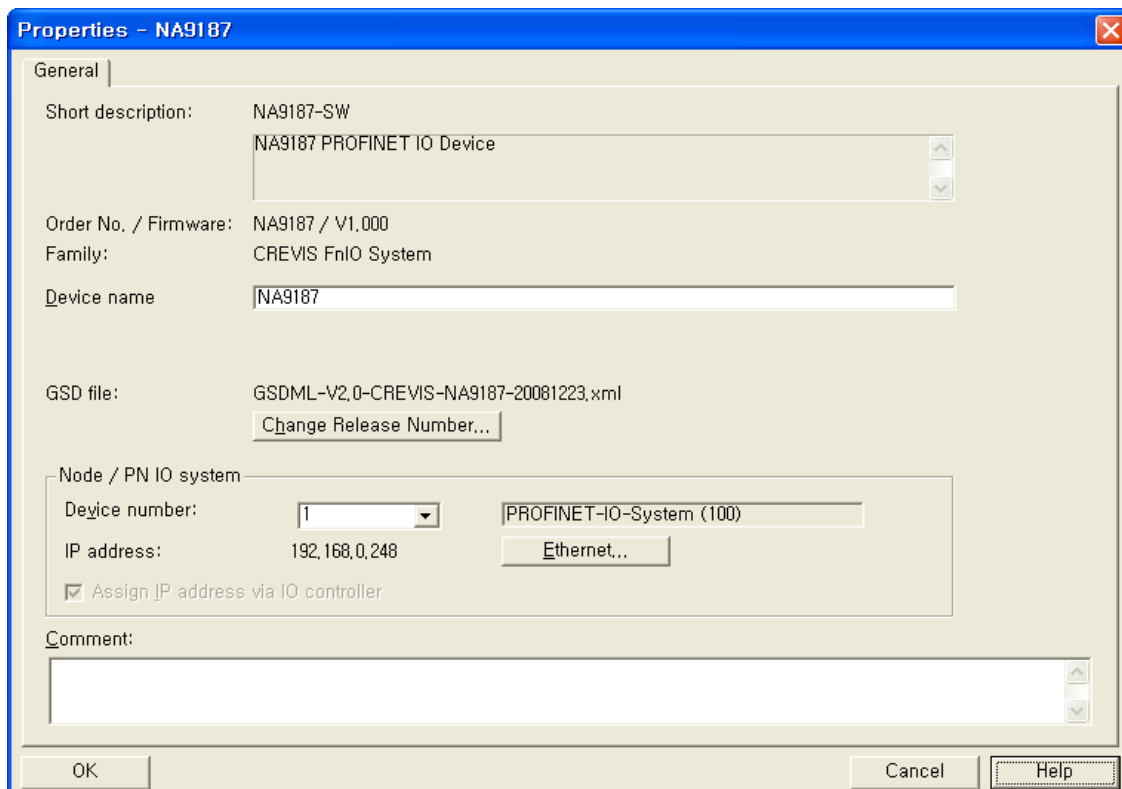
● **After installation of GSDML file**

You can then find the NA9187 device in the standard catalog as below picture.



## 2. Assign the device name

Insert a NA9187 node in your HW config and add the expansion IO modules according to your real configuration. If you double-click the node in HW config, a Properties dialog is appeared. You can set the name of the NA9187 and IP address.



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### ● Short description

The DNS compatible name "NA9187-SW" from GSDML file will be displayed. Here you will find a short description about the NA-9187 device, to the extent that this is available in the GSDML file. ("NA9187 PROFINET IO Device")

### ● Order no/Firmware

The order no and Firmware version from GSDML file will be displayed. (This firmware version could be differ from the version of real NA-9187 device)

### ● Device Name

#### **When the rotary switch is set to non-zero(1~99) :**

If the decimal value of the rotary switch is not zero(0), the name of device will be fixed as "NA9187-xx"(xx:1~99). You must put the fixed device name.

Value	Description
0	- Name of station will be read from non-volatile memory. (For example, "Node-1") - IP address will be read from non-volatile memory.
1~99	- Name of station will be NA9187-xx. (xx is the decimal value of Rotary Switch . eg. "NA9187-1") - IP address will be read from non-volatile memory.

#### **When the rotary switch is set to zero(0) :**

If the decimal value of the rotary switch set to zero(0), the device name will be read from non-volatile memory. You should put the same name as the name from non-volatile memory. If you want to read the name in non-volatile memory, please refer to Chapter 3. Editing ethernet nodes.

NA-1987 Devices on an PROFINET subnet must have unique names. The device names must satisfy DNS naming conventions. This means that the following rules must be observed:

- Names are limited to a total of 127 characters (letters, numbers, dashes or dots)
- Any component part (that is, a character string between two dots) of the device name may only be up to 63 characters long.
- Names cannot contain any special characters such as umlauts, parentheses, underscores, forward or backward slashes, empty spaces, etc. The dash is the only special character allowed.
- Names must not begin or end with the "-" or "." characters.
- Names must not have the format n.n.n.n (where n = 0...999).
- The device name must not start with numbers.
- Names must not begin with the character sequence "port-xyz-" (where x,y,z = 0...9).
- If you want to change the IP address in non-volatile memory, please refer to Chapter 3. (Editing Ethernet Nodes)

Device names are assigned to PROFINET IO device when the device is being set up and placed in operation for the first time ("commissioned").

The default name is "NA9187-SW"(see "Short Designation").

If several devices of the same type are arranged on the same PROFINET IO system, then STEP 7 automatically adds sequential number to the name from the GSD file. In this case, the second device has the extension "-1", the third one has the extension "-2", etc.

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## ● **GSD File**

The name of the GSDML file that is being used by STEP 7 to represent IO device and show its properties. If several NA-9187 GSDML files with different versions or releases are available in the STEP 7 data management, then the file with the latest GSDML schema version/release number is used to represent this device in the Hardware Catalog.

Click the "Change release number" button to display a dialog box in which you can access other versions and releases of GSDML files. This allows you to conveniently configure earlier NA-9187 devices or new NA-9187 devices.

## ● **Nodes on a PROFINET IO system**

Device number: the number of the NA-9187 device. You can use SFCs to evaluate the device number in the user program. In addition to the device number, the associated IO system also shown.

IP address: The IP address for the NA-9187 is normally automatically assigned by STEP 7. This address is based on the IP address of the IO controller. This automatically configured IP address is downloaded along with the hardware configuration to the IO controller. The IO controller assigns the IP address to the NA-9187 at startup.

- If the "Assign IP address via IO Controller" check box is selected, then the NA-9187 device receives its IP address at startup of the IO controller, as described above. To change this IP address, click the "Ethernet" button.
- If the "Assign IP address via IO Controller" check box is not selected, then NA-9187 device has to get its IP address from its non-volatile memory than the IO controller.
- If you want to change the IP address in non-volatile memory, please refer to Chapter 3. (Editing Ethernet Nodes)

### 3. Editing Ethernet Nodes(in non-volatile memory)

You can change the device name and IP address in non-volatile memory. To do this, select the "PLC → Ethernet → Edit Ethernet node..." menu command, which starts the dialog below.

Please check below condition :

- You must set PG/PC interface to Ethernet card on your PC.
- The NA-9187 devices must be in the same Ethernet subnet as the PG

#### ● IP configuration

STEP 1) Find out the MAC addresses of the available devices using the "Browse" button or enter the MAC address (assuming you know it).

!	IP address	MAC address	Device type	Device name
	192.168.0.248	00-14-F7-00-00-F3	CREVIS Fn...	na9187-1
	192.168.0.254	00-01-05-02-2A-11	BK Device	bk9103-2

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STEP 2) If this is the case, select the module with the known MAC address from the list displayed in the dialog after browsing the network.

STEP 3) Set the IP configuration; select from the following alternatives:

- Use IP parameters :  
If you opened the dialog based on a selected module, the IP address already has the values configured for the module. Otherwise, you must enter the IP address, subnet mask and if applicable the gateway.
- Obtain IP address from a DHCP server  
If you select this option, the IP address is obtained from a DHCP server. Depending on the selected option, the DHCP server is informed of the MAC address of the CP, the device name, or the client ID that you can enter here. The client ID is a string with a maximum of 63 characters. Only the following characters can be used: a-z, A-Z, 0-9 and - (dash)  
If you specify here that the DHCP server should obtain the IP address using a device name, you must first assign the device a device name.

STEP 4) Click the "Assign IP Configuration" button.

#### \* **"Flash" button**

**If you click "Flash" button, you trigger the sending of a DCP flash frame for the selected module. If the NA-9187 receives this frame, MOD and NET leds are flashing Green and Red one and after another.**

#### **Assigning Device Names**

If you configure a NA-9187 as a PROFINET IO device, you can assign the PROFINET IO device name here. The device name must be specified according to DNS conventions; in other words:

- Restricted to a total of 240 characters (letters, digits, dash or period)
- Restrictions regarding parts of the name within the device name; in other words, a string between two periods must not exceed a maximum of 63 characters.
- No special characters such as umlauts (? ?etc.), brackets, underscore, slash, blank etc. The dash is the only permitted special character.
- The device name must not begin or end with the "-" character.
- The device name must not have the structure n.n.n.n (n = 0...999).
- The device name must not begin with the string "port-xyz-" (x, y, z = 0...9).

**The device name must be unique in the Ethernet subnet (PROFINET IO system).**

Click the "Assign Name" button to transfer the device name to the device.

#### **Reset to Factory settings**

With the "Reset" button, you can reset the NA-9187 to the factory settings. The IP address is then deleted.

- IP address in non-volatile memory will be 0.0.0.0.
- Device name in non-volatile memory will be NULL("").

#### 4. Parameters,IO cycle time and port options

In HW config,there are several slots for a node.

Slot	Module	Order Number
0	NA9187-1	NA9187
X1	NA9187	
X1 P1	Port 1	
X1 P2	Port 2	
1	ST-2318	ST-2318
2	ST-2318	ST-2318
3		
4		

If you double click the specific subslot,you can set the parameters of each NA-9187 subslot.

- Slot 0 => You can set the parameters of NA-9187
- Slot 0 X1 => You can set IO Cycle time
- Slot 0 X1 P1 => You can set the settings for port-001
- Slot 0 X1 P2 => You can set the settings for port-002

#### ● Parameters for NA-9187 itself

If you double click Slot 0,you can set the parameters of NA-9187.

Parameter	Value
Parameters	
NA9187 Parameters	
Word data format	MOTOROLA
Stop action	Depends on IO's fault action parameters
Reaction on FnBus Error	Auto Reset

Parameter	Setting	Description
<b>Word data type</b>	MOTOLORA *	Big Endian format(MSB-LSB)
	INTEL	Little Endian format(LSB-MSB)
<b>Stop action</b>	Clear output image to 0 *	All outputs are set to 0.
	Hold last valid output image	All outputs are remain the last value.
	Depends on IO's fault action parameters	Stop the FnBus communication.
<b>Reaction on FnBus error</b>	Clear input image	The input image is clear to 0.
	Hold last image	The input image remain the last valid value.
	Auto reset *	NA-9187 perfoms reset.
	Disconnect PROFINET	Stop the communication with Controller.

\* : Default settings

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## ● IO Cycle

If you double click Slot 0 X1, you can see the IO Cycle Tab. The following can be set:

- **"automatic"**: STEP 7 finds the best solution for the user. The update time is kept as short as possible and as high as necessary, so that no errors or warnings can occur.
- **"fixed factor"**: You can set the reduction ratio with which the NA-9187 is updated (for example, factor 4 for update every fourth send clock pulse).

The screenshot shows a dialog box titled "Properties - NA9187 (X1)" with three tabs: "General", "Addresses", and "IO Cycle". The "IO Cycle" tab is active. It contains two main sections: "Update Time" and "Watchdog Time".

**Update Time Section:**

- Mode:** A dropdown menu set to "fixed factor".
- Update time [ms]:** A dropdown menu set to "4,000".
- Factor:** A dropdown menu set to "4".
- Send clock [ms]:** A text input field set to "1,000".

**Watchdog Time Section:**

- Number of accepted update cycles with missing IO data:** A dropdown menu set to "3".
- Watchdog time [ms]:** A text input field set to "12,000".

At the bottom of the dialog box, there are three buttons: "OK", "Cancel", and "Help".

**Update time [ms]** : The update time can only be changed when there are no synchronized PROFINET IO devices in the IO system.

**Factor** : Reduction ratio.

**Send clock [ms]** : Send clock set in the sync domain.

### **Number of accepted update cycles with missing IO data :**

To make adaptations in problem situations, you can change the default number of accepted update cycles with missing IO data (for example during commissioning).

This action will also indirectly change the watchdog time.

In much the same way as in a PROFIBUS system, exceeding the watchdog time will result in an error reaction (the IO device switches its outputs to a safe state).

**Watchdog Time** : The watchdog time is computed as follows:

Product of "Update Time" x "Number of accepted update cycles with missing IO data".

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## ● Port 1 or Port 2 : Topology Tab

If you double click Slot 0 X1 P1 or Slot 0 X1 P2, you can see the properties for port 1 or port 2.

### **Port Interconnection(read only)**

You can see the name of the local port.

Copper cable will be displayed as a medium for the local and partner port

### **Partners**

The NA-9187 devices can support topology configuration.

You can interconnect NA-9187 devices under "Partner port" when one of below conditions are meet.

- The port is connected to the PROFINET subnet.
- Other PROFINET devices are connected to a port on the subnet.
- The devices support topology configuration(NA-9187 supports this functionality)
- 

Select the required partner port from the "Partner port" drop-down list.

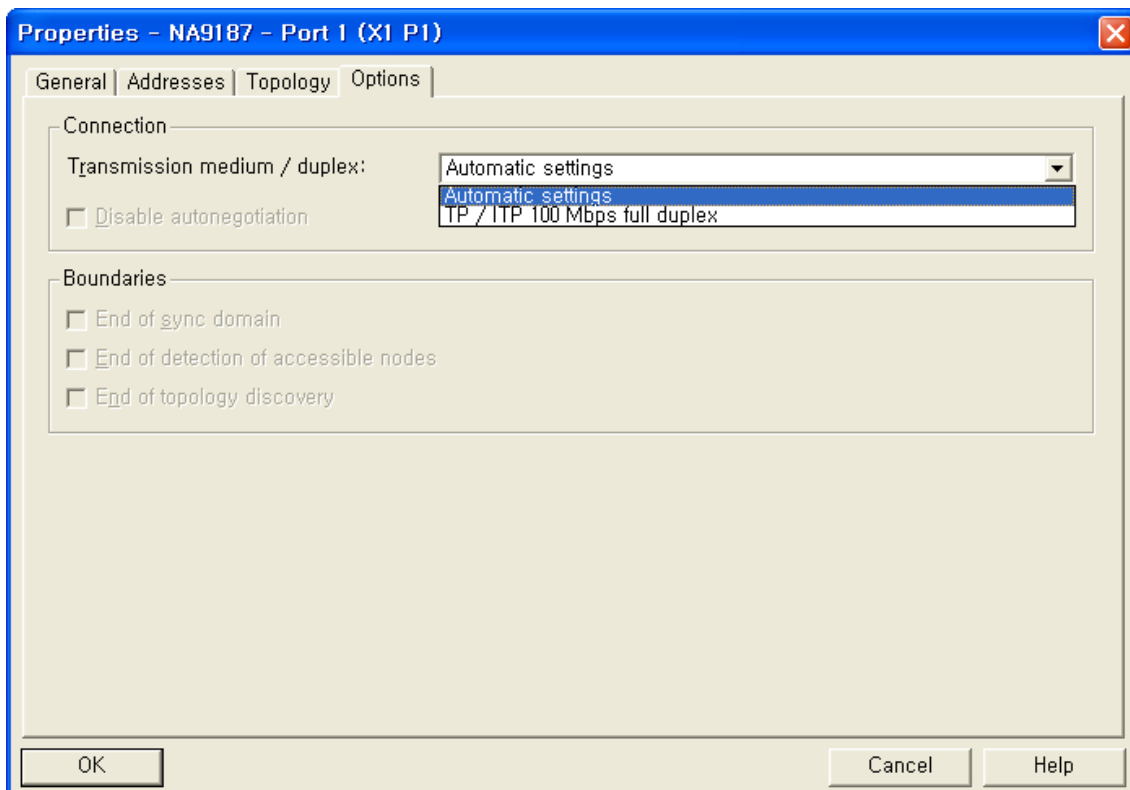
The default setting is "Any partner".

(We recommended the default setting in normal case.)



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● **Port 1 or Port 2 : Options Tab**



**Transmission medium / duplex**

If necessary, you can enter fixed port settings here. By default, "Automatic setting" is already selected. Usually, this setting will provide smooth, problem-free communication.

**Caution:** Ensure that the setting for the local port and the partner port are identical.

- Automatic settings :  
Recommended default setting for the port. The transmission settings are automatically "negotiated" with the partner port. "Autonegotiation" is also automatically enabled with this setting.
- TP / ITP 100Mbps full duplex :  
The effect depends on the setting "Disable auto-negotiation "

**Disable autonegotiation check box**

This check box can only be controlled when you have selected a concrete medium( TP/ITP with 100 Mbps full duplex). The check box has no effect with the automatic setting.

When the check box is selected, the defined setting of the port is forced, such as required for a quick start of the NA-9187. You need to ensure that the partner port has the same settings.

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## 5. Regarding Ethernet Switch

- The NA-9187 sends PROFINET IO RT frames which are marked with a **priority of 6**.
- The NA-9187 supports the **LLDP(Link Layer Discovery Protocol)** protocol which is extended by the PNO according to IEEE 802.1 AB.
- You can use any standard Ethernet switch which supports IEEE 802.3u 100Mbps, Full-Duplex ,and autonegotiation capability. Autonegotiation is also recommended.
- Optionally with PROFINET and recommendation,you can use a switch with QOS(IEEE 802.1q/p) for prioritization of PROFINET real time frames,SNMP for OSI Layer 1~4 diagnostics and topology detection.
- With the PROFINET IO capable switches,the NA-9187 devices can communicate to the PROFINET controller and send alarms based on the link status or other problems about topology. And you can add prioritization because the NA-9187 send realtime messages with the priority 6.

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### **III.F/W Upgrade guide**

- Turn on the NA-9187
- If you turn on the NA-9187,ftp server is working.  
This ftp server can be used for FW update purpose only.
- Log in the NA-9187 FTP server with any FTP client utility.
  - FTP host : the IP address of NA-9187
  - Port : 21
  - User : root
  - Password : crevis
- Upload the FW file **image.bin** on the NA-9187 FTP server.  
The name of FW file must be image.bin.Don't change the name of the FW.
- If the uploading process is finished,disconnect the connection of FTP.
- After a few seconds later,the NA-9187 will reboot by intself.  
Then the FW is updated succesfully.
- **Don't turn off the power before the NA-9187 execute rebooting.**