
Using a Modbus TCP to Profibus PA Gateway by IFAK system

Objective:	<ul style="list-style-type: none">• Learn how set up the gateway• Learn how the data is mapped
Equipment:	<ul style="list-style-type: none">• Web browser• Modbus TCP Client• Ethernet X0 cable or Ethernet switch and cables• Pactware 4.1 SP3 (works on XP or Windows 7 Professional)• SITRANS DTM• isNet Profibus DTM

While every effort was made to verify the following information, no warranty of accuracy or usability is expressed or implied.

Overview

Many gateways are available for use on the market. Siemens has tested a gateway made by IFAK systems called isNet MODgate. This gateway will provide a Modbus TCP/IP connection to Profibus PA, Profibus DP or HART modules. This guide will focus on the Profibus PA modules and show how to connect instruments to the network and access the information.

The Profibus PA module comes in two versions: a 2 segment and 4 segment variant. Currently the 2 segment is available in both 100 mA and 320 mA versions. The 4 segment is only available in a 100 mA version.

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Hardware Setup

isNet Lite is the Ethernet module which can have either PNGate or Modgate loaded. These features are loaded when you order the model. In the example below, we have chosen isNet Lite with Modgate option.

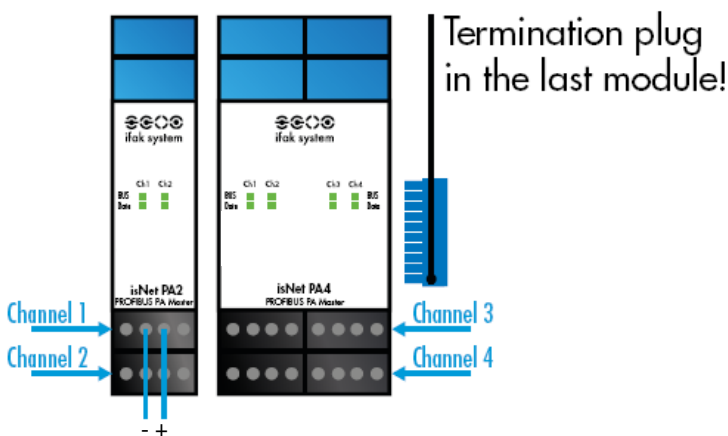


Up to five communication modules can be attached to one isNet Modgate module. The modules simply plug into one another using the side pins. On the last module, a termination plug is required.

Wiring

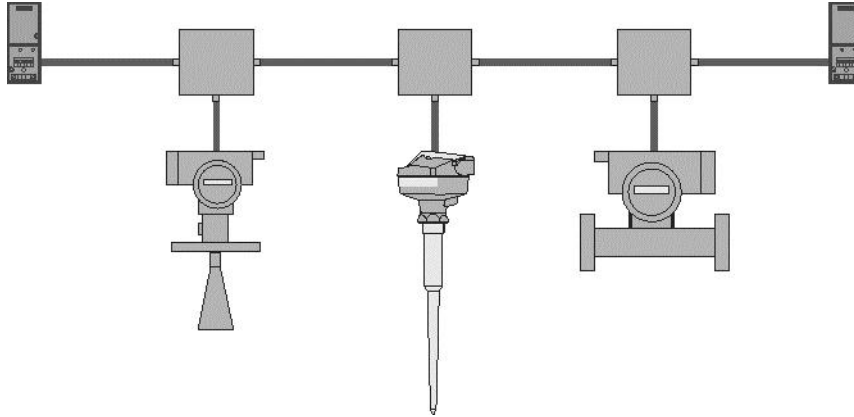
The modules run on 24 V DC. The isNet PA modules get their power from the isNet Lite module. Power is connected to the top terminals using the wiring diagram on the side of the module.

Profibus PA device also gets power through the isNet Lite module. Each channel is a segment with its own PA master. The general wiring is shown below.



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PA segment/channel is normally wired using a trunk line and spur lines as shown below:



Software Components

To fully integrate this gateway, you will need the following software components:

- web browser (for example: Internet Explorer that is part of Windows)
- PACTware (downloadable from IFAK)
- isNet DP DTM V1.0 (downloadable from IFAK)
- isNet Mod Gate Config Setup (from IFAK)
- Modbus TCP client (eg. Modscan32)
- SITRANS DTM (from Siemens service and support)
- EDD for SITRANS DTM for the Siemens instruments you have

The IFAK software can be downloaded from:

<http://www.ifak-system.com/en/communication-automation/downloads/>

with the exception of isNetModGate Config Setup – contact IFAK support at: <http://www.ifak-system.com/en/communication-automation/support/>.

Siemens SITRANS DTM and EDD for SITRANS DTM can be downloaded from:

<http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo&lang=en&siteid=csius&aktprim=0&extranet=standard&viewreg=WW&objid=45498418&treeLang=en>

Software setup

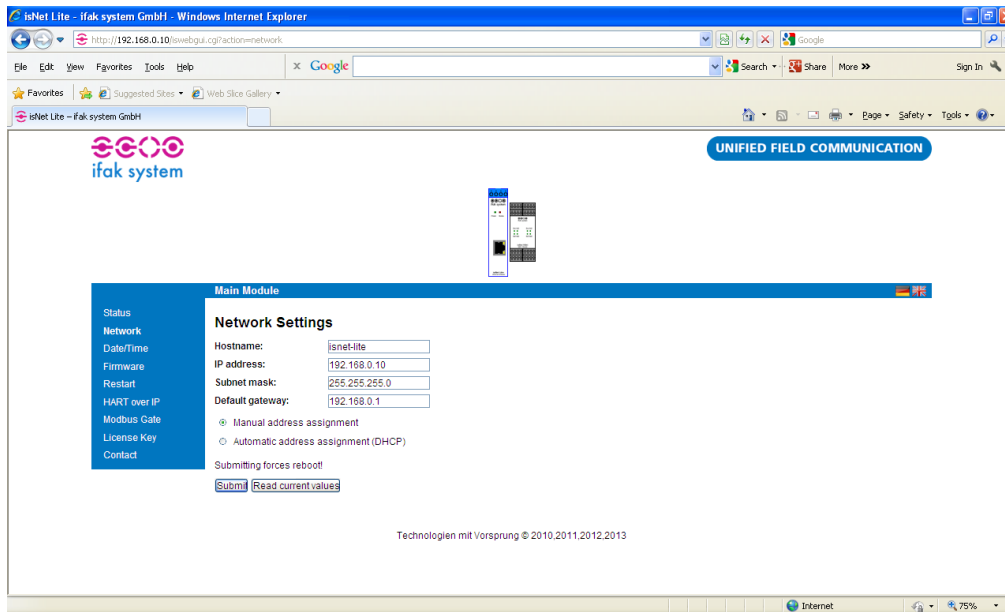
1. Setting the IP address

The default IP address of the gateway is 192.168.0.10.

For your computer to access this range, you will need to change your network TCP/IP settings to use an IP address so that the first three octets match the IFAK module: the IP address needs to be in the range of 192.168.0.xx where xx is between 1 and 254 but not 10. Also the subnet will need to be set to 255.255.255.0.

Using a web browser, you can change the IP address through the network screen shown below:

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You have two options: setting the values manually or using DHCP. Please note that changing these values and clicking the submit button will cause a reset.

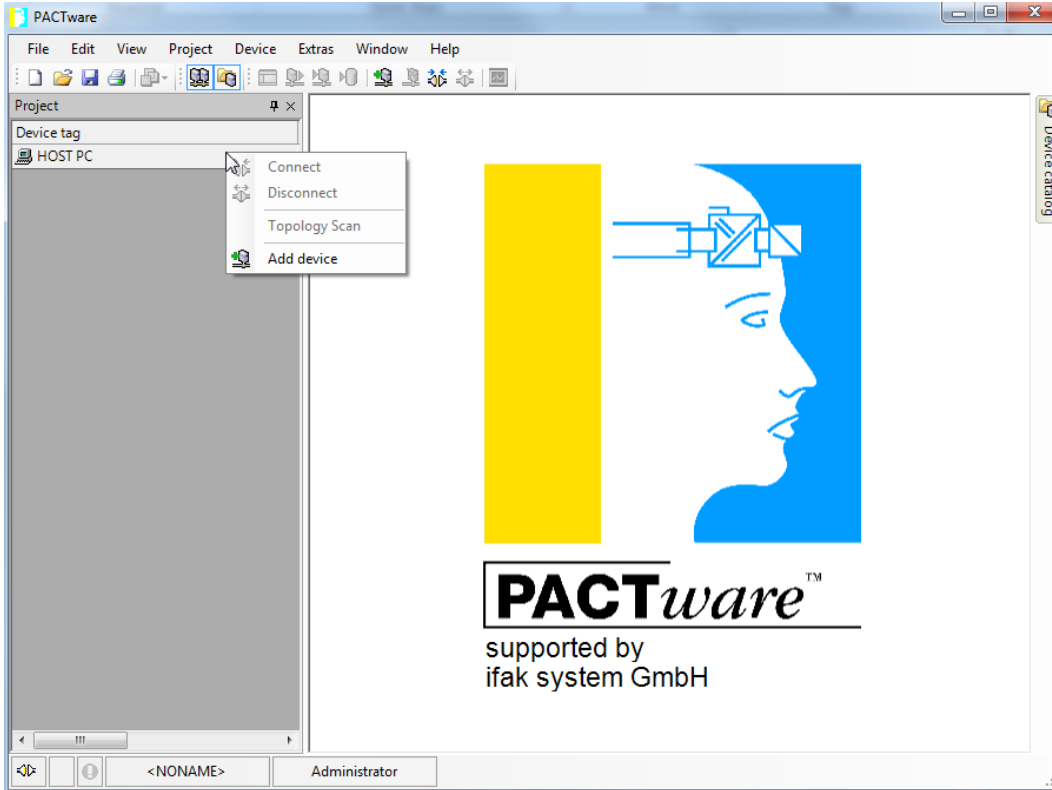
2. Profibus Communications:

The Profibus instruments need to have their addresses set to an address from 3 to 125. A special GSDML file will need to be generated to let the isNet PA module know what instrument is at what address.

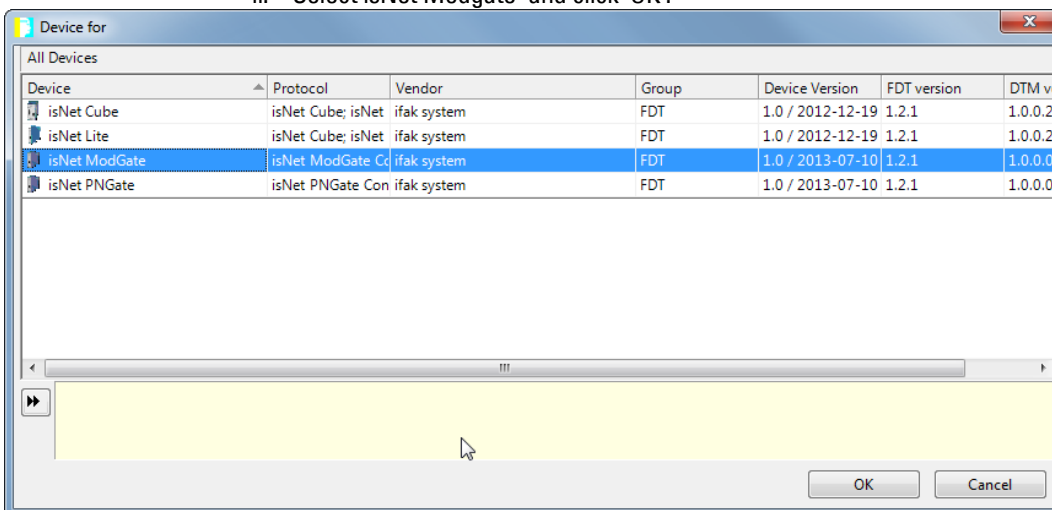
- a. Verify that you have all the GSD files of all the instruments that you want to attach to the isNet PA. Save these to a directory that you can reference later.
- b. Lay out your network so that you know which instrument is at what address.
- c. Run Pactware with Modgate DTM installed and do the following:

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- i. Run PACTware and right-click on **HOST PC** and select **Add device**.

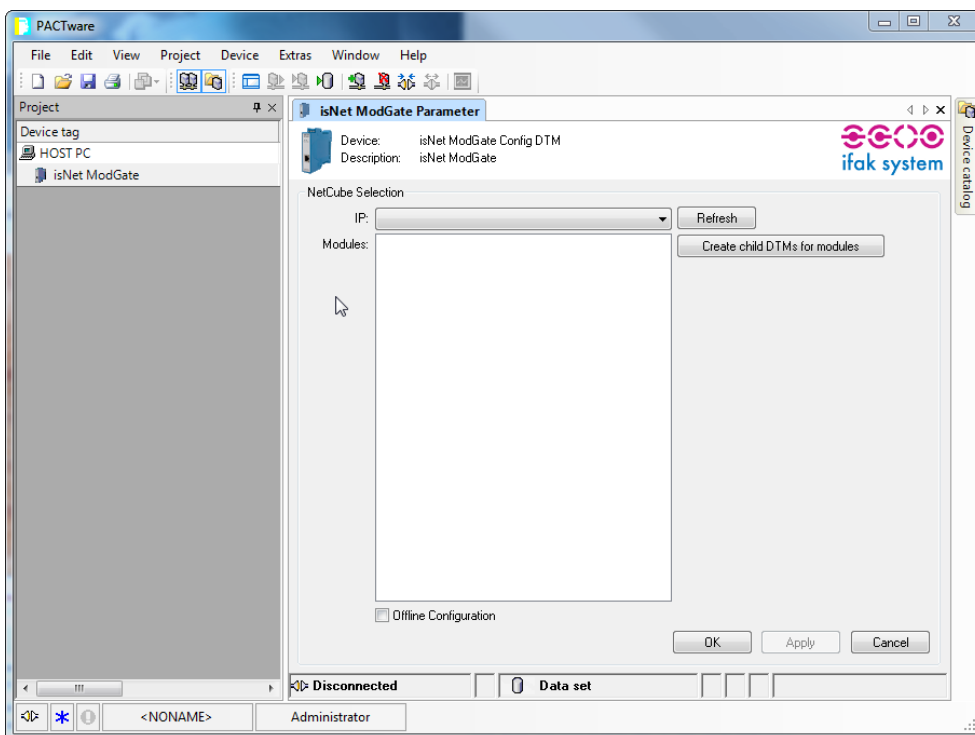
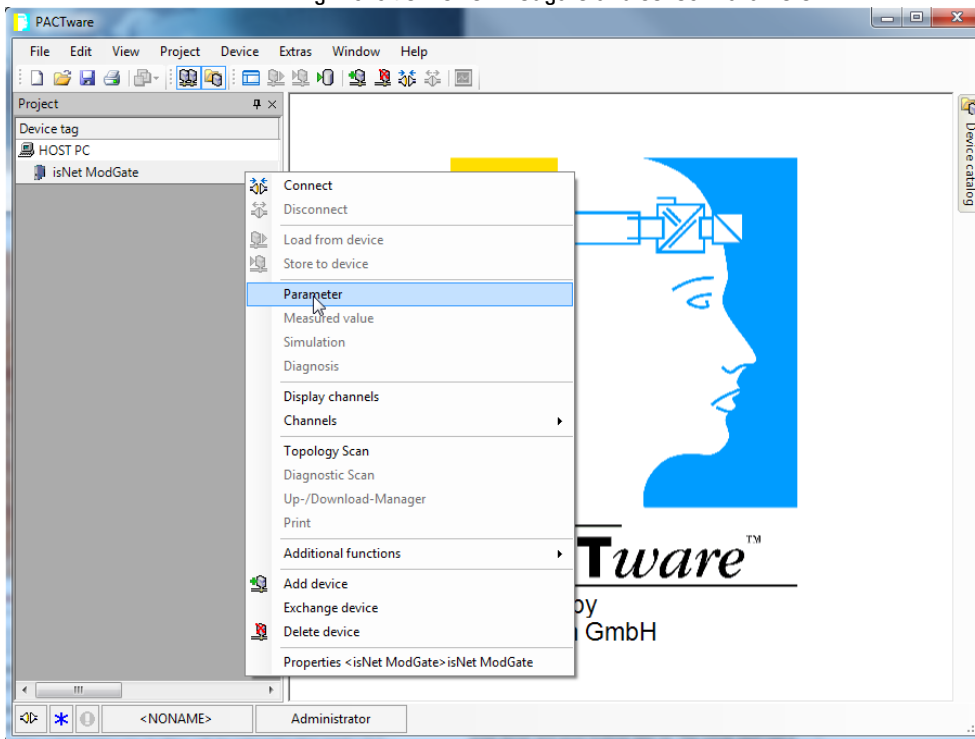


- ii. Select **isNet Modgate** and click 'OK'.



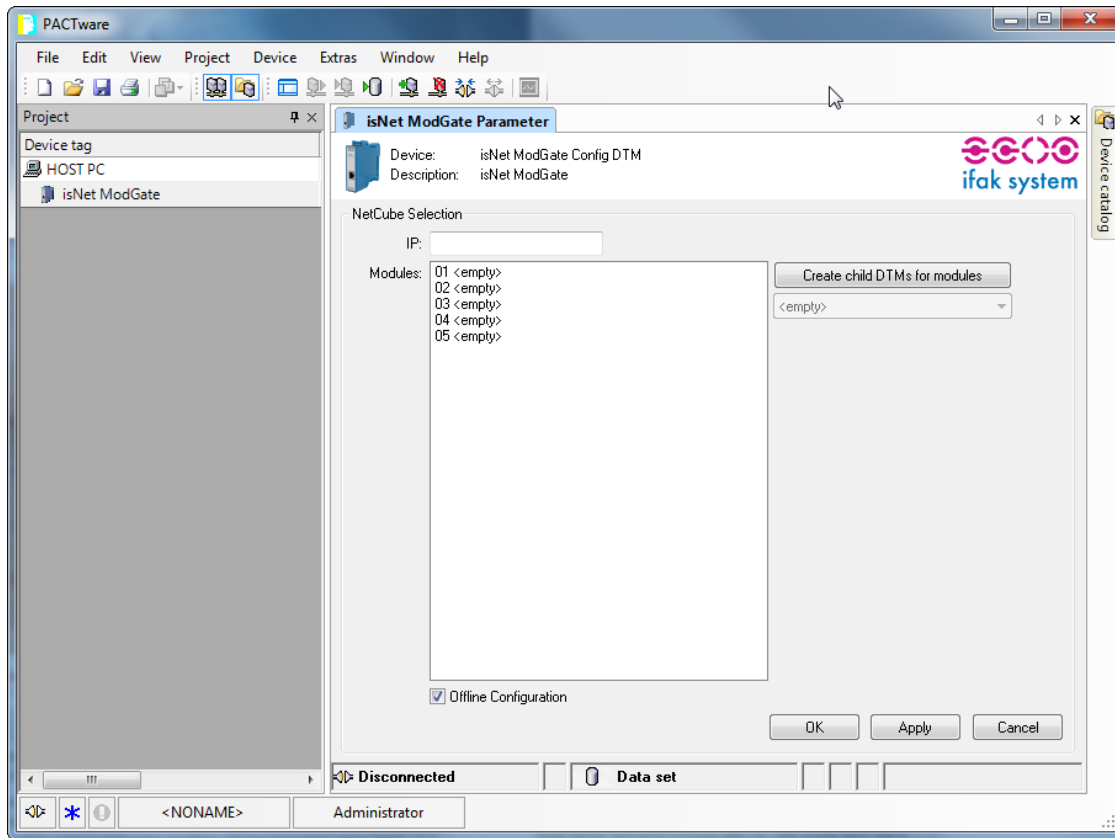
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iii. Right click on isNet Modgate and select Parameter



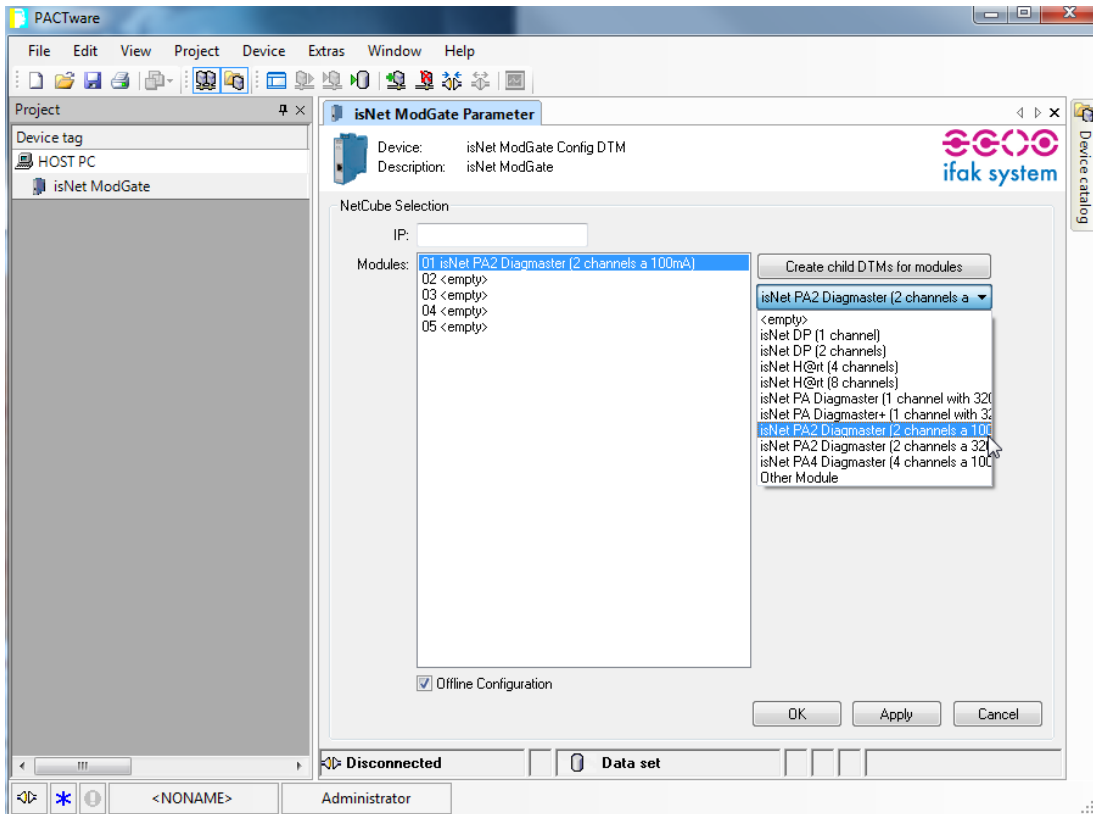
iv. Check the off-line configuration button at the bottom of the screen:

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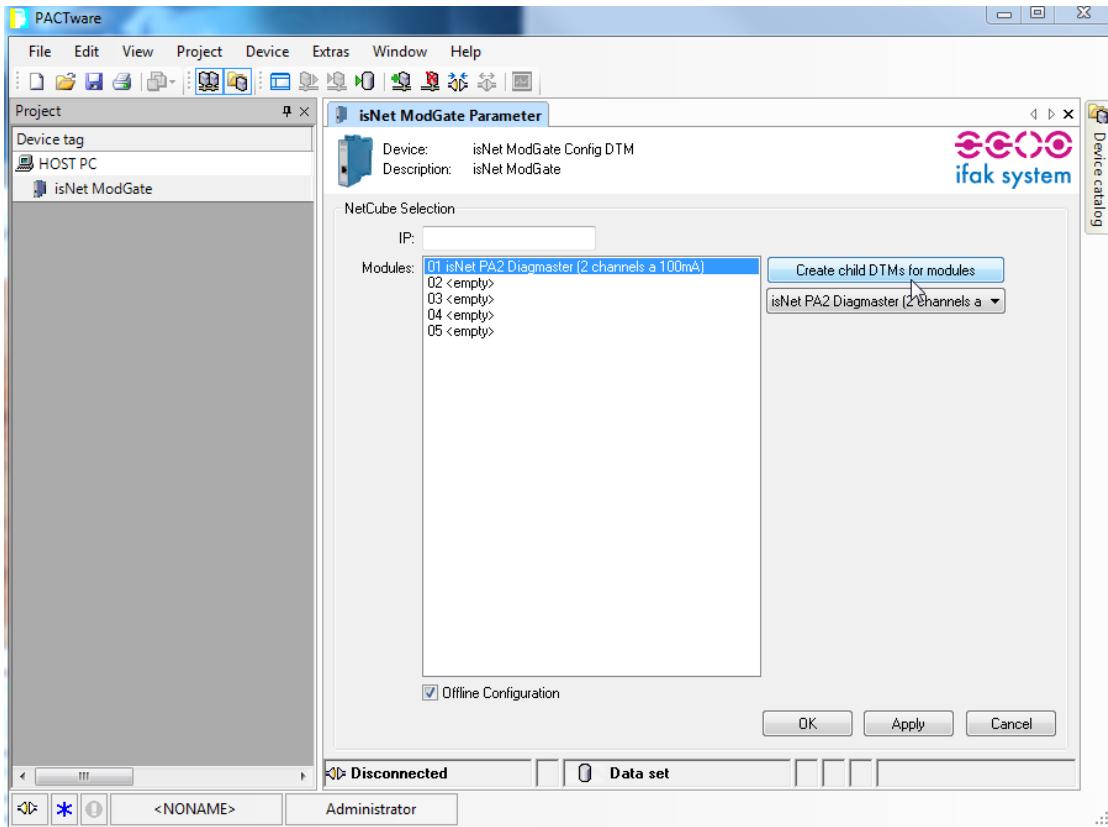
- v. Highlight the module and select the PA module that you are using from the dropdown menu on the side:

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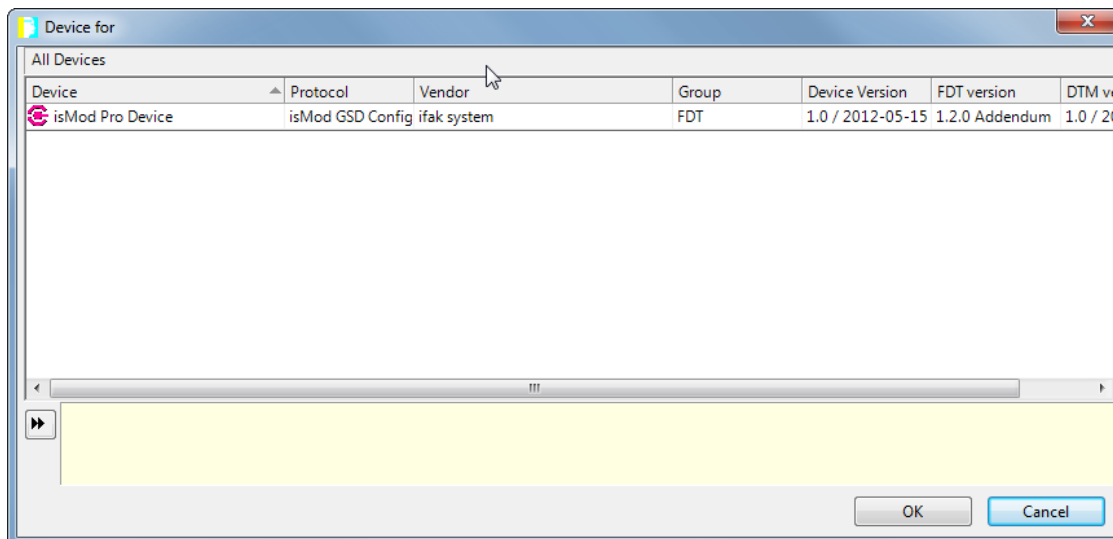
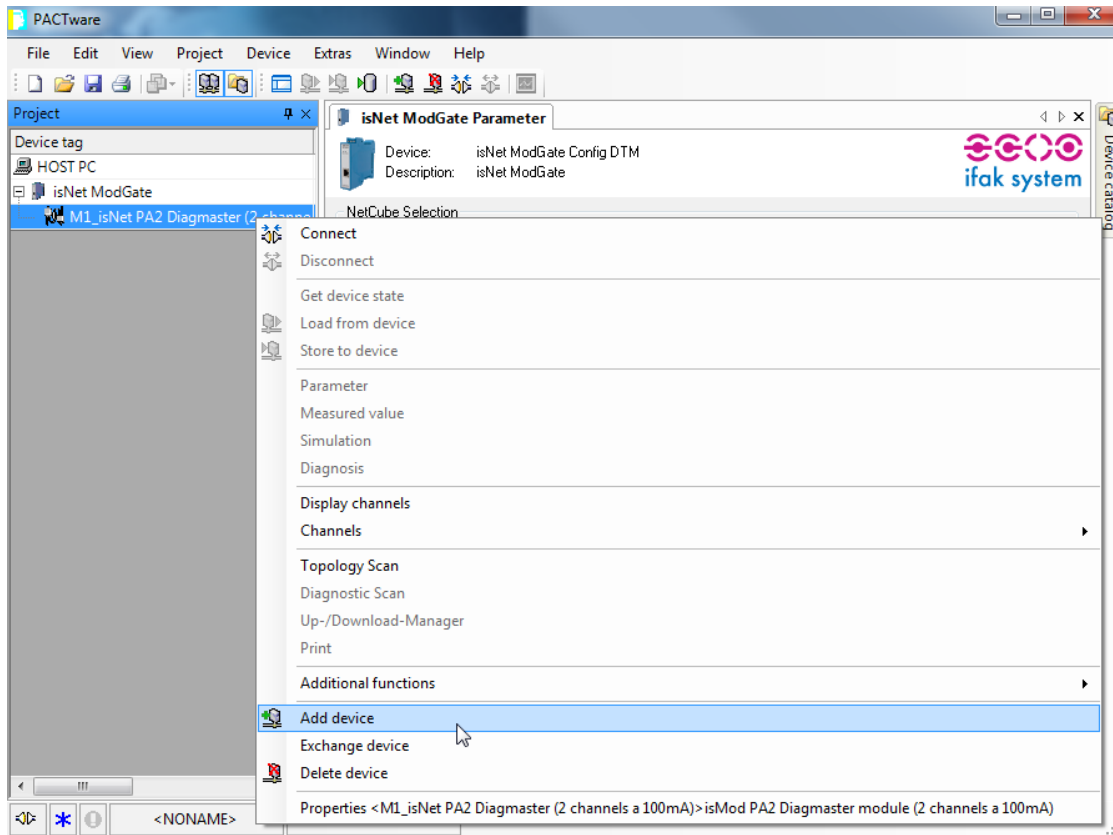
vi. Click on Create child DTM

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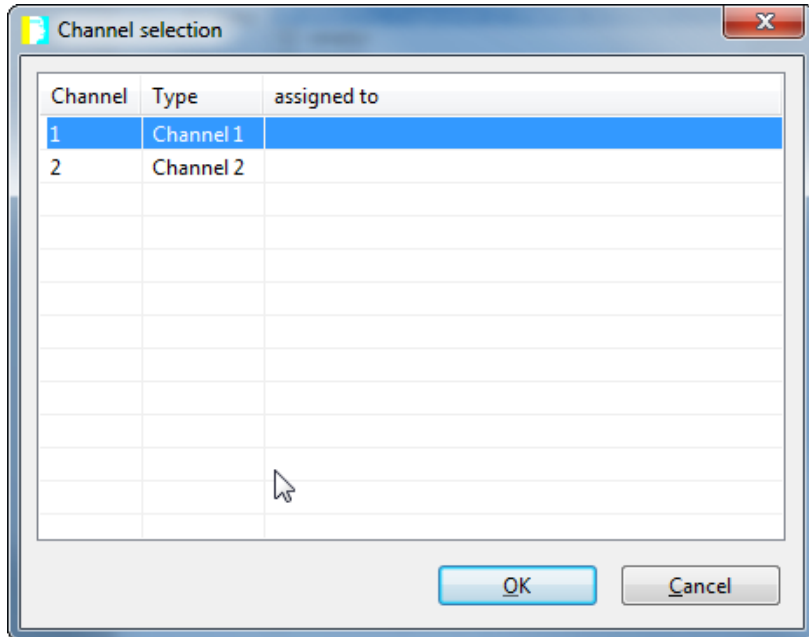
vii. Right click on PA module and select 'add a device'

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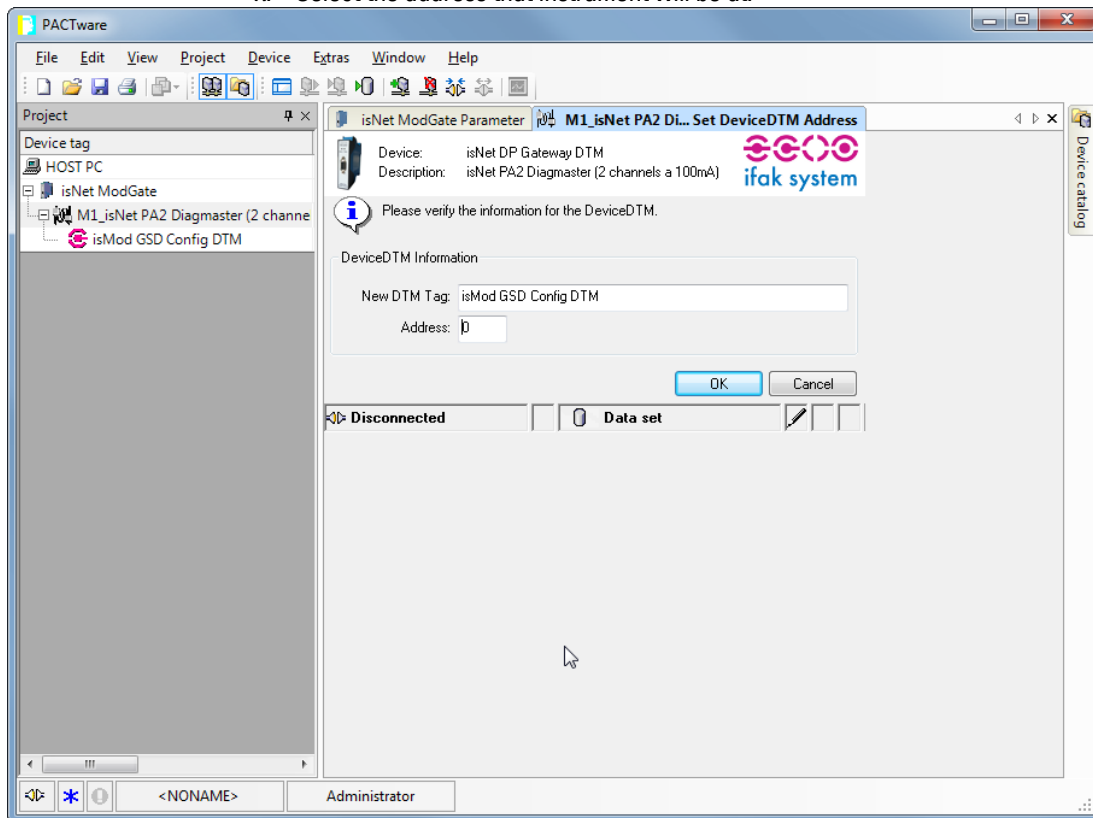


- viii. Select isMod Pro Device and double click.
- ix. Select the channel;

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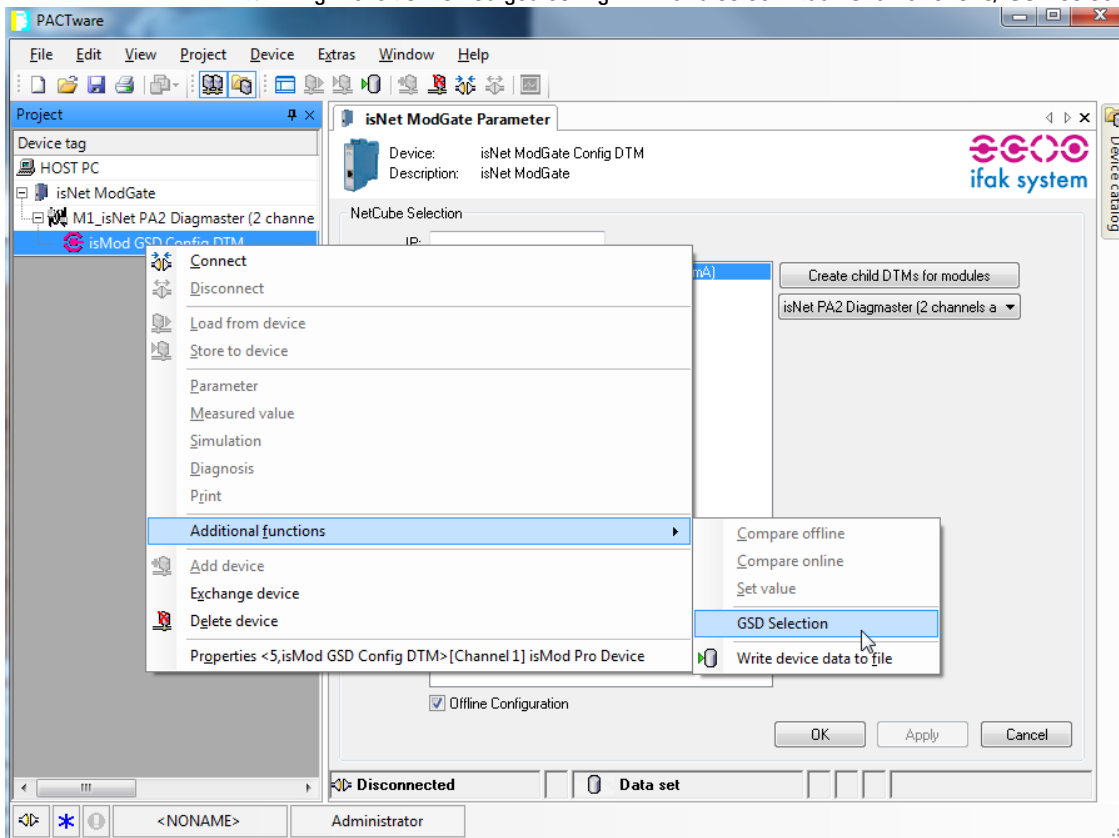


x. Select the address that instrument will be at:

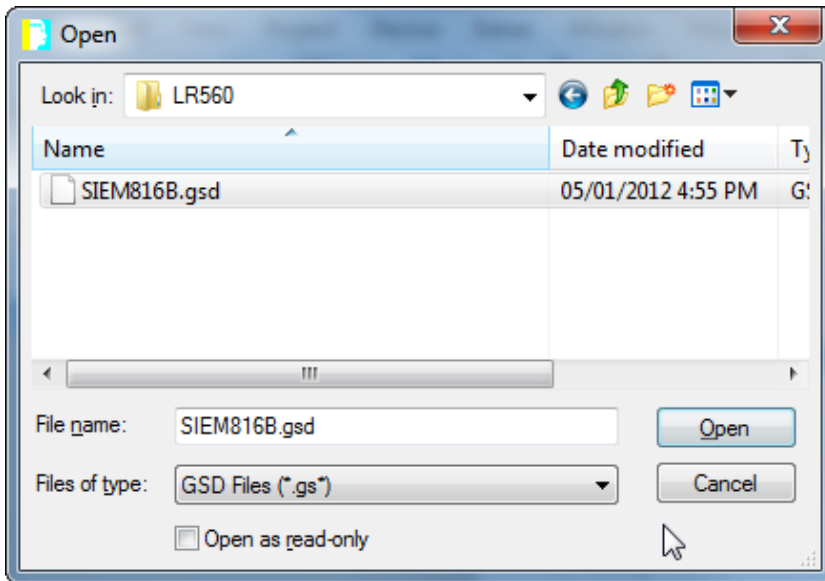


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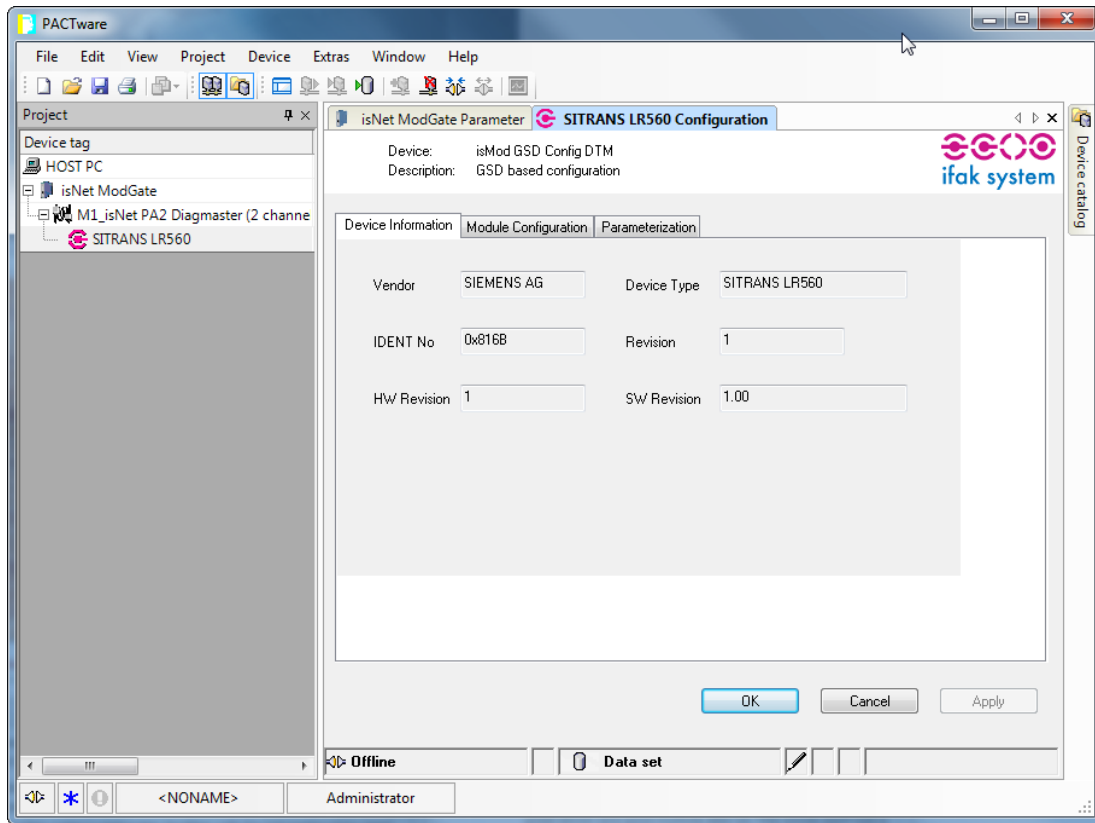
xi. Right click on ismod gsd config DTM and select 'Additional functions/ GSD selector.'



xii. Pick the GSD file you need and select open.



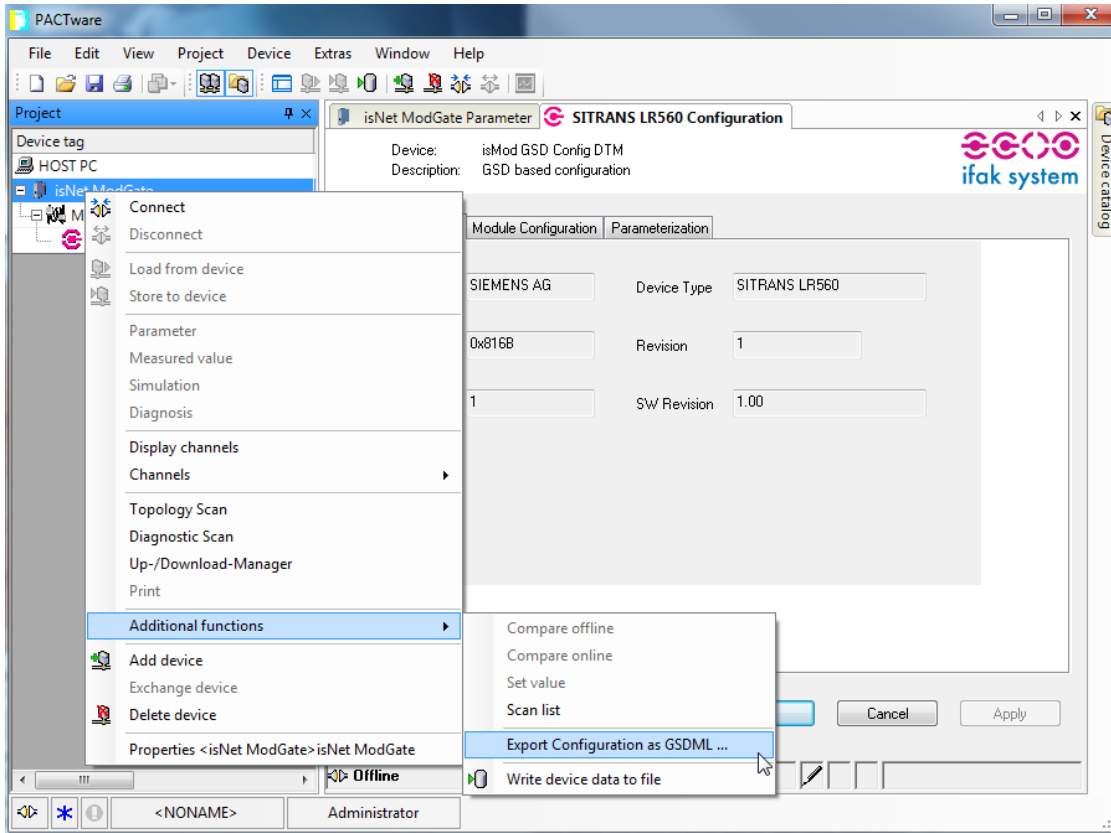
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xiii. Repeat the process of adding devices until you have your full network.

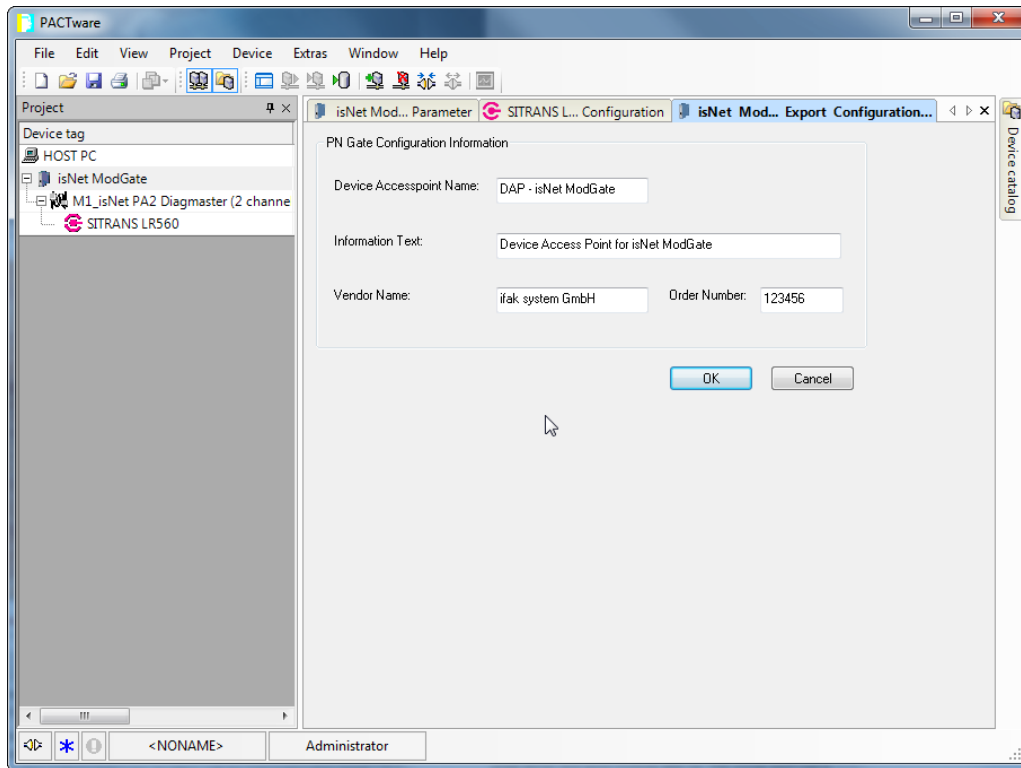
xiv. When you are done adding instruments, highlight isNet Modgate at the top of the tree:

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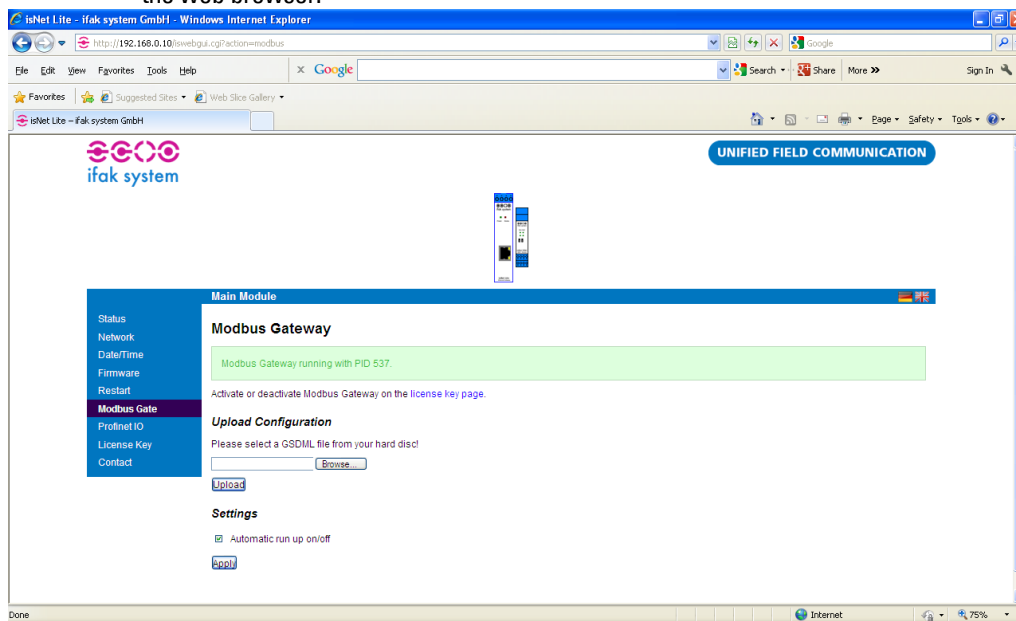


- xv. Right click and select 'Additional functions / Export configuration as a GSDML ...'
- xvi. When you do this you will get this screen:

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xvii. Click OK and it will ask you will to put the GSDML file. This file will need to imported into isNet lite via the web browser:



xviii. After you upload the GSDML file. Please verify that the Automatic run up on/off box is checked.

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3. Modbus Memory Map

The data from the instruments is stored in input registers in isNet Modgate. It is very simple to access. You need to configure the Modbus TCP client software to access the IP address of the gateway and then the Modbus address corresponds to the module number. The first module to the right of the head module is address 1, the second is address 2, and so on.

The data is located in the following input registers address (300,000 series). Please note that the addresses given assume that you start a 1. Some Modbus TCP master start counting at 0, so the addresses stated would be shifted down by 1.

Each channel on the card has a different range of input registers.

Channel number	Start	Length
1	300,001	16,128
2	316,129	16,128
3	332,257	16,128
4	348,385	16,128

Within each channel range of registers the input data is mapped as per the Profibus address with the following offsets:

Profibus address	Input register offset
0	384
1	505
2	626
3	747
4	868
5	989
6	1110
7	1231
8	1352
9	1473
10	1594
11	1715
12	1836
13	1957
14	2078
15	2199
16	2320
17	2441
18	2562
19	2683
20	2804
21	2925
22	3046
23	3167
24	3288
25	3409
26	3530
27	3651
28	3772

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29	3893
30	4014
31	4135
32	4256
33	4377
34	4498
35	4619
36	4740
37	4861
38	4982
39	5103
40	5224
...	...

Each Profibus slave can return up to 121 words long. If you have a PA device attached with one AI, then the data within 121 word range would have the following meaning:

Offset and range	Meaning
Word 1 low byte	Communication status 0 = data ok, 255 = data is bad, communication error
Word 1 high byte	Message counter – should always be changing values
Word 2 to 5	IEEE floating point representation of the PV
Word 6 high byte	Profibus PA Status byte

Example: If you had a SITRANS LR250 attached to Channel 1 of Module 1 and it was addressed at Profibus bus address 10 then the PV would be located at 301,596 and 301,597. The status byte would be the high byte of 301,598.

Accessing Profibus instruments parameters via PACTware

To access instruments parameters via PACTware, you require the following packages:

- PACTware V4.1 sp3
- isNet Profibus DTM
- SITRANS DTM
- EDD for the SITRANS DTM for the Siemens instrument that is attached to the IFAK gateway

The first two software packages can be downloaded from the IFAK website at www.ifak-system.com , clicking on **Stationary Integration** and then Downloads.

SITRANS DTM can be downloaded from Siemens Service and support. Please go to the product page for SITRANS DTM at www.siemens.com/sitransdtm and click on **Support** and then **Software Downloads**.

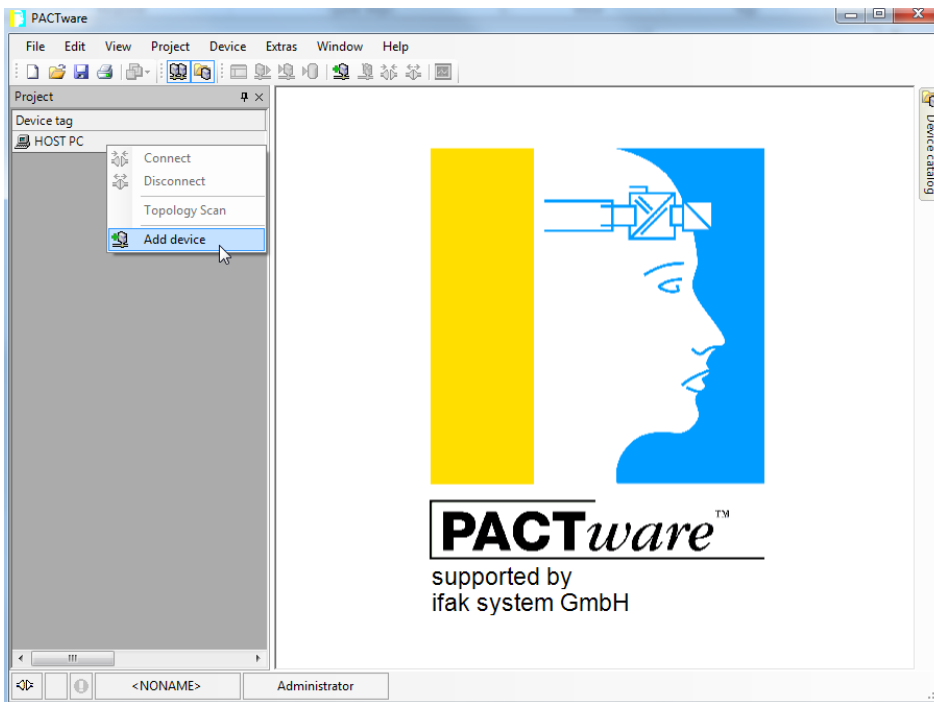
The EDD for the different instruments can be found on Siemens service and support from the download section accessible from the instrument's product page. For example, for the SITRANS LR250, go to www.siemens.com/sitranslr250 and click on **Support** and then **Software Downloads**.

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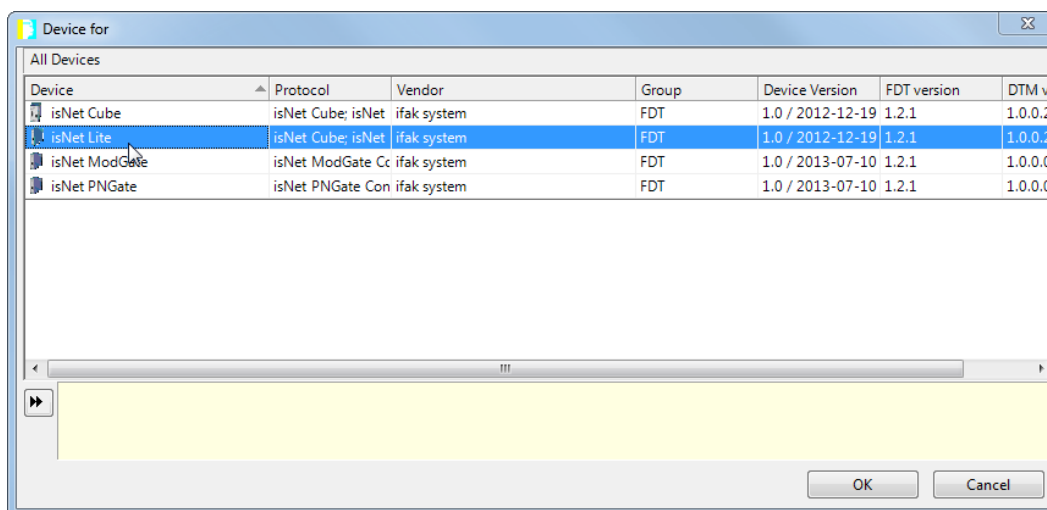
Using PACTware to talk to instruments

Below are the steps required to setup a PACTware project to connect to an instrument connected the isNet PA2 gateway. In this example, we will be using the SITRANS LR560.

1. Run PACTware and right-click on **HOST PC** and select **Add device**.

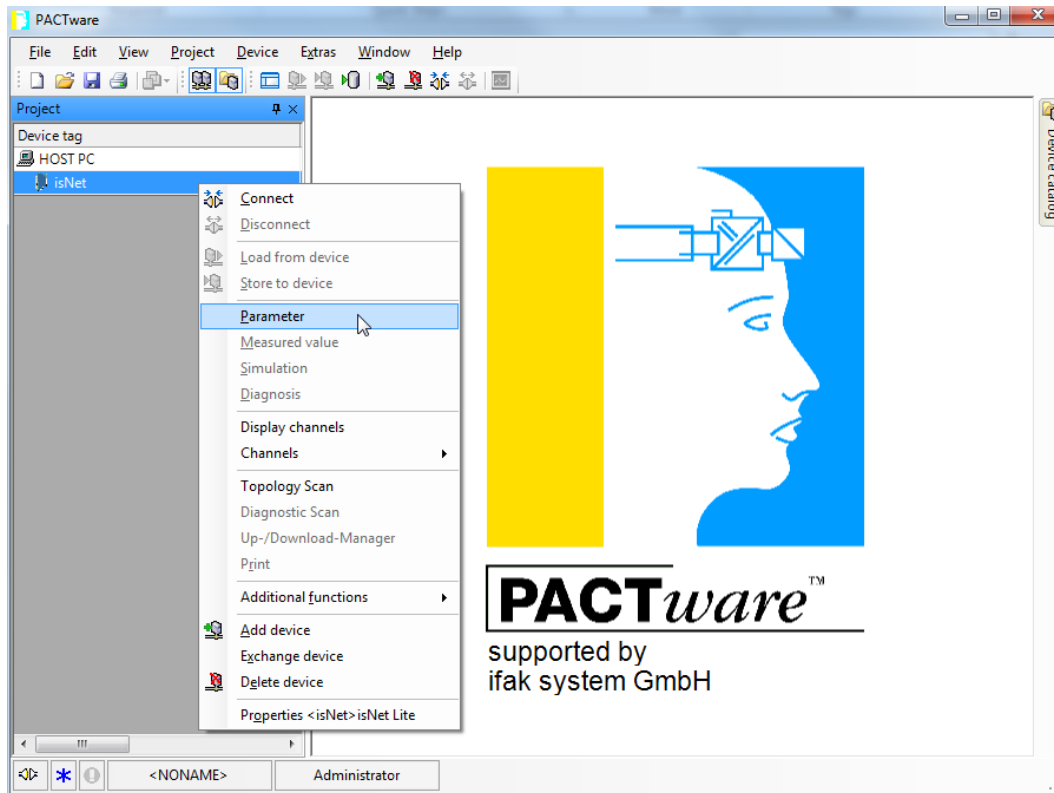


2. Select **isNet Lite** and click **OK**.

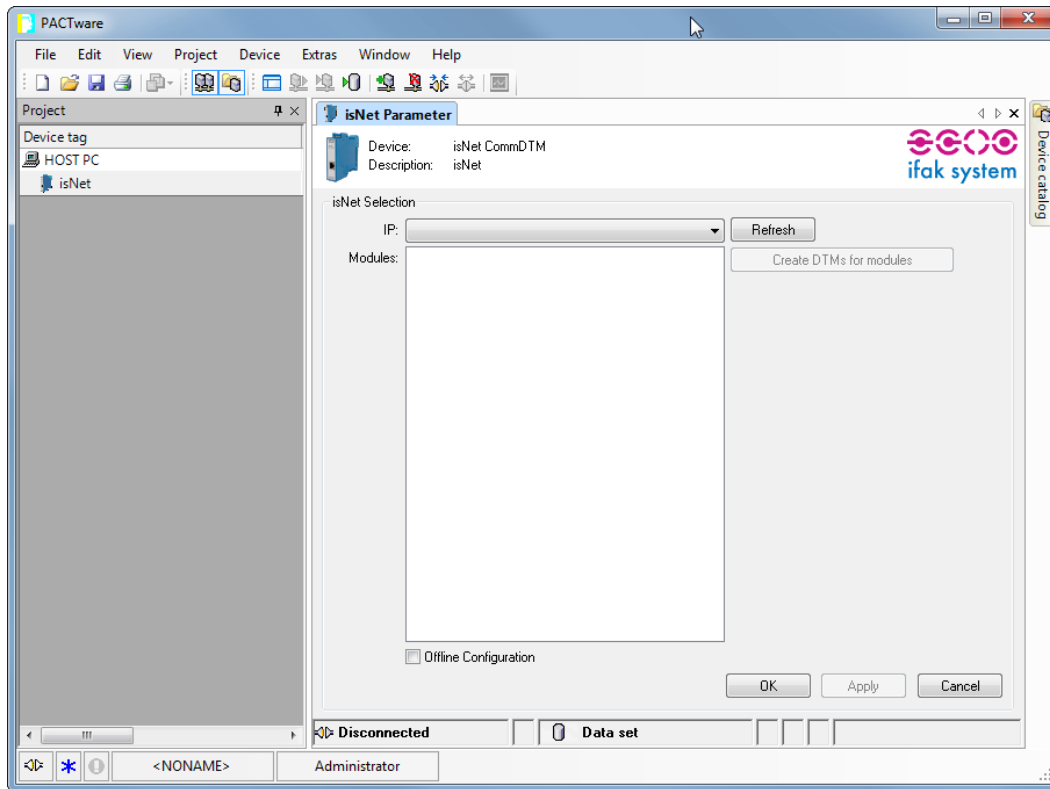


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3. Right-click on **isNet** and select **Parameters**:



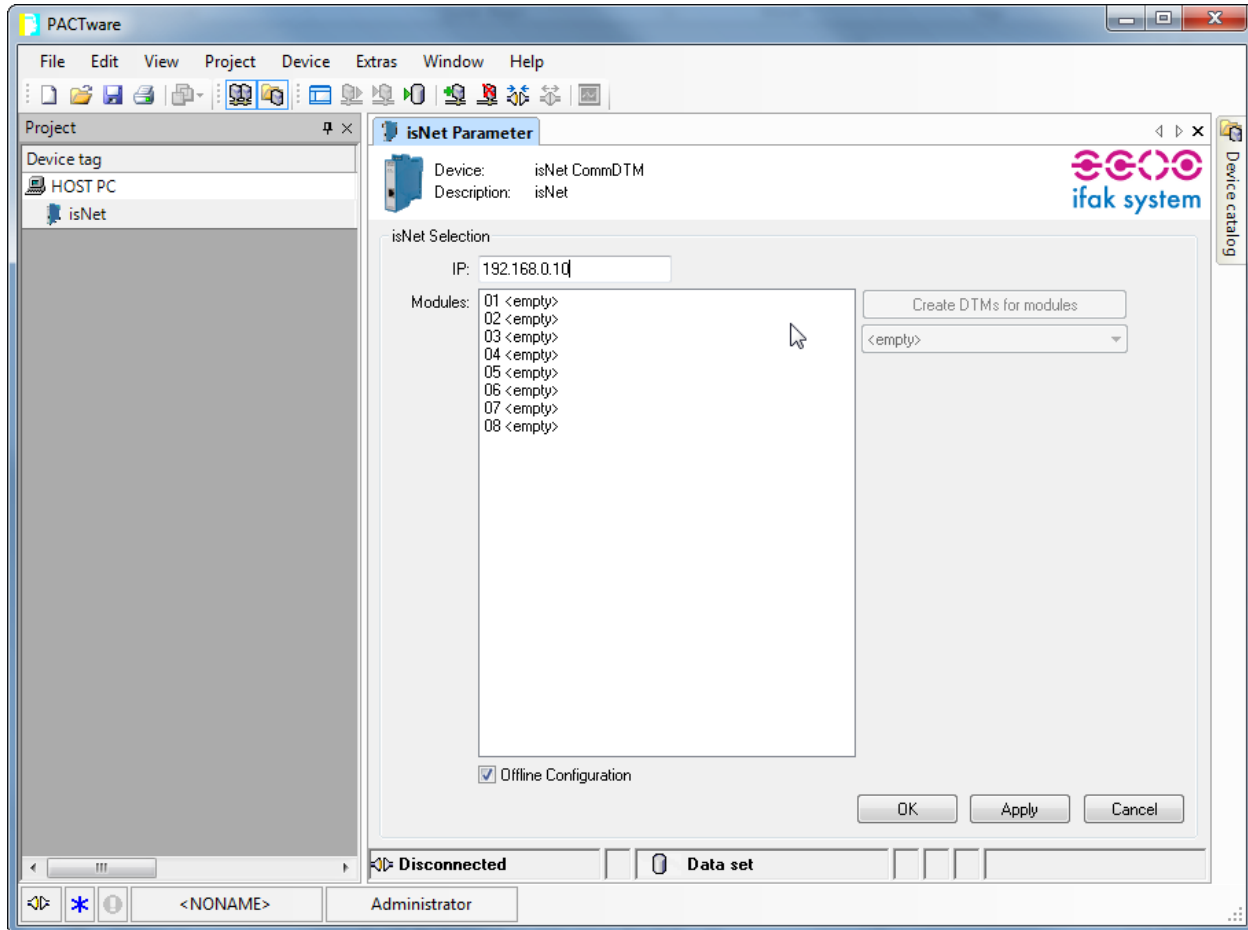
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4. If your Ethernet connection is on the same IP subnet as the gateway, the IP address of the gateway will appear to you on this screen (**note**: you may have to click on the dropdown menu for it to appear). Then your modules will appear and you can click on **Create DTMs for modules** and go to step 12 below.

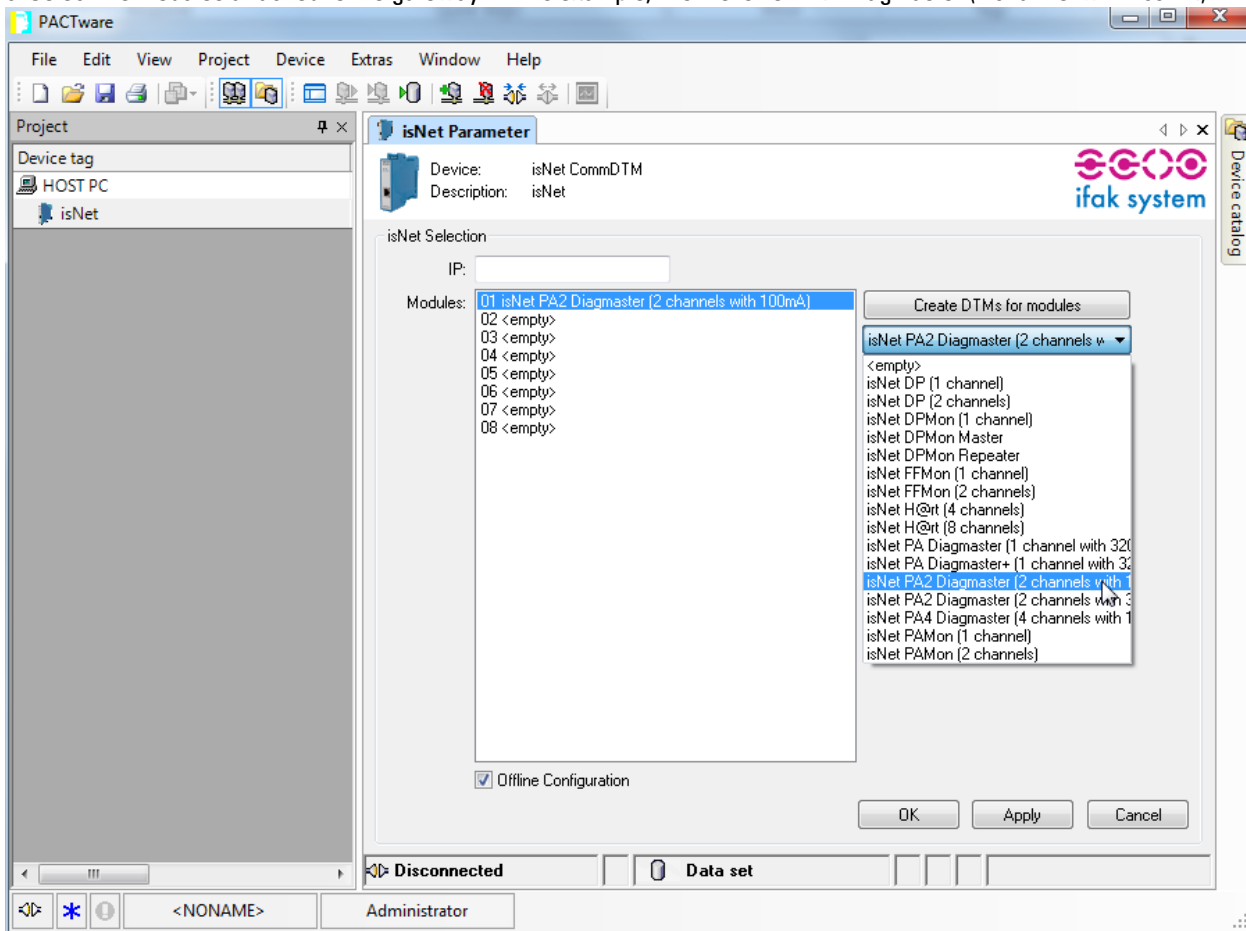
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5. If your Ethernet connection is not on the same IP subnet as the gateway, you can configure PACTware offline using the following method. Click the **Offline Configuration** box and enter the IP address of the gateway.



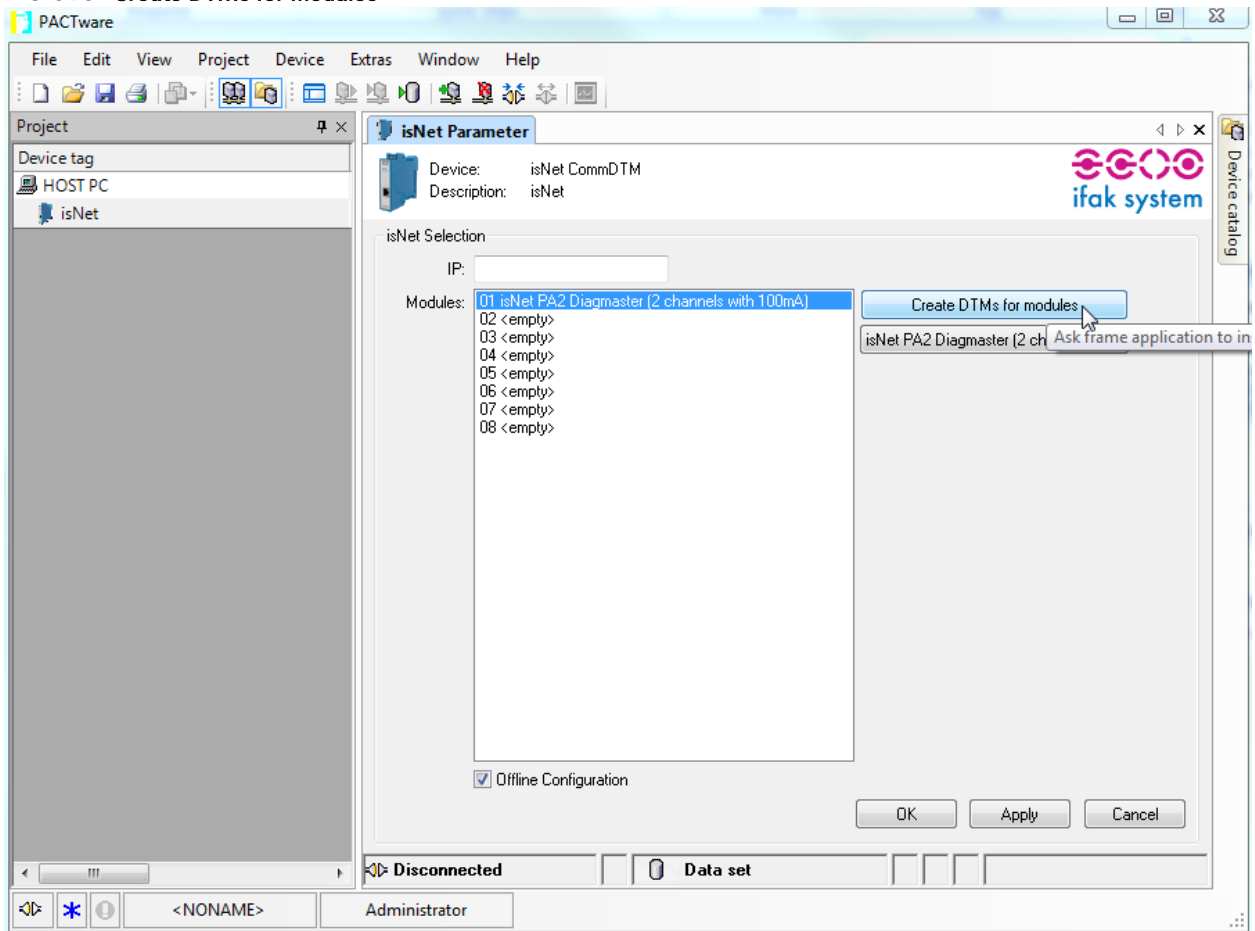
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6. Select the modules attached to the gateway. In this example, it is the isNet PA2 Diagmaster (2 channel with 100mA).

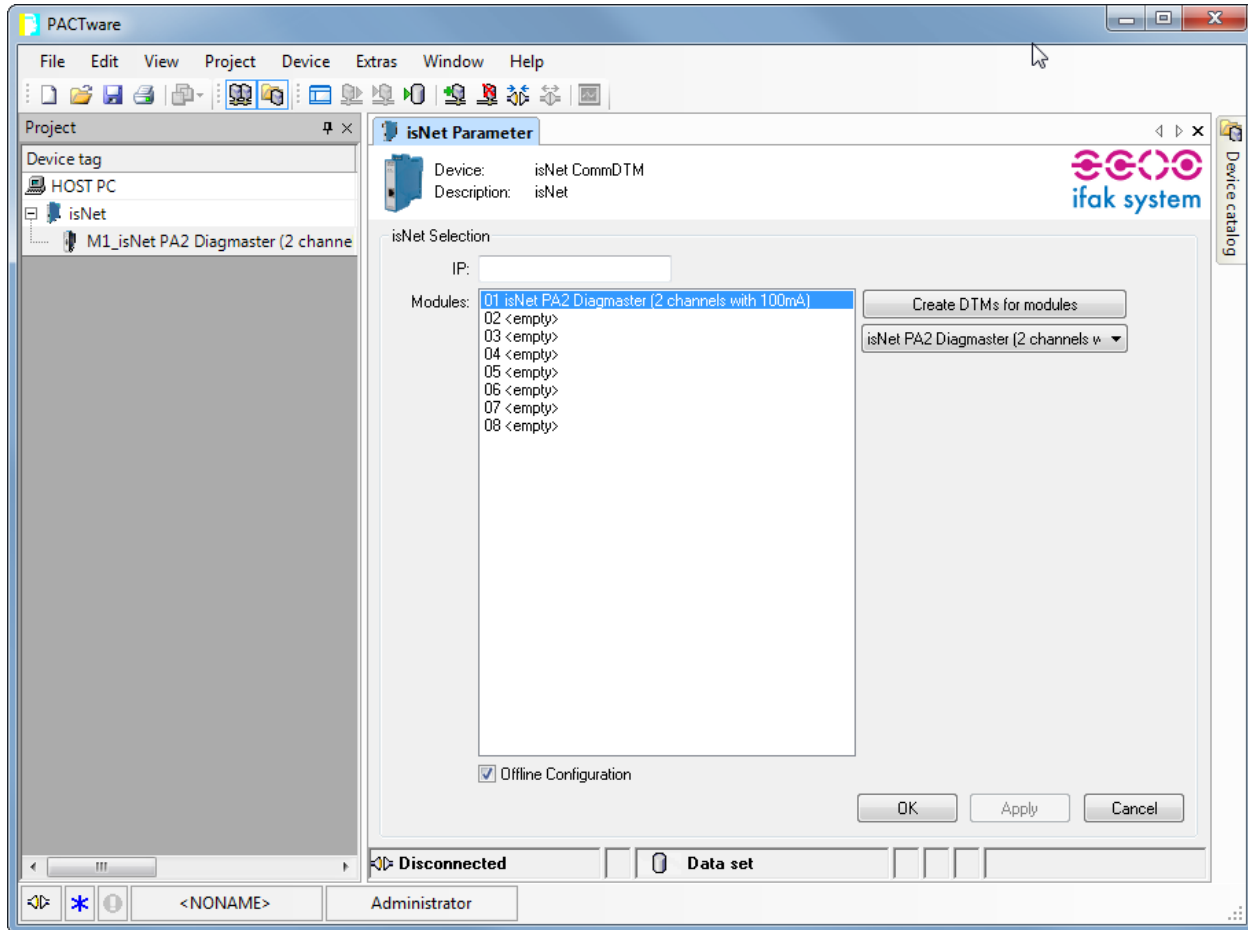


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7. Click on **Create DTMs for modules.**

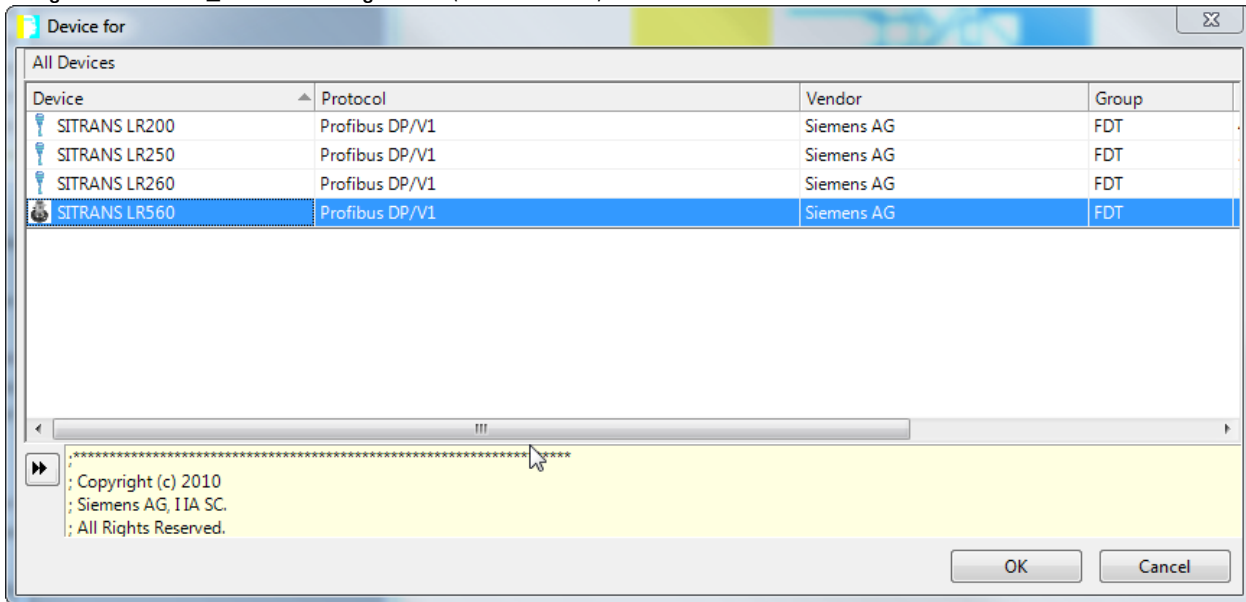


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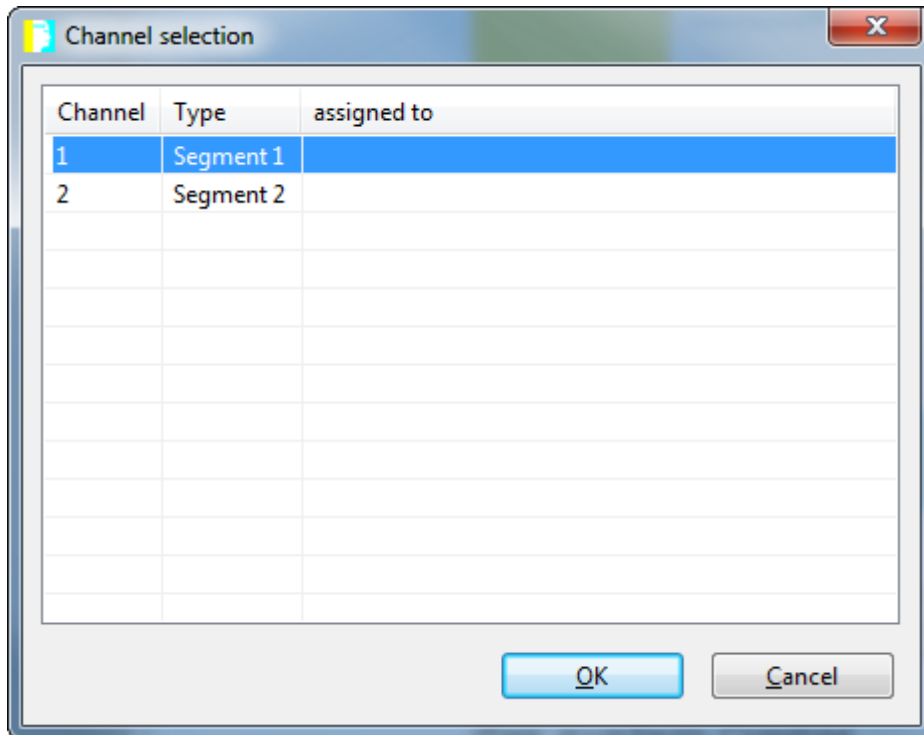


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8. Right-click on M1_isNet PA2 Diagmaster (2 channel ...) and select **Add Device**. Select the LR560.

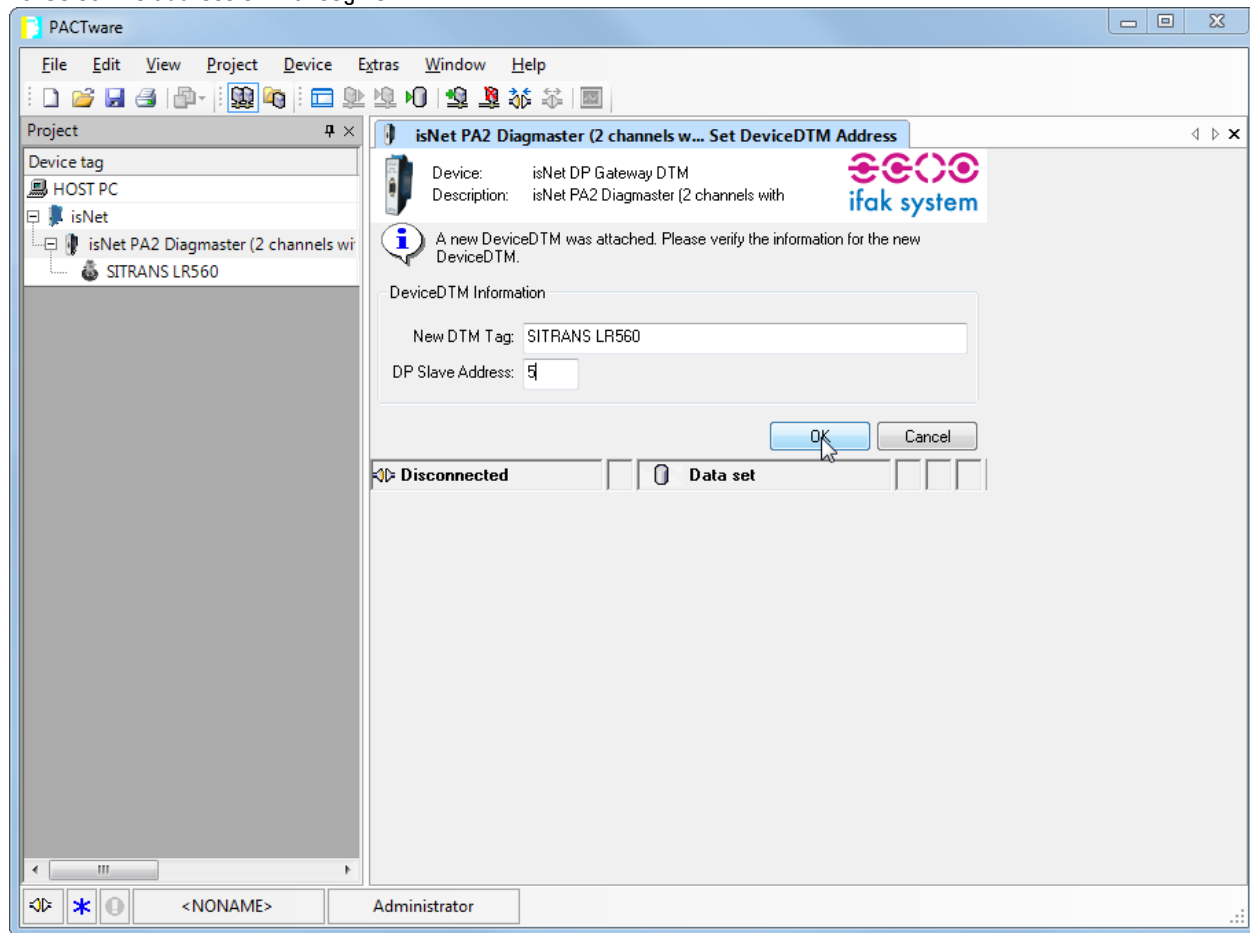


9. Select the segment that the instrument is on:



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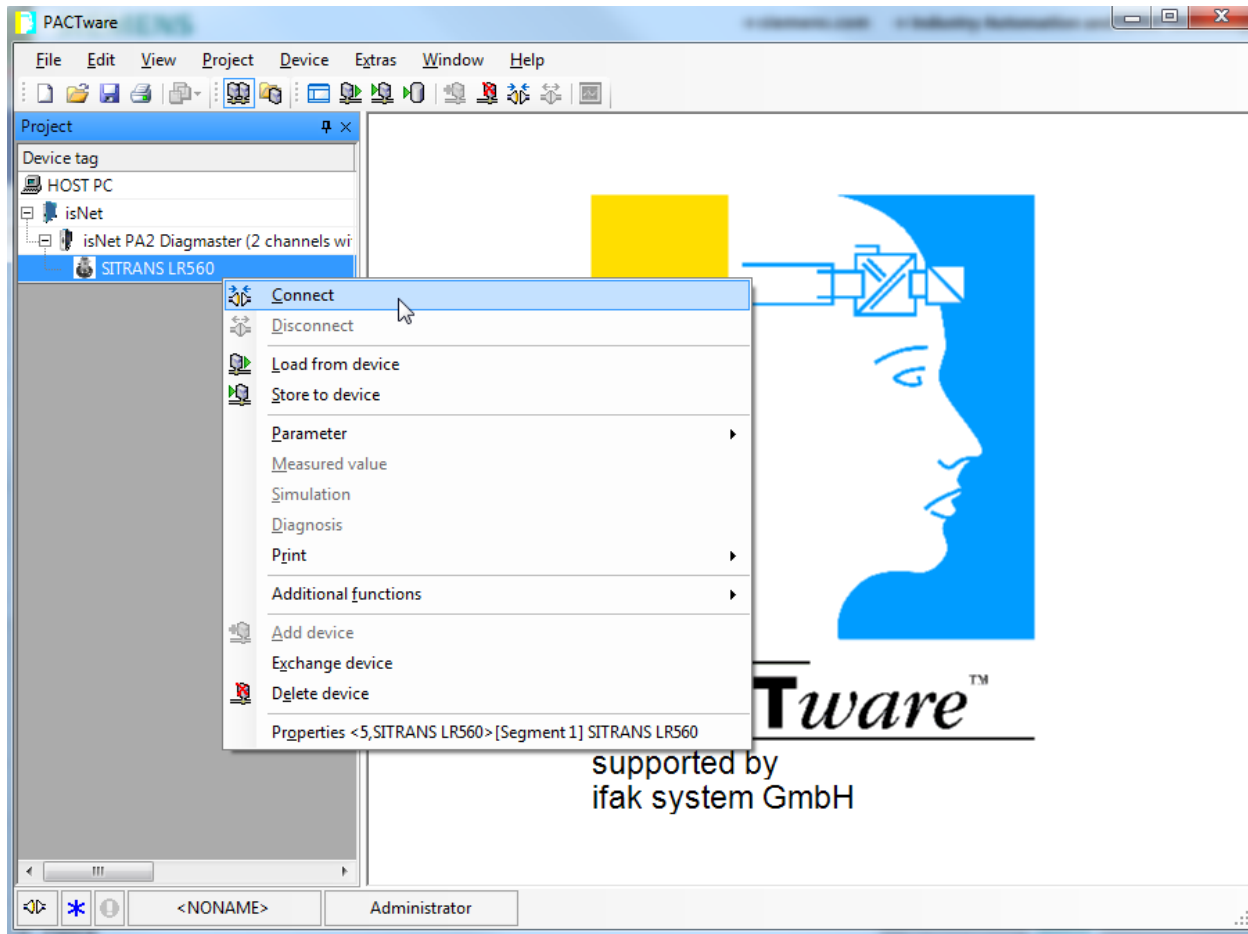
10. Select the address on that segment:



11. Now you are ready to go on-line. This will involve either being connected on the same Ethernet subnet or being connected via a VPN.

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12. To go on-line, right click on the LR560 and select **Connect**. Then you access the online or offline tables and connect to the device.



Field Connect (PROFIBUS PA)

	Order Number	EAR*	Supplier
Field Connect Allows connection of PROFIBUS PA instruments to an ethernet network allowing remote configuration of field instruments.			
Hardware			
ISNet Ethernet gateway supporting up to 5 input modules**	19200-0101	600.00	IFAK System
MODBUS TCP option	19200-0102	100.00	IFAK System
PROFINET option	19200-0103	100.00	IFAK System
Input Modules			
ISNETPA2 2 x PROFIBUS PA (Intrinsically safe) with max current per channel of 100mA	19200-1001	1.000,00	IFAK System
ISNETPA4 4 x PROFIBUS PA (Intrinsically safe) with max current per channel of 100mA	19200-1101	1.400,00	IFAK System
ISNETPA2 2 x PROFIBUS PA general purpose with max current per channel of 350mA	19200-1201	1.400,00	
Software			
PACTWare V4.1		FOC	IFAK System
ISNET ComDTM PROFIBUS		FOC	IFAK System
SITRANS DTM V3.1		FOC	Siemens PI
Options			
MultiTech rcell Quad Band GPRS/HSPA Ethernet Modem	7ML1930-1GJ	600.00	Siemens PI
Sitrans I100 IS single 4-20mA barrier	7NG4124-0AA00	163.00	Siemens PI
110V -230V AC 24V DC@5A power supply	6EP1333-4BA00	155.00	Siemens PI
DIN Rail			
Instruction manuals			
Using a Modbus TCP to Profibus PA Gateway by IFAK system	AG012314	FOC	Siemens PI
110V -230V AC 24V DC@8A power supply manual			Service & Support
SITRANS I100 IS Barrier manual			Service & Support
Panel requirements			
A 4 channel PROFIBUS PA system including Ethernet Modem could be housed in a panel size of 200mm(H) x 300mm(W) 400mm(L)			

* The prices listed here are in Euro and are estimated values for rough budget only. Please refer to vendor for detailed pricing

** In case of PROFIBUS PA, the isNet gateway must be used with one of the two communication options.