

PSSu DeviceNet with ControlLogix



Product

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Name: PSSu H SB DN, PSSu H DN
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March 2011

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1. Useful documentation

Reading the documentation listed below is necessary for understanding this application note.
The availability of the indicated tools and safe handling are also presupposed with the user.

1.1. Documentation from Pilz GmbH & Co. KG

No.	Description	Item No.
1	Pilz international homepage, download section	www.pilz.com
2	Software "PSSuniversal Assistant", Online Help Pilz's international homepage > Products section > Safety control technology > PSSuniversal > Selection guides (download link)	www.pilz.com
3	Operating manual of module "PSSu H SB DN"	21 603-EN-xx
4	Technical Catalogue of PSSuniversal (english)	1001264-EN-xx
5	System Description of PSSuniversal	21 256-EN-xx
6	Installation Manual of PSSuniversal	21 262-EN-xx

1.2. Documentation from other sources of information

No.	Description	Item No.
1	Rockwell Automation, International Homepage	www.ab.com
2	Rockwell Automation, Literature Library http://literature.rockwellautomation.com/idc/groups/public/documents/.	www.rockwellautomation.com

2. Hardware configuration

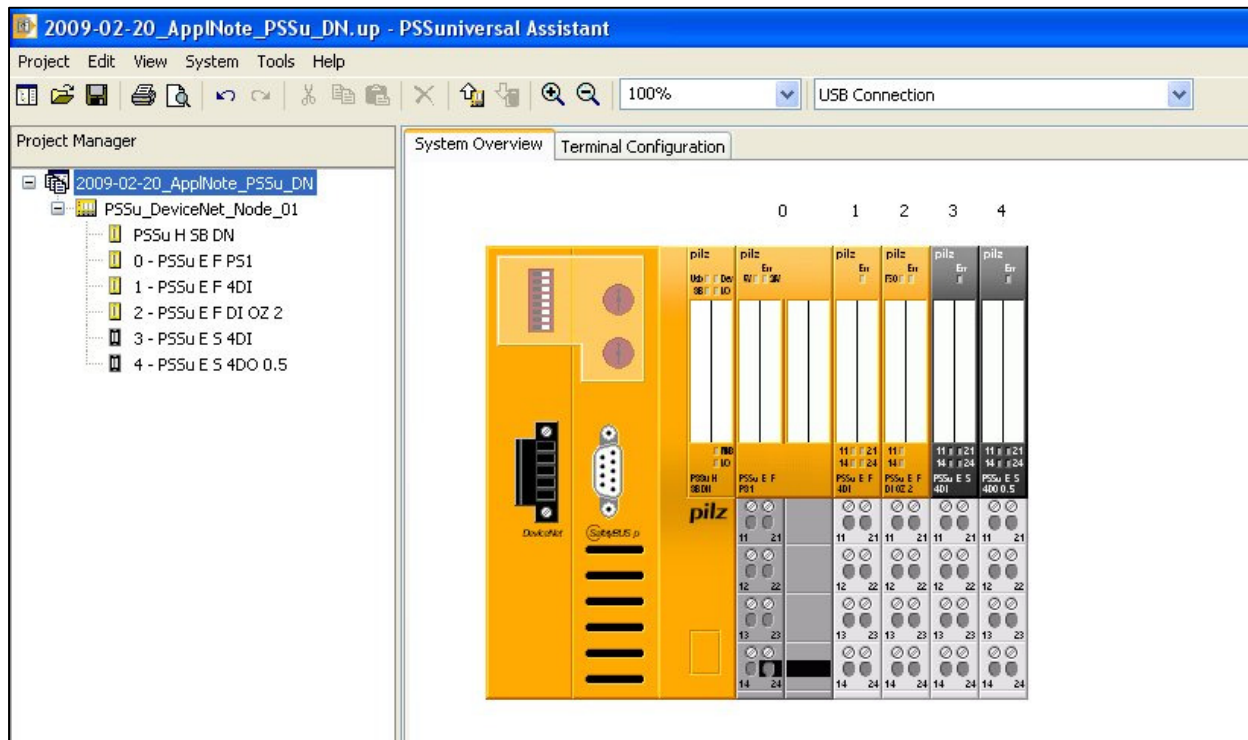


Fig. 1: PSSu Configurator – PSSu system

- ▶ PSSu H SB DN (PSSu SafetyBUS p DeviceNet Head)
- Slot 0 PSSu E F PS1 (Power Supply)
- Slot 1 PSSu E F 4DI (PSS Fail Safe Input)
- Slot 2 PSSu E F DI OZ 2 (PSS Fail Safe Input and one Dual Output)
- Slot 3 PSSu E S 4 DI (ST inputs used only by Allen Bradley PLC ControlLogix 5000)
- Slot 4 PSSu E S 4DO 0.5 (ST outputs used only by Allen Bradley PLC ControlLogix 5000)

3. Application Task

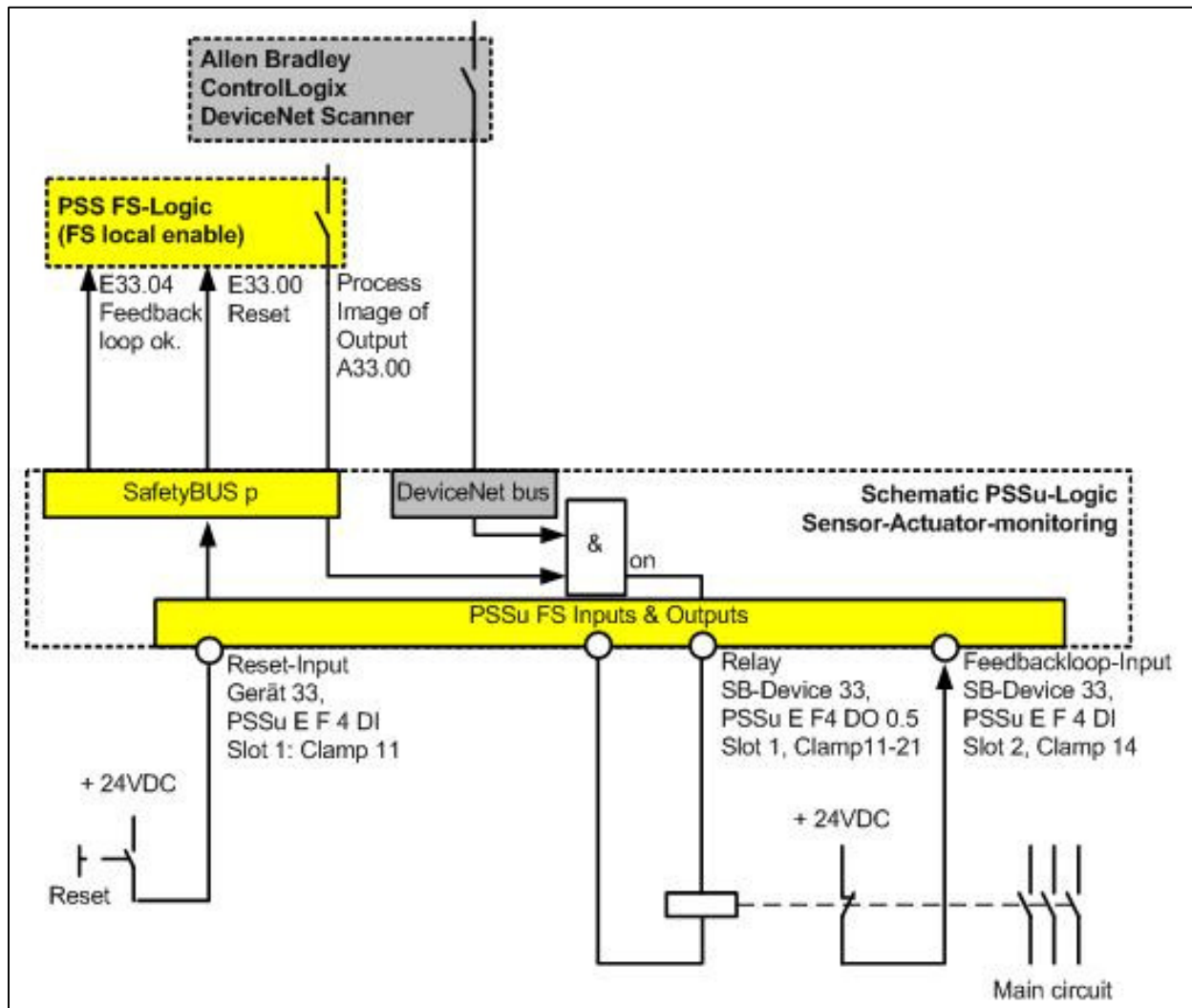


Fig. 2: Overview – Application task

- Connect PSSu Device to a Allen Bradley -System via DeviceNet-Scanner 1756-DNB and code these functions:
 - Slot 0 PSSu E F PS1:
 - Copy PSSu Device information to the CL5000 PLC
 - Slot 1 PSSu E F 4DI:
 - Copy PSS Fail Safe Input to the CL5000-PLC
 - Slot 2 PSSu E F DI OZ 2:
 - Configure an enabled FS-Output switch by the CL5000-PLC and a switch on monitored feedback loop
 - Slot 3 PSSu E S 4 DI:
 - Use this ST-inputs on CL5000-PLC
 - Slot 4 PSSu E S 4DO 0.5:
 - Use this ST-outputs on CL5000-PLC

3.1. FS Configuration Hardware

- ▶ PSSu H SB DN:
 - SafetyBUS address 33
 - SafetyBUS-I/O-Group 00 PSSu Device outputs
 - SafetyBUS-I/O-Group 01 PSSu Device inputs

- ▶ The outcome of this is an Fail Safe allocation table:
 - E33.00 PSS FS input slot 1 clamp 11
 - E33.01 PSS FS input slot 1 clamp 21
 - E33.02 PSS FS input slot 1 clamp 14
 - E33.03 PSS FS input slot 1 clamp 24
 - E33.04 virtual PSS FS input, result of PSSu monitoring "feedback loop"
 - E33.05 virtual PSS FS input, result of PSSu monitoring "open circuit detection"

 - A33.00 Dual FS Output

 - M116.00 SafetyBUS-I/O-Group 00 attached to all PSSu Device 33 outputs
 - M116.01 SafetyBUS-I/O-Group 01 attached to all PSSu Device 33 inputs

3.2. Calculate Input and Output Size manually

Requirement	ST-Input Bytes	and	ST-Output Bytes
- 01,"PSSu E F PS"	+0 Input Byte		+0 Output Byte
- 02,"PSSu E F PS R"	+1 Input Byte		+0 Output Byte
- 03,"PSSu E F PS1"	+0 Input Byte		+0 Output Byte
- 04,"PSSu E F PS1 R"	+1 Input Byte		+0 Output Byte
- 05,"PSSu E F PS-P"	+0 Input Byte		+0 Output Byte
- 06,"PSSu E F BSW"	+0 Input Byte		+0 Output Byte
- 07,"PSSu E F BSW R"	+1 Input Byte		+0 Output Byte
- 08,"PSSu E F BSW R*"	+X Input Byte		+0 Output Byte
- 09,"PSSu E S 4DI"	+1 Input Byte		+0 Output Byte
- 10,"PSSu E S 4DI*"	+X Input Byte		+0 Output Byte
- 11,"PSSu E S 4DO 0.5"	+0 Input Byte		+1 Output Byte
- 12,"PSSu E S 4DO 0.5*"	+0 Input Byte		+X Output Byte
- 13,"PSSu E S 2DO 2"	+0 Input Byte		+1 Output Byte
- 14,"PSSu E S 2DO 2*"	+0 Input Byte		+X Output Byte
- 15,"PSSu E F 4DI"	+0 Input Byte		+0 Output Byte
- 16,"PSSu E F 4DI R"	+1 Input Byte		+0 Output Byte
- 17,"PSSu E F 4DI R*"	+X Input Byte		+0 Output Byte
- 18,"PSSu E F 4DO 0.5"	+0 Input Byte		+0 Output Byte
- 19,"PSSu E F 4DO 0.5 R"	+1 Input Byte		+0 Output Byte
- 20,"PSSu E F 4DO 0.5 R*"	+X Input Byte		+0 Output Byte
- 21,"PSSu E F 4DO 0.5 &"	+1 Input Byte		+1 Output Byte
- 22,"PSSu E F 4DO 0.5 &*"	+X Input Byte		+X Output Byte
- 23,"PSSu E F 2DO 2"	+0 Input Byte		+0 Output Byte
- 24,"PSSu E F 2DO 2 R"	+1 Input Byte		+0 Output Byte
- 25,"PSSu E F 2DO 2 R*"	+X Input Byte		+0 Output Byte
- 26,"PSSu E F 2DO 2 &"	+1 Input Byte		+1 Output Byte
- 27,"PSSu E F 2DO 2 &*"	+X Input Byte		+X Output Byte
- 28,"PSSu E F 2DOR 8"	+0 Input Byte		+0 Output Byte
- 29,"PSSu E F 2DOR 8 R"	+1 Input Byte		+0 Output Byte
- 30,"PSSu E F 2DOR 8 R*"	+X Input Byte		+0 Output Byte
- 31,"PSSu E F 2DOR 8 &"	+1 Input Byte		+1 Output Byte
- 32,"PSSu E F 2DOR 8 &*"	+X Input Byte		+X Output Byte
- 33,"PSSu E F DI OZ 2"	+0 Input Byte		+0 Output Byte
- 34,"PSSu E F DI OZ 2 R"	+1 Input Byte		+0 Output Byte
- 35,"PSSu E F DI OZ 2 R*"	+X Input Byte		+0 Output Byte
- 36,"PSSu E F DI OZ 2 &"	+1 Input Byte		+1 Output Byte
- 37,"PSSu E F DI OZ 2 &*"	+X Input Byte		+X Output Byte

► Abbreviations:

- +0: do nothing
- +1: add one Byte
- +X: check bit informations in byte of former slot,
* do nothing if there is space
* add one Byte if there is no space

In our Application Note example we uses

Requirement	<u>ST-Input Bytes</u>	and	<u>ST-Output Bytes</u>
- 02,"PSSu E F PS R"	+1 Input Byte		+0 Output Byte
- 16,"PSSu E F 4DI R"	+1 Input Byte		+0 Output Byte
- 36,"PSSu E F DI OZ 2 &"	+1 Input Byte		+1 Output Byte
- 09,"PSSu E S 4DI"	+1 Input Byte		+0 Output Byte
- 11,"PSSu E S 4DO 0.5"	+0 Input Byte		+1 Output Byte

⇒ Input Data Size := **4 Bytes**

⇒ Output Data Size := **2 Bytes**

► Note:

One could use the PSSu Configurator(PSSu Assistant menu process image to get the needed I/O Data Sizes automatically.

3.3. Process Images of inputs on the CL5000-side

Module

DoubleWord

Bit

Slot

Clamp

I	0	0	0	-	PSSu E F PS1 Bit(0) = "SBp is ready" ==> PSS FS M113.05
I	0	1	0	-	PSSu E F PS1 Bit(1) = "SBp I/O-Group of Inputs RUN" ==>PSS FS M116.01
I	0	2	0	-	PSSu E F PS1 Bit(2) = "SBp I/O-Group of Outputs RUN" ==>PSS FS M116.00
I	0	3	0	-	PSSu E F PS1 Bit(3) = "Device Status FS: Error"
I	0	4	0	-	PSSu E F PS1 Bit(4) = "Device Status ST: Error"
I	0	5	0	-	PSSu E F PS1 Bit(5) = "FS-Module Error"
I	0	6	0	-	PSSu E F PS1 Bit(6) = "ST-Module Error"
I	0	7	0	-	PSSu E F PS1 Bit(7) = "Reserved"

Module	DoubleWord	Bit	Slot	Clamp	
I	0	8	1	11	I0 PSSu E F 4DI Bit(0) = Status of clamp 11 PSS FS E33.00
I	0	9	1	21	I1 PSSu E F 4DI Bit(1) = Status of clamp 21 PSS FS E33.01
I	0	10	1	14	I2 PSSu E F 4DI Bit(2) = Status of clamp 14 PSS FS E33.02
I	0	11	1	24	I3 PSSu E F 4DI Bit(3) = Status of clamp 24 PSS FS E33.03
I	0	12			not used
I	0	13			not used
I	0	14			not used
I	0	15			not used
I	0	16	2	11-21	PSSu E F DI OZ 2 Bit(0) = Status signal of PSS FS PIO output A33.00 (clamp 11-21), RLO = 1 ==> firstcondition of local enabling is true
I	0	17	2	14	I4 PSSu E F DI OZ 2 Bit(1) = Status of "feedbackloop enable" virtualFS input E33.04, (clamp 14), result of PSSumonitoring, here "on-test"
I	0	18	2	No Terminal	PSSu E F DI OZ 2 Bit(2) = Status signal of PSS FS "Status of open circuit detection" ,virtual FS input E33.05 of open circuit output PSS FS A33.00 (clamp 11-21), RLO = 1 ==> closed loop
I	0	19			not used
I	0	20			not used
I	0	21			not used
I	0	22			not used
I	0	23			not used

Module	DoubleWord	Bit	Slot	Clamp	
I	0	24	3	11	PSSu E S 4DI CL5000 input 0
I	0	25	3	21	PSSu E S 4DI CL5000 input 1
I	0	26	3	14	PSSu E S 4DI CL5000 input 2
I	0	27	3	24	PSSu E S 4DI CL5000 input 3

3.4. Process Images of outputs on the CL5000-side

Module	DoubleWord	Bit	Slot	Clamp	

Q	0	0	2	11-21	PSSu E F DI OZ 2 Bit(0) = switch signal CL5000 to PSS FS output A33.00 (clamp 11-21) RLO = 1 ==> second condition of local enabling is true
Q	0	1			not used
Q	0	2			not used
Q	0	3			not used
Q	0	4			not used
Q	0	5			not used
Q	0	6			not used
Q	0	7			not used
Q	0	8	4	11	PSSu E S 4DO 0.5 CL5000 output 0
Q	0	9	4	21	PSSu E S 4DO 0.5 CL5000 input 1
Q	0	10	4	14	PSSu E S 4DO 0.5 CL5000 input 2
Q	0	11	4	24	PSSu E S 4DO 0.5 CL5000 input 3
Q	0	12			not used
Q	0	13			not used
Q	0	14			not used
Q	0	15			not used

4. FS Configuration on Pilz-Side

4.1. Step 1: Start SafetyBUS-Configurator and add a new PSSu H DN Device

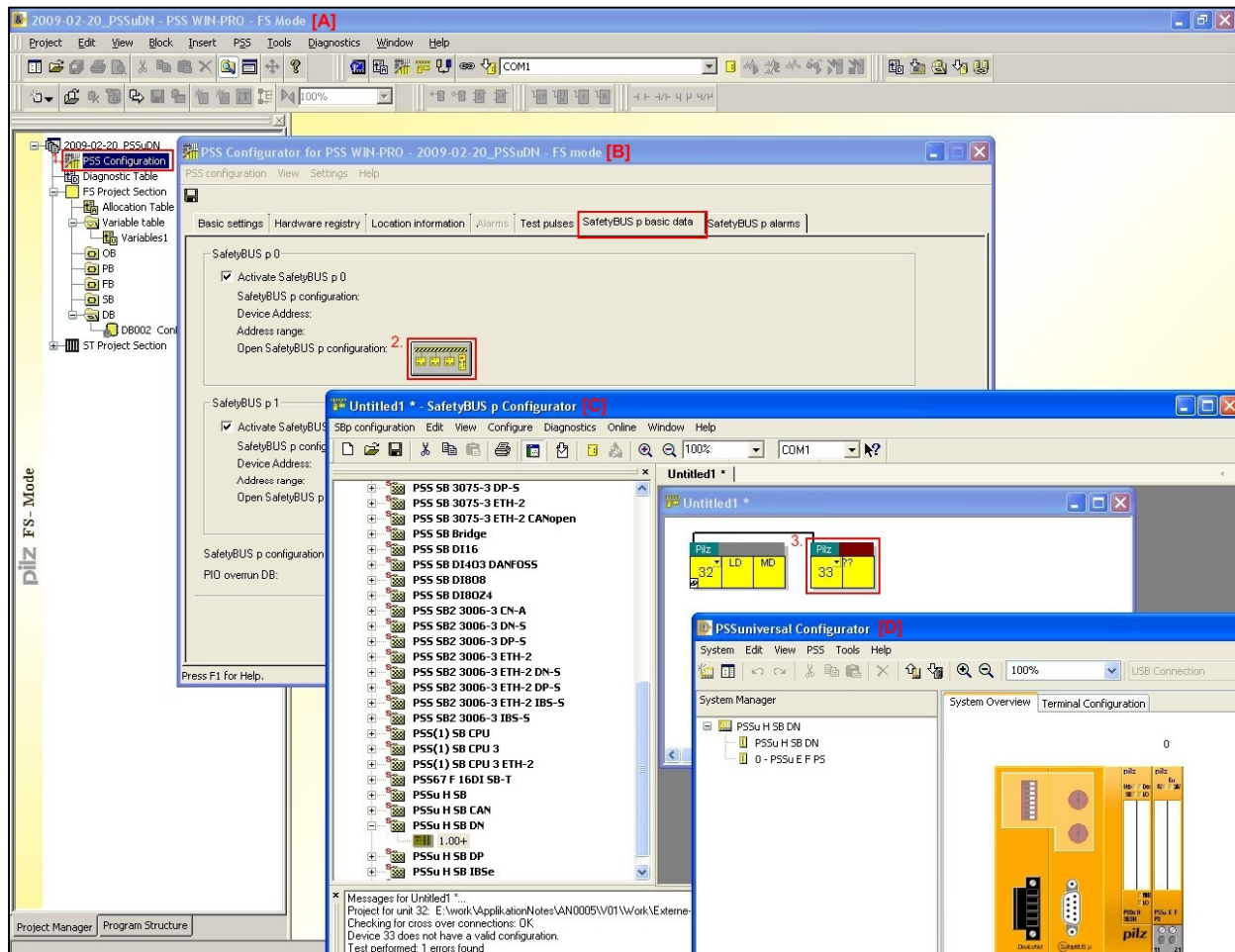


Fig. 3: Overview – Workflow of PSSu FS-configuration

- Overview of PSSu FS-configuration workflow:
 - [A] FS-part of WIN-PRO ('PSS Configuration')
 - [B] Hardware Registry ('SafetyBUS p basic data')
 - [C] 'SafetyBUS Configurator' and
 - [D] finally the 'PSSuniversal Configurator'

- ▶ Start WIN-PRO
- ▶ Enable SafetyBUS in the hardware registry and start the SafetyBUS configurator

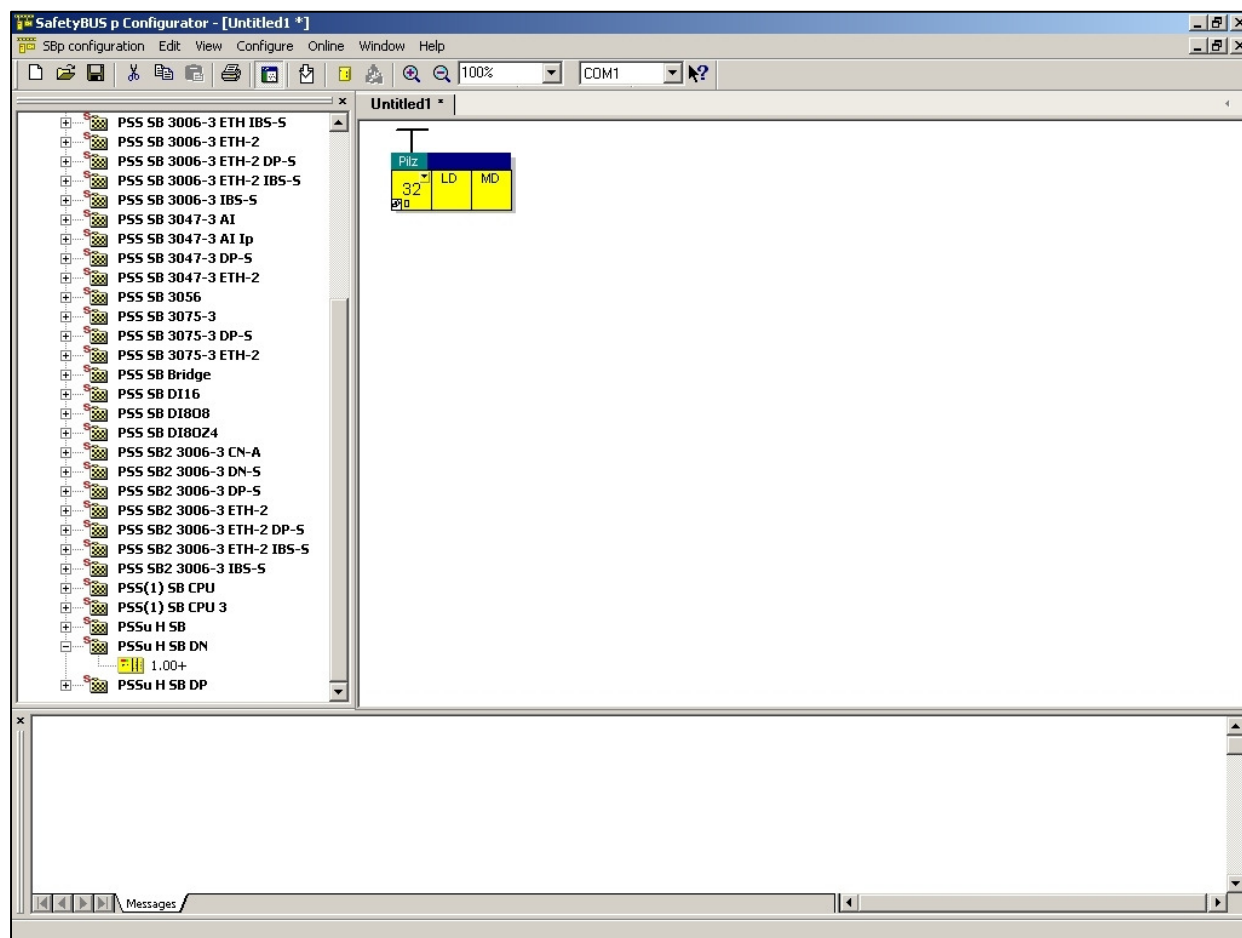


Fig. 4: SafetyBUS p Configurator – Add new device PSS SB CPU

- Start the PSSu Configurator by opening the new PSSu H DN Device double clicking.

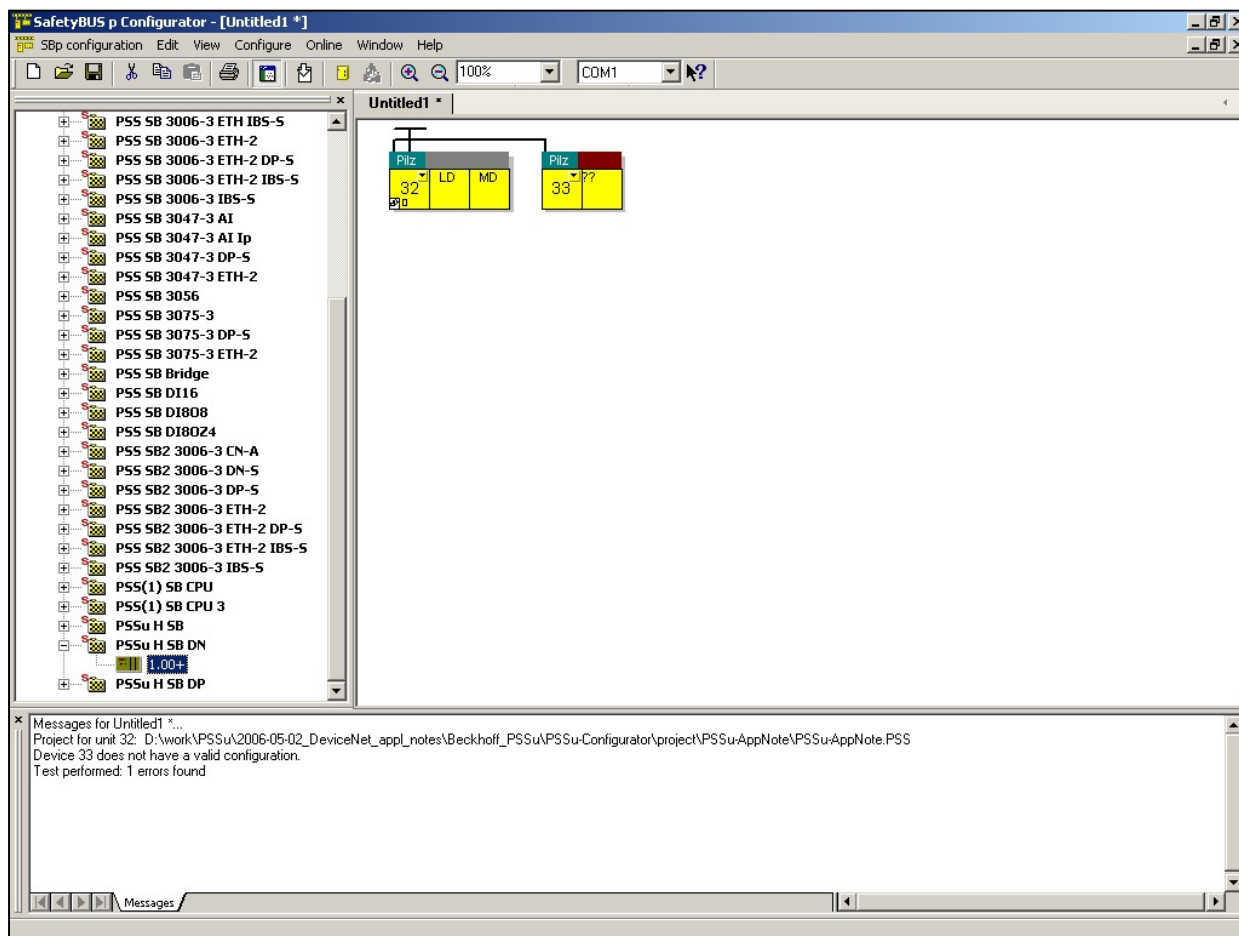


Fig. 5: SafetyBUS p Configurator – Add new device PSSu H SB DN

4.2. Step 2: Import FS Configuration via USB port

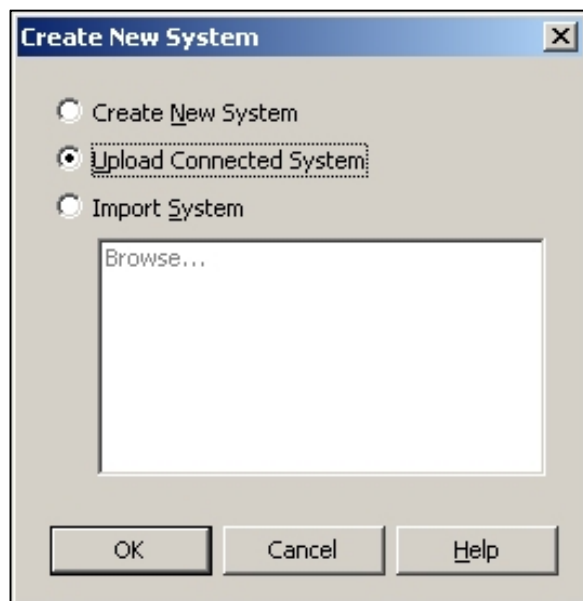


Fig. 6: PSSu Configurator – Upload connected PSSu system

The hardware registry upload of an existing PSSu System is the fastest way for a setup. Connect the PSSu H DN head module via Mini-USB and press the "OK"-button.

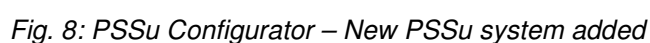
► **Note:**

The Pilz USB driver is installed on the PC. The driver is in the PSSu-Assistant subdirectory (e.g. ...\\PSSuniversal Assistant v1.8.0\\bin\\PILZ_USB_DRIVER)

One can't upload the FS-configuration from the PSSu device.

The screenshot shows a window titled "P55universal Configurator". Inside the window, there is a yellow warning triangle icon on the left. To the right of the icon, the text reads: "Any previously configured FS information is not available for this system." At the bottom center of the window, there is an "OK" button.

► The message box means, that one will upload only the mounting sequence without FS & ST-Configuration.
Only the ST-parameters of some non digital PSSu Electronic modules would be uploaded.



4.4. Step 4: Start PSS FS Configuration

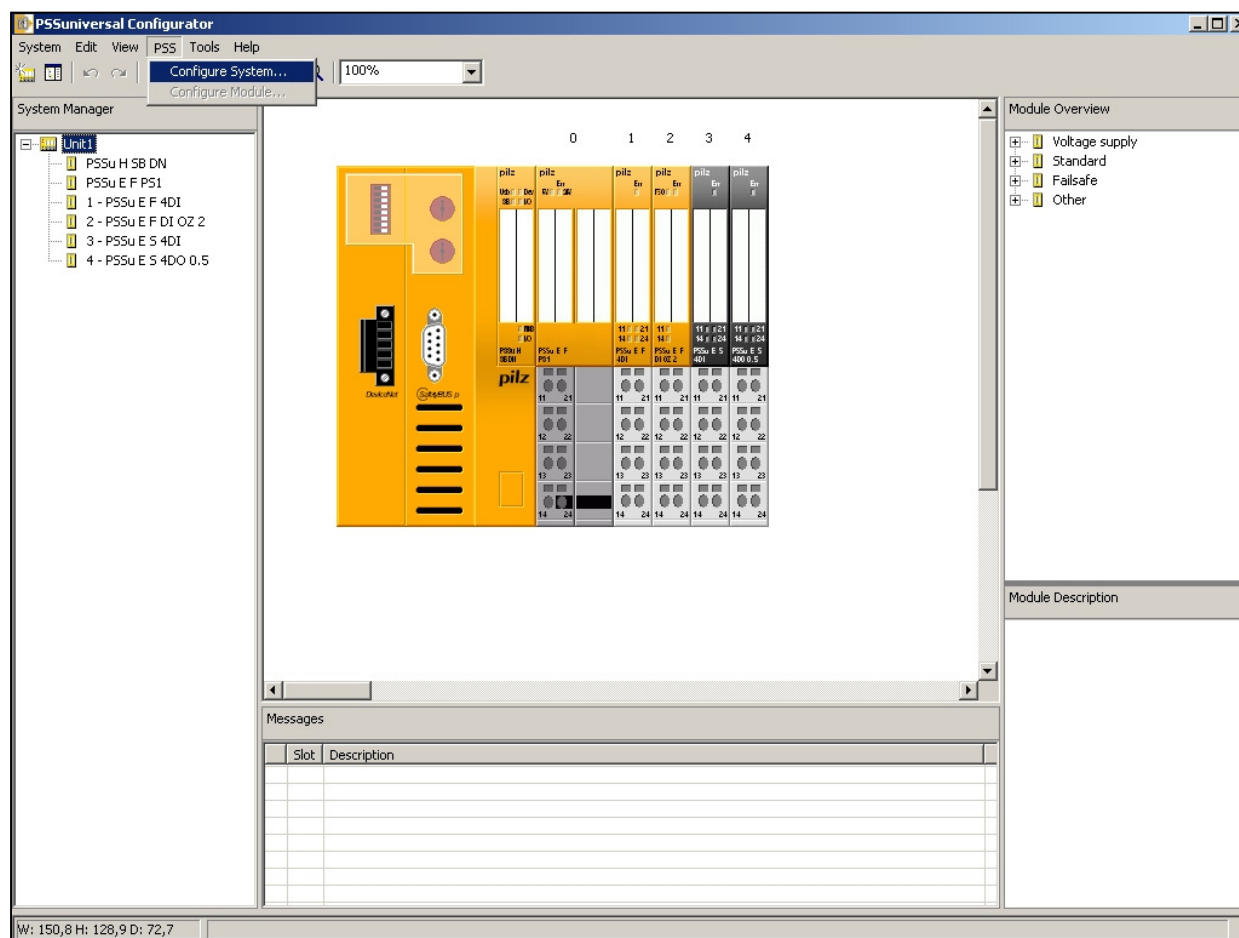


Fig. 9: PSSu Configurator – Start configuration of PSSu system

- Input 4 (E33.04) will use test pulse T0.
 - Select "ST output" for local enabling of the FS output A33.00 from the CL5000-side.

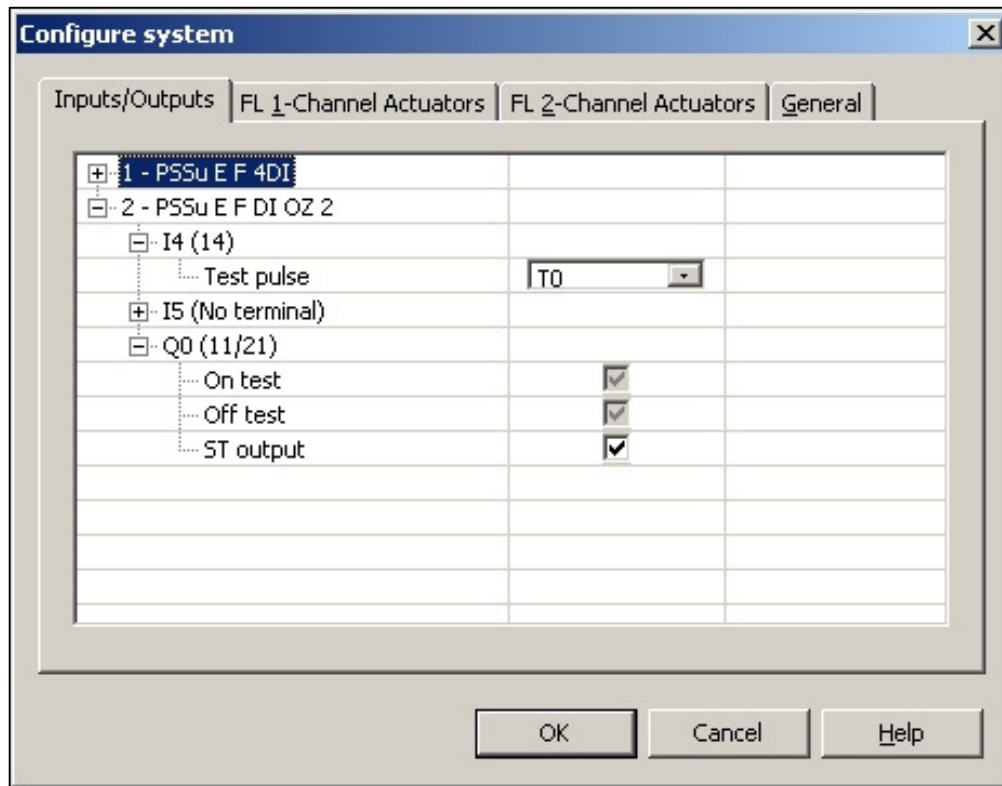


Fig. 10. PSSu Configurator – Configuration of Inputs and Outputs (Parameter)

- Select "On test" for the FS output A33.00 in the menu "Monitoring PSSu feedback loop":

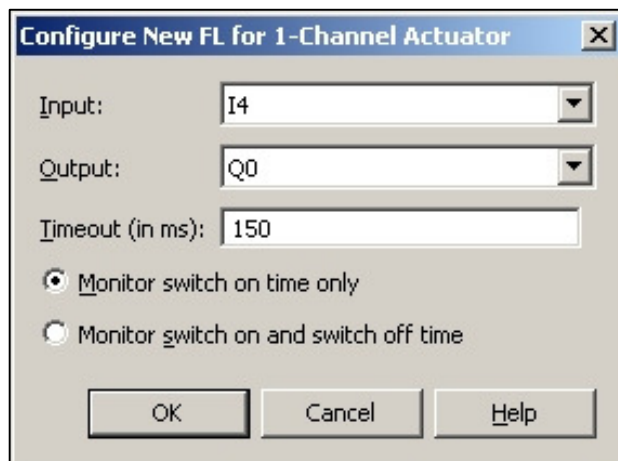


Fig. 11: PSSu Configurator – Configuration of Feedback Loop (Parameter)

- Note:
 - If an Input is configured to a Feedback loop function, the status is not the physical input anymore. The status is the "enabled" signal of the Feedback loop monitoring (RLO-1 = Feedback loop is ok.). Use the PSSu internal feedback loop if one use local enabling only.

4.5. Step 5: Exit of PSSu configurator session and save FS-information

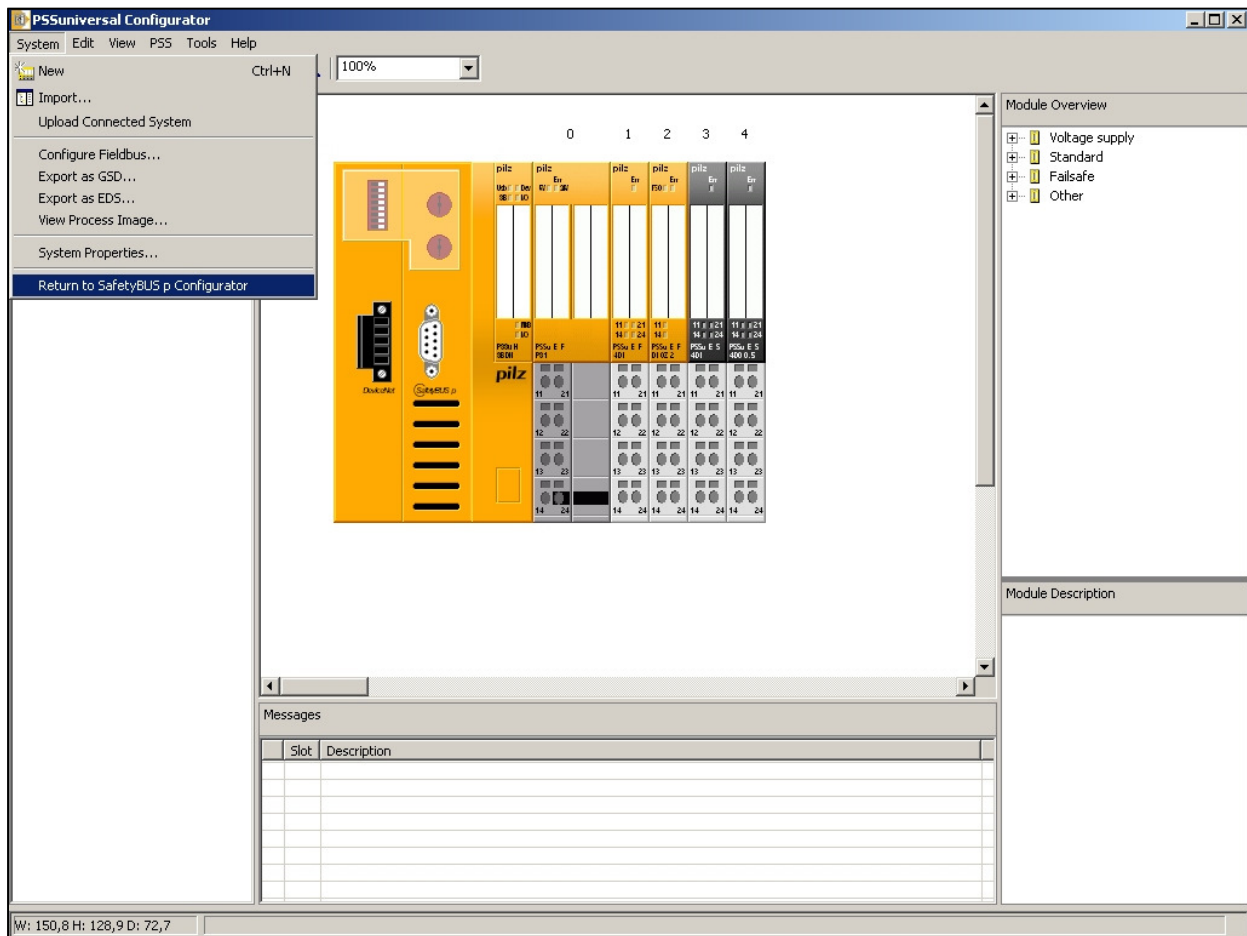


Fig. 12: PSSu Configurator – Return to SafetyBUS p Configurator

► Do you want to save the SafetyBUS p Configuration? Answer: "JA" (YES)

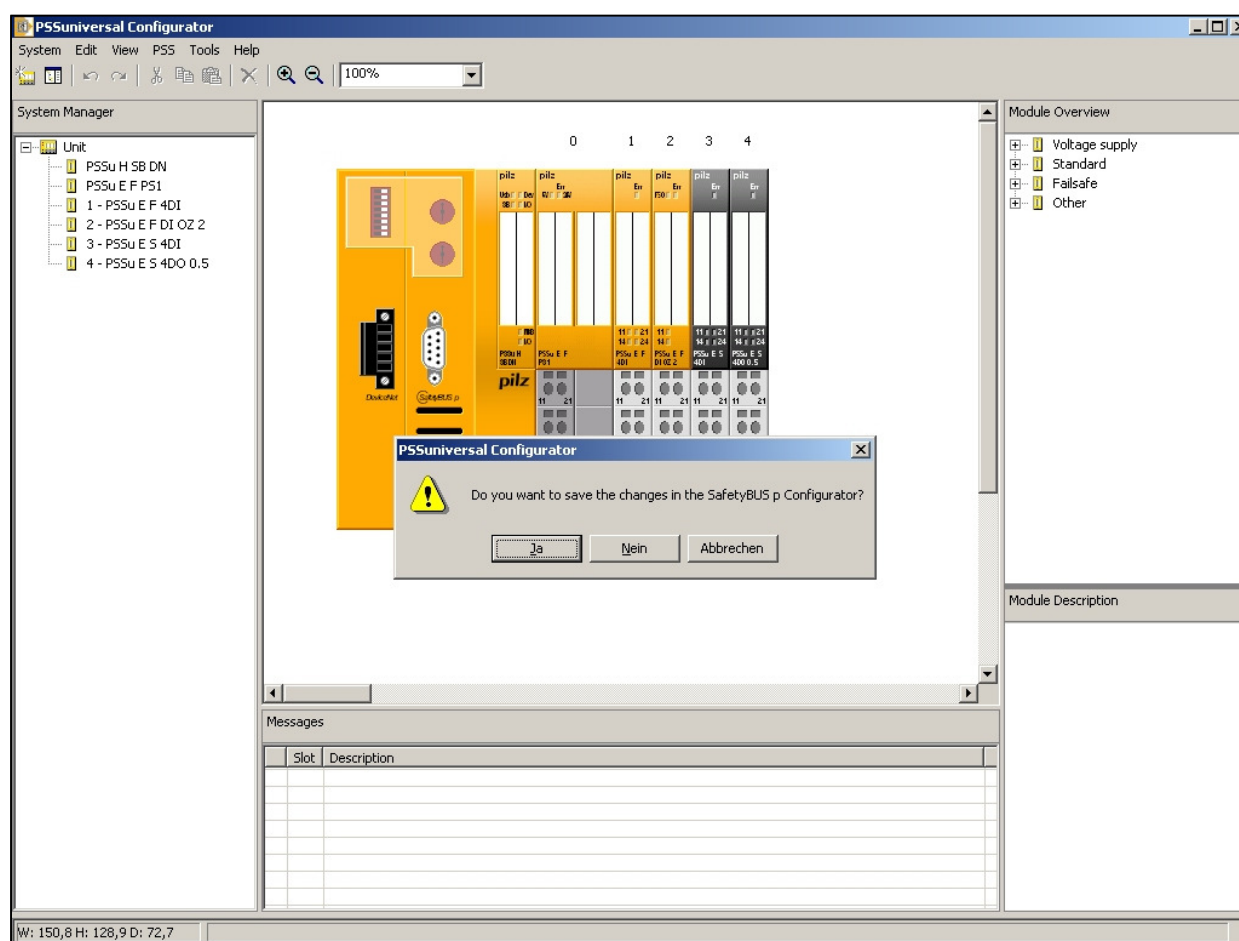


Fig. 13: PSSu Configurator – Return to SafetyBUS p Configurator (query for saving)

4.6. Step 6: SafetyBUS I/O groups of the PSSu device

- ▶ Assign PSSu Device FS outputs to SafetyBUS-I/O-Group 00 and the PSSu Device FS inputs to SafetyBUS-I/O-Group 01.

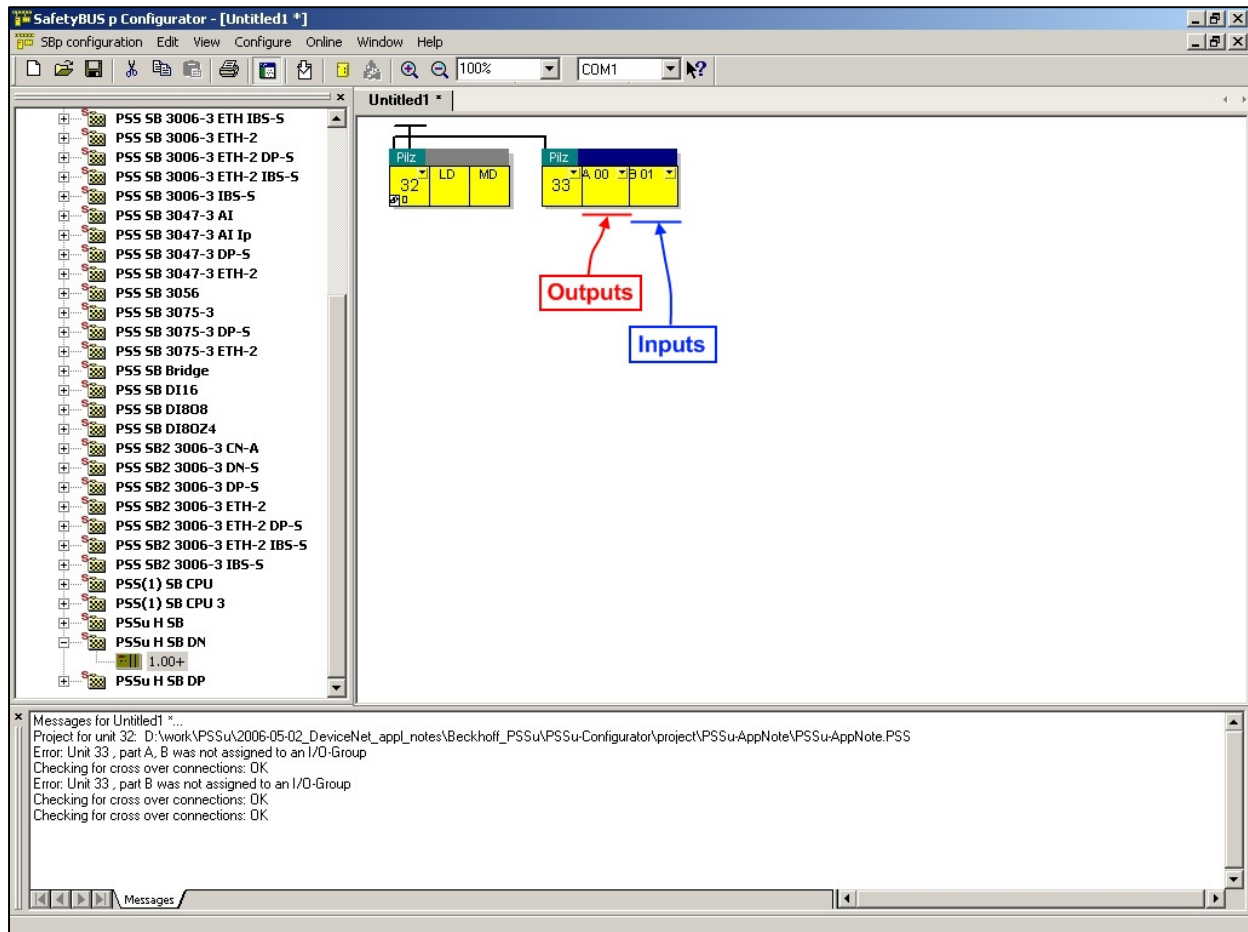


Fig. 14: SafetyBUS p Configurator – FS configuration of device PSSu H SB DN completed

The PSSu DeviceNet uses SafetyBUS node address 33.

- ▶ The SafetyBUS-Outputs are assigned to SafetyBUS group 00 and
- ▶ the SafetyBUS-Inputs are assigned to SafetyBUS group 01.
- ▶ Save and close the SafetyBUS Configurator, link the FS-project and download it to the PSS.

5.1. Step 1: Import PSSu-EDS in RSNetWorx for DeviceNet

The individual setting of the PSSu-Device have to be set up manually.



► First runnings

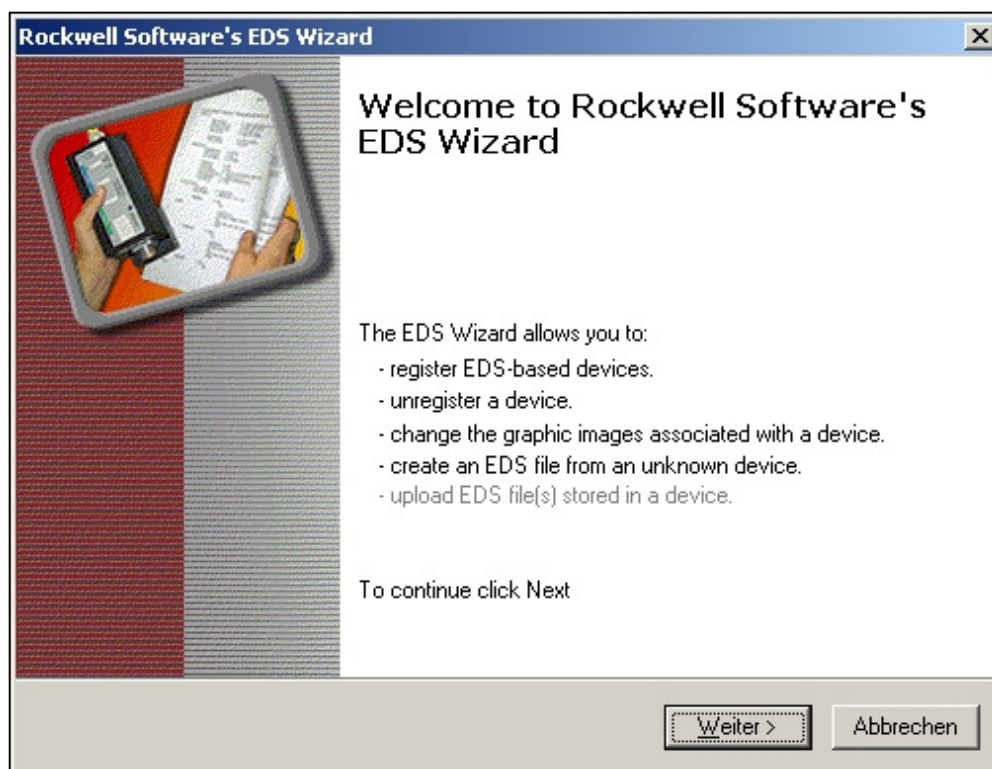


Fig. 16: RSNetWorx for DeviceNet – EDS Wizard, Part1

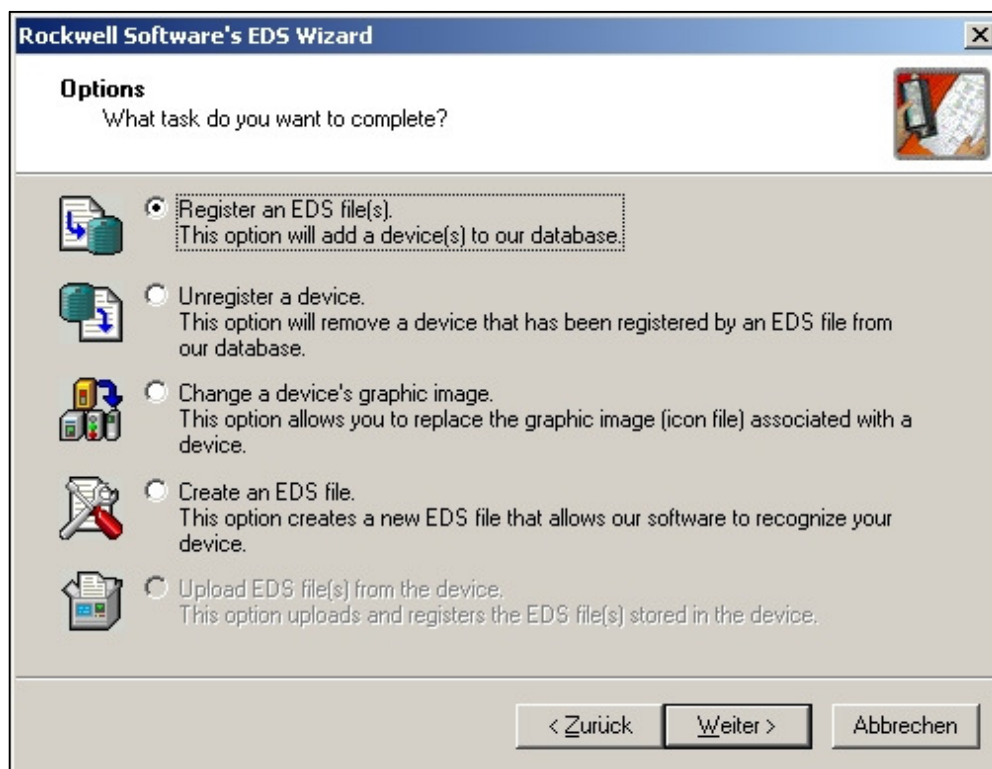


Fig. 17: RSNetWorx for DeviceNet – EDS Wizard, Part2

► Selection of EDS file

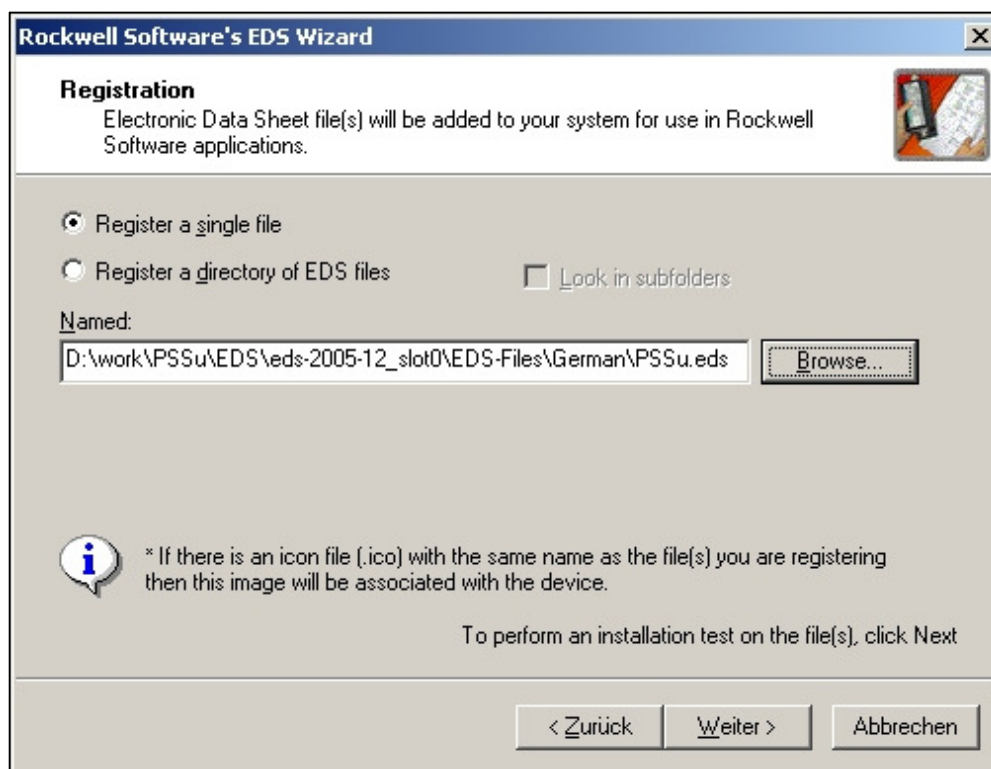


Fig. 18: RSNetWorx for DeviceNet – EDS Wizard, Part3

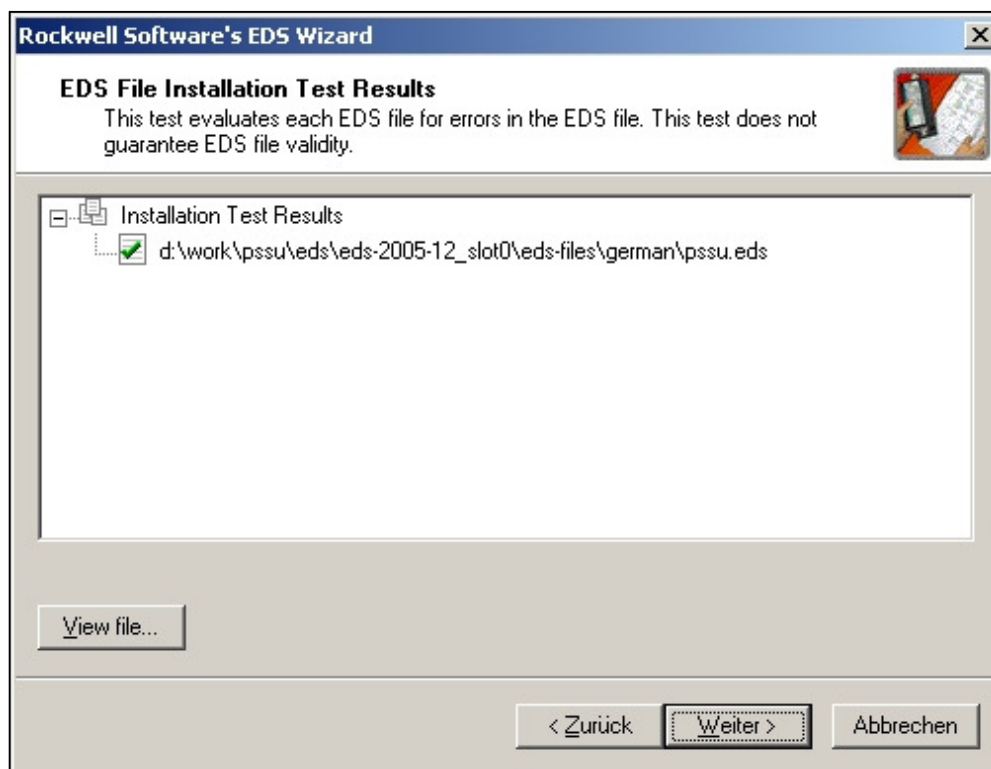


Fig. 19: RSNetWorx for DeviceNet – EDS Wizard, Part4

► Selection of Icon ('Graphic Image')

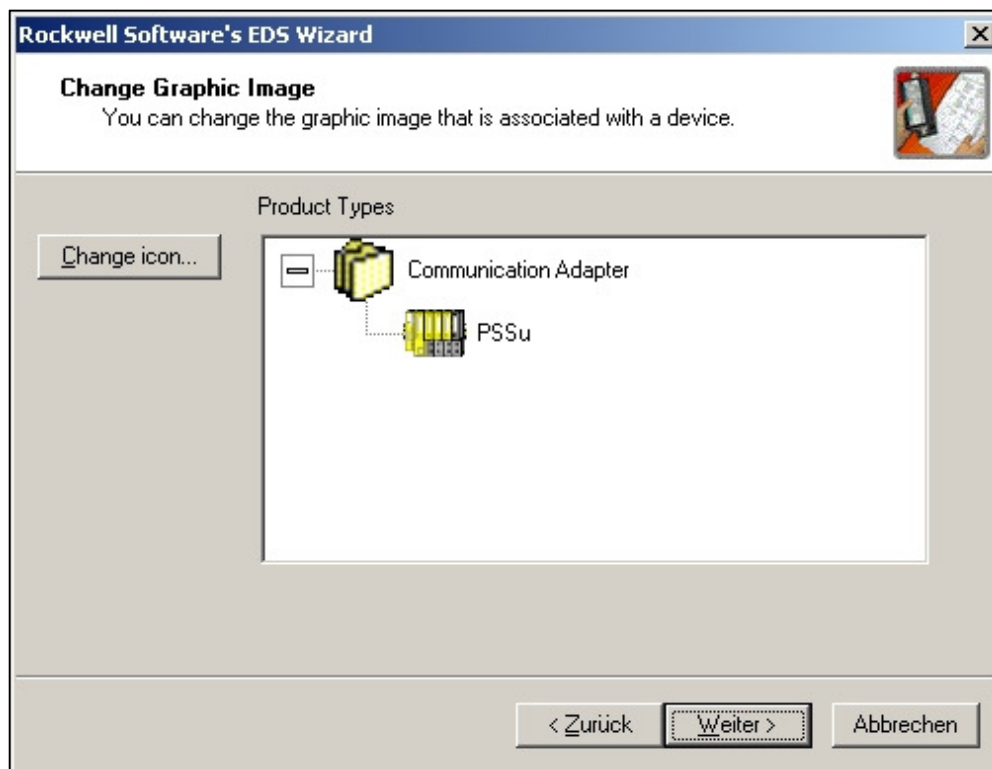


Fig. 20: RSNetWorx for DeviceNet – EDS Wizard, Part5

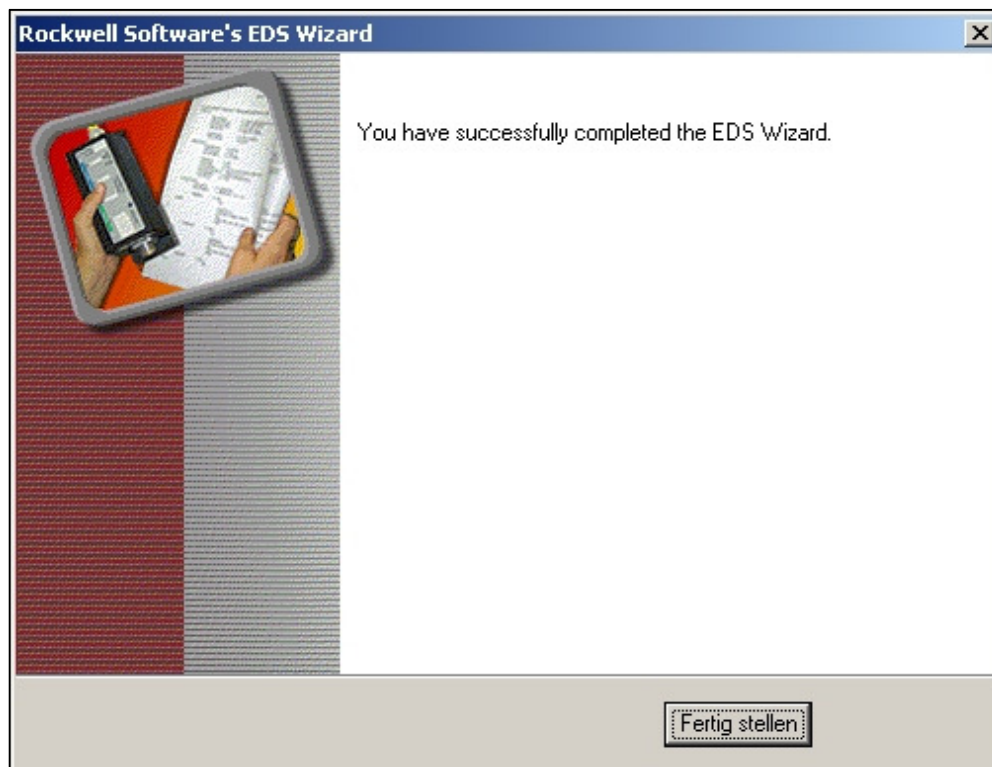


Fig. 21: RSNetWorx for DeviceNet – EDS Wizard, Part6

5.2. Step 2: Configure PSSu-device in RSNetWorx for DeviceNet

- ▶ **Task:**
Configure a small DeviceNet-System and create a mapping table from the DeviceNet to the Allen Bradley CL5000 Controller Tags.
- ▶ Drag and drop the Allen Bradley DeviceNet-Scanner (1756-DNB) and the Pilz PSSu-device to the workspace:

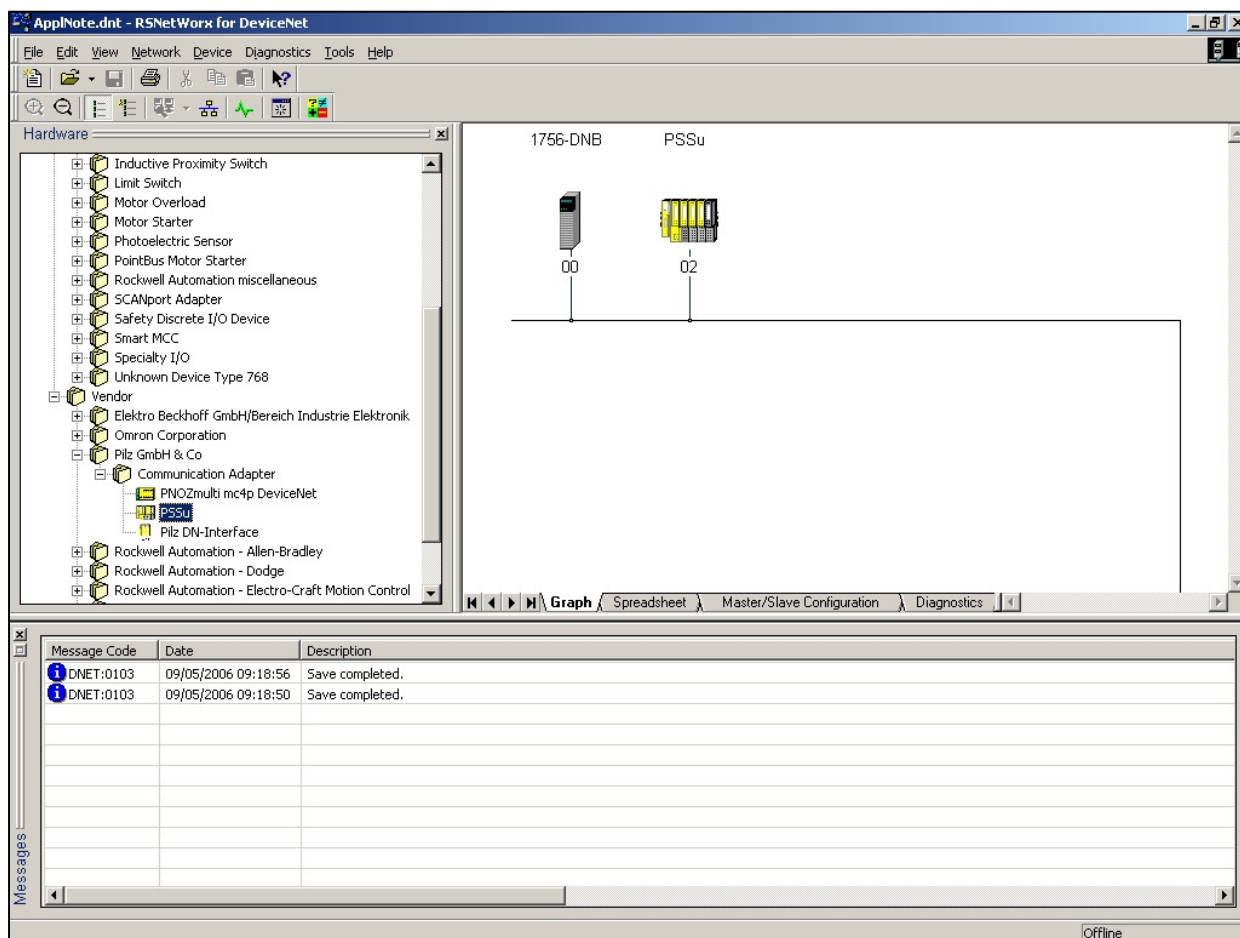


Fig. 22: RSNetWorx for DeviceNet – New DeviceNet network created

- ▶ Select the PSSu-object properties and change to the “Parameters” tab.

5.3. Step 3: FS read access and local enabling

On the combo boxes one have to configure these settings:

- ▶ Enable reading PSSu Device "System Status" of slot 0.
- ▶ Enable "read access" of all FS Inputs and Outputs of slot 1 and 2.
- ▶ Select Local enabling "ST write access" of slot 2 output A33.00.

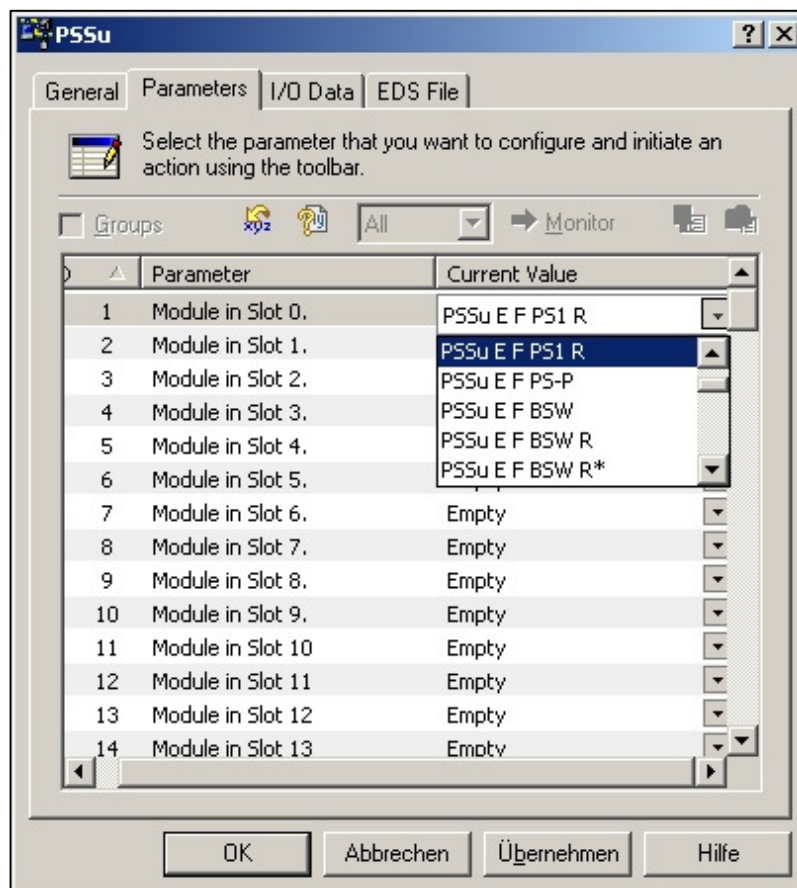


Fig. 23: RSNetWorx for DeviceNet – Enable reading 'System Status'

- Enable the Local enabling of the PSSu E F DI OZ 2 & of slot 2 PSS Safety Output A33.00.

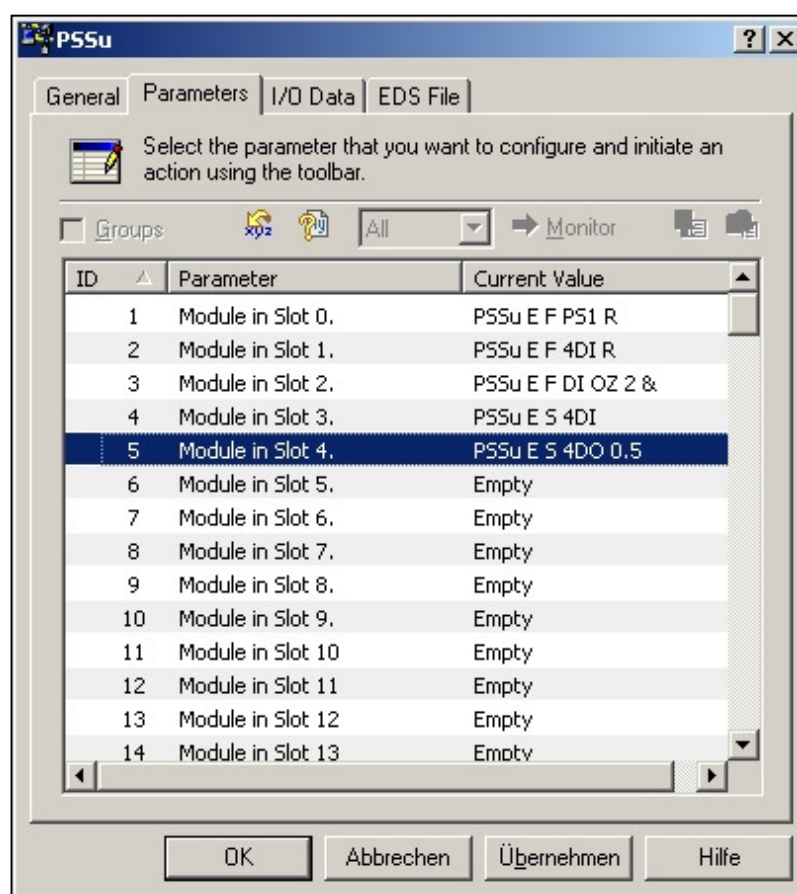


Fig. 24: RSNetWorx for DeviceNet – Enable the 'Local enabling'

- ▶ Enable the parameters for 'Local enabling' "ST (CL5000) write access" of slot 2 output O33.00
- ▶ and the "wire break detection/open circuit detection"

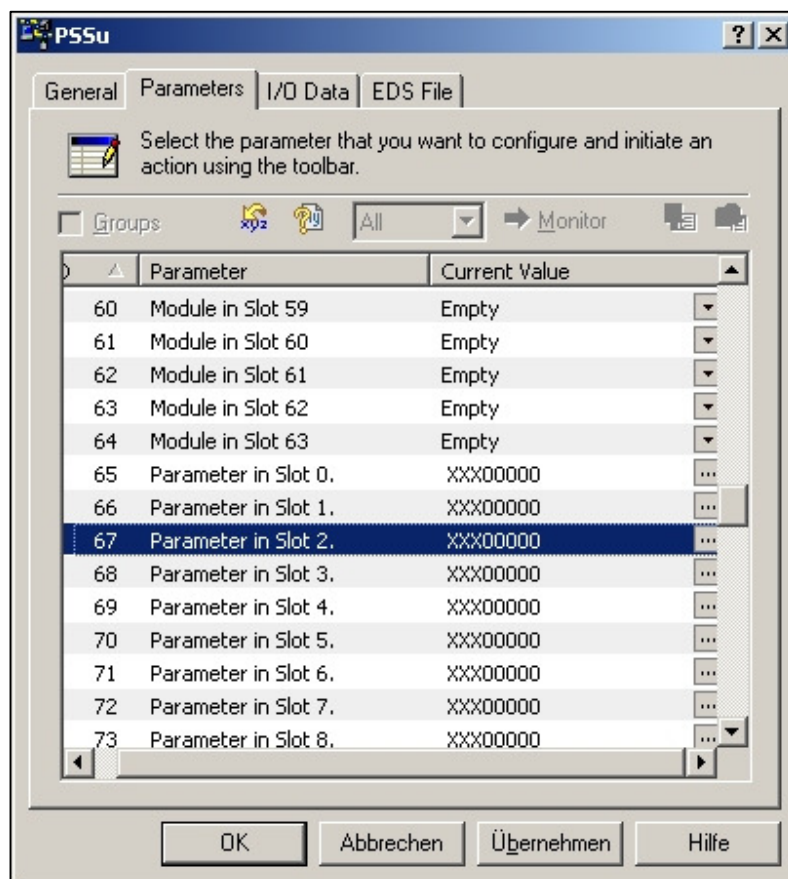


Fig. 25: RSNetWorx for DeviceNet – I/O Bits for 'PSSu E F DI OZ 2 &', Part1

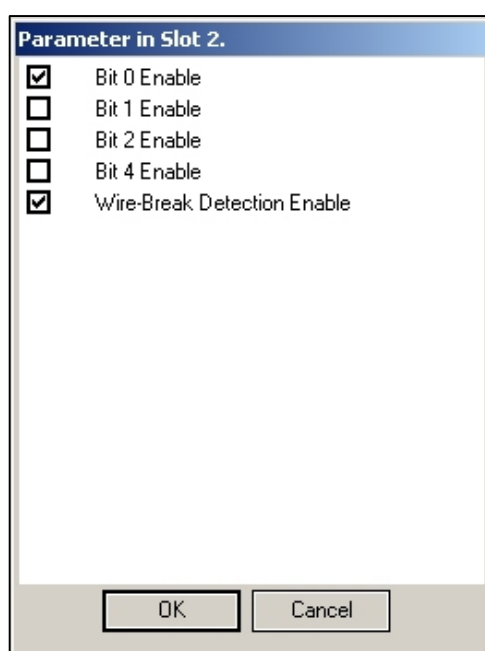


Fig. 26: RSNetWorx for DeviceNet – I/O Bits for 'PSSu E F DI OZ 2 &', Part2

- Open the DeviceNet-Scanner properties and select the "Scanlist"-tab.

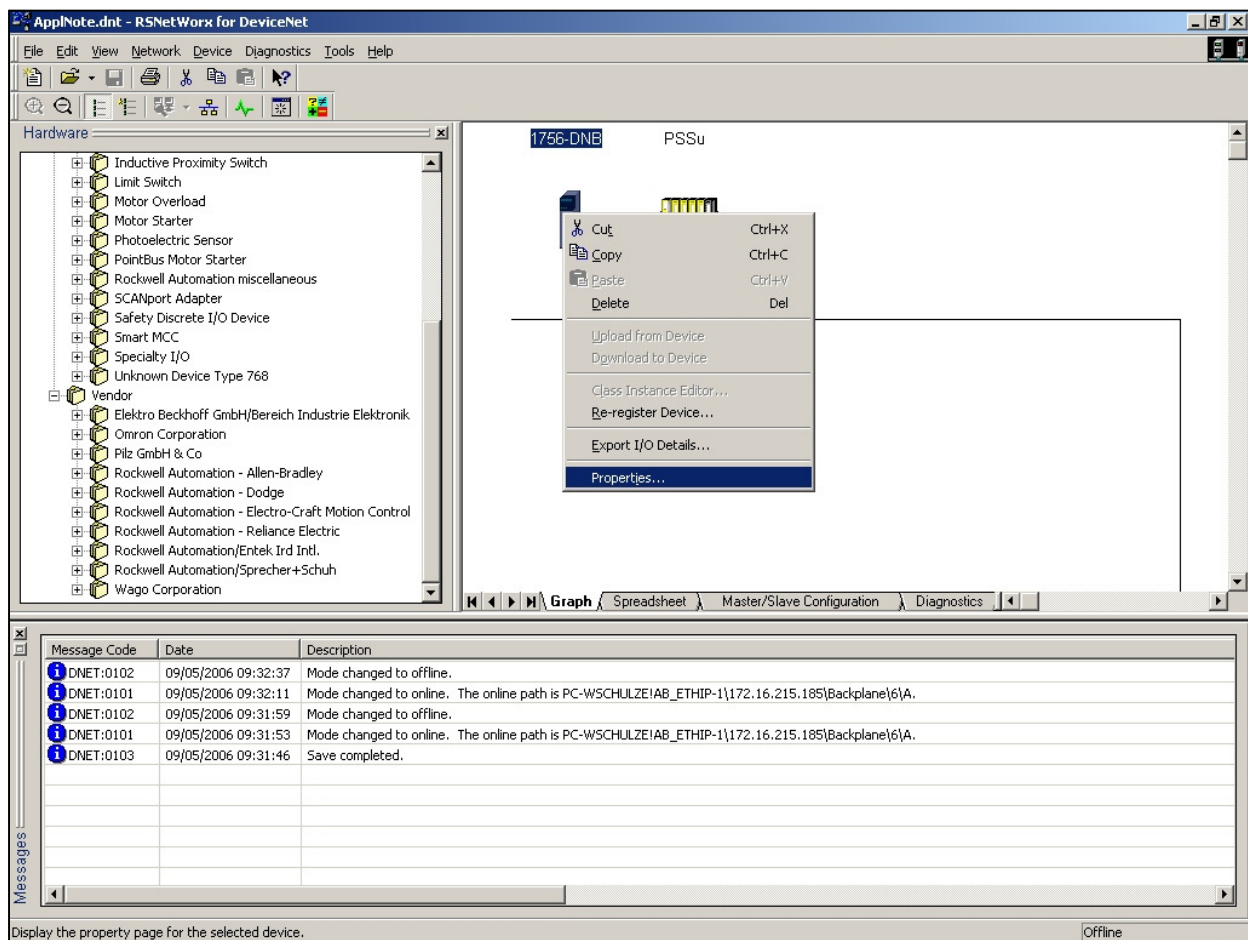


Fig. 27: RSNetWorx for DeviceNet – Open DeviceNet-Scanner properties

- Copy the PSSu-device to the Scanlist of the DeviceNet-Scanner by pressing ">".

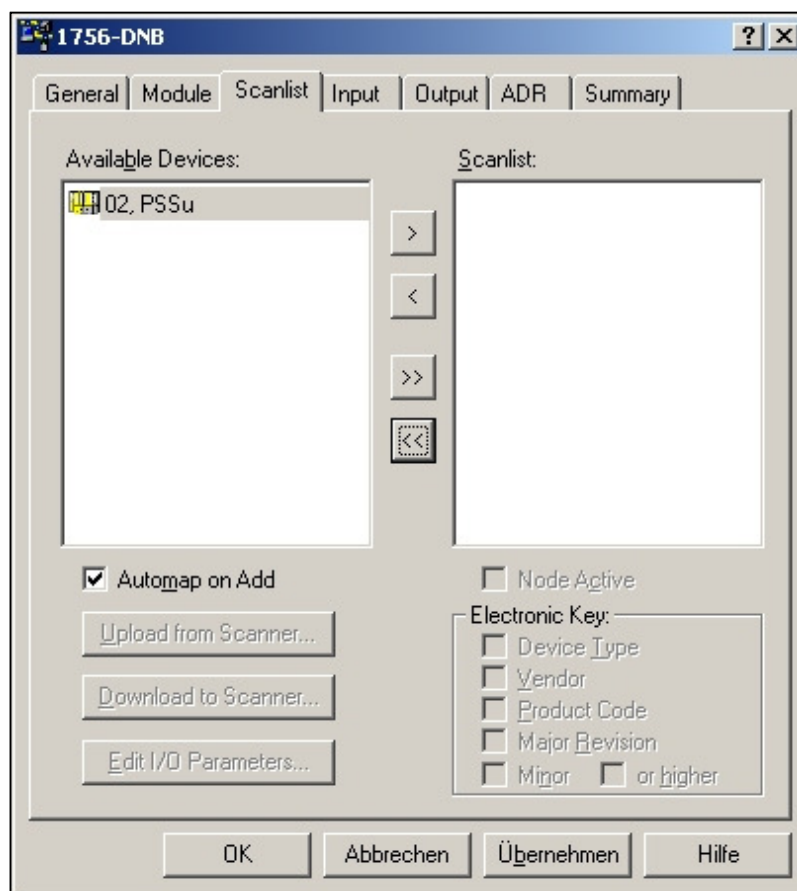


Fig. 28: RSNetWorx for DeviceNet – Scanlist of DeviceNet Scanner, Part1

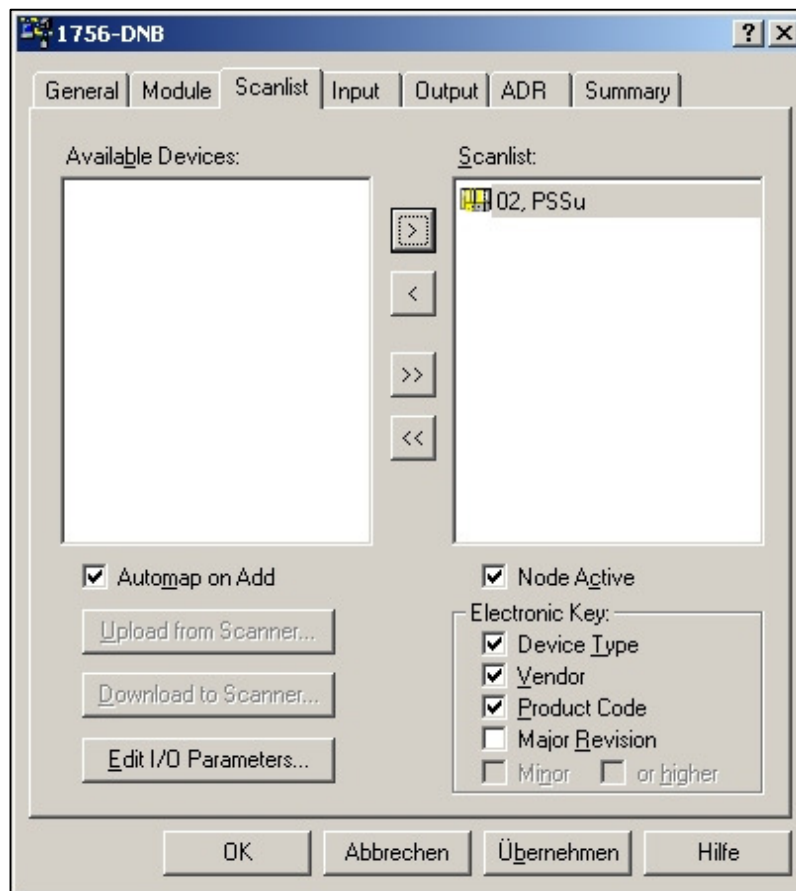


Fig. 29: RSNetWorx for DeviceNet – Scanlist of DeviceNet Scanner, Part2

- ▶ Press the "Edit I/O Parameters..." button and edit the 'I/O data' for the PSSu:
 - polled "Input Size" := 4 Bytes and
 - polled "Output Size" := 2Bytes

5.3.1. PSSu DeviceNet: Diagnostic Bytes

Byte 0: Reserved

Byte 1: PSSu device status

- Bit 00 RLO 1 ==> "SBp is ready"
- Bit 01 RLO 1 ==> "SBp I/O-Group of Inputs RUN"
- Bit 02 RLO 1 ==> "SBp I/O-Group of Outputs RUN"
- Bit 03 RLO 1 ==> "Device Status FS: Error"
- Bit 04 RLO 1 ==> "Device Status ST: Error"
- Bit 05 RLO 1 ==> "FS-Module Error"
- Bit 06 RLO 1 ==> "ST-Module Error"
- Bit 07 RLO 1 ==> "Reserved"

Byte 2: Extended PSSu device status

- Bit 00: RLO 1 ==> "PSSu E-Module in non default mode"
- Bit 01: RLO 1 ==> "Startup-Tool forcing"
- Bit 02: RLO 1 ==> "Configuration fault"
- Bit 03: RLO 1 ==> "USB-Modified E-Modul-Parameters"
- Bit 04 to 07: Reserved

Byte 3: Slot number (from 0 to 63)

Byte 4: Channel number

- Values 00 to 03 ==> Channel number
- Value 0xFF ==> E-Module error

Byte 5: PSSu Diagnostic Byte

- Value 00 ==> No error
- Value 01 ==> Output error
- Value 02 ==> Undervoltage error
- Value 03 ==> Overvoltage error
- Value 04 ==> Excessive load
- Value 05 ==> Temperature error: Too hot
- Value 06 ==> Wire break PSSu E F DI OZ 2
- Value 07 ==> Overrange value
- Value 08 ==> Underrange value
- Value 09 ==> Error
- Value 10 to 15 Reserved
- Value 16 ==> Protokoll error

Diagnostic Data via Change of State (COS)

This PSSu Diagnostics data is not used in this PLC example of this Application Note.
The Heartbeat Rate will be increased from 250ms to 1000 ms to keep the DeviceNet-Traffic down.

- Input Size := 6 Bytes
- Heartbeat Rate := 1000 msec

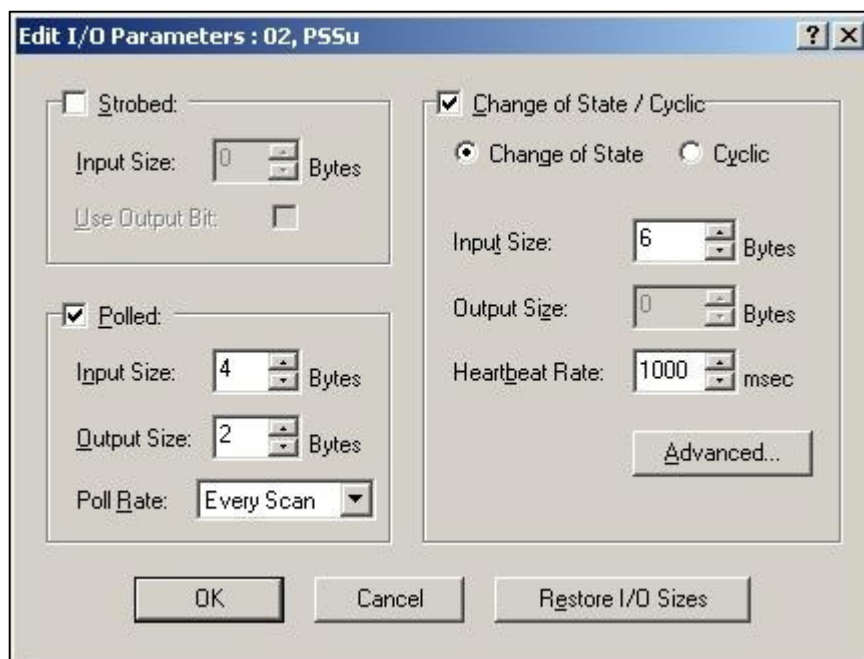


Fig. 30: RSNetWorx for DeviceNet – Mapping of I/O Parameters for PSSu system, Part1

- Confirm you manual I/O settings by pressing "OK" ("Ja").

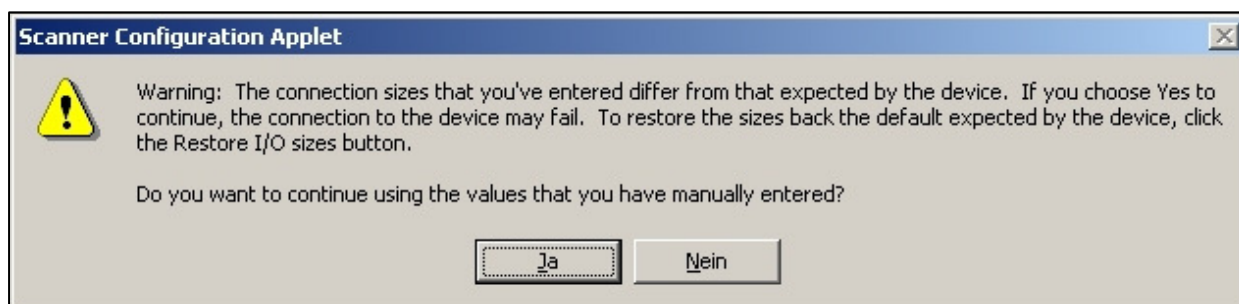


Fig. 31: RSNetWorx for DeviceNet – Mapping of I/O Parameters for PSSu system, Part2

- In the »**First Step**« use the Automap function to take the suggested mapping table.

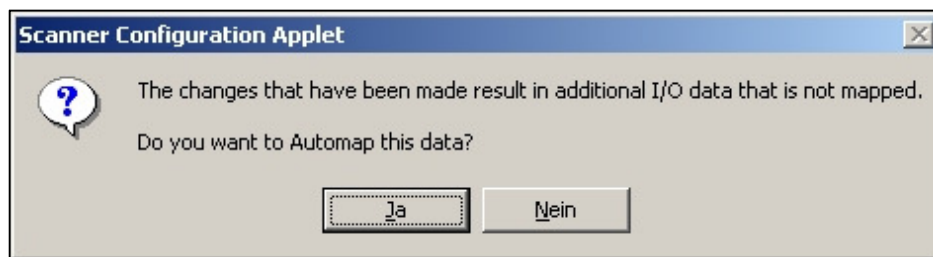


Fig. 32: RSNetWorx for DeviceNet – Mapping of I/O Parameters for PSSu system, Part3

5.3.2. PSSu DeviceNet: Optimal data arrangement

With the 'Automap' function the data are arranged unfavorably, first stand the diagnostic data ('COS'), then the I/O data ('Polled'). One would like to usually change this. But the following additional steps must be accomplished.

- In the »**Second Step**« both input data streams and unmap it by pressing "Unmap".

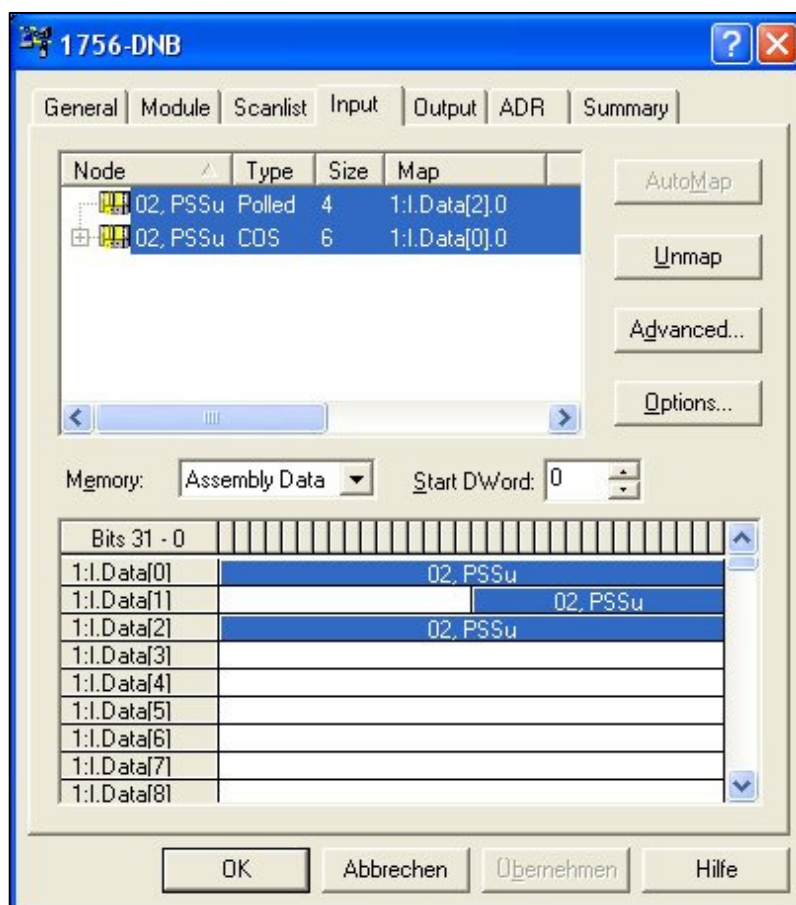


Fig. 33: RSNetWorx for DeviceNet – Optimization of I/O Parameters (Unmap)

- In the »**Third Step**« select the polled data stream and apply the first address by pressing "AutoMap" and one get the needed tag start address Data[0].0 (Double word 0, Bit 0)

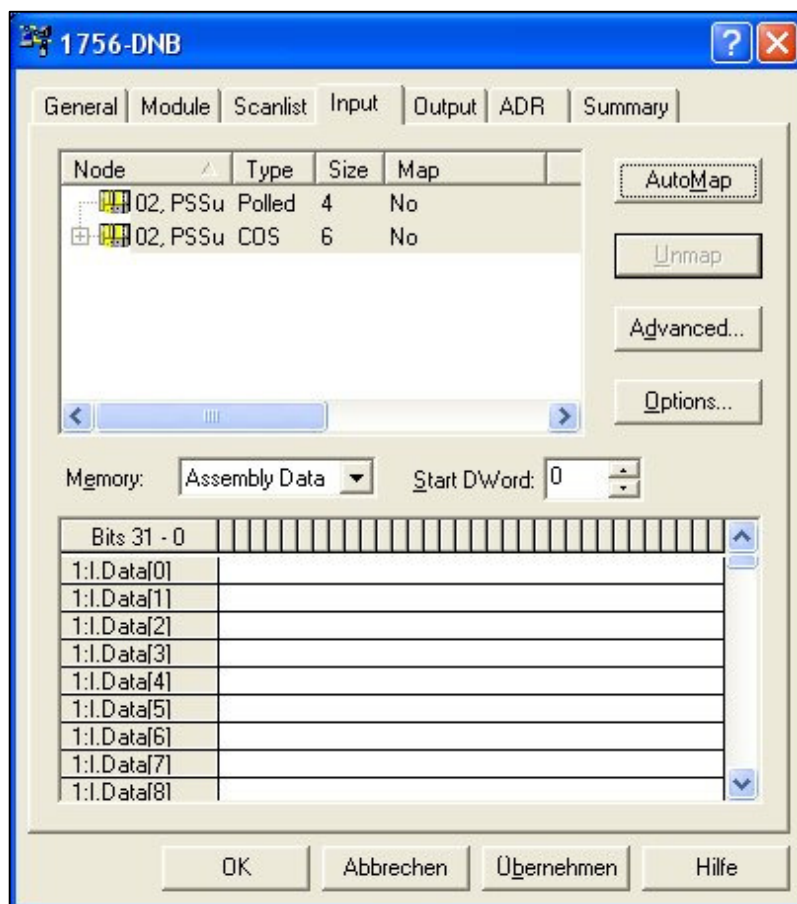


Fig. 34: RSNetWorx for DeviceNet – Optimization of I/O Parameters (AutoMap)

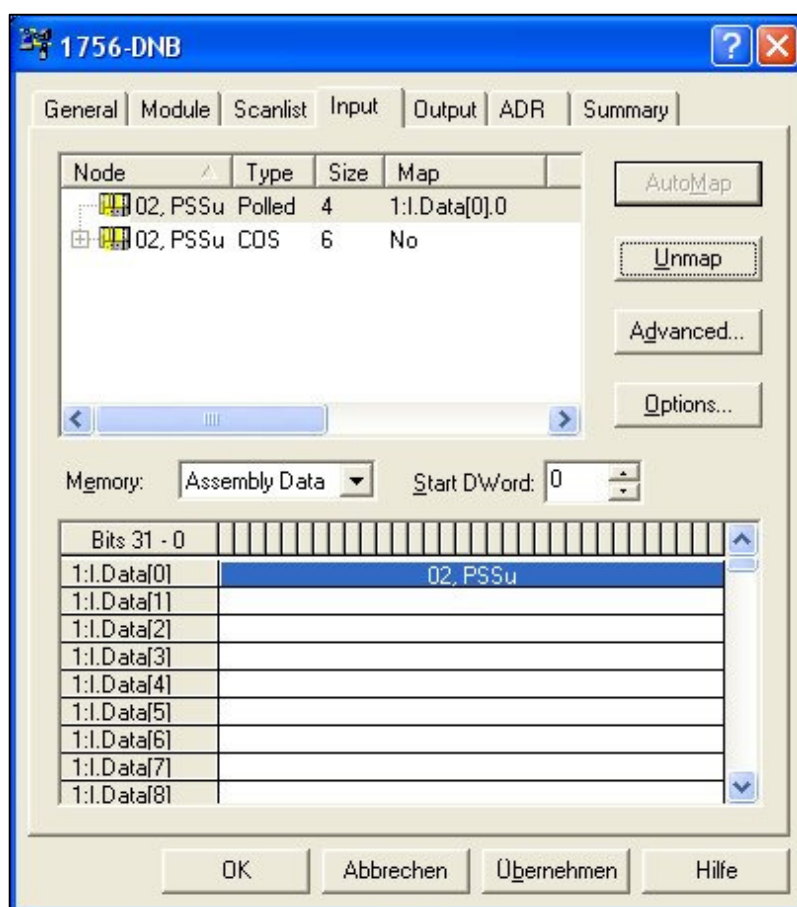


Fig. 35: RSNetWorx for DeviceNet – Optimization of I/O Parameters ('Input')

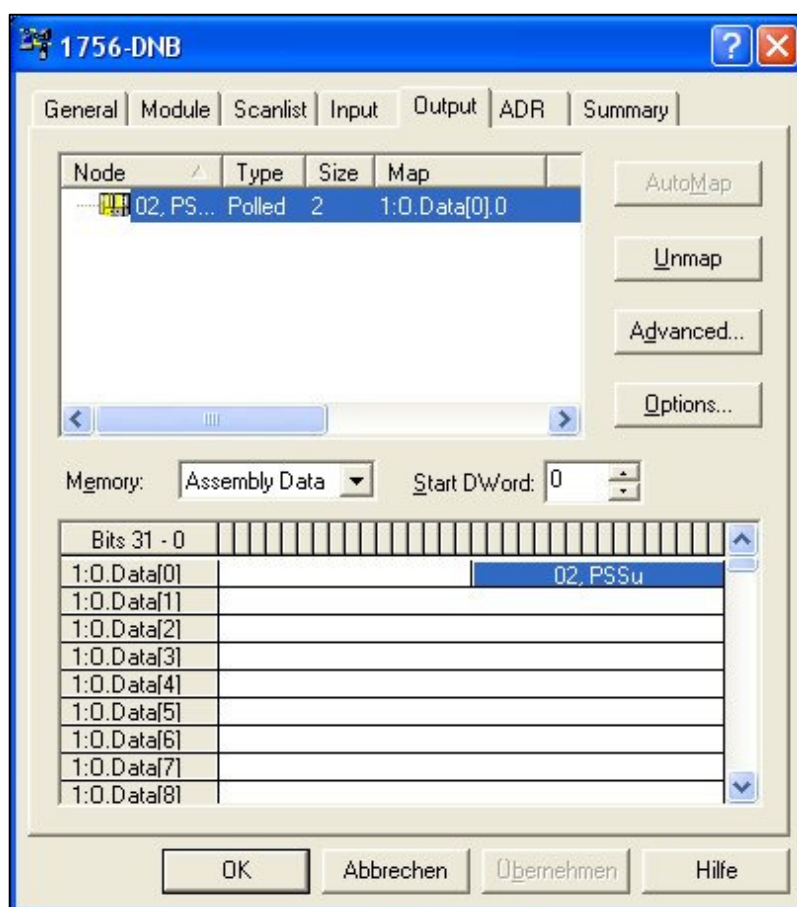


Fig. 36: RSNetWorx for DeviceNet – Optimization of I/O Parameters ('Output')

► Note:

For details of the Bit-informations see chapter 7 'Allen Bradley ControlLogix 5000-side', page 49ff, please.

5.3.3. PSSu DeviceNet: Enable ADR configuration recovery

- Select the ADR tab, the PSSu device and download the online ADR-settings by pressing "Load Device Config".

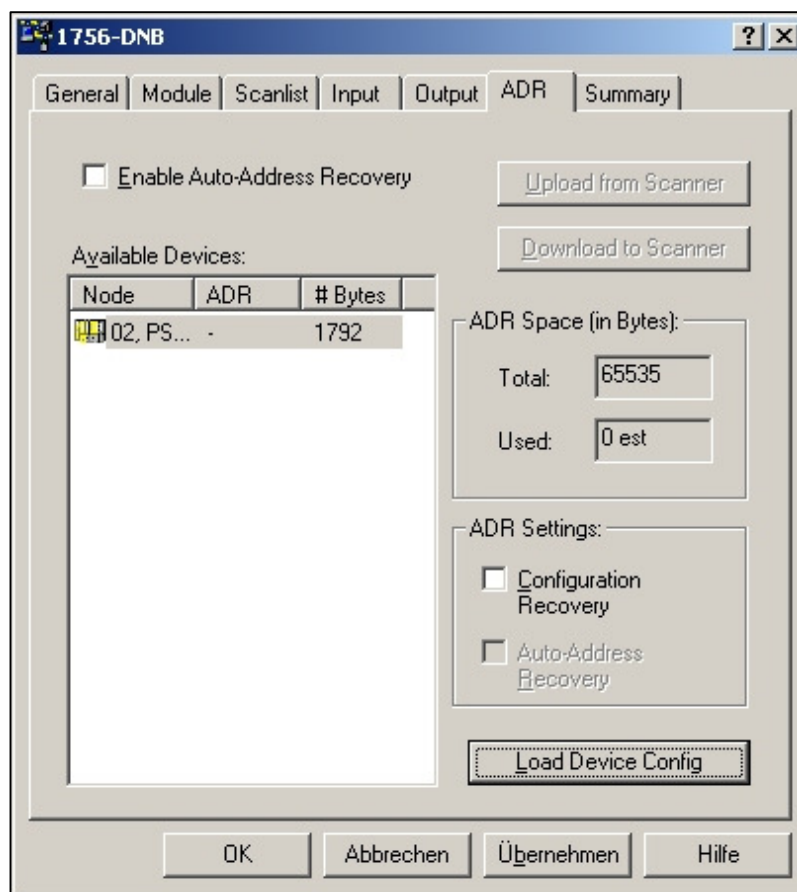


Fig. 37: RSNetWorx for DeviceNet – ADR configuration, Part1

- If the box “Configuration Recovery” is not enabled, do it and
- download the new setting to the DeviceNet-Scanner by pressing “Download to Scanner”.

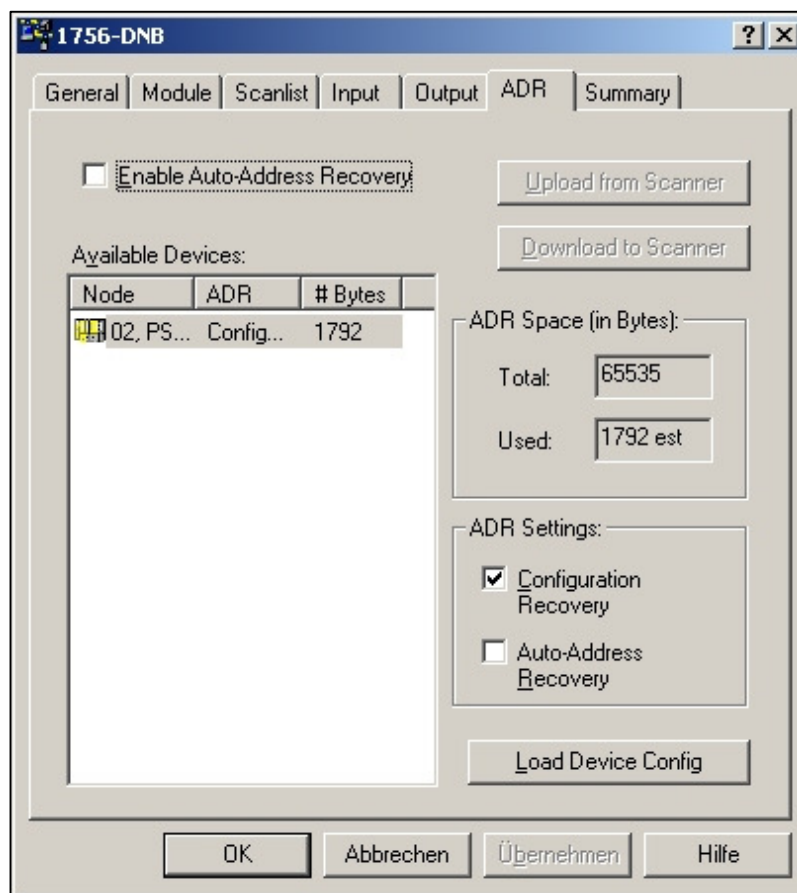


Fig. 38: RSNetWorx for DeviceNet – ADR configuration, Part2

- Note:
If the function ADR 'Configuration Recovery' is set, after an exchange the configuration is again transferred automatically to the new PSSu head module by the Master/Scanner. Thus no renewed downloads of the configuration with the user software is necessary.

5.4. Step 4: Download DeviceNet configuration to the scanner

- ▶ Stop PLC and change it in PLC programming mode (PRG).
- ▶ Go online by pressing "F10".

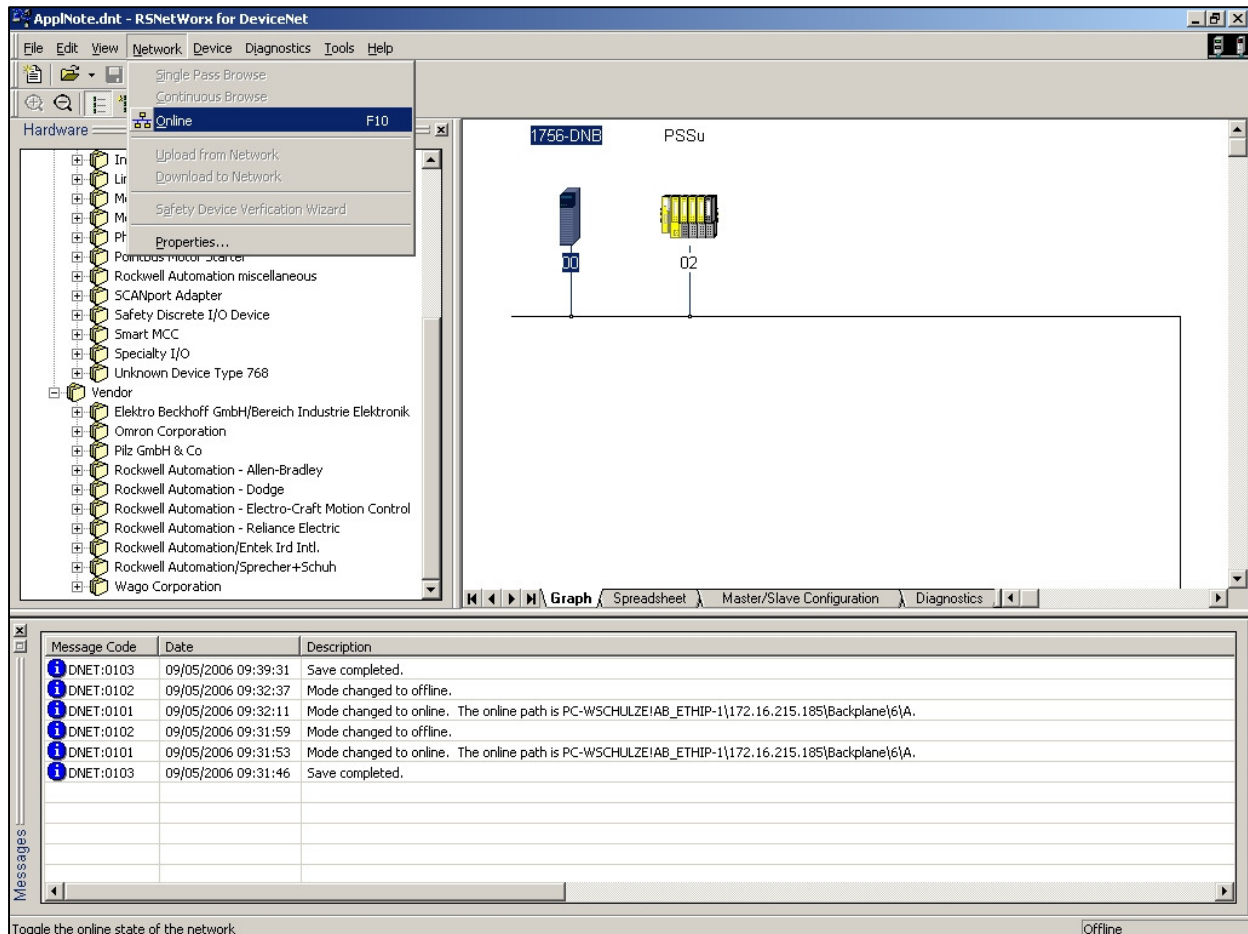


Fig. 39: RSNetWorx for DeviceNet – Network Online, Part1

RSNetWorx for DeviceNet will start a MAC-ID note scanning.

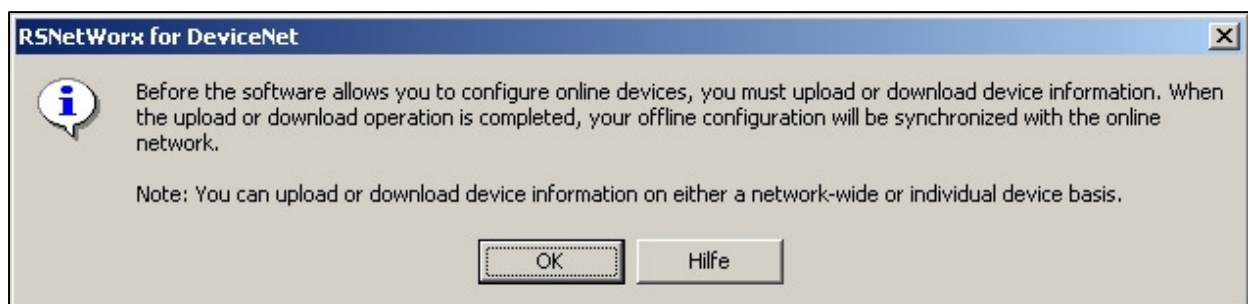


Fig. 40: RSNetWorx for DeviceNet – Network Online, Part2

If the hardware is connected the right way, one could cancel this scanning operation by pressing "Cancel".

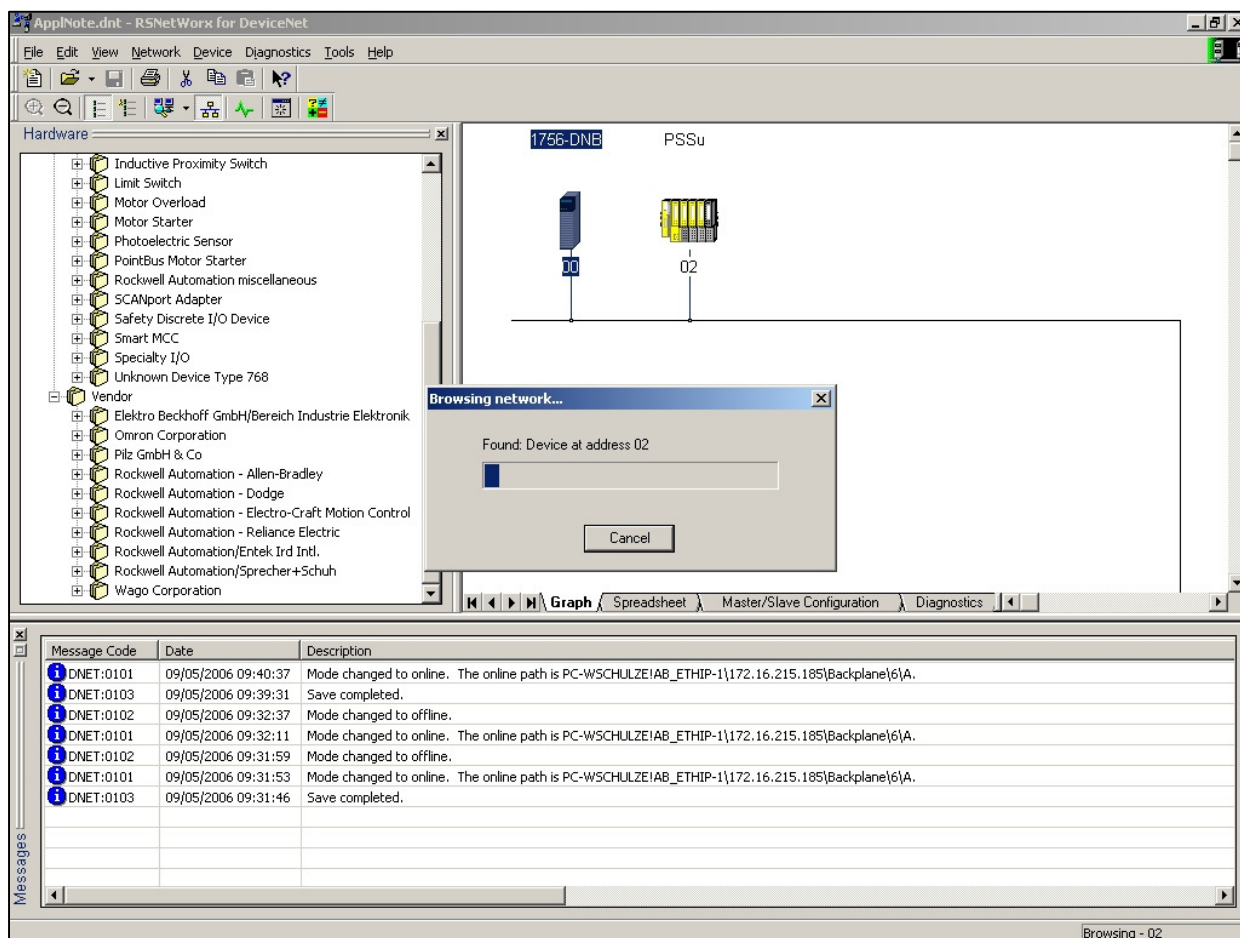


Fig. 41: RSNetWorx for DeviceNet – Network online, 'Browsing network...'

- Start the download of the DeviceNet-configuration:

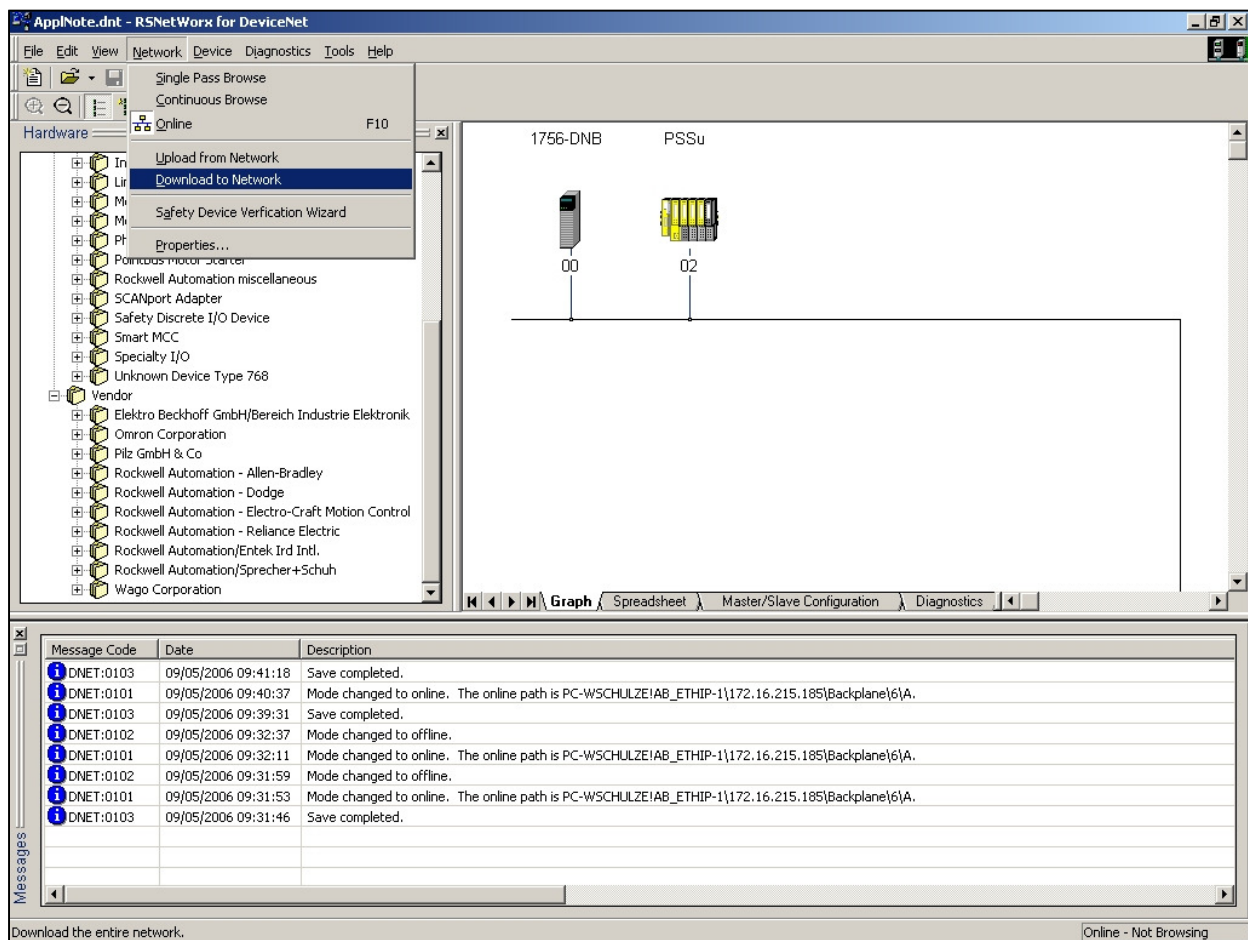


Fig. 42: RSNetWorx for DeviceNet – Network online, Part1, 'Download to Network'

- Confirm the download operation by pressing "OK" ("Ja").



Fig. 43: RSNetWorx for DeviceNet – Network online, Part2, 'Downloading entire Network...'

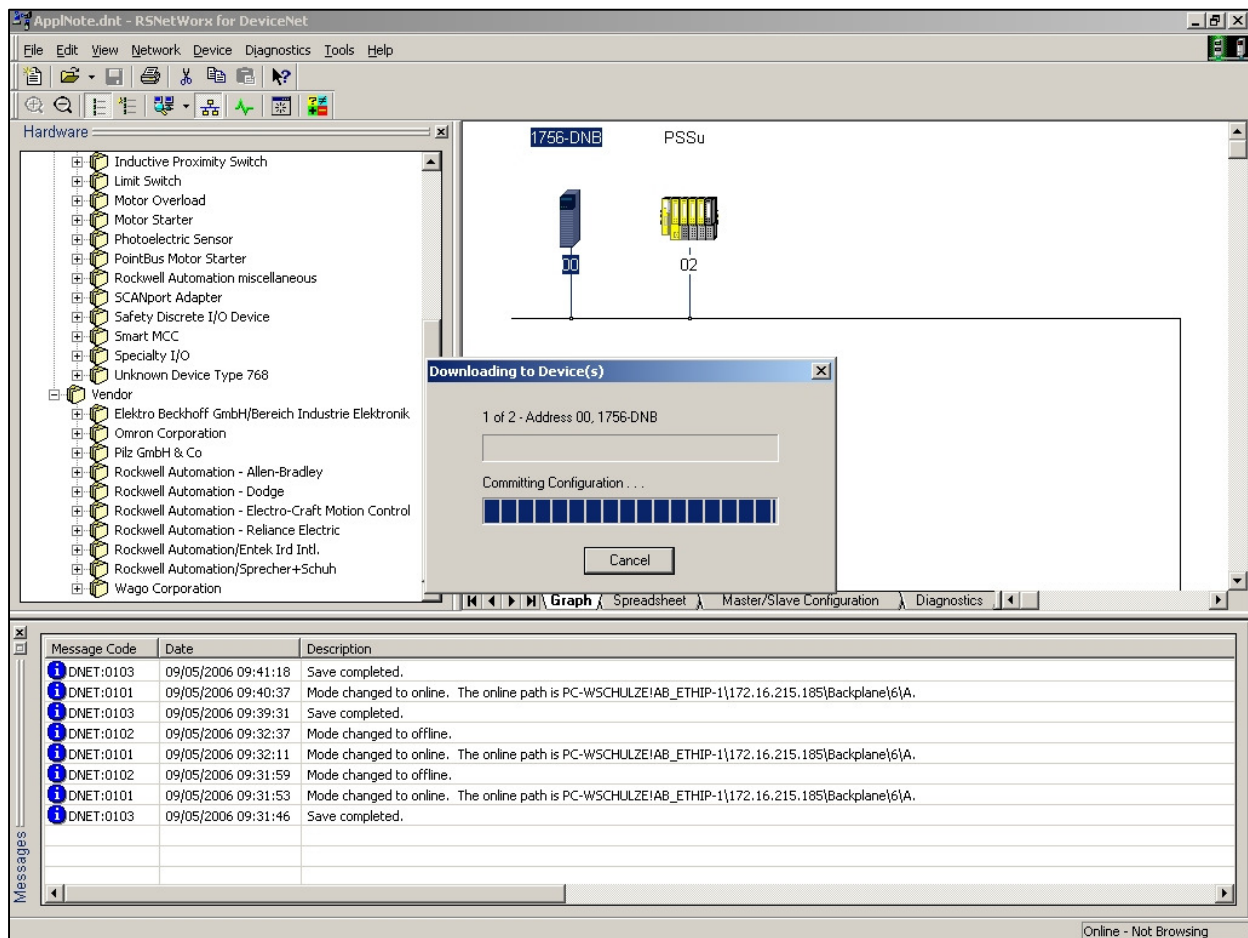


Fig. 44: RSNetWorx for DeviceNet – Network online, Part3, 'Downloading to Device(s)'

After the download operation the PSSu-device should be in idle mode.

- ▶ The PSSu-device is in IDLE-mode:
LED-display on the PSSu Device
 - MNS-LED is green
 - I/O is red
- ▶ Change to off-line mode by pressing F10 and save the configuration file. I. e. by clicking "save as" and the destination name "2005-05-08.dnt".
- ▶ If the PSSu device is not in idle mode one could read a error message on the display.

6. Small Troubleshooting with DeviceNet

Allen-Bradley 1756-DNB: Display Informations and Error Codes

6.1. ControlLogix Scanner 1756-DNB, character display

<u>Display:</u>	<u>Description:</u>
A#xx	Address of this device, where: xx is the address.
IDLE	Device is in idle mode.
AUTO	The AutoScan option is on and the device is in idle mode.
RUN	Device is in run mode.
No Network Power	The DeviceNet cable is not supplying power to the communication port.
Network Disabled	Controller has set the device to the disabled mode.
No Rx	Either or both of the following: - The device does not have a scan list. - The device has not received communication from any other device
No Tx	Device has failed to transmit a message.
N#xx	Another device has a problem, where: xx is the address of the device. The status code for the device follows the address.
E#xx	Status code for a device with a problem, where: xx is the status code for the device. The address of the device comes before the status code.

6.2. Possible display errors on the DeviceNet-Scanner with PSSu system

with Application Note example PSSu node 2

- ▶ No Network Power
Check 24 VDC fieldbus power supply (first and last pin of DeviceNet-Plug , red and black)
- ▶ Bus Off Detected
Check both 120 Ohm terminators between Can low and Can high, white and blue at the start and end of the DeviceNet cable, switch off and on 24 VDC Fieldbus power supply
- ▶ A#02 E#72
no communication with device node 1 (PSSu), inspect device and verify connections
- ▶ A#02 E#77
node 1 (PSSu) wrong Input/Output Data Size
If the data size expected by the device does not match the scan list entry. (see Chapter 4.2: Calculate Input and Output Size manually).
If the Data Size is ok, then compare the offline settings with PSSu-Device upload information and try a new DeviceNet-Parameter download.
- ▶ A#02 E#78
node 1 (PSSu) is not connected to DeviceNet, check electrical wiring to PSSu device

- ▶ A#02 E#89
node 1 (PSSu) Scanner failed to configure a device using the Automatic Device Recovery (ADR) parameters, The offline configuration for the device does not match the actual (online) configuration of the device. (see Chapter: 5.4 Enable ADR configuration recovery)
- ▶ A#00, without A#02-message
idle, DeviceNetScanner address = 0, DeviceNet Bus is ready to run, PLC Run Mode is needed
- ▶ Note:
For further informations like Module/Network (Mod/NET) status indicator see Allen Bradley manual, please.

7. Allen Bradley ControlLogix 5000-side

7.1. ControlLogix 5000 Communications

Apply RSNetWorx for DeviceNet-configuration file to the CL5000-project

- ▶ Select the DeviceNet configuration file by clicking "Browse":

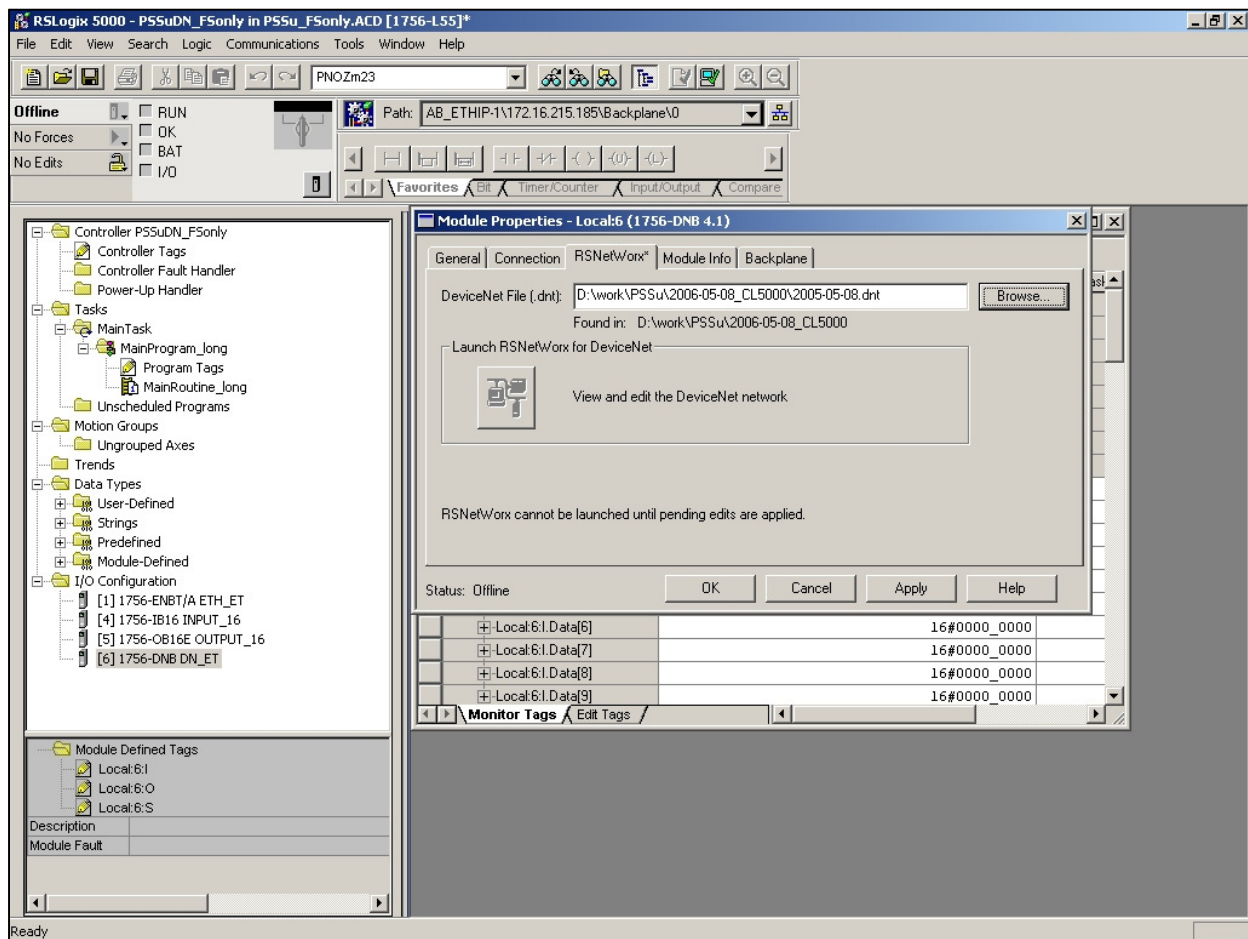


Fig. 45: RSLogix 5000 – Module Properties, 'RSNetWorx', Part1

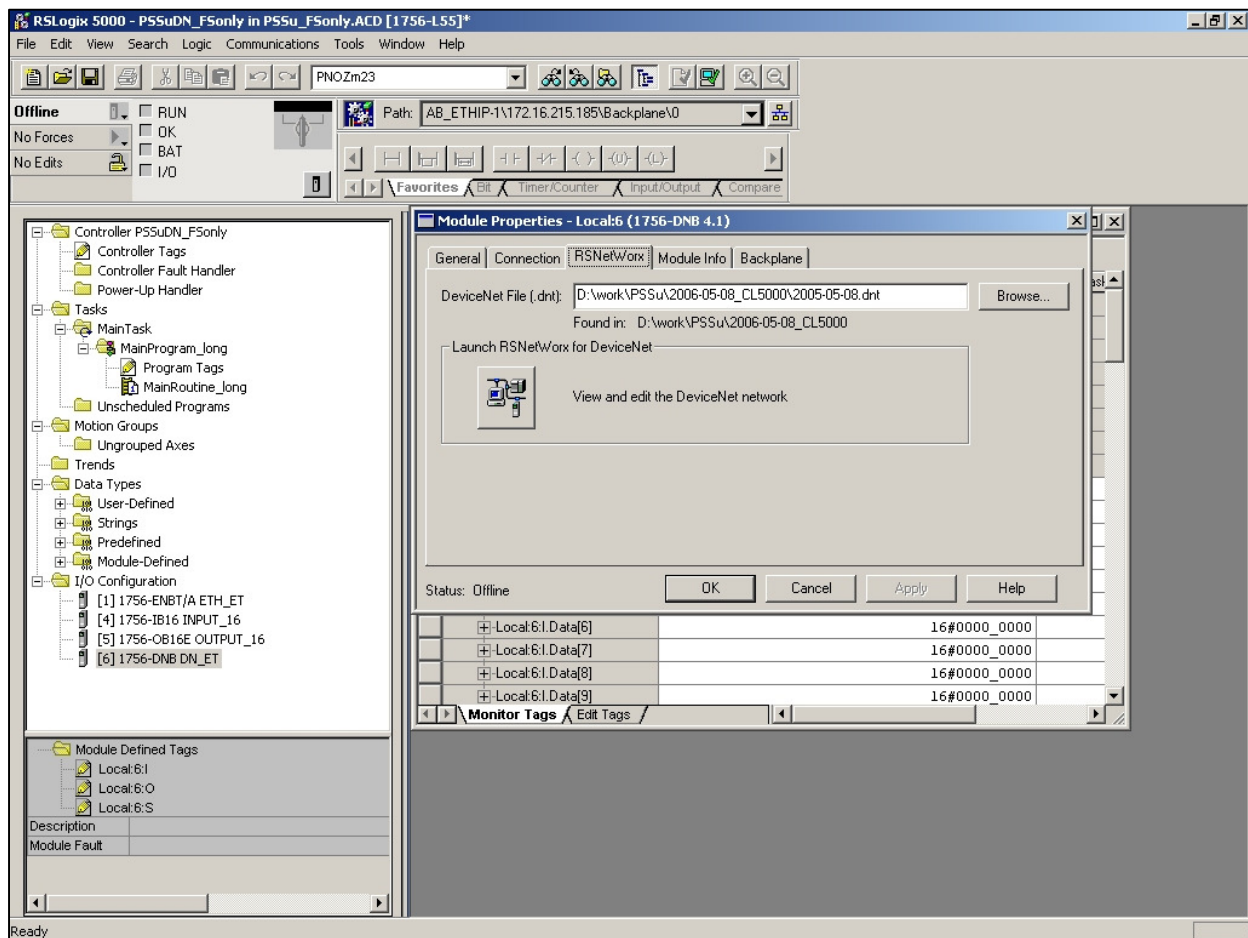


Fig. 46: RSLogix 5000 – Module Properties, 'RSNetWorx', Part2

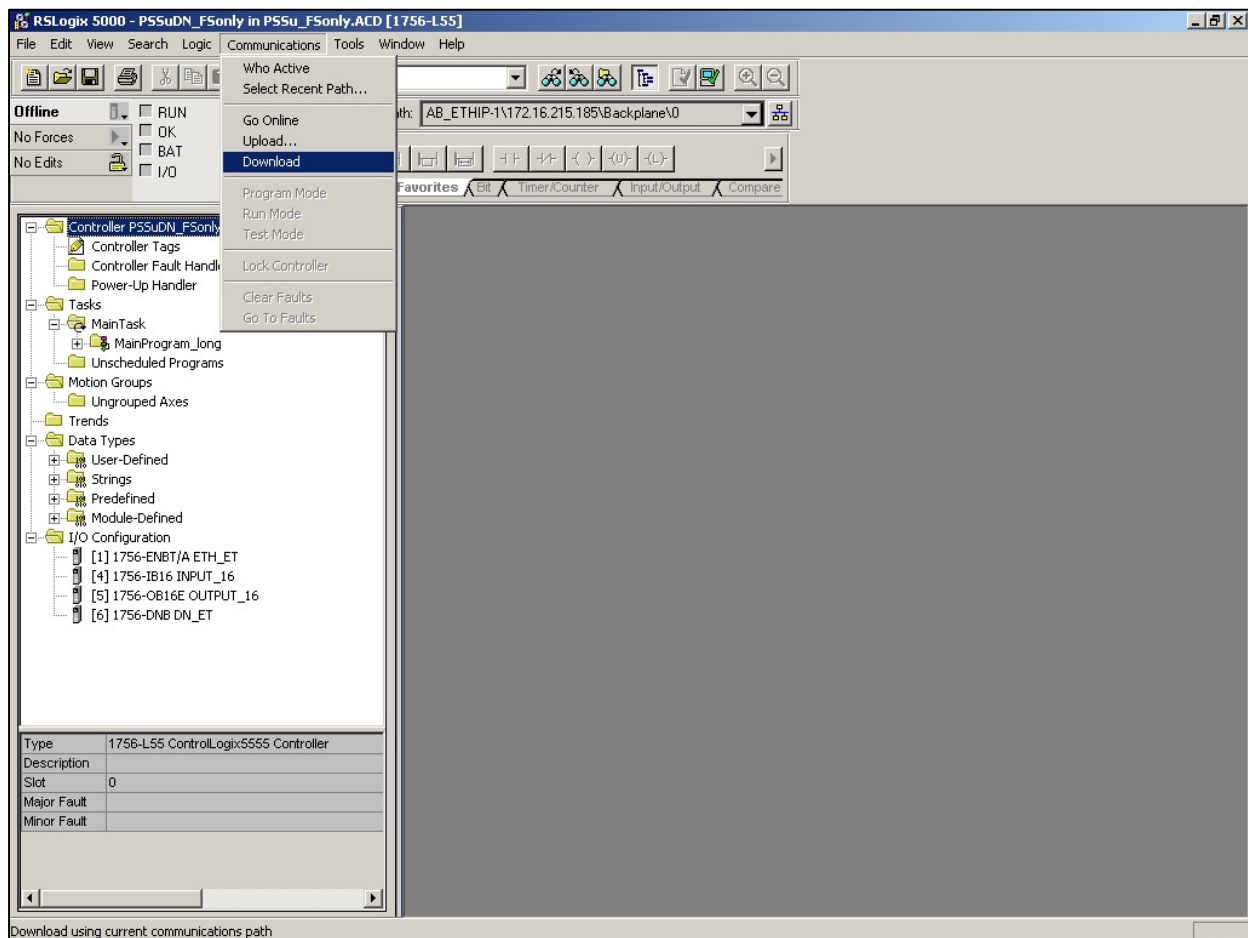


Fig. 47: RSLogix 5000 – Communications, 'Download'

After the CL5000 program download and change to "RUN-mode" the DeviceNet Scanner should change to to RUN-Mode either.

- LED-display on the PSSu Device
 - MNS-LED is green
 - I/O is green

Controller Tags

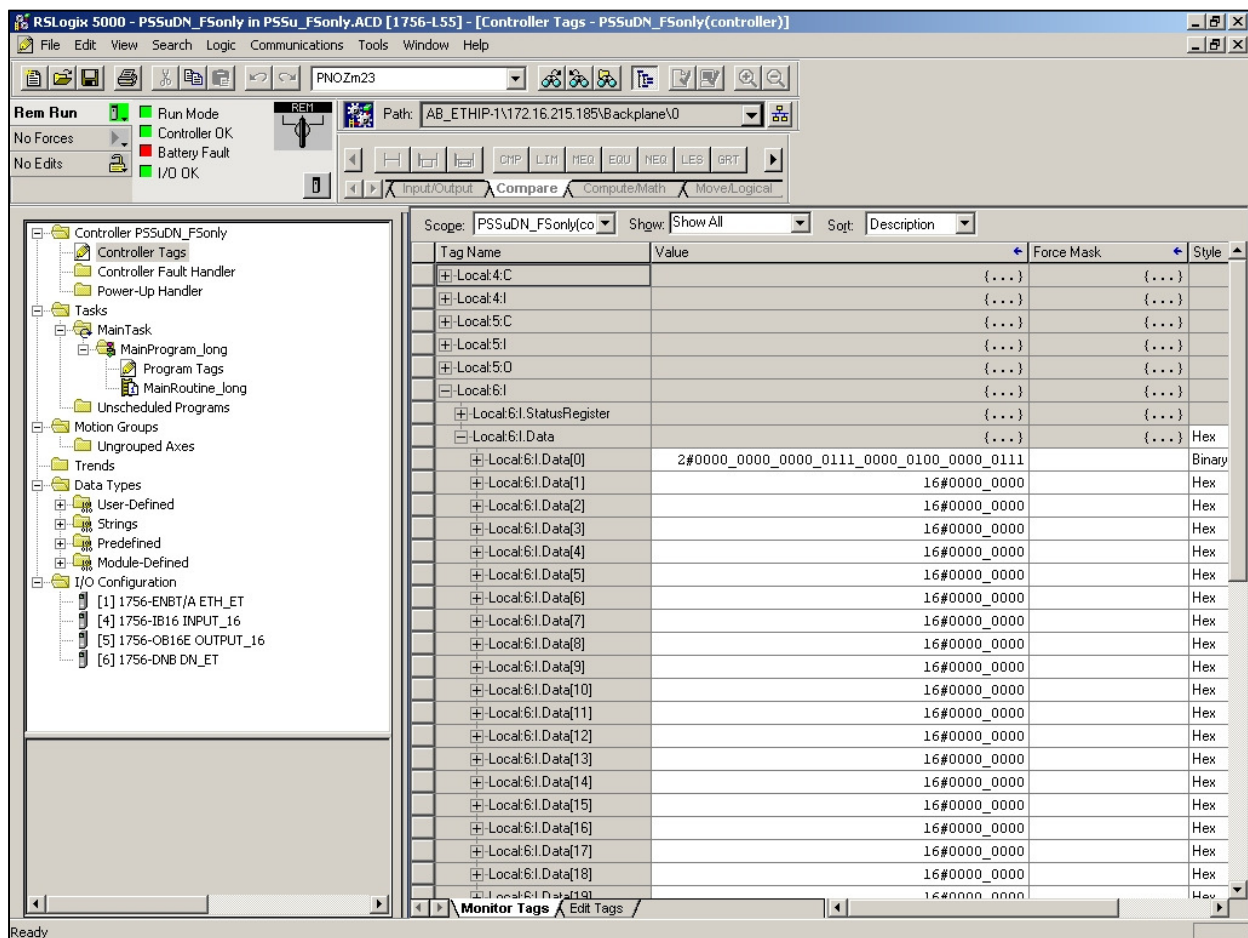


Fig. 48: RSLogix 5000 – Program, 'Controller Tags', Part1

On the double word Local 6:I Data [0] one see RLO 1 for the following Status signals

Bit(00) = SBp is ready" ==> PSS FS M113.05
 Bit(01) = SBp I/O-Group of Inputs RUN" ==> PSS FS M116.01
 Bit(02) = SBp I/O-Group of Outputs RUN"==> PSS FS M116.00

Bit(10) = Status feedback of clamp 14 PSS FS E33.02
 Bit(16) = PSSu E F DI OZ 2
 Bit(0) = Status signal of PSS FS PIO output A33.00 (clamp 11-21),
 RLO = 1 ==> first condition of local enabling is true

Bit (17) = PSSu E F DI OZ 2
 Bit(1) = Status of "feedbackloop enable" virtual FS input
 E33.04, (clamp 14), result of PSSu monitoring, here "on-test"

Bit (18) = PSSu E F DI OZ 2
 Bit(2) = Status signal of PSS FS "Status of open circuit detection" ,
 virtual FS input E33.05 of open circuit output PSS FS A33.00 (clamp 11-21),
 RLO = 1 ==> closed loop

7.2. ControlLogix 5000 Outputs (Controller Tags)

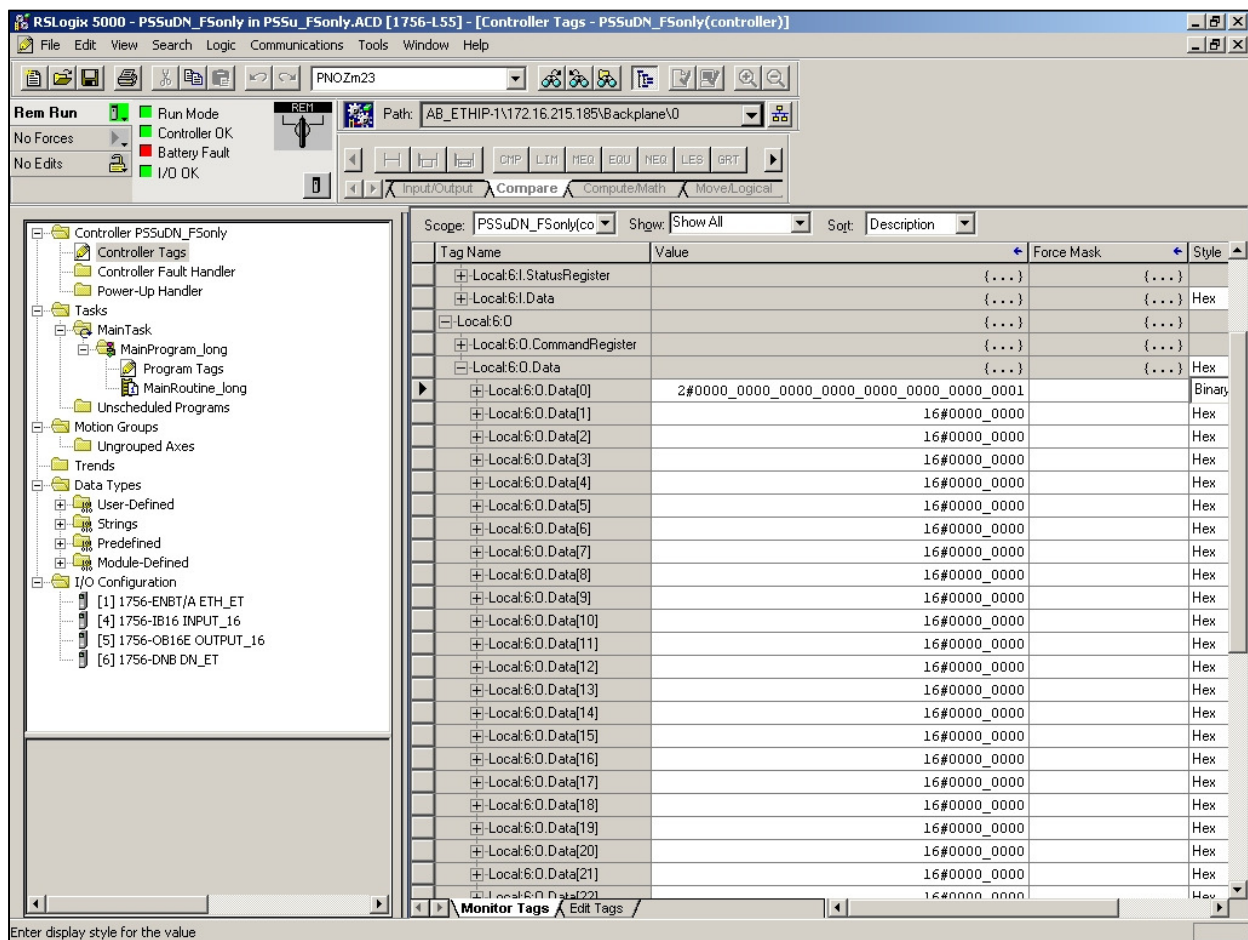


Fig. 49: RSLogix 5000 – Program, 'Controller Tags', Part2

Bit (0) PSSu E F DI OZ 2
 Bit(0) = switch signal CL5000 to PSS FS output A33.00 (clamp 11-21)
 RLO = 1 ==> second condition of local enabling is true

There are two rungs. The first rung is needed for the DeviceNet I/O copying.

In the second rung one see that the Status of the

- ▶ PSS FS Output Local 6:I Data [0].16 (NO, only feedback information from PSS) and
- ▶ PLC switch Local 4:I Data [0].0 (NC) switches the FS Output A33.00 of the PSSu to RLO 1.

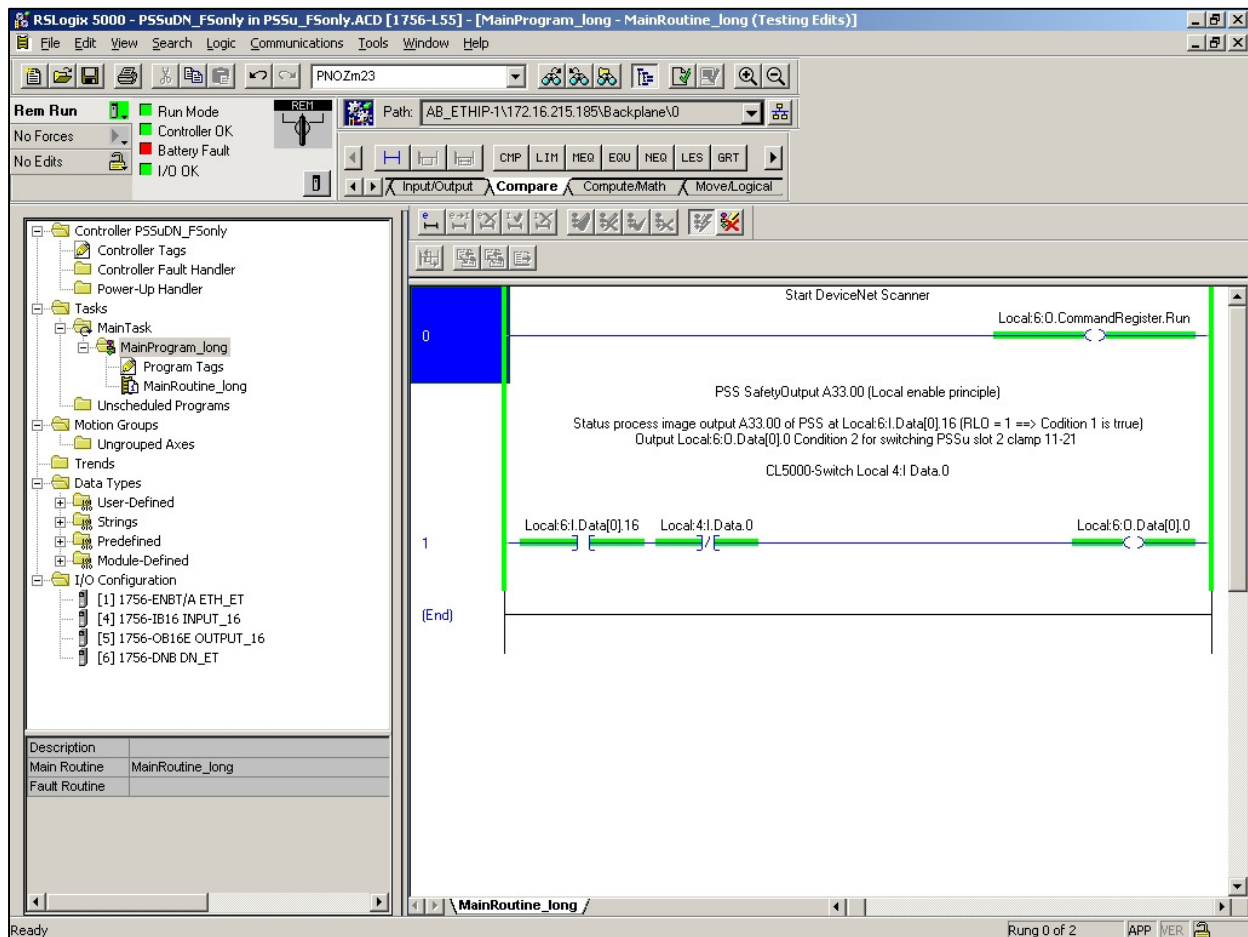


Fig. 50: RSLogix 5000 – Program, 'Online Mode'

The polled Output data stream was mapped on the right start address without manual operations.

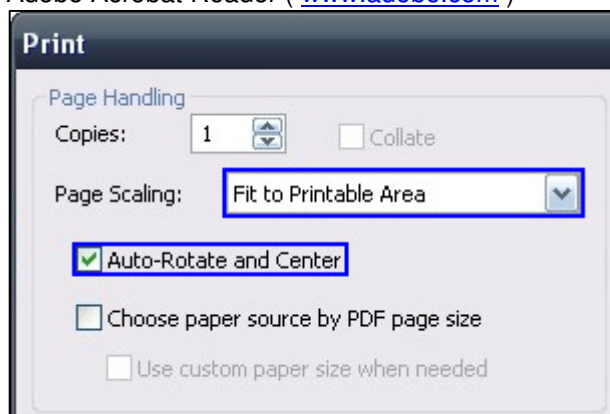
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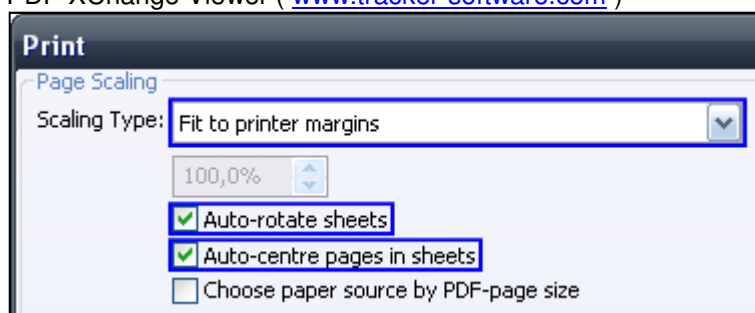
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Recommended printer settings

Adobe Acrobat Reader (www.adobe.com)



PDF-XChange Viewer (www.tracker-software.com)





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