

www.powermation.com

INTEGRATING PLCNEXT AND CAPAROC: A PROFINET SETUP GUIDE

For Communication Between the PLCnext and CAPAROC Smart Breaker System

WHITE PAPER

Prepared By: David Ellers Business Development Manager

GETTING STARTED - Project Background and Description

This paper will walk the reader through the process of setting up PROFINET communication between a Phoenix Contact PLCnext Controller and the CAPAROC electronic circuit breaker system. The goal is to remove obstacles for the first time user and introduce tools to aid in updating system components. Modern software tools require firmware on the hardware to match the version of the tool. Knowing this before beginning will save time and simplify the experience.

i Assumptions

1.PLCnext Engineer has already been installed. In this example version 2024.0.3 has been used.

- 2. The PLCnext hardware and CAPAROC PM PN are both capable of being Powered.
- 3. Internet access is available.
- 4. The reader's computer has an available ethernet port and permissions to set a static IP address and install software.

GATHERING YOUR CAPAROC HARDWARE AND SOFTWARE

Before connecting the devices, identify the firmware version of the CAPAROC PM PN (#1110986), which can be found on the right side of the module. Mount the CAPAROC Power Module (PM) onto the DIN rail busbar and attach the breakers. Ensure that all components are properly aligned and fully engaged during installation. Next, visit the Phoenix Contact website to download the necessary files:

- On the product page for the CAPAROC Power Module (part number #1110986), download:
 - GSDML Configuration File
 - Firmware CAPAROC PM PN
- Search for and download the tool: 2403718 PC Worx Firmware Updater

After downloading:

- 1. Extract the GSDML and firmware files.
- 2. Install the PC Worx Firmware Updater tool.

Video and other helpful links

Visual Tutorial | PLCnext Store CAPAROC Function Block | Authors system Overview.

STARTING UP THE SOFTWARE

The first step is to set the IP address of the CAPAROC PM and update its firmware. Install the PC Worx Firmware Updater and run the program. A firewall warning may appear; you might need to deactivate it. Click OK, and the Updater screen will be displayed.

Worx Firmware Up									
INSPIRING IN	PC Wo	rx Firmw	are Upda	ter					
Network adapter:				7					
Ethemet (192.168.1.	111)		~						
Recent used firmy	vare files:			-	Help:				
Device Name	TFTP-Path	Firmware File	Firmware Version	File	Please select the Ne	twork adapt			
	D:\Phoenix\CAPAROC\CAPAROC P	CAPAROC_PM			first. Then you can either use one of the recently used firmware files in the list to keep these				
CAPAROC PM PN	D:\Phoenix\CAPAROC\CAPAROC P	CAPAROC_PM		1					
CAPAROC PM PN	D:\Phoenix\CAPAROC\CAPAROC P	CAPAROC_PM		1	settings and to jump into the main window	directly v pressing			
CAPAROC PM PN	D:\Phoenix\CAPAROC\CAPAROC P	CAPAROC_PM		1	the "OK"-button, or y	ou can mak			
CAPAROC PM PN D:\Phoenix\CAPAROC CAPAROC CAPAROC PM P									
CAPAROC PM PN	D:\Phoenix\CAPAROC	CAPAROC PM P		1	"New"-button.	-			
				Help	Cancel	OK			

The software tool combines two steps into one operation: assigning the IP address and updating the firmware. In this example, the IP address **192.168.1.11** was assigned to the CAPAROC PM. Check the **Enable IP address assignment** box and enter the desired address. Use the ellipsis (...) button to locate the directory with the extracted firmware file, then select the appropriate file, ensuring it matches the hardware version of the Power Module. Click **OK** to begin the update and set the IP address. This will be blank the first time you use the tool, while the example on the left shows the files I have used. Select the network adapter that will connect to the CAPAROC. Click the **FILE** button to add the previously downloaded firmware file.



Ethernet (192.168.1.111)	¥	Cancel
Network scan	🔽 List only supported devices Devices	
First IP address filter	r for network scan: +	
	Password:	private
Extended Scan	(HW version, Serial No), extends the scan time	
Enable EtherNet	t/IP Scan	
Enable EtherNet	t/IP Scan	
Enable EtherNet	V/IP Scen «P / DCP)	
Enable EtherNet	UP Scan 4P / DCP) First IP address: 192.168.1 11 🔄 Last IP address: 192.168.1 11	¢
Enable EtherNet	VIP Scan AP / DCP) First IP address: 192.168.1 11 Image: Complex Comparison	÷
Enable EtherNet Assigning IP addresses (Boo Selecting firmware file	U/IP Scan AP / DCP) First IP address: 192.168.1 11 ⊕ Last IP address: 192.168.1 11 Generation of the second	÷
Enable EtherNet Assigning IP addresses (Boo Selecting firmware file Directory:	VIP Scan AP / DCP) Finit IP address: 192:168.1 11 P Enable IP address assignment D. \Phoenix\CAPAROC\CAPAROC PM PN FW-Update V1.0.8\CAPAROC PM PN FW-Up	•



The scan window will now open, displaying the scan options. Click the **magnifying glass icon** to begin the network scan. **Select the checkbox** next to the listed Power Module and click the **Download to Device** button.

Close the tool when finished.

Tips: Begin this step with your static IP address set to an address on the desired machine network. Double-check the hardware version number before downloading it to the device (see yellow highlights).

A complete description of this process is available in the CAPAROC PM PN Manual, Chapter 8, which can be found on the Phoenix Contact website. <u>Download / Manual</u> (https://www.phoenixcontact.com/en-us/products/power-module-caparoc-pm-pn-1110986)

PREPARING THE PLCNEXT ENGINEER PROJECT

The first step is to import the GSDML PROFINET configuration file for the CAPAROC into your PLCnext project. Open a project that matches your hardware and desired software release.



From the **File** menu, select **Import** and then **Import GSDML File**. When the message box opens, locate the extracted file, select it, and click **Open**. PLCnext Engineer will display a confirmation window; once confirmed, it will copy the files into the Network Components.

This process imports the GSDML into the open project. To avoid repeating these steps in the future, save an empty project with the imported GSDML as a personal project template.

> Phoenix > PLCnext > GSDML Files > GS	SDML-Phoenix_Contact-CAP	AROC PM PN-20230412	2 > FW V1.00.	04 and above > GSDM
ame	Date modified	Туре	Size	
GSDML-V2.35-Phoenix_Contact-CAPARO	10/7/2024 4:43 PM	Microsoft Edge HT	94 KB	

i



Note the location of the newly imported objects.

CREATING THE CAPAROC PROFINET DROP IN A PROJECT



Using the project created above, drag the CAPAROC PM PN from the network directory in the components window to the **Profinet** project directory in the plant window. Add the CAPAROC E# breaker modules that will be used in the system by dragging them to the PM PN module. Once the modules are added, the IP address for the I/O drop needs to be set.

COMPONENTS							
Search	ব						
> 🛅 Programming (307)							
> 🚞 PLCnext Components & Programs (0)							
🛩 💣 Network (619)							
QUINT4-PS/3AC/24DC/40/IOL Rev. >= 00/1.00							
CAPAROC PM PN Rev. >= 1/V1.0.3							
	Search DC/40/IOL Rev. >= = 1/V1.0.3						



Double-click the CAPAROC PM PN under the **Profinet** branch to open the module parameters window. In the **Settings** menu, either scroll down or select **Ethernet** to locate the IP settings section. Enter the IP settings that correspond to those assigned to the PM PN during the firmware update. The **Data List** in this window will display the data items available for the power module and all the breaker modules added in the previous step.

The next available option on the CAPAROC PM PN is to adjust the global status and data settings. The builtin webserver is deactivated by default. Use the dropdown box to enable the webserver, if desired. Another notable option is the switch-on delay, which allows the user to cascade the power-up of connected devices.

тарагос-ріп-рін-т ли ахо-					•
Settings 🔚 Parameters	E Data List E GDS Port List			~	
	Parameters		* -		×
Parameters	Lock current programming for all channe	ls			
	Lock current programming for all channels:	No change	~		
	Local user interface lock				
	Local user interface lock:	No change	~		
	Switch-on delay				
	Switch-on delay:	200 ms	¥		
	Operating mode after startup				
	Operating mode after startup:	No change	~		
	Webserver enable/disable				
	Webserver:	No change	~		
		Disable			
	Enable				
		No obongo A	_		_

Save the changes to the project. Connect to the controller and download the program by selecting Write and Start Project (with Source) or pressing CTRL + F5.

i

Write with Sources is not required while developing. It is recommended when the project is complete as it allows program recovery from the controller memory.

VIEWING CONTROLLER AND BUS STATUS

Both the PLCnext Controller and the CAPAROC PM PN will now display active status and diagnostics on their web-based management pages. Using a browser, open each page by entering the corresponding IP address into the address bar. The PLCnext Controller page provides access to various configuration settings, security options, and status information.

For instance, if the **BF-D** light is blinking red, indicating the controller is not being accessed by another PROFINET controller, this function can be disabled. To do this, open the configuration settings, select **System Services**, and uncheck the **PROFINET DEVICE** activation box.

Configuration	OPCUA PUBSUB	OPC OA PUDSUD		U
Configuration	PLCNEXT STORE	PLCnext Store Connector	\checkmark	
Network	PROFICLOUD	ProficIoud	\checkmark	
PLCnext Store	PROFINET CONTROLLER	Profinet Controller		Image: A start of the start
Proficloud Services	PROFINET DEVICE	Profinet Device		0
Date and Time	SOFTWARE UPDATE	Software Update via Device and Update Management		
System Services	TRACING	Trace Controller		
Web Services				n

Diagnostic pages for the PLCnext PROFINET communications and the CAPAROC information are shown below. The CAPAROC status page provides additional details, including voltage, total load, load per circuit, and the current setting per channel. If a QUINT 4 power supply with IO-Link is connected, the IO-Link data from the QUINT 4 will also be displayed.

Diagnostics				← C (▲ №	t secure 192.168.1	.11
PROFINET				CAPAROC -	Modular Ci	ircuit Breaker System
Overview Device List Tree View	System LEDs					
Profinet Tree View	PWR		Operating voltage present			Phoenix Contact
AXC F 2152 / 192.168.1.10 [1] Grangeronment / 192.168.1.11 / CARABOC PM PN [3]	BF	\bigcirc	Bus connection present	Device type CAPAROC PM PN Order number 1110886		CAPAROC PM PN
Compared primery 1 section and the section of	SF	0				1110986
0x2 Giorda status and data 0x8000 - Interface 0x8001 - Port 1 - RJ45 0x8002 - Port 2 - RJ45	RDY		Device is ready for operation		Serial number	1369369712 02 / 1.0.8
 ○ 0x1 - CAPAROC E4 12-24DC/1-4A [1] ○ 0x1 - CAPAROC E4 12-24DC/1-4A [1] ○ 0x2 - CAPAROC E4 12-24DC/1-4A [1] ○ 0x2 - CAPAROC E4 12-24DC/1-4A [1] 				Network inform	nation	
			OK	Device name		caparoc-pm-pn-1
			Urgent Warning From A. Deactivated	Subnet mask		255.255.255.0
				Default gateway		192.168.1.254
			(2) No Information	MAC address		a8:74:1d:12:74:75



www.powermation.com

INTEGRATING PLCNEXT AND CAPAROC: A PROFINET SETUP GUIDE

For Communication Between the PLCnext and CAPAROC Smart Breaker System

Corporate Headquarters

1310 Energy Ln, St Paul, MN 55108

Prepared By: David Ellers Business Development Manager