

**Application Note** 

# Configuring a Phoenix Bus Coupler to communicate Modbus/TCP with an MPiec Controller

Yaskawa Electric America 2121 Norman Drive South Waukegan, IL 60085 1-800-927-5292

YASKAWA		
Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045
Title: Phoenix bus coupler communicating with an MPiec controller		

## **Application Overview**

This document provides detailed steps on how to configure the Phoenix bus coupler to communicate with an Yaskawa MPiec controller using the Modbus/TCP protocol.

## **Application Highlights**

Industry:	Any
Major Features:	Modbus I/O, Phoenix coupler operating as a slave (server)
Results:	Easy configuration, extra I/O using the Phoenix bus coupler

## Products Used:

Component	Product and Model Number
Controller	MPiec controller, Minimum Firmware version 1.1.1.4
Software	MotionWorks IEC Express or Pro, Minimum Ver 1.1.1.7
Third Party Devices	Phoenix MODBUS bus coupler: IL ETH BK DI8 DO4 2TX-PAC



Figure 1: Communication configuration

YASKAWA		
Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045
Title: Phoenix bus coupler communicating	with an MPiec controller	

## Application Requirements

Application Specifications and Constraints

- Cycle Speeds: Modbus poll period 20 ms
- Transmission: Modbus TCP

## Implementation Method of Core Operation

#### Configuration on the Phoenix bus coupler:

Use IP assign.exe which is free downloadable software from Phoenix's web page to assign the bus coupler an IP address of choice. For the test set up used in this document the Phoenix bus coupler IP address was set at 192.168.207.241. Once a valid IP address has been assigned to the device, go to the web interface of the bus coupler.



Figure 2: Phoenix bus coupler web page

YASKAWA		
Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045
Title: Phoenix bus coupler communicating	with an MPiec controller	

## Set the configuration on each page of the Phoenix bus coupler as follows:

CONTACT	IL ETH BK DI8 D04 2TX-F	AC	last update: 15:34:17	
	<b>IP</b> Configuration			
	IP Address	192.168.207.241	]	
IL ETH BK	Subnet Mask	255.255.255.0		
General Instructions	Default-Gateway	0.0.0.0		
Device Information	Please enter IP Address, S decimal notation (e.g., 172	Please enter IP Address, Subnet Mask and Gateway Address in dotted decimal notation (e.g., 172.16.16.230). The changes will take effect after the		
Device Configuration	reboot of the IL ETH BK.	reboot of the IL ETH BK.		
IP Configuration				
System Identification	Enter Password		Reboot	
Software Update				
Change Password				
Inline Station	BootP Requests	Enable	O Disable	
Home	Before disabling automatic address. You will need the setting of the IP address. I the whole configuration ove	Before disabling automatic BootP setting, be sure to record the current IP address. You will need the current IP address if you want to re-enable BootP setting of the IP address. If you forget the IP address, the only way is to delete the whole configuration over the Reconf-Button.		
	Enter Password		Apply	

## Figure 3: IP configuration of the Phoenix bus coupler

PHENIX	IL ETH BK DI8 DO4 2TX-P/	AC last update: 15:35:10
	System Identificatio	n
	Name of Device	IL ETH BK DI8 DO4 2TX-PAC
IL ETH BK	Description	Ethernet bus terminal
General Instructions	Physical Location	Unknown
Device Information	Contact	Unknown
🔁 Device Configuration	Writing a new information ca	n take several seconds!
IP Configuration		
System Identification	Enter Password	Apply
Software Update		
Change Password		
Inline Station		
🖻 <u>Home</u>		

Figure 4: Device ID page on Phoenix bus coupler



#### Title: Phoenix bus coupler communicating with an MPiec controller



Figure 5: Software update page

PHENIX	IL ETH BK DI8 D04 2TX-P	AC	last update: 15:36:26
	Services Plug&Play		
	Plug&Play-Mode	C Enable	<ul> <li>Disable</li> </ul>
General Instructions	The status enable becomes status disable is taken over	s effective after a rest immediately.	art of the IL ETH BK. The
Device Information           Device Configuration	Enter password	Apply	Apply and Reboot
🔄 Inline Station			
Services Process Data	Control Device Function		
Monitoring           Remote Diagnostics	This service can be used to	confirm the periphera	al faults of all modules.
Bus Configuration	Enter password		Confirm
PCP Configuration			
🖻 <u>Home</u>			

Figure 6: Disable Plug and Play mode



PHENIX	IL ETH BK DI8 D04 2TX-P	AC last update: 15:37:05		
	Process Data Monit	oring		
IL ETH BK	Fault Response Mode	<ul> <li>Reset Fault Mode (default)</li> <li>Standard Fault Mode</li> <li>Hold Last State Mode</li> </ul>		
General Instructions	Process Data Watchdog Timeout	0 ms		
Device Information Device Configuration	The time is indicated in mill A value of 0 ms disables the	The time is indicated in milliseconds and ranges from 200 ms to 65,000 ms. A value of 0 ms disables the Process OUT Data Monitoring.		
Inline Station	Enter password	Apply		
Process Data Monitoring				
Remote Diagnostics	Network Failure			
Bus Configuration	Status	No network failure (nF) occurred.		
PCP Configuration				
Home	Enter password	Confirm		

Figure 7: Set watchdog to 0 ms

PHENIX	IL ETH BK DI8 DO4 2TX-PA	C last update: 15:37:35			
	<b>Remote Diagnostics</b>	Remote Diagnostics			
IL ETH BK		<ul> <li>✓ Controller board ready-to-operate</li> <li>✓ Selected configuration ready-to-operate</li> <li>✓ Data transmission active</li> </ul>			
General Instructions	Diagnostic Status Register	<ul> <li>Diagnostic routine active</li> <li>Controller board/ hardware error</li> </ul>			
Device Information		<ul> <li>Bus error</li> <li>Perinheral fault</li> </ul>			
Device Configuration		User error / parameterization			
Inline Station	Diagnostic Parameter Register	No additional information available.			
<ul> <li><u>Services</u></li> <li><u>Process Data</u></li> <li><u>Monitoring</u></li> </ul>	<u>, , , , , , , , , , , , , , , , , , , </u>				
Remote Diagnostics					
Bus Configuration					
PCP Configuration					
🔁 <u>Home</u>					



YASKAWA			
Subject: Application Note	Product: MPiec	Doc#:	AN.MCD.09.045
Title: Phoenix bus coupler communicating with an MPiec controller			

### Configuration for the MPiec controller:

Open a new project in MotionWorks IEC.

- 1) Open the Configuration Tool.
- 2) The Phoenix bus coupler will be a server (slave) and the MPiec controller will be the client (master) in this Modbus communication set up. The phoenix device will have to be added as a server device in the configuration tool. This addition must be performed while the Configuration Tool is offline to the controller.
- 3) Click on 'Modbus /TCP' in the left of the configuration tool in the configuration tree.



Figure 9: MotionWorks IEC - Device Configuration Tree

4) At the right bottom corner of the Configuration window, there will be an option to 'Add Slave Device'. Click on 'add slave device'



Figure 10: Add Phoenix bus coupler as Modbus slave

YASKAWA			
Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045	
Title: Phoenix bus coupler communicating with an MPiec controller			

5) Add the details of the phoenix bus coupler as shown below.

Add ModbusTCP Devic	ie in the second se
Name	phoenix
IP Address	192 . 168 . 207 . 241
Status Variable	pstat
Update Interval (ms)	50
Comment	
	Add Cancel

Figure 11: Configuration details of the bus coupler



Figure 12: MotionWorks IEC Configuration after Phoenix slave added

	Add Data Bl	<u>ock</u>
N 😒 👍 🚉 😳 🇞 🌖	<u>*</u> 🖗 🖉 🚰	3:56 PM

Figure 13: Adding data blocks for Modbus communication

🖅 YASKAWA					
Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045			
Title: Phoenix bus coupler communicating with an MPiec controller					

Da	Data Blocks								
	1/O Group	Function Code	Starting Address	# of Items	Comment				
	grp5	Read Holding Registers	8001	1					
	grp4	Write Single Register	8002	1					

Figure 14: Data block details for communication with the Phoenix Modbus bus coupler

- 6) Enter the IP address of the controller and connect to the controller.
- 7) Choose the offline configuration if asked to choose between auto discovered and offline configuration.
- 8) After going online, save the configuration and cycle power on the machine for the new configuration to take effect.
- 9) Also after saving, MotionWorks IEC will have variable groups created in the global variable list.
- 10) Insert new variables and assign hardware addresses as shown below. Two variables in this example are Input and output. The status of the connection with the phoenix bus coupler is available in the variable 'pstat' which was defined in the Configuration.

🖂 <phoenix> 'ig</phoenix>	rp5' Address Range	e: %IB0 - %IB1 (* D	o Not Modify Group	) Name or Status	Variable‼*)		
input	BYTE	VAR_GLOBAL		%IB0			
pstat	WORD	VAR_GLOBAL	(* Do Not Modify!! *	%MV2			
🖂 <phoenix> 'ogrp4' Address Range: %QB2068 - %QB2069 (* Do Not Modify Group Name or Status Va</phoenix>							
output	BYTE	VAR_GLOBAL		%QB2068			

Figure 15: Variables added to the Phoenix Variable Group

- 11) Make the project.
- 12) Download it and 'Warm Start' the program.
- 13) Going into debug mode, one can see the variables in their online values. For a healthy connection, the status word 'pstat' displays 16#1000 (4096 decimal). In this example, the phoenix bus coupler has been wired such that the bus coupler's inputs have been looped back to its outputs. So, the inputs to the

YASKAWA				
Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045		
Title: Phoenix bus coupler communicating with an MPiec controller				

MPiec will display the same values that are written to the outputs.

🖂 <phoenix> 'igrp5' Address Range: %IB0 - %IB1 (* Do Not Modify Group Name or Status Variable!! *)</phoenix>							
input	16#07	BYTE	VAR_GLOBAL		%IB0		
pstat	16#1000	WORD	VAR_GLOBAL	(* Do Not Modify!! *	%MV2		
🖃 shoenix> 'ogrp4' Address Range: %QB2068 - %QB2069 (* Do Not Modify Group Name or Status Variable!! *)							
output	16#07	BYTE	VAR_GLOBAL		%QB2068		

Figure 16: Debug mode values of the Modbus variables and status word