

Application Note

Kuhnke Vico 404, 704, 1004 Modbus RTU Modbus TCP

E 854 EN

28.03.2019

PRECISION. SAFETY. MOTION.

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1 Vorwort

1.1 Imprint

1.1.1 Contact details

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1.1.2 Versionshistorie

Handbuchhistorie					
Date	Comments / Changes				
28.03.2022	first version				

2 General

2.1 Scope of validity

Kendrion PLCs ab CODESYS Version 3.5 SP16 Patch40

2.2 System requirements

Modbus RTU: RS485 Interface Modbus TCP: Ethernet- Interface

2.3 Description

Kendrion controllers as Modbus masters.

Many units on the market have a Modbus interface integrated as standard. No special bus hardware is required for implementation, which makes integration inexpensive.

Modbus is an open communication protocol developed by Modicon. It is based on a master/slave or client/server architecture.

RTU stands for Remote Terminal Unit. Communication takes place via RS485 or RS232. TCP is based on Ethernet TCP/IP client-server communication.

3 Quick Start Guide

3.1 Modbus RTU

Information
There were two bugs in CODESYS that have been fixed.
CDS-54579 (Modbus Configurator - Com-Port: Parameter Flow Control)
CDS-14320 (SysCom: wrong datatype for bRTSControl and bDtrControl, has to be BYTE)
In the Kendrion controllers from CODESYS version 3.5 SP16 Patch40 the bugfixes have been implemented. For RS485 communication, use the KICS Modbus COM, as this sets the RTS settings of the serial interface correctly.

In this example, a Modbus IO is to be connected to a Kuhnke Vico 04 PLC. The device tree is built up as follows:

Control system (Kuhnke Vico 04 PLC WV)

- KICS Modbus COM
 - Modbus Master

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Modbus Slave

You will find the unit description files for each unit in our product finder under

Touchpanel SPS (kendrion.com)



3.1.1 Configuration

After you have inserted the units in the unit tree, open the respective configuration page of the unit with a double click.

3.1.1.1 Modbus_COM (KICS Modbus COM

The settings for the serial interface are made in the "General" tab.

2	Modbus_COM X							
	PCI-Bus IEC Objects	Serial Port Configuration						
	General	COM port	1					
		Baud rate	9600 ~					
	SerialPort Parameters	Parity	NONE ~					
	Status	Data bits	8					
	Information	Stop bits	1					

For the number of the COM port, please refer to the operating instructions of the control unit used.

3.1.1.2 Modbus_Master_COM_Port (Modbus Master, COM Port)

The protocol and the timing for the Modbus communication are set in the "General" tab.

Modbus_Master_COM_Port	×			
General	Modbus RTU/ASCII			Monpue
ModbusGenericSerialMaster I/O Mapping	Transmission mode	● RTU	⊖ ASCII	MUDDUS
ModbusGenericSerialMaster IEC	Response timeout (ms)	5000		
Objects	Time between frames (ms)	100		
Status	Auto-restart communication	on		
• F				

3.1.1.3 Modbus_Slave_COM_Port (Modbus Slave, COM Port)

The slave address and the timing for the slave are set in the "General" tab.

Modbus_Slave_COM_Port X			
General	Modbus RTU/ASCII		MODDUC
Modbus Slave Channel	Slave address [1247]	1	MUDBUS
Modbus Slave Init	Response timeout [ms]	5000	

The process data channels are defined in the "Modbus Slave Channel" tab. For the available process data, please refer to the operating instructions of the Modbus slave used.

In this example, a device with 8 digital inputs and 8 digital outputs was used. The operating instructions of the Modbus slave contain the following information:

- Read Digital Input Value
 - Function Code: 0x02 (Read Discrete Inputs)
 - o Starting Channel: 0x0000-0x0007
 - o Input Channel Numbers: 0x0001-0x0008
- Write Digital Output Value
 - Function Code: 0x0F (Write Multiple Coils)
 - o Starting Channel: 0x0000-0x0007
 - o Input Channel Numbers: 0x0001-0x0008

The "Add Channel" button is used to add a channel.

Modbus Channel X	Modbus Channel X
Channel Name DigitalInputs Access type Read Discrete Inputs (Function Code 2) Trigger Cyclic Comment READ Register Offset 0x0000 Length	Channel Name DigitalOutputs Access type Write Multiple Colls (Function Code 15) Trigger Cyclic Comment
Error handling Keep last value WRITE Register Offset 0x0000 Length 0 QK Cancel	Error handling Keep last value WRITE Register Offset 0x0000 Length 8 QK Cancel

The following channels are now available:

_	Modbus_Slave_COM_Port x										
				1			1			1	1 1
	General		Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length	Comment
		0	DigitalInputs	Read Discrete Inputs (Function Code 02)	Cyclic, t#50ms	16#0000	8	Keep last value			
	Modbus Slave Channel	1	DigitalOutputs	Write Multiple Coils (Function Code 15)	Cyclic, t#50ms				16#0000	8	

From this, the corresponding I/O mapping is generated for the slave:

General	Find Filter Show all 🔹 🕂						Add FB for IO Channel → Go to li		
Modbus Slave Channel	Variable	Mapping	Channel	Address	Туре	Unit	Description		
An dhun Chun Tait			DigitalInputs	%IB0	ARRAY [00] OF BYTE		Read Discrete Input		
Modbus Slave Init	An uclaus 1010	×.	DigitalInputs[0]	76100	BOOL		Read Discrete Input		
1odbusGenericSerialSlave	V XSIAVE IDIO		BILU	%1X0.0	BOOL		0x0000		
arameters	×Slave1D11	· · · · · · · · · · · · · · · · · · ·	Bit1	%IX0.1	BOOL		0x0001		
1odbusGenericSerialSlave I/O	V xSlave 1DI2		Bit2	%IX0.2	BOOL		0x0002		
1apping ·	🐂 🦘 xSlave 1DI3		Bit3	%IX0.3	BOOL		0x0003		
4 NodbusGenericSerialSlave IEC	🖤 🦘 xSlave 1DI4	**	Bit4	%IX0.4	BOOL		0x0004		
bjects	🗤 👋 xSlave 1DI 5	**	Bit5	%IX0.5	BOOL		0x0005		
Na ku z	👋 xSlave 1DI6	**	Bit6	%IX0.6	BOOL		0x0006		
status	👋 xSlave 1DI7	*	Bit7	%IX0.7	BOOL		0x0007		
nformation	i *>		DigitalOutputs	%QB0	ARRAY [00] OF BYTE		Write Multiple Coils		
	🖻 * ø		DigitalOutputs[0]	%QB0	BYTE		Write Multiple Coils		
	×Slave 1D00	*	BitO	%QX0.0	BOOL		0x0000		
	× Slave 1DO1	*	Bit1	%QX0.1	BOOL		0x0001		
	💊 xSlave 1DO2	*	Bit2	%QX0.2	BOOL		0x0002		
	* XSlave 1DO3	*	Bit3	%QX0.3	BOOL		0x0003		
	×Slave 1D04	*	Bit4	%QX0.4	BOOL		0x0004		
	×Slave 1D05	*	Bit5	%QX0.5	BOOL		0x0005		
	×Slave 1D06	*	Bit6	%QX0.6	BOOL		0x0006		
	% xSlave 1D07	*	Bit7	%OX0.7	BOOL		0x0007		

3.2 Modbus TCP

In this example, a Modbus IO is to be connected to a Kuhnke Vico 04 PLC. The device tree is built up as follows:

- Control system (Kuhnke Vico 04 PLC WV)
 - o Ethernet
 - Modbus TCP Master

Modbus TCP Slave

You will find the unit description files for each unit in our product finder under

Touchpanel SPS (kendrion.com)

🖻 😏 🥅 Device [connected] (Kuhnke Vico x04 PLC WV)
🗉 🗐 PLC Logic
🖹 🧐 Ethernet (Ethernet)
🖹 🤣 🎁 Modbus_TCP_Master (Modbus TCP Master)
😔 😭 Modbus_TCP_Slave (Modbus TCP Slave)

3.2.1 Configration

After you have inserted the units in the unit tree, open the respective configuration page of the unit with a double click.

3.2.1.1 Ethernet (Ethernet)

The settings for the Ethernet interface are made in the "General" tab. The settings can also be adopted from a connected control unit using the button.

🛉 Ethernet 🗙			
General	Network interface	eth0	
Log	IP address	192 . 168 . 0 . 204	
Status	Subnet mask	255 . 255 . 255 . 0	
Ethernet Device I/O Mapping	Default gateway	0.0.0.0 g system settings	
Ethernet Device IEC Objects			
Information			

3.2.1.2 Modbus_TCP_Master (Modbus TCP Master)

The timing for the Modbus communication is set in the "General" tab.

Modbus_TCP_Master 🗙		
General	Modbus TCP	MODBUS
ModbusTCPMaster I/O Mapping	Response timeout (ms) 1000	
ModbusTCPMaster IEC Objects	Auto-reconnect	
ModbusTCPMasterParameters		

3.2.1.3 Modbus_TCP_Slave (Modbus TCP Slave)

The slave address and the timing for the slave are set in the "General" tab.

Modbus_TCP_Slave X			
General	Modbus TCP		
Modbus Slave Channel	Slave IP address	192 . 168 . 0 . 55	MODBUS
Modbus Slave Init	Response timeout (ms)	1000	
ModbusTCPSlave Parameters	Port	502	
ModbusTCPSlave I/O Mapping			

The process data channels are defined in the "Modbus Slave Channel" tab. For the available process data, please refer to the operating instructions of the Modbus slave used.

In this example, a device with 8 digital inputs and 8 digital outputs was used. The operating instructions of the Modbus slave contain the following information:

- Read Digital Input Value
 - Function Code: 0x02 (Read Discrete Inputs)
 - o Starting Channel: 0x0000-0x0007
 - o Input Channel Numbers: 0x0001-0x0008
- Write Digital Output Value
 - Function Code: 0x0F (Write Multiple Coils)
 - o Starting Channel: 0x0010-0x0017
 - o Input Channel Numbers: 0x0001-0x0008

The "Add Channel" button is used to add a channel.

Modbus Channel		\times	Modbus Channel			×
Channel			Channel			
Name	DigitalInputs		Name	DigitalOutputs		
Access type	Read Discrete Inputs (Function Code 2)	~	Access type	Write Multiple Coils (Function	Code 15)	\sim
Trigger	Cyclic ~ Cycle time (ms) 100		Trigger	Cyclic 🗸	Cycle time (ms)	100
Comment			Comment			
READ Register			READ Register			
Offset	0x0000	~	Offset	0x0000		~
Length	8		Length	0		
Error handling	Keep last value \checkmark		Error handling	Keep last value $\qquad \lor$		
WRITE Register			WRITE Register			
Offset	0x0000	~	Offset	0x0010		~
Length	0		Length	8		
	<u>Q</u> K <u>C</u> ar	ncel			<u>о</u> к	<u>C</u> ancel

The slave used in this example has been configured as follows:

Modbus_TCP_Slave X											
1	Modbus TCP Slave De	vice: F	thernet: Modbus	TCP_Master1				1	1	1	
Gener	General General	eral		Access type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length	Comment
		0	DigitalInputs	Read Discrete Inputs (Function Code 02)	Cyclic, t#100ms	16#0000	8	Keep last value			
Mod	Modbus Slave Channel	1	DigitalOutputs	Write Multiple Coils (Function Code 15)	Cyclic, t#100ms				16#0010	8	

From this, the corresponding I/O mapping is generated for the slave:

Modbus_TCP_Slave 🗙

General	Find Filter Show all 🔹 🕂 Add FB for IO Channel							
Modbus Slave Channel	Variable	Mapping	Channel	Address	Туре	Unit	Description	
Fiodbus Slave Chamler	🗐 🖓 🦄		DigitalInputs	%IB0	ARRAY [00] OF BYTE		Read Discrete Inputs	
Modbus Slave Init	🚊 - 🦄		DigitalInputs[0]	%IB0	BYTE		Read Discrete Inputs	
	🗝 🦘 xSlave 1DI0	**	Bit0	%IX0.0	BOOL		0x0000	
ModbusTCPSlave Parameters	🗝 🦃 xSlave 1DI 1	**	Bit1	%IX0.1	BOOL		0x0001	
	🗝 🦘 xSlave 1DI2	*	Bit2	%IX0.2	BOOL		0x0002	
ModbusTCPSlave I/O Mapping	🦘 xSlave 1DI3	**	Bit3	%IX0.3	BOOL		0x0003	
	🗝 🦘 xSlave 1DI4	**	Bit4	%IX0.4	BOOL		0x0004	
ModbusTCPSlave IEC Objects	👋 xSlave 1DI 5	**	Bit5	%IX0.5	BOOL		0x0005	
Status	👋 xSlave 1DI6	**	Bit6	%IX0.6	BOOL		0x0006	
Status	👋 xSlave 1DI7	**	Bit7	%IX0.7	BOOL		0x0007	
Information	ii		DigitalOutputs	%QB0	ARRAY [00] OF BYTE		Write Multiple Coils	
	i - *		DigitalOutputs[0]	%QB0	BYTE		Write Multiple Coils	
	Slave 1DO0	**	Bit0	%QX0.0	BOOL		0x0010	
	XSlave 1DO 1	**	Bit1	%QX0.1	BOOL		0x0011	
	👘 🍫 xSlave 1DO2	**	Bit2	%QX0.2	BOOL		0x0012	
	🍢 xSlave 1DO3	**	Bit3	%QX0.3	BOOL		0x0013	
	* xSlave 1DO4	*	Bit4	%QX0.4	BOOL		0x0014	
	* xSlave 1DO5	***	Bit5	%QX0.5	BOOL		0x0015	
	💖 xSlave 1DO6	**	Bit6	%QX0.6	BOOL		0x0016	
	×Slave 1D07	**	Bit7	%QX0.7	BOOL		0x0017	



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