

## Modbus TCP – Master protocol

Driver documentation

Connect Ideas. Shape solutions.



### Table of contents

Document description	
Driver selection	3
Communication parameters	5
Tag definition	8
Memory areas	9
Broadcast message	
Error codes	



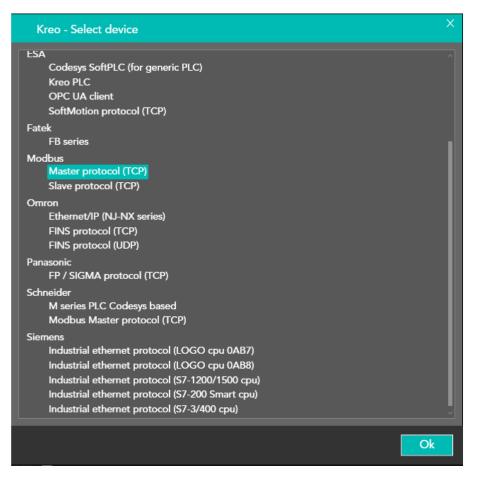
## Document description

This document is dedicated to the programming and functionality of the Modbus master driver. The operator panel in this configuration acts as a Modbus Master (CLIENT) and sends read-write requests to the predefined slaves.

It is possible to define a configuration with multiple slaves adding multiple instances of the Modbus master driver.

Each instance represents the connection with a slave.

## Driver selection



In the Kreo HMI driver portfolio select Modbus – Master protocol (TCP).



The + icon let the user add several instances of the driver in case of a multi slave connection. Each instance is for the communication to one of the slaves.

The configuration below, for example, is in case 3 slaves are connected.

+ × 🗘	$+ \times \mathbb{C}$		
LUMIA110C*R0000	ETH 1	ETH 2	
	Master protocol (TCF Master protocol (TCF Master protocol (TCF	P)_02	



## Communication parameters

Via the double click on the HMI model the below page is displayed.

						X
Info		ETH 1		ETH 2		
Etherne	t paraı	neters				
IP addr	ress 1	92.168.0.1				
Subnet	: mask 2	55.255.0.0				
Ping tir	meout 5	00 ms		~		
Master	protoc	ol (TCP)				
_						
Name			Value		Format	
	neral por	t parameters				
🕟 Ge	neral por	t parameters	Value 500		Format <i>[50 - 10000] Step:50</i>	
🕟 Ge	ol timeou	t parameters		-		
Ge Protoc	ol timeou	t parameters	500		[50 - 10000] Step:50	
Ge Protoc	ol timeou	t parameters	500		[50 - 10000] Step:50	,
Ge Protoc	ol timeou	t parameters	500		[50 - 10000] Step:50	
Ge Protoc	ol timeou	t parameters	500		[50 - 10000] Step:50	
Ge Protoc	ol timeou	t parameters	500	_	[50 - 10000] Step:50	,
Ge Protoc	ol timeou	t parameters	500		[50 - 10000] Step:50	,

IP address	Ip address of the port connected to the Modbus slave network
Subnet mask	Subnet mask
Ping timeout	The PING command is sent in order to test the connection stability.
Protocol	The replay from the slave device has to come before this timeout will expire
Timeout	
No. Of retry	The total amount of request necessary in order to raise the communication error



Via the double click over the driver id the below page will be displayed.

							×
Info		Parameters					
De	vice proper	ties					
	🗌 Is offscan		🗌 Disab	ole Optimization			
	User Address I	Field Format	Default		~		
De	vice parame	eters					
	Name		Value		Form	ət	
	🔿 Tcp/IP setting	gs					
	IP address		0.0.0.0		IP ad	dress: 0.0.0.0 - 255.255.255.255	
	IP port		502		numb	per: 0 - 65535	
	🔗 Modbus spe	cific paramete	rs				
	Modbus address		1		numb	per: 0 - 247	
							Ok

Is offscan	The driver is defined in the project but will not be scheduled. In order to enable the driver it is mandatory to use the ST script function: TAG_SETOFFSCANDEV (device, state)
Disable	TAG_SETOFFSCAN (Tag, state)
Disable	Disable the data optimization.
Optimization	Each tag will be refreshed with a separate communication message.
User Address	Tag address format.
Field Format	The default format is defined in the driver description but the user can select
	the desired format (DECIMAL or HEXADECIMAL)
Address prefix	Prefix that will be added at the beginning of the Tag addressing string.
IP address	IP address of the PLC port
IP port	Ethernet communication port.
	The default value 502 is the standard port to be used with Modbus
	communication.
Modbus	Slave address for this specific slave
address	



#### Offscan

Is offscan management can be used in case a specific machine module will be part of the Kreo HMI project but will not be physically connected.



A NOT CONNECTED and ONSCAN device will reduce dramatically the performance of the page refresh due to the communication timeout.

#### **Disable Optimization:**

This option can be used in order to identify wich of the data displayed on a specific page is causing the communication error.

The value will not be displayed but a series of ????? will let the user identify the faulty tag to be fixed.



# **ESN** Tag definition

							×
Tag		Transformations	Thresholds	Database	Events		
Name	Tag1						
Address type	Devic	e	~				
Туре	Unsig	nedInteger	<ul> <li>Array size</li> </ul>	1			
Device N	laster p	rotocol (TCP)	V Dynamic				
Data Area F	C 03-06	(read/write single regis	ter) 🗸 Data Type	Word	→ BCD	Signed	
Address 0			Ø				
Persisten	t 🗌 R	ead only 🗌 Always u	odate 🗌 Use in script	s 🗹 Allow subtags [	Tag OPC		
Refresh (ms)		OffScan mode	e Never V Netwo	ork Id 0			
Use defa							
Unit	[None	] ~					
							Ok

The addressing is based on the device memory mapping and on the Modbus Function Codes to be used in order to read and write the registers.

FC 03-06 stands for Function Codes that will be used for reading and writing the object.



## Memory areas

AREA	TIPO	DIM.	R/W	DESCRIZIONE
FC03-06 (Read / write single register)	Word Dword Real String	16 32 32 16 (2 char)	R/W	Read / Write a single register
FC03-16 (Read / write multiple registers)	Word Dword Real String	16 32 32 16 (2 char)	R/W	Read / Write of an area made of registers having consecutive addresses
FC03-16 (Read / write long registers)	Dword Real	32 32	R/W	Read / Write of an area made of long (32 bits) registers having consecutive addresses
FC04 (read multiple input registers)	Word Dword	16 32	R/-	Read multiple input registers having consecutive addresses
FC01-05 (read/write single coil)	Bit	1	R/W	Read / Write of a single coil (Boolean object)
FC01-15 (read/write multiple coils)	Bit	1	R/W	Read / Write of an area made of multiple coils having consecutive addresses
FC02 (read multiple input status)	Bit	1	R/-	Read / Write of an area made of multiple inputs having consecutive addresses



## Broadcast message

The slave address 0 identify the Broadcast message; a message wich is sent to all the slaves in the network.

This broadcast message do not require any reply.

							×
Info		Parameters					
De	vice proper	ties					
	S offscan		🗌 Disal	ble Optimization			
	User Address I	Field Format	Default			]	
De	vice parame	eters					
	Name	_	Value	_	Form	at	
	Tcp/IP setting	gs					
	IP address		0.0.0.0		IP ac	ldress: 0.0.0.0 - 255.255.255.255	
	IP port		502		num	ber: 0 - 65535	
	🔿 Modbus spe	cific paramete	rs				
	Modbus address		0		num	ber: 0 - 247	
							Ok

The read functions on the variables mapped on this device are not performed.

The write functions are performed (the broadcast message is then sent) and the driver closes the data exchange without waiting for the response from the device to be received.



## Error codes

CODE	DESCRIPTION
PROTOCOL ERROR	Generic error
PROTOCOL TIMEOUT	The slave did not replay to the master request
SOCKET ERROR	The ethernet socket cannot be created
PING ERROR	The device is not replying the PING command
TRANSMISSION ERROR	The TCP message cannot be created
ERROR	Unknown error



Connect ideas. shape solutions.