

Your Global Automation Partner

FEN20 Start-up Guide

G1038

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About This Guide

This guide will show the how to set the IP address on an FEN20 device. It will also show the user how to configure the FEN20 devices using EtherNet/IP, Profinet, and Modbus TCP configurations.







Required Parts

Hardware

FEN20-4DIP-4DXP - Multiprotocol 4 DI, 4 DI/DO slave FEN20-16DXP - Multiprotocol 16 DI/DO slave VT250-57x-L7-IPM – Turck programmable HMI. (Note: Any VT250 model can be used following the same steps) RJ45-RJ45-1M, Ethernet cables SE-44X-E924 – 9 Port Unmanaged Ethernet Switch 24V Power supply Any Digital Input Any Digital Output

Software

Windows 7 or Windows XP Pactware / IO Assistant 3+ CoDeSys V3.5 SP1 Turck IP address tool RS Logix 5000 RS Linx GE Proficy Machine Edition Turck GSD(ML) Files

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PRODUCT SEARCH	Product FE	N20-4DIP-4	4DXP	
SENSORS >	Lange and the second	Comp 4 Dig	act IP20 Multiprotocol Et tal PNP Inputs and 4 Cor	hemet I/O Station nfigurable Digital PNP
DENTIFICATION	Des Still Lines	Order	number: F6931090	
	- 1000		Modbus TCP Slave	
FIELDBUS TECHNOLOGY ->	-	-	PROFINET Slave	
Modular I/O			Integrated Ethernet Swit	ch
Block PO		-	10 Mbps / 100 Mbps sup	pported
Foundation Fieldbus & PROFIBUS-PA			2 x RJ45 Sockets for Fi 4 digital PNP inputs	eldbus Connection
Accessories			4 configurable PNP char	nnels, DI or DO
		-	24 VDC	
NTERFACE TECHNOLOGY			1 A outputs	
MACHINE SAFETY		-	Degree of protection IP.	20
	SPECIFICATION S	INFO MATERIAL	ACCESSORIES	CAD DOWNLOAD
POWER SUPPLIES				_
DOWNLOADS >	Data Sheet (English	1)	294 KB	Download
	E Catalog	Networks Cat	alog 83714	KB Download
	Customer CAD File	2D (DWG)	54 KB	Download
	Configuration file	GSDML files	43 KB	Download
	Configuration file	EDS files 7 Ca	talog files 10 KB	Download

FEN20 Modules

Introduction

FEN20-16DXP is a multiprotocol communication adapter which supports following networking standards: EtherNet/IP PROFINET Modbus TCP/IP

The factory default "out of the box" setting is that all communication protocols are enabled. After powerup, a multiprotocol device is listening on all necessary ports to detect on which kind of network it is used. The "Active Fieldbus Protocol" is defined as the first protocol to do one of the following actions:

EtherNet/IP: Establish a Class 1 Exclusive Owner connection to device. PROFINET RT: Connect request. Modbus TCP: Write to Output Register Range.

The Configuration Guide describes device features and configuration procedure in the EtherNet/IP environment.

Connection Diagrams

FEN20-16DXP connection diagram

FEN20-16DXP wiring



- V1+ will have the following functions
 - Station power and Group A of IOs
 - Provide 700mA to Vaux1+
 - It is galvanically isolated from groups B and C
- V2+ will have the following functions
 - Power for Group B
 - It is galvanically isolated from groups A and C
- V3+ will have the following functions
 - Power for Group C
 - It is galvanically isolated from groups A and B



LED Diagnostics

- LED Status •
 - I/O •
- 100 1015
 - Solid Green: Input Responded, Output on • Input not asserted, output off
 - Off:
- BUS
 - Solid Green: Active connection to master •
 - Flashing Green: Ready
 - Solid Red: ACD or bit set in Status word
 - Flashing Red: Blink/Wink command active
 - Off: No power supplied
- ETH1/ETH2
- Solid Green: Ethernet Link (100 Mbps)
- Flashing Green: Ethernet communication (100 Mbps)
- Ethernet Link (10Mbps) Solid Yellow:
- Flashing Yellow: Ethernet communication (10 Mbps)
 - Off: No Ethernet Link

IO and Configuration Data Map

EtherNet/IP IO data map consists of:

- Produced (input) data: 5 x UINT (16-bit) •
- Consumed (output) data: 2 x UINT (16-bit) •
- Configuration data: 16 x USINT (8-bit) •

	FEN20-16DXP															
Input Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Word 0							UB Iow		UL Iow							Diag Warn
Word 1	I-16	I-15	I-14	I-13	I-12	I-11	I-10	1-9	1-8	1-7	I-6	1-5	1-4	1-3	1-2	I-1
Word 2			EC 5		Reserved								EM 0			
Word 3	OSC 8	OSC 7	OSC 6	OSC 5	OSC 4	OSC 3	OSC 2	OSC 1								IGS
Word 4				Rese	erved				OSC 16	OSC 15	OSC 14	OSC 13	OSC 12	OSC 11	OSC 10	OSC 9
Output Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Word 0	Reserved															
Word 1	0-16	0-15	0-14	0-13	0-12	0-11	0-10	0-9	0-8	0-7	0-6	0-5	0-4	0-3	0-2	0-1

Abbreviations:

- 11...116: Input state •
- O1...O16: Output state
- DiagWarn: Summarized diagnostic warning •
- UI: UI voltage too low error •
- Ub voltage too low error Ub: •
- EM0: Summarized diagnostics mod 0 •
- IGS: Input group status error •
- OSC1...16: Output status O1 O16 short-circuit

QC QuickConnect

FEN20-16DXP Configuration Assembly Data											
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Byte 0											
Byte 1											
Byte 2											
Byte 3											
Byte 4	Reserve	Reserved									
Byte 5											
Byte 6											
Byte 7											
Byte 8											
Byte 9	Reserve	ed						QC			
Byte10-15	Reserve	ed									



Setting up the IP Address

The general procedure for IP address setup is:

- Set rotary switches to desired position
- Cycle (reset) power to the station
- Run IP address server to assign IP address
- Set address switches to rotary mode or PGM mode
- Cycle power to the station

When address switches are in rotary mode, the last octet may be dialed in 1-254 range.

Default IP Address

The default IP address is:

- IP-address 192.168.1.254
- Subnet mask 255.255.255.0
- Default gateway 192.168.1.1

To reset IP address to default, set address switches to 0 and reset device power.

Address Switches

FEN20 devices have three rotary switches marked as follows:

- x100 sets the last digit of IP address to a 100's value
- x10 sets the last digit of IP address to a 10's value
- x1 sets the last digit of IP address to a 1's value

Switch position determines either address or device mode of operation as follows:



When using the static rotary mode, the last octet of the module's IP address can be set via the rotary coding-switches on the module.

Address range is 1 to 254. Addresses 0 and 255 are reserved and cannot be used. Following example shows the last octet set to of address xx.xxx.**173**



BOOTP/DHCP Mode (300/400)

An Ethernet station (client) may obtain IP address from the BOOTP / DHCP server when address switches are set to 300 (BOOTP) or 400 (DHCP). The IP address, as well as the subnet mask assigned to the station, is stored in the device's EEPROM. When the station is subsequently switched to rotary or PGM-mode and power rest, the IP address is read from the EEPROM.

File Tools Help Request History Clear History Add to Relation List (hr:min:sec) Type Ethernet Address (MAC) IP Address Hostname
Request History Clear History Add to Relation List (hr:min:sec) Type Ethernet Address (MAC) IP Address
Clear History Add to Relation List (hr:min:sec) Type Ethernet Address (MAC) IP Address Hostname
(hr:min:sec) Type Ethernet Address (MAC) IP Address Hostname
16:00:12 DHCP 00:17:08:61:44:10 16:00:07 DHCP 00:07:46:FF:20:07 192:168.1.125
16:00:07 DHCP 00:07:46:FF:20:07
New Entry
Ethernet Address (MAC): 00:07:46:FF:20:07
Relation List
Ethernet Address (MAC) T Hostname. D0:07:45:65:00:07 D Enter the IP address for the device to
Description:
0K Cancel
Status
Unable to service DHCP request from 00:17:08:61:44:10. 1 of 256



PGM-DHCP Mode (600)

When the rotary switches are set to 600 it enables PGM–DHCP mode of operation. This mode is the Out-of-the-Box mode and provides the customer with powerful and convenient IP address setup. Procedure is the identical as for DHCP mode. When finished, click on "*Disable BOOTP/DHCP"*. The device switches into PGM mode and keeps assigned IP address in the EEPROM memory.

57	BOOTP/DHCP	Server 2	.3					_ 🗆 🗵
File	e Tools Help							
Ξ.F	equest History-							
	Clear History	1 Adda	Balation List					
	Clear History	A001((5 Helation List					
	(hr:min:sec)	Туре	Ethernet Addr	ess (MAC)	IP Address	Hostname		^
	16:24:25	DHCP	00:50:56:84:3	2:EC				
	16:24:24	DHCP	00:07:46:FF:2	0:07	192.168.1.125			
i III	16:24:24	DHCP	00:07:46:FF:2	0:07				
	16:24:21	DHCP	00:07:46:FF:2 00:10:25:72.8	0:07				
	16:24:20	DHCP	00:10:25:72:8	0.30				
	16:24:14	DHCP	00:07:46:FF:2	0.07				-1
		51105						-
E	elation List							
	New Delete	En abl						
	New Delete	: Enabl			sable buui F7DHCF			
	Ethernet Addre	ss (MAC)	Type	IP Address	Hostname	Description	[
	00:07:46:FF:20	:07	DHCP	192.168.1.12	5			
					-			
ES.	tatus							Entries
	Disable DHCP] C	ommand :	successful					1 of 256

PGM Mode (500)

When the rotary switches are set to 500 (PGM mode), the device will use either the factory default IP address on the first power-up or maintain current IP address whatever it is. Device IP address may be also changed, when in PGM mode, with software tools like:

- Device WEB server
- TURCK IP address tool
- IOAssistant configuration tool

PGM and Web Server (500)

Use any web browser and enter current IP address of the device. When device web server starts, enter "password" into "Login" field:

T Home	×	
← → C ↑ □ 192 FEN20-16DXP Embedded Website of FEN20	Block I/O Module	ce dress Cogin
		Password [Login] Industrial Automation
Home >		
Home Station Diagnostics Ethernet Statistics Links	Station Information Type Identification Number Firmware Revision Bootloader Revision EtherNet/IP Revision PROFINET Revision Modbus TCP Revision Rotary Switch Mode	FEN20-16DXP 6931089 V3.0.6.0 V7.1.0.0 V2.5.0.0 V1.1.7.0 V1.2.0.0 PGM

Enter device new IP address, press "Submit" and then "Reset". Refresh web page.

FEN20-16DXP Embedded Website of FEN20 Block	I/O Module	TURCK
	admin-user@1	192.168.1.48 [Logout] Industrial Automation
Network Configuration >		
Home Network Configuration Station Configuration Station Diagnostics Ethernet Statistics Links Change Admin Password 16DXP Parameters	Network Settings Changing the IP address will of Ethernet Port 1 setup Ethernet Port 2 setup IP Address Netmask Default Gateway MAC Address LLDP MAC Address 1 LLDP MAC Address 2	not take affect until the device is rebooted. Autonegotiate Autonegotiate 192.168.1.144 255.255.255.0 192.168.1.1 00:07:46:bb:20:01 00:07:46:bb:20:02 00:07:46:bb:20:03



PGM and TURCK IP address tool (500)

Start t	the IP address too	l and press sea	arch:				
- 🎫 Tu	urck IP Address Tool, \	/ers. 1.3					
9	Search		0) 🔳 💿 🔤			TURCK
	Change Rese	et Wink		Close			Industrial Automation
No	Ethernet address	IP address	Netmask	Gateway	Mode	Device	Version
1	00:07:46:BB:20:01	192.168.1.144	255.255.255.0	192.168.1.1	PGM		6.0.0.0
Foun	d 1 Device.						:

Highlight device, press "Change" button and enter new IP address; press "Write to device".

Turck IP Address Tool, Vers. 1.3		– – X
Search Change Reset	Change Device IP properties IP Properties Ethemet address IP addres IP address IP address IP address IP address IP addres	TURCK Industrial Automation
No Ethernet address IP addre	UU:U7/46/88/20/UT	Device Version
1 00:07:46:BB:20:01 192.168	Netmask Gateway 255.255.255.0 192.168.1.1	6.0.0.0
Found 1 Device.	Cancel Write to device	

Press search and verify address:

	urck IP Address Tool, V	Vers. 1.3					
	Search		0) 💻 💿 🚟			TURCK
	Change Res	et Win	k	Close			Industrial Automation
No	Ethernet address	IP address	Netmask	Gateway	Mode	Device	Version
1	00:07:46:BB:20:01	192.168.1.33	255.255.255.0	192.168.1.1	PGM		6.0.0.0

PGM and IOAssistant

Highlight currently displayed IP address and write new one. DO the same with Netmask and Gateway.

Turck BL Service TCP-IP.PW3 - PACTware							
File Edit View Project Device E	xtras Window Help 🖳 🍋 😫 🎉 🍀 🎼 🗌						
Project 🛛 🕂 🖉	TCP/IP Busaddress mar	nagement					• •
Device tag Address U R Dev	Device 👷	e type 🛛 🛛 🖪	L Service Etherr	net		TUR	ск
	Descri	iption B	L Service over e	thernet commun	ication DTM	Industrial Autor	mation
	🗖 र 😰 🖈 🛛 🖏	🔊 🗘 🔅 🗍	P‡ IP† + 0 2	生 美 二	Busa	ddress manag	ement
	Online available devices	Add devices mar	nually				
	Linksys Adapter (192.168.1.	48/255.255.255	.0)				•
	Device type	Online ID	IP address	Netmask	Gateway	Ethernet address	Mode
	FEN20-16DXP	1500027	192.168.1.33	255.255.255.0	192.168.1.1	00:07:46:88:20:01	PGM

Press Apply and follow dialog:

🗖 • 🖹 🔹 🔊	🚸 🗘	IP‡ IP† +🛈 🛓	Q 👗 🕹	Busa	ddress manage	ement				
Online available devices Add devices manually										
Linksys Adapter (192.168.1.48/255.255.255.0)										
Device type	Online ID	IP address	Netmask	Gateway	Ethernet address	Mode				
🖌 FEN20-16DXP	1500027	192.168.1.44	255.255.255.0	192.168.1.1	00:07:46:BB:20:01	PGM				
Planned devices Device type	Image: BL Service Ethernet Busaddress managem Image: BL Service Ethernet									
Dougo Abe	Of million 10	[Yes	No						

New IP address is accepted:

🗖 🔻 🔐 🕼 🔅 🎨 🕸 🖓 🈻 12]. 12† 🖷 🖄 🛔 👗 📫 😫 🛛 🗛 Busaddress managemen											
Online ava	Online available devices Add devices manually										
Linksys Adapter (192.168.1.48/255.255.255.0)											
Device	type	Online ID	IP address	Netmask	Gateway	Ethernet address	Mode				
? FEN20	FEN20-16DXP		192.168.1.44	255.255.255.0	192.168.1.1	00:07:46:88:20:01	PGM				



RESTORE Mode (0)

The RESTORE mode is a special mode which restores the IP address to the factory default values. Station responds to PING command, but it does not operate when switches are set to 0.

Set all three rotary switches to 0 and cycle the power to the station. It instantaneously restores IP address, Mask and Gateway as follows:

- IP address: 192.168.1.254
- Mask: 255.255.255.0
- Gateway: 192.168.1.1

Set rotary switches to any position as following diagram and cycle device power:



RECOVERY Mode (900)

The RECOVERY mode (900) is a special mode which resets all device resources to factory default values. It will clear all previously assigned parameter values to the device. Set rotary switches to 900 and cycle the power to the device. Wait for a moment, set rotary switches as previously described and cycle device power again.

EtherNet/IP Configuration

Following section provides information how to configure FEN20 product line with Rockwell Automation Logix controllers (mainly ControlLogix, GuardLogix, CompactLogix controllers). Third party devices may be configured using two different configuration methods which depend on a controller revision:

• Device configuration using EDS file (Electronic Data Sheet):

All Logix controllers, revision 20.00.00 and above, support device configuration using EDS files (EDS profiles) and configuration assembly data

• Device configuration using Ethernet Generic Profile:

All Logix controllers, revision 19.01.00 and below, support device configuration using Ethernet Generic Device profile and Catalog files based on CIP bridging device concept

FEN20 Configuration using EDS Files

An EDS file which supports configuration assembly data can be imported into RSLogix5000 project as a third party Add-on-Profile device. Once it is imported, Logix Designer creates device configuration tag that contains its configuration data. It is saved in the project and it is pushed to the device whenever connection between the controller and the device is established.

The FEN20 device configuration procedure includes following steps:

- Configure EtherNet/IP interface
- Create RSLogix5000 project
- Install device EDS file(s)
- FEN20 general configuration
- FEN20 connection configuration
- FEN20 input, output and configuration data tags



Configure User Interface

Configure user interface to the ControlLogix platform using RSLinx communication software and add new EtherNet/IP driver. The assign IP address is actual address of the Ethernet port of the PC:

💫 RS	Linx C	lassic Profess	onal	_ _ >	C
File	Edit	View Com	nunications Station DDE/OPC Security Window Help		
2	쁆	5 🐻 🛍	12 N?		
	Con	figure Drivers		<u> ? x</u>	
		Available Driver EtherNet/IP D	ypes: iver	Close	
		Configured Drive Name and D	s: scription Status BUNNING Bunning	Configure	
			Add New RSLinx Classic Driver	Startup	
			Choose a name for the new driver. OK (15 characters maximum)	Start	
			AB_ETHIP-1	Stop Delete	
		1			

Select designated driver and click apply:

Configure driver: AB_ETHIP-1	? ×
EtherNet/IP Settings	
 Browse Local Subnet Browse Remote Subnet 	
Description	IP Address
Windows Default	
ASIX AX88772 USB2.0 to Fast Ethemet Adapter	192.168.1.48
Microsoft Virtual WiFi Miniport Adapter #2	unknown
Microsoft Virtual WiFi Miniport Adapter	unknown

IP address 192.168.1.48 is address of a PC's Ethernet port used for the network configuration.

Create RSLogix5000 Project

Open new RSlogix5000 project and configure your PLC

orces	Incase I	Ind field (1) (1) (1) (2) tes & Add-On & Alerna & Bit & TeenCounter & RoutPutput & Cons	nara. 🗸 ComputerMath. 🔏 M
Controller Organizer Controller CLX63 Centroller CLX63 Call of the set of	▼ 0 X Advanced General Vendor: Type Revision Name: Description Chassis Ty Slot:	Properties - CLX63 SPC Execution File Redundancy Norwolatile Memory Serial Port System Protocol User Protocol Major Faults Alen-Brodley 1756-L63 ControlLogis:5563 Controller 20.11 CLX63 EIP device configuration pe: 1756-A10 10-Slot ControlLogix Chassie 0	Memory Security Minor Faults Date/Time Change Controller



Install EDS Files

Tools > EDS Hardware Installation Tool



Follow istruction of the wizard



Register a single EDS file



Following file is registered:





Configure FEN20-16DXP

Following example shows how to add FEN20-16DXP device to the project. The same procedure is used for any other FEN20 lwjerpq3rptq34ptoi module. To add new device to the EtherNet/IP network use: File > New Component > Module

💕 F	SLogix 5000 - CLX63 [1756-L63 20.11]		
File	Edit View Search Logic Communications	Tools	s Window Help
1	<u>N</u> ew C	trl+N	🗸 🏘 🍓 🍓 🕼 🔃 📝 🛒 🔍 🔍 Select a Language
2	<u>O</u> pen C	trl+0	Path: AB_ETHIP:1\192.168.1.63\Backplane\0*
	Close		
	Save C	trl+S	FI
	Save <u>A</u> s		Favorites 🖌 Add-On 🔏 Alarms 🔏 Bit 🔏 Timer/Counter 🔏 Input/Output 🔏 Compare 🌶
	Ne <u>w</u> Component	Þ	Add-On Instruction
	Import Component	•	• 📴 Data Type
	Compact		<u>9</u> <u>M</u> odule
			_ C Program
	Page Set <u>u</u> p		<u>∎</u> <u>R</u> outine
	<u>G</u> enerate Report		String Type
	Print	•	· ☑ <u>T</u> ag Ctrl+W
	Print Op <u>t</u> ions		Loo Tas <u>k</u>
	<u>1</u> CLX63.ACD		Trend
	2 CLX62V20_TBEN_QC_Eds_noxdp.ACD		
	3 C:\Users\\CLX62V20_TBEN_QC_Eds_R2.ACD		
	4 C:\Users\\2013\TBEN\TBEN_Conn.ACD		
	5 C:\Users\\CLX62V20_TBEN_DLR_1.ACD		
	<u>6</u> TBEN_Conn.ACD		
	7 C:\Users\\TBEN\CLX62V20_TBEN_DLR.ACD		
	8 C:\Users\\CLX62V20_TBEN_DLR_CELL1.ACD		
	E <u>x</u> it		



New device may be located in the "Select Module Type" by scrolling:

Enter Search Text for Mod	lule Type	Cle	ear F	Filter	3	Hide Filters	*
Modul Modul	e Type Category Filters		-	V	Modu	le Type Vendor Filters	*
Communication Communications Ada Controller	pter	l	-	✓ ✓ ✓	Allen-Bradley Advanced Micro Co Cognex Corporation Endress+Hauser	ontrols Inc. (AMCI)	- III
<	III	Þ		•		III	
Catalog Number 0005_007B_0030 0005_007B_0038 0005_007B_0039 0005_007B_003A 0005_007B_003A 0005_007F_0027 0005_007F_0028 002F_000C_000B 1305-ACDrive-EN1 1336E-IMPACTDrive-EN 1336R-REGENBrake- 1336S-PLUSDrive-EN	Description SP600 SP600 ER 400V SP600 ER 200V SP600 ER 600V Liquiflo 2.0 MD60 MD65 CJ1W-EIP21 AC Drive via 1203-EN1 XC Drive via 1203-EN1 XC Drive via 1203-EN1 SPRake via 1203-EN1 EN1 Brake via 1203-EN1 EN1	trive via	a 12	20	Vendor Reliance Electric Reliance Electric Reliance Electric Reliance Electric Reliance Electric Reliance Electric Omron Corporation Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley	Category DPI to EtherNet/IP DPI to EtherNet/IP DPI to EtherNet/IP DPI to EtherNet/IP DPI to EtherNet/IP MDI to EtherNet/IP MDI to EtherNet/IP Communications Adapter Drive Drive Drive Drive Drive Drive Drive	Î
•		-	Ш			-	

By searching specific name:

FEN:	20	Clas	ar Filton	- Hid	e Filtere 🐟
		Clea	ar r men		
	Module Type Category Filters		<u> </u>	Module Type Vendor Filters	
	Communication			Advanced Micro Controls Inc. (AMCI)	=
1	Communications Adapter			Allen-Bradley	
	Controller			Cognex Corporation	
	Digital	-	-	Endress+Hauser	-
•	III		-	III	4



Or by flitering the "Module Type Vendor Filters" to serch specific products, as follows:

						C		7		
Ente	r Search Text for Module	Type	Clea	ar Fi	Iters		neck TURC	к	Hide Filters	*
V	Module T	ype Category Filters		<u>*</u>		10	dule Type Ver	ndor Filte	rs	*
V	Communication					Parker Hannifin C	orporation			-
1	Communications Adapter	r		li		Religince Electric				
1	Controller			li		Sprecher+Schuh				≡
1	Digital			-	v	Turck				-
•	-	11	E.		•				•	
•	Catalog Number	Description					Vendor		Category	*
	6825434	FXEN-XSG16-0001-IP/	CS3000	17			Turck		Communications	1
	6825435	FXEN-IM16-0001-IP/CS	630007				Turck		Communications	F I
	6825436	FXEN-OM16-0001-IP/C	S30007	7		Select	Turck		Communications	1
	6825437	FXEN-IOM88-0001-IP/	CS3000	7	7/	$ \longrightarrow $	Turck		Communications	1
	6825438	FXEN-IP-DN/CS30007					Turck	or	ß	A I
	6827214	BL67-GW-EN		-			Turck	Click t	o create	F -
	6827329	BL20-F-GW-EN					Turck		is	I
	6831089	FEN20-16DXP					Turck	77	Communications	i ≡
The second	RM-89 Encoders	RM89EtherNetIP					Turck		Encoder	-
<			11						4	
52 of	f 266 Module Types Foun	d							Add to Favori	tes

If device name does not appear in the list of registered device, either device EDS file is not installed or installation failed.

Enter required data into the "**New Module**" general page: • Name (tag name) and description

- IP address
- Click "Change" to open Module Definition page •

Type: Vendor:	Turck Tag na	ame IP adress
Parent:	EN2TR	
Name:	FEN20	Ethernet Address
Description:	Enter device description or comments, e.g.: FEN20-16DXP FW V3.0.6.0 EIP V2.5.0.0 MAC 00:07:46:80:00:01	Private Network: 192.168.1. 44 IP Address: Host Name:
- Module Defi	nition	
Revision: Electronic K Connections	2.5 eying: Compatible Module :: Exclusive Owner	Click to select proper connection and device data type. TURCK devices support INT data format.



x

-

INT

SINT

Help

Module Definition Data Format

FEN20 supports INTEGER data format only. It is important to edit and change data format used by RSLogix5000 to match INTEGER. A failure to do so may case erronious IO data or inoperable IO data update. Use "Change" button to:

- Change data format to INTEGER
- Review connection type

FEN20 supports following connections:

- Exclusive Owner
- Input Only Connection
- Listen Only Connection

Note:

Exclusive Owner connection is the preferd, default, connection type use by the device. Input Only and Listen Only connections are used to configure the device with multiple PLC's and they do not support configuration assemblies.

The "Module Definition" page provides following setup options:

						· ·				
ſ	Module Definition*			— X			Module Definition	ז*		
	Revision: 2	•	5 🌲			Re	evision:	2	•	5 🌲
I	Electronic Keying: Comp	atible Mod	lule	•		Ele	ectronic Keying:	Compa	atible Mod	ule
ł	Connections:					Co	nnections:			
I	Name Size		1		Name			Size		
I	Exclusive Owner	Input:	10 SINT			Exclusive Owner		Input:	5	
I		Output:	4				Exclusive owner	Outp		2
	Exclusive Owner Input Only Connection Listen Only Connection				_				Aust use	INT
	ОК	Cano	cel	Help			OK		Canc	;el

The required setup for the FEN20:

Type: Vender	6831069 FEN20-1600/P	Module Definition*
Parent:	EN2TR	Revision: 2 • 5 +
Name:	FEN20	Electronic Keying Compatible Module
Description	Enter device description or comments, e.g.: FEN2018020 PW V30.60 EP V25.00 MAC 00.0746.90.00.01	Lonnectors: Name Size Exclusive Owner Input 5 Ovput: 2 NT
Nodule Def Revision Electronic R	nilion 2.5 Leging: Compatible Module	Required setup
Connection	E Exclusive Owner	OK Cancel Help

Communication RPI, Multicast / Unicast

The "Connection" tab is used for selecting:

- RPI (Requested Packet Rate) is a scheduled interval when a Target (FEN20) and Origin (controller) transmit data. The connection timeout may occure after 4xRPI time, when either Target or Origin stops sending data.
- Unicast:
 - Used for point-to-point communication (TCP, UDP)
 - Both Producer /Consumer use IP address classes A, B, or C for data exchange
 - No need to process and reject multicast packets
 - Reduces burden on all EIP participants
- Multicast:
 - Used for one-to-many communications (UDP)
 - Multicast allows for multiple consumers. However, a single consumer is supported
 - With multiple consumers, multicast is more timely efficient than unicast
 - Uses IP address class D (multicast addresses, e.g. 239.192.1.2)

New Module						
General [*] Connection [*] Module Info [*] Internet Protocol [*]	Port Configuration*					
Name	Requested Packet Interval (RPI) (ms)	Input Type	Input Trigger			
Exclusive Owner	20.0 🜻 1.0 - 3200.0	Unicast 🔹	Cyclic 🗨			
Increase or decrease RPI interval per project requirements.	un Mode	Multicast Unicast Multicast is us communicatior contro Unicast is reco duction of traffic nfigured with a	sed for device with multiple illers. commended for c when device is single controller.			
Status: Creating	(ок	Cancel Help			

Following dialog to complete device configuration.



Input, Output and Configuration Data Tags

The new device, after being configured, is added to the Controller Oranizer and associated input, output and configuration tags are created at the Controller Tags level.



Input data tag content:

Note: Device "ConnectionFaulted" flag is attached to the input data by the controller.

Scope: DLR_BL67_CIP - Show: All Tags - T. En								
	Name	e		Data Type	Description			
	FEN20:I			_0030:68310	Input (Produced) data			
	FEN20:1.ConnectionFaulted			BOOL	Controller provided connection status			
	FEN20:1.Data			INT[5]	Input (Produced) data			
		+ FEN20:1.Data[0]		INT	FEN20 status word			
		+ FEN20:1.Data[1]		INT	Input data			
	+ - FEN20:1.Data[2]			INT	Scheduled diagnostics			
				INT	Scheduled diagnostics			
		+ FEN20:1.Data[4]		INT	Scheduled diagnostics			

Output data tag content:

s	Scope: DLR_BL67_CIP Show: All Tags √.							
	Name	Data Type	Description					
		_0030:68310	Input (Produced) data					
	- FEN20:0	_0030:68310	Output (Consumed) data					
	E-FEN20:0.Data	INT[2]	Output (Consumed) data					
		INT	FEN20 control word					
	FEN20:0.Data[1]	INT	Output data					

Configuration data tag content:

Scope: DLR_BL67_CIP - Show: All Tags -							
Name Data Type Description							
	E-FEN20:C	_0030:68310	Configuration assembly				
	FEN20:C.Quick_Connect_0	BOOL	1 = Enable QuickConnect				
		_0030:68310	Input (Produced) data				
		_0030:68310	Output (Consumed) data				

Note: The "Quick_Connect" parameter may be used only in conjuction with QC infrastructure and program control. When enabled, it causes ethernet ports to be set as described in the FEN20 and QC section of the document.



FEN20 Profile Info

The device property is a subject to change. It also provides path to check installed EDS file: right-click on the device and select "*Properties*":



Click on marked icon and follow instructions:

Module Properties: EIP (6831089 2.5)	
Gen val Connection Module Info Internet Protocol Port Configuration	<u>^</u>
Type: 6831089 FEN20-16DXP About RSLogix 5000 Module Profile Info	×
Select About Module Profile Name: FEN20 RSLogix 5000 Module Profile Core Software Version Installed: 8.01.2627	.0 44
Description: Enter device description or co FEN20-16DXP FW V3.0.6.0 EIP V2.5.0.0. MAC 00:07:46:80:00:01 EDS File: Revision: 2 Creation Date: 4/15/201	
Module Definition Creation Time: 5:03:31 P	м
Revision: 2.5 Modification Date: 8/20/201 Electronic Keying: Compatible Module Modification Time: 1:44:05 P	13 M
Connections: Exclusive Owner OK	
View device profile and installed EDS file	

FEN20 Configured as Ethernet Generic Device

Earlier versions of RSlogix5000 Programming Software and Logix controllers, revision 19 or less do not support EDS files. Third party devices are configured using Ethernet Generic profile. It generally creates input, output and configuration tags as array of data. Configuration data is manually entered. A device is implicitly configured using one of the following connections: Exclusive Owner (default), Input Only or Listen Only connection.

The FEN20-16DXP device configuration procedure includes following steps:

- Create RSLogix5000 project
- Add new device
- Configure connection data
- · Review input, output and configuration data tags

Create a New RSLogix5000 Project





Add New Device

Right click to add new module:



Select "ETHERNET-MODULE" and click "OK":

	Sele	ect Module			x
Γ					
L	Modu	ule	Description	Vendor	
L		ETHERNET-BRIDGE	Generic EtherNet/IP CIP Bridge	Allen-Bradley	
L		ETHERNET-MODULE	Generic Ethernet Module	Allen-Bradley	
L.		EtherNet/IP	SoftLogix5800 EtherNet/IP	Allen-Bradley	
		In-Sight 1700 Series	Vision System	Coonex Corporation	

New device configuration page looks as follows:

Type: Vendor:	ETHERNET-MODULE Generic Ether Allen-Bradley	net Module			
Parent:	EIP	- Connection Par	ameters		
Name: Description:			Assembly Instance:	Size:	
	Î.	Input:		125 🔮	(32-bit)
	v	Output:		124	(32-bit)
Comm Forma	t: Data - DINT	Configuration:		0	(8-bit)
IP Addr	ess:	Status Input:			
🔘 Host Na	ame:	Status Output:			

Enter following data and click OK:

- Name
- CommFormat field : Data INT
- IP address
- Assembly instances and size per Table 2.1:

New Module					×
Type: Vendor: Parent:	ETHERNET-MODULE Generic Ethe Allen-Bradley EIP	met Module			
Name:	FEN20	Connection Par	ameters		
Description:	FEN20.16DXP		Assembly Instance:	Size:	
		Input:	103	5	🚔 (16-bit)
		Output:	104	2	🚖 (16-bit)
Comm Format	: Data - INT 🛛 🔻	Configuration:	106	0	🔺 (8-Ы)
Address / H	ost Name	configuration.		_	- (0.0k)
IP Addre	ess: 192 . 168 . 1 . 44	Status Input:			_
🔘 Host Na	me:	Status Output:			
🔲 Open Modu	le Properties	OK	Can	cel	Help

The device is implicitly configured with the controller using "Exclusive Owner" connection. It is defult connection and only one that supports configuration assembly data.

Table 2.1 contains assembly instance and data size information for the FEN20 product family. The configuration assembly data is pushed to the device during the communication startup (a Forward Open request).

Exclusive Owner connection	Input assembly instance	Input size	Output assembly instance	Output size	Configuration assembly instance	Configuration size
FEN20-16DXP	103	5	104	2	106	0
FEN20-4DIP-4DXP	103	4	104	2	106	0

Table 2.1 Exclusive owner configuration data.

Configure connection data according to the project requirements:

Module Properties: EIP (ETHERNET-MODULE 1.1)	×
General Connection Module Info	
Requested Packet Interval (RPI): 10.0 + ms (1.0 - 3200.0 ms)	
Major Fault On Controller If Connection Fails While in Bun Mode	
Use Unicast Connection over EtherNet/IP	



Configuration Assembly Data

The device Configuration data is an array of data saves in a PLC. It pushes configuration to the device during the Forward Open request. That occurs every time when device is connected, or power reset or replaced with the same model.

Following table shows the structure of the FEN20-16DXP configuration data:

FEN20-16DXP								
	Bit7	Blt6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0								
Byte1								
Byte2								
Byte3	yte3							
Byte4	Reserve	ed						
Byte5								
Byte6								
Byte7	Byte7							
Byte8								
Byte9	Reserve	ed						QC
Byte10-15	Reserve	d						

Table 2.4 – FEN20-16DXP configuration data

Abbreviations:

QC - Quick Connect

Input Only Connection Configuration

Input Only connection is used to configure a device when:

- It is configured with multiple PLCs (max three) where only one is Ecxlusive Owner
- Other PLCs get input data only. They maintaine connection if exclusive owner is closed
- PLCs have to be set to the same RPI and must use MULTICAST messaging. PLCs may reside on different subnets, VLANs, when infrastructure is available.

Enter following data and click OK:

- Name
- CommFormat field : Input Data INT
- IP address
- Assembly instances and size per Table 2.2:

New Module							x
Type: Vendor: Parent:	ETHERNET-MODULE Generic Allen-Bradley EIP	Etherne	et Module				
Name:	FEN20		Connection Para				
Description:	FEN20-16DXP			Assembly Instance:	Size:		
	Input Only connection		Input:	103	5	🚔 (16-bit)	
	EIF \$2.3.0.0	Ŧ	Output:	254			
Comm Format	: Input Data - INT	-	Configuration:	106	0	(8-bit)	
Address / H	ost Name					-	
IP Addre	ss: 192.168.1.4	14	Status Input:			_	
🔘 Host Na	me:		Status Output:				
🔲 Open Modu	le Properties		OK	Can	cel	Help	

The device is implicitly configured with the controller using "Input Only" connection. Table 2.2 contains assembly instance and data size information for the FEN20-L1 product family.

Input Only connection	Input assembly instance	Input size	Output assembly instance	Output size	Configuration assembly instance	Configuration size
FEN20-16DXP	103	5	254	n/a	106	0
FEN20-4DIP-4DXP	103	4	254	n/a	106	0

Table 2.2 – Input Only configuration data

Note: If multiple connections to the device are used, then use casme RPI and Multicast

Requested Packet Interval (RPI): 10.0 🚔 ms (1.0 - 3200.0 ms)					
🔲 Inhibit Module					
Major Fault On Controller If Connection Fails While in Run Mode					
Use Unicast Connection over EtherNet/IP					



Listen Only Connection Configuration

Listen Only connection is used to configure a device when:

- It is configured with multiple PLCs (max three) where only one is Ecxlusive Owner
- Other PLCs get input data only. They drop connection if exclusive owner is closed
- PLCs have to be set to the same RPI and must use MULTICAST messaging. PLCs may reside on different subnets, VLANs, when infrastructure is available.

Enter following data and click OK:

- Name
- CommFormat field : Input Data INT
- IP address
- Assembly instances and size per Table 2.3:

New Module						×
Type: Vendor: Parent:	ETHERNET-MODULE Generi Allen-Bradley EIP	c Etherne	t Module			
Name:	FEN20		Connection Para	ameters Assemblu		
Description:	FEN20-16DXP			Instance:	Size:	
	Input Only connection		Input:	103	5	🚔 (16-bit)
	En v2.3.0.0	Ŧ	Output:	255		_
Comm Format	: Input Data - INT	•	Configuration:	106	d	(8-bit)
Address / H	lost Name		coningaration.			- (0 bk)
IP Addre	ess: 192 . 168 . 1 .	44	Status Input:			_
🔘 Host Na	me:		Status Output:			
🔲 Open Mod	ule Properties		OK	Can	cel	Help

The device is implicitly configured with the controller using "Input Only" connection. Table 2.3 contains assembly instance and data size information for the FEN20-L1 product family

Listen Only connection	Input assembly instance	Input size	Output assembly instance	Output size	Configuration assembly instance	Configuration size
FEN20-16DXP	103	5	255	n/a	106	0
FEN20-4DIP-4DXP	103	4	255	n/a	106	0

Table 2.3 – Listen Only configuration data

Note: If multiple connections to the device are used, then use casme RPI and Multicast

Requested Packet Interval (RPI): 10.0 🚔 ms (1.0 - 3200.0 ms)
🔲 Inhibit Module
Major Fault On Controller If Connection Fails While in Run Mode
Use Unicast Connection over EtherNet/IP

FEN20 and DLR Network

A Device Level Ring (DLR) network is the EtherNet/IP network capable of fast recovery and uninterrupted service in case of a single break point in network topology. It consists of a ring supervisor and ring nodes connected in closed loop, ring topology. The ring supervisor maintains DLR protocol, performs fast fault detection and reconfiguration of the network architecture into a linear in less than 3msec for 50 node network.

Nodes do not require any DLR related configuration and no external switches are necessary. Following image illustrates a simple ring network:



FEN20 DLR features

FEN20 series is designed to meet DLR network requirements including:

- Compliance with the DLR and QoS Object Specification, Volume 2: EtherNet/IP Adaptation of CIP, Chapter 5: Object library, Edition 1.15
- Integrated embedded switching technology that supports two external and an internal Ethernet ports with following features:
 - Auto-negotiation, with 10/100Mbps, full/half duplex
 - Forced setting of speed/duplex
 - Turn off flow control on ring ports;
 - Auto MDIX (medium dependent interface crossover), in both auto-negotiate and forced speed/duplex modes.
- Fault detection in the ring topology on either Ethernet port to the left or right of the breaking point and error reporting to the supervisor



FEN20 and QC startup

The Quick Connect (QC) provides high device availability during startup of EtherNet/IP network. Typical application where it is implemented is a frequent robot tool exchange along assembly lines in the automotive industry, Figure 1.



Figure 1: Tool exchange

When new tool is engaged and locked into the robot arm, it generates a high lock signal to the Logix controller which starts the QC allocation sequence. The QC sequence has to be complete in less than 350msec. The QC is supported by Logix controller's revision 20.00.00 and above.

The Quick Connect Sequence

Following sequence of events describe Quick Connect application:

- The Logix controller inhibits current QC modules and turns power OFF
- The robot arm physically disengages a tool
- The robot arm physically attaches a new tool that has one or more QC modules mounted on the tool
- The robot acknowledges successful attachment of a tool with appropriate lock signal
- The Logix controller turns power ON to the QC modules when lock signal is received
- The Logix controller waits for QC modules to complete initialization before it un-inhibits device
- The robot is ready for operation when connections with device are established

Ethernet port setup

FEN20 Ethernet ports are marked as:

- "P1", Ethernet port 1
- "P2", Ethernet port 2

Note that it is essential to connect incoming Ethernet cable to P1. When QC is enabled, Ethernet ports are set as follows:

Ports	Auto-negotiate	Port	Forced speed /	Speed	Duplex
		Mode	duplex		
P1	Disabled	MDI	Enabled	100	Full
P2	Disabled	MDIX	Enabled	100	Full

Enable QC

• If FEN20 is configured using EDS file, set QC parameter to 1:

s	Scope: 🛐 CLX62_V20 🗸 Show: All Tags									
	Name	Value 🗲	SES A	Data Type	Alias	Description				
	-FEN20:C	{}		_0030:683						
	FEN20:C.Quick_Connect_0	0	Decimal	BOOL		1 = QC Enabled				
		{}		_0030:683						
		{}		_0030:683						

• If FEN20 is configured as Ethernet Generic module, set "... C:Data[9]:= 1"

S	cope: 🛐 CLX63_V19 🔹 👻	Show: A	All Tags			-
	Name	Value 🗲	SIEB A	Data Type	Alias For	Description
	E-FEN20:C	{}		AB:ETHER		Configuration data
	FEN20:C.Data	{}	Decimal	SINT[400]		Configuration data
	+ FEN20:C.Data[0]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[1]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[2]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[3]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[4]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[5]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[6]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[7]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[8]	0	Decimal	SINT		Configuration data
	+ FEN20:C.Data[9]	1	Decimal	SINT		1 = QC Enabled
		0	Decimal	SINT		Configuration data

• Download configuration to the PLC and connect the gateway

• QC mode will be executed during the next gateway power-up and subsequent power cycles

Disable QC

- Clear QC attribute of the configuration assembly instance 106, byte 10
- Download configuration to the PLC and connect the gateway
- Standard mode is executed on the next and subsequent power cycles of the gateway

Reset to factory default

- Set the rotary switches to 900 and cycle power to the module
- Set the rotary switches to 100 and cycle power to the module
- The module is reset to factory default settings and
 - IP address 192.168.1.100
 - Mask 255.255.255.0
 - Gateway 192.168.1.1

QC startup time

The startup time is 200msec.

PROFINET Configuration

Setup



GE Proficy Machine Edition Setup

It is assumed that there is working knowledge of GE Proficy Machine Edition. If not, please refer to the <u>GE Proficy Machine Edition Manual</u>.

Create a New project in Proficy using New Project Wizard or Open Project File -> New Project

Eile	Edit Search Project Target Variab	es	Tools	Wind	ow ł	<u>t</u> elp						
200	New Project			20	X	N.		2	B 1	A	r	60 123
È	Open Project	k	- -	₩ 0) - (/)	(1)	())	(S)	(R)	0	9	
	Restore Project				a ×							
	Cours And Pardure President											

For a new project, insert the Project Name, Project Template, and Project location. When done click "OK".

Project Template: GE Intelligent Platforms PACS	ystems RX3i 📃 Set as d
Project Location: GE Intelligent Platforms PACS GE Intelligent Platforms PACS GE Intelligent Platforms PACS GE Intelligent Platforms Remo GE Intelligent Platforms Remo GE Intelligent Platforms Series GE Intelligent Platforms Series GE Intelligent Platforms Series GE Intelligent Platforms Versa GE Intelligent Platforms Versa Guided Tour fxConveyor Projet	vstems RX3i ystems RX7i te I/O - PACSystems RX3i Etherne te I/O - Series 90-30 Ethernet te I/O - Series 90-70 Genius te I/O - VersaMax Ethernet te I/O - VersaMax Genius te I/O - VersaMax Profibus 90 Micro PLC 90-70 PLC 90-70 PLC Max Nano/Micro PLC Max Nano/Micro PLC wet
Sample Sample Target1 Configuration Configurati	Target1:PACSystems RX3iData Watch Lists:EmptyHardwareDefault PACSystem:Configuration:RX3iLogicProgramContains emptyBlocks:_MAIN LD BlockReference ViewContains DefaultTables:RVTsSupplementalContains empty

Eile Edit Search Project Target Variables Tools Window	v <u>H</u> elp
i 🕅 😂 🖬 🚭 🗸 🍵 🖡 🔍 i 🕺 📴 🖼 요 요	× ⊠ !!⊡ ₦ ⊅ 🕾 👙 # * 🖋 🕍 !! ← ⇒ ⊗ 🖓 🖓 ₪ 💭
╡╡@₩▶╠■॥Ѻ!!k+ŀ₩↔	◇ ⊕ ⊕ ⊜ 県 睅 睅 睅 № @ ┆;ぬ ֎ ✿
Navigator	Catalog X
	Central Processing Unit
Image: Hardware Configuration Image: Rack 0 (IC695CH5012) Image: Slot 0 (IC695PSA040) Slot 1 (Used With Slot 0) Image: Slot 2 (IC695CPU310) Image: Slot 3 (Used With Slot 2) Image: Slot 5 () Image: Slot 5 () Image: Slot 5 () Image: Slot 5 () Image: Slot 7 () Image: Slot 8 () Image: Slot 9 () Image: Slot 10 () Image: Slot 11 () Image: Slot 12 () Image: Slot 11 () Image: Slot 11 () Image: Slot 12 () Image: Slot 12 () Image: Slot 12 ()	Catalog Number Description IC695CPE305 PACSystems RX3i Single Slot CPU 5 MB w/ Ethernet IC695CPU310 PACSystems RX3i CPU 10 MB IC695CPU310 PACSystems RX3i CPU 10 MB IC695CPU315 PACSystems RX3i 1000MHz Celeron-M CPU 20 MB IC695CPU320 PACSystems RX3i 1000MHz Celeron-M CPU 64 MB IC695CRU3200P PACSystems RX3i 1000MHz Celeron-M Redundancy CPU IC695CRU3200P PACSystems RX3i 1000MHz Celeron-M Redundancy CPU IC695NIU001 PACSystems RX3i NIU

To add the Profinet Controller, right click on the slot the Profinet card is in the chassis and in the pop up window click Add Module



Once the project is in Proficy, Right click on the Processor and select the CPU. Click "OK" Elle Edit Search Project Target Variables Tools Window Help



In the Catalog Window, click on the Bus Controller Tab and select communication master. In our example, the RX3i Profibus Master and RX3i Profinet Controller are used. Click "OK".

Catalog		×
Central Processing Un	it	
Discrete Input Discre	ete Output Discrete Mixed Analog Input Analog Output	
Analog Mixed Comm	unications Bus Controller Motion 3rd Party Power Supplies	
Catalog Number	Description	Cancel
IC693BEM321	90-30 Fanuc I/O Link Module (Master)	
IC693BEM331	90-30 Genius Bus Controller (GBC)	
IC693BEM341	90-30 2.5 MHz FIP Bus Controller	
IC693DNM200	90-30 DeviceNet Master	
IC694BEM321	90-30 Fanue I/O Link Module (Master)	
IC694BEM331	RX3i Genius Bus Controller (GBC)	
IC694DNM200	RX3i DeviceNet Master	
IC695PBM300	RX3i Profibus Master	
IC695PNC001	RX3i PROFINET Controller (2 SFP)	

IP Addressing

In Turck products, the IP addressing can be set by either connecting to the Turck Gateway through Pactware, the IP address tool, or through Internet Explorer or modifying the first three octets of the IP Address. The last octet will be set by the rotary dials or dip switches.

Right click on the Profinet Controller in the Navigator Window. Select Launch Discovery Tool in the Pop up Window



- Click on Refresh Device List to bring list of devices on the network.
- Select device to be modified and click edit device.

- Connection	n Settinas					
Connection	r: Local Area Conne	ction 2			Refresh Device List	
LAN:	LAN01				▼	
Status:	No Errors					
States	Device Name	Δ	IP Address	Vendor	Device Type	
2 -		•	192.168. 1. 2	Hans Turck GmbH + Co. KG	FEN20-16DXP	
2	fgen		192.168. 1.111	Hans Turck GmbH + Co. KG	FGEN-IOM88-5001	
2	pn-io		192.168. 1.77	Siemens	S7-300	
- Filters (3/3)	Filters (3/3) — Selection Properties					
🔽 🚫 Assigi	ned	MAC Add	ress: 00-07-46-FF-40-CF	IP Address: 192,168,1,2	Identify Device	
_		Device R	ole: Device	Subnet Mask: 255,255,255,0		
🗠 👩 Assigi	ned with errors	Vendor IE): 013D	Gateway: 192.168.1.1	Edit Device	
💌 🥐 Not a	ssigned	Device IE): 9001			



• In the properties window, the Device Name and IP address can be changed. You can also reset the device to factory defaults and identify the device on the network. When identify the device, the LEDs on the gateway will flash. When Done click on the exit button

FEN20-16DXP Properties	×
Vendor Name: Hans Turck GmbH + Co. KG MAC Address: 00-07-46-FF-40-CF Device Type: FEN20-16DXP	Vendor ID: 013D Device ID: 9001 Device Role: Device
fen20	Set Device Name
IP Address: 192.168.1.2 Subnet Mask: 255.255.255.0 Gateway: 192.168.1.1	Set IP Information
Reset device to factory settings	Reset Device
	Exit

Installing GSD / GSDML Files in the Hardware Configuration

In the Toolchest window click on the dropdown arrow and select a Profibus /Profinet Device.



Right mouse click on the Toolchest window, click Assistants -> Add GSD File...

	Per contrar and and		
- CHINELLIGENT PLATFORMS	Collapse All		
HORNER ELECTRIC TOTAL CONTROL PRODUCTS TURCK INC_ WHEDCO, INC_	New Drawer Rename Drawer Delete Drawer	Del	
	Export Drawer Import Drawer Import Drawer as Copy	,	
	Scan for new objects		
	New Folder		
	Assistants	,	Add GSD File Write To GSD File



- Browse to the folder where the GSD file is located.
- Select file(s). Click "Open".

Choose a GSDML	file to import				? ×
Look in:	C FEN20		• ¢	• 🗈 💣 🗉	I •
	GSDML-V2.2-TUR	CK-FEN20-20130704-0 RCK-FEN20-20130704-	10600 010600		
My Recent Documents					
Desktop					
My Documents					
Mu Computer					
My Computer					
Mu Network	File name:			•	Open
Places	Files of type:	GSDML Files (GSDML*.	xml;GSDML*.zip) -	Cancel

- Note: All files with .GSD are the default GSD files in the English language. Other versions may include GSE (English), GSF (French), and GSG (German) languages.
- All Profinet files are .XML files.

Adding a Profinet Device onto the Network.

Click on the Profinet Devices drop down in the Toolchest



- Click on the folder to open the folder
- Click on the GSDML file and drag it to the Profinet card.





• Once it is under the Profinet, click on the gateway and the device name and IP Address will be in the Inspector. This must match the configuration downloaded to the gateway when using the network discovery tool.

Navigator	t ×	
Slot 0 	<pre>(IC695PSA040) (Used With Slot 0) (IC695CPE305) (IC695PNC001)* 57 (#1) [BL67-GW-EN-PN]* rck-fen20-16dxp (#5) [FEN20-16DXP]* Slot 0 (FEN20-16DXP)*</pre>	
IⅢ	1114AI-VI(1)*	
🛃 0 🦯 Uti 🛃 t	M 🖾 Pr 💈 Va 🢡 Inf	
Inspector	4 ×	
IO-Device		
Device Number	5	
Update Rate (ms)	128	
Reference Variable	<none></none>	
⊡Network Identification		
IO LAN	LAN01	
Device Name	turck-fen20-16dxp	
Device Description		
	192.168.1.2	
IP Address	192.168.1.2	
IP Address General	192.168.1.2	
IP Address General GSDML	192.168.1.2 GSDML-V2.2-TURCK-FEN20-20130704	
IP Address General GSDML Device Type	192.168.1.2 GSDML-V2.2-TURCK-FEN20-20130704 FEN20-16DXP	
IP Address General GSDML Device Type Device Access Point ID	192.168.1.2 GSDML-V2.2-TURCK-FEN20-20130704 FEN20-16DXP DAP 2	

 Double click on turck-fen20=16dxp to bring up the properties / station parameters of the gateway. Double click on slot 1 to bring parameters for the 16 DXP points



This will bring up the GW parameters for Profinet.

2	PROFINET DCP - Direct Connection (0	D.3.5.1) 16DXP (0.3.5.0) FEN20-16DXP	₹ ×
Γ	10-Device Access Point 🛛 Media Redundanc	cy Station parameter Protocol selection GSDML Details	
L	Output behaviour at communication loss:	Set to zero	•
L	Disable all diagnosis:		
	Disable output power diagnosis:		
l	I/O Assistant Force Mode disabled:		
l			

• After changing the parameters click the X to close the window.



2	PROFINET DCP - Direct Con	nection (0.3.5.1) 16DXP (0.3.5.0) PEN20-16DXP		×
ſ	Settings Inputs/outputs GS	SDML Details		
l	Digital input 1::	Normal	•	-
l	Digital input 2::	Normal	•	
l	Digital input 3::	Normal	•	
l	Digital input 4::	Normal	-	
l	Digital input 5::	Normal	•	
l	Digital input 6::	Normal	•	
l	Digital input 7::	Normal	•	
l	Digital input 8::	Normal	•	
l	Digital input 9::	Normal	•	
l	Digital input 10::	Normal .	•	
l	Digital input 11::	Normal	•	
l	Digital input 12::	Normal	•	
l	Digital input 13::	Normal	•	
l	Digital input 14::	Normal	•	
l	Digital input 15::	Normal	•	
l	Digital input 16::	Normal	•	
	Output 1::	Activate	•	
	Output 2::	Activate	•	
	Output 3::	Activate	-	

Modbus TCP Configuration

The following pages contain step by step instructions to set up communication between a Turck FEN20-16DXP multriprotocol slave to a Turck VT250-57x-L7-IPM HMI display. This example will use Modbus TCP communication between the devices.

Hardware

The following hardware was used to create this startup guide.

- VT250-57x-L7-IPM – Turck programmable HMI. (note: any VT250 model can be used following the same steps)

- FEN20-16DXP Multiprotocol 16 DI/DO slave
- SE-44X-E924 9 Port Unmanaged Ethernet Switch
- Ethernet cables
- 24 VDC Power supply

Software

The following software will be required to setup this system:

- CoDeSys V3.5 SP1 Hotfix 1 (can be downloaded from

http://pdb.turck.de/media/_en/Anlagen/SW_CoDeSys_v3510.zip)

- Turck IP address tool (can be downloaded from www.turck-usa.com/Support/Downloads ~ Software/)

Setup

Hardware setup

- 1. Change the rotary switches on the FEN20-16DXP to 0,1,3 to have an IP address of 192.168.1.13
- 2. Connect VT250 and FEN20 to the Ethernet switch
- 3. Power up both devices

4. Setup the IP address on the VT250 using IP address tool:

	Turck IP Address Tool, Vers. 1.3									
	Search Industrial Automation									
No	Ethernet address	IP address	Netmask	Gateway	Mode	Device	Version			
1 2 3 4	00:07:46:24:06:0A 00:07:46:FF:40:CF 00:07:46:00:32:EA 00:07:46:00:0D:5F	192.168.1.254 192.168.1.2 192.168.1.110 192.168.1.120	255.255.255.0 255.255.255.0 255.255.255.0 255.255.255.0	192.168.1.1 192.168.1.1 192.168.1.1 192.168.1.1	PGM ROTARY ROTARY ROTARY	VT250-57x-L7-IPM	1.5.3.0 3.0.0.0 0.0.0.0 0.0.0.0			
Four	nd 4 Devices.						:			



Setting Up the VT250

• File, new project



• Select standard project and name it

📋 New Proje	ect				 X
Categories	: raries ojects	Templates:	Standard project	Standard project w	
A project co	ontaining one device, one ap	plication, and an e	mpty impleme	ntation for PLC	PRG
Name:	VT250 modbus master sam	ple			
Location:	C: \Users\rsolis\Documents\	\Codesys			▼
			C	ОК	Cancel

• Select Turck VT250-57x and click OK

Standard Pr	oject	
	You are about objects within	t to create a new standard project. This wizard will create the following this project:
	- One prograr - A program P - A cyclic task - A reference	nmable device as specified below LC_PRG in the language specified below which calls PLC_PRG every 20 milliseconds to the newest version of the Standard library currently installed.
	Device:	Turck VT250-57x (Hans Turck GmbH & Co. KG)
	PLC_PRG in:	Ladder Logic Diagram (LD)
		OK Cancel

Configure the communication with VT250 in Codesys. Go to Devices, double click on Device (VT250-57x). Click on scan network to find the connected VT250

IT257 module master sample Device (Turds VT259-57x) Signal Package Device (Turds VT259-57x) Signal	Start Page / Device Communication Settings Anderstown Line - 100/Continue Task dedoument	+ X	TonBox - 0 M
	Select the network path to the controller: Gateway-1	• Statesh	
P. IC, Peis Peis) P. C, Peis Peis) P. Configuration S MeanTask	- 💑 Gitteway-1	Node Hames Galewar: Add gatewar	
	Don't save network path in project		
1	fersique	* 0 0m	= 0 X
	Description	Project Object	Pasition

•



Click on the desired VT250 to highlight it and click on "Set active path". The selection becomes **bold**

VT250 modbus master sample project* - CoDeSys	the second se								
Be 6dt yew grotest Build Online Debug	Toola Burgan Rep								
	1416110-01100(2424)。1113-02-05-03-03-03-03								
lexes + 8	K / B StartPage / Bevice	• X Tooloo - + X							
 ITZE readue mante sample Derice (Turck iTZEI-67k) R.C.Lopic Appl 	Communication Settings Applications Log RLC settings Task deployment Status Softmention Select the network path to the controller: Geteney-1922D-APP	Set active calls							
● PLC, PBS (PRC) ● PLC, PBS (PRC) ● Task Configuration	# (#):s Grbenvy-L Bicde Bis (#): VT250-279-L7-00M [3208] VT250-279-L7-00M [3208] (#): VT250-579-L7-00M [3208] Bicde Bis (#): VT250-579-L7-00M [3208.A0FE] (active) Bicde Bis <	Addi parlameny. Addi parlameny. Filter I Farlament. Scanto estavath. Farlament. Scanto estavath. Scanto estavath							
	Dan't zone neboerk path in propert Secure online mode								
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	Description	Project Object Position							
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They a bear	1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Annual sea balanta							

• Right click on "Device (Turck VT250-57x)" and click on "Add device"



• Select "Ethernet adapter" and click "Add device"



Right click on the recently added Ethernet adapter and click "Add device"





• Select "Modbus TCP master netX" from the list and click "add device"

Add Device		
Name: Modbus_TCP_Master_netX		
Action:		_
Append device Insert device Plug d	Sevice 💿 Update device	
Device:		
Vendor: <all vendors=""></all>		*
Name	Vendor	Version
E- I Fieldbusses		
+ themetIP		
- Modbus TCP Master		
Modbus TCP Master	35 - Smart Software Solutions GmbH	3.5.1.0
Modbus TCP Master netX	Hilscher Gesellschaft für Systemautomation mbH	3.5.1.0
Display all versions (for experts only)	splay outdated versions	
Rame: Modbus TCP Master netX Vendor: Hischer Genelischaft für Systema Categories: Moduus TCP Master Versione 3.5.1.0 Order Ramber - Description: A device that works as a Mo sleves can get connected to it.	utomation mbH dbus Master on Ethernet. Up too 8	
Append selected device as last child of Ethernet (You can select another target node in the	navigator while this window is open.)	
L	Add Device	Close

• Right click on the recently added Modbus master, click on "Add device"



• Select Modbus TCP slave

Add Device	×
Name: Modbus_TCP_Slave	
Action:	
Append device Insert device Plug device Update device	
Desire:	
Varian call unders	-
New York Street	
Name Vendor	Version
H- III Fieldbusses	
R Modbus TCP Slave	
Modbus TCP Slave 35 - Smart Software Solutions GmbH	3.5.1.0
Display all versions (for experts only)	
Hame: Modbus TCP Slave Vendor: 35 - Smart Software Solutions GmbH Categories: Modbus TCP Slave Version: 3.5.1.0 Order Rumber: - Description: A generic Modbus device that is configured as Slave for a Modbu TCP Master.	× 🕺
Append selected device as last child of Modbus_TCP_Master_netX	
(You can select another target node in the navigator while this window is op-	pen.)
	Add Device Close

• This will be the FEN20. Name can be changed by right clicking on it, and click properties





• Change name

Properties - FEN20	[Device: Ethernet: Modbus_TCP_Master_netX]	x
Common Build	Access control	
1	FEN20	
Full name:	FEN20 [Device: Ethernet: Modbus_TCP_Master_netX]	
Object type:	Device	
Open with:	Device Editor	
	OK Cancel Ap	ply

• Double click on the Modbus slave to change its configuration. First we need to assign the IP address. For this example we are using 192.168.1.13

VT250 modbus master sample project* - CoDeSys						0.0	
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 ITZER readus manter sample E Device (Turck (T288-57k) 	ModeurTCP Save Modeur Save	Channel Nodbur Slave Init Modbur 70	PSieve Configuration Machuel/CPSieve I/O Mepping	Saha Information			
- DA Appl	Modeus-TOP		MODRUS				
Library Manager	Sieve IP Address:	192 . 188 . 1 . 13	MUMDUS				
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S HanTesk	Response Timeout (ms)	1000					
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	Description	Description Project					
	Memory area 1 contains Ratain	Deta: highest used address: 8158, lar	gest contiguous memory gep: 8159 (100 %)	VT250 modbus meet			
	Memory area 2 contains Persis Build complete 8 errors, 8 with	tert Data: highest used address: 8150 wrings unady for download?	largest contiguous memory gap: 6150 (106 %)	VT250 modbus mast.			
THUR ST Devices	Pieconolle: 0 GK						
and the second					Current	Lesen (nabody)	

• The communication between Modbus TCP master and Modbus Slaves is realized via Modbus channels. To configure them click on Modbus Slave Channel tab. The information for this channels is taken from the Modbus TCP data map included on the datasheet.

Compact 16 Config FEN20-16 Process Data M	IP20 Mu urable E DXP Mapping	ltipro Digita	itoco I PNF	l Ethe Cha	ernet nnels	I/O S \$	statio	n							Ind	ustrial Auto	mation
Modbus TCP R	Register Map	ping															
	Reg	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Inputs (RO)	0x0000	DI15	DI14	DI13	DI12	DI11	DI10	DI9	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0
Status (RO)	0x0001	-	FCE	-	-	CFG	COM	V1 low	-	-	-	-	-	-	-	-	Diag
																	Warn
Diag (RO)	0x0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I/O
																	Diag
Outputs (RW)	0x0800	DO15	DO14	DO13	DO12	DO11	DO10	DO9	DO8	D07	DO6	DO5	DO4	DO3	DO2	DO1	DO0
I/O Diag (RO)	0xA000	SCO7	SCO6	SCO5	SCO4	SCO3	SCO2	SCO1	SCO0	-	-	-	-	-	-	-	IGS
I/O Diag (RO)	0xA001	-	-	-	-	-	-	-	-	SCO15	SCO14	SCO13	SCO12	SCO11	SCO10	SCO9	SCO8

• Click on Modbus Slave Channel tab then add channel

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Organization restrict served Device (Urak V1226-tA) Device	X F #	- FER20			- X	Toobox + 8 M
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• • • • • • • • • • • • • • • • • • •	= Device (Tardi V7250-57k)	ModbusTCP State Modbus Save Channel Modbus S	Anve Dett. Modbus/PCPSArve Carriligueation	ModbusTCPSieve 3/O Mapping Stetus Information	In the second second	
Add Chemnel.	C Appl Consy Hanager PLC_PR0 (PR0) PR0 PR0 PR0 (PR0) PR0 PR0	Plane Access Type	Trigger IILAD ON	fuet Length Enter Handling WHITE Offs	e Leegh	
Memory + 8 • Ø Geror(s) • 8 Avering(s) Description Project Object		<u></u>		Add Channel.	* 200.1	
Pointer(s) * 0 entro(s) *		Annungen .				
Description Project Object Position	18				• 0 erte	(a) 🔹 D warning(a) 😶 D measage(a)
				111 0339700		



• First we will add the input data. This is using Read Holding Registers (Function Code 3). The offset is the Modbus register indicated on the datamap. Length is the amount of registers (in WORD format). In this case is offset is 0x000 and length 1

Name	FEN_INPUT	S	
Access Type	Read Holdir	ng Registers (Function Code 3)	•
Trigger	Cyclic	▼ Cycle Time (ms)	100
Comment			
READ Register			
Offset	0x0000		-
Length	1		
congen			
Error Handling	Keep last V	alue 🔻	
Error Handling WRITE Register -	Keep last V	alue 🔻	
Error Handling WRITE Register - Offset	Keep last V	alue	*

• Same steps for the outputs. Add channel and use the information from the datamap. Write multiple registers (Function code 16). Offset is 0x0800 and length is 1.

Name	FEN_OUTPUTS	
Access Type	Write Multiple Registers (Function Code 16)	-
Trigger	Cyclic Cycle Time (ms	s) 100
Comment		
READ Register		
Offset		-
Length	0	
Error Handling	Keep last Value	
WRITE Register		
Offset	0x0800	-
Length	1	

Once input and output channels are created, go to Modbus TCP Slave I/O mapping tab. We will
assign variable names for one input and one output bit (data tags). Make sure that "Always
update variables" is enabled

(anable	Mapping	Channel	Address	Туре	Default Value	Unit	Description	
÷- 0		FEN20_INPUTS	%3W0	ARRAY			Read Holdn	
8.9		FEN20_INPUTS[0]	963W0	WORD			READ 16#0	
 FEN20_INPUT0 	×.,	Bittl	%D0.0	BOOL	FALSE			
- 0		Bit1	%D0.1	BOOL	PALSE			
- 🛊		8412	%D0.2	BOOL	PALSE			
- 🖗		Bit3	%DX0.3	BOOL	FALSE			
- •		Bit4	%D0.4	BOOL	FALSE			
- •		Bit5	%20.5	BOOL	FALSE			
- 🔶		Bit6	%D0.6	BOOL	FALSE			
- 🛊		847	%D0.7	BOOL	PALSE			
- 🖗		Bit8	%EX1.0	BOOL	FALSE			
		Bit9	%D(1.1	BOOL	FALSE			
		Bit10	%D01.2	BOOL	FALSE			
- 🔶		Bit11	%D01.3	BOOL	FALSE			
- 🔶		8812	%D0.4	BOOL	PALSE			
- 🛊		B#t13	%DX1.5	BOOL	FALSE			
- •		Bit14	%DX1.6	BOOL	FALSE			
		Bit15	%D(1.7	BOOL	FALSE			
3- Ø		PEN20_OUTPUTS	%QWD	ARRAY			Write Multipl	
8- 0		PEN20_OUTPUTS	%QW0	WORD			WRITE 16#0	
- 🛊		B/t0	%GQXB.0	BOOL	FALSE			
FEN20_OUTPUT1	×.	Bit1	%Q00.1	BOOL	FALSE			
- •		8/12	%QX8.2	BOOL	FALSE			
- •		8/63	%Q00.3	BOOL	FALSE			
- 🗭		844	%Q00.4	BOOL	PALSE			
- *		Rits	%000.5	800	FALSE			

- -



• Double click on "PLC_PRG" on the devices tree. Create a small logic, when FEN20_INPUT0 is turn ON activates FEN20_OUTPUT1.

PE 6 51 per 0 peter POLON, Buil Order Delog Tek Weder 1990 Image: Imag	VT250 modbus mester sample.project* - CoDeSys	and the second second processing the based has been as a second s			x
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Detection • • • • • • • • • • • • • • •	112 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	★ \$ \$ \$ 100 100 - 101 100 00 00 00 00 00 00 00 00 00 00 0			
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Prof	R D R.C Logic	3 EID VAR		Math operators	
Buczasz Boczasz B	ii O Appl			Other Operators	
Back Configuration Back Configuratio	Library Manager			Punction blocks	
Series Configuration Series Configura	PLC_PRG (PRG)		-	Ladder elements	4
Image: Street (Sharrat) Image: Street (Sharrat) Image: Street (Sharrat) Image: Street (Sharrat) <td>III Task Configuration</td> <td></td> <td>-</td> <td>Network</td> <td></td>	III Task Configuration		-	Network	
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Image:	Modbus_TOP_Master_netX (Modbus TOP N			Parallel contact	
Cold	FEN20 (Hodbus TCP Save)			Parallel negated contact	
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B/MB · · · · · · · · · · · · · · · · · · ·		Dud	• • • • • • • •	sr(s) 🗢 d warning(s) 🛡 6 me	arede (1)
Description Project Object Position *		Description Pro	oject Object	Pesition	*
Total allocated memory size for code and data: 121828 bytes V7250 modbus mest		Total allocated memory size for code and data: 121828 bytes VT2	250 modbus mest		
Memory area 6 casteira Data, Input, Output, Memory and Cade: highest used address: 723966, largest castiguous me V1250 modious mast		Memory area 0 contains Data, Input, Dutput, Memory and Code: highest used address: 723988, largest contiguous me	250 modbus mast		
Memory area 1 contains Retain Data: highest used address: 8158, largest contiguous memory gap: 8158 (200 %) V1250 modbus mast		Memory area 1 contains Retain Data: highest used address: 8158, largest contiguous memory gap: 8158 (100 %) VT2	250 modbus mast		+
Transmission Pressenties 0 0K	CONTRACTOR SER Designed	Presentales 0 CK			
Turke (@rearb)	Class Trans			Annual second high and the	

• Finally go to main menu "Online". Click Login and Yes when prompted.



Put the VT250 on Run mode by clicking on Debug, Start



 Connect an input to the first input of the FEN20 and turn it on. This will turn the second output on the station.

VT250 modbus mester sample.project* - CoDe5ys			And the second				to a subset of				3 3
Ble Edit yew Broject FBD/LD/IL, Build Online (ebug Tools	Window Help									
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V7250 modus master sample		inc me							General		
Device [connected] (Turck VT250-57k)	Device.Ap	punc_ms	_	_	_	_			Sociesn 0	perators	
R D Ruc Logic	Expression		Туре	Value	Prepared value	Comment		15	Math oper	ators	
i 🔿 Appl (run)									Other Ope	rators	
- 💼 Library Manager									Function 8	olocka	
PLC_PRG (PRG)									Ladder el	enerts	4
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G Modbus_TCP_Master_netX Modbus TC	1								e Paralle	el contact	
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	Memory a	rea I contains Ratain	Data: highest used as	ddress: 8158, largest o	ontiguous memory gap: 815	8 (100 %)	VT250 modbus mast.				
	O Memory a	rea 2 contains Persis	tent Data: highest use	d address: 8150, large	it contiguous memory gap:	8150 (100 %)	VT250 modbus mast.				
	Build com	piete 0 errors, 0 wa	mings i ready for dow	micadł							-
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