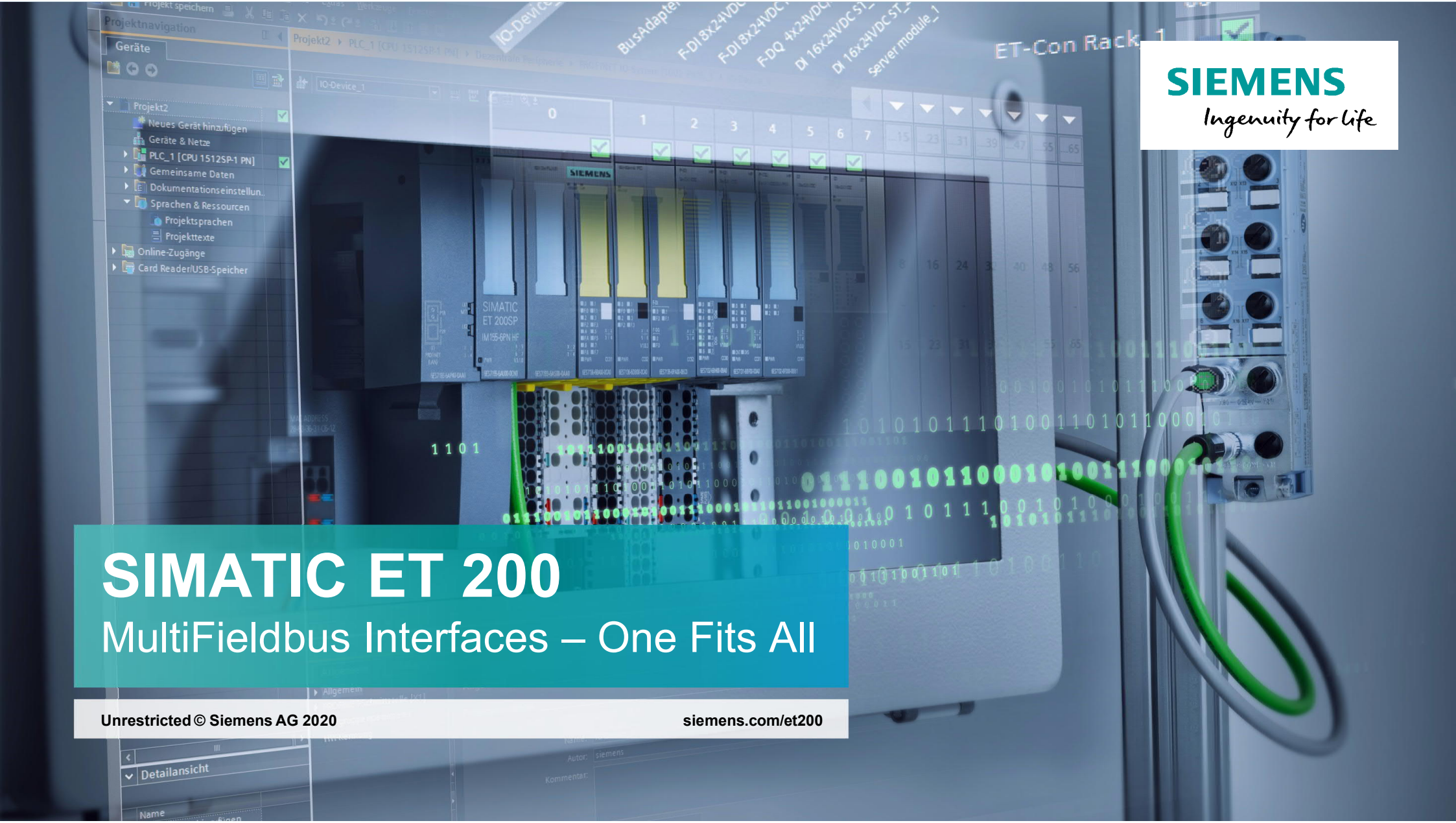

SIMATIC ET 200

MultiFieldbus Interfaces – One Fits All

siemens.com/et200

Agenda

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Ingenuity for life

1 Overview

2 Functionality

3 Customer benefit

4 MFCT

5 How to integrate

6 Summary

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SIMATIC ET 200 MultiFieldbus
Overview

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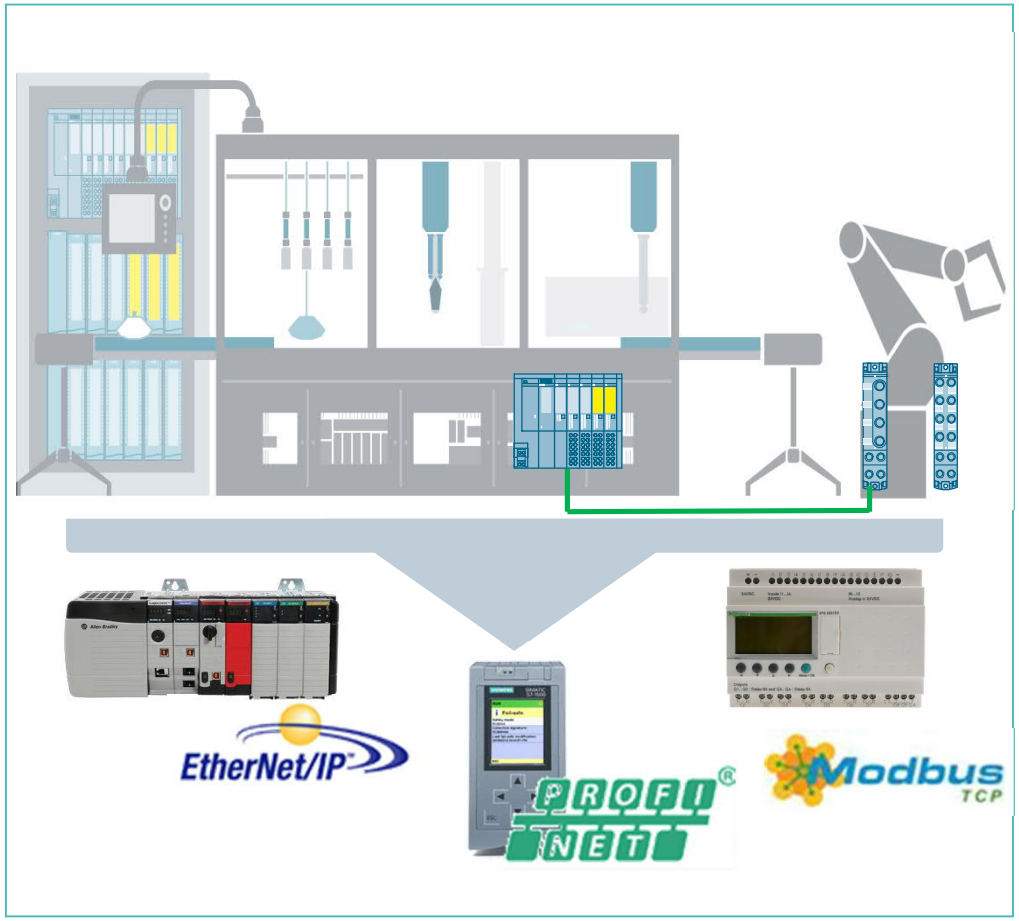

Features

- MF devices support multiple Ethernet-based protocols with high distribution rate
- Different SIMATIC MF Devices
  - ET 200SP (IM155-6MF HF)
  - ET 200MP (IM155-5MF ST)
  - PN/MF Coupler
  - In further delivery stages also ET 200eco PN
- Standardized .eds-file Export

Benefits

- No exchange of the peripheral system required when changing the fieldbus
- Standardization, both for HW and for SW
- Local IO data coupling
- Consistently modular and scalable system
- Inventory costs and planning effort firmly defined

Possible applications

1. Machine building	Controller-independent connection of the periphery to the PLC
2. Tunnel application	ModbusTCP as communication standard
3. Energy management	Common use ModbusTCP → Price sensitive market

Portfolio

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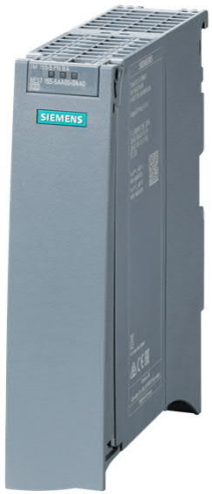
SIMATIC ET 200 MultiFieldbus Devices for



ET 200MP*

ET 200SP

PN/MF Coupler*
(release planned for August 2020)

ET 200eco PN*

*future portfolio

Overview
ET 200SP MultiFieldbus

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Feature / function	Benefit

• Three Ethernet based fielbus types supported
  • PROFINET
  • EtherNet/IP
  • Modbus TCP
	• Constant hardware setup while covering local preferences

• Simple and free of charge engineering tool **M**ulti**F**ieldbus **C**onfiguation **T**ool (MFCT)	• Fast configuration and parametrization “4 steps to the configured MF device” FAQ
• Shared-Device*	• Access from up to 6 controllers (max. 2 per protocol)
• Redundant storage of configuration data*	• Exchange without need of reconfiguration
• Local IO-Data coupling*	• Simple controller - controller communication via different protocols

* planned for next firmware update

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Target industries / applications

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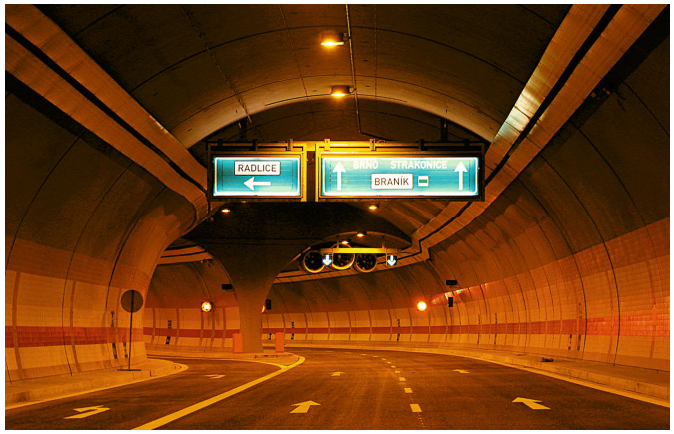

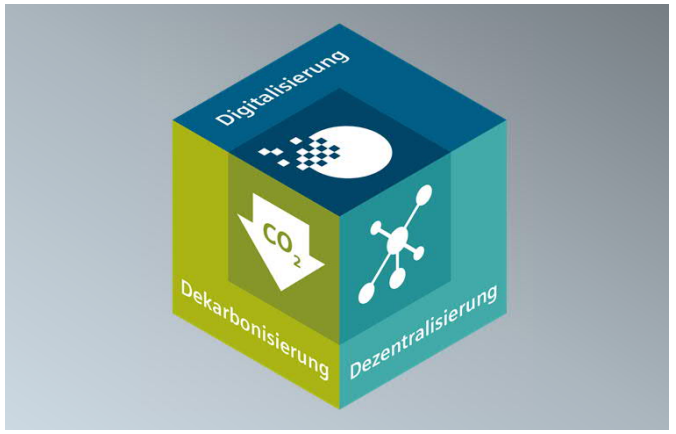

Machine Building

- End customer often specifies PLC vendor to OEM
- Standard for periphery is commonly unspecified
- MF enables PLC independent connection of ET 200 I/O to specified protocols

Tunnel Applications

- Connect ET200 periphery to applications, wherever Modbus TCP is communication standard
- Connect ET 200 periphery with specified protocol for tunnel application

Energy Management

- Use ET 200SP I/O (e.g. Energy Meter) in the energy measurement market with ModbusTCP
- Use advantages of energy management tools in combination with ET 200SP

Solutions for Machine Building
EtherNet/IP via IM155-6MF HF

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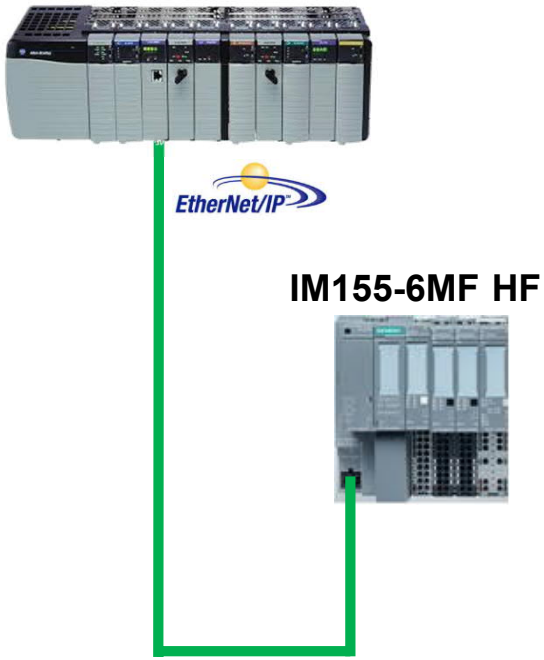
ET 200SP (IM155-6MF HF)

- Periphery stays unchanged, independently of the fieldbus protocol
- Customer requirements on controller can be met without exchange of periphery
- Minimizes engineering costs and time to market for application exchange to different countries or applications
- Local boundaries can easily be overcome
- Use of ET 200SP system advantages on foreign fieldbus protocols

SIMATIC periphery on 3rd party PLC



Solutions for mixed I/O operation of different controllers*

Shared devices between EtherNet/IP, Modbus TCP, PROFINET

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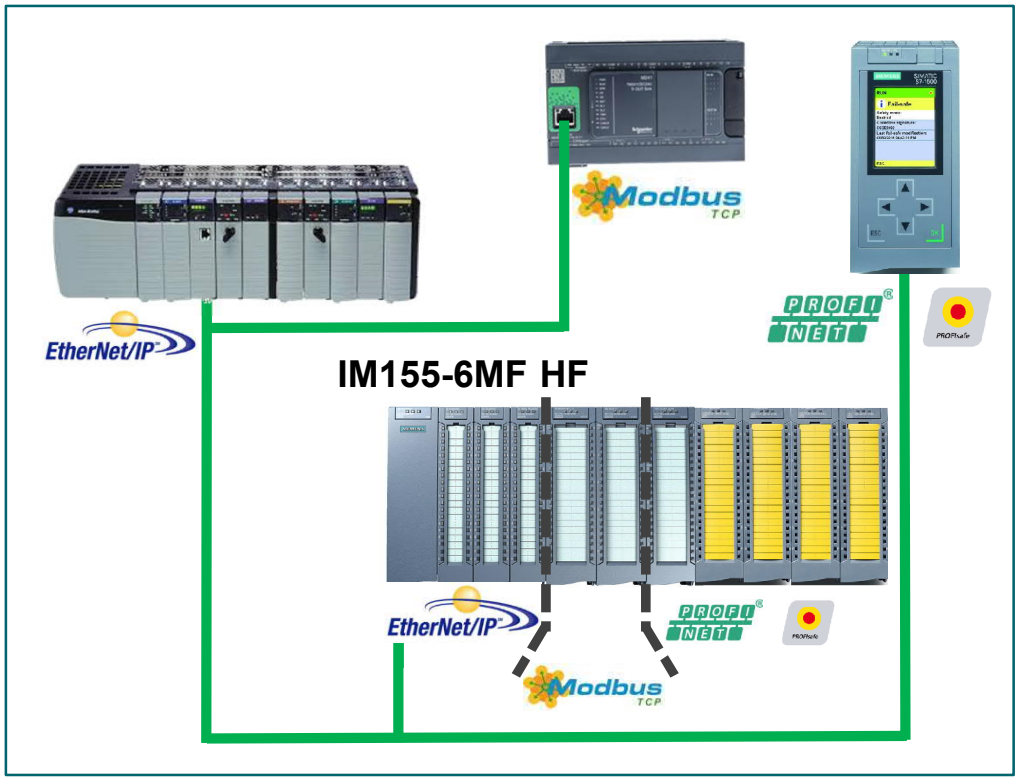
ET 200SP (IM155-6MF HF) shared devices*

- „Shared Device“ allows exclusive sharing of IO‘s within one ET 200 station to different protocols
- Regular IO‘s are assigned to the Rockwell or Schneider controllers (via EtherNet/IP or Modbus TCP)
- Safety and additional regular IO’s are assigned to Simatic controller (via PROFIsafe/PROFINET)
- One common cable for communication via EtherNet/IP and Modbus TCP and PROFINET
- Always up-to-date: New functionality can easily be added via firmware update.

One calbe shares I/O modules for diffent protocols*



*future portfolio

Solutions for integration of SIMATIC in 3rd party environment

Modbus TCP via PN/MF Coupler*

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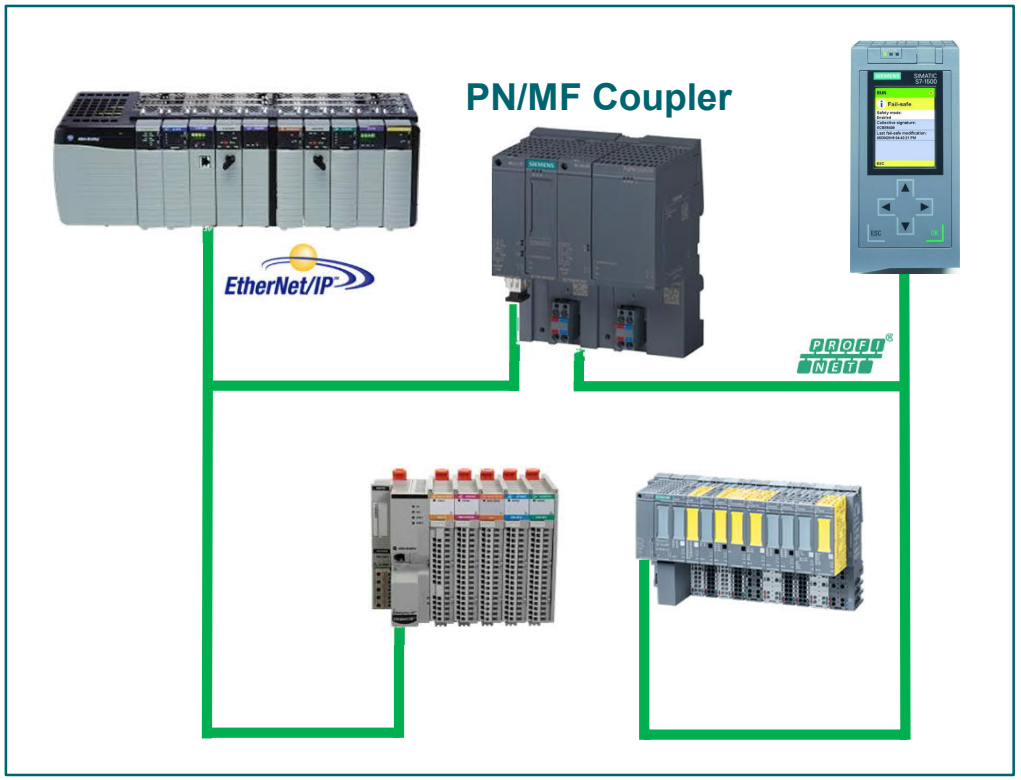
PN/MF Coupler*

- Simple engineering of data exchange between Simatic Controller and 3rd party controller via virtual I/O interface
- Separated network interfaces ensure data security
- SIMATIC PLC and periphery can be operated in parallel to 3rd Party infrastructure
- Brownfield applications can easily be expanded: Minimized engineering costs and time to market for application extension with SIMATIC
- Local boundaries can easily be overcome

Enhanced data security*



*future portfolio

Feature differences
PROFINET – EtherNet/IP – Modbus TCP

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Functionality only as PROFINET device	Functionality as EtherNet/IP device	Functionality as Modbus TCP device
I / O communication with PROFINET controller	I / O communication with EtherNet/IP scanner	I / O communication with Modbus client
Configuration via TIA Portal or GSDML file	Configuration via MFCT	Configuration via MFCT
Support of all ET 200SP modules and functions, except isochronous mode	Limited support of ET 200SP modules and functions (see manual)	Limited support of ET 200SP modules and functions (see manual)
Comprehensive support of diagnostic messages and alarm handling	Read diagnostics (alarms are not supported) Diagnostic bit in the data status of the cyclic I / O data per submodule	Device status register Diagnostic bit in the data status of the cyclic I / O data per submodule (alarms are not supported)
Shared device, MSI/MSO	Shared Device, MSI/MSO (planned for next firmware update)	Shared Device, MSI/MSO (planned for next firmware update)
Media redundancy (MRP) and System redundancy (S2)	DLR (planned for next firmware update)	Free user registers (e.g. for coordinating redundancy)
Supported Ethernet services: PING, ARP, SNMP, LLDP	Supported Ethernet services: PING, ARP, SNMP, LLDP	Supported Ethernet services: PING, ARP, SNMP, LLDP
	Normative CIP objects	
Configuration control	Yes (planned for next firmware update)	-
Minimum update time 250 µs	2 ms	2 ms
Multi hot swap	yes	yes
Module to Module Communication	no	no

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Customer benefit
Constant hardware setup while covering local preferences

- With the three ethernet based fieldbus types:
  - PROFINET
  - EtherNet/IP
  - Modbus TCP
- Local market preferences and market requirements can be covered and customer only needs to engineer one peripheral system
  - ⇨ no change of cabinet design
  - ⇨ no change of wiring and test methods
  - ⇨ only one documentation
  - ⇨ no additional knowledge and spare parts
  - ⇨ simplified service
  - ⇨ simplified function extension (only once)

Customer benefit
Fast and easy commissioning

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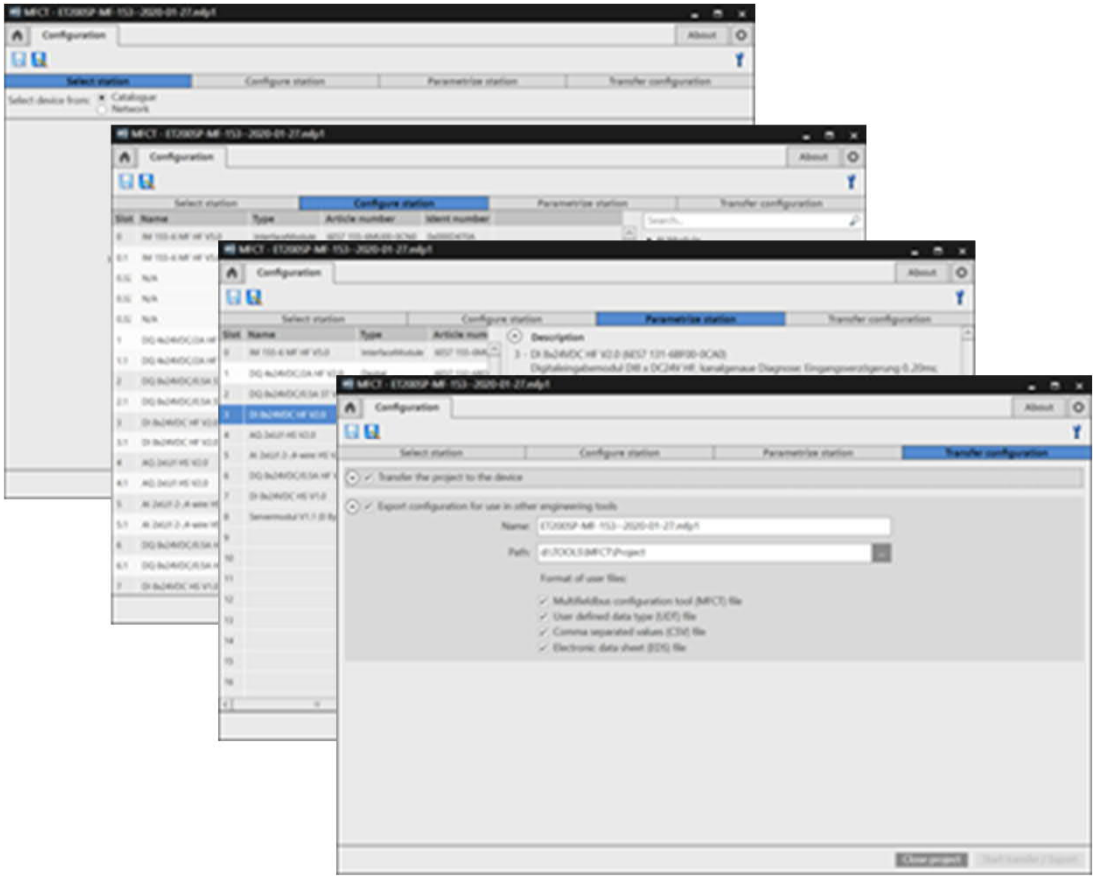

Just 4 steps to the configured MF device with free of charge engineering tool MFCT:

1. Select station
2. Configure station
3. Parametrize station
4. Transfer project to station

- Configuration and parameterization is based on GSDML file
- GSDML file can be updated
- EDS and UDT file for implementation in EtherNet/IP will be provided by MFCT

Customer benefit
Diagnostics in Modbus TCP and EtherNet/IP

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Modbus TCP

1. LED´s of the device
   - Further information in the manual

2. Device status register:
   - general diagnostic information e.g. configured, error or maintenance

3. Diagnostic byte in the data status of the cyclic I/O data per submodule (alarms are not supported)
   - IDS/ODS with diagnostic information e.g. IO data valid, error or diagnostic information available

EtherNet/IP

1. LED´s of the device
   Further information in the manual

2. Read diagnostics (alarms are not supported)
   Read diagnostic data via “Message function” in EtherNet/IP enviroment

3. Diagnostic bit in the data status of the cyclic I/O data per submodule (alarms are not supported)
   - IDS/ODS with diagnostic information e.g. IO data valid, error or diagnostic information available

Further information to this topic in the manual at SIOS entry ID: 109773210
FAQ to Diagnostics at Modbus TCP or EtherNet/IP at SIOS entry ID: XXXXX

Comparison
Diagnostics in PROFINET IO, EtherNet/IP and Modbus TCP

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Diagnostics	PROFINET	EtherNet/IP	Modbus TCP
Diagnotic alarms	supported	not supported	not supported
I&M Data	supported	supported using CIP Object	limited support (IDS/ODS) via Device-Info Area
Module diagnotics	supported	limited support (IDS/ODS)	limited support (IDS/ODS)
Channel Diagnostics (e.g. wire break, short circiut, cross circuit)	supported (channel granular)	supported - Channel Granular (using CIP Object)	limited support - Module granular (IDS/ODS)
Invalid configuration	supported	supported using CIP Object and from MFCT Download Result	Limited support (via Device-Info Area & MFCT Download Result)
Failure supply voltage	supported	Supported using CIP Objects	limited support (common Maintenance diagnostics from Device-Info Area)
STOP Controller	supported via RDREC	supported using CIP Object	limited support (IDS/ODS)

All shown diagnostics are availables as LED flashing at the device.

Customer benefit
Access from up to 6 controllers

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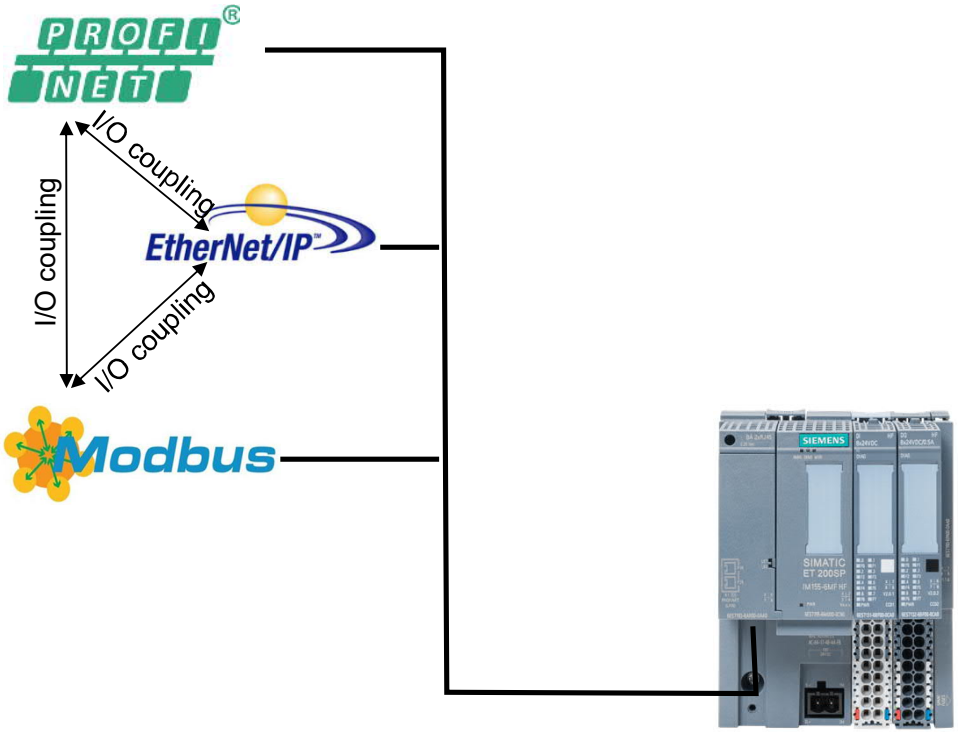

- Shared device* will allow access to the IO-Modules of an MF interface module from up to 6 controller:
  - Two EtherNet/IP Scanner
  - Two Modbus TCP Clients
  - Two PROFINET Controllers
- Access will be possible submodule granular
- I/O data can be shared between all controllers via local data coupling

* planned for next firmware update

Customer benefit
Safety solutions

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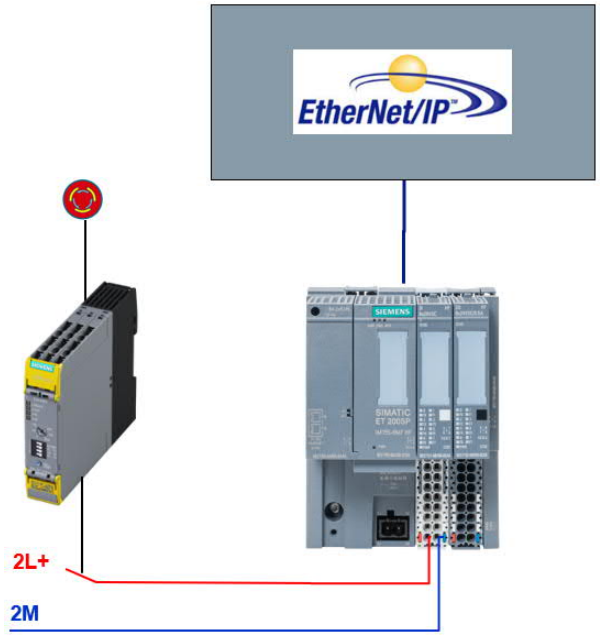
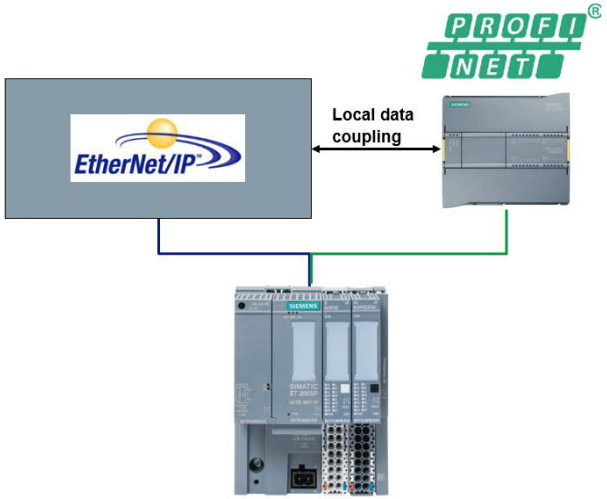
Local safety

- solution up to SIL2/ PLd with external safety relay
- A FAQ to for fail-safe load group shoutdown can be found here: SIOS ID: 39198632



PROFIsafe modules*

- non safe modules were controlled via EtherNet/IP or Modbus TCP controller
- PROFIsafe modules were controlled by SIMATIC F-controller
- Local data coupling* allows direct data exchange between controllers of different fieldbusses



* Solution requires shared device and local data coupling
=> planned for next firmware update

Customer benefit
Exchange without PG*

- Configuration stored redundantly within interface and server module
- In case of maintenance, interface module can be exchanged without additional usage of engineering tool

⇨ New Interface module will be automatically updated with configuration data

* planned for next firmware update

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MFCT
Overview

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System requirements

- The MFCT runs on Windows 10
- Start-up is possible without installation
- Administrator rights are not required

Installation requirements for MFCT

You also need to install the following software for MFCT:

- Microsoft .NET Framework 4.6.1 (Offline Installer) (https://www.microsoft.com/en-US/download/confirmation.aspx?id=49982)
- WinPcap from directory "Misc„
- Microsoft C++ Redistributable:
  - For x86 systems (https://aka.ms/vs/15/release/vc_redist.x86.exe)
  - For x64 systems (https://aka.ms/vs/15/release/vc_redist.x64.exe)

Note: For commissioning with MFCT, the MF device must be connected via an Ethernet connection with 100Mbps full duplex.

MFCT
Overview

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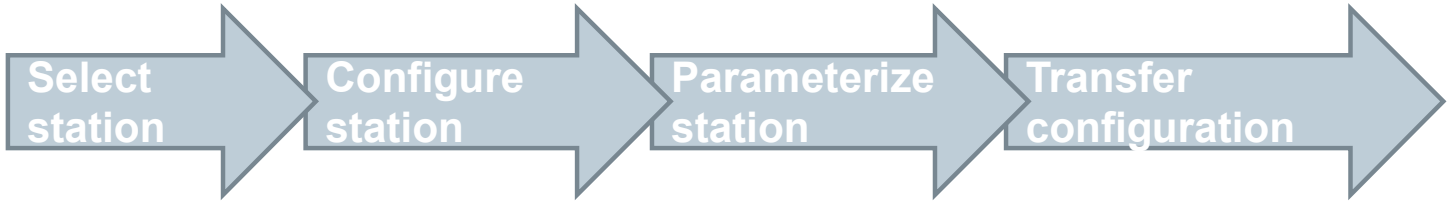
Tasks of MFCT

- Engineering for EtherNetIP and ModbusTCP
- Create project files to embed into 3rd party engineering systems and for upload into the MF-devices Unterstützende Diagnosen
- Supporting diagnosis
- Keeping of project data

Info to MFCT

- MFCT is free of charge
- MFCT has not to be installed (no admin rights necessary!)

Project planning process



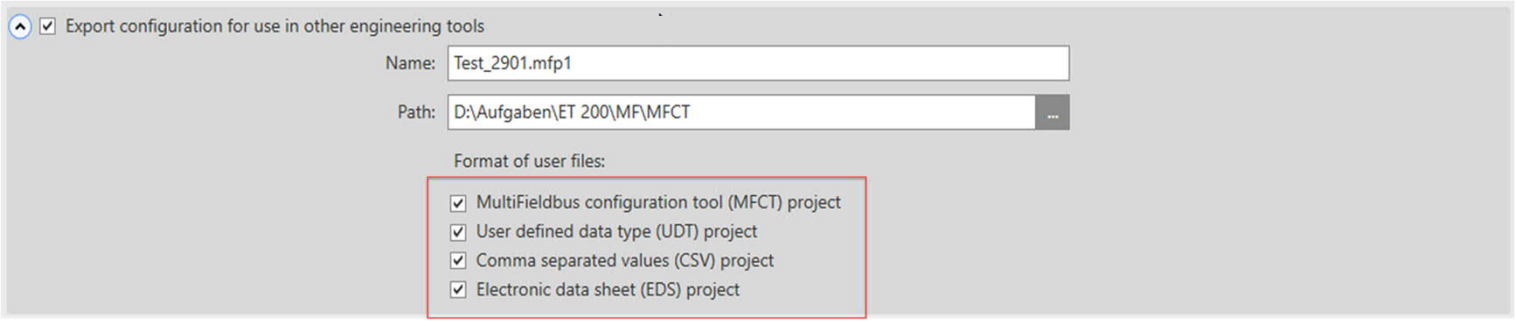
Selection
- Create new
- Open existing file
- Load / import (online)
- Read configuration

Edit
- Configuration
- Parameterization

Store
- Projekt file (per station)
- EDS (generic)
- UDT
- CSV

Download MFCT: https://support.industry.siemens.com/cs/ww/en/view/109773881
Introduction: MFCT: https://support.industry.siemens.com/cs/ww/en/view/109778898

MFCT
Export files



EtherNet/IP

- **U**ser definded **d**ata **t**ype (UDT)
- Generic **E**lectronic **d**ata **s**heet (EDS)

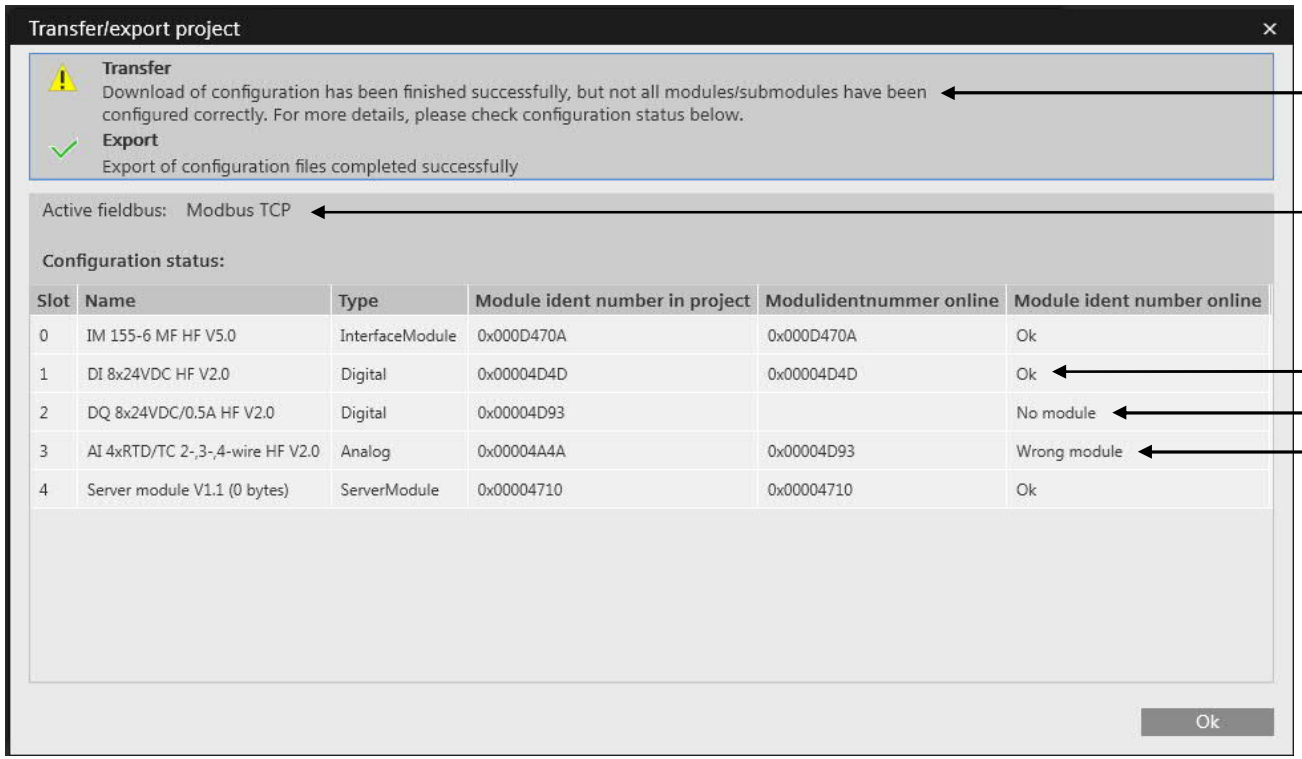
Modbus TCP

- **C**omma **s**eperated **v**alues (CSV)

Protocol independent

- MFCT project file

MFCT
Diagnostics in MFCT



Information if download was successful and if configuration was correct

Feedback about currently active fieldbus type

Information about Module state:

- OK
- No module
- Wrong module

MFCT
Export files: EtherNet/IP - EDS

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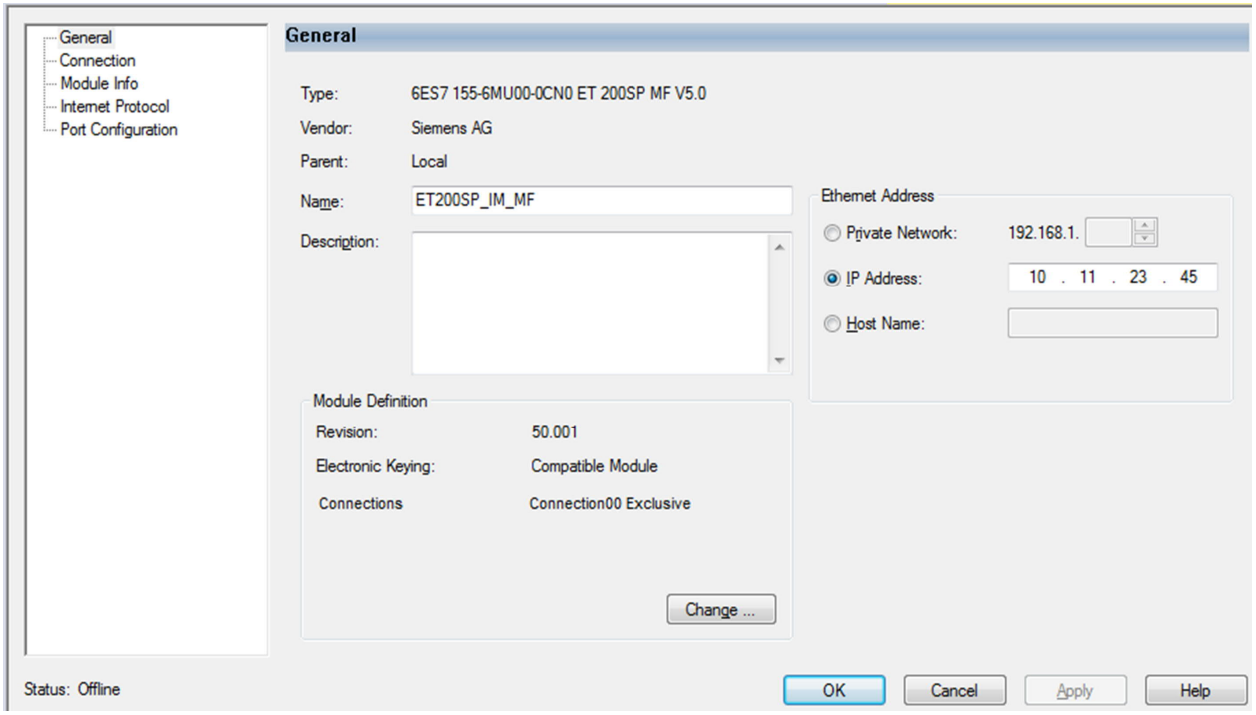
Electronic data sheet (EDS)



Description of EDS file

- EDS is necessary for integration of the MF device in an EtherNet/IP controller engineering tool, e.g. Studio 5000®
- EDS allows to set the device IP address, device name and some rudimentary parameters.
- EDS is a generic file
  => EDS does not depend on the configuration or parameterization of the station.

MFCT
Export files: EtherNet/IP - UDT

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User definded data type (UDT)

Name: UDT_EtherNetIP_config_Input — Data Type Size: 16 byt

Description: IM 155-6 MF HF V5.0 / 6ES7 155-6MU00-0CN0

Members:

Name	Data Type	Description
Slot0_1_IDS	SINT	IM 155-6 MF HF V5.0 / Input Data State
Slot1_1_I_channel_0_0	SINT	DI 8x24VDC HF V2.0
Slot1_1_IDS	SINT	DI 8x24VDC HF V2.0 / Input Data State
Slot3_1_I_channel_0_0	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_0_1	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_1_0	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_1_1	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_2_0	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_2_1	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_3_0	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_I_channel_3_1	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
Slot3_1_IDS	SINT	AI 4xRTD/TC 2-,3-,4-wire HF V2.0 / Input Data State
Slot4_1_IDS	SINT	Server module V1.1 (0 bytes) / Input Data State
Slot2_1_ODS	SINT	DQ 8x24VDC/0.5A HF V2.0 / Output Data State

Description

- The UDT contains data areas, matched to the configuration of the MF device. These can be used for simplified mapping of the input and output data area.
- The UDT depends on the configuration of the station and is not generic.

MFCT
Export files: Modbus TCP

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Comma separated values file (CSV)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Connection	Direction	RegAddr	Lo/Hi	ByteAddr	Slot	Subslot	DataItem	Submodule			
2	Connection0	INPUT	0	MSB	0	0	1	IDS	IM 155-6 MF HF V5.0 / Input Data State			
3	Connection0	INPUT	0	LSB	1	0	1	0x00	Padding			
4	Connection0	INPUT	1	MSB	2	1	1	Inputs	DI 8x24VDC HF V2.0			
5	Connection0	INPUT	1	LSB	3	1	1	0x00	Padding			
6	Connection0	INPUT	2	MSB	4	1	1	IDS	DI 8x24VDC HF V2.0 / Input Data State			
7	Connection0	INPUT	2	LSB	5	1	1	0x00	Padding			
8	Connection0	INPUT	3	MSB	6	3	1	I-channel_0	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
9	Connection0	INPUT	3	LSB	7	3	1	I-channel_0	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
10	Connection0	INPUT	4	MSB	8	3	1	I-channel_1	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
11	Connection0	INPUT	4	LSB	9	3	1	I-channel_1	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
12	Connection0	INPUT	5	MSB	10	3	1	I-channel_2	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
13	Connection0	INPUT	5	LSB	11	3	1	I-channel_2	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
14	Connection0	INPUT	6	MSB	12	3	1	I-channel_3	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
15	Connection0	INPUT	6	LSB	13	3	1	I-channel_3	AI 4xRTD/TC 2-,3-,4-wire HF V2.0			
16	Connection0	INPUT	7	MSB	14	3	1	IDS	AI 4xRTD/TC 2-,3-,4-wire HF V2.0 / Input Data State			
17	Connection0	INPUT	7	LSB	15	3	1	0x00	Padding			
18	Connection0	INPUT	8	MSB	16	4	1	IDS	Server module V1.1 (0 bytes) / Input Data State			
19	Connection0	INPUT	8	LSB	17	4	1	0x00	Padding			
20	Connection0	INPUT	9	MSB	18	2	1	ODS	DQ 8x24VDC/0.5A HF V2.0 / Output Data State			
21	Connection0	INPUT	9	LSB	19	2	1	0x00	Padding			
22	Connection0	OUTPUT	720	MSB	0	2	1	Outputs	DQ 8x24VDC/0.5A HF V2.0			
23	Connection0	OUTPUT	720	LSB	1	2	1	-	Padding			
24												

Description

Column C:
Register address: address of the Modbus TCP register the cyclic information of an channel are given.

Column D:
Information how the registers are mapped. Most significant byte/Least significant byte.
16#0011 → LSB
16#1100 → MSB

Column E:
Additional information about used data length

Column H:
Description on the data item. E.g. channel number, input, output, IDS or ODS.

Column I:
Description of information behind register adress.

MFCT
Export files: Modbus TCP – Address Alignment - Byte

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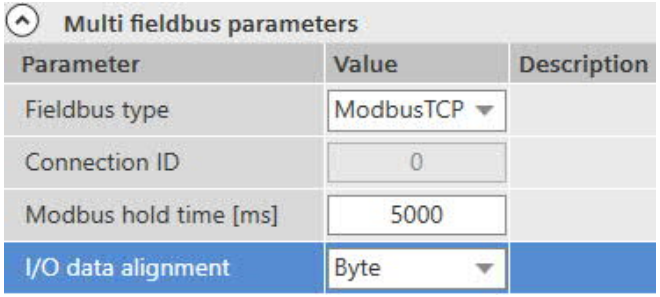
- Set I/O data alignment to: Byte



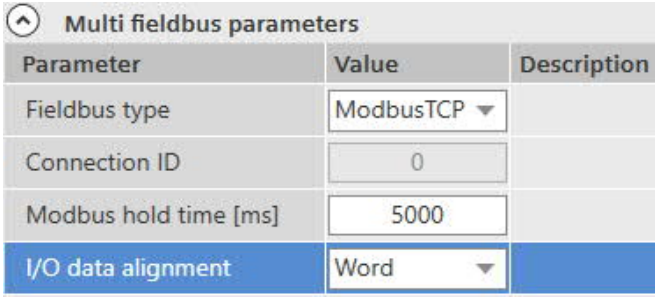
- Exported CSV file without fill-bytes
- Mixed Register Addresses possible

Direction	RegAddr	Lo/Hi	ByteAddr	Slot	Subslot	DataItem	Submodule
INPUT	0	MSB	0	0	1	IDS	IM 155-6 MF HF V5.0 / Input Data State
INPUT	0	LSB	1	1	1	Inputs	DI 8x24VDC HF V2.0
INPUT	1	MSB	2	1	1	IDS	DI 8x24VDC HF V2.0 / Input Data State
INPUT	1	LSB	3	3	1	I_channel_0_0	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
INPUT	2	MSB	4	3	1	I_channel_0_1	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
INPUT	2	LSB	5	3	1	I_channel_1_0	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
INPUT	3	MSB	6	3	1	I_channel_1_1	AI 4xRTD/TC 2-,3-,4-wire HF V2.0

MFCT
Export files: Modbus TCP – Address alignment - Word

SIEMENS
Ingenuity for life

- Set I/O data alignmet to: Word



- Exported CSV file with fill-bytes; usual Modbus TCP data structure
- No mixed register addresses, each information gathered in word structure

Direction	RegAddr	Lo/Hi	ByteAddr	Slot	Subslot	DataItem	Submodule
INPUT	0	MSB	0	0	1	IDS	IM 155-6 MF HF V5.0 / Input Data State
INPUT	0	LSB	1	0	1	0x00	Padding
INPUT	1	MSB	2	1	1	Inputs	DI 8x24VDC HF V2.0
INPUT	1	LSB	3	1	1	0x00	Padding
INPUT	2	MSB	4	1	1	IDS	DI 8x24VDC HF V2.0 / Input Data State
INPUT	2	LSB	5	1	1	0x00	Padding
INPUT	3	MSB	6	3	1	I_channel_0_0	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
INPUT	3	LSB	7	3	1	I_channel_0_1	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
INPUT	4	MSB	8	3	1	I_channel_1_0	AI 4xRTD/TC 2-,3-,4-wire HF V2.0
INPUT	4	LSB	9	3	1	I_channel_1_1	AI 4xRTD/TC 2-,3-,4-wire HF V2.0

Agenda

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5 **How to integrate**

6 Summary

How to integrate
Quick guide: integration in EtherNet/IP

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IO data exchange via EtherNet/IP

Required engineering steps

1. ET 200 configuration via MFCT

   (MultipleFieldbus Configuration Tool)

2. Implementation in controller-dependent engineering tool

LiveDemo
Configuration with MFCT + Integration in 3rd Party Engineering

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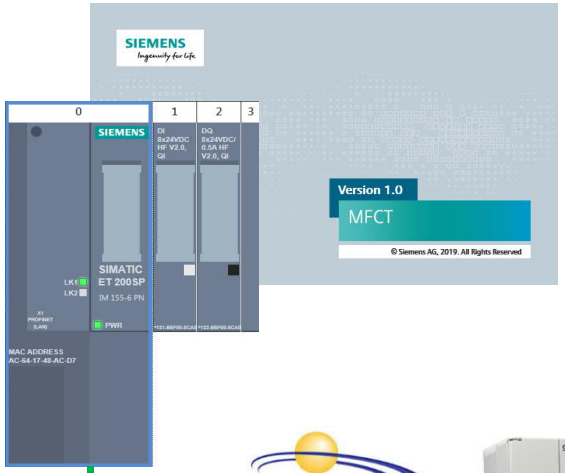
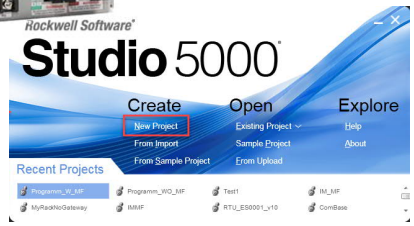
L I V E D E M O





- Configuration of SIMATIC ET 200SP IM 155-6 via MFCT
  1. Select I/O station
  2. Configure I/O station
  3. Parameterize I/O station
  4. Download config to MF-Device

- Integration of ET 200 I/Os in controller-dependent engineering tool
  → Integration with Studio 5000 - Rockwell

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Top highlights at a glance

Easily connect ET 200SP peripherals to 3rd party PLCs

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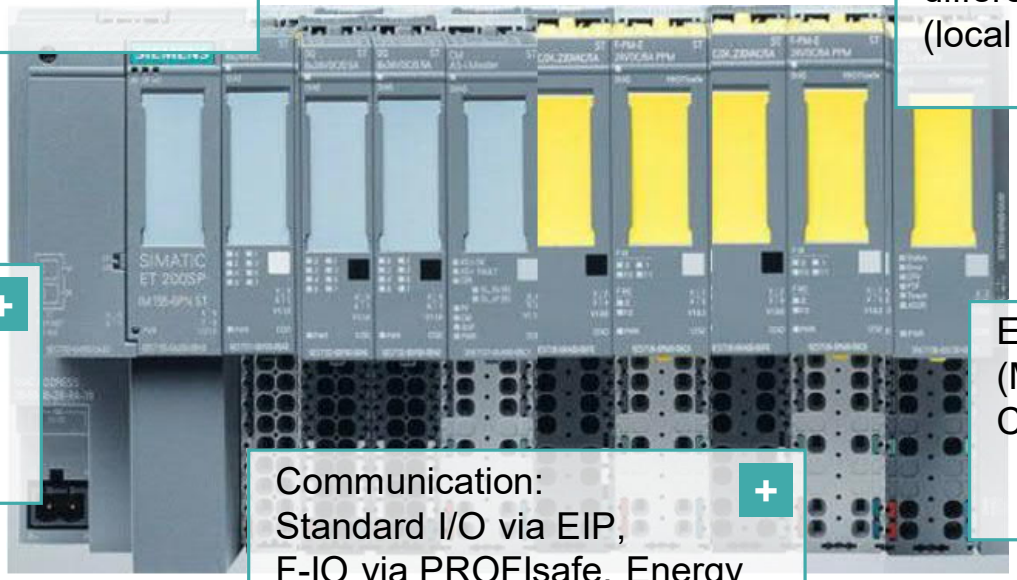
Support for PROFINET, EtherNet/IP and Modbus TCP +

Simple data exchange between controllers via different fieldbus protocols (local data coupling)* +



Access to modules of a station can be assigned to different PLCs (Shared Device)* +

Engineering via MFCT (MultiFieldbus Configuration Tool) +

Communication: Standard I/O via EIP, F-IO via PROFIsafe, Energy Metering via MTCP* +

*future portfolio

Product data overview
Great portfolio offers perfect integration into new application

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Product data overview

	Order Number	Designation	Availability
ET 200SP (IM155-6MF HF)	6ES7155-6MU00-0CN0	IM155-6PN HF	Since 12/2019
ET 200MP (IP155-5MF ST)*		IP155-5MF ST	
PN/MF Coupler*	6ES7 158-3MU10-0XA0	PN/MF Coupler	Release planned for 08/2020
ET 200 eco PN* (will follow later)		ET 200 eco PN	
MutliFieldbus Configuration Tool (Tool free of charge)	Download	MultiFieldbus Configuration Tool (MFCT)	Since 12/2019

*future portfolio


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Projektnavigation
Geräte
Projekt2
Neues Gerät hinzufügen
Geräte & Netze
PLC_1 [CPU 1512SP-1 PN]
Gemeinsame Daten
Dokumentationseinstellun...
Sprachen & Ressourcen
Projektsprachen
Projekttexte
Online-Zugänge
Card Reader/USB-Speicher
Detailansicht
Name
ET-Con Rack_1
SIMATIC
ET 200SP
IM155-6PN HF
Thank You!
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