

EN- ProfiSafe on Profinet IndraDrive (TIA 16, 15xx CPU)

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Version:	V1.2.1

AGENDA

1. ProfiSafe on Profinet
2. Example project and data types

General important hint Profinet with IndraDrive:

→ The master communication engineering IP address must be **different** to the Profinet IP address (automaticly set by Siemens PLC)!

EN-S7Profinet IndraDrive

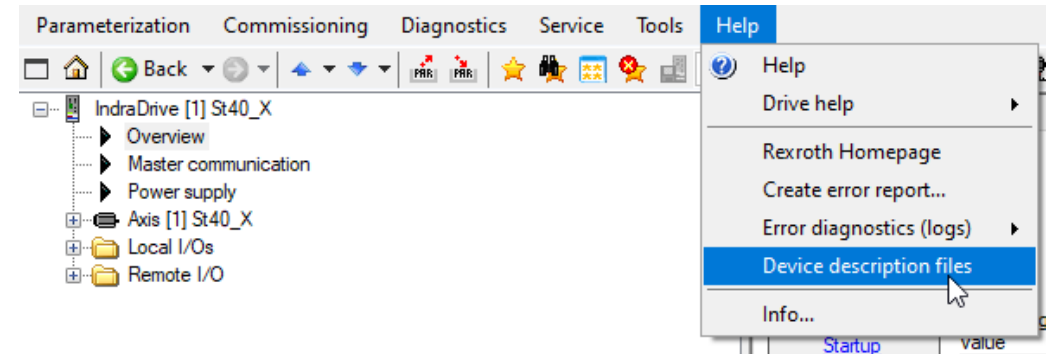
1. ProfiSafe on Profinet up Firmware MPx20:

- a) GSDML file
- b) ProfiSafe address, F-Modul configuration
- c) Checksumme F_iPar_CRC
- d) Reinitialize, Note Doc
- e) Control Safety of S7
- f) Predefined configuration , Assignment of safety control / status word
- g) Hint dual axis
- h) Hint CCD system mode tunneling of Safety telegram (up firmware MPx21V12) **New**

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1a. ProfiSafe GSDML file

- For PROFIsafe on PROFINET, the GSDML file "GSDML-V2.1-Bosch Rexroth AG-011F-Indradrive_02V02-20180110.xml" or more up-to-date must be used.
- Storage location in the IndraWorks installation directory:



- c:\ProgramFiles\Rexroth\IndraWorks_xxxx\DeviceDataSheets\IndraDrive

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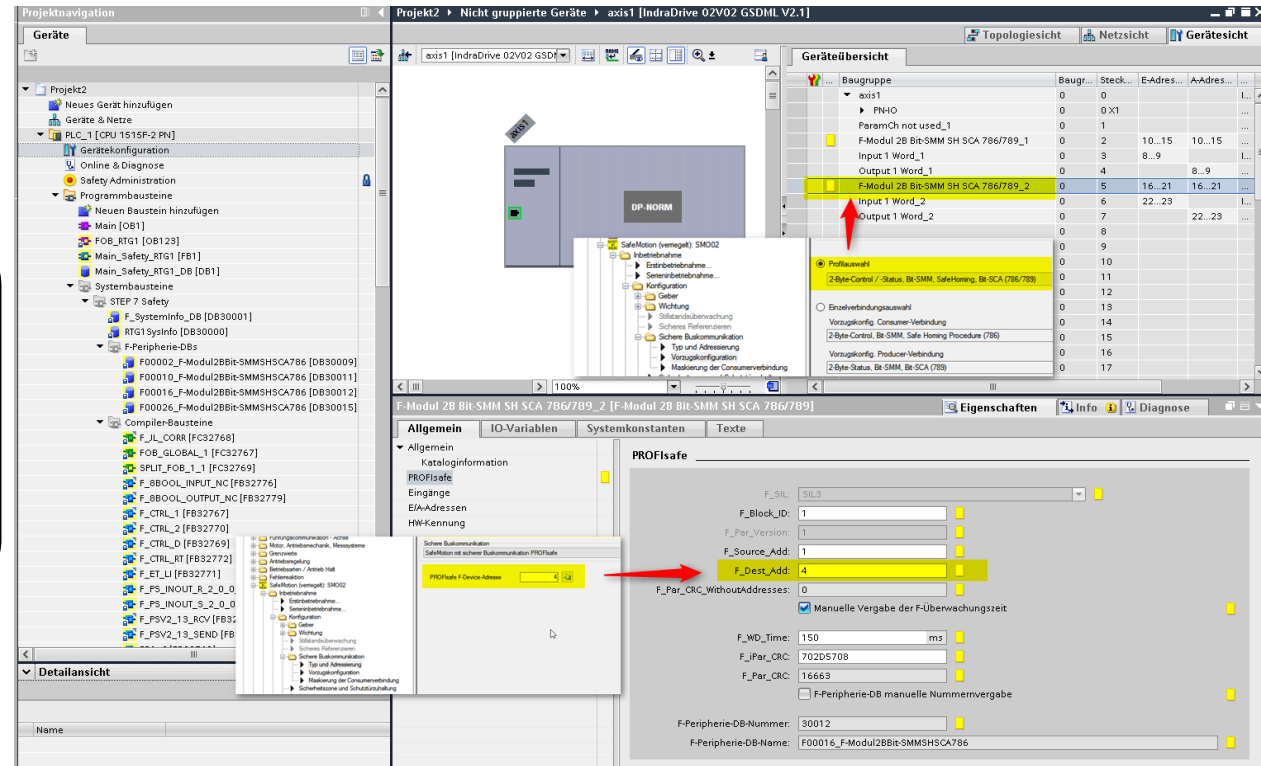
1b. ProfiSafe Address, F-Modul configuration

- PROFIsafe address in IndraWorks is F_Dest_Add in Siemens configuration
- SMO "Preferred configuration profile selection" IndraDrive must match the F-module configuration Siemens.

Note: As soon as F-module is active in S7 configuration, Safemotion must also be commissioned in IndraDrive, SCM (configuration mode) must be completed.

- Otherwise "F4012 wrong I / O length"!

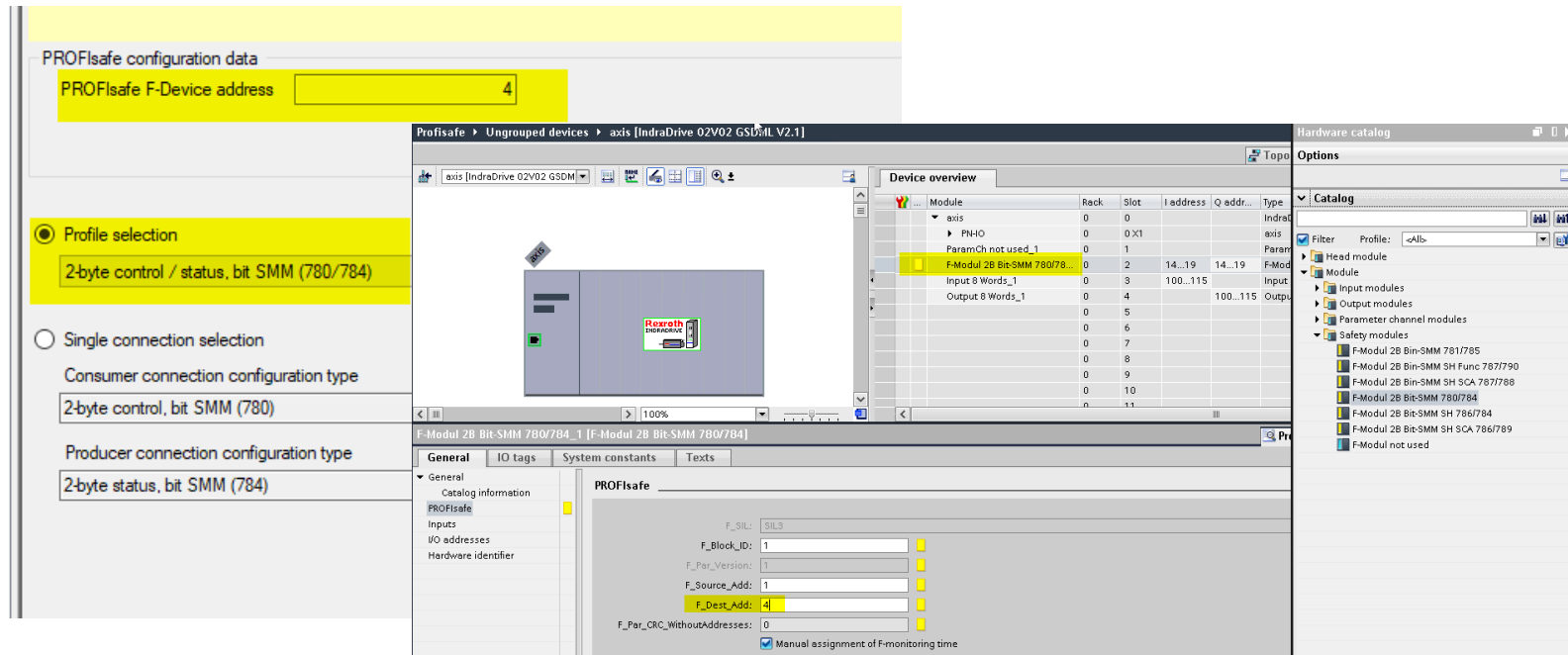
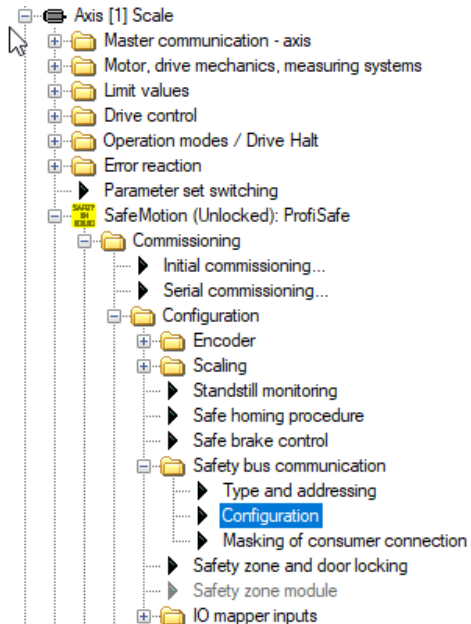
Note, screenshot double axis module IndraDrive!



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1b. ProfiSafe Address, F-Modul configuration

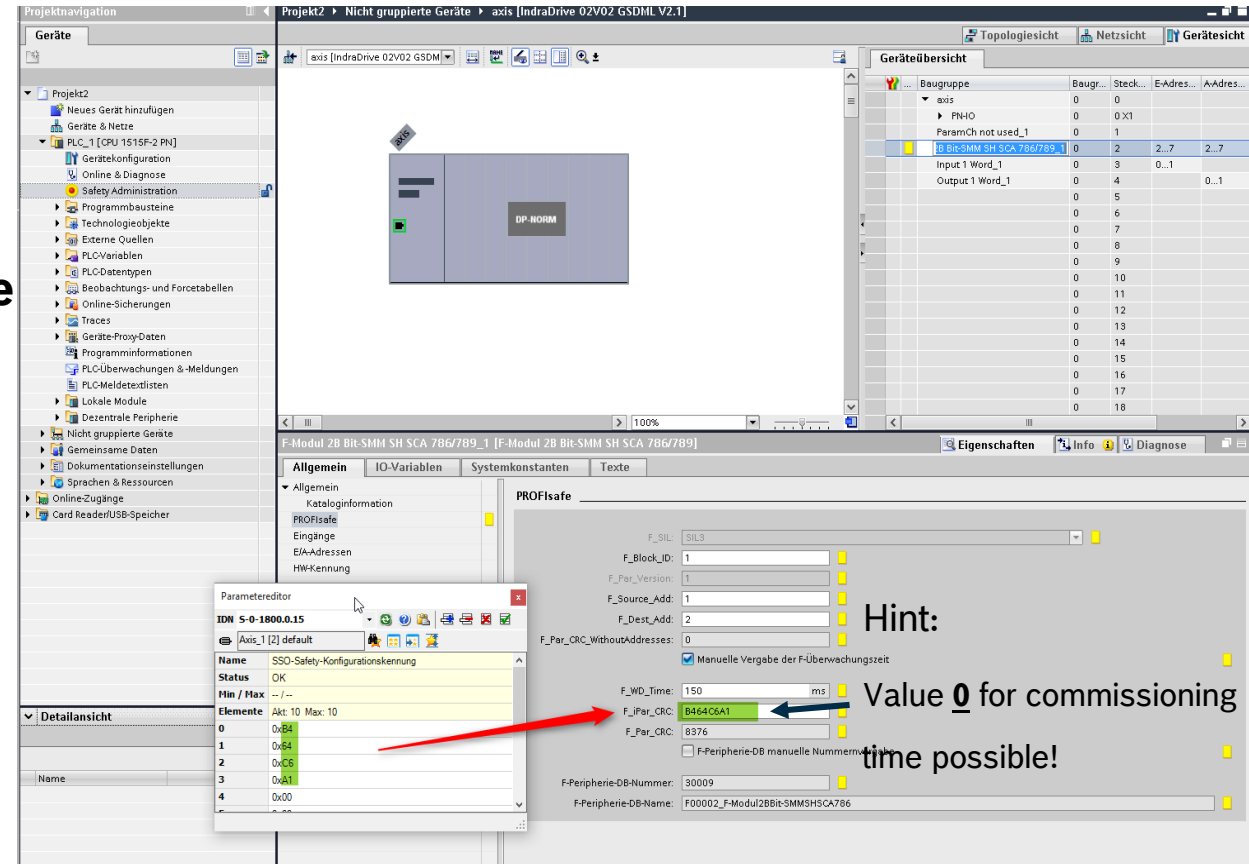
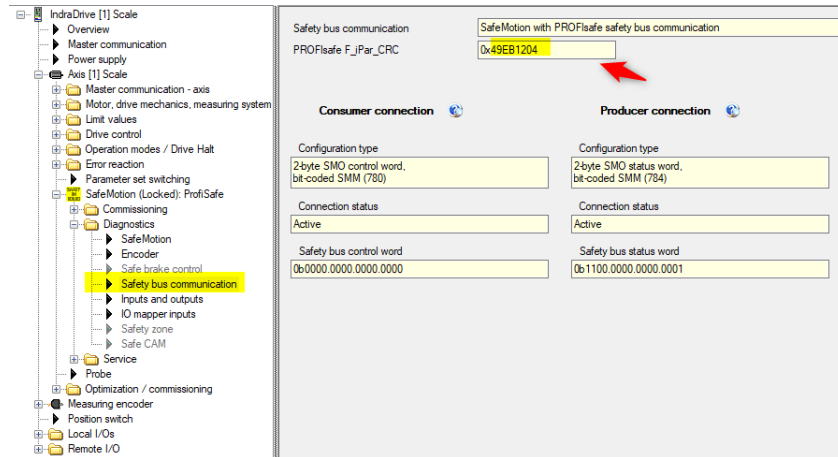
- PROFIsafe address in IndraWorks is F_Dest_Add in Siemens configuration
- SMO "Preferred configuration profile selection" IndraDrive must match the F-module configuration Siemens.



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1c. ProfiSafe F_iPar_CRC

- PROFIsafe Transfer F_iPar_CRC from parameter S-0-1800.0.15 is currently not displayed in the IndraWorks dialog.
- **Note: Checksum changes each time the SMO parameterization is changed**



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1d. ProfiSafe reinitialization

- Note: Siemens Documentation

ACK_REI

When the F-system detects a communication error or an F-I/O fault for an F-I/O, the relevant F-I/O is passivated. If channel faults are detected and channel granular passivation is configured, the relevant channels are passivated. If passivation of the entire F-I/O is configured, all channels of the relevant F-I/O are passivated.

Reintegration of the F-I/O/channels of the F-I/O after the fault has been eliminated requires a **user acknowledgment** with a positive edge at variable **ACK_REI** of the F-I/O DB:

- After every communication error
- After F-I/O or channel faults only with parameter assignment "Channel failure acknowledgement = manual" or ACK_NEC = 1

Reintegration after channel faults reintegrates all channels whose faults were eliminated.

Acknowledgment is not possible until tag ACK_REQ = 1.

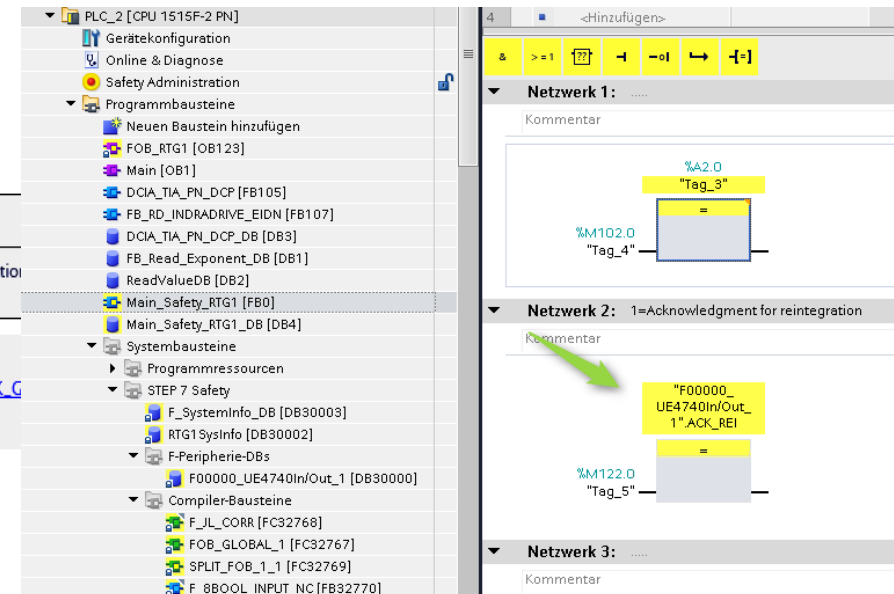
In your safety program, you must provide a user acknowledgment by means of the **ACK_REI** tag for each F-I/O.

⚠ WARNING

For the user acknowledgement, you must interconnect the **ACK_REI** tag of the F-I/O DB with a signal generated by an operator input. An interconnection automatically generated signal is not permitted. (S011)

Note

Alternatively, you can use the "ACK_GL" instruction to carry out reintegration of the F-I/O following communication errors or F-I/O/channel faults ([ACK_GL Global acknowledgment of all F-I/O in an F-runtime group \(STEP 7 Safety V14 SP1\)](#)).



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1d. ProfiSafe reinitialization

The screenshot displays the Siemens STEP 7 software interface, specifically the 'Project tree' and 'Device overview' windows, illustrating the configuration of a Rexroth IndraDrive for ProfiSafe reinitialization.

Project tree (Left): Shows the project structure for 'ProfiSafeOnProfinetST55_V02'. The 'System blocks' folder is expanded, showing the 'F-Module 2B Bit-SMM 780/784_1' (ID: F00014_F-Module2BBit-SMM780/784_1 [0830002]) selected.

Device overview (Top Right): Displays the hardware configuration table for the 'axis [IndraDrive 02V02 GSDML V2.1]'.

Module	Rack	Slot	I address	Q address	Type
axis	0	0			IndraDrive 02...
PN-I/O	0	0 X1			axis
ParamCh not used_1	0	1			ParamCh not ...
F-Module 2B Bit-SMM 780/784_1	0	2	14...19	14...19	F-Module 2B Bit...
Input 8 Words_1	0	3	100...115		Input 8 Words
Output 8 Words_1	0	4		100...115	Output 8 Words

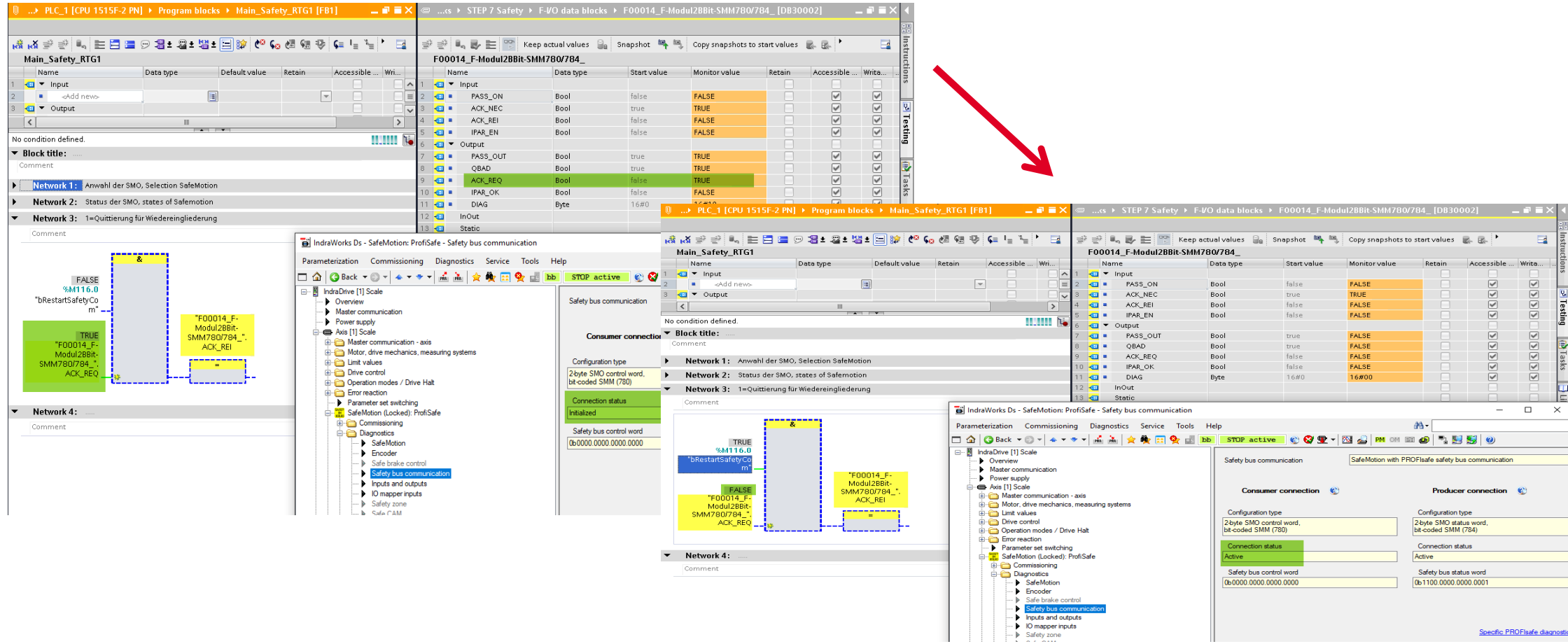
Hardware catalog (Right): Shows the 'Catalog' view with the 'F-Module 2B Bit-SMM 780/784' selected under 'Safety modules'.

Properties window (Bottom): Displays the 'PROFI-safe' configuration for the selected module. The 'General' tab is active, showing the following settings:

- F_SIL: SIL3
- F_Block_ID: 1
- F_Par_Version: 1
- F_Source_Add: 1
- F_Dest_Add: 4
- F_Par_CRC_WithoutAddresses: 0
- ☒ Manual assignment of F-monitoring time
- F_WD_Time: 150 ms
- F_iPar_CRC: 0
- F_Par_CRC: S1210
- ☐ F-I/O DB manual number assignment
- F-I/O DB-number: 30002
- F-I/O DB-name: F00014_F-Module2BBit-SMM780/784_1

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1d. ProfiSafe reinitialization



The screenshot shows the Siemens STEP 7 software interface for configuring a ProfiSafe reinitialization sequence. The main window displays the 'Main_Safety_RTG1' block with three networks. Network 1 is 'Anwahl der SMO, Selection SafeMotion', Network 2 is 'Status der SMO, states of Safemotom', and Network 3 is '1=Quittierung für Wiedereingliederung'. A red arrow points from the 'Main_Safety_RTG1' block to the 'F00014_F-Modul28Bit-SMM780/784' block. The 'F00014_F-Modul28Bit-SMM780/784' block is shown in a separate window, displaying its parameters and the 'Safety bus communication' section. The 'Safety bus communication' section shows the 'Consumer connection' and 'Producer connection' status, both set to 'Active'. The 'Safety bus control word' is set to '0b0000.0000.0000.0000'.

Name	Data type	Default value	Retain	Accessible ...	Write ...
1	Input				
2	PASS_ON	Bool	false	FALSE	
3	ACK_NEG	Bool	true	TRUE	
4	ACK_REI	Bool	false	FALSE	
5	IPAR_EN	Bool	false	FALSE	
6	Output				
7	PASS_OUT	Bool	true	TRUE	
8	QBAD	Bool	true	TRUE	
9	ACK_REQ	Bool	false	FALSE	
10	IPAR_OK	Bool	false	FALSE	
11	DIAG	Byte	16#0	16#0	
12	InOut				
13	Static				

Network 1: Anwahl der SMO, Selection SafeMotion

Network 2: Status der SMO, states of Safemotom

Network 3: 1=Quittierung für Wiedereingliederung

Network 4: ...

Parameterization

- IndraDrive [1] Scale
 - Master communication
 - Power supply
 - Axis [1] Scale
 - Master communication - axis
 - Limit values
 - Drive control
 - Operation modes / Drive Halt
 - Error reaction
 - Parameter set switching
 - SafeMotion (Locked): ProfiSafe
 - Commissioning
 - Diagnostics
 - SafeMotion
 - Encoder
 - Safe brake control
 - Safety bus communication
 - Inputs and outputs
 - IO mapper inputs
 - Safety zone
 - Safe CAM

Safety bus communication

Configuration type: 2-byte SMO control word, bit-coded SMM (780)

Connection status: Initialized

Safety bus control word: 0b0000.0000.0000.0000

Consumer connection

Configuration type: 2-byte SMO control word, bit-coded SMM (780)

Connection status: Active

Safety bus control word: 0b0000.0000.0000.0000

Producer connection

Configuration type: 2-byte SMO status word, bit-coded SMM (784)

Connection status: Active

Safety bus status word: 0b1100.0000.0000.0001

Specific PROFIsafe diagnostic

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1d. Control Safety of S7

Hint:
The user data of the ProfiSafe are the first 2 bytes of the process data.

...S5_V02 ▶ PLC_1 [CPU 1515F-2 PN] ▶ Program blocks ▶ Main_Safety_RTG1 [FB1]

Main_Safety_RTG1

Name	Data type	Default value	Retain	Accessible ...	Writa...	Visib...
%A14.0	"ModeSelectionSignal"					
%M114.0	"bModeSelection"					
%A14.1	"EmergencyStopSignal"					
%M114.1	"bEmergencyStopMode"					

Network 2: Status der SMO, states of Safemotom

Comment

%M115.0

"bSMESState"

%E14.0

"SMESStatus"

%M115.1

"bSMSTActive"

%E14.1

"SMSTState"

Device overview

Module	Rack	Slot	I address	Q addr...	Type
axis					IndraDrive 02V02 ...
▶ PN-IO	0	0 X1			axis
ParamCh not used_1					ParamCh not used
F-Modul 2B Bit-SMM 780/78...	0	2	14...19	14...19	F-Modul 2B Bit-SM...
Input 8 Words_1	0	3	100...115		Input 8 Words
Output 8 Words_1	0	4		100...115	Output 8 Words
	0	5			
	0	6			
	0	7			
	0	8			
	0	9			
	0	10			
	0	11			
	0	12			
	0	13			
	0	14			
	0	15			
	0	16			
	0	17			
	0	18			
	0	19			
	0	20			
	0	21			
	0	22			
	0	23			
	0	24			
	0	25			
	0	26			
	0	27			
	0	28			
	0	29			
	0	30			
	0	31			

Safety used IO's only
the first word!

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1d. Control Safety of S7

The image displays three screenshots of the IndraWorks software interface, specifically the 'Main_Safety_RTG1' block configuration for an IndraDrive. The interface is divided into several sections:

- Parameterization:** Shows the configuration of the IndraDrive, including the 'Safety bus communication' section. The 'Consumer connection' is set to 'Active', and the 'Safety bus control word' is set to '0b0000.0000.0000.0000'.
- Commissioning:** Shows the 'Safety bus communication' section with the 'Consumer connection' set to 'Active' and the 'Safety bus control word' set to '0b0000.0000.0000.0000'.
- Diagnostics:** Shows the 'Safety bus communication' section with the 'Consumer connection' set to 'Active' and the 'Safety bus control word' set to '0b0000.0000.0000.0000'.

The 'Main_Safety_RTG1' block is configured with the following parameters:

- ModeSelectionSignal:** %A14.0
- EmergencyStopSignal:** %A14.1
- bEmergencyStop Mode:** %M114.1
- bSMESState:** %M115.0
- bSMSTActive:** %M115.1
- SMSTState:** %M114.1

The 'Network 2: Status der SMO, states of Safemotion' section shows the 'Inputsignal, Drive Safemotion state' with the following parameters:

- bSMESState:** %M115.0
- bSMSTActive:** %M115.1
- SMSTState:** %M114.1

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2d. Control Safety of S7

- The first 2 bits are the same in all preference configurations.
- SMES and SMST are zero active bits. ("Wire unbreakable").

Hint:
Byteorder Safety matches, no high / low byte necessary!

IndraWorks Ds - SafeMotion: ProfiSafe - Safety bus communication

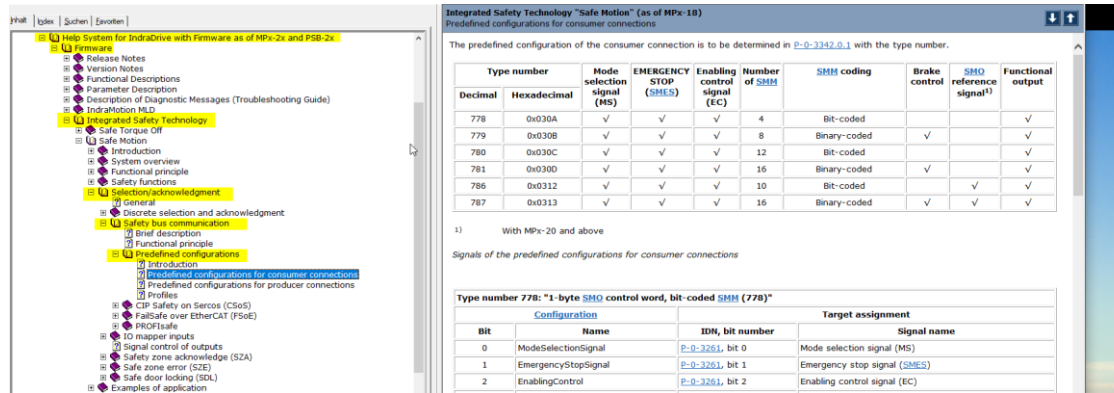
Consumer connection	Producer connection
Configuration type 2-byte SMO control word, bit-coded SMM (780)	Configuration type 2-byte SMO status word, bit-coded SMM (784)
Connection status Active	Connection status Active
Safety bus control word 0b0000.0000.0000.0011	Safety bus status word 0b0100.0000.0000.0000

Specific PROFIsafe diagnostics

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1e. ProfiSafe preferred configuration

- Note on IndraWorks help



The predefined configuration of the consumer connection is to be determined in [P-0-3242.0.1](#) with the type number.

Type number	Mode selection signal (MS)	EMERGENCY STOP (SHE.S)	Enabling control signal (EC)	Number of SMM	SMM coding	Brake control	SMM reference signal ¹⁾	Functional output
778	0x030A	✓	✓	4	Bit-coded			✓
779	0x030B	✓	✓	8	Binary-coded	✓		✓
780	0x030C	✓	✓	12	Bit-coded			✓
781	0x030D	✓	✓	16	Binary-coded	✓		✓
786	0x0312	✓	✓	10	Bit-coded		✓	✓
787	0x0313	✓	✓	16	Binary-coded	✓	✓	✓

1) With MPx-20 and above

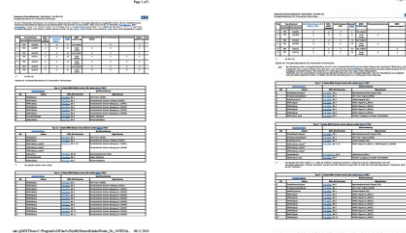
Signals of the predefined configurations for consumer connections

Type number 778: "1-byte SMM control word, bit-coded SMM (778)"^{a)}

Bit	Configuration	Name	IDN, bit number	Target assignment	Signal name
0	ModeSelectionSignal		P-0-3261, bit 0	Mode selection signal (MS)	
1	EmergencyStopSignal		P-0-3261, bit 1	Emergency stop signal (SHE.S)	
2	EnablingControl		P-0-3261, bit 2	Enabling control signal (EC)	

Note:
Byteorder Safety
matches, no high /
low byte necessary!

- Docu preferred configuration Status word Control word



The first screenshot shows a table with columns for 'Status word' and 'Control word'. The second screenshot shows a similar table with additional details.

Safety modules	
	F-Modul 2B Bin-SMM 781/785
	F-Modul 2B Bin-SMM SH Func 787/790
	F-Modul 2B Bin-SMM SH SCA 787/788
	F-Modul 2B Bit-SMM 780/784
	F-Modul 2B Bit-SMM SH 786/784
	F-Modul 2B Bit-SMM SH SCA 786/789
	F-Modul not used

- The preferred configuration determines the assignment of the safety control or status word.

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1e. ProfiSafe preferred configuration

- Docu preferred configuration control word 780

Type number 780: "2-byte SMO control word, bit-coded SMM (780)"				
Configuration		Target assignment		
Byte	Bit	Name	IDN, bit number	Signal name
0	0	ModeSelectionSignal	P-0-3261, bit 0	Mode selection signal (MS)
	1	EmergencyStopSignal	P-0-3261, bit 1	Emergency stop signal (SMES)
	2	EnablingControl	P-0-3261, bit 2	Enabling control signal (EC)
	3	SMM1Signal	P-0-3261, bit 3	SMM1 signal (A_SMM1)
	4	SMM2Signal	P-0-3261, bit 4	SMM2 signal (A_SMM2)
	5	SMM3Signal	P-0-3261, bit 5	SMM3 signal (A_SMM3)
	6	SMM4Signal	P-0-3261, bit 6	SMM4 signal (A_SMM4)
1	7	SMM5Signal	P-0-3261, bit 7	SMM5 signal (A_SMM5)
	0	SMM6Signal	P-0-3261, bit 8	SMM6 signal (A_SMM6)
	1	SMM7Signal	P-0-3261, bit 9	SMM7 signal (A_SMM7)
	2	SMM8Signal	P-0-3261, bit 10	SMM8 signal (A_SMM8)
	3	SMM9Signal	P-0-3261, bit 11	SMM9 signal (A_SMM9)
	4	SMM10Signal	P-0-3261, bit 12	SMM10 signal (A_SMM10)
	5	SMM11Signal	P-0-3261, bit 13	SMM11 signal (A_SMM11)
7	6	SMM12Signal	P-0-3261, bit 14	SMM12 signal (A_SMM12)
	7	SafeOutput_Local	P-0-3223, bit 0	Safe output at local interface

Status word 784

Type number 784: "2-byte SMO status word, bit-coded SMM (784)"				
Configuration		Source assignment		
Byte	Bit	Name	IDN, bit number	Signal name
0	0	SMESStatus	P-0-3231, bit 1	EMERGENCY STOP (SMES)
	1	SMSTStatus	P-0-3231, bit 2	Special mode Safe standstill (SMST)
	2	SMM1Status	P-0-3231, bit 3	Special mode Safe motion 1 (SMM1)
	3	SMM2Status	P-0-3231, bit 4	Special mode Safe motion 2 (SMM2)
	4	SMM3Status	P-0-3231, bit 5	Special mode Safe motion 3 (SMM3)
	5	SMM4Status	P-0-3231, bit 6	Special mode Safe motion 4 (SMM4)
	6	SMM5Status	P-0-3231, bit 7	Special mode Safe motion 5 (SMM5)
1	7	SMM6Status	P-0-3231, bit 8	Special mode Safe motion 6 (SMM6)
	0	SMM7Status	P-0-3231, bit 9	Special mode Safe motion 7 (SMM7)
	1	SMM8Status	P-0-3231, bit 10	Special mode Safe motion 8 (SMM8)
	2	SMM9Status	P-0-3231, bit 11	Special mode Safe motion 9 (SMM9)
	3	SMM10Status	P-0-3231, bit 12	Special mode Safe motion 10 (SMM10)
	4	SMM11Status	P-0-3231, bit 13	Special mode Safe motion 11 (SMM11)
	5	SMM12Status	P-0-3231, bit 14	Special mode Safe motion 12 (SMM12)
7	6	EncoderStandstill	P-0-3256, bit 6	Encoder standstill
	7	SafetyStatus	P-0-3237, bit 0	Safety status

- Docu preferred configuration control word 786

Type number 786: "2-byte SMO control word, bit-coded SMM (786)"				
Configuration		Target assignment		
Byte	Bit	Name	IDN, bit number	Signal name
0	0	ModeSelectionSignal	P-0-3261, bit 0	Mode selection signal (MS)
	1	EmergencyStopSignal	P-0-3261, bit 1	Emergency stop signal (SMES)
	2	EnablingControl	P-0-3261, bit 2	Enabling control signal (EC)
	3	SMM1Signal	P-0-3261, bit 3	SMM1 signal (A_SMM1)
	4	SMM2Signal	P-0-3261, bit 4	SMM2 signal (A_SMM2)
	5	SMM3Signal	P-0-3261, bit 5	SMM3 signal (A_SMM3)
	6	SMM4Signal	P-0-3261, bit 6	SMM4 signal (A_SMM4)
1	7	SMM5Signal	P-0-3261, bit 7	SMM5 signal (A_SMM5)
	0	SMM6Signal	P-0-3261, bit 8	SMM6 signal (A_SMM6)
	1	SMM7Signal	P-0-3261, bit 9	SMM7 signal (A_SMM7)
	2	SMM8Signal	P-0-3261, bit 10	SMM8 signal (A_SMM8)
	3	SMM9Signal	P-0-3261, bit 11	SMM9 signal (A_SMM9)
	4	SMM10Signal	P-0-3261, bit 12	SMM10 signal (A_SMM10)
	5 ¹⁾	SafeHomingProcedure	P-0-3253, bit 0	SMO reference signal
7	6	Reserved	-	-
	7	SafeOutput_Local	P-0-3223, bit 0	Safe output at local interface

Status word 789

Type number 789: "2-byte SMO status word, bit-coded SMM (789)"				
Configuration		Source assignment		
Byte	Bit	Name	IDN, bit number	Signal name
0	0	SMESStatus	P-0-3231, bit 1	EMERGENCY STOP (SMES)
	1	SMSTStatus	P-0-3231, bit 2	Special mode Safe standstill (SMST)
	2	SMM1Status	P-0-3231, bit 3	Special mode Safe motion 1 (SMM1)
	3	SMM2Status	P-0-3231, bit 4	Special mode Safe motion 2 (SMM2)
	4	SMM3Status	P-0-3231, bit 5	Special mode Safe motion 3 (SMM3)
	5 ¹⁾	HomingStatus	P-0-3256, bit 5	Status of Safe reference
	6 ¹⁾	SCA1Status	P-0-3273.0.1, bit 0	Cam 1 status
1	7 ¹⁾	SCA2Status	P-0-3273.0.1, bit 1	Cam 2 status
	0 ¹⁾	SCA3Status	P-0-3273.0.1, bit 2	Cam 3 status
	1 ¹⁾	SCA4Status	P-0-3273.0.1, bit 3	Cam 4 status
	2 ¹⁾	SCA5Status	P-0-3273.0.1, bit 4	Cam 5 status
	3 ¹⁾	SCA6Status	P-0-3273.0.1, bit 5	Cam 6 status
	4	BrakeStatus	P-0-3265, bit 0	Acknowledgment of holding brake control
	5	SafetyError	P-0-3231, bit 25	Safety technology error
7	6	EncoderStandstill	P-0-3256, bit 6	Encoder standstill
	7	SafetyStatus	P-0-3237, bit 0	Safety status

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1e. ProfiSafe preferred configuration

- Docu preferred configuration control word 781

Typ-Number 781: "2-byte SMO control word, binary-coded SMM (781)"

Configuration			Target assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	ModeSelectionSignal	P-0-3261, bit 0	Mode selection signal (MS)
	1	EmergencyStopSignal	P-0-3261, bit 1	Emergency stop signal (SMES)
	2	EnablingControl	P-0-3261, bit 2	Enabling control signal (EC)
	3	SMM1Signal_coded ¹⁾	P-0-3261, bit 3..18	SMM1 signal (A_SMM1)
	4	SMM2Signal_coded ¹⁾		...
	5	SMM3Signal_coded ¹⁾		SMM16 signal (A_SMM16)
	6	SMM4Signal_coded ¹⁾		
	7	Reserved	-	-
1	0..5	Reserved	-	-
	6	ReleaseBrake	P-0-3265.0.2, bit 0	Release holding brake
	7	SafeOutput_local	P-0-3323, bit 0	Safe output at local interface

Status word 785

Type number 785: "2-byte SMO status word, binary-coded SMM (785)"

Configuration			Source assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	SMESStatus	P-0-3231, bit 1	EMERGENCY STOP (SMES)
	1	SMSTStatus	P-0-3231, bit 2	Special mode Safe standstill (SMST)
	2	SMM1Status_coded ¹⁾	P-0-3231, bit 3..18	Special mode Safe motion 1 (SMM1)
	3	SMM2Status_coded ¹⁾		...
	4	SMM3Status_coded ¹⁾		Special mode Safe motion 16 (SMM16)
	5	SMM4Status_coded ¹⁾		
	6..7	Reserved	-	-
1	0..5	Reserved	-	-
	4	BrakeStatus	P-0-3265, bit 0	Acknowledgment of holding brake control
	5	SafetyError	P-0-3231, bit 25	Safety technology error
	6	EncoderStandstill	P-0-3256, bit 6	Encoder standstill
	7	SafetyStatus	P-0-3237, bit 0	Safety status

- Docu preferred configuration control word 787

Typ-Number 787: "2-byte SMO control word, binary-coded SMM (787)"

Configuration			Target assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	ModeSelectionSignal	P-0-3261, bit 0	Mode selection signal (MS)
	1	EmergencyStopSignal	P-0-3261, bit 1	Emergency stop signal (SMES)
	2	EnablingControl	P-0-3261, bit 2	Enabling control signal (EC)
	3	SMM1Signal_coded ¹⁾	P-0-3261, bit 3..18	SMM1 signal (A_SMM1)
	4	SMM2Signal_coded ¹⁾		...
	5	SMM3Signal_coded ¹⁾		SMM16 signal (A_SMM16)
	6	SMM4Signal_coded ¹⁾		
	7 ²⁾	SafeHomingProcedure	P-0-3253, bit 0	SMO reference signal
1	0..5	Reserved	-	-
	6	ReleaseBrake	P-0-3265.0.2, bit 0	Release holding brake
	7	SafeOutput_local	P-0-3323, bit 0	Safe output at local interface

Status word 790

Type number 790: "2-byte SMO status word, binary-coded SMM (790)"

Configuration			Source assignment	
Byte	Bit	Name (SDDML)	IDN, bit number	Signal name
0	0	SMESStatus	P-0-3231, bit 1	EMERGENCY STOP (SMES)
	1	SMSTStatus	P-0-3231, bit 2	Special mode Safe standstill (SMST)
	2	SMM1Signal_coded ¹⁾	P-0-3231, bit 3..10	Special mode Safe motion 1 (SMM1)
	3	SMM2Signal_coded ¹⁾		...
	4	SMM3Signal_coded ¹⁾		Special mode Safe motion 8 (SMM8)
	5 ²⁾	HomingStatus		Status of Safe reference
1	6	FunctionalInput1	P-0-3329, bit 0	Functional input signals 1 drive
	7	FunctionalInput2	P-0-3329, bit 1	Functional input signals 2 drive
	0	FunctionalInput3	P-0-3329, bit 2	Functional input signals 3 drive
	1	FunctionalInput4	P-0-3329, bit 3	Functional input signals 4 drive
	2 ²⁾	ParkingAxis	P-0-3231, bit 27	Parking axis
	3	Reserved	-	-
	4	BrakeStatus	P-0-3265, bit 0	Acknowledgment of holding brake control
	5	SafetyError	P-0-3231, bit 25	Safety technology error
	6	EncoderStandstill	P-0-3256, bit 6	Encoder standstill
	7	SafetyStatus	P-0-3237, bit 0	Safety status

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1e. ProfiSafe preferred configuration

- Docu preferred configuration control word 787

Type number 787: "2-byte SMO control word, binary-coded SMM (787)"

Configuration			Target assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	ModeSelectionSignal	P-0-3261, bit 0	Mode selection signal (MS)
	1	EmergencyStopSignal	P-0-3261, bit 1	Emergency stop signal (SMES)
	2	EnablingControl	P-0-3261, bit 2	Enabling control signal (EC)
	3	SMM1Signal_coded ¹⁾	P-0-3261, bit 3..18	SMM1 signal (A_SMM1)
	4	SMM2Signal_coded ¹⁾		...
	5	SMM3Signal_coded ¹⁾		SMM16 signal (A_SMM16)
	6	SMM4Signal_coded ¹⁾		
1	7 ²⁾	SafeHomingProcedure	P-0-3253, bit 0	SMO reference signal
	0..5	Reserved	-	-
	6	ReleaseBrake	P-0-3265.0.2, bit 0	Release holding brake
	7	SafeOutput_local	P-0-3323, bit 0	Safe output at local interface

Status word 788

Type number 788: "2-byte SMO status word, binary-coded SMM (788)"

Configuration			Source assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	SMESStatus	P-0-3231, bit 1	EMERGENCY STOP (SMES)
	1	SMSTStatus	P-0-3231, bit 2	Special mode Safe standstill (SMST)
	2	SMM1Status_coded ¹⁾	P-0-3231, bit 3..18	Special mode Safe motion 1 (SMM1)
	3	SMM2Status_coded ¹⁾		...
	4	SMM3Status_coded ¹⁾		Special mode Safe motion 16 (SMM16)
	5	SMM4Status_coded ¹⁾		
	6 ²⁾	HomingStatus	P-0-3256, bit 0	Status of Safe reference
1	7 ²⁾	SCA1Status_coded	P-0-3273, bit 0..4	Cam 1 status
	0 ²⁾	SCA2Status_coded		...
	1 ²⁾	SCA3Status_coded		Cam 32 status
	2 ²⁾	SCA4Status_coded		
	3 ²⁾	SCA5Status_coded		
	4	BrakeStatus	P-0-3266, bit 0	Acknowledgment of holding brake control
	5	SafetyError	P-0-3231, bit 25	Safety technology error
	6	EncoderStandstill	P-0-3256, bit 6	Encoder standstill
	7	SafetyStatus	P-0-3237, bit 0	Safety status

- Docu preferred configuration control word 786

Type number 786: "2-byte SMO control word, bit-coded SMM (786)"

Configuration			Target assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	ModeSelectionSignal	P-0-3261, bit 0	Mode selection signal (MS)
	1	EmergencyStopSignal	P-0-3261, bit 1	Emergency stop signal (SMES)
	2	EnablingControl	P-0-3261, bit 2	Enabling control signal (EC)
	3	SMM1Signal	P-0-3261, bit 3	SMM1 signal (A_SMM1)
	4	SMM2Signal	P-0-3261, bit 4	SMM2 signal (A_SMM2)
	5	SMM3Signal	P-0-3261, bit 5	SMM3 signal (A_SMM3)
	6	SMM4Signal	P-0-3261, bit 6	SMM4 signal (A_SMM4)
1	7	SMM5Signal	P-0-3261, bit 7	SMM5 signal (A_SMM5)
	0	SMM6Signal	P-0-3261, bit 8	SMM6 signal (A_SMM6)
	1	SMM7Signal	P-0-3261, bit 9	SMM7 signal (A_SMM7)
	2	SMM8Signal	P-0-3261, bit 10	SMM8 signal (A_SMM8)
	3	SMM9Signal	P-0-3261, bit 11	SMM9 signal (A_SMM9)
	4	SMM10Signal	P-0-3261, bit 12	SMM10 signal (A_SMM10)
	5 ¹⁾	SafeHomingProcedure	P-0-3253, bit 0	SMO reference signal
	6	Reserved	-	-
	7	SafeOutput_local	P-0-3323, bit 0	Safe output at local interface

Status word 784

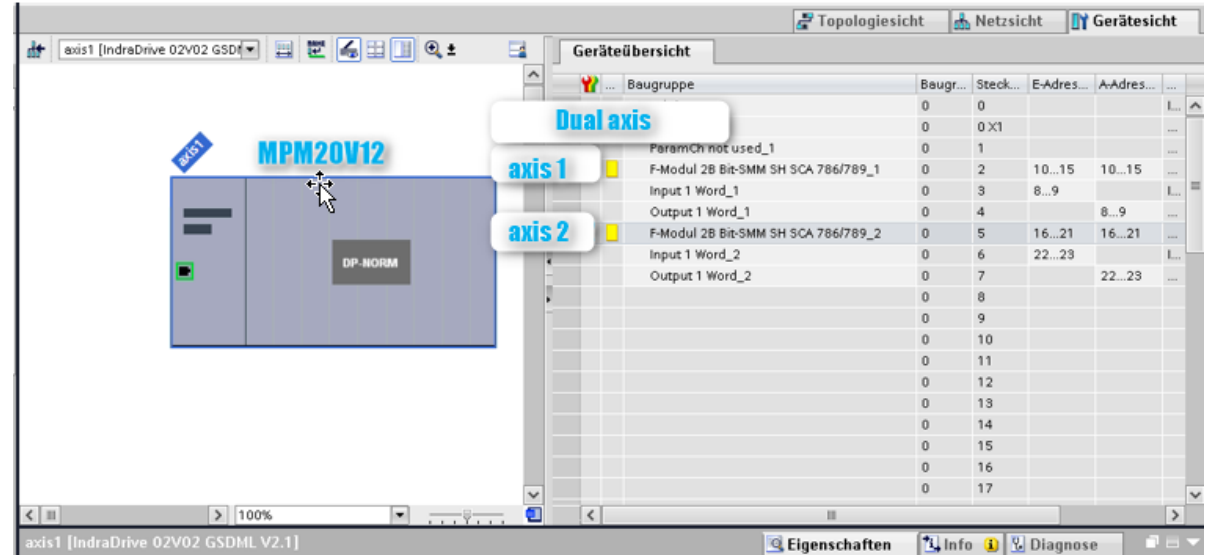
Type number 784: "2-byte SMO status word, bit-coded SMM (784)"

Configuration			Source assignment	
Byte	Bit	Name	IDN, bit number	Signal name
0	0	SMESStatus	P-0-3231, bit 1	EMERGENCY STOP (SMES)
	1	SMSTStatus	P-0-3231, bit 2	Special mode Safe standstill (SMST)
	2	SMM1Status	P-0-3231, bit 3	Special mode Safe motion 1 (SMM1)
	3	SMM2Status	P-0-3231, bit 4	Special mode Safe motion 2 (SMM2)
	4	SMM3Status	P-0-3231, bit 5	Special mode Safe motion 3 (SMM3)
	5	SMM4Status	P-0-3231, bit 6	Special mode Safe motion 4 (SMM4)
	6	SMM5Status	P-0-3231, bit 7	Special mode Safe motion 5 (SMM5)
1	7	SMM6Status	P-0-3231, bit 8	Special mode Safe motion 6 (SMM6)
	0	SMM7Status	P-0-3231, bit 9	Special mode Safe motion 7 (SMM7)
	1	SMM8Status	P-0-3231, bit 10	Special mode Safe motion 8 (SMM8)
	2	SMM9Status	P-0-3231, bit 11	Special mode Safe motion 9 (SMM9)
	3	SMM10Status	P-0-3231, bit 12	Special mode Safe motion 10 (SMM10)
	4	SMM11Status	P-0-3231, bit 13	Special mode Safe motion 11 (SMM11)
	5	SMM12Status	P-0-3231, bit 14	Special mode Safe motion 12 (SMM12)
	6	EncoderStandstill	P-0-3256, bit 6	Encoder standstill
	7	SafetyStatus	P-0-3237, bit 0	Safety status

EN-S7Profinet IndraDrive

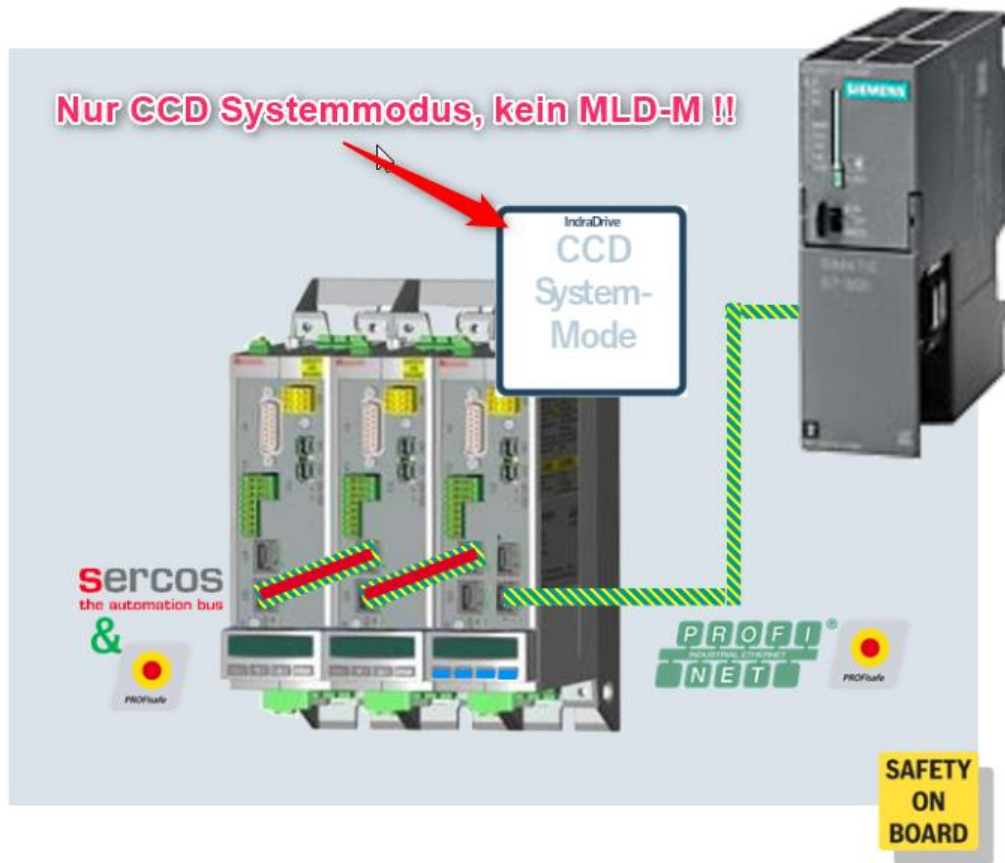
1g. Hint Dual drive controller with Profinet

- PROFI-safe on PROFINET as of MPM20VRS
- Master-side configuration:
 - Each axis has an F-, input- and output-module.
 - Thus each axis has its own address range.



EN-S7Profinet IndraDrive

1h. Hint tunneling of ProfiSafe telegrams, only CCD Systemmodus!



Good to know!

- Tunneling of PROFI-safe telegrams via Sercos III to CCD Slaves

ab Firmware MPC 21V12 !!



Now!

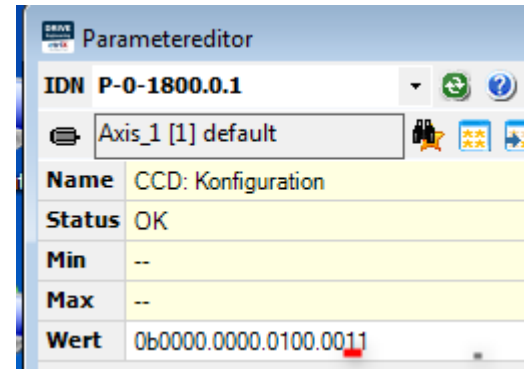
Device overview	
...	Module
✓	axis
✓	▶ PN-IO
✓	ParamCh not used_1
✓	F-Modul 2B Bit-SMM 780/78...
✓	Input 8 Words_1
✓	Output 8 Words_1
✓	F-Modul 2B Bit-SMM 780/78...
✓	Input 8 Words_2
✓	Output 8 Words_2
✓	F-Modul 2B Bit-SMM 780/78...
✓	Input 8 Words_3
✓	Output 8 Words_3

DE-S7Profinet IndraDrive

1h. Hint Tunneling ProfiSafe, **Only** CCD Systemmodus!

Following configuration is required:

- In order for the Profinet master to have access to the subordinate CCD slaves, the CCD system mode must be set.
- To activate the ProfiSafe-Tunnel function, Bit1 must be set to "1" parameter P-0-1800.0.1, see screenshot.



EN-S7Profinet IndraDrive

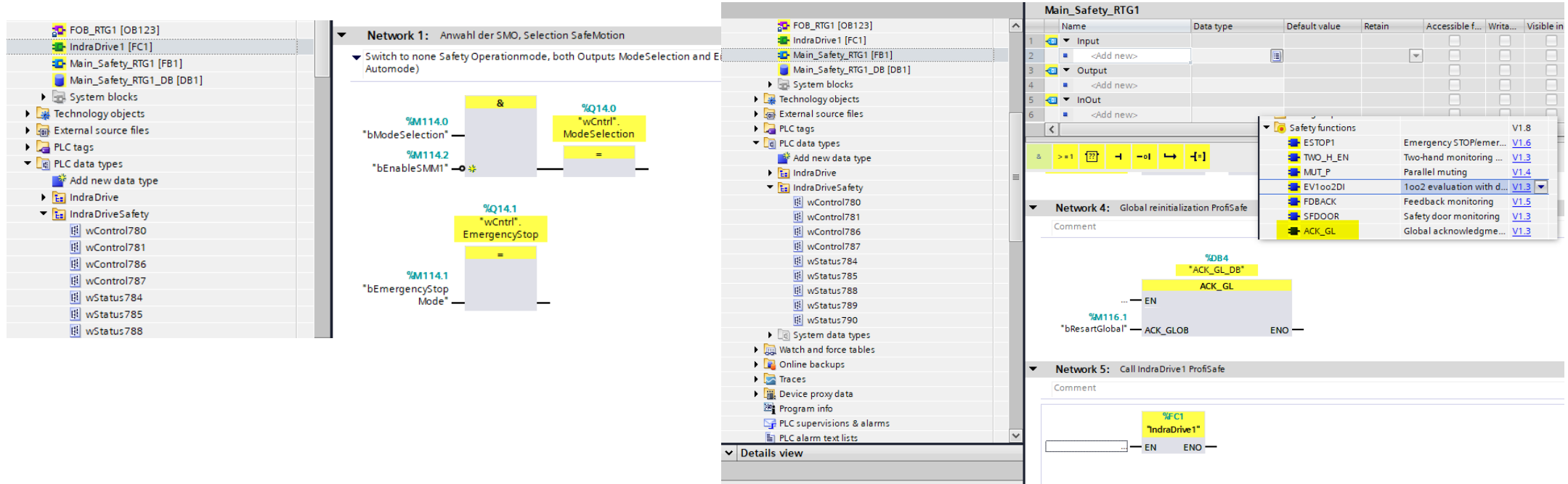
2. Example project, Data types up Firmware MPx20:

- a) Example project
- b) Data types im project

EN-S7Profinet IndraDrive

2a. Example project

- The example project include the configuration of ProfiSafe on Profinet
- Switching in auto mode,
- Global Acknowledge to reinitialization the ProfiSafe



EN-S7Profinet IndraDrive

2a. Data types ProfiSafe Assemblies

- Data types for the different Safety assemblies.

The screenshot displays the Siemens STEP 7 software interface. On the left, the 'Project tree' shows the hierarchy: 'IndraDrive1 [FC1]' > 'Main_Safety_RTG1 [FB1]' > 'Main_Safety_RTG1_DB [DB1]' > 'System blocks' > 'Technology objects' > 'External source files' > 'PLC tags' > 'PLC data types' > 'Add new data type' > 'IndraDrive' > 'IndraDriveSafety' > 'wControl780'. The 'IndraDriveSafety' folder is expanded, showing a list of data types including 'wControl780', 'wControl781', 'wControl786', 'wControl787', 'wStatus784', 'wStatus785', 'wStatus788', 'wStatus789', 'wStatus790', 'System data types', 'Watch and force tables', 'Online backups', 'Traces', and 'Device proxy data'.

The main window shows the 'wControl780' data type configuration. The table below lists the data types and their properties:

Name	Data type	Default value	Accessible f...	Writa...	Visible in ...	Setpoint	Comment
1 ModeSelection	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2 EmergencyStop	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 EnablingControl	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4 SMM1_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5 SMM2_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6 SMM3_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7 SMM4_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8 SMM5_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9 SMM6_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10 SMM7_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11 SMM8_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12 SMM9_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 SMM10_Signal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
14 SafeHomingProcedure	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15 Reserved	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
16 SafeOutputLocal	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	