Function block overview

for STEP 7

Documentation for
PHOENIX CONTACT function blocks
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This documentation is available in English only.

1 General information

In this document you will find an overview of the libraries and function blocks for the STEP 7 development environment from Siemens. Listed are all libraries with the current versioning and the associated MSI file. In addition, see the point function blocks with a short description of the functionality of the individual components of each library, the current version number and the corresponding Phoenix Contact products.

2 Libraries

Library	Description	File	Version
AnalogTechnology	Function blocks for acquisition and evaluation of analog signals.	STEP_7_AnalogTechnology_V1_07_20180925.msi	1.07
AsynCom	Function blocks for asynchronous communication for INTERBUS and PROFINET.	STEP_7_AsynCom_V1_10_20180925.msi	1.10
Bushandling	Function block for switching bus devices.	STEP_7_Bushandling_V1_06_20180925.msi	1.06
ComSerial	Function blocks for implementing communication protocols as well as activating communication modules.	STEP_7_ComSerial_3_20180925.msi	3
DevMod_PN	Function blocks for switching and/or bridging INTERBUS devices, which are connected to a Profinet bus system.	STEP_7_DevMod_PN_V1_40_20180925.msi	1.40
Drives	Function blocks for power-level terminals from Phoenix Contact.	STEP_7_Drives_V1_04_20180925.msi	1.04
FunctionModules	Function blocks for acquisition, open and closed-loop control (drivers for position detection terminals for incremental encoders, terminals with counting function or communication with IO-Link devices).	STEP_7_FunctionModules_V1_10_20180925.msi	1.10
IBS_DSC	Function block used for communication between a Siemens controller and the INTERBUS termination board IBS S7 300 DSC-T.	STEP_7_IBS_DSC_V1_80_20180925.msi	1.80
Lighting	Function blocks for controlling PLD machine lights.	STEP_7_Lighting_V1_01_20180925.msi	1.01
Modbus	Function block library for implementing the Modbus communication protocol using Modbus/RTU.	STEP_7_Modbus_3_20190218.msi	3
Positioning	Function blocks for positioning terminals from Phoenix Contact.	STEP_7_Positioning_V1_03_20180925.msi	1.03

PowerMeasurement	Function blocks for power measurement terminals from Phoenix Contact.	STEP_7_PowerMeasurement_V1_03_20180925.msi	1.03
PN_Dev_Diag	Function blocks for handling Profinet.	STEP_7_PN_Dev_Diag_V1_04_20180925.msi	1.04
RadiolineBasic	The RadiolineBasic library contains driver blocks for the currently available Radioline devices.	STEP_7_RadiolineBasic_3_20180925.msi	3
SBT_V2	Function blocks for a standard controller for startup of the logic modules and for exchanging data between the safe I/O modules and the logic module.	STEP_7_SBT_V2_V1_03_20180925.msi	1.03
SBT_V3	Function blocks for a standard controller for startup of the logic modules and for exchanging data between the safe I/O modules and the logic module.	STEP_7_SBT_V3_V3_00_20180925.msi	3.00

3 Function blocks

3.1 AnalogTechnology

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
IB_S7_AO	Standardization of analog output values for analog modules from Phoenix Contact.	1.10	AWL	V5.5	no	-
IL_AI_2_SF	Standardization of analog input values for the IB IL AI 2/SF analog module.	1.00	SCL	V5.5	V13	IB IL AI 2/SF-PAC (2861302) IB IL AI 2/SF (2726285)
IL_AI_4_EF	Standardization of analog input values for the IB IL AI 4/EF analog module.	1.00	SCL	V5.5	V13	IB IL AI 4/EF-PAC 2878447
IL_AO_4_8	Parameterization and operation of the IB IL AO 4/8/U/BP terminal as well as standardization of analog values.	1.10	AWL	V5.5	no	IB IL AO 4/8/U/BP-PAC 2878036
IL_AI_8	Parameterization and operation of the IB IL AI 8/SF terminal as well as standardization of analog values.	2.11	AWL	V5.5	no	IB IL AI 8/SF-PAC 2861412 IB IL AI8/SF 2MBD PAC 2862042 IB IL AI8/IS PAC 2861661 (only current measuring range)
ILAI4AO2	Parameterization and operation of the ILB IB AI4/AO2 terminal as well as standardization of analog values.	1.00	AWL	V5.5	no	ILB IB AI4/AO2-PAC 2878777
IL_AO_2_SF	Parameterization and operation of the IB IL AO2 SF terminal as well as standardization of analog values.	1.00	SCL	V5.5	V13	IB IL AO 2/SF 2862806 IB IL AO 2 /U/BP-ME 2863957

3.2 AsynCom

Acyclic reading and writing of PCP- communication data via the SFB52/SFB53 system blocks in a PROFIBUS/PROFINET system is possible with the help of these function blocks.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
AsynCom_PN	Profinet communication block for operation with the IL PN BK DI8 DO4 2TX-PAC (2703994).	1.10	SCL	V5.5	V12 V13	IL PN BK DI8 DO4 2TX-PAC (2703994)
AsynCom_PBb	Profibus communication block for operation with the IL PB BK DI8 DO4/EF PAC (2692322).	1.10	SCL	V5.5	V12 V13	IL PB BK DI8 DO4/EF PAC (2692322)
AsynCom_PBa	Profibus communication block for operation with the IL PB BK DP/V1 (2718688).	1.10	SCL	V5.5	V12 V13	IL PB BK DP/V1 (2718688)

3.3 Bushandling

The Bushandling function block library enables switching bus devices.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
DevMod_II	Function block for switching bus devices.	1.65	AWL	V5.5	V12 V13	—

3.4 ComSerial

The ComSerial function block library offers function blocks for implementing communication protocols, and for controlling communication modules.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
IL_RS_UNI	Function blocks for controlling and configuring the IB IL RS UNI-PAC (2700893) and IB IL RS UNI-2MBD-PAC (2701025) terminal.	2	SCL	V5.5	V13	IB IL RS UNI-PAC (2700893) IB IL RS UNI-2MBD-PAC (2701025)
AXL_RS_UNI	Function block for sending and receiving data with the AXL F RS UNI 1H (2688666) serial-communication module.	1.00	SCL	V5.5	V13	AXL F RS UNI 1H (2688666)
AXL_RS_UNI_RCV	Internal function block to receive data from the AXL F RS UNI 1H (2688666) module.	1.00	SCL	V5.5	V13	AXL F RS UNI 1H (2688666)
AXL_RS_UNI_SND	Internal function block to send data to the AXL F RS UNI 1H (2688666) module.	1.00	SCL	V5.5	V13	AXL F RS UNI 1H (2688666)

3.5 DevMod_PN

The DevMod_PN library is used to switch and/or bridge INTERBUS devices, which are connected to a PROFINET bus system via a PROFINET proxy.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
DevMod_PN	Block for switching and/or bridging INTERBUS devices.	1.4	AWL	V5.5	V13	FL NP PND-4TX IB (2985974) FL NP PND-4TX IB-LK (2985929)
Init_IB	Block for the initialization of INTERBUS communication.	1.1	AWL	V5.5	V13	FL NP PND-4TX IB (2985974) FL NP PND-4TX IB-LK (2985929)
Mem_Read	Block for cyclic reading of INTERBUS devices.	1.1	AWL	V5.5	V13	FL NP PND-4TX IB (2985974) FL NP PND-4TX IB-LK (2985929)

3.6 Drives

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
IL400MOT	Parameterization, operation, and diagnostics of power-level terminals.	1.01	AWL	V5.5	no	IB IL 400 MLR 1-8A (2727365) IB IL 400 ELR 1-3 (2727352) IB IL 400 ELR R-3 (2727378)
IP400MOT	Parameterization, operation, and diagnostics of 400 series INTERBUS motor starters (IP54/IP67).	2.10	AWL	V5.5	no	IBS IP 400 ELR 1 - 3A DI 4/4-F (2728005) IBS IP 400 ELR 2-3A DI 4/4-F (2836023) IBS IP 400 ELR 1-3A DI 4/4 (2727967) IBS IP 400 ELR 2-3A DI 4/4 (2727970) IBS IP 400 MLR 1-8A DI 4/4-F (2727996) IBS IP 400 MLR 2-8A DI 4/4-F (2836010)
IP400MOTR	Parameterization, operation, and diagnostics of 400 series INTERBUS reversing load motor starters (IP54/IP67).	2.20	AWL	V5.5	no	IBS IP 400 ELR R-3A DI 4/4-F (2836502) IBS IP 400 ELR R-3A DI 4/4 (2836502) IBS IP 400 MLR R-8A DI 4/4-F (2836515)
VFD_1W	Initialization, parameterization, operation, and diagnostics of the IBS IP 400 ME-VFD-3A FO (2734523) INTERBUS variable frequency drive for single-word operation.	1.00	AWL	V5.5	no	IBS IP 400 ME-VFD-3A FO (2734523)
VFD_2W	Parameterization, operation, and diagnostics of the IBS IP 400 VFD 1-3A DI4 (2836939) INTERBUS variable frequency drive with two-word operation.	2.20	AWL	V5.5	no	IBS IP 400 VFD 1-3A DI4 (2836939)
VFD_2W_D	Parameterization, operation, and diagnostics of the IBS IP 400 VFD 1-3A DI4 (2836939) INTERBUS variable frequency drive with two-	2.20	AWL	V5.5	no	IBS IP 400 VFD 1-3A DI4

	word operation/direct.					(2836939)
VFD_4W_D	Parameterization, operation, and diagnostics of the IBS IP 400 VFD 1-3A DI4 (2836939) INTERBUS variable frequency drive with four-word operation/direct.	2.10	AWL	V5.5	no	IBS IP 400 VFD 1-3A DI4 (2836939)

3.7 FunctionModules

The FunctionModules block library for the STEP7 development environment from Siemens offers function blocks for temperature measurement terminals and temperature controller terminals.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
IL_TEMPCON	Parameterization, operation, and diagnostics of IB IL TEMPCON terminals for multi-channel temperature controllers.	1.10	AWL	V5.5	no	IB IL TEMPCON 300 RTD-PAC(281966) IB IL TEMPCON 300 RTD-2MBD-PAC (2819820) IB IL TEMPCON 300 RTD-B-PAC (2819590) IB IL TEMPCON 300 RTD-B-2M-PAC (2819859) IB IL TEMPCON 300 UTH-PAC (2819671) IB IL TEMPCON 300 UTH-2MBD-PAC (2819833) IB IL TEMPCON 300 UTH-B-PAC (2819613) IB IL TEMPCON 300 UTH-B-2M-PAC (2819846)
TEMP_4_8_RTD	Parameterization, operation, and diagnostics of the IB IL TEMP 4/8 RTD terminal.	1.10	AWL	V5.5	no	IB IL TEMP 4/8 RTD-PAC (2863915) IB IL TEMP 4/8 RTD-2MBD-PAC (2878612) IB IL TEMP 4/8 RTD-PAC/CN (2692487)
IL_CNT_COUNT	This block is used for event counting via the Inline function terminal IB IL CNT PAC.	1.00	SCL	V5.5	V12	IB IL CNT-PAC (2861852)

3.8 IBS_DSC

The function blocks are used for communication between a Siemens controller and the INTERBUS termination board IBS S7 300 DSC-T. The library offers different possibilities and modes for communication. They are used for start-up the communication, diagnostics, and read and write data records or to use user-defined functions. In addition, it is possible to operate in the asynchronous mode with synchronization pulse.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
Init_IB	Initialize communication and synchronize the PLC and the controller board.	1.80	AWL	no	V12	—
MEM_READ	Read process data and PCP services.	1.80	AWL	no	V12	—
MEM_WRIT	Write process data and PCP services.	1.80	AWL	no	V12	—
IB_DIAG	The function processes INTERBUS error messages together with the internal functions of the controller board.	1.80	AWL	no	V12	—
IB_SERV	The PCP-Handling function sends services to the controller board and receives answers.	1.80	AWL	no	V12	—
IB_FUNCT	The function executes handshakes for user defined functions.	1.80	AWL	no	V12	—
IB_SYNC	This function controls the protocol in asynchronous with synchronization pulse operating mode. It also calls functions to read and write I/O data.	1.80	AWL	no	V12	—
READ_DS	Read all data records.	1.80	AWL	no	V12	—
WRITE_DS	Write all data records.	1.80	AWL	no	V12	—

3.9 Lighting

The Lighting library offers function blocks for controlling PLD machine lights.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
PLD_PWM	This block controls the PLD machine lights via the IB IL PWM/2-PAC (2861632) Inline function terminal.	1.00	SCL	V5.5	V13	IB IL PWM/2-PAC (2861632)

3.10 Modbus

The Modbus library is required in order to communicate with Modbus devices with an S7 controller via Profinet and/or PROFIBUS using an Inline and/or Axioline RS UNI terminal.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
MB_AXL_RTU_Master	Function block for communication with Modbus/RTU devices and the AXL F RS UNI 1H (2688666) module as the master.	3	SCL	V5.5	V13	AXL F RS UNI 1H (2688666)
MB_AXL_RTU_Slave	Function block for communication with a Modbus network and the AXL F RS UNI 1H (2688666) module as a slave.	2	SCL	V5.5	V13	AXL F RS UNI 1H (2688666)
MB_AXL_RCV	Function block for receiving data with the AXL F RS UNI 1H (2688666) module. Integrated in MB_AXL_RTU_Master and in MB_AXL_RTU_Slave.	2	SCL	V5.5	V13	—
MB_AXL_SND	Function block for sending data with the AXL F RS UNI 1H (2688666) module. Integrated in MB_AXL_RTU_Master and in MB_AXL_RTU_Slave.	2	SCL	V5.5	V13	—
MB_IL_RTU_Master	Function block for communication with Modbus/RTU devices and the IB IL RS UNI-PAC (2700893) module as the master.	2	SCL	V5.5	V13	IB IL RS UNI-PAC (2700893)
MB_IL_RTU_Slave	Function block for communication with a Modbus network and the IB IL RS UNI-PAC (2700893) module as a slave.	1.1	SCL	V5.5	V13	IB IL RS UNI-PAC (2700893)
MB_RTU_DiagInfo_DE	Optional function block for displaying diagnostic messages for Modbus communication as plain text in German.	1.0	SCL	V5.5	V13	—
MB_RTU_DiagInfo_EN	Optional function block for displaying diagnostic messages for Modbus communication as plain text in English.	1.0	SCL	V5.5	V13	—
MB_RTU_FC1	Function block for Modbus function code 1.	2	SCL	V5.5	V13	—
MB_RTU_FC2	Function block for Modbus function code 2.	2	SCL	V5.5	V13	—

MB_RTU_FC3	Function block for Modbus function code 3.	2	SCL	V5.5	V13	—
MB_RTU_FC4	Function block for Modbus function code 4.	2	SCL	V5.5	V13	—
MB_RTU_FC5	Function block for Modbus function code 5.	2	SCL	V5.5	V13	—
MB_RTU_FC6	Function block for Modbus function code 6.	2	SCL	V5.5	V13	—
MB_RTU_FC15	Function block for Modbus function code 15.	2	SCL	V5.5	V13	—
MB_RTU_FC16	Function block for Modbus function code 16.	2	SCL	V5.5	V13	—
MB_RTU_FC23	Function block for Modbus function code 23.	2	SCL	V5.5	V13	—

3.11 PN_Dev_Diag

These function blocks are used for diagnosis of a PROFIBUS device. Diagnostic reports which must be confirmed can be approved with function blocks from the PN_Dev_Diag Profinet library.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
PNDD_IL_Diag	The function block checks cyclically the diagnostic status of Profinet devices. The function block can be used to confirm diagnostic messages from safety Inline I/O modules.	1.11	SCL	V5.5	V13	Inline I/O modules SMC valve terminal
PNDD_AXL_Diag	The function block checks the status of a PROFINET module/device connected to an Axioline Profinet bus coupler. If possible, the function block can acknowledge error messages from the module.	1.01	SCL	V5.5	V13	Axioline modules

3.12 Positioning

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
IL_SSI_IN	Function block for operation and diagnosis of the IB IL SSI-IN (2819309) and IB_IL_SSI_IN_PAC modules.	1.0	SCL	V5.5	V13	IB IL SSI-IN (2819309) IB IL SSI-IN-PAC (2819574)
IL_INC	Initialization, parameterization, operation, and diagnostics of the IB IL INC positioning control terminal with position detection using incremental encoders.	2.11	AWL	V5.5	no	IB IL INC (2836324) IB IL INC-PAC (2861849)
POS200	Process data and PCP communication with the IB IL POS-200 positioning controller.	1.0	AWL	V5.5	no	—
POS200_S	Process data and PCP communication with the IB IL POS-200 positioning controller. The block is used as an interface between the application program and the positioning controller.	1.0	AWL	V5.5	no	—
PIL_SSI	Initialization, parameterization, operation, and diagnostics of the IB IL SSI positioning control terminal. With position detection using absolute encoders with SSI interface.	1.3	AWL	V5.5	no	IB IL SSI-IN (2819309) IB IL SSI-IN-PAC (2819574)

3.13 PowerMeasurement

Function blocks for power measurement.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
S7_IL_PM_3P_N_EF	Function block for power measurement.	1.01	SCL	V5.5	V13	IB IL PM3P/N/EF-PAC (27009650)

3.14 RadiolineBasic

The RadiolineBasic library contains driver blocks for the Phoenix Contact Radioline devices. These blocks can be used to first establish an image of the modules configured in the Radioline network with the module information that applies in each case, thus forming a basis for communication and then allowing the modules to be controlled and evaluated during subsequent operation.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
RAD_FC3	Block for the execution of Modbus function code “3” (read the contents of the hold registers of the Modbus slave). The block is based on the function of the corresponding block (MB_RTU_FC3) in the Phoenix Contact Modbus library.	3	SCL	V5.5	V13	—
RAD_FC4	Block for the execution of Modbus function code “4” (read the contents of the input registers of the Modbus slave). The block is based on the function of the corresponding block (MB_RTU_FC4) in the Phoenix Contact Modbus library.	3	SCL	V5.5	V13	—
RAD_FC16	Block for the execution of Modbus function code “16” (write to the hold register of the Modbus slave). The block is based on the function of the corresponding block (MB_RTU_FC16) in the Phoenix Contact Modbus library.	3	SCL	V5.5	V13	—
RAD_Search	The block is used for detecting all the I/O modules in a Radioline network and entering the information in a structure.	2	SCL	V5.5	V13	—
RAD_Diag	Function block for reading the diagnostic information of the wireless transceivers that are present in the Radioline network.	3	SCL	V5.5	V13	—
RAD_AI4	Driver block for communication with a RAD-AI4-IFS (2901537) module.	3	SCL	V5.5	V13	RAD-AI4-IFS (2901537)
RAD_AO4	Driver block for communication with a RAD-AO4-IFS (2901538) module.	3	SCL	V5.5	V13	RAD-AO4-IFS (2901538)
RAD_DAIO6	Driver block for communication with a RAD-DAIO6-IFS (2901533) module.	3	SCL	V5.5	V13	RAD-DAIO6-IFS (2901533)
RAD_DI4	Driver block for communication with a RAD-DI4-IFS (2901535) module.	3	SCL	V5.5	V13	RAD-DI4-IFS (2901535)
RAD_DI8_STAT	Driver block for communication with a RAD-DI8-IFS (2901539) module in “static mode” operating mode.	3	SCL	V5.5	V13	RAD-DI8-IFS (2901539)
RAD_DI8_CNT	Driver block for communication with a RAD-DI8-IFS (2901539) module in “pulse counter mode” operating mode.	3	SCL	V5.5	V13	RAD-DI8-IFS (2901539)
RAD_DO8	Driver block for communication with	3	SCL	V5.5	V13	RAD-DO8-

	a RAD-DO8-IFS (2902811) module.					IFS (2902811) module
RAD_DOR4	Driver block for communication with a RAD-DOR4-IFS (2901536) module.	3	SCL	V5.5	V13	RAD-DOR4-IFS (2901536)
RAD_PT100_4	Driver block for communication with a RAD-PT100-4-IFS (2904035) module.	3	SCL	V5.5	V13	RAD-PT100-4-IFS (2904035)
RAD_Search_Module	The block is used for detecting an I/O module in the Radioline network and entering the information in a structure.	1	SCL	V5.5	V13	—

3.15 SBT_V2

This block family is used for data exchange between the LPSDO and other devices. It is also possible to perform diagnostics and transmit acknowledgment signals to the individual devices. All blocks use a data structure among each other for data exchange and this contains all necessary project data as well as diagnostics.

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
SBT_V2_Operate5	Function block for transmitting the LPSDO project and exchanging data between the LPSDO and the devices.	1.10		V5.5	V12 V13	IB IL 24 LPSDO 8 V2-PAC (2700606)
SBT_V2_Operate3	Function block for transmitting the LPSDO project and exchanging data between the LPSDO and the devices.	1.10		V5.5	V12 V13	IB IL 24 LPSDO 8 V2-PAC (2700606)
SBT_V2_Operate5_IBS	Function block for transmitting the LPSDO project and exchanging data between the LPSDO and the devices.	1.10		V5.5	V12 V13	IB IL 24 LPSDO 8 V2-PAC (2700606)
SBT_V2_Operate3_IBS	Function block for transmitting the LPSDO project and exchanging data between the LPSDO and the devices.	1.10		V5.5	V12 V13	IB IL 24 LPSDO 8 V2-PAC (2700606)

3.16 SBT_V3

The SafetyBridge Technology (SBT) offers flexible safe functionality, without the use of a safety-PLC. It is based on an island model. The logic module IB IL 24 LPSDO 16 V3-PAC is the central component of the SafetyBridge-system (Island), and SBT input and output modules are the island's satellites.

The function block generates and monitors the SafetyBridge protocol, processes the freely configurable safety logic, and it controls the SBT input and output modules (SBT Satellites).

Function block	Description	Version	Source	Simatic Manager	TIA Portal	Supported articles
SBT_V3_Operate	The function block is used to send a SAFECONF project to the LPSDO logic module. The block also takes care of the communication of maximum 16 satellites (modules).	3.00	SCL	V5.5	V13	IB IL 24 LPSDO 8 V3-PAC (2701625)
SBT_V3_CrossComm	In the SBT version V3, the islands can communicate with each other. The cross communication is a master-slave model. One or more islands act as slaves for another master island.	3.00	SCL	V5.5	V13	IB IL 24 LPSDO 8 V3-PAC (2701625)
SBT_V3_DataExch	If two islands are connected on different PLCs, and a cross-communication is needed, then the function block is responsible for data exchange between the master and the slave island.	3.00	SCL	V5.5	V13	IB IL 24 LPSDO 8 V3-PAC (2701625)
SBT_V3_Tracer	If a communication error has occurred, the safety module saves the last four telegrams between the module and the other devices.	1.00	SCL	V5.5	V13	IB IL 24 LPSDO 8 V3-PAC (2701625) AXL F LPSDO8/3 1F (2702171)