SIEMENS

SIMATIC

STEP 7 Professional / WinCC Unified SIMATIC Control Function Library

System Manual

Online documentation

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Online documentation

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Basics

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1.1 Introduction

The SIMATIC Control Function Library provides function blocks and faceplates for automatic engineering in the process industry.

The SIMATIC Control Function Library based on the "Module Type Package (MTP)". MTP is a formal description of the interfaces and functions of the automation technology of a modular process unit. This means you parameterize, operate and visualize function blocks by using faceplates and/or MTP interfaces.

1.2 Software and hardware requirements

Hardware requirements

All blocks of the Control Function Library are activated for the following controllers:

- SIMATIC S7-1200 (firmware V4.3)
- SIMATIC S7-1500 (firmware V2.8)
- SIMATIC S7 Open Controller (firmware V2.5 and higher)
- SIMATIC ET200 SP CPU (firmware V2.8 and higher)
- SIMATIC S7-1500 Software Controller (firmware V2.5 and higher)
- Simulation with SIMATIC S7-PLCSIM (as of V18)
  Only applies to S7-1500, S7-1200 and ET200 CPU
- Simulation with SIMATIC S7-PLCSIM Advanced (as of V5.0)
  Only applies to S7-1500 and ET200 CPU

Software requirements

To use and configure the blocks, you need the following product:

- SIMATIC STEP 7 Professional V18 Update 2 (TIA Portal) or higher

You need the following product to visualize the blocks:

- WinCC Unified V18 Update 2 or higher
- WinCC Unified PC Runtime V18 Update 2 Service Release 1

Additional software:

- SiVarc V18 Update 2

Note

GDPR - General Data Protection Regulations

Adhere to the General Data Protection Regulations (GDPR) of WinCC Unified V18.

More information can be found in the online help of WinCC Unified Runtime (start page of the web client > WinCC Unified Help > Runtime Readme > Data Protection Regulation (GDPR)").

1.3 Configuration concept

You have the option to use and visualize function blocks, PLC data types, faceplates and master copies from the Control Function Library in your process.

The following configuration sequence is possible:

1. You are using function blocks of the Control Function Library in your project.
2. You are using PLC data types of the Control Function Library in your project.
3. You configure tags of a PLC data type intended for the configuration and connect the tags to the function blocks.
4. You are using faceplates of the Control Function Library in an image.
5. You are connecting the faceplates to tags of a PLC data type intended for the faceplates.

1.4 Simulation with SIMATIC S7-PLCSIM / SIMATIC S7-PLCSIM Advanced

Introduction

You can simulate function blocks with SIMATIC S7-PLCSIM or SIMATIC S7-PLCSIM Advanced. The simulation is already activated in the properties of the function blocks. All you have to do is activate the simulation capability of the function blocks in the project properties.

Note

Function blocks with activated simulation capability use more memory in the PLC.

Requirement

- Your project is completely compiled.

Procedure

1. Select the project in the project tree.
2. Click "Properties" in the context menu.
   The project properties are displayed.
3. Select the "Protect" tab.
4. Select the option "Support simulation during block compilation".

1.5 Units of measurement

Some of the function blocks in the Control Function Library use units of measurement. When a function block contains a unit of measurement, the unit of measurement is defined in the configuration data of the function block (e.g. VUnit = 1001). To display the correct unit of measurement in the faceplate, the text list "LCFL_Unit" is used. This list contains a data pair (e.g. 1001 = °C) for each unit of measurement. The text list is attached to the interface of the block icon for the corresponding blocks.

You can find the list with the units of measurement and their values in the section References (Page 421).

Note

To save space in the system, not all units of measurement are displayed in their totality. The units of measurement are displayed left-justified. If you want to abbreviate the unit of measurement, use the "Customer-specific units".

Control Function Library

2

Introduction

The Control Function Library can be found under the global libraries. To use the function blocks, PLC data types, faceplates, and master copies contained therein in your project, import the Control Function Library into your project library.

More information on libraries is available in the STEP 7 manual under "Using libraries".

Structure of the library

The Control Function Library is divided up into individual folders.

"Types" folder

The following folders with the corresponding function blocks, PLC data types, and faceplates are available under "Types > LCFL". A distinction is made here between the hardware families "SIMATIC S7-1200" and "SIMATIC S7-1500", as well as "PLC Hardware" and "PLC Software".

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
Common Blocks	Diagnostics	SIMATIC S7-1200	LCFL_1200_typeDiagnostics	-	-	LCFL_1200_Status
		SIMATIC S7-1500	LCFL_typeDiagnostics	-	-	LCFL_Status
	DriveInterconnector	SIMATIC S7-1200	LCFL_1200_DriveInterconnector	-	-	-
		SIMATIC S7-1500	LCFL_DriveInterconnector	-	-	-
	Feedback Monitoring	SIMATIC S7-1200	-	LCFL_1200_FeedbackMonitoring	-	-
		SIMATIC S7-1500	-	LCFL_FeedbackMonitoring	LCFL_SW_FeedbackMonitoring	-
	Interlock	SIMATIC S7-1200	-	LCFL_1200_Interlock	-	-
		SIMATIC S7-1500	-	LCFL_Interlock	LCFL_SW_Interlock	-
	Maintenance	SIMATIC S7-1200	LCFL_1200_typeMaintenance LCFL_1200_typeConfigMaintenance LCFL_1200_typeConfigMaintenanceSiemens	LCFL_1200_Maintenance	-	LCFL_1200_Maintenance1 LCFL_1200_Maintenance2
		SIMATIC S7-1500	LCFL_typeMaintenance LCFL_typeConfigMaintenance LCFL_typeConfigMaintenanceSiemens	LCFL_Maintenance	LCFL_SW_Maintenance	LCFL_Maintenance1 LCFL_Maintenance2
	Operation Mode	SIMATIC S7-1200	-	LCFL_1200_OperationMode	-	LCFL_OperationMode
		SIMATIC S7-1500	-	LCFL_OperationMode	LCFL_SW_OperationMode	-
	OS Level	SIMATIC S7-1200	LCFL_1200_typeMTPOSLevel LCFL_1200_typeMTPOSLevelSiemens LCFL_1200_typeOSLevelSiemens	-	-	LCFL_1200_OSLevelControl LCFL_1200_OSLevelIcon
		SIMATIC S7-1500	LCFL_typeMTPOSLevel LCFL_typeMTPOSLevelSiemens	-	-	LCFL_OSLevelControl LCFL_OSLevelIcon

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
			LCFL_typeOSLevelSiemens			
	Source Mode	SIMATIC S7-1200	-	LCFL_1200_SourceMode	-	-
		SIMATIC S7-1500	-	LCFL_SourceMode	LCFL_SW_SourceMode	-

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
Drives	MonAnaDrv	SIMATIC S7-1200	LCFL_1200_typeConfigMonAnaDrv LCFL_1200_typeMTPMonAnaDrv LCFL_1200_typeMTPMonAnaDrvSiemens	LCFL_1200_MonAnaDrv	-	LCFL_1200_MonAnaDrvHome1 LCFL_1200_MonAnaDrvHome2 LCFL_1200_MonAnaDrvHome3 LCFL_1200_MonAnaDrvHomeErr LCFL_1200_MonAnaDrvSettings1 LCFL_1200_MonAnaDrvSettings2 LCFL_1200_MonAnaDrvSymbol
		SIMATIC S7-1500	LCFL_typeConfigMonAnaDrv LCFL_typeMTPMonAnaDrv LCFL_typeMTPMonAnaDrvSiemens	LCFL_MonAnaDrv	LCFL_SW_MonAnaDrv	LCFL_MonAnaDrvHome1 LCFL_MonAnaDrvHome2 LCFL_MonAnaDrvHome3 LCFL_MonAnaDrvHomeErr LCFL_MonAnaDrvSettings1 LCFL_MonAnaDrvSettings2 LCFL_MonAnaDrvSymbol
	MonAnaVlv	SIMATIC S7-1200	LCFL_1200_typeConfigMonAnaVlv LCFL_1200_typeMTPMonAnaVlv LCFL_1200_typeMTPMonAnaVlvSiemens	LCFL_1200_MonAnaVlv	-	LCFL_1200_MonAnaVlvHome1 LCFL_1200_MonAnaVlvHome2 LCFL_1200_MonAnaVlvHomeErr LCFL_1200_MonAnaVlvSettings LCFL_1200_MonAnaVlvSymbol
		SIMATIC S7-1500	LCFL_typeConfigMonAnaVlv LCFL_typeMTPMonAnaVlv LCFL_typeMTPMonAnaVlvSiemens	LCFL_MonAnaVlv	LCFL_SW_MonAnaVlv	LCFL_MonAnaVlvHome1 LCFL_MonAnaVlvHome2 LCFL_MonAnaVlvHomeErr LCFL_MonAnaVlvSettings

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
						LCFL_MonAnaVlv-Symbol
	MonBinDrv	SIMATIC S7-1200	LCFL_1200_type ConfigMon-BinDrv LCFL_1200_type MTPMonBinDrv LCFL_1200_type MTPMonBinDrv-Siemens	LCFL_1200_Mon BinDrv	-	LCFL_1200_Mon-BinDrvHome LCFL_1200_Mon-BinDrvSettings LCFL_1200_Mon-BinDrvSymbol
		SIMATIC S7-1500	LCFL_typeCon-figMonBinDrv LCFL_type-MTPMonBinDrv LCFL_type-MTPMonBinDrv-Siemens	LCFL_MonBinDrv	LCFL_SW_Mon-BinDrv	LCFL_MonBinDrv-Home LCFL_MonBinDrv-Settings LCFL_MonBinDrv-Symbol
	MonBinVlv	SIMATIC S7-1200	LCFL_1200_type ConfigMon-BinVlv LCFL_1200_type MTPMonBinVlv LCFL_1200_type MTPMonBinVlv-Siemens	LCFL_1200_Mon BinVlv	-	LCFL_1200_Mon-BinVlvHome LCFL_1200_Mon-BinVlvSettings1 LCFL_1200_Mon-BinVlvSettings2 LCFL_1200_Mon-BinVlvSymbol
		SIMATIC S7-1500	LCFL_typeCon-figMonBinVlv LCFL_type-MTPMonBinVlv LCFL_type-MTPMonBinVlv-Siemens	LCFL_MonBinVlv	LCFL_SW_Mon-BinVlv	LCFL_MonBinVlv-Home LCFL_MonBinVlv-Settings1 LCFL_MonBinVlv-Settings2 LCFL_MonBinVlv-Symbol

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
Interlock	LockView4	SIMATIC S7-1200	LCFL_1200_typeConfigLockView4 LCFL_1200_typeMTPLockView4 LCFL_1200_typeMTPLockView4Siemens	LCFL_1200_LockView4	-	LCFL_1200_LockView4Home LCFL_1200_LockView4Symbol
		SIMATIC S7-1500	LCFL_typeConfigLockView4 LCFL_typeMTPLockView4 LCFL_typeMTPLockView4Siemens	LCFL_LockView4	LCFL_SW_LockView4	LCFL_LockView4Home LCFL_LockView4Symbol
	LockView8	SIMATIC S7-1200	LCFL_1200_typeConfigLockView8 LCFL_1200_typeMTPLockView8 LCFL_1200_typeMTPLockView8Siemens	LCFL_1200_LockView8	-	LCFL_1200_LockView8Home LCFL_1200_LockView8Symbol
		SIMATIC S7-1500	LCFL_typeConfigLockView8 LCFL_typeMTPLockView8 LCFL_typeMTPLockView8Siemens	LCFL_LockView8	LCFL_SW_LockView8	LCFL_LockView8Home LCFL_LockView8Symbol

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
Monitoring	AnaMon	SIMATIC S7-1200	LCFL_1200_typeConfigAnaMon LCFL_1200_typeMTPAnaMon LCFL_1200_typeMTPAnaMonSiemens	LCFL_1200_AnaMon	-	LCFL_1200_AnaMonHome LCFL_1200_AnaMonSettings1 LCFL_1200_AnaMonSettings2 LCFL_1200_AnaMonSymbol
		SIMATIC S7-1500	LCFL_typeConfigAnaMon LCFL_typeMTPAnaMon LCFL_typeMTPAnaMonSiemens	LCFL_AnaMon	LCFL_SW_AnaMon	LCFL_AnaMonHome LCFL_AnaMonSettings1 LCFL_AnaMonSettings2 LCFL_AnaMonSymbol
	BinMon	SIMATIC S7-1200	LCFL_1200_typeConfigBinMon LCFL_1200_typeMTPBinMon LCFL_1200_typeMTPBinMonSiemens	LCFL_1200_BinMon	-	LCFL_1200_BinMonHome LCFL_1200_BinMonSettings LCFL_1200_BinMonSymbol
		SIMATIC S7-1500	LCFL_typeConfigBinMon LCFL_typeMTPBinMon LCFL_typeMTPBinMonSiemens	LCFL_BinMon	LCFL_SW_BinMon	LCFL_BinMonHome LCFL_BinMonSettings LCFL_BinMonSymbol
	DIntMon	SIMATIC S7-1200	LCFL_1200_typeConfigDIntMon LCFL_1200_typeMTPDIntMon LCFL_1200_typeMTPDIntMonSiemens	LCFL_1200_DIntMon	-	LCFL_1200_DIntMonHome LCFL_1200_DIntMonSettings1 LCFL_1200_DIntMonSettings2 LCFL_1200_DIntMonSymbol
		SIMATIC S7-1500	LCFL_typeConfigDIntMon LCFL_typeMTPDIntMon LCFL_typeMTPDIntMonSiemens	LCFL_DIntMon	LCFL_SW_DIntMon	LCFL_DIntMonHome LCFL_DIntMonSettings1 LCFL_DIntMonSettings2 LCFL_DIntMonSymbol

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
	StringView	SIMATIC S7-1200	LCFL_1200_typeConfigStringView LCFL_1200_typeMTPStringView LCFL_1200_typeMTPStringView-Siemens	LCFL_1200_StringView	-	LCFL_1200_StringViewHome LCFL_1200_StringViewSymbol
		SIMATIC S7-1500	LCFL_typeConfigStringView LCFL_type-MTPStringView LCFL_type-MTPStringView-Siemens	LCFL_StringView	LCFL_SW_String-View	LCFL_StringViewHome LCFL_StringView-Symbol

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
Operate	AnaManInt	SIMATIC S7-1200	LCFL_1200_typeConfigAnaManInt LCFL_1200_typeMTPAnaManInt LCFL_1200_typeMTPAnaManInt-Siemens	LCFL_1200_AnaManInt	-	LCFL_1200_AnaManIntHome LCFL_1200_AnaManIntSymbol
		SIMATIC S7-1500	LCFL_typeConfigAnaManInt LCFL_typeMTPAnaManInt LCFL_typeMTPAnaManIntSiemens	LCFL_AnaManInt	LCFL_SW_AnaManInt	LCFL_AnaManIntHome LCFL_AnaManIntSymbol
	BinManInt	SIMATIC S7-1200	LCFL_1200_typeConfigBinManInt LCFL_1200_typeMTPBinManInt LCFL_1200_typeMTPBinManInt-Siemens	LCFL_1200_BinManInt	-	LCFL_1200_BinManIntHome LCFL_1200_BinManIntSymbol
		SIMATIC S7-1500	LCFL_typeConfigBinManInt LCFL_typeMTPBinManInt LCFL_typeMTPBinManInt-Siemens	LCFL_BinManInt	LCFL_SW_BinManInt	LCFL_BinManIntHome LCFL_BinManIntSymbol
	DIntManInt	SIMATIC S7-1200	LCFL_1200_typeConfigDIntManInt LCFL_1200_typeMTPDIntManInt LCFL_1200_typeMTPDIntManInt-Siemens	LCFL_1200_DIntManInt	-	LCFL_1200_DIntManIntHome LCFL_1200_DIntManIntSymbol
		SIMATIC S7-1500	LCFL_typeConfigDIntManInt LCFL_typeMTPDIntManInt LCFL_typeMTPDIntManInt-Siemens	LCFL_DIntManInt	LCFL_SW_DIntManInt	LCFL_DIntManIntHome LCFL_DIntManIntSymbol

Folder (Family)	Sub folder (Control module)	Program block (hardware family)	PLC data types	Program blocks (PLC hardware)	Program blocks (PLC software)	Faceplates (WinCC Unified)
Control	Aggr8	SIMATIC S7-1200	LCFL_1200_typeConfigAggr8 LCFL_1200_typeMTPAggr8 LCFL_1200_typeMTPAggr8Siemens	LCFL_1200_Aggr8	-	LCFL_1200_Aggr8Home1 LCFL_1200_Aggr8Home2 LCFL_1200_Aggr8Home3 LCFL_1200_Aggr8Settings1 LCFL_1200_Aggr8Settings2 LCFL_1200_Aggr8Symbol
		SIMATIC S7-1500	LCFL_typeConfigAggr8 LCFL_typeAggr8 LCFL_typeAggr8Siemens	LCFL_Aggr8	LCFL_SW_Aggr8	LCFL_Aggr8Home1 LCFL_Aggr8Home2 LCFL_Aggr8Home3 LCFL_Aggr8Settings1 LCFL_Aggr8Settings2 LCFL_Aggr8Symbol
	PIDCtrl	SIMATIC S7-1200	LCFL_1200_typeConfigPIDCtrl LCFL_1200_typeMTPPIDCtrl LCFL_1200_typeMTPPIDCtrlSiemens	LCFL_1200_PIDCtrl	-	LCFL_1200_PIDCtrlHome LCFL_1200_PIDCtrlSettings LCFL_1200_PIDCtrlSymbol
		SIMATIC S7-1500	LCFL_typeConfigPIDCtrl LCFL_typeMTPPIDCtrl LCFL_typeMTPPIDCtrlSiemens	LCFL_PIDCtrl	LCFL_SW_PIDCtrl	LCFL_PIDCtrlHome LCFL_PIDCtrlSettings LCFL_PIDCtrlSymbol

Note

In the following sections, in which the function blocks, PLC data types, and faceplates are described in more detail, no distinction is made between the hardware families or program blocks. The function descriptions are identical.

The following folder with the graphics used in the faceplate is located under "Types > LCFL":

Folder	Sub folder	Graphics
Graphics	-	LCFL_AlarmRed LCFL_Close LCFL_CloseVlv LCFL_False LCFL_Forward LCFL_IconAlarm LCFL_IconDisabled LCFL_IconLock LCFL_IconManual LCFL_IconTolerance LCFL_IconVlvDark LCFL_IconVlvWhite LCFL_IconWarning LCFL_LockClosed LCFL_LockOpened LCFL_NotOKGrey LCFL_Off LCFL_OK LCFL_OKGrey LCFL_OpenVlv LCFL_OSLevelLockClosed LCFL_OSLevelLockOpened LCFL_Reset LCFL_Reverse LCFL_SourceInternal LCFL_SourceManual LCFL_StateAutomatic LCFL_Stop LCFL_Tolerance LCFL_True LCFL_Warning

"Master copies" folder

The following folders with the corresponding master copies are available under "Master copies > LCFL":

Folder (Family)	Sub folder	Master copies
Control	Aggr8 > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_Aggr8
	Aggr8 > SIMATIC S7-1500 > WinCC Unified	LCFL_Aggr8
	PIDCtrl > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_PIDCtrl
	PIDCtrl > SIMATIC S7-1500 > WinCC Unified	LCFL_PIDCtrl
Drives	MonAnaDrv > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_MonAnaDrv
	MonAnaDrv > SIMATIC S7-1500 > WinCC Unified	LCFL_MonAnaDrv
	MonAnaVlv > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_MonAnaVlv
	MonAnaVlv > SIMATIC S7-1500 > WinCC Unified	LCFL_MonAnaVlv
	MonBinDrv > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_MonBinDrv
	MonBinDrv > SIMATIC S7-1500 > WinCC Unified	LCFL_MonAnaDrv
	MonBinVlv > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_MonBinVlv
	MonBinVlv > SIMATIC S7-1200 > WinCC Unified	LCFL_MonBinVlv

Folder (Family)	Sub folder	Master copies
HMI alarms	General > WinCC Unified > Alarm classes	LCFL_Alarm LCFL_Event LCFL_PLC_ProcessControl LCFL_PreventativeMaintenance LCFL_Process LCFL_Status LCFL_Tolerance LCFL_Warning LCFL_Color_Alarm LCFL_Color_Event LCFL_Color_PLC_ProcessControl LCFL_Color_PreventativeMaintenance LCFL_Color_Process LCFL_Color_Status LCFL_Color_Tolerance LCFL_Color_Warning
	General > WinCC Unified > Discrete alarms	Control • Aggr8 LCFL_Aggr8_Aggregate1ErrorMessage LCFL_Aggr8_Aggregate2ErrorMessage LCFL_Aggr8_Aggregate3ErrorMessage LCFL_Aggr8_Aggregate4ErrorMessage LCFL_Aggr8_Aggregate5ErrorMessage LCFL_Aggr8_Aggregate6ErrorMessage LCFL_Aggr8_Aggregate7ErrorMessage LCFL_Aggr8_Aggregate8ErrorMessage • PIDCtrl LCFL_PIDCtrl_DisturbanceValueInvalidMessage LCFL_PIDCtrl_ManipulatedValueFailedMessage LCFL_PIDCtrl_ManipulatedValueManualInvalidMessage LCFL_PIDCtrl_PIDControllerTimeErrMessage LCFL_PIDCtrl_ProcessValueInvalidInputMessage LCFL_PIDCtrl_ProcessValueLimitMessage LCFL_PIDCtrl_SetpointInvalidMessage LCFL_PIDCtrl_SubstitudeValueInvalidMessage Drives • MonAnaDrv LCFL_MonAnaDrv_MonitorDynamicMessage LCFL_MonAnaDrv_MonitorStaticMessage LCFL_MonAnaDrv_RevolutionSpeedAlarmHighMessage LCFL_MonAnaDrv_RevolutionSpeedAlarmLowMessage LCFL_MonAnaDrv_TripMessage LCFL_MonAnaDrv_AlarmCounterMessage LCFL_MonAnaDrv_SwitchCounterMessage LCFL_MonAnaDrv_CycleTimeMessage

Folder (Family)	Sub folder	Master copies
		LCFL_MonAnaDrv_OperatingTimeMessage • MonAnaVlv LCFL_MonAnaVlv_MonitorDynamicMessage LCFL_MonAnaVlv_MonitorStaticMessage LCFL_MonAnaVlv_MonitorPositionMessage LCFL_MonAnaVlv_AlarmCounterMessage LCFL_MonAnaVlv_SwitchCounterMessage LCFL_MonAnaVlv_CycleTimeMessage LCFL_MonAnaVlv_OperatingTimeMessage • MonBinDrv LCFL_MonBinDrv_MonitorDynamicMessage LCFL_MonBinDrv_MonitorStaticMessage LCFL_MonBinDrv_TripMessage LCFL_MonBinDrv_AlarmCounterMessage LCFL_MonBinDrv_SwitchCounterMessage LCFL_MonBinDrv_CycleTimeMessage LCFL_MonBinDrv_OperatingTimeMessage • MonBinVlv LCFL_MonBinVlv_MonitorDynamicMessage LCFL_MonBinVlv_MonitorStaticMessage LCFL_MonBinVlv_AlarmCounterMessage LCFL_MonBinVlv_SwitchCounterMessage LCFL_MonBinVlv_CycleTimeMessage LCFL_MonBinVlv_OperatingTimeMessage Monitoring • AnaMon LCFL_AnaMon_AlarmHighMessage LCFL_AnaMon_AlarmLowMessage LCFL_AnaMon_ToleranceHighMessage LCFL_AnaMon_ToleranceLowMessage LCFL_AnaMon_WarningHighMessage LCFL_AnaMon_WarningLowMessage • BinMon LCFL_BinMon_FlutteringMessage LCFL_BinMon_ValueMessage • DIntMon LCFL_DIntMon_AlarmHighMessage LCFL_DIntMon_AlarmLowMessage LCFL_DIntMon_ToleranceHighMessage LCFL_DIntMon_ToleranceLowMessage LCFL_DIntMon_WarningHighMessage LCFL_DIntMon_WarningLowMessage
HMI tags	General > WinCC Unified	LCFL_InternalTags

Folder (Family)	Sub folder	Master copies
Interlock	LockView4 > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_LockView4
	LockView4 > SIMATIC S7-1500> WinCC Unified	LCFL_LockView4
	LockView8 > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_LockView8
	LockView8 > SIMATIC S7-1500> WinCC Unified	LCFL_LockView8
Monitoring	AnaMon > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_AnaMon
	AnaMon > SIMATIC S7-1500 > WinCC Unified	LCFL_AnaMon
	BinMon > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_BinMon
	BinMon > SIMATIC S7-1500 > WinCC Unified	LCFL_BinMon
	DIntMon > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_DIntMon
	DIntMon > SIMATIC S7-1500 > WinCC Unified	LCFL_DIntMon
	StringView > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_StringView
	StringView > SIMATIC S7-1500 > WinCC Unified	LCFL_StringView
Operate	AnaManInt > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_AnaManInt
	AnaManInt > SIMATIC S7-1500 > WinCC Unified	LCFL_AnaManInt
	BinManInt > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_BinManInt
	BinManInt > SIMATIC S7-1500 > WinCC Unified	LCFL_BinManInt
	DIntManInt > SIMATIC S7-1200 > WinCC Unified	LCFL_1200_DIntManInt
	DIntManInt > SIMATIC S7-1500 > WinCC Unified	LCFL_DIntManInt

Folder (Family)	Sub folder	Master copies
SiVarc	General	LCFL_General_CopyRules
	SIMATIC S7-1200 > PLC hardware	LCFL_1200_SiVarc LCFL_1200_AlarmRules LCFL_1200_CopyRules LCFL_1200_ScreenRules
	SIMATIC S7-1500 > General	LCFL_CopyRules
	SIMATIC S7-1500 > PLC hardware	LCFL_SiVarc LCFL_AlarmRules LCFL_ScreenRules
	SIMATIC S7-1500 > PLC software	LCFL_SW_SiVarc LCFL_SW_AlarmRules LCFL_SW_ScreenRules
Text and graphic lists	General > WinCC Unified	LCFL_OSLevel LCFL_Unit

Integrating the Control Function Library into the project library

1. In the context menu of the Control Function Library, click on "Update types > Library". The "Update types in a library" dialog opens.
2. Enable the "Update project library" option if it is not enabled by default.
3. Click "OK".

Result

The "Types" folder with the function blocks, PLC data types and faceplates has been created in the project library.

Note

The master copies must be moved separately from the global library to the project library using drag-and-drop.

Cleaning up the project library

1. Click "Library management" in the context menu of the project library. The "Library view" opens.
2. Click on the "Clean up project library" button. The "Clean up project library" dialog opens.
3. Enable the option: "Delete complete types".
4. Click "OK".

Result

All types that are not used in the project have been deleted from the project library. The folder structure is retained.

Note

When all "Types" folders with the function blocks, PLC data types, and faceplates for each hardware family have been updated or copied, the unused objects can be deleted again by means of "Clean up project library". This can simplify the use of the objects, e.g. if only objects from one hardware family are used. This also reduces the memory size of the TIA Portal project.

Defining multilingual support

3

Identifier and description of the DataAssembly

Each DataAssembly contains a unique identifier (TagName) and description (TagDescription). Both tags are static and can be modeled in multiple languages. In the case of multilingual modeling, the reference language is exported as the default value.

Requirement

- Your TIA Portal project is open.

Procedure for single-instance block

For single-instance blocks, TagName and TagDescription are exported from the title and comment of the block.

To configure the values, follow these steps:

1. Select the data block in the project tree.
2. Enter the desired values under "Properties > General > Information":
   - Title: During an MTP export, this value is written as TagName to the MTP file. The value must not be longer than 64 characters.
   - Comment: During an MTP export, this value is written as TagDescription to the MTP file.
3. If necessary, change the editing language in the "Tasks" task card under "Languages & Resources", and repeat Step 2 for additional languages.

Note

If the title and comment are not configured for the selected reference language in the block, the name of the block is exported as TagName and TagDescription.

Additional languages are exported as multilingual text if the title and comment are configured in the block. If additional languages are configured, configuration of the English values is mandatory.

Procedure for multi-instance blocks

For multi-instance blocks, TagName and TagDescription are exported from the comment of the connected technology data block.

To configure the value, follow these steps:

1. Open the multi-instance block by double-clicking in the project tree.
2. In the "Comment" column of the connected technology data block, enter the desired value in the form `{ "TagName" : "<Text for TagName>" , "TagDescription" : "<Text for TagDescription>" }`.
   - <Text for TagName>: During an MTP export, this value is written as TagName to the MTP file. The value must not be longer than 64 characters.
   - <Text for TagDescription>: During an MTP export, this value is written as TagDescription to the MTP file.
3. If necessary, change the editing language in the "Tasks" task card under "Languages & Resources", and repeat Step 2 for additional languages.

Note

If the "Comment" field is not configured for the selected reference language in the technology data block, the composite names of multi-instance and lower-level instance data blocks are exported as TagName and TagDescription.

Additional languages are exported as multilingual text if the comment field is configured in the technology data block. If additional languages are configured, configuration of the English value is mandatory.

Alarms

4

Introduction

With some faceplates of the Control Function Library it is possible to output predefined alarms and thus monitor your process. You can implement the monitoring with ProDiag or discrete alarms.

Each alarm can be activated or deactivated by a separate alarm activation tag. Each alarm is represented by a separate alarm display tag.

Alarm activation tag

Each alarm can be activated or deactivated in a corresponding configuration data block using associated PLC data types. The name of the alarm activation tag ends with "MessageEn" and the default value for each alarm is "TRUE", i.e. activated. Each alarm activation tag has a similar comment, such as "Alarm activation for ... (1: Enabled; 0: Deactivated)".

Alarm display tag

Each alarm has a separate alarm display tag in the associated PLC data type for extending MTP data. The name of the alarm display tag ends with "Message" and the default value for each message is "FALSE", i.e. not activated. Each alarm display tag has a similar comment, such as "Alarm for ... (1: Message active; 0: Message is deactivated)".

Monitoring is configured with ProDiag for each alarm display tag. This only applies to the function block of the hardware families "SIMATIC S7-1500" and "SIMATIC S7-1500 Software Controller". For the hardware family "SIMATIC S7-1200" this monitoring is not available with ProDiag.

4.1 Defining alarm classes

Introduction

In your project tree under "Common data > Alarm classes" the Control Function Library provides you with 8 alarm classes with the following properties:

- Alarm (ID = 35; Acknowledgment = Yes; Priority = 12)
- Process alarm (ID = 36; Acknowledgment = Yes; Priority = 4)
- Status (ID = 37; Acknowledgment = No; Priority = 12)
- Tolerance (ID = 38; Acknowledgment = Yes; Priority = 8)
- Event message (ID = 39; Acknowledgment = No; Priority = 8)
- Maintenance demanded (ID = 40; Acknowledgment = Yes; Priority = 1)

- PLC process monitoring (ID = 41; Acknowledgment = Yes; Priority = 5)
- Warning (ID = 42; Acknowledgment = Yes; Priority = 8)

This proposal for each individual alarm class is stored under the master copies in the folder "General > WinCC Unified > Alarm classes > HMI alarms".

Note

The alarm classes are additionally provided as an external object under "Control Function Library > UserFiles > AlarmClasses.dat" and can be imported into the alarm classes under "Common data" using the import function.

The alarm classes are automatically transferred from the "Common data" folder to your HMI device. Each alarm class has the same default settings for colors and flash attributes. Therefore, adapt the colors and flash attributes for all 8 alarm classes. You only need to make these settings once for a TIA Portal project.

A proposal for each individual color and its flash attributes for each individual alarm class is stored under the master copies in the "General > WinCC Unified > Alarm classes > HMI alarms" folder. The master copies begin with the name "LCFL_Color".

Procedure

1. In your project tree, navigate to "<HMI device>[WinCC Unified PC RT] > HMI alarms".
2. In the display area, navigate to the "Alarm classes" tab.
   The alarm classes are automatically taken from the "Common data" folder and displayed.
3. Select an alarm class.
4. In the Inspector window, navigate to "Settings > General > Colors".
5. Change the colors and flash attributes.
6. Repeat steps 3–5 for all 8 alarm classes of the Control Function Library.

4.2 Activating alarm classes

Introduction

To use ProDiag, activate the alarm classes. If necessary, adapt the structure of the alarm texts.

The "FB parameters" of the "Supervisions with an error message" are used for the alarm texts. The structure is specified as follows: <PLC name> : <Instance name> : <Specific text box>. The specific text field is the alarm text defined in the function block and is a requirement for alarm filtering in the associated alarm overview (faceplate).

Procedure

1. In your project tree, navigate to "Common data > Supervision settings".
2. Navigate to "General > Categories" in the display area.

3. Activate all 8 alarm classes.
4. Navigate to "Alarm texts > Supervisions with an error message > FB parameters".
5. If necessary, adapt the structure of the alarm texts.

Result

The alarm classes are activated and, if necessary, the structure of the alarm texts is adapted.

The monitoring settings are additionally provided as an external object under "Control Function Library > UserFiles > ProDiagSettings.dat". These can be imported via the import function in the monitoring settings under "Common data".

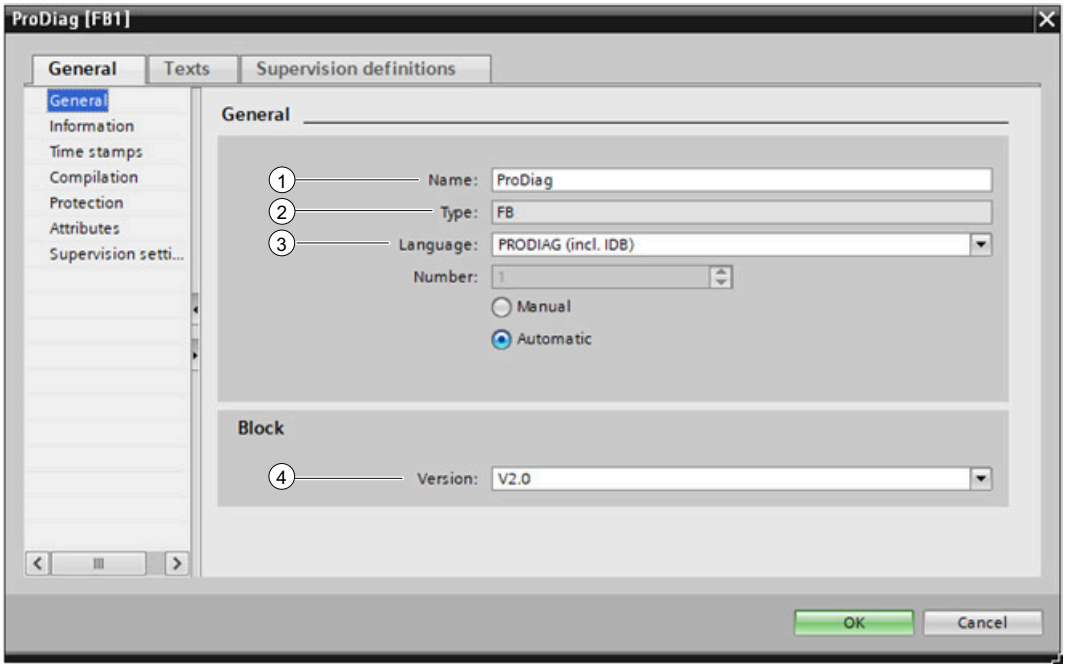
4.3 Monitoring with ProDiag

With ProDiag you can monitor your process and intervene in the process in the event of a fault. The supervision alarms that you can create for different faults provide you with specific information on the supervision type, the location, and the cause of the fault. For the detected faults, you also have the option of outputting notes on how to rectify them. This enables you not only to detect faults, but also to identify potential risks of fault and take appropriate countermeasures.

Few configuration steps are necessary to integrate simple supervisions into your program. You do not need to change the program code. For example, you can create a supervision by monitoring a Boolean operand for its signal state. As soon as the operand delivers the set signal state, a ProDiag supervision alarm is output based on the configured ProDiag supervision settings. The configuration of the supervisions is independent of the programming languages of the TIA Portal because only individual operands are supervised, and you do not need any additional programming sections.

4.4 ProDiag function block

To activate the monitoring, create a ProDiag function block and call the function block in a cyclic organization block. As soon as a new ProDiag function block has been created, a corresponding ProDiag instance data block is also automatically created.

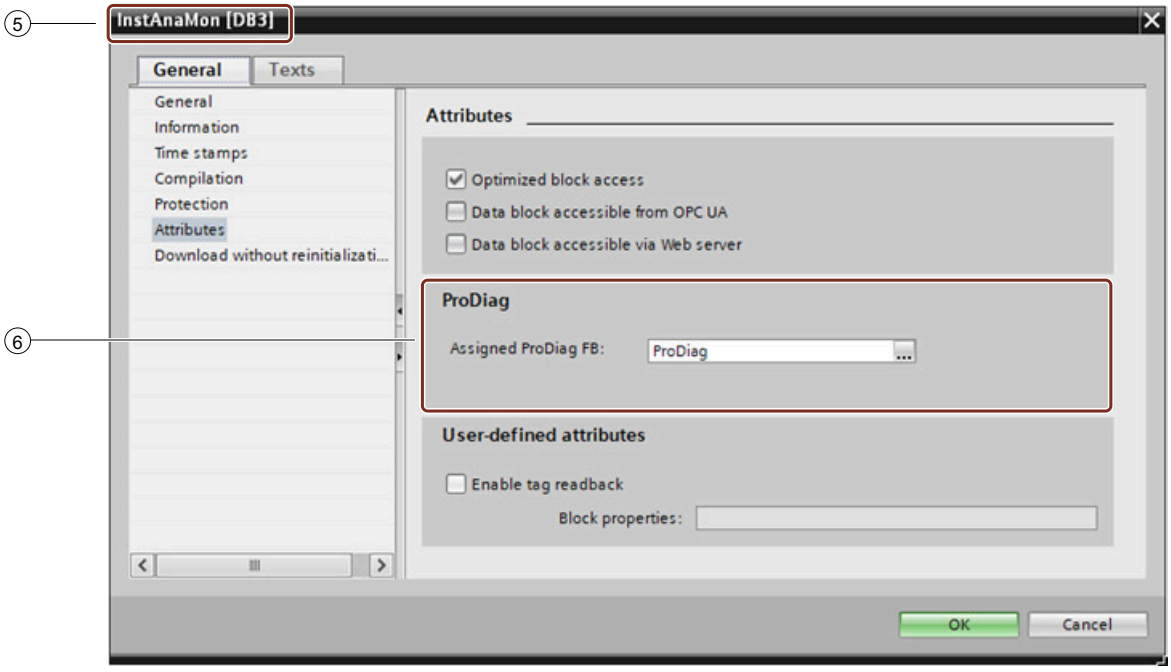


① Name of the ProDiag function block, e.g. "Station_1", "Station_2", etc., for structuring the program code according to machine and plant units.

② The type is always "FB" for function block.

③ A ProDiag function block is created in the PRODIAG programming language (incl. IDB).

④ Depending on the version, the number of supervisions is defined (maximum 250 monitors in version 1.0 and 1,000 supervisions in version 2.0)

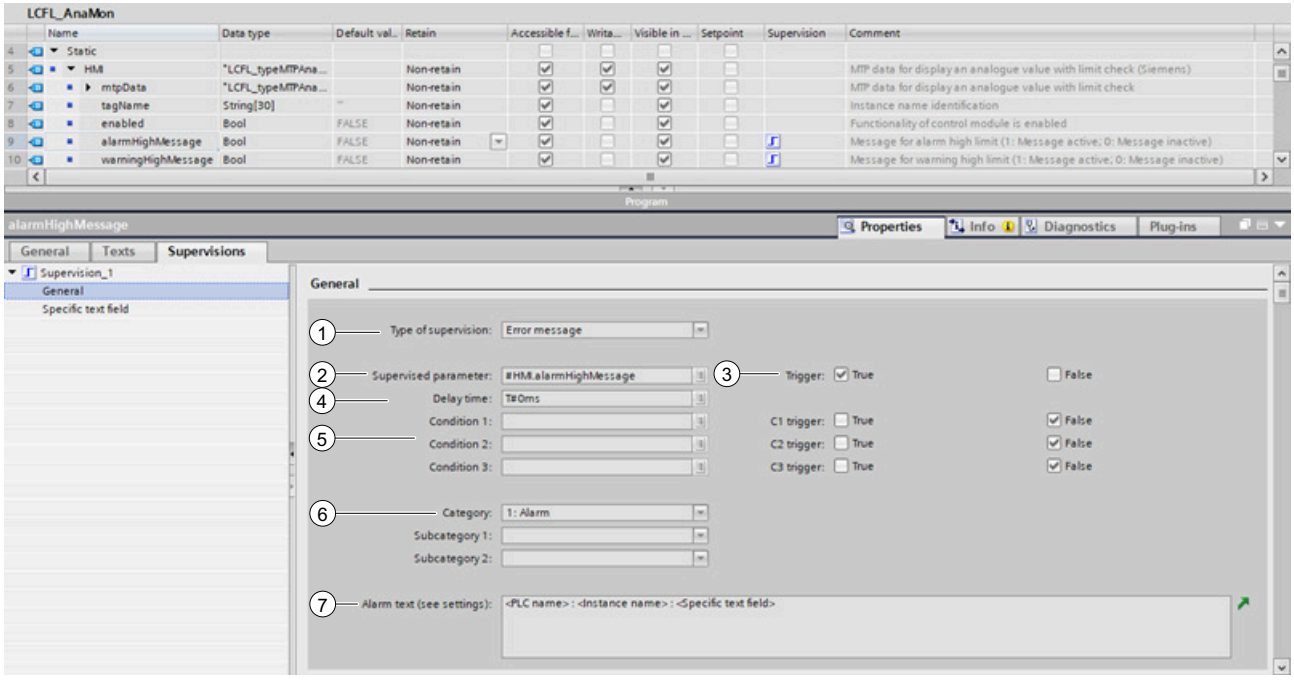


⑤ Each instance data block that contains supervisions has an attribute for ProDiag.

⑥ The instance DB must be assigned to a ProDiag function block.

4.5 Monitoring properties in the function blocks

A supervision is configured at each alarm display tag that includes "Message" at the end of its name.



① The monitoring type is set to "Error message" everywhere.

② The supervised parameter is automatically set to the alarm display tag.

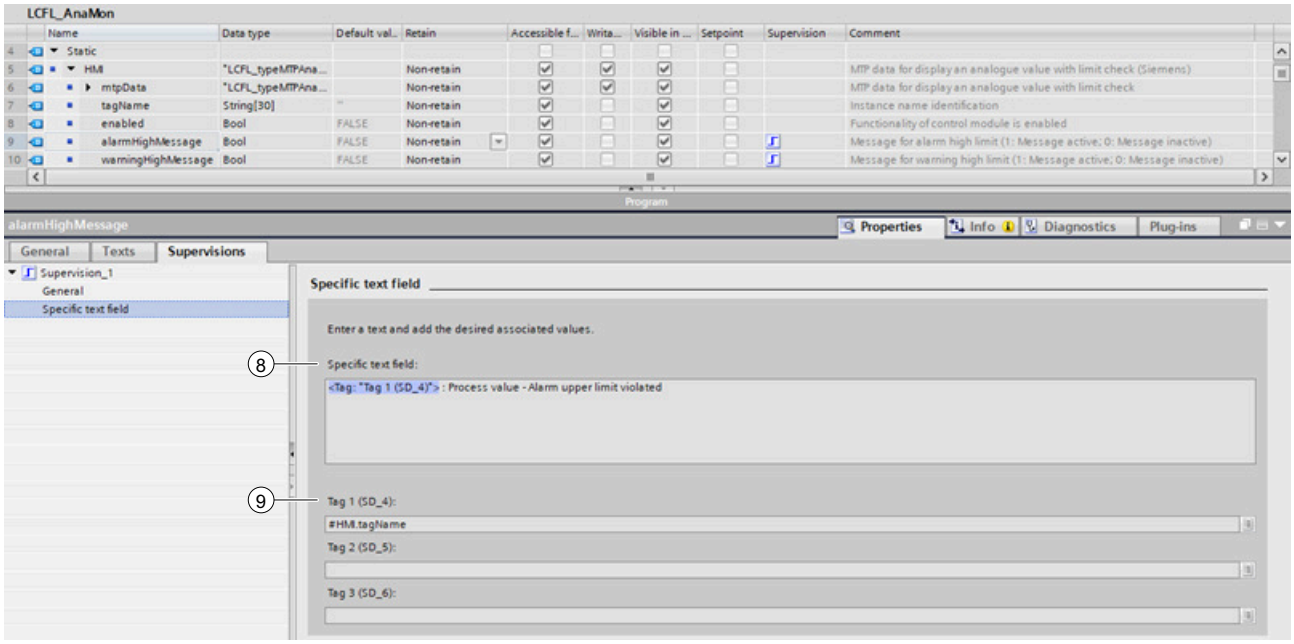
③ The supervision trigger is always set to "True".

④ The delay time is always set to 0 milliseconds.

⑤ No additional conditions are activated.

⑥ The corresponding category is selected from the defined categories of the supervision settings under "Common data". The category depends on the alarm itself.

⑦ The structure of the alarm text is already defined in the supervision settings under "Common data".



⑧ The specific text field always starts with the tag name. For this purpose, the placeholder "<Tag: "Tag 1 (SD_4)">" is used to use the linked tag. The specific text field is defined as follows: <Tag name> : <Alarm text>. The alarm text is provided in all supplied languages.

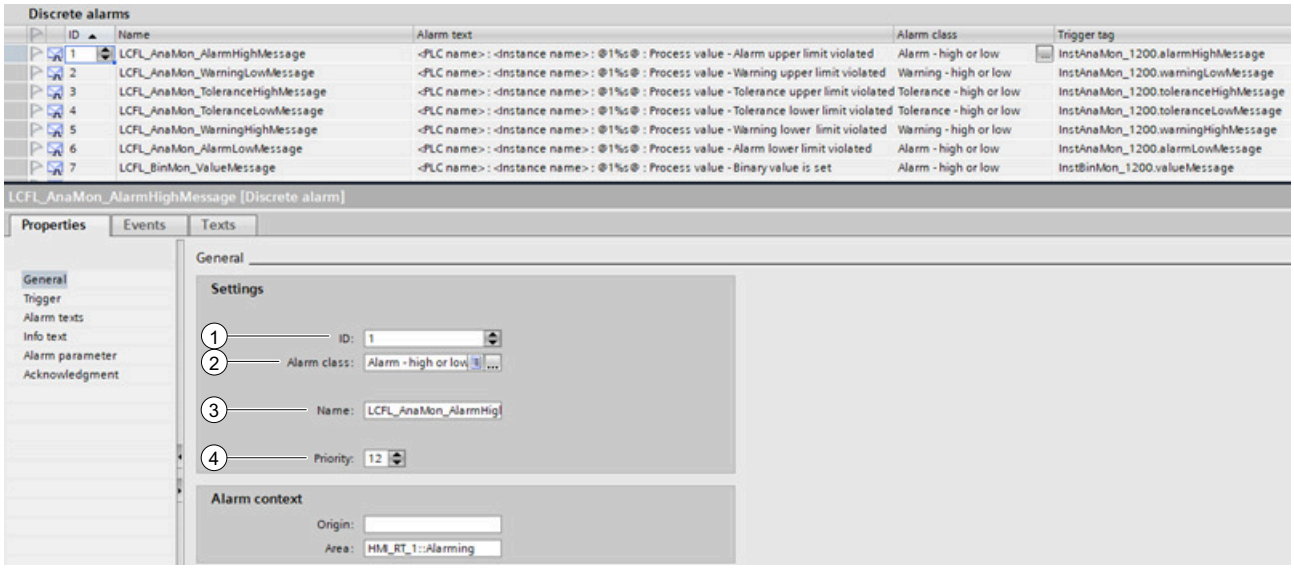
⑨ The "tagName" tag from the "HMI" structure is linked in "Tag 1 (SD_4)". This tag is a requirement for alarm filtering in the associated alarm overview (faceplate).

4.6 Discrete alarms

You can implement the supervision of your process with discrete alarms instead of ProDiag. This is possible with the "SIMATIC S7-1200", "SIMATIC S7-1500", and "SIMATIC S7-1500 Software Controller" hardware families.

A discrete alarm can be created for each alarm display tag marked with "Message" at the end in the tag designation.

Each individual discrete alarm is stored under the master copies in the "General > WinCC Unified > Discrete alarms > HMI alarms" folder. After the discrete alarms have been copied from the master copies, they can be found in your project tree under "<HMI device>[WinCC Unified PC RT] > HMI alarms" in the "Discrete alarms" tab.

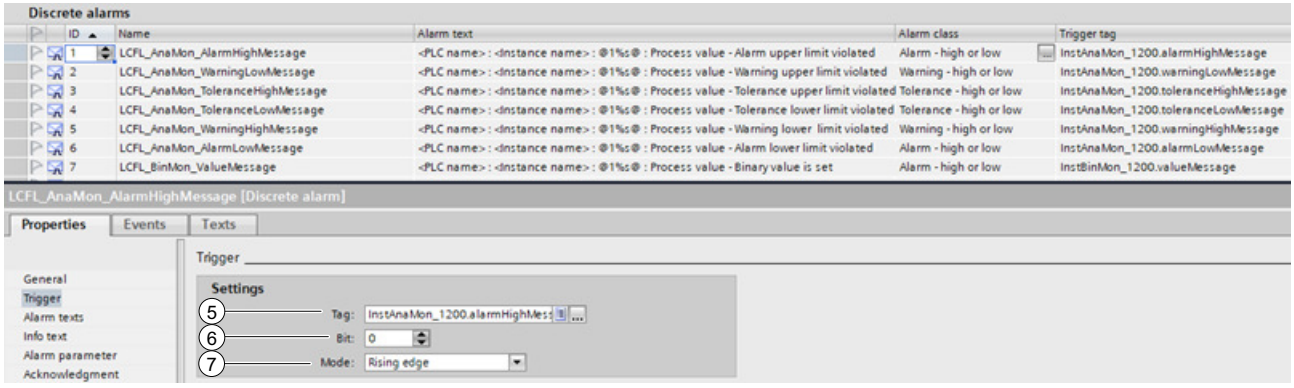


① A unique ID is assigned for each discrete alarm.

② Each discrete alarm is already assigned to an existing alarm class defined under the alarm classes of the HMI device.

③ The name of the discrete alarm is already predefined with "LCFL_<Name>_<Alarm display tag>". The name of each discrete alarm must be unique in the HMI device. If the name of the discrete alarm already exists when copying, a _<sequential number> is appended to the name of the discrete alarm.

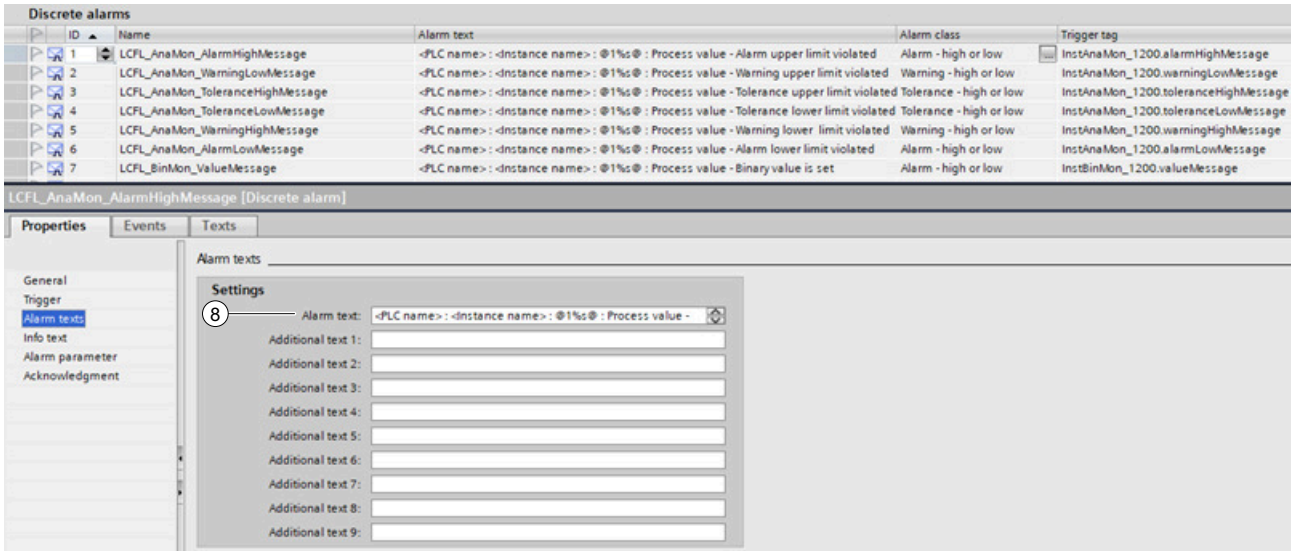
④ The priority is set to the same priority as that of the associated alarm class.



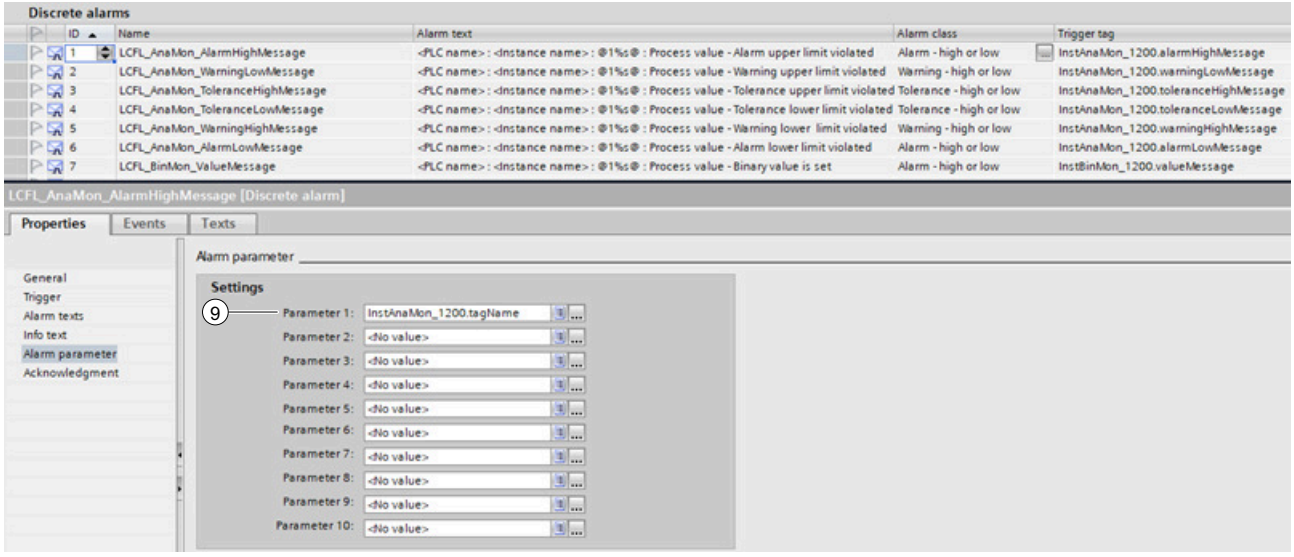
⑤ The user must assign the corresponding alarm display tag, marked with "Message" at the end of the tag designation, to the discrete alarm.

⑥ Since the alarm display tag is a binary variable, bit 0 is selected here.

⑦ "Mode" is always set to "Rising edge".



⑧ The alarm text is defined as follows: <PLC name> : <Instance name> : <Tag name> : <Alarm text>. The alarm text is provided in all required languages. The user must replace the placeholders <PLC name> and <Instance name> with the corresponding names in all available languages.



⑨ The "tagName" tag from the "HMI" structure must be linked under "Parameter 1". The placeholder "1%s" is replaced by the string of the "tagName" tags in the alarm text.

Program blocks 5

5.1 Common Blocks

A Common Block is a subfunction of a function block that provides a specific functionality. This functionality is called by the function block. The Common Block takes on a specific task in this case and then refers back to the called location.

A Common Block is identified by an identifier (e.g. FeedbackMonitoring). Data is transferred to the identifier in the form of arguments from the calling function block for processing. The Common Blocks (e.g. Feedback**Mon**itoring) are used by several function blocks (e.g. **Mon**BinVlv and **Mon**BinDrv).

A function block that calls a Common Block is used in an organization block. The Common Block is automatically stored in the program folders of your project in the process.

5.1.1 DriveInterconnector

5.1.1.1 LCFL_DriveInterconnector – Description of function

Object name (type + number) and family

Family: Common

Description

The "LCFL_DriveInterconnector" function is used for the following application areas:

- Expand LCFL_Aggregate8 with the drive interconnector interface by up to 8 connections
- Expand LCFL drives with the drive interconnector interface by 1 connector

With the LCFL_DriveInterconnector you have the possibility to connect the LCFL drives (LCFL_MonBinDrv, LCFL_MonAnaDrv, LCFL_MonBinDrv, LCFL_MonAnaVlv) to a higher-level control, such as LCFL_Aggregate8 (LCFL_Aggr8). The higher-level control can send control information, for example send commands to the drive. The drive can, for example, send status information to the higher-level control.

Data from the drive to the higher-level control

Name	Data type	Description
status	Byte	Bit0: Enabled; Bit1: Ready to start; Bit2: Started; Bit3.. 7: For future use
operatingCounters.operatingTime	Real	Running time meter (summed)

Name	Data type	Description
operatingCounters.cycleTime	Real	Cycle time meter
operatingCounters.switches	DInt	Current number of switching operations
driveType	UInt	0: Not connected, 1: Valve; 2: Motor; 2000-2999: Reserved for LCFL blocks
tagName	String[30]	Instance name identification

Data from the higher-level control to the drive

Name	Data type	Description
start	Bool	1: Start (open); 0: Stop (close)
directionReversal	Bool	1: Reverse; 0: Forward
controlType	UInt	0: Not connected (standalone); 2000-2999: Reserved for LCFL blocks
tagName	String[30]	Instance name identification

Configuration

LCFL drives

All LCFL drives are equipped with the input/output parameter "interconnector".

The function is called within an LCFL_function block. The "interconnector" input/output parameter on the LCFL function block must be associated with the "LCFL_typeDriveInterconnector" data type.

Standalone mode of the drive

To operate in standalone mode, the interconnector is connected to an empty interconnector, preferably to its own configuration:

Instance DB of LCFL_Drive.interconnector :=
LCFL_typeConfigDrive.standaloneDrive

In this case, the drive is controlled in the classic sense, as described in the Drives sections.

Interconnector mode of the drive / LCFL_Aggr8 as a higher-level control

To operate in interconnector mode, the drive is connected to the interconnector tag of the higher-level control (e.g. LCFL_Aggr8):

Instance DB of LCFL_Drive.interconnector :=
LCFL_typeConfigAggr8.driveInterconnectors[0..7]

LCFL_Aggr8 can control up to 8 drives. Therefore 8 interconnector-slot-interconnectors[0..7] are available, where 0 refers to the connection point of the control module (drive) 1 and so on.

The aggregate is connected via the input/output parameter "interconnector" to the LCFL_function block via the data type "LCFL_typeDriveInterconnector" or via the input/

output parameter "configuration" to the LCFL_Agg8 function block via the data type "LCFL_typeConfigAggr8".

5.1.2 FeedbackMonitoring

5.1.2.1 LCFL_FeedbackMonitoring – Description of function

Object name (type + number) and family

Type + number: FB 2000

Family: Common

Description

The "LCFL_FeedbackMonitoring" function monitors the feedback messages and distinguishes between static and dynamic errors.

Feedback monitoring

You can activate or deactivate the feedback monitoring:

Feedback monitoring	Parameter	Description
Activate / Deactivate	monitorEn	monitorEn = 1 Feedback monitoring is activated. monitorEn = 0 Feedback monitoring is deactivated.

The following errors can occur during activated monitoring:

Error		Parameter	Description
Static error	Feedback error	monitorStaticErr	A static error occurs if, for example, a valve changes its state without a change in control, and this lasts longer than the configured monitoring time. This error indicates, for example, the loss of supply energy.
	Monitoring time	monitorStaticTime	
Dynamic error	Feedback error	monitorDynamicErr	A dynamic error occurs, for example, if the state of a valve does not change during the monitoring time, or changes incorrectly, even though a change has occurred in the controller. This error can indicate a mechanical valve problem, for example.
	Monitoring time	monitorDynamicTime	

Safe position

You have the option of activating a safe position. When an error occurs, for example, a valve then automatically enters a configured safe position.

Safe position	Parameter	Description
Activate / Deactivate	monitorSafePos	monitorSafePos = 1 The safe position is activated. The object moves to the configured safe position in the case of an error. monitorSafePos = 0 The safe position is deactivated. In the case of an error, the object remains in the current state.

Configuration

The function is called within an LCFL function block. The block interface is supplied by the calling LCFL function block.

5.1.3 Interlock

5.1.3.1 LCFL_Interlock – Description of function

Object name (type + number) and family

Type + number: FB 2003

Family: Common

Description

The "LCFL_Interlock" function manages the interlock of an LCFL function block. The function supports three interlock types:

- Authorization
  Permit or lock operation of the faceplate.
- Interlock
  Allow an object status change (e.g. a valve) or lock it (interlock without resetting).
- Protection
  Allow or lock an object status change (e.g. a valve). A reset is required to enable a status change once again (interlock with reset).

You can activate or deactivate the interlocks:

Interlocks	Parameter	Description
Authorization Activate / Deactivate	permitEn	permitEn = 1 The authorization is activated. permitEn = 0 The authorization is deactivated.
Interlock Activate / Deactivate	interlockEn	interlockEn = 1 The interlock is activated. interlockEn = 0 The interlock is deactivated.
Protection Activate / Deactivate	protectEn	protectEn = 1 The protection is activated. protectEn = 0 The protection is deactivated.

Displaying interlocks

The current interlocks are connected to the inputs of the calling LCFL function blocks:

Interlock	Parameter	Description
Authorization Activate / Deactivate	permit	permit = 1 The authorization is activated. The safe position (safePos) of the object can be exited. The activation has no effect when the function block is not in the safe position. permit = 0 The authorization is deactivated.
Interlock Activate / Deactivate	interlock	interlock = 1 The interlock is deactivated. The current control of the object becomes active in automatic mode. The state of the object can be changed again in the operator mode. interlock = 0 The interlock is activated, and the function block moved into the safe position. The state of the object can no longer be changed. The operation mode can still be changed.
Protection Activate / Deactivate	protect	protect = 1 The protection is deactivated. The operator must perform a reset in the faceplate (HMI.mtpData.ResetOp) or an activation sequence by means of interconnection (reset) must be executed. protect = 0 The protection is activated and moves the object to the safe position.

Note

If no safe position is configured, the object remains in the current position.

Configuration

The function is called within an LCFL function block. The block interface is supplied by the calling LCFL function block.

5.1.4 Maintenance

5.1.4.1 LCFL_Maintenance – Description of function

Object name (type + number) and family

Type + number: FB 2004

Family: Common

Description

The "LCFL_Maintenance" function is used for the following application areas:

- Measure the actual operating time of the drive.
- Measure the actual cycle time of the drive.
- Measure the number of status changes to determine how many times the drive has been switched to the on status.
- Measure the number of alarms to determine how often the drive displays an alarm.
- Compare the actual values with the associated limit value.
- Change the actual values and limit values on the HMI.

"controlActive" input

The "controlActive" input indicates whether the drive is active. If the drive is active (controlActive = 1), this information is used as a calculation basis for the operating time and cycle time.

"alarmActive" input

The "alarmActive" input indicates whether the drive is in an alarm state. If the alarm status is active (alarmActive = 1), this information is used as a calculation basis for the number of status changes and alarms.

Limits

You have the option to set limit values for operating time, cycle time, number of status changes and number of alarms. The faceplate displays the actual values and their limit values. If the actual value is greater than or equal to the limit value, the actual value is displayed with a yellow border in the faceplate.

This information can be used to display a yellow warning on the drive icon and on the Home view, and to issue alarms in the Alarm view.

If a limit value is set to 0, the associated value evaluation remains active. The limit-dependent signals are deactivated at the function block output and at the HMI.

Configuration

The function is called within an LCFL_function block. All inputs must be interconnected. The "configuration" input/output parameter on the LCFL function block must be associated with the LCFL_typeConfigMaintenance data type.

Operating time

The times when the drive is activated are summed up as operating time. The "HMI.operatingTimeAct" parameter contains the current operating time. When the limit of operating time (HMI.operatingTimeLimit) is reached, the corresponding state "HMI.operatingTimeReached = 1" is set.

Cycle time

The time elapsed since the last switch-on is summed up as cycle time. The parameter "HMI.cycleTimeAct" contains the current cycle time. When the limit of the cycle time (HMI.cycleTimeLimit) is reached, the corresponding state "HMI.cycleTimeReached = 1" is set.

Number of status changes

Whenever the drive is activated, the number is increased. Deactivation of the drive is not counted. The "HMI.switchCounterAct" parameter contains the current number of status changes. When the limit of the quantity (HMI.switchCounterLimit) is reached, the corresponding state "HMI.switchCounterReached = 1" is set.

Number of alarms

Whenever the drive indicates an alarm, the number of alarms is increased. The "HMI.alarmCounterAct" parameter contains the current number of alarms. When the limit of the quantity (HMI.alarmCounterLimit) is reached, the corresponding state "HMI.alarmCounterReached = 1" is set.

5.1.5 OperationMode

5.1.5.1 LCFL_OperationMode – Description of function

Object name (type + number) and family

Type + number: FB 2001

Family: Common

Description

The "LCFL_OperationMode" function manages the operation mode of an LCFL function block. The function supports three operation modes:

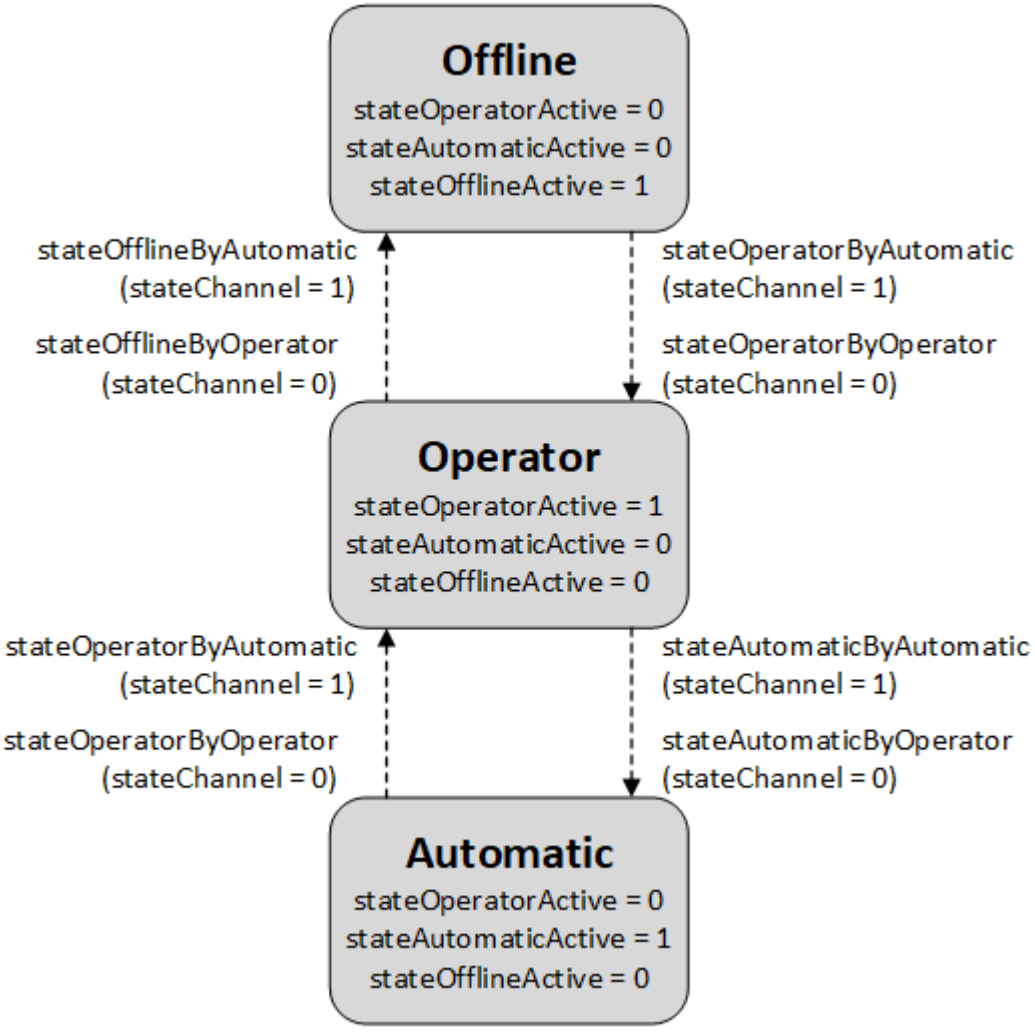
- Offline
- Operator
- Automatic

The operator mode is active when the PLC is started. Depending on the value of the "stateChannel" input, the mode can be changed by the HMI inputs or the PLC inputs. The changes are made by operator interaction or automatic interaction.

Changing the operation mode by operator interaction	**Parameter**	**Description**
Offline mode Activate / Deactivate	stateOfflineByOperator	stateOfflineByOperator = 1 The offline mode is activated through an operator interaction. stateOfflineByOperator = 0 The offline mode is deactivated through an operator interaction.
Operator mode Activate / Deactivate	stateOperatorByOperator	stateOperatorByOperator = 1 The operator mode is activated through an operator interaction. stateOperatorByOperator = 0 The operator mode is deactivated through an operator interaction.
Automatic mode Activate / Deactivate	stateAutomaticByOperator	stateAutomaticByOperator = 1 The automatic mode is activated through an operator interaction. stateAutomaticByOperator = 0 The automatic mode is deactivated through an operator interaction.

Changing the operation mode by automatic interaction	**Parameter**	**Description**
Offline mode Activate / Deactivate	stateOfflineByAutomatic	stateOfflineByAutomatic = 1 The offline mode is activated through an automatic interaction. stateOfflineByAutomatic = 0 The offline mode is deactivated through an automatic interaction.
Operator mode Activate / Deactivate	stateOperatorByAutomatic	stateOperatorByAutomatic = 1 The operator mode is activated through an automatic interaction. stateOperatorByAutomatic = 0 The operator mode is deactivated through an automatic interaction.
Automatic mode Activate / Deactivate	stateAutomaticByAutomatic	stateAutomaticByAutomatic = 1 The automatic mode is activated through an automatic interaction. stateAutomaticByAutomatic = 0 The automatic mode is deactivated through an automatic interaction.

The following diagram shows how to switch between the different operation modes:



The offline mode has a higher priority than the operator mode. The operator mode has a higher priority than the automatic mode. If all three states are requested simultaneously, the object status is set to "Offline". If the operator mode and the automatic mode are requested simultaneously, the object status is set to "Operator".

The direct transition from "Offline" to "Automatic" is not permitted.

Display of the current operation mode

The current mode is displayed at the outputs of the calling LCFL function blocks:

Operation mode	Parameter	Description
Offline mode Active / Inactive	stateOfflineActive	stateOfflineActive= 1 The offline mode is active. stateOfflineActive = 0 The offline mode is inactive.
Operator mode Active / Inactive	stateOperatorActive	stateOperatorActive = 1 The operator mode is active. stateOperatorActive = 0 The operator mode is inactive.
Automatic mode Active / Inactive	stateAutomaticActive	stateAutomaticActive = 1 The automatic mode is active. stateAutomaticActive = 0 The automatic mode is inactive.

Configuration

The function is called within an LCFL function block. The block interface is supplied by the calling LCFL function block.

5.1.6 OSLevel

5.1.6.1 LCFL_OSLevel – Description of function

Object name (type + number) and family

Family: Common

Description

With the "LCFL_OSLevel" function, you can specify whether read permission or write permission is given for the views within the faceplates.

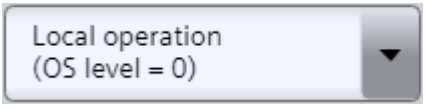
The OS Level provides a mechanism for monitoring the writing at multiple operator levels. Each operating level (e.g. local control room / central control room) is assigned a corresponding number. If the operator level value and the operating system level value from the object match, the control elements permit the write command, otherwise the fields are disabled. This prevents unauthorized write access at the operator level. The operator level value is stored in a central data storage location within the OS level. All operator levels access one and the same value.

To enable independent operation, a distinction is made between two cases:

State	Meaning
OS level = 0	Manual operation is only allowed via local operation.
OS level > 0	Manual operation is only permitted via the station mode.

Selection of the OS level

The OS level for the HMI can be selected via a symbolic I/O field.



The following properties are set in the symbolic I/O field:

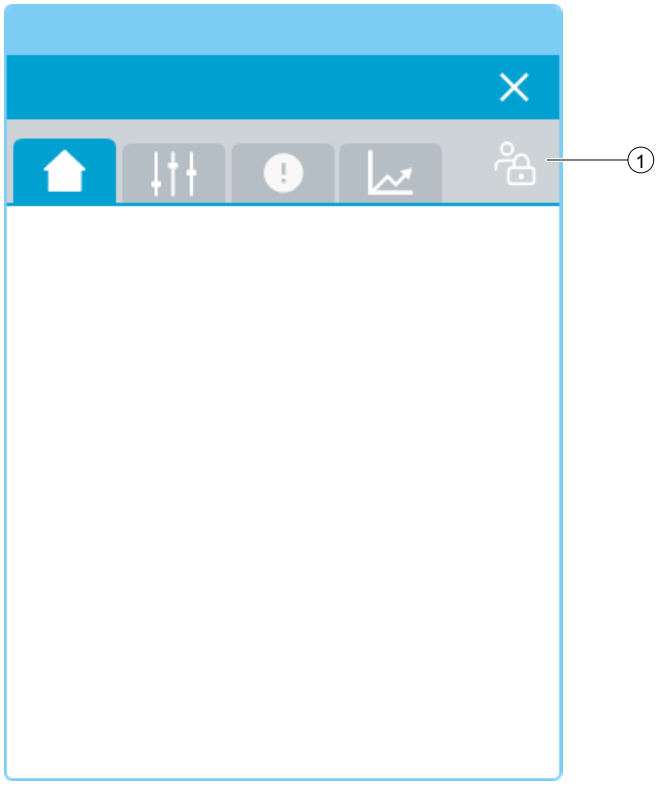
Name	Type	Value
Process value	Internal tag	LCFL_OSLevel
Resource list	Text list	LCFL_OSLevel

Procedure

1. Drag and drop the "LCFL_InternalTags" tag list from the master copy into the "HMI tags" folder in your project.
2. Drag and drop the "LCFL_OSLevel" text list from the master copy into the "Text and graphic lists" folder in your project.
3. Drag and drop a symbolic I/O field from the "Tools > Elements" area into your central screen.
4. In the Inspector window, go to "Properties > Properties > General".
5. Select the "Tag" property under "Process value" in the "Dynamization" column.
6. On the right, under "Process > Tag", select the "LCFL_OSLevel" tag from the "LCFL_InternalTags" tag list.
7. In the Inspector window, go to "Properties > Properties > General".
8. Select the "LCFL_OSLevel" text list under "Resource list" in the "Static value" column.

Visualization in the faceplate

The individual views of the faceplate in runtime show as follows whether operator authorization is granted via the OS level:

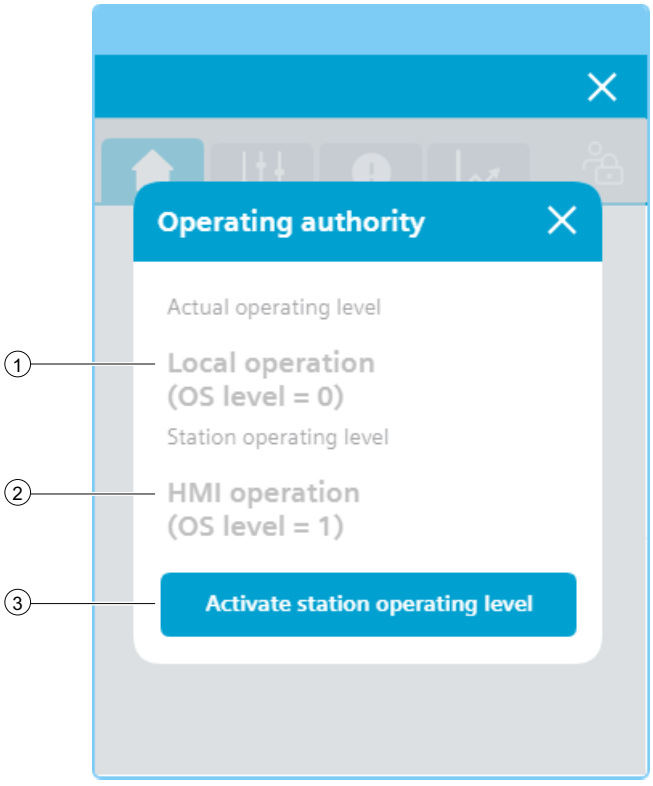


① **Operator authorization given / not given**

Symbol	State	Meaning
	Closed	Write permissions are not given
	Not closed	Write permissions are given

Additional information in the faceplate

Click the icon to view more information about write permissions.



① Actual OS level

Values	Text list	HMI tag
Permitted values = 0..255	LCFL_OSLevel	HMI.mtpData.OSLevel

② Operating level of the station

Values	Text list	Internal tag
Permitted values = 0..255	LCFL_OSLevel	LCFL_OSLevel

③ Button to activate the operating level of the station

Clicking the button sets the station OS level to the actual OS level for the individual object.

If the value of the operator level and the value of the operating system level from the object match, the operator authorization is given.

5.1.7 SourceMode

5.1.7.1 LCFL_SourceMode – Description of function

Object name (type + number) and family

Type + number: FB 2002

Family: Common

Description

The "LCFL_SourceMode" function manages the source mode of an LCFL function block. The interface tags of the source mode implement a state machine to select a value specification for interfaces. The inputs can come from two different sources:

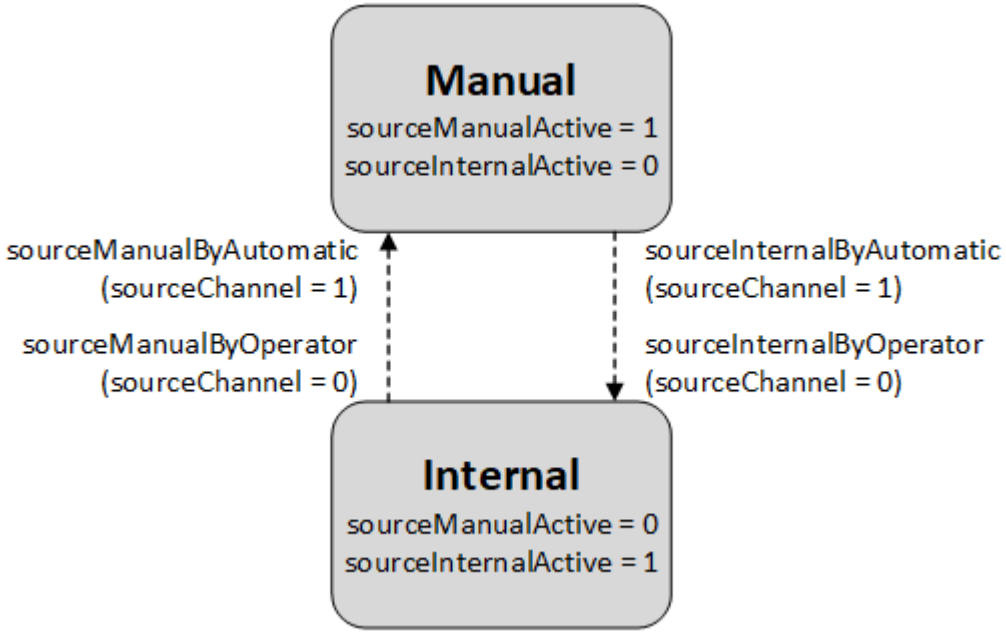
- Manual
- Internal

Depending on the value of the "sourceChannel" input, the source mode can be changed via the HMI inputs or the PLC inputs. The changes are made by operator interaction or automatic interaction.

Changing the source mode by operator interaction	Parameter	Description
Manual Activate / Deactivate	sourceManualByOperator	sourceManualByOperator = 1 The "Manual" source mode is activated through an operator interaction. sourceManualByOperator = 0 The "Manual" source mode is deactivated through an operator interaction.
Internal Activate / Deactivate	sourceInternalByOperator	sourceInternalByOperator = 1 The "Internal" source mode is activated through an operator interaction. sourceInternalByOperator = 0 The "Internal" source mode is deactivated through an operator interaction.

Changing the source mode by automatic interaction	Parameter	Description
Manual Activate / Deactivate	sourceManualByAutomatic	sourceManualByAutomatic = 1 The "Manual" source mode is activated through an automatic interaction. sourceManualByAutomatic = 0 The "Manual" source mode is deactivated through an automatic interaction.
Internal Activate / Deactivate	sourceInternalByAutomatic	sourceInternalByAutomatic = 1 The "Internal" source mode is activated through an automatic interaction. sourceInternalByAutomatic = 0 The "Internal" source mode is deactivated through an automatic interaction.

The following diagram shows how to switch between the different sources:



The "Internal" source mode has a higher priority than the "Manual" source mode. If both source modes are requested simultaneously, the associated data is provided via the "Internal" source mode.

Display of the current source mode

The current source mode is indicated at the outputs of the calling LCFL function blocks:

Source mode	Parameter	Description
Manual Active / Inactive	sourceManualActive	sourceManualActive = 1 The "Manual" source mode is active. sourceManualActive = 0 The "Manual" source mode is inactive.
Internal Active / Inactive	sourceInternalActive	sourceInternalActive = 1 The "Internal" source mode is active. sourceInternalActive = 0 The "Internal" source mode is inactive.

Configuration

The function is called within an LCFL function block. The block interface is supplied by the calling LCFL function block.

5.2 Interlock

5.2.1 LockView4

5.2.1.1 LCFL_LockView4 – Description of function

Object name (type + number) and family

Type + number: FB 2022

Family: Interlock

Description

The function block uses 4 logic inputs which either trigger an AND operation or an OR operation. Based on these logic inputs, the output is set to "TRUE" or "FALSE". Every input can be activated or deactivated.

Configuration

Call the function block in one of the following organization blocks:

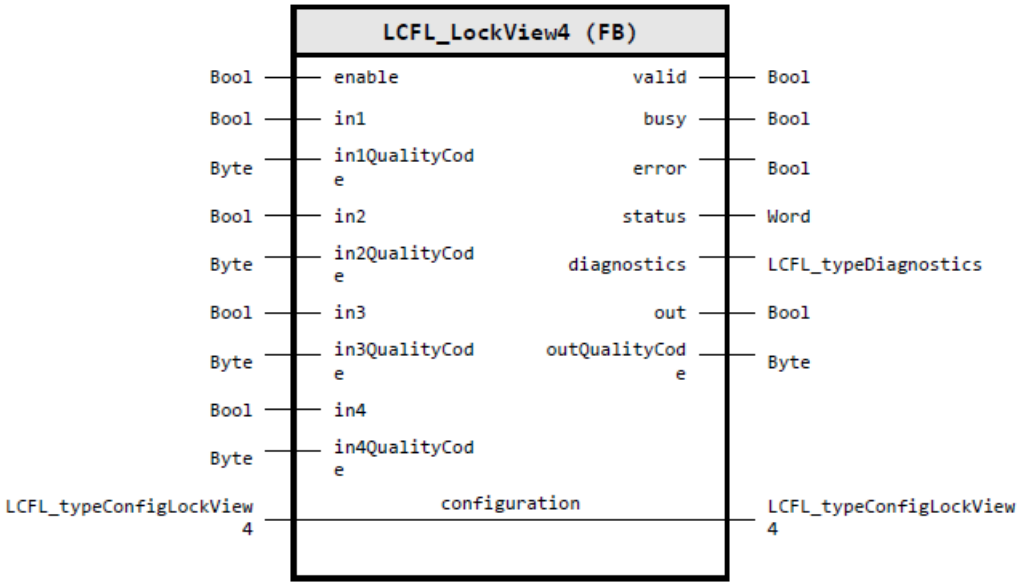
- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under input/output parameters of the function block, connect a tag that is derived from PLC data type "LCFL_typeConfigLockView4".

In this PLC data type, the instance name and logical behavior are configured.

5.2.1.2 LCFL_LockView4 - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
in1	Bool	FALSE	Locking input 1 - value
in1QualityCode	Byte	16#FF	Locking input 1 - quality code
in2	Bool	FALSE	Locking input 2 - value
in2QualityCode	Byte	16#FF	Locking input 2 - quality code
in3	Bool	FALSE	Locking input 3 - value
in3QualityCode	Byte	16#FF	Locking input 3 - quality code
in4	Bool	FALSE	Locking input 4 - value
in4QualityCode	Byte	16#FF	Locking input 4 - quality code

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module

Parameter	Data type	Description
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
out	Bool	Locking result output
outQualityCode	Byte	Locking result output - Quality code

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigLock-View4	Configuration data to display a logical unit operation (AND/OR) with 4 inputs You can find the parameter description under LCFL_typeConfigLockView4 (Page 142).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the control module
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.2.2 LockView8

5.2.2.1 LCFL_LockView8 – Description of function

Object name (type + number) and family

Type + number: FB 2016

Family: Interlock

Description

The function block uses 8 logic inputs which either trigger an AND operation or an OR operation. Based on these logic inputs, the output is set to "TRUE" or "FALSE". Every input can be activated or deactivated.

Configuration

Call the function block in one of the following organization blocks:

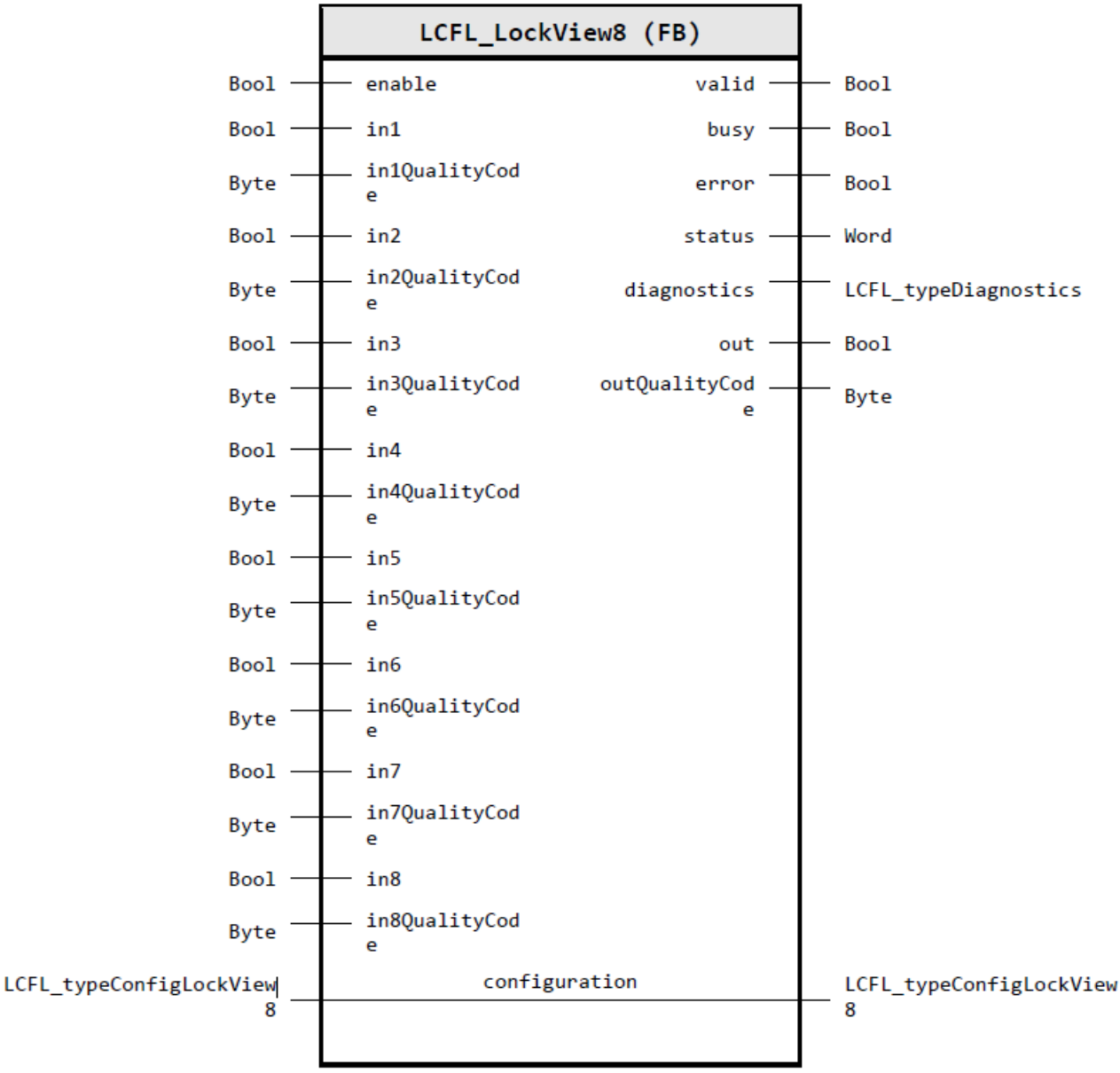
- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigLockView8".

In this PLC data type, the instance name and logical behavior are configured.

5.2.2.2 LCFL_LockView8 parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
in1	Bool	FALSE	Locking input 1 - value
in1QualityCode	Byte	16#FF	Locking input 1 - quality code

Parameter	Data type	Default value	Description
in2	Bool	FALSE	Locking input 2 - value
in2QualityCode	Byte	16#FF	Locking input 2 - quality code
in3	Bool	FALSE	Locking input 3 - value
in3QualityCode	Byte	16#FF	Locking input 3 - quality code
in4	Bool	FALSE	Locking input 4 - value
in4QualityCode	Byte	16#FF	Locking input 4 - quality code
in5	Bool	FALSE	Locking input 5 - value
in5QualityCode	Byte	16#FF	Locking input 5 - quality code
in6	Bool	FALSE	Locking input 6 - value
in6QualityCode	Byte	16#FF	Locking input 6 - quality code
in7	Bool	FALSE	Locking input 7 - value
in7QualityCode	Byte	16#FF	Locking input 7 - quality code
in8	Bool	FALSE	Locking input 8 - value
in8QualityCode	Byte	16#FF	Locking input 8 - quality code

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
out	Bool	Locking result output
outQualityCode	Byte	Locking result output - Quality code

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigLock-View8	Configuration data to display a logical unit operation (AND/OR) with 8 inputs You can find the parameter description under LCFL_typeConfigLockView8 (Page 144).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details

Code / Value	Identification	Description
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the control module
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.3 Drives

5.3.1 MonAnaDrv

5.3.1.1 LCFL_MonAnaDrv – Description of function

Object name (type + number) and family

Type + number: FB 2018

Family: Drives

Description

The "LCFL_MonAnaDrv" function block enables you to control a drive and specify a speed. The drive stops, moves forward or moves in reverse with control signal. The drive cannot be moved directly from one direction to the other. The drive must be stopped beforehand.

The following outputs are used to control the drive:

Drive	Parameter	Description
Stop	controlStop	controlStop = 1 The drive is stopped. controlStop = 0 The drive is not stopped.
Move forward	controlForward	controlForward = 1 The drive is moved forward. controlForward = 0 The drive is not moved forward.
Move in reverse	controlReverse	controlReverse = 1 The drive is moved in reverse. controlReverse = 0 The drive is not moved in reverse.

The current state of the drive is indicated at the following outputs:

Drive	Parameter	Description
Stop Active / Inactive	stopActive	stopActive = 1 The drive is stopped. stopActive = 0 The drive is not stopped.
Move forward Active / Inactive	forwardActive	forwardActive = 1 The drive moves forward. forwardActive = 0 The drive does not move forward.
Move in reverse Active / Inactive	reverseActive	reverseActive = 1 The drive moves in reverse. reverseActive = 0 The drive does not move in reverse.

The controller is monitored by the forward and reverse checkback signals on the function block. Missing feedback messages are derived from the control in the function block.

In addition, you can monitor the speed of the drive. The function block checks the limits of the speed setpoint and forwards them to the "revolutionSpeed" output depending on whether the manual (output: sourceManualActive = 1) or the internal (output: sourceInternalActive = 1) source mode is active. When the drive is stopped, the speed setpoint is set to 0. The setpoint is monitored by the checkback signal "revolutionSpeedFeedback". An incorrect feedback can be derived from the setpoint in the function block.

The output "safePosActive" indicates whether the safe position is activated (safe operation).

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigMonAnaDrv".

Instance names, feedbacks, monitoring feedbacks, operator authorization, interlock and protection are activated or deactivated and configured in this PLC data type. You can also configure the safe position that the drive is set to in case of a monitoring error, as well as the static and dynamic monitoring times.

The limits must be configured according to the following rule:
configuration.revolutionSpeedScaleMin <=
configuration.revolutionSpeedAlarmLowLim <=
0.0 <=
configuration.revolutionSpeedAlarmHighLim <=
configuration.revolutionSpeedScaleMax

Operating mode

The operating mode is applied from the subfunction "LCFL_OperationMode".

You can find more information at LCFL_OperationMode – Description of function (Page 50).

The operator mode is active when the PLC is started. The following actions are possible in the individual operating modes:

Operating mode	Actions
Offline	No operation is possible in offline mode.
Operator	If the mode is set to "Operator" (stateOperator = 1), the operator can use the following signals to control the drive: • Stop (HMI.mtpData.StopOp = 1) • Move forward (HMI.mtpData.FwdOp = 1) • Move in reverse (HMI.mtpData.RevOp = 1)
Automatic	If the mode is set to "Automatic" (stateAutomatic = 1), the state can be changed by the following inputs: • Stop (stop = 1) • Move forward (forward = 1) • Move in reverse (reverse = 1) If all three states are requested simultaneously, the drive is stopped. If the forward state and the reverse state are requested at the same time, the drive remains in the state before the request. "Stop" is prioritized over "forward" and "reverse". "forward" and "reverse" have the same priority.

Note

If an interconnector is being used and is active, the inputs "Stop", "Move forward" and "Move in reverse" are inactive in automatic mode. The higher-level control sends the control signals via the interconnector.

Drive interconnector

The drive interconnector is applied from the subfunction "LCFL_DriveInterconnector".

You can find more information at LCFL_DriveInterconnector – Description of function (Page 43).

Tags of the function block

Name	Interface	Data type	Description
interconnector	Input/output parameter	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control
interconnectorActive	Output parameter	Bool	Interconnector active (1: Active; 0: Inactive)

Configuration tag

Name	Interface	Data type	Description
standaloneDrive	Static	LCFL_typeDriveInterconnector	Drive interconnector for standalone configuration

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57).

Depending on the source mode, the value at the output "revolutionSpeed" is either set or reset:

- "Manual" source mode
  Specification of speed via faceplate (HMI.mtpData.RpmMan)
- "Internal" source mode
  Specification of the speed via an interconnection at the "revolutionSpeedInternal" input.

The manual value is tracked from the limited internal value to achieve a smooth switchover from the internal to the manual value.

Interlocks

The interlocks are applied from the subfunction "LCFL_Interlock".

You can find more information at LCFL_Interlock – Description of function (Page 46).

Feedback quality

The function block uses the "forwardFeedbackQuality" and "reverseFeedbackQuality" quality inputs to check the validity of the corresponding checkback signals.

forwardActive

The quality inputs have effects on the "forwardActive" output. This can only be active when the following conditions are defined:

- (configuration.forwardFeedbackEn = 1 AND forwardFeedbackQuality = 1)
  AND
  forwardFeedback = 1
- configuration.forwardFeedbackEn = 0
  AND
  controlForward = 1

reverseActive

The quality inputs have effects on the "reverseActive" output. This can only be active when the following conditions are defined:

- (configuration.reverseFeedbackEn = 1 AND reverseFeedbackQuality = 1)
  AND
  reverseFeedback = 1
- configuration.reverseFeedbackEn = 0
  AND
  controlReverse = 1

safePosActive

The quality inputs have effects on the activation of the safe position (output: "safePosActive"). The safe position is only active when the following conditions are defined:

- configuration.forwardFeedbackEn = 1
  AND
  forwardFeedbackQuality = 0
  AND
  configuration.reverseFeedbackEn = 1
  AND
  reverseFeedbackQuality = 0
  AND
  configuration.forwardEn = 1
  AND
  configuration.reverseEn = 1
- configuration.forwardFeedbackEn = 1
  AND
  forwardFeedbackQuality = 0
  AND
  configuration.forwardEn = 1
  AND
  configuration.reverseEn = 0
- configuration.reverseFeedbackEn = 1
  AND
  reverseFeedbackQuality = 0
  AND
  configuration.reverseEn = 1
  AND
  configuration.forwardEn = 0

Feedback monitoring

The feedback monitoring is applied from the subfunction "LCFL_FeedbackMonitoring".

You can find more information at LCFL_FeedbackMonitoring – Description of function (Page 45).

Speed monitoring

The speed is monitored for deviations from the high limit and low limit, which you define yourself. The "HMI.mtpData.RmpErr" tag is used to calculate the difference between the speed setpoint "HMI.mtpData.Rmp" and the actual speed value "HMI.mtpData.RmpFbk".

To monitor the speed, you must activate the speed limits beforehand:

- Enable speed alarm high limit: "HMI.mtpData.RmpAHEn = 1"
- Enable speed alarm low limit: "HMI.mtpData.RmpALEn = 1"

If the difference is higher than the speed alarm high limit "HMI.mtpData.RmpAHLim", the alarm of the speed high limit is displayed (HMI.mtpData.RmpAHAct).

If the difference is less than the speed alarm low limit "HMI.mtpData.RmpALLim", the alarm of the speed low limit is displayed (HMI.mtpData.RmpALAct).

Safe position

The safe position of a drive is always the idle position (stopped).

You can exit the safe position by activating the operator authorization ("permit = 1" input). The activation has no effect when the function block is not in the safe position. An active interlock ("interlock = 0" or "protect = 0" inputs) moves the function block into the safe position. Depending on the input configuration, the drive moves to its safe position (configuration.monitorSafePos) or not after a feedback error.

Triggering of the motor protection

If the input is "trip = 0", a triggering of the safety indicator occurs. The drive moves into the safe position if it is activated.

Reset

In the following cases, the operator (HMI.mtpData.ResetOp) or an activation sequence must perform a "Reset" by means of interconnection (reset):

- To activate the interlock again after the interlock condition at the input "protect = 0 -> 1" has been deleted.
- To activate the safety indicator again after the trip condition has been deleted.
- To prevent a feedback monitoring error or speed monitoring error from being displayed after the error has been corrected.

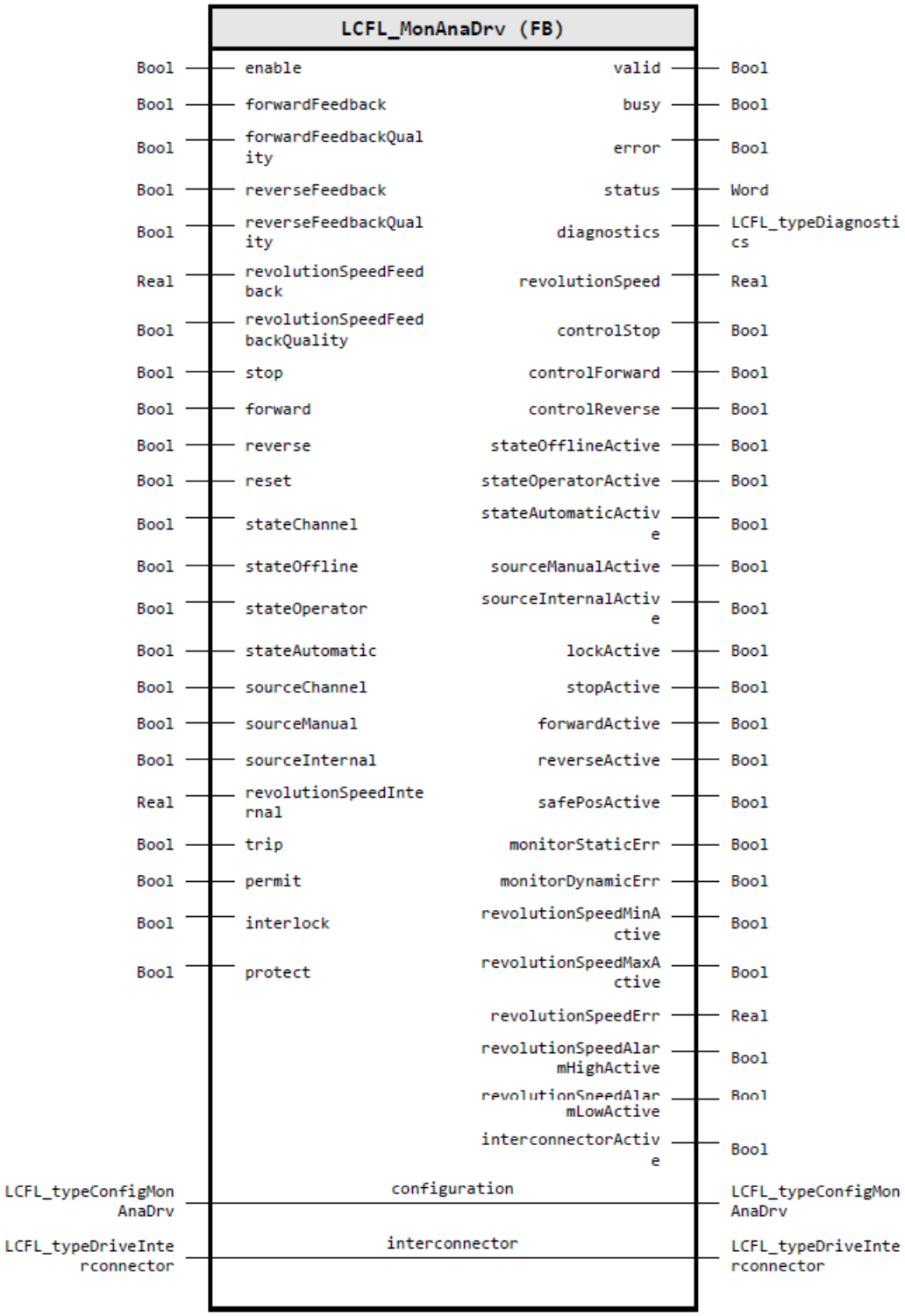
Maintenance

The maintenance is applied from the subfunction "LCFL_Maintenance".

You can find more information at LCFL_Maintenance – Description of function (Page 48).

5.3.1.2 LCFL_MonAnaDrv - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
forwardFeedback	Bool	FALSE	Forward feedback signal (1: Forward running; 0: Not forward running)
forwardFeedbackQuality	Bool	TRUE	Forward feedback quality (1: Feedback is valid; 0: Feedback is invalid)
reverseFeedback	Bool	FALSE	Reverse feedback signal (1: Reverse running; 0: Not reverse running)
reverseFeedbackQuality	Bool	TRUE	Reverse feedback quality (1: Feedback is valid; 0: Feedback is invalid)
revolutionSpeedFeedback	Real	0.0	Revolution speed feedback signal
revolutionSpeedFeedbackQuality	Bool	TRUE	Revolution speed feedback quality (1: Feedback is valid; 0: Feedback is invalid)
stop	Bool	FALSE	Set drive from "Automatic" to "Stop" (relevant if StateAutAct = 1) (1: Stop request; 0: No stop request)
forward	Bool	FALSE	Set drive to forward by automatic (relevant if StateAutAct = 1 & FwdEn = 1) (1: Forward running request; 0: No forward running request)
reverse	Bool	FALSE	Set drive to reverse by automatic (relevant if StateAutAct= 1 & RevEn = 1) (1: Reverse running request; 0: No reverse running request)
reset	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
stateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
stateOffline	Bool	FALSE	Set operating mode to "Offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Offline"; 0: No operation)
stateOperator	Bool	FALSE	Set operating mode to "Operator" by automatic interaction (relevant if StateChannel = 1) (1: Operation mode is set to "operator"; 0: No operation)
stateAutomatic	Bool	FALSE	Set operating mode to "Automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Automatic"; 0: No operation)
sourceChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) are used; 1: The automatic switches (*Aut) are used)
sourceManual	Bool	FALSE	Set source mode to "Manual" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "Manual"; 0: No operation)
sourceInternal	Bool	FALSE	Set source mode to "Internal" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "Internal"; 0: No operation)
revolutionSpeedInternal	Real	0.0	Revolution speed internal setpoint (relevant, if SrcIntAct = 1)

Parameter	Data type	Default value	Description
trip	Bool	TRUE	Drive safety indicator (0: Tripped, 1: No error)
permit	Bool	FALSE	Permit allows control (1: Authorization is given; 0: Authorization is not given)
interlock	Bool	FALSE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
protect	Bool	FALSE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
revolutionSpeed	Real	Revolution speed setpoint
controlStop	Bool	Drive stop control (1: Desired movement is stopped; 0: Desired movement is forward or reverse)
controlForward	Bool	Drive forward movement control (1: Desired movement is forward; 0: Desired movement is in reverse or stopped)
controlReverse	Bool	Drive reverse movement control (1: Desired movement is reverse; 0: Desired movement is forward or stopped)
stateOfflineActive	Bool	1: Current mode is "Offline"; 0: Current mode is not "Offline"
stateOperatorActive	Bool	1: Current mode is "Operator"; 0: Current mode is not "Operator"
stateAutomaticActive	Bool	1: Current mode is "Automatic"; 0: Current mode is not "Automatic"
sourceManualActive	Bool	1: Current mode is "Manual"; 0: Current mode is not "Manual"
sourceInternalActive	Bool	1: Current mode is "Internal"; 0: Current mode is not "Internal"
lockActive	Bool	Lock activated (1: Lock is activated; 0: Lock is not activated)
stopActive	Bool	No feedback signal is activated (1: Stopped; 0: Not stopped)
forwardActive	Bool	Forward feedback signal is activated (1: Forward movement; 0: No forward movement)
reverseActive	Bool	Reverse feedback signal is activated (1: Reverse movement; 0: No reverse movement)
safePosActive	Bool	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
monitorStaticErr	Bool	Static supervision error active (1: Active; 0: Inactive)
monitorDynamicErr	Bool	Dynamic supervision error active (1: Active; 0: Inactive)

Parameter	Data type	Description
revolutionSpeedMinActive	Bool	1: Revolution speed low limit violated -> revolutionSpeedMin active
revolutionSpeedMaxActive	Bool	1: Revolution speed high limit violated -> revolutionSpeedMax active
revolutionSpeedErr	Real	Revolution speed error (RpmErr = Rpm – RpmFbk)
revolutionSpeedAlarmHigh-Active	Bool	"Revolution speed alarm high limit" active (1: Active; 0: Inactive)
revolutionSpeedAlarmLo-wActive	Bool	"Revolution speed alarm low limit" active (1: Active; 0: Inactive)
interconnectorActive	Bool	Interconnector active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigMonAnaDrv	Configuration data for analog drive with the feedback monitoring You can find the parameter description under LCFL_typeConfigMonAnaDrv (Page 147).
interconnector	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control system You can find the parameter description under LCFL_typeDriveInterconnector (Page 139).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZATION_REV-OLUTION_SPEED_SCALE_LIM	Error: During parameterization of revolution speed limit value for "Scale low" and "Scale high"
16#8202	ERR_PARAMETRIZATION_REV-OLU-TION_SPEED_ALARM_HIGH_LIM	Error: During parameterization of revolution speed limit value for "Alarm high"
16#8203	ERR_PARAMETRIZATION_REV-OLU-TION_SPEED_ALARM_LOW_LIM	Error: During parameterization of revolution speed limit value for "Alarm low"
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.3.2 MonAnaVlv

5.3.2.1 LCFL_MonAnaVlv – Description of function

Object name (type + number) and family

Type + number: FB 2019

Family: Drives

Description

You can use the function block "LCFL_MonAnaVlv" to open or close an analog valve with a control signal.

The following outputs are used to open and close the valve:

Valve	Parameter	Description
Open	controlOpen	controlOpen = 1 The valve is opened (to setpoint position). controlOpen = 0 The valve is not opened.
Close	controlClose	controlClose = 1 The valve is closed (to minimum position configuration). controlClose = 0 The valve is not closed.

When the valve is opened, the valve is set to the maximum position configuration that is configured at the "configuration.posMax" parameter.

When the valve is closed, the valve is set to the minimum position configuration that is configured at the "configuration.posMin" parameter.

With the "position" parameter, the current setpoint position of the valve is output and can thus be monitored.

The current state of the valve is indicated at the following outputs:

Checkback signal	Parameter	Description
Open	openActive	openActive = 1 The valve is open. openActive = 0 The valve is not open.
Closed	closeActive	closeActive = 1 The valve is closed. closeActive = 0 The valve is not closed.

The controller is monitored by the open and close checkback signals at the function block. Missing feedback messages are derived from the control in the function block.

The function block checks the limits of the position setpoint and forwards them to the output position depending on whether the manual or the internal source mode is active. The setpoint is monitored by the feedback signal "positionFeedback". An incorrect feedback can be derived from the setpoint in the function block.

The output "safePosActive" indicates whether the safe position is activated (safe operation).

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigMonAnaVlv".

Instance names, feedbacks, monitoring feedbacks, operator authorization, interlock and protection are activated or deactivated and configured in this PLC data type. You also configure the safe position (valve open or valve closed) that the valve is set to in case of a monitoring error, as well as the static and dynamic monitoring times and the position.

Position limits

The limits must be configured according to the following rules:

- configuration.positionMin < configuration.positionMax
- configuration.positionScaleMin < configuration.positionScaleMax
- configuration.positionTolerance >= 0.0

Operating mode

The operating mode is applied from the subfunction "LCFL_OperationMode".

You can find more information at LCFL_OperationMode – Description of function (Page 50).

The operator mode is active when the PLC is started. The following actions are possible in the individual operating modes:

Operating mode	Actions
Offline	No operation is possible in offline mode.
Operator	If the mode is set to "Operator" (stateOperator = 1), the operator can use the following signals to control the valve: • Open valve (HMI.mtpData.OpenOp = 1) • Close valve (HMI.mtpData.CloseOp = 1)
Automatic	If the mode is set to "Automatic" (stateAutomatic = 1), the state can be changed by the following inputs: • Open valve (open = 1) • Close valve (close = 1) If the safe position is activated and both states are requested at the same time, the valve goes to the safe position.

Note

If an interconnector is being used and is active, the inputs "Open valve" and "Close valve" are inactive in automatic mode. The higher-level control sends the control signals via the interconnector.

Drive interconnector

The drive interconnector is applied from the subfunction "LCFL_DriveInterconnector".

You can find more information at LCFL_DriveInterconnector – Description of function (Page 43).

Tags of the function block

Name	Interface	Data type	Description
interconnector	Input/output parameter	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control
interconnectorActive	Output parameter	Bool	Interconnector active (1: Active; 0: Inactive)

Configuration tag

Name	Interface	Data type	Description
standaloneDrive	Static	LCFL_typeDriveInterconnector	Drive interconnector for standalone configuration

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57)

Depending on the source mode, the integer value at the output "valueOut" is either set or reset:

- "Manual" source mode
  Specification of position setpoint via HMI (HMI.mtpData.PosMan)
- "Internal" source mode
  Specification of the position setpoint via an interconnection at the "positionInternal" input.

The manual value is tracked from the limited internal value to achieve a smooth switchover from the internal to the manual value.

Interlocks

The interlocks are applied from the subfunction "LCFL_Interlock".

You can find more information at LCFL_Interlock – Description of function (Page 46).

Feedback calculation

Feedback signals can be calculated by the function block itself via the following configurations:

Feedback for	Calculation
Valve open	HMI.mtpData.OpenFbkCalc = configuration.openFeedbackEn = 0
Valve closed	HMI.mtpData.CloseFbkCalc = configuration.closeFeedbackEn = 0
Position	HMI.mtpData.PosFbkCalc = configuration.positionFeedback-En = 0

The "openFeedback" and "closeFeedback" parameters are calculated by the "positionFeedback" parameter as follows:

Parameter	Calculation
openFeedback	openFeedbackCalculated = ABS (positionFeedback - configuration.positionMax) <= configuration.positionTolerance
closeFeedback	closeFeedbackCalculated = ABS (positionFeedback - configuration.positionMin) <= configuration.positionTolerance

The "positionFeedback" parameter can be replaced by the position setpoint:

Parameter	Calculation
positionFeedback	positionFeedbackCalculated = position

The status of the feedback calculations is displayed on HMI.mtpData.*FbkCalc. When the tag = 1, the feedback is calculated; otherwise, the corresponding inputs are linked as feedback source. Feedback calculation is disabled by default.

Feedback quality

The function block uses the "openFeedbackQuality", "closeFeedbackQuality" and "positionFeedbackQuality" quality inputs to check the validity of the corresponding checkback signals.

openActive

The "openActive" output shows the status of the open feedback signal:

- 1: Open
- 0: Not open

The feedback signal can be calculated or linked with the corresponding input as described in the "Feedback calculation" section.

closeActive

The "closeActive" output shows the status of the close feedback signal:

- 1: Closed
- 0: Not closed

The feedback signal can be calculated or linked with the corresponding input as described in the "Feedback calculation" section.

safePosActive

The output "safePosActive" = 1 (HMI.mtpData.SafePosAct) when the safe position is activated (safePosEn). The safe position can be configured as described in the section "Safe position".

Feedback monitoring

The feedback monitoring is applied from the subfunction "LCFL_FeedbackMonitoring".

You can find more information at LCFL_FeedbackMonitoring – Description of function (Page 45).

Position monitoring

Position monitoring expands feedback monitoring with tags. The system also monitors whether the execution time to open or close the valve is within the set time. The HMI.mtpData.MonPosErr and monitorPositionErr output tags indicate violation of the execution time. The target position has been reached when the setpoint position +/– the position tolerance has been reached. The position tolerance is defined by means of configuration.positionTolerance. Position monitoring is enabled with configuration.monitorEn = 1. The monitoring time for positioning errors is defined with configuration.monitorPositionTime. HMI.mtpData.PosReachedFbk indicates that the setpoint position that is being calculated has been reached: ABS (HMI.mtpData.PosFbk – HMI.mtpData.Pos) <= configuration.positionTolerance.

Safe position

The safe position is defined by the following parameter:

Safe position	Parameter	Description
Open / closed	safePos	configuration.safePos = 1 The safe position of the valve is "open". configuration.safePos = 0 The safe position of the valve is "closed".

If no safe position is configured, the parameter is safePosEn = 0.

You can exit the safe position by activating the operator authorization ("permit = 1" input). The activation has no effect when the function block is not in the safe position. An active interlock ("interlock = 0" or "protect = 0" inputs) moves the function block into the safe position. Depending on the input configuration, the valve moves to its safe position (configuration.monitorSafePos) or not after a feedback error.

Reset

In the following cases, the operator (HMI.mtpData.ResetOp) or an activation sequence must perform a "Reset" by means of interconnection (reset):

- To activate the interlock again after the interlock condition at the input "protect = 0 -> 1" has been deleted.
- To activate the safety indicator again after the trip condition has been deleted.
- To prevent a monitoring error from being displayed after the error has been corrected.

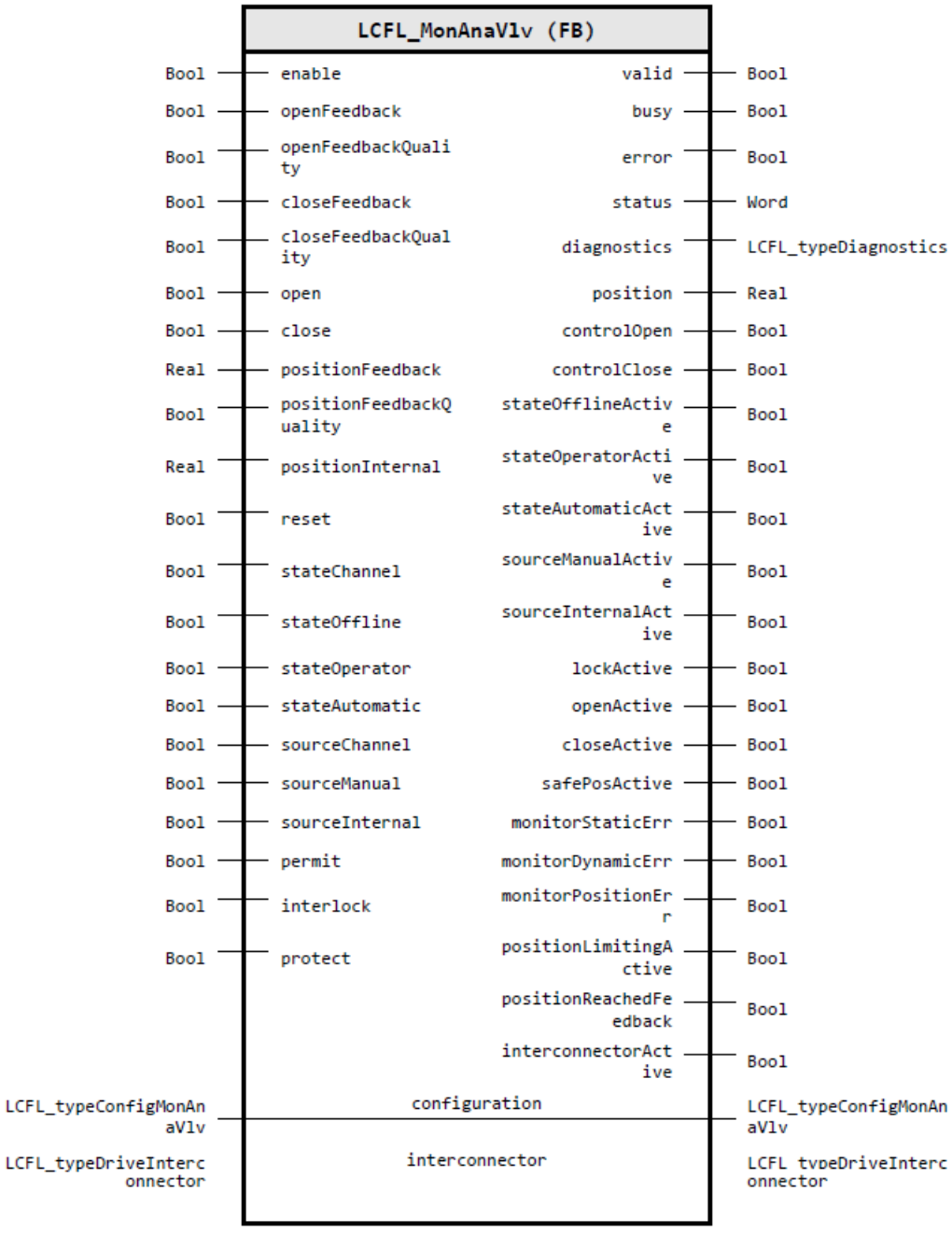
Maintenance

The maintenance is applied from the subfunction "LCFL_Maintenance".

You can find more information at LCFL_Maintenance – Description of function (Page 48).

5.3.2.2 LCFL_MonAnaVlv - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
openFeedback	Bool	FALSE	Open checkback signal (1: open; 0: is not opened)
openFeedbackQuality	Bool	TRUE	Open feedback quality (1: Feedback is valid; 0: Feedback is invalid)
closeFeedback	Bool	FALSE	Close checkback signal (1: close; 0: is not closed)
closeFeedbackQuality	Bool	TRUE	Close feedback quality (1: Feedback is valid; 0: Feedback is invalid)
open	Bool	FALSE	Set valve to "open" by automatic (relevant if StateAutAct = 1) (1: "Open" request; 0: "Do not open" request)
close	Bool	FALSE	Set valve to "close" by automatic (relevant if StateAutAct = 1) (1: "Close" request; 0: "Do not close" request)
positionFeedback	Real	0.0	Position feedback signal
positionFeedbackQuality	Bool	TRUE	Position feedback quality (1: Feedback is valid; 0: Feedback is invalid)
positionInternal	Real	0.0	Position internal setpoint (relevant if SrcIntAct = 1)
reset	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
stateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
stateOffline	Bool	FALSE	Set operating mode to "offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "offline"; 0: No operation)
stateOperator	Bool	FALSE	Set operating mode to "operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "operator"; 0: No operation)
stateAutomatic	Bool	FALSE	Set operating mode to "automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "automatic"; 0: No operation)
sourceChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
sourceManual	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
sourceInternal	Bool	FALSE	Set source mode to "Internal" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
permit	Bool	FALSE	Permit allows control (1: Permission is given; 0: Permission is not given)

Parameter	Data type	Default value	Description
interlock	Bool	FALSE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
protect	Bool	FALSE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
position	Real	Position setpoint
controlOpen	Bool	Valve open control (1: Desired position is open; 0: Desired position is closed)
controlClose	Bool	Valve close control (1: Desired position is closed; 0: Desired position is open)
stateOfflineActive	Bool	1: Current mode is "offline"; 0: Current mode is not "Offline"
stateOperatorActive	Bool	1: Current mode is "operator"; 0: Current mode is not "operator"
stateAutomaticActive	Bool	1: Current mode is "automatic"; 0: Current mode is not "automatic"
sourceManualActive	Bool	1: Current mode is "manual"; 0: Current mode is not "manual"
sourceInternalActive	Bool	1: Current mode is "internal"; 0: Current mode is not "internal"
lockActive	Bool	Lock activated (1: Lock is activated; 0: Lock is not activated)
openActive	Bool	Open checkback signal is activated (1: open; 0: is not opened)
closeActive	Bool	Close checkback signal is activated (1: close; 0: is not closed)
safePosActive	Bool	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
monitorStaticErr	Bool	Static supervision error active (1: Active; 0: Inactive)
monitorDynamicErr	Bool	Dynamic supervision error active (1: Active; 0: Inactive)
monitorPositionErr	Bool	Position error active (1: Active; 0: Inactive)
positionLimitingActive	Bool	Position setpoint limiting active (1: Active; 0: Inactive)
positionReachedFeedback	Bool	Position is reached when the position feedback is within the tolerance range of the setpoint position +/- (PosFbk – Pos <= PosTolerance)
interconnectorActive	Bool	Interconnector active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigMonAnaVlv	Configuration data for analog valve with feedback monitoring You can find the parameter description under LCFL_typeConfigMonAnaVlv (Page 154).
interconnector	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control system You can find the parameter description under LCFL_typeDriveInterconnector (Page 139).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZATION_POSITION_LIM	Error: During parameterization of the position limit values for "low" and "high"
16#8202	ERR_PARAMETRIZATION_POSITION_SCALE_LIM	Error: During parameterization of the position limit value scale for "scale low" and "scale high"
16#8203	ERR_PARAMETRIZATION_POSITION_TOL_LIM	Error: During parameterization of the position tolerance values
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.3.3 MonBinDrv

5.3.3.1 LCFL_MonBinDrv – Description of function

Object name (type + number) and family

Type + number: FB 2015

Family: Drives

Description

The "LCFL_MonBinDrv" function block enables you to control a drive. The drive stops, moves forward or moves in reverse with control signal. The drive cannot be moved directly from one direction to the other. The drive must be stopped beforehand.

The following outputs are used to control the drive:

Drive	Parameter	Description
Stop	controlStop	controlStop = 1 The drive is stopped. controlStop = 0 The drive is not stopped.
Move forward	controlForward	controlForward = 1 The drive is moved forward. controlForward = 0 The drive is not moved forward.
Move in reverse	controlReverse	controlReverse = 1 The drive is moved in reverse. controlReverse = 0 The drive is not moved in reverse.

The current state of the drive is indicated at the following outputs:

Drive	Parameter	Description
Stop Active / Inactive	stopActive	stopActive = 1 The drive is stopped. stopActive = 0 The drive is not stopped.
Move forward Active / Inactive	forwardActive	forwardActive = 1 The drive moves forward. forwardActive = 0 The drive does not move forward.
Move in reverse Active / Inactive	reverseActive	reverseActive = 1 The drive moves in reverse. reverseActive = 0 The drive does not move in reverse.

The controller is monitored by the forward and reverse checkback signals on the function block. Missing feedback messages are derived from the control in the function block.

The output "safePosActive" indicates whether the safe position is activated (safe operation).

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigMonBinDrv".

Instance names, feedbacks, monitoring feedbacks, operator authorization, interlock and protection are activated or deactivated and configured in this PLC data type. You can also configure the safe position that the drive is set to in case of a monitoring error, as well as the static and dynamic monitoring times.

Operating mode

The operating mode is applied from the subfunction "LCFL_OperationMode".

You can find more information at LCFL_OperationMode – Description of function (Page 50).

The operator mode is active when the PLC is started. The following actions are possible in the individual operating modes:

Operating mode	Actions
Offline	No operation is possible in offline mode.
Operator	If the mode is set to "Operator" (stateOperator = 1), the operator can use the following signals to control the drive: • Stop (HMI.mtpData.StopOp = 1) • Move forward (HMI.mtpData.FwdOp = 1) • Move in reverse (HMI.mtpData.RevOp = 1)
Automatic	If the mode is set to "Automatic" (stateAutomatic = 1), the state can be changed by the following inputs: • Stop (stop = 1) • Move forward (forward = 1) • Move in reverse (reverse = 1) If all three states are requested simultaneously, the drive is stopped. If the forward state and the reverse state are requested at the same time, the drive remains in the state before the request. "Stop" is prioritized over "forward" and "reverse". "forward" and "reverse" have the same priority.

Note

If an interconnector is being used and is active, the inputs "Stop", "Move forward" and "Move in reverse" are inactive in automatic mode. The higher-level control sends the control signals via the interconnector.

Drive interconnector

The drive interconnector is applied from the subfunction "LCFL_DriveInterconnector".

You can find more information at LCFL_DriveInterconnector – Description of function (Page 43).

Tags of the function block

Name	Interface	Data type	Description
interconnector	Input/output parameter	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control
interconnectorActive	Output parameter	Bool	Interconnector active (1: Active; 0: Inactive)

Configuration tag

Name	Interface	Data type	Description
standaloneDrive	Static	LCFL_typeDriveInterconnector	Drive interconnector for standalone configuration

Interlocks

The interlocks are applied from the subfunction "LCFL_Interlock".

You can find more information at LCFL_Interlock – Description of function (Page 46).

Feedback quality

The function block uses the "forwardFeedbackQuality" and "reverseFeedbackQuality" quality inputs to check the validity of the corresponding checkback signals.

forwardActive

The quality inputs have effects on the "forwardActive" output. This can only be active when the following conditions are defined:

- (configuration.forwardFeedbackEn = 1 AND forwardFeedbackQuality = 1)
  AND
  forwardFeedback = 1
- configuration.forwardFeedbackEn = 0
  AND
  controlForward = 1

reverseActive

The quality inputs have effects on the "reverseActive" output. This can only be active when the following conditions are defined:

- (configuration.reverseFeedbackEn = 1 AND reverseFeedbackQuality = 1)
  AND
  reverseFeedback = 1
- configuration.reverseFeedbackEn = 0
  AND
  controlReverse = 1

safePosActive

The quality inputs have effects on the activation of the safe position (output: "safePosActive"). The safe position is only active when the following conditions are defined:

- configuration.forwardFeedbackEn = 1
  AND
  forwardFeedbackQuality = 0
  AND
  configuration.reverseFeedbackEn = 1
  AND
  reverseFeedbackQuality = 0
  AND
  configuration.forwardEn = 1
  AND
  configuration.reverseEn = 1
- configuration.forwardFeedbackEn = 1
  AND
  forwardFeedbackQuality = 0
  AND
  configuration.forwardEn = 1
  AND
  configuration.reverseEn = 0
- configuration.reverseFeedbackEn = 1
  AND
  reverseFeedbackQuality = 0
  AND
  configuration.reverseEn = 1
  AND
  configuration.forwardEn = 0

Feedback monitoring

The feedback monitoring is applied from the subfunction "LCFL_FeedbackMonitoring".

You can find more information at LCFL_FeedbackMonitoring – Description of function (Page 45).

Safe position

The safe position of a drive is always the idle position (stopped).

You can exit the safe position by activating the operator authorization ("permit = 1" input). The activation has no effect when the function block is not in the safe position. An active interlock ("interlock = 0" or "protect = 0" inputs) moves the function block into the safe position. Depending on the input configuration, the drive moves to its safe position (configuration.monitorSafePos) or not after a feedback error.

Triggering of the motor protection

If the input is "trip = 0", a triggering of the safety indicator occurs. The drive moves into the safe position if it is activated.

Reset

In the following cases, the operator (HMI.mtpData.ResetOp) or an activation sequence must perform a "Reset" by means of interconnection (reset):

- To activate the interlock again after the interlock condition at the input "protect = 0 -> 1" has been deleted.
- To activate the safety indicator again after the trip condition has been deleted.
- To prevent a monitoring error from being displayed after the error has been corrected.

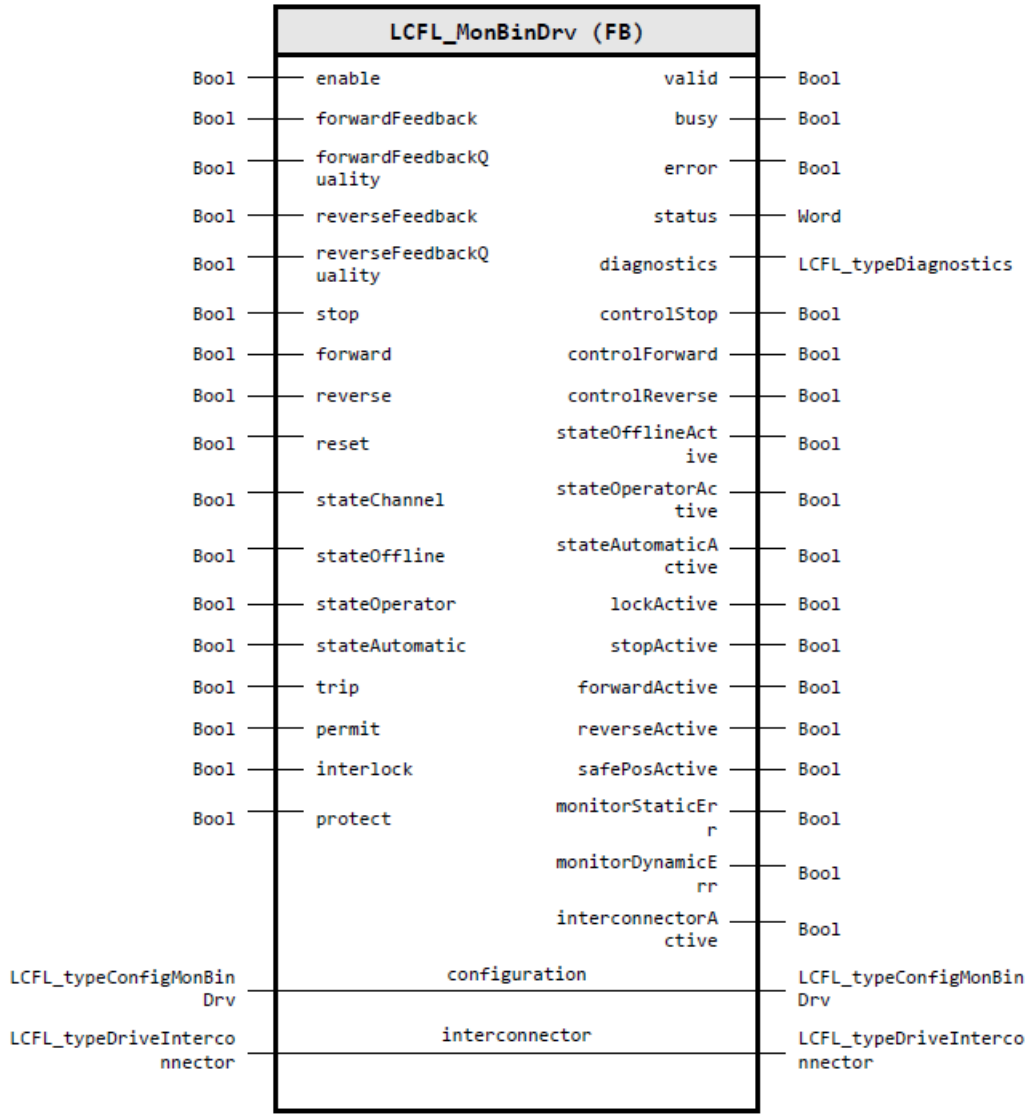
Maintenance

The maintenance is applied from the subfunction "LCFL_Maintenance".

You can find more information at LCFL_Maintenance – Description of function (Page 48).

5.3.3.2 LCFL_MonBinDrv parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
forwardFeedback	Bool	FALSE	Forward checkback signal (1: Forward running; 0: Not forward running)
forwardFeedbackQuality	Bool	TRUE	Forward feedback quality (1: Feedback is valid; 0: Feedback is invalid)

Parameter	Data type	Default value	Description
reverseFeedback	Bool	FALSE	Reverse checkback signal (1: Reverse running; 0: Not reverse running)
reverseFeedbackQuality	Bool	TRUE	Reverse feedback quality (1: Feedback is valid; 0: Feedback is invalid)
stop	Bool	FALSE	Set drive to "stop" by automatic (relevant if StateAutAct = 1) (1: Stop request; 0: No stop request)
forward	Bool	FALSE	Set drive to forward by automatic (relevant if StateAutAct = 1 & FwdEn = 1) (1: Forward running request; 0: No forward running request)
reverse	Bool	FALSE	Set drive to reverse by automatic (relevant if StateAutAct= 1 & RevEn = 1) (1: Reverse running request; 0: No reverse running request)
reset	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
stateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
stateOffline	Bool	FALSE	Set operating mode to "offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "offline"; 0: No operation)
stateOperator	Bool	FALSE	Set operating mode to "operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "operator"; 0: No operation)
stateAutomatic	Bool	FALSE	Set operating mode to "automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "automatic"; 0: No operation)
trip	Bool	TRUE	Drive safety indicator (0: Tripped, 1: No error)
permit	Bool	FALSE	Permit allows control (1: Permission is given; 0: Permission is not given)
interlock	Bool	FALSE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
protect	Bool	FALSE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification

Parameter	Data type	Description
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
controlStop	Bool	Drive stop control (1: Desired movement is stopped; 0: Desired movement is forward or reverse)
controlForward	Bool	Drive forward movement control (1: Desired movement is forward; 0: Desired movement is in reverse or stopped)
controlReverse	Bool	Drive reverse movement control (1: Desired movement is reverse; 0: Desired movement is forward or stopped)
stateOfflineActive	Bool	1: Current mode is "offline"; 0: Current mode is not "Offline"
stateOperatorActive	Bool	1: Current mode is "operator"; 0: Current mode is not "operator"
stateAutomaticActive	Bool	1: Current mode is "automatic"; 0: Current mode is not "automatic"
lockActive	Bool	Lock activated (1: Lock is activated; 0: Lock is not activated)
stopActive	Bool	No checkback signal is activated (1: Stopped; 0: Not stopped)
forwardActive	Bool	Forward checkback signal is activated (1: Forward movement; 0: No forward movement)
reverseActive	Bool	Reverse checkback signal is activated (1: Reverse movement; 0: No reverse movement)
safePosActive	Bool	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
monitorStaticErr	Bool	Static supervision error active (1: Active; 0: Inactive)
monitorDynamicErr	Bool	Dynamic supervision error active (1: Active; 0: Inactive)
interconnectorActive	Bool	Interconnector active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigMonBinDrv	Configuration data for bistable drive with feedback monitoring You can find the parameter description under LCFL_typeConfigMonBinDrv (Page 159).
interconnector	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control system You can find the parameter description under LCFL_typeDriveInterconnector (Page 139).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.3.4 MonBinVlv

5.3.4.1 LCFL_MonBinVlv - Description of function

Object name (type + number) and family

Type + number: FB 2009

Family: Drives

Description

You can use the function block "LCFL_MonBinVlv" to open or close a valve with a control signal.

The following outputs are used to open and close the valve:

Valve	Parameter	Description
Open	controlOpen	controlOpen = 1 The valve is opened. controlOpen = 0 The valve is not opened.
Close	controlClose	controlClose = 1 The valve is closed. controlClose = 0 The valve is not closed.

The current state of the valve is indicated at the following outputs:

Checkback signal	Parameter	Description
Open	openActive	openActive = 1 The valve is open. openActive = 0 The valve is not open.
Closed	closeActive	closeActive = 1 The valve is closed. closeActive = 0 The valve is not closed.

The controller is monitored by the open and close checkback signals at the function block. Missing feedback messages are derived from the control in the function block.

The output "safePosActive" indicates whether the safe position is activated (safe operation).

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigMonBinVlv".

Instance names, feedbacks, monitoring feedbacks, operator authorization, interlock and protection are activated or deactivated and configured in this PLC data type. You also configure the safe position (valve open or valve closed) that the valve is set to in case of a monitoring error, as well as the static and dynamic monitoring times.

Operating mode

The operating mode is applied from the subfunction "LCFL_OperationMode".

You can find more information at LCFL_OperationMode – Description of function (Page 50).

The operator mode is active when the PLC is started. The following actions are possible in the individual operating modes:

Operating mode	Actions
Offline	No operation is possible in offline mode.
Operator	If the mode is set to "Operator" (stateOperator = 1), the operator can use the following signals to control the valve: • Open valve (HMI.mtpData.OpenOp = 1) • Close valve (HMI.mtpData.CloseOp = 1)
Automatic	If the mode is set to "Automatic" (stateAutomatic = 1), the state can be changed by the following inputs: • Open valve (open = 1) • Close valve (close = 1) If the safe position is activated and both states are requested at the same time, the valve goes to the safe position.

Note

If an interconnector is being used and is active, the inputs "Open valve" and "Close valve" are inactive in automatic mode. The higher-level control sends the control signals via the interconnector.

Drive interconnector

The drive interconnector is applied from the subfunction "LCFL_DriveInterconnector".

You can find more information at LCFL_DriveInterconnector – Description of function (Page 43).

Tags of the function block

Name	Interface	Data type	Description
interconnector	Input/output parameter	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control
interconnectorActive	Output parameter	Bool	Interconnector active (1: Active; 0: Inactive)

Configuration tag

Name	Interface	Data type	Description
standaloneDrive	Static	LCFL_typeDriveInterconnector	Drive interconnector for standalone configuration

Interlocks

The interlocks are applied from the subfunction "LCFL_Interlock".

You can find more information at LCFL_Interlock – Description of function (Page 46).

Feedback quality

The function block uses the "openFeedbackQuality" and "closeFeedbackQuality" quality inputs to check the validity of the corresponding checkback signals.

openActive

The quality inputs have effects on the "openActive" output. This can only be active when the following conditions are defined:

- (configuration.openFeedbackEn = 1 AND openFeedbackQuality = 1)
  AND
  openFeedback = 1
- (configuration.openFeedbackEn = 0 OR openFeedbackQuality = 0)
  AND
  (configuration.closeFeedbackEn = 1 AND closeFeedbackQuality = 1)
  AND
  closeFeedback = 0
- (configuration.openFeedbackEn = 0 OR openFeedbackQuality = 0)
  AND
  (configuration.closeFeedbackEn = 0 OR closeFeedbackQuality = 0)
  AND
  controlOpen = 1

closeActive

The quality inputs have effects on the "closeActive" output. This can only be active when the following conditions are defined:

- (configuration.closeFeedbackEn = 1 AND closeFeedbackQuality = 1)
  AND
  closeFeedback = 1
- (configuration.closeFeedbackEn = 0 OR closeFeedbackQuality = 0)
  AND
  (configuration.openFeedbackEn = 1 AND openFeedbackQuality = 1)
  AND
  openFeedback = 0
- (configuration.closeFeedbackEn = 0 OR closeFeedbackQuality = 0)
  AND
  (configuration.openFeedbackEn = 0 OR openFeedbackQuality = 0)
  AND
  controlClose = 1

safePosActive

The quality inputs have effects on the activation of the safe position (output: "safePosActive") if the safe position is enabled (configuration.safePosEn = 1). The safe position is only active when the following conditions are defined:

- configuration.closeFeedbackEn = 1
  AND
  configuration.safePos = 0 (Close)
  AND
  closeFeedbackQuality = 0
- configuration.openFeedbackEn = 1
  AND
  configuration.safePos = 1 (Open)
  AND
  openFeedbackQuality = 0

Feedback monitoring

The feedback monitoring is applied from the subfunction "LCFL_FeedbackMonitoring".

You can find more information at LCFL_FeedbackMonitoring – Description of function (Page 45).

Safe position

The safe position is defined by the following parameter:

Safe position	Parameter	Description
Open / closed	safePos	configuration.safePos = 1 The safe position of the valve is "open". configuration.safePos = 0 The safe position of the valve is "closed".

If no safe position is configured, the parameter is safePosEn = 0.

You can exit the safe position by activating the operator authorization ("permit = 1" input). The activation has no effect when the function block is not in the safe position. An active interlock ("interlock = 0" or "protect = 0" inputs) moves the function block into the safe position. Depending on the input configuration, the valve moves to its safe position (configuration.monitorSafePos) or not after a feedback error.

Reset

In the following cases, the operator (HMI.mtpData.ResetOp) or an activation sequence must perform a "Reset" by means of interconnection (reset):

- To activate the interlock again after the interlock condition at the input "protect = 0 -> 1" has been deleted.
- To activate the safety indicator again after the trip condition has been deleted.
- To prevent a monitoring error from being displayed after the error has been corrected.

Operating hours

The times during which the valve opens or closes, are totaled up as operating hours. The parameter "HMI.operatingHoursAct" contains the current operating hours as a real value. When the limit of operating hours (configuration.operatingHoursLimit) is reached, the corresponding state "HMI.operatingHoursReached = 1" is set.

Switch counter of the status change

The switch counter increases every time the valve opens or closes. The parameter "HMI.switchCounterAct" contains the current switch counts. When the limit of the switch counter (configuration.switchCounterLimit) is reached, the corresponding state "HMI.switchCounterReached = 1" is set.

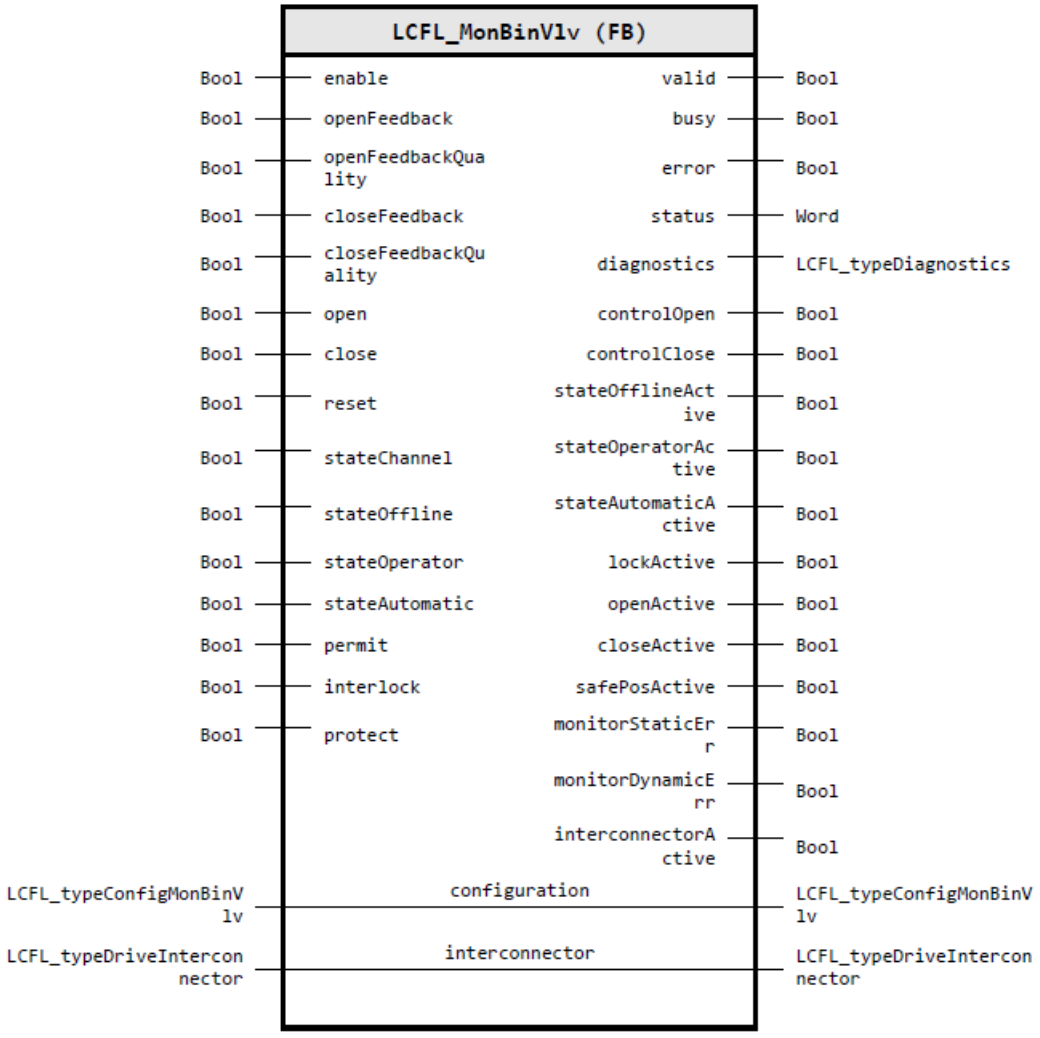
Maintenance

The maintenance is applied from the subfunction "LCFL_Maintenance".

You can find more information at LCFL_Maintenance – Description of function (Page 48).

5.3.4.2 LCFL_MonBinVlv parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
openFeedback	Bool	FALSE	Open checkback signal (1: open; 0: is not opened)
openFeedbackQuality	Bool	TRUE	Open feedback quality (1: Feedback is valid; 0: Feedback is invalid)
closeFeedback	Bool	FALSE	Close checkback signal (1: close; 0: is not closed)
closeFeedbackQuality	Bool	TRUE	Close feedback quality (1: Feedback is valid; 0: Feedback is invalid)

Parameter	Data type	Default value	Description
open	Bool	FALSE	Set valve to "open" by automatic (relevant if StateAutAct = 1) (1: "Open" request; 0: "Do not open" request)
close	Bool	FALSE	Set valve to "close" by automatic (relevant if StateAutAct = 1) (1: "Close" request; 0: "Do not close" request)
reset	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
stateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
stateOffline	Bool	FALSE	Set operating mode to "offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "offline"; 0: No operation)
stateOperator	Bool	FALSE	Set operating mode to "operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "operator"; 0: No operation)
stateAutomatic	Bool	FALSE	Set operating mode to "automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "automatic"; 0: No operation)
permit	Bool	FALSE	Permit allows control (1: Permission is given; 0: Permission is not given)
interlock	Bool	FALSE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
protect	Bool	FALSE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
controlOpen	Bool	Valve open control (1: Desired position is open; 0: Desired position is closed)
controlClose	Bool	Valve close control (1: Desired position is closed; 0: Desired position is open)
stateOfflineActive	Bool	1: Current mode is "offline"; 0: Current mode is not "Offline"

Parameter	Data type	Description
stateOperatorActive	Bool	1: Current mode is "operator"; 0: Current mode is not "operator"
stateAutomaticActive	Bool	1: Current mode is "automatic"; 0: Current mode is not "automatic"
lockActive	Bool	Lock activated (1: Lock is activated; 0: Lock is not activated)
openActive	Bool	Open checkback signal is activated (1: open; 0: is not opened)
closeActive	Bool	Close checkback signal is activated (1: close; 0: is not closed)
safePosActive	Bool	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
monitorStaticErr	Bool	Static supervision error active (1: Active; 0: Inactive)
monitorDynamicErr	Bool	Dynamic supervision error active (1: Active; 0: Inactive)
interconnectorActive	Bool	Interconnector active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigMonBinVlv	Configuration data for bistable valve with feedback monitoring You can find the parameter description under LCFL_typeConfigMonBinVlv (Page 164).
interconnector	LCFL_typeDriveInterconnector	Enables the connection of drive blocks to a higher-level control system You can find the parameter description under LCFL_typeDriveInterconnector (Page 139).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.4 Monitoring

5.4.1 AnaMon

5.4.1.1 LCFL_AnaMon - Description of function

Object name (type + number) and family

Type + number: FB 2010

Family: Monitoring

Description

You can use the "LCFL_AnaMon" function block to display analog values of the PLC (e.g. process values and parameters). These include:

- Current value
- Unit of measure
- Minimum scale value
- Maximum scale value

The scale values describe the configured limits. The configured limits are a combination of the physically possible value range and usable value range. The basis for this are the configured limits in the PLC. The unit of a value is described with a unit tag, for example, 1001 = °C - degrees Celsius (see section References (Page 421)). The output tag contains the active value.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigAnaMon".

In this PLC data type the instance name, the upper and lower limits for tolerance, warning and alarm are activated or deactivated and configured.

Limit monitoring

The function block monitors an analog value for up to 6 limits. The limits are divided into high limits and low limits for tolerance, warning and alarm.

The "enable" tags are used for activating or deactivating the limit monitoring.

Limit monitoring	Parameter	Description
Alarm high limit Activate / Deactivate	configuration.alarmHighEn	configuration.alarmHighEn = 1 The alarm high limit is activated. configuration.alarmHighEn = 0 The alarm high limit is deactivated.
Warning high limit Activate / Deactivate	configuration.warningHighEn	configuration.warningHighEn = 1 The warning high limit is activated. configuration.warningHighEn = 0 The warning high limit is deactivated.
Tolerance high limit Activate / Deactivate	configuration.toleranceHigh-En	configuration.toleranceHighEn = 1 The tolerance high limit is activated. configuration.toleranceHighEn = 0 The tolerance high limit is deactivated.
Tolerance low limit Activate / Deactivate	configuration.toleranceLo-wEn	configuration.toleranceLowEn = 1 The tolerance low limit is activated. configuration.toleranceLowEn = 0 The tolerance low limit is deactivated.
Warning low limit Activate / Deactivate	configuration.warningLowEn	configuration.warningLowEn = 1 The warning low limit is activated. configuration.warningLowEn = 0 The warning low limit is deactivated.
Alarm low limit Activate / Deactivate	configuration.alarmLowEn	configuration.alarmLowEn = 1 The alarm low limit is activated. configuration.alarmLowEn = 0 The alarm low limit is deactivated.

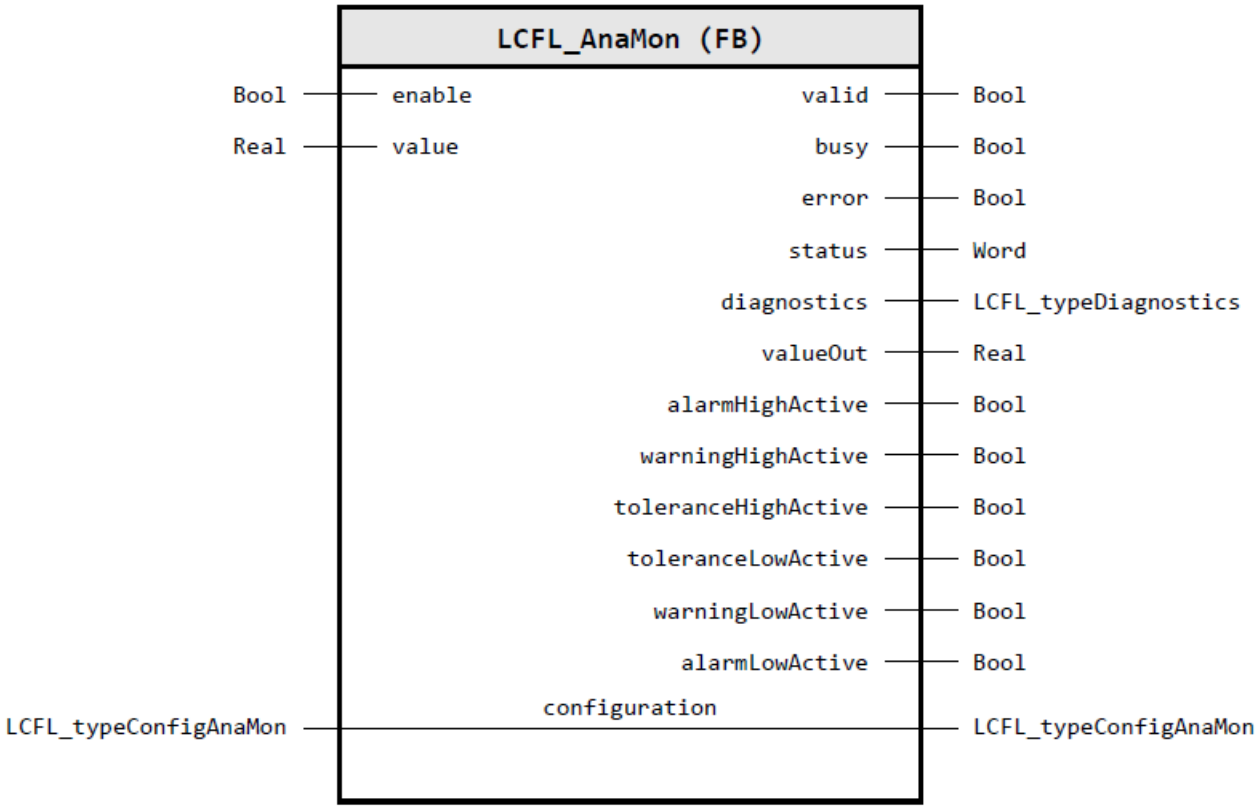
The "limit" tags define the limit:

Parameter	Description
configuration.alarmLowLim	Value for alarm high limit
configuration.warningHighLim	Value for warning high limit
configuration.toleranceHighLim	Value for tolerance high limit
configuration.toleranceLowLim	Value for tolerance low limit
configuration.warningLowLim	Value for warning low limit
configuration.alarmLowLim	Value for alarm low limit

These tags can be changed by the operator. The "active" tags signal a violation of the limits.

5.4.1.2 LCFL_AnaMon parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
value	Real	0.0	Process value

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module

Parameter	Data type	Description
valueOut	Real	Process value
alarmHighActive	Bool	"Alarm high" active (1: Active; 0: Inactive)
warningHighActive	Bool	"Warning high" active (1: Active; 0: Inactive)
toleranceHighActive	Bool	"Tolerance high" active (1: Active; 0: Inactive)
toleranceLowActive	Bool	"Tolerance low" active (1: Active; 0: Inactive)
warningLowActive	Bool	"Warning low" active (1: Active; 0: Inactive)
alarmLowActive	Bool	"Alarm low" active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigAnaMon	Configuration data for display an analog value with limit check You can find the parameter description under LCFL_typeConfigAnaMon (Page 168).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZATION_SCALE_LIM	Error: During parameterization of limit value for "scale low" and "scale high"
16#8202	ERR_PARAMETRIZATION_ALARM_HIGH_LIM	Error: During parameterization of limit value for "alarm high"
16#8203	ERR_PARAMETRIZATION_WARNING_HIGH_LIM	Error: During parameterization of limit value for "warning high"
16#8204	ERR_PARAMETRIZATION_TOLERANCE_HIGH_LIM	Error: During parameterization of limit value for "tolerance high"
16#8205	ERR_PARAMETRIZATION_TOLERANCE_LOW_LIM	Error: During parameterization of limit value for "tolerance low"
16#8206	ERR_PARAMETRIZATION_WARNING_LOW_LIM	Error: During parameterization of limit value for "warning low"
16#8207	ERR_PARAMETRIZATION_ALARM_LOW_LIM	Error: During parameterization of limit value for "alarm low"
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.4.2 BinMon

5.4.2.1 LCFL_BinMon - Description of function

Object name (type + number) and family

Type + number: FB 2011

Family: Monitoring

Description

You can use the function block "LCFL_BinMon" to monitor digital process tags with or without flutter monitoring. The function block signals excess flutter signals that are generated within a defined period. The digital value to be monitored is connected to the value input parameter.

The following output is used for flutter monitoring:

Parameter	Description
flutteringActive	flutteringActive = 1 Flutter signal detected. flutteringActive = 0 No flutter signal detected.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigBinMon".

In this PLC data type the instance name is configured, the flutter detection is activated or deactivated and configured. Texts can be stored for the values "true" and "false".

Flutter monitoring

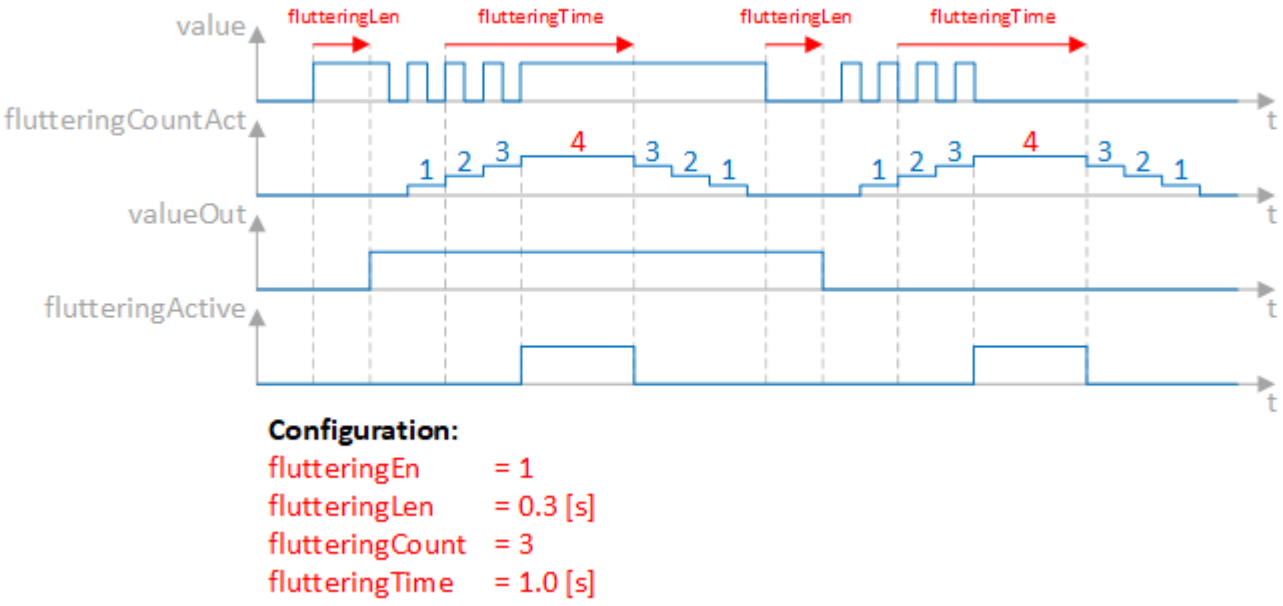
The "enable" tag is used for activating or deactivating flutter monitoring.

Flutter detection	Parameter	Description
Activate / Deactivate	configuration.flutteringEn	configuration.flutteringEn = 1 Flutter monitoring is enabled. configuration.flutteringEn = 0 Flutter monitoring is disabled.

The following parameters are available to you for configuration:

Parameter	Description
configuration.flutteringTime	Period of an active signal before it is detected as flutter-free [s]
configuration.flutteringCount	Counts of the allowed flutter signals in the defined period
configuration.flutteringLen	Period of the signal length that is needed to prevent flutter detection [s]

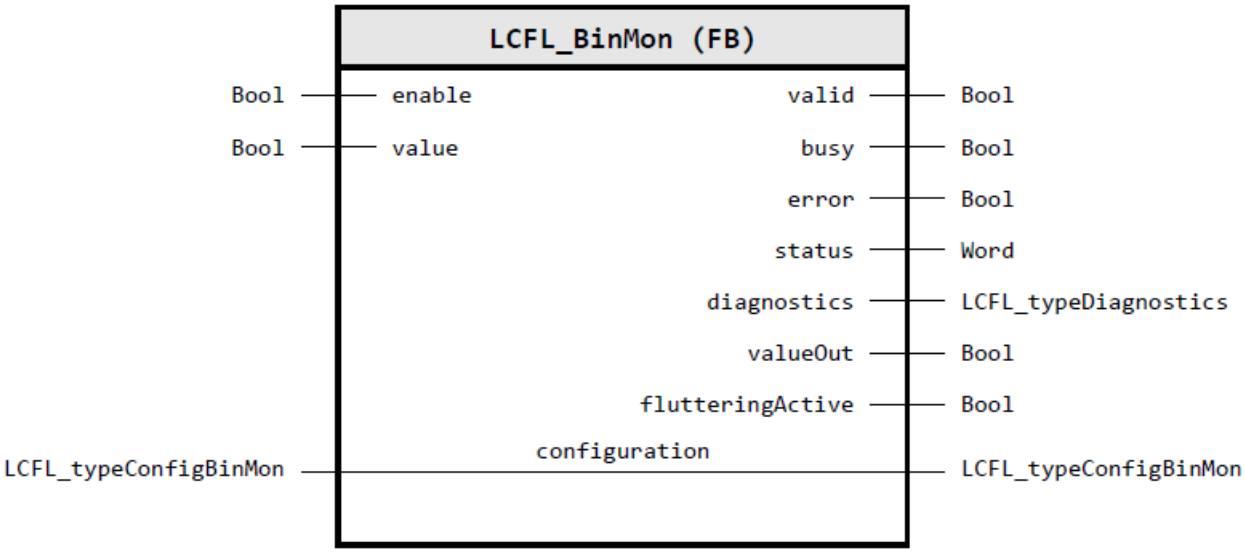
Each change of the input signal with a length that is less than the value of the configuration parameter "configuration.flutteringLen" is detected as fluttering.



An active flutter is detected (flutteringActive = 1) if during the period of an active signal before it is detected as flutter-free (configuration.flutteringTime), the active signal changes more than the number of flutter signals allowed (configuration.flutteringCount) 0->1->0 or 1->0->1 and the time for each change is less than the period of signal length needed to prevent flutter detection (configuration.flutteringLen).

5.4.2.2 LCFL_BinMon parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
value	Bool	FALSE	Process value

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
valueOut	Bool	Process value
flutteringActive	Bool	Flutter signal detected (1: Flutter signal detected; 0: No flutter signal detected)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigBinMon	Configuration data for display of a binary value with monitoring of a flutter signal You can find the parameter description under LCFL_typeConfigBinMon (Page 171).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the control module
16#8201	ERR_PARAMETRIZATION_FLUTTERING_TIME	Error: During parameterization of the period of an active signal before it will be recognized as flutter-free [s]
16#8202	ERR_PARAMETRIZATION_FLUTTERING_COUNT	Error: During parameterization of counts of the allowed fluttering signals in the defined period
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.4.3 DIntMon

5.4.3.1 LCFL_DIntMon – Description of function

Object name (type + number) and family

Type + number: FB 2012

Family: Monitoring

Description

You can use the "LCFL_DIntMon" function block to display integer values of the PLC (e.g. process values and parameters). These include:

- Current value
- Unit of measure
- Minimum scale value
- Maximum scale value

The scale values describe the configured limits. The configured limits are a combination of the physically possible value range and usable value range. The basis for this are the configured limits in the PLC. The unit of a value is described with a unit tag, for example,

1001 = °C - degrees Celsius (see section References (Page 421)). The output tag contains the active value.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigDIntMon".

In this PLC data type the instance name, the upper and lower limits for tolerance, warning and alarm are activated or deactivated and configured.

Limit monitoring

The function block monitors an analog value for up to 6 limits. The limits are divided into high limits and low limits for tolerance, warning and alarm.

The "enable" tags are used for activating or deactivating the limit monitoring.

Limit monitoring	Parameter	Description
Alarm high limit Activate / Deactivate	configuration.alarmHighEn	configuration.alarmHighEn = 1 The alarm high limit is activated. configuration.alarmHighEn = 0 The alarm high limit is deactivated.
Warning high limit Activate / Deactivate	configuration.warningHighEn	configuration.warningHighEn = 1 The warning high limit is activated. configuration.warningHighEn = 0 The warning high limit is deactivated.
Tolerance high limit Activate / Deactivate	configuration.toleranceHigh-En	configuration.toleranceHighEn = 1 The tolerance high limit is activated. configuration.toleranceHighEn = 0 The tolerance high limit is deactivated.
Tolerance low limit Activate / Deactivate	configuration.toleranceLo-wEn	configuration.toleranceLowEn = 1 The tolerance low limit is activated. configuration.toleranceLowEn = 0 The tolerance low limit is deactivated.
Warning low limit Activate / Deactivate	configuration.warningLowEn	configuration.warningLowEn = 1 The warning low limit is activated. configuration.warningLowEn = 0 The warning low limit is deactivated.
Alarm low limit Activate / Deactivate	configuration.alarmLowEn	configuration.alarmLowEn = 1 The alarm low limit is activated. configuration.alarmLowEn = 0 The alarm low limit is deactivated.

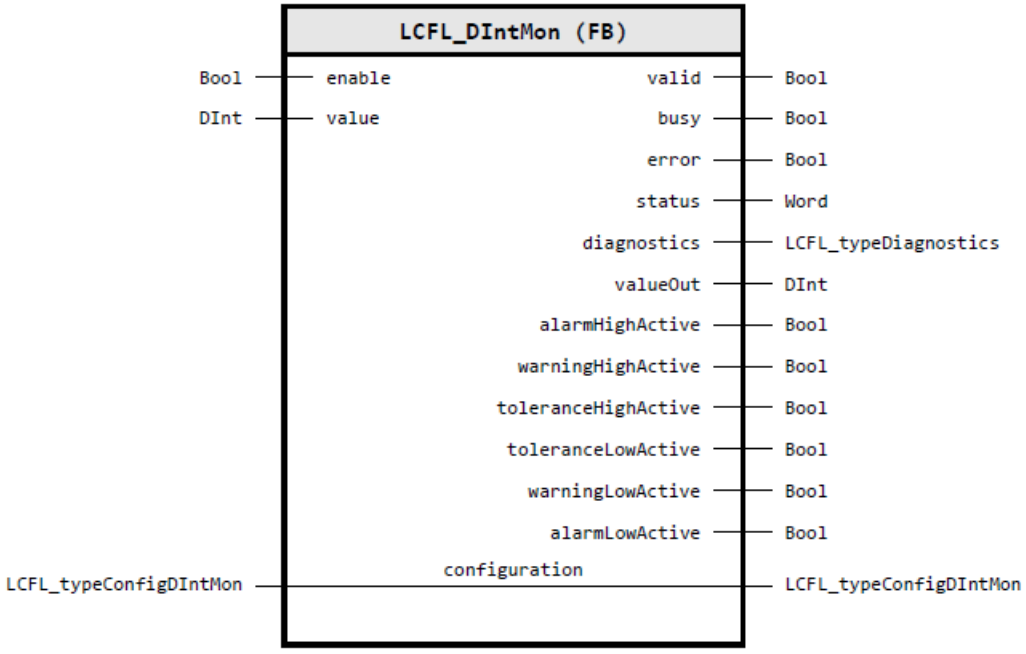
The "limit" tags define the limit:

Parameter	Description
configuration.alarmLowLim	Value for alarm high limit
configuration.warningHighLim	Value for warning high limit
configuration.toleranceHighLim	Value for tolerance high limit
configuration.toleranceLowLim	Value for tolerance low limit
configuration.warningLowLim	Value for warning low limit
configuration.alarmLowLim	Value for alarm low limit

These tags can be changed by the operator. The "active" tags signal a violation of the limits.

5.4.3.2 LCFL_DIntMon - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
value	DInt	0	Process value

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
valueOut	DInt	Process value
alarmHighActive	Bool	"Alarm high" active (1: Active; 0: Inactive)
warningHighActive	Bool	"Warning high" active (1: Active; 0: Inactive)
toleranceHighActive	Bool	"Tolerance high" active (1: Active; 0: Inactive)
toleranceLowActive	Bool	"Tolerance low" active (1: Active; 0: Inactive)
warningLowActive	Bool	"Warning low" active (1: Active; 0: Inactive)
alarmLowActive	Bool	"Alarm low" active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigDInt-Mon	Configuration data for display of an integer value with limit check You can find the parameter description under LCFL_typeConfigDIntMon (Page 173).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZATION_SCALE_LIM	Error: During parameterization of limit value for "scale low" and "scale high"
16#8202	ERR_PARAMETRIZATION_ALARM_HIGH_LIM	Error: During parameterization of limit value for "alarm high"
16#8203	ERR_PARAMETRIZATION_WARNING_HIGH_LIM	Error: During parameterization of limit value for "warning high"
16#8204	ERR_PARAMETRIZATION_TOLERANCE_HIGH_LIM	Error: During parameterization of limit value for "tolerance high"
16#8205	ERR_PARAMETRIZATION_TOLERANCE_LOW_LIM	Error: During parameterization of limit value for "tolerance low"
16#8206	ERR_PARAMETRIZATION_WARNING_LOW_LIM	Error: During parameterization of limit value for "warning low"

Code / Value	Identification	Description
16#8207	ERR_PARAMETRIZA-TION_ALARM_LOW_LIM	Error: During parameterization of limit value for "alarm low"
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.4.4 StringView

5.4.4.1 LCFL_StringView – Description of function

Object name (type + number) and family

Type + number: FB 2021

Family: Monitoring

Description

The "LCFL_StringView" function block defines an interface for displaying a string from the modular process unit (PEA, Process Equipment Assembly) in a visualization system.

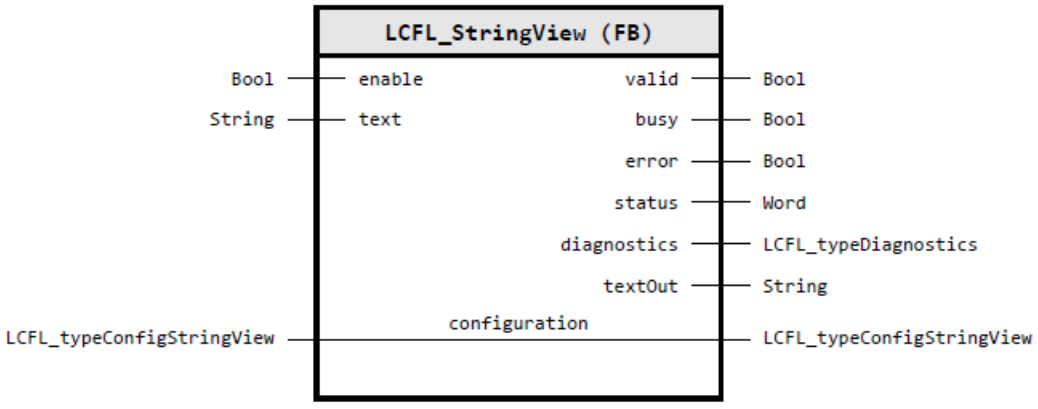
Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

5.4.4.2 LCFL_StringView - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
text	String	''	Value

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
textOut	String	Value

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigStringView	Configuration data to display a string from the PEA in a visualization system You can find the parameter description under LCFL_typeConfigStringView (Page 176).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.5 Operate

5.5.1 AnaManInt

5.5.1.1 LCFL_AnaManInt – Description of function

Object name (type + number) and family

Type + number: FB 2014

Family: Operate

Description

The "LCFL_AnaManInt" function block gives you the option of checking and transmitting analog input values. The function block checks the following incoming, analog values for their limits:

- Manual analog values that are entered in the HMI
- Internal analog values

The function block then forwards the analog value to the output value, depending on whether the source mode "Manual" or "Internal" is active.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigAnaManInt".

In this PLC data type the instance name, scale, unit, and minimum and maximum limits of the analog value are configured.

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57).

Depending on the source mode, the analog value at the output "valueOut" is either set or reset:

- "Manual" source mode
  Specification of analog value via HMI (HMI.mtpData.VMan)
- "Internal" source mode
  Specification of analog value via an interconnection at the input "valueInternal".

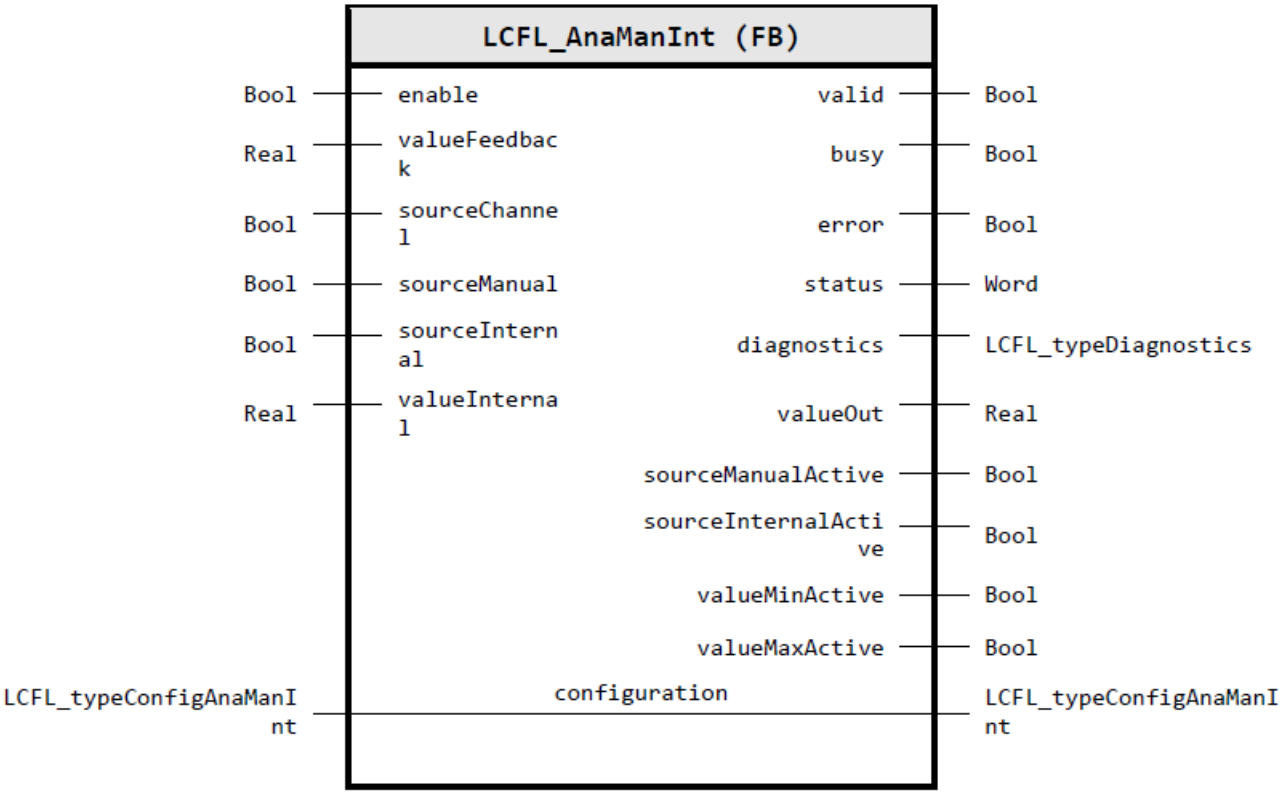
The manual analog value is tracked from the limited internal analog value to achieve a smooth switchover from the internal to the analog value.

Feedback value

The function block has the input parameter "valueFeedback" for displaying a feedback value in the HMI.

5.5.1.2 LCFL_AnaManInt parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
valueFeedback	Real	0.0	Feedback value
sourceChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
sourceManual	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
sourceInternal	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
valueInternal	Bool	0.0	Internal value (relevant if sourceInternalActive = 1)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
valueOut	Real	Output value
sourceManualActive	Bool	1: Current mode is "manual"; 0: Current mode is not "manual"
sourceInternalActive	Bool	1: Current mode is "internal"; 0: Current mode is not "internal"
valueMinActive	Bool	1: Low limit violated -> valueMin active
valueMaxActive	Bool	1: High limit violated -> valueMax active

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigAnaManInt	Configuration data for specifying an analog value from HMI or internal source and functionality to select the source You can find the parameter description under LCFL_typeConfigAnaManInt (Page 177).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")

Code / Value	Identification	Description
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZATION_SCALE_LIM	Error: During parameterization of limit value for "scale low" and "scale high"
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.5.2 BinManInt

5.5.2.1 LCFL_BinManInt – Description of function

Object name (type + number) and family

Type + number: FB 2013

Family: Operate

Description

The "LCFL_BinManInt" function block enables you to manipulate a binary value. The function block manipulates the following incoming, binary values:

- Manual binary values that are entered in the HMI
- Internal binary values

The function block then forwards the binary value to the output value, depending on whether the source mode "Manual" or "Internal" is active.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigBinManInt".

In this PLC data type, the instance name, texts for the "true" und "false" values of the "valueOut" output are configured. These texts are displayed in the HMI.

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57).

Depending on the source mode, the binary value at the output "valueOut" is either set or reset:

- "Manual" source mode
  Specification of the binary value via HMI (HMI.mtpData.VMan)
- "Internal" source mode
  Specification of the binary value via an interconnection at the "valueInternal" input.

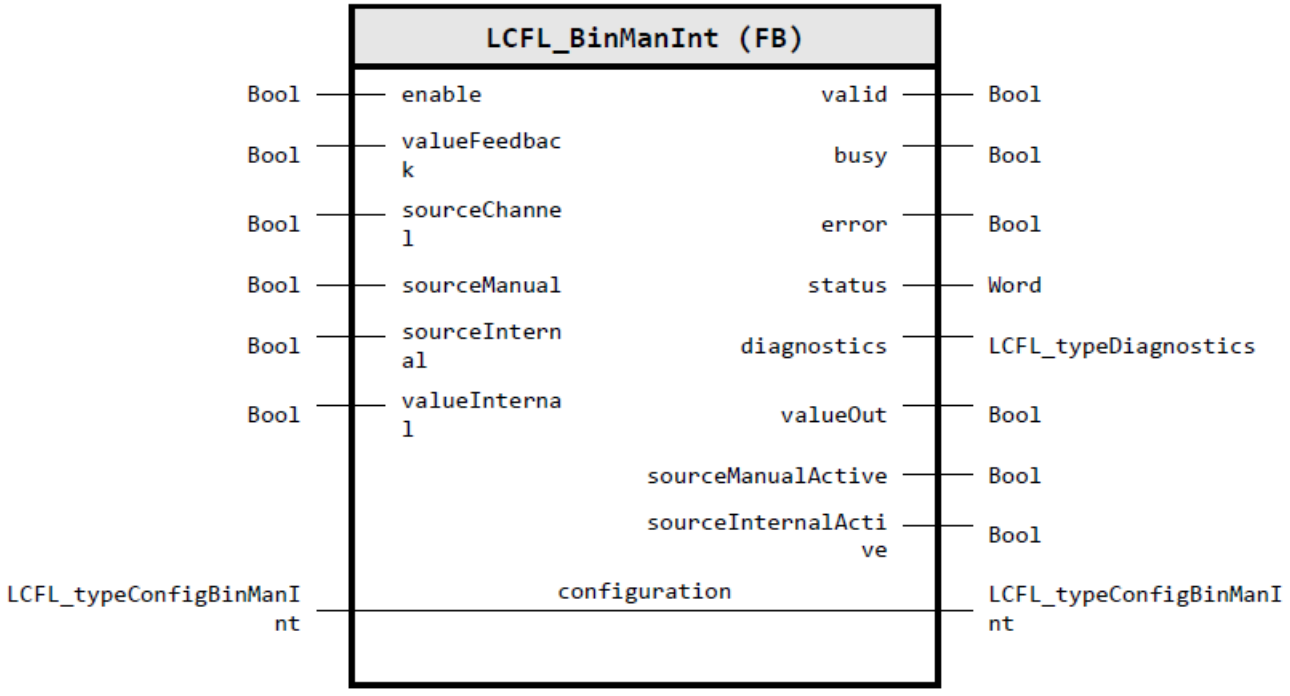
The manual binary value is tracked by the internal binary value to achieve a smooth switchover from the internal to the manual binary value.

Feedback value

The function block has the parameter "valueFeedback" for displaying a feedback value in the HMI.

5.5.2.2 LCFL_BinManInt parameter

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
valueFeedback	Bool	FALSE	Feedback value

Parameter	Data type	Default value	Description
sourceChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
sourceManual	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
sourceInternal	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
valueInternal	Bool	FALSE	Internal value (relevant if sourceInternalActive = 1)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
valueOut	Bool	Output value
sourceManualActive	Bool	1: Current mode is "manual"; 0: Current mode is not "manual"
sourceInternalActive	Bool	1: Current mode is "internal"; 0: Current mode is not "internal"

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigBinManInt	Configuration data for setting or resetting a binary value with internal value and functionality to select the source You can find the parameter description under LCFL_typeConfigBinManInt (Page 179).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.5.3 DIntManInt

5.5.3.1 LCFL_DIntManInt – Description of function

Object name (type + number) and family

Type + number: FB 2020

Family: Operate

Description

The "LCFL_DIntManInt" function block gives you the option of checking and transmitting integer input values. The function block checks the following incoming, integer values for their limits:

- Manual integer values that are entered in the HMI
- Internal integer values

The function block then forwards the integer value to the output value, depending on whether the source mode "Manual" or "Internal" is active.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigDIntManInt".

In this PLC data type the instance name, scale, unit, and minimum and maximum limits of the integer value are configured.

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57).

Depending on the source mode, the integer value at the output "valueOut" is either set or reset:

- "Manual" source mode
  Specification of the integer value via HMI (HMI.mtpData.VMan)
- "Internal" source mode
  Specification of the integer value via an interconnection at the "vInt" input.

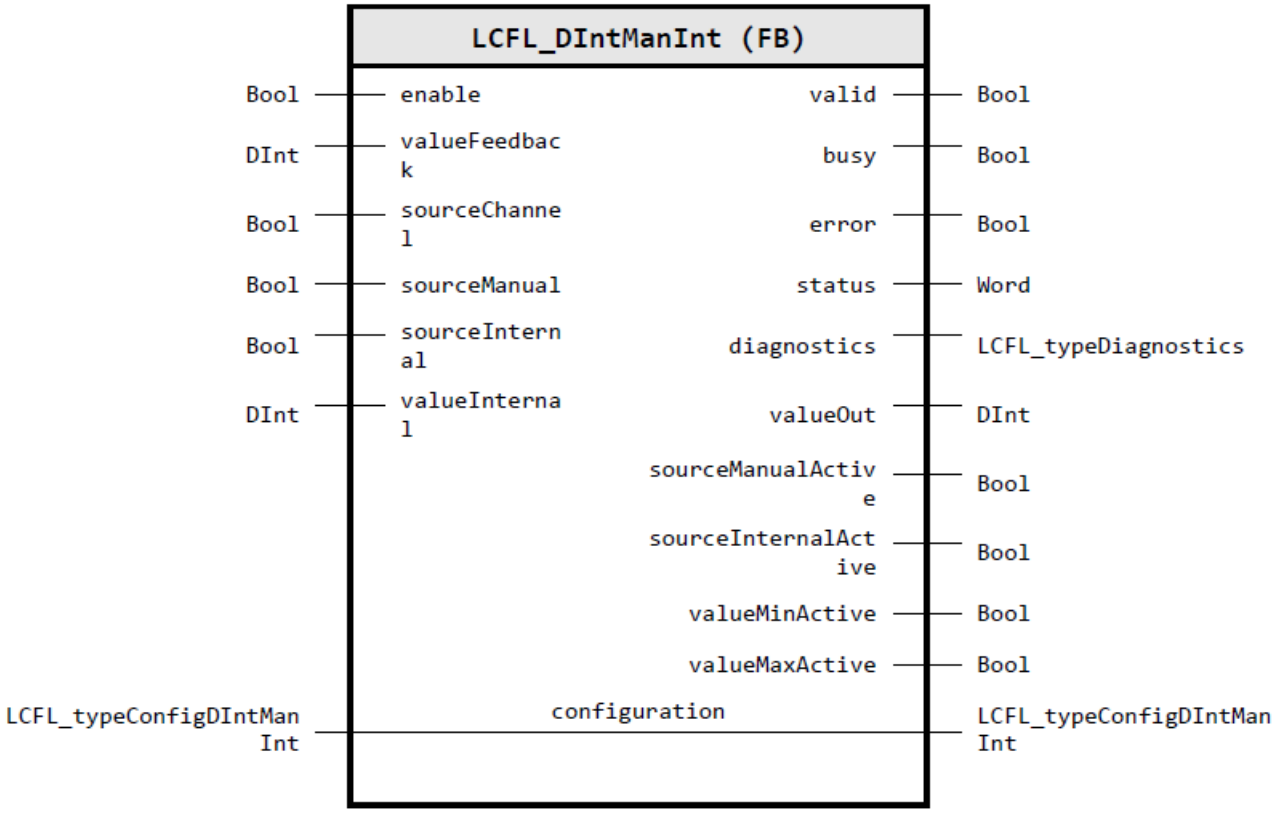
The manual integer value is tracked from the limited internal integer value to achieve a smooth switchover from the internal to the manual integer value.

Feedback value

The function block has the input parameter "valueFeedback" for displaying a feedback value in the HMI.

5.5.3.2 LCFL_DIntManInt - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
valueFeedback	DInt	0	Feedback value
sourceChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
sourceManual	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)

Parameter	Data type	Default value	Description
sourceInternal	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
valueInternal	DInt	0	Internal value (relevant if sourceInternalActive = 1)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	Diagnostics information of control module
valueOut	DInt	Output value
sourceManualActive	Bool	1: Current mode is "manual"; 0: Current mode is not "manual"
sourceInternalActive	Bool	1: Current mode is "internal"; 0: Current mode is not "internal"
valueMinActive	Bool	1: Low limit violated -> valueMin active
valueMaxActive	Bool	1: High limit violated -> valueMax active

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigDInt-ManInt	Configuration data for specifying an integer value from HMI or internal source and functionality to select the source You can find the parameter description under LCFL_typeConfigDIntManInt (Page 181).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZA-TION_SCALE_LIM	Error: During parameterization of limit value for "scale low" and "scale high"
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.6 Control

5.6.1 Aggr8

5.6.1.1 LCFL_Aggr8 – Description of function

Object name (type + number) and family

Type + number: FB 2022

Family: Control

Description

The "LCFL_Aggr8" function block controls the automatic switching on/off and switchover of up to 8 aggregates.

A requested aggregate number is required for the first start. This is set in the HMI or in the PLC. This can be done in "Operator" mode (HMI.data.NoMan signal) or "Automatic" mode (HMI.data.NoMan signal) mode. This value is limited to 8. If the value is greater than 8, the maximum number (8) is set.

The drive can be controlled by the elapsed cycle time or elapsed operating time. This is set in the HMI or in the PLC. This can be done in "Operator" mode or "Automatic" mode. In "Operator" mode, select a value. If the signal is HMI.data.SmMan = 1, the operating time is taken into account. If the signal is HMI.data.SmInt = 0, the cycle time is taken into account. The behavior is the same in the "Automatic" mode. This value is limited to 8. If the value is greater than 8, the maximum number (8) is set.

The aggregates may have a different priority. A list with the sequence of the start process is useful here.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under the function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigAggr8".

The instance name, delay time, rest time, runtime limit value, aggregate text to identify the aggregate and the type of the aggregate are configured in this PLC data type.

You can enable or disable the error output.

Drive interconnector

The drive interconnector is applied from the subfunction "LCFL_DriveInterconnector".

You can find more information at LCFL_DriveInterconnector – Description of function (Page 43).

Drive connection without interconnector

The drives can be connected conventionally via the input and output interfaces of the function block:

- Inputs: aggregate1.. aggregate8
- Output: onAggregates

The input tags receive the status information from the drive. The output tag sends the start signal to the drive.

Name	Interface	Data type	Description
aggregate1..8	Input parameters	Byte	Status of the aggregate: Bit 0 - enabled, Bit 1 - ready, Bit 2 - on
onAggregates	Output parameters	Byte	Bits 0 to 7: Aggregate 1 to 8, 1 = command on, 0 = command off.

These signals are to be evaluated and connected to drives in code logic.

Drive connection with interconnector

To operate in interconnector mode, the interconnector input/output parameter of the drive is connected to the configuration tag of LCFL_Aggr8 (driveInterconnectors[0..7])

LCFL_Aggr8 can control up to 8 drives. Therefore 8 interconnector-slot-interconnectors[0..7] are available, where 0 refers to the connection point of the control module (drive) 1 and so on. The connected interconnectors can be enabled accordingly with driveInterconnectorsEn[0..7] bits. The direction of rotation is specified with the configuration tag "driveDirectionOnInterconnectors[0..7]". This does not affect valves, which are only relevant for motor drives. When the interconnector is activated, communication with the corresponding modules is implemented via the interconnector, and the status information of the drive is evaluated accordingly. This means that the input tags "aggregateX" are omitted, output "onAggregates" continues to function unchanged.

Tags of the function block

Name	Interface	Data type	Description
interconnectorActive	Output parameters	Bool	Drive interconnectors activated (Bit0: Drive1... Bit7: Drive8)

Configuration tag

Name	Interface	Data type	Description
driveInterconnectorsEn	Static	Array[0..7] of Bool	Drive interconnectors activated (1: Enabled; 0: Disabled)
driveDirectionOnInter-connectors	Static	Array[0..7] of Bool	Direction of the drive interconnector (1: Backward; 0: Forward)
driveInterconnectors	Static	Array[0..7] of LCFL_typeDriveInterco-nector	Drive interconnectors

Features of the start

The function block switches to manual mode when the PLC is started and the block is activated.

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57).

Source mode for the number of requested aggregates (manual and internal)

Depending on the source mode, the value at the output "number" is either set or reset:

- "Manual" source mode
  Specification of the binary value via faceplate (HMI.data.NoMan)
- "Internal" source mode
  Specification of the binary value via an interconnector interconnection at the "numberSourceInternal" input.

The manual value is tracked by the internal value to achieve a smooth switchover from the internal to the manual value.

Source mode for switchover by time (manual and internal)

Depending on the source mode, the value at the output "switchMode" is either set or reset:

- "Manual" source mode
  Specification of the binary value via faceplate (HMI.data.SmMan)
- "Internal" source mode
  Specification of the binary value via an interconnector interconnection at the "switchModeSourceInternal" input.

The manual value is tracked by the internal value to achieve a smooth switchover from the internal to the manual value.

Source mode for priorities (manual and internal)

Depending on the source mode, the value at the output "priority1..8" is either set or reset:

- "Manual" source mode
  Specification of the binary value via faceplate (HMI.data.PrioritiesMan)
- "Internal" source mode
  Specification of the binary value via an interconnector interconnection at the "aggregateXPriority" input.

The manual value is tracked by the internal value to achieve a smooth switchover from the internal to the manual value.

Modes

The function block controls the automatic switching on/off of up to 8 aggregates.

Sequential switching by priority

- Switch on: The released aggregate with the highest priority
- Switch off: The aggregate in operation with the lowest priority

Priority controlled switching is active as soon as different priorities are parameterized and the configured limit time is zero.

Switching taking the operating hours into account

- Switch on: The released aggregate with the shortest total runtime
- Switch off: The aggregate in operation with the longest total runtime

This operating mode is active when the "Switch by time" function is enabled and applies only to those aggregates that have the same priority.

Switching taking the cycle time into account

- Switch on: The released aggregate with the shortest cycle time
- Switch off: The aggregate in operation with the longest total runtime

This operating mode is active when the "Switch by time" function is disabled and applies only to those aggregates that have the same priority.

Switch to the next aggregate

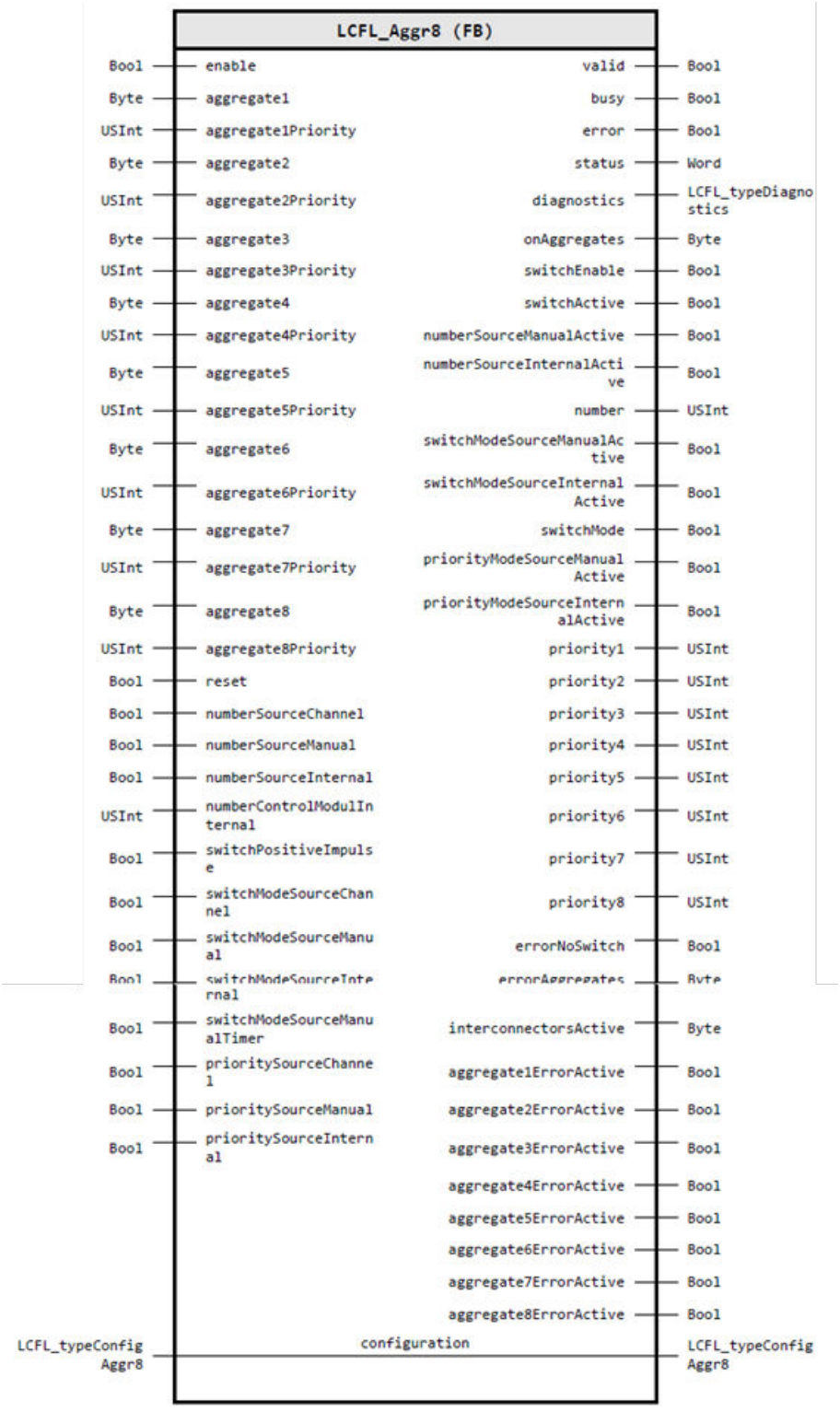
You have the option to switch to the next aggregate manually using the button on the faceplate (HMI.data.switchCommandManOp) or internally (input: switchPositiveImpulse). This function works only if the aggregates have the same priority.

Reset

In the event of an error message, the "Reset" button (HMI.data.Reset) on the faceplate or the "HMI.data.reset" input is available. The command to start or stop the aggregate is available, but not the feedback from the aggregate.

5.6.1.2 LCFL_Aggr8 - Parameters

Overview


LCFL_Aggr8 (FB)
Bool enable
Byte aggregate1
USInt aggregate1Priority
Byte aggregate2
USInt aggregate2Priority
Byte aggregate3
USInt aggregate3Priority
Byte aggregate4
USInt aggregate4Priority
Byte aggregate5
USInt aggregate5Priority
Byte aggregate6
USInt aggregate6Priority
Byte aggregate7
USInt aggregate7Priority
Byte aggregate8
USInt aggregate8Priority
Bool reset
Bool numberSourceChannel
Bool numberSourceManual
Bool numberSourceInternal
USInt numberControlModulInternal
Bool switchPositiveImpulse
Bool switchModeSourceChannel
Bool switchModeSourceManual
Bool switchModeSourceInternal
Bool switchModeSourceManualTimer
Bool prioritySourceChannel
Bool prioritySourceManual
Bool prioritySourceInternal
valid Bool
busy Bool
error Bool
status Word
diagnostics LCFL_typeDiagnostics
onAggregates Byte
switchEnable Bool
switchActive Bool
numberSourceManualActive Bool
numberSourceInternalActive Bool
number USInt
switchModeSourceManualActive Bool
switchModeSourceInternalActive Bool
switchMode Bool
priorityModeSourceManualActive Bool
priorityModeSourceInternalActive Bool
priority1 USInt
priority2 USInt
priority3 USInt
priority4 USInt
priority5 USInt
priority6 USInt
priority7 USInt
priority8 USInt
errorNoSwitch Bool
errorAggregates Byte
interconnectorsActive Byte
aggregate1ErrorActive Bool
aggregate2ErrorActive Bool
aggregate3ErrorActive Bool
aggregate4ErrorActive Bool
aggregate5ErrorActive Bool
aggregate6ErrorActive Bool
aggregate7ErrorActive Bool
aggregate8ErrorActive Bool
LCFL_typeConfigAggr8 configuration LCFL_typeConfigAggr8

Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
aggregate1	Byte	16#00	Status aggregate 1: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate1Priority	USInt	0	Priority of aggregate 1
aggregate2	Byte	16#00	Status aggregate 2: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate2Priority	USInt	0	Priority of aggregate 2
aggregate3	Byte	16#00	Status aggregate 3: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate3Priority	USInt	0	Priority of aggregate 3
aggregate4	Byte	16#00	Status aggregate 4: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate4Priority	USInt	0	Priority of aggregate 4
aggregate5	Byte	16#00	Status aggregate 5: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate5Priority	USInt	0	Priority of aggregate 5
aggregate6	Byte	16#00	Status aggregate 6: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate6Priority	USInt	0	Priority of aggregate 6
aggregate7	Byte	16#00	Status aggregate 7: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate7Priority	USInt	0	Priority of aggregate 7
aggregate8	Byte	16#00	Status aggregate 8: Bit 0 - enable, Bit 1 - ready, Bit 2 - on
aggregate8Priority	USInt	0	Priority of aggregate 8
reset	Bool	FALSE	Reset error
numberSourceChannel	Bool	FALSE	Selection of the active number source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
numberSourceManual	Bool	FALSE	Set number source mode to "manual" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
numberSourceInternal	Bool	FALSE	Set number source mode to "internal" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
numberControlModulInternal	USInt	0	Internal value (relevant, if SrcIntActNo = false) number control modules
switchPositiveImpulse	Bool	FALSE	Command to switch aggregates with positive impulse
switchModeSourceChannel	Bool	FALSE	Selection of the active switch mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)

Parameter	Data type	Default value	Description
switchModeSourceManual	Bool	FALSE	Set switch mode to "manual" by automatic interaction (relevant, if SrcChannelSm = 1) (1: Source mode is set to "manual"; 0: No operation)
switchModeSourceInternal	Bool	FALSE	Set switch mode to "internal" by automatic interaction (relevant, if SrcChannelSm = 1) (1: Source mode is set to "internal"; 0: No operation)
switchModeSourceManualTimer	Bool	FALSE	Set switch mode to "manual time" by automatic interaction (relevant, if SrcChannelSm = 1) (1: Source mode is set to "manual time"; 0: No operation)
prioritySourceChannel	Bool	FALSE	Selection of the active priority source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
prioritySourceManual	Bool	FALSE	Set priority source mode to "manual" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
prioritySourceInternal	Bool	FALSE	Set priority source mode to "internal" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification
diagnostics	LCFL_typeDiagnostics	MTP data for diagnostics
onAggregates	Byte	Bits 0 ... 7 - true = on command, false = off command. Aggregate 1 ... 8
switchEnable	Bool	True: Switching operation possible
switchActive	Bool	True: Switching operation active
numberSourceManualActive	Bool	1: Current number source mode is "manual"; 0: Current mode is not "manual"
numberSourceInternalActive	Bool	1: Current number source mode is "internal"; 0: Current mode is not "internal"
number	USInt	Number output
switchModeSourceManualActive	Bool	1: Current switch mode is "manual"; 0: Current mode is not "manual"
switchModeSourceInternalActive	Bool	1: Current switch mode is "internal"; 0: Current mode is not "internal"
switchMode	Bool	Switch mode output
priorityModeSourceManualActive	Bool	1: Current priority mode is "manual"; 0: Current mode is not "manual"

Parameter	Data type	Description
priorityModeSourceInternalActive	Bool	1: Current priority mode is "internal"; 0: Current mode is not "internal"
priority1	USInt	Output of the prioritized aggregate 1
priority2	USInt	Output of the prioritized aggregate 2
priority3	USInt	Output of the prioritized aggregate 3
priority4	USInt	Output of the prioritized aggregate 4
priority5	USInt	Output of the prioritized aggregate 5
priority6	USInt	Output of the prioritized aggregate 6
priority7	USInt	Output of the prioritized aggregate 7
priority8	USInt	Output of the prioritized aggregate 8
errorNoSwitch	Bool	Error: No aggregate available
errorAggregates	Byte	Error flags for aggregates
interconnectorsActive	Byte	Drive interconnectors activated
aggregate1ErrorActive	Bool	Aggregate 1: Error active (1: Active; 0: Inactive)
aggregate2ErrorActive	Bool	Aggregate 2: Error active (1: Active; 0: Inactive)
aggregate3ErrorActive	Bool	Aggregate 3: Error active (1: Active; 0: Inactive)
aggregate4ErrorActive	Bool	Aggregate 4: Error active (1: Active; 0: Inactive)
aggregate5ErrorActive	Bool	Aggregate 5: Error active (1: Active; 0: Inactive)
aggregate6ErrorActive	Bool	Aggregate 6: Error active (1: Active; 0: Inactive)
aggregate7ErrorActive	Bool	Aggregate 7: Error active (1: Active; 0: Inactive)
aggregate8ErrorActive	Bool	Aggregate 8: Error active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigAggr8	Configuration data for specifying aggregations value from HMI or internal source and functionality to select the source You can find the parameter description under LCFL_typeConfigAggr8 (Page 183).

Retain static parameter

Parameter	Data type	Retain	Description
statTimeOld	DTL	✓	Instance of the old time

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details

Code / Value	Identification	Description
16#8200	ERR_READ_SYSTEM_TIME	Error: Read system time
16#8201	ERR_PARAMETRIZATION_SETPOINT_INTERNAL_LOW_LIM	Error: During parameterization of internal setpoint value for "Scale low"
16#8202	ERR_PARAMETRIZATION_SETPOINT_INTERNAL_HIGH_LIM	Error: During parameterization of internal setpoint value for "Scale high"
16#8203	ERR_PARAMETRIZATION_SETPOINT_MANUAL_LOW_LIM	Error: During parameterization of manual setpoint value for "Scale low"
16#8204	ERR_PARAMETRIZATION_SETPOINT_MANUAL_HIGH_LIM	Error: During parameterization of manual setpoint value for "Scale high"
16#8205	ERR_PARAMETRIZATION_MANIPULATED_VALUE_LOW_LIM	Error: During parameterization of manipulated value for "Scale low"
16#8206	ERR_PARAMETRIZATION_MANIPULATED_VALUE_HIGH_LIM	Error: During parameterization of manipulated value for "Scale high"
16#8207	ERR_PARAMETRIZATION_SETPOINT_SCALE_WRONG	Error: During parameterization of setpoint value min and max values are zero
16#8208	ERR_PARAMETRIZATION_MANIPULATED_VALUE_SCALE_WRONG	Error: During parameterization of manipulated value min and max value are zero
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

5.6.2 PIDCtrl

5.6.2.1 LCFL_PIDCtrl – Description of function

Object name (type + number) and family

Type + number: FB 2017

Family: Control

Description

The "LCFL_PIDCtrl" function block supplies information for a continuous PID controller, which processes the typical values (process value, setpoint, manipulated variable) accordingly.

When the source mode is changed, an internal or external setpoint can be used. In "Manual" mode, the manipulated variable "HMI.mtpData.MV" is specified by the operator using the manual variables for manipulated values "HMI.mtpData.MVMan".

In automatic mode, the control algorithm is effective and can implement a manual setpoint specification or cascade switching according to the internal or external setpoint. The minimum and maximum variables are used to display limits for setpoints and the manipulated variable. The control algorithm can be used with the three variables of proportional parameters "HMI.mtpData.P", integration parameters "HMI.mtpData.Ti" and derivation parameters "HMI.mtpData.Td". To access these values, we use PID Compact.

Configuration

Call the function block in one of the following organization blocks:

- Cyclic organization block (OB1 or OB123 to OB32767)
- Cyclic interrupt organization block (OB30 to OB38 or OB123 to OB32767)

Under function block input/output parameter, connect a tag that is derived from the PLC data type "LCFL_typeConfigPIDCtrl".

Minimum and maximum values as well as units are set in this PLC data type. You can enable or disable the error output of the PID controller.

Operation mode

The operating mode is applied from the subfunction "LCFL_OperationMode".

You can find more information at LCFL_OperationMode – Description of function (Page 50).

The operator mode is active when the PLC is started. The following actions are possible in the individual operating modes:

Operation mode	Actions
Offline	No operation is possible in offline mode.
Operator	If the mode is set to "Operator" (stateOperator = 1), the operator can specify a manual output value in the parameter "ManualValue" (HMI.mtpData.MVMan).
Automatic	If the mode is set to "Automatic" (stateAutomatic = 1), PID Compact switches to automatic mode and the manipulated value is controlled via the input and the setpoints.

Source mode

The source mode is applied from the subfunction LCFL_SourceMode.

You can find more information at LCFL_SourceMode – Description of function (Page 57).

Depending on the source mode, the value at the output "valueOut" is either set or reset:

- "Manual" source mode
  Specification of the binary value via faceplate (HMI.mtpData.SPMan)
- "Internal" source mode
  Specification of the binary value via an interconnection at the "setpointInternal" input.

The manual value is tracked by the internal value to achieve a smooth switchover from the internal to the manual value.

PID Compact

PID Compact provides a PID controller with integrated tuning for actuators with proportional effect. You change the proportional parameter "HMI.mtpData.P", integration parameter "HMI.mtpData.Ti" and derivation parameter "HMI.mtpData.Td" in the PLC data type "LCFL_typeConfigPIDCtrl" or in the settings view in the faceplate. The parameters "scaleMin" and "scaleMax" are the scaling limits for the process value and the setpoint. If the process value or setpoint falls outside these limits, an error occurs. You can change the substitute value and the disturbance value at the inputs. Under error conditions, PID Compact uses a substitute output value that is defined at input "substitudeOutputValue". The substitute output value must lie within the limits of the manipulated value.

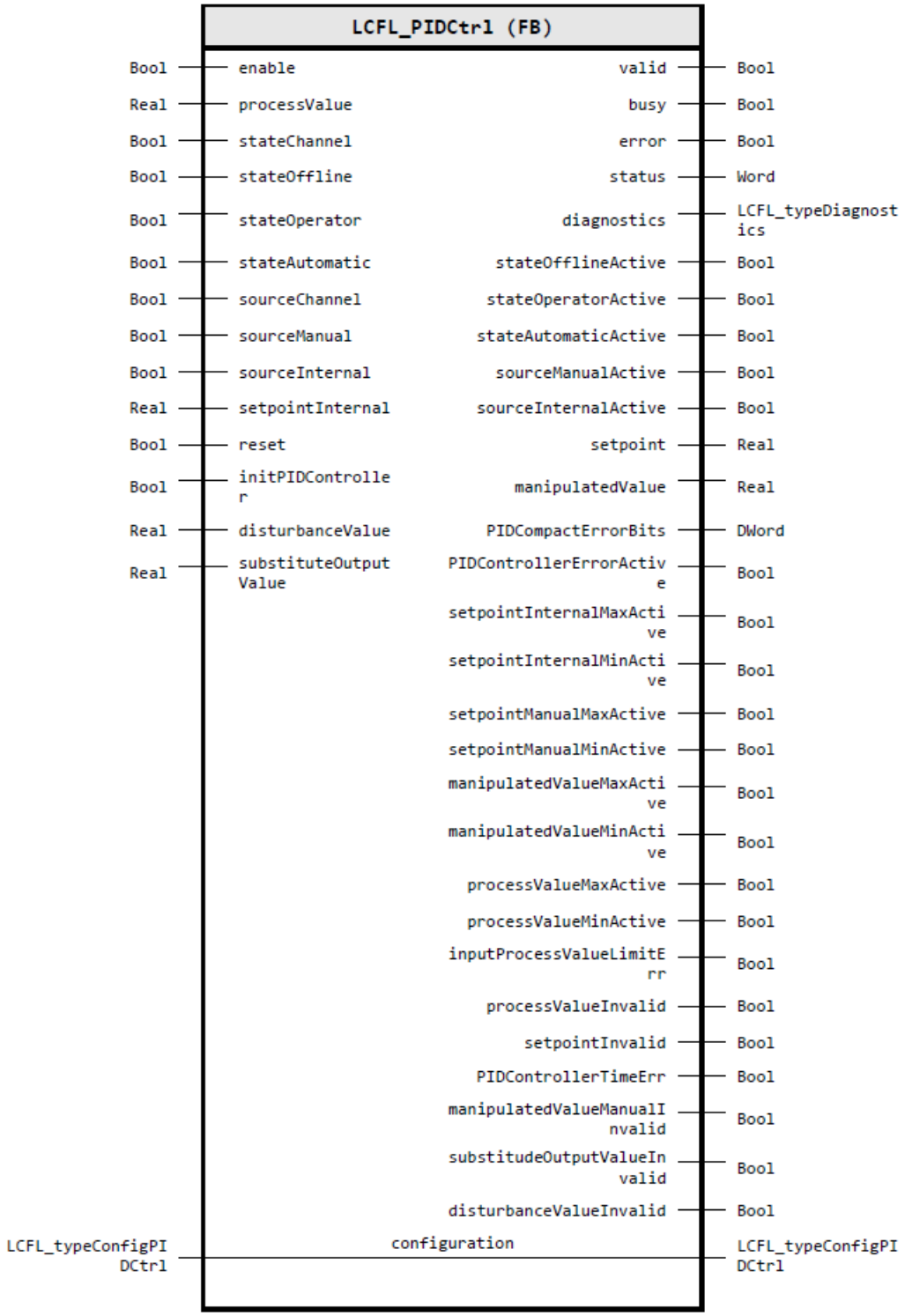
The following modes are possible:

- Offline
- Operator
- Automatic
- Substitute output value with error monitoring

You can find detailed information in the documentation of the PID Compact.

5.6.2.2 LCFL_PIDCtrl - Parameters

Overview



Input parameters

Parameter	Data type	Default value	Description
enable	Bool	FALSE	1: Enable functionality of control module
processValue	Real	0.0	Process value
stateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) are used; 1: The automatic switches (*Aut) are used)
stateOffline	Bool	FALSE	Set operating mode to "Offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Offline"; 0: No operation)
stateOperator	Bool	FALSE	Set operating mode to "Operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Operator"; 0: No operation)
stateAutomatic	Bool	FALSE	Set operating mode to "Automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Automatic"; 0: No operation)
sourceChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) are used; 1: The automatic switches (*Aut) are used)
sourceManual	Bool	FALSE	Set source mode to "Manual" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "Manual"; 0: No operation)
sourceInternal	Bool	FALSE	Set source mode to "Internal" by automatic interaction (relevant if sourceChannel = 1) (1: Source mode is set to "Internal"; 0: No operation)
setpointInternal	Real	0.0	Internal setpoint (relevant if SrcIntAct = 1 & StateAutAct = 1)
reset	Bool	FALSE	Reset from Automatic (1: Reset executed; 0: No operation)
initPIDController	Bool	FALSE	PID controller initialization from Automatic (1: PID controller initialization executed; 0: No operation)
disturbanceValue	Real	0.0	Disturbance intrusion in PID Compact
substituteOutputValue	Real	0.0	Substitute output value in case of PID Compact error

Output parameters

Parameter	Data type	Description
valid	Bool	1: Valid set of output values available at the control module
busy	Bool	1: Control module is not finished and new output values can be expected
error	Bool	1: An error occurred during the execution of the control module
status	Word	16#0000 - 16#7FFF: Status of the control module, 16#8000 - 16#FFFF: Error identification

Parameter	Data type	Description
diagnostics	LCFL_typeDiagnostics	MTP data for diagnostics
stateOfflineActive	Bool	1: Current mode is "Offline"; 0: Current mode is not "Offline"
stateOperatorActive	Bool	1: Current mode is "Operator"; 0: Current mode is not "Operator"
stateAutomaticActive	Bool	1: Current mode is "Automatic"; 0: Current mode is not "Automatic"
sourceManualActive	Bool	1: Current mode is "Manual"; 0: Current mode is not "Manual"
sourceInternalActive	Bool	1: Current mode is "Internal"; 0: Current mode is not "Internal"
setpoint	Real	Setpoint (if SrcIntAct = 1, then setpoint from SPInt; if SrcManAct = 1, then setpoint from SPMan)
manipulatedValue	Real	Manipulated value (if StateAutAct = 1, then manipulated value from PID algorithm; if StateOpAct = 1, then manipulated value from MVOp)
PIDCompactErrorBits	DWord	Error bits for PID Compact
PIDControllerErrorActive	Bool	Error bit for PID Compact active
setpointInternalMaxActive	Bool	1: Setpoint internal high limit violated -> setpointInternalMax active
setpointInternalMinActive	Bool	1: Setpoint internal low limit violated -> setpointInternalMin active
setpointManualMaxActive	Bool	1: Setpoint manual high limit violated -> setpointManualMax active
setpointManualMinActive	Bool	1: Setpoint manual low limit violated -> setpointManualMin active
manipulatedValueMaxActive	Bool	1: Manipulated value high limit violated -> manipuliertValueMax active
manipulatedValueMinActive	Bool	1: Manipulated value low limit violated ->manipuliertValueMin active
processValueMaxActive	Bool	Process value "alarm high limit" active (1: Active; 0: Inactive)
processValueMinActive	Bool	Process value "alarm low limit" active (1: Active; 0: Inactive)
inputProcessValueLimitErr	Bool	Input process value limit of the range active (1: Active; 0: Inactive)
processValueInvalid	Bool	Process value invalid active (1: Active; 0: Inactive)
setpointInvalid	Bool	Setpoint invalid active (1: Active; 0: Inactive)
manipulatedValueFailed	Bool	Manipulated value failed active (1: Active; 0: Inactive)
PIDControllerTimeErr	Bool	PID controller sampling time error active (1: Active; 0: Inactive)
manipulatedValueManualInvalid	Bool	Manipulated value manual value invalid active (1: Active; 0: Inactive)
substitudeOutputValueInvalid	Bool	Substitute output value invalid active (1: Active; 0: Inactive)
disturbanceValueInvalid	Bool	Disturbance value invalid active (1: Active; 0: Inactive)

Input/output parameters

Parameter	Data type	Description
configuration	LCFL_typeConfigPIDCtrl	Configuration data for a continuous PID controller, which processes the typical values accordingly You can find the parameter description under LCFL_typeConfigPIDCtrl (Page 187).

Status and error codes

Code / Value	Identification	Description
16#7000	STATUS_NO_CALL	No job being currently processed
16#7001	STATUS_FIRST_CALL	First call after incoming new job (rising edge "enable")
16#7002	STATUS_SUBSEQUENT_CALL	Subsequent call during active processing without further details
16#8001	ERR_IN_CM_OPERATION	Error: Wrong operation of the Control module
16#8201	ERR_PARAMETRIZATION_SETPOINT_INTERNAL_LOW_LIM	Error: During parameterization of internal setpoint value for "Scale low"
16#8202	ERR_PARAMETRIZATION_SETPOINT_INTERNAL_HIGH_LIM	Error: During parameterization of internal setpoint value for "Scale high"
16#8203	ERR_PARAMETRIZATION_SETPOINT_MANUAL_LOW_LIM	Error: During parameterization of manual setpoint value for "Scale low"
16#8204	ERR_PARAMETRIZATION_SETPOINT_MANUAL_HIGH_LIM	Error: During parameterization of manual setpoint value for "Scale high"
16#8205	ERR_PARAMETRIZATION_MANIPULATED_VALUE_LOW_LIM	Error: During parameterization of manipulated value for "Scale low"
16#8206	ERR_PARAMETRIZATION_MANIPULATED_VALUE_HIGH_LIM	Error: During parameterization of manipulated value for "Scale high"
16#8207	ERR_PARAMETRIZATION_SETPOINT_SCALE_WRONG	Error: During parameterization of setpoint value min and max values are zero
16#8208	ERR_PARAMETRIZATION_MANIPULATED_VALUE_SCALE_WRONG	Error: During parameterization of manipulated value min and max value are zero
16#8600	ERR_UNDEFINED_STATE	Error: Due to an undefined state in state machine

PLC data types

6

6.1 Common Blocks

6.1.1 Diagnostics

6.1.1.1 LCFL_typeDiagnostics

Description

The PLC data type "LCFL_typeDiagnostics" contains the diagnostic information.

Parameter

Parameter	Data type	Default value	Description
status	Word	16#0000	Status of the block or error identification when error occurred
subfunctionStatus	Word	16#0000	Status or return value of called FB's, FCs and system blocks
stateNumber	DInt	0	State in the state machine of the block where the error occurred

6.1.2 DriveInterconnector

6.1.2.1 LCFL_typeDriveInterconnector

Description

The PLC data type "LCFL_typeDriveInterconnector" enables the connection of drive blocks to a higher-level control

Parameter

Parameter			Data type	Default value	Description
fromDrive			Struct	-	Data from the drive to the higher-level control
	status		Byte	16'00	Bit0: Enabled; Bit1: Ready to start; Bit2: Started; Bit3.. 7: For future use
	operating-Counters		Struct	-	Operating counter
		operatingTime	Real	0.0	Running time meter (summed)
		cycleTime	Real	0.0	Counter for current switch-on or switch-off cycle
		switches	DInt	0	Current number of switching operations
	operatingTime		Real	0.0	Running time meter (summed)
	cycleTime		Real	0.0	Counter for current switch-on or switch-off cycle
	switches		DInt	0	Current number of switching operations
	driveType		UInt	0	0: Not connected, 1: Valve; 2: Motor; 2000-2999: Reserved for LCFL blocks
	tagName		String[30]	''	Instance name identification
toDrive			Struct	-	Data from the higher-level control to the drive
	start		Bool	FALSE	1: Start (open); 0: Stop (close)
	directionReversal		Bool	FALSE	1: Backward; 0: Forward
	controlType		UInt	0	0: Not connected (standalone); 2000-2999: Reserved for LCFL blocks
	tagName		String[30]	''	Instance name identification

6.1.3 Maintenance

6.1.3.1 LCFL_typeConfigMaintenance

Description

The PLC data type "LCFL_typeConfigMaintenance" contains configuration data of the limit values for operating time, cycle time, number of status changes and number of alarms of a drive.

Parameter

Parameter	Data type	Default value	Description
operatingTimeLimit	Real	0.0	Max. limit of operating time [h]
cycleTimeLimit	Real	0.0	Max. limit of cycle time [h]
switchCounterLimit	UDInt	0	Max. limit of number of status changes
alarmCounterLimit	UDInt	0	Max. limit of number of alarms

6.1.3.2 LCFL_typeMaintenance

Description

The PLC data type "LCFL_typeMaintenance" contains information about the operating time, cycle time, number of status changes and number of alarms of a drive.

Parameter

Parameter	Data type	Default value	Description
operatingTimeAct	Real	0.0	Actual operating time of the drive [h]
operatingTimeLimit	Real	0.0	Max. limit of operating time [h]
operatingTimeReached	Bool	FALSE	1: The actual operating time has reached or exceeded its limit (if limit > 0)
cycleTimeAct	Real	0.0	Actual cycle time of the drive [h]
cycleTimeLimit	Real	0.0	Max. limit of cycle time [h]
cycleTimeReached	Bool	FALSE	1: The actual cycle time has reached or exceeded its limit (if limit > 0)
switchCounterAct	UDInt	0	Actual number of status changes of the drive
switchCounterLimit	UDInt	0	Max. limit of number of status changes
switchCounterReached	Bool	FALSE	1: The actual number of status changes has reached or exceeded its limit (if limit > 0)
alarmCounterAct	UDInt	0	Actual number of alarms of the drive
alarmCounterLimit	UDInt	0	Max. limit of number of alarms
alarmCounterReached	Bool	FALSE	1: The actual number of alarms has reached or exceeded its limit (if limit > 0)

6.1.4 OSLevel

6.1.4.1 LCFL_typeMTPOSLevel

Description

The PLC data type "LCFL_typeMTPOSLevel" contains MTP data for OSLevel.

Parameter

Parameter	Data type	Default value	Description
OSLevel	Byte	16#00	OSLevel

6.1.4.2 LCFL_typeMTPOSLevelSiemens

Description

The "LCFL_typeMTPOSLevelSiemens" PLC data type contains the "LCFL_typeMTPOSLevel" PLC data type and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPOSLevel	---	MTP data for OSLevel. You can find the parameter description under LCFL_typeMTPOSLevel (Page 141)

6.2 Interlock

6.2.1 LockView4

6.2.1.1 LCFL_typeConfigLockView4

Description

The PLC data type "LCFL_typeConfigLockView4" contains configuration data to display a logical unit operation (AND/OR) with 4 inputs. A tag that is derived from this PLC data type is connected to the function block LockView4 (Page 59).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
logic	Bool	FALSE	Logical behavior (0: OR; 1: AND)
in1En	Bool	FALSE	Locking input 1 - Enable (0: Input not used; 1: Input is used)
in1Inversion	Bool	FALSE	Locking input 1 - Inversion enable (0: Input not inverted; 1: Input inverted)
in1Text	String[16]	''	Locking input 1 - Additional text

Parameter	Data type	Default value	Description
in2En	Bool	FALSE	Locking input 2 - Enable (0: Input not used; 1: Input is used)
in2Inversion	Bool	FALSE	Locking input 2 - Inversion enable (0: Input not inverted; 1: Input inverted)
in2Text	String[16]	''	Locking input 2 - Additional text
in3En	Bool	FALSE	Locking input 3 - Enable (0: Input not used; 1: Input is used)
in3Inversion	Bool	FALSE	Locking input 3 - Inversion enable (0: Input not inverted; 1: Input inverted)
in3Text	String[16]	''	Locking input 3 - Additional text
in4En	Bool	FALSE	Locking input 4 - Enable (0: Input not used; 1: Input is used)
in4Inversion	Bool	FALSE	Locking input 4 - Inversion enable (0: Input not inverted; 1: Input inverted)
in4Text	String[16]	''	Locking input 4 - Additional text

6.2.1.2 LCFL_typeMTPLockView4

Description

The PLC data type "LCFL_typeMTPLockView4" contains MTP data to display a logical unit operation (AND/OR) with 4 inputs.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
Logic	Bool	FALSE	Logical behavior (0: OR; 1: AND)
In1En	Bool	FALSE	Locking input 1 - Enable (0: Input not used; 1: Input is used)
In1	Bool	FALSE	Locking input 1 - Value
In1QC	Byte	16#FF	Locking input 1 - Quality code
In1Inv	Bool	FALSE	Locking input 1 - Inversion enable (0: Input not inverted; 1: Input inverted)
In1Txt	String[16]	''	Locking input 1 - Additional text
In2En	Bool	FALSE	Locking input 2 - Enable (0: Input not used; 1: Input is used)
In2	Bool	FALSE	Locking input 2 - Value
In2QC	Byte	16#FF	Locking input 2 - Quality code
In2Inv	Bool	FALSE	Locking input 2 - Inversion enable (0: Input not inverted; 1: Input inverted)
In2Txt	String[16]	''	Locking input 2 - Additional text
In3En	Bool	FALSE	Locking input 3 - Enable (0: Input not used; 1: Input is used)
In3	Bool	FALSE	Locking input 3 - Value
In3QC	Byte	16#FF	Locking input 3 - Quality code
In3Inv	Bool	FALSE	Locking input 3 - Inversion enable (0: Input not inverted; 1: Input inverted)
In3Txt	String[16]	''	Locking input 3 - Additional text

Parameter	Data type	Default value	Description
In4En	Bool	FALSE	Locking input 4 - Enable (0: Input not used; 1: Input is used)
In4	Bool	FALSE	Locking input 4 - Value
In4QC	Byte	16#FF	Locking input 4 - Quality code
In4Inv	Bool	FALSE	Locking input 4 - Inversion enable (0: Input not inverted; 1: Input inverted)
In4Txt	String[16]	''	Locking input 4 - Additional text
Out	Bool	FALSE	Locking result output
OutQC	Byte	16#FF	Locking result output - Quality code

6.2.1.3 LCFL_typeMTPLockView4Siemens

Description

The "LCFL_typeMTPLockView4Siemens" PLC data type contains the "LCFL_typeMTPLockView4" PLC data type and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_type-MTPLockView4	-	MTP data to display a logical unit operation (AND/OR) with 4 inputs You can find the parameter description under LCFL_typeMTPLock-View4 (Page 143).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled

6.2.2 LockView8

6.2.2.1 LCFL_typeConfigLockView8

Description

The PLC data type "LCFL_typeConfigLockView8" contains configuration data to display a logical unit operation (AND/OR) with 8 inputs. A tag that is derived from this PLC data type is connected to the function block LockView8 (Page 61).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
logic	Bool	FALSE	Logical behavior (0: OR; 1: AND)

Parameter	Data type	Default value	Description
in1En	Bool	FALSE	Locking input 1 - Enable (0: Input not used; 1: Input is used)
in1Inversion	Bool	FALSE	Locking input 1 - Inversion enable (0: Input not inverted; 1: Input inverted)
in1Text	String[16]	''	Locking input 1 - Additional text
in2En	Bool	FALSE	Locking input 2 - Enable (0: Input not used; 1: Input is used)
in2Inversion	Bool	FALSE	Locking input 2 - Inversion enable (0: Input not inverted; 1: Input inverted)
in2Text	String[16]	''	Locking input 2 - Additional text
in3En	Bool	FALSE	Locking input 3 - Enable (0: Input not used; 1: Input is used)
in3Inversion	Bool	FALSE	Locking input 3 - Inversion enable (0: Input not inverted; 1: Input inverted)
in3Text	String[16]	''	Locking input 3 - Additional text
in4En	Bool	FALSE	Locking input 4 - Enable (0: Input not used; 1: Input is used)
in4Inversion	Bool	FALSE	Locking input 4 - Inversion enable (0: Input not inverted; 1: Input inverted)
in4Text	String[16]	''	Locking input 4 - Additional text
in5En	Bool	FALSE	Locking input 5 - Enable (0: Input not used; 1: Input is used)
in5Inversion	Bool	FALSE	Locking input 5 - Inversion enable (0: Input not inverted; 1: Input inverted)
in5Text	String[16]	''	Locking input 5 - Additional text
in6En	Bool	FALSE	Locking input 6 - Enable (0: Input not used; 1: Input is used)
in6Inversion	Bool	FALSE	Locking input 6 - Inversion enable (0: Input not inverted; 1: Input inverted)
in6Text	String[16]	''	Locking input 6 - Additional text
in7En	Bool	FALSE	Locking input 7 - Enable (0: Input not used; 1: Input is used)
in7Inversion	Bool	FALSE	Locking input 7 - Inversion enable (0: Input not inverted; 1: Input inverted)
in7Text	String[16]	''	Locking input 7 - Additional text
in8En	Bool	FALSE	Locking input 8 - Enable (0: Input not used; 1: Input is used)
in8Inversion	Bool	FALSE	Locking input 8 - Inversion enable (0: Input not inverted; 1: Input inverted)
in8Text	String[16]	''	Locking input 8 - Additional text

6.2.2.2 LCFL_typeMTPLockView8

Description

The PLC data type "LCFL_typeMTPLockView8" contains MTP data to display a logical unit operation (AND/OR) with 8 inputs.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
Logic	Bool	FALSE	Logical behavior (0: OR; 1: AND)
In1En	Bool	FALSE	Locking input 1 - Enable (0: Input not used; 1: Input is used)
In1	Bool	FALSE	Locking input 1 - Value
In1QC	Byte	16#FF	Locking input 1 - Quality code
In1Inv	Bool	FALSE	Locking input 1 - Inversion enable (0: Input not inverted; 1: Input inverted)
In1Txt	String[16]	''	Locking input 1 - Additional text
In2En	Bool	FALSE	Locking input 2 - Enable (0: Input not used; 1: Input is used)
In2	Bool	FALSE	Locking input 2 - Value
In2QC	Byte	16#FF	Locking input 2 - Quality code
In2Inv	Bool	FALSE	Locking input 2 - Inversion enable (0: Input not inverted; 1: Input inverted)
In2Txt	String[16]	''	Locking input 2 - Additional text
In3En	Bool	FALSE	Locking input 3 - Enable (0: Input not used; 1: Input is used)
In3	Bool	FALSE	Locking input 3 - Value
In3QC	Byte	16#FF	Locking input 3 - Quality code
In3Inv	Bool	FALSE	Locking input 3 - Inversion enable (0: Input not inverted; 1: Input inverted)
In3Txt	String[16]	''	Locking input 3 - Additional text
In4En	Bool	FALSE	Locking input 4 - Enable (0: Input not used; 1: Input is used)
In4	Bool	FALSE	Locking input 4 - Value
In4QC	Byte	16#FF	Locking input 4 - Quality code
In4Inv	Bool	FALSE	Locking input 4 - Inversion enable (0: Input not inverted; 1: Input inverted)
In4Txt	String[16]	''	Locking input 4 - Additional text
In5En	Bool	FALSE	Locking input 5 - Enable (0: Input not used; 1: Input is used)
In5	Bool	FALSE	Locking input 5 - Value
In5QC	Byte	16#FF	Locking input 5 - Quality code
In5Inv	Bool	FALSE	Locking input 5 - Inversion enable (0: Input not inverted; 1: Input inverted)
In5Txt	String[16]	''	Locking input 5 - Additional text
In6En	Bool	FALSE	Locking input 6 - Enable (0: Input not used; 1: Input is used)
In6	Bool	FALSE	Locking input 6 - Value
In6QC	Byte	16#FF	Locking input 6 - Quality code
In6Inv	Bool	FALSE	Locking input 6 - Inversion enable (0: Input not inverted; 1: Input inverted)
In6Txt	String[16]	''	Locking input 6 - Additional text
In7En	Bool	FALSE	Locking input 7 - Enable (0: Input not used; 1: Input is used)
In7	Bool	FALSE	Locking input 7 - Value
In7QC	Byte	16#FF	Locking input 7 - Quality code
In7Inv	Bool	FALSE	Locking input 7 - Inversion enable (0: Input not inverted; 1: Input inverted)

Parameter	Data type	Default value	Description
In7Txt	String[16]	''	Locking input 7 - Additional text
In8En	Bool	FALSE	Locking input 8 - Enable (0: Input not used; 1: Input is used)
In8	Bool	FALSE	Locking input 8 - Value
In8QC	Byte	16#FF	Locking input 8 - Quality code
In8Inv	Bool	FALSE	Locking input 8 - Inversion enable (0: Input not inverted; 1: Input inverted)
In8Txt	String[16]	''	Locking input 8 - Additional text
Out	Bool	FALSE	Locking result output
OutQC	Byte	16#FF	Locking result output - Quality code

6.2.2.3 LCFL_typeMTPLockView8Siemens

Description

The "LCFL_typeMTPLockView8Siemens" PLC data type contains the "LCFL_typeMTPLockView8" PLC data type and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_type-MTPLockView8	-	MTP data to display a logical unit operation (AND/OR) with 8 inputs You can find the parameter description under LCFL_typeMTPLock-View8 (Page 145).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled

6.3 Drives

6.3.1 MonAnaDrv

6.3.1.1 LCFL_typeConfigMonAnaDrv

Description

The PLC data type "LCFL_typeConfigMonAnaDrv" contains configuration data for analog drive with the feedback monitoring. A tag that is derived from this PLC data type is connected to the function block MonAnaDrv (Page 65).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
forwardEn	Bool	TRUE	Forward movement enable (1: Enabled; 0: Disabled)
forwardFeedbackEn	Bool	TRUE	Enables the forward movement checkback signal (1: Enabled; 0: Disabled)
reverseEn	Bool	TRUE	Reverse movement enable (1: Enabled; 0: Disabled)
reverseFeedbackEn	Bool	TRUE	Enables the reverse movement checkback signal (1: Enabled; 0: Disabled)
monitorEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
monitorSafePos	Bool	FALSE	Define error behavior when a monitoring error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the status)
monitorStaticTime	Real	1.0	Monitoring time for uncontrolled changes [s]
monitorDynamicTime	Real	5.0	Monitoring time for controlled changes [s]
revolutionSpeedFeedbackEn	Bool	TRUE	Activates the speed checkback signal (1: Enabled; 0: Disabled)
revolutionSpeedScaleMin	Real	-100.0	Speed for setpoint scale low limit
revolutionSpeedScaleMax	Real	100.0	Speed for setpoint scale high limit
revolutionSpeedUnit	Int	1085	Speed unit
revolutionSpeedMin	Real	-95.0	Speed for setpoint low limit
revolutionSpeedMax	Real	95.0	Speed for setpoint high limit
revolutionSpeedErrorHysteresis	Real	0.0	Speed error hysteresis (RpmErr = Rpm – RpmFbk)
revolutionSpeedSafePos	Bool	FALSE	Define error behavior when a speed error occurs (1: After a speed error occurs, the safe position is set; 0: After a speed error occurs, the entity holds the status)
revolutionSpeedAlarmHighEn	Bool	TRUE	Enables speed alarm high limit (1: Enabled; 0: Disabled)
revolutionSpeedAlarmHighLim	Real	90.0	Limit for "Speed alarm high limit"
revolutionSpeedAlarmLowEn	Bool	TRUE	Enables speed alarm low limit (1: Enabled; 0: Disabled)
revolutionSpeedAlarmLowLim	Real	-90.0	Limit for "Speed alarm low limit"
protectEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
interlockEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
permitEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
tripMessageEn	Bool	TRUE	Alarm activation for safety indicator of the drive (1: Enabled; 0: Disabled)
monitorStaticMessageEn	Bool	TRUE	Alarm activation for static supervision error (1: Enabled; 0: Disabled)
monitorDynamicMessageEn	Bool	TRUE	Alarm activation for dynamic supervision error (1: Enabled; 0: Disabled)
revolutionSpeedAlarmHighMessageEn	Bool	TRUE	Enable message for speed alarm high (1: Enabled; 0: Disabled)
revolutionSpeedAlarmLowMessageEn	Bool	TRUE	Enable message for speed alarm low (1: Enabled; 0: Disabled)
operatingTimeMessageEn	Bool	TRUE	Message activation for operating hours have reached their limit (1: Enabled; 0: Disabled)
cycleTimeMessageEn	Bool	TRUE	Message activation for cycle time has reached its limit (1: Enabled; 0: Disabled)
switchCounterMessageEn	Bool	TRUE	Message activation for number of status changes has reached its limit (1: Enabled; 0: Disabled)
alarmCounterMessageEn	Bool	TRUE	Message activation for number of alarm counters has reached its limit (1: Enabled; 0: Disabled)
standaloneDrive	LCFL_typeDriveInterconnector	-	Drive interconnector for standalone configuration
maintenance	LCFL_typeConfigMaintenance	-	Maintenance configuration

6.3.1.2 LCFL_typeMTPMonAnaDrv

Description

The PLC data type "LCFL_typeMTPMonAnaDrv" contains MTP data for analog drive with the feedback monitoring.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
StateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
StateOffAut	Bool	FALSE	Set operating mode to "Offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Offline"; 0: No operation)
StateOpAut	Bool	FALSE	Set operating mode to "Operator" by automatic interaction (relevant if StateChannel = 1) (1: Operation mode is set to "operator"; 0: No operation)

Parameter	Data type	Default value	Description
StateAutAut	Bool	FALSE	Set operating mode to "Automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Automatic"; 0: No operation)
StateOffOp	Bool	FALSE	Set operating mode to "Offline" by operator interaction (relevant if StateChannel = 0) (0-->1: request to set operating mode to "Offline"; 1-->0: acknowledge by PEA)
StateOpOp	Bool	FALSE	Set operating mode to "Operator" by operator interaction (relevant if StateChannel = 0) (0-->1: request to set operating mode to "Operator"; 1-->0: acknowledge by PEA)
StateAutOp	Bool	FALSE	Set operating mode to "Automatic" by operator interaction (relevant if StateChannel = 0) (0-->1: request to set operating mode to "Automatic"; 1-->0: acknowledge by PEA)
StateOpAct	Bool	FALSE	1: Current mode is "Operator"; 0: Current mode is not "Operator"
StateAutAct	Bool	FALSE	1: Current mode is "Automatic"; 0: Current mode is not "Automatic"
StateOffAct	Bool	FALSE	1: Current mode is "Offline"; 0: Current mode is not "Offline"
SrcChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) are used; 1: The automatic switches (*Aut) are used)
SrcManAut	Bool	FALSE	Set source mode to "Manual" by automatic interaction (relevant, if SrcChannel = 1) (1: Source mode is set to "Manual"; 0: No operation)
SrcIntAut	Bool	FALSE	Set source mode to "Internal" by automatic interaction (relevant, if SrcChannel = 1) (1: Source mode is set to "Internal"; 0: No operation)
SrcManOp	Bool	FALSE	Set source mode to "Manual" by operator interaction (relevant, if SrcChannel = 0) (0-->1: request to set operating mode to "Manual"; 1-->0: acknowledge by PEA)
SrcIntOp	Bool	FALSE	Set source mode to "Internal" by operator interaction (relevant, if SrcChannel = 0) (0-->1: request to set operating mode to "Internal"; 1-->0: acknowledge by PEA)
SrcManAct	Bool	FALSE	1: Current mode is "Manual"; 0: Current mode is not "Manual"
SrcIntAct	Bool	FALSE	1: Current mode is "Internal"; 0: Current mode is not "Internal"
SafePos	Bool	FALSE	Safe position (1: Running; 0: Stopped)
SafePosAct	Bool	FALSE	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
FwdEn	Bool	TRUE	Forward movement enable (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
RevEn	Bool	TRUE	Reverse movement enable (1: Enabled; 0: Disabled)
StopOp	Bool	FALSE	Stop command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
FwdOp	Bool	FALSE	Forward command from operator (relevant if StateOpAct = 1 & FwdEn = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
RevOp	Bool	FALSE	Reverse command from operator (relevant if StateOpAct = 1 & RevEn = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
StopAut	Bool	FALSE	Set drive to "stop" by automatic (relevant if StateAutAct = 1) (1: Stop request; 0: No stop request)
FwdAut	Bool	FALSE	Set drive to forward by automatic (relevant if StateAutAct = 1 & FwdEn = 1) (1: Forward running request; 0: No forward running request)
RevAut	Bool	FALSE	Set drive to reverse by automatic (relevant if StateAutAct= 1 & RevEn = 1) (1: Reverse running request; 0: No reverse running request)
FwdCtrl	Bool	FALSE	Forward control (1: Active; 0: Inactive)
RevCtrl	Bool	FALSE	Reverse control (1: Active; 0: Inactive)
RpmSclMin	Real	0.0	Revolution speed setpoint scale low limit
RpmSclMax	Real	0.0	Revolution speed setpoint scale high limit
RpmUnit	Int	0	Revolution speed unit
RpmMin	Real	0.0	Revolution speed setpoint low limit
RpmMax	Real	0.0	Revolution speed setpoint high limit
RpmInt	Real	0.0	Revolution speed internal setpoint (relevant, if SrcIntAct = 1)
RpmMan	Real	0.0	Revolution speed manual setpoint (relevant, if SrcIntAct = 1)
Rpm	Real	0.0	Revolution speed setpoint
RpmRbk	Real	0.0	Revolution speed readback
RevFbkCalc	Bool	FALSE	Reverse feedback source (1: Calculated; 0: Sensor detection)
RevFbk	Bool	FALSE	Reverse feedback signal (1: Reverse running; 0: Not reverse running)
FwdFbkCalc	Bool	FALSE	Forward feedback source (1: Calculated; 0: Sensor detection)
FwdFbk	Bool	FALSE	Forward feedback signal (1: Forward running; 0: Not forward running)
RpmFbkCalc	Bool	FALSE	Revolution speed feedback source (1: Calculated; 0: Sensor detection)
RpmFbk	Real	0.0	Revolution speed feedback signal
Trip	Bool	FALSE	Drive safety indicator (0: Tripped, 1: No error)
PermEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
Permit	Bool	TRUE	Permit allows control (1: Authorization is given; 0: Authorization is not given)
IntEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
Interlock	Bool	TRUE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
ProtEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
Protect	Bool	TRUE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)
ResetOp	Bool	FALSE	Reset from operator (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
ResetAut	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
MonEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
MonSafePos	Bool	FALSE	Define error performance, when a supervision error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the state)
MonStatErr	Bool	FALSE	Static supervision error active (1: Active; 0: Inactive)
MonDynErr	Bool	FALSE	Dynamic supervision error active (1: Active; 0: Inactive)
MonStatTi	Real	0.0	Monitoring time for uncontrolled changes [s]
MonDynTi	Real	0.0	Monitoring time for controlled changes [s]
RpmErr	Real	0.0	Revolution speed error (RpmErr = Rpm – RpmFbk)
RpmAHEn	Bool	TRUE	Enables revolution speed alarm high limit (1: Enabled; 0: Disabled)
RpmALEn	Bool	TRUE	Enables revolution speed alarm low limit (1: Enabled; 0: Disabled)
RpmAHAct	Bool	FALSE	"Revolution speed alarm high limit" active (1: Active; 0: Inactive)
RpmALAct	Bool	FALSE	"Revolution speed alarm low limit" active (1: Active; 0: Inactive)
RpmAHLim	Real	0.0	Limit value for "Revolutions per minute alarm high limit"
RpmALLim	Real	0.0	Limit value for "Revolutions per minute alarm low limit"

6.3.1.3 LCFL_typeMTPMonAnaDrvSiemens

Description

The "LCFL_typeMTPMonAnaDrvSiemens" PLC data type contains the "LCFL_typeMTPMonAnaDrv" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPMon-BinDrv	-	MTP data for bistable drive with feedback monitoring You can find the parameter description under LCFL_typeMTPMonAnaDrv (Page 149).
maintenance	LCFL_typeMaintenance	-	Data type for HMI data You can find the parameter description under LCFL_typeMaintenance (Page 141).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
tripMessage	Bool	FALSE	Message for drive protection indicator (1: Message active; 0: Message inactive)
monitorStaticMessage	Bool	FALSE	Message for static monitoring error (1: Message active; 0: Message inactive)
monitorDynamicMessage	Bool	FALSE	Message for dynamic monitoring error (1: Message active; 0: Message inactive)
revolutionSpeedAlarmHighMessage	Bool	FALSE	Alarm for revolution speed at alarm high limit (1: Message active; 0: message inactive)
revolutionSpeedAlarmLowMessage	Bool	FALSE	Alarm for revolution speed at alarm low limit (1: Message active; 0: message inactive)
operatingTimeMessage	Bool	FALSE	Message for operating hours have reached their limit (1: Message is activated; 0: Message inactive)
cycleTimeMessage	Bool	FALSE	Message for cycle time is reached (1: Message active; 0: Message inactive)
switchCounterMessage	Bool	FALSE	Message for number of state changes has reached its limit (1: Message is activated; 0: Message inactive)
alarmCounterMessage	Bool	FALSE	Message for alarm counter is reached (1: Message active; 0: Message inactive)
interconnectorActive	Bool	FALSE	Interconnector active (1: Active; 0: Inactive)
interconnectedTagName	String[30]	''	Name of the connected instance

6.3.2 MonAnaVlv

6.3.2.1 LCFL_typeConfigMonAnaVlv

Description

The PLC data type "LCFL_typeConfigMonAnaVlv" contains configuration data for an analog valve with feedback monitoring. A tag that is derived from this PLC data type is connected to the function block MonAnaVlv (Page 75).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
openFeedbackEn	Bool	TRUE	Enables the open checkback signal (1: Enabled; 0: Disabled)
closeFeedbackEn	Bool	TRUE	Enables the close checkback signal (1: Enabled; 0: Disabled)
positionFeedbackEn	Bool	TRUE	Enables the position feedback signal (1: Enabled; 0: Disabled)
safePosEn	Bool	FALSE	Hardware safe position activated (1: Device has a safe position; 0: Device has no safe position)
safePos	Bool	FALSE	Safe position (1: Open; 0: Closed)
monitorEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
monitorSafePos	Bool	FALSE	Define error behavior when a monitoring error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the status)
monitorStaticTime	Real	1.0	Monitoring time for uncontrolled changes [s]
monitorDynamicTime	Real	5.0	Monitoring time for controlled changes [s]
monitorPositionTime	Real	5.0	Monitoring time until position is reached [s]
positionScaleMin	Real	0.0	Position setpoint scale low limit
positionScaleMax	Real	100.0	Position setpoint scale high limit
positionUnit	Int	1342	Position setpoint unit
positionMin	Real	0.0	Position setpoint low limit
positionMax	Real	100.0	Position setpoint high limit
positionTolerance	Real	1.0	Position tolerance value for calculation
protectEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
interlockEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
permitEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)
monitorStaticMessageEn	Bool	TRUE	Alarm activation for static supervision error (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
monitorDynamicMessageEn	Bool	TRUE	Alarm activation for dynamic supervision error (1: Enabled; 0: Disabled)
monitorPositionMessageEn	Bool	TRUE	Message activation for position error (1: Enabled; 0: Disabled)
operatingTimeMessageEn	Bool	TRUE	Message activation for operating hours have reached their limit (1: Enabled; 0: Disabled)
cycleTimeMessageEn	Bool	TRUE	Message activation for cycle time has reached its limit (1: Enabled; 0: Disabled)
switchCounterMessageEn	Bool	TRUE	Message activation for number of status changes has reached its limit (1: Enabled; 0: Disabled)
alarmCounterMessageEn	Bool	TRUE	Message activation for number of alarm counters has reached its limit (1: Enabled; 0: Disabled)
standaloneDrive	LCFL_typeDriveInterconnector	-	Drive interconnector for standalone configuration
maintenance	LCFL_typeConfigMaintenance	-	Maintenance configuration

6.3.2.2 LCFL_typeMTPMonAnaVlv

Description

The PLC data type "LCFL_typeMTPMonAnaVlv" contains MTP data for an analog valve with feedback monitoring.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
StateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
StateOffAut	Bool	FALSE	Set operating mode to "offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "offline"; 0: No operation)
StateOpAut	Bool	FALSE	Set operating mode to "operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "operator"; 0: No operation)
StateAutAut	Bool	FALSE	Set operating mode to "automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "automatic"; 0: No operation)
StateOffOp	Bool	FALSE	Set operating mode to "offline" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operating mode to "offline"; 1-->0: Acknowledge by PEA)

Parameter	Data type	Default value	Description
StateOpOp	Bool	FALSE	Set operating mode to "operator" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operating mode to "operator"; 1-->0: Acknowledge by PEA)
StateAutOp	Bool	FALSE	Set operating mode to "automatic" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operating mode to "automatic"; 1-->0: Acknowledge by PEA)
StateOpAct	Bool	FALSE	1: Current mode is "operator"; 0: Current mode is not "operator"
StateAutAct	Bool	FALSE	1: Current mode is "automatic"; 0: Current mode is not "automatic"
StateOffAct	Bool	FALSE	1: Current mode is "offline"; 0: Current mode is not "Offline"
SrcChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
SrcManAut	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
SrcIntAut	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
SrcManOp	Bool	FALSE	Set source mode to "manual" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
SrcIntOp	Bool	FALSE	Set source mode to "internal" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
SrcManAct	Bool	FALSE	1: Current mode is "manual"; 0: Current mode is not "manual"
SrcIntAct	Bool	FALSE	1: Current mode is "internal"; 0: Current mode is not "internal"
SafePos	Bool	FALSE	Safe position (1: Open; 0: Closed)
SafePosEn	Bool	TRUE	Hardware safe position activated (1: Device has a safe position; 0: Device has no safe position)
SafePosAct	Bool	FALSE	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
OpenOp	Bool	FALSE	Open command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
CloseOp	Bool	FALSE	Close command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)

Parameter	Data type	Default value	Description
OpenAut	Bool	FALSE	Set valve to "open" by automatic (relevant if StateAutAct = 1) (1: "Open" request; 0: "Do not open" request)
CloseAut	Bool	FALSE	Set valve to "close" by automatic (relevant if StateAutAct = 1) (1: "Close" request; 0: "Do not close" request)
OpenAct	Bool	FALSE	Valve is set to "open" (1: Valve is set to "open"; 0: Valve is not set to "open")
CloseAct	Bool	FALSE	Valve is set to "close"; (1: Valve is set to "close"; 0: Valve is not set to "close")
PosSclMin	Real	0.0	Position setpoint scale low limit
PosSclMax	Real	0.0	Position setpoint scale high limit
PosUnit	Int	0	Position setpoint unit
PosMin	Real	0.0	Position setpoint low limit
PosMax	Real	0.0	Position setpoint high limit
PosInt	Real	0.0	Position internal setpoint (relevant if SrcIntAct = 1)
PosMan	Real	0.0	Position manual setpoint (relevant if SrcManAct = 1)
PosRbk	Real	0.0	Position readback signal (if SrcIntAct is true, then PosRbk = PosInt); (if SrcManAct is true, then PosRbk = PosMan)
Pos	Real	0.0	Position setpoint
OpenFbkCalc	Bool	FALSE	Open feedback source (1: Calculated; 0: Sensor detection)
OpenFbk	Bool	FALSE	Open checkback signal (1: open; 0: is not opened)
CloseFbkCalc	Bool	FALSE	Close feedback source (1: Calculated; 0: Sensor detection)
CloseFbk	Bool	FALSE	Close checkback signal (1: close; 0: is not closed)
PosFbkCalc	Bool	FALSE	Position feedback source (1: Calculated; 0: Sensor detection)
PosFbk	Real	0.0	Position feedback signal
PermEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)
Permit	Bool	TRUE	Permit allows control (1: Permission is given; 0: Permission is not given)
IntEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
Interlock	Bool	TRUE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
ProtEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
Protect	Bool	TRUE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)
ResetOp	Bool	FALSE	Reset from operator (0-->1: Request from POL; 1-->0: Acknowledge from PEA)

Parameter	Data type	Default value	Description
ResetAut	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
MonEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
MonSafePos	Bool	FALSE	Define error behavior when a monitoring error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the status)
MonStatErr	Bool	FALSE	Static supervision error active (1: Active; 0: Inactive)
MonDynErr	Bool	FALSE	Dynamic supervision error active (1: Active; 0: Inactive)
MonStatTi	Real	0.0	Monitoring time for uncontrolled changes [s]
MonDynTi	Real	0.0	Monitoring time for controlled changes [s]
PosReachedFbk	Bool	FALSE	Position reached; position is reached if the position feedback is inside the setpoint position +/– tolerance range. (PosFbk – Pos <= PosTolerance)
PosTolerance	Real	0.0	Position tolerance value for calculation
MonPosTi	Real	0.0	Monitoring time until position is reached [s]
MonPosErr	Bool	FALSE	Position error active (1: if MonPosTi is elapsed before ReachedFbk = 1; 0: No error)

6.3.2.3 LCFL_typeMTPMonAnaVlvSiemens

Description

The "LCFL_typeMTPMonAnaVlvSiemens" PLC data type contains the "LCFL_typeMTPMonAnaVlv" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPMonAnaVlv	-	MTP data for analog valve with feedback monitoring You can find the parameter description under LCFL_typeMTPMonAnaVlv (Page 155).
maintenance	LCFL_typeMaintenance	-	Data type for HMI data You can find the parameter description under LCFL_typeMaintenance (Page 141).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
monitorStaticMessage	Bool	FALSE	Message for static monitoring error (1: Message active; 0: Message inactive)
monitorDynamicMessage	Bool	FALSE	Message for dynamic monitoring error (1: Message active; 0: Message inactive)

Parameter	Data type	Default value	Description
monitorPositionMessage	Bool	FALSE	Message for position error (1: Message active; 0: Message inactive)
positionLimitingActive	Bool	FALSE	Position setpoint limiting active (1: Active; 0: Inactive)
operatingTimeMessage	Bool	FALSE	Message for operating hours have reached their limit (1: Message is activated; 0: Message inactive)
cycleTimeMessage	Bool	FALSE	Message for cycle time is reached (1: Message active; 0: Message inactive)
switchCounterMessage	Bool	FALSE	Message for number of state changes has reached its limit (1: Message is activated; 0: Message inactive)
alarmCounterMessage	Bool	FALSE	Message for alarm counter is reached (1: Message active; 0: Message inactive)
interconnectorActive	Bool	FALSE	Interconnector active (1: Active; 0: Inactive)
interconnectedTagName	String[30]	''	Name of the connected instance

6.3.3 MonBinDrv

6.3.3.1 LCFL_typeConfigMonBinDrv

Description

The PLC data type "LCFL_typeConfigMonBinDrv" contains configuration data for a bistable drive with feedback monitoring. A tag that is derived from this PLC data type is connected to the function block MonBinDrv (Page 84).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
forwardEn	Bool	TRUE	Forward movement enable (1: Enabled; 0: Disabled)
forwardFeedbackEn	Bool	TRUE	Enables the forward movement checkback signal (1: Enabled; 0: Disabled)
reverseEn	Bool	TRUE	Reverse movement enable (1: Enabled; 0: Disabled)
reverseFeedbackEn	Bool	TRUE	Enables the reverse movement checkback signal (1: Enabled; 0: Disabled)
monitorEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
monitorSafePos	Bool	FALSE	Define error behavior when a monitoring error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the status)
monitorStaticTime	Real	1.0	Monitoring time for uncontrolled changes [s]
monitorDynamicTime	Real	5.0	Monitoring time for controlled changes [s]
protectEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
interlockEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
permitEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)
tripMessageEn	Bool	TRUE	Alarm activation for safety indicator of the drive (1: Enabled; 0: Disabled)
monitorStaticMessageEn	Bool	TRUE	Alarm activation for static supervision error (1: Enabled; 0: Disabled)
monitorDynamicMessageEn	Bool	TRUE	Alarm activation for dynamic supervision error (1: Enabled; 0: Disabled)
operatingTimeMessageEn	Bool	TRUE	Message activation for operating hours have reached their limit (1: Enabled; 0: Disabled)
cycleTimeMessageEn	Bool	TRUE	Message activation for cycle time has reached its limit (1: Enabled; 0: Disabled)
switchCounterMessageEn	Bool	TRUE	Message activation for number of status changes has reached its limit (1: Enabled; 0: Disabled)
alarmCounterMessageEn	Bool	TRUE	Message activation for number of alarm counters has reached its limit (1: Enabled; 0: Disabled)
standaloneDrive	LCFL_typeDriveInterconnector	-	Drive interconnector for standalone configuration
maintenance	LCFL_typeConfigMaintenance	-	Maintenance configuration

6.3.3.2 LCFL_typeMTPMonBinDrv

Description

The PLC data type "LCFL_typeMTPMonBinDrv" contains MTP data for a bistable drive with feedback monitoring.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level

Parameter	Data type	Default value	Description
StateChannel	Bool	FALSE	Selection of the active operation mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
StateOffAut	Bool	FALSE	Set operation mode to "offline" by automatic interaction (relevant if StateChannel = 1) (1: Operation mode is set to "offline"; 0: No operation)
StateOpAut	Bool	FALSE	Set operation mode to "operator" by automatic interaction (relevant if StateChannel = 1) (1: Operation mode is set to "operator"; 0: No operation)
StateAutAut	Bool	FALSE	Set operation mode to "automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operation mode is set to "automatic"; 0: No operation)
StateOffOp	Bool	FALSE	Set operation mode to "offline" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operation mode to "offline"; 1-->0: Acknowledge by PEA)
StateOpOp	Bool	FALSE	Set operation mode to "operator" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operation mode to "operator"; 1-->0: Acknowledge by PEA)
StateAutOp	Bool	FALSE	Set operation mode to "automatic" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operation mode to "automatic"; 1-->0: Acknowledge by PEA)
StateOpAct	Bool	FALSE	1: Current mode is "operator"; 0: Current mode is not "operator"
StateAutAct	Bool	FALSE	1: Current mode is "automatic"; 0: Current mode is not "automatic"
StateOffAct	Bool	FALSE	1: Current mode is "offline"; 0: Current mode is not "offline"
SafePos	Bool	FALSE	Safe position (1: Running; 0: Stopped)
SafePosAct	Bool	FALSE	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
FwdEn	Bool	TRUE	Forward movement enable (1: Enabled; 0: Disabled)
RevEn	Bool	TRUE	Reverse movement enable (1: Enabled; 0: Disabled)
StopOp	Bool	FALSE	Stop command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
FwdOp	Bool	FALSE	Forward command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
RevOp	Bool	FALSE	Reverse command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)

Parameter	Data type	Default value	Description
StopAut	Bool	FALSE	Set drive to "stop" by automatic (relevant if StateAutAct = 1) (1: Stop request; 0: No stop request)
FwdAut	Bool	FALSE	Set drive to forward by automatic (relevant if StateAutAct = 1 & FwdEn = 1) (1: Forward running request; 0: No forward running request)
RevAut	Bool	FALSE	Set drive to reverse by automatic (relevant if StateAutAct= 1 & RevEn = 1) (1: Reverse running request; 0: No reverse running request)
FwdCtrl	Bool	FALSE	Forward control (1: Active; 0: Inactive)
RevCtrl	Bool	FALSE	Reverse control (1: Active; 0: Inactive)
RevFbkCalc	Bool	FALSE	Reverse feedback source (1: Calculated; 0: Sensor detection)
RevFbk	Bool	FALSE	Reverse feedback signal (1: Reverse running; 0: Not reverse running)
FwdFbkCalc	Bool	FALSE	Forward feedback source (1: Calculated; 0: Sensor detection)
FwdFbk	Bool	FALSE	Forward feedback signal (1: Forward running; 0: Not forward running)
Trip	Bool	FALSE	Drive safety indicator (0: Tripped, 1: No error)
PermEn	Bool	TRUE	Activates the authorization lock (1: Enabled; 0: Disabled)
Permit	Bool	TRUE	Permit allows control (1: Authorization is given; 0: Authorization is not given)
IntEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
Interlock	Bool	TRUE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
ProtEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
Protect	Bool	TRUE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)
ResetOp	Bool	FALSE	Reset from operator (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
ResetAut	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
MonEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
MonSafePos	Bool	FALSE	Define error performance, when a supervision error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the state)
MonStatErr	Bool	FALSE	Static supervision error active (1: Active; 0: Inactive)
MonDynErr	Bool	FALSE	Dynamic supervision error active (1: Active; 0: Inactive)
MonStatTi	Real	0.0	Monitoring time for uncontrolled changes [s]
MonDynTi	Real	0.0	Monitoring time for controlled changes [s]

6.3.3.3 LCFL_typeMTPMonBinDrvSiemens

Description

The "LCFL_typeMTPMonBinDrvSiemens" PLC data type contains the "LCFL_typeMTPMonBinDrv" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPMon-BinDrv	-	MTP data for bistable drive with feedback monitoring You can find the parameter description under LCFL_typeMTPMonBinDrv (Page 160).
maintenance	LCFL_typeMaintenance	-	Data type for HMI data You can find the parameter description under LCFL_typeMaintenance (Page 141).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
tripMessage	Bool	FALSE	Message for drive protection indicator (1: Message active; 0: Message inactive)
monitorStaticMessage	Bool	FALSE	Message for static monitoring error (1: Message active; 0: Message inactive)
monitorDynamicMes-sage	Bool	FALSE	Message for dynamic monitoring error (1: Message active; 0: Message inactive)
operatingTimeMes-sage	Bool	FALSE	Message for operating hours have reached their limit (1: Message is activated; 0: Message inactive)
cycleTimeMessage	Bool	FALSE	Message for cycle time is reached (1: Message active; 0: Message inactive)
switchCounterMessage	Bool	FALSE	Message for number of state changes has reached its limit (1: Message is activated; 0: Message inactive)
alarmCounterMessage	Bool	FALSE	Message for alarm counter is reached (1: Message active; 0: Message inactive)
interconnectorActive	Bool	FALSE	Interconnector active (1: Active; 0: Inactive)
interconnectedTag-Name	String[30]	''	Name of the connected instance

6.3.4 MonBinVlv

6.3.4.1 LCFL_typeConfigMonBinVlv

Description

The PLC data type "LCFL_typeConfigMonBinVlv" contains configuration data for a bistable valve with feedback monitoring. A tag that is derived from this PLC data type is connected to the function block MonBinVlv (Page 93).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
openFeedbackEn	Bool	TRUE	Enables the open checkback signal (1: Enabled; 0: Disabled)
closeFeedbackEn	Bool	TRUE	Enables the close checkback signal (1: Enabled; 0: Disabled)
safePosEn	Bool	FALSE	Hardware safe position activated (1: Device has a safe position; 0: Device has no safe position)
safePos	Bool	FALSE	Safe position (1: Open; 0: Closed)
monitorEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
monitorSafePos	Bool	FALSE	Define error behavior when a monitoring error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the status)
monitorStaticTime	Real	1.0	Monitoring time for uncontrolled changes [s]
monitorDynamicTime	Real	5.0	Monitoring time for controlled changes [s]
protectEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)
interlockEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
permitEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)
operatingHoursLimit	Int	0.0	Max. limit of the operating hours [h]
switchCounterLimit	DInt	0	Max. limit of switch counter
monitorStaticMessageEn	Bool	TRUE	Alarm activation for static supervision error (1: Enabled; 0: Disabled)
monitorDynamicMessageEn	Bool	TRUE	Alarm activation for dynamic supervision error (1: Enabled; 0: Disabled)
operatingHoursMessageEn	Bool	TRUE	Message activation for operating hours have reached their limit (1: Enabled; 0: Disabled)
switchCounterMessageEn	Bool	TRUE	Message activation for number of state changes has reached its limit (1: Enabled; 0: Disabled)
operatingTimeMessageEn	Bool	TRUE	Message activation for operating hours have reached their limit (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
cycleTimeMessageEn	Bool	TRUE	Message activation for cycle time has reached its limit (1: Enabled; 0: Disabled)
switchCounterMessageEn	Bool	TRUE	Message activation for number of status changes has reached its limit (1: Enabled; 0: Disabled)
alarmCounterMessageEn	Bool	TRUE	Message activation for number of alarm counters has reached its limit (1: Enabled; 0: Disabled)
standaloneDrive	LCFL_typeDriveInterconnector	-	Drive interconnector for standalone configuration
maintenance	LCFL_typeConfigMaintenance	-	Maintenance configuration

6.3.4.2 LCFL_typeMTPMonBinVlv

Description

The PLC data type "LCFL_typeMTPMonBinVlv" contains MTP data for a bistable valve with feedback monitoring.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
StateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
StateOffAut	Bool	FALSE	Set operating mode to "offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "offline"; 0: No operation)
StateOpAut	Bool	FALSE	Set operating mode to "operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "operator"; 0: No operation)
StateAutAut	Bool	FALSE	Set operating mode to "automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "automatic"; 0: No operation)
StateOffOp	Bool	FALSE	Set operating mode to "offline" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operating mode to "offline"; 1-->0: Acknowledge by PEA)
StateOpOp	Bool	FALSE	Set operating mode to "operator" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operating mode to "operator"; 1-->0: Acknowledge by PEA)

Parameter	Data type	Default value	Description
StateAutOp	Bool	FALSE	Set operating mode to "automatic" by operator interaction (relevant if StateChannel = 0) (0-->1: Request to set operating mode to "automatic"; 1-->0: Acknowledge by PEA)
StateOpAct	Bool	FALSE	1: Current mode is "operator"; 0: Current mode is not "operator"
StateAutAct	Bool	FALSE	1: Current mode is "automatic"; 0: Current mode is not "automatic"
StateOffAct	Bool	FALSE	1: Current mode is "offline"; 0: Current mode is not "Offline"
SafePos	Bool	FALSE	Safe position (1: Open; 0: Closed)
SafePosEn	Bool	TRUE	Hardware safe position activated (1: Device has a safe position; 0: Device has no safe position)
SafePosAct	Bool	FALSE	Safe position activated (1: Safe position is activated (safe operation); 0: Safe position is not activated (normal operation))
OpenOp	Bool	FALSE	Open command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
CloseOp	Bool	FALSE	Close command from operator (relevant if StateOpAct = 1) (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
OpenAut	Bool	FALSE	Set valve to "open" by automatic (relevant if StateAutAct = 1) (1: "Open" request; 0: "Do not open" request)
CloseAut	Bool	FALSE	Set valve to "close" by automatic (relevant if StateAutAct = 1) (1: "Close" request; 0: "Do not close" request)
Ctrl	Bool	FALSE	Valve control (1: Desired position is "open"; 0: Desired position is "closed")
OpenFbkCalc	Bool	FALSE	Open feedback source (1: Calculated; 0: Sensor detection)
OpenFbk	Bool	FALSE	Open checkback signal (1: open; 0: is not opened)
CloseFbkCalc	Bool	FALSE	Close feedback source (1: Calculated; 0: Sensor detection)
CloseFbk	Bool	FALSE	Close checkback signal (1: close; 0: is not closed)
PermEn	Bool	TRUE	Enables the permission lock (1: Enabled; 0: Disabled)
Permit	Bool	TRUE	Permit allows control (1: Permission is given; 0: Permission is not given)
IntEn	Bool	TRUE	Enables the interlock lock (1: Enabled; 0: Disabled)
Interlock	Bool	TRUE	Interlock prevents a status change and sets the object to the safe position (1: Interlock is not active; 0: Interlock is active)
ProtEn	Bool	TRUE	Enables the protection lock (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
Protect	Bool	TRUE	Protect prevents a status change and sets the object to the safe position, requires reset (1: Protect is not active; 0: Protect is active, requires reset)
ResetOp	Bool	FALSE	Reset from operator (0-->1: Request from POL; 1-->0: Acknowledge from PEA)
ResetAut	Bool	FALSE	Reset from automatic (1: Reset executed; 0: No operation)
MonEn	Bool	TRUE	Monitor enable (1: Enabled; 0: Disabled)
MonSafePos	Bool	FALSE	Define error behavior when a monitoring error occurs (1: After a supervision error occurs, the safe position is set; 0: After a supervision error occurs, the entity holds the status)
MonStatErr	Bool	FALSE	Static supervision error active (1: Active; 0: Inactive)
MonDynErr	Bool	FALSE	Dynamic supervision error active (1: Active; 0: Inactive)
MonStatTi	Real	0.0	Monitoring time for uncontrolled changes [s]
MonDynTi	Real	0.0	Monitoring time for controlled changes [s]

6.3.4.3 LCFL_typeMTPMonBinVlvSiemens

Description

The "LCFL_typeMTPMonBinVlvSiemens" PLC data type contains the "LCFL_typeMTPMonBinVlv" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPMonBinVlv	-	MTP data for bistable valve with feedback monitoring You can find the parameter description under LCFL_typeMTPMonBinVlv (Page 165).
maintenance	LCFL_typeMaintenance	-	Data type for HMI data You can find the parameter description under LCFL_typeMaintenance (Page 141).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
operatingHoursLimit	Int	0.0	Max. limit of the operating hours [h]
operatingHoursAct	Int	0.0	Actual operating hours of the valve [h]
operatingHoursReached	Bool	FALSE	1: The actual operating hours have reached or exceeded their limit
switchCounterLimit	DInt	0	Max. limit of switch counter
switchCounterAct	DInt	0	Actual number of switches of the valve

Parameter	Data type	Default value	Description
switchCounterReached	Bool	FALSE	1: The actual switch counter has reached or exceeded its limit
monitorStaticMessage	Bool	FALSE	Message for static monitoring error (1: Message active; 0: Message inactive)
monitorDynamicMessage	Bool	FALSE	Message for dynamic monitoring error (1: Message active; 0: Message is disabled)
operatingHoursMessage	Bool	FALSE	Message for operating hours have reached their limit (1: Message is enabled; 0: Message is disabled)
switchCounterMessage	Bool	FALSE	Message for number of state changes has reached its limit (1: Message is enabled; 0: Message is disabled)
operatingTimeMessage	Bool	FALSE	Message for operating hours have reached their limit (1: Message is activated; 0: Message inactive)
cycleTimeMessage	Bool	FALSE	Message for cycle time is reached (1: Message active; 0: Message inactive)
switchCounterMessage	Bool	FALSE	Message for number of state changes has reached its limit (1: Message is activated; 0: Message inactive)
alarmCounterMessage	Bool	FALSE	Message for alarm counter is reached (1: Message active; 0: Message inactive)
interconnectorActive	Bool	FALSE	Interconnector active (1: Active; 0: Inactive)
interconnectedTagName	String[30]	''	Name of the connected instance

6.4 Monitoring

6.4.1 AnaMon

6.4.1.1 LCFL_typeConfigAnaMon

Description

The PLC data type "LCFL_typeConfigAnaMon" contains configuration data to display an analog value with limit check. A tag that is derived from this PLC data type is connected to the function block AnaMon (Page 101).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
scaleMin	Real	0.0	Value scale low limit
scaleMax	Real	100.0	Value scale high limit
unit	Int	1001	Value unit
alarmHighEn	Bool	TRUE	Enable alarm high limit (1: Enabled; 0: Disabled)
alarmHighLim	Real	95.0	Limit value for "alarm high"
warningHighEn	Bool	TRUE	Enable warning high limit (1: Enabled; 0: Disabled)
warningHighLim	Real	90.0	Limit value for "warning high"
toleranceHighEn	Bool	TRUE	Enable tolerance high limit (1: Enabled; 0: Disabled)
toleranceHighLim	Real	85.0	Limit value for "tolerance high"
toleranceLowEn	Bool	TRUE	Enable tolerance low limit (1: Enabled; 0: Disabled)
toleranceLowLim	Real	15.0	Limit value for "tolerance low"
warningLowEn	Bool	TRUE	Enable warning low limit (1: Enabled; 0: Disabled)
warningLowLim	Real	10.0	Limit value for "warning low"
alarmLowEn	Bool	TRUE	Enables alarm low limit (1: Enabled; 0: Disabled)
alarmLowLim	Real	5.0	Limit value for "alarm low"
alarmHighMessageEn	Bool	TRUE	Message activation for alarm high limit (1: Enabled; 0: Disabled)
warningHighMessageEn	Bool	TRUE	Message activation for warning high limit (1: Enabled; 0: Disabled)
toleranceHighMessageEn	Bool	TRUE	#Message activation for tolerance high limit (1: Enabled; 0: Disabled)
toleranceLowMessageEn	Bool	TRUE	Message activation for tolerance high limit (1: Enabled; 0: Disabled)
warningLowMessageEn	Bool	TRUE	Message activation for warning low limit (1: Enabled; 0: Disabled)
alarmLowMessageEn	Bool	TRUE	Message activation for alarm low limit (1: Enabled; 0: Disabled)

6.4.1.2 LCFL_typeMTPAnaMon

Description

The PLC data type "LCFL_typeMTPAnaMon" contains MTP data to display an analog value with limit check.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
V	Real	0.0	Value
VSclMin	Real	0.0	Value scale low limit
VSclMax	Real	0.0	Value scale high limit
VUnit	Int	0	Value unit
VAHEn	Bool	TRUE	Enable alarm high limit (1: Enabled; 0: Disabled)
VAHLim	Real	0.0	Limit value for "alarm high"
VAHAct	Bool	FALSE	"Alarm high" active (1: Active; 0: Inactive)
VWHEn	Bool	FALSE	Enable warning high limit (1: Enabled; 0: Disabled)
VWHLim	Real	0.0	Limit value for "warning high"
VWHAct	Bool	FALSE	"Warning high" active (1: Active; 0: Inactive)
VTHEn	Bool	TRUE	Enable tolerance high limit (1: Enabled; 0: Disabled)
VTHLim	Real	0.0	Limit value for "tolerance high"
VTHAct	Bool	FALSE	"Tolerance high" active (1: Active; 0: Inactive)
VTLEn	Bool	TRUE	Enable tolerance low limit (1: Enabled; 0: Disabled)
VTLLim	Real	0.0	Limit value for "tolerance low"
VTLAct	Bool	FALSE	"Tolerance low" active (1: Active; 0: Inactive)
VWLEn	Bool	TRUE	Enable warning low limit (1: Enabled; 0: Disabled)
VWLLim	Real	0.0	Limit value for "warning low"
VWLAct	Bool	FALSE	"Warning low" active (1: Active; 0: Inactive)
VALEn	Bool	TRUE	Enables alarm low limit (1: Enabled; 0: Disabled)
VALLim	Real	0.0	Limit value for "alarm low"
VALAct	Bool	FALSE	"Alarm low" active (1: Active; 0: Inactive)

6.4.1.3 LCFL_typeMTPAnaMonSiemens

Description

The "LCFL_typeMTPAnaMonSiemens" PLC data type contains the "LCFL_typeMTPAnaMon", PLC data type as well as the additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPAnaMon	-	MTP data for display of an analog value with limit check You can find the parameter description under LCFL_typeMTPAnaMon (Page 169).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
alarmHighMessage	Bool	FALSE	Message for alarm high limit (1: Message is enabled; 0: Message is disabled)
warningHighMessage	Bool	FALSE	Message for warning high limit (1: Message is enabled; 0: Message is disabled)
toleranceHighMessage	Bool	FALSE	Message for tolerance high limit (1: Message is enabled; 0: Message is disabled)
toleranceLowMessage	Bool	FALSE	Message for tolerance low limit (1: Message is enabled; 0: Message is disabled)
warningLowMessage	Bool	FALSE	Message for warning low limit (1: Message is enabled; 0: Message is disabled)
alarmLowMessage	Bool	FALSE	Message for alarm low limit (1: Message is enabled; 0: Message is disabled)

6.4.2 BinMon

6.4.2.1 LCFL_typeConfigBinMon

Description

The PLC data type "LCFL_typeConfigBinMon" contains configuration data to display a binary value with monitoring of a flutter signal. A tag that is derived from this PLC data type is connected to the function block BinMon (Page 105).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
valueState0	String[16]	'false'	Text replacement for FALSE
valueState1	String[16]	'true'	Text replacement for TRUE
flutteringEn	Bool	TRUE	Enable flutter detection (1: Enabled; 0: Disabled)
flutteringLen	Real	0.5	Period of the signal length that is needed to prevent flutter detection [s]
flutteringTime	Real	3.0	Period of an active signal before it is detected as flutter-free [s]
flutteringCount	Int	0	Counts of the allowed flutter signals in the defined period

Parameter	Data type	Default value	Description
valueMessageEn	Bool	TRUE	Message activation for the value (1: Enabled; 0: Disabled)
flutteringMessageEn	Bool	TRUE	Message activation for flutter detection of a signal (1: Enabled; 0: Disabled)

6.4.2.2 LCFL_typeMTPBinMon

Description

The PLC data type "LCFL_typeMTPBinMon" contains MTP data to display a binary value with verification of limits.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
V	Bool	FALSE	Value
VState0	String[16]	''	Text replacement for FALSE
VState1	String[16]	''	Text replacement for TRUE
VFlutEn	Bool	TRUE	Enable flutter detection (1: Enabled; 0: Disabled)
VFlutTi	Real	0.0	Period of an active signal before it is detected as flutter-free [s]
VFlutCnt	Int	0	Counts of the allowed flutter signals in the defined period
VFlutAct	Bool	FALSE	Flutter signal detected (1: Flutter signal detected; 0: No flutter signal detected)

6.4.2.3 LCFL_typeMTPBinMonSiemens

Description

The "LCFL_typeMTPBinMonSiemens" PLC data type contains the "LCFL_typeMTPBinMon", PLC data type as well as the additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPBinMon	-	MTP data for display of a binary value with monitoring of a flutter signal You can find the parameter description under LCFL_typeMTPBinMon (Page 172).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
valueMessage	Bool	FALSE	Message for value (1: Message is enabled; 0: Message is disabled)
flutteringMessage	Bool	FALSE	Message for flutter detection of a signal (1: Message is enabled; 0: Message is disabled)

6.4.3 DIntMon

6.4.3.1 LCFL_typeConfigDIntMon

Description

The PLC data type "LCFL_typeConfigDIntMon" contains configuration data for displaying an integer value with limit check. A tag that is derived from this PLC data type is connected to the function block DIntMon (Page 108).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
scaleMin	DInt	0	Value scale low limit
scaleMax	DInt	100	Value scale high limit
unit	Int	1001	Value unit
alarmHighEn	Bool	TRUE	Enable alarm high limit (1: Enabled; 0: Disabled)
alarmHighLim	DInt	95	Limit value for "alarm high"
warningHighEn	Bool	TRUE	Enable warning high limit (1: Enabled; 0: Disabled)
warningHighLim	DInt	90	Limit value for "warning high"
toleranceHighEn	Bool	TRUE	Enable tolerance high limit (1: Enabled; 0: Disabled)
toleranceHighLim	DInt	85	Limit value for "tolerance high"
toleranceLowEn	Bool	TRUE	Enable tolerance low limit (1: Enabled; 0: Disabled)
toleranceLowLim	DInt	15	Limit value for "tolerance low"
warningLowEn	Bool	TRUE	Enable warning low limit (1: Enabled; 0: Disabled)
warningLowLim	DInt	10	Limit value for "warning low"

Parameter	Data type	Default value	Description
alarmLowEn	Bool	TRUE	Enables alarm low limit (1: Enabled; 0: Disabled)
alarmLowLim	DInt	5	Limit value for "alarm low"
alarmHighMessageEn	Bool	TRUE	Message activation for alarm high limit (1: Enabled; 0: Disabled)
warningHighMessageEn	Bool	TRUE	Message activation for warning high limit (1: Enabled; 0: Disabled)
toleranceHighMessageEn	Bool	TRUE	#Message activation for tolerance high limit (1: Enabled; 0: Disabled)
toleranceLowMessageEn	Bool	TRUE	Message activation for tolerance high limit (1: Enabled; 0: Disabled)
warningLowMessageEn	Bool	TRUE	Message activation for warning low limit (1: Enabled; 0: Disabled)
alarmLowMessageEn	Bool	TRUE	Message activation for alarm low limit (1: Enabled; 0: Disabled)

6.4.3.2 LCFL_typeMTPDIntMon

Description

The PLC data type "LCFL_typeMTPDIntMon" contains MTP data for displaying an integer value with limit check.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
V	DInt	0	Value
VSclMin	DInt	0	Value scale low limit
VSclMax	DInt	0	Value scale high limit
VUnit	Int	0	Value unit
VAHEn	Bool	TRUE	Enable alarm high limit (1: Enabled; 0: Disabled)
VAHLim	DInt	0	Limit value for "alarm high"
VAHAct	Bool	FALSE	"Alarm high" active (1: Active; 0: Inactive)
VWHEn	Bool	FALSE	Enable warning high limit (1: Enabled; 0: Disabled)
VWHLim	DInt	0	Limit value for "warning high"
VWHAct	Bool	FALSE	"Warning high" active (1: Active; 0: Inactive)
VTHEn	Bool	TRUE	Enable tolerance high limit (1: Enabled; 0: Disabled)
VTHLim	DInt	0	Limit value for "tolerance high"
VTHAct	Bool	FALSE	"Tolerance high" active (1: Active; 0: Inactive)
VTLEn	Bool	TRUE	Enable tolerance low limit (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
VTLLim	DInt	0	Limit value for "tolerance low"
VTLAct	Bool	FALSE	"Tolerance low" active (1: Active; 0: Inactive)
VWLEn	Bool	TRUE	Enable warning low limit (1: Enabled; 0: Disabled)
VWLLim	DInt	0	Limit value for "warning low"
VWLAct	Bool	FALSE	"Warning low" active (1: Active; 0: Inactive)
VALEn	Bool	TRUE	Enables alarm low limit (1: Enabled; 0: Disabled)
VALLim	DInt	0	Limit value for "alarm low"
VALAct	Bool	FALSE	"Alarm low" active (1: Active; 0: Inactive)

6.4.3.3 LCFL_typeMTPDIntMonSiemens

Description

The "LCFL_typeMTPDIntMonSiemens" PLC data type contains the "LCFL_typeMTPDIntMon" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPDIntMon	-	MTP data for display an integer value with limit check You can find the parameter description under LCFL_typeMTPDIntMon (Page 174).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
alarmHighMessage	Bool	FALSE	Message for alarm high limit (1: Message is enabled; 0: Message inactive)
warningHighMessage	Bool	FALSE	Message for warning high limit (1: Message is enabled; 0: Message inactive)
toleranceHighMessage	Bool	FALSE	Message for tolerance high limit (1: Message is enabled; 0: Message inactive)
toleranceLowMessage	Bool	FALSE	Message for tolerance low limit (1: Message is enabled; 0: Message inactive)
warningLowMessage	Bool	FALSE	Message for warning low limit (1: Message is enabled; 0: Message inactive)
alarmLowMessage	Bool	FALSE	Message for alarm low limit (1: Message is enabled; 0: Message inactive)

6.4.4 StringView

6.4.4.1 LCFL_typeConfigStringView

Description

The PLC data type "LCFL_typeConfigStringView" contains configuration data to display a string from the PEA in a visualization system. A tag that is derived from this PLC data type is connected to the function block StringView (Page 112).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification

6.4.4.2 LCFL_typeMTPStringView

Description

The PLC data type "LCFL_typeMTPStringView" contains MTP data to display a string from the PEA in a visualization system.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
Text	String	''	Value

6.4.4.3 LCFL_typeMTPStringViewSiemens

Description

The "LCFL_typeMTPStringViewSiemens" PLC data type contains the "LCFL_typeMTPStringView" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPString-View	-	MTP data to display a string from the PEA in a visualization system You can find the parameter description under LCFL_typeMTPStringView (Page 176).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled

6.5 Operate

6.5.1 AnaManInt

6.5.1.1 LCFL_typeConfigAnaManInt

Description

The PLC data type "LCFL_typeConfigAnaManInt" contains configuration data for specifying an analog value from the HMI or an internal source and functionality for selecting the source. A tag that is derived from this PLC data type is connected to the function block AnaManInt (Page 114).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
scaleMin	Real	0.0	Value scale low limit
scaleMax	Real	100.0	Value scale high limit
unit	Int	1001	Value unit
valueMin	Real	5.0	Value low limit
valueMax	Real	95.0	Value high limit

6.5.1.2 LCFL_typeMTPAnaManInt

Description

The PLC data type "LCFL_typeMTPAnaManInt" contains MTP data for specifying an analog value from the HMI or an internal source and functionality for selecting the source.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
VOut	Real	0.0	Output value
VSclMin	Real	0.0	Value scale low limit
VSclMax	Real	0.0	Value scale high limit
VUnit	Int	0	Value unit
VMan	Real	0.0	Manual value (relevant if SrcManAct = 1)
VInt	Real	0.0	Internal value (relevant if SrcIntAct = 1)
VRbk	Real	0.0	Readback value
VFbk	Real	0.0	Feedback value
VMin	Real	0.0	Value low limit
VMax	Real	0.0	Value high limit
SrcChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
SrcManAut	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
SrcIntAut	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
SrcManOp	Bool	FALSE	Set source mode to "manual" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
SrcIntOp	Bool	FALSE	Set source mode to "internal" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
SrcManAct	Bool	FALSE	1: Current mode is "manual"; 0: Current mode is not "manual"
SrcIntAct	Bool	FALSE	1: Current mode is "internal"; 0: Current mode is not "internal"

6.5.1.3 LCFL_typeMTPAnaManIntSiemens

Description

The "LCFL_typeMTPAnaManIntSiemens" PLC data type contains the "LCFL_typeMTPAnaManInt" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_typeMTPA-naManInt	-	MTP data for specifying an analog value from HMI or internal source and functionality to select the source You can find the parameter description under LCFL_typeMTPAnaMa-nInt (Page 177).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled

6.5.2 BinManInt

6.5.2.1 LCFL_typeConfigBinManInt

Description

The PLC data type "LCFL_typeConfigBinManInt" contains configuration data for specifying or resetting a binary value with an internal value and functionality for selecting the source. A tag that is derived from this PLC data type is connected to the function block BinManInt (Page 117).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
valueState0	String[16]	'false'	Text replacement for FALSE
valueState1	String[16]	'true'	Text replacement for TRUE

6.5.2.2 LCFL_typeMTPBinManInt

Description

The PLC data type "LCFL_typeMTPBinManInt" contains MTP data for specifying or resetting a binary value with an internal value and functionality for selecting the source.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
VOut	Bool	FALSE	Output value
VState0	String[16]	''	Text replacement for FALSE
VState1	String[16]	''	Text replacement for TRUE

Parameter	Data type	Default value	Description
VMan	Bool	FALSE	Manual value (relevant if SrcManAct = 1)
VInt	Bool	FALSE	Internal value (relevant if SrcIntAct = 1)
VRbk	Bool	FALSE	Readback value
VFbk	Bool	FALSE	Feedback value
SrcChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
SrcManAut	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
SrcIntAut	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
SrcManOp	Bool	FALSE	Set source mode to "manual" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
SrcIntOp	Bool	FALSE	Set source mode to "internal" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
SrcManAct	Bool	FALSE	1: Current mode is "manual"; 0: Current mode is not "manual"
SrcIntAct	Bool	FALSE	1: Current mode is "internal"; 0: Current mode is not "internal"

6.5.2.3 LCFL_typeMTPBinManIntSiemens

Description

The "LCFL_typeMTPBinManIntSiemens" PLC data type contains the "LCFL_typeMTPBinManInt" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_type-MTPBinManInt	-	MTP data for setting or resetting a binary value with internal value and functionality to select the source You can find the parameter description under LCFL_typeMTPBinManInt (Page 179).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled

6.5.3 DIntManInt

6.5.3.1 LCFL_typeConfigDIntManInt

Description

The PLC data type "LCFL_typeConfigDIntManInt" contains configuration data for specifying an integer value from HMI or internal source and functionality to select the source. A tag that is derived from this PLC data type is connected to the function block DIntManInt (Page 120).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
scaleMin	DInt	0	Value scale low limit
scaleMax	DInt	100	Value scale high limit
unit	Int	1001	Value unit
valueMin	DInt	5	Value low limit
valueMax	DInt	95	Value high limit

6.5.3.2 LCFL_typeMTPDIntManInt

Description

The PLC data type "LCFL_typeMTPDIntManInt" contains MTP data for specifying an integer value from HMI or internal source and functionality to select the source.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
VOut	DInt	0	Output value
VSclMin	DInt	0	Value scale low limit
VSclMax	DInt	0	Value scale high limit
VUnit	Int	0	Value unit
VMan	DInt	0	Manual value (relevant if SrcManAct = 1)
VInt	DInt	0	Internal value (relevant if SrcIntAct = 1)
VRbk	DInt	0	Readback value
VFbk	DInt	0	Feedback value
VMin	DInt	0	Value low limit
VMax	DInt	0	Value high limit

Parameter	Data type	Default value	Description
SrcChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
SrcManAut	Bool	FALSE	Set source mode to "manual" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
SrcIntAut	Bool	FALSE	Set source mode to "internal" by automatic interaction (relevant if SrcChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
SrcManOp	Bool	FALSE	Set source mode to "manual" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
SrcIntOp	Bool	FALSE	Set source mode to "internal" by operator interaction (relevant if SrcChannel = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
SrcManAct	Bool	FALSE	1: Current mode is "manual"; 0: Current mode is not "manual"
SrcIntAct	Bool	FALSE	1: Current mode is "internal"; 0: Current mode is not "internal"

6.5.3.3 LCFL_typeMTPDIntManIntSiemens

Description

The "LCFL_typeMTPDIntManIntSiemens" PLC data type contains the "LCFL_typeMTPDIntManInt" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_type-MTPDIntManInt	-	MTP data for specifying an integer value from HMI or internal source and functionality to select the source You can find the parameter description under LCFL_typeMTPDIntManInt (Page 181).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled

6.6 Control

6.6.1 Aggr8

6.6.1.1 LCFL_typeConfigAggr8

Description

The PLC data type "LCFL_typeConfigAggr8" contains configuration data for specifying aggregations values from HMI or internal source and functionality to select the source. A tag that is derived from this PLC data type is connected to the function block Aggr8 (Page 123).

Parameters

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
delayTime	Time	T#1s	Delay time "On/Off"
restTime	Time	T#15m	Rest time for new switch on
limitTimeSwitch	Time	T#0s	Limit time for automatic switch [s]
aggregate1ErrorMessageEn	Bool	TRUE	Enable message for aggregate 1: Error (1: Enabled; 0: Disabled)
aggregate2ErrorMessageEn	Bool	TRUE	Enable message for aggregate 2: Error (1: Enabled; 0: Disabled)
aggregate3ErrorMessageEn	Bool	TRUE	Enable message for aggregate 3: Error (1: Enabled; 0: Disabled)
aggregate4ErrorMessageEn	Bool	TRUE	Enable message for aggregate 4: Error (1: Enabled; 0: Disabled)
aggregate5ErrorMessageEn	Bool	TRUE	Enable message for aggregate 5: Error (1: Enabled; 0: Disabled)
aggregate6ErrorMessageEn	Bool	TRUE	Enable message for aggregate 6: Error (1: Enabled; 0: Disabled)
aggregate7ErrorMessageEn	Bool	TRUE	Enable message for aggregate 7: Error (1: Enabled; 0: Disabled)
aggregate8ErrorMessageEn	Bool	TRUE	Enable message for aggregate 8: Error (1: Enabled; 0: Disabled)
aggregateTexts	Array[0..7] of String[16]	-	Additional text for aggregates
aggregateDriveTypes	Array[0..7] of UInt	-	Drive type for aggregates (1: Drive icon; 2: Valve icon)
driveInterconnectorsEn	Array[0..7] of Bool	-	Drive interconnector enabling (1: Enabled; 0: Disabled)

Parameter	Data type	Default value	Description
driveDirectionOnInterconnectors	Array[0..7] of Bool	-	Direction on drive interconnector (1: Reverse; 0: Forward)
driveInterconnectors	Array[0..7] of LCFL_type-DriveInter-connector	-	Drive interconnectors

6.6.1.2 LCFL_typeAggr8

Description

The PLC data type "LCFL_typeAggr8" contains data for specifying aggregations values from HMI or internal source and functionality to select the source.

Parameters

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
NoSrcChannel	Bool	FALSE	Selection of the active number source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
NoSrcIntAct	Bool	FALSE	1: Current number source is "internal"; 0: Current number source is not "internal"
NoSrcIntAut	Bool	FALSE	Set number source mode to "internal" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "internal"; 0: No operation)
NoSrcIntOp	Bool	FALSE	Set number source mode to "internal" by operator interaction (relevant, if SrcChannelNo = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
NoSrcManAct	Bool	FALSE	1: Current number source is "manual"; 0: Current number source is not "manual"
NoSrcManAut	Bool	FALSE	Set number source mode to "manual" by automatic interaction (relevant, if sourceChannel = 1) (1: Source mode is set to "manual"; 0: No operation)
NoSrcManOp	Bool	FALSE	Set number source mode to "manual" by operator interaction (relevant, if SrcChannelNo = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
NoInt	USInt	0	Internal value (relevant, if SrcIntActNo = false) number control modules
NoMan	USInt	0	Manual value (relevant, if SrcIntManAct = true) number control modules
No	USInt	0	Number of requested aggregates (1 to 8)
SmSrcChannel	Bool	FALSE	Selection of the active switch mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)

Parameter	Data type	Default value	Description
SmSrcIntAct	Bool	FALSE	1: Current switch mode source is "internal"; 0: Current switch mode source is not "internal"
SmSrcIntAut	Bool	FALSE	1: Current switch mode source is "internal"; 0: Current source is not "internal"
SmSrcIntOp	Bool	FALSE	Set source mode to "internal" by operator interaction (relevant, if SrcChannelSm = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
SmSrcManAct	Bool	FALSE	1: Current switch mode source is "manual"; 0: Current switch mode source is not "manual"
SmSrcManAut	Bool	FALSE	1: Current switch mode source is "manual"; 0: Current source is not "manual"
SmSrcManOp	Bool	FALSE	Set switch mode to "manual" by operator interaction (relevant, if SrcChannelSm = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
SmInt	Bool	FALSE	Internal value (relevant, if SrcIntActNo = false) number control modules
SmMan	Bool	FALSE	Manual value (relevant, if SrcIntManAct = true)
Sm	Bool	FALSE	Switch mode
SwitchCommandInt	Bool	FALSE	Command to switch aggregates with positive impulse
SwitchCommandManOp	Bool	FALSE	Bit = 0 switch rolling; Bit = 1 switch by operating time
PrioSrcChannel	Bool	FALSE	Selection of the active priority SourceMode (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
PrioSrcIntAct	Bool	FALSE	1: Current priority source is "internal"; 0: Current priority source is not "internal"
PrioSrcIntAut	Bool	FALSE	1: Current priority source is "internal"; 0: Current source is not "internal"
PrioSrcIntOp	Bool	FALSE	Set priority source to "internal" by operator interaction (relevant, if PrioSrcChannel = 0) (0-->1: Request to set operation mode to "internal"; 1-->0: Acknowledge by PEA)
PrioSrcManAct	Bool	FALSE	1: Current priority source is "manual"; 0: Current priority source is not "manual"
PrioSrcManAut	Bool	FALSE	1: Current priority source is "manual"; 0: Current source is not "manual"
PrioSrcManOp	Bool	FALSE	Set priority source to "manual" by operator interaction (relevant, if PrioSrcChannel = 0) (0-->1: Request to set operation mode to "manual"; 1-->0: Acknowledge by PEA)
PrioritiesInt	Array[0..7] of USInt	-	Position in the switch-on sequence in internal mode for the aggregates 1 to 8
PrioritiesMan	Array[0..7] of USInt	-	Position in the switch-on sequence in manual mode for the aggregates 1 to 8
Priority	Array[0..7] of USInt	-	Position in the actual switch-on sequence for the aggregates 1 to 8
DelayTime	Time	T#0s	Delay time "On/Off"
LimitTimeSwitch	Time	T#0s	Limit time for automatic switch [s]
RestTime	Time	T#0s	Rest period after switch off (if switchByTimes = 1)
DifferenceLimit	Time	T#0s	Difference between runtime and maximum execution time

Parameter	Data type	Default value	Description
NextUp	Int	0	Number of the aggregate to be switched on next
NextDown	Int	0	Number of the aggregate to be switched off next
CycleSeconds	Array[0..7] of Real	-	Runtimes of the aggregates 1 to 8 (Array field 0 corresponds to aggregate 1)
OperatingSeconds	Array[0..7] of Real	-	Operating times for aggregates 1..8
RemainingRestTimes	Array[0..7] of Time	-	Remaining rest time of the aggregates 1 to 8 (Array field 0 corresponds to aggregate 1)
Readys	Array[0..7] of Bool	-	True: Aggregate is ready to start (Array field 0 corresponds to aggregate 1)
RunCommands	Array[0..7] of Bool	-	Switching on commands at the aggregates 1 to 8 (Array field 0 corresponds to aggregate 1)
Ons	Array[0..7] of Bool	-	True: Aggregate is switched on (Array field 0 corresponds to aggregate 1)
AggregateTxts	Array[0..7] of String[16]	-	Additional aggregate text
AggregatesEn	Array[0..7] of Bool	-	Enabled aggregate on the input
AggregatesDriveType	Array[0..7] of UInt	-	Drive type for aggregates
SwitchEnable	Bool	FALSE	True: Switching enable
NumberRunning	Int	0	Running aggregates number
Reset	Bool	FALSE	Reset error
Errors	Array[0..7] of Bool	-	True: Aggregate is interrupted (Array field 0 corresponds to aggregate 1)
ErrorNoSwitch	Bool	FALSE	Error: No aggregate available
CollectedError	Bool	FALSE	Collected error from all aggregates
InterconnectorsActive	Array[0..7] of Bool	-	Interconnector activated 1 to 8 (Array field 0 corresponds to aggregate 1)

6.6.1.3 LCFL_typeAggr8Siemens

Description

The PLC data type "LCFL_typeAggr8Siemens" contains the PLC data type "LCFL_typeAggr8" as well as additional function parameters and is the data interface between the AS (PLC) and OS (HMI).

Parameters

Parameter	Data type	Default value	Description
Data	LCFL_type-Aggr8	-	Data for specifying aggregations values from HMI or internal source and functionality to select the source. You can find the parameter description under LCFL_type-Aggr8 (Page 184).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
aggregate1ErrorMessage	Bool	FALSE	Message for aggregate 1: Error (1: Message active; 0: Message inactive)
aggregate2ErrorMessage	Bool	FALSE	Message for aggregate 2: Error (1: Message active; 0: Message inactive)
aggregate3ErrorMessage	Bool	FALSE	Message for aggregate 3: Error (1: Message active; 0: Message inactive)
aggregate4ErrorMessage	Bool	FALSE	Message for aggregate 4: Error (1: Message active; 0: Message inactive)
aggregate5ErrorMessage	Bool	FALSE	Message for aggregate 5: Error (1: Message active; 0: Message inactive)
aggregate6ErrorMessage	Bool	FALSE	Message for aggregate 6: Error (1: Message active; 0: Message inactive)
aggregate7ErrorMessage	Bool	FALSE	Message for aggregate 7: Error (1: Message active; 0: Message inactive)
aggregate8ErrorMessage	Bool	FALSE	Message for aggregate 8: Error (1: Message active; 0: Message inactive)

6.6.2 PIDCtrl

6.6.2.1 LCFL_typeConfigPIDCtrl

Description

The PLC data type "LCFL_typeConfigPIDCtrl" contains configuration data to provide information for a continuous PID controller, which processes the typical values. A tag that is derived from this PLC data type is connected to the function block PIDCtrl (Page 132).

Parameter

Parameter	Data type	Default value	Description
tagName	String[30]	''	Instance name identification
PIDCControllerUnit	Int	1342	PID controller unit
scaleMin	Real	0.0	Value scale low limit
scaleMax	Real	100.0	Value scale high limit
setpointInternalMin	Real	0.0	Internal setpoint low limit

Parameter	Data type	Default value	Description
setpointInternalMax	Real	100.0	Internal setpoint high limit
setpointManualMin	Real	0.0	Manual setpoint low limit
setpointManualMax	Real	100.0	Manual setpoint high limit
manipulatedValueMin	Real	0.0	Manipulated value low limit
manipulatedValueMax	Real	100.0	Manipulated value high limit
manipulatedValueScaleMin	Real	0.0	Manipulated value scale low limit
manipulatedValueScaleMax	Real	100.0	Manipulated value scale high limit
proportionalGain	Real	0.15	Proportional parameter (relevant if StateAutAct = 1)
integrationTime	Real	10.0	Integration parameter [s] (relevant if StateAutAct = 1)
derivationTime	Real	0.0	Derivation parameter [s] (relevant if StateAutAct = 1)
processValueLimitMessageEn	Bool	TRUE	Enable message for "Input" parameter is outside the process value limits
processValueInvalidMessageEn	Bool	TRUE	Enable message for invalid value at process value
manipulatedValueFailedMessageEn	Bool	TRUE	Enable message for invalid value at process value
PIDControllerTimeErrMessageEn	Bool	TRUE	Enable message for calculation of manipulated value failed
setpointInvalidMessageEn	Bool	TRUE	Enable message for sampling time error
manipulatedValueManualInvalidMessageEn	Bool	TRUE	Enable message for invalid value at manipulated value in manual mode
substitudeOutputValueInvalidMessageEn	Bool	TRUE	Enable message for invalid value at substitute value output
disturbanceValueInvalidMessageEn	Bool	TRUE	Enable message for invalid value at disturbance value

6.6.2.2 LCFL_typeMTPPIDCtrl

Description

The PLC data type "LCFL_typeMTPPIDCtrl" contains MTP data to provide information for a continuous PID controller, which processes the typical values.

Parameter

Parameter	Data type	Default value	Description
WQC	Byte	16#FF	Worst quality code
OSLevel	Byte	16#00	OS level
StateChannel	Bool	FALSE	Selection of the active operating mode interaction channel (0: The operator switches (*Op) are used; 1: The automatic switches (*Aut) are used)

Parameter	Data type	Default value	Description
StateOffAut	Bool	FALSE	Set operating mode to "Offline" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Offline"; 0: No operation)
StateOpAut	Bool	FALSE	Set operating mode to "Operator" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Operator"; 0: No operation)
StateAutAut	Bool	FALSE	Set operating mode to "Automatic" by automatic interaction (relevant if StateChannel = 1) (1: Operating mode is set to "Automatic"; 0: No operation)
StateOffOp	Bool	FALSE	Set operating mode to "Offline" by operator interaction (relevant if StateChannel = 0) (0-->1: request to set operating mode to "Offline"; 1-->0: acknowledge by PEA)
StateOpOp	Bool	FALSE	Set operating mode to "Operator" by operator interaction (relevant if StateChannel = 0) (0-->1: request to set operating mode to "Operator"; 1-->0: acknowledge by PEA)
StateAutOp	Bool	FALSE	Set operating mode to "Automatic" by operator interaction (relevant if StateChannel = 0) (0-->1: request to set operating mode to "Automatic"; 1-->0: acknowledge by PEA)
StateOpAct	Bool	FALSE	1: Current mode is "Operator"; 0: Current mode is not "Operator"
StateAutAct	Bool	FALSE	1: Current mode is "Automatic"; 0: Current mode is not "Automatic"
StateOffAct	Bool	FALSE	1: Current mode is "Offline"; 0: Current mode is not "Offline"
SrcChannel	Bool	FALSE	Selection of the active source mode interaction channel (0: The operator switches (*Op) shall be used; 1: The automatic switches (*Aut) shall be used)
SrcManAut	Bool	FALSE	Set source mode to "Manual" by automatic interaction (relevant, if SrcChannel = 1) (1: Source mode is set to "Manual"; 0: No operation)
SrcIntAut	Bool	FALSE	Set source mode to "Internal" by automatic interaction (relevant, if SrcChannel = 1) (1: Source mode is set to "Internal"; 0: No operation)
SrcIntOp	Bool	FALSE	Set source mode to "Internal" by operator interaction (relevant, if SrcChannel = 0) (0-->1: request to set operating mode to "Internal"; 1-->0: acknowledge by PEA)
SrcManOp	Bool	FALSE	Set source mode to "Manual" by operator interaction (relevant, if SrcChannel = 0) (0-->1: request to set operating mode to "Manual"; 1-->0: acknowledge by PEA)
SrcIntAct	Bool	FALSE	1: Current mode is "Internal"; 0: Current mode is not "Internal"
SrcManAct	Bool	FALSE	1: Current mode is "Manual"; 0: Current mode is not "Manual"
PV	Real	0.0	Process value
PVSclMin	Real	0.0	Process value scale low limit
PVSclMax	Real	0.0	Process value scale high limit
PVUnit	Int	0	Process value unit
SPMan	Real	0.0	Manual setpoint (relevant, if SrcManAct = 1 & StateAutAct = 1)
SPInt	Real	0.0	Internal setpoint (relevant, if SrcManAct = 1 & StateAutAct = 1)
SPSclMin	Real	0.0	Setpoint scale low limit
SPSclMax	Real	0.0	Setpoint scale high limit
SPUnit	Int	0	Setpoint unit
SPIntMin	Real	0.0	Internal setpoint low limit
SPIntMax	Real	0.0	Internal setpoint high limit

Parameter	Data type	Default value	Description
SPManMin	Real	0.0	Manual setpoint low limit
SPManMax	Real	0.0	Manual setpoint high limit
SP	Real	0.0	Setpoint (if SrcIntAct = 1, then setpoint from SPInt; if SrcManAct = 1, then setpoint from SPMan)
MVMan	Real	0.0	Manipulated value from operator (relevant, if StateOpAct = 1)
MV	Real	0.0	Manipulated value (if StateAutAct = 1, then manipulated value from PID algorithm; if StateOpAct = 1, then manipulated value from MVOp)
MVMin	Real	0.0	Minimal manipulated value
MVMax	Real	0.0	Maximal manipulated value
MVUnit	Int	0	Manipulated value unit
MVSclMin	Real	0.0	Manipulated value scale low limit
MVSclMax	Real	0.0	Manipulated value scale high limit
P	Real	0.0	Proportional parameter (relevant, if StateAutAct = 1)
Ti	Real	0.0	Integration parameter [s] (relevant, if StateAutAct = 1)
Td	Real	0.0	Derivation parameter [s] (relevant, if StateAutAct = 1)

6.6.2.3 LCFL_typeMTPPIDCtrlSiemens

Description

The "LCFL_typeMTPPIDCtrlSiemens" PLC data type contains the "LCFL_typeMTPPIDCtrl" PLC data type as well as additional function parameters and is the data interface between AS (PLC) and OS (HMI).

Parameter

Parameter	Data type	Default value	Description
mtpData	LCFL_type-MTPPIDCtrl	-	MTP data for providing the information for a continuous PID controller that processes the typical values. You can find the parameter description under LCFL_type-MTPPIDCtrl (Page 188).
tagName	String[30]	''	Instance name identification
enabled	Bool	FALSE	Functionality of control module is enabled
processValueLimitMessage	Bool	FALSE	Message for "Input" parameter is outside the process value limits
processValueInvalidInput-Message	Bool	FALSE	Message for invalid value at process value
manipulatedValueFailed-Message	Bool	FALSE	Message for calculation of manipulated value failed
PIDControllerTimeErrMes-sage	Bool	FALSE	Message for sampling time error
setpointInvalidMessage	Bool	FALSE	Message for invalid value at setpoint value

Parameter	Data type	Default value	Description
manipulatedValueManualInvalidMessage	Bool	FALSE	Message for invalid value at manipulated value in manual mode
substitudeValueInvalidMessage	Bool	FALSE	Message for invalid value at substitute value output
disturbanceValueInvalidMessage	Bool	FALSE	Message for invalid value at disturbance value

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7.1 Using LCFL function blocks for "SIMATIC S7-1500" in the project

Introduction

To use and configure function blocks from the Control Function Library in a "SIMATIC S7-1500", instantiate the function blocks from the corresponding hardware family (example folder: LCFL/Drives/MonAnaDrv/SIMATIC S7-1500/PLC hardware) in an organization block. To output messages using ProDiag in runtime, assign a ProDiag function block to the instance data blocks.

Requirement

- A PLC from the "SIMATIC S7-1500/PLC hardware" hardware family has been created.
- An organization block exists and is open (e.g. OB1).
- A ProDiag function block is created if you want to use alarms that are managed using ProDiag.

Procedure

1. Drag-and-drop the desired function block from the project library from the "SIMATIC S7-1500/PLC hardware" folder into the network of the organization block.
   The "Call options" dialog opens.
2. If you want to use messages managed by means of ProDiag, select the created ProDiag function block under "ProDiag-FB".
3. Click "OK".

Result

- An instance data block of the function block used was created in the "Program blocks" folder.
- The "LCFL" folder with the function block used and its internal functions (common blocks) from the same "SIMATIC S7-1500/PLC hardware" hardware family was created in the "Program blocks" folder.
- The "LCFL" folder with the PLC data types of the function block used from the same "SIMATIC S7-1500" hardware family was created in the "PLC data types" folder.

Note

The function blocks of the hardware family "SIMATIC S7-1500/PLC hardware" and "SIMATIC S7-1500/PLC software" use the same PLC data types and for this reason can be found under the folder "SIMATIC S7-1500".

7.2 Using LCFL function blocks for "SIMATIC S7-1500 Software Controller" in the project

Introduction

To use and configure function blocks from the Control Function Library in a "SIMATIC S7-1500 Software Controller", instantiate the function blocks from the corresponding hardware family (example folder: LCFL/Drives/MonAnaDrv/SIMATIC S7-1500/PLC software) in an organization block. To output messages using ProDiag in runtime, assign a ProDiag function block to the instance data blocks.

Requirement

- A PLC from the "SIMATIC S7-1500/PLC software" hardware family has been created.
- An organization block exists and is open (e.g. OB1).
- A ProDiag function block is created if you want to use alarms that are managed using ProDiag.

Procedure

1. Drag-and-drop the desired function block from the project library from the "SIMATIC S7-1500/PLC software" folder into the network of the organization block.
   The "Call options" dialog opens.
2. If you want to use messages managed by means of ProDiag, select the created ProDiag function block under "ProDiag-FB".
3. Click "OK".

Result

- An instance data block of the function block used was created in the "Program blocks" folder.
- The "LCFL" folder with the function block used and its internal functions (common blocks) from the same "SIMATIC S7-1500/PLC software" hardware family was created in the "Program blocks" folder.
- The "LCFL" folder with the PLC data types of the function block used from the same "SIMATIC S7-1500" hardware family was created in the "PLC data types" folder.

Note

The function blocks of the hardware family "SIMATIC S7-1500/PLC hardware" and "SIMATIC S7-1500/PLC software" use the same PLC data types and for this reason can be found under the folder "SIMATIC S7-1500".

7.3 Using LCFL function blocks for "SIMATIC S7-1200" in the project

Introduction

To use and configure function blocks from the Control Function Library in a "SIMATIC S7-1200", instantiate the function blocks from the corresponding hardware family (example folder: LCFL/Drives/MonAnaDrv/SIMATIC S7-1200/PLC hardware) in an organization block. Alarms via ProDiag cannot be used in a "SIMATIC S7-1200". ProDiag is not available here.

Requirement

- A PLC from the "SIMATIC S7-1200/PLC hardware" hardware family has been created.
- An organization block exists and is open (e.g. OB1).

Procedure

1. Drag-and-drop the desired function block from the project library from the "SIMATIC S7-1200/PLC hardware" folder into the network of the organization block.
   The "Call options" dialog opens.
2. Click "OK".

Result

- An instance data block of the function block used was created in the "Program blocks" folder.
- The "LCFL" folder with the function block used and its internal functions (common blocks) from the same "SIMATIC S7-1200/PLC hardware" hardware family was created in the "Program blocks" folder.
- The "LCFL" folder with the PLC data types of the function block used from the same "SIMATIC S7-1200" hardware family was created in the "PLC data types" folder.

Note

The function blocks of the "SIMATIC S7-1200/PLC hardware" hardware family use their own PLC data types and for this reason can be found under the folder "SIMATIC S7-1200".

7.4 Interconnecting the LCFL instance data block with the PLC data type "Config"

Introduction

To interconnect the PLC data type "Config" at the instance data block, an additional global data block must be created.

This procedure is described using the instance data block "LCFL-MonAnaDrv_DB" as an example.

Requirement

- A PLC has been created.
- The function block "LCFL_MonAnaDrv" is used in combination with the instance data block "LCFL-MonAnaDrv_DB" in an organization block.

Procedure

1. Click on "Add new block" under the "Program blocks" folder.
   The "Add new block" dialog opens.
2. Select "Data block".
3. Select the option "Global DB".
4. Assign a name, for example, DB_MonAnaDrvConfig.
5. Click "OK".
   The data block has been created and opened.
6. In the table under "Name > Static > Add", enter a name, such as MonAnaDrvConfig.
7. Under "Data type", select the PLC data type "LCFL_typeConfigMonAnaDrv".
8. Open the organization block.
9. Enter the name of the global data block at the "configuration" I/O of the function block "LCFL_MonAnaDrv" with the instance data block "LCFL-MonAnaDrv_DB".
10. Select the entry that you have written in the table of the data block (MonAnaDrvConfig).

Result

The "configuration" I/O of the instance data block "LCFL_MonAnaDrv_DB" is connected to the "MonAnaDrvConfig" tag of the PLC data type "LCFL_typeConfigMonAnaDrv" of the global data block "DB_MonAnaDrvConfig".

Visualization over faceplates

8

Faceplates are user-defined groups of display and operating objects that are stored, managed and edited in the project library in a versioned manner. By using faceplates, the configured function blocks can be visualized by using the PLC data types in the faceplate type (Page 415).

You can find a detailed description of faceplates in the WinCC Unified manual under "Visualizing processes > Configuring screens > Configuring faceplates".

8.1 Interlock

8.1.1 Visualization of LCFL_LockView4

8.1.1.1 Faceplate "LCFL_LockView4Symbol"

Introduction

For visualization of the function block "LCFL_LockView4", you can use the faceplate "LCFL_LockView4Symbol". The interface of the program block "LCFL_LockView4" and of the faceplate "LCFL_LockView4Symbol" is the PLC data type "LCFL_typeMTPLockView4Siemens".

You can find more information at LCFL_typeMTPLockView4Siemens (Page 144).

Left-click the faceplate to open the "LCFL_LockView4" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_LockView4Home" monitoring view is displayed. Navigate to the different views in the opened screen:

	View	Description
	LCFL_LockView4Home (Page 198)	The monitoring view is used to display basic information.
	LCFL_LockView4Trend (Page 202)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_LockView4Symbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:

① Result at output

By default, the output is shown with a red or green bar. If you want to change the colors, got to "Properties > Interface" in the Inspector window of the faceplate. You change the colors under "backgroundColorOff" or "backgroundColorOn".

Symbol	Meaning	HMI tag
	Output not enabled	HMI.mtpData.Out = 0
	Output enabled	HMI.mtpData.Out = 1

Disabled faceplate

If the faceplate "LCFL_LockView4Symbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.1.1.2 "LCFL_LockView4Home" view

Introduction

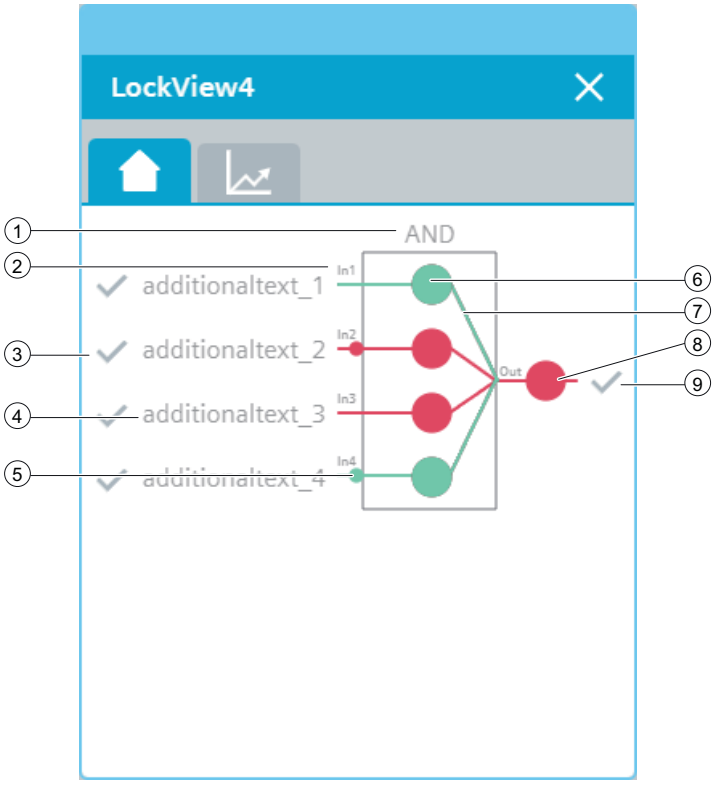
The "LCFL_LockView4Home" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_LockView4Home" view is enabled with "HMI.enabled = 1", the view appears as follows:



① Logical behavior

Meaning	HMI tag
Logical behavior "OR"	HMI.mtpData.Logic = 0
Logical behavior "AND"	HMI.mtpData.Logic = 1

② Input number

Number of the input

③ Quality code of the input

The display is only visible when "HMI.mtpData.InEn1...InEn4 = 1".

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.In1QC ... In4QC = In1QC ... In4QC <> 16#80 OR In1QC ... In4QC <> 16#FF
	OK	HMI.mtpData.In1QC ... In4QC = In1QC ... In4QC == 16#80 OR In1QC ... In4QC == 16#FF

④ Additional text for display of locking inputs

The display is only visible when "HMI.mtpData.InEn1...InEn4 = 1".

Meaning	HMI tag
Text of the input	HMI.mtpData.InTxt1...InTxt4

⑤ Input inverted

The display is only visible when "HMI.mtpData.InEn1...InEn4 = 1".

Symbol	Meaning	HMI tag
	Inversion enabled, result "false"	HMI.mtpData.In1Inv...In4Inv = 1 AND HMI.mtpData.In1...In4 = 1
	Inversion enabled, result "true"	HMI.mtpData.In1Inv...In4Inv = 1 AND HMI.mtpData.In1...In4 = 0

⑥ Circle of locking input

The display is only visible when "HMI.mtpData.InEn1...InEn4 = 1".

Symbol	Meaning	HMI tag
	Input not activated	(HMI.mtpData.In1...In4 = 0 AND HMI.mtpData.In1Inv...In4Inv = 0) OR (HMI.mtpData.In1...In4 = 1 AND HMI.mtpData.In1Inv...In4Inv = 1)
	Input activated	(HMI.mtpData.In1...In4 = 1 AND HMI.mtpData.In1Inv...In4Inv = 0) OR (HMI.mtpData.In1...In4 = 0 AND HMI.mtpData.In1Inv...InI4Inv = 1)

⑦ Line of locking input

The display is only visible when "HMI.mtpData.InEn1...InEn4 = 1".

Symbol	Meaning	HMI tag
	Input not activated	(HMI.mtpData.In1...In4 = 0 AND HMI.mtpData.In1Inv...In4Inv = 0) OR (HMI.mtpData.In1...In4 = 1 AND HMI.mtpData.In1Inv...In4Inv = 1)
	Input activated	(HMI.mtpData.In1...In4 = 1 AND HMI.mtpData.In1Inv...In4Inv = 0) OR (HMI.mtpData.In1...In4 = 0 AND HMI.mtpData.In1Inv...In4Inv = 1)

⑧ Result at output

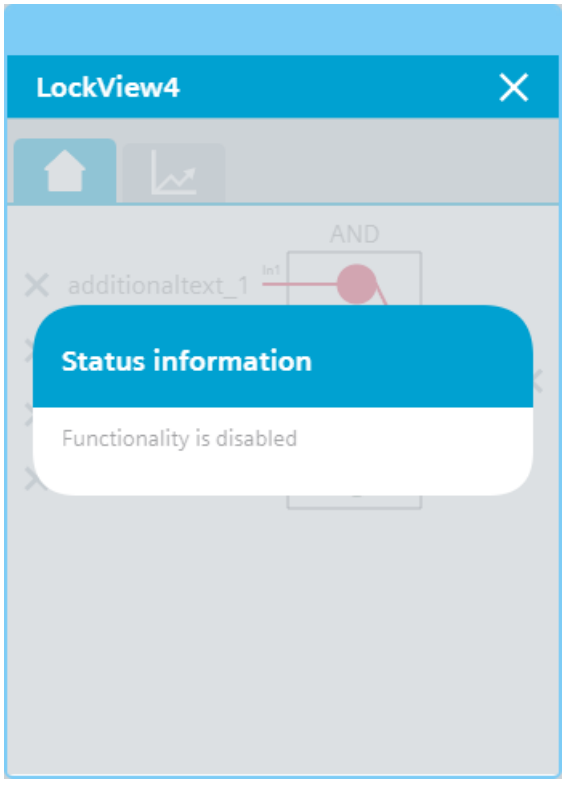
Symbol	Meaning	HMI tag
	Output not enabled	HMI.mtpData.Out = 0
	Output enabled	HMI.mtpData.Out = 1

⑨ Quality code of the output

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.OutQC = OutQC <> 16#80 AND OutQC <> 16#FF
	OK	HMI.mtpData.OutQC = OutQC == 16#80 OR OutQC == 16#FF

Disabled view

If the "LCFL_LockView4Home" view is disabled with "HMI.enabled = 0", the view with the following status information appears:

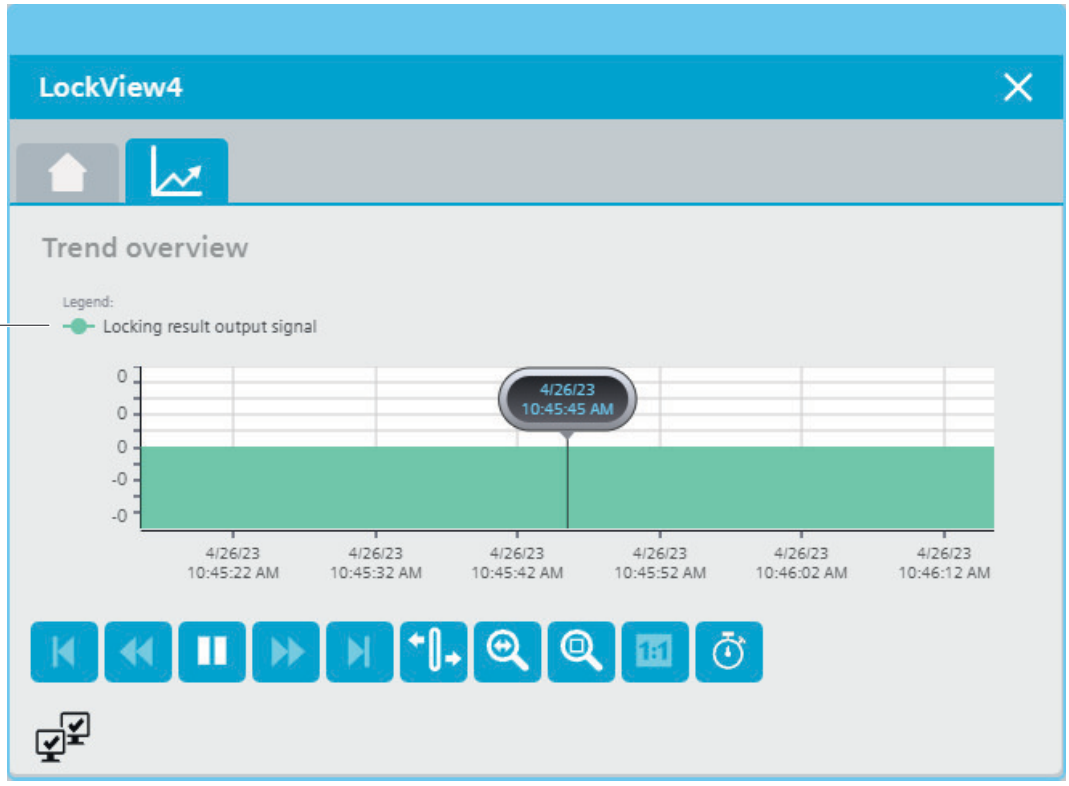


8.1.1.3 "LCFL_LockView4Trend" view

Introduction

The "LCFL_LockView4Trend" view is used for the diagnostics of values from the function block "LCFL_LockView4".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Lock result output signal

Text	HMI tag
Lock result output signal	HMI.mtpData.Out

8.1.2 Visualization of LCFL_LockView8

8.1.2.1 Faceplate "LCFL_LockView8Symbol"

Introduction

For visualization of the function block "LCFL_LockView8" you can use the faceplate "LCFL_LockView8Symbol". The interface of the program block "LCFL_LockView8" and of the faceplate "LCFL_LockView8Symbol" is the PLC data type "LCFL_typeMTPLockView8Siemens".

You can find more information at LCFL_typeMTPLockView8Siemens (Page 147).

Left-click the faceplate to open the "LCFL_LockView8" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_LockView8Home" monitoring view is displayed. Navigate to the different views in the opened screen:

	View	Description
	LCFL_LockView8Home (Page 205)	The monitoring view is used to display basic information.
	LCFL_LockView8Trend (Page 209)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_LockView8Symbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:

① Result at output

By default, the output is shown with a red or green bar. If you want to change the colors, got to "Properties > Interface" in the Inspector window of the faceplate. You change the colors under "backgroundColorOff" or "backgroundColorOn".

Symbol	Meaning	HMI tag
	Output not enabled	HMI.mtpData.Out = 0
	Output enabled	HMI.mtpData.Out = 1

Disabled faceplate

If the faceplate "LCFL_LockView8Symbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.1.2.2 "LCFL_LockView8Home" view

Introduction

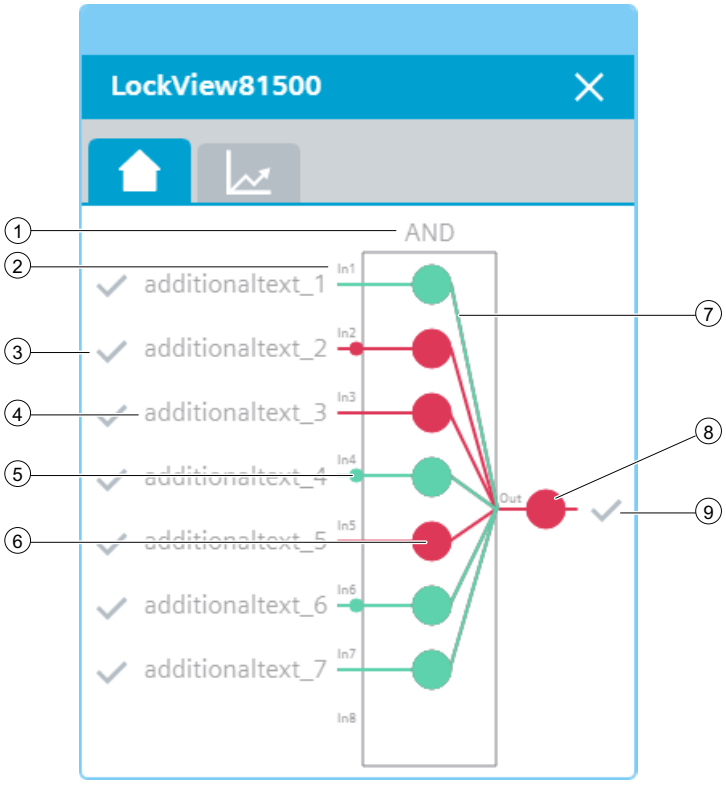
The "LCFL_LockView8Home" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_LockView8Home" view is enabled with "HMI.enabled = 1", the view appears as follows:



① Logical behavior

Meaning	HMI tag
Logical behavior "OR"	HMI.mtpData.Logic = 0
Logical behavior "AND"	HMI.mtpData.Logic = 1

② Input number

Number of the input

③ Quality code of the input

The display is only visible when "HMI.mtpData.InEn1...InEn8 = 1".

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.In1QC...In8QC <> 16#80 OR In1QC...In8QC <> 16#FF
	OK	HMI.mtpData.In1QC == 16#80 OR In1QC...In8QC == 16#FF

④ Additional text for display of locking inputs

The display is only visible when "HMI.mtpData.InEn1...InEn8 = 1".

Meaning	HMI tag
Text of the input	HMI.mtpData.InTxt1...InTxt8

⑤ Input inverted

The display is only visible when "HMI.mtpData.InEn1...InEn8 = 1".

Symbol	Meaning	HMI tag
	Inversion enabled, result "false"	HMI.mtpData.In1Inv...In8Inv = 1 AND HMI.mtpData.In1...In8 = 1
	Inversion enabled, result "true"	HMI.mtpData.In1Inv...In8Inv = 1 AND HMI.mtpData.In1...In8 = 0

⑥ Circle of locking input

The display is only visible when "HMI.mtpData.InEn1...InEn8 = 1".

Symbol	Meaning	HMI tag
	Input not activated	(HMI.mtpData.In1...In8 = 0 AND HMI.mtpData.In1Inv...In8Inv = 0) OR (HMI.mtpData.In1...In8 = 1 AND HMI.mtpData.In1Inv...In8Inv = 1)
	Input activated	(HMI.mtpData.In1...In8 = 1 AND HMI.mtpData.In1Inv...In8Inv = 0) OR (HMI.mtpData.In1...In8 = 0 AND HMI.mtpData.In1Inv...In8Inv = 1)

⑦ Line of locking input

The display is only visible when "HMI.mtpData.InEn1...InEn8 = 1".

Symbol	Meaning	HMI tag
	Input not activated	(HMI.mtpData.In1...In8 = 0 AND HMI.mtpData.In1Inv...In8Inv = 0) OR (HMI.mtpData.In1...In8 = 1 AND HMI.mtpData.In1Inv...In8Inv = 1)
	Input activated	(HMI.mtpData.In1...In8 = 1 AND HMI.mtpData.In1Inv...In8Inv = 0) OR (HMI.mtpData.In1...In8 = 0 AND HMI.mtpData.In1Inv...In8Inv = 1)

⑧ Result at output

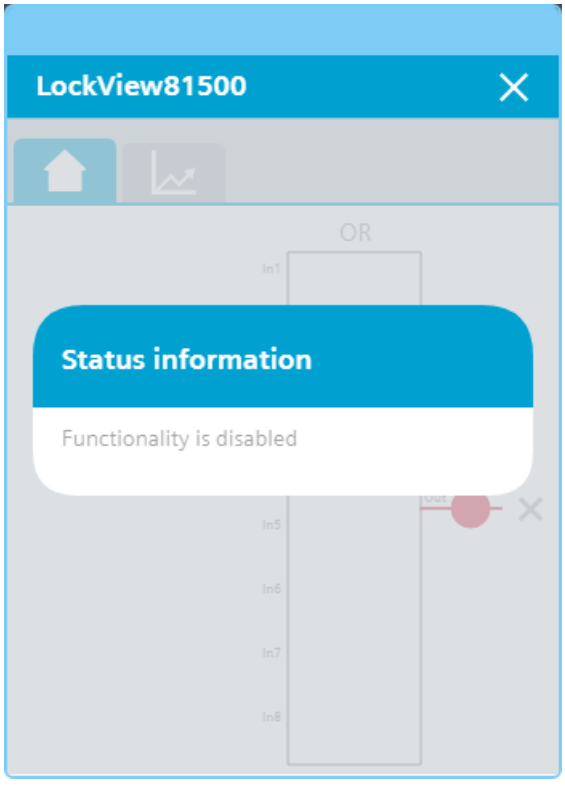
Symbol	Meaning	HMI tag
	Output not enabled	HMI.mtpData.Out = 0
	Output enabled	HMI.mtpData.Out = 1

⑨ Quality code of the output

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.OutQC = OutQC <> 16#80 AND OutQC <> 16#FF
	OK	HMI.mtpData.OutQC = OutQC == 16#80 OR OutQC == 16#FF

Disabled view

If the "LCFL_LockView8Home" view is disabled with "HMI.enabled = 0", the view with the following status information appears:

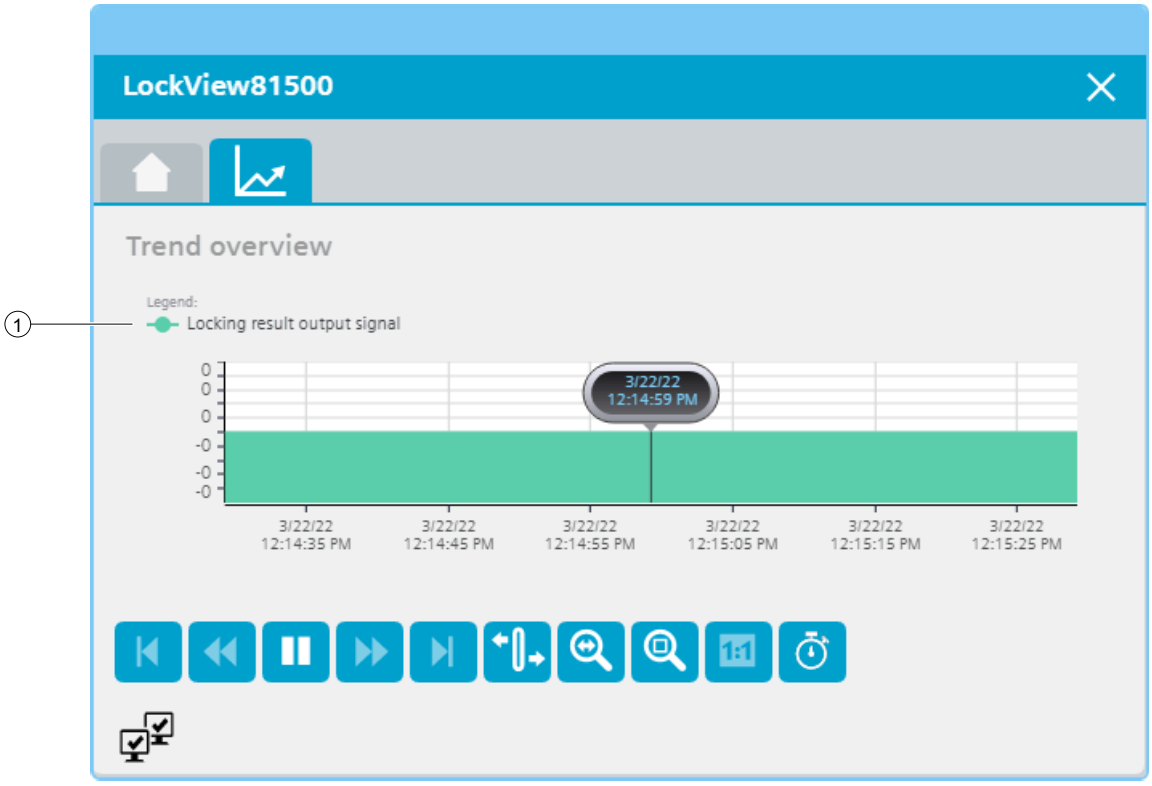


8.1.2.3 "LCFL_LockView8Trend" view

Introduction

The "LCFL_LockView8Trend" view is used for the diagnostics of values from the function block "LCFL_LockView8".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Lock result output signal

Text	HMI tag
Lock result output signal	HMI.mtpData.Out

8.2 Drives

8.2.1 Visualization of LCFL_MonAnaDrv

8.2.1.1 Faceplate "LCFL_MonAnaDrvSymbol"

Introduction

For visualization of the function block "LCFL_MonAnaDrv", you can use the faceplate "LCFL_MonAnaDrvSymbol". The interface of the program block "LCFL_MonAnaDrv" and of the faceplate "LCFL_MonAnaDrvSymbol" is the PLC data type "LCFL_typeMTPMonAnaDrvSiemens".

You can find more information at LCFL_typeMTPMonAnaDrvSiemens (Page 153).

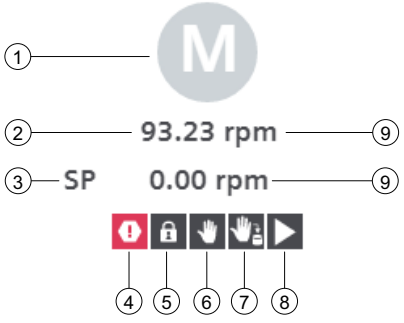
Left-click the faceplate to open the "LCFL_MonAnaDrv" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_MonAnaDrvHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_MonAnaDrvHome1 (Page 215) LCFL_MonAnaDrvHome2 (Page 226) LCFL_MonAnaDrvHome3 (Page 229)	The views are used to display basic information, as well as setting options for the mode and the control of the drive. The number shows which Home view you are currently in. An error symbol is displayed when there is an error within a view. The affected view is displayed in red.
	LCFL_MonAnaDrvSettings1 (Page 231) LCFL_MonAnaDrvSettings2 (Page 233) "LCFL_Maintenance1" view (Page 234) "LCFL_Maintenance2" view (Page 236)	In the first settings view, you have the option to enable or disable the feedback monitoring. In the second settings view, you can define the high and low limit for the speed. In the maintenance settings you have the option of displaying the actual values of the operating time, cycle time, number of status changes and alarms and of configuring the limit values.
	LCFL_MonAnaDrvAlarm (Page 237)	The alarm view shows incoming alarms.
	LCFL_MonAnaDrvTrend (Page 240)	The trend view is used for the diagnostics of values.

Display and structure of the symbol

If the faceplate "LCFL_MonAnaDrvSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



The display is a pure information view in runtime. You can make settings in the various views.

① Current state of the drive

Symbol	State of the drive	HMI tag
	Running	(HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.FwdCtrl = 1) OR (HMI.mtpData.RevFbk = 1 AND HMI.mtpData.RevCtrl = 1) AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Stopped	HMI.mtpData.FwdFbk = 0 AND HMI.mtpData.FwdCtrl = 0 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Forward movement or reverse movement is stopped	(HMI.mtpData.FwdFbk = 1 XOR HMI.mtpData.RevFbk = 1) AND HMI.mtpData.FwdCtrl = 0 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Forward movement or reverse movement is started	(HMI.mtpData.FwdCtrl = 1 XOR HMI.mtpData.RevCtrl = 1) AND HMI.mtpData.FwdFbk = 0 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Unknown	(HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 1) OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1

② Current feedback value of the speed

Meaning	HMI tag
Feedback value of the speed	HMI.mtpData.RpmFbk

③ Current speed setpoint

Meaning	HMI tag
Speed setpoint	HMI.mtpData.Rpm

④ Triggered motor protection, static or dynamic monitoring error, speed monitoring error, maintenance

Symbol	State	HMI tag
	Motor protection or supervision error	HMI.mtpData.Trip = 0 OR HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.RpmAHAct = 1 OR HMI.mtpData.RpmALAct = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1

⑤ Drive locked / not locked

Symbol	State	HMI tag
	Locked	HMI.mtpData.Permit = 0 OR HMI.mtpData.Interlock = 0 OR HMI.mtpData.Protect = 0

⑥ Mode

Symbol	Mode	HMI tag
	Offline	HMI.mtpData.StateOffAct = 1
	Operator	HMI.mtpData.StateOpAct = 1

⑦ Source mode

Symbol	Mode	HMI tag
	Manual	HMI.mtpData.SrcManAct = 1
	Internal	HMI.mtpData.SrcIntAct = 1

⑧ Additional information on current drive state

Symbol	State	HMI tag
	Running with forward movement	HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 0
	Running with reverse movement	HMI.mtpData.FwdFbk = 0 AND HMI.mtpData.RevFbk = 1

⑨ Unit of the feedback value and speed setpoint

Meaning	HMI tag
Unit of the feedback value and speed setpoint	HMI.mtpData.RpmUnit

Disabled faceplate

If the faceplate "LCFL_MonAnaDrvSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.2.1.2 "LCFL_MonAnaDrvHome1" view

Introduction

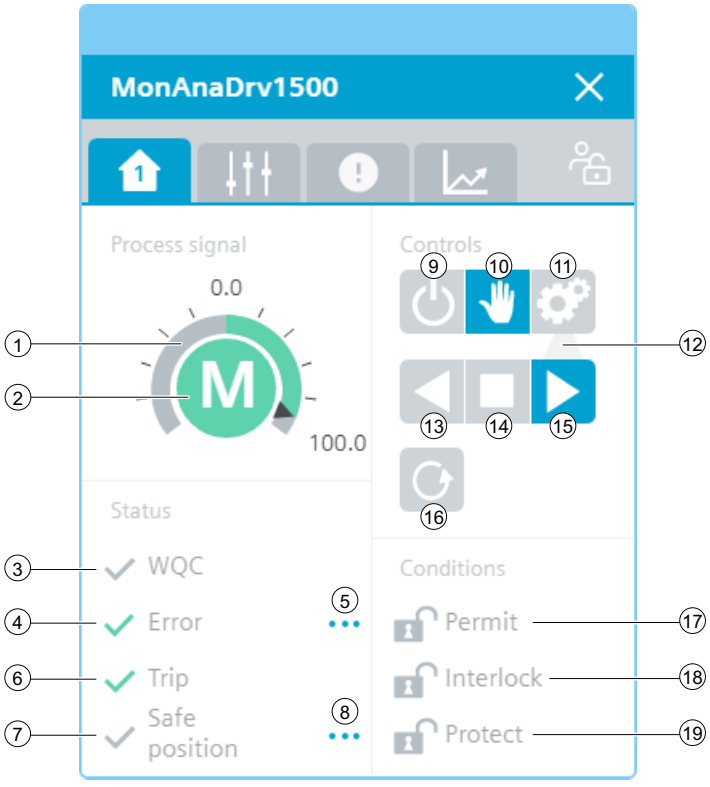
The "LCFL_MonAnaDrvHome1" view is used to display basic information, as well as setting options for the operating mode and control of the drive.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_MonAnaDrvHome1" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Process signal	This area visualizes the drive state (running / stopped / forward movement or reverse movement is stopped / forward movement or reverse movement is started). In addition, the speed feedback value is shown in the form of an arc diagram.
Status	This area contains information on quality code, monitoring error, maintenance, motor protection, and safe position.

Area	Description
Controllers	This area contains buttons that can be enabled with a click: • Operating mode (Offline / Operator / Automatic) • Drive operations (running with forward movement / running with reverse movement / stopped) • Reset error
Conditions	This area contains the following information: • Permit The operation of the faceplate is possible / not possible. • Interlock The status change of the drive is possible / not possible. • Protect The status change of the drive is possible / not possible. A reset is required to enable a status change once again.

① Feedback value of the speed in the form of an arc diagram

The scaling values "HMI.mtpData.RpmSclMin" and "HMI.mtpData.RpmSclMax" determine the range of the gauge. When the speed feedback value is higher than "HMI.mtpData.RpmMax" or lower than "HMI.mtpData.RpmMin", the color of the gauge changes to red.

② Current state of the drive

The current state of the drive of the faceplate "LCFL_MonAnaDrvSymbol" is shown here once again.

You can find information under Faceplate "LCFL_MonAnaDrvSymbol" (Page 211).

③ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
✕	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
✓	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

④ Monitoring error or maintenance required

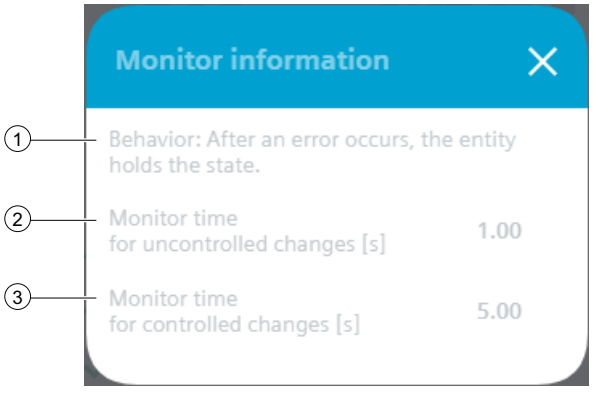
The display is only visible when "HMI.mtpData.MonEn = 1".

Symbol	Meaning	HMI tag
	No supervision error	HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonEn = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1
	Static supervision error	HMI.mtpData.MonStatErr = 1 AND HMI.mtpData.MonEn = 1
	Dynamic supervision error	HMI.mtpData.MonDynErr = 1 AND HMI.mtpData.MonEn = 1

⑤ Information for feedback monitoring

Symbol	Meaning	HMI tag
	Information	HMI.mtpData.MonEn = 1

To open the information, click on the icon.



① Behavior after an error occurs

Text	HMI tag
After an error occurs, the entity holds the status.	HMI.mtpData.MonSafePos = 0
After an error has occurred, the safe position is set.	HMI.mtpData.MonSafePos = 1

② Monitoring time for uncontrolled changes

Text	Meaning	HMI tag
Monitoring time for uncontrolled changes [s]	A static supervision error occurs when the drive state is changed during the entire monitoring time without a change in control (uncontrolled change).	HMI.mtpData.MonStatTi

③ Monitoring time for controlled changes

Text	Meaning	HMI tag
Monitoring time for controlled changes [s]	A dynamic monitoring error occurs if, during the entire monitoring time, the drive state is not changed, even though a change in control has taken place, or if it is changed to the wrong state (controlled change).	HMI.mtpData.MonDynTi

⑥ Motor protection

Symbol	Meaning	HMI tag
✓	Motor protection not triggered	HMI.mtpData.Trip = 1
!	Motor protection triggered	HMI.mtpData.Trip = 0

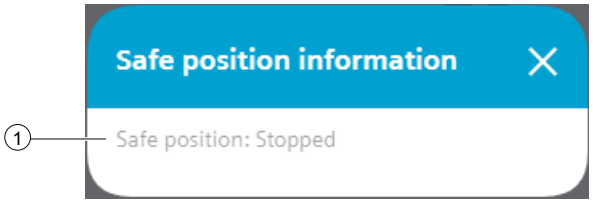
⑦ Safe position

Symbol	Meaning	HMI tag
✓	Safe position is not activated	HMI.mtpData.SafePosAct = 0
✕	Safe position is activated.	HMI.mtpData.SafePosAct = 1

⑧ Information about the safe position

Symbol	Meaning
•••	Information

To open the information, click on the icon.



① Behavior of the safe position

The safe position of the drive is always the idle position (stopped). When an error occurs, the safe position is activated.

Text	HMI tag
Stopped	HMI.mtpData.SafePos = 0
Running	HMI.mtpData.SafePos = 1

⑨ Mode: Offline

Button	State	HMI tag
	Offline (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOffAct = 1)
	Offline	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 1
	Not Offline (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOffAct = 0

⑩ Mode: Operator

Button	State	HMI tag
	Operator (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOpAct = 1)
	Operator	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 1
	Not operator (no switch-over triggered by operator or automatic mode)	HMI.mtpData.StateOpAct = 0

⑪ Mode: Automatic

Button	State	HMI tag
	Automatic (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateAutAct = 1)
	Automatic	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 1
	Not automatic mode (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateAutAct = 0

⑫ Mode preview: Automatic

The gray line under the automatic icon indicates whether the drive is stopped or runs with forward or reverse movement when switched to automatic mode.

Meaning	HMI tag
Preview shows "Forward movement"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.FwdAut = 1
Preview shows "Stop"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.StopAut = 1
Preview shows "Reverse movement"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.RevAut = 1

⑬ Operation: Set drive to reverse movement

Button	State	HMI tag
	Runs with reverse movement (no operator authorization)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevFbk = 1 AND HMI.mtpData.FwdFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 0)
	Running with reverse movement	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 1
	Does not run with reverse movement (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevCtrl = 1 AND HMI.mtpData.RevFbk = 0) OR (HMI.mtpData.StateOpAct AND HMI.mtpData.RevCtrl = 1 AND HMI.mtpData.RevFbk = 0 AND Operating permit = 0)

Button	State	HMI tag
	Does not run with reverse movement (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevCtrl = 1 AND HMI.mtpData.RevFbk = 0 AND Operating permit = 1
	Does not run with reverse movement (no switchover triggered by operator or automatic mode)	HMI.mtpData.RevFbk = 0

⑭ Operation: Stopping the drive

Button	State	HMI tag
	Stop (no operator authorization)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.FwdFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 0)
	Stop	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 1
	Do not stop (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.FwdCtrl = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.FwdCtrl = 0 AND Operating permit = 0)
	Do not stop (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.FwdCtrl = 0 AND Operating permit = 1
	Do not stop (no switchover triggered by operator or automatic mode)	HMI.mtpData.FwdFbk = 1 OR HMI.mtpData.RevFbk = 1

⑮ Operation: Set drive to forward movement

Button	State	HMI tag
	Runs with forward movement (no operator authorization)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdFbk = 1 AND Operating permit = 0)
	Running with forward movement	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 0 AND Operating permit = 1
	Does not run with forward movement (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.FwdCtrl = 1 AND HMI.mtpData.FwdFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdCtrl = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 0)
	Does not run with forward movement (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdCtrl = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 1
	Does not run with forward movement (no switchover triggered by operator or automatic mode)	HMI.mtpData.FwdFbk = 0

⑯ Reset drive

Button	State	HMI tag
	Reset required	HMI.mtpData.StateOpAct = 1 AND Operating permit = 1 AND (HMI.mtpData.ProtEn= 1 AND HMI.mtpData.Protect = 0 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.RpmAHAct = 1 OR HMI.mtpData.RpmALAct = 1 OR HMI.mtpData.Trip = 0)
	No reset required	HMI.mtpData.StateOpAct = 0 OR Operating permit = 0 OR (HMI.mtpData.Protect = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.RpmAHAct = 0 AND HMI.mtpData.RpmALAct = 0 AND HMI.mtpData.Trip = 1)

⑰ Interlock state: Permit

The display is only visible when "HMI.mtpData.PermEn = 1".

Symbol	Meaning	HMI tag
	Authorization is given	HMI.mtpData.Permit = 1 AND HMI.mtpData.PermEn = 1
	Authorization is not given	HMI.mtpData.Permit = 0 AND HMI.mtpData.PermEn = 1

⑱ Interlock state: Interlock

The display is only visible when "HMI.mtpData.IntlEn = 1".

Symbol	Meaning	HMI tag
	Interlock is not activated	HMI.mtpData.Interlock = 1 AND HMI.mtpData.IntlEn = 1
	Interlock is activated	HMI.mtpData.Interlock = 0 AND HMI.mtpData.IntlEn = 1

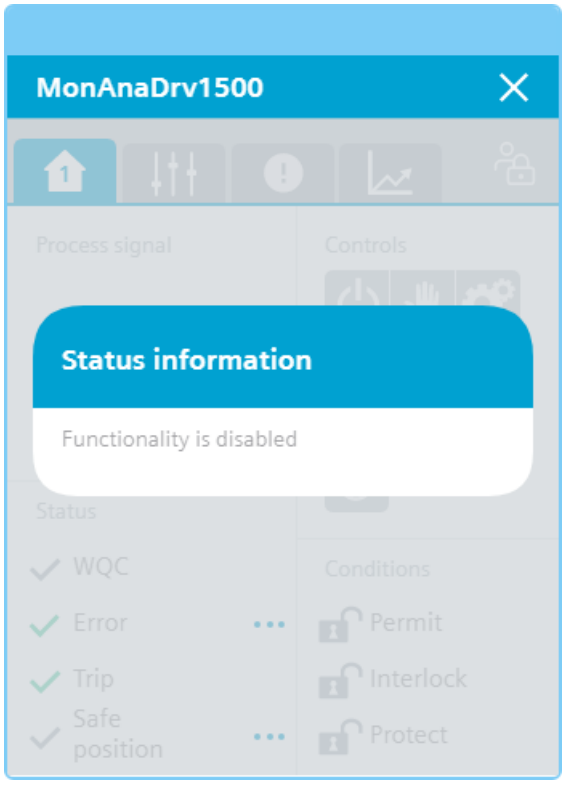
⑲ Interlock state: Protect

The display is only visible when "HMI.mtpData.ProtEn = 1".

Symbol	Meaning	HMI tag
	Protection is not activated	HMI.mtpData.Protect = 1 AND HMI.mtpData.ProtEn = 1
	Protection is activated	HMI.mtpData.Protect = 0 AND HMI.mtpData.ProtEn = 1

Disabled view

If the "LCFL_MonAnaDrvHome1" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.2.1.3 "LCFL_MonAnaDrvHome2" view

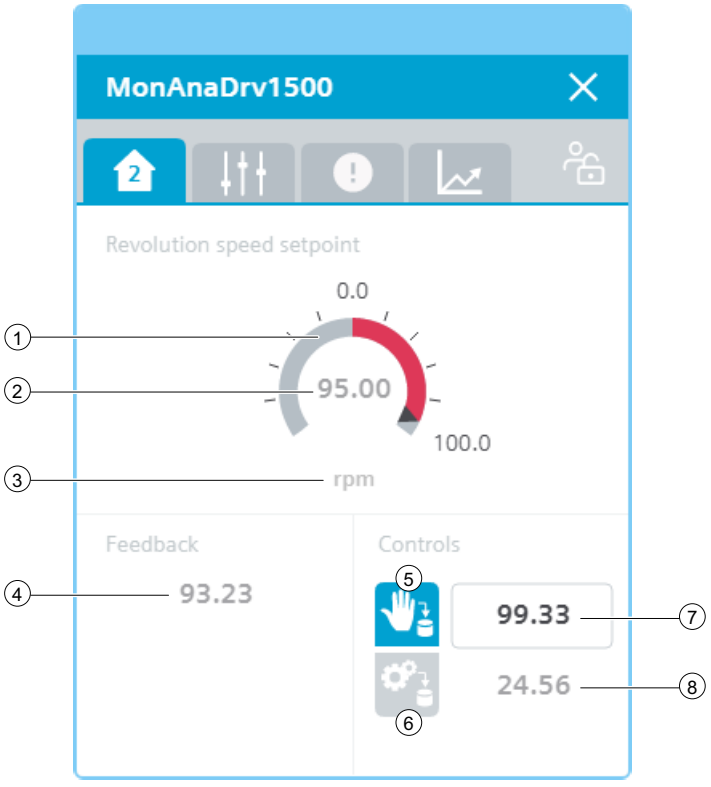
Introduction

The "LCFL_MonAnaDrvHome2" view shows the speed setpoint and the feedback value. The source mode is shown and can be changed.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



The view is divided into four areas:

Area	Description
Speed setpoint	The current speed setpoint is displayed in this area.
Feedback	The feedback value of the speed is displayed in this area.
Controllers	This area contains buttons that can be enabled with a click: • "Manual" source mode • "Internal" source mode An additional display shows the manual and internal speed setpoint.

① Speed setpoint in the form of an arc diagram

The scaling values "HMI.mtpData.RpmSclMin" and "HMI.mtpData.RpmSclMax" determine the range of the gauge. When the speed setpoint is higher than "HMI.mtpData.RpmMax" or lower than "HMI.mtpData.RpmMin", the color of the gauge changes to red.

② Current speed setpoint

Meaning	HMI tag
Speed setpoint	HMI.mtpData.Rpm

③ Unit of the speed setpoint

Meaning	HMI tag
Unit of the speed setpoint	HMI.mtpData.RpmUnit

④ Current feedback value of the speed

Meaning	HMI tag
Feedback value of the speed	HMI.mtpData.RpmFbk

⑤ Source mode: Manual

Symbol	State	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcManAct = 0

⑥ Source mode: Internal

Symbol	State	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1
	Not internal (no switchover triggered by operator)	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcIntAct = 0

⑦ Manual speed setpoint

Meaning	HMI tag
Manual speed setpoint	HMI.mtpData.RpmMan

⑧ Internal speed setpoint

Meaning	HMI tag
Internal speed setpoint	HMI.mtpData.RpmInt

8.2.1.4 "LCFL_MonAnaDrvHome3" view

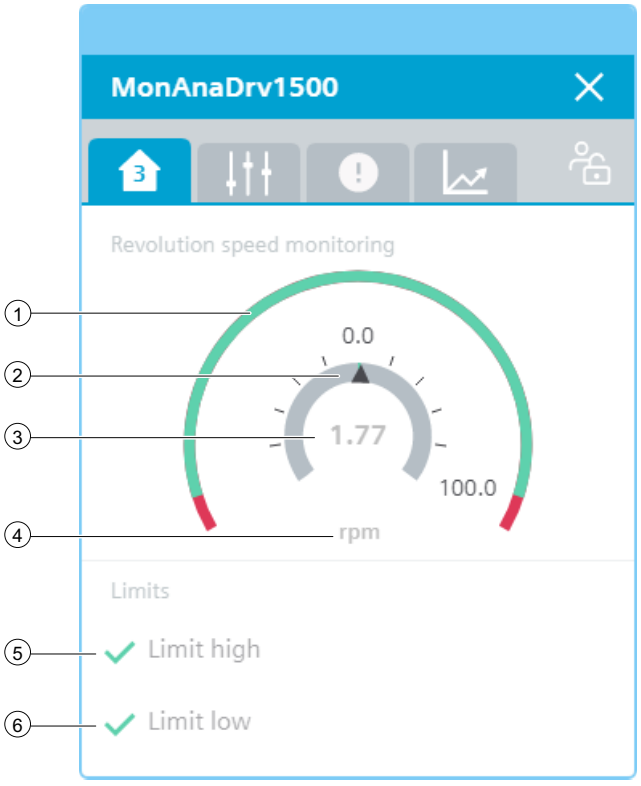
Introduction

The "LCFL_MonAnaDrvHome3" view shows information about the speed error.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



The view is divided into two areas:

Area	Description
Speed error	Speed errors are displayed in this area.
Limits	This area shows whether the speed alarm high limit or speed alarm low limit was violated or not.

① Alarm limits (red) in the form of an arc diagram

Meaning	HMI tag
Alarm high limit / Alarm low limit	HMI.mtpData.RpmAHLim / HMI.mtpData.RpmALLim

② Current speed error value in the form of an arc diagram

Meaning	HMI tag
Minimum scaling value	HMI.mtpData.RpmSclMin
Maximum scaling value	HMI.mtpData.RpmSclMax
Speed error value	HMI.mtpData.RpmErr

③ Current speed error value

Meaning	HMI tag
Speed error value	HMI.mtpData.RpmErr

④ Unit of speed error value

Meaning	HMI tag
Unit of the speed error value	HMI.mtpData.RpmUnit

⑤ Display for speed alarm high limit violated

Symbol	Meaning	HMI tag
	Alarm high limit not violated	HMI.mtpData.RpmAHAct = 0
	Alarm high limit violated	HMI.mtpData.RpmAHAct = 1

⑥ Display for speed alarm low limit violated

Symbol	Meaning	HMI tag
	Alarm low limit not violated	HMI.mtpData.RpmALAct = 0
	Alarm low limit violated	HMI.mtpData.RpmALAct = 1

8.2.1.5 "LCFL_MonAnaDrvSettings1" view

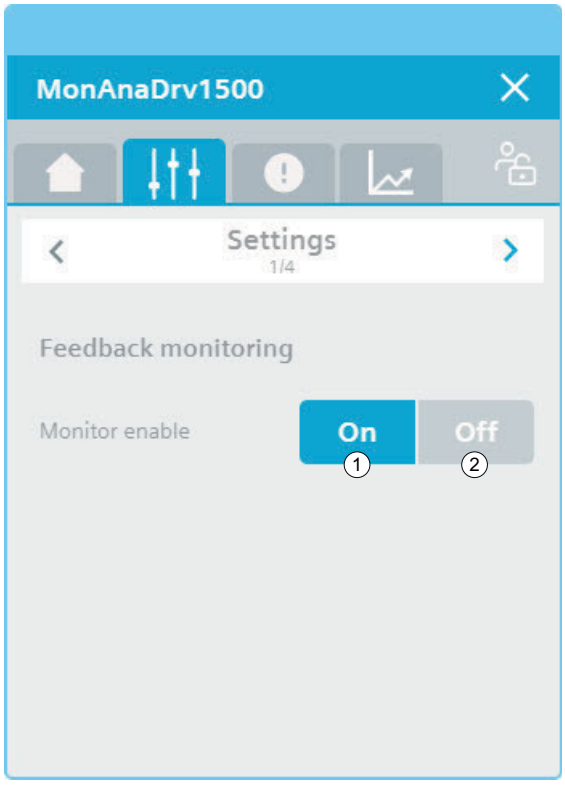
Introduction

In the "LCFL_MonAnaDrvSettings1" view, you can activate or deactivate feedback monitoring using buttons. If feedback monitoring is disabled, the "Monitoring error" display is not visible in the "LCFL_MonAnaDrvHome1" view.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Feedback monitoring: On

Symbol	Meaning	HMI variable
On	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1
On	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1

② Feedback monitoring: Off

Symbol	Meaning	HMI variable
Off	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1
Off	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1

8.2.1.6 "LCFL_MonAnaDrvSettings2" view

Introduction

In the "LCFL_MonAnaDrvSettings2" view, you can change the alarm high limit and alarm low limits of the speed.

The speed limits are only displayed when the following tags are activated:

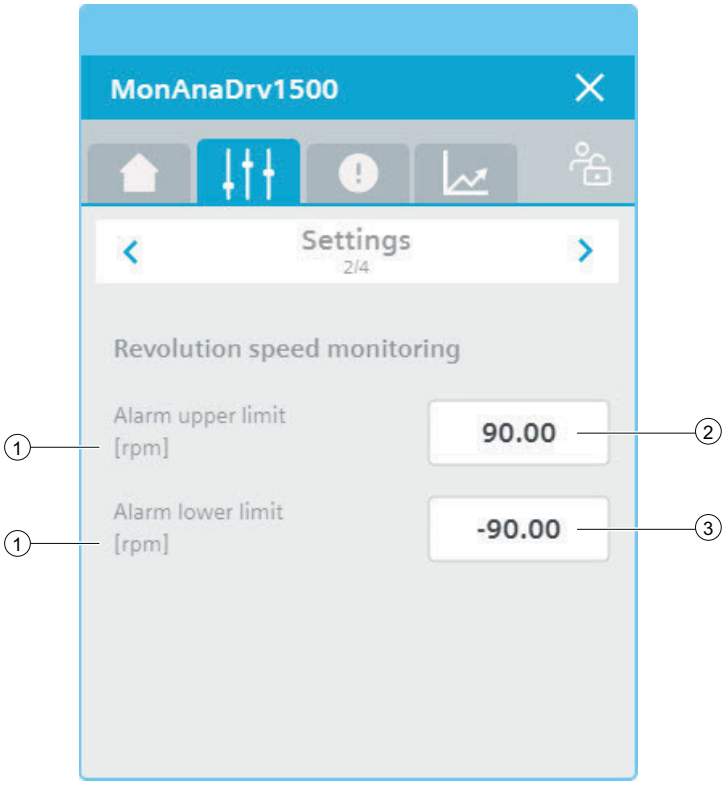
Limit monitoring	HMI tag
Activate alarm high limit of speed	HMI.mtpData.RpmAHEn = 1
Activate alarm low limit of speed	HMI.mtpData.RpmALEn = 1

The enable bit is set in the configuration data block (PLC data type).

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the speed limits

Value	HMI tag
Unit of the speed limits	HMI.mtpData.RpmUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Alarm high limit of speed

Value	HMI tag
Alarm high limit of speed	HMI.mtpData.RpmAHLim AND Operating permit = 1

③ Alarm low limit of speed

Value	HMI tag
Alarm low limit of speed	HMI.mtpData.RpmALLim AND Operating permit = 1

8.2.1.7 "LCFL_Maintenance1" view

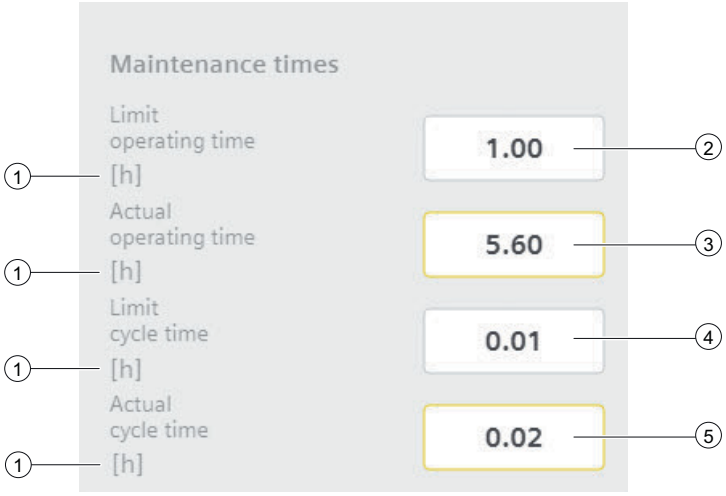
Introduction

In the "LCFL_Maintenance1" view you have the option to display the actual values of the operating time and cycle time and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Text	Value
Unit of the process value	Hours

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Operating time: Limit

Text	Meaning	HMI tag
Operating time limit	Maximum limitation of the operating time of the drive in hours	HMI.operatingTimeLimit

③ Operating time: Actual value

Text	Meaning	HMI tag
Actual operating time	Actual operating time of the drive in hours	HMI.operatingTimeAct

② Cycle time: Limit

Text	Meaning	HMI tag
Limit cycle time	Maximum limitation of the cycle time of the drive in hours	HMI.cycleTimeLimit

③ Cycle time: Actual value

Text	Meaning	HMI tag
Actual cycle time	Actual cycle time of the drive in hours	HMI.cycleTimeAct

8.2.1.8 "LCFL_Maintenance2" view

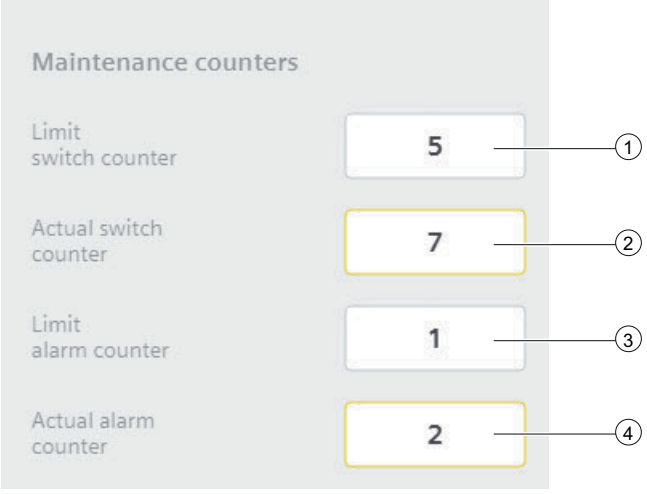
Introduction

In the "LCFL_Maintenance2" view you have the option to display the number of status changes and alarms and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Number of status changes: Limit

Text	Meaning	HMI tag
Limit value for number of status changes	Actual number of status changes of the drive	HMI.switchCounterLimit

② Number of status changes Actual value

Text	Meaning	HMI tag
Actual number of status changes	Actual number of status changes of the drive	HMI.switchCounterAct

③ Number of alarms: Limit

Text	Meaning	HMI tag
Limit value of number of alarms	Actual number of alarms of the drive	HMI.alarmCounterLimit

④ Number of alarms: Actual value

Text	Meaning	HMI tag
Actual number of alarms	Actual number of alarms of the drive	HMI.alarmCounterAct

8.2.1.9 "LCFL_MonAnaDrvAlarm" view

Introduction

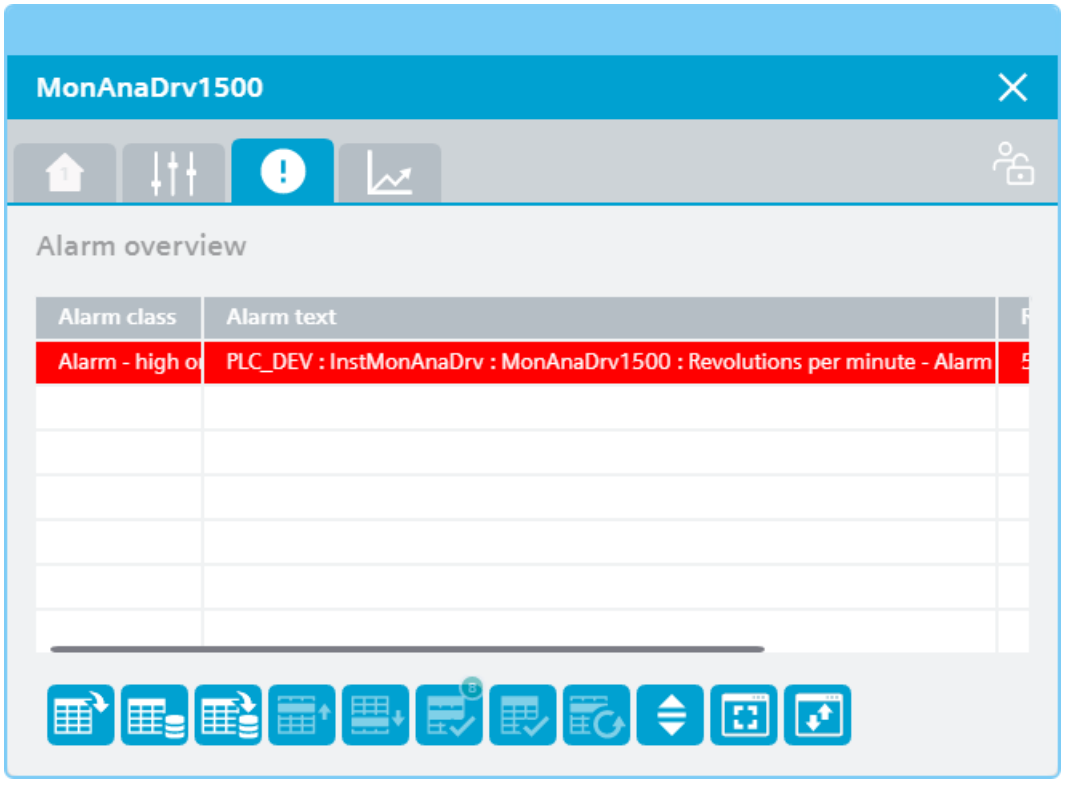
The "LCFL_MonAnaDrvAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output in the event of supervision errors and when the motor protection is triggered:

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.tripMessage	HMI.mtpData.Trip = 0	Motor protection triggered	configuration.tripMessageEn = 1 The alarm is enabled. configuration.tripMessageEn = 0 The alarm is disabled.
HMI.monitorStaticMessage	HMI.mtpData.MonStatTi < T	Motor feedback error (static)	configuration.monitorStaticMessageEn = 1 The alarm is enabled. configuration.monitorStaticMessageEn = 0 The alarm is disabled.
HMI.monitorDynamicMessage	HMI.mtpData.MonDynTi < T	Motor feedback error (dynamic)	configuration.monitorDynamicMessageEn = 1 The alarm is enabled. configuration.monitorDynamicMessageEn = 0 The alarm is disabled.

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.revolutionSpeedAlarmHighMessage	HMI.mtpData.RpmErr > HMI.mtpData.RpmAHLim	Speed - Alarm high limit violated	configuration.revolutionSpeedAlarmHighEn = 1 The alarm is enabled. configuration.revolutionSpeedAlarmHighEn = 0 The alarm is disabled.
HMI.revolutionSpeedAlarmLowMessage	HMI.mtpData.RpmErr < HMI.mtpData.RpmALLim	Speed - Alarm low limit violated	configuration.revolutionSpeedAlarmLowEn = 1 The alarm is enabled. configuration.revolutionSpeedAlarmLowEn = 0 The alarm is disabled.
HMI.maintenance.operatingTimeMessage	HMI.maintenance.operatingTimeReached	Operating time reached	configuration.operatingTimeMessageEn = 1 The alarm is enabled. configuration.operatingTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.cycleTimeMessage	HMI.maintenance.cycleTimeReached	Cycle time reached	configuration.cycleTimeMessageEn = 1 The alarm is enabled. configuration.cycleTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.switchCounterMessage	HMI.maintenance.switchCounterReached	Number of status changes reached	configuration.switchCounterMessageEn = 1 The alarm is enabled. configuration.switchCounterMessageEn = 0 The alarm is disabled.
HMI.maintenance.alarmCounterMessage	HMI.maintenance.switchCounterReached	Number of alarms reached	configuration.alarmCounterMessageEn = 1 The alarm is enabled. configuration.alarmCounterMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_MonAnaDrv" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.

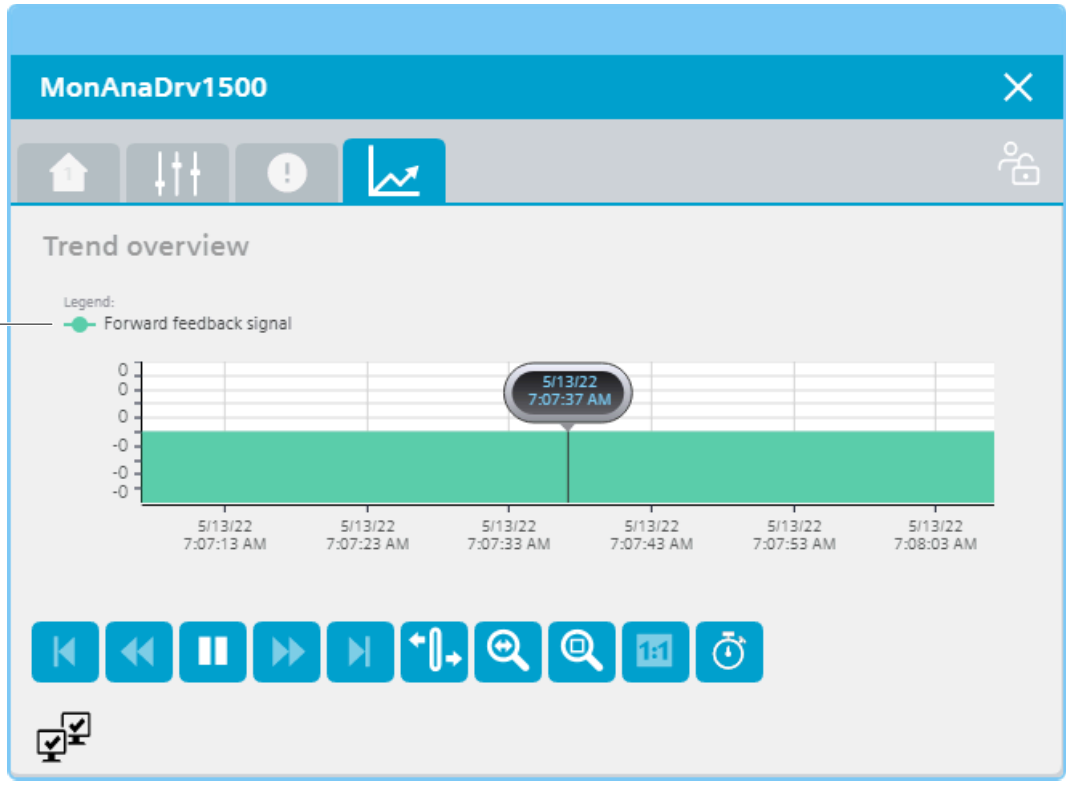
Button		Function
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.2.1.10 "LCFL_MonAnaDrvTrend" view

Introduction

The "LCFL_MonAnaDrvTrend" view is used for the diagnostics of values from the function block "LCFL_MonAnaDrv".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Forward checkback signal

Value	HMI tag
Forward checkback signal	HMI.mtpData.FwdFbk

8.2.2 Visualization of LCFL_MonAnaVlv

8.2.2.1 Faceplate "LCFL_MonAnaVlvSymbol"

Introduction

For visualization of the function block "LCFL_MonAnaVlv", you can use the faceplate "LCFL_MonAnaVlvSymbol". The interface of the program block "LCFL_MonAnaVlv" and of the faceplate "LCFL_MonAnaVlvSymbol" is the PLC data type "LCFL_typeMTPMonAnaVlvSiemens".

You can find more information at LCFL_typeMTPMonAnaVlvSiemens (Page 158)

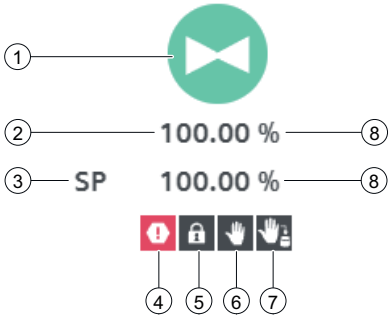
Left-click the faceplate to open the "LCFL_MonAnaVlv" screen containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_MonAnaVlvHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_MonAnaVlvHome1 (Page 246) LCFL_MonAnaVlvHome2 (Page 257)	The monitoring view is used to display basic information as well as operating mode and valve setting options. The number shows which Home view you are currently in. An error symbol is displayed when there is an error within a view. The affected view is displayed in red.
	LCFL_MonAnaVlvSettings (Page 260) "LCFL_Maintenance1" view (Page 262) "LCFL_Maintenance2" view (Page 263)	In the settings view you can activate or deactivate the feedback monitoring. In the maintenance settings you have the option of displaying the actual values of the operating time, cycle time, number of status changes and alarms and of configuring the limit values.
	LCFL_MonAnaVlvAlarm (Page 265)	The alarm view shows incoming alarms.
	LCFL_MonAnaVlvTrend (Page 267)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_MonAnaVlvSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current state of the valve

Symbol	State of the valve	HMI tag
	Open	HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonPosErr = 0
	Closed	HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonPosErr = 0
	Is being opened	HMI.mtpData.OpenAct = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonPosErr = 0
	Is being closed	HMI.mtpData.OpenFbk = 0 AND HMI.mtpData.CloseFbk = 0 AND HMI.mtpData.CloseAct = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonPosErr = 0
	Unknown	HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 1 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.MonPosErr = 1

② Current feedback value of the position

Meaning	HMI tag
Position feedback value	HMI.mtpData.PosFbk

③ Current position setpoint

Meaning	HMI tag
Position setpoint	HMI.mtpData.Pos

④ Static or dynamic monitoring error or maintenance required

Symbol	State	HMI tag
	Monitoring error	HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonPosErr = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1

⑤ Valve locked/not locked

Symbol	State	HMI tag
	Locked	HMI.mtpData.Permit = 0 OR HMI.mtpData.Interlock = 0 OR HMI.mtpData.Protect = 0

⑥ Mode

Symbol	Mode	HMI tag
	Offline	HMI.mtpData.StateOffAct = 1
	Operator	HMI.mtpData.StateOpAct = 1

⑦ Source mode

Symbol	Mode	HMI tag
	Manual	HMI.mtpData.SrcManAct = 1
	Internal	HMI.mtpData.SrcIntAct = 1

⑧ Unit of the feedback value and position setpoint

Meaning	HMI tag
Unit of the feedback value and position setpoint	HMI.mtpData.PosUnit

Disabled faceplate

If the faceplate "LCFL_MonAnaVlvSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.2.2.2 "LCFL_MonAnaVlvHome1" view

Introduction

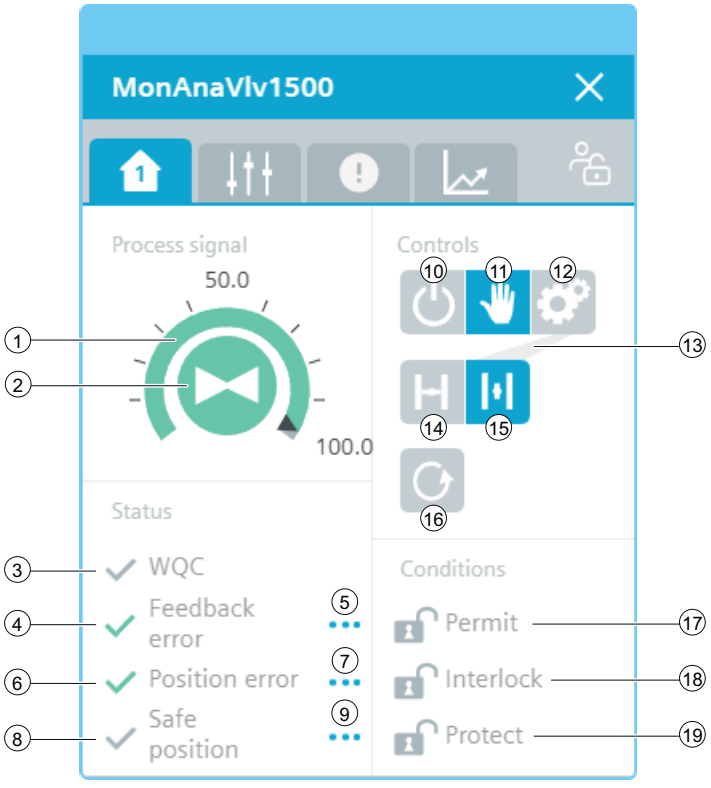
The "LCFL_MonAnaVlvHome" view is a monitoring view that is used to display basic information. You also have the option to change the operating mode and open or close the valve.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_MonAnaVlvHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Process signal	The state of the valve is visualized in this area (open / closed / is being opened / is being closed).
Status	This area contains information on quality code, feedback error, maintenance, position error and safe position.
Controllers	This area contains buttons that can be enabled with a click: • Operating mode (Offline / Operator / Automatic) • Valve action (open / close) • Reset error
Conditions	This area contains the following information: • Permit The operation of the faceplate is possible / not possible. • Interlock The status change of the valve is possible / not possible. • Protect The status change of the valve is possible / not possible. A reset is required to enable a status change once again.

① Feedback value of the position in the form of an arc diagram

The scaling values "HMI.mtpData.PosSclMin" and "HMI.mtpData.PosSclMax" determine the range of the gauge. When the position feedback value is higher than "HMI.mtpData.PosMax" or lower than "HMI.mtpData.PosMin", the color of the gauge changes to red.

② Current state of the valve

The current state of the valve of the faceplate "LCFL_MonAnaVlvSymbol" is shown here once again.

You can find information under Faceplate "LCFL_MonAnaVlvSymbol" (Page 242).

③ Worst quality code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

④ Feedback error or maintenance required

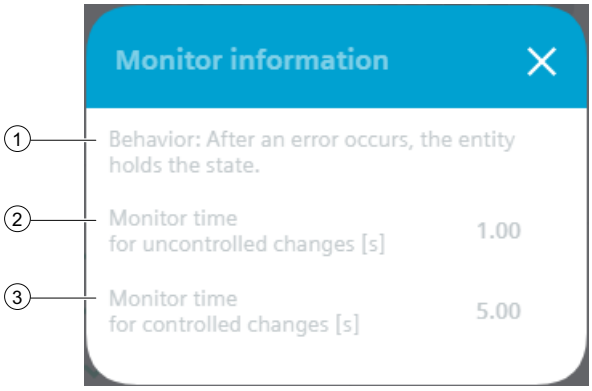
The display is only visible when "HMI.mtpData.MonEn = 1".

Symbol	Meaning	HMI tag
	No error	HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonEn = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1
	Static error	HMI.mtpData.MonStatErr = 1 AND HMI.mtpData.MonEn = 1
	Dynamic error	HMI.mtpData.MonDynErr = 1 AND HMI.mtpData.MonEn = 1

⑤ Information for feedback monitoring

Symbol	Meaning	HMI tag
•••	Information	HMI.mtpData.MonEn = 1

To open the information, click on the icon.



① Behavior after an error occurs

Text	HMI tag
After an error occurs, the entity holds the status.	HMI.mtpData.MonSafePos = 0
After an error has occurred, the safe position is set.	HMI.mtpData.MonSafePos = 1

② Monitoring time for uncontrolled changes

Text	Meaning	HMI tag
Monitoring time for uncontrolled changes [s]	A static monitoring error occurs when the valve state is changed at some point during the entire monitoring time, but without a change in control (uncontrolled change).	HMI.mtpData.MonStatTi

③ Monitoring time for controlled changes

Text	Meaning	HMI tag
Monitoring time for controlled changes [s]	A dynamic monitoring error occurs if, during the entire monitoring time, the valve state is not changed, even though a change in control has taken place, or if it is changed to the wrong state (controlled change).	HMI.mtpData.MonDynTi

⑥ Position error

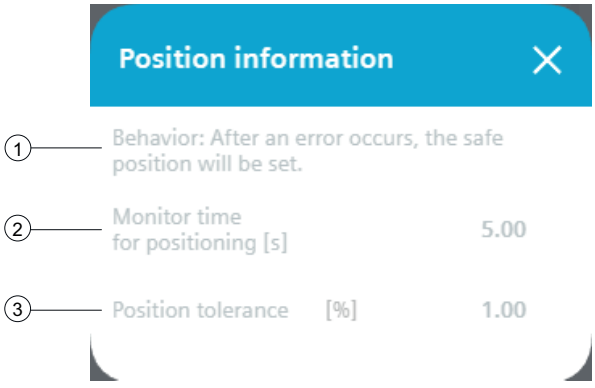
The display is only visible when "HMI.mtpData.MonEn = 1".

Symbol	Meaning	HMI tag
✓	No error	HMI.mtpData.MonPosErr = 0 AND HMI.mtpData.MonEn = 1
⛔	Position error	HMI.mtpData.MonPosErr = 1 AND HMI.mtpData.MonEn = 1

⑦ Information for position monitoring

Symbol	Meaning	HMI tag
•••	Information	HMI.mtpData.MonEn = 1

To open the information, click on the icon.



① Behavior after a position error has occurred

Text	HMI tag
After an error occurs, the entity holds the status.	HMI.mtpData.SafePos = 0
After an error has occurred, the safe position is set.	HMI.mtpData.SafePos = 1

② Monitoring time for positioning

Text	Meaning	HMI tag
Monitoring time for positioning [s]	A position error indicates violation of the execution time. If the set time is exceeded and the position has not yet been reached, a position error is output.	HMI.mtpData.MonStatTi

③ Position tolerance

Text	Meaning	HMI tag
Position tolerance [unit]	This value is added to and subtracted from the position setpoint so that a tolerance window can be calculated. The position is evaluated as reached within this range (PosReachedFbk =1).	HMI.mtpData.PosTolerance

⑧ Safe position

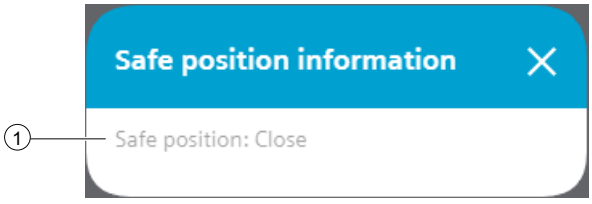
The display is only visible when "HMI.mtpData.SafePosEn = 1".

Symbol	Meaning	HMI tag
✓	Safe position is not activated	HMI.mtpData.SafePosAct = 0
✗	Safe position is activated.	HMI.mtpData.SafePosAct = 1

⑨ Information about the safe position

Symbol	Meaning
•••	Information

To open the information, click on the icon.



① Behavior of the safe position

The safe position of the valve is defined by the parameter "configuration.safePos". When an error occurs, the safe position is activated.

If no safe position is available, it can be disabled with "configuration.safePosEn = 0".

Text	HMI tag
Closed	HMI.mtpData.SafePos = 0
Open	HMI.mtpData.SafePos = 1

⑩ Mode: Offline

Button	State	HMI tag
	Offline (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOffAct = 1)
	Offline	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 1
	Not Offline (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOffAct = 0

⑪ Mode: Operator

Button	State	HMI tag
	Operator (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOpAct = 1)
	Operator	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 1
	Not operator (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOpAct = 0

⑫ Mode: Automatic

Button	State	HMI tag
	Automatic (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateAutAct = 1)
	Automatic	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 1
	Not automatic mode (no switchover triggered by operator or automatic mode)	HMI.mtpData.stateAutAct = 0

⑬ Mode preview: Automatic

The gray line under the automatic icon indicates whether the valve is opened or closed when switched to automatic mode.

Meaning	HMI tag
Preview shows "Open"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.OpenAut = 1
Preview shows "Closed"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.CloseAut = 1

⑭ Operation: Close valve

Button	State	HMI tag
	Close (no operator control)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.OpenFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 0)
	Close	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 1

Button	State	HMI tag
	Close (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.CloseFbk = 0) OR (HMI.mtpData.StateOpAct AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 0)
	Do not close (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 1
	Do not close (no switchover triggered by operator or automatic mode)	HMI.mtpData.CloseFbk = 0

⑮ Operation: Open valve

Button	State	HMI tag
	Open (no operator control)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 0)
	Open	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 1
	Open (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.OpenFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 0)

Button	State	HMI tag
	Do not open (switch-over triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 1
	Do not open (no switch-over triggered by operator or automatic mode)	HMI.mtpData.OpenFbk = 0

⑯ Reset valve

Button	State	HMI tag
	Reset required	HMI.mtpData.StateOpAct = 1 AND Operating permit = 1 AND (HMI.mtpData.ProtEn= 1 AND HMI.mtpData.Protect = 0 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1)
	No reset required	HMI.mtpData.StateOpAct = 0 OR Operating permit = 0 OR (HMI.mtpData.Protect = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND)

⑰ Interlock state: Permit

The display is only visible when "HMI.mtpData.PermEn = 1".

Symbol	Meaning	HMI tag
	Authorization is given	HMI.mtpData.Permit = 1 AND HMI.mtpData.PermEn = 1
	Authorization is not given	HMI.mtpData.Permit = 0 AND HMI.mtpData.PermEn = 1

⑱ Interlock state: Interlock

The display is only visible when "HMI.mtpData.IntlEn = 1".

Symbol	Meaning	HMI tag
	Interlock is not activated	HMI.mtpData.Interlock = 1 AND HMI.mtpData.IntlEn = 1
	Interlock is activated	HMI.mtpData.Interlock = 0 AND HMI.mtpData.IntlEn = 1

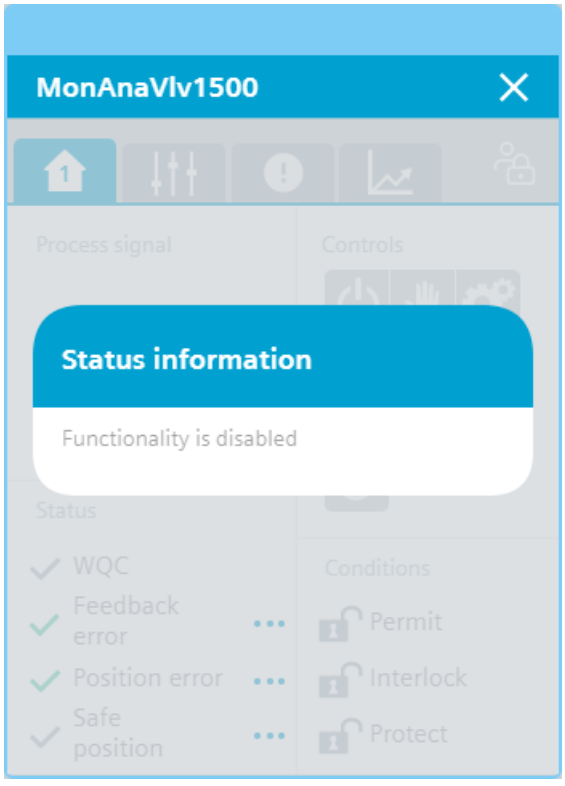
⑲ Interlock state: Protect

The display is only visible when "HMI.mtpData.ProtEn = 1".

Symbol	Meaning	HMI tag
	Protection is not activated	HMI.mtpData.Protect = 1 AND HMI.mtpData.ProtEn = 1
	Protection is activated	HMI.mtpData.Protect = 0 AND HMI.mtpData.ProtEn = 1

Disabled view

If the "LCFL_MonAnaVlvHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.2.2.3 "LCFL_MonAnaVlvHome2" view

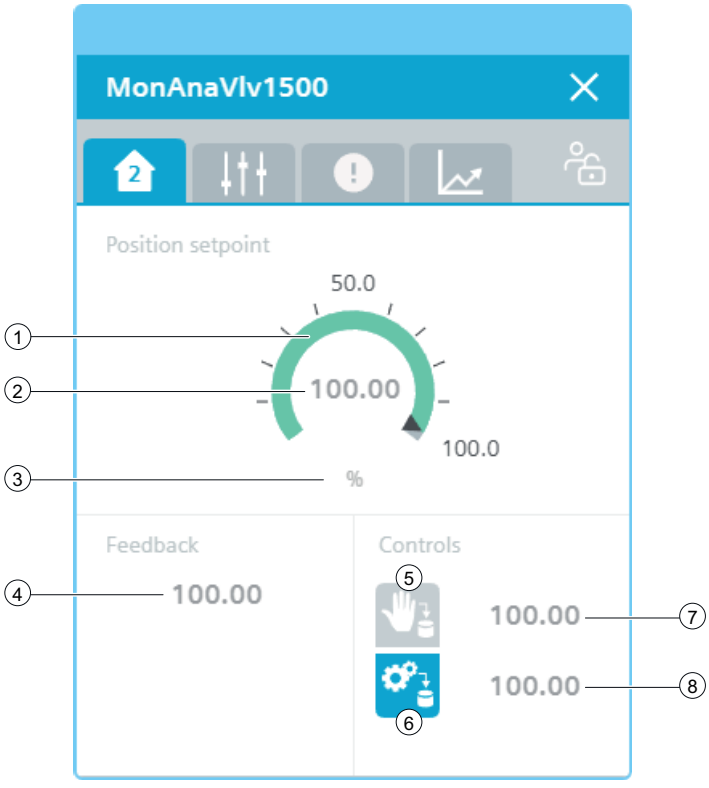
Introduction

The "LCFL_MonAnaVlvHome2" view shows the position setpoint and the feedback value. The source mode is shown and can be changed.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



The view is divided into four areas:

Area	Description
Position setpoint	The current position setpoint is displayed in this area.
Feedback	The feedback value of the position is displayed in this area.
Controllers	This area contains buttons that can be enabled with a click: • "Manual" source mode • "Internal" source mode An additional display shows the manual and internal values.

① Position setpoint in the form of an arc diagram

The scaling values "HMI.mtpData.PosSclMin" and "HMI.mtpData.PosSclMax" determine the range of the gauge. When the position setpoint is higher than "HMI.mtpData.PosMax" or lower than "HMI.mtpData.PosMin", the color of the gauge changes to red.

② Current position setpoint

Meaning	HMI tag
Position setpoint	HMI.mtpData.Pos

③ Unit of the position setpoint

Meaning	HMI tag
Unit of the position setpoint	HMI.mtpData.PosUnit

④ Current feedback value of the position

Meaning	HMI tag
Feedback value of the position	HMI.mtpData.PosFbk

⑤ Source mode: Manual

Symbol	State	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcManAct = 0

⑥ Source mode: Internal

Symbol	State	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1
	Not internal (no switchover triggered by operator)	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcIntAct = 0

⑦ Manual position setpoint

Meaning	HMI tag
Manual position setpoint	HMI.mtpData.PosMan

⑧ Internal position setpoint

Meaning	HMI tag
Internal position setpoint	HMI.mtpData.PosInt

8.2.2.4 "LCFL_MonAnaVlvSettings" view

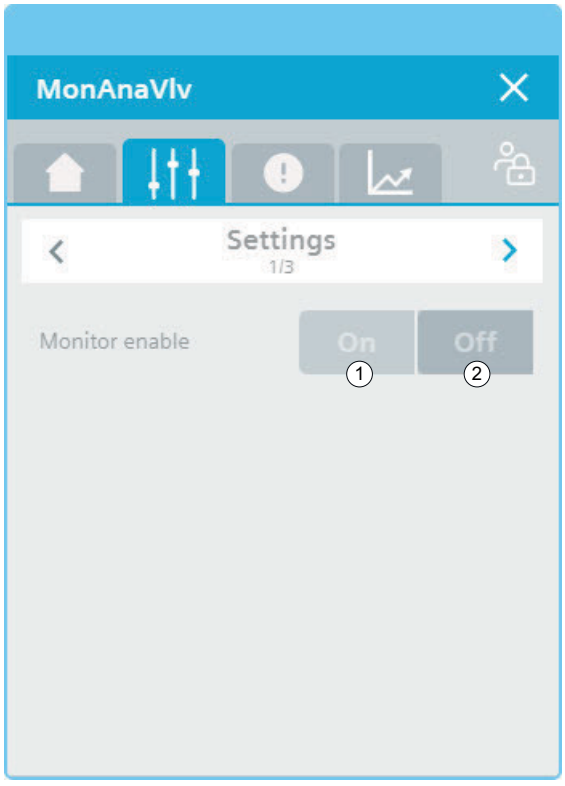
Introduction

In the "LCFL_MonAnaVlvSettings" view, you can activate or deactivate feedback monitoring using buttons. If feedback monitoring is disabled, the "Monitoring error" display is not visible in the "LCFL_MonAnaVlvHome1" view.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Feedback monitoring: On

Symbol	Meaning	HMI tag
On	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1
On	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1

② Feedback monitoring: Offline

Symbol	Meaning	HMI tag
Off	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1
Off	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1

8.2.2.5 "LCFL_Maintenance1" view

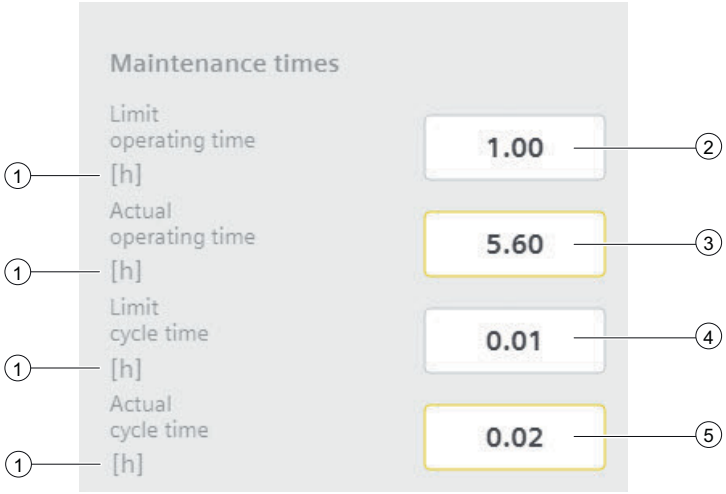
Introduction

In the "LCFL_Maintenance1" view you have the option to display the actual values of the operating time and cycle time and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Text	Value
Unit of the process value	Hours

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Operating time: Limit

Text	Meaning	HMI tag
Operating time limit	Maximum limitation of the operating time of the drive in hours	HMI.operatingTimeLimit

③ Operating time: Actual value

Text	Meaning	HMI tag
Actual operating time	Actual operating time of the drive in hours	HMI.operatingTimeAct

② Cycle time: Limit

Text	Meaning	HMI tag
Limit cycle time	Maximum limitation of the cycle time of the drive in hours	HMI.cycleTimeLimit

③ Cycle time: Actual value

Text	Meaning	HMI tag
Actual cycle time	Actual cycle time of the drive in hours	HMI.cycleTimeAct

8.2.2.6 "LCFL_Maintenance2" view

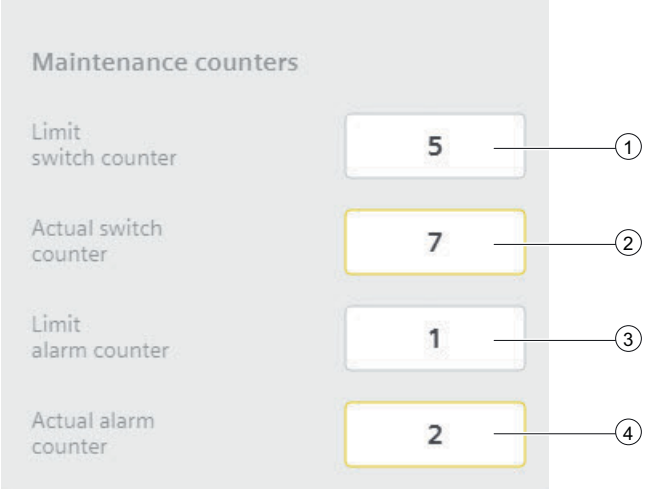
Introduction

In the "LCFL_Maintenance2" view you have the option to display the number of status changes and alarms and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Number of status changes: Limit

Text	Meaning	HMI tag
Limit value for number of status changes	Actual number of status changes of the drive	HMI.switchCounterLimit

② Number of status changes Actual value

Text	Meaning	HMI tag
Actual number of status changes	Actual number of status changes of the drive	HMI.switchCounterAct

③ Number of alarms: Limit

Text	Meaning	HMI tag
Limit value of number of alarms	Actual number of alarms of the drive	HMI.alarmCounterLimit

④ Number of alarms: Actual value

Text	Meaning	HMI tag
Actual number of alarms	Actual number of alarms of the drive	HMI.alarmCounterAct

8.2.2.7 "LCFL_MonAnaVlvAlarm" view

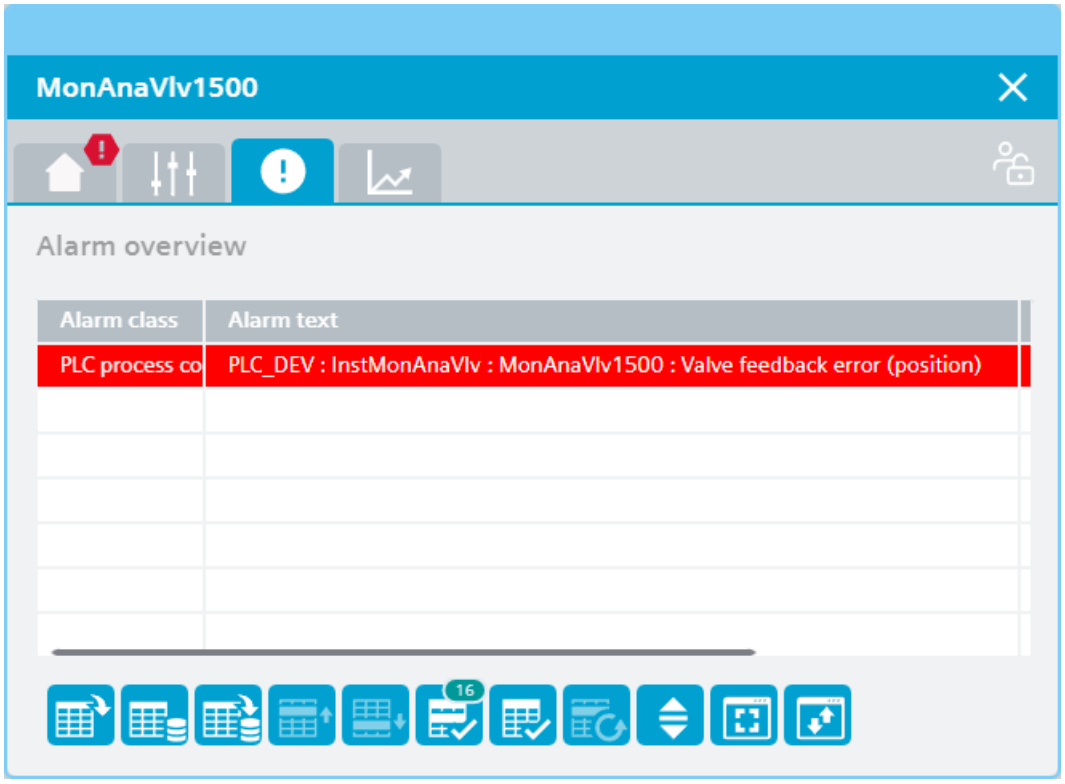
Introduction

The "LCFL_MonAnaVlvAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output in case of supervision errors:

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.monitorStaticMessage	HMI.mtpData.MonStatTi < T	Valve feedback error (static)	configuration.monitorStaticMessageEn = 1 The alarm is enabled. configuration.monitorStaticMessageEn = 0 The alarm is disabled.
HMI.monitorDynamicMessage	HMI.mtpData.MonDynTi < T	Valve feedback error (dynamic)	configuration.monitorDynamicMessageEn = 1 The alarm is enabled. configuration.monitorDynamicMessageEn = 0 The alarm is disabled.
HMI.monitorPositionMessage	HMI.mtpData.MonPosTi < T	Valve feedback error (position)	configuration.monitorPositionMessageEn = 1 The alarm is enabled. configuration.monitorPositionMessageEn = 0 The alarm is disabled.
HMI.maintenance.operatingTimeMessage	HMI.maintenance.operatingTimeReached	Operating time reached	configuration.operatingTimeMessageEn = 1 The alarm is enabled. configuration.operatingTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.cycleTimeMessage	HMI.maintenance.cycleTimeReached	Cycle time reached	configuration.cycleTimeMessageEn = 1 The alarm is enabled. configuration.cycleTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.switchCounterMessage	HMI.maintenance.switchCounterReached	Number of status changes reached	configuration.switchCounterMessageEn = 1 The alarm is enabled. configuration.switchCounterMessageEn = 0 The alarm is disabled.
HMI.maintenance.alarmCounterMessage	HMI.maintenance.switchCounterReached	Number of alarms reached	configuration.alarmCounterMessageEn = 1 The alarm is enabled. configuration.alarmCounterMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_MonAnaVlv" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.

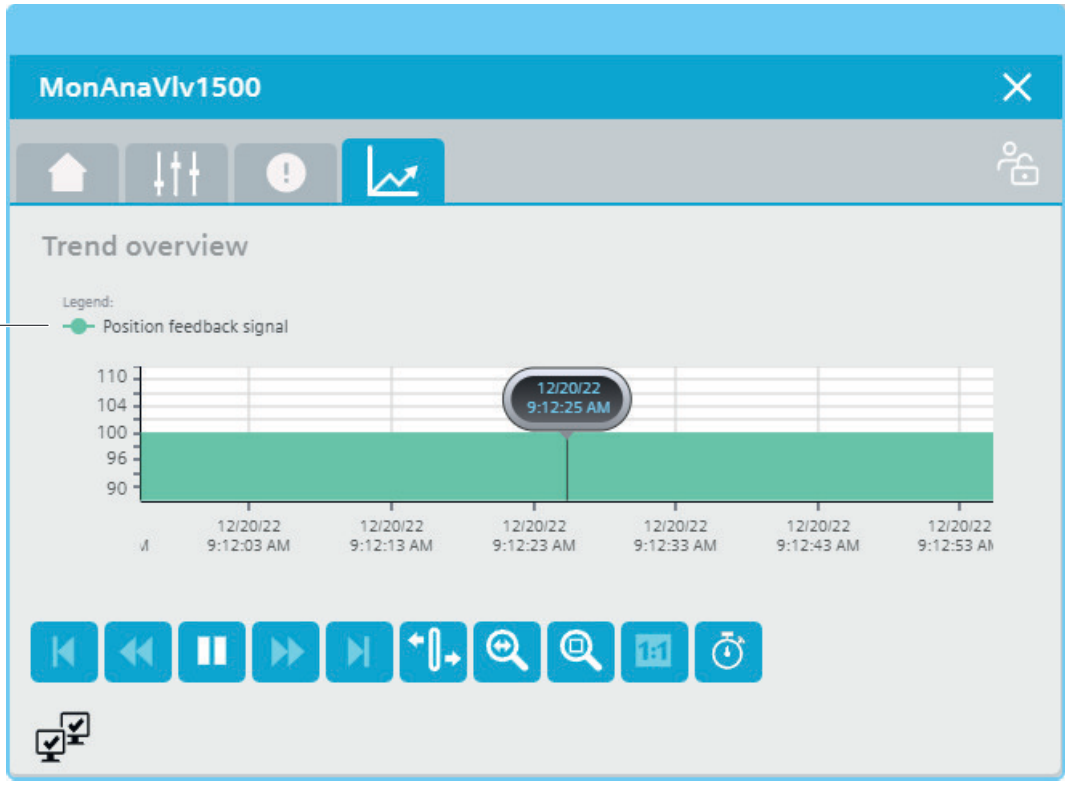
Button		Function
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.2.2.8 "LCFL_MonAnaVlvTrend" view

Introduction

The "LCFL_MonAnaVlvTrend" view is used for the diagnostics of values from the function block "LCFL_MonAnaVlv".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Position feedback signal

Value	HMI tag
Position feedback signal	HMI.mtpData.PosFbk

8.2.3 Visualization of LCFL_MonBinDrv

8.2.3.1 Faceplate "LCFL_MonBinDrvSymbol"

Introduction

For visualization of the function block "LCFL_MonBinDrv" you can use the faceplate "LCFL_MonBinDrvSymbol". The interface of the program block "LCFL_MonBinDrv" and of the faceplate "LCFL_MonBinDrvSymbol" is the PLC data type "LCFL_typeMTPMonBinDrvSiemens".

You can find more information at LCFL_typeMTPMonBinDrvSiemens (Page 163).

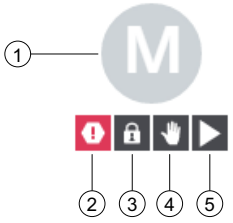
Left-click the faceplate to open the "LCFL_MonBinDrv" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_MonBinDrvHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_MonBinDrvHome (Page 273)	The monitoring view is used to display basic information, as well as setting options for the mode and the control of the drive.
	LCFL_MonBinDrvSettings (Page 284) "LCFL_Maintenance1" view (Page 286) "LCFL_Maintenance2" view (Page 287)	In the settings view you can activate or deactivate the feedback monitoring. In the maintenance settings you have the option of displaying the actual values of the operating time, cycle time, number of status changes and alarms and of configuring the limit values.
	LCFL_MonBinDrvAlarm (Page 289)	The alarm view shows incoming alarms.
	LCFL_MonBinDrvTrend (Page 291)	The trend view is used for the diagnostics of values.

Display and structure of the symbol

If the faceplate "LCFL_MonBinDrvSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



The display is a pure information view in runtime. You can make settings in the various views.

① Current state of the drive

Symbol	State of the drive	HMI tag
	Running	(HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.FwdCtrl = 1) OR (HMI.mtpData.RevFbk = 1 AND HMI.mtpData.RevCtrl = 1) AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Stopped	HMI.mtpData.FwdFbk = 0 AND HMI.mtpData.FwdCtrl = 0 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Forward movement or reverse movement is stopped	(HMI.mtpData.FwdFbk = 1 XOR HMI.mtpData.RevFbk = 1) AND HMI.mtpData.FwdCtrl = 0 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Forward movement or reverse movement is started	(HMI.mtpData.FwdCtrl = 1 XOR HMI.mtpData.RevCtrl = 1) AND HMI.mtpData.FwdFbk = 0 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Unknown	(HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 1) OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1

② Triggered motor protection, static or dynamic monitoring error, maintenance

Symbol	State	HMI tag
	Motor protection or monitoring error	HMI.mtpData.Trip = 0 OR HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.MonDynErr = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1

③ Drive locked / not locked

Symbol	State	HMI tag
	Locked	HMI.mtpData.Permit = 0 OR HMI.mtpData.Interlock = 0 OR HMI.mtpData.Protect = 0

④ Operation mode

Symbol	Mode	HMI tag
	Offline	HMI.mtpData.StateOffAct = 1
	Operator	HMI.mtpData.StateOpAct = 1

⑤ Additional information on current drive state

Symbol	State	HMI tag
	Running with forward movement	HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 0
	Running with reverse movement	HMI.mtpData.FwdFbk = 0 AND HMI.mtpData.RevFbk = 1

Disabled faceplate

If the faceplate "LCFL_MonBinDrvSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.2.3.2 "LCFL_MonBinDrvHome" view

Introduction

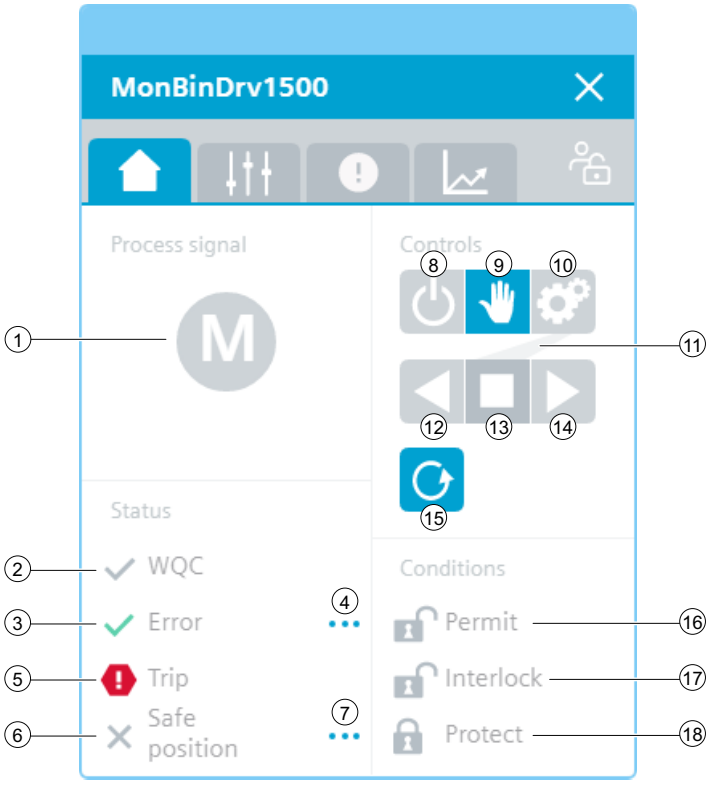
The "LCFL_MonBinDrvHome" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_MonBinDrvHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Process signal	This area visualizes the drive state (running / stopped / forward movement or reverse movement is stopped / forward movement or reverse movement is started).
Status	This area contains information on quality code, supervision errors, motor protection, and safe position.

Area	Description
Controllers	This area contains buttons that can be enabled with a click: • Operating mode (Offline / Operator / Automatic) • Drive operations (running with forward movement / running with reverse movement / stopped) • Reset error
Conditions	This area contains the following information: • Permit The operation of the faceplate is possible / not possible. • Interlock The status change of the drive is possible / not possible. • Protect The status change of the drive is possible / not possible. A reset is required to enable a status change once again.

① Current state of the drive

The current state of the drive of the faceplate "LCFL_MonBinDrvSymbol" is shown here once again.

You can find information under Faceplate "LCFL_MonBinDrvSymbol" (Page 269).

② Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

③ Monitoring error or maintenance required

The display is only visible when "HMI.mtpData.MonEn = 1".

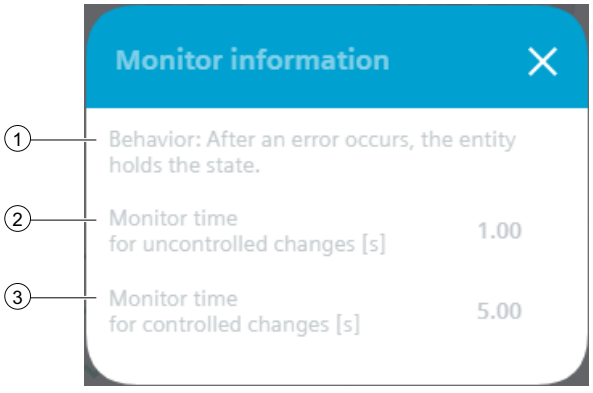
Symbol	Meaning	HMI tag
	No supervision error	HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonEn = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1

Symbol	Meaning	HMI tag
	Static supervision error	HMI.mtpData.MonStatErr = 1 AND HMI.mtpData.MonEn = 1
	Dynamic supervision error	HMI.mtpData.MonDynErr = 1 AND HMI.mtpData.MonEn = 1

④ Information for feedback monitoring

Symbol	Meaning	HMI tag
...	Information	HMI.mtpData.MonEn = 1

To open the information, click on the icon.



① Behavior after an error occurs

Text	HMI tag
After an error occurs, the entity holds the status.	HMI.mtpData.MonSafePos = 0
After an error has occurred, the safe position is set.	HMI.mtpData.MonSafePos = 1

② Monitoring time for uncontrolled changes

Text	Meaning	HMI tag
Monitoring time for uncontrolled changes [s]	A static supervision error occurs when the drive state is changed during the entire monitoring time without a change in control (uncontrolled change).	HMI.mtpData.MonStatTi

③ Monitoring time for controlled changes

Text	Meaning	HMI tag
Monitoring time for controlled changes [s]	A dynamic monitoring error occurs if, during the entire monitoring time, the drive state is not changed, even though a change in control has taken place, or if it is changed to the wrong state (controlled change).	HMI.mtpData.MonDynTi

⑤ Motor protection

Symbol	Meaning	HMI tag
	Motor protection not triggered	HMI.mtpData.Trip = 1
	Motor protection triggered	HMI.mtpData.Trip = 0

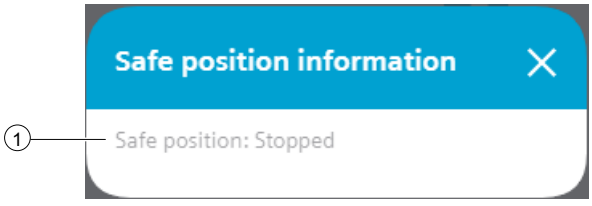
⑥ Safe position

Symbol	Meaning	HMI tag
	Safe position is not activated	HMI.mtpData.SafePosAct = 0
	Safe position is activated.	HMI.mtpData.SafePosAct = 1

⑦ Information about the safe position

Symbol	Meaning
	Information

To open the information, click on the icon.



① Behavior of the safe position

The safe position of the drive is always the idle position (stopped). When an error occurs, the safe position is activated.

Text	HMI tag
Stopped	HMI.mtpData.SafePos = 0
Running	HMI.mtpData.SafePos = 1

⑧ Mode: Offline

Button	State	HMI tag
	Offline (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOffAct = 1)
	Offline	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 1
	Not Offline (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOffAct = 0

⑨ Mode: Operator

Button	State	HMI tag
	Operator (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOpAct = 1)
	Operator	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 1
	Not operator (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOpAct = 0

⑩ Mode: Automatic

Button	State	HMI tag
	Automatic (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateAutAct = 1)
	Automatic	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 1
	Not automatic mode (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateAutAct = 0

⑪ Mode preview: Automatic

The gray line under the automatic icon indicates whether the drive is stopped or runs with forward or reverse movement when switched to automatic mode.

Meaning	HMI tag
Preview shows "Forward movement"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.FwdAut = 1
Preview shows "Stop"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.StopAut = 1
Preview shows "Reverse movement"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.RevAut = 1

⑫ Operation: Set drive to reverse movement

Button	State	HMI tag
	Runs with reverse movement (no operator authorization)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevFbk = 1 AND HMI.mtpData.FwdFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 0)
	Running with reverse movement	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 1
	Does not run with reverse movement (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevCtrl = 1 AND HMI.mtpData.RevFbk = 0) OR (HMI.mtpData.StateOpAct AND HMI.mtpData.RevCtrl = 1 AND HMI.mtpData.RevFbk = 0 AND Operating permit = 0)
	Does not run with reverse movement (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevCtrl = 1 AND HMI.mtpData.RevFbk = 0 AND Operating permit = 1
	Does not run with reverse movement (no switchover triggered by operator or automatic mode)	HMI.mtpData.RevFbk = 0

⑬ Operation: Stopping the drive

Button	State	HMI tag
	Stop (no operator authorization)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.FwdFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 0)
	Stop	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevFbk = 0 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 1
	Do not stop (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.FwdCtrl = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.FwdCtrl = 0 AND Operating permit = 0)
	Do not stop (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.RevCtrl = 0 AND HMI.mtpData.FwdCtrl = 0 AND Operating permit = 1
	Do not stop (no switchover triggered by operator or automatic mode)	HMI.mtpData.FwdFbk = 1 OR HMI.mtpData.RevFbk = 1

⑭ Operation: Set drive to forward movement

Button	State	HMI tag
	Runs with forward movement (no operator authorization)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdFbk = 1 AND Operating permit = 0)
	Running with forward movement	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdFbk = 1 AND HMI.mtpData.RevFbk = 0 AND Operating permit = 1
	Does not run with forward movement (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.FwdCtrl = 1 AND HMI.mtpData.FwdFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdCtrl = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 0)
	Does not run with forward movement (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.FwdCtrl = 1 AND HMI.mtpData.FwdFbk = 0 AND Operating permit = 1
	Does not run with forward movement (no switchover triggered by operator or automatic mode)	HMI.mtpData.FwdFbk = 0

⑮ Reset drive

Button	State	HMI tag
	Reset required	HMI.mtpData.StateOpAct = 1 AND Operating permit = 1 AND (HMI.mtpData.ProtEn= 1 AND HMI.mtpData.Protect = 0 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.Trip = 0)
	No reset required	HMI.mtpData.StateOpAct = 0 OR Operating permit = 0 OR (HMI.mtpData.Protect = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.Trip = 1)

⑯ Interlock state: Permit

The display is only visible when "HMI.mtpData.PermEn = 1".

Symbol	Meaning	HMI tag
	Authorization is given	HMI.mtpData.Permit = 1 AND HMI.mtpData.PermEn = 1
	Authorization is not given	HMI.mtpData.Permit = 0 AND HMI.mtpData.PermEn = 1

⑰ Interlock state: Interlock

The display is only visible when "HMI.mtpData.IntlEn = 1".

Symbol	Meaning	HMI tag
	Interlock is not activated	HMI.mtpData.Interlock = 1 AND HMI.mtpData.IntlEn = 1
	Interlock is activated	HMI.mtpData.Interlock = 0 AND HMI.mtpData.IntlEn = 1

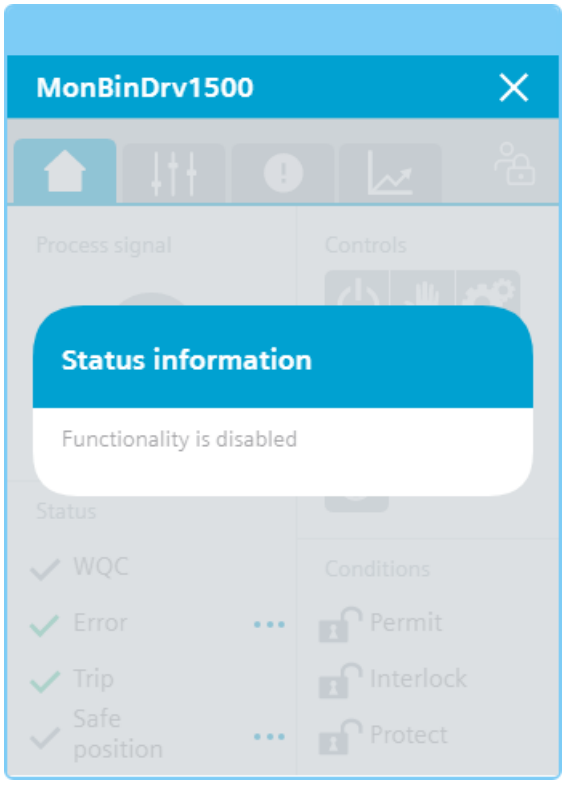
⑱ Interlock state: Protect

The display is only visible when "HMI.mtpData.ProtEn = 1".

Symbol	Meaning	HMI tag
	Protection is not activated	HMI.mtpData.Protect = 1 AND HMI.mtpData.ProtEn = 1
	Protection is activated	HMI.mtpData.Protect = 0 AND HMI.mtpData.ProtEn = 1

Disabled view

If the "LCFL_MonBinDrvHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.2.3.3 "LCFL_MonBinDrvSettings" view

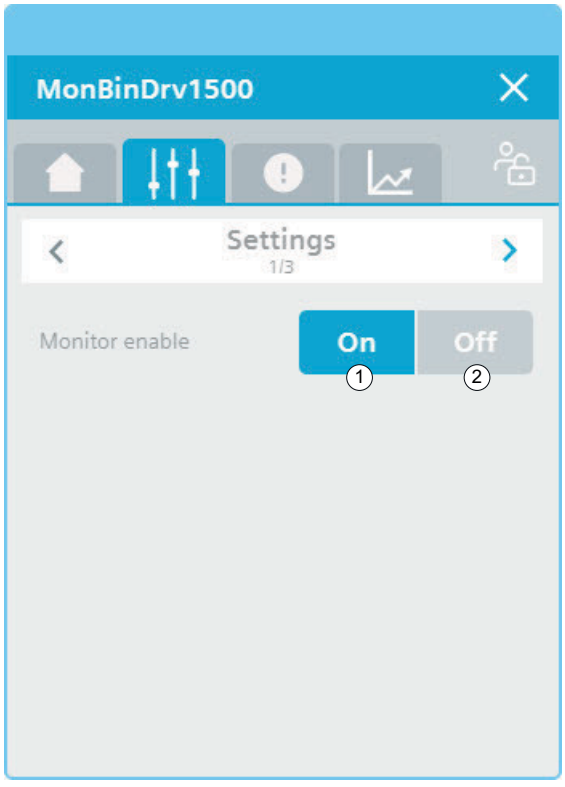
Introduction

In the "LCFL_MonBinDrvSettings" view, you can activate or deactivate feedback monitoring using buttons. If feedback monitoring is disabled, the "Monitoring error" display is not visible in the "LCFL_MonBinDrvHome" view.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Feedback monitoring: On

Symbol	Meaning	HMI tag
On	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1
On	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1

② Feedback monitoring: Off

Symbol	Meaning	HMI tag
Off	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1
Off	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1

8.2.3.4 "LCFL_Maintenance1" view

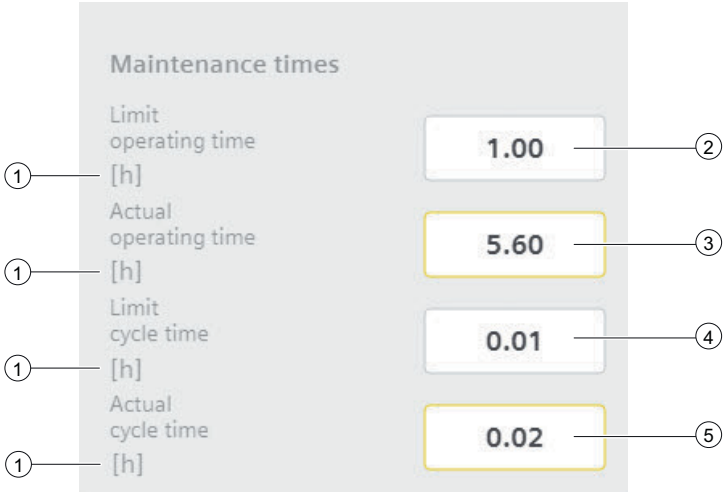
Introduction

In the "LCFL_Maintenance1" view you have the option to display the actual values of the operating time and cycle time and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Text	Value
Unit of the process value	Hours

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Operating time: Limit

Text	Meaning	HMI tag
Operating time limit	Maximum limitation of the operating time of the drive in hours	HMI.operatingTimeLimit

③ Operating time: Actual value

Text	Meaning	HMI tag
Actual operating time	Actual operating time of the drive in hours	HMI.operatingTimeAct

② Cycle time: Limit

Text	Meaning	HMI tag
Limit cycle time	Maximum limitation of the cycle time of the drive in hours	HMI.cycleTimeLimit

③ Cycle time: Actual value

Text	Meaning	HMI tag
Actual cycle time	Actual cycle time of the drive in hours	HMI.cycleTimeAct

8.2.3.5 "LCFL_Maintenance2" view

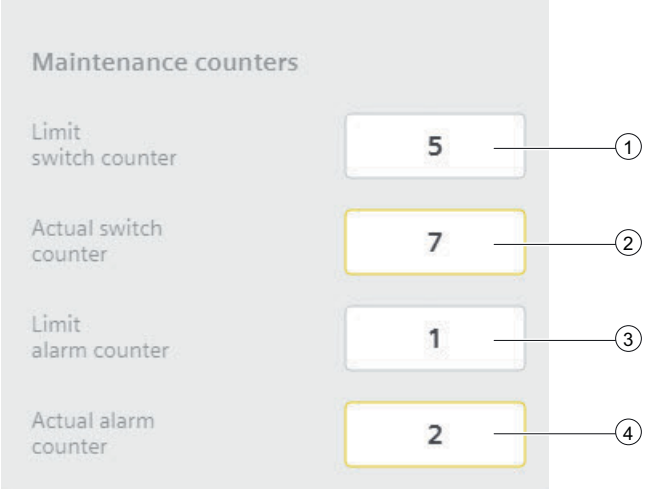
Introduction

In the "LCFL_Maintenance2" view you have the option to display the number of status changes and alarms and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Number of status changes: Limit

Text	Meaning	HMI tag
Limit value for number of status changes	Actual number of status changes of the drive	HMI.switchCounterLimit

② Number of status changes Actual value

Text	Meaning	HMI tag
Actual number of status changes	Actual number of status changes of the drive	HMI.switchCounterAct

③ Number of alarms: Limit

Text	Meaning	HMI tag
Limit value of number of alarms	Actual number of alarms of the drive	HMI.alarmCounterLimit

④ Number of alarms: Actual value

Text	Meaning	HMI tag
Actual number of alarms	Actual number of alarms of the drive	HMI.alarmCounterAct

8.2.3.6 "LCFL_MonBinDrvAlarm" view

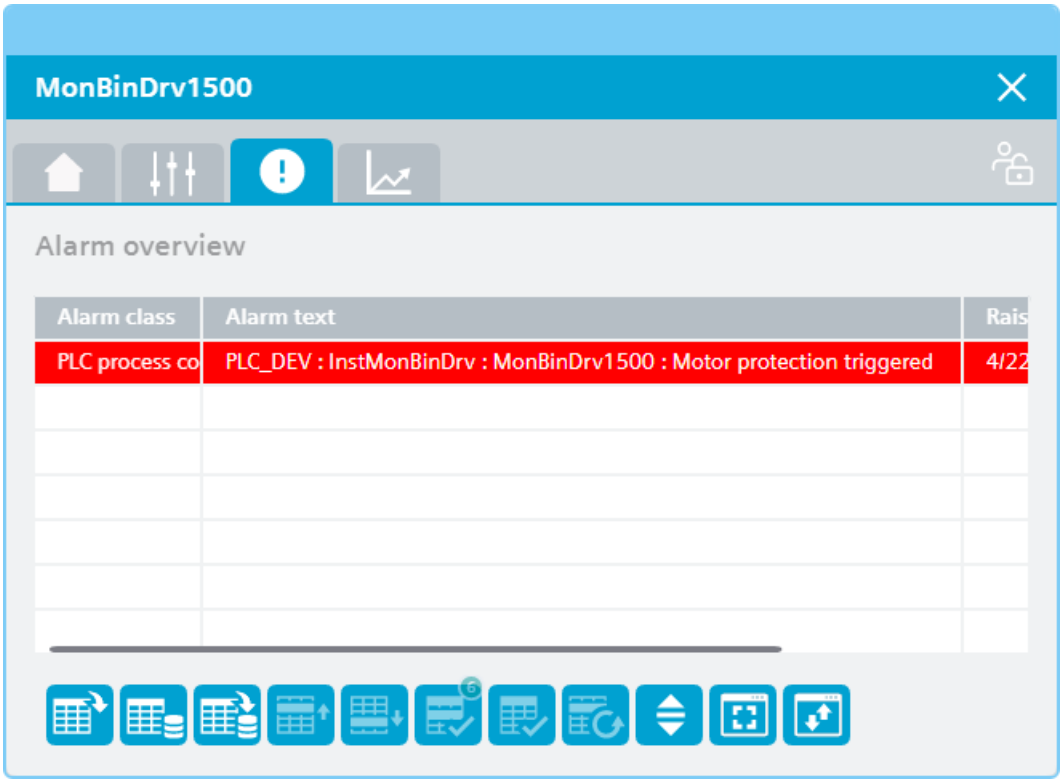
Introduction

The "LCFL_MonBinDrvAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output in the event of supervision errors and when the motor protection is triggered:

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.tripMessage	HMI.mtpData.Trip = 0	Motor protection triggered	configuration.tripMessageEn = 1 The alarm is enabled. configuration.tripMessageEn = 0 The alarm is disabled.
HMI.monitorStaticMessage	HMI.mtpData.MonStatTi < T	Motor feedback error (static)	configuration.monitorStaticMessageEn = 1 The alarm is enabled. configuration.monitorStaticMessageEn = 0 The alarm is disabled.
HMI.monitorDynamicMessage	HMI.mtpData.MonDynTi < T	Motor feedback error (dynamic)	configuration.monitorDynamicMessageEn = 1 The alarm is enabled. configuration.monitorDynamicMessageEn = 0 The alarm is disabled.
HMI.maintenance.operatingTimeMessage	HMI.maintenance.operatingTimeReached	Operating time reached	configuration.operatingTimeMessageEn = 1 The alarm is enabled. configuration.operatingTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.cycleTimeMessage	HMI.maintenance.cycleTimeReached	Cycle time reached	configuration.cycleTimeMessageEn = 1 The alarm is enabled. configuration.cycleTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.switchCounterMessage	HMI.maintenance.switchCounterReached	Number of status changes reached	configuration.switchCounterMessageEn = 1 The alarm is enabled. configuration.switchCounterMessageEn = 0 The alarm is disabled.
HMI.maintenance.alarmCounterMessage	HMI.maintenance.switchCounterReached	Number of alarms reached	configuration.alarmCounterMessageEn = 1 The alarm is enabled. configuration.alarmCounterMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_MonBinDrv" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.

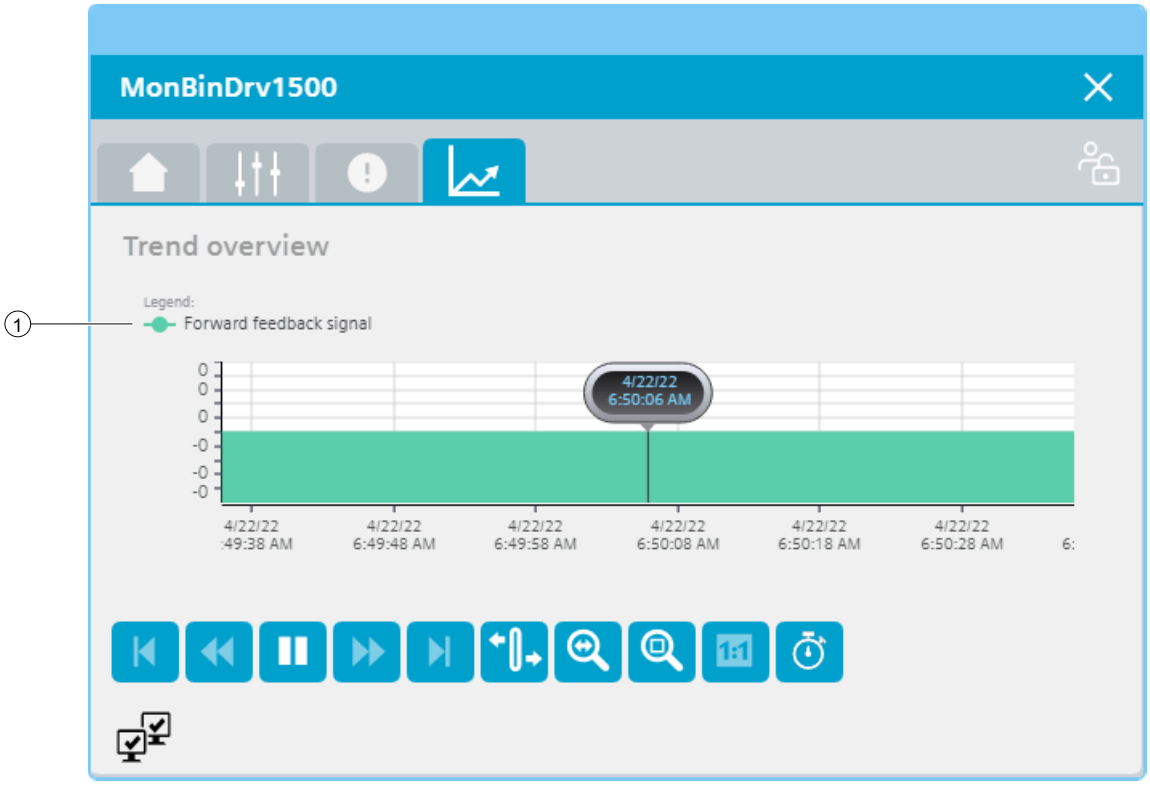
Button		Function
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.2.3.7 "LCFL_MonBinDrvTrend" view

Introduction

The "LCFL_MonBinDrvTrend" view is used for the diagnostics of values from the function block "LCFL_MonBinDrv".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Forward checkback signal

Value	HMI tag
Forward checkback signal	HMI.mtpData.FwdFbk

8.2.4 Visualization of LCFL_MonBinVlv

8.2.4.1 Faceplate "LCFL_MonBinVlvSymbol"

Introduction

For visualization of the function block "LCFL_MonBinVlv", you can use the faceplate "LCFL_MonBinVlvSymbol". The interface of the program block "LCFL_MonBinVlv" and of the faceplate "LCFL_MonBinVlvSymbol" is the PLC data type "LCFL_typeMTPMonBinVlvSiemens".

You can find more information at LCFL_typeMTPMonBinVlvSiemens (Page 167).

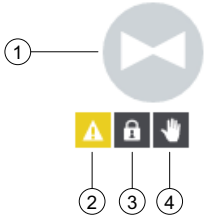
Left-click the faceplate to open the "LCFL_MonBinVlv" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_MonBinVlvHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_MonBinVlvHome (Page 296)	The monitoring view is used to display basic information as well as operating mode and valve setting options.
	LCFL_MonBinVlvSettings (Page 306) "LCFL_Maintenance1" view (Page 308) "LCFL_Maintenance2" view (Page 309)	In the settings view you can activate or deactivate the feedback monitoring. In the maintenance settings you have the option of displaying the actual values of the operating time, cycle time, number of status changes and alarms and of configuring the limit values.
	LCFL_MonBinVlvAlarm (Page 311)	The alarm view shows incoming alarms.
	LCFL_MonBinVlvTrend (Page 313)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_MonBinVlvSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current state of the valve

Symbol	State of the valve	HMI tag
	Open	HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Closed	HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0

Symbol	State of the valve	HMI tag
	Is being opened	HMI.mtpData.OpenFbk = 0 AND HMI.mtpData.CloseFbk = 0 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Is being closed	HMI.mtpData.OpenFbk = 0 AND HMI.mtpData.CloseFbk = 0 AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0
	Unknown	(HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 1) OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1

② Static or dynamic monitoring error, maintenance required

Symbol	State	HMI tag
	Monitoring error	HMI.mtpData.MonStatErr = 1 OR HMI.mtpData.MonDynErr = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1

③ Valve locked / not locked

Symbol	State	HMI tag
	Locked	HMI.mtpData.Permit = 0 OR HMI.mtpData.Interlock = 0 OR HMI.mtpData.Protect = 0

④ Operating mode

Symbol	Mode	HMI tag
	Offline	HMI.mtpData.StateOffAct = 1
	Operator	HMI.mtpData.StateOpAct = 1

Disabled faceplate

If the faceplate "LCFL_MonBinVlvSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.2.4.2 "LCFL_MonBinVlvHome" view

Introduction

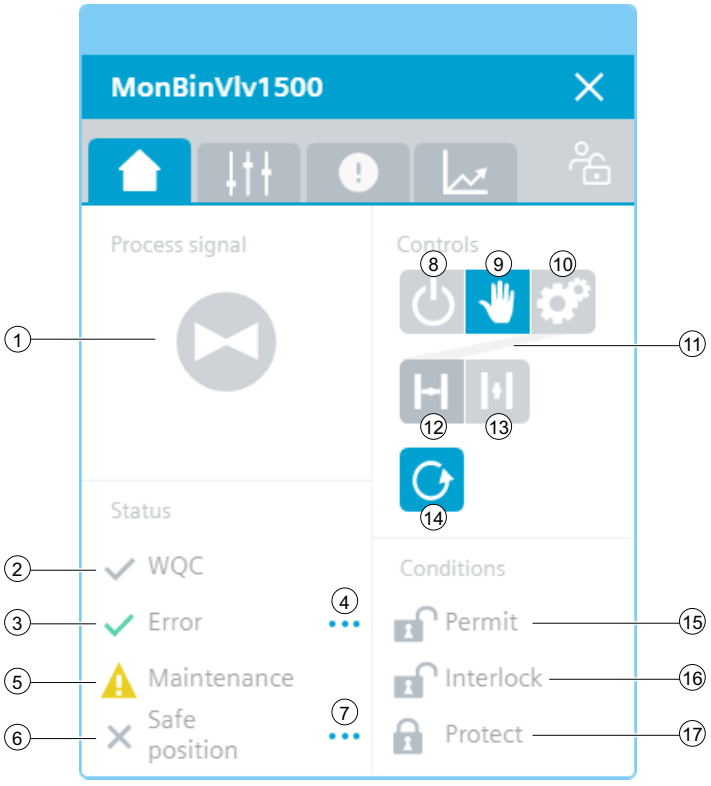
The "LCFL_MonBinVlvHome" view is a monitoring view that is used to display basic information. You also have the option to change the operating mode and open or close the valve.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_MonBinVlvHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Process signal	The state of the valve is visualized in this area (open / closed / is being opened / is being closed).
Status	This area contains information on quality code, monitoring error, maintenance and safe position.
Controllers	This area contains buttons that can be enabled with a click: • Operating mode (Offline / Operator / Automatic) • Valve action (open / close) • Reset error
Conditions	This area contains the following information: • Permit The operation of the faceplate is possible / not possible. • Interlock The status change of the valve is possible / not possible. • Protect The status change of the valve is possible / not possible. A reset is required to enable a status change once again.

① Current state of the valve

The current state of the valve of the faceplate "LCFL_MonBinVlvSymbol" is shown here once again.

You can find information under Faceplate "LCFL_MonBinVlvSymbol" (Page 293).

② Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

③ Monitoring error or maintenance required

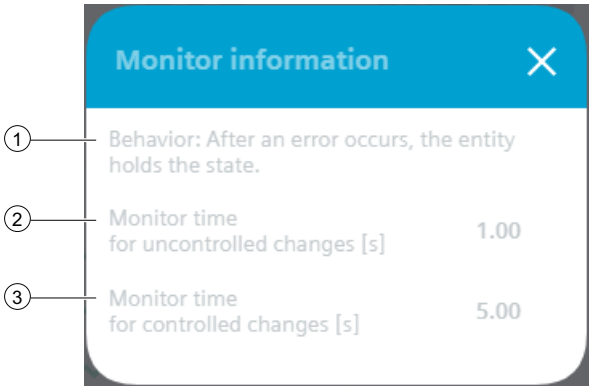
The display is only visible when "HMI.mtpData.MonEn = 1".

Symbol	Meaning	HMI tag
	No supervision error	HMI.mtpData.MonStatErr = 0 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonEn = 1
	Maintenance required	HMI.maintenance.operatingTimeReached = 1 OR HMI.maintenance.switchCounterReached = 1 OR HMI.maintenance.cycleTimeReached = 1 OR HMI.maintenance.alarmCounterReached = 1
	Static supervision error	HMI.mtpData.MonStatErr = 1 AND HMI.mtpData.MonEn = 1
	Dynamic supervision error	HMI.mtpData.MonDynErr = 1 AND HMI.mtpData.MonEn = 1

④ Information for feedback monitoring

Symbol	Meaning	HMI tag
	Information	HMI.mtpData.MonEn = 1

To open the information, click on the icon.



① Behavior after an error occurs

Text	HMI tag
After an error occurs, the entity holds the status.	HMI.mtpData.MonSafePos = 0
After an error has occurred, the safe position is set.	HMI.mtpData.MonSafePos = 1

② Monitoring time for uncontrolled changes

Text	Meaning	HMI tag
Monitoring time for uncontrolled changes [s]	A static monitoring error occurs when the valve state is changed at some point during the entire monitoring time, but without a change in control (uncontrolled change).	HMI.mtpData.MonStatTi

③ Monitoring time for controlled changes

Text	Meaning	HMI tag
Monitoring time for controlled changes [s]	A dynamic monitoring error occurs if, during the entire monitoring time, the valve state is not changed, even though a change in control has taken place, or if it is changed to the wrong state (controlled change).	HMI.mtpData.MonDynTi

⑤ Maintenance

See section "③ Monitoring error or maintenance required".

⑥ Safe position

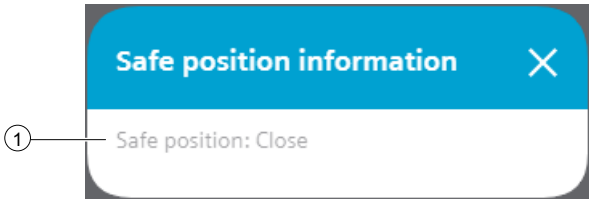
The display is only visible when "HMI.mtpData.SafePosEn = 1".

Symbol	Meaning	HMI tag
✓	Safe position is not activated	HMI.mtpData.SafePosAct = 0
✗	Safe position is activated.	HMI.mtpData.SafePosAct = 1

⑦ Information about the safe position

Symbol	Meaning
•••	Information

To open the information, click on the icon.



① Behavior of the safe position

The safe position of the valve is defined by the parameter "configuration.safePos". When an error occurs, the safe position is activated.

If no safe position is available, it can be disabled with "configuration.safePosEn = 0".

Text	HMI tag
Closed	HMI.mtpData.SafePos = 0
Open	HMI.mtpData.SafePos = 1

⑧ Mode: Offline

Button	State	HMI tag
	Offline (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOffAct = 1)
	Offline	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 1
	Not Offline (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOffAct = 0

⑨ Mode: Operator

Button	State	HMI tag
	Operator (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOpAct = 1)
	Operator	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 1
	Not operator (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOpAct = 0

⑩ Mode: Automatic

Button	State	HMI tag
	Automatic (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateAutAct = 1)
	Automatic	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 1
	Not automatic mode (no switchover triggered by operator or automatic mode)	HMI.mtpData.stateAutAct = 0

⑪ Mode preview: Automatic

The gray line under the automatic icon indicates whether the valve is opened or closed when switched to automatic mode.

Meaning	HMI tag
Preview shows "Open"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.OpenAut = 1
Preview shows "Closed"	HMI.mtpData.StateAutAct = 0 AND HMI.mtpData.CloseAut = 1

⑫ Operation: Close valve

Button	State	HMI tag
	Close (no operator control)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.OpenFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 0)
	Close	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.CloseFbk = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 1

Button	State	HMI tag
	Close (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.CloseFbk = 0) OR (HMI.mtpData.StateOpAct AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 0)
	Do not close (switchover triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.Ctrl = 0 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 1
	Do not close (no switchover triggered by operator or automatic mode)	HMI.mtpData.CloseFbk = 0

⑬ Operation: Open valve

Button	State	HMI tag
	Open (no operator control)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 0)
	Open	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.OpenFbk = 1 AND HMI.mtpData.CloseFbk = 0 AND Operating permit = 1
	Open (switchover triggered by automatic mode)	(HMI.mtpData.StateAutAct = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.OpenFbk = 0) OR (HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 0)

Button	State	HMI tag
	Do not open (switch-over triggered by operator)	HMI.mtpData.StateOpAct = 1 AND HMI.mtpData.Ctrl = 1 AND HMI.mtpData.OpenFbk = 0 AND Operating permit = 1
	Do not open (no switch-over triggered by operator or automatic mode)	HMI.mtpData.OpenFbk = 0

⑭ Reset valve

Button	State	HMI tag
	Reset required	HMI.mtpData.StateOpAct = 1 AND Operating permit = 1 AND (HMI.mtpData.ProtEn= 1 AND HMI.mtpData.Protect = 0 OR HMI.mtpData.MonDynErr = 1 OR HMI.mtpData.MonStatErr = 1)
	No reset required	HMI.mtpData.StateOpAct = 0 OR Operating permit = 0 OR (HMI.mtpData.Protect = 1 AND HMI.mtpData.MonDynErr = 0 AND HMI.mtpData.MonStatErr = 0 AND)

⑮ Interlock state: Permit

The display is only visible when "HMI.mtpData.PermEn = 1".

Symbol	Meaning	HMI tag
	Authorization is given	HMI.mtpData.Permit = 1 AND HMI.mtpData.PermEn = 1
	Authorization is not given	HMI.mtpData.Permit = 0 AND HMI.mtpData.PermEn = 1

⑯ Interlock state: Interlock

The display is only visible when "HMI.mtpData.IntlEn = 1".

Symbol	Meaning	HMI tag
	Interlock is not activated	HMI.mtpData.Interlock = 1 AND HMI.mtpData.IntlEn = 1
	Interlock is activated	HMI.mtpData.Interlock = 0 AND HMI.mtpData.IntlEn = 1

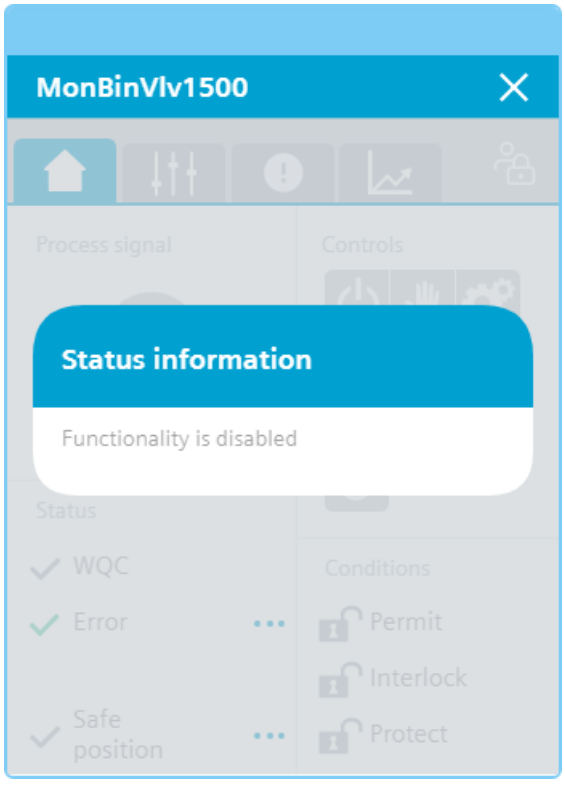
⑰ Interlock state: Protect

The display is only visible when "HMI.mtpData.ProtEn = 1".

Symbol	Meaning	HMI tag
	Protection is not activated	HMI.mtpData.Protect = 1 AND HMI.mtpData.ProtEn = 1
	Protection is activated	HMI.mtpData.Protect = 0 AND HMI.mtpData.ProtEn = 1

Disabled view

If the "LCFL_MonBinVlvHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.2.4.3 "LCFL_MonBinVlvSettings" view

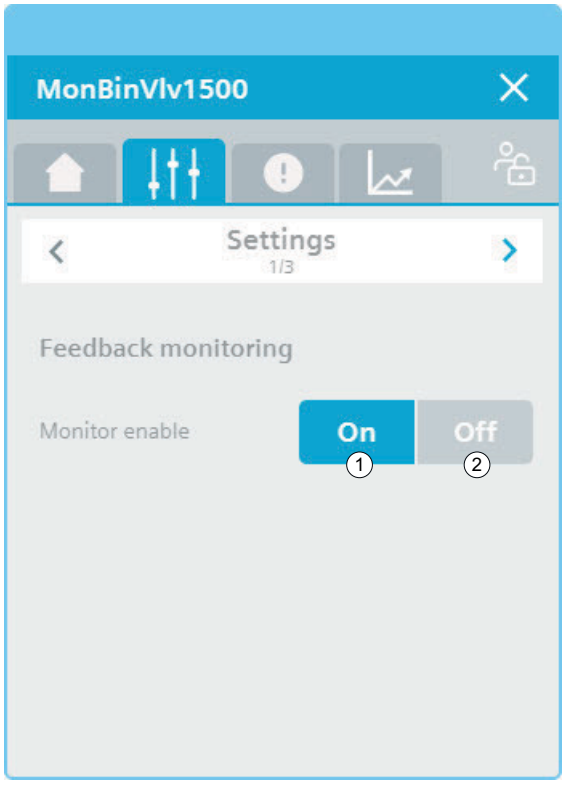
Introduction

In the "LCFL_MonBinVlvSettings" view, you can enable or disable the feedback monitoring using buttons. If feedback monitoring is disabled, the "Monitoring error" display is not visible in the "LCFL_MonBinVlvHome" view.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Feedback monitoring: On

Symbol	Meaning	HMI tag
On	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1
On	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1

② Feedback monitoring: Offline

Symbol	Meaning	HMI tag
Off	Feedback monitoring is deactivated.	HMI.mtpData.MonEn = 0 AND Operating permit = 1
Off	Feedback monitoring is activated.	HMI.mtpData.MonEn = 1 AND Operating permit = 1

8.2.4.4 "LCFL_Maintenance1" view

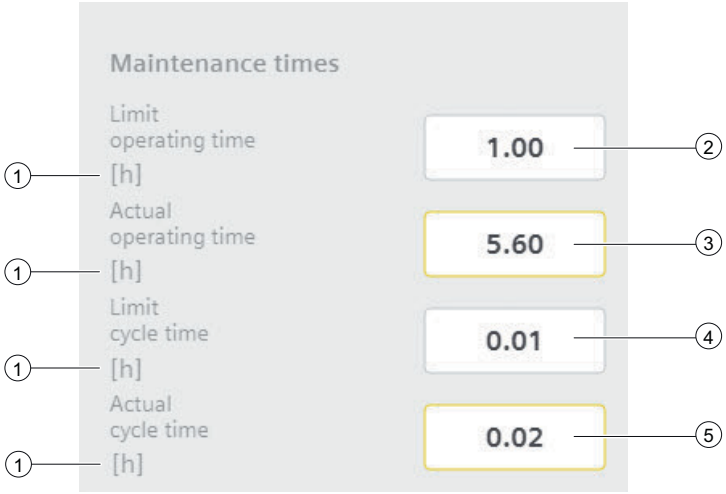
Introduction

In the "LCFL_Maintenance1" view you have the option to display the actual values of the operating time and cycle time and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Text	Value
Unit of the process value	Hours

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Operating time: Limit

Text	Meaning	HMI tag
Operating time limit	Maximum limitation of the operating time of the drive in hours	HMI.operatingTimeLimit

③ Operating time: Actual value

Text	Meaning	HMI tag
Actual operating time	Actual operating time of the drive in hours	HMI.operatingTimeAct

② Cycle time: Limit

Text	Meaning	HMI tag
Limit cycle time	Maximum limitation of the cycle time of the drive in hours	HMI.cycleTimeLimit

③ Cycle time: Actual value

Text	Meaning	HMI tag
Actual cycle time	Actual cycle time of the drive in hours	HMI.cycleTimeAct

8.2.4.5 "LCFL_Maintenance2" view

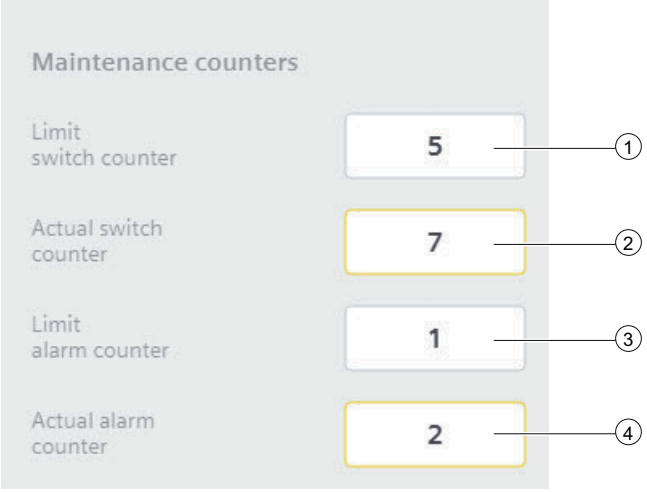
Introduction

In the "LCFL_Maintenance2" view you have the option to display the number of status changes and alarms and to configure the limit values.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Number of status changes: Limit

Text	Meaning	HMI tag
Limit value for number of status changes	Actual number of status changes of the drive	HMI.switchCounterLimit

② Number of status changes Actual value

Text	Meaning	HMI tag
Actual number of status changes	Actual number of status changes of the drive	HMI.switchCounterAct

③ Number of alarms: Limit

Text	Meaning	HMI tag
Limit value of number of alarms	Actual number of alarms of the drive	HMI.alarmCounterLimit

④ Number of alarms: Actual value

Text	Meaning	HMI tag
Actual number of alarms	Actual number of alarms of the drive	HMI.alarmCounterAct

8.2.4.6 "LCFL_MonBinVlvAlarm" view

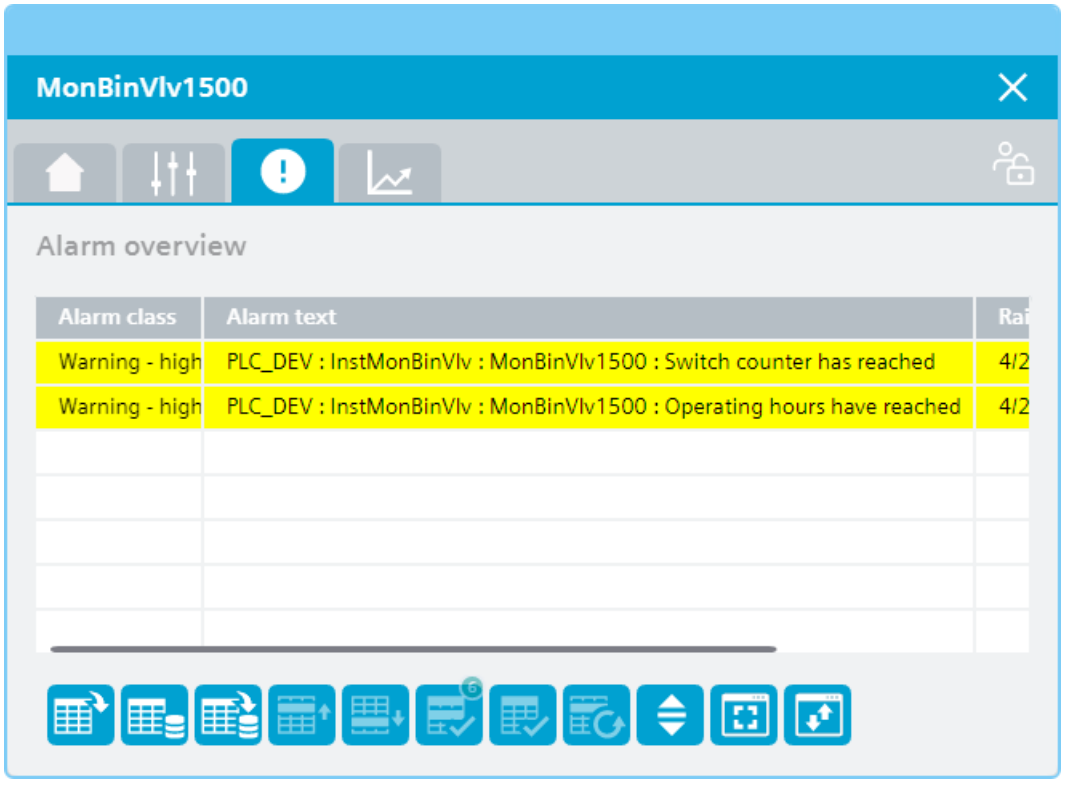
Introduction

The "LCFL_MonBinVlvAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output in case of supervision errors:

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.monitorStaticMessage	HMI.mtpData.MonStatTi < T	Valve feedback error (static)	configuration.monitorStaticMessageEn = 1 The alarm is enabled. configuration.monitorStaticMessageEn = 0 The alarm is disabled.
HMI.monitorDynamicMessage	HMI.mtpData.MonDynTi < T	Valve feedback error (dynamic)	configuration.monitorDynamicMessageEn = 1 The alarm is enabled. configuration.monitorDynamicMessageEn = 0 The alarm is disabled.
HMI.maintenance.operatingTimeMessage	HMI.maintenance.operatingTimeReached	Operating time reached	configuration.operatingTimeMessageEn = 1 The alarm is enabled. configuration.operatingTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.cycleTimeMessage	HMI.maintenance.cycleTimeReached	Cycle time reached	configuration.cycleTimeMessageEn = 1 The alarm is enabled. configuration.cycleTimeMessageEn = 0 The alarm is disabled.
HMI.maintenance.switchCounterMessage	HMI.maintenance.switchCounterReached	Number of status changes reached	configuration.switchCounterMessageEn = 1 The alarm is enabled. configuration.switchCounterMessageEn = 0 The alarm is disabled.
HMI.maintenance.alarmCounterMessage	HMI.maintenance.switchCounterReached	Number of alarms reached	configuration.alarmCounterMessageEn = 1 The alarm is enabled. configuration.alarmCounterMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_MonBinVlv" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.

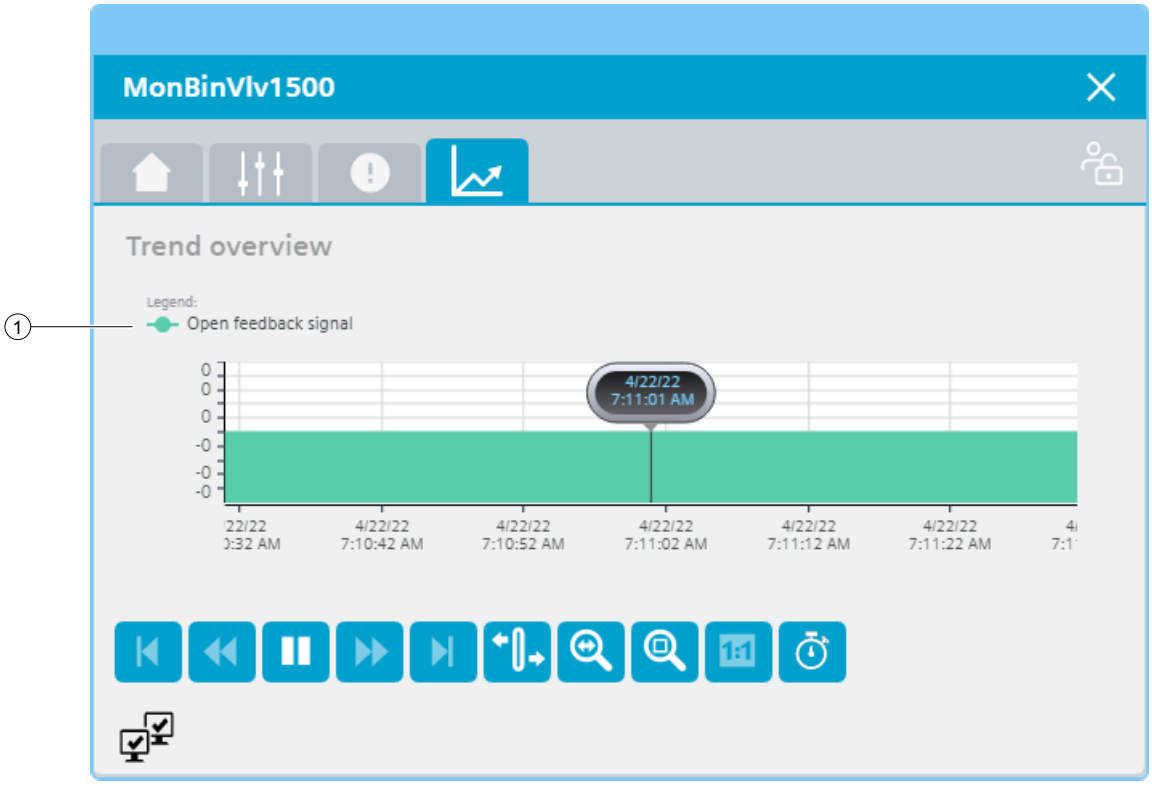
Button		Function
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.2.4.7 "LCFL_MonBinVlvTrend" view

Introduction

The "LCFL_MonBinVlvTrend" view is used for the diagnostics of values from the function block "LCFL_MonBinVlv".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Open checkback signal

Value	HMI tag
Open checkback signal	HMI.mtpData.OpenFbk

8.3 Monitoring

8.3.1 Visualization of LCFL_AnaMon

8.3.1.1 Faceplate "LCFL_AnaMonSymbol"

Introduction

For visualization of the function block "LCFL_AnaMon", you can use the faceplate "LCFL_AnaMonSymbol". The interface of the program block "LCFL_AnaMon" and of the faceplate "LCFL_AnaMonSymbol" is the PLC data type "LCFL_typeMTPAnaMonSiemens".

You can find more information at LCFL_typeMTPAnaMonSiemens (Page 170).

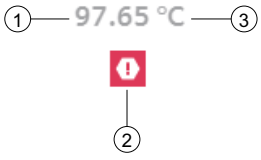
Left-click the faceplate to open the "LCFL_AnaMon" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_AnaMonHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_AnaMonHome (Page 317)	The monitoring view is used to display basic information, such as process values and limits.
	LCFL_AnaMonSettings1 (Page 320) LCFL_AnaMonSettings2 (Page 322)	In the first settings view, you have the option to change the high limits. In the second settings view, you have the option of changing the low limits.
	LCFL_AnaMonAlarm (Page 324)	The alarm view shows incoming alarms.
	LCFL_AnaMonTrend (Page 326)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_AnaMonSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current process value

Value	HMI tag
Process value	HMI.mtpData.V

② Alarm, warning, tolerance

Symbol	Meaning	HMI tag
	Alarm high limit / alarm low limit active	HMI.mtpData.VAHAct = 1 OR HMI.mtpData.VALAct = 1
	Warning high limit / warning low limit active	HMI.mtpData.VWHAct = 1 OR HMI.mtpData.VWLAct = 1
	Tolerance high limit / tolerance low limit active	HMI.mtpData.VTHAct = 1 OR HMI.mtpData.VTLAct = 1

③ Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

Disabled faceplate

If the faceplate "LCFL_AnaMonSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.3.1.2 "LCFL_AnaMonHome" view

Introduction

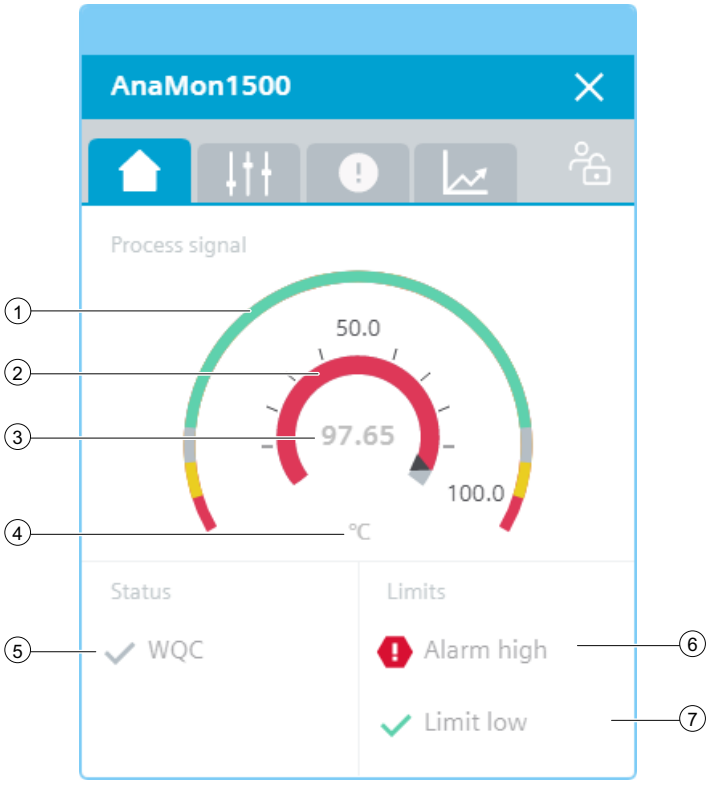
The "LCFL_AnaMonHome" view is a monitoring view that is used to display basic information, such as process values and limits.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_AnaMonHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



① Alarm limits (red), warning limits (yellow), and tolerance limits (gray) in the form of an arc diagram

Value	HMI tag
Alarm high limit / Alarm low limit	HMI.mtpData.VAHLim / HMI.mtpData.VALLim
Warning high limit / Warning low limit	HMI.mtpData.VWHLim / HMI.mtpData.VWLLim
Tolerance high limit / Tolerance low limit	HMI.mtpData.VTHLim / HMI.mtpData.VTLLim

② Current process value in the form of an arc diagram

Value	HMI tag
Minimum scaling value	HMI.mtpData.VSclMin
Maximum scaling value	HMI.mtpData.VSclMax
Process value	HMI.mtpData.V

③ Current process value

Value	HMI tag
Process value	HMI.mtpData.V

④ Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

⑤ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

⑥ Display for violation of high limits (alarm, warning or tolerance)

Symbol	Meaning	HMI tag
	Alarm high limit violated	HMI.mtpData.VAHAct = 1
	Warning high limit violated	HMI.mtpData.VWHAct = 1
	Tolerance high limit violated	HMI.mtpData.VTHAct = 1
	No limit violated	HMI.mtpData.VAHAct = 0 AND HMI.mtpData.VWHAct = 0 AND HMI.mtpData.VTHAct = 0

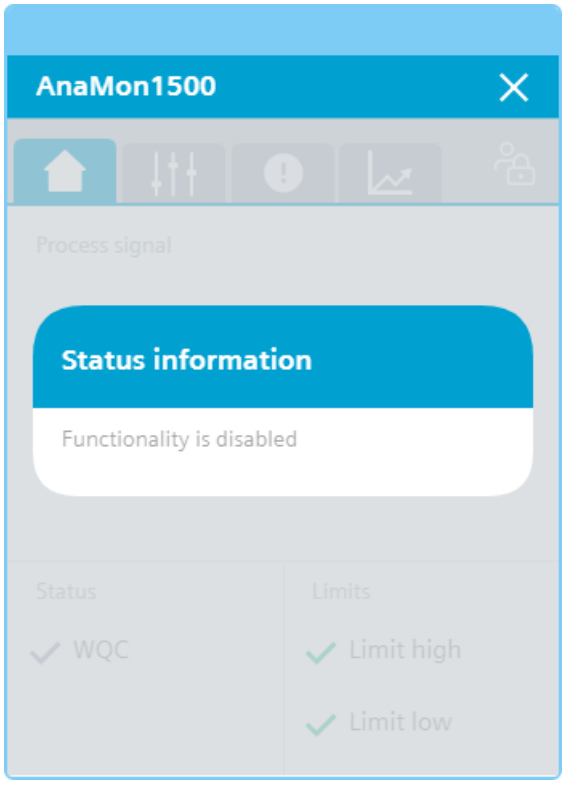
⑦ Display for violation of low limits (alarm, warning or tolerance)

Symbol	Meaning	HMI tag
	Alarm low limit violated	HMI.mtpData.VALAct = 1
	Warning low limit violated	HMI.mtpData.VWLAct = 1

Symbol	Meaning	HMI tag
	Tolerance low limit violated	HMI.mtpData.VTLAct = 1
	No limit violated	HMI.mtpData.VALAct = 0 AND HMI.mtpData.VWLAct = 0 AND HMI.mtpData.VTLAct = 0

Disabled view

If the "LCFL_AnaMonHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.3.1.3 "LCFL_AnaMonSettings1" view

Introduction

In the "LCFL_AnaMonSettings1" view, you can change the high limits.

The high limits are only displayed when the following tags are activated:

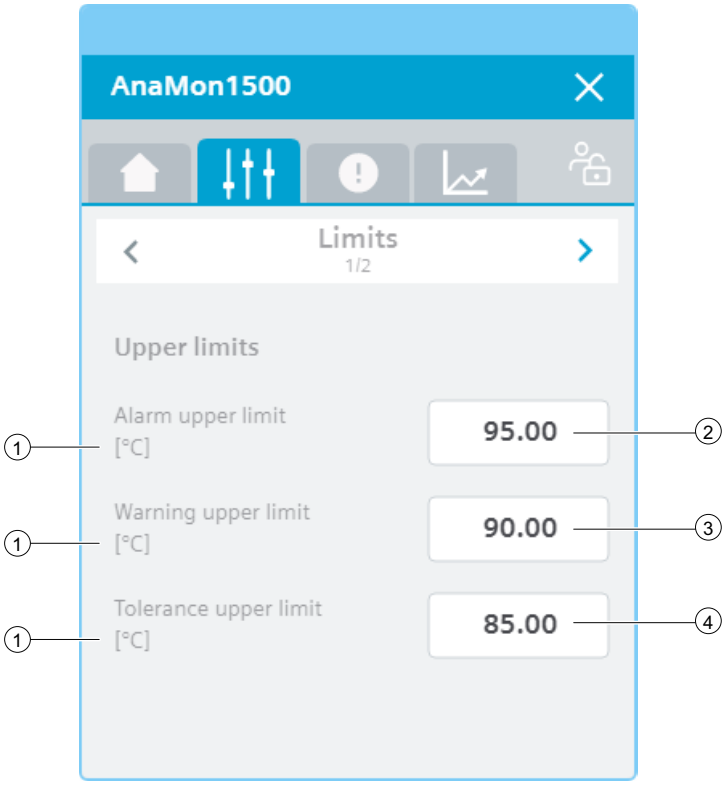
Limit monitoring	HMI tag
Enable alarm high limit	HMI.mtpData.VAHEn = 1
Warning high limit activated	HMI.mtpData.VWHEn = 1
Enable tolerance high limit	HMI.mtpData.VTHEn = 1

The enable bit is set in the configuration data block (PLC data type).

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Alarm upper limit

Value	HMI tag
Alarm upper limit	HMI.mtpData.VAHLim AND Operating permit = 1

③ Warning upper limit

Value	HMI tag
Warning upper limit	HMI.mtpData.VWHLim AND Operating permit = 1

④ Tolerance upper limit

Value	HMI tag
Tolerance upper limit	HMI.mtpData.VTHLim AND Operating permit = 1

8.3.1.4 "LCFL_AnaMonSettings2" view

Introduction

In the "LCFL_AnaMonSettings2" view, you can change the low limits.

The low limits are only displayed when the following tags are activated:

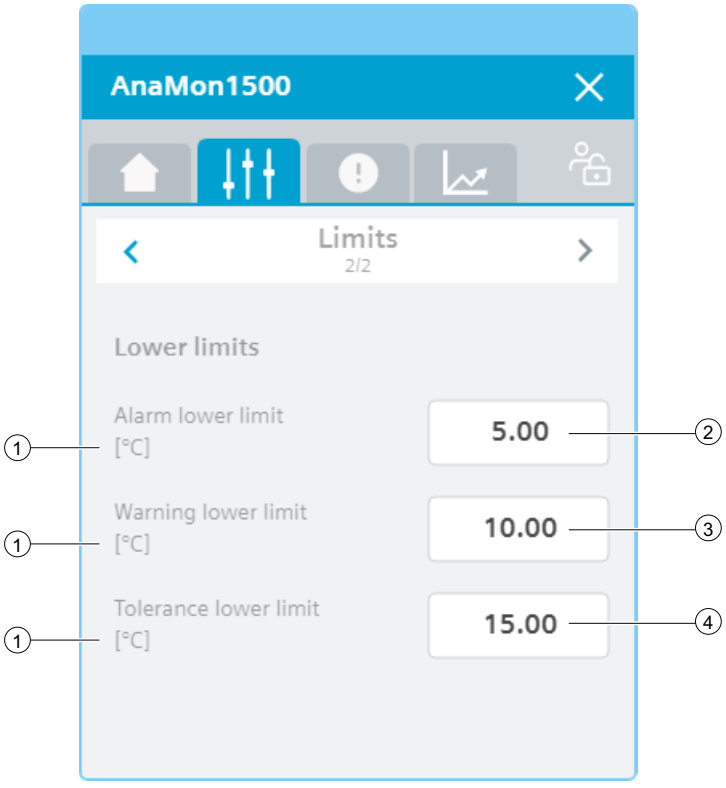
Limit monitoring	HMI tag
Enable alarm low limit	HMI.mtpData.VALEn = 1
Warning low limit activated	HMI.mtpData.VWLEn = 1
Enable tolerance low limit	HMI.mtpData.VTLEn = 1

The enable bit is set in the configuration data block (PLC data type).

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Alarm lower limit

Value	HMI tag
Alarm lower limit	HMI.mtpData.VALLim AND Operating permit = 1

③ Warning lower limit

Value	HMI tag
Warning lower limit	HMI.mtpData.VWLLim AND Operating permit = 1

④ Tolerance lower limit

Value	HMI tag
Tolerance lower limit	HMI.mtpData.VTLLim AND Operating permit = 1

8.3.1.5 "LCFL_AnaMonAlarm" view

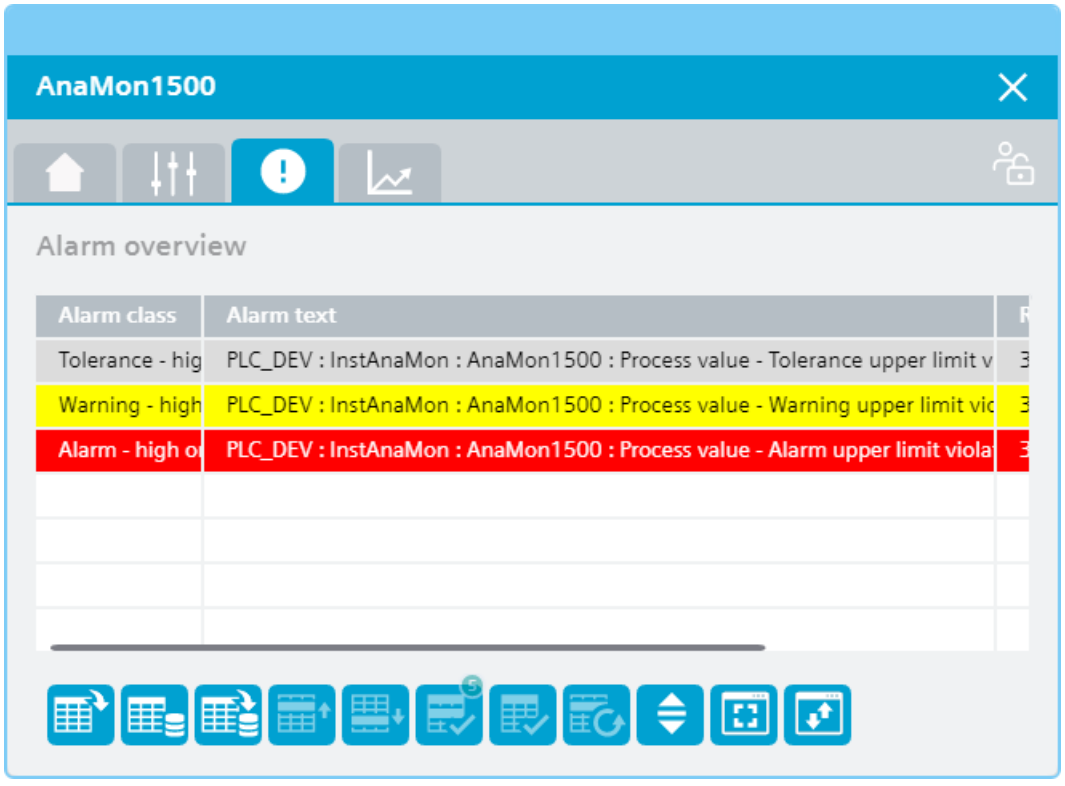
Introduction

The "LCFL_AnaMonAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The corresponding alarms are output in case of limit violations:

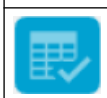
Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.alarmHighMessage	HMI.mtpData.VAHLim < value	Process value - alarm high limit violated	configuration.alarmHighMessageEn = 1 The alarm is enabled. configuration.alarmHighMessageEn = 0 The alarm is disabled.
HMI.warningHighMessage	HMI.mtpData.VWHLim < value	Process value - warning high limit violated	configuration.warningHighMessageEn = 1 The alarm is enabled. configuration.warningHighMessageEn = 0 The alarm is disabled.
HMI.toleranceHighMessage	HMI.mtpData.VTHLim < value	Process value - tolerance high limit violated	configuration.toleranceHighMessageEn = 1 The alarm is enabled. configuration.toleranceHighMessageEn = 0 The alarm is disabled.
HMI.toleranceLowMessage	HMI.mtpData.VTLLim > value	Process value - tolerance low limit violated	configuration.toleranceLowMessageEn = 1 The alarm is enabled. configuration.toleranceLowMessageEn = 0 The alarm is disabled.
HMI.warningLowMessage	HMI.mtpData.VWLim > value	Process value - warning low limit violated	configuration.warningLowMessageEn = 1 The alarm is enabled. configuration.warningLowMessageEn = 0 The alarm is disabled.
HMI.alarmLowMessage	HMI.mtpData.VALLim > value	Process value - alarm low limit violated	configuration.alarmLowMessageEn = 1 The alarm is enabled. configuration.alarmLowMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_AnaMon" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.

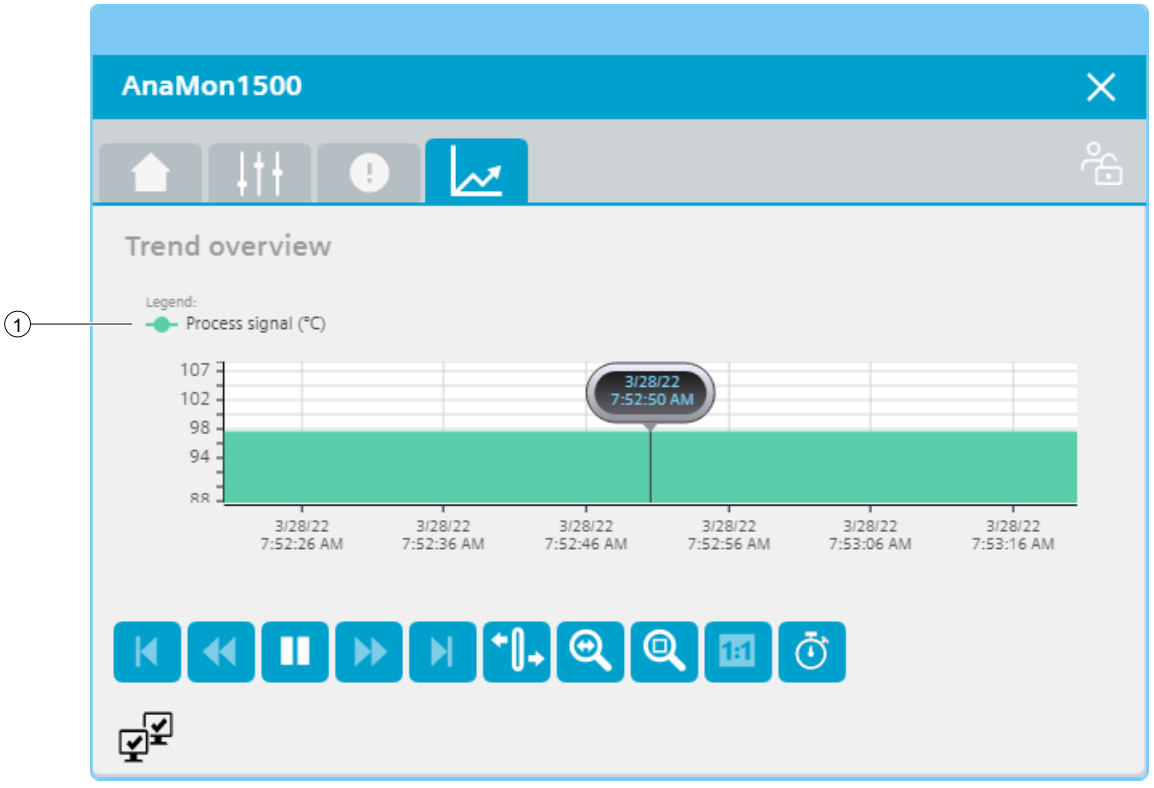
Button		Function
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.3.1.6 "LCFL_AnaMonTrend" view

Introduction

The "LCFL_AnaMonTrend" view is used for the diagnostics of values from the function block "LCFL_AnaMon".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Process signal (unit)

Text	HMI tag
Process signal with unit	HMI.mtpData.V

8.3.2 Visualization of LCFL_BinMon

8.3.2.1 Faceplate "LCFL_BinMonSymbol"

Introduction

For visualization of the function block "LCFL_BinMon" you can use the faceplate "LCFL_BinMonSymbol". The interface of the program block "LCFL_BinMon" and of the faceplate "LCFL_BinMonSymbol" is the PLC data type "LCFL_typeMTPBinMonSiemens".

You can find more information at LCFL_typeMTPBinMonSiemens (Page 172).

Left-click the faceplate to open the "LCFL_BinMon" image containing more faceplates. These faceplates are shown as additional views in runtime:

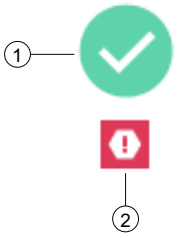
If you click the symbol in runtime, the "LCFL_BinMonHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_BinMonHome (Page 330)	The monitoring view is used to display basic information.
	LCFL_BinMonSettings (Page 332)	In the settings view you can configure the flutter detection.

Symbol	View	Description
	LCFL_BinMonAlarm (Page 334)	The alarm view shows incoming alarms.
	LCFL_BinMonTrend (Page 336)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_BinMonSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current signal value

Symbol	HMI tag
	HMI.mtpData.V = 1
	HMI.mtpData.V = 0

② Error

Symbol	Meaning	HMI tag
	Value active	HMI.valueMessage = 1
	Fluttering active	HMI.mtpData.VFlutAct = 1

Disabled faceplate

If the faceplate "LCFL_BinMonSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.3.2.2 "LCFL_BinMonHome" view

Introduction

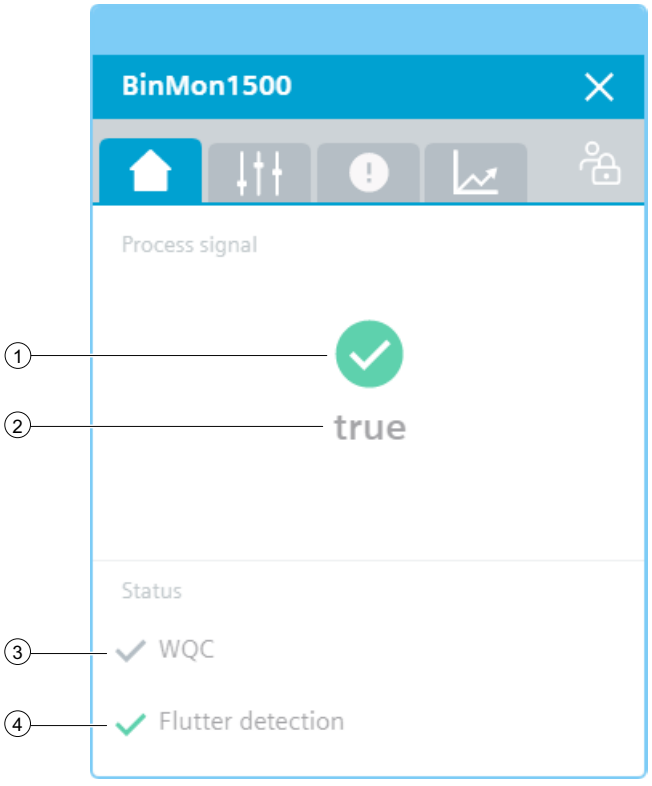
The "LCFL_BinMonHome" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_BinMonHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into two areas:

Area	Description
Process signal	The current signal and binary value is displayed in this area.
Status	This section contains information on quality code and flutter detection.

① Current signal value

Symbol	HMI tag
	HMI.mtpData.V = 1
	HMI.mtpData.V = 0

② Current binary value

Meaning	HMI tag
Text replacement for "false"	HMI.mtpData.VState0
Text replacement for "true"	HMI.mtpData.VState1

③ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

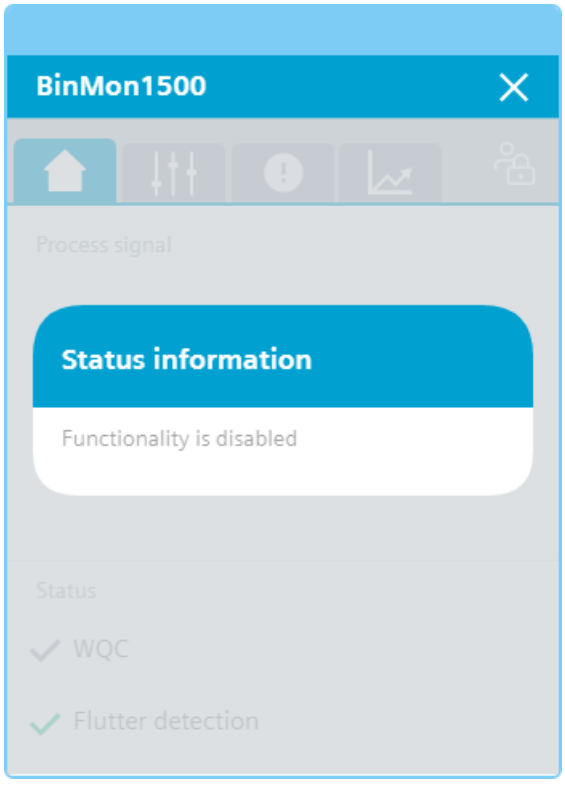
④ Flutter detection

The display is only visible when "HMI.mtpData.VFlutEn = 1".

Symbol	Meaning	HMI tag
	Fluttering active	HMI.mtpData.VFlutAct = 1
	Fluttering not active	HMI.mtpData.VFlutAct = 0

Disabled view

If the "LCFL_BinMonHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.3.2.3 "LCFL_BinMonSettings" view

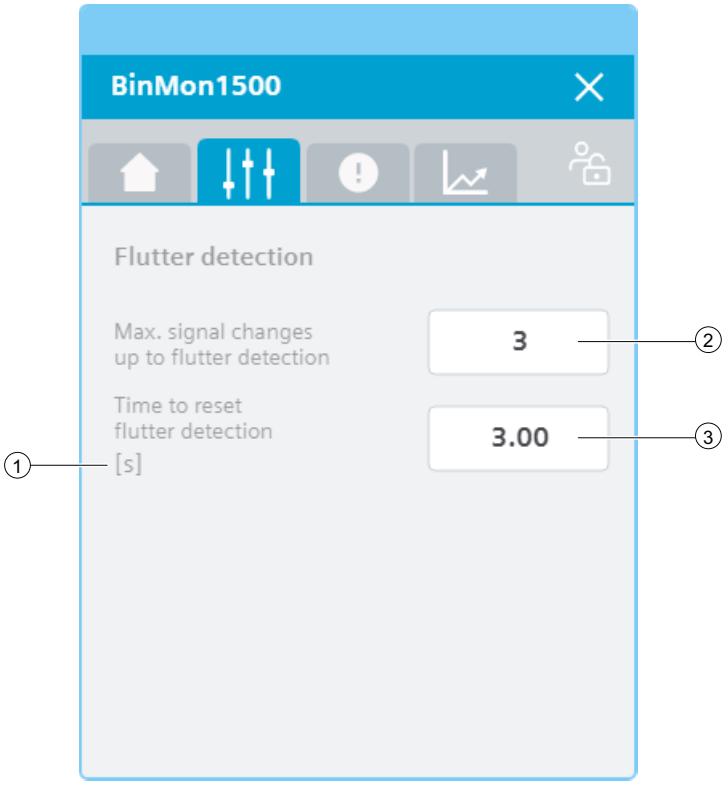
Introduction

In the "LCFL_BinMonSettings1" view, you can configure the flutter detection.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Meaning	Value
Unit of the process value	Seconds

The value is permanently set to hours [h] and cannot be changed.

② Flutter configuration: Max. signal change until flutter detection

Meaning	HMI tag
Counts of the allowed flutter signals in the defined period	HMI.mtpData.VFlutCnt

③ Flutter configuration: Time to reset the flutter detection

Meaning	HMI tag
Period of an active signal before the signal is recognized as flutter-free (in seconds).	HMI.mtpData.VFlutTi

8.3.2.4 "LCFL_BinMonAlarm" view

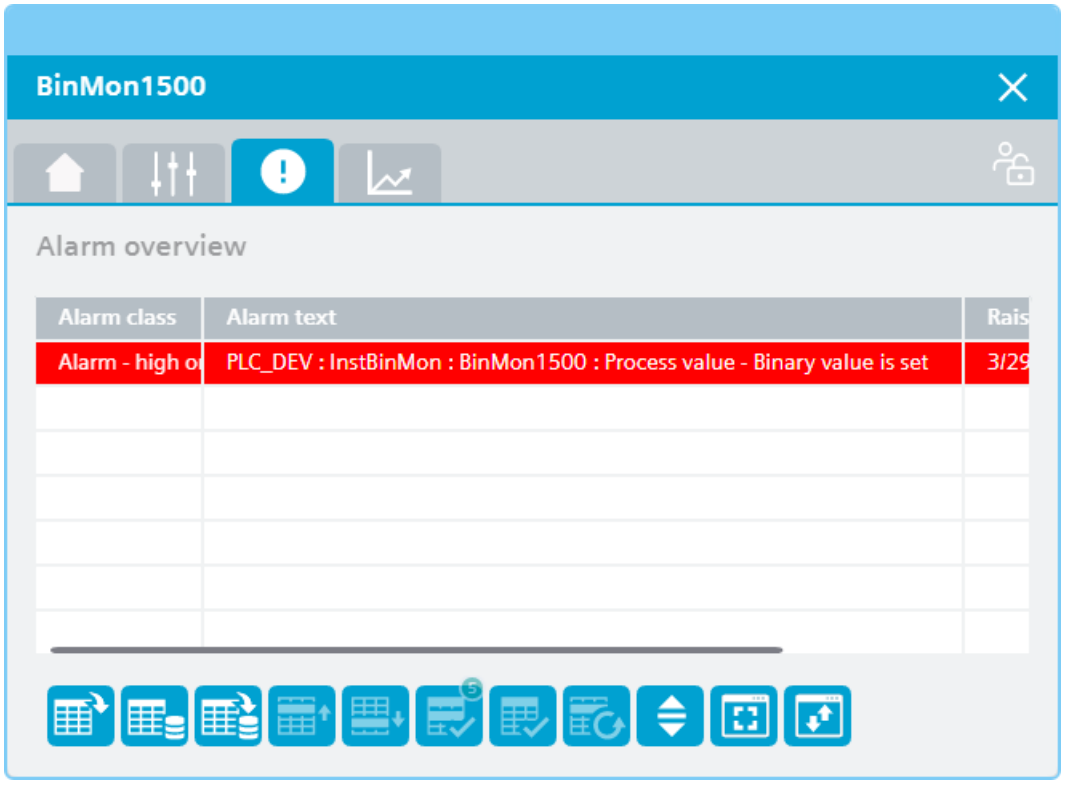
Introduction

The "LCFL_BinMonAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output:

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.valueMessage	HMI.mtpData.V = 1	Process value - Binary value is set	configuration.valueMessageEn = 1 The alarm is enabled. configuration.valueMessageEn = 0 The alarm is disabled.
HMI.flutteringMessage	HMI.mtpData.VFlutAct = 1	Process value - Flutter signal detected	configuration.flutteringMessageEn = 1 The alarm is enabled. configuration.flutteringMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_BinMon" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

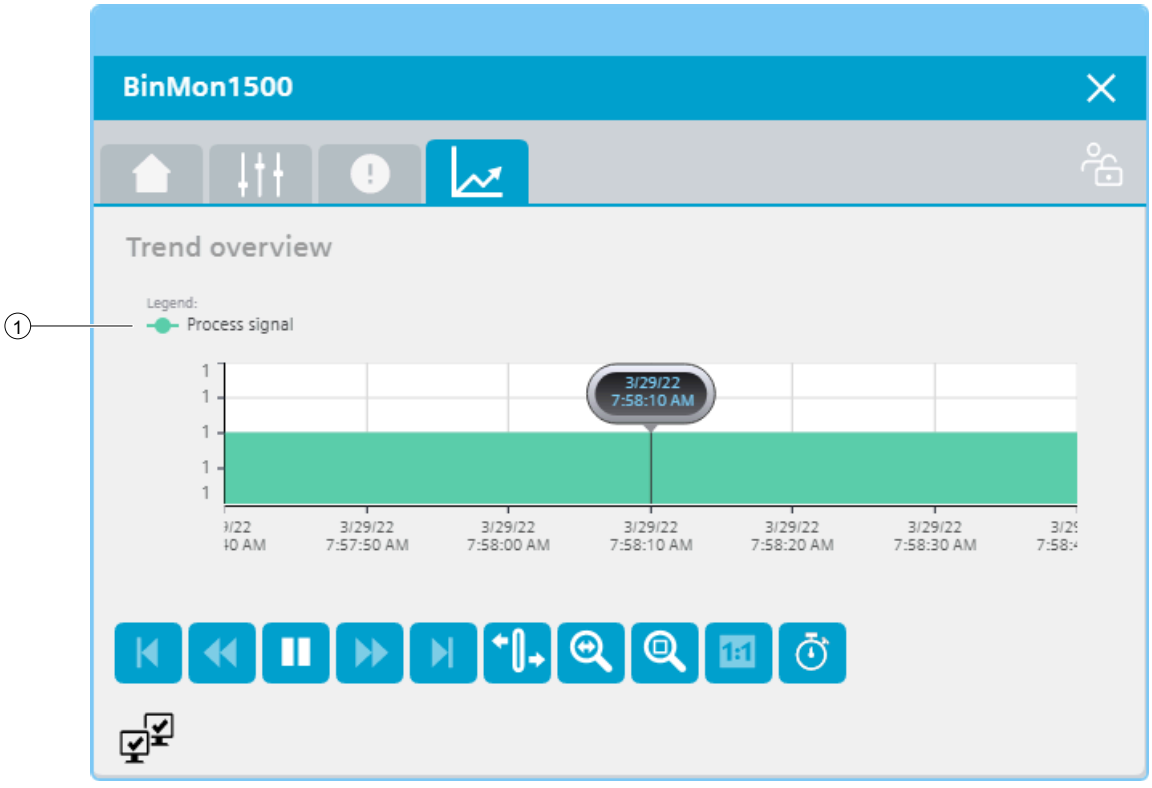
Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.3.2.5 "LCFL_BinMonTrend" view

Introduction

The "LCFL_BinMonTrend" view is used for the diagnostics of values from the function block "LCFL_BinMon".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.

Button		Function
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Process signal

Text	HMI tag
Process signal	HMI.mtpData.V

8.3.3 Visualization of LCFL_DIntMon

8.3.3.1 Faceplate "LCFL_DIntMonSymbol"

Introduction

For visualization of the function block "LCFL_DIntMon", you can use the faceplate "LCFL_DIntMonSymbol". The interface of the program block "LCFL_DIntMon" and of the faceplate "LCFL_DIntMonSymbol" is the PLC data type "LCFL_typeMTPDIntMonSiemens".

You can find more information at LCFL_typeMTPDIntMonSiemens (Page 175).

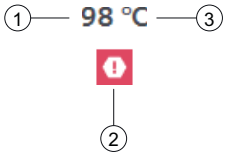
Left-click the faceplate to open the "LCFL_DIntMon" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_DIntMonHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_DIntMonHome (Page 339)	The monitoring view is used to display basic information, such as process values and limits.
	LCFL_DIntMonSettings1 (Page 342) LCFL_DIntMonSettings2 (Page 344)	In the first settings view, you have the option to change the high limits. In the second settings view, you have the option of changing the low limits.
	LCFL_DIntMonAlarm (Page 346)	The alarm view shows incoming alarms.
	LCFL_DIntMonTrend (Page 348)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_DIntMonSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current process value

Value	HMI tag
Process value	HMI.mtpData.V

② Alarm, warning, tolerance

Symbol	Meaning	HMI tag
	Alarm high limit / alarm low limit active	HMI.mtpData.VAHAct = 1 OR HMI.mtpData.VALAct = 1
	Warning high limit / warning low limit active	HMI.mtpData.VWHAct = 1 OR HMI.mtpData.VWLAct = 1
	Tolerance high limit / tolerance low limit active	HMI.mtpData.VTHAct = 1 OR HMI.mtpData.VTLAct = 1

③ Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

Disabled faceplate

If the faceplate "LCFL_DIntMonSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.3.3.2 "LCFL_DIntMonHome" view

Introduction

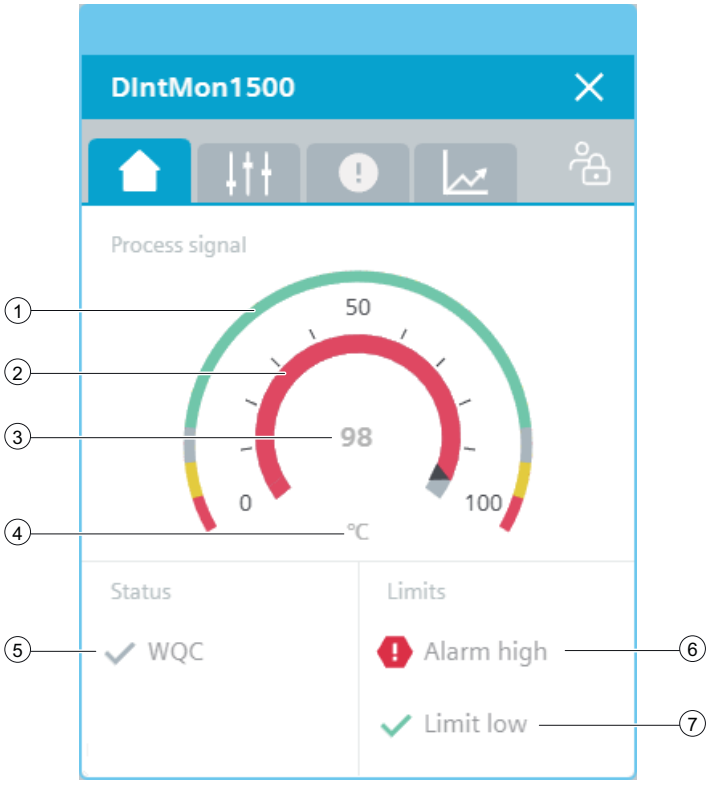
The "LCFL_DIntMonHome" view is a monitoring view that is used to display basic information, such as process values and limits.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_DIntMonHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



① Alarm limits (red), warning limits (yellow), and tolerance limits (gray) in the form of an arc diagram

Value	HMI tag
Alarm high limit / Alarm low limit	HMI.mtpData.VAHLim / HMI.mtpData.VALLim
Warning high limit / Warning low limit	HMI.mtpData.VWHLim / HMI.mtpData.VWLLim
Tolerance high limit / Tolerance low limit	HMI.mtpData.VTHLim / HMI.mtpData.VTLLim

② Current process value in the form of an arc diagram

Value	HMI tag
Minimum scaling value	HMI.mtpData.VSclMin
Maximum scaling value	HMI.mtpData.VSclMax
Process value	HMI.mtpData.V

③ Current process value

Value	HMI tag
Process value	HMI.mtpData.V

④ Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

⑤ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

⑥ Display for violation of high limits (alarm, warning or tolerance)

Symbol	Meaning	HMI tag
	Alarm high limit violated	HMI.mtpData.VAHAct = 1
	Warning high limit violated	HMI.mtpData.VWHAct = 1
	Tolerance high limit violated	HMI.mtpData.VTHAct = 1
	No limit violated	HMI.mtpData.VAHAct = 0 AND HMI.mtpData.VWHAct = 0 AND HMI.mtpData.VTHAct = 0

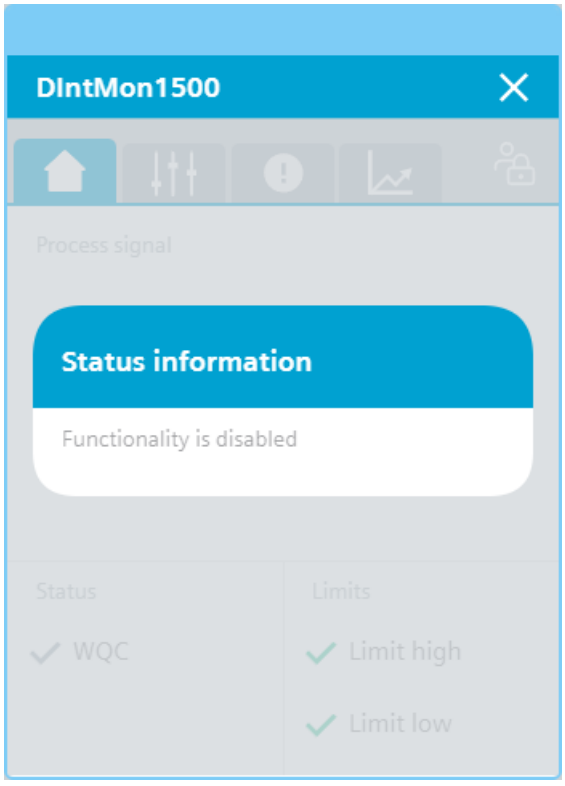
⑦ Display for violation of low limits (alarm, warning or tolerance)

Symbol	Meaning	HMI tag
	Alarm low limit violated	HMI.mtpData.VALAct = 1
	Warning low limit violated	HMI.mtpData.VWLAct = 1

Symbol	Meaning	HMI tag
	Tolerance low limit violated	HMI.mtpData.VTLAct = 1
	No limit violated	HMI.mtpData.VALAct = 0 AND HMI.mtpData.VWLAct = 0 AND HMI.mtpData.VTLAct = 0

Disabled view

If the "LCFL_DIntMonHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.3.3.3 "LCFL_DIntMonSettings1" view

Introduction

In the "LCFL_DIntMonSettings1" view, you can change the high limits.

The high limits are only displayed when the following tags are activated:

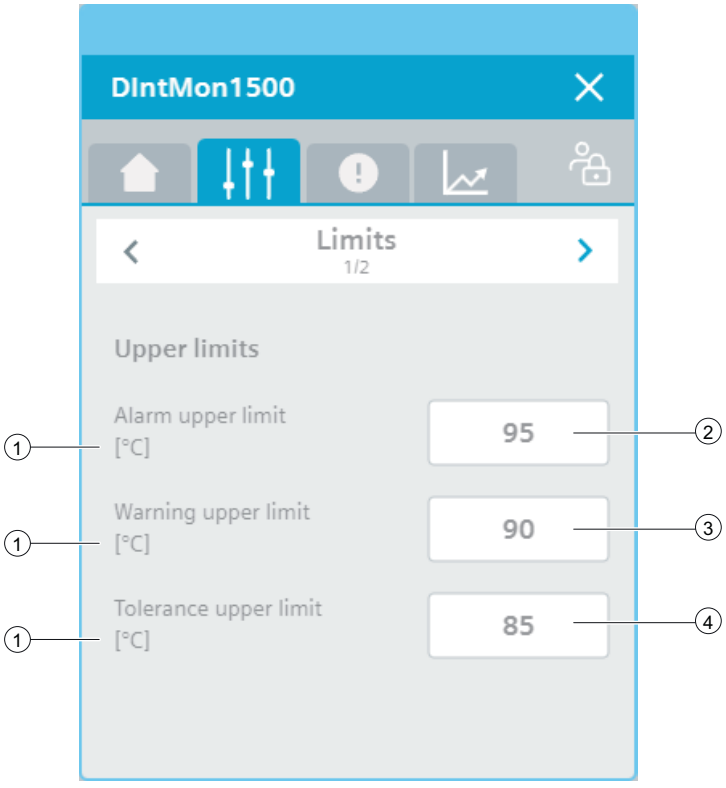
Limit monitoring	HMI tag
Enable alarm high limit	HMI.mtpData.VAHEn = 1
Warning high limit activated	HMI.mtpData.VWHEn = 1
Enable tolerance high limit	HMI.mtpData.VTHEn = 1

The enable bit is set in the configuration data block (PLC data type).

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Alarm upper limit

Value	HMI tag
Alarm upper limit	HMI.mtpData.VAHLim AND Operating permit = 1

③ Warning upper limit

Value	HMI tag
Warning upper limit	HMI.mtpData.VWHLim AND Operating permit = 1

④ Tolerance upper limit

Value	HMI tag
Tolerance upper limit	HMI.mtpData.VTHLim AND Operating permit = 1

8.3.3.4 "LCFL_DIntMonSettings2" view

Introduction

In the "LCFL_DIntMonSettings2" view, you can change the low limits.

The low limits are only displayed when the following tags are activated:

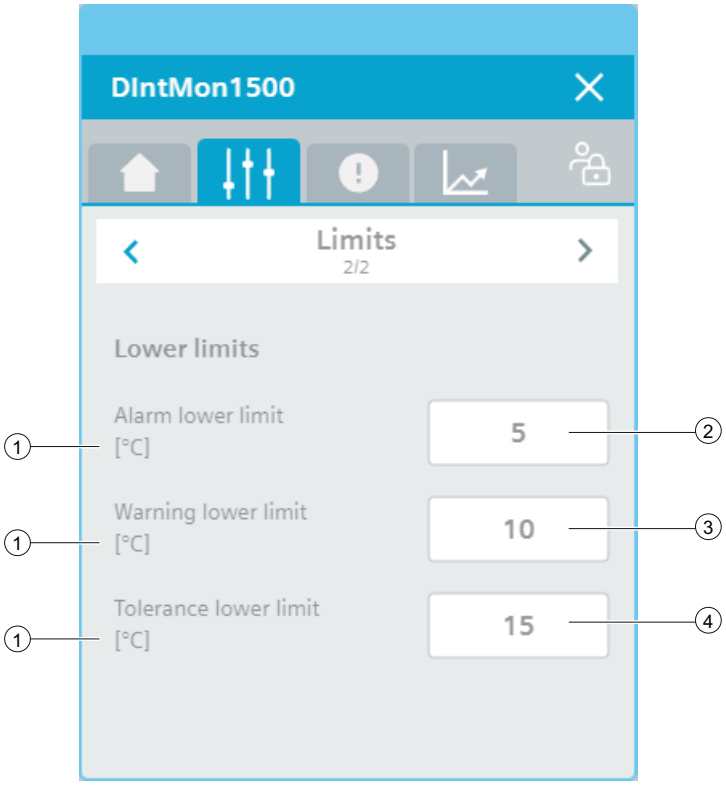
Limit monitoring	HMI tag
Enable alarm low limit	HMI.mtpData.VALEn = 1
Warning low limit activated	HMI.mtpData.VWLEn = 1
Enable tolerance low limit	HMI.mtpData.VTLEn = 1

The enable bit is set in the configuration data block (PLC data type).

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the process value

Value	HMI tag
Unit of the process value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

② Alarm lower limit

Value	HMI tag
Alarm lower limit	HMI.mtpData.VALLim AND Operating permit = 1

③ Warning lower limit

Value	HMI tag
Warning lower limit	HMI.mtpData.VWLLim AND Operating permit = 1

④ Tolerance lower limit

Value	HMI tag
Tolerance lower limit	HMI.mtpData.VTLLim AND Operating permit = 1

8.3.3.5 "LCFL_DIntMonAlarm" view

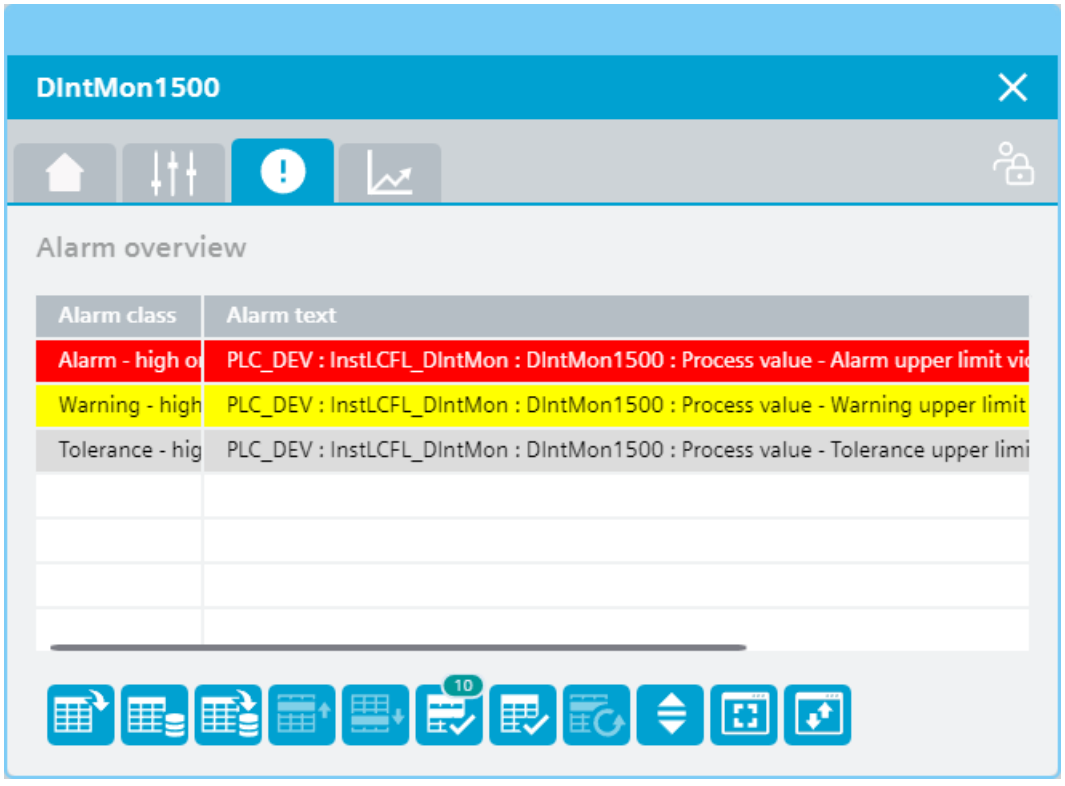
Introduction

The "LCFL_DIntMonAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The corresponding alarms are output in case of limit violations:

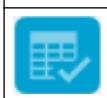
Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.alarmHighMessage	HMI.mtpData.VAHLim < value	Process value - alarm high limit violated	configuration.alarmHighMessageEn = 1 The alarm is enabled. configuration.alarmHighMessageEn = 0 The alarm is disabled.
HMI.warningHighMessage	HMI.mtpData.VWHLim < value	Process value - warning high limit violated	configuration.warningHighMessageEn = 1 The alarm is enabled. configuration.warningHighMessageEn = 0 The alarm is disabled.
HMI.toleranceHighMessage	HMI.mtpData.VTHLim < value	Process value - tolerance high limit violated	configuration.toleranceHighMessageEn = 1 The alarm is enabled. configuration.toleranceHighMessageEn = 0 The alarm is disabled.
HMI.toleranceLowMessage	HMI.mtpData.VTLLim > value	Process value - tolerance low limit violated	configuration.toleranceLowMessageEn = 1 The alarm is enabled. configuration.toleranceLowMessageEn = 0 The alarm is disabled.
HMI.warningLowMessage	HMI.mtpData.VWLim > value	Process value - warning low limit violated	configuration.warningLowMessageEn = 1 The alarm is enabled. configuration.warningLowMessageEn = 0 The alarm is disabled.
HMI.alarmLowMessage	HMI.mtpData.VALLim > value	Process value - alarm low limit violated	configuration.alarmLowMessageEn = 1 The alarm is enabled. configuration.alarmLowMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_DIntMon" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show recent" function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter includes all connected servers, but not filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they are subject to single acknowledgment.

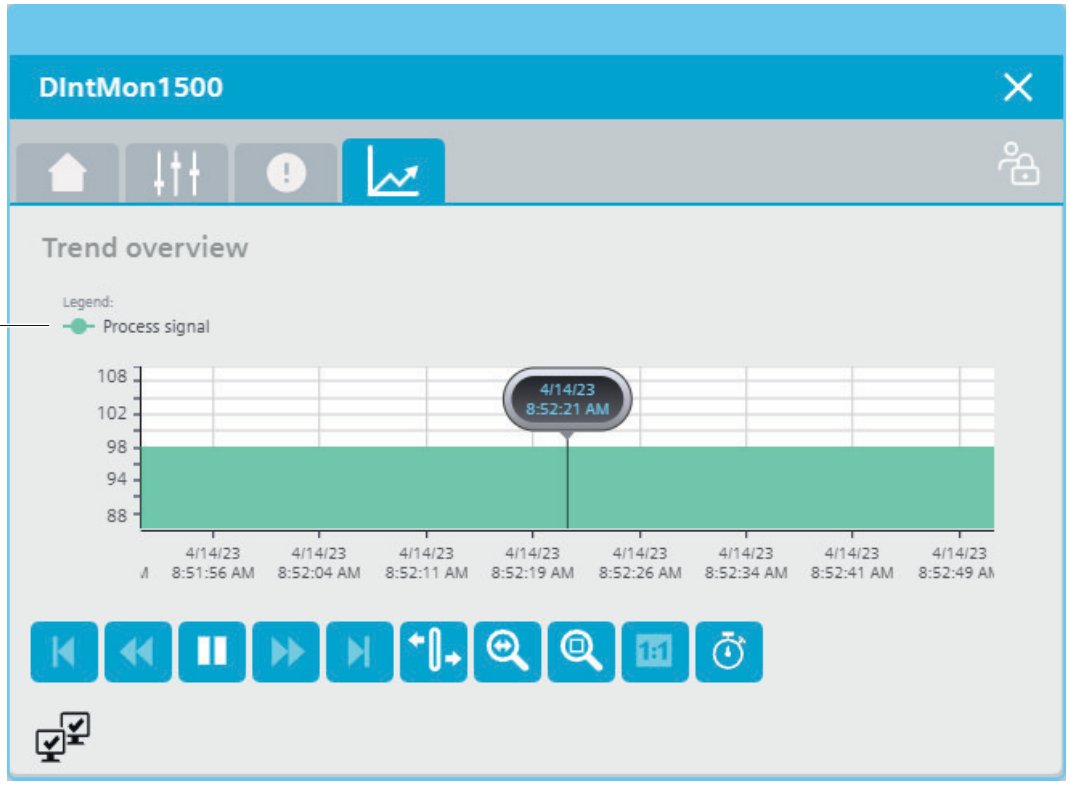
Button		Function
	Single confirm	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show recent	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show recent" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show recent" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the engineering system.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.3.3.6 "LCFL_DIntMonTrend" view

Introduction

The "LCFL_DIntMonTrend" view is used for the diagnostics of values from the function block "LCFL_DIntMon".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Process signal (unit)

Text	HMI tag
Process signal with unit	HMI.mtpData.V

8.3.4 Visualization of LCFL_StringView

8.3.4.1 Faceplate "LCFL_StringViewSymbol"

Introduction

For visualization of the function block "LCFL_StringView", you can use the faceplate "LCFL_StringViewSymbol". The interface of the program block "LCFL_StringView" and of the faceplate "LCFL_StringViewSymbol" is the PLC data type "LCFL_typeMTPStringViewSiemens".

You can find more information at LCFL_typeMTPStringView (Page 176).

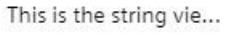
Left-click the faceplate to open the "LCFL_StringView" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_StringViewHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_StringViewHome (Page 351)	The monitoring view is used to display a string.

Display and structure

If the faceplate "LCFL_StringViewSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



Current value of the string

Meaning	HMI tag
Displayed value of the string	HMI.mtpData.Text

Disabled faceplate

If the faceplate "LCFL_StringViewSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

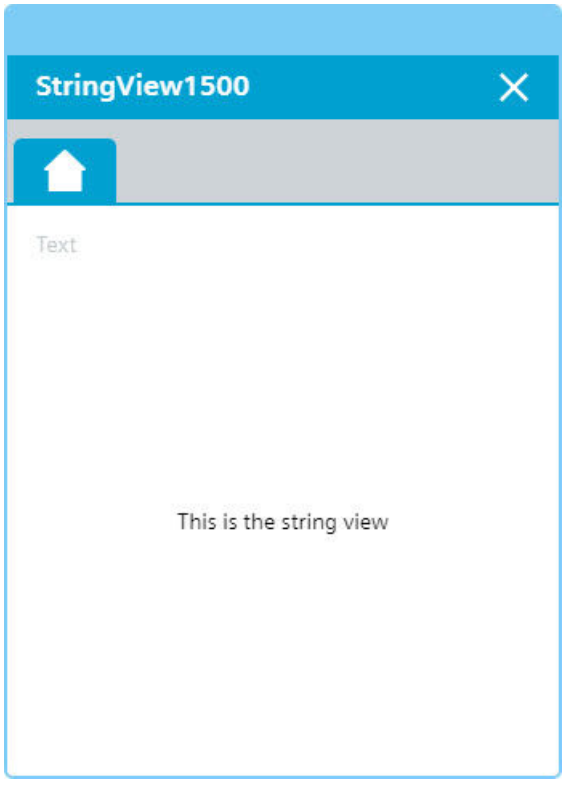
8.3.4.2 "LCFL_StringViewHome" view

Introduction

The "LCFL_StringViewHome" view is a monitoring view and is used to display a string.

Display and structure

If the "LCFL_StringViewHome" view is enabled with "HMI.enabled = 1", the view appears as follows:

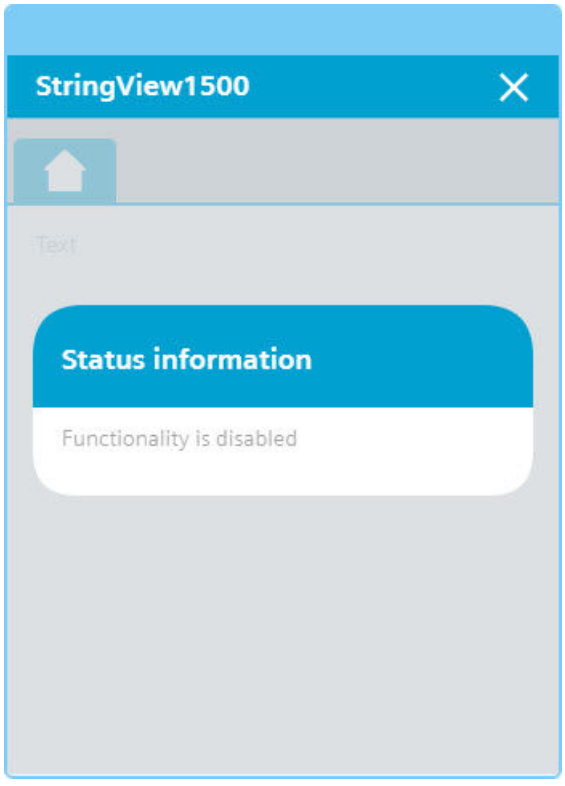


Current value of the string

Meaning	HMI tag
Displayed value of the string	HMI.mtpData.Text

Disabled view

If the "LCFL_StringViewHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.4 Operate

8.4.1 Visualization of LCFL_AnaManInt

8.4.1.1 Faceplate "LCFL_AnaManIntSymbol"

Introduction

For visualization of the function block "LCFL_AnaManInt" you can use the faceplate "LCFL_AnaManIntSymbol". The interface of the program block "LCFL_AnaManInt" and of the faceplate "LCFL_AnaManIntSymbol" is the PLC data type "LCFL_typeMTPAnaManIntSiemens".

You can find more information at LCFL_typeMTPAnaManIntSiemens (Page 178).

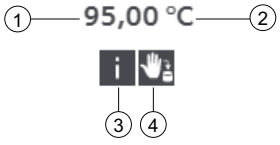
Left-click the faceplate to open the "LCFL_AnaManInt" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_AnaManIntHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_AnaManIntHome (Page 355)	The monitoring view is used to display basic information.
	LCFL_AnaManIntTrend (Page 359)	The trend view is used for the diagnostics of values.

Display and structure of the symbol

If the faceplate "LCFL_AnaManIntSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current analog value

Value	HMI tag
Analog value	HMI.mtpData.VOut

② Unit of the analog value

Value	HMI tag
Unit of the analog value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

③ Limit violations

Symbol	Meaning	HMI tag
	High limit or low limit violated	HMI.mtpData.VMin = 1 OR HMI.mtpData.VMax = 1

④ Source mode

Symbol	Mode	HMI tag
	Manual	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcChannel = 0
	Internal	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcChannel = 0

Disabled faceplate

If the faceplate "LCFL_AnaManIntSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.4.1.2 "LCFL_AnaManIntHome" view

Introduction

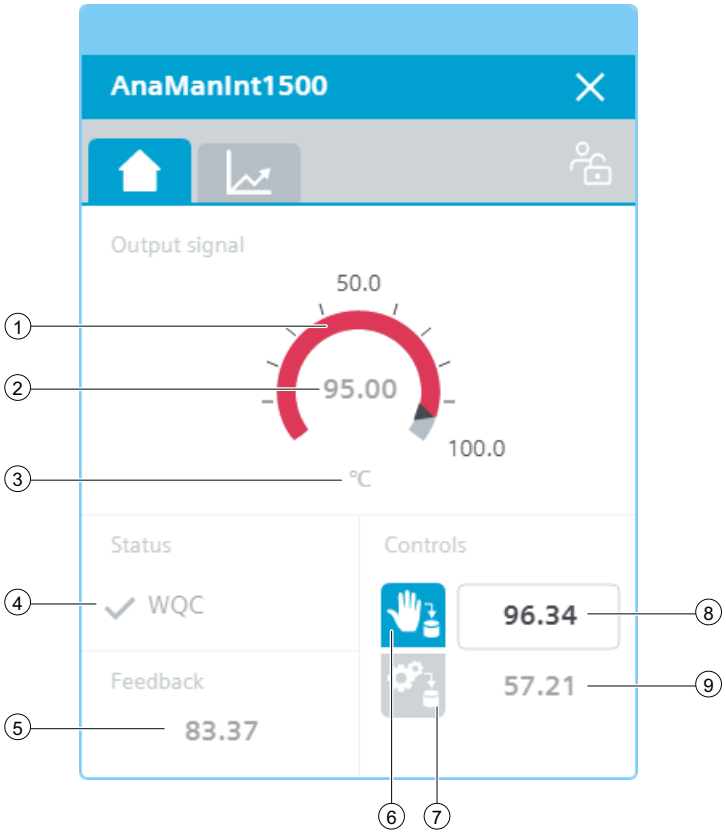
The "LCFL_AnaManIntHome" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_AnaManIntHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Output signal	The current analog value is displayed in this area.
Status	This area contains information on the quality code.
Feedback	The feedback value is displayed in this area.
Controllers	This area contains buttons that can be enabled with a click: • "Manual" source mode • "Internal" source mode An additional display shows the manual and internal values.

① Analog value in the form of an arc diagram

The scaling values "HMI.mtpData.VSclMin" and "HMI.mtpData.VSclMax" determine the range of the gauge. When the analog value is higher than "HMI.mtpData.VMax" or lower than "HMI.mtpData.VMin", the color of the gauge changes to red.

② Current analog value

Value	HMI tag
Analog value	HMI.mtpData.VOut

③ Unit of the analog value

Value	HMI tag
Unit of the analog value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at Units of measurement (Page 11).

④ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <>16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

⑤ Feedback value

Value	HMI tag
Feedback value	HMI.mtpData.VFbk

⑥ Source mode: Manual

Symbol	State	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcManAct = 0

⑦ Source mode: Internal

Symbol	State	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1
	Not internal (no switchover triggered by operator)	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcIntAct = 0

⑧ Manual value

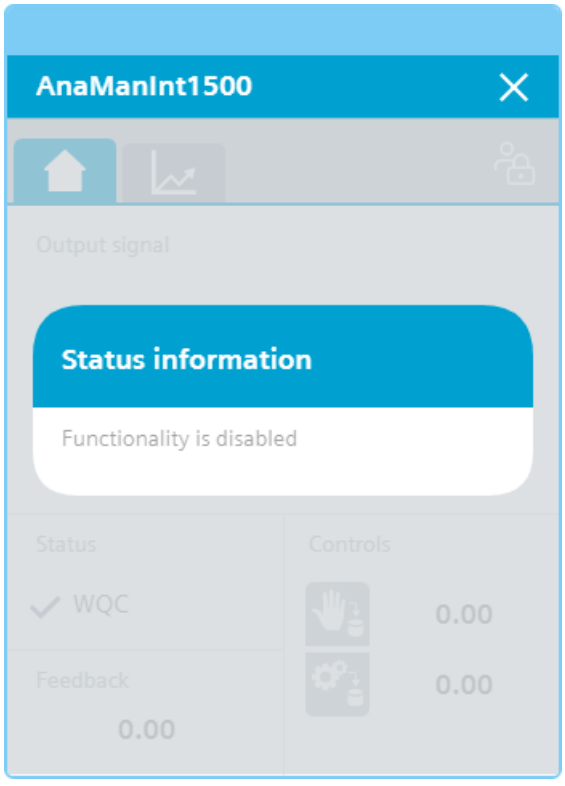
Value	HMI tag
Manual value	HMI.mtpData.VMan

⑨ Internal value

Value	HMI tag
Internal value	HMI.mtpData.VInt

Disabled view

If the "LCFL_AnaManIntHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:

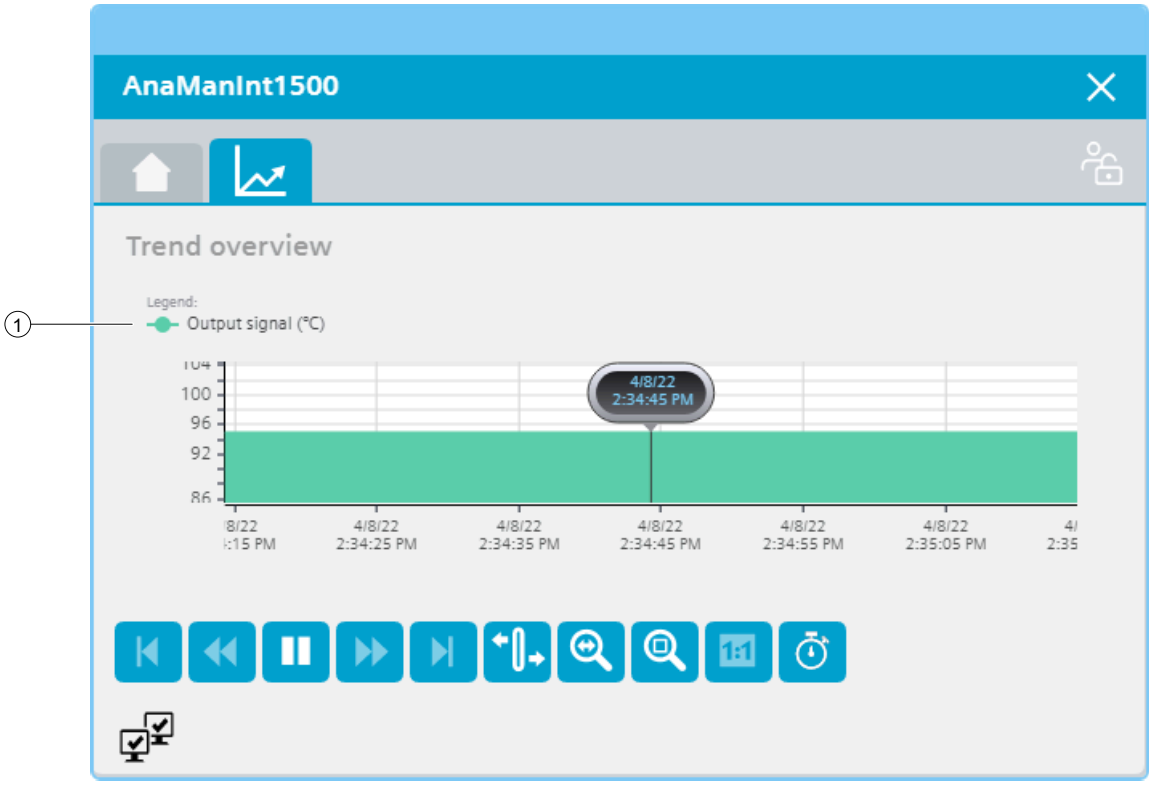


8.4.1.3 "LCFL_AnaManIntTrend" view

Introduction

The "LCFL_AnaManIntTrend" view is used for the diagnostics of values from the function block "LCFL_AnaManInt".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Output signal (unit)

Value	HMI tag
Output signal with unit	HMI.mtpData.VOut

8.4.2 Visualization of LCFL_BinManInt

8.4.2.1 Faceplate "LCFL_BinManIntSymbol"

Introduction

For visualization of the function block "LCFL_BinManInt" you can use the faceplate "LCFL_BinManIntSymbol". The interface of the program block "LCFL_BinManInt" and of the faceplate "LCFL_BinManIntSymbol" is the PLC data type "LCFL_typeMTPBinManIntSiemens".

You can find more information at LCFL_typeMTPBinManIntSiemens (Page 180).

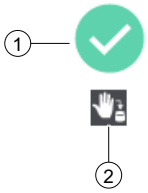
Left-click the faceplate to open the "LCFL_BinManInt" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_BinManIntHome" monitoring view is displayed. Navigate to the different views in the opened screen:

	View	Description
	LCFL_BinManIntHome (Page 363)	The monitoring view is used to display basic information.
	LCFL_BinManIntTrend (Page 367)	The trend view is used for the diagnostics of values.

Display and structure of the symbol

If the faceplate "LCFL_BinManIntSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current signal value

Symbol	HMI tag
	HMI.mtpData.VOut = 1
	HMI.mtpData.VOut = 0

② Source mode

Symbol	Mode	HMI tag
	Manual	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcChannel = 0
	Internal	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcChannel = 0

Disabled faceplate

If the faceplate "LCFL_BinManIntSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.4.2.2 "LCFL_BinManIntHome" view

Introduction

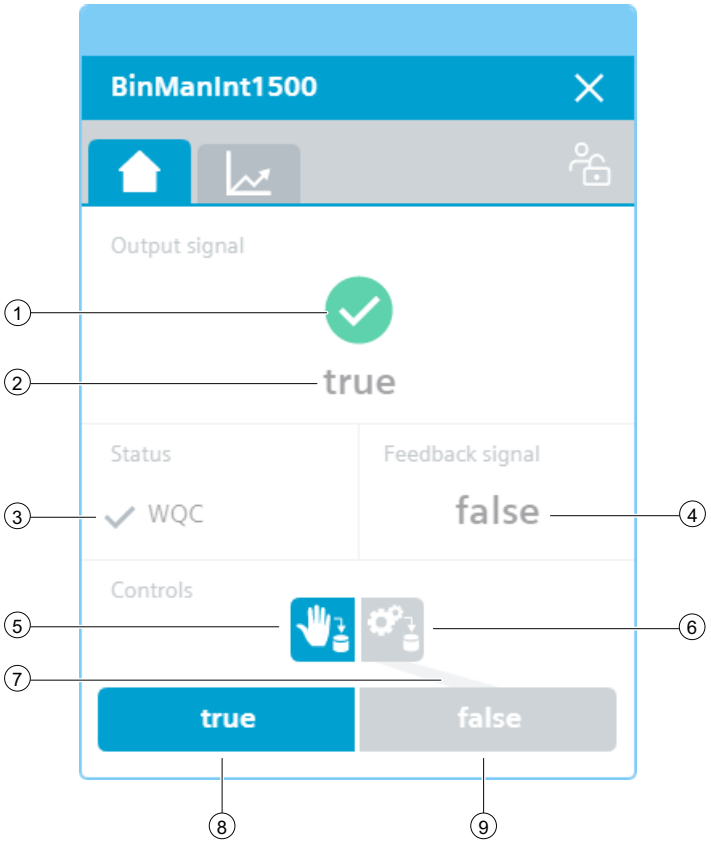
The "LCFL_BinManIntHome" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_BinManIntHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Output signal	The current signal and binary value is displayed in this area.
Status	This area contains information on the quality code.

Area	Description
Checkback signal	The feedback value is displayed in this area.
Controllers	This area contains buttons that can be enabled with a click: • "Manual" source mode • "Internal" source mode • Value output state "true" • Value output state "false"

① Current signal value

Symbol	HMI tag
	HMI.mtpData.VOut = 1
	HMI.mtpData.VOut = 0

② Current binary value

Value	HMI tag
Text replacement for false	HMI.mtpData.VState0
Text replacement for true	HMI.mtpData.VState1

③ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
	OK	HMI.mtpData.WQC <> 16#80 OR HMI.mtpData.WQC <> 16#FF

④ Feedback value

Value	HMI tag
Feedback value	HMI.mtpData.VFbk

⑤ Source mode: Manual

Symbol	State	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcManAct = 0

⑥ Source mode: Internal

Symbol	State	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1
	Not manual internal (no switchover triggered by operator)	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcIntAct = 0

⑦ Preview of the source: Internal

The gray line under the "Source mode internal" icon indicates which value output state is active when the source mode is changed to "Internal". This line is only visible when the source mode is "Manual".

Value	HMI tag
Internal value	HMI.mtpData.VInt

⑧ Value output state: true

Text replacement for "true": HMI.mtpData.VState = 1

Symbol	State	HMI tag
	Value output is active (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.VOut =1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.VOut =1)
	Value output is active	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.VOut =1
	Value output is not active (no request for change from operator)	HMI.mtpData.SrcManAct =1 AND HMI.mtpData.SrcIntAct = 0 AND HMI.mtpData.VOut =0

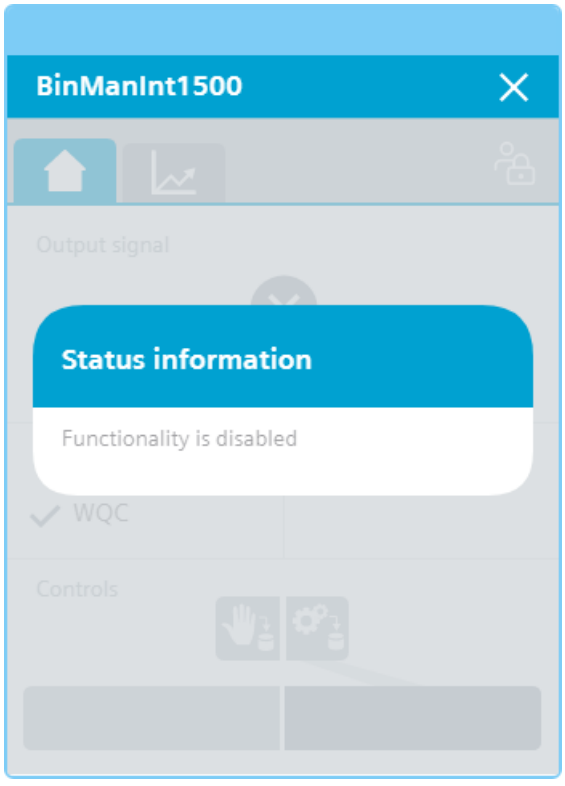
⑨ Value output state: false

Text replacement for "false": HMI.mtpData.VState = 0

Symbol	State	HMI tag
	Value output is not active (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.VOut =0) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.VOut =0)
	Value output is not active	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.VOut =0
	Value output is active (no request for change from operator)	HMI.mtpData.SrcManAct =1 AND HMI.mtpData.SrcIntAct = 0 AND HMI.mtpData.VOut =1

Disabled view

If the "LCFL_BinManIntHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:

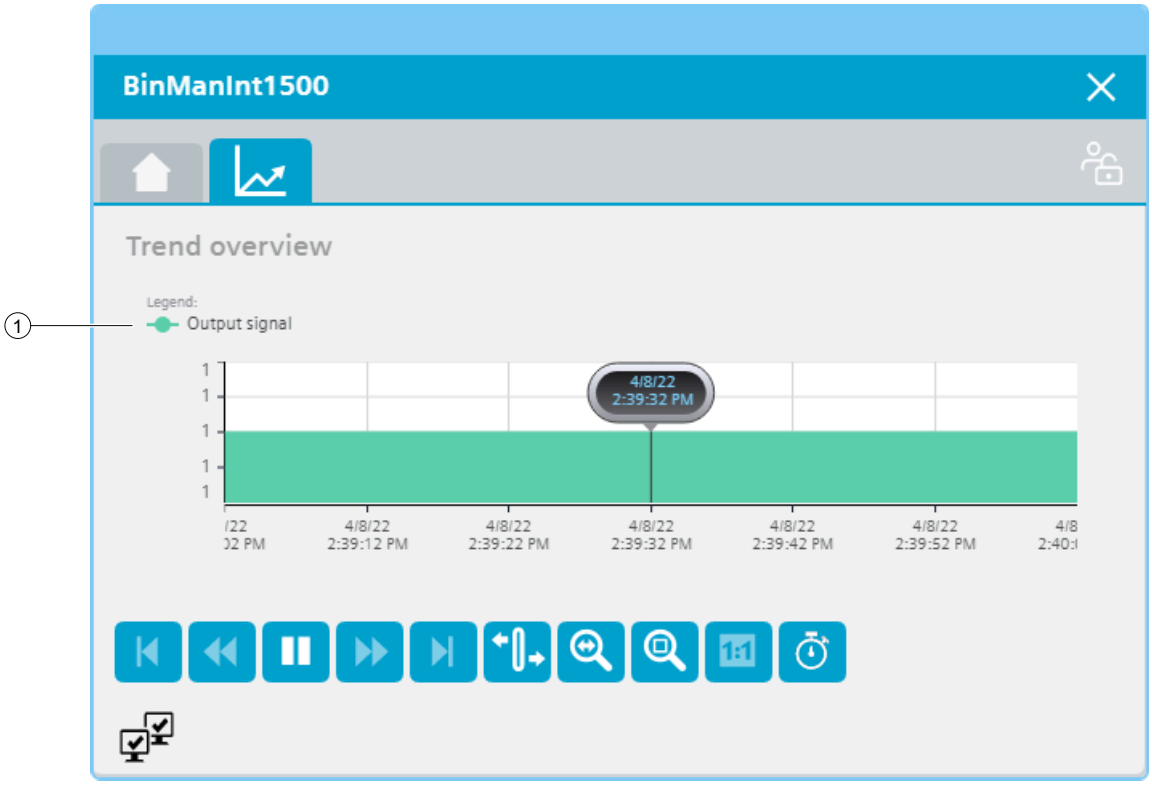


8.4.2.3 "LCFL_BinManIntTrend" view

Introduction

The "LCFL_BinManIntTrend" view is used for the diagnostics of values from the function block "LCFL_BinManInt".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Output signal

Value	HMI tag
Output signal	HMI.mtpData.VOut

8.4.3 Visualization of LCFL_DIntManInt

8.4.3.1 Faceplate "LCFL_DIntManIntSymbol"

Introduction

For visualization of the function block "LCFL_DIntManInt", you can use the faceplate "LCFL_DIntManIntSymbol". The interface of the program block "LCFL_DIntManInt" and of the faceplate "LCFL_DIntManIntSymbol" is the PLC data type "LCFL_typeMTPDIntManIntSiemens".

You can find more information at LCFL_typeMTPDIntManIntSiemens (Page 182).

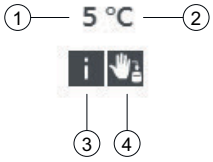
Left-click the faceplate to open the "LCFL_DIntManInt" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_DIntManIntHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Symbol	View	Description
	LCFL_DIntManIntHome (Page 371)	The monitoring view is used to display basic information.
	LCFL_DIntManIntTrend (Page 375)	The trend view is used for the diagnostics of values.

Display and structure of the symbol

If the faceplate "LCFL_DIntManIntSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① Current integer value

Value	HMI tag
Integer value	HMI.mtpData.VOut

② Unit of the integer value

Value	HMI tag
Unit of the integer value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at LCFL_typeMTPDIntManIntSiemens (Page 182).

③ Limit violations

Symbol	Meaning	HMI tag
	High limit or low limit violated	HMI.mtpData.VMin = 1 OR HMI.mtpData.VMax = 1

④ Source mode

Symbol	Mode	HMI tag
	Manual	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcChannel = 0
	Internal	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcChannel = 0

Disabled faceplate

If the faceplate "LCFL_DIntManIntSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

See also

Units of measurement (Page 11)

8.4.3.2 "LCFL_DIntManIntHome" view

Introduction

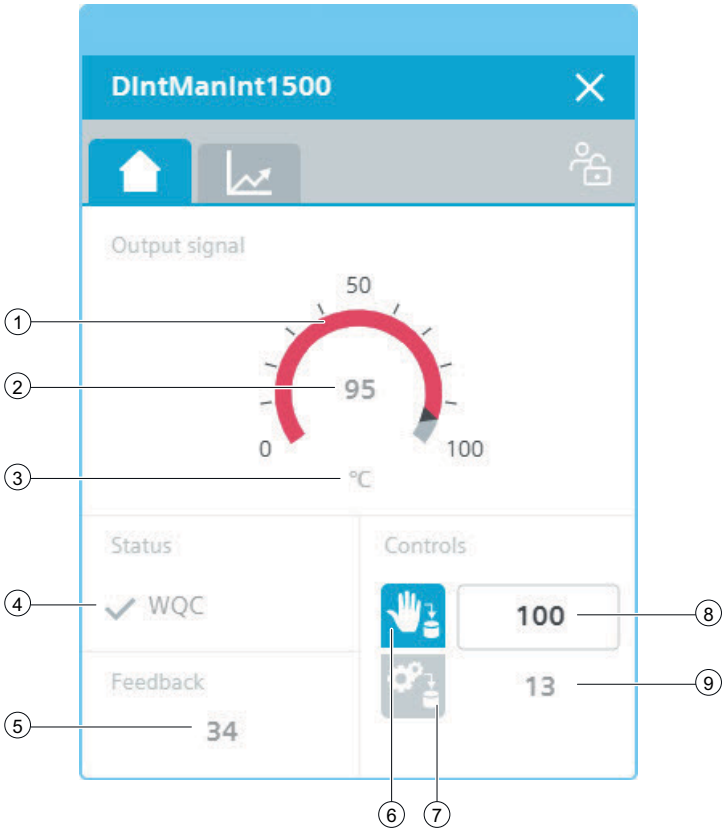
The "LCFL_DIntManIntHome" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_DIntManIntHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Output signal	The current analog value is displayed in this area.
Status	This area contains information on the quality code.
Feedback	The feedback value is displayed in this area.
Controllers	This area contains buttons that can be enabled with a click: • "Manual" source mode • "Internal" source mode An additional display shows the manual and internal values.

① Integer value in the form of an arc diagram

The scaling values "HMI.mtpData.VSclMin" and "HMI.mtpData.VSclMax" determine the range of the gauge. When the integer value is higher than "HMI.mtpData.VMax" or lower than "HMI.mtpData.VMin", the color of the gauge changes to red.

② Current integer value

Value	HMI tag
Integer value	HMI.mtpData.VOut

③ Unit of the integer value

Value	HMI tag
Unit of the integer value	HMI.mtpData.VUnit

The integer value is triggered or displayed using the text list "LCFL_Unit". You can find more information at LCFL_OSLevel – Description of function (Page 53).

④ Worst Quality Code (WQC)

Symbol	Meaning	HMI tag
	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <>16#FF
	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

⑤ Feedback value

Value	HMI tag
Feedback value	HMI.mtpData.VFbk

⑥ Source mode: Manual

Symbol	State	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcManAct = 0

⑦ Source mode: Internal

Symbol	State	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1
	Not internal (no switchover triggered by operator)	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcIntAct = 0

⑧ Manual value

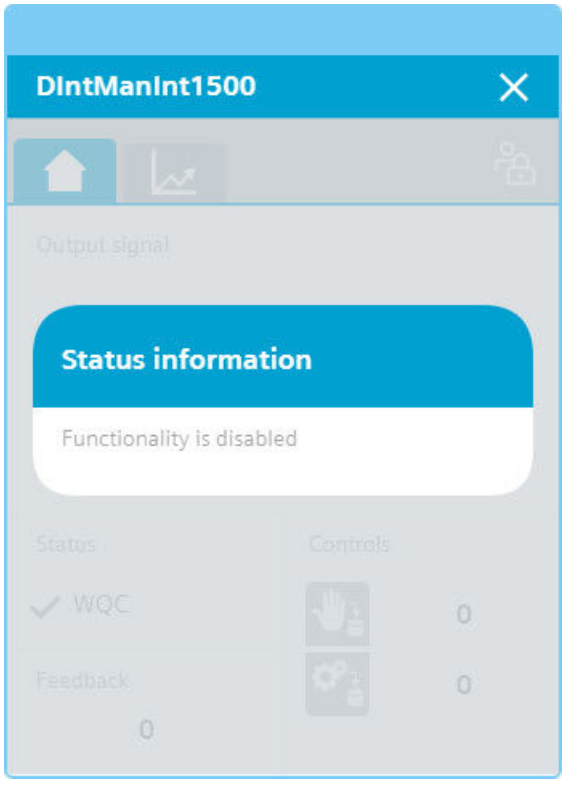
Value	HMI tag
Manual value	HMI.mtpData.VMan

⑨ Internal value

Value	HMI tag
Internal value	HMI.mtpData.VInt

Disabled view

If the "LCFL_DIntManIntHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



See also

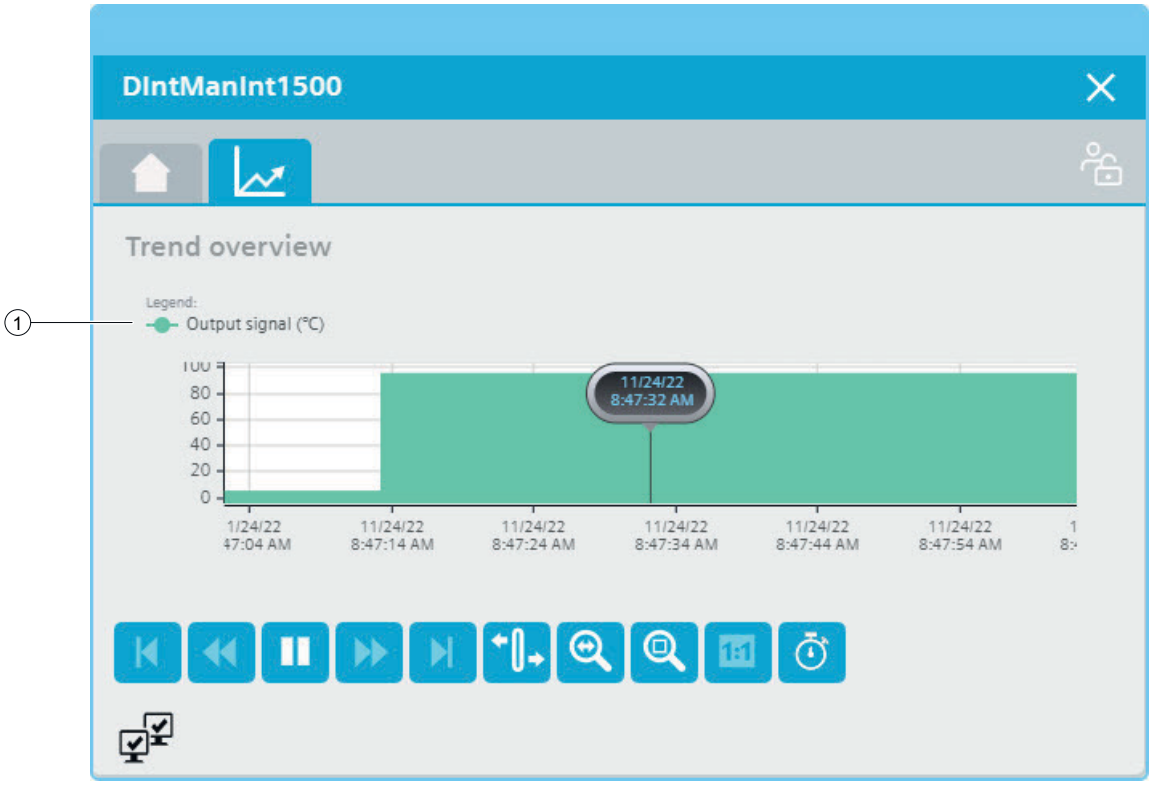
Units of measurement (Page 11)

8.4.3.3 "LCFL_DIntManIntTrend" view

Introduction

The "LCFL_DIntManIntTrend" view is used for the diagnostics of values from the function block "LCFL_DIntManInt".

Display and structure



Operator controls

Button		Function
	First data record	Shows the trend direction starting with the first logged value.
	Previous data record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next data record	Shows the trend direction of the next time interval.
	Last data record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Enlarges or reduces the time axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend view back to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Output signal (unit)

Value	HMI tag
Output signal with unit	HMI.mtpData.VOut

8.5 Control

8.5.1 Visualization of LCFL_Aggr8

8.5.1.1 Faceplate "LCFL_Aggr8Symbol"

Introduction

For visualization of the function block "LCFL_Aggr8", you can use the faceplate "LCFL_Aggr8Symbol". The interface of the program block "LCFL_Aggr8" and of the faceplate "LCFL_Aggr8Symbol" is the PLC data type "LCFL_typeAggr8Siemens".

You can find more information at LCFL_typeAggr8Siemens (Page 186).

Left-click the faceplate to open the "LCFL_Aggr8" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the symbol in runtime, the "LCFL_Aggr8Home" monitoring view is displayed. Navigate to the different views in the opened screen:

Icon	View	Description
	LCFL_Aggr8Home1 (Page 379) LCFL_Aggr8Home2 (Page 381) LCFL_Aggr8Home3 (Page 387)	The views are used to display basic information, as well as setting options of the source mode and the control of the aggregates. The number shows which Home view you are currently in. An error symbol is displayed when there is an error within a view. The affected view is displayed in red.
	LCFL_Aggr8Settings1 (Page 391) LCFL_Aggr8Settings2 (Page 393)	In the first settings view you have the option to set different times for the aggregates. In the second settings view you have the option to set the operating time for the aggregates.
	LCFL_Aggr8Alarm (Page 395)	The alarm view shows incoming alarms.
	LCFL_Aggr8Trend (Page 398)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_Aggr8Symbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:

① Current state of the control

Icon	Meaning	HMI tag
	Error in the function block	HMI.data.CollectedError = 1
	Warning in the function block	HMI.data.ErrorNoSwitch = 1

Disabled faceplate

If the faceplate "LCFL_Aggr8Symbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

8.5.1.2 "LCFL_Aggr8Home1" view

Introduction

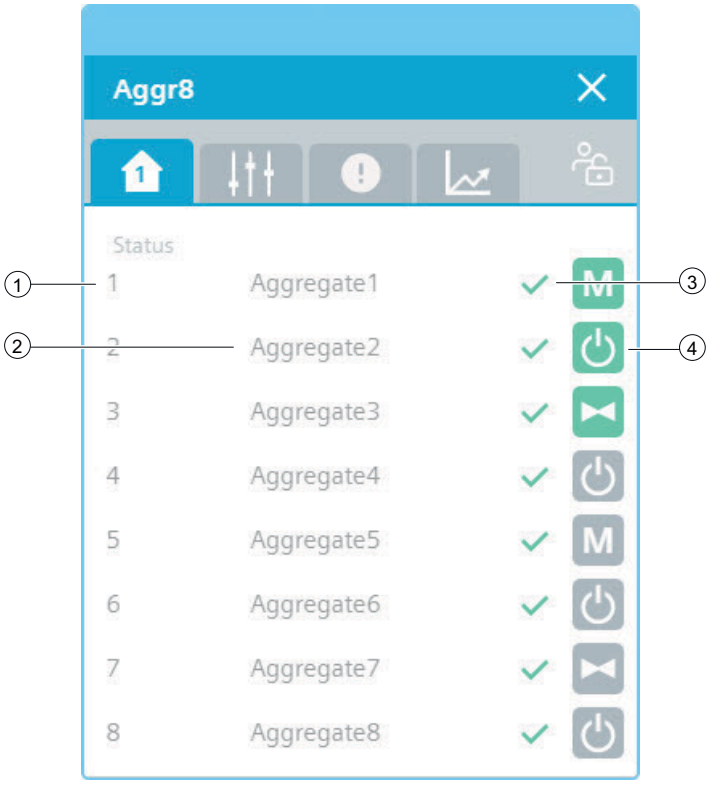
The "LCFL_Aggr8Home1" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_Aggr8Home1" view is enabled with "HMI.enabled = 1", the view appears as follows:



① Number

Number to identify the number of the aggregate. The number of a given control module is framed when the module's interconnector is active.

② Name of the aggregate

Meaning	HMI tag
Name of the aggregate (1..8)	HMI.data.AggregateTxts[0..7]

③ Status of the aggregate

Icon	State	HMI tag
	Aggregate in "Ready" state	HMI.data.Ready[0..7] = 1 AND HMI.data.Errors[0..7] = 0 AND HMI.data.AggregatesEn[0..7] = 1
	Aggregate in "Warning" state	HMI.data.Ready[0..7] = 1 AND HMI.data.Errors[0..7] = 0 AND HMI.data.AggregatesEn[0..7] = 1
	Aggregate in "Alarm" state	HMI.data.Errors[0..7] = 1 AND HMI.data.AggregatesEn[0..7] = 1

④ Symbol of the aggregate

You have the option to define the icons on the aggregate itself if the aggregate is, for example, a motor or valve.

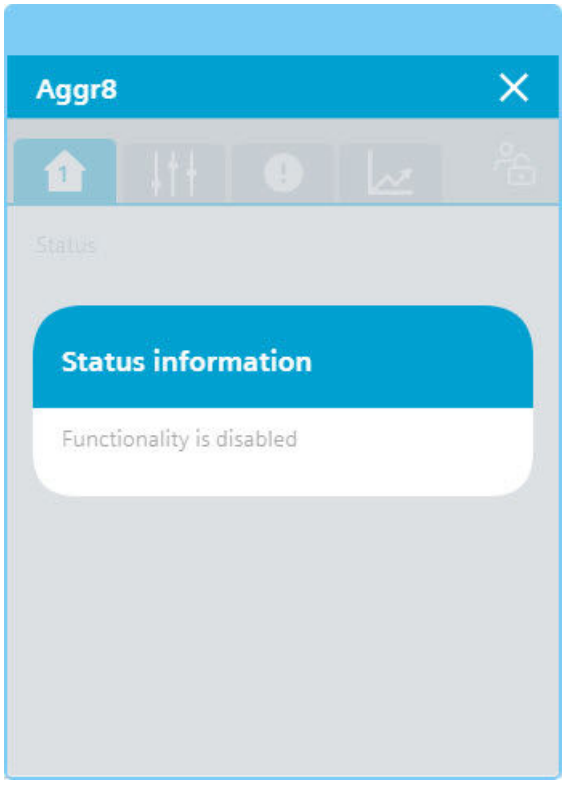
The icon is derived from "aggregateDriveTypes[]" of the configuration. If the configuration is 0 and an interconnector is active at the module, the drive type is passed through via the interconnector. The LCFL function blocks are automatically detected (drive type is between 2000 and 2999).

Icon	Meaning	HMI tag
	Aggregate is not running	HMI.data.AggregateDriveType[0..7] = 0 AND HMI.data.Ons[0..7] = 0 AND HMI.data.AggregatesEn[0..7] = 1
	Aggregate is running	HMI.data.AggregateDriveType[0..7] = 0 AND HMI.data.Ons[0..7] = 1 AND HMI.data.AggregatesEn[0..7] = 1
	Aggregate is not running	HMI.data.AggregateDriveType[0..7] = 1 AND HMI.data.Ons[0..7] = 0 AND HMI.data.AggregatesEn[0..7] = 1
	Aggregate is running	HMI.data.AggregateDriveType[0..7] = 1 AND HMI.data.Ons[0..7] = 1 AND HMI.data.AggregatesEn[0..7] = 1

Icon	Meaning	HMI tag
	Aggregate is not running	HMI.data.AggregateDriveType[0..7] = 2 AND HMI.data.Ons[0..7] = 0 AND HMI.data.AggregatesEn[0..7] = 1
	Aggregate is running	HMI.data.AggregateDriveType[0..7] = 1 AND HMI.data.Ons[0..7] = 1 AND HMI.data.AggregatesEn[0..7] = 1

Disabled view

If the "LCFL_Aggr8Home1" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



8.5.1.3 "LCFL_Aggr8Home2" view

Introduction

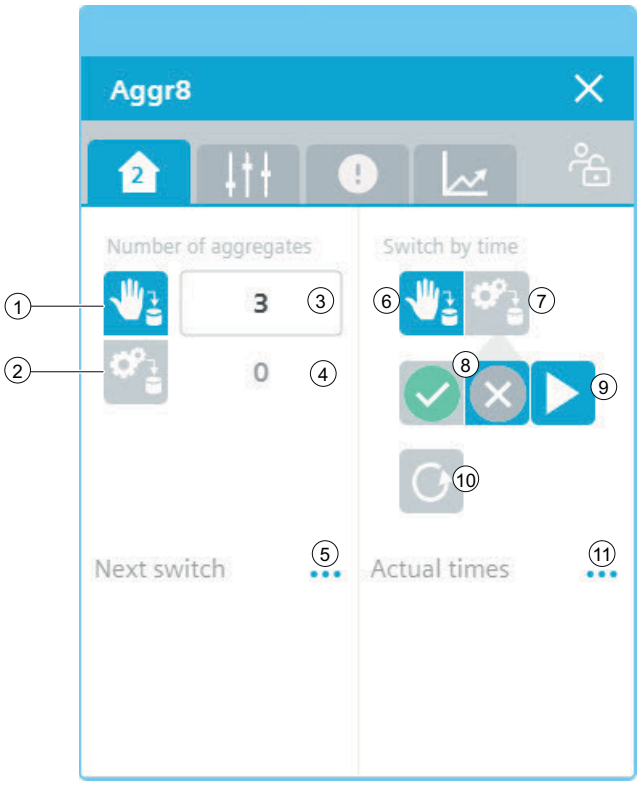
The "LCFL_Aggr8Home2" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_Aggr8Home2" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into four areas:

Area	Description
Number of aggregates	The current signal and binary value is displayed in this area. This area contains buttons that can be enabled with a click: • "Manual" source mode • "Internal" source mode
Next switch	This area contains information, for switching the next aggregate on or off, as well as the remaining runtime.
Switch by time	In this area, you can define whether a switchover is to be performed "manually" or "internally" according to time and whether the cycle time, operating time or rest time is to be used for the switchover. Switching to the next aggregate and resetting the current aggregate are also possible.
Actual times	This area shows the cycle time, operating time and rest time of the aggregates.

① Source mode for the number of aggregates: Manual

Icon	Meaning	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.data.NoSrcChannel = 0 AND HMI.data.NoSrcManAct = 1) OR (HMI.data.NoSrcChannel = 1 AND HMI.data.NoSrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.data.NoSrcChannel = 0 AND HMI.data.NoSrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.data.NoSrcIntAct = 1 AND HMI.data.NoSrcManAct = 0

② Source mode for the number of aggregates: Internal

Icon	Meaning	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.data.NoSrcChannel = 0 AND HMI.data.NoSrcIntAct = 1) OR (HMI.data.NoSrcChannel = 1 AND HMI.data.NoSrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.data.NoSrcChannel = 0 AND HMI.data.NoSrcIntAct = 1
	Not manual internal (no switchover triggered by operator)	HMI.data.NoSrcManAct = 1 AND HMI.data.NoSrcIntAct = 0

③ Manual value for the number of aggregates

Meaning	HMI tag
Manual numerical value	HMI.data.NoMan

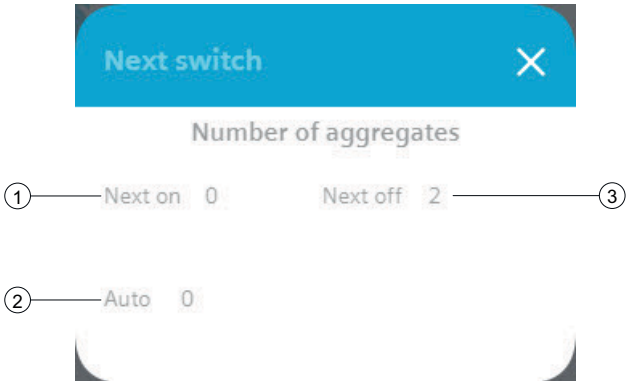
④ Internal value for the number of aggregates

Meaning	HMI tag
Internal numerical value	HMI.data.NoInt

⑤ Next switch

Icon	Meaning
•••	Information on switching

To open the information, click on the icon.



① Next on - The number of the aggregate that will be switched on next
② Next off - The number of the aggregate that will be switched off next.
③ Auto - The remaining runtime until the next aggregate is switched on/off.

⑥ Source mode for switchover by time: Manual

Icon	Meaning	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.data.SmSrcChannel = 0 AND HMI.data.SmSrcManAct = 1) OR (HMI.data.SmSrcChannel = 1 AND HMI.data.SmSrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.data.SmSrcChannel = 0 AND HMI.data.SmSrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.data.SmSrcIntAct = 1 AND HMI.data.SmSrcManAct = 0

⑦ Source mode for switchover by time: Internal

Icon	Meaning	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.data.SmSrcChannel = 0 AND HMI.data.SmSrcIntAct = 1) OR (HMI.data.SmSrcChannel = 1 AND HMI.data.SmSrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.data.SmSrcChannel = 0 AND HMI.data.SmSrcIntAct = 1
	Not manual internal (no switch-over triggered by operator)	HMI.data.SmSrcManAct = 1 AND HMI.data.SmSrcIntAct = 0

⑧ The switchover should take place over time

Icon	Meaning	HMI tag
	Switchover takes place via the operating time	Operating permit = 1 AND HMI.data.Sm = 1 AND HMI.data.SmSrcManAct = 1
	Switchover does not take place via the operating time	HMI.data.Sm = 1 AND (HMI.data.SmSrcIntAct = 1 OR Operating permit = 0)
	Switchover takes place via the cycle time	Operating permit = 1 AND HMI.data.Sm = 0 AND HMI.data.SmSrcManAct = 1
	Switchover does not take place via the cycle time	HMI.data.Sm = 0 AND (HMI.data.SmSrcIntAct = 1 OR Operating permit = 0)

⑨ Switch to the next aggregate

If more aggregates are available, you have the option to switch manually via the switchover button.

Button	Meaning	HMI tag
	Switch to the next aggregate	HMI.data.SwitchCommandManOp = 1 AND Operating permit = 1

⑩ Reset aggregate

Button	Meaning	HMI tag
	Reset required	Operating permit = 1 AND HMI.data.CollectedError = 1
	No reset required	Operating permit = 1 AND HMI.data.CollectedError = 0

⑪ Actual times

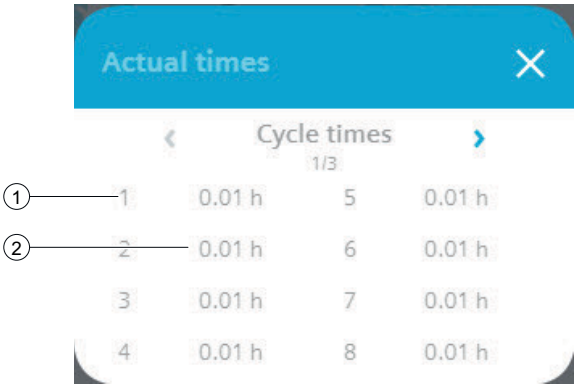
Icon	Meaning
•••	Information on cycle times, rest times and operating times

To open the information, click on the icon.

Note

Operating times and cycle times are displayed in hours. Example: 0.5 hours = 30 minutes.

Cycle times



① Number - Number of the aggregate

② Cycle times - The current cycle times of the individual aggregates.

Rest times

① Number - Number of the aggregate
② Rest times – The current rest times of the individual aggregates.

Operating times

① Number - Number of the aggregate
② Operating times – The current operating times of the individual aggregates.

8.5.1.4 "LCFL_Aggr8Home3" view

Introduction

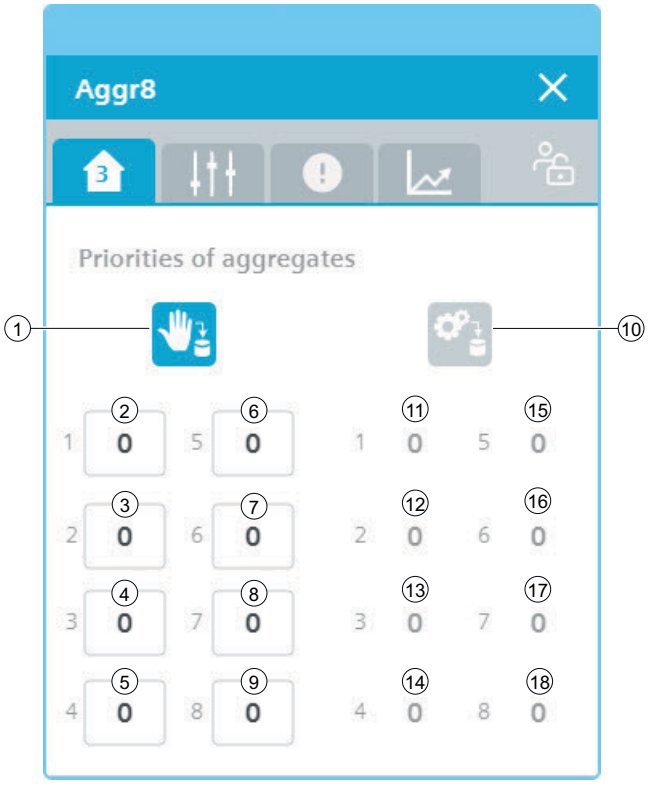
The "LCFL_Aggr8Home3" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_Aggr8Home3" view is enabled with "HMI.enabled = 1", the view appears as follows:



① Source mode for priorities: Manual

Icon	Meaning	HMI tag
	Manual (no operator control)	(Operating permit = 0 AND HMI.data.PrioSrcChannel = 0 AND HMI.data.PrioSrcManAct = 1) OR (HMI.data.PrioSrcChannel = 1 AND HMI.data.PrioSrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.data.PrioSrcChannel = 0 AND HMI.data.PrioSrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.data.PrioSrcIntAct = 1 AND HMI.data.PrioSrcManAct = 0

② Manual priority value for aggregate 1

Meaning	HMI tag
Manual priority value for aggregate 1	HMI.data.PrioritiesMan[0]

③ Manual priority value for aggregate 2

Meaning	HMI tag
Manual priority value for aggregate 2	HMI.data.PrioritiesMan[1]

④ Manual priority value for aggregate 3

Meaning	HMI tag
Manual priority value for aggregate 3	HMI.data.PrioritiesMan[2]

⑤ Manual priority value for aggregate 4

Meaning	HMI tag
Manual priority value for aggregate 4	HMI.data.PrioritiesMan[3]

⑥ Manual priority value for aggregate 5

Meaning	HMI tag
Manual priority value for aggregate 5	HMI.data.PrioritiesMan[4]

⑦ Manual priority value for aggregate 6

Meaning	HMI tag
Manual priority value for aggregate 6	HMI.data.PrioritiesMan[5]

⑧ Manual priority value for aggregate 7

Meaning	HMI tag
Manual priority value for aggregate 7	HMI.data.PrioritiesMan[6]

⑨ Manual priority value for aggregate 8

Meaning	HMI tag
Manual priority value for aggregate 8	HMI.data.PrioritiesMan[7]

⑩ Source mode for priorities: Internal

Icon	Meaning	HMI tag
	Internal (no operator control)	(Operating permit = 0 AND HMI.data.PrioSrcChannel = 0 AND HMI.data.PrioSrcIntAct = 1) OR (HMI.data.PrioSrcChannel = 1 AND HMI.data.PrioSrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.data.PrioSrcChannel = 0 AND HMI.data.PrioSrcIntAct = 1
	Not manual internal (no switch-over triggered by operator)	HMI.data.PrioSrcManAct = 1 AND HMI.data.PrioSrcIntAct = 0

⑪ Internal priority value for aggregate 1

Meaning	HMI tag
Internal priority value for aggregate 1	HMI.data.PrioritiesInt[0]

⑫ Internal priority value for aggregate 2

Meaning	HMI tag
Internal priority value for aggregate 2	HMI.data.PrioritiesInt[1]

⑬ Internal priority value for aggregate 3

Meaning	HMI tag
Internal priority value for aggregate 3	HMI.data.PrioritiesInt[2]

⑭ Internal priority value for aggregate 4

Meaning	HMI tag
Internal priority value for aggregate 4	HMI.data.PrioritiesInt[3]

⑮ Internal priority value for aggregate 5

Meaning	HMI tag
Internal priority value for aggregate 5	HMI.data.PrioritiesInt[4]

⑯ Internal priority value for aggregate 6

Meaning	HMI tag
Internal priority value for aggregate 6	HMI.data.PrioritiesInt[5]

⑰ Internal priority value for aggregate 7

Meaning	HMI tag
Internal priority value for aggregate 7	HMI.data.PrioritiesInt[6]

⑱ Internal priority value for aggregate 8

Meaning	HMI tag
Internal priority value for aggregate 8	HMI.data.PrioritiesInt[7]

8.5.1.5 "LCFL_Aggr8Settings1" view

Introduction

In the "LCFL_Aggr8Settings1" view, you have the option to set different times for the aggregates.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

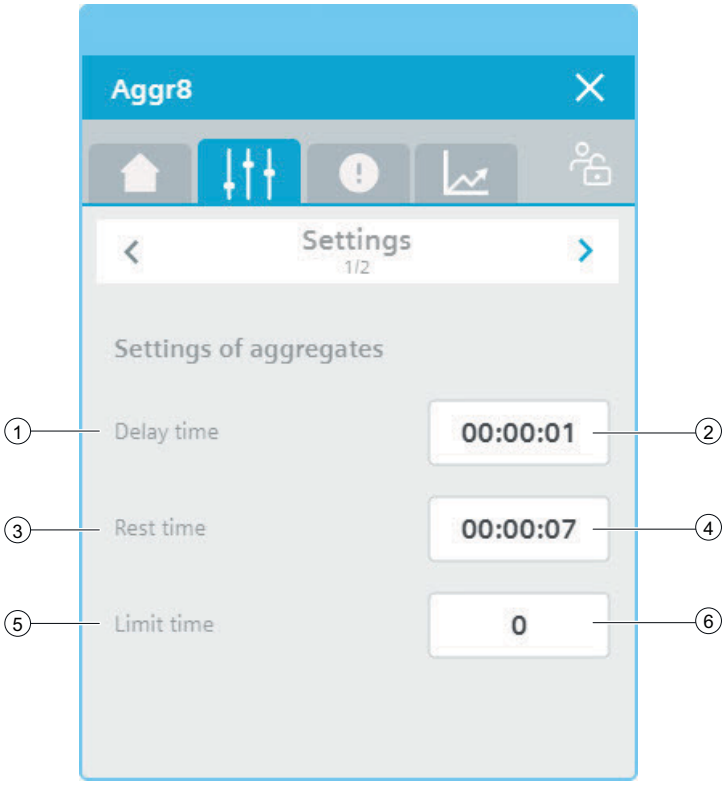
In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Note

Some time settings may lead to inconsistencies in the correct execution of the selected operating mode. To avoid this, please note the following:

- If you are using a limit time, make sure that the delay time is su iciently less than the limit. In this way, the requested aggregates can be switched on and off in time.
- Set the delay time so that the logic can receive the running status signal of the aggregates during the delay time. Otherwise, an error signal will be generated.
- Ensure that the aggregates can be switched off according to the limit time as a result of the set time configuration. Otherwise, the block stops the aggregates with an error.
- If the limit time is used (limit time is not 0), the configured priorities must be the same.

Display and structure



① Delay time:

Delay time – wait time

Time after which the "Switch on" command is given and a aggregate is switched on/off.

② Delay time (value)

Value of the delay time

③ Rest time

Rest time – Wait time/cooling time

Time after switching off a aggregate until the aggregate is ready to be switched on again.

④ Rest time (value)

Value of the rest time

⑤ Limit time

Limit time – maximum runtime of the aggregates

⑥ Limit time (value)

Limit time

8.5.1.6 "LCFL_Aggr8Settings2" view

Introduction

In the "LCFL_Aggr8Settings2" view, you have the option to set the operating time for the aggregates. The number of a control module is framed when the interconnector of the control module is active.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

Note

Operating times are displayed in hours. Example: 0.5 hours = 30 minutes.

① Operating time for aggregate 1

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

② Operating time for aggregate 2

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

③ Operating time for aggregate 3

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

④ Operating time for aggregate 4

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

⑤ Operating time for aggregate 5

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

⑥ Operating time for aggregate 6

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

⑦ Operating time for aggregate 7

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

⑧ Operating time for aggregate 8

The values can be overwritten if the module is not running and is not synchronized via an interconnector.

8.5.1.7 "LCFL_Aggr8Alarm" view

Introduction

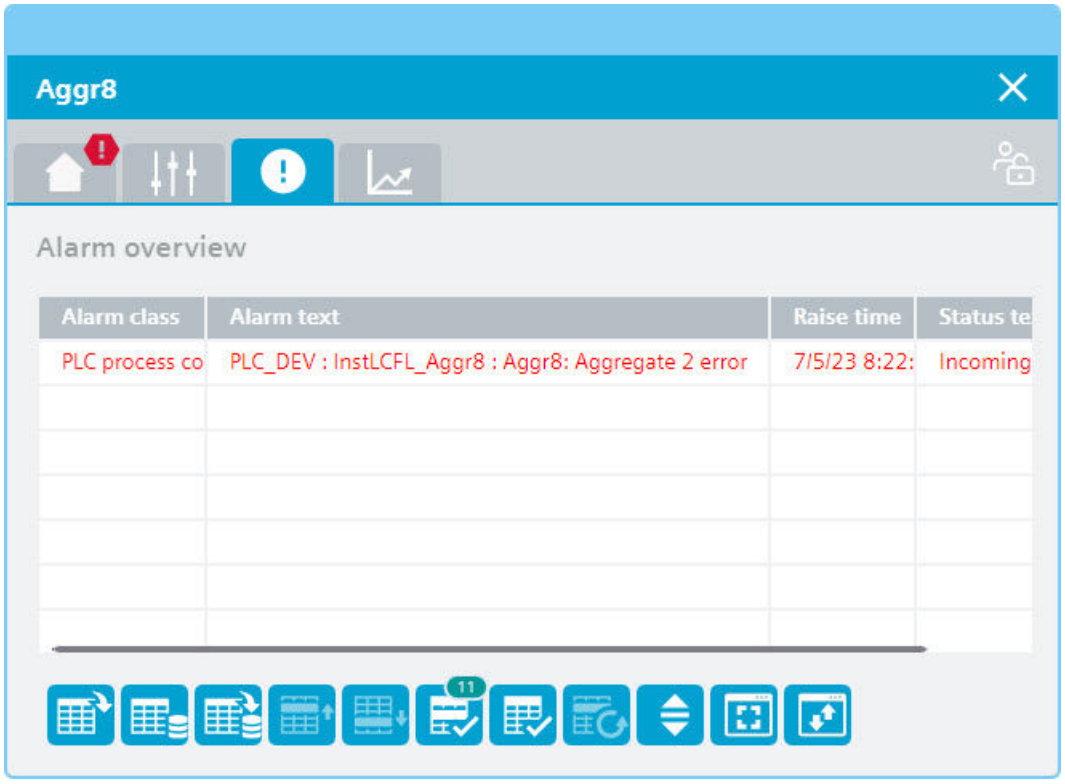
The "LCFL_Aggr8Alarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output:

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.aggregate1ErrorMessage	HMI.data.Errors[0] = 0	Aggregate 1: Error	configuration.aggregate1ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate1ErrorMessageEn = 0 The alarm is disabled.
HMI.aggregate2ErrorMessage	HMI.data.Errors[1] = 0	Aggregate 2: Error	configuration.aggregate2ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate2ErrorMessageEn = 0 The alarm is disabled.
HMI.aggregate3ErrorMessage	HMI.data.Errors[2] = 0	Aggregate 3: Error	configuration.aggregate3ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate3ErrorMessageEn = 0 The alarm is disabled.
HMI.aggregate4ErrorMessage	HMI.data.Errors[3] = 0	Aggregate 4: Error	configuration.aggregate4ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate4ErrorMessageEn = 0 The alarm is disabled.
HMI.aggregate5ErrorMessage	HMI.data.Errors[4] = 0	Aggregate 5: Error	configuration.aggregate5ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate5ErrorMessageEn = 0 The alarm is disabled.
HMI.aggregate6ErrorMessage	HMI.data.Errors[5] = 0	Aggregate 6: Error	configuration.aggregate6ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate6ErrorMessageEn = 0 The alarm is disabled.

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.aggregate7ErrorMessage	HMI.data.Errors[6] = 0	Aggregate 7: Error	configuration.aggregate7ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate7ErrorMessageEn = 0 The alarm is disabled.
HMI.aggregate8ErrorMessage	HMI.data.Errors[7] = 0	Aggregate 8: Error	configuration.aggregate8ErrorMessageEn = 1 The alarm is enabled. configuration.aggregate8ErrorMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_Aggr8" is assigned to a ProDiag function block or that a discrete alarm is configured for the parameters in the HMI. See section Configuration of the LCFL function blocks (Page 193).

Display and structure



Operator controls

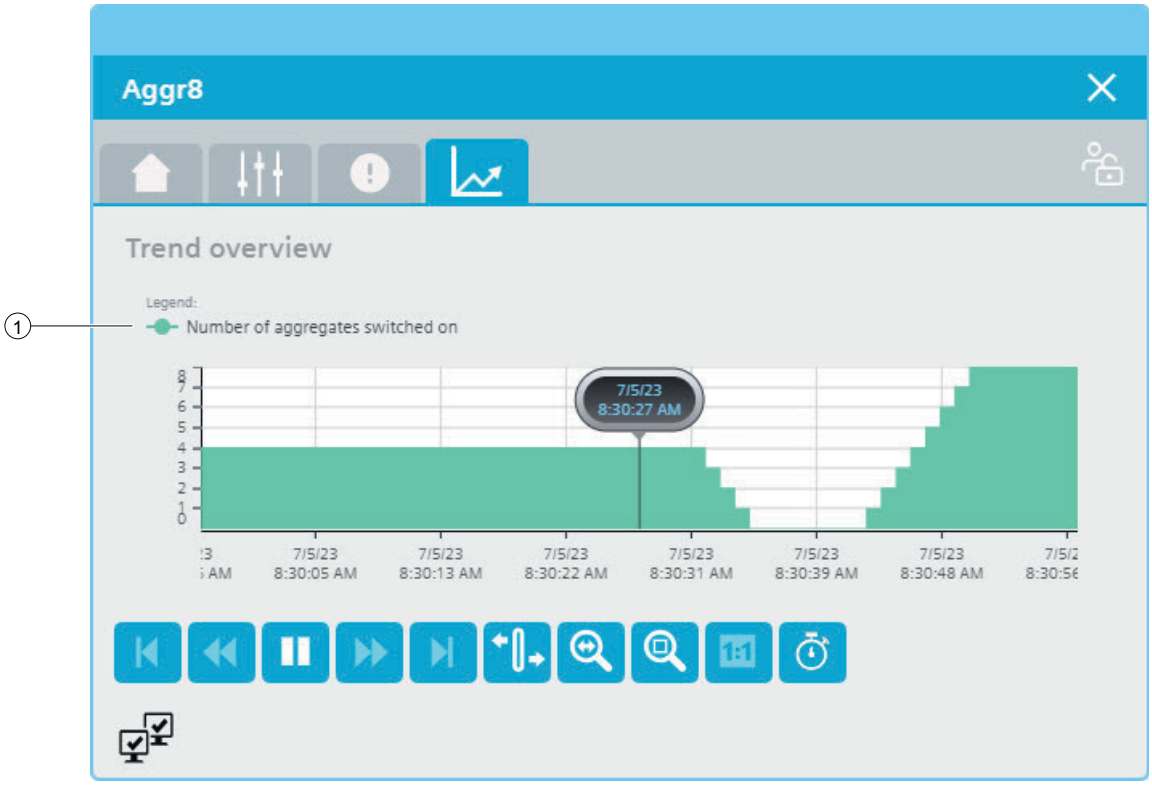
Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show current " function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show current " function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter takes into account all connected servers but no filters.
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they require single acknowledgment.
	Single acknowledgment	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show current	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show current" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show current" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the Engineering System.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.5.1.8 "LCFL_Aggr8Trend" view

Introduction

The "LCFL_Aggr8Trend" view is used for the diagnostics of values from the function block "LCFL_Aggr8".

Display and structure



Operator controls

Button		Function
	First record	Shows the trend starting with the first logged value.
	Previous record	Shows the trend of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.

Button		Function
	Next record	Shows the trend of the next time interval.
	Last record	Shows the trend up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.
	Zoom time axis +/-	Zooms in on or out from the time axis.
	Zoom area	Zooms in on any section of the trend window.
	Original view	Switches from the zoomed-in trend control to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Number of aggregates that are switched on

Text	HMI tag
Number of aggregates that are switched on	HMI.data.NumberRunning

8.5.2 Visualization of LCFL_PIDCtrl

8.5.2.1 Faceplate "LCFL_PIDCtrlSymbol"

Introduction

For visualization of the function block "LCFL_PIDCtrl", you can use the faceplate "LCFL_PIDCtrlSymbol". The interface of the program block "LCFL_PIDCtrl" and of the faceplate "LCFL_PIDCtrlSymbol" is the PLC data type "LCFL_typeMTPPIDCtrlSiemens".

You can find more information at LCFL_typeMTPPIDCtrlSiemens (Page 190).

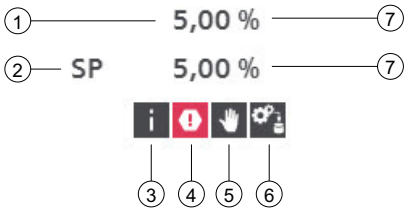
Left-click the faceplate to open the "LCFL_PIDCtrl" image containing more faceplates. These faceplates are shown as additional views in runtime:

If you click the icon in runtime, the "LCFL_PIDCtrlHome" monitoring view is displayed. Navigate to the different views in the opened screen:

Icon	View	Description
	LCFL_PIDCtrlHome (Page 402)	The monitoring view is used to display basic information as well as operating mode and source mode setting options.
	LCFL_PIDCtrlSettings (Page 408)	You can change various values in the setting view.
	LCFL_PIDCtrlAlarm (Page 410)	The alarm view shows incoming alarms.
	LCFL_PIDCtrlTrend (Page 413)	The trend view is used for the diagnostics of values.

Display and structure

If the faceplate "LCFL_PIDCtrlSymbol" is enabled with "HMI.enabled = 1", the faceplate appears as follows:



① I/O field with actual process value

Meaning	HMI variable
Process value	HMI.mtpData.PV

② I/O field with actual setpoint

Meaning	HMI variable
Setpoint	HMI.mtpData.SP

③ Indicator of violation of high or low limits (process value, setpoint, manipulated value)

Icon	Meaning	HMI variable
	High limit / low limit active	HMI.processValueLimitActive = 1 OR HMI.setpointValueLimitActive = 1 OR HMI.manipulatedValueLimitActive = 1

④ Error in the PID Compact block

Icon	Meaning	HMI variable
	Error in the PID Compact controller	HMI.processValueLimitMessage = 1 OR HMI.processValueInvalidMessage = 1 OR HMI.manipulatedValueFailedMessage = 1 OR HMI.PIDControllerTimeErrMessage = 1 OR HMI.setpointInvalidMessage = 1 OR HMI.manipulatedValueManualInvalidMessage = 1 OR HMI.substitudeValueInvalidMessage = 1 OR HMI.disturbanceValueInvalidMessage = 1

⑤ Operating mode

Icon	Mode	HMI variable
	Offline	HMI.mtpData.StateOffAct = 1
	Operator	HMI.mtpData.StateOpAct = 1

⑥ Source mode

Icon	Mode	HMI variable
	Manual	HMI.mtpData.SrcManAct = 1
	Internal	HMI.mtpData.SrcIntAct = 1

⑦ Unit of the process value and setpoint

Unit of the process value and setpoint.

Disabled faceplate

If the faceplate "LCFL_PIDCtrlSymbol" is disabled with "HMI.enabled = 0", the faceplate appears as follows:

See also

Units of measurement (Page 11)

8.5.2.2 "LCFL_PIDCtrlHome" view

Introduction

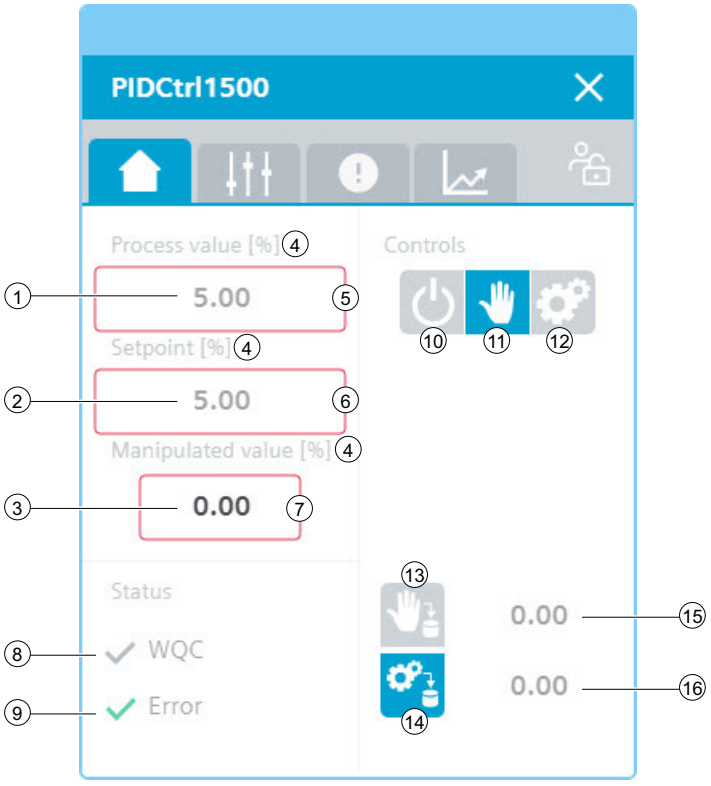
The "LCFL_PIDCtrlHome" view is a monitoring view that is used to display basic information.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure

If the "LCFL_PIDCtrlHome" view is enabled with "HMI.enabled = 1", the view appears as follows:



The view is divided into 3 areas:

Area	Description
Process value, setpoint, manipulated value	The current process value, setpoint and manipulated value are displayed in this area.
Status	This section contains information on quality code and flutter detection.
Controls	This area contains buttons that can be enabled with a click: • Operating mode (Offline / Operator / Automatic) • Source mode (Manual / Internal) An additional display shows the manual and internal values.

① I/O field with actual process value

Meaning	HMI variable
Process value	HMI.mtpData.PV

② I/O field with actual setpoint

Meaning	HMI variable
Setpoint	HMI.mtpData.SP

③ I/O field with actual manipulated value

Icon	Meaning	HMI variable
0.00	PIDCtrl in automatic mode - manipulated value write-protected	HMI.mtpData.MV = 1 AND HMI.mtpData.StateAutAct = 1
0.00	PIDCtrl in automatic mode - manipulated value can be changed	HMI.mtpData.MVMan = 1 AND HMI.mtpData.StateOpAct = 1

④ Unit of the process value, setpoint and manipulated value

Unit of the process value, setpoint and manipulated value.

⑤ Indicator of violation of high or low limit of process value

Icon	Meaning	HMI variable
i	Process value high limit / process value low limit active	HMI.processValueLimitActive = 1

⑥ Indicator of violation of high or low limit of setpoint

Icon	Meaning	HMI variable
i	Setpoint high limit / setpoint low limit active	HMI.setpointValueLimitActive = 1

⑦ Indicator of violation of high or low limit of manipulated value

Icon	Meaning	HMI variable
i	Manipulated value high limit / manipulated value low limit active	HMI.manipulatedValueLimitActive = 1

⑧ Worst Quality Code (WQC)

Icon	Meaning	HMI variable
×	Not OK	HMI.mtpData.WQC <> 16#80 AND HMI.mtpData.WQC <> 16#FF
✓	OK	HMI.mtpData.WQC = 16#80 OR HMI.mtpData.WQC = 16#FF

⑨ Monitoring error

The display is only visible when "HMI.mtpData.MonEn = 1".

Icon	Meaning	HMI variable
	No error	HMI.processValueLimitMessage = 0 AND HMI.processValueInvalidMessage = 0 AND HMI.manipulatedValueFailedMessage = 0 AND HMI.PIDControllerTimeErrMessage = 0 AND HMI.setpointInvalidMessage = 0 AND HMI.manipulatedValueManualInvalidMessage = 0 AND HMI.substitudeValueInvalidMessage = 0 AND HMI.disturbanceValueInvalidMessage = 0
	Error in the PID Compact controller	HMI.processValueLimitMessage = 1 OR HMI.processValueInvalidMessage = 1 OR HMI.manipulatedValueFailedMessage = 1 OR HMI.PIDControllerTimeErrMessage = 1 OR HMI.setpointInvalidMessage = 1 OR HMI.manipulatedValueManualInvalidMessage = 1 OR HMI.substitudeValueInvalidMessage = 1 OR HMI.disturbanceValueInvalidMessage = 1

⑩ Operating mode: Offline

Button	State	HMI variable
	Offline (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOffAct = 1)
	Offline	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOffAct = 1 AND Operating permit = 1
	Not Offline (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOffAct = 0

⑪ Operating mode: Operator

Button	State	HMI variable
	Operator (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateOpAct = 1)
	Operator	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateOpAct = 1 AND Operating permit = 1
	Not operator (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateOpAct = 0

⑫ Operating mode: Automatic

Button	State	HMI variable
	Automatic (no operator authorization)	(HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 0) OR (HMI.mtpData.StateChannel = 1 AND HMI.mtpData.StateAutAct = 1)
	Automatic	HMI.mtpData.StateChannel = 0 AND HMI.mtpData.StateAutAct = 1 AND Operating permit = 1
	Not automatic mode (no switchover triggered by operator or automatic mode)	HMI.mtpData.StateAutAct = 0

⑬ Source mode: Manual

Icon	State	HMI variable
	Manual (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcManAct = 1)
	Manual	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcManAct = 1
	Not manual (no switchover triggered by operator)	HMI.mtpData.SrcIntAct = 1 AND HMI.mtpData.SrcManAct = 0

⑭ Source mode: Internal

Icon	State	HMI variable
	Internal (no operator control)	(Operating permit = 0 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1) OR (HMI.mtpData.SrcChannel = 1 AND HMI.mtpData.SrcIntAct = 1)
	Internal	Operating permit = 1 AND HMI.mtpData.SrcChannel = 0 AND HMI.mtpData.SrcIntAct = 1
	Not internal (no switchover triggered by operator)	HMI.mtpData.SrcManAct = 1 AND HMI.mtpData.SrcIntAct = 0

⑮ Manual setpoint

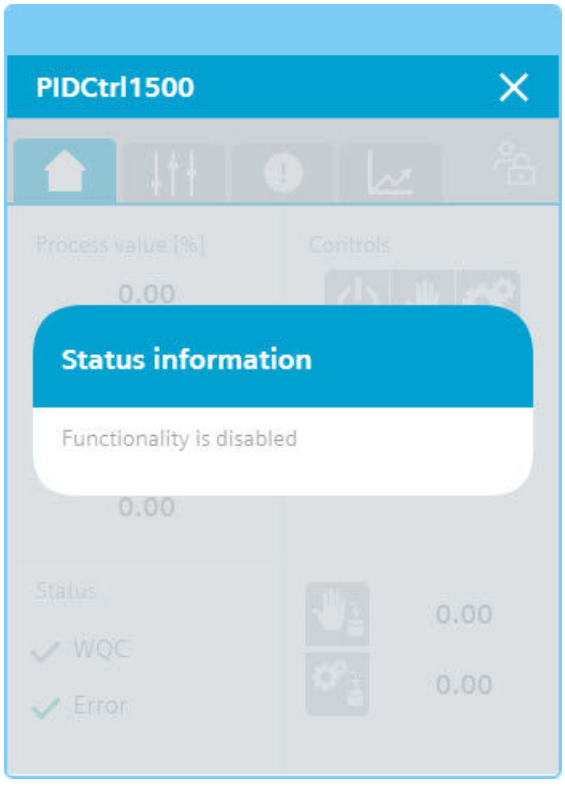
Meaning	HMI variable
Manual setpoint	HMI.mtpData.SPMan

⑯ Internal setpoint

Meaning	HMI variable
Internal setpoint	HMI.mtpData.SPInt

Disabled view

If the "LCFL_PIDCtrlHome" view is disabled with "HMI.enabled = 0", the view with the following status information appears:



See also

Units of measurement (Page 11)

8.5.2.3 "LCFL_PIDCtrlSettings" view

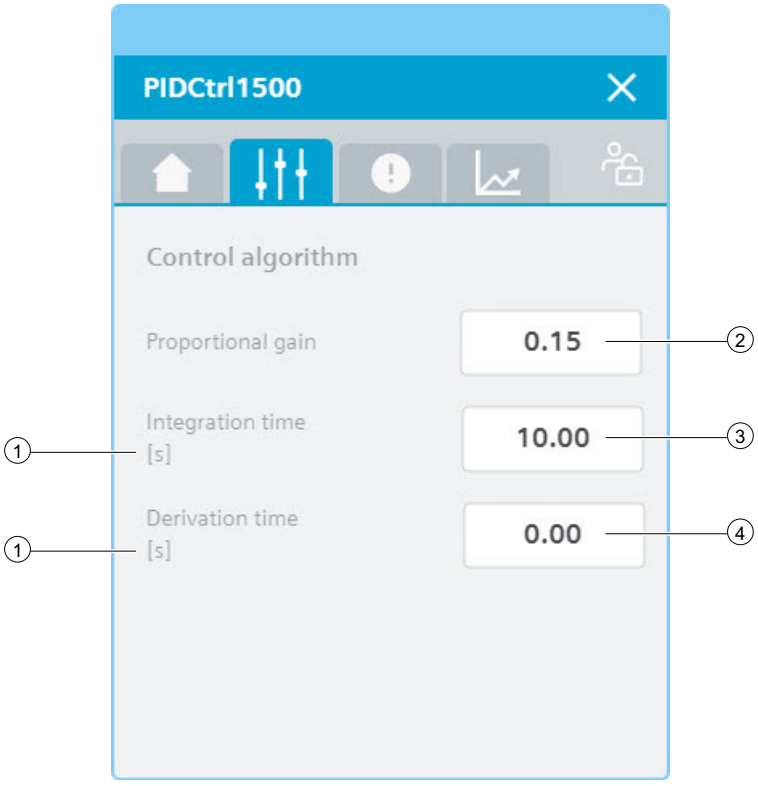
Introduction

You can change various values in the "LCFL_PIDCtrlSettings" view.

To operate the view, you need at least one operator authorization, such as HMI Operator. You can find more information in the TIA Portal help.

In addition, enable the OS level. You can find more information at LCFL_OSLevel – Description of function (Page 53).

Display and structure



① Unit of the integration time and differential time

Meaning	Value
Unit of the integration time and differential time	Seconds

The value is permanently set to seconds [s] and cannot be changed.

② Proportional gain

Meaning	HMI variable
Proportional gain	HMI.mtpData.P AND Operating permit = 1

③ Integration time

Meaning	HMI variable
Integration time	HMI.mtpData.Ti AND Operating permit = 1

④ Differential time

Meaning	HMI variable
Differential time	HMI.mtpData.Td AND Operating permit = 1

8.5.2.4 "LCFL_PIDCtrlAlarm" view

Introduction

The "LCFL_PIDCtrlAlarm" view is used for working with alarms. You can activate or deactivate each individual alarm. The following alarms are output:

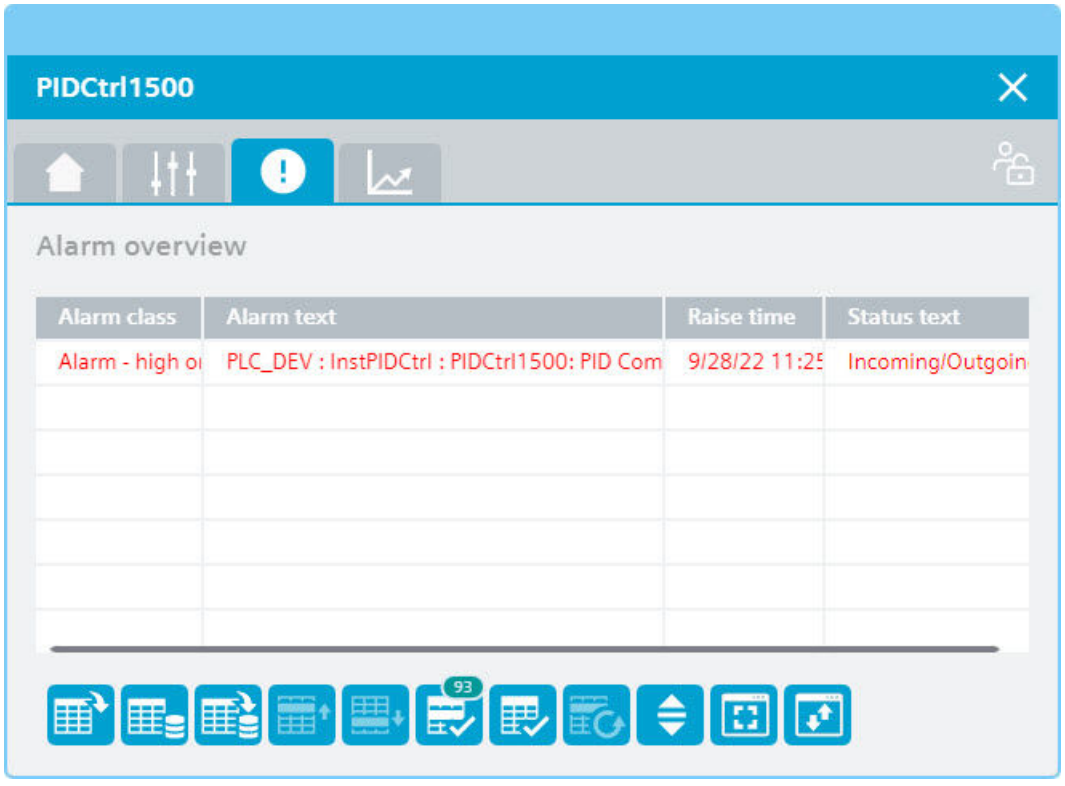
Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.processValueLimit-Message	processValueMaxActive OR processValueMaxActive	Process value limit error	configuration.processValueLimitMes-sageEn = 1 The alarm is enabled. configuration.processValueLimitMes-sageEn = 0 The alarm is disabled.
HMI.processValueInvalid-Message	Invalid process value. The value has an invalid number format.	Invalid process value	configuration.processValueInvalidMes-sageEn = 1 The alarm is enabled. configuration.processValueInvalidMes-sageEn = 0 The alarm is disabled.
HMI.manipulatedValueFai-ledMessage	Calculation of output value failed. Check the PID parameters.	Manipulated value failed	configuration.manipulatedValueFailedMes-sageEn = 1 The alarm is enabled. configuration.manipulatedValueFailedMes-sageEn = 0 The alarm is disabled.
HMI.PIDControllerTimeErr-Message	Sampling time error: PID Compact is not called within the sampling time of the cyclic interrupt OB.	PID controller time error	configuration.PIDControllerTimeErrMes-sageEn = 1 The alarm is enabled. configuration.PIDControllerTimeErrMes-sageEn = 0 The alarm is disabled.
HMI.setpointInvalidMes-sage	Invalid setpoint value. Value has invalid number format.	Invalid setpoint value	configuration.setpointInvalidMessageEn = 1 The alarm is enabled. configuration.setpointInvalidMessageEn = 0 The alarm is disabled.

Parameter	Condition	Alarm text	Alarm enabled / disabled
HMI.manipulatedValueManualInvalidMessage	Invalid manipulated value. Value has invalid number format.	Invalid manipulated value by manual value	configuration.manipulatedValueManualInvalidMessageEn = 1 The alarm is enabled. configuration.manipulatedValueManualInvalidMessageEn = 0 The alarm is disabled.
HMI.substitudeValueInvalidMessage	Invalid substitute output tag value. Value has invalid number format.	Invalid substitute output value	configuration.substitudeValueInvalidMessageEn = 1 The alarm is enabled. configuration.substitudeValueInvalidMessageEn = 0 The alarm is disabled.
HMI.disturbanceValueInvalidMessage	Invalid disturbance value. Value has invalid number format.	Invalid disturbance value	configuration.disturbanceValueInvalidMessageEn = 1 The alarm is enabled. configuration.disturbanceValueInvalidMessageEn = 0 The alarm is disabled.

The requirement is that the instance data block of the function block "LCFL_PDICtrl" is assigned to a ProDiag function block or a discrete alarm is configured in the HMI for the parameters. See section Configuration of the LCFL function blocks (Page 193).

You can find more information about error bits of PID Compact in the PID Compact documentation.

Display and structure



Operator controls

Button		Function
	Show active alarms	Displays the currently active alarms.
	Show logged alarms	Displays the logged alarms.
	Update and show logged alarms	Updates and displays the logged alarms.
	Previous line	Selects the previous alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show current " function is deactivated.
	Next line	Selects the next alarm in relation to the currently selected alarm. The visible area of the alarm control is moved. This button can only be operated if the "Show current " function is deactivated.
	Single acknowledgment	Acknowledges a single alarm. A counter shows how many alarms are unacknowledged. The counter takes into account all connected servers but no filters.

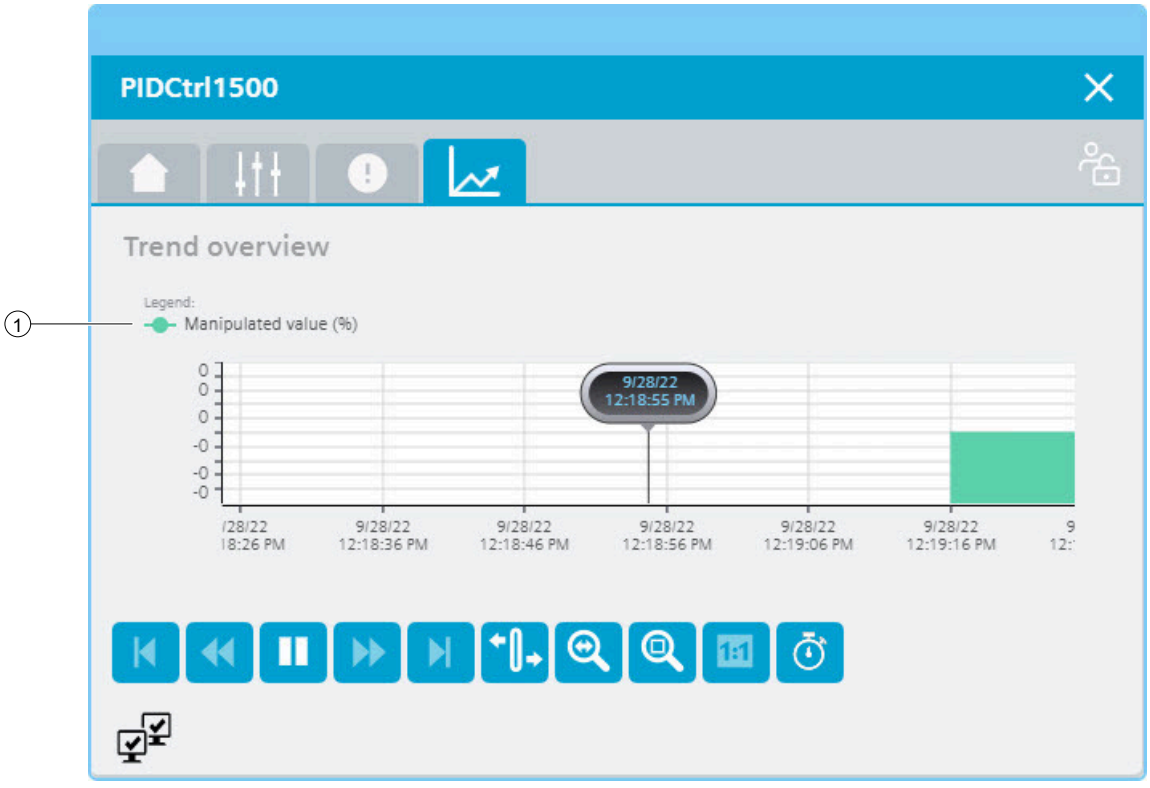
Button		Function
	Group acknowledgment	Acknowledges all active visible alarms in the alarm control that require acknowledgment, unless they require single acknowledgment.
	Single acknowledgment	Resets the alarm. Relevant for alarms with the state machine "Alarm with acknowledgment and confirmation" that have already been acknowledged and are outgoing.
	Show current	Defines whether the current alarm is always selected in the alarm control. Button not pressed: The "Show current" function is active: • The current alarms in the alarm control are always displayed first. • The visible area of the alarm control is moved automatically, as needed. • You cannot select the alarms individually or sort them by column. Button pressed: The "Show current" function is paused.
	Selection display	Opens a dialog for filtering alarms. You can define the filter criteria or filter the alarms by criteria defined in the Engineering System.
	Sorting setup	Opens a dialog for setting user-defined sort criteria for the displayed alarms.

8.5.2.5 "LCFL_PIDCtrlTrend" view

Introduction

The "LCFL_PIDCtrlTrend" view is used for the diagnostics of values from the function block "LCFL_PIDCtrl".

Display and structure



Operator controls

Button		Function
	First record	Shows the trend starting with the first logged value.
	Previous record	Shows the trend of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next record	Shows the trend of the next time interval.
	Last record	Shows the trend up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Button		Function
	Zoom time axis +/-	Zooms in on or out from the time axis.
	Zoom area	Zooms in on any section of the trend window.
	Original view	Switches from the zoomed-in trend control to the normal view.
	Select time range	Opens the dialog for setting the time range displayed in the trend window.

① Legend: Manipulated value (unit)

Text	HMI variable
Manipulated value with unit (%)	HMI.mtpData.MV

8.6 Interface of the symbol faceplate.

Introduction

For the visualization in runtime and the operator authorization, use the following faceplate interface:

Property	Description
moduleData	The instance data of the PLC data type "LCFL_typeMTPSiemens" of a function block are connected.
OSLevelData	To enable operator authorization, the internal HMI tag "LCFL_OSLevel" is connected from the tag list "LCFL_InternalTags".
OSLevel	In order for a text to be output for the tag "LCFL_OSLevel", the text list "LCFL_OSLevel" is connected.
unit	The text list "LCFL_Unit" is connected so that the integer value can be resolved or displayed using the text list. This property is only available if the function block has a unit. You can find more information at Units of measurement (Page 11).
format	Entering "{F3}", for example, specifies that analog values are output with three decimal places (x.xxx). If nothing is specified, the analog values are always displayed with two decimal places (x.xx). "F" stands for "float".
activeColorEnabled	This color is used, for example, for the "Off" control elements. In addition, this color is used for the header bar and for active navigation elements of the opened screen. The default value is blue (0, 0, 255).

Property	Description
inactiveColor	This color is used e.g. for the "Not Off" control elements (no switch-over triggered by operator or automatic mode) The default value is blue (0, 0, 255).
inactiveColor	This color is used e.g. for the "Off" control elements (no operator authorization) In addition, this color is used for inactive navigation elements of the opened screen. The default value is blue (0, 0, 255).

Requirement

- The "WinCC Unified PC RT" HMI device has been created.
- An image has been created.
- A symbolic I/O field is created and linked to the tag "LCFL_OSLevel" and the text list "LCFL_OSLevel".
  You can find more information at LCFL_OSLevel – Description of function (Page 53).

Creating an interface from the PLC to HMI

1. In the area of the HMI device under "HMI tags", click "Add new tag table".
   A new tag table is created.
2. Open the new tag table.
3. Drag-and-drop the "HMI" structure from the instance data block into the tag table from the PLC area under "Program blocks". Select only the data block and select the "HMI" tag from the detail view.
   The entry "<Name of the instance data block>_HMI" with the associated PLC data type "LCFL_typeMTPSiemens" is created.

Using faceplates and supplying with interfaces

1. From the global library under "Control function library > Master copies", drag and drop the folder that belongs to the function block, such as Drives, to the "Screens" folder in your project.
2. Open your configured screen.
3. From the project library, drag and drop the associated faceplate into the screen, for example, "LCFL_MonAnaDrvSymbol".
4. In the Inspector window under "Properties", go to "Properties > Miscellaneous > Interface".
5. Select the created entry of the tag table under "moduleData" in the "Static value" column.
6. Under "OSLevelData" in the "Static value" column, select the "LCFL_OSLevel" tag from the "LCFL_InternalTags" tag list.
7. Select the "LCFL_OSLevel" text list under "OSLevel" in the "Static value" column.
8. If the function block has a unit, select the text list "LCFL_Unit" in the "Static value" column under "unit".

9. If necessary, change the "format" property for the configuration of the decimal places.
10. Change the colors for display in runtime.
    Suggestion for an optimal color configuration:
    - activeColorEnabled (0, 161, 209)
    - inactiveColor (205, 211, 215)
    - activeColorDisabled (181, 190, 197)

Defining the unit of measurement

The units of measurement are defined in the global data block. You can find more information at Interconnecting the LCFL instance data block with the PLC data type "Config" (Page 195).

1. Double-click the global data block.
2. Under the tags that end with "Unit", enter the number of the unit in the "Default value" column.

8.7 Automatic visualization with SiVArc

Introduction

With the installation of the option package SiVArc (SIMATIC Visualization Architect) you can have the visualization generated automatically. Rules define the assignment between the control program and the visualization elements. When executing these rules, SiVArc analyzes the control program and automatically generates the visualization.

Requirement

- The master copies are copied from the global library to the project library.
- The screen rules are copied from the global library in your project under "Common data > SiVArc > Screen rules".
- The copy rules are copied from the global library in your project under "Common data > SiVArc > Copy rules".
- If you use discrete alarms instead of ProDiag: The alarm rules are copied from the global library in your project under "Common data > SiVArc > Alarm rules".

Rules

You can apply the following rules to the function blocks:

Number	Folder group in the library	Description	Valid for function block
1	SiVArc > General	The copy rule "LCFL_General_CopyRules" is used to implement the internal tags "LCFL_InternalTags" from the tag table "LCFL_InternalTags" ("HMI tags" from library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
		The copy rule "LCFL_General_CopyRules" is used to implement the text list "LCFL_OSLevel" ("Text and graphic lists" from library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
		The copy rule "LCFL_General_CopyRules" is used to implement the text list "LCFL_Unit" ("Text and graphic lists" from library).	MonAnaDrv, MonAnaVlv, AnaMon, DIntMon, AnaManInt, DIntManInt, PIDCtrl, Aggr8
2	SiVArc > SIMATIC S7-1200 > PLC hardware	The master copy "LCFL_1200_SiVArc" is used for screen rules "LCFL_1200_ScreenRules" to create symbols (faceplate from library = LCFL_1200_<Function block name>Icon) for each object instance from a "SIMATIC S7-1200" hardware family. The master copy must be copied to the master copies of the project library.	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
		The alarm rule "LCFL_1200_AlarmRules" is used for creating the discrete alarms for each object instance from a hardware family "SIMATIC S7-1200" ("HMI alarms > General > WinCC Unified > Discrete alarms" from library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, PIDCtrl, Aggr8
		The copy rule "LCFL_1200_CopyRules" is used to create screen objects (screen from library = LCFL_1200_<Function block name>).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
		The screen rule "LCFL_1200_ScreenRules" is used to create symbols (faceplate from library = LCFL_1200_<Function block name>Icon) for each object instance from a "SIMATIC S7-1200" hardware family into the screen "LCFL_1200_SiVArc".	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
3	SiVArc > SIMATIC S7-1500 > General	The copy rule "LCFL_1500_CopyRules" is used to create screen objects (screen from library = LCFL_1500_<Function block name>).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8

Number	Folder group in the library	Description	Valid for function block
4	SiVArc SIMATIC S7-1500 > PLC hardware	The master copy "LCFL_SiVArc" is used for screen rule "LCFL_ScreenRules" to create symbols (faceplate from library = LCFL_<Function block name>Icon) for each object instance from a "SIMATIC S7-1500" hardware family (the master copy must be copied to the master copies of the project library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
		The alarm rule "LCFL_AlarmRules" is used to create the discrete alarms for each object instance from a "SIMATIC S7-1500" hardware family ("HMI alarms > General > WinCC Unified > Discrete alarms" from the library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, PIDCtrl, Aggr8
		The screen rule "LCFL_ScreenRules" is used to create symbols (faceplate from library = LCFL_<Function block name>Icon) for each object instance from a "SIMATIC S7-1500" hardware family into the screen "LCFL_SiVArc".	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
5	SiVArc > SIMATIC S7-1500 > PLC software	The master copy "LCFL_SW_SiVArc" is used for screen rule "LCFL_SW_ScreenRules" to create symbols (faceplate from library = LCFL_<Function block name>Icon) for each object instance from a "SIMATIC S7-1500 Software Controller" hardware family (the master copy must be copied to the master copies of the project library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8
		The alarm rule "LCFL_SW_AlarmRules" is used to create the discrete alarms for each object instance from a "SIMATIC S7-1500 Software Controller" hardware family ("HMI alarms > General > WinCC Unified > Discrete alarms" from the library).	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, PIDCtrl, Aggr8
		The screen rule "LCFL_SW_ScreenRules" is used to create symbols (faceplate from library = LCFL_1500_<Function block name>Icon) for each object instance from a "SIMATIC S7-1500 Software Controller" hardware family into the screen "LCFL_SW_SiVArc".	MonAnaDrv, MonAnaVlv, MonBinVlv, MonBinDrv, AnaMon, BinMon, DIntMon, StringView, AnaManInt, BinManInt, DIntManInt, LockView4, LockView8, PIDCtrl, Aggr8

To use the rules, copy the corresponding master copies to the appropriate element within the SiVArc folder in your project.

For more information, refer to the SiVArc documentation.

References

9

9.1 Frequently used units of measurement

The following table lists the most frequently used units of measurement according to IEC 61158:

Value	Display	Description
1000	K	Kelvin
1001	°C	Degrees Celsius
1002	°F	Degrees Fahrenheit
1005	°	Degree
1006	'	Minute
1007	"	Second
1010	m	Meter
1013	mm	Millimeter
1018	ft	Foot
1023	m^2	Square meter
1038	L	Liter
1041	hl	Hectoliter
1054	s	Second
1058	min	Minute
1059	h	Hour
1060	d	Day
1061	m/s	Meters per second
1077	Hz	Hertz
1081	kHz	Kilohertz
1082	1/s	Per second
1083	1/min	Per minute
1088	kg	Kilogram
1092	t	Metric ton
1100	g/cm^3	Grams per cubic centimeter
1105	g/L	Grams per liter
1120	N	Newton
1123	mN	Millinewton
1130	Pa	Pascal
1133	kPa	Kilopascal
1137	bar	Bar
1138	mbar	Millibar
1149	mmH_2O	Millimeters of water column
1175	Wh	Watt hour
1179	kWh	Kilowatt hour
1181	$kcal_{th}$	Kilocalorie

Value	Display	Description
1190	kW	Kilowatt
1209	A	Ampere
1211	mA	Milliampere
1221	Ah	Ampere hour
1240	V	Volt
1349	m^3/h	Cubic meters per hour
1353	L/h	Liters per hour
1384	mol	Mol
1422	pH	pH value

9.2 All units of measurement

The following table lists all units of measurement according to IEC 61158:

Value	Display	Description
1000	K	Kelvin
1001	°C	Degrees Celsius
1002	°F	Degrees Fahrenheit
1003	°R	Degrees Rankine
1004	rad	Radian
1005	°	Degree
1006	'	Minute
1007	"	Second
1008	gon	Gon
1009	r	Revolution
1010	m	Meter
1011	km	Kilometer
1012	cm	Centimeter
1013	mm	Millimeter
1014	µm	Micrometer
1015	nm	Nanometer
1016	pm	Picometer
1017	Å	Ångström
1018	ft	Foot
1019	in	Inch
1020	yd	Yard
1021	mile	Mile
1022	nautical mile	Nautical mile
1023	m^2	Square meter
1024	km^2	Square kilometer
1025	cm^2	Square centimeter
1026	dm^2	Square decimeter

Value	Display	Description
1027	mm^2	Square millimeter
1028	a	Ar
1029	ha	Hectare
1030	in^2	Square inch
1031	ft^2	Square foot
1032	yd^2	Square yard
1033	$mile^2$	Square mile
1034	m^3	Cubic meter
1035	dm^3	Cubic decimeter
1036	cm^3	Cubic centimeter
1037	mm^3	Cubic millimeter
1038	L	Liter
1039	cl	Centiliter
1040	ml	Milliliter
1041	hl	Hectoliter
1042	in^3	Cubic inch
1043	ft^3	Cubic foot
1044	yd^3	Cubic yard
1045	$mile^3$	Cubic mile
1046	pint	Pint
1047	quart	Quart
1048	gal	US gallon
1049	ImpGal	Imperial gallon
1050	bushel	Bushel
1051	bbl	Barrel = 42 gallons
1052	bbl(liq)	Liquid barrel = 31.5 gallons
1053	ft^3 std.	Standard cubic foot
1054	s	Second
1055	ks	Kilosecond
1056	ms	Millisecond
1057	µs	Microsecond
1058	min	Minute
1059	h	Hour
1060	d	Day
1061	m/s	Meters per second
1062	mm/s	Millimeters per second
1063	m/h	Meters per hour
1064	km/h	Kilometers per hour
1065	knot	Knots
1066	in/s	Inches per second
1067	ft/s	Feet per second
1068	yd/s	Yards per second
1069	in/min	Inches per minute

Value	Display	Description
1070	ft/min	Feet per minute
1071	yd/min	Yards per minute
1072	in/h	Inches per hour
1073	ft/h	Feet per hour
1074	yd/h	Yards per hour
1075	mi/h	Miles per hour
1076	m/s^2	Meters/second squared
1077	Hz	Hertz
1078	THz	Terahertz
1079	GHz	Gigahertz
1080	MHz	Megahertz
1081	kHz	Kilohertz
1082	1/s	Per second
1083	1/min	Per minute
1084	r/s	Revolutions per second
1085	rpm	Revolutions per minute
1086	rad/s	Radians per second
1087	$1/s^2$	Per second squared
1088	kg	Kilogram
1089	g	Gram
1090	mg	Milligram
1091	Mg	Megagram
1092	t	Metric ton
1093	oz	Ounce
1094	lb	Pound
1095	STon	US ton
1096	LTon	British ton
1097	kg/m^3	Kilograms per cubic meter
1098	Mg/m^3	Megagrams per cubic meter
1099	kg/dm^3	Kilograms per cubic decimeter
1100	g/cm^3	Grams per cubic centimeter
1101	g/m^3	Grams per cubic meter
1102	t/m^3	Metric tons per cubic meter
1103	kg/L	Kilograms per liter
1104	g/ml	Grams per milliliter
1105	g/L	Grams per liter
1106	lb/in^3	Pounds per cubic inch
1107	lb/ft^3	Pounds per cubic foot
1108	lb/gal	Pounds per US gallon
1109	$STon/yd^3$	US tons per cubic yard
1110	°Twad	Degrees Twaddell
1111	°Baumé (hv)	Degrees Baumé (heavy)
1112	°Baumé (lt)	Degree Baumé (light)

Value	Display	Description
1113	°API	Degrees API
1114	SGU	Specific gravity units
1115	kg/m	Kilograms per meter
1116	mg/m	Milligrams per meter
1117	tex	Tex
1118	kg·m^2	Kilograms times square meters
1119	kg·m/s	Kilograms times meters per second
1120	N	Newton
1121	MN	Meganewton
1122	kN	Kilonewton
1123	mN	Millinewton
1124	µN	Micronewton
1125	kg·m^2/s	Kilograms times square meters per second
1126	N·m	Newtons times meters
1127	MN·m	Meganewtons times meters
1128	kN·m	Kilonewtons times meter
1129	mN·m	Millinewtons times meters
1130	Pa	Pascal
1131	GPa	Gigapascal
1132	MPa	Megapascal
1133	kPa	Kilopascal
1134	mPa	Millipascal
1135	µPa	Micropascal
1136	hPa	Hectopascal
1137	bar	Bar
1138	mbar	Millibar
1139	torr	Torr
1140	atm	Atmosphere
1141	psi	Pounds per square inch
1142	psia	Pounds per square inch (absolute)
1143	psig	Pounds per square inch (gauge)
1144	g/cm^2	Grams per square centimeter
1145	kg/cm^2	Kilograms per square centimeter
1146	inH_2O	Inches of water column
1147	inH_2O (4°C)	Inches of water column at 4 degrees Celsius
1148	inH_2O (68°F)	Inches of water column at 68 degrees Fahrenheit
1149	mmH_2O	Millimeters of water column[1]
1150	mmH_2O (4°C)	Millimeters of water column at 4 degrees Celsius
1151	mmH_2O (68°F)	Millimeters of water column at 68 degrees Fahrenheit

Value	Display	Description
1152	ftH_2O	Feet of water column
1153	ftH_2O (4°C)	Feet of water column at 4 degrees Celsius
1154	ftH_2O (68°F)	Feet of water column at 68 degrees Fahrenheit
1155	inHg	Inches of mercury column
1156	inHg (0°C)	Inches of mercury at 0 degrees Celsius
1157	mmHg	Millimeters of mercury column
1158	mmHg (0°C)	Millimeters of mercury column at 0 degrees Celsius
1159	Pa·s	Pascal seconds
1160	m^2/s	Square meters per second
1161	P	Poise
1162	cP	Centipoise
1163	St	Stokes
1164	cSt	Centistokes
1165	N/m	Newtons per meter
1166	mN/m	Millinewtons per meter
1167	J	Joule
1168	EJ	Exajoule
1169	PJ	Petajoule
1170	TJ	Terajoule
1171	GJ	Gigajoule
1172	MJ	Megajoule
1173	kJ	Kilojoule
1174	mJ	Millijoule
1175	Wh	Watt hour
1176	TW·h	Terawatt hour
1177	GW·h	Gigawatt hour
1178	MW·h	Megawatt hour
1179	kWh	Kilowatt hour
1180	cal_{th}	Calorie (thermo chemical)
1181	$kcal_{th}$	Kilocalorie (thermochemical)
1182	$Mcal_{th}$	Megacalorie (thermochemical)
1183	Btu_{th}	British thermal unit
1184	datherm	Decatherm
1185	ft·lbf	Feet times pounds
1186	W	Watt
1187	TW	Terawatt
1188	GW	Gigawatt
1189	MW	Megawatt
1190	kW	Kilowatt
1191	mW	Milliwatt

Value	Display	Description
1192	µW	Microwatt
1193	nW	Nanowatt
1194	pW	Picowatt
1195	$Mcal_{th}/h$	Megacalories per hour
1196	MJ/h	Megajoules per hour
1197	Btu_{th}/h	British thermal units per hour
1198	hp	Horsepower
1199	W/(m·K)	Watts per meter times Kelvin
1200	$W/(m^2·K)$	Watts per (square meters times Kelvin)
1201	$m^2·K/W$	Square meters times Kelvin per watt
1202	J/K	Joules per Kelvin
1203	kJ/K	Kilojoules per Kelvin
1204	J/(kg·K)	Joules per (kilograms times Kelvin)
1205	kJ/(kg·K)	Kilojoules per (kilograms times Kelvin)
1206	J/kg	Joules per kilogram
1207	MJ/kg	Megajoules per kilogram
1208	kJ/kg	Kilojoules per kilogram
1209	A	Ampere
1210	kA	Kiloampere
1211	mA	Milliampere
1212	µA	Microampere
1213	nA	Nanoampere
1214	pA	Picoampere
1215	C	Coulomb
1216	MC	Megacoulomb
1217	kC	Kilocoulomb
1218	µC	Microcoulomb
1219	nC	Nanocoulomb
1220	pC	Picocoulomb
1221	Ah	Ampere hour
1222	C/m^3	Coulombs per cubic meter
1223	C/mm^3	Coulombs per cubic millimeter
1224	C/cm^3	Coulombs per cubic centimeter
1225	kC/m^3	Kilocoulombs per cubic meter
1226	mC/m^3	Millicoulombs per cubic meter
1227	$µC/m^3$	Microcoulombs per cubic meter
1228	C/m^2	Coulombs per square meter
1229	C/mm^2	Coulombs per square millimeter
1230	C/cm^2	Coulombs per square centimeter
1231	kC/m^2	Kilocoulombs per square meter

Value	Display	Description
1232	mC/m^2	Millicoulombs per square meter
1233	$\mu C/m^2$	Microcoulombs per square meter
1234	V/m	Volts per meter
1235	MV/m	Megavolts per meter
1236	kV/m	Kilovolts per meter
1237	V/cm	Volts per centimeter
1238	mV/m	Millivolts per meter
1239	µV/m	Microvolts per meter
1240	V	Volt
1241	MV	Megavolt
1242	kV	Kilovolt
1243	mV	Millivolt
1244	µV	Microvolt
1245	F	Farad
1246	mF	Millifarad
1247	µF	Microfarad
1248	nF	Nanofarad
1249	pF	Picofarad
1250	F/m	Farad per meter
1251	µF/m	Microfarad per meter
1252	nF/m	Nanofarad per meter
1253	pF/m	Picofarad per meter
1254	C·m	Coulombs times meters
1255	A/m^2	Amperes per square meter
1256	MA/m^2	Megaamperes per square meter
1257	A/cm^2	Amperes per square centimeter
1258	kA/m^2	Kiloamperes per square meter
1259	A/m	Amperes per meter
1260	kA/m	Kiloamperes per meter
1261	A/cm	Amperes per centimeter
1262	T	Tesla
1263	mT	Millitesla
1264	µT	Microtesla
1265	nT	Nanotesla
1266	Wb	Weber
1267	mWb	Milliweber
1268	Wb/m	Webers per meter
1269	kWb/m	Kilowebers per meter
1270	H	Henry
1271	mH	Millihenry
1272	µH	Microhenry
1273	nH	Nanohenry
1274	pH	Picohenry

Value	Display	Description
1275	H/m	Henries per meter
1276	µH/m	Microhenries per meter
1277	nH/m	Nanohenries per meter
1278	A·m^2	Amperes times square meters
1279	N·m^2/A	Newtons times meters squared per ampere
1280	Wb·m	Weber times meter
1281	Ω	Ohm
1282	GΩ	Gigaohm
1283	MΩ	Megaohm
1284	kΩ	Kiloohm
1285	mΩ	Milliohm
1286	µΩ	Microohm
1287	S	Siemens
1288	kS	Kilosiemens
1289	mS	Millisiemens
1290	µS	Microsiemens
1291	Ω·m	Ohms times meters
1292	GΩ·m	Gigaohms times meters
1293	MΩ·m	Megaohms times meters
1294	kΩ·m	Kiloohms times meters
1295	Ω·cm	Ohms times centimeters
1296	mΩ·m	Milliohms times meters
1297	µΩ·m	Microohms times meters
1298	nΩ·m	Nanoohms times meters
1299	S/m	Siemens per meter
1300	MS/m	Megasiemens per meter
1301	kS/m	Kilosiemens per meter
1302	mS/cm	Millisiemens per centimeter
1303	µS/mm	Microsiemens per millimeter
1304	1/H	Per henry
1305	sr	Steradian
1306	W/sr	Watts per steradian
1307	W/(sr·m^2)	Watts per (steradians times square meters)
1308	W/(m^2)	Watts per square meter
1309	lm	Lumen
1310	lm·s	Lumen second
1311	lm·h	Lumen hour
1312	lm/m^2	Lumens per square meter
1313	lm/W	Lumens per watt
1314	lx	Lux
1315	lx·s	Lux second

Value	Display	Description
1316	cd	Candela
1317	cd/m^2	Candelas per square meter
1318	g/s	Grams per second
1319	g/min	Grams per minute
1320	g/h	Grams per hour
1321	g/d	Grams per day
1322	kg/s	Kilograms per second
1323	kg/min	Kilograms per minute
1324	kg/h	Kilograms per hour
1325	kg/d	Kilograms per day
1326	t/s	Metric tons per second
1327	t/min	Metric tons per minute
1328	t/h	Metric tons per hour
1329	t/d	Metric tons per day
1330	lb/s	Pounds per second
1331	lb/min	Pounds per minute
1332	lb/h	Pounds per hour
1333	lb/d	Pounds per day
1334	STon/s	US tons per second
1335	STon/min	US tons per minute
1336	STon/h	US tons per hour
1337	STon/d	US tons per day
1338	LTon/s	British tons per second
1339	LTon/min	British tons per minute
1340	LTon/h	British tons per hour
1341	LTon/d	British tons per day
1342	%	Percent
1343	% sol/wt	Percentage of solid matter per weight unit
1344	% sol/vol	Percentage of solid matter per volume unit
1345	% stm qual	Percentage steam quality
1346	°Plato	Degree plato
1347	m^3/s	Cubic meters per second
1348	m^3/min	Cubic meters per minute
1349	m^3/h	Cubic meters per hour
1350	m^3/d	Cubic meters per day
1351	L/s	Liters per second
1352	L/min	Liters per minute
1353	L/h	Liters per hour
1354	L/d	Liters per day
1355	ML/d	Megaliters per day
1356	ft^3/s	Cubic feet per second

Value	Display	Description
1357	ft^3/m	Cubic feet per minute
1358	ft^3/h	Cubic feet per hour
1359	ft^3/d	Cubic feet per day
1360	ft^3/min std	Standard cubic feet per minute
1361	ft^3/h std	Standard cubic feet per hour
1362	gal/s	US gallons per second
1363	gal/min	US gallons per minute
1364	gal/h	US gallons per hour
1365	gal/d	US gallons per day
1366	Mgal/d	Mega US gallons per day
1367	ImpGal/s	Imperial gallons per second
1368	ImpGal/min	Imperial gallons per minute
1369	ImpGal/h	Imperial gallons per hour
1370	ImpGal/d	Imperial gallons per day
1371	bbl/s	Barrels per second
1372	bbl/min	Barrels per minute
1373	bbl/h	Barrels per hour
1374	bbl/d	Barrels per day
1375	W/m^2	Watts per square meter
1376	mW/m^2	Milliwatts per square meter
1377	$µW/m^2$	Microwatts per square meter
1378	pW/m^2	Picowatts per square meter
1379	$Pa·s/m^3$	Pascal seconds per cubic meter
1380	N·s/m	Newton seconds per meter
1381	Pa·s/m	Pascal seconds per meter
1382	B	Bel
1383	dB	Decibel
1384	mol	Mol
1385	kmol	Kilomole
1386	mmol	Millimole
1387	µmol	Micromole
1388	kg/mol	Kilograms per mole
1389	g/mol	Grams per mole
1390	m^3/mol	Cubic meters per mole
1391	dm^3/mol	Cubic decimeters per mole
1392	cm^3/mol	Cubic centimeters per mole
1393	L/mol	Liters per mole
1394	J/mol	Joules per mole
1395	kJ/mol	Kilojoules per mole
1396	J/(mol·K)	Joules per (moles times Kelvin)
1397	mol/m^3	Moles per cubic meter
1398	mol/dm^3	Moles per cubic decimeter
1399	mol/L	Moles per liter

Value	Display	Description
1400	mol/kg	Moles per kilogram
1401	mmol/kg	Millimoles per kilogram
1402	Bq	Becquerel
1403	MBq	Megabecquerel
1404	kBq	Kilobecquerel
1405	Bq/kg	Becquerels per kilogram
1406	kBq/kg	Kilobecquerels per kilogram
1407	MBq/kg	Megabecquerel per kilogram
1408	Gy	Gray
1409	mGy	Milligray
1410	rd	Rad
1411	Sv	Sievert
1412	mSv	Millisievert
1413	rem	Rem
1414	C/kg	Coulombs per kilogram
1415	mC/kg	Millicoulombs per kilogram
1416	R	Röntgen
1417	$1/Jm^3$	Density of magnetic energy
1418	e/Vm^3	-
1419	m^3/C	Cubic meters per coulomb
1420	V/K	Volts per Kelvin
1421	mV/K	Millivolts per Kelvin
1422	pH	pH value
1423	ppm	Parts per million
1424	ppb	Parts per billion
1425	ppth	Parts per trillion
1426	°Brix	Degrees Brix
1427	°Balling	Degrees Balling
1428	proof/vol	Proof per volume
1429	proof/mass	Proof per mass
1430	lb/ImpGal	Pounds per Imperial gallon
1431	$kcal_{th}/s$	Kilocalories per second
1432	$kcal_{th}/min$	Kilocalories per minute
1433	$kcal_{th}/h$	Kilocalories per hour
1434	$kcal_{th}/d$	Kilocalories per day
1435	$Mcal_{th}/s$	Megacalories per second
1436	$Mcal_{th}/min$	Megacalories per minute
1437	$Mcal_{th}/d$	Megacalories per day
1438	kJ/s	Kilojoules per second
1439	kJ/min	Kilojoules per minute
1440	kJ/h	Kilojoules per hour
1441	kJ/d	Kilojoules per day
1442	MJ/s	Megajoules per second

Value	Display	Description
1443	MJ/min	Megajoules per minute
1444	MJ/d	Megajoules per day
1445	Btu_{th}/s	British thermal units per second
1446	Btu_{th}/min	British thermal units per minute
1447	Btu_{th}/d	British thermal units per day
1448	µgal/s	Micro US gallons per second
1449	mgal/s	Milli US gallons per second
1450	kgal/s	Kilo US gallons per second
1451	Mgal/s	Mega US gallons per second
1452	µgal/min	Micro US gallons per minute
1453	mgal/min	Milli US gallons per minute
1454	kgal/min	Kilo US gallons per minute
1455	Mgal/min	Mega US gallons per minute
1456	µgal/h	Micro US gallons per hour
1457	mgal/h	Milli US gallons per hour
1458	kgal/h	Kilo US gallons per hour
1459	Mgal/h	Mega US gallons per hour
1460	µgal/d	Micro US gallons per day
1461	mgal/d	Milli US gallons per day
1462	kgal/d	Kilo US gallons per day
1463	µImpGal/s	Micro Imperial gallons per second
1464	mImpGal/s	Milli Imperial gallons per second
1465	kImpGal/s	Kilo Imperial gallons per second
1466	MImpGal/s	Mega Imperial gallons per second
1467	µImpGal/min	Micro Imperial gallons per minute
1468	mImpGal/min	Milli Imperial gallons per minute
1469	kImpGal/min	Kilo Imperial gallons per minute
1470	MImpGal/min	Mega Imperial gallons per minute
1471	µImpGal/h	Micro Imperial gallons per hour
1472	mImpGal/h	Milli Imperial gallons per hour
1473	kImpGal/h	Kilo Imperial gallons per hour
1474	MImpGal/h	Mega Imperial gallons per hour
1475	µImpgal/d	Micro Imperial gallons per day
1476	mImpgal/d	Milli Imperial gallons per day
1477	kImpgal/d	Kilo Imperial gallons per day
1478	MImpgal/d	Mega Imperial gallons per day
1479	µbbl/s	Microbarrels per second
1480	mbbl/s	Millibarrels per second
1481	kbbl/s	Kilobarrels per second
1482	Mbbl/s	Megabarrels per second
1483	µbbl/min	Microbarrels per minute
1484	mbbl/min	Millibarrels per minute
1485	kbbl/min	Kilobarrels per minute

Value	Display	Description
1486	Mbbl/min	Megabarrels per minute
1487	µbbl/h	Microbarrels per hour
1488	mbbl/h	Millibarrels per hour
1489	kbbl/h	Kilobarrels per hour
1490	Mbbl/h	Megabarrels per hour
1491	µbbl/d	Microbarrels per day
1492	mbbl/d	Millibarrels per day
1493	kbbl/d	Kilobarrels per day
1494	Mbbl/d	Megabarrels per day
1495	$\mu m^3/s$	Cubic micrometers per second
1496	mm^3/s	Cubic millimeters per second
1497	km^3/s	Cubic kilometers per second
1498	Mm^3/s	Cubic megameters per second
1499	$\mu m^3/min$	Cubic micrometers per minute
1500	mm^3/min	Cubic millimeters per minute
1501	km^3/min	Cubic kilometers per minute
1502	mm^3/min	Cubic megameters per minute
1503	$\mu m^3/h$	Cubic micrometers per hour
1504	mm^3/h	Cubic millimeters per hour
1505	km^3/h	Cubic kilometers per hour
1506	Mm^3/h	Cubic megameters per hour
1507	$\mu m^3/d$	Cubic micrometers per day
1508	mm^3/d	Cubic millimeters per day
1509	km^3/d	Cubic kilometers per day
1510	Mm^3/d	Cubic megameters per day
1511	cm^3/s	Cubic centimeters per second
1512	cm^3/min	Cubic centimeters per minute
1513	cm^3/h	Cubic centimeters per hour
1514	cm^3/d	Cubic centimeters per day
1515	$kcal_{th}/kg$	Kilocalories per kilogram
1516	Btu_{th}/lb	British thermal units per pound
1517	kL	Kiloliter
1518	kL/min	Kiloliters per minute
1519	kL/h	Kiloliters per hour
1520	kL/d	Kiloliters per day
1551	S/cm	Siemens per centimeter
1552	µS/cm	Microsiemens per centimeter
1553	mS/m	Millisiemens per meter
1554	µS/mm	Microsiemens per meter
1555	MΩ · cm	Megaohms centimeter
1556	kΩ · cm	Kiloohm centimeter
1557	Wt%	Weight percent
1558	mg/L	Milligrams per liter

Value	Display	Description
1559	µg/L	Micrograms per liter
1560	%Sät	-
1561	vpm	-
1562	%vol	Volume percent
1563	ml/min	Milliliters per minute
1564	mg/dm³	Milligrams per cubic centimeter
1565	mg/L	Milligrams per liter
1566	mg/m³	Milligrams per cubic meter
1567	ct	Carat (jewels) = 200.0·10⁻⁶ kg
1568	lb (tr)	Pound (troy or apothecary) = 0.3732417216 kg
1569	oz (tr)	Ounce (troy or apothecary) = 1/12 lb (tr)
1570	fl oz (U.S.)	Ounce (U.S. fluid) = (1/128) gal
1571	cm³	Cubic centimeter = 10⁻⁶ m³
1572	af	acre foot = 43 560 ft³
1573	m³ normal	Cubic meter
1574	L normal	Liter
1575	m³ std.	Standard cubic meter
1576	L std.	Standard liter
1577	ml/s	Milliliters per second
1578	ml/h	Milliliters per hour
1579	ml/d	Milliliters per day
1580	af/s	Acre feet per second
1581	af/min	Acre feet per minute
1582	af/h	Acre feet per hour
1583	af/d	Acre feet per day
1584	fl oz (U.S.)/s	Ounces per second
1585	fl oz (U.S.) /min	Ounces per minute
1586	fl oz (U.S.)/h	Ounces per hour
1587	fl oz (U.S.)/d	Ounces per day
1588	m³/s normal	Standard cubic meters per second
1589	m³/min normal	Standard cubic meters per minute
1590	m³/h normal	Standard cubic meters per hour
1591	m³/d normal	Standard cubic meters per day
1592	L/s normal	Standard liters per second
1593	L/min normal	Standard liters per minute
1594	L/h normal	Standard liters per hour
1595	L/d normal	Standard liters per day
1596	m³/s std.	Standard cubic meters per second
1597	m³/min std.	Standard cubic meters per minute
1598	m³/h std.	Standard cubic meters per hour
1599	m³/d std.	Standard cubic meters per day

Value	Display	Description
1600	L/s std.	Standard liters per second
1601	L/min std.	Standard liters per minute
1602	L/h std.	Standard liters per hour
1603	L/d std.	Standard liters per day
1604	ft^3/s std.	Standard cubic feet per second
1605	ft^3/d std.	Standard cubic feet per day
1606	oz/s	Ounces per second
1607	oz/min	Ounces per minute
1608	oz/h	Ounces per hour
1609	oz/d	Ounces per day
1610	Paa	Pascal (absolute)
1611	Pag	Pascal (gauge)
1612	GPaa	Gigapascal (absolute)
1613	GPag	Gigapascal (gauge)
1614	MPaa	Megapascal (absolute)
1615	MPag	Megapascal (gauge)
1616	kPaa	Kilopascal (absolute)
1617	kPag	Kilopascal (gauge)
1618	mPaa	Millipascal (absolute)
1619	mPag	Millipascal (gauge)
1620	µPaa	Micropascal (absolute)
1621	µPag	Micropascal (gauge)
1622	hPaa	Hectopascal (absolute)
1623	hPag	Hectopascal (gauge)
1624	gf/cm^2a	-
1625	gf/cm^2g	-
1626	kgf/cm^2a	-
1627	kgf/cm^2g	-
1628	SD4°C	Standard density at 4 °C
1629	SD15°C	Standard density at 15 °C
1630	SD20°C	Standard density at 20 °C
1631	PS	Metric horsepower
1632	ppt	Parts per trillion = 10^{12}
1633	hl/s	Hectoliters per second
1634	hl/min	Hectoliters per minute
1635	hl/h	Hectoliters per hour
1636	hl/d	Hectoliters per day
1637	bbl (liq)/s	Barrels (US liquid) per second
1638	bbl (liq)/min	Barrels (US liquid) per minute
1639	bbl (liq)/h	Barrels (US liquid) per hour
1640	bbl (liq)/d	Barrels (US liquid) per day
1641	bbl (fed)	Barrel (U.S. federal) = 31 gallons
1642	bbl (fed)/s	Barrels (U.S. federal) per second

Value	Display	Description
1643	bbl (fed)/min	Barrels (U.S. federal) per minute
1644	bbl (fed)/h	Barrels (U.S. federal) per hour
1645	bbl (fed)/d	Barrels (U.S. federal) per day
1998	Unit of measurement unknown	To be used when the unit of measure is not known during configuration
1999	special	Special units

Glossary

MTP (Module Type Package)

Formal description of the interfaces and functions of the automation technology of a modular process unit.

(Entry from the VDI/VDE/NAMUR 2658 standard).

PEA (Process Equipment Assembly)

Automated and from a safety perspective almost autonomous modular process unit, which consists of one or more functional equipment assemblies and which represents a processing step or provides infrastructure within a modular plant.

(Entry from the VDI/VDE/NAMUR 2658 standard).

POL (Process Orchestration Layer)

Process equipment assembly spanning, automation and information technology level for the operation of modular systems.

(Entry from the VDI/VDE/NAMUR 2658 standard).