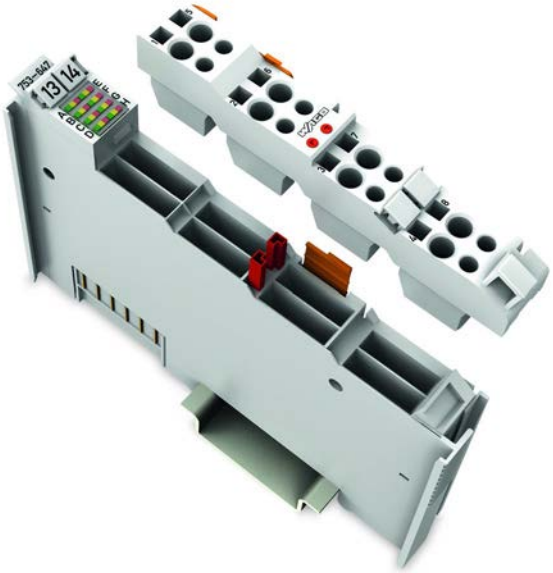
WAGO I/O SYSTEM 750

Libraries for Building Automation



Function Block Descriptions for DALI-Multi-Master-Module 753-647

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

We wish to point out that the software and hardware names, as well as the trademarks of companies used and/or mentioned in the present manual, are generally protected by trademark or patent.

WAGO-I/O-PRO Library for DALI Multi-Master Module 753-647

Content

Important Notes

To ensure fast installation and start-up of the units, we strongly recommend that the following information and explanations are carefully read and adhered to.

Copyright

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The use of the product described in this document is exclusively geared to specialists having qualifications in SPS programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the appropriate current standards. WAGO Kontakttechnik GmbH & Co. KG assumes no liability resulting from improper action and damage to WAGO products and third-party products due to non-observance of the information contained in this document.

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For each individual application, the components are supplied from the factory with a dedicated hardware and software configuration. Modifications are only admitted within the framework of the possibilities documented in this document. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

Please send your requests for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

Scope of Validity

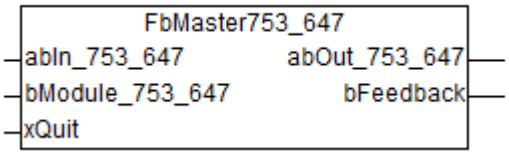
This application note is based on the stated hardware and software from the specific manufacturer, as well as the associated documentation. This application note is therefore only valid for the described installation. New hardware and software versions may need to be handled differently.

Please note the detailed description in the specific manuals.

01 Communication

DALI Master Module (FbMaster753_647)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbMaster753_647		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
abIn_753_647	ARRAY[0..23] OF BYTE	Input array for DALI module 753-647	
bModule_753_647	BYTE	Specifies which DALI module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
xQuit	BOOL	Error message acknowledgement	
Input/output parameter:	**Data type:**	**Comment:**	
abOut_753_647	ARRAY[0..23] OF BYTE	Output array for DALI module 753-647	
Output parameters:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
Graphical illustration:			



Function description:

The **FbMaster753_647** function block is used as the interface for DALI Multi-Master module 753-647. All other function blocks communicate with the DALI module via this function block.

The corresponding DALI module is specified at the ***"bModule_753_647"*** input. Counting is from left to right.

The ***"abIn_753_647"*** input and ***"abOut_753_647"*** output contain the input or output array for the data of the DALI module. The variables at these inputs must be linked to the corresponding hardware address.

Example:

abIn_753_647 = Input **AT %IB0** : ARRAY [0..23] OF BYTE;

abOut_753_647 = Output **AT %QB0** : ARRAY [0..23] OF BYTE;

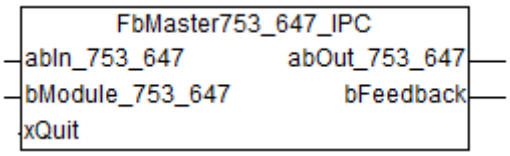
The output ***"bFeedback"*** outputs a numeric code with the error message. Numeric codes are listed in Table 1 in the Appendix.

The error message can be acknowledged via a positive edge at the ***"xQuit"*** input.

Note:

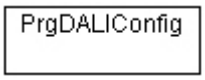
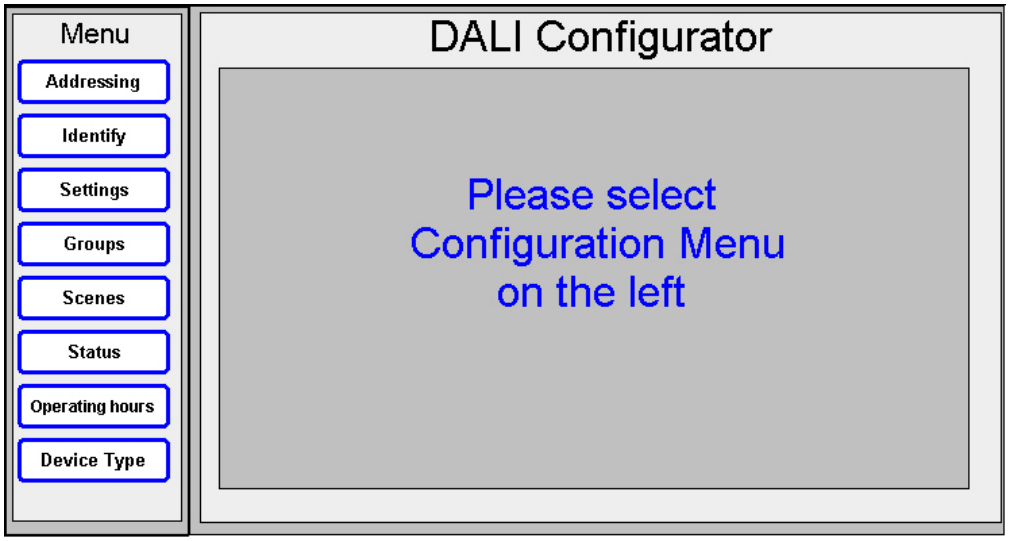
- **The FbMaster753_647 function block must be called in the program sequence before all other DALI function blocks.**
- **All DALI function blocks that communicate with this master must be called up in the same program task.**
- **Only one DALI master module may be used per DALI module.**
- **The function block switches the DALI Multi-Master module automatically into the full mode.**
- **The function block use the PFC variables %IW499 - %IW511 and %QW499 - %QW511**

DALI Master Module IPC (FbMaster753_647_IPC)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbMaster753_647_IPC		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
abIn_753_647	ARRAY[0..23] OF BYTE	Input array for DALI module 753-647	
bModule_753_647	BYTE	Specifies which DALI module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
xQuit	BOOL	Error message acknowledgement	
Input/output parameter:	**Data type:**	**Comment:**	
abOut_753_647	ARRAY[0..23] OF BYTE	Output array for DALI module 753-647	
Output parameters:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
Graphical illustration:			
			
Function description:			
See the function description FbMaster753_647			

02 Configuration

DALI Configuration (PrgDALIConfig)

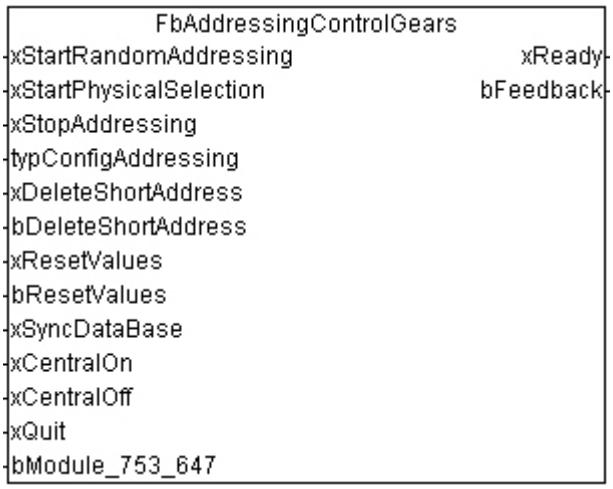
WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	PrgDALIConfig		
Type:	Function ☐	Function block ☐	Program ☒
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Visualization templates:	DALI_647_01.exp		
Graphical illustration:			
			
Display:			
			
Function description:			
For the DALI configuration tool, the **PrgDALIConfig** program must be called once in the project. In addition, the associated visualization pages can be imported into the project via the **DALI_647_01.exp** export file.			

Addressing the Control Gears (FbAddressingControlGears)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbAddressingControlGears		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xStartRandomAddressing	BOOL	A positive edge starts the random addressing of the DALI control gears.	
xStartPhysicalSelection	BOOL	A positive edge starts the addressing of the Control Gears via the physical selection.	
xStopAddressing	BOOL	A positive edge ends the addressing of the control gears prematurely.	
typConfigAddressing	typConfigAddressing	Selection of the different addressing options	
.xRandomSetResetValue	BOOL	With random addressing, all newly addressed control gears are set to their "reset values". Default setting = TRUE	
.xRandomUnaddressed	BOOL	With random addressing, only control gears with no short address are readdressed. Default setting = TRUE	
.xRandomChangeActualLevel	BOOL	With random addressing, the current dimming level remains unchanged. Default setting = FALSE	
.xPhysicalSetResetValue	BOOL	With physical selection, all newly addressed control gears are set to their "reset values". Default setting = FALSE	
.xPhysicalUnaddressed	BOOL	With physical selection, only control gears with no short address are readdressed. Default setting = TRUE	
xDeleteShortAddress	BOOL	A positive edge deletes the selected *"bDeleteShortAddress"* short address.	
bDeleteShortAddress	BYTE	Selection of the short address to be deleted	
xResetValues	BOOL	A positive edget sets the control gears with the short address *"bResetValues"* to its "reset values".	
bResetValues	BYTE	Selection of the control gears to be reset	
xSyncDataBase	BOOL	A positive edge synchronizes the module-internal database.	
xCentralOn	BOOL	A positive edge switches all control gears on.	

xCentralOff	BOOL	A positive edge switches all control gears off.
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1
Return value:	**Data type:**	**Comment:**
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)

Graphical illustration:



Function description:

The **FbAddressingControlGears** is used to address the connected control gears. In addition, the short addresses can be deleted or the settings reset to the "reset values" via the module.

Random addressing with the following parameters is started with a positive edge on the ***"xStartRandomAddressing"*** input:

"typConfigAddressing.xRandomSetResetValue"
TRUE = Each readdressed control gear is set to its "reset values"
FALSE = All control gears retain their old configuration

"typConfigAddressing.xRandomUnaddressed"
TRUE = Only control gears with no short address are readdressed
FALSE = All control gears are readdressed

"typConfigAddressing.xRandomChangeActualLevel"
TRUE = The dimming level is not changed while addressing
FALSE = The dimming level is changed while addressing

Addressing with the following parameters is started with a positive edge on the ***"xStartPhysicalSelection"*** input:

"typConfigAddressing.xPhysicalSetResetValue"
TRUE = Each readdressed control gear is set to its "reset values"
FALSE = All control gears retain their old configuration

"typConfigAddressing.xPhysicalUnaddressed"
TRUE = Only control gears with no short address are readdressed
FALSE = All control gears are readdressed

The addressing routine is terminated prematurely with a positive edge on the ***"xStopAddressing"*** input.

If a positive edge is detected on the ***"xDeleteShortAddress"*** input, the short address is then deleted for the control gear selected on the ***"bDeleteShortAddress"*** input.

If a positive edge is detected on the ***"xResetValues"*** input, the control gear is reset to its "reset values" on the ***"bResetValues"*** input.

The module database is synchronized with a positive edge on the ***"xSyncDataBase"*** input.

The entire lighting is switched on or off with a positive edge on the ***"xCentralOn"*** or ***"xCentralOff"*** inputs.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

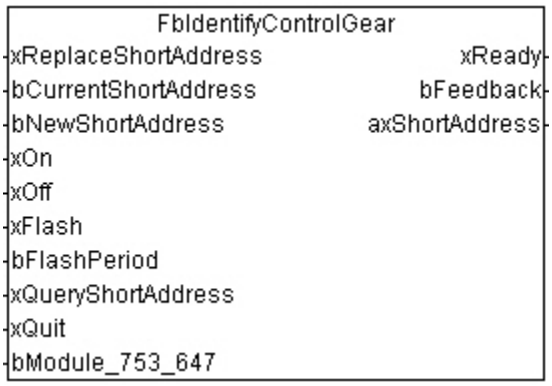
Note:

- Before addressing, all connected sensors are switched to "Passive Mode"(Sensors may not independently transmit DALI messages).
- Once addressing is complete, the database is synchronized in the module and the sensors switced to "Indirect Mode"(The sensors can send their value only to the DALI-Multi Master module).

Localizing the Control Gears (FbIdentifyControlGear)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbIdentifyControlGear		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xReplaceShortAddress	BOOL	A positive edge replaces the *"bCurrentShortAddress"* short address with the *"bNewShortAddress"* short address.	
bCurrentShortAddress	BYTE	Short address for localizating the control gears	
bNewShortAddress	BYTE	New address when replacing the short addresses	
xCentralOnxCentralOn	BOOL	A positive edge switches all control gears on.	
xCentralOff	BOOL	A positive edge switches all control gears off.	
xFlash	BOOL	As long as the input is active, the control gears flashes with the *"bActualShortAddress"* short address.	
bFlashPeriod	BYTE	Flash period for the detection of the control gears Value range = 1 – 51 [s] Default setting = 1	
xQueryShortAddress	BOOL	A positive edge determins the existing short addresses from the module database.	
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
axShortAddress	ARRAY [0..63] OF BOOL	Indication of the existing control gear short addresses	

Graphical illustration:



Function description:

The **FbIdentifyControlGear** is used to identify and replace the control gear short addresses.

With a positive edge on the ***"xReplaceShortAddress"*** input, the ***"bCurrentShortAddress"*** short address is replaced with the ***"bNewShortAddress"*** short address. The "*bCurrentShortAddress"* short address must be available at least.

The entire lighting is switched on or off with a positive edge on the ***"xCentralOn"*** or ***"xCentralOff"*** inputs.

If the ***"xFlash"*** is activated, the control gear selected on the *"bCurrentShortAddress"* flashes for the ***"bFlashPeriod"*** flash period.

With a positive edge on the ***"xQueryShortAddress"*** input, the existing short addresses are queried from the module database and displayed at the ***"axShortAddress"*** output.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

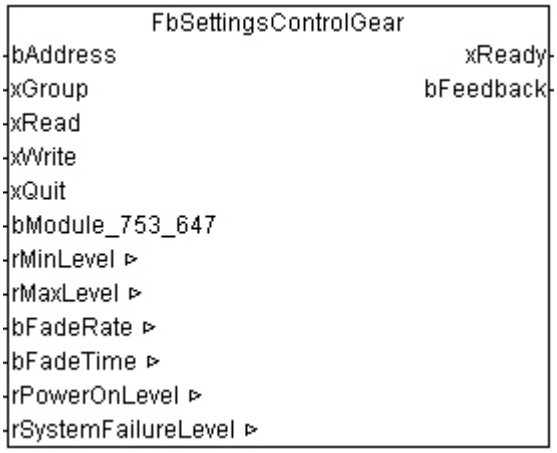
The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

Control Gear settings (FbSettingsControlGear)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbSettingsControlGear		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address from 0 – 63 or broadcast	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
xRead	BOOL	A positive edge causes reading of the configuration values.	
xWrite	BOOL	A positive edge writs the configuration parameters to the control gear.	
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
rMinLevel	REAL	Input of min brightness level [%] Value range = 0 – 100 %	
rMaxLevel	REAL	Input of max brightness level [%] Value range =0 – 100%	
bFadeRate	BYTE	Input of fade rate Value range: 1 –15	
bFadeTime	BYTE	Input of fade time Value range: 0 – 15	
rPowerOnLevel	REAL	Input of power on level [%] Value range = 0 – 100% 101 = no change	
rSystemFailureLevel	REAL	Input of system failure brightness level [%] Value range = 0 - 100% 101 = no change	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	

Graphical illustration:



Function description:

The **FbSettingsControlGear** can read and write the parameters from an control gear.

The short or group address are specified at the ***"bAddress"*** input. The value at the ***"xGroup"*** input determines whether the entered address is interpreted as a short or group address (FALSE = short address; TRUE = group address). Alternatively, the address broadcast (255) can also be used to write.

The following parameters are read or written from the control gears with a positive edge at the ***"xRead"*** or ***"xWrite"*** inputs:

- The minimum or maximum dimming level of the control gears can be limited by the ***"rMinLevel"*** and ***"rMaxLevel"*** paramters.
- The "***bFadeRate"*** parameter determines the level for dimming. The input is done according to IEC 62386 in level values 1 – 15. Number 1 means large grading and number 15 fine grading. This value is only effective with relative dimming commands.
- The ***"bFadeTime"*** parameter determines the fade rate of the control gear when sending defined dimming levels. The input is done according to IEC 62386 in level values 0 – 15. Number 0 means new value is reached quickly and number 15 new value is reached slowly.
- The ***"rPowerOnLevel"*** determines the brightness value by power recovery. At a *"rPowerOnLevel"* of 101%, the last value before the power failure is recalled.
- The ***"rSystemFailureLevel"*** parameter determines the brightness value in the event of a bus fault. At a *"rSystemFailureLevel"* of 101%, the brightness value remains unchanged.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

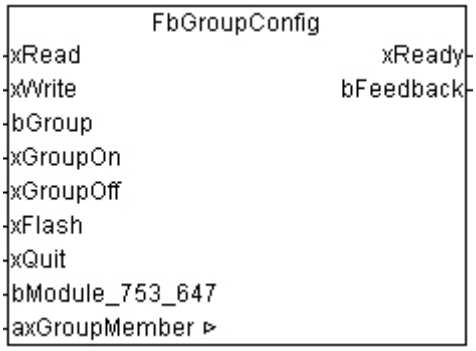
The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

Group Configuration (FbGroupConfig)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbGroupConfig		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xRead	BOOL	A positive edge causes reading of the group configuration.	
xWrite	BOOL	A positive edge writes the group configuration to the control gears.	
bGroup	BYTE	Selection of the DALI group Range = 0 - 31	
xGroupOn	BOOL	A positive edge switches the selected group on.	
xGroupOff	BOOL	A positive edge switches the selected group off.	
xFlash	BOOL	As long as the input is active, the selected group flashes.	
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
axGroupMember	ARRAY [0..63] of BOOL	The array is used on the one hand to display the current group configuration. The array can be used on the other to redefine group members.	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	

Graphical illustration:



Function description:

The **FbGroupConfig** is used to configure the DALI groups. In addition to the 16 DALI groups, this function block can be used to define an additional 16 virtual groups.

With a positive edge at the ***"xRead"*** input, all control gears are queried if they belong to the ***"bGroup"*** group. Group members appear in the ***"axGroupMember"*** array.

With a positive edge at the ***"xWrite"*** input, all control gears that have been set to TRUE in the *"axGroupMember"* array are assigned to the *"bGroup"* group.

To check the group configuration, the group can be switched on or off by a positive edge at the ***"xGroupOn"*** or ***"xGroupOff"*** inputs.

As long as the ***"xFlash"*** input is active, the lights from the selected groups flash at a flash period set in the DALI module.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

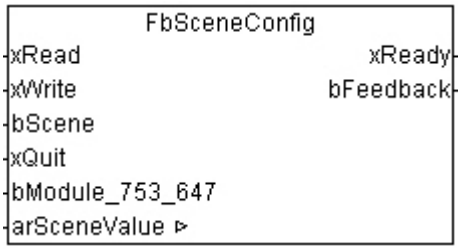
If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

Note:

- The virtual groups are saved to the DALI module and can have up to 8 members. All other subscribers are rejected.
- For the virtual groups, the module sends the telegrams to all group members one after the other as fast as possible.

Scene Configuration (FbSceneConfig)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbSceneConfig		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xRead	BOOL	A positive edge causes reading of the scene configuration.	
xWrite	BOOL	A positive edge writes the scene configuration to the control gears.	
bScene	BYTE	Selection of the DALI scene Value range = 0 – 15	
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
arSceneValue	ARRAY [0..63] of REAL	The array is used to display and configure the selected scene [%] Value range = 0 - 100% 101 = no scene value	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
Graphical illustration:			



Function description:
The **FbSceneConfig** is used to configure the DALI scenes. With a positive edge at the ***“xRead“*** input or at a value change at the ***“bScene“*** input, all ballasts are queried, which scene value they stored under the *“bScene“* scene. The scene values are displayed in the ***“arSceneValue“*** array. With a positive edge at the ***"xWrite"*** input, the *"bScene"* scene is saved to all control gears with the scene value from the *"arSceneValue"* array. The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***. The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block. If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

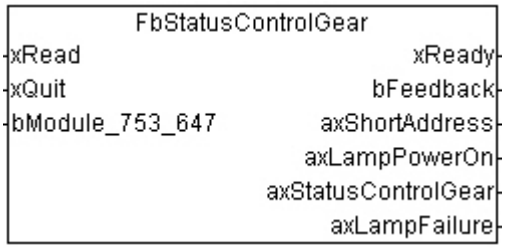
Status Query of the Control Gears (FbStatusControlGear)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbStatusControlGear		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
xRead	BOOL	A positive edge causes reading of the status values from the internal module database.
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1

Return value:	**Data type:**	**Comment:**
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)
axShortAddress	ARRAY [0..63] OF BOOL	Indication of the existing short addresses for control gears
axLampPowerOn	ARRAY [0..63] OF BOOL	Indication of the lamps switched on
axStatusControlGear	ARRAY [0..63] OF BOOL	Indication of the control gear faults
axLampFailure	ARRAY [0..63] OF BOOL	Indication of the defective lamps

Graphical illustration:



Function description:

The **FbStatusControlGear** reads the current status of the control gears from the module database.

With a positive edge at the ***"xRead"*** input, the status of the control gears is read from the module database and displayed at the following outputs:

"axShortAddress" = Indication of the available control gears (online)

"axLampPowerOn" = Indication of which lamps are on

"axStatusControlGear" = Indication of which control gears have a fault

"axLampFailure"“ = Indication of which lamps are defective

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

Note:

- The DALI module cyclically eads the status of the control gears. The WAGO-DALI-Configurator can be used to set the update rate.

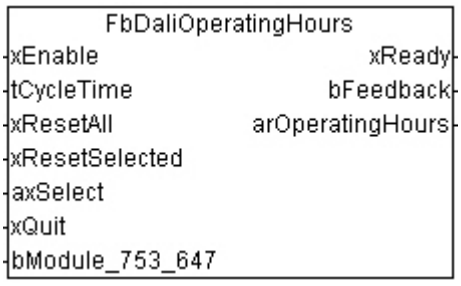
Readout operating hours (FbDaliOperatingHours)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliOperatingHours		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
xEnable	BYTE	Enable cyclic reading of the operating hours Default setting = TRUE
tCycleTime	TIME	Time intervall for cyclic reading Default setting = t#1h
xResetAll	BOOL	A positive edge delete all operating hours inside the module database
xResetSelected	BOOL	A positive edge reset only the operating hours from the ECGs, which are selected in “axSelect”
axSelect	ARRAY [0..63] OF BOOL	Selection of the ECGs, which should be reset.
xQuit	BOOL	A positive edge acknowledges the fault message on the *"bFeedback"* output.
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1

Return value:	**Data type:**	**Comment:**
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)
arOperatingHours	ARRAY [0..63] OF REAL	Operating hours [h]

Graphical illustration:

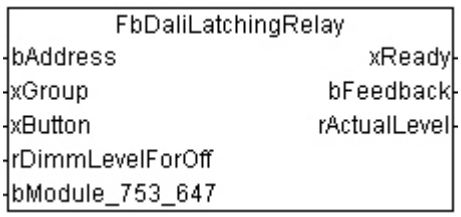


Function description:
The **FbOperatingHours** reads the operating hours of the control gears from the module database. The cyclic reading function is enabled by setting the input ***“xEnable”*** to TRUE. A cyclic reading runs with the time interval as set on the input ***“tCycleTime”***. The operating hours will be displayed at the output ***“arOperatingHours”.*** A positive edge to the input ***“xResetAll”*** will reset all operating hours in the module database. A positive edge to the input ***“xResetSelected”*** will reset the operating hours of all selected short addresses in the array ***“axSelect”.*** The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***. The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block. If there is fault message at the ***"bFeedback"*** output, it can be acknowledged by a positive edge on the ***"xQuit"*** input. Only after the fault is acknowledged can the module execute a new action.

03 Switching

Latching Relay (FbDaliLatchingRelay)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliLatchingRelay		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
xButton	BOOL	Input from switch lighting request	
rDimmLevelForOff	REAL	dimming level which switching off [%] Default setting = 0% (off)	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
rActualLevel	REAL	Indication of the current dimming level [%]	
Graphical illustration:			



Function description:
The **FbDaliLatchingRelay** forms the function of an latching relay. The short or group address are specified at the ***"bAddress"*** input. The value at the ***"xGroup"*** input determines whether the entered address is interpreted as a short or group address (FALSE = short address; TRUE = group address). A rising edge at the ***"xButton"*** input causes the light addressed by the short or group address to switch on or off. Whether the light is switched on or off depends on the previous switching state of the lighting. If ***"rDimmLevelForOff"*** is greater than zero, the lights are not switched off, rather set to the dimming level set at the *"rDimmLevelForOff"* input. The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***. The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block. The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix. The ***"rActualLevel"*** output displays the current dimming level of the selected short address or group.

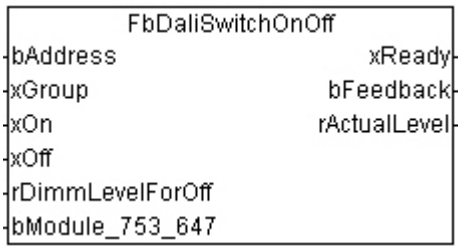
ON/OFF Switch (FbDaliSwitchOnOff)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliSwitchOnOff		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE
xOn	BOOL	A positive edge switches the selected control gears on.
xOff	BOOL	A positive edge switches the selected control gears off.
rDimmLevelForOff	REAL	dimming level which switching off [%] Default setting = 0% (off)
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1

Return value:	**Data type:**	**Comment:**
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)
rActualLevel	REAL	Indication of the current dimming level [%]

Graphical illustration:



Function description:
The **FbDaliSwitchOnOff** forms the function of a switch. The short or group address are specified at the ***"bAddress"*** input. The value at the ***"xGroup"*** input determines whether the entered address is interpreted as a short or group address (FALSE = short address; TRUE = group address). A rising edge at the ***"xOn"*** or ***"xOff"*** inputs causes the light addressed by the short or group address to switch on or off. If ***"rDimmLevelForOff"*** is greater than zero, the lights are not switched off, rather set to the dimming level set at the *"rDimmLevelForOff"* input. The DALI module with which this function block must communicate is selected at input "***bModule_753_647"***. The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block. The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix. The ***"rActualLevel"*** output displays the current dimming level of the selected short address or group.

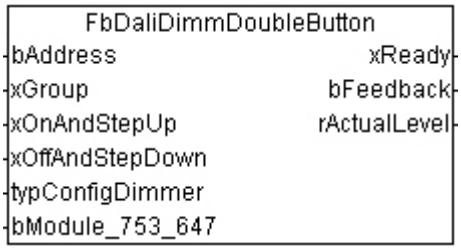
04 Dimming

Dimmer Double Button (FbDaliDimmDoubleButton)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliDimmDoubleButton		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
xOnAndStepUp	BOOL	Button signal for power on and step up brightness	
xOffAndStepDown	BOOL	Button signal for power off and step down brightness	
typConfigDimmer	typConfig Dimmer	Setting parameter for the dimmer	
.tShortPushButton	TIME	Maximum time for a brief button press Default = t#500ms	
.xOnlyDimming	BOOL	Only the *"xOnAndStepUp"* and *"xOffAndStepDown"* inputs can be used to dim.	
.xSwitchOnLastLevel	BOOL	Switching on with the last dimming level	
.xUseSwitchOnLevel	BOOL	switching on with a defined dimming level	
.bSwitchOnLevel	BYTE	dimming level when switching on [%] Value range 0 – 100 [%] Default setting = 90	
.xMinLevelAsOff	BOOL	Instead of the switch-off command, the lighting is dimmed to the min. level. Default setting = FALSE	
.xSwitchOnAndStepUp	BOOL	Before dimming, a switch-on command is sent.	
.xStepDownAnd SwitchOff	BOOL	If the minimum dimming level is reached, the lighting is switched off.	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	

Return value:	Data type:	Comment:
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)
rActualLevel	REAL	Indication of the current dimming level [%]

Graphical illustration:



Function description:

The **FbDaliDimmDoubleButton** module can be used to dim the DALI lighting. The lighting is dimmed or powered on and off by controlling two separate button inputs.

The short or group address are specified at the ***"bAddress"*** input. The value at the ***"xGroup"*** input determines whether the entered address is interpreted as a short or group address (FALSE = short address; TRUE = group address).

The lighting is switched by a brief button press at the ***"xButton"*** input. At which dimming level the lighting is switched on depends on the following options:

- ***"typConfigDimmer.xSwitchOnLastLevel"*** = Switched on at the last dimming level
- ***"typConfigDimmer.xUseSwitchOnLevel"*** = Switched on at the defined dimming level ***"typConfigDimmer.bSwitchOnLevel"***
- If neither of the two options is selected, the lighting is switched on at the maximum dimming level.

The lighting is switched off by a brief button press at the ***"xOffAndStepDown"*** input. If the ***"typConfigDimmer.xMinLevelAsOff"*** parameter is activated, the minimum dimming level is called up instead of the switch-off command.

If the ***"typConfigDimmer.xOnlyDimming"*** parameter is activated, the functions of the "brief button press" are not supported.

The lighting is turned brighter by a long button press at the ***"xOnAndStepUp"*** input. If the ***"typConfigDimmer.xSwitchOnAndStepUp"*** options is activated, a switch-on command is sent before dimming.

The lighting is turned darker by a long button press at the ***"xOffAndStepDown"*** input. If the ***"typConfigDimmer.xStepDownAndSwitchOff"*** option is activated, the lighting is switched off at the minimum dimming level.

The time for differentiating between a short and long button press can be specified via the ***"tShortPushButton"*** input parameter. Any button pulse that is smaller in value than the set parameter value is interpreted as a short button press.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

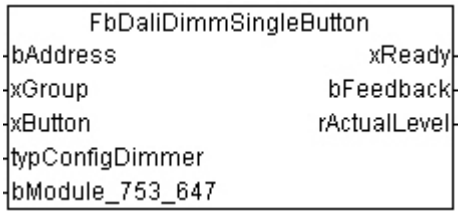
The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix.

The ***"rActualLevel"*** output displays the current dimming level of the selected short address or group.

Dimmer Single Button (FbDaliDimmSingleButton)

WAGO-I/O-*PRO* Library Elements		
Category:	Building Automation	
Name:	FbDaliDimmSingleButton	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_647_01.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE
xButton	BOOL	Short button press = ON/OFF Long button press = brighter/darker
typConfigDimmer	typConfig Dimmer	Setting parameter for the dimmer
.tShortPushButton	TIME	Maximum time for a brief button press Default = t#500ms
.xOnlyDimming	BOOL	Only the *"xOnAndStepUp"* and *"xOffAndStepDown"* inputs can be used to dim.
.xSwitchOnLastLevel	BOOL	Switching on with the last dimming level
.xUseSwitchOnLevel	BOOL	switching on with a defined dimming level
.bSwitchOnLevel	BYTE	dimming level when switching on [%] Value range 0 – 100 [%] Default setting = 90
.xMinLevelAsOff	BOOL	Instead of the switch-off command, the lighting is dimmed to the min. level. Default setting = FALSE
.xSwitchOnAndStepUp	BOOL	Before dimming, a switch-on command is sent.
.xStepDownAnd SwitchOff	BOOL	If the minimum dimming level is reached, the lighting is switched off.
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1
Return value:	**Data type:**	**Comment:**
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)
rActualLevel	REAL	Indication of the current dimming level [%]

Graphical illustration:



Function description:

The **FbDaliDimmSingleButton** module can be used to dim the DALI lighting. The lighting is dimmed or powered on and off by controlling one button.

The short or group address to which the DALI commands are to be sent is specified at the input ***"bAddress"***. The value at input ***"xGroup"*** determines whether the entered address is interpreted by the function block as a short or group address (FALSE = short address; TRUE = group address).

The lighting is switched on when off by briefly pressing the button at the ***"xButton"*** input. At which dimming level the lighting is switched on depends on the following options:

- ***"typConfigDimmer.xSwitchOnLastLevel"*** = Switched on at the last dimming level
- ***"typConfigDimmer.xUseSwitchOnLevel"*** = Switched on at the defined dimming level ***"typConfigDimmer.bSwitchOnLevel"***
- If neither of the two options is selected, the lighting is switched on at the maximum dimming level.

The lighting is switched off when on by a brief button press at the *"xButton"* input. If the ***"typConfigDimmer.xMinLevelAsOff"*** parameter is activated, the minimum dimming level is called up instead of the switch-off command.

If the ***"typConfigDimmer.xOnlyDimming"*** parameter is activated, the functions of the "brief button press" are not supported.

The lighting is turned brighter by a long button press at the *"xButton"* input. If the ***"typConfigDimmer.xSwitchOnAndStepUp"*** options is activated, a switch-on command is sent before dimming.

The lighting is turned darker by the next long button press at the *"xButton"* input. If the ***"typConfigDimmer.xStepDownAndSwitchOff"*** option is activated, the lighting is switched off at the minimum dimming level.

The lighting is turned brighter by the next long button press at the *"xButton"* input., etc.

The time for differentiating between a short and long button press can be specified via the ***"tShortPushButton"*** input parameter. Any button pulse that is smaller in value than the set parameter value is interpreted as a short button press.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix.

The ***"rActualLevel"*** output displays the current dimming level of the selected short address or group.

05 Light Control

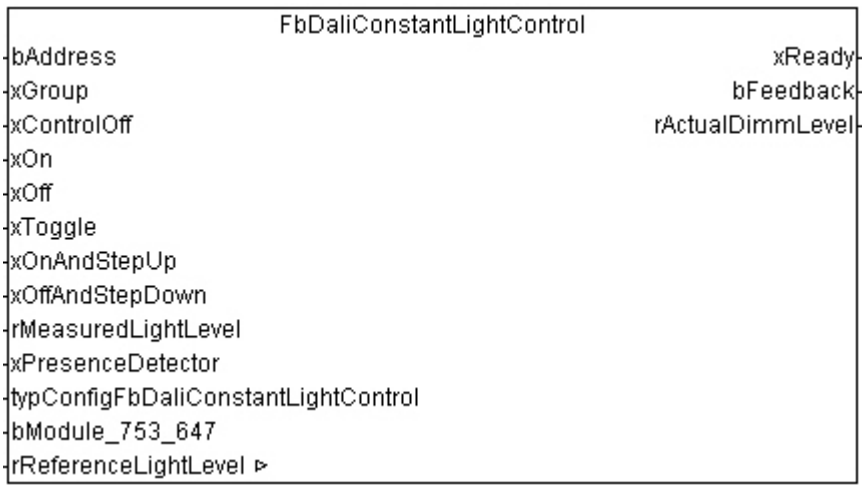
Constant Light Control (FbDaliConstantLightControl)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliConstantLightControl		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
xControlOff	BOOL	The control is switched off	
xOn	BOOL	The lighting is switched on	
xOff	BOOL	The lighting is switched off	
xToggle	BOOL	A positive edge at the input switches the lighting on or off.	
xOnAndStepUp	BOOL	The lighting is switched on by pushing the button briefly, the lighting is dimmed brighter by pushing the button longer. (if *"xSetpValueShifting"* = TRUE)	
xOffAndStepDown	BOOL	The lighting is switched off by pushing the button briefly, the lighting is dimmed lower by pushing the button longer. (if *"xSetpValueShifting"* = TRUE)	
rMeasuredLightLevel	REAL	Input signal of the light sensor [lx]	
xPresenceDetector	BOOL	Switching signal of the presence detector. The lighting and controller are switched off by a falling edge.	
typConfigFbDaliConstant LightControl	typConfig Dali Constant Light Control	Setting parameter for the constant light control	
.tOffDelayAtMinLevel	TIME	Switch-off delay of the lighting at minimum dimming level Default setting = t#15m (t#0s = no swich-off)	
.tOffDelayStandby	TIME	Swtich-off delay of the lighting in standby mode Default setting = t#30m (t#0s = no standby mode)	

.bFadeTimeOn	BYTE	Fade time, when the light is turned on Default setting = 4
.bFadeTimeStandby	BYTE	Fade time, when the controller goes into stand-by mode Default setting = 9
.bFadeTimeOff	BYTE	Fade time, when the light is switched off Default setting = 7
.rPresetReferenceLight Level	REAL	Setpoint value when switching on [lx] Default setting = 500 lx
.rGain	REAL	Gain of the light sensor measured value Default setting = 3
.rGainAdaption	REAL	Adaptation of the gain depending on the daylight percentage [%] Value range: 0 - 90 % Default setting = 20
.rSwitchOnDimmLevel	REAL	Dimming level when switching on before the controller is activated [%] Default setting = 50 %
.rStandbyLevel	REAL	Dimming level in standby mode [%] Default setting = 3 %
.xSetpValueShifting	BOOL	The *"rReferenceLightLevel"* setpoint value can be moved up or down using the *"xOnAndStepUp"* and *"xOffAndStepDown"* buttons. Default setting = TRUE
.xRememberLastLight Level	BOOL	The lighting is adjusted to the *"rReferenceLightLevel"* after switching on. Otherwise, it is adjusted to the *"rPresetReferenceLightLevel"* setpoint value. Default setting = FALSE
.xEnableSwitchOnAt Presence	BOOL	The presence detector automatically switches the lighting on. Requirement: actual value < setpoint value Default setting = TRUE
.xDimmingActivate Controller	BOOL	A long button press at the *"xOnAndStepUp"* and *"xOffAndStepDown"* inputs activates the controller. Default setting = TRUE
.xDisableShortPress	BOOL	The brief button press is deactivated at both *"xOnAndStepUp"* and *"xOffAndStepDown"* button inputs. Default setting = FALSE
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1
Input/output parameter:	**Data type:**	**Comment:**
rReferenceLightLevel	REAL	Setpoint value for light intensity in [lx]

Feedback value:	Data type:	Comment:
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated
bFeedback	BYTE	Response byte (see table 1 in the appendix)
rActualLevel	REAL	Indication of the current dimming level [%]

Graphical illustration:



Function description:

The function block enables constant light to be controlled automatically in connection with a light sensor.

The short or group address to which the DALI commands are to be sent is specified at the input ***"bAddress"***. The value at input ***"xGroup"*** determines whether the entered address is interpreted by the function block as a short or group address (FALSE = short address; TRUE = group address).

The DALI master module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The control can be deactivated via input ***"xControlOff"*** so that, for example, when selecting a scene of the relevant address, the dimming level will not be immediately overwritten.

Before the controller is activated, the lighting is generally switched on at the ***"typConfigFbDaliConstantLightControl.rSwitchOnDimmLevel"*** dimming level.

The transition time when switching on the lighting is determined by parameter ***"typConfigFbDaliConstantLightControl.bFadeTimeOn"***.

A positive edge at the ***"xOn"*** and ***"xOff"*** inputs switches the lighting and controller on or off.

A positive edge at the ***"xToggle"*** input switches the lighting and controller on or off depending on state.

The ***"rReferenceLightLevel"*** setpoint value for light intensity can be moved up or down with a long button press at the ***"xOnAndStepUp"*** and ***"xOffAndStepDown"***. The setpoint offset must be activated with the ***"typConfigFbDaliConstantLightControl.xSetpValueShifting"*** parameter.

Alternatively, the *"xOnAndStepUp"* and *"xOffAndStepDown"* inputs can be used as simple dimmers if ***"typConfigFbDaliConstantLightControl .xDimmingActivateController"*** is deactivated.

A brief button press at the ***"xOnAndStepUp"*** or ***"xOffAndStepDown"*** inputs switches the lighting on or off. Evaluation of the brief button press by the ***"typConfigFbDaliConstantLightControl .xDisableShortPress"*** parameter cannot be switched off. When switching on the lighting, the light intensity is adjusted to the *"rReferenceLightLevel"*.

The ***"typConfigFbDaliConstantLightControl.tSwitchOffDelay"*** input specifies the time after which the lighting changes to standby mode at the minimum dimming level. Any change to the dimming level restarts the switch-off delay. The t#0s value can be used to deactivate switching off the lighting at minimum dimming level.

In standby mode, the lighting is dimmed to the ***"typConfigFbDaliConstantLightControl.rStandbyLevel"*** level.

The ***"typConfigFbDaliConstantLightControl.tOffDelayStandby"*** input specifies the runtime of the standby mode. After the time has expired, the lighting is switched off. The t#0s value can be used to deactivate the standby function.

The transition time when switching the lighting off is determined by parameter ***"typConfigFbDaliConstantLightControl.bFadeTimeOff"***.

If ***"typConfigFbDaliConstantLightControl.xRememberLastLightLevel"*** is activated, the lighting is adjusted to the last setpoint value *"rReferenceLightLevel"* when it is switched on. If the parameter is not activated, the lighting is adjusted to the setpoint value ***"typConfigFbDaliConstantLightControl .rPresetReferenceLightLevel"*** when switched on.

The ***"rMeasuredLightLevel"*** input passes the actual value from the light sensor to the module.

With a presence dependent constant light control, the switching contact of the presence detector is connected to the input ***"xPresenceDetector"***. The lighting is switched off or set to standby mode by a falling edge of the presence detector.

If ***"typConfigFbDaliConstantLightControl.xEnableSwitchOnAtPresence"*** is activated, the *"xPresenceDetector"* input can also switch on the lighting. This can only be done when the actual value is smaller than the setpoint value by 50 lx.

The ***"typConfigFbDaliConstantLightControl.rGain"*** and ***"typConfigFbDaliConstantLightControl.rGainAdaption"*** parameters are used to compare the measured value of the light sensor on the ceiling with the light intensity at the workplace.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

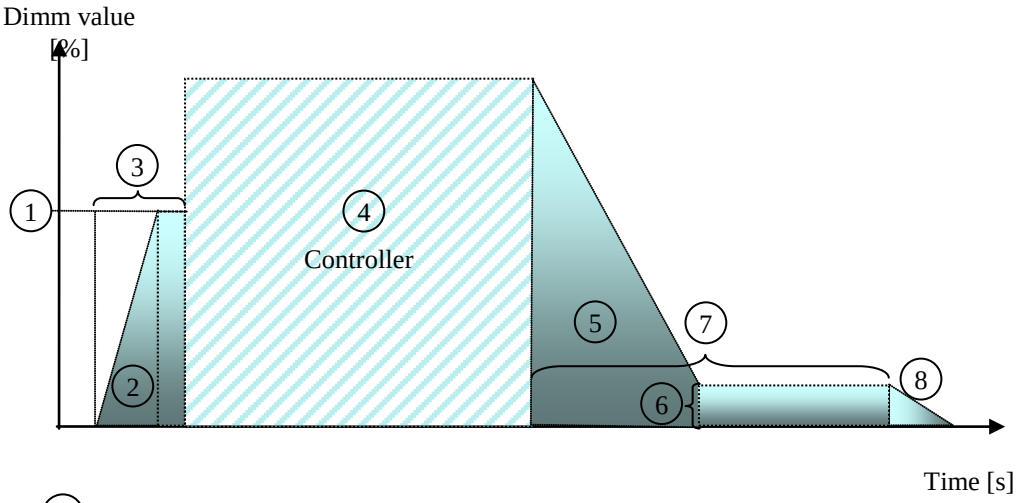
The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix.

The ***"rActualLevel"*** output displays the current dimming level of the selected short address or group.

Note:

- The *"rReferenceLightLevel"* variable should be defined as RETAIN.

Time Referenced Behavior:



1. Initial dimm level (".rSwitchOnDimmLevel“)
2. Transition time when switching on (".bFadeTimeOn“)
3. ON delay controller (".tOnDelayController“)
4. Presence + run time, light control is active, transition time = 0
5. Transition time when switching to stand-by mode(".bFadeTimeStandby“)
6. Dimming value in standby mode (".rStandbyLevel“)
7. Max. run time in standby mode (".tOffDelayStandby“)
8. Transition time when switching off (".bFadeTimeOff“)

Calibration requirements:

- The source of light to be measured must be switched on about 20 minutes before measuring, so that the lamps can operate at their full potential.
- The setpoint value for light intensity is to be measured on the work surface. A luxmeter is required that has a good adaptation to the V(λ) curve.
- The calibration cannot be performed until the room has been completely furnished since the measured values of the light sensor depend on the reflection properties of the room.
- *Start value "rGain"* = 3
- Start value *"rGainAdaption"* = 20

Two measurements are required for calibrating the light sensor. For both measurements, the luxmeter is placed on the work surface where the desired light intensity must be reached.

The first measurement is performed in a darkened room using pure artificial light. The calibration value is determined as follows:

- If the light intensity in the workplace is higher than the setpoint light intensity, the calibration value must be increased until the desired light intensity is reached.
- If the light intensity in the workplace is lower than the setpoint light intensity, the calibration value must be decreased until the desired light intensity is reached.

For safety reasons, the light intensity measured by the luxmeter should be about 10 % higher than the desired setpoint light intensity.

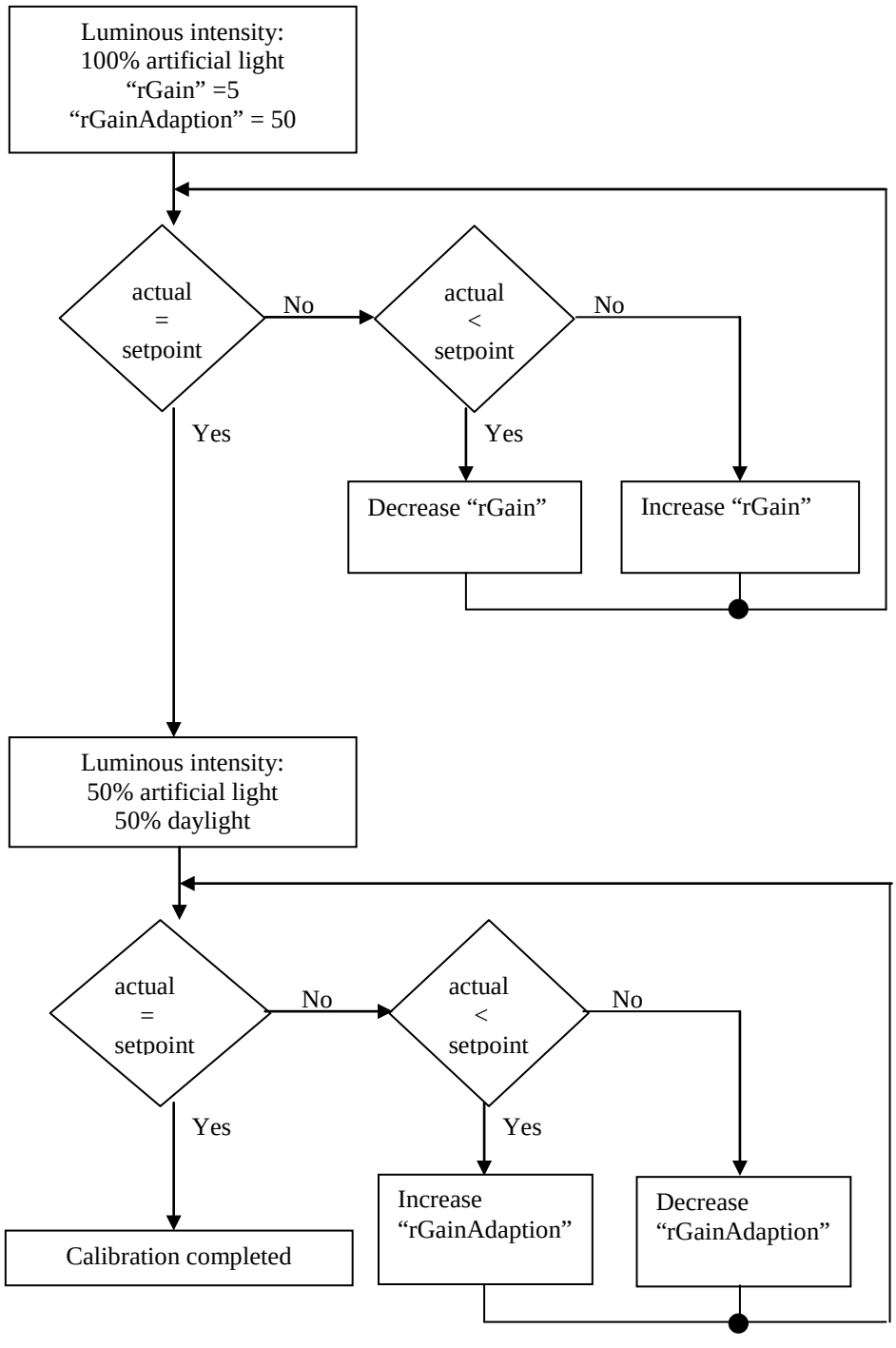
The second calibration measurement is required in order to determine the percentage adaptation of the calibration value. This measurement is performed in a semi-darkened room with residual artificial light.

The second measurement is performed as follows:

- If the light intensity in the workplace is lower than the setpoint light intensity, the percentage of the adaptation must be increased until the desired light intensity is reached.
- If the light intensity in the workplace is higher than the desired light intensity, the percentage of the adaptation must be decreased until the desired light intensity is reached.

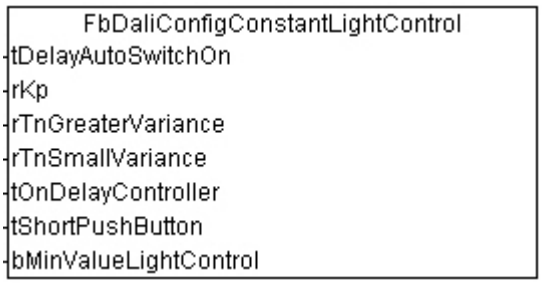
If the percentage adaptation of the calibration value is performed in a semi-darkened room, the lowest possible offset is achieved depending on the part of daylight or artificial light. The actual value of the light intensity can still be lower than the setpoint light intensity.

Calibration:



Constant Light Control Settings (FbDaliConfigConstantLightControl)

WAGO-I/O-*PRO* Library Elements		
Category:	Building Automation	
Name:	FbDaliConfigConstantLightControl	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_647_01.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
tDelayAutoSwitchOn	TIME	Switch-on delay when switching on the lighting if the setpoint value falls short by 50 lx and presence is detected. Default setting = t#30s
rKp	REAL	Constant light control gain Default setting = 0.005
rTnGreaterVariance	REAL	Reset time for large setpoint/actual value deviation [s] Default setting = 500
rTnSmallVariance	REAL	Reset time for small setpoint/actual value deviation [s] Default setting = 800
tOnDelayController	TIME	Switch-on delay of the controller after the lighting has been switched on. Default setting = t#5s
tShortPushButton	TIME	Maximum time for a brief button press Default = t#500ms
bMinValueLightControl	BYTE	Min. value constant light control [%] Default setting = 1
Graphical illustration:		



Function description:

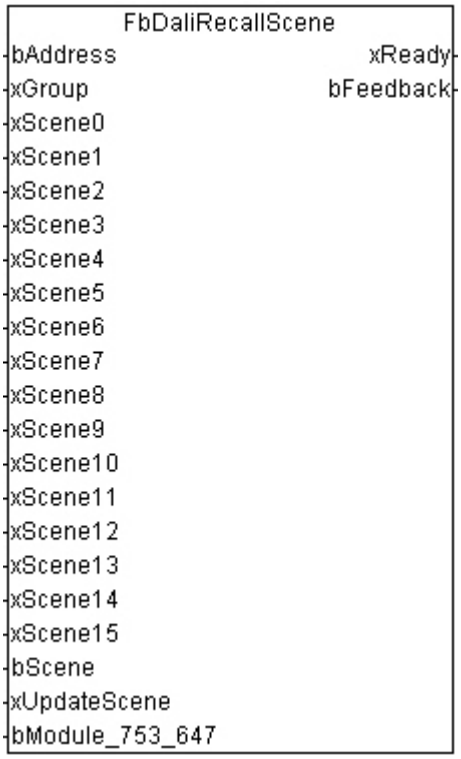
The **FbDaliConfigConstantLightControl** can be used to change any global setting for all DALI constant light controls in the project.

06 Scenes

Scene Recall (FbDaliRecallScene)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliRecallScene		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
xScene0	BOOL	A positive edge calls up scene 0	
xScene1	BOOL	A positive edge calls up scene 1	
…		…	
xScene14	BOOL	A positive edge calls up scene 14	
xScene15	BOOL	A positive edge calls up scene 15	
bScene	BYTE	Scene recall when the scene number changes Value range = 0 - 15	
xUpdateScene	BOOL	The scene selected at the *"bScene"* input is called by positive edge	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	

Graphical illustration:



Function description:

The **FbDaliRecallScene** can be used to call up the DALI light scenes defined in the control gear.

At the ***"bAddress"*** input, the short and group address is assigned to which the DALI command should be sent. The value at input ***"xGroup"*** determines whether the entered address is interpreted by the function block as a short or group address (FALSE = short address; TRUE = group address).

The DALI light scenes can be called in two different ways.

1.) With a positive edge at inputs ***"xScene0"*** to ***"xScene15"***, the corresponding DALI light scene is called.

2.) If a value changes at the ***"bScene"*** input or with a positive edge at the ***"xUpdateScene"*** input, the DALI light scene specified at the ***"bScene"*** input is called up.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

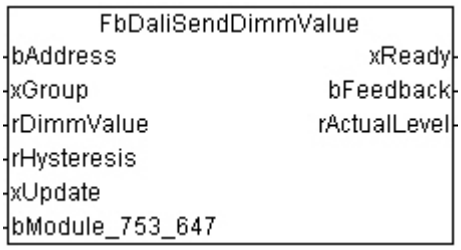
The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix.

07 General

Send Direct Dim Level (FbDaliSendDimmValue)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliSendDimmValue		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
rDimmValue	REAL	The dimming level specified at the input is sent after each change in value [%]. Value range = 0 – 100 %	
rHysteresis	REAL	Hysteresis [%] Value range = 1 % - 100 % Default setting = 1 %	
xUpdate	BOOL	A positive edge sends the *"rDimmValue"* dimming level again.	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
rActualLevel	REAL	Indication of the current dimming level [%]	

Graphical illustration:



Function description:

The **FbDaliSendDimmValue** sends direct dimming levels to the selected DALI control gears.

At the ***"bAddress"*** input, the short and group address is assigned to which the DALI command should be sent. The value at input ***"xGroup"*** determines whether the entered address is interpreted by the function block as a short or group address (FALSE = short address; TRUE = group address).

If the value change at the ***"rDimmValue"*** input is greater than ***"rHysteresis"*** or a positive edge is detected at the ***"xUpdate"*** input, the selected lamps are dimmed to the dimming value set at the *"rDimmValue"* input.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

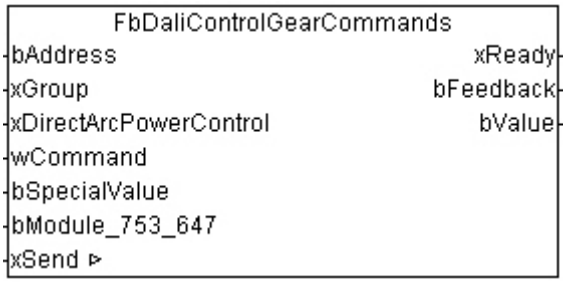
The output ***"bFeedback"*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix.

The ***"rActualLevel"*** output displays the current dimming level of the selected short address or group.

Send individual DALI commands (FbDaliControlGearCommands)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliControlGearCommands		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 0 – 63 Group address 0 - 31 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
xDirectArcPowerControl	BOOL	TRUE = Direct dimming value (raw value) FALSE = DALI command	
wCommand	WORD	Command (see table 2 in the appendix)	
bSpecialValue	BYTE	Special values (see table 2 in the appendix)	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
xSend	BOOL	If the input is set, the DALI command is transmitted to the terminal. After transfer, the input is reset by the function module.	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
bValue	BYTE	Feedback from the ECG (raw value)	

Graphical illustration:



Function description:

With the **FbDaliControlGearCommands** module, it is possible to issue the DALI commands specified in standard IEC 82386 (see Table 2 in the appendix).

The short or group address to which the DALI commands are to be sent is specified at the input ***"bAddress"***. The value at input ***"xGroup"*** determines whether the entered address is interpreted by the function block as a short or group address (FALSE = short address; TRUE = group address).

Address 16#FF (255) can be entered at input *„bAddress“* for the broadcasting commands.

When input ***"xDirectArcPowerControl“*** is activated, the value at input ***"wCommand“*** is transmitted as direct lamp value.

If input *"xDirectArcPowerControl“* is deactivate, the values at input *"wCommand“* are interpreted as DALI-commands.

Some DALI commands require additional information, which can be set via input ***"bSpecialValue“*** (see Table 2 in the appendix).

The DALI commands are transmitted, when input ***"xSend“*** is set to TRUE. After transmitting the DALI command to the module, input *“xSend“* is automatically reset.

The DALI module with which this function block must communicate is selected at input ***"bModule_753_647"***.

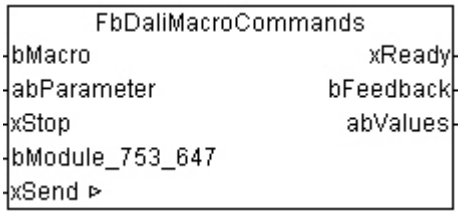
The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block.

The output ***“bFeedback”*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix.

Output ***"bValue“*** delivers the reply from the ECGs at query commands.

Call up macros in the module (FbDaliMacroCommands)

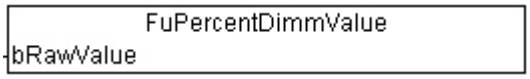
WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FbDaliMacroCommands		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bMacro	BYTE	Macro number	
abParameter	ARRAY [0..6] OF BYTE	Parameter for the macros. (see table 3 in the appendix)	
xStop	BOOL	A positive flank terminates the addressing macro	
bModule_753_647	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
xSend	BOOL	If the input is set, the call-up of the macro is transmitted to the terminal. After transfer, the input is reset by the function module.	
Return value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 1 in the appendix)	
abValues	ARRAY [0..66] OF BYTE	Feedback from the respective macros	
Graphical illustration:			



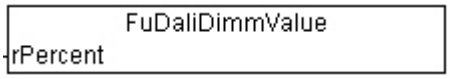
Function description:
It is possible with module **FbDaliMacroCommands** to call up the macros stored in the DALI Multi-Master module. The macro number is selected at input ***"bMacro“***. The related parameters are set via the array ***"abParameter“***. Addressing can be prematurely terminated for the addressing macros via the input ***"xStop“***. The macros are called up, when input ***"xSend“*** is set to TRUE. After transmitting the macro parameters to the module, input "*xSend“* is automatically reset. The DALI module with which this function block must communicate is selected at input "***bModule_753_647"***. The ***"xReady"*** output signals whether the module is active. As long as *"xReady"* is FALSE, no further action is taken by the function block. The output ***“bFeedback”*** outputs a numeric code with the response. Numeric codes are listed in Table 1 in the Appendix. Output ***"abValues“*** delivers the appropriate results depending on the macro. Feedback from the ECG (raw value)

08 Conversions

DALI Dimming Level -> Dimming Level Percent (FuPercentDimmValue)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FuPercentDimmValue		
Type:	Funktion [X]	Function block [ ]	Program [ ]
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bRawValue	BYTE	DALI dimming level of 0 - 255	
Return value:	**Data type:**	**Comment:**	
FuPercentDimmValue	REAL	Output of the dimming level [%]	
Graphical illustration:			
			
Function description:			
This function block converts the DALI dimming level (0 – 255) into a dimming level of 0 – 100 percent.			

Dimming Level Percent -> DALI Dimming Level (FuDaliDimmValue)

WAGO-I/O-*PRO* Library Elements			
Category:	Building Automation		
Name:	FuDaliDimmValue		
Type:	Funktion [X]	Function block [ ]	Program [ ]
Name of library:	DALI_647_01.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
rPercent	REAL	Input of the dimming level [%]	
Return value:	**Data type:**	**Comment:**	
FuDaliDimmValue	BYTE	Output of the DALI dimming level (0 – 255)	
Graphical illustration:			
			
Function description:			
This function block converts a dimming level of 0 – 100 percent into a DALI dimming level (0 – 255).			

Appendix

Numeric code "bFeedback"

Table 1

Feedback from the module	
0	OK
1	The last command sent is not supported by the module.
2	Invalid command
3	No virtual group available or max. number of participants exceeded
4	Several devices respond at the same time (frame error)
5	No response from the device (timeout) or module initialize
6	Internal error in the sequence number
7	Intermediate messages (e.g. Specify new short address)
8	Function aborted (e.g. addressing terminated prematurely)
9	The module has checked the command for plausibility and rejected the command.
10	Collision detected when sending
11	Internal database is invalid
12	Error when copying to the module database
13	Receive buffer overflow
14	Status message from the module
15	Unaddressed devices found
16	Not all control gears could be addressed. Addressing must be restarted.
17	Transmission buffer in the terminal block is full
18	Error in front end controller
19	Wrong sequnce ID
Feedback from the function blocks	
100	Wrong address (short or group address)
101	Global reset of the function blocks was sent
102	Mailbox error
103	DALI module not recognized (e.g. master module was not called up)
105	DALI power not available
106	Interface errors in the terminal block (re-initialization)
107	Control Gears are already selected (physical selection)
108	Mailbox could not be initialized
109	Invalid command
110	External access from WAGO DALI-Configurator
Feedback from the mailbox	
200	OK
201	Mailbox is not ready yet
202	Invalid command
203	Invalid configuration
204	Service rejected
205	Buffer full
206	Unexpected error on the module side
207	General error

Command set for FbDaliControlGearCommands

Table 2

Indirect control commands of the lamp power		
Command	wCommand	bSpecial Value
OFF	0	-
UP	1	-
DOWN	2	-
STEP UP	3	-
STEP DOWN	4	-
RECALL MAX LEVEL	5	-
RECALL MIN LEVEL	6	-
STEP DOWN AND OFF	7	-
ON AND STEP UP	8	-
ENABLE DAPC SEQUENCE	9	-
RESERVED	10 - 15	-
GO TO SCENE	16 - 31	-
Configuration commands		
RESET	32	-
STORE ACTUAL LEVEL IN THE DTR	33	-
RESERVED	34 - 41	-
STORE THE DTR AS MAX LEVEL	42	-
STORE THE DTP AS MIN LEVEL	43	-
STORE THE DTR AS SYSTEM FAILURE LEVEL	44	-
STORE THE DTR AS POWER ON LEVEL	45	-
STORE THE DTR AS FADE TIME	46	-
STORE THE DTR AS FADE RATE	47	-
RESERVED	48 - 63	-
STORE THE DTR AS SCENE	64 - 79	-
REMOVE FROM SCENE	80 - 95	-
ADD TO GROUP	96 – 111	-
REMOVE FROM GROUP	112 - 127	-
STORE DTR AS SHORT ADDRESS	128	-
ENABLE WRITE MEMORY	129	-
RESERVED	130 - 143	-
Query commands		
QUERY STATUS	144	-
QUERY CONTROL GEAR	145	-
QUERY LAMP FAILURE	146	-
QUERY LAMP POWER ON	147	-
QUERY LIMIT ERROR	148	-
QUERY RESET STATE	149	-
QUERY MISSING SHORT ADDRESS	150	-
QUERY VERSION NUMBER	151	-
QUERY CONTENT DTR	152	-
QUERY DEVICE TYPE	153	-
QUERY PHYSICAL MINIMUM LEVEL	154	-
QUERY POWER FAILURE	155	-
QUERY CONTENT DTR1	156	-
QUERY CONTENT DTR2	157	-
RESERVED	158 - 159	-
QUERY ACTUAL LEVEL	160	-
QUERY MAX LEVEL	161	-
QUERY MIN LEVEL	162	-
QUERY POWER ON LEVEL	163	-
QUERY SYSTEM FAILURE LEVEL	164	-

Command	wCommand	bSpecial Value
Query commands		
QUERY FADE TIME / FADE RATE	165	-
RESERVED	166 - 175	-
QUERY SCENE LEVEL	176 - 191	-
QUERY GROUPS 0 - 7	192	-
QUERY GROUPS 8 - 15	193	-
QUERY RANDOM ADDRESS (H)	194	-
QUERY RANDOM ADDRESS (M)	195	-
QUERY RANDOM ADDRESS (L)	196	-
READ MEMORY LOCATION	197	-
RESERVED	198 - 223	-
Device Type specific commands		
DEVIC TYPE SPECIFIC COMMANDS	224 - 254	DEVICE TYPE
QUERY EXTENDED VERSION NUMBER	255	DEVICE TYPE
Special commands		
TERMINATE	256	-
DATA TRANSFER REGISTER (DTR)	257	VALUE
INITIALISE	258	VALUE
RANDOMISE	259	-
COMPARE	260	-
WITHDRAW	261	-
RESERVED	262 - 263	-
SEARCHADDRH	264	VALUE
SEARCHADDRM	265	VALUE
SEARCHADDRL	266	VALUE
PROGRAM SHORT ADDRESS	267	-
VERIFY SHORT ADDRESS	268	-
QUERY SHORT ADDRESS	269	-
PHYSICAL SELECTION	270	-
RESERVED	271	VALUE
ENABLE DEVICE TYPE X	272	DEVICE TYPE
DATA TRANSFER REGISTER 1 (DTR1)	273	VALUE
DATA TRANSFER REGISTER 2 (DTR2)	274	VALUE
WRITE MEMORY LOCATION	275	VALUE

Command set for FbDaliMacroCommands

Table 3

Macro 1 Random addressing	
Send	
abParameter[0]	0: All newly addressed operating units are set to the "reset value" 1: The operating units retain their settings
abParameter[1]	0: Only non-addressed devices are addressed 1: All operating units are re-addressed
abParameter[2]	0: The dimming value is changed during addressing (max. value) 1: The dimming value is not changed during addressing
Receive	
abValues[0]	Macro used
abValues[1]	Number of addressed operating units
abValues[2]	First short address assigned
abValues[3]	Last short address assigned
Macro 2 Physical addressing	
Send	
abParameter[0]	0: All newly addressed operating units are set to the "reset value" 1: The operating units retain their settings
abParameter[1]	0: Only non-addressed devices are addressed 1: All operating units are re-addressed
abParameter[2]	0: The dimming value is changed during addressing (max. value)
Receive	
abValues[0]	Macro used
abValues[1]	Number of addressed operating units
abValues[2]	First short address assigned
abValues[3]	Last short address assigned
Macro 3 Exchange short addresses	
Send	
abParameter[0]	Short address (0 – 63) to be exchanged must be available
abParameter[1]	Short address (0 – 63) to be exchanged can be available
Receive	
abValues[0]	Macro used

Macro 4 Send two commands successively	
Send	
abParameter[0]	Address of first command (according to IEC 62386)
abParameter[1]	First DALI command
abParameter[2]	Reserve
abParameter[3]	Address of second command (according to IEC 62386)
abParameter[4]	Second DALI command
abParameter[5]	Reserve
abParameter[6]	Number of repetitions (should always be zero)
Receive	
abValues[0]	Macro used
Macro 5 Read serial number (8 bytes)	
Send	
abParameter[0]	Short address (0 – 63)
Receive	
abValues[0]	Macro used
abValues[1]	Number of bytes read
abValues[2]	Serial number byte 8
abValues[3]	Serial number byte 7
abValues[4]	Serial number byte 6
abValues[5]	Serial number byte 5
abValues[6]	Serial number byte 4
abValues[7]	Serial number byte 3
abValues[8]	Serial number byte 2
abValues[9]	Serial number byte 1
Macro 6 Synchronize module database	
Send	
Receive	
abValues[0]	Macro used
Macro 7 Start flashing	
Send	
abParameter[0]	Address (0 – 96) 0 – 63 = Short address 0 – 63 64 – 95 = Group 0 – 31 96 = Broadcast
abParameter[1]	Number of flashing periods
Receive	
abValues[0]	Macro used

Macro 8 Stop flashing		
Send		
abParameter[0]	Address (0 – 96) 0 – 63 = Short address 0 – 63 64 – 95 = Group 0 – 31 96 = Broadcast	
Receive		
abValues[0]	Macro used	
Macro 9 Start dimming		
Send		
abParameter[0]	Address (0 – 96) 0 – 63 = Short address 0 – 63 64 – 95 = Group 0 – 31 96 = Broadcast	
abParameter[1]	Bit	
	0.1	00 = Dimming only 01 = Start at the last dimming value 02 = Can be switched on via dimming
	2	0 = Darker 1 = Brighter
	3	0 = Light stays on when reaching the minimum value 1 = Light switches off when reaching the minimum value
	4	0 = No check whether min / max value reached 1 = Check for min / max value
	5	0 = No check of values 1 = Check whether min / max values were reached
	6.7	Reserve
Receive		
abValues[0]	Macro used	
Macro 10 Stop dimming		
Send		
abParameter[0]	Address (0 – 96) 0 – 63 = Short address 0 – 63 64 – 95 = Group 0 – 31 96 = Broadcast	
Receive		
abValues[0]	Macro used	
Macro 11 Delete virtual group		
Send		
abParameter[0]	Virtual group (16 – 31)	
Receive		
abValues[0]	Macro used	

Macro 12 Read device status		
Send		
abParameter[0]	Bit	
	0	Short address available
	1	Operating unit (ECG) is switched on
	2	Reading a status bit
abParameter[1]	Bit number in the status byte, if abParameter[0] = 2 0 = State of the operating unit (ECG) 1 = Lamp error 2 = Lamp power on 3 = Query limit value error 4 = Transition process 5 = Query "Reset State“? 6 = Query short address is missing? 7 = Query "Power Failure"?	
Receive		
abValues[0]	Macro used	
abValues[1]	Status short address 0 – 7 (bit coded)	
abValues[2]	Status short address 8 – 15 (bit coded)	
abValues[3]	Status short address 16 – 23 (bit coded)	
abValues[4]	Status short address 24 – 31 (bit coded)	
abValues[5]	Status short address 32 – 39 (bit coded)	
abValues[6]	Status short address 40 – 47 (bit coded)	
abValues[7]	Status short address 48 – 55 (bit coded)	
abValues[8]	Status short address 56 – 63 (bit coded)	

Macro 13 Read memory bank	
Send	
abParameter[0]	Short address (0 – 63)
abParameter[1]	Number of memory bank
abParameter[2]	Starting value (Offset)
abParameter[3]	Number of bytes to be read
Receive	
abValues[0]	Macro used
abValues[1]	Number of bytes read
abValues[2]	1st read byte from the memory bank
abValues[3]	2nd read byte from the memory bank
	etc.
abValues[65]	64th read byte from the memory bank

Macro 14 Write in memory bank	
Send	
abParameter[0]	Short address (0 – 63)
abParameter[1]	Number of memory bank
abParameter[2]	Starting value (Offset)
abParameter[3]	Number of bytes to write
abParameter[4]	First byte to write
abParameter[5]	Second byte to write
abParameter[6]	Third byte to write
Receive	
abValues[0]	Macro used

Macro 15 Write module database into EEPROM	
Send	
abParameter[0]	No significance
Receive	
abValues[0]	Macro used
Macro 16 Read module database from EEPROM	
Send	
abParameter[0]	No significance
Receive	
abValues[0]	Macro used
Macro 17 Read operating hours	
Send	
abParameter[0]	Short address (0 – 63)
Receive	
abValues[0]	Macro used
abValues[1]	First byte of operating hours (LSB)
abValues[2]	Second byte of operating hours
abValues[3]	Third byte of operating hours (MSB)
Macro 18 Delete operating hours	
Send	
abParameter[0]	Short address (0 – 63)
Receive	
abValues[0]	Macro used
Macro 19 Add short address to virtual group	
Send	
abParameter[0]	Short address (0 – 63)
abParameter[1]	Virtual group (16 – 31)
Receive	
abValues[0]	Macro used
Macro 20 Remove short address from virtual group	
Send	
abParameter[0]	Short address (0 – 63)
abParameter[1]	Virtual group (16 – 31)
Receive	
abValues[0]	Macro used

Macro 21 Check for subscription in virtual group	
Send	
abParameter[0]	Short address (0 – 63)
Receive	
abValues[0]	Macro used
abValues[1]	Virtual group 16 - 23 (bit coded)
abValues[2]	Virtual group 24 - 31 (bit coded)
Macro 23 Read module register	
Send	
abParameter[0]	First register to read
abParameter[1]	Number of registers to read (max. 16)
Receive	
abValues[0]	Macro used
abValues[1]	Number of read registers
abValues[2]	Register value 1 (MSB)
abValues[3]	Register value 1 (LSB)
	etc.
abValues[32]	Register 16 (MSB)
abValues[33]	Register 16 (LSB)
Macro 24 Write module register	
Send	
abParameter[0]	Register to write (32 – 41)
abParameter[1]	Register value (MSB)
abParameter[2]	Register value (LSB)
Receive	
abValues[0]	Macro used
Macro 25 Send configuration commands	
Send	
abParameter[0]	Reserve
abParameter[1]	Content of data transfer register (DTR)
abParameter[2]	Address of second command (according to IEC 62386)
abParameter[3]	DALI command
Receive	
abValues[0]	Macro used
Macro 26 Switch own power supply on / off	
Send	
abParameter[0]	0 = On 1 = Off
Receive	
abValues[0]	Macro used

Macro 28 Read group subscribers	
Send	
abParameter[0]	Group (0 – 31)
Receive	
abValues[0]	Macro used
abValues[1]	Short address 0 – 7 (bit coded)
abValues[2]	Short address 8 – 15 (bit coded)
abValues[3]	Short address 16 – 23 (bit coded)
abValues[4]	Short address 24 – 31 (bit coded)
abValues[5]	Short address 32 – 39 (bit coded)
abValues[6]	Short address 40 – 47 (bit coded)
abValues[7]	Short address 48 – 55 (bit coded)
abValues[8]	Short address 56 – 63 (bit coded)

Macro 29 Configuration with DTR, DTR1 and DTR2		
Send		
abParameter[0]	Content of data transfer register (DTR2)	
abParameter[1]	Content of data transfer register (DTR1)	
abParameter[2]	Content of data transfer register (DTR)	
abParameter[3]	Address (according to IEC 62386)	
abParameter[4]	DALI command	
abParameter[5]	Bit	
	0	Data transfer register (DTR1) will be written
	1	Data transfer register (DTR2) will be written
abParameter[6]	Device Type	
Receive		
abValues[0]	Macro used	

Reset values

Table 4

Parameter	Reset Value
Min-level	Physically smallest value
Max-level	100 %
Fade rate	7
Fade time	0
Power on level	100 %
System failure level	100 %
Group assignment	All deleted
Scene values	No scene defined

Fade Time and Fade Rate

Table 5

Value	Fade time [s]	Fate rate [fades/s]
0	< 0.707	not usable
1	0.707	357.796
2	1.00	253.00
3	1.414	178.898
4	2.00	126.50
5	2.828	89.449
6	4.00	63.25
7	5.657	44.725
8	8.00	31.625
9	11.314	22.362
10	16.00	15.813
11	22.627	11.181
12	32.00	7.906
13	45.255	5.591
14	64.00	3.953
15	90.51	2.795

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