WAGO I/O SYSTEM 750

Library for Building Automation

Function Block Description for DALI – Master Module 750-641

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We wish to point out that the software and hardware terms 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 CAA Library for DALI– Master Module 750-641

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Important Notes

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

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The use of the product detailed in this document is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines any 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.

Intended Use

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 direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

Scope of Validity

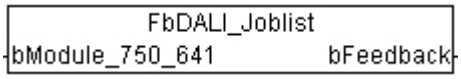
This application note is based on the stated hardware and software of the specific manufacturer as well as the associated documentation. This application note is therefore only valid for the described installation. New hardware and software versions may need to be handled differently.

Please note the detailed description in the specific manuals.

Communication

DALI Job List (FbDALI_Joblist)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_Joblist		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Output parameters:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



Function description:

The **FbDALI_Joblist** function block is used for communication with the DALI module 750-641 on the fieldbus controllers 750-8xx. This function block detects all queued commands of the other DALI function blocks in the program and causes their execution.

The controller recognizes the plugged DALI modules on its own and counts them one after the other, starting from the left. To address the function block to the proper DALI module, the corresponding module index must be entered as a constant at the input ***"bModule_750_641"***.

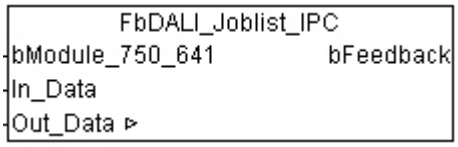
The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Note:

- The function block sends the command “Terminate” (256) after the program start.
- **The function block “FbDALI_Joblist” should be called in the program sequence before all other DALI function blocks.**
- This function block may be used only once per installed DALI module.

DALI Job List IPC (FbDALI_Joblist_IPC)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_Joblist_IPC		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bModule_750_641	BYTE	Selection of DALI master module Value range = 1 – 5 Default setting = 1	
In_Data	ARRAY[0..5] OF BYTE	Input array of DALI master modules 750-641	
Input/output parameter:	**Data type:**	**Comment:**	
Out_Data	ARRAY[0..5] OF BYTE	Output array of DALI master modules 750-641	
Output parameters:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response (see table 6 in the appendix)	
Graphical display:			



Function description:

The **FbDALI_Joblist_IPC** function block is used for communication with the DALI module 750-641. This function block detects all DALI commands of the other DALI function blocks in the program and causes their execution.

The DALI module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The inputs ***"In_Data"*** and ***"Out_Data"*** contain the input or output array for the data of the DALI master module. The variables at these inputs must be linked to the corresponding hardware address. The address depends on the installation position of the module.

Example:

In_Data = Input **AT %IB0** : ARRAY [0..5] OF BYTE;

Out_Data = Output **AT %QB0** : ARRAY [0..5] OF BYTE;

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

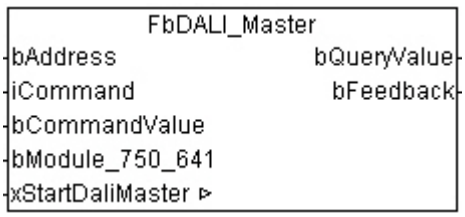
Note:

- The module sends the command “Terminate” (256) after the program start.
- The function block **FbDALI_Joblist_IPC** should be called in the program sequence before all other DALI function blocks.
- This function block may be used only once per installed DALI module.

Basic Function Block

DALI Master

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_Master		
Type:	Function ☐	Function block X☐	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1–64 or Group address 1–16 Broadcast = 255	
iCommand	INT	Input of DALI commands in accordance with DALI command set (see DIN IEC 60929) Example: 0 = Off 1 = On 2 = Darker etc. (see appendix, table 1)	
bCommandValue	BYTE	Command value (e.g. brightness)	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
xStartDaliMaster	BOOL	Starts the command. This bit is to be set by the user. The block resets it after execution of the command.	
Feedback value:	**Data type:**	**Comment:**	
bQueryValue	BYTE	This byte returns the query value in accordance with the DALI specification.	
bFeedback	BYTE	Response (see table 6 in the appendix)	
Graphical display:			



Function description:

The **FbDALI_Master** function block enables you to initiate the DALI commands specified in DIN IEC 60929 (see list in the appendix, table 1).

To address a single ballast, specify the short address (1–64) of the corresponding ballast at the input ***"bAddress"***. If you wish to address a group, enter the corresponding group (1–16) at the input ***"bAddress"***.

To be able to send broadcast commands, the address 16#FF (255) can be entered.

The command number for the DALI command is to be entered at the input ***"iCommand"***. If this command additionally requires a command value, this must be specified at the input ***"bCommandValue"***. To be able to differentiate between short address and group commands, an offset of 300 must be added for the commands of group commands.

Example:

1. **Command to a short address**

   "bAddress" = 1 ; *"iCommand"*= 0 ➔

   "Off" command to ballast with short address 1

2. **Command to a group**

   „bAddress" = 1 ; *„iCommand"* = 300 ➔

   "Off" command to ballasts with group address 1

The short address commands 32 to 128 and group commands 332 to 364 must be sent twice within 100 ms to enable correct execution.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The sending of the DALI command is triggered by the signal TRUE at the input ***"xStartDaliMaster".*** This input must be specified using a variable that can be set by the user. The block resets this variable itself, so that the user can then initiate a further DALI command.

If a query is sent to the DALI slaves, the response is then sent to the ***"bQueryValue"*** output.

The output ***"bFeedback"*** outputs a numeric code as response. The numeric codes are listed in table 6 in the appendix

Note:

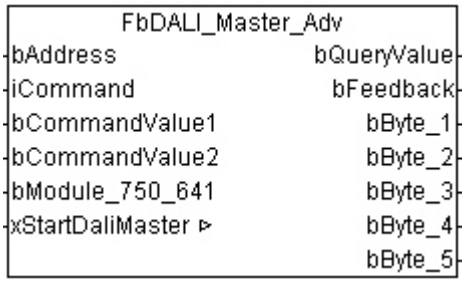
The input or output of dimming values is done in the block **FbDALI_Master** in the value range 0 - 254 (logarithmic dimming curve).

The DALI dimming value can be converted into a percentage via the **FuDimmValue_Percent** function.

DALI Master Advanced (FbDALI_Master_Adv)

WAGO-I/O PRO CAA Library Elements		
Category:	Building Automation	
Name:	FbDALI_Master_Adv	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_02.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 1–64 or Group address 1–16 Broadcast = 255
iCommand	INT	Input of DALI commands in accordance with DALI command set (see DIN IEC 60929) Example: 0 = Off 1 = On 2 = Darker 3 = One level brighter etc. (see appendix, table 1)
bCommandValue1	BYTE	Command value 1
bCommandValue2	BYTE	Command value 2
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1
Input/output parameter:	**Data type:**	**Comment:**
xStartDaliMaster	BOOL	Starts the command. This bit is to be set by the user. The block resets it after execution of the command.
Feedback value:	**Data type:**	**Comment:**
bQueryValue	BYTE	This byte returns the query value in accordance with the DALI specification.
bFeedback	BYTE	Response byte (see table 6 in the appendix)
bByte_1	BYTE	DALI response byte 1
bByte_2	BYTE	DALI response byte 2
bByte_3	BYTE	DALI response byte 3
bByte_4	BYTE	DALI response byte 4
bByte_5	BYTE	DALI response byte 5

Graphical display:



Function description:

The **FbDALI_Master_Adv** function block enables you to initiate the DALI commands specified in DIN IEC 60929 (see list in the appendix, table 1). This function block also supports the so-called “extended commands” (see table 2 in the appendix). These are the commands that are stored as macros in the DALI master module (e.g. macro for assigning a new address).

To address a single ballast, specify the short address (1–64) of the corresponding ballast at the input ***“bAddress”***. If you wish to address a group, enter the corresponding group (1–16) at the input *“bAddress"*.

To be able to send broadcast commands, the address 16#FF (255) can be entered. Broadcast commands are not possible using group commands.

The command number for the DALI command is to be entered at the input ***“iCommand”***. If this command additionally requires a command value, this must be specified at the input ***“bCommandValue1”***.

With some extended commands, a second parameter must be entered and this is done at the input ***“bCommandValue2"***.

To be able to differentiate between short address and group commands, an offset of 300 must be added to the command number *"iCommand"* of the group commands. The command numbers of the extended commands start with the number 500. The differentiation between short and group addresses is similarly achieved with an offset of 300. This means that the extended commands of the group addresses start with command number 800.

Example:

1. **Command to a short address**
   "bAddress" = 1 ; *"iCommand"*= 0
   ➔ “Off” command to ballast with short address 1
2. **Command to a group**
   "bAddress" = 1 ; *"iCommand"* = 300
   ➔ "Off" command to ballasts with group address 1
3. **Extended command to a short address**
   "bAddress“ = 1; *"iCommand“* = 501; *"bCommandValue1“* = 42; *"bCommandValue2“*=254
   ➔ Command “Save max. value 100% (254)” to ballast with short address 1
4. **Extended command to a group address**
   "bAddress“ = 1; *"iCommand“* = 801; *"bCommandValue1“* = 42; *"bCommandoValue2“*=254
   ➔ Command “Save max. value 100% (254)” to ballasts with group address 1

The short address commands 32 to 128 and group commands 332 to 364 must be sent twice within 100 ms to enable correct execution.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The sending of the DALI command is triggered by the signal TRUE at the input ***"xStartDaliMaster".*** This input must be specified using a variable that can be set by the user. The block resets this variable itself, so that the user can then initiate a further DALI command.

The output ***"bFeedback"*** outputs a numeric code as response. The numeric codes are listed in table 6 in the appendix

If a query is sent to the DALI slaves, the response is then sent to the ***"bQueryValue"*** output.

Responses to the queries of extended commands are displayed at outputs ***"bByte1 – bByte5"*** (see appendix, table 3).

Note:
The input or output of dimming values is done in the block **FbDALI_Master_Adv** in the value range 0 - 254 (logarithmic dimming curve).

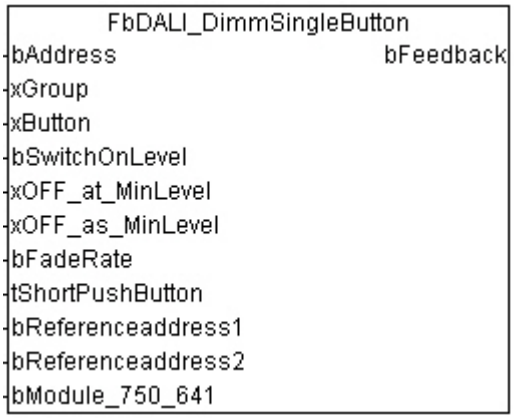
The DALI dimming value can be converted into a percentage via the **FuDimmValue_Percent** function.

Recall Lighting

Dimmer Single Button (FbDALI_DimmSingleButton)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_DimmSingleButton		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1–64 or Group address 1–16 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 or dim lighting request.	
bSwitchOnLevel	BYTE	Value for power on brightness Value range 0 – 100 [%] Default = 0 (max. value)	
xOFF_at_MinLevel	BOOL	Lighting is switched off when minimum dimming value reached. Default setting = FALSE	
xOFF_as_MinLevel	BOOL	Instead of the switch-off command, the lighting is dimmed to the min. level. Default setting = FALSE	
bFadeRate	BYTE	Fade rate Value range = 1–15 (255) Default setting = 255 (no change)	
tShortPushButton	TIME	Brief period allocated to push the button Default = t#500ms	
bReferenceaddress1	BYTE	First reference control gear determines the current dim value	
bReferenceaddress2	BYTE	Second reference control gear determines the current dim value	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	

Graphical display:



Function description:

A lighting can be dimmed with DALI interface via the **FbDALI_DimmSingleButton** function block. The dimming commands and power on and off for the lighting is done by the control of one switch.

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 reactions for a short and long press of the button are as follows:

- short button press at input ***"xButton"*** => lighting is switched on at the value specified at input ***"bPowerOnLevel"***. If the power on brightness is set to zero, the maximum brightness is called when switching on.
- short button press at input *"xButton"* while lighting is switched on
  => Lighting switches off
- *short button press at input "xButton" when* ***"xOFF_as_MinLevel"*** = *TRUE* and the lighting is switched on.
  => Lighting is not switched off but set to min. level.
- long button press at input *"xButton"* while lighting is switched off
  => The lighting is switched on and turned brighter.
- long button press at input *"Button"* while lighting is switched on
  => The lighting is turned dimmer or brighter, opposite to the previous long button press.
- If the value ***"xOFF_at_MinLevel"*** is set to TRUE, the lighting switches off, when stepping down the brightness, as soon as the minimum dimming value is reached.

It is obligatory to give a reference control gear from the group if the group is to be switched or dimmed. For redundancy reasons it is possible to give two reference values (***"bReferenceaddress1"*** and ***"bReferenceaddress2"***).

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

A change in the fade rate can be set via the input parameter ***"bFadeRate"***. This parameter is only sent when the button is pressed or the value changed. If the value of 255 is entered, the fade rate is not changed.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

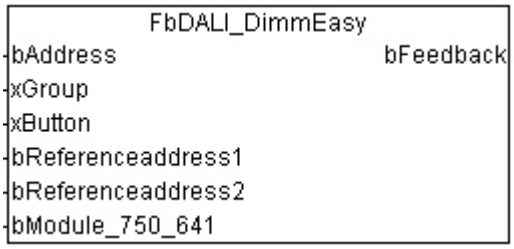
The output ***"bFeedback"*** outputs a numeric code as response. The numeric codes are listed in table 6 in the appendix

Note:
The value "0" at the input *"bSwitchOnLevel"* is interpreted as the maximum brightness value.

Dimmer Single Button (Easy) (FbDALI_DimmEasy)

WAGO-I/O PRO CAA Library Elements		
Category:	Building Automation	
Name:	FbDALI_DimmEasy	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_02.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 1–64 or Group address 1–16 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 or dim lighting request.
bReferenceaddress1	BYTE	First reference control gear determines the current dim value
bReferenceaddress2	BYTE	Second reference control gear the current dim value
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1
Feedback value:	**Data type:**	**Comment:**
bFeedback	BYTE	Response byte (see table 6 in the appendix)

Graphical display:



Function description:

The function block **FbDALI_DimmEasy** enables you to dimm a lighting with DALI ballasts. The dimming commands and power on and off for the lighting is done by the control of one switch.

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 reactions for a short and long press of the button are as follows:

- short button press at input ***"xButton"***
  => lighting switches on
- short button press at input *"xButton"* while lighting is switched on
  => lighting switches off
- long button press at input *"xButton"* while lighting is switched off
  => The lighting is switched on and turned brighter.
- long button press at input *"xButton"* while lighting is switched on
  => The lighting is turned dimmer or brighter, opposite to the previous long button press.

It is obligatory to give a reference control gear from the group if the group is to be switched or dimmed. For redundancy reasons it is possible to give two reference values (***"bReferenceaddress1"*** and ***"bReferenceaddress2"***).

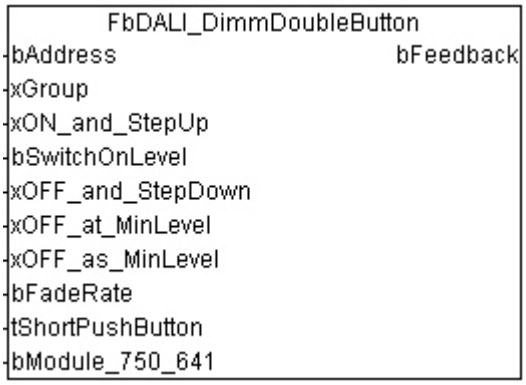
The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***"bFeedback"*** outputs a numeric code as response. The numeric codes are listed in table 6 in the appendix.

Dimmer Double Button (FbDALI_DimmDoubleButton)

WAGO-I/O PRO CAA Library Elements		
Category:	Building Automation	
Name:	FbDALI_DimmDoubleButton	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_02.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 1–64 or Group address 1–16 Broadcast = 255
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE
xON_and_StepUp	BOOL	Button signal for power on and step up brightness
bSwitchOnLevel	BYTE	Value for power on brightness Value range 0 – 100 [%] Default = 0 (max. value)
xOFF_and_StepDown	BOOL	Button signal for power off and step down brightness
xOFF_at_MinLevel	BOOL	Lighting is switched off when minimum dimming value reached. Default setting = FALSE
xOFF_as_MinLevel	BOOL	Instead of the switch-off command, the lighting is dimmed to the min. level. Default setting = FALSE
bFadeRate	BYTE	Fade rate Value range = 1–15 (255) Default setting = 255 (no change)
tShortPushButton	TIME	Brief period allocated to push the button Default = t#500ms
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1
Feedback value:	**Data type:**	**Comment:**
bFeedback	BYTE	Response byte (see table 6 in the appendix)

Graphical display:



Function description:

The function block **FbDALI_DimmDoubleButton** enables you to dimm a lighting with DALI ballasts. The dimming commands and power on and off for the lighting is done by the control of two separate button inputs.

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 reactions for a short and long press of the button are as follows:

- short button press at input ***"xON_and_StepUp"***
  => lighting is switched on at the value specified at input ***"bSwitchOnLevel"***. The value "0" at the input *"bSwitchOnLevel"* is interpreted as the maximum brightness value.
- short button press at input ***"xOFF_and_StepDown"***
  => lighting switches off
- *long button press at input "xOn_and_StepUp"*
  => brightness is stepped up
- *long button press at input "xOff_and_StepDown"*
  => brightness is stepped down

If the value ***"xOFF_at_MinLevel"*** is set to TRUE, the lighting switches off, when stepping down the brightness, as soon as the minimum dimming value is reached.

If the input ***"xOFF_as_MinLevel"*** is TRUE, instead of the switch-off command, the lighting is dimmed to the min. level.

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

A change in the fade rate can be set via the input parameter ***"bFadeRate"***. This parameter is only sent when the value changed. If no value or a value of 255 is entered, the fade rate is not changed.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

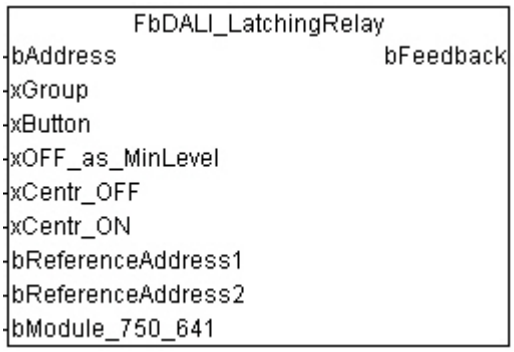
Latching Relay (FbDALI_LatchingRelay)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_LatchingRelay		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 1–64 or Group address 1–16 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.
xOFF_as_MinLevel	BOOL	Instead of the switch-off command, the lighting is dimmed to the min. level. Default setting = FALSE
xCentr_OFF	BOOL	TRUE = group address
xCentr_ON	BOOL	Input for the central ON command.
bReferenceaddress1	BYTE	First reference control gear determines the current brightness value
bReferenceaddress2	BYTE	Second reference control gear determines the current brightness value
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1

Feedback value:	**Data type:**	**Comment:**
bFeedback	BYTE	Response byte (see table 6 in the appendix)

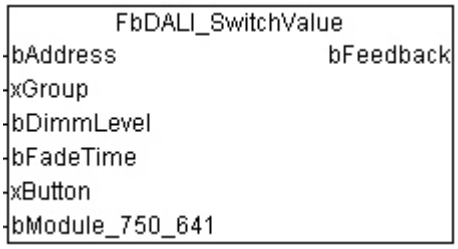
Graphical display:



Function description:
This function block is used to implement a DALI latching relay. 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). A rising edge at the input ***"xButton"*** causes the lighting addressed via short or group address to be switched on or off. Whether the lighting is switched on or off depends on the previous switching status of the lighting. If the input ***"xOFF_as_MinLevel"*** is TRUE, instead of the switch-off command, the lighting is dimmed to the min. level. The inputs ***"xCentr_ON"*** and ***"xCentr_OFF"*** are used for forced control of the lighting via a central command. The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***. **It is obligatory** to give a reference control gear from the group if the group is to be switched. For redundancy reasons it is possible to give two reference values ("bReferenceaddress1" and "bReferenceaddress2"). The first reference value from the group must absolutely be available. The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Switch Value with Percent values (FbDALI_SwitchValue)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_SwitchValue		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1 - 64 or Group address 1 - 16 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
bDimmLevel	BYTE	Dimming value [%] Value range = 0 – 100 %	
bFadeTime	BYTE	Fade time Value range = 0 - 15 (255) Default setting = 255 (no change)	
xButton	BOOL	Switch signal for invoking dimming value	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



Function description:
This module implements a latching relay module for DALI devices. 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). A rising edge at the input ***"xButton"*** dimms the lightings, that are addressed via short or group address, to the dimming value set at the ***"bDimmLevel"*** input. Entering the dimming value is done in the value range 0 – 100 %. The input parameter ***"bFadeTime"*** defines the fade speed with which the brightness must be reached for a change. This value is transmitted to the appropriate DALI subscriber before invoking the new brightness value. The transmission only takes place when a value modification of the fade speed was performed or when adddressing has been changed. The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***. The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

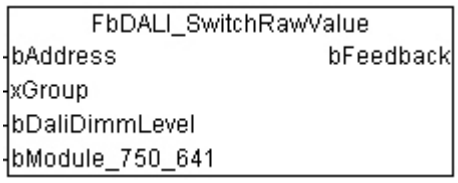
Switch Value with DALI raw values (FbDALI_SwitchRawValue)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_SwitchRawValue		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 1 - 64 or Group address 1 - 16 Broadcast = 255
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE
bDimmLevel	BYTE	DALI Dimming value Value range = 0 – 255
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1

Feedback value:	**Data type:**	**Comment:**
bFeedback	BYTE	Response byte (see table 6 in the appendix)

Graphical display:



Function description:

This module implements a latching relay module for DALI devices.

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 transmission of the DALI dimmvalue only takes place when a value modification of the ***"bDaliDimmLevel"*** was performed.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Constant Light Control (FbDALI_ConstantLightControl)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_ConstantLightControl		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1–64 or Group address 1–16 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	
xON_and_StepUp	BOOL	The lighting is switched on by pushing the button briefly, the lighting is dimmed brighter by pushing the button longer. (when "xSetpValueShifting" = TRUE)	
xOFF_and_StepDown	BOOL	The lighting is switched off by pushing the button briefly, the lighting is dimmed lower by pushing the button longer. (when "xSetpValueShifting" = TRUE)	
tShortPushButton	TIME	Brief period allocated to push the button Default = t#500ms	
wActualValue	WORD	Input signal of the light sensor Value range: 0 – 32767	
wBasicSetpValue	WORD	Basic set point value [Lux] Default setting = 500 lx	
wMaxMeasuredValue Sensor	WORD	Maximum measured value of the light sensor in [lux] Default setting = 2000 lx	
tSwitchOffDelay	TIME	Switch-off delay of the lighting at minimum dimming level. Value range: 1 - 30 [min] Default setting = t#0s (no switch-off delay)	
xSetpValueShifting	BOOL	Setpoint value correction is activated, the set point value "wSetpValue" can be shifted up or down Otherwise "wBasicSetpValue" is valid. Default setting = FALSE	

xMemo	BOOL	If Memo is activated, the lamp will be adjusted to the "wSetpValue“ after power on. Otherwise "wBasicSetpValue" is valid. Default setting = FALSE
xPresenceDetector	BOOL	Switching signal of the presence detector. The lighting and controller are switched off by a falling edge.
xAuto_On_at_Presence	BOOL	When the input is activated, the lighting can be switched on via the presence detector. Requirement:actual value < set point value Default setting = FALSE
rCalibration	REAL	Input used to calibrate the light sensor. Default setting = 5
bAdaption_in_Percent	BYTE	Input used to adapt the calibration value to the daylight. Value range: 0 - 100 % Default setting = 70
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1
Input/output parameter:	**Data type:**	**Comment:**
wSetpValue	WORD	Set point value for light intensity in [lux]
Feedback value:	**Data type:**	**Comment:**
bFeedback	BYTE	Response byte (see table 6 in the appendix)

Graphical display:

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_750_641"***.

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

The ***"xOn"*** and ***"xOff"*** inputs allow the lights and the control to be switched ON or OFF.

A positive edge at the *"xToggle"* input switches the control and the lights on or off, depending on their current states.

By pushing the input buttons ***"xOn_and_StepUp"*** or ***"xOff_and_StepDown"*** longer, the set point light intensity at input ***"wSetpValue"*** can be shifted up or down. This is only possible when the input signal ***"xSetpValueShifting"*** is TRUE.

The lighting is switched on or off by briefly pushing (briefer than the ***"tShortPushButton"*** time) the input buttons *"xOn_and_StepUp"* or *"xOff_and_StepDown"*. When switching on, the light intensity is adjusted to the set point value *"wSetpValue"*.

The actual brightness value is called up via the ***"wActualValue"***.

Adaptating the measured value ***"wActualValue"*** to the measuring range of the light sensor is done via the ***"wMaxMeasuredValueSensor"*** input. The determined actual value is compared with the set point value ***"wSetpValue"***. The lighting is dimmed if these two values differ from each other.

The time after which the lighting will switch off at minimum dimming position is set using the input ***"tSwitchOffDelay"***. The time is restarted if the dimming position changes during this time period. If the value is t#0s at input *"tSwitchOffDelay*", the lighting won't switch off automatically.

If the input ***"xMemo"*** is TRUE, the previously adjusted set point value *"wSetpValue"* will be memorised after switching off and recalled when switching on again.

If this memory function is not required, the signal at input *"xMemo"* is set to FALSE. In this case, the ***"wBasicSetpValue"*** value is set when power on for *"wSetpValue"*.

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 by a falling edge of the presence detector.

When the input "***xAuto_On_at_Presence"*** is activated, the lighting can be switched on via the *"xPresenceDetector"* input. This can only be done when the actual value is smaller than the set point value.

Using the parameters ***"rCalibration"*** and ***"bAdaptation_in_Percent"***, the measured value of the ceiling-mounted light sensor is compared with the light intensity in the workplace.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Note:

1. Control gears that are controlled via constant light control require a **FADE TIME** of zero.
2. The inputs *"rCalibration"* and *"bAdaption_in_Percent"* should be defined as constant values.
3. The variable *"wSetpValue"* should be defined as RETAIN value.

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 light intensity is to be measured on the work surface using a luxmeter that has a good fit 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 „rCalibration“* = 5
- Start value *“bAdaption_in_Percent”* = 70

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 set point 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 set point 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 set point light intensity.

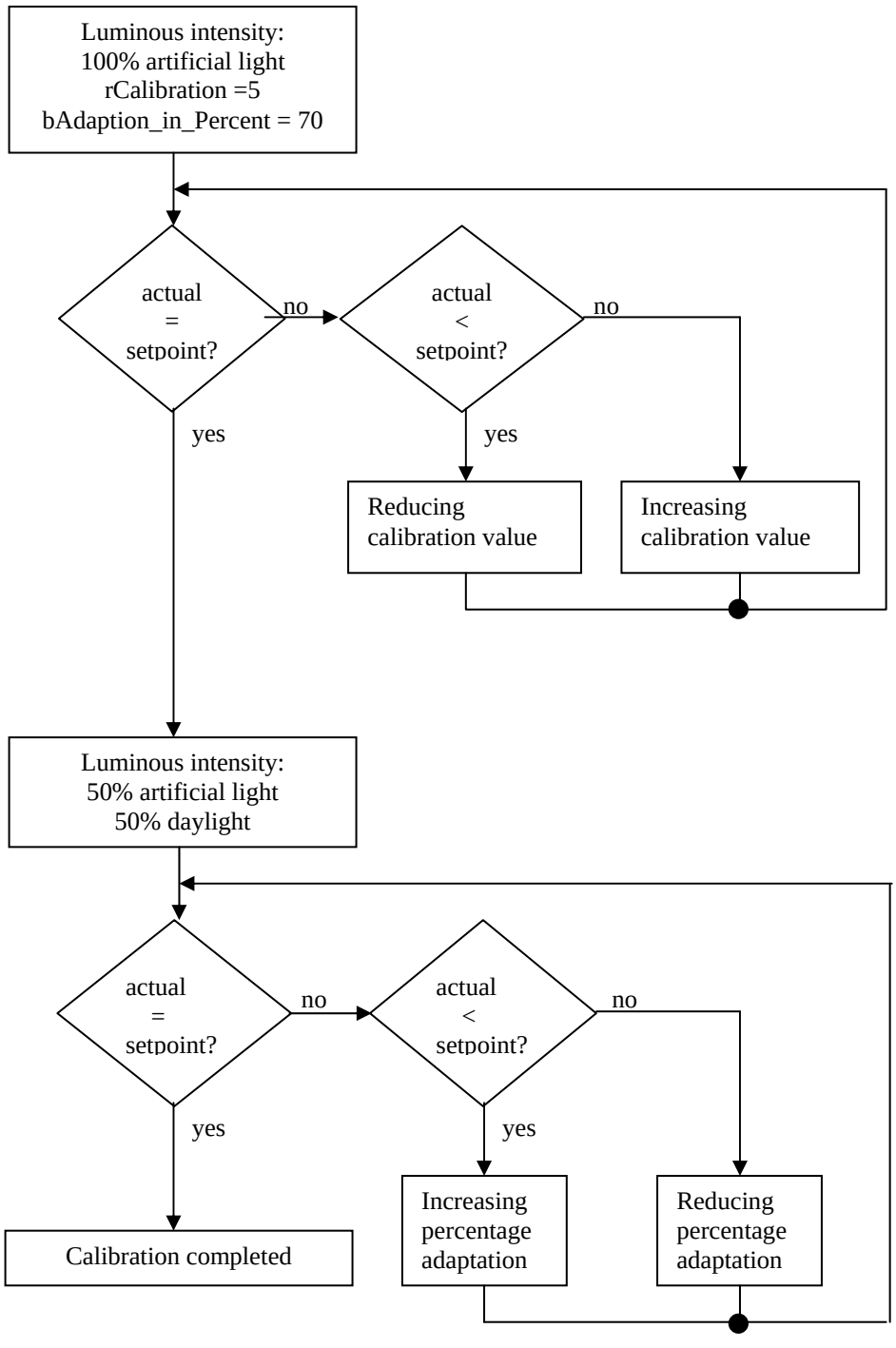
The second calibration measurement is required in order to determine the percentage adaptation of the calibration value. This measurement is performed in a semi-darkened room with residual artificial light.

The second measurement is performed as follows:

- If the light intensity in the workplace is lower than the set point 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.

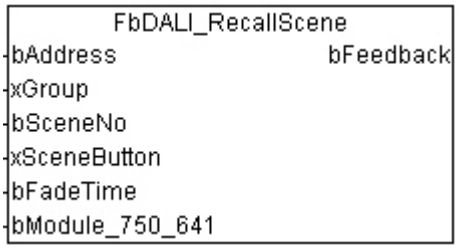
If the percentage adaptation of the calibration value is performed in a semi-darkened room, the lowest possible offset is achieved depending on the part of daylight or artificial light. The actual value of the light intensity can still be lower than the set point light intensity.

Calibration:



Selecting Scene (FbDALI_RecallScene)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_RecallScene		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1–64 or Group address 1–16 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
bSceneNo	BYTE	Light scene selection Range = 1 - 16	
xSceneButton	BOOL	The selected scene is called by a positive edge.	
bFadeTime	BYTE	Fade time input parameter Value range = 0–15 (255) Default setting = 255 (no change)	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



Function description:

This function block allows the polling of maximum 16 possible light scenes. Different fade times can be defined per scene selection (see function block **FbSelectSceneFadeTime**) .

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 selection of the required scene is done via the value at ***"bSceneNo"*** input.

The input parameter ***"bFadeTime"*** defines the fade speed with which the brightness must be reached for a change. The fade time is only transmitted to the relevant DALI subscribers when a value is changed.

Entering the values is done in the range 0 – 15. The number 255 is valid. The value 255 means that no value has been changed in the DALI devices. The number 1 means that the new dimming value is approached quickly and that it is approached slower with higher numbers (see table 5).

Via a rising edge at input ***"xSceneButton"***, it is possible to force the re-transmission of the scene call even though the input value "*bSceneNo"* has not been changed. This can be required in some applications when, for example, the lighting has been switched centraly from another location. In this case, the relevant scene buttons must be switched via an OR linkage on the "*xSceneButton"* input.

The function block is only used to poll the lighting scenes and not for configuration purposes.

The function block **FbSelectSceneNo** is available when the scene selection is done via Boolean inputs.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

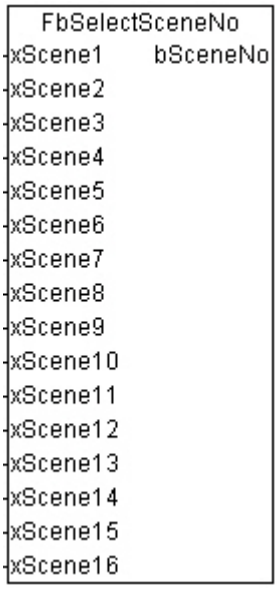
Selecting Scene No. (FbSelectSceneNo)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbSelectSceneNo		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
xScene1	BOOL	Light scene selection 1
xScene2	BOOL	Light scene selection 2
:	:	:
xScene16	BOOL	Light scene selection 16

Feedback value:	**Data type:**	**Comment:**
bSceneNo	BYTE	Output of light scene number Value range 1 – 16

Graphical display:



Function description:

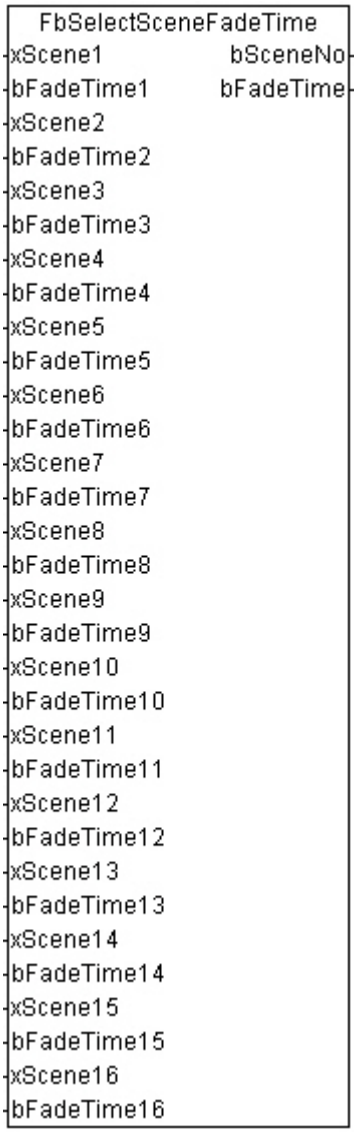
The function block **FbSelectSceneNo** is used together with the **FbDALI_RecallScene** function block. It has the task of converting the input button signals ***("xScene1" – "xScene16"***) of type BOOL into output values 1–16 of data type BYTE.

These output values allow the polling of maximum 16 possible light scenes. For that purpose, the output ***"bSceneNo"*** must be connected with the input of the **FbDALI_RecallScene**, which has the same name.

Selection of Sene No. + Fade Time (FbSelectSceneFadeTime)

WAGO-I/O PRO CAA Library Elements		
Category:	Building Automation	
Name:	FbSelectSceneFadeTime	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_02.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
xScene1	BOOL	Light scene selection 1
bFadeTime1	BYTE	Fade time for selecting scene 1 Range = 0 - 15
xScene2	BOOL	Light scene selection 2
bFadeTime2	BYTE	Fade time for selecting scene 2 Range = 0 - 15
: :	: :	: :
xScene16	BOOL	Light scene selection 16
bFadeTime16	BOOL	Fade time for selecting scene 16 Range = 0 - 15
Feedback value:	**Data type:**	**Comment:**
bSceneNo	BYTE	Output of light scene number Range = 1 - 16
bFadeTime	BYTE	Output of fade time Range = 0 - 15

Graphical display:



Function description:

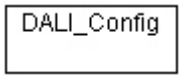
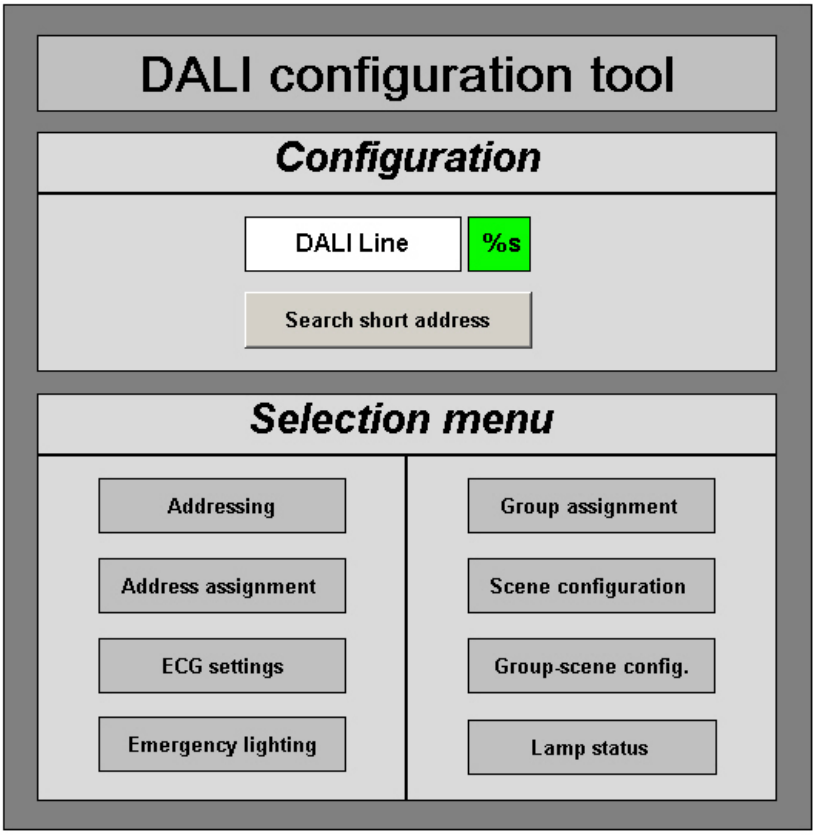
The function block **FbSelectSceneFadeTime** is used together with the **FbDALI_RecallScene** function block. It has the task of converting the input button signals **(“xScene1” – “xScene16”**) of type BOOL into output values 1–16 of data type BYTE.

These output values allow the polling of maximum 16 possible light scenes. Simultaneously, an individual fade time can be parametrized at the inputs ***"bFadeTime1” – “bFadeTime16“*** for each light scene.

The outputs ***"bSceneNo“*** and ***"bFadeTime“*** must be connected with the inputs of the same name for the transmission to the **FbDALI_RecallScene** function block.

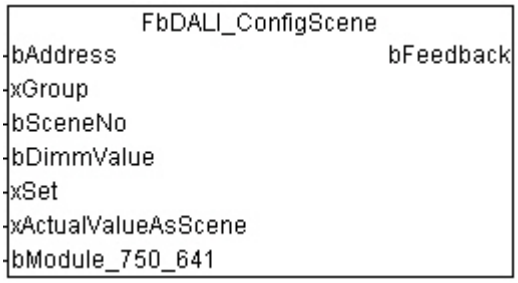
Configuration

Commissioning Tool (DALI_Config)

WAGO-I/O *PRO* CAA Library Elements			
Category:	Building Automation		
Name:	DALI_Config		
Type:	Function ☐	Function block ☐	Programm ☒
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Illustration:			
			
Display:			
			
Function description:			
For the DALI configuration tool, the programm **DALI_Config** and the visualization page ***"FrontPageDALI"*** must be called once in the project.			

Scene Configuration (FbDALI_ConfigScene)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_ConfigScene		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1–64 or Group address 1–16 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
bSceneNo	BYTE	Scene numbers 1 – 16	
bDimmValue	BYTE	Dimm value to be stored [%]	
xSet	BOOL	Start signal for storing the scene	
xActualValueAsScene	BOOL	Store current lamp power value as scene	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



Function description:

This function block is used to configure the scenes. The following procedure is required to store new scenes:

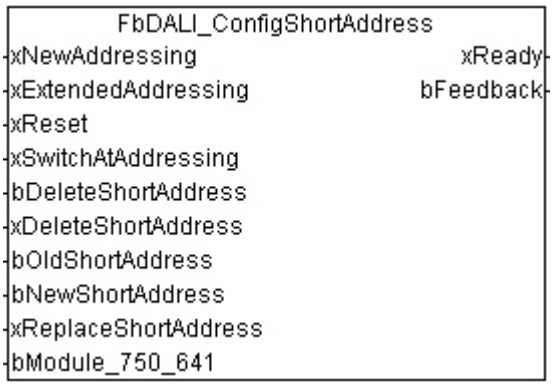
- The short or group address to which the DALI commands are to be sent is specified at the input ***"bAddress"***. The value at input ***"xGroup"*** determines whether the entered address is interpreted by the function block as a short or group address (FALSE = short address; TRUE = group address).
- The dimming value to be stored is defined at input ***"bDimmValue"***. Entering the value is done in the range 0 – 100 %. Values above 100 % are interpreted as “MASK“ (i.e. no change or deleting from the scene).
- The scene number under which this dimming value has been called must be defined at input ***"bSceneNo"***. Up to 16 scenes can be defined.
- The current input values are stored as scene by a rising edge at the input ***"xSet“***.
- The current lamp power value of the control gear are stored as scene by a rising edge at the input ***„xActualValueAsScene“***. The control gear are addressed that are addressed at input *"bAddress"*. The lamp power value is stored under the scene number indicated at input *"bSceneNo“*.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***“bFeedback”*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Addressing Control Gears (FbDALI_ConfigShortAddress)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_ConfigShortAddress		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xNewAddressing	BOOL	Start signal for new addressing short addresses (*** Double click***)	
xExtendedAddressing	BOOL	Start signal for addressing the short address for system extension	
xReset	BOOL	Reset before new addressing	
xSwitchAtAddressing	BOOL	Addressed DALI lights are switched on.	
bDeleteShortAddress	BYTE	Short address to be deleted	
xDeleteShortAddress	BOOL	Start deleting short address	
bOldShortAddress	BYTE	Old short address	
bNewShortAddress	BYTE	New short address	
xReplaceShortAddress	BOOL	Start replacing short address	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
xReady	BOOL	The output is set to FALSE as long as the configuration is activated.	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



Function description:

This function block is used to configure the short addresses. Before new installed DALI devices can be addressed, a short address must be assigned to them. Searching the connected DALI devices is defined in an algorithm. Generally, assigning short addresses is done at random. The addresses are assigned in ascending order.

The following functions are carried out by the function block:

- When a rising edge (double click) is recognized twice at ***"xNewAddressing"*** input within 500 ms, a short address will be assigned to all ballasts that are connected to the DALI module.
- When a rising edge is identified at input ***"xExtendedAddressing"***, only the ballasts to which no short address has been assigned are addressed. The next free short address is assigned.
- When the ***"xSwitchAtAddressing"*** input is activated, the lighting is set to max value after the address assignment of the control gear. This way, it is possible to identiy which control gear has already been addressed.
- If the ***"xReset"*** input receives a signal TRUE, then a reset command is sent to the control gear when starting a new addressing, so that they can be reset to factory setting. If no signal is received by this input, then reset is carried out.
- If a rising edge is identified at ***"xDeleteShortAddress"*** input, then the control gear is deleted together with the short address defined at input ***"bDeleteShortAddress"***.
- A rising edge at input ***"xReplaceShortAddress"*** causes the assignment of the ballast with short address ***"bOldShortAddress"*** to the ***"bNewShortAddress"*** short address. This way, a short address defined by the user can be assigned to the selected DALI devices.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

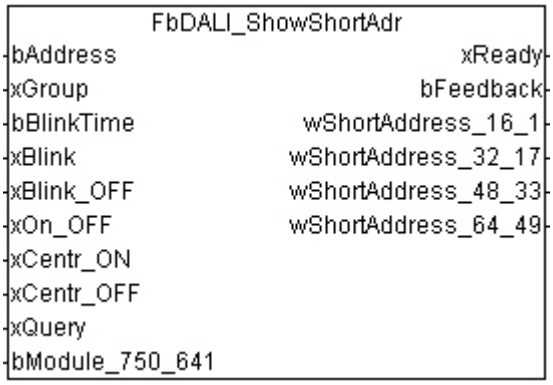
The output ***"xReady"*** indicates if an addressing procedure is activated. No new command is sent by the function block as long as addressing is activated.

Searching Short addresses (FbDALI_ShowShortAdr)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_ShowShortAdr		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bAddress	BYTE	Short address of 1–64 or Group address 1–16 Broadcast = 255	
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE	
bBlinkTime	BYTE	Blink time in seconds Range of values: 3 - 255 Default setting = 3	
xBlink	BOOL	A TRUE at this input causes lamps with the specified addresses to blink.	
xBlink_OFF	BOOL	Resets blinking if the blink time has not yet expired	
xON_OFF	BOOL	A TRUE at this input switches on lamps with the specified address.	
xCentr_ON	BOOL	A rising edge switches on all lamps on the DALI bus.	
xCentr_OFF	BOOL	A rising edge switches off all lamps on the DALI bus.	
xQuery	BOOL	A rising edge starts query of short addresses	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = query of device status activated	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
wShortAddress_16_1	WORD	Output of available short addresses coded for short addresses 1 – 16	
wShortAddress_32_17	WORD	Output of available short addresses coded for short addresses 17 – 32	
wShortAddress_48_33	WORD	Output of available short addresses coded for short addresses 48 – 33	

WAGO-I/O PRO CAA Library Elements		
wShortAddress_64_49	WORD	Output of available short addresses coded for short addresses 49 – 64

Graphical display:



Function description:

The assignment of new short addresses is done at random. The individual subscribers can be searched so that the short addresses can be assigned logically to the installed lamps.

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 lamp with the specified address starts blinking for the time ***"bBlinkTime"*** if a positive edge is identified at input ***"xBlink"***. The blinking action can be reset at any time via the input ***"xBlink_OFF"***.

If no blink sequence is active, the lamp with the specified address can be manually switched on or off via the input ***"xON_Off"***.

A broadcast command to all connected ballasts can be sent by means of a rising edge at the input ***"xCentr_ON"*** or ***"xCentr_OFF"***. This command can be used to switch all lamps on or off.

A rising edge at the input *"xQuery"* causes the connected DALI slaves with available short address to be displayed at the four outputs ***"wShortAddress_16_1"***, ***"wShortAddress_32_17"***, ***"wShortAddress_48_33"*** and ***"wShortAddress_64_49"***.

Example:

"wShortAddress_16_1" = 16#0000 0000 0001 1111

⇒ Short addresses 1 – 5 available in the DALI line.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

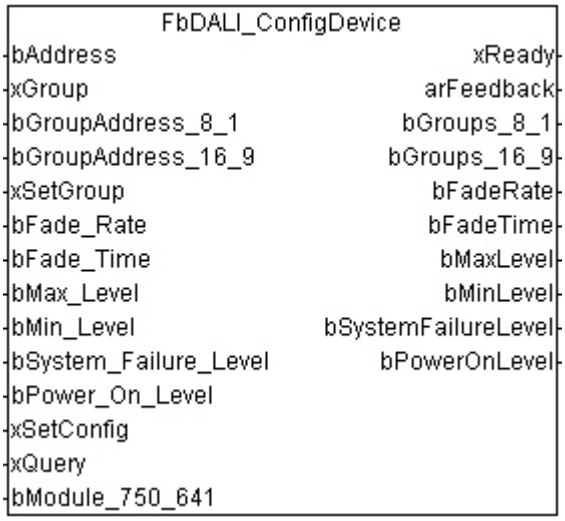
Communication with the control gear is activated when output ***"xReady"*** is FALSE.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Configuration Control Gear (FbDALI_ConfigDevice)

WAGO-I/O PRO CAA Library Elements		
Category:	Building Automation	
Name:	FbDALI_ConfigDevice	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	DALI_02.lib	
Applicable to:	See release note	
Input parameter:	**Data type:**	**Comment:**
bAddress	BYTE	Short address of 1 – 64 or Group address 1 – 16 Broadcast = 255
xGroup	BOOL	Selects short or group address: FALSE = short address or broadcast TRUE = group address Default setting = FALSE
bGroupAddress_8_1	BYTE	Input of group assignment binary coded for groups 1 - 8
bGroupAddress_16_9	BYTE	Input of group assignment binary coded for groups 9 - 16
xSetGroup	BOOL	Start signal for storing groups
bFade_Rate	BYTE	Input of fade rate Value range = 1 – 15 (255) Default setting = 255 (no change)
bFade_Time	BYTE	Input of fade time Value range = 0 – 15 (255) Default setting = 255 (no change)
bMax_Level	BYTE	Input of max brightness level [%] Value range = 1 – 100 % (255) Default setting = 255 (no change)
bMin_Level	BYTE	Input of min brightness level [%] Value range = 1 – 100 % (255) Default setting = 255 (no change)
bSystem_Failure_Level	BYTE	Input of system failure brightness level [%] Value range = 0 - 100 % (255) Default setting = 255 (no change)
bPower_On_Level	BYTE	Input of power on level [%] Value range = 0 – 100 % (255) 255 = no change
xSetConfig	BOOL	Start signal for storing the configuration
xQuery	BOOL	A rising edge causes reading of the configuration values.
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1

Feedback value:	Data type:	Comment:
xReady	BOOL	TRUE = communication deactivated FALSE = query of device status activated
arFeedback	ARRAY [0..7] OF BYTE	Reply string with inquiries or false inputs [0] = see error list in the appendix, table 6 [1] = max value [2] = min value [3] = power on level [4] = system failure value [5] = fade rate / fade time [6] = groups_8_1 [7] = groups_16_9 In the response bytes [1..7], there is either a 0 for OK or a 255 for error.
bGroups_8_1	BYTE	Output of group assignment binary coded for groups 1 - 8
bGroups_16_9	BYTE	Output of group assignment binary coded for groups 9 - 16
bFadeRate	BYTE	Output of fade rate (1 - 15)
bFadeTime	BYTE	Output of fade time (0 - 15)
bMaxLevel	BYTE	Output of max. dim level [%]
bMinLevel	BYTE	Output of min. dim level [%]
bSystemFailureLevel	BYTE	Output of system failure dim level [%]
bPowerOnLevel	BYTE	Output power on level [%]
Graphical display:		



Function description:

The function block enables setting of the configuration parameters of DALI devices.

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 following configuration parameters can be changed via this function block:

- A ballast can be assigned to up to 16 groups in the DALI system. The assignment is specified via the two inputs ***"bGroup_8_1"*** and ***"bGroup_16_9"***. The assignment is binary coded.

  Example:

  "bGroupAddress_8_1" = 2#11000000

  "bGroupAddress_16_9" = 2#00001111

  ⇒ The ballast is assigned to groups 7-12.

  The group assignments are sent by a rising edge at the input ***"xSetGroup"***.

- The parameter ***"bFadeRate"*** determines the level for dimming. The input is done in accordance with IEC 60929 E4.3.10 in levels 1 – 15. Number 1 means large grading and number 15 fine grading. This value is only effective with relative dimming commands.

- The parameter ***"bFadeTime_0_15"*** determines the dimming rate of the ballast during absolute dimming (specification of fixed brightness values). The input is done according to IEC 60929 E4.3.10 in level values 0 – 15. Number 0 means new value is reached quickly and number 15 new value is reached slowly.

- The minimum or maximum brightness level of the slave is limited by the values of the inputs ***"bMinLevel_1_100"*** and ***"bMaxLevel_1_100"***. If a system failure is detected, the DALI devices are dimmed to a specified value. This value is determined by the input parameter ***"bSystemFailureLevel"***.

- The brightness after power up can be specified at the input parameter ***"bPowerOnLevel"***.

A rising edge at the input ***"xSetConfig"*** triggers the sending of the configuration parameters to the DALI devices.

A rising edge at the input ***"xQuery"*** causes the configuration parameters of the addressed ballast to be read. The block provides the read-out parameter values at the outputs. The query commands to group addresses are blocked for this function block.

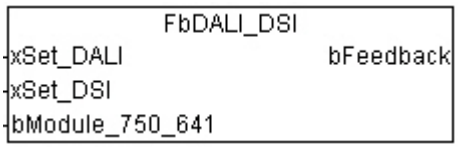
The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

Communication with the control gear is activated when output ***"xReady"*** is FALSE.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Select DALI / DSI

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_DSI		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xSet_DALI	BOOL	Sets module to DALI mode	
xSet_DSI	BOOL	Sets module to DSI mode	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Output parameters:	**Data type:**	**Comment:**	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



Function description:

The DALI master module can be operated in two modes. The module is set to DALI mode by default. A change to a different mode is done by means of a rising edge at the input ***"xSet_DALI"*** or ***"xSet_DSI".***

The active mode is indicated on the module by the LED at bottom left (TxD). In DALI mode, this LED blinks cyclically. In DSI mode, the LED TxD is off.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***. The variable at this input is usually declared as a constant.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

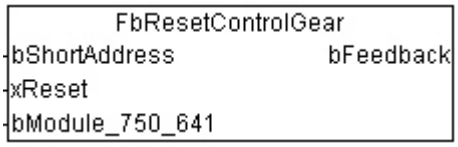
Reset Control Gear (FbResetControlGear)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbResetControlGear		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		

Input parameter:	**Data type:**	**Comment:**
bShortAddress	BYTE	DALI short address of 1 – 64 (255)
xReset	BOOL	Start of reset command
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1

Output parameters:	**Data type:**	**Comment:**
bFeedback	BYTE	Response byte (see table 6 in the appendix)

Graphical display:



Function description:

The function block enables resetting of the parameters stored in the ballasts to the factory default. The group assignments, for example, are deleted and the fade rates reset.

Factory setting

- Power on level = 100 %
- System faiure level = 100 %
- Min. value = Physically smallest value
- Max level = 100 %
- Fade rate = 7
- Fade time =0
- Group 1 – 8 = no group assignment
- Group 9 – 16 = no group assignment
- Senes 1 – 16 = 255 (“MASK” = no change)

Which subscriber is to be addressed is entered at the input ***“bShortAddress”***. The reset command can be executed as short addresses or as broadcast (255). Group commands are non-permissible.

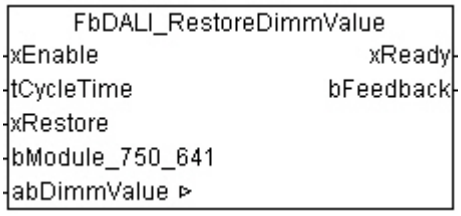
The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

The output ***“bFeedback”*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Restore parameters

Restore Last Light Level (FbDALI_RestoreDimmValue)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_RestoreDimmValue		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xEnable	BOOL	Activation of cyclic query Default setting = TRUE	
tCycleTime	TIME	Period for inquiry of control gears Minimum cycle time = t#30s Default setting = t#5m	
xRestore	BOOL	The dimming value determined last is assigned to all 64 short addresses by a positive edge.	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range 1 – 5 Default setting = 1	
Input/output parameter:	**Data type:**	**Comment:**	
abDimmValue	ARRAY [1..64] OF BYTE	Data array with the dimming values of all 64 short addresses determined last.	
Feedback value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = query of device status activated	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
Graphical display:			



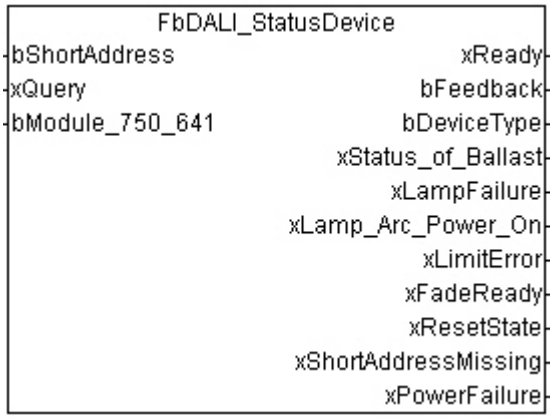
Function description:
Using the **FbDALI_RestoreDimmValue** function block, the last valid dimming values of the control gears are restored following a power failure. To do so, the current dimming values are queried and stored cyclically. The query of the dimming values of all DALI devices that are known by the DALI master module is initiated by a rising edge at the ***"xEnable"*** input. Read-out dimming values are written to the ***"abDimmValue"*** array. Reading out the values is performed cyclically if the *"xEnable"* input is permanently set to TRUE. The ***"tCycleTime"*** input parameter determines the cycle time. A positive edge at the ***"xRestore"*** input restores the dimming values determined last from the *"abDimmValue"* array in the DALI devices. The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***. Communication with the control gear is activated when output ***"xReady"*** is FALSE. The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix. **NOTE:** The *"abDimmValue"* should be declared as RETAIN so the dimming values are maintained even after a power failure.

Status Query

Query Status Device (FbDALI_StatusDevice)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_StatusDevice		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bShortAddress	BYTE	Short address of 1 – 64	
xQuery	BOOL	Start query of device status	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = query of device status activated	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
bDeviceType	BYTE	Query status device type	
xStatus_of_Ballast	BOOL	Query status ballast	
xLampFailure	BOOL	Query status lamp failure	
xLamp_Arc_Power_On	BOOL	Query status lamp power on	
xLimitError	BOOL	Query status limit error	
xFadeReady	BOOL	Query status fade ready	
xResetState	BOOL	Query status reset state	
xShortAddressMissing	BOOL	Query status short address missing	
xPowerFailure	BOOL	Query status power failure	

Graphical display:



Function description:

This function block enables reading of general information on the status of the DALI devices.

Which DALI device is to be addressed is entered at the input ***"bShortAddress"***.

The query command for the device status is triggered by means of a rising edge at the input ***"xQuery"***. The following information is output as response:

- ***"bDeviceType":*** output of device type
  - "0" = standard device
  - "1" = device for emergency lighting
  - "2" = device for HID lamps
  - "3" = device for low-voltage halogen lamps
  - "4" = device for the dimming of filament lamps
  - "99" = no response

- ***"xStatus_of_Ballast"*** : "0" = OK
- ***"xLampFailure"*** : "0" = OK
- ***"xLamp_Arc_Power_On"*** : "0" = OFF
- ***"xLimitError"*** : "0" = last requested lamp output value lies between minimum and maximum brightness level or OFF
- ***"xFadeReady"*** : "0" = fade is finished
- ***"xResetState"*** : "0" = No
- ***"xShortAddressMissing"*** : "0" = No
- ***"xPowerFailure"*** : "0" = No

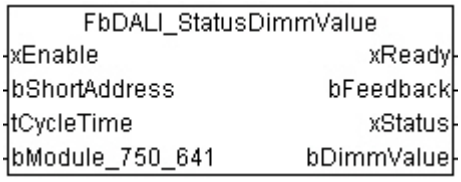
The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

Communication with the control gear is activated when output ***"xReady"*** is FALSE.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

Query for Current Lamp Value (FbDALI_StatusDimmValue)

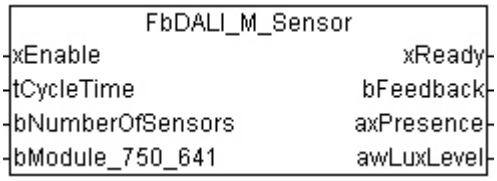
WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_StatusDimmValue		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xEnable	BOOL	Activation of cyclic query Default setting = TRUE	
bShortAddress	BYTE	DALI Short address of 1 – 64	
tCycleTime	TIME	Period for inquiry of control gears Minimum cycle time = t#1s Default setting = t#10s	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = query of dim value activated	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
xStatus	BOOL	Status confirmation of lighting	
bDimmValue	BYTE	Indication of dimming value [%]	
Graphical display:			



Function description:
Cyclic polling of the dimming value is done if the input ***"xEnable"*** is TRUE. The cycle time is defined via the ***"tCycleTime"*** input. Which DALI device is to be addressed is entered at the input ***"bShortAddress"***. The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***. Communication with the control gear is activated when output ***"xReady"*** is FALSE. The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix. The output ***"bDimmValue"*** indicates the current dim value. The status of the addressed control gear is indicated at the ***"xStatus"*** output.

Query Actual Level M-Sensor (FbDALI_M_Sensor)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FbDALI_M_Sensor		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
xEnable	BOOL	Activation of cyclic query Default setting = TRUE	
tCycleTime	TIME	Period for inquiry of all sensor values from the DALI module Minimum cycle time = t#800ms Default setting = t#1s	
bNumberOfSensors	BYTE	Number of sensors, which should be polled Value range = 0 - 8 Default setting = 8	
bModule_750_641	BYTE	Specifies which DALI master module is to be addressed at the controller. Counting is from left to right. Value range = 1 – 5 Default setting = 1	
Feedback value:	**Data type:**	**Comment:**	
xReady	BOOL	TRUE = communication deactivated FALSE = communication activated	
bFeedback	BYTE	Response byte (see table 6 in the appendix)	
axPresence	ARRAY [1..8] of BOOL	Presence signal of the M-Sensors	
awLuxLevel	ARRAY [1..8] of WORD	Measured brightness of the M-Sensors [lx] Value range = 0 – 1008 lx	
Graphical display:			



Function description:

If the input ***"xEnable"*** is TRUE, the automatic polling of the M- sensor values is activated. At the same time, the sensor values will be read cyclically from the memory of the DALI 750-641 module. The cycle time is specified by the ***"tCycleTime"*** input.

With a negative edge on the input *"xEnable,"* the automatic polling of the M- sensor values will be deactivated again.

With the parameter ***"bNumberOfSensors,"*** the number of sensors is defined that are polled cyclically by the DALI module.

The DALI master module with which this function block must communicate is selected at input ***"bModule_750_641"***.

If the output ***"xReady"*** is FALSE, then the module is occupied with reading out the sensor values.

The output ***"bFeedback"*** outputs a numeric code with the response. The numeric codes are listed in table 6 in the appendix.

The presence signal of all connected sensors is displayed on the output array ***"axPresence"***.

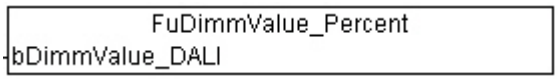
The brightness value of the connected sensor measures is displayed on the output array ***"awLuxLevel"***.

Note:

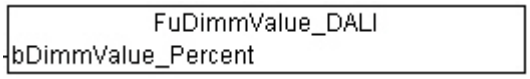
1. The index of the arrays *„axPresence"* and *„awLuxLevel"* is defined as followed:
   Arrayindex [1] = Short address 64,
   Arrayindex [2] = Short address 63,
   Arrayindex [3] = Short address 62,
   and so on
2. This function block is applicable for FW 7 or higher

Conversions

Converting DALI Dimm Value -> Percentage (FuDimmValue_Percent)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FuDimmValue_Percent		
Type:	Function ☒	Function block ☐	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bDimmValue_DALI	BYTE	DALI dim value of 0 - 255	
Feedback value:	**Data type:**	**Comment:**	
FuDimmValue_Percent	BYTE	Output of the dim value in percent	
Graphical display:			
			
Function description:			
This function block converts the DALI dim value (0 – 255) into a dim value of 0 – 100 percent.			

Converting Percentage -> DALI Dimm Value (FuDimmValue_DALI)

WAGO-I/O PRO CAA Library Elements			
Category:	Building Automation		
Name:	FuDimmValue_DALI		
Type:	Function ☒	Function block ☐	Program ☐
Name of library:	DALI_02.lib		
Applicable to:	See release note		
Input parameter:	**Data type:**	**Comment:**	
bDimmValue_Percent	BYTE	Input of the dim value in percentage	
Feedback value:	**Data type:**	**Comment:**	
FuDimmValue_DALI	BYTE	Output of the DALI dim value (0 – 254)	
Graphical display:			
			
Function description:			
This function block converts a dim value of 0 – 100 percent into a DALI dim value (0 – 255).			

Appendix

Command List for FbDALI_Master + FbDALI_Master_Adv

Table1

Command set for short addresses or broadcast	
0	Power off
1	Up
2	Down
3	Step up
4	Step down
5	Recall max. level
6	Recall min. level
7	Step down and off
8	On and step up
9 - 15	Reserved
16 - 31	Go to scene 1 - 16
32	Reset
33	Store actual level in the DTR
34 – 41	Reserved
42	Store the DTR as max value
43	Store the DTR as min value
44	Store the DTR as system failure value
45	Store the DTR as ‘power on value’
46	Store the DTR as fade time
47	Store the DTR as fade rate
48 – 63	Reserved
64 - 79	Store the DTR as scene 1 - 16
80	Remove from scene
81 – 95	Reserved for “Remove from scene”
96 - 111	Add to group 1 - 16
112 -127	Remove from group 1 - 16
128	Store the DTR as short address
129 – 143	Reserved
144	Query status
145	Query ballast
146	Query lamp failure
147	Query lamp power on
148	Query limit error
149	Query reset state
150	Query short address missing
151	Query version number
152	Query contents DTR
153	Query device type
154	Query physical min value
155	Query power failure
156 – 159	Reserved

160	Query current value
161	Query max value
162	Query min value
163	Query 'Power on value'
164	Query system failure value
165	Query fade time / fade rate
166 – 175	Reserved
176 -191	Query scene value (scenes 1 to 16)
192	Query groups 1 to 8
193	Query groups 9 to 16
194	Query random address (H)
195	Query random address (M)
196	Query random address (L)
197 – 223	Reserved
224 – 255	Query application-related extension commands
999	Direct control of lamp power
Command set for group commands (WAGO specific)	
300	Power off group
301	Group up
302	Group down
303	Group step up
304	Group step down
305	Group recall max. level
306	Group recall min. level
307	Group step down and off
308	Group on and step up
309 - 315	Reserved
316 - 331	Group go to scene 1 - 16
332	Group reset
333	Store group current value in DTR
334 – 341	Reserved
342	Group store the DTR as max value
343	Group store the DTR as min value
344	Group store the DTR as system failure value
345	Group store the DTR as 'Power on value'
346	Group store the DTR as fade time
347	Group store the DTR as fade rate
348 - 363	Reserved
364 - 379	Group store the DTR as scene 1 - 16
380 - 395	Group remove from scene
396 - 411	Group add to group
412 - 427	Group remove from group
428	Store the DTR as short address
429 - 443	Reserved
1299	Direct control of lamp power

Note:

DTR = Data Transfer Register

Command List FbDALI_Master_Adv

Table2

Command set for extended commands or broadcast			
iCommand	***Function***	***bCommandValue1***	***bCommandValue2***
500	Reserved	--	--
501	(Save scene 1 – 16)	64-79	0–255 (brightness)
501	(Assign group 1–16)	96-111	--
501	(Delete group 1–16)	112-127	--
501	(Store fade time)	46	0–15 (time)
501	(Store fade rate)	47	0–15 (time)
501	(Store max value)	42	0–254 (brightness)
501	(Store min value)	43	0–254 (brightness)
501	(Save system failure level)	44	0–255 (brightness)
501	(Save power on_level)	45	1–254 (brightness)
502	(New addressing extended)	0	0 = luminaire on 1 = luminaire unchanged
502	(Addressing for system extension)	255	0 = luminaire on 1 = luminaire unchanged
503	Delete short address	--	--
504	Replace short address	1-64 new short address	--
505	Blink show short address	Number of blink sequences	Duration of a blink sequence x * 600 ms
506	Query short address [1 - 32] available	--	--
507	Query short address [33 - 64] available	--	--
508	Query status ballasts [1 - 32]	--	--
509	Query status ballasts [33 - 64]	--	--
510	Query lamp failure [1 - 32]	--	--
511	Query lamp failure [33 - 64]	--	--
512	Query lamp power ON [1 - 32]	--	--
513	Query lamp power ON [33 - 64]	--	--
514	Set feature register	1 = DALI 2 = DSI 3 = Fast poll OFF 4 = Fast poll ON	--
515	Reset	--	--
516	Store current value as scene 1–16	64-79	--
517	Deactivate polling	255	255
517	Activate polling	232	3
518	Device type specific commands	DALI command	Reply(Y) Device type (X) YYYYXXXX

519	Query Actual Level Short address [56 – 59]	--	--
520	Query Actual Level Short address [60 – 64]	--	--
521	Configuration device polling	Number of devices (0 – 8)	Pause between two “query actual level” commands x * 10 ms 255 = OFF
522	Query device polling configuration	--	--
523	Query hardware-/ firmware version	--	--
536	Query status via fast poll (1 x)	--	--

Replies to Extended Commands FbDALI_Master_Adv

Table3

Replies to Extended Commands					
iCommand	**bByte_1**	**bByte_2**	**bByte_3**	**bByte_4**	**bByte_5**
506 Short address available	Address 1-8	--	Address 9-16	Address 17-24	Address 25-32
507 Short address available	Address 33-40	--	Address 41-48	Address 49-56	Address 57-64
508 Status ballast	Address 1-8	--	Address 9-16	Address 17-24	Address 25-32
509 Status ballast	Address 33-40	--	Address 41-48	Address 49-56	Address 57-64
510 Lamp failure	Address 1-8	--	Address 9-16	Address 17-24	Address 25-32
511 Lamp failure	Address 33-40	--	Address 41-48	Address 49-56	Address 57-64
512 Lamp power on	Address 1-8	--	Address 9-16	Address 17-24	Address 25-32
513 Lamp power on	Address 33-40	--	Address 41-48	Address 49-56	Address 57-64
519 Actual Level	Address 57	--	Address 58	Address 59	Address 60
520 Actual Level	Address 61	--	Address 62	Address 63	Address 64
522 Configuration Device polling	--	--	Number of devices to be polled	Device polltime X * 10ms	Number of identified devices
523 HW / SW version	--	--	--	Software version	Hardware version
Meaning of bit values: 0 = no / 1= yes 0 = OK / 1 = error 0 = off / 1 = on					

Factory Set Device Parameters

Table4

Parameter	Default 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

Table5

Value	Fade time [s]	Fade rate [Fades/s]
0	< 0.707	nicht anwendbar
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

Numeric Code "bFeedback"

Table6

00 (Hex)	No error
01 (Hex)	OK
02 (Hex)	Time Out (command did not arrive)
03 (Hex)	Job list in controller is full
04 (Hex)	Time Out (Didn't receive the answer)
08 (Hex)	Framing error
09 (Hex)	DALI bus error
0A (Hex)	Wrong DALI line
0B (Hex)	Wrong command
0C (Hex)	Job list not available
0D (Hex)	Wrong scene number
0E (Hex)	yes
0F (Hex)	no
10 (Hex)	Wrong response
11 (Hex)	Wrong address
12 (Hex)	Queried dealt with
13 (Hex)	Address unknown
14 (Hex)	Address assigned
15 (Hex)	Invalid reference address
16 (Hex)	DALI module was not recognized
17 (Hex)	Not supported by the firmware
18 (Hex)	Joblist is reseted

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