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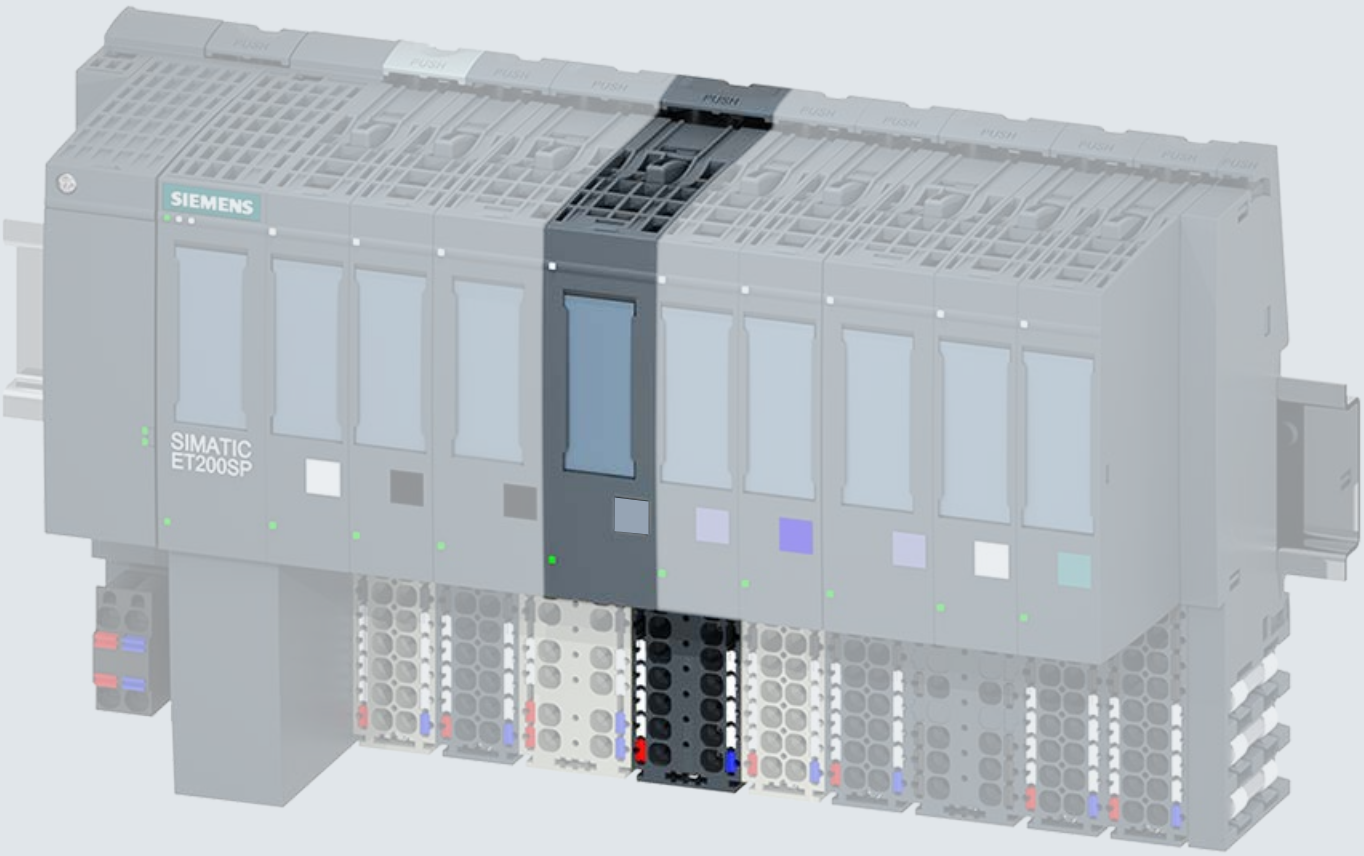

Manual

SIMATIC

ET 200SP

Communication module
CM 1xDALI (6ES7137-6CA00-0BU0)

Edition 06/2019

support.industry.siemens.com

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SIMATIC

ET 200SP Communication module CM 1xDALI (6ES7137-6CA00-0BU0)

Manual

06/2019

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Legal information

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Siemens AG
Division Digital Factory
Postfach 48 48
90026 NÜRNBERG
GERMANY

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Preface

Purpose of the documentation

This manual supplements the system manual ET 200SP distributed I/O system. Functions that generally relate to the system are described in this manual.

The information provided in this manual and in the system/function manuals supports you in commissioning the DALI system controlled by the ET 200 SP CM 1xDALI.

Conventions

- STEP 7: In this documentation, "STEP 7" is used as a synonym for all versions of the configuration and programming software "STEP 7 (TIA Portal)".
- In a DALI system many input devices are sensors. Therefore in this documentation the terms “sensor” and “input device” are used as synonyms to improve readability.

This documentation contains figures of the described device. The figures may differ slightly from the devices supplied.

Please also observe notes marked as follows:

Note

A note contains important information on the product described in the documentation, on the handling of the product or on the section of the documentation to which particular attention should be paid.

Note

To prevent injury, read the manual before use.

⚠ The manual is delivered online, you can download the document from Central technical support (https://support.industry.siemens.com/cs/ww/en/).

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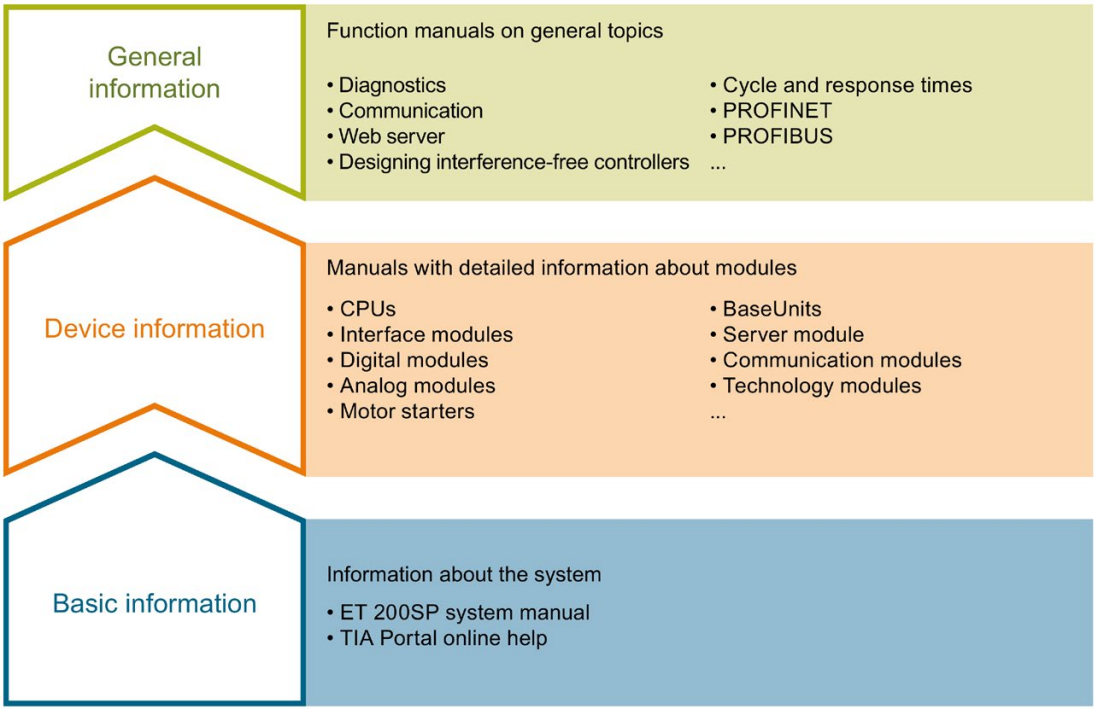
Table of contents

Documentation guide

1

The documentation for the SIMATIC ET 200SP distributed I/O system is arranged into three areas.
This arrangement enables you to access the specific content you require.



Basic information

The System Manual and Getting Started describe in detail the configuration, installation, wiring and commissioning of the SIMATIC ET 200SP distributed I/O system. The STEP 7 online help supports you in the configuration and programming.

Device information

Product manuals contain a compact description of the module-specific information, such as properties, wiring diagrams, characteristics and technical specifications.

General information

The function manuals contain detailed descriptions on general topics regarding the SIMATIC ET 200SP distributed I/O system, e.g. diagnostics, communication, Web server, motion control and OPC UA.

You can download the documentation free of charge from the Internet (https://support.industry.siemens.com/cs/ww/en/view/109742709).

Changes and supplements to the manuals are documented in a Product Information.

You can download the product information free of charge from the Internet (https://support.industry.siemens.com/cs/us/en/view/73021864).

Manual Collection ET 200SP

The Manual Collection contains the complete documentation on the SIMATIC ET 200SP distributed I/O system gathered together in one file.

You can find the Manual Collection on the Internet (https://support.industry.siemens.com/cs/ww/en/view/84133942).

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Application examples

The application examples support you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus in individual products.

You can find the application examples on the Internet (https://support.industry.siemens.com/sc/ww/en/sc/2054).

Product overview

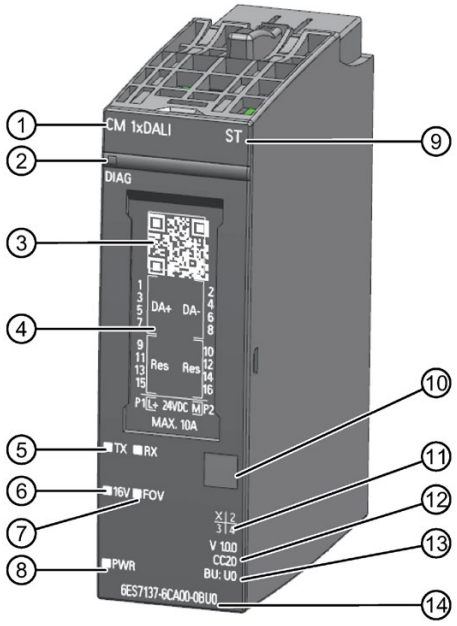
2

2.1 Properties

Article number

6ES7137-6CA00-0BU0

View of the module



① Module type and name
② LED for diagnostics
③ 2D matrix code
④ Wiring diagram
⑤ LEDs for transmitting and receiving status
⑥ LED for integrated DALI bus power supply
⑦ LED for fault over voltage on DALI bus
⑧ LED for the supply voltage
⑨ Function class
⑩ Color coding module type
⑪ Function and firmware version
⑫ Color code for color-coded labels
⑬ BU type
⑭ Article number

Figure 2-1 View of the CM 1xDALI (without the BaseUnit)

Properties

The CM 1xDALI connects one DALI bus to the automation system and has the following properties:

- Technical properties:
  - DALI application controller (Multi-master)
  - 1xDALI bus with 4 pairs DALI+ and DALI- terminals (non-polarity)
  - 64 DALI control gears
  - 63 DALI input devices
  - 16 groups
  - 16 scenes
  - Integrated DALI bus power supply (can be disabled (Page 21))
  - Supports external DALI power supply when you disable the integrated DALI power supply
  - DALI bus short circuit diagnostic behavior (Page 111)
  - DALI bus fault over voltage protection which can protect DALI bus against accidental connection of the main voltage (up to 250 V AC)
  - Compliant with IEC 62386-101,103
  - Support of device types according to IEC 62386- 201, 202, 203, 204, 205, 205, 206, 207, 208, 209 and others as generic type
  - Support of input device types according to IEC 62386-301, 302, 303, 304
- Supported system functions:
  - Firmware update
  - Diagnostic
  - I&M data (identification and maintenance data): I&M0 to I&M3
- Supported functions:
  - Scan of the DALI bus and automatic assign of short addresses
  - Integrated operation hours counting for each control gear
  - Exchange two short addresses
  - Commands to devices and to groups or as broadcast
  - Control of groups and scenes
  - Receive event messages from input devices
  - Cyclic read of the status of the lamps
  - CM 1xDALI can receive messages from sensors (multi-master). You can read these messages from the command "DALI_CTRL". The other commands and queries to or from DALI devices are called by the user program.

- Supported control gear types and input device types:
  - Fluorescent (control gear type 00)
  - Emergency lamp (control gear type 01)
  - Discharge lamp (control gear type 02)
  - Halogen (control gear type 03)
  - Incandescent (control gear type 04)
  - Voltage converter (control gear type 05)
  - LED (control gear type 06)
  - Switch function (control gear type 07)
  - Color control (control gear type 08)
  - Push button (input device type 01)
  - Absolute input device (input device type 02)
  - Occupancy sensor (input device type 03)
  - Light sensor (input device type 04)
  - Other types by generic commands

CM 1xDALI Functionality

- CM 1xDALI controls the DALI bus and holds the parameters of the DALI devices. The parameters are stored in the module even if power is off. The parameters can be read from the CPU and deployed to the devices. There can be connected more than 64 sensor instances in 1 DALI bus, but a maximum of 64 instance data sets can be stored in the module.
- CM 1xDALI sends all received CPU commands from the CPU to the DALI bus, more complex CPU commands (like setting parameters) are split into several DALI commands by the module.
- CM 1xDALI has an operating hour counter for every device that can be read and set from the CPU.
- If necessary, the module can scan the bus and assign short addresses to a newly installed device on DALI bus with one command.
- CM 1xDALI queries the status of the devices cyclically, this action is called "background detection". The CM 1xDALI periodically sends DALI commands to query the status of all the devices on the bus and stores the information in the module. The query period can be set by module parameters. The program blocks of the CPU have a higher priority when accessing the DALI bus. If the program blocks of the CPU continuously access the DALI bus, the background detection may be blocked. The background detection can detect the following results:
  - Whether each DALI device has a short address
  - For control gear: the information of basic status, control gear type and extended status
  - For sensor: the information of device status, number of instances and type of each instance

2.2 Compatibility

Connection to the system

Through BaseUnit type U0, you can assemble a CM 1xDALI to the CPU, open controller, or IM of the ET 200SP distributed I/O system.

Supported DALI devices

You can only use the input device which meets the standard of DALI-2, IEC 62386-103.

You can only use the control gear which meets the standard of DALI-1 or DALI-2. But on DALI-1 control gears, you cannot use the new functionalities which are added in DALI-2 standard.

Library

The CM 1xDALI library is compatible with the S7-1500 based CPUs (CPU 15xx).

Wiring

3

3.1 Important notes on using the device

WARNING

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) or Protective Extra-Low Voltage (PELV).

This means that electrical circuit in which the voltage cannot exceed 30 V AC (RMS), 42.4 V AC peak or 60 V DC under NORMAL CONDITIONS and CONDITIONS OF A SINGLE FAULT, including ground faults in other circuits.

Notes on use in hazardous areas according to ATEX / IECEx

WARNING

Requirement for the installing enclosure

The modules shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN 60079-15, taking into account the environmental conditions under which the equipment will be used.

WARNING

Provision against transient disturbances

Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.

WARNING

Hazardous location

The equipment shall only be used in an area of not more than pollution degree 2, as defined in EN 60664-1.

General notices on use in hazardous areas according to FM

⚠ WARNING

Requirement for the installing enclosure

If the equipment is installed within an ultimate enclosure, the inner service temperature of the enclosure corresponds to the ambient temperature of the module.

⚠ WARNING

Risk of burn injury

If a device is operated in an ambient temperature of more than 50 °C, the temperature of the device housing may be higher than 70 °C. The device must therefore be installed so that it is only accessible to service personnel or users that are aware of the reason for restricted access and the required safety measures at an ambient temperature higher than 50 °C.

⚠ WARNING

Explosion hazard

Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

⚠ WARNING

Cable

The equipment is intended to be installed within an enclosure/control cabinet. The inner service temperature of the enclosure/control cabinet corresponds to the ambient temperature of the module. Use cables with a maximum permitted operating temperature of at least 30 °C higher than the maximum ambient temperature.

⚠ WARNING

Hazardous location

The equipment shall only be used in an area of not more than pollution degree 2.

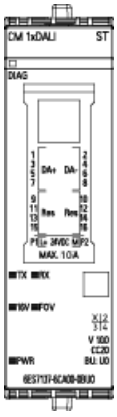
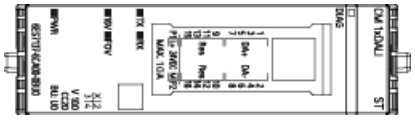
3.2 Installing position

Note

When installing and connecting up the CM 1xDALI, refer to the instructions in the system manual SIMATIC ET 200SP Distributed I/O system (https://support.industry.siemens.com/cs/ww/en/view/58649293) note the information in the document "Use of subassemblies/modules in a Zone 2 Hazardous Area" that you will find on the Internet at the following address:

Link: (https://support.industry.siemens.com/cs/ww/en/view/78381013)

NOTICE
Installation location - Dependency of the temperature range The upper and lower ventilation slits of CM 1xDALI cannot be covered, allowing adequate ventilation. Above and below the module, there must be a clearance of 25 mm to allow air to circulate and prevent overheating.

Installation position	Installation position of the CM 1xDALI
Horizontal installation of the CM 1xDALI	
Vertical installation of the CM 1xDALI	

3.3 DALI bus cable

Pay attention to the following requirements when you set up a DALI system.

Requirement for DALI cable

- The voltage drop between the DALI power supply and any DALI device on the DALI bus must be less than 2 V.
- The cable length between DALI power supply and the DALI device should be less than 300 m. The recommend minimum-cross-section of the conductors depends on the cable length.

Material	Cable length	Conductor cross section (Minimum)
Copper	< 100 m	0.5 mm^2
	100 m to 150 m	0.75 mm^2
	> 150 m	1.5 mm^2

Conductor cross section depending on the cable length

Note

It is not necessary to use special bus cables (twisted or shielded).

Maximum current permitted for integrated DALI power

When use the integrated DALI power, the DALI bus load $\sum I_{DALI}$ cannot exceeds 160 mA. You can calculate the DALI bus load with the following formula:

$\sum I_{DALI} = I_{DALI\_1} + I_{DALI\_2} + I_{DALI\_3} + ... + I_{DALI\_n}$

$\sum I_{DALI}$: Load of the DALI supply including all extension terminals

I_{DALI_1}: Load of the first device on DALI bus

n: Total number of the devices on DALI bus

Example

You need to set up a DALI system with some control gears and sensors. At first, you add 64 control gears whose respective current consumption is 2 mA. Then you need to add a kind of sensor whose respective current consumption is 5 mA.

The number of sensor you can add is:

(160 mA - 64 x 2 mA) / 5 mA = 6.4

So the maximum number of this kind sensor you can add in this DALI system is 6.

DALI bus topology

CM 1xDALI is a gateway between automation system and DALI system. At the CPU side, CM 1xDALI works as a communication module and gateway to the system. At DALI side, CM 1xDALI works as an application controller. You can use line, tree, star or mixed structures to set up the DALI system.

NOTICE
Important notes on setting up DALI system • Do not use ring structure to set up a DALI system. • Use the input devices which fulfill the DALI-2 standard. • CM 1xDALI module cannot work until CPU and IM are ready. Make sure CPUs are ready before you start up the DALI communication.

The following figure shows an example of a DALI topology containing 4 DALI systems.

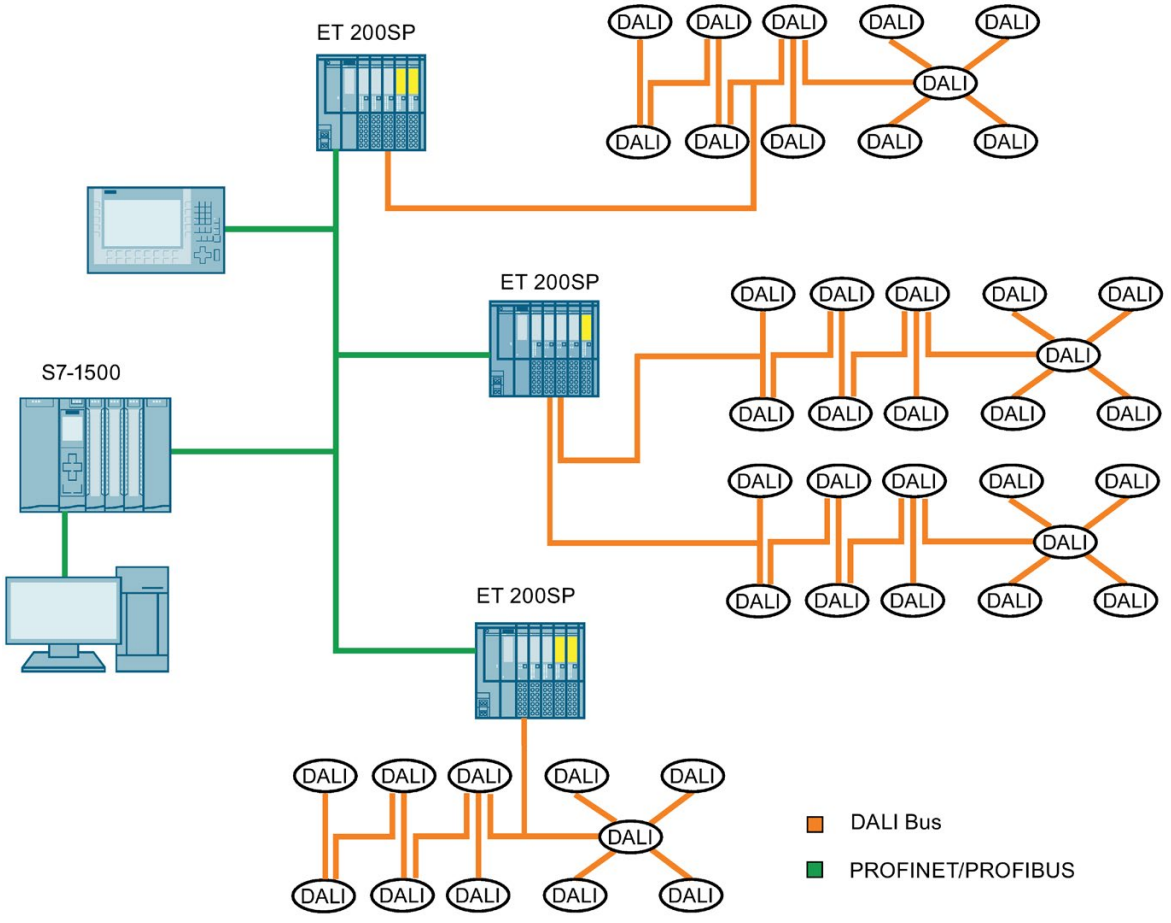


Figure 3-1 DALI Topology

3.4 Block diagram

Requirements

For connecting, you require a BaseUnit:

- Type U0, Light color BaseUnit, article number 6ES7193-6BP00-0DU0
- Type U0, Dark color BaseUnit, article number 6ES7193-6BP00-0BU0

BaseUnit

The BaseUnit is not included in the scope of delivery of the module and must be ordered separately.

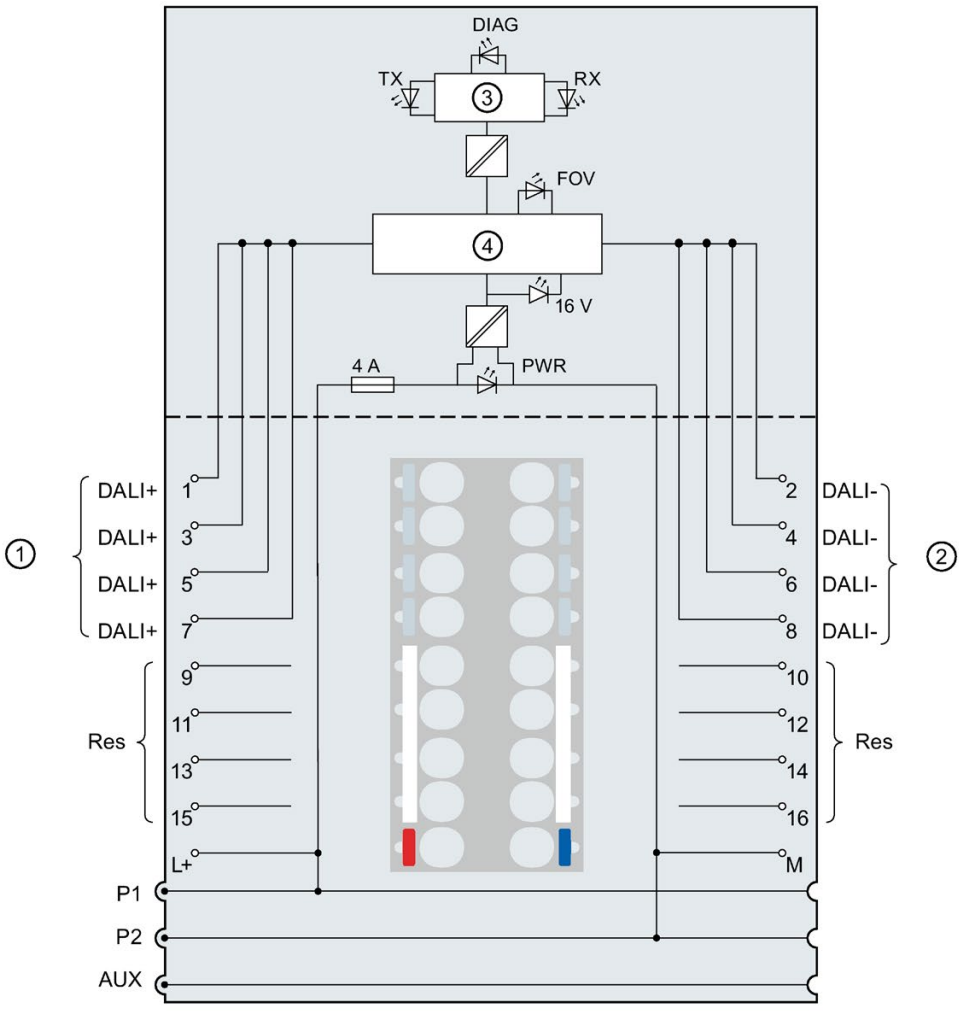
You can find an overview of the BaseUnits that you can use with the technology module in the product information for the documentation of the ET 200SP distributed I/O system (https://support.industry.siemens.com/cs/ww/en/view/73021864).

You can find information about selecting a suitable BaseUnit in the ET 200SP Distributed I/O System (https://support.industry.siemens.com/cs/ww/en/view/58649293) system manual and ET 200SP BaseUnits (https://support.industry.siemens.com/cs/ww/en/view/59753521) manual.

You can find information on wiring the BaseUnit, connecting cable shields, etc. in the Connecting section of the ET 200SP Distributed I/O System (https://support.industry.siemens.com/cs/ww/en/view/58649293) system manual.

Block diagram

The following figure shows the block diagram and the terminal assignment of the CM 1xDALI.



①	DALI+ connection	TX	Transmit LED (green)
②	DALI- connection	RX	Receive LED (green)
③	Backplane bus interface	FOV	Fault over voltage LED (red)
④	DALI driver electronics	PWR	POWER LED (green)
DIAG	Error or Diagnostics LED (green, red)	L+	24 VDC supply voltage
P1, P2, AUX	Internal self-configuring voltage buses	M	Ground
	Connection to the left (dark BaseUnit)		
	Connection to the left interrupted (light BaseUnit)		

Figure 3-2 Wiring and block diagram for CM 1xDALI

L+/M supply voltage

You connect the supply voltage (DC 24 V) to terminals L+ and M on a light BaseUnit. For a dark BaseUnit, it uses the supply voltage of the module on its left. An internal protection circuit protects the CM 1xDALI from reverse polarity of the supply voltage. The CM 1xDALI monitors whether the supply voltage is connected.

Parameters

4

4.1 Parameter assignment

Introduction

You configure and assign the parameters of the communication module with STEP 7 V15.1 or later versions.

In the CM 1xDALI project, you assign the parameters in the device view of STEP 7 and in the properties tab of the communication module DALI.

4.2 CM 1xDALI Module Parameters

Module Parameters

Each CM 1xDALI has the following DALI parameters in **Module Parameters**. According to your request, you can configure any of these parameters.

The following table shows the module parameters for the CM 1xDALI.

Table 4- 1 Module Parameters

Module Parameters	Description	Value range	Default value	Configuration in RUN
Basic parameter				
Enable integrated DALI bus power supply	Enable or disable the DALI bus power supply. • Enable: Use the integrated DALI bus power in the CM 1xDALI. • Disable: Do not use the integrated DALI bus power in the CM 1xDALI.	• Enable • Disable	Enable	Yes
Enable DALI Application Controller	Enable or disable DALI Application Controller. • Enable: The CM 1xDALI can send any forward frame or receive any backward frame to the DALI bus. • Disable: The CM 1xDALI cannot send any forward frame or receive any backward frame to the DALI bus.	• Enable • Disable	Enable	Yes

Module Parameters	Description	Value range	Default value	Configuration in RUN
Diagnostics				
Diagnostics: Over voltage on DALI bus	Enable or disable the diagnostic message on DALI bus. • Enable: When the DALI bus is connected to a fault over voltage (FOV) by mistake, the CM 1xDALI reports an error of over voltage and the FOV LED (Page 109) is on. • Disable: When the DALI bus is connected to a fault over voltage by mistake, only the FOV LED is on.	• Enable • Disable	Enable	Yes
Diagnostics: Short circuit on DALI bus	Monitor the short circuit on DALI bus. This function is only available when the integrated DALI bus power supply is enabled: • Enable: When a short circuit occurs on the DALI bus, the module reports a diagnostic error and shuts down the bus power. • Disable: When a short circuit occurs on the DALI bus, the module only shuts down the bus power.	• Enable • Disable	Disable	Yes
Period				
Background detection period (s)	The CM 1xDALI periodically sends DALI commands to query the status of all the devices on the bus and stores the information in the module. As a result, the status that is saved in CM 1xDALI cannot be updated in time to get the latest status information in the CM 1xDALI. The program blocks of the CPU have a higher priority when accessing the DALI bus. If the program blocks of the CPU continuously access the DALI bus, the background detection may be blocked. The background detection can detect the following results: • Whether each DALI device has a short address • For control gear: the information of basic status, control gear type and extended status • For sensor: the information of device status, number of instances and type of each instance You can set the frequency of the detection. The status saved in the DALI device update during every detection.	60 to 3600 (second)	60 (second)	Yes

Programming

5

CM 1xDALI library is a SIMATIC CPU program library. You use the CM 1xDALI library to program for the CM 1xDALI. It helps you easily access CM 1xDALI from the SIMATIC CPU.

CM 1xDALI library can be used on S7-1500 based CPUs (CPU 15xx).

CM 1xDALI library contains several CM 1xDALI function blocks (FB) in the STEP 7. The CM 1xDALI function blocks are collected in several functions groups, such as Addressing function blocks (Page 32), Control gear dimming function blocks (Page 40), Diagnostic function blocks (Page 52) and Configuration function blocks (Page 67).

Download the CM 1xDALI library from the Internet (https://support.industry.siemens.com/cs/ww/en/view/109767048). For more information about using libraries, refer to STEP 7 online help.

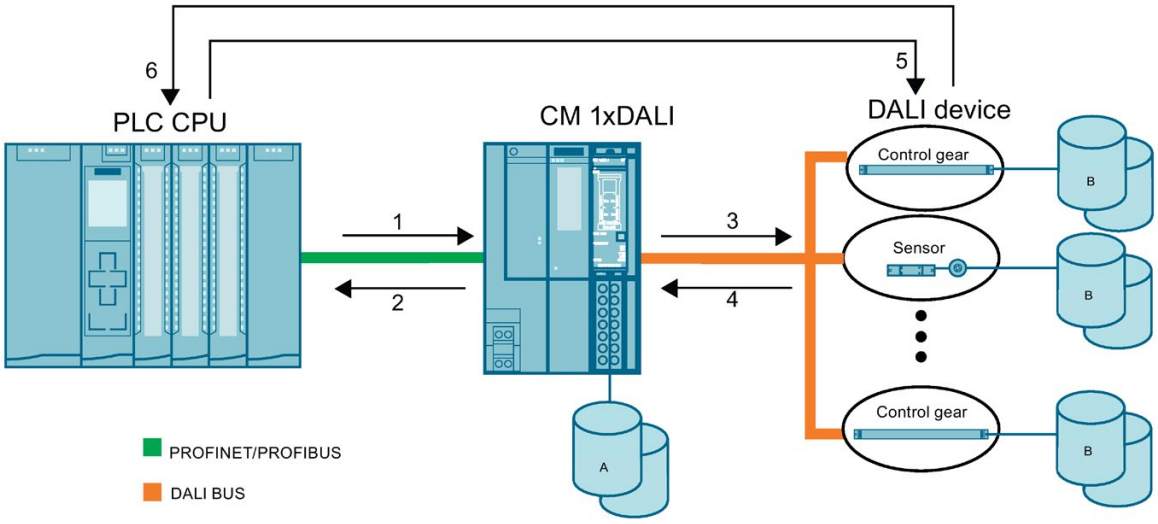
5.1 CM 1xDALI data storage model

CM 1xDALI data storage model

A DALI device can be a control gear or input device. The term "sensor" refers to the input device in this documentation.

Each of the CM 1xDALI and DALI devices has its own database to store status and address information.

The following figure shows the CM 1xDALI data storage model and data flow.



A CM 1xDALI Database

B DALI device Database

1 CPU sends data to CM 1xDALI, and CM 1xDALI stores the data. For example, the CPU uses **DALI_ECG_SET_OPHOUR** (Page 59) to set the operating hour of control gear in CM 1xDALI.

2 CPU receives data from CM 1xDALI. For example, the CPU uses **DALI_DEV_QUERY_ADDR** (Page 37) to obtain the address status and device status which are saved in CM 1xDALI.

3 CM 1xDALI sends data to the DALI device. For example, the CPU uses **DALI_DEV_DOWNLOAD** (Page 102) to deploy the configuration parameters stored in the CM 1xDALI to the DALI device.

4 CM 1xDALI receives data from the DALI device, and stores the data in CM 1xDALI. For example, the CM 1xDALI queries the device status of each DALI device by background detection.

5 CPU sends data to the DALI device. For example, the CPU uses **DALI_SENSOR_SET_INST_PARAM** (Page 97) to send the instance configuration parameters to the DALI device

6 CPU receives data from DALI device. For example, the CPU uses **DALI_DEV_GTIN** (Page 52) to query the global trade item number from the DALI device.

Figure 5-1 CM 1xDALI data storage model and data flow

For the detailed parameter information on CM 1xDALI database and DALI device database, refer to the following table.

Table 5- 1 Description for database parameters

Parameters	Storage location		Read-only	Description
	CM 1xDALI	DALI devices		
DALI device status	✓	✓	✓	The basic status and extended status of control gears, and device status of sensors.
Address status	✓		✓	The address status of DALI device on the bus. CM 1xDALI cyclic queries all the address status of DALI devices on the bus through the background detection, and detects the following results: • Whether each DALI device has a short address • For control gear: the information of basic status, control gear type and extended status • For sensor: the information of device status, number of instances and type of each instance
Configuration parameters	✓	✓		The basic parameters, extended parameters, group and scene parameters of control gears and device parameters, instance parameters of sensors. The CM 1xDALI does not store the read-only parameters of the DALI devices.
Operating hour of control gears	✓			The CM 1xDALI stores the operating hour of configured control gears.

5.2 General information for programming

The following general information is useful for programming a DALI application:

About function block (FB)

- All the FBs in CM 1xDALI library are asynchronous instructions. It is recommended to use the FBs in the same cyclic organization block (OB).
- Most of the FBs in the CM 1xDALI library are triggered by a rising edge, except for **DALI_CTRL** (Page 26)and **DALI_ECG_SWITCH_DIM** (Page 42).
- If you call several FBs at the same time, they are queued. You can check the output parameters in each FB.

About DALI_CTRL

- **DALI_CTRL** (Page 26) is the basic FB of CM 1xDALI. **DALI_CTRL** must be called in a cyclic OB, and be executed in every cycle. Do not use it in an interrupt OB.
- Each CM 1xDALI works with only one instance of **DALI_CTRL** FB.
- Specify the hardware ID of connected CM 1xDALI at the **DALI_CTRL** FB, and then connect the **DALI_CTRL** DB with the other FBs through the InOut parameter of CM_DALI.

About output parameter

- The outputs of the FBs are kept when the processing of job is done:
  - For the FBs with an input of CANCEL, only when both the trigger and input of CANCEL turn to zero, their output is reset.
  - For the FBs without the input CANCEL, when the trigger turns to zero, the output of these FBs is reset.
- If the triggering input is reset before the FB has finished, the output parameters are set at least for one cycle.
- The output of **DALI_ECG_SWITCH_DIM** (Page 42) can be triggered by a positive level at the inputs ON_UP or OFF_DOWN; the output of this FB will not be reset all of the time.
- Most of the FBs have the following output parameters:
  - BUSY: Shows whether the FB is being committed. When BUSY = 1, the FB is triggered but not finished yet.
  - ACTIVE: Shows whether the FB is being executed. When ACTIVE = 1, the FB is communicating with the CM 1xDALI.
  - DONE: Shows whether the FB is executed without errors. When DONE = 1, the FB is executed without any error. You can check the result of execution in the output of this FB.
  - ERROR: Shows whether an error occurs during the process. When ERROR = 1, the FB is stopped with some errors. You can check the error code in STATUS of this FB.
  - STATUS: Shows the FB progress or detailed error code. When ERROR = 0, STATUS shows the FB progress; when ERROR = 1, STATUS shows the detailed error code.

5.3 System function blocks

System function blocks are the basic function blocks of the CM 1xDALI, and they are used for sending all DALI commands.

5.3.1 DALI_CTRL

Description

DALI_CTRL is used as the interface for the CM 1xDALI. Through this function block, all of the other DALI function blocks can communicate with the CM 1xDALI.

- **DALI_CTRL** is the basic function block of CM 1xDALI. **DALI_CTRL** must be called in a cyclic OB, and be executed in every cycle. Do not use it in an interrupt OB.
- Each CM 1xDALI works with only one instance of **DALI_CTRL** FB.
- Specify the hardware ID of connected CM 1xDALI at the **DALI_CTRL** FB, and then connect the **DALI_CTRL** DB with the other FBs through the InOut parameter of CM_DALI.

- The FB receives and reports the event messages which are sent be the DALI-2 input devices.
- When Bit 1 or Bit 2 of the CM_STATUS show "1", all the other DALI function blocks cannot be executed. You can choose any of the following actions to resume the status of CM 1xDALI.
  - Set the input CM_RESET to 1.
  - Send the DALI command "STOP QUIESCENT MODE" or "ENABLE APPLICATION CONTROLLER" (refer to IEC 62386-103) to the CM 1xDALI through other DALI application controllers.
- A defined set of messages and their content are shown at the inputs EVENT_MSG, EVENT_SCHEME, EVENT_SRC_1, EVENT_SRC_2 and EVENT_INFO.
- Other generic event messages are shown at the outputs RSV_MSG, RSV_MSG_LEN and RSV_MSG_VAL. The content is shown without interpretation at the output RSV_MSG_VAL.

Parameter

The following table shows the parameters of the function block.

Parameter	Declaration	Data type	Memory area	Description
HW_ID	Input	HW_IO	I, Q, M, D, L or Constant	The hardware identifier of the CM 1xDALI
CM_RESET		BOOL	I, Q, M, D, L or Constant	Stop quiescent mode and re-enable the DALI application controller upon a raising edge. After this action, Bit 1 and Bit 2 of the CM_STATUS will be reset to 0.
CONN_ERR	Output	BOOL	I, Q, M, D, L	The status of CPU communication with CM 1xDALI: • CONN_ERR = 0: No error when the CPU communicates with CM 1xDALI. • CONN_ERR = 1: Error occurs when the CPU communicates with CM 1xDALI.
CM_STATUS		DWORD	I, Q, M, D, L	Indicate the status of the CM 1xDALI: 16#00000000: The status of the CM 1xDALI is OK. For the detailed explanation for each Bit of the CM_STATUS, refer to the following section "Parameter CM_STATUS".
EVENT_MSG		BOOL	I, Q, M, D, L	The status of the sensor event. When the CM 1xDALI receives a sensor event, the EVENT_MSG remains true for one cycle: • EVENT_MSG = 0: No sensor event • EVENT_MSG = 1: A sensor event is received.

Parameter	Declaration	Data type	Memory area	Description						
EVENT_SCHEME		USInt	I, Q, M, D, L	Event characterization that identifies the source of the event: • 0~4: Normal event message • 255: Power cycle event						
				Scheme of the event	0	1	2	3	4	255
EVENT_SRC_1		USInt	I, Q, M, D, L	First event source information	Instance type	Short address	Short address	Device group	Instance group	Group [1]
EVENT_SRC_2		USInt	I, Q, M, D, L	Second event source information	Instance number	Instance type	Instance number	Instance type	Instance type	Short address [2]
EVENT_INFO		WORD	I, Q, M, D, L	When EVENT_SCHEME ≤ 4, the lower 10 bits of EVENT_INFO indicate the event data. When EVENT_SCHEME = 255, EVENT_INFO shows "16#0000". For the detailed meaning of EVENT_INFO in DALI standard, refer to the following section "Parameter EVENT_INFO".						
RSV_MSG		BOOL	I, Q, M, D, L	The status of the reserved message. When the CM 1xDALI receives a reserved message, the RSV_MSG remains true for one cycle: • RSV_MSG = 0: No reserved message • RSV_MSG = 1: A reserved message is received.						
RSV_MSG_LEN		USInt	I, Q, M, D, L	The bit length of the reserved message						
RSV_MSG_VAL		DWORD	I, Q, M, D, L	The bit stream of the reserved message						

[1] For a valid device group, group of EVENT_SRC_1 indicates the lowest group; otherwise it shows "16#FF".

[2] For a valid short address, short address of EVENT_SRC_2 indicates the short address of the device; otherwise, it shows "16#FF".

Parameter CM_STATUS

Each Bit of the CM_STATUS indicates the different status:

Bit	Explanation of status
Bit 0	The CM 1xDALI is initializing.
Bit 1	The CM 1xDALI is set to quiescent mode by DALI command "START QUIESCENT MODE".
Bit 2	The CM 1xDALI is disabled by DALI command "DISABLE APPLICATION CONTROLLER".[3]
Bit 3	The application controller is disabled by module parameters.[4]
Bit 4	The DALI bus is over voltage.
Bit 5	Missing Voltage (MV)[5] of module input
Bit 6	The DALI bus is short-circuited.
Bit 7	Integrated DALI bus power is disabled in CM 1xDALI, and there is no external DALI bus power on DALI bus.

Bit	Explanation of status
Bit 8	Several error frames on the bus.
Bit 9 to Bit 31	Reserved

[3] When the module is disabled by other DALI application controllers, the CM 1xDALI cannot send out any forward frame (16-bits or 24-bits) to the bus, but it can send out the response frame (8-bits) to other DALI application controllers.

[4] When the module is disabled by the module parameters, the CM 1xDALI cannot send out any forward frame or response frame to the bus.

[5] When the input voltage 24 VDC is lower than 16V±1V, the PWR LED changes from green to off.

Parameter EVENT_INFO

EVENT_INFO of push button (instance type 1)

Event information	Event name	Description
2#00_0000_0000	Button released	The button is released.
2#00_0000_0001	Button pressed	The button is pressed.
2#00_0000_0010	Short press [6]	Press the button and release quickly.
2#00_0000_0101	Double press	Press the button twice in rapid succession.
2#00_0000_1001	Long press start [6]	Press the button and hold for longer than the T_{short}.
2#00_0000_1011	Long press repeat [6]	The button is still pressed after a long press. The event occurs at regular intervals as long as the condition holds.
2#00_0000_1100	Long press stop [6]	The button is released after a long press.
2#00_0000_1110	Button free	The button is restored from getting stuck.
2#00_0000_1111	Button stuck	The button is pressed for a very long time and is assumed stuck.
Others	Reserved	

[6] To configure instance related parameters for push button, refer to DALI_SENSOR_SET_INST_PARAM (Page 97).

EVENT_INFO of absolute input devices (instance type 2)

Event information	Event name	description
positionEvent	Position report	A position report contains the actual position of the sensor. Refer to the DALI Device Manual from the manufacturer for details.

EVENT_INFO of occupancy sensor (instance type 3)

Event information	Event name	description
2#00_0000_***0	No movement	Does not detect movement.
2#00_0000_***1	Movement	Detects movement.
2#00_0000_*00*	Vacant	The area is vacant.
2#00_0000_*10*	Still vacant	The area is still vacant. The event occurs at regular intervals as long as the vacant condition holds.

Event information	Event name	description
2#00_0000_*01*	Occupied	The area is occupied.
2#00_0000_*11*	Still occupied	The area is still occupied. The event occurs at regular intervals as long as the occupied condition holds.
2#00_0000_0***	Presence sensor	The current event is triggered by a presence based sensor.
2#00_0000_1***	Movement sensor	The current event is triggered by a movement based sensor.
Others	Reserved	

EVENT_INFO of light sensor (instance type 4)

Event information	Event name	description
illuminanceEvent	illuminance level report	An illuminance level report contains the actual illuminance level of the sensor. For detailed information, refer to the DALI Device Manual from the manufacturer.

5.3.2 DALI_SEND_CMD

Description

DALI_SEND_CMD can send a user-defined command to the DALI bus and receive the response message of the command. This function block does not interpret the input command code and sends the command to the DALI bus directly. You can send the commands, which are defined in the DALI standard or defined by the device manufacturer.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SEND	Input	BOOL	I, Q, M, D, L or Constant	Send the DALI command upon a rising edge.	
CMD_CODE		DWord	I, Q, M, D, L or Constant	The bit stream of the DALI command	
CMD_BIT_LEN		USInt	I, Q, M, D, L or Constant	The bit length of the DALI command. Only 16 and 24 are valid.	
SEND_TWICE		BOOL	I, Q, M, D, L or Constant	SEND_TWICE = 1: Send the DALI command twice.	
WAIT_RESP		BOOL	I, Q, M, D, L or Constant	• WAIT_RESP = 0: Do not wait for the response. DONE is set to 1 immediately after the DALI command is sent. • WAIT_RESP = 1: Wait for the response of the command. DONE is set to 1 when CM 1xDALI receives the response byte, and the response byte is shown in "CMD_ACK".	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has the following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
CMD_ACK		BYTE	I, Q, M, D, L	When WAIT_RESP = 1, this function block is completed successfully and shows the response byte of the sent command.	

5.4 Addressing function blocks

Addressing function blocks are used for assigning short address, identifying devices, changing short address, or querying the address status of the DALI devices.

5.4.1 DALI_DEV_SCAN

Description

DALI_DEV_SCAN is used for scanning the DALI devices (control gears or input devices) on the bus through random address. The address status of DALI devices are saved in CM 1xDALI (refer to data flow path 4 (Page 23)).

If a device has a short address which is unique compared to other devices, the device keeps its short address. If a device does not have a short address or its short address is not unique, the system assigns a new short address to it.

It takes about 6 seconds to search for one device. If there are 64 devices or more devices on the bus, it takes more than 6 minutes.

This function block can only scan 64 devices, so if there are more than 64 devices on the DALI bus, the result changes every period, and this result is not determinate after each procedure. The result can be queried through function block **DALI_DEV_QUERY_ADDR** (Page 37).

Note

The output resets, only if both the CANCEL and SCAN are set to 0.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SCAN	Input	BOOL	I, Q, M, D, L or Constant	Start the scan procedure upon a rising edge.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
ADDRESS		USInt	I, Q, M, D, L or Constant	Select the address information of scanned devices: • 0 to 63: Scan one single short address, it is generally used to solve the conflict of short address. • 253: Only scan the unaddressed devices. • 255: Scan all the devices.	
CANCEL		BOOL	I, Q, M, D, L or Constant	CANCEL = 1: Stop current scan procedure, and return an error.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has the following values: • 16#00: Idle • 16#01 to 16#40: Scanning devices. The value will be increased when the CM 1xDALI scan a device. • 16#41: Assigning short address. • 16#42: Updating address status. • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.4.2 DALI_DEV_IDENTIFY

Description

DALI_DEV_IDENTIFY is used for identifying devices.

If the control gear does not support the DALI command IDENTIFY, this function provides a light flicker method to identify the device by setting the level to maximum and minimum alternately.

Note

The output resets, only if both the CANCEL and IDENTIFY are set to 0.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
IDENTIFY	Input	BOOL	I, Q, M, D, L or Constant	Identify the devices upon a rising edge.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
GROUP		BOOL	I, Q, M, D, L or Constant	Specify the short address or group address of the control gear: • GROUP = 0: ADDRESS indicates the short address or broadcast. • GROUP = 1: ADDRESS indicates the group address.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Identify the address information of the CM 1xDALI.	
				When GROUP = 0, ADDRESS indicates the short address or broadcast: • 0 to 63: Specify the short address of the device • 253: Broadcast the un-addressed devices • 255: Broadcast all the devices	When GROUP = 1, ADDRESS indicates the group address: • 0 to 15: Group address

Parameter	Declaration	Data type	Memory area	Description	
FLICKER		BOOL	I, Q, M, D, L or Constant	Specify the type of identification process: • FLICKER = 0: Identify the device by DALI command IDENTIFY. The identifying process is specified by manufacturer. • FLICKER = 1: Flicker the control gear to identify the device by setting the level, only valid for control gears. After the identification, the level of control gears is set to "MIN_LEVEL".	
CANCEL		BOOL	I, Q, M, D, L or Constant	CANCEL = 1: Stop current identify procedure, and return an error.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.4.3 DALI_DEV_CHG_ADDR

Description

DALI_DEV_CHG_ADDR is used for changing the short address of one device. If the new address is assigned to another device, the two devices exchange their short addresses.

This function block only changes the short address of the physical devices. The data in the CM 1xDALI is not influenced by this short address changing (refer to data flow path 5 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
CHANGE	Input	BOOL	I, Q, M, D, L or Constant	Change the short address of the specific device upon a rising edge.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
OLD_ADDR		BOOL	I, Q, M, D, L or Constant	The current short address of the device.	
NEW_ADDR		USInt	I, Q, M, D, L or Constant	The short address to be assigned to the device.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.4.4 DALI_DEV_QUERY_ADDR

Description

DALI_DEV_QUERY_ADDR is used for querying the address information of the DALI bus.

- When you set the input DET_ALL to 0, the FB queries the address information which is saved directly in the CM 1xDALI (refer to data flow path 2 (Page 23)).
- When you set the input DET_ALL to 1, the FB detects all devices on the bus and then returns the latest address information (refer to data flow path 4 and data flow path 2 (Page 23)).

CM 1xDALI cyclic queries all the address status of DALI devices on the bus through the background detection (Page 21), and detects the following results:

- Whether each DALI device has a short address
- For control gear: the information of basic status, control gear type and EXT_STATUS
- For sensor: the information of device status, NUM_OF_INST and type of each instance

These results are saved in the CM 1xDALI (refer to data flow path 4 (Page 23)).

Note

The output resets, only if both the CANCEL and QUERY are set to 0.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query the address information upon a rising edge.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
DET_ALL		BOOL	I, Q, M, D, L or Constant	• DET_ALL = 0: Query the address information which is saved directly in the CM 1xDALI. • DET_ALL = 1: Detect all devices on the bus and then return the latest address information.	
CANCEL		BOOL	I, Q, M, D, L or Constant	CANCEL = 1: Stop the scanning/querying procedure, and return an error.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following four values: • 16#00: Idle • 16#01 to 16#40: Detecting the status from DALI devices. • 16#41: Querying the information from CM 1xDALI. • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

Parameter		Declaration	Data type	Memory area	Description
ADDR_INFO			AddrInfo-Detail	D, L	Address information
	UNADDR		BOOL		UNADDR =1: At least one unaddressed device is detected on the DALI bus.
	EXCEED		BOOL		EXCEED =1: More than 64 control gears or input devices are scanned by using DALI_DEV_SCAN (Page 32).
	CONFIGURED		Ar-ray[0..63] of BOOL		CONFIGURED = 1: The short address has been configured by using DALI_ECG_ADD (Page 67), DALI_SENSOR_ADD (Page 89) or DALI_DEV_UPLOAD (Page 100). The index of the array indicates the short address.
	ADDR_CHANGED		Ar-ray[0..63] of BOOL		• ADDR_CHANGED = 0: The short address of the device is not changed. • ADDR_CHANGED = 1: The device is assigned a new short address after scanning. The index of the array indicates the short address.
	ADDR_STATUS [1]		Ar-ray[0..63] of USInt		Show the status of short address: • 0: Unknown status [2] • 1: Normal status • 2: No device with the short address • 3: The DALI device displays an error frame. This error may be caused by the short address conflict or the problem of DALI device. • 4: Type mismatch. The configured type is not the same as the physical device's. • 5: Instance number mismatch. The configured instance number of the sensor is not the same as the actual instance number. This status is only for sensors. • 15: This short address of sensor device is assigned to CM 1xDALI. The index of the array indicates the short address.

[1] Not every short address conflict can be detected. Even if there is a short address conflict on the DALI bus, the status of DALI_CTRL might show "1".

[2] When you use the DALI_ECG_STATUS (Page 53) or DALI_SENSOR_STATUS (Page 60) to query the status of the DALI device, or the DALI device is queried by background detection (Page 21), this unknown status change to another status.

5.5 Control gear dimming function blocks

Control gear dimming function blocks are used for querying or setting the level and color of the control gears.

5.5.1 DALI_ECG_SWITCH

Description

DALI_ECG_SWITCH is used for switching on or off control gear, and you can also define the on and off level with this switch. The on and off levels are neither saved in the CM 1xDALI nor in the DALI device (refer to data flow path 5 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
ON	Input	BOOL	I, Q, M, D, L or Constant	Switch on upon a rising edge.	
OFF		BOOL	I, Q, M, D, L or Constant	Switch off upon a rising edge.	
GROUP		BOOL	I, Q, M, D, L or Constant	Specify the short address or group address of the control gear: • GROUP = 0: ADDRESS indicates the short address or broadcast. • GROUP = 1: ADDRESS indicates the group address.	
ADDRESS		USint	I, Q, M, D, L or Constant	Identify the address information of the CM 1xDALI.	
				When GROUP = 0, ADDRESS indicates the short address or broadcast: • 0 to 63: Specify the short address of the device • 253: Broadcast the unaddressed devices • 255: Broadcast all the devices	When GROUP = 1, ADDRESS indicates the group address: • 0 to 15: Group address

Parameter	Declaration	Data type	Memory area	Description	
ON_TYPE		USint	I, Q, M, D, L or Constant	Switch to the required level: • 0: Switch to the maximum level. • 1: Switch to the last active level. • 2: Switch to the user defined level, which is given by input of ON_LEVEL.	
ON_LEVEL		USint	I, Q, M, D, L or Constant	When ON_TYPE = 2, the value of ON_LEVEL is available. The control gear‘s target level sets to this level when the switch is on. Range: 0 to 254	
OFF_TYPE		USint	I, Q, M, D, L or Constant	Switch off or switch to the required level: • 0: Switch off. • 1: Switch to the minimum level. • 2: Switch to user defined level, which is given by input of OFF_LEVEL.	
OFF_LEVEL		USint	I, Q, M, D, L or Constant	When OFF_TYPE = 2, the value of OFF_LEVEL is available. The control gear’s target level sets to this level when the switch is off. Range: 0 to 254	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.5.2 DALI_ECG_SWITCH_DIM

Description

DALI_ECG_SWITCH_DIM is used for controlling the control gear (refer to data flow path 5 (Page 23)), and has the following features:

- If ON_UP sets to 1 and remains for the time which is shorter than the value of SHORT_PRESS, and then resets to 0, the control gear is switched on.
- If OFF_DOWN sets to 1 and remains for the time which is shorter than the value of SHORT_PRESS, and then resets to 0, the control gear is switched off.
- If ON_UP sets to 1 and remains for the time which is longer than the value of SHORT_PRESS, the control gear is dimming up until the ON_UP sets to 0.
- If OFF_DOWN sets to 1 and remains for the time which is longer than the value of SHORT_PRESS, the control gear is dimming down until the OFF_DOWN sets to 0.
- If the level of the control gear is 0, the level cannot be changed by dimming up.
- If the level of the control gear is MIN_LEVEL, the level cannot be set to 0 by dimming down.

Note

Do not set the "ON_UP" and "OFF_DOWN" to 1 at the same time. Otherwise the error code "16#88" is shown in the output parameter STATUS.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
ON_UP	Input	BOOL	I, Q, M, D, L or Constant	Switch on or dim up upon a rising edge. • If ON_UP sets to 1 and remains for the time which is shorter than the value of SHORT_PRESS, and then resets to 0, the control gear switches on. • If ON_UP sets to 1 and remains for the time which is longer than the value of SHORT_PRESS, the control gear is dimming up until the ON_UP sets to 0.	
OFF_DOWN		BOOL	I, Q, M, D, L or Constant	Switch off or dim down upon a rising edge. • If OFF_DOWN sets to 1 and remains for the time which is shorter than the value of SHORT_PRESS, and then resets to 0, the control gear switches off. • If OFF_DOWN sets to 1 and remains for the time which is longer than the value of SHORT_PRESS, the control gear is dimming down until the OFF_DOWN sets to 0.	
GROUP		BOOL	I, Q, M, D, L or Constant	Specify the short address or group address of the control gear: • GROUP = 0: ADDRESS indicates the short address or broadcast. • GROUP = 1: ADDRESS indicates the group address.	
ADDRESS		USint	I, Q, M, D, L or Constant	Identify the address information of the CM 1xDALI.	
				When GROUP = 0, ADDRESS indicates the short address or broadcast: • 0 to 63: Specify the short address of the device • 253: Broadcast the unaddressed devices • 255: Broadcast all the devices	When GROUP = 1, ADDRESS indicates the group address: • 0 to 15: Group address
DIM_ONLY		BOOL	I, Q, M, D, L or Constant	DIM_ONLY = 1: The dimming is only performed by the inputs ON_UP and OFF_DOWN.	
ON_TYPE		USint	I, Q, M, D, L or Constant	Switch to the required level: • 0: Switch to the maximum level. • 1: Switch to the last active level. 2: Switch to the user defined level, which is given by input ON_LEVEL.	

Parameter	Declaration	Data type	Memory area	Description	
ON_LEVEL		USint	I, Q, M, D, L or Constant	When ON_TYPE = 2, the value of ON_LEVEL is available. The control gear‘s target level sets to the required level when the switch is on. Range: 0 to 254	
OFF_TYPE		USint	I, Q, M, D, L or Constant	Switch off or switch to the required level: • 0: Switch off. • 1: Switch to the minimum level. • 2: Switch to the user defined level, which is given by input OFF_LEVEL.	
OFF_LEVEL		USint	I, Q, M, D, L or Constant	When OFF_TYPE = 2, the value of OFF_LEVEL is available. The control gear’s target level sets to this level when the switch is off. Range: 0 to 254	
SHORT_PRESS		TIME	I, Q, M, D, L or Constant	The time threshold for distinguishing the switching on/off action or dimming up/down action. The default value is 300 ms.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.5.3 DALI_ECG_QUERY_LEVEL

Description

DALI_ECG_QUERY_LEVEL is used for querying the actual level of DALI control gears (refer to data flow path 6 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query actual level upon a rising edge.	
ADDRESS		USint	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
LEVEL		USInt	I, Q, M, D, L	The actual level is queried from the control gear.	

5.5.4 DALI_ECG_SET_LEVEL

Description

DALI_ECG_SET_LEVEL is used for setting the target level of DALI control gears (refer to data flow path 5 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SET	Input	BOOL	I, Q, M, D, L or Constant	Set the level upon a rising edge.	
GROUP		BOOL	I, Q, M, D, L or Constant	Specify the short address or group address of the control gear: • GROUP = 0: ADDRESS indicates the short address or broadcast. • GROUP = 1: ADDRESS indicates the group address.	
ADDRESS		USint	I, Q, M, D, L or Constant	Identify the address information of the CM 1xDALI.	
				When GROUP = 0, ADDRESS indicates the short address or broadcast: • 0 to 63: Specify the short address of the device • 253: Broadcast the unaddressed devices • 255: Broadcast all the devices	When GROUP = 1, ADDRESS indicates the group address: • 0 to 15: Group address
LEVEL		USint	I, Q, M, D, L or Constant	Set the target level. Range: 0 to 254	
CM_DALI		"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	

Parameter	Declaration	Data type	Memory area	Description	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When the ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When the ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.5.5 DALI_ECG_QUERY_COLOR

Description

DALI_ECG_QUERY_COLOR is used for querying the actual color of DALI control gears that are compliant with IEC-62386-209, device type 8 (color control) (refer to data flow path 6 (Page 23)).

When you query a control gear that does not support color control, the error code “16#87” (Not supported) is shown in the output parameter of STATUS.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query actual color upon a rising edge.

Parameter	Declaration	Data type	Memory area	Description	
ADDRESS		USint	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
COLOR		DALIColorDetail	D, L	Color information of the control gear	
COLOR_TYPE		USInt		Set the color type: • 16#10: Color xy-coordinate • 16#20: Color temperature	
COORDINATE_X		UInt		The x-coordinate value of the point in the CIE color space chromaticity diagram. X-coordinate = "COORDINATE_X" * 1/65536. Range: 0 to 65534	
COORDINATE_Y		UInt		The y-coordinate value of the point in the CIE color space chromaticity diagram. Y-coordinate = "COORDINATE_Y" * 1/65536. Range: 0 to 65534	
TEMPERATURE		UInt		The color value of temperature. T_C(K) = 1000000 / "TEMPERATURE" Range: 1 to 65534	

5.5.6 DALI_ECG_SET_COLOR

Description

DALI_ECG_SET_COLOR is used for setting the actual color of DALI control gears that are compliant with IEC-62386-209, device type 8 (color control) (refer to data flow path 5 (Page 23)).

If you use this FB to set color to a control gear which does not support color control, the command cannot take effect and does not report an error.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SET	Input	BOOL	I, Q, M, D, L or Constant	Set the color upon a rising edge.	
GROUP		BOOL	I, Q, M, D, L or Constant	Specify the short address or group address of the control gear: • GROUP = 0: ADDRESS indicates the short address or broadcast. • GROUP = 1: ADDRESS indicates the group address.	
ADDRESS		USint	I, Q, M, D, L or Constant	Identify the address information of the CM 1xDALI.	
				When GROUP = 0, ADDRESS indicates the short address or broadcast: • 0 to 63: Specify the short address of the device • 253: Broadcast the unaddressed devices • 255: Broadcast all the devices	When GROUP = 1, ADDRESS indicates the group address: • 0 to 15: Group address
COLOR		DALIColorDetail	D, L	Color information of the control gear	
COLOR_TYPE		USInt		Set the color type: • 16#10: xy-coordinate • 16#20: Color temperature	
COORDINATE_X		UInt		The x-coordinate value of the point in the CIE color space chromaticity diagram. X-coordinate = "COORDINATE_X" * 1/65536. Range: 0 to 65534	
COORDINATE_Y		UInt		The y-coordinate value of the point in the CIE color space chromaticity diagram. Y-coordinate = "COORDINATE_Y" * 1/65536. Range: 0 to 65534	

Parameter	Declaration	Data type	Memory area	Description	
TEMPERATURE		UInt		The color value of temperature. T_C(K) = 1000000 / "TEMPERATURE" Range: 1 to 65534	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: An error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.5.7 DALI_ECG_GOTO_SCENE

Description

DALI_ECG_GOTO_SCENE is used for setting control gears to go to the specified scene (refer to data flow path 5 (Page 23)). You can also query or configure the scene information by using DALI_ECG_QUERY_SCENE (Page 85) or DALI_ECG_SET_SCENE (Page 87).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
GOTO	Input	BOOL	I, Q, M, D, L or Constant	Go to the specified scene upon a rising edge.	
GROUP		BOOL	I, Q, M, D, L or Constant	Specify the short address or group address of the control gear: • GROUP = 0: ADDRESS indicates the short address or broadcast. • GROUP = 1: ADDRESS indicates the group address.	
ADDRESS		USint	I, Q, M, D, L or Constant	Identify the address information of the CM 1xDALI.	
				When GROUP = 0, ADDRESS indicates the short address or broadcast: • 0 to 63: Specify the short address of the device • 253: Broadcast the unaddressed devices • 255: Broadcast all the devices	When GROUP = 1, ADDRESS indicates the group address: • 0 to 15: Group address
SCENE_NUM		USint	I, Q, M, D, L or Constant	Go to the specified scene. Range: Less than 16	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.6 Diagnostic function blocks

Diagnostic function blocks are used for querying the status information of all the DALI devices.

5.6.1 DALI_DEV_GTIN

Description

DALI_DEV_GTIN is used for querying the GTIN (Global Trade Item Number) of device (refer to data flow path 6 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
READ	Input	BOOL	I, Q, M, D, L or Constant	Query the GTIN of device upon a rising edge.
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.

Parameter	Declaration	Data type	Memory area	Description	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
GTIN		Array[0..5] of BYTE	I, Q, M, D, L	Show the global trade item number of the device. Each GTIN has 6 bytes.	

5.6.2 DALI_ECG_STATUS

Description

DALI_ECG_STATUS is used for querying the status of one control gear. The status information is queried from the physical DALI device (refer to data flow path 6 (Page 23)). The status information saved in the CM 1xDALI will be updated (refer to data flow path 4 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
READ	Input	BOOL	I, Q, M, D, L or Constant	Query the status of one control gear upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.

Parameter	Declaration	Data type	Memory area	Description	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
ECG_STATUS		ECGStatusDetail	D, L	The status information of control gear	
CONFIGURED		BOOL		CONFIGURED = 1: The short address is configured by using DALI_ECG_ADD (Page 67) or DALI_DEV_UPLOAD (Page 100).	
ADDR_CHANGED		BOOL		• ADDR_CHANGED = 0: The short address of control gear is not changed. • ADDR_CHANGED = 1: The short address of control gear is changed during the scan procedure.	
ADDR_STATUS		BYTE		Show the status of short address: • 1: Normal status • 2: No device with the short address • 3: The DALI device displays an error frame. This error may be caused by the short address conflict or the problem of the DALI device. • 4: Type mismatch. The configured type is not the same as the physical device's.	
BASIC_STATUS		BYTE		Show the status of the control gear. For the detailed explanation for each Bit of BASIC_STATUS, refer to the following section "Parameter BASIC_STATUS".	
CONFIG_TYPE		BYTE		• CONFIGURED = 0, the value of CONFIG_TYPE is 16#FF. • CONFIGURED = 1, the value of CONFIG_TYPE is the same as the value of ECG_TYPE in DALI_ECG_ADD (Page 67).	
ACTUAL_TYPE		BYTE		The actual device type of the control gear.	

Parameter		Declaration	Data type	Memory area	Description
	EXT_STATUS [1]		BYTE		Show the type-related failure status of the control gear which compliant with the IEC62386-20x. When 1 ≤ ACTUAL_TYPE ≤ 8, each Bit of EXT_STATUS indicates the different error types. Otherwise, the value of EXT_STATUS is 0.
	ACTUAL_LEVEL		USInt		The actual level of the control gear.

[1] For the detailed description about each bit of **Control Gear EXT_STATUS**, refer to the following table.

Bit	Type 1 (emergency)	Type 2 (discharge)	Type 3 (halogen)	Type 4 (incandescent)	Type 5 (converter)	Type 6 (LED)	Type 7 (switch)	Type 8 (color control)
0	Circuit failure	Mains voltage too low	Short circuit	Load overcurrent shutdown	Output fault detected	Short circuit	Load error	XY-coordinate color point out of range
1	Battery duration failure	Mains voltage too high	Open circuit	Open circuit	Reserved	Open circuit	Error detection in hold off	Color temperature out of range
2	Battery failure	Converter thermal overload	Load decrease	Load decrease		Load decrease	Last threshold acted upon • '00' up switch-on • '01' up switch-off • '10' down switch on • '11' down switch off	Auto calibration running
3	Emergency lamp failure	Reserved	Load increase	Load increase		Load increase		Auto calibration successful
4	Function test max delay exceeded	Ignition time out	Current protector active	Reserved		Current protector active	Reserved	Color type XY-coordinate active
5	Duration test max delay exceeded	Reserved	Thermal shutdown	Thermal shutdown		Thermal shutdown		Color type color temperature active
6	Function test failed	Lamp voltage out of spec	Thermal overload	Thermal overload		Thermal overload		Color type primary N active
7	Duration test failed	Lamp cycling failure	Reference measurement failed	Reference measurement failed		Reference measurement failed	Reference measurement failed	Color type RGBWAF active

Parameter BASIC_STATUS

Each Bit of the BASIC_STATUS indicates the different status:

Bit	Status	Explanation
Bit 0	Control gear failure	The control gear cannot be operated as intended.
Bit 1	Lamp failure	The lamp cannot operate as intended.
Bit 2	Lamp on	The lamp is on.
Bit 3	Limit error	The last requested target level is modified in accordance with limitations of "MIN_LEVEL" or "MAX_LEVEL".
Bit 4	Fade running	The fade timer is running.
Bit 5	Reset state	All the parameters of this device are at their reset value.
Bit 6	No short address	No short address is assigned to this device.
Bit 7	Power cycle seen	An external power cycle is occurred.

5.6.3 DALI_ECG_STATUS_CHECK

Description

DALI_ECG_STATUS_CHECK is used for checking the status of control gears. For the detailed status bits description, refer to BASIC_STATUS and EXT_STATUS in DALI_ECG_STATUS (Page 53).

You can set the status mask of all the control gears, compare with the actual status that is stored in the CM 1xDALI, and then return the matching result. The function block checks the status information which is saved in the CM 1xDALI (refer to data flow path 2 (Page 23)). The CM 1xDALI queries the actual device status in the "Background detection period" which is set in the Module Parameters (Page 21).

For example, for the control gear whose short address is 5, if you want to monitor whether the bit 1 of BASIC_STATUS in DALI_ECG_STATUS (Page 53) set to 1, you can set input EXT_STATUS to 0 and set STATUS_MASK[5] to 16#02.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
CHECK	Input	BOOL	I, Q, M, D, L or Constant	Compare the specified status mask with the control gears upon a rising edge.	
EXT_STATUS		BOOL	I, Q, M, D, L or Constant	Show the status of control gear: • EXT_STATUS = 0: Basic status of the control gear • EXT_STATUS = 1: Type-related failure status of the control gear	
STATUS_MASK		Array[0..63] of BYTE	I, Q, M, D, L or Constant	Show the status mask of all the control gears. The index of the array indicates the short address.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
MATCH		Array[0..63] of BOOL	I, Q, M, D, L	Check result of devices on all the short addresses. MATCH = 1: The status of the control gear which is matched with the specified status mask. The index of the array indicates the short address.	

5.6.4 DALI_ECG_QUERY_OPHOUR

Description

DALI_ECG_QUERY_OPHOUR is used for querying the operation hour of DALI control gear. The operation hour accumulates when the control gear remains on for one hour. The operation hour is stored in the CM 1xDALI (refer to data flow path 2 (Page 23)). If you change short adresses of two control gears, the operating hours of these two control gears are not be changed, you exchange the related operation hours of these two control gears by using DALI_ECG_SET_OPHOUR (Page 59).

Before calling this function block, make sure that the control gear is configured by using DALI_ECG_ADD (Page 67) or DALI_DEV_UPLOAD (Page 100).

When you query the operating hour of the control gear, the following occurs:

- If the control gear is not configured before, the error code “16#8D” is shown in the output parameter of STATUS.
- If the control gear is configured, but the type of control gear is mismatched, the error code “16#8B” is shown in the output parameter of STATUS.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query the operation hour of control gear upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.

Parameter	Declaration	Data type	Memory area	Description	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.6.5 DALI_ECG_SET_OPHOUR

Description

DALI_ECG_SET_OPHOUR is used for setting the operation hour of DALI control gear. The operation hour accumulates when the control gear remains on for one hour. The operation hour is stored in the CM 1xDALI (refer to data flow path 1 (Page 23)).

Before calling this function block, make sure that the control gear is configured by using DALI_ECG_ADD (Page 67) and DALI_DEV_UPLOAD (Page 100).

When you set the operating hour of the control gears, the following occurs:

- If the control gear is not configured before, the error code “16#8D” is shown in the output parameter of STATUS.
- If the control gear is configured, but the type of control gear is mismatched, the error code “16#8B” is shown in the output parameter of STATUS.

It is recommended to reset the operation hour after exchanging the physical control gear device.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SET	Input	BOOL	I, Q, M, D, L or Constant	Set the operation hour upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
OPHOUR		UInt	I, Q, M, D, L or Constant	Set the operation hour to the control gear.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.6.6 DALI_SENSOR_STATUS

Description

DALI_SENSOR_STATUS is used for querying the status of one sensor (input device). The status information is queried from the physical DALI device (refer to data flow path 6 (Page 23)). The status information saved in CM 1xDALI will be updated (refer to data flow path 4 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
READ	Input	BOOL	I, Q, M, D, L or Constant	Query the status of sensor upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
SENSOR_STATUS		SensorStaStatusDetail	D, L	The status information of sensor	
CONFIGURED		BOOL		CONFIGURED = 1: The short address is configured by using DALI_SENSOR_ADD (Page 89) or DALI_DEV_UPLOAD (Page 100).	
ADDR_CHANGED		BOOL		• ADDR_CHANGED = 0: The short address of sensor is not changed. • ADDR_CHANGED = 1: The short address of sensor is changed during the scan procedure.	

Parameter		Declaration	Data type	Memory area	Description
	ADDR_STATUS		BYTE		Show the control status of the device: • 1: Normal status • 2: No device with the short address • 3: The DALI device displays an error frame. This error may be caused by the short address conflict or the problem of the DALI device. • 4: Type mismatch. The configured type is not the same as the actual one. • 5: The number of instances mismatch. The configured number of instances is different from the physical device. • 15: This short address of sensor device is assigned to CM 1xDALI.
	DEV_STATUS		BYTE		Show the status of the input devices. For the detailed explanation for each Bit of DEV_STATUS, refer to the following section "Parameter DEV_STATUS".
	CFG_NUM_OF_INST		BYTE		• When CONFIGURED = 0, the value of CFG_NUM_OF_INST is 0. • When CONFIGURED = 1, the value of CFG_NUM_OF_INST is the configured number of instances.
	NUM_OF_INST		USInt		The actual number of sensor instances in the device. Range: 0 to 32
	INST_ERR		Array[0..31] of BOOL		INST_ERR = 1: Error occurs in the instance. The index of the array indicates the instance number.
	INST_ACTIVE		Array[0..31] of BOOL		INST_ACTIVE = 1: The instance is active. The index of the array indicates the instance number.
	CFG_INST_TYPE		Array[0..31] of USInt		Configured instance type of each sensor instance. The index of the array indicates the instance number.
	INST_TYPE		Array[0..31] of USInt		Actual instance type of each sensor instance. The index of the array indicates the instance number.

Parameter DEV_STATUS

Each Bit of the DEV_STATUS indicates the different status:

Bit	Status	Explanation
Bit 0	Input device error	The input device or its instances has an error.
Bit 1	Quiescent mode	The input device does not produce any forward frame.
Bit 2	Short address is mask (255)	No short address is assigned to this device.
Bit 3	Application active	The application controller is active
Bit 4	Application controller error	This application controller has an error.
Bit 5	Power cycle seen	An external power cycle is occurred.
Bit 6	Reset state	All the parameters of this device are at their reset value.
Bit 7	Unused	Unused

5.6.7 DALI_SENSOR_INPUT

Description

DALI_SENSOR_INPUT is used for querying the input value of one instance in the input device (sensor). The input value is queried from the physical DALI device (refer to data flow path 6 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
READ	Input	BOOL	I, Q, M, D, L or Constant	Query status of sensor upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
INST_NUM		USint	I, Q, M, D, L or Constant	Specify the instance number of the sensor. Range: 0 to 32	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
RESOLUTION		USint	I, Q, M, D, L	The resolution of the input value. It indicates the range of INPUT_VALUE.	
INPUT_VALUE		UDInt	I, Q, M, D, L	The input value of sensor.	

5.6.8 DALI_SENSOR_STATUS_CHECK

Description

DALI_SENSOR_STATUS_CHECK is used for checking the status of input device (sensor). For the detailed status bits description, refer to DEV_STATUS in DALI_SENSOR_STATUS (Page 60).

You can set the status mask of all the sensors, compare with the actual status that is stored in the CM 1xDALI, and then return the matching result. The function block checks the status information which is saved in the CM 1xDALI (refer to data flow path 2 (Page 23)). The CM 1xDALI queries the actual device status in the "Background detection period" which is set in the Module Parameters (Page 21).

For example, for the sensor whose short address is 4, if you want to check whether the bit 0 of DEV_STATUS in DALI_SENSOR_STATUS (Page 60) is set to 1, you can set input STATUS_MASK[4] to 16#01.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
CHECK	Input	BOOL	I, Q, M, D, L or Constant	Compare the specified status mask with sensors upon a rising edge.	
STATUS_MASK		Array[0..63] of BYTE	I, Q, M, D, L or Constant	Show the status mask of all the sensors.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
MATCH		Array[0..63] of BOOL	I, Q, M, D, L	Check result of devices on all the short addresses. MATCH = 1: The status of the sensor which is matched with the specified status mask. The index of the array indicates the short address.	

5.7 Configuration function blocks

Configuration function blocks are used for configuring the parameters of all the DALI devices.

These function blocks allow to store configuration data in the CM 1xDALI module.

The configuration in the modules database can be built up by uploading the physical devices or by configuring from the CPU. A stored configuration can be easily queried and modified by these function blocks.

5.7.1 DALI_ECG_ADD

Description

DALI_ECG_ADD is used for adding or modifying one configured control gear.

- In order to add one configured control gear, you must set the device type of the control gear.
- This function block does not send any command to the DALI bus, and the CM 1xDALI saves the data of the added devices (refer to data flow path 1 (Page 23)).
- After adding the device by this function block, the parameters you set by other function blocks (for example, DALI_ECG_SET_BASIC_PARAM (Page 72) and DALI_ECG_SET_GROUP (Page 83)) are saved in the CM 1x DALI.
- The device is marked as configured after the device type is set. Refer to the output parameter CONFIGURED of DALI_DEV_QUERY_ADDR (Page 37).
- All of the setting parameters are saved in the CM 1xDALI until the device is deleted by using DALI_ECG_DELETE (Page 69) or reset by using DALI_DEV_RESET (Page 104).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
ADD	Input	BOOL	I, Q, M, D, L or Constant	Add or modify one configured control gear upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
ECG_TYPE		USInt	I, Q, M, D, L or Constant	Specify the device type of the control gear which is added or modified. Refer to Electric control gear (ECG) type (Page 107).	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.2 DALI_ECG_DELETE

Description

DALI_ECG_DELETE is used for deleting one configured control gear.

This function block does not send any command to the DALI bus, but deletes the device which is added by using DALI_ECG_ADD (Page 67) and the data which is saved in the CM 1xDALI (refer to data flow path 1 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
DELETE	Input	BOOL	I, Q, M, D, L or Constant	Delete one configured control gear upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.3 DALI_ECG_QUERY_BASIC_PARAM

Description

DALI_ECG_QUERY_BASIC_PARAM is used for querying the basic parameters of DALI control gears.

- When you set the input "PHY_DEV" to 1, this function block queries the parameters from the physical device (refer to data flow path 6 (Page 23)).
- When you set the input "PHY_DEV" to 0, this function block queries the parameters which are saved in CM 1xDALI (refer to data flow path 2 (Page 23)).

You can set the basic parameter of control gear by using DALI_ECG_SET_BASIC_PARAM (Page 72).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query basic parameters of the control gear upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
PHY_DEV		BOOL	I, Q, M, D, L or Constant	Specify the location of parameters: • PHY_DEV = 1 : Query the parameters from the physical device by sending commands. • PHY_DEV = 0 : Query the parameters which are saved in CM 1xDALI.
CM_DALI	InOut	"DALI_CTRL"		The data block of DALI_CTRL specifies the CM 1xDALI which communicates with current function block.
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.

Parameter	Declaration	Data type	Memory area	Description	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
BASIC_PRM_QRY		BasicPrmQryDetail	D, L	The basic parameters of control gear	
PWR_ON_LEVEL		USInt		Power on level Range: 0 to 255 **Note:** If PWR_ON_LEVEL is set to 255, the control gear sets the level to the last active level when power on.	
SYS_FAIL_LEVEL		USInt		System failure level Range: 0 to 255 **Note:** If SYS_FAIL_LEVEL is set to 255, the control gear has no response to the system failure.	
MIN_LEVEL		USInt		Minimum level of the brightness Range: 1 to the value of MAX_LEVEL	
MAX_LEVEL		USInt		Maximum level of the brightness Range: The value of MIN_LEVEL to 254	
FADE_RATE		USInt		The fading speed for dimming. The fade rate is used by DALI_ECG_SWITH_DIM (Page 42) for dimming up or down function. $fade\ rate = \frac{506}{\sqrt{2^{FADE\_RATE}}}\ step/s$ Range: 1 to 15	
FADE_TIME		USInt		The fade time use for setting level or go to scene. The fade time is used by DALI_ECG_SET_LEVEL (Page 46), DALI_ECG_SWITCH (Page 40) and DALI_ECG_SWTICH_DIM (Page 42) for setting the level. $fade\ time = \begin{cases} use\ extended\ fade\ time, & FADE\_TIME=0 \\ \frac{1}{2}\cdot\sqrt{2^{FADE\_TIME}}\cdot 1\,s, & FADE\_TIME>0 \end{cases}$ Range: 0 to 15	
EXT_FADE_BASE		USInt		Base of the extend fade time extendedFadeTimeBase = EXT_FADE_BASE + 1 Range: 0 to 15	

Parameter		Declaration	Data type	Memory area	Description	
	EXT_FADE_MUL		USInt		Multiplier of the extend fade time Range: 0 to 5	
					EXT_FADE_MUL	**extemdedFadeTimeMultiplier**
					0	0 ms
					1	100 ms
					2	1 s
					3	10 s
					4	1 min
					In case FADE_TIME = 0, extended fade time is used, fade time = extendedFadeTimeBase * extemdedFadeTimeMultiplier **Note**: Extended fade time is only supported by devices compliant with DALI 2.0. If the device doses not support extended fade time, the value of EXT_FADE_TIME_BASE and EXT_FADE_TIME_MUL shows 0.	
	ECG_TYPE		USInt		Device type of control gears. Refer to Electric control gear (ECG) type (Page 107).	
	DEV_VER		USInt		The device version. If you set the input PHY_DEV to 0, the value of DEV_VER is 0. The version is in the format "x.y". The major version number x is placed in bits 7 to 2, and the minor version number y is placed in bits 1 to 0.	
	PHM		USInt		Physical minimum level. If PHY_DEV = 0, the value of PHM is 0.	

5.7.4 DALI_ECG_SET_BASIC_PARAM

Description

DALI_ECG_SET_BASIC_PARAM is used for setting the basic parameters of DALI control gears.

- If the status of control gear is configured (for example, control gear is added by using DALI_ECG_ADD (Page 67)), the parameters are saved in the CM 1xDALI (refer to data flow path 1 (Page 23)) and sent to the physical device (refer to data flow path 5 (Page 23)).
- If the status of control gear is not configured, the parameters are only sent to the physical device (refer to data flow path 5 (Page 23)).

You can query the basic parameter of control gear by using DALI_ECG_QUERY_BASIC_PARAM (Page 70).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
SET	Input	BOOL	I, Q, M, D, L or Constant	Set basic parameters of the control gear upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
BASIC_PRM_SET		BasicPrmSetDetail	D, L	The basic parameters of control gear which is used for setting.
PWR_ON_LEVEL		USInt		Power on level. Range: 0 to 255 **Note:** If PWR_ON_LEVEL is set to 255, the control gear sets the level to the last active level when power was on.
SYS_FAIL_LEVEL		USInt		System failure level Range: 0 to 255 **Note:** If SYS_FAIL_LEVEL is set to 255, the control gear has no response to the system failure.
MIN_LEVEL		USInt		Minimum level of the brightness Range: 1 to the value of MAX_LEVEL
MAX_LEVEL		USInt		Maximum level of the brightness Range: The value of MIN_LEVEL to 254
FADE_RATE		USInt		The fading speed for dimming. The fade rate is used by DALI_ECG_SWITCH_DIM (Page 42) for dimming up or down function. $fade\ rate = \frac{506}{\sqrt{2^{FADE\_RATE}}}\ step/s$ Range: 1 to 15
FADE_TIME		USInt		The fade time use for setting level or go to scene. The fade time is used by DALI_ECG_SET_LEVEL (Page 46), DALI_ECG_SWITCH (Page 40) and DALI_ECG_SWITCH_DIM (Page 42) for setting the level. $fade\ time = \begin{cases} use\ extended\ fade\ time, & FADE\_TIME=0 \\ \frac{1}{2}\cdot\sqrt{2^{FADE\_TIME}}\cdot 1\ s, & FADE\_TIME>0 \end{cases}$ Range: 0 to 15
EXT_FADE_BASE		USInt		Base of the extend fade time extendedFadeTimeBase = EXT_FADE_BASE + 1 Range: 0 to 15
EXT_FADE_MUL		USInt		Multiplier of the extended fade time Range: 0 to 5

EXT_FADE_MUL	extemdedFadeTimeMultiplier
0	0 ms

Parameter	Declaration	Data type	Memory area	Description	
				1	100 ms
				2	1 s
				3	10 s
				4	1 min
				In case FADE_TIME = 0, extended fade time is used, fade time = extendedFadeTimeBase * extemdedFadeTimeMultiplier **Note**: Extended fade time is only supported by devices compliant with DALI-2. If the device does not support extended fade time, the value of EXT_FADE_TIME_BASE and EXT_FADE_TIME_MUL are ignored by DALI device.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL		Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL		Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL		Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL		Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE		When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.5 DALI_ECG_QUERY_EXT_PARAM

Description

DALI_ECG_QUERY_EXT_PARAM is used for querying the extended parameters of DALI control gears.

- When you set the input "PHY_DEV" to 1, this function block queries the extended parameters from the physical device (refer to data flow path 6 (Page 23)).
- When you set the input "PHY_DEV" to 0, this function block queries the parameters which are saved in CM 1xDALI (refer to data flow path 2 (Page 23)).

The extended parameters have the following features:

- The extended parameters are type-related.
- The extended parameters in the physical device can only be queried from the control gears whose type range is from 1 to 8; Otherwise, the error code “16#87” (Not supported) is shown in the output parameter of STATUS.
- The extended parameters which are saved in CM 1xDALI can only be queried from the control gear whose type is 1, or 4 to 8.

You can set the extended parameters of control gear by using DALI_ECG_SET_EXT_PARAM (Page 79).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query the extended parameters of the control gear upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
PHY_DEV		BOOL	I, Q, M, D, L or Constant	Specify the location of parameters: • PHY_DEV = 0 : Query the parameters which are saved in CM 1xDALI. • PHY_DEV = 1 : Query the parameters from the physical device by sending commands.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
ECG_TYPE		USInt	I, Q, M, D, L	Device type of the control gear.	
EXT_PRM_QRY [1]		Array[0..30] of BYTE	I, Q, M, D, L	The type-related parameters of the control gear.	

[1] For the detailed description of the extended parameters for DALI control gears, refer to the following table.

Table 5- 2 The extended parameters of DALI control gears

Attributes	BYTE	Type 1 (emergency)	Type 2 (discharge)	Type 3 (halogen)	Type 4 (incandescent)	Type 5 (converter)	Type 6 (LED)	Type 7 (switch)	Type 8 (color control)			
Read/Write	0	Emergency level	Not used	Not used	Dimming curve	Dimming curve	Dimming curve	Up switch-on threshold	Power on color	Color type		
	1	Prolong time			Not used	Output rage	Fast fade time	Up switch-off threshold		Color value	Coordinate x	Color temperature
	2	Function test delay				Internal pullup		Down switch-off threshold				
	3					Physical Min level		Down switch-on threshold			Coordinate y	Not used
	4	Duration test delay				Not used		Error hold-off time				
	5							Not used	System failure color	Color type		
	6	Function test interval								Color value	Coordinate x	Color temperature
	7	Duration test interval										
	8	Test execute timeout									Coordinate y	Not used
	9	Not used										
	10								Color temperature physical coolest			
	11											
	12								Color temperature physical warmest			
	13											
	14								Color temperature coolest			
	15											
	16								Color temperature warmest			
	17											

Attributes	BYTE	Type 1 (emergency)	Type 2 (discharge)	Type 3 (halogen)	Type 4 (incandescent)	Type 5 (converter)	Type 6 (LED)	Type 7 (switch)	Type 8 (color control)
Read only	18	Extend version	Extend version	Extend version	Extend version	Extend version	Extend version	Extend version	Extend version
	19	Features	Features	Features	Features byte 0	Features	Features	Features	Color type features
	20	Emergency min level	HID status	Failure status	Features byte 1	Converter status	Failure state	Switch status	Color status
	21	Emergency max level	Actual failure	Not used	Features byte 2	Output level	Min fast fade time	Gear type	Not used
	22	Duration test result	Stored failure		Dimmer status	Not used	Gear type	Not used	
	23	Rated duration	Thermal overload time		Dimmer temperature		Possible operation mode		
	24	Battery charge			RMS supply voltage		Operation mode		
	25	Emergency time	Thermal load		Supply frequency		Not used		
	26	Total operation time	Not used		RMS load voltage				
	27	Emergency mode			RMS load current				
	28	Failure status			Real load power				
	29	Emergency status							
	30	Not used			Load rating				

5.7.6 DALI_ECG_SET_EXT_PARAM

Description

DALI_ECG_SET_EXT_PARAM is used for setting the extended parameters of DALI control gears. The extended parameters are type-related.

- If the status of control gear is configured (for example, control gear is added by using DALI_ECG_ADD (Page 67)), the parameters are saved in the CM 1xDALI (refer to data flow path 1 (Page 23)) and sent to the physical device (refer to data flow path 5 (Page 23)).
- If the status of control gear is not configured, the parameters are only sent to the physical device (refer to data flow path 5 (Page 23)).
- This function block does not check whether the input parameter EXT_PRM_SET is valid for the specified control gear.

You can query the extended parameters of control gear by using DALI_ECG_QUERY_EXT_PARAM (Page 75).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SET	Input	BOOL	I, Q, M, D, L or Constant	Set extended parameters of the control gear upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
ECG_TYPE		USInt	I, Q, M, D, L or Constant	Device type of the control gears. Refer to Electric control gear (ECG) type (Page 107). Range:1, 4 to 8	
EXT_PRM_SET [1]		Array[0..17] of BYTE	I, Q, M, D, L or Constant	The parameters are set to the control gear.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

[1] For the detailed description of the extended parameters for DALI control gears, refer to the following table.

Table 5- 3 The extended parameters of DALI control gears

Attributes	BYTE	Type 1 (emergency)	Type 4 (incandescent)	Type 5 (converter)	Type 6 (LED)	Type 7 (switch)	Type 8 (color control)			
Read/Write	0	Emergency level	Dimming curve	Dimming curve	Dimming curve	Up switch-on threshold	Power on color	Color type		
	1	Prolong time	Not used	Output rage	Fast fade time	Up switch-off threshold		Color value	Coordinate x	Color temperature
	2	Function test delay		Internal pullup		Down switch-off threshold				
	3			Physical Min level		Down switch-on threshold			Coordinate y	Not used
	4	Duration test delay		Not used		Error hold-off time				
	5					Not used	System failure color	Color type		
	6	Function test interval						Color value	Coordinate x	Color temperature
	7	Duration test interval								
	8	Test execute timeout							Coordinate y	Not used
	9	Not used								
	10						Color temperature physical coolest			
	11									
	12						Color temperature physical warmest			
	13									
	14						Color temperature coolest			
	15									
	16						Color temperature warmest			
	17									

5.7.7 DALI_ECG_QUERY_GROUP

Description

DALI_ECG_QUERY_GROUP is used for querying the group membership of DALI control gears.

- When you set the input "PHY_DEV" to 1, this function block queries the group membership from the physical device (refer to data flow path 6 (Page 23)).
- When you set the input "PHY_DEV" to 0, this function block queries the parameters which are saved in CM 1xDALI (refer to data flow path 2 (Page 23)).

You can set the group membership of control gear by using DALI_ECG_SET_GROUP (Page 83).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query the group membership of the control gear upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
PHY_DEV		BOOL	I, Q, M, D, L or Constant	Specify the location of parameters: • PHY_DEV = 0 : Query the parameters which are saved in CM 1xDALI. • PHY_DEV = 1 : Query the parameters from the physical device by sending commands.
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.

Parameter	Declaration	Data type	Memory area	Description	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
GROUP_BITS		Array[0..15] of BOOL	I, Q, M, D, L	The group membership of the control gear. The index of the array indicates the group address. • GROUP_BITS = 0: Not in group • GROUP_BITS = 1: In group	

5.7.8 DALI_ECG_SET_GROUP

Description

DALI_ECG_SET_GROUP is used for setting the group membership of DALI control gears.

- If the status of control gear is configured (for example, control gear is added by using DALI_ECG_ADD (Page 67)), the parameters are saved in the CM 1xDALI (refer to data flow path 1 (Page 23)) and sent to the physical device (refer to data flow path 5 (Page 23)).
- If the status of control gear is not configured, the parameters are only sent to the physical device (refer to data flow path 5 (Page 23)).

You can query the group membership of control gear by using DALI_ECG_QUERY_GROUP (Page 82).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SET	Input	BOOL	I, Q, M, D, L or Constant	Set the group membership of the control gear upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
GROUP_BITS		Array[0..15] of BOOL	I, Q, M, D, L or Constant	The group membership of the control gear. The index of the array indicates the group address. • GROUP_BITS = 0: Remove from group • GROUP_BITS = 1: Add to group	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.9 DALI_ECG_QUERY_SCENE

Description

DALI_ECG_QUERY_SCENE is used for querying the scene configuration of the control gear.

- When you set the input "PHY_DEV" to 1, this function block queries the scene information from the physical device (refer to data flow path 6 (Page 23)).
- When you set the input "PHY_DEV" to 0, this function block queries the parameters which are saved in CM 1xDALI (refer to data flow path 2 (Page 23)).

You can set the scene configuration of control gear by using DALI_ECG_SET_SCENE (Page 87).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query the scene configuration of the control gear upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
SCENE_NUM		USInt	I, Q, M, D, L or Constant	Specify the scene number. Range: 0 to 15
PHY_DEV		BOOL	I, Q, M, D, L or Constant	Specify the location of parameters: • PHY_DEV = 0 : Query the parameters which are saved in CM 1xDALI. • PHY_DEV = 1 : Query the parameters from the physical device by sending commands.
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.

Parameter	Declaration	Data type	Memory area	Description	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
SCENE_INFO		Scene-InfoDetail	D, L	The scene information of control gear	
LEVEL		USInt	I, Q, M, D, L	Scene level. Range: 0 to 255 **Note**: When LEVEL= 255: The scene is not configured.	
COLOR		DALIColorDetail	D, L	The color information of the scene	
COLOR_TYPE		USInt	I, Q, M, D, L	Set the color type: • 16#00: No color, only set the scene level, ignore the scene color. • 16#10: xy-coordinate • 16#20: Color temperature	
COORDINATE_X		UInt	Constant	The x-coordinate value of the point in the CIE color space chromaticity diagram. X-coordinate = "COORDINATE_X" * 1/65536. Range: 0 to 65534	
COORDINATE_Y		UInt	Constant	The y-coordinate value of the point in the CIE color space chromaticity diagram. Y-coordinate = "COORDINATE_Y" * 1/65536. Range: 0 to 65534	
TEMPERATURE		UInt	Constant	The color value of temperature. T_C(K) = 1000000 / "TEMPERATURE" Range: 1 to 65534	

5.7.10 DALI_ECG_SET_SCENE

Description

DALI_ECG_SET_SCENE is used for setting the scene configuration of the control gear.

- You can set the scene level and scene color of one scene.
- If the control gear does not support the color control function, only scene level can be set. In this case, the input COLOR_TYPE under the "SCENE_INFO" is set to 16#00.
- If the status of control gear is configured (for example, control gear is added by using DALI_ECG_ADD (Page 67)), the parameters are saved in the CM 1xDALI (refer to data flow path 1 (Page 23)) and sent to the physical device (refer to data flow path 5 (Page 23)).
- If the status of control gear is not configured, the parameters are only sent to the physical device (refer to data flow path 5 (Page 23)).

You can query the scene configuration of control gear by using DALI_ECG_QUERY_SCENE (Page 85).

Parameter

The following table shows the parameters of the function block:

Parameter			Declaration	Data type	Memory area	Description
SET			Input	BOOL	I, Q, M, D, L or Constant	Set the scene configuration of the control gear upon a rising edge.
ADDRESS				USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
SCENE_NUM				USInt	I, Q, M, D, L or Constant	Specify the scene number. Range: 0 to 15
SCENE_INFO				SceneInfoDetail	D, L	The scene information of the control gear
	LEVEL			USInt		Scene level. Write scene level to 255 means remove scene. Range: 0 to 255
	COLOR					The color information of the scene
		COLOR_TYPE		USInt		Set the color type: • 16#00: No color, only set the scene level, ignore the scene color. • 16#10: xy-coordinate • 16#20: Color temperature

Parameter			Declaration	Data type	Memory area	Description	
		COORDINATE_X		UInt		The x-coordinate value of the point in the CIE color space chromaticity diagram. X-coordinate = "COORDINATE_X" * 1/65536. Range: 0 to 65534	
		COORDINATE_Y		UInt		The y-coordinate value of the point in the CIE color space chromaticity diagram. Y-coordinate = "COORDINATE_Y" * 1/65536. Range: 0 to 65534	
		TEMPERATURE		UInt		The color value of temperature. T_C(K) = 1000000 / "TEMPERATURE" Range: 1 to 65534	
CM_DALI			InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY			Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE				BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE				BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR				BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS				BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.11 DALI_SENSOR_ADD

Description

DALI_SENSOR_ADD is used for adding or modifying one configured sensor, including its instances.

- In order to add one configured sensor, you must set the sensor type of the instance.
- The total number of instances within all sensors which you can add is limited to 64. If the total number of instance exceeds the limitation, this function block returns an error of 16#87 (not supported).
- This function block does not send any command to the DALI bus, and the CM 1xDALI saves the data of the added devices (refer to data flow path 1 (Page 23)).
- After adding the device using this function block, the parameters you set using other function blocks (for example, DALI_SENSOR_SET_DEV_PARAM (Page 93) and DALI_SENSOR_SET_INST_PARAM (Page 97)) are saved in the CM 1xDALI.
- The device is marked as configured after the device type is set. Refer to the output CONFIGURED of function block DALI_DEV_QUERY_ADDR (Page 37).
- All the setting parameters are saved in the CM 1xDALI until the device is deleted by using DALI_SENSOR_DELETE (Page 91) or reset by using DALI_DEV_RESET (Page 104).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
ADD	Input	BOOL	I, Q, M, D, L or Constant	Add or modify one configured sensor upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
NUM_OF_INST		USInt	I, Q, M, D, L or Constant	Specify the number of instances of the sensor. Range: 1 to 32	
INST_TYPES		Array[0..31] of USInt	I, Q, M, D, L or Constant	Specify the instance type of sensor which is added or modified. Refer to Instance type of input device (Page 107). Range: 0 to 255 The index of the array indicates the instance number.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.12 DALI_SENSOR_DELETE

Description

DALI_SENSOR_DELETE is used for deleting one configured sensor, including its instances.

This function block does not send any command to the DALI bus, but deletes the device which is added by using DALI_SENSOR_ADD (Page 89) and the data which is saved in the CM 1xDALI (refer to data flow path 1 (Page 23)).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
DELETE	Input	BOOL	I, Q, M, D, L or Constant	Delete one configured sensor upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.13 DALI_SENSOR_QUERY_DEV_PARAM

Description

DALI_SENSOR_QUERY_DEV_PARAM is used for querying the device parameters of the input device (sensor).

- When you set the input "PHY_DEV" to 1, this function block queries the parameters from the physical device (refer to data flow path 6 (Page 23)).
- When you set the input "PHY_DEV" to 0, this function block queries the parameters which are saved in CM 1xDALI (refer to data flow path 2 (Page 23)).

You can set the device parameters of sensor by using DALI_SENSOR_SET_DEV_PARAM (Page 93).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query device parameters of the sensor upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
PHY_DEV		BOOL	I, Q, M, D, L or Constant	Specify the location of parameters. • PHY_DEV = 1 : Query the parameters from the physical device by sending commands. • PHY_DEV = 0 : Query the parameters which are saved in CM 1xDALI.
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.

Parameter	Declaration	Data type	Memory area	Description	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
OPER_MODE		BYTE	I, Q, M, D, L	Operating mode of the sensor device which is defined by the device manufacturer.	
PWR_CYCLE		BOOL	I, Q, M, D, L	Power cycle notification flag. PWR_CYCLE = 1: After completing its external power cycle, the sensor generates a power cycle event message.	

5.7.14 DALI_SENSOR_SET_DEV_PARAM

Description

DALI_SENSOR_SET_DEV_PARAM is used for setting the device parameters of the input device (sensor).

- If the status of sensor is configured (for example, sensor is added by using DALI_SENSOR_ADD (Page 89)), the parameters are saved in the CM 1xDALI (refer to data flow path 1 (Page 23)) and sent to the physical device (refer to data flow path 5 (Page 23)).
- If the status of sensor is not configured, the parameters are only sent to the physical device (refer to data flow path 5 (Page 23)).

You can query the device parameter of sensor by using DALI_SENSOR_QUERY_DEV_PARAM (Page 92).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
SET	Input	BOOL	I, Q, M, D, L or Constant	Set device parameters of the sensor upon a rising edge.	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
OPER_MODE		BYTE	I, Q, M, D, L	Operating mode of the sensor device which is defined by the device manufacturer.	
PWR_CYCLE		BOOL	I, Q, M, D, L	Power cycle notification flag. PWR_CYCLE = 1: After completing its external power cycle, the sensor generates a power cycle event message.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.7.15 DALI_SENSOR_QUERY_INST_PARAM

Description

DALI_SENSOR_QUERY_INST_PARAM is used for querying the instance parameters of the input device (sensor).

- When you set the input "PHY_DEV" to 1, this function block queries the parameters from the physical device (refer to data flow path 6 (Page 23)).
- When you set the input "PHY_DEV" to 0, this function block queries the parameters which are saved in CM 1xDALI (refer to data flow path 2 (Page 23)).

You can set the instance parameters of sensor by using DALI_SENSOR_SET_INST_PARAM (Page 97).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
QUERY	Input	BOOL	I, Q, M, D, L or Constant	Query the instance parameters of the sensor upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
INST_NUM		USInt	I, Q, M, D, L or Constant	Specify the instance number. Range: 0 to 31
PHY_DEV		BOOL	I, Q, M, D, L or Constant	Specify the location of parameters: • PHY_DEV = 0 : Query the parameters which are saved in CM 1xDALI. • PHY_DEV = 1 : Query the parameters from the physical device by sending commands.
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.

Parameter	Declaration	Data type	Memory area	Description	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).
INST_PRM_QRY		InstPrmQryDetail	D, L	The instance parameters of input device (sensor)	
INST_TYPE		USInt		Refer to Instance type of input device (Page 107) to query the Instance type.	
INST_ACTIVE		BOOL		Activation of the instance.	
EVENT_SCHEME		USInt		An instance of an input device uses the selected event source addressing according to the following scheme: • 0: Instance type and instance number • 1: Short address and instance type • 2: Short address and instance number • 3: Device group and instance number • 4: Instance group and instance type	
EVENT_FILTER		BYTE		The event message filter is used to enable and disable specific events. Refer to Description for EVENT_FILTER (Page 107) for detailed description.	
EVENT_PRIO		USInt		The sending priority of the event message. The system reactions are sent according to the set priority. The system reactions with high priority take precedence over the system reactions with low priority.	
TYPE_PRM_QRY [1]		Array[0..6] of BYTE		The type-related parameters of the instance.	

[1] For the detailed description of sensor instance type-related parameters, refer to the following table.

Table 5- 4 Sensor instance type-related parameters

Attributes	BYTE	Type 1 (push button)	Type 2 (absolute input)	Type 3 (occupancy)	Type 4 (light sensor)
Read/Write	0	*tShort*	Deadtime	Hold time	Hysteresis
	1	*tDouble*	Report time	Report time	Hysteresis min
	2	*tRepeat*	Not used	Deadtime	Report time
	3	*tStuck*		Not used	Deadtime
Read only	4	Resolution			
	5	tShortMin	Not used	Not used	Not used
	6				

5.7.16 DALI_SENSOR_SET_INST_PARAM

Description

DALI_SENSOR_INST_PARAM is used for setting the instance parameters of the input device (sensor).

- If the status of the sensor is configured (for example, sensor is added by using DALI_SENSOR_ADD (Page 89)), the parameters are saved in the CM 1xDALI (refer to data flow path 1 (Page 23)) and sent to the physical device (refer to data flow path 5 (Page 23)).
- If the status of the sensor is not configured, the parameters are only sent to the physical device (refer to data flow path 5 (Page 23)).

You can query the instance parameters of the sensor by using DALI_SENSOR_QUERY_INST_PARAM (Page 95).

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description
SET	Input	BOOL	I, Q, M, D, L or Constant	Set the instance parameters of the sensor upon a rising edge.
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63
INST_NUM		USInt	I, Q, M, D, L or Constant	Specify the instance number. Range: 0 to 31
INST_PRM_SET		InstPrmSetDetail	D, L	The instance parameters of the input device (sensor).
INST_TYPE		USInt		Refer to the Instance type of input device (Page 107) to set the instance type. Range: 1 to 4
INST_ACTIVE		BOOL		Activation of the instance.
EVENT_SCHEME		USInt		An instance of an input device uses the selected event source addressing according to the scheme: • 0: Instance type and instance number • 1: Short address and instance type • 2: Short address and instance number • 3: Device group and instance number • 4: Instance group and instance type
EVENT_FILTER		BYTE		The event message filter can be used to enable and disable specific events. Refer to Description for EVENT_FILTER (Page 107) for the detailed description. • INST_TYPE = 1 (push button), EVENT_FILTER is in the range of 0 to 16#FF. • INST_TYPE = 2 (absolute input device), EVENT_FILTER is in the range of 0 to 16#01. • INST_TYPE = 3 (occupancy sensor), EVENT_FILTER is in the range of 0 to 16#1F. • INST_TYPE = 4 (light sensor), EVENT_FILTER is in the range of 0 to 16#01.
EVENT_PRIO		USInt		The sending priority of the event message. The system reactions are sent according to the set priority. The system reactions with high priority take precedence over the system reactions with low priority.
TYPE_PRM_SET [1]		Array[0..6] of BYTE		The type-related parameters of the instance.

Parameter	Declaration	Data type	Memory area	Description	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

[1] For the detailed description of sensor instance type-related parameters for configuring **DALI_SENSOR_INST_PARAM**, refer to the following table.

Table 5- 5 Sensor instance type-related parameters for configuring **DALI_SENSOR_INST_PARAM**

Attributes	BYTE	Type 1 (push button)	Type 2 (absolute input)	Type 3 (occupancy)	Type 4 (light sensor)
Read/Write	0	*tShort*	Deadtime	Hold time	Hysteresis
	1	*tDouble*	Report time	Report time	Hysteresis min
	2	*tRepeat*	Not used	Deadtime	Report time
	3	*tStuck*		Not used	Deadtime

5.7.17 DALI_DEV_UPLOAD

Description

DALI_DEV_UPLOAD is used for uploading all the parameters of the DALI device and saving them in the CM 1xDALI (refer to data flow path 4 (Page 23)).

After this function block is executed without errors, the DALI device is marked as configured, and the setting parameters are saved in the CM 1xDALI.

It takes some time to execute this function block. If needed, you can use CANCEL to stop the procedure before it is finished.

Note

The output resets, only if both the CANCEL and UPLOAD are set to 0.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
UPLOAD	Input	BOOL	I, Q, M, D, L or Constant	Upload parameters from the device upon a rising edge.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CANCEL		BOOL	I, Q, M, D, L or Constant	CANCEL = 1: Stop this function block, and return an error.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • > 16#00 and < 16#7F: Upload progress [1] • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

[1] For the detailed description of STATUS on upload process, refer to the following table.

Table 5- 6 Description of STATUS on upload process

Device type	STATUS	Comment
Control gear	16#01	Querying basic parameters
	16#02	Querying extended parameters
	16#03	Querying group configuration
	16#04	Querying scene configuration
	16#05	Saving all parameters
Input device (Sensor)	16#11	Querying sensor parameters and saving
	16#12~16#31	Querying sensor instances parameters and saving: • 16#12: The function block is dealing with the Instance 0. • 16#13: The function block is dealing with the Instance 1. • ... • 16#31: The function block is dealing with the Instance 31.

5.7.18 DALI_DEV_DOWNLOAD

Description

DALI_DEV_DOWNLOAD is used for downloading all the parameters that are saved in the CM 1xDALI to the DALI device (refer to data flow path 3 (Page 23)). The control gear type or sensor instance type are saved in CM 1xDALI, and these types must be the same as the physic device's. This function block does not check whether the parameter saved in CM 1xDALI is valid for this DALI device.

It takes some time to execute this function block. If needed, you can use CANCEL to stop the procedure before it is finished.

Note

The output resets, only if both the CANCEL and DOWNLOAD are set to 0.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
DOWNLOAD	Input	BOOL	I, Q, M, D, L or Constant	Download parameters from the device upon a rising edge.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CANCEL		BOOL	I, Q, M, D, L or Constant	CANCEL = 1: Stop this function block, and return an error.	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • > 16#00 and < 16#7F: Download progress [1] • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

[1] For the detailed description of STATUS on download process, refer to the following table.

Table 5- 7 Description of STATUS on download process

Action	PROC	Comment
Control Gear	16#01	Querying status of the control gear
	16#02	Setting basic parameters
	16#03	Setting type-related parameters
	16#04	Setting group configuration
	16#05	Setting scene configuration
Input device (Sensor)	16#11	Querying status of the sensor
	16#12	Setting parameters of the sensor device
	16#13~16#32	Setting parameters of the sensor instances: • 16#13: The function block is dealing with the Instance 0. • 16#14: The function block is dealing with the Instance 1. • ... • 16#32: The function block is dealing with the Instance 31.

5.7.19 DALI_DEV_RESET

Description

DALI_DEV_RESET is used for resetting all the parameters of the device.

After this function block is executed without errors, the physical device is reset and the parameters which are saved in CM 1xDALI are all deleted. But the value of output CONFIGURED in DALI_ECG_STATUS (Page 53) or DALI_SENSOR_STATUS (Page 60) remains.

When you set the input "DEL_ADDR" to 1, the short address of the physical device is deleted.

Parameter

The following table shows the parameters of the function block:

Parameter	Declaration	Data type	Memory area	Description	
RESET	Input	BOOL	I, Q, M, D, L or Constant	Reset the parameters upon a rising edge.	
DEL_ADDR		BOOL	I, Q, M, D, L or Constant	DEL_ADDR =1: Delete the short address of the device.	
DEV_TYPE		USInt	I, Q, M, D, L or Constant	Select the device type: • 1: Control gear • 2: Input device (Sensor)	
ADDRESS		USInt	I, Q, M, D, L or Constant	Specify the short address of the device. Range: 0 to 63	
CM_DALI	InOut	"DALI_CTRL"		The data block of **DALI_CTRL** specifies the CM 1xDALI which communicates with the current function block.	
BUSY	Output	BOOL	I, Q, M, D, L	Status parameter: • BUSY = 0: Processing of job is terminated. • BUSY = 1: Job is still being committed.	
ACTIVE		BOOL	I, Q, M, D, L	Status parameter: • ACTIVE = 0: Job is not yet started. • ACTIVE = 1: Job is being executed.	
DONE		BOOL	I, Q, M, D, L	Status parameter: • DONE = 0: Job is not yet started or still executing. • DONE = 1: Job is executed without errors.	
ERROR		BOOL	I, Q, M, D, L	Status parameter: • ERROR = 0: No error occurs. • ERROR = 1: Error occurs during processing.	
STATUS		BYTE	I, Q, M, D, L	When ERROR = 0, STATUS has following three values: • 16#00: Idle • 16#01: Executing • 16#7F: Completed	When ERROR = 1, STATUS shows the detailed error code. For the detailed meaning of each error code, refer to Parameter STATUS (Page 106).

5.8 Parameter STATUS

The following table shows the explanation of each STATUS value:

- When the value of STATUS is greater than 16#80: It shows the detailed error code.
- When the value of STATUS is less than 16#80: It indicates the progress of the function block.

Table 5- 8 STATUS message

Value of STATUS	Explanation
16#00	The function block is not started.
16#01~16#7E	For the detailed description, refer to each function block.
16#7F	The function block is completed successfully and the output parameters are ready.
16#82	The CM 1xDALI is busy with the last command.
16#83	Timeout. The function block does not get the response from CM 1xDALI.
16#84	Cancel. The function block is cancelled by command.
16#85	CM 1xDALI receives an error response frame after sending the query command. This might be caused by a short address confliction or a DALI device failure. **Note**: Not every short address conflict can be detected. It can only be detected when the conflicted devices send the response frame at the same time.
16#87	Not supported. This action is not supported by CM 1xDALI.
16#88	Invalid parameters. The input of the function block is not correct.
16#89	No data. There is no data saved in CM 1xDALI or no response on the DALI bus.
16#8A	Status error. The CM 1xDALI is not in the normal state. For the detailed information, refer to the output "STATUS" of **DALI_CTRL** (Page 26).
16#8B	Configuration mismatch. The actual device is not matched with the control gear or input device (sensor) which is added by **DALI_ECG_ADD** (Page 67) or **DALI_SENSOR_ADD.** (Page 89)
16#8C	The short address is not configured, and there is no device with this short address on the DALI bus.
16#8D	No device is configured with this short address.
16#8E	No physical device with the specified short address is on the DALI bus.
16#8F	The scan procedure is stopped abnormally.
16#90	CM 1xDALI cannot send commands to the DALI bus.
16#91	The input type of control gear or input device (sensor) is not matched with the physical device.
16#F0	Communication failure between CPU and CM 1xDALI.

5.9 Electric control gear (ECG) type

The following table shows the detailed device types of the control gears:

Table 5- 9 Device type of the electric control gear

Type ID	Device type
16#00	Fluorescent
16#01	Emergency lamp
16#02	Discharge lamp
16#03	Halogen
16#04	Incandescent
16#05	Voltage converter
16#06	LED
16#07	Switch function
16#08	Color control
16#FF	General type
Others	Unknown type

5.10 Instance type of input device

The following table shows the detailed instance type of the input devices:

Table 5- 10 Instance type of input devices

Type ID	Device type
16#01	Push button
16#02	Absolute input device
16#03	Occupancy sensor
16#04	Light sensor
Others	Unknown type

5.11 Description for EVENT_FILTER

Push button (type 1)

Bit	Description	Value
0	Button released event enabled?	"1" = "Yes"
1	Button pressed event enabled?	"1" = "Yes"
2	Short press event enabled?	"1" = "Yes"
3	Double press event enabled?	"1" = "Yes"

Bit	Description	Value
4	Long press start event enabled?	"1" = "Yes"
5	Long press repeat event enabled?	"1" = "Yes"
6	Long press stop event enabled?	"1" = "Yes"
7	Button stuck/free event enabled?	“1” = “Yes”

Absolute input device (type 2)

Bit	Description	Value
0	Position event enabled?	"1" = "Yes"
1~7	Reserved	

Occupancy sensor (type 3)

Bit	Description	Value
0	Occupied event enabled?	"1" = "Yes"
1	Vacant event enabled?	"1" = "Yes"
2	Repeat event enabled?	"1" = "Yes"
3	Movement event enabled?	"1" = "Yes"
4	No movement event enabled?	"1" = "Yes"
5~7	Reserved	

Light sensor (type 4)

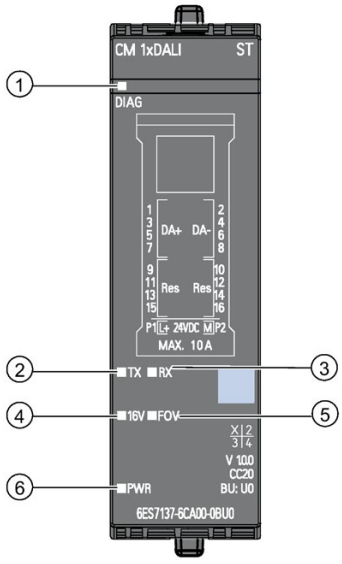
Bit	Description	Value
0	Illuminance level event enabled?	"1" = "Yes"
1~7	Reserved	

Diagnostic alarms

6

6.1 Status and error displays

LED display



① LED display DIAG
② LED display TX
③ LED display RX
④ LED display integrate DALI power 16 V
⑤ LED display detected over voltage on DALI Bus (Threshold value: 45 V)
⑥ LED display PWR

Figure 6-1 LED displays

Table 6- 1 Meaning of DIAG LED displays

LED DIAG	Meaning	Solution
■ On	CM configured and ready for operation	---
☼ Flashes	CM in startup, parameters not assigned yet	---
☼ Flashes	Error information; diagnostic interrupt	Evaluate the diagnostics data and eliminate the error.

Table 6- 2 Meaning of the TX/RX LED displays

LED		Meaning	Solution
TX	RX		
Flashes	Off	Interface is transmitting	---
Off	Flashes	Interface is receiving	---

When the CM 1xDALI receives an "IDENTIFY DEVICE" command (IEC 62386-103), the LED Rx and Tx flash simultaneously at a frequency of 1 Hz and last about 10 seconds.

Table 6- 3 Meaning of the 16V displays

LED	Meaning	Solution
16V		
On	CM 1xDALI integrated DALI power 16 V power on	---
Off	CM 1xDALI integrated DALI power 16 V power off	---

Table 6- 4 Meaning of FOV (Fault over voltage) displays

LED	Meaning	Solution
FOV		
On	Detected over voltage on the DALI bus (between 38 V and 353 V (250 V AC))	Check the wiring and supply voltage of DALI bus For example, check if you connected the city power to the DALI bus by mistake.
Off	The voltage on DALI bus is less than or equal to 20.5 V	---

Table 6- 5 Meaning of the PWR LED displays

LED	Meaning	Solution
PWR		
On	Power on (supply voltage present)	---
Off	Power off (supply voltage missing)	Check the supply voltage

6.2 Diagnostics alarms

A diagnostics alarm is generated and the DIAG-LED flashes on the module for each diagnostics event. Read out the diagnostics alarms, for example, in the diagnostics buffer of the CPU. Evaluate the error codes with the user program.

Diagnostic alarm	Error code	Meaning	Solution
Internal error	100_H	Communication module is defective	Replace communication module
Parametrization Fault	103_H	Possible causes: • The received parametrization record is not valid. • The configured BaseUnit is not the actual BaseUnit.	• Check the parametrization record. • Check the BaseUnit.
Short circuit	1_H	Short circuit of DALI bus. Only occurs when the integrated DALI bus power is enabled.	Correct the DALI bus wiring.
Fault over voltage	3_H	The supply voltage of the module exceeds the permission.	Check the supply voltage on the BaseUnit. For example, Check whether you connected the city power to the DALI bus by mistake.
Component temporarily unavailable	$1F_H$	Firmware update is currently in progress or has been canceled. The module does not output any process or substitute values in this state.	• Wait for firmware update. • Restart the firmware update.

Short circuit behavior

On detection of a short circuit which exists for longer than the shutdown delay time (650 ms), the bus power supply may shut down for a period up to the restart period (14 s). On each restart the power supply turns on the output for the retry time (650 ms).

Technical specification

7

7.1 Technical specifications

Article number	6ES7137-6CA00-0BU0
General information	
Product type designation	CM 1xDALI
Firmware version	
• FW update possible	Yes
usable BaseUnits	BU type U0
Color code for module-specific color identification plate	CC20
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	STEP 7 V15.1 or higher
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.34
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	163 mA
Current consumption, typ.	92 mA
Current consumption, max.	250 mA
Power loss	
Power loss, typ.	1.7 W
Address area	
Address space per module	
• Inputs	16 byte
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes

Article number	6ES7137-6CA00-0BU0
Diagnostic messages	
• Short-circuit	Yes; On DALI bus
Diagnostics indication LED	
• ERROR LED	Yes
• Monitoring of the supply voltage (PWR-LED)	Yes; Green PWR LED
• Receive RxD	Yes; Green LED
• Transmit TxD	Yes; Green LED
Potential separation	
between backplane bus and interface	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-30 °C
• vertical installation, max.	50 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	3 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Decentralized operation	
to SIMATIC S7-1500	Yes
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	50 g

Appendix A Parameter data record

A

Parameter assignment and structure of parameter data record

You have the option of reassigning module parameters with the user program while the CPU is in RUN. The parameters are transferred to the module using data record 128, for example, with the WRREC instruction.

Table A- 1 Structure of data record

Bit Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved [2]		Major version = 0		Minor version = 1			
1	Length of DALI module parameters = 4							
2	Reserved [2]				Enable DALI bus short circuit diagnostic [1]	Enable DALI bus over voltage diagnostics [1]	Enable DALI app controller [1]	Enable integrated DALI bus power [1]
3	Reserved [2]							
4	The period of background detection [3]							
5	Value range in second: 60 to 3600							

[1] You activate the respective parameter by setting the associated bit to 1.

[2] Reserved bits must be set to 0.

[3] The high byte of the period is in byte 4 and the low byte of the period is in byte 5.

Output parameter STATUS

If errors occur when transferring parameters with the "WRREC" instruction, the module continues operation with the previous parameter assignment. The STATUS output parameter contains a corresponding error code.

You will find a description of the "WRREC" instruction and the error codes in the STEP 7 online help.

Error messages

The module always checks all the values of the transferred data record. Only if all the values were transferred without errors does the module apply the values from the data record.

The instruction WRREC for writing data records returns corresponding error codes when errors occur in the parameter STATUS.

The following table shows the module-specific error codes and their meaning for the parameter data record 128:

Table A- 2 Error message

Error code	Meaning
$80B1_H$	Error in data length
$80E0_H$	Error in header information
$80E1_H$	Parameter error

Appendix B Approvals

B

This chapter lists the approval for ET 200SP CM 1xDALI specifically.

Detailed references to the other approvals of CM 1xDALI are listed in the document *ET 200SP Distributed I/O system.*

Note

Information of the ET 200SP CM 1xDALI

The currently valid markings and approvals are printed on the components of the ET 200SP CM 1xDALI.

DALI-2

The CM 1xDALI meets the requirements of the DALI-2 standards.

IECEx

The CM 1xDALI meets the requirements of explosion protection according to

IECEx. IECEx classification: Ex nA IIC T4 Gc

IECEx certificate: IECEx DEK 19.0024X

The CP meets the requirements of the following standards:

- IEC 60079-0

  Hazardous areas - Part 0: Equipment - General requirements

- EN 60079-15

  Explosive atmospheres - Part 15: Equipment protection by type of protection 'n'

ATEX

The CP meets the requirements of the EC directive 2014/34/EU "Equipment and Protective Devices for Use in Potentially Explosive Atmospheres".

Applied standards:

- EN 60079-0

  Hazardous areas - Part 0: Equipment - General requirements

- EN 60079-15

  Explosive atmospheres - Part 15: Equipment protection by type of protection 'n'

The current versions of the standards can be seen in the EC Declaration of Conformity, see above.

ATEX approval: II 3 G Ex nA IIC T4 Gc

Test number: DEKRA 19ATEX0045 X

You should also note the information in the document "Use of subassemblies/modules in a Zone 2 Hazardous Area" that you will find on the Internet at the following address:

Link (https://support.industry.siemens.com/cs/ww/en/view/78381013):

c(UL)us

Applied standards:

- Underwriters Laboratories, Inc.: UL 61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements)
- IEC/UL 61010-2-201 (Safety requirements for electrical equipment for measurement, control and laboratory use. Particular requirements for control equipment)
- Canadian Standards Association: CSA C22.2 No. 142 (Process Control Equipment)

Report / UL file: E472609

FM

Factory Mutual Research (FM) in accordance with

Approval Standard Class Number 3611, 3600, 3810

ANSI/UL61010-1, ANSI/UL 121201

CAN/CSA-C22.2 No. 0-10

CSA C22.2 No. 213

CSA C22.2 No. 1010-1

APPROVED for use in Class I, Division 2, Group A, B, C, D Tx;

Class I, Zone 2, Group IIC Tx

Installation Instructions for FM

- WARNING – Explosion Hazard – Do not disconnect while circuit is live unless area is known to be non-hazardous.
- WARNING - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2 or Zone 2.
- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC; or non-hazardous locations.
- WARNING: EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES OF MATERIALS USED IN THE RELAYS.

cULus Hazardous (Classified) Locations

Underwriters Laboratories, Inc.: CULUS Listed E472610 IND. CONT. EQ. FOR HAZ. LOC.

Applied standards:

- ANSI ISA 12.12.01
- CSA C22.2 No. 213-M1987

APPROVED for Use in:

- Cl. 1, Div. 2, GP. A, B, C, D T4
- Cl. 1, Zone 2, GP. IIC T4

Report / UL file: E472610

Installation Instructions for cULus haz.loc.

- WARNING – Explosion Hazard – Do not disconnect while circuit is live unless area is known to be non-hazardous.
- WARNING - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2 or Zone 2.
- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC; or non-hazardous locations.

WARNING: EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES OF MATERIALS USED IN THE RELAYS.

Korea certificate

This product meets the requirements of Korean certification.

Registration Number: R-R-S53-ET200SP

Note that this device conforms to Limit Class A for emission of radio interference. This device can be used in all areas except the residential area.

이 기기는 업무용(A 급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

Glossary

Battery charge

Show level of the battery charge.

Color space

Color space plane scaled in such a way that any color within it may be identified with two coordinates x and y, where x and y are both in the range 0 to 1.

Color temperature Tc

A black body (perfect radiant body) changes its color from red through yellow to white as its temperature increases (black body line – BBL). The absolute temperature T (Kelvin) of the black body is referred to as the color temperature T_C.

Color type

Mechanism to set a color in an appropriate way

Color value

Number or a set of numbers interpreted in the context of a color type to specify a color

Control gear

Device that is connected to the DALI bus and receives commands in order to control at least one output in a direct or indirect way.

DALI

Digital Addressable Lighting Interface

DALI bus

Two-wire connection line carrying DALI power and frames

Deadtime

If the deadtime timer is set, the instance shall not send out an event until the deadtime timer has expired. The deadtime timer shall be restarted every time an event is sent.

Device group

Type of address used to address a group of control devices in the system at once

Dimming curve

The dimming curve defines how dimmers set voltage output in response to control signal input, such as a slider position.

You can set the dimming curve of the control gear as below:

0: sets the dimming curve to linear.

1: sets the dimming curve to the standard logarithmic output characteristics.

Down switch off threshold

Value against which the virtual arc power level is continually compared, the output of the control gear being switched off whenever the virtual arc power level reaches or passes this level whilst decreasing.

Down switch on threshold

Value against which the virtual arc power level is continually compared, the output of the control gear being switched on whenever the virtual arc power level reaches or passes this level whilst decreasing.

Duration test

Test to check if the self-contained battery supplies the system within the limits of rated duration of emergency operation.

Emergency Level

The brightness of the lamp when the lamp is in emergency mode

Emergency min Level

The minimum brightness of the lamp when the lamp is in emergency mode

Emergency mode

Mode in which mains supply has failed and whilst the control gear is powered by the battery until deep discharge point

Emergency time

Time the device in emergency mode lasts

Error hold-off time

The ERROR HOLD-OFF TIME specifies the minimum time an error must be continuously present in order to be indicated Total operation time.

Event

An instance report, characterized by its event number, of a change or a defined sequence of changes of its input value

Fast fade time

The Fast Fade Time is used instead of the Fade Time if the Fade Time is equal to 0. The Fast Fade Time can be set to zero or to any value in the range "Min Fast Fade Time".

Function test

Test to check the integrity of the circuit and the correct operation of a lamp, a changeover device and the self-contained battery.

Hold time

The hold timer is only implemented for movement based sensors.

Hysteresis

Define a hysteresis band to direct impact on how sensitive the input device responds to changes of illuminance level and therefore event generation.

Input device

Control device that is connected to the DALI bus and sends commands using a multi-master transmitter in order to distribute information about user actions and/or sensor values.

Instance

Analogue or binary signal processing unit of an input device

PLC

Programmable Logic Controller

Power on color

The color that the device shows when the device is turned on.

Prolong time

Time the extended emergency mode lasts after restoration of the mains supply

Report time

If the report timer is set, it shall generate a ‘repeat’ trigger every Treport even if the "inputValue" has not changed. The report timer shall be restarted every time an event is sent.

Scene

Configurable preset level

Short address

Type of address used to address an individual control gear in the system

TC

Color type, representing the color of a light source that matches the temperature of a black body radiator according to Planck’s law.

tDouble

The time which differentiates a single (short) press from a double press

Thermal overload

Scenario where the maximum permissible gear temperature is exceeded

Thermal overload time

Time the thermal overload lasts

tRepeat

The repetition interval of long press repeat events.

tShort

The time which differentiates a short press from a long press.

tStuck

If a button is pressed or bouncing longer than Tstuck, it is considered broken.

Up switch off threshold

Value against which the virtual arc power level is continually compared, the output of the control gear being switched off whenever the virtual arc power level reaches or passes this level whilst increasing.

Up switch on threshold

Value against which the virtual arc power level is continually compared, the output of the control gear being switched on whenever the virtual arc power level reaches or passes this level whilst increasing.

xy chromaticity

Color type, representing the color matching functions of a standard observer according to the Commission Internationale de L'Eclairage (CIE) basis for colorimetry of 1931

Index