# Datasheet Dali Controller

## INT-202-D-01

External Dali power supply required

The DALI Controller module acts as a master device, in accordance with the DALI standard, it enables the operation of 64 ballasts - Control Gears, connected to the DALI bus.
The module allows you to control single ballasts, as well as control by groups, each ballast can be assigned to 16 groups. Thanks to this, it is much easier to organize the lighting control and create advanced control scenarios.

## 1. Parameters - DALI_MASTER

| Features: | |
|---|---|
| State | 0 - no ballast configuration, 1 - DALI Discovery, 2 - No power to the DALI bus, 3 - ballast configuration is on the device, 4 - saving information about groups |
| NumberOfGear | Number of ballasts in the device configuration. The feature value is refreshed after a system restart or when the UpdateMissingGears method is called |
| GearAddresses | Ballast addresses given during DALI_Discovery. The feature value is refreshed after Dali Discovery |
| ActiveGears | Addresses of active ballasts. The feature value is refreshed after system restart or calling the UpdateMissingGears method |
| MissingGears | Addresses of inactive ballasts. The feature value is refreshed after system restart or calling the UpdateMissingGears method |
| **Methods:** | |
| GetDAPCValue | Queries the gear for the DAPC value |
| Identify | Turns on the luminaire for 2 seconds |
| ResetGear | Restart the ballast |
| ResetLocalAddress | Removes the LocalAddress of the selected ballast. RemoveFromController parameter: True - removes the ballast address from the controller memory, False - retains the address in the controller's memory |
| ChangeLocalAddress | Changes the current LocalAddress of the ballast to the selected one, address is not deleted from Dali Controller memory |
| RemoveGear | Removes the ballast from the controller memory |
| ResolveAddressDuplicate | Resolves address conflicts on the Dali bus |
| UpdateMissingGears | Checks the activity of the ballasts that are in the configuration |
| DALI_Discovery | Search for ballasts connected to the DALI bus and assign them local addresses: GetConfiguration - retrieve the addresses of ballasts on the bus, NewWithoutLocalAddress - assign addresses to new ballasts without an assigned address, ResetAllLocalAddress - assign addresses to all ballasts on the bus. When an address is assigned, the ballast is turned on for 300ms. No operations should be performed on the device during DALI_Discovery. |
| SetPowerOnLevel | For the selected address, it saves in the ballast memory the DACPValue that is to be set after a restart/bus failure |
| SetDAPCValue | Sets the value of the power with which the luminaire shines. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetLastActiveLevel | If the ballast is off, turns on the ballast with the DACPValue value set before it was turned off |
| SetGroupDAPCValue | Sets the value of the power with which the luminaire shines for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| GroupSwitch | Changes the output state for a ballast group to the opposite. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| GroupSwitchOn | Turns on the luminaire for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| GroupSwitchOff | Turns off the luminaire for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetGroupLastActiveLevel | If the ballasts in the group are off, turns them on with the DAPCValue value set before they were turned off |
| HoldGroup | Executes the function of illuminating / dimming the luminaires for a given ballast group |
| HoldGroupUp | Executes the function of illuminating the luminaires for a given ballast group |
| HoldGroupDown | Executes the function of dimming the luminaires for a given ballast group |
| SetGroupColourTemperature | Sets the colour temperature value for a given group, where 0 - physical minimum, 100 - physical maximum. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetGroupHSVValue | Sets brightness value (0.00-1.00) for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetGroupHSVSaturation | Sets saturation value (0.00-1.00) for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetGroupHSVHue | Sets hue value (0-360) for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetGroupRGBValue | Sets the value of the R (Red), G (Green), B (Blue) channels for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetGroupWAFValue | Sets the value of the W (White) channel, and the A (Amber) and F (Freecolour) parameters for a given group. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| **Events:** | |
| OnDALI_DiscoveryCompleted | Event occurring after the ballasts have been found and given local addresses |
| OnDALI_BusPowerFailure | Event generated: when there is no power supply to the DALI bus for more than 1s, when there is a short circuit on the DALI bus |
| OnDALI_BusPowerRestored | Event generated when the DALI bus power is restored |

## 2. Parameters - PowerSupplyVoltage

| Features: | |
|---|---|
| Value | Current output value taking into account the scalar |
| Value% | Current percenatge input value of the maximum value (MaxValue characteristic) |
| Sensitivity | Minimum change of input state when the OnValueChange, OnValueLower or OnValueRise event is generated |
| MinValue | Minimum value of the Value characteristic after exceeding which the OnOutOfRange event is generated |
| MaxValue | Maximum value of the Value characteristic after exceeding which the OnOutOfRange event is generated |
| **Methods:** | |
| SetSensitivity | Sets input sensitivity value |
| SetMinValue | Sets MinValue |
| SetMaxValue | Sets MaxValue |
| **Events:** | |
| OnValueChange | Event resulting from changing input state |
| OnValueLower | Event occurs when a value lower than the value from the last reading appears at input |
| OnValueRise | Event occurs when a value higher than the value from the last reading appears at input |
| OnOutOfRange | Event resulting from exceeding the permissible range (MinValue : MaxValue) |
| OnInRange | Event occurs when value returns to MinValue/MaxValue range |

## 3. Parameters - DALI_GEAR

| Features: | |
|---|---|
| Address | Ballast address |
| Group | Ballast group numbers, subsequent groups from the 1-16 range are given after the decimal point. 0 - no belonging to any group |
| DAPCValue | The value of the power with which the luminaire shines |
| **Methods:** | |
| GetDAPCValue | Queries the gear for the DAPC value |
| Identify | Turns on the luminaire for 2 seconds |
| SetDAPCValue | Sets the value of the power with which the luminaire shines. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| Switch | Changes the luminaire state to the opposite (0 / 254). RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SwitchOn | Turns on the luminaire. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SwitchOff | Turns off the luminaire. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| Hold | Executes the function of illuminating / dimming the luminaire |
| HoldUp | Executes the function of illuminating the luminaire |
| HoldDown | Executes the function of dimming the luminaire |
| **Events:** | |
| OnDAPCValueChange | Event occuring when changing the DAPCValue |
| OnSwitchOn | Event occuring when the DAPCValue value is changed from 0 to the greater value |
| OnSwitchOff | Event occuring when the DAPCValue value is changed to 0 |

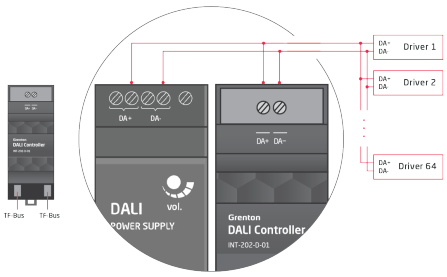
## 4. Parameters - DALI_GEAR_DT8

| Features: | |
|---|---|
| Address | Ballast address |
| Group | Ballast group numbers, subsequent groups from the 1-16 range are given after the decimal point. 0 - no belonging to any group |
| DAPCValue | The value of the power with which the luminaire shines |
| HSVValue | Brightness value as per the HSV model (range: 0.00-1.00) |
| HSVSaturation | Colour saturation value as per the HSV model (0.00-1.00) |
| HSVHue | Colour hue value as per the HSV model (0-360) |
| ColourTemperature | Colour temperature set based on the invoked SetColourTemperature method. The feature does not retrieve the actual colour temperature of the fixture |
| **Methods:** | |
| GetDAPCValue | Queries the gear for the DAPC value |
| Identify | Turns on the luminaire for 2 seconds |
| SetDAPCValue | Sets the value of the power with which the luminaire shines. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| Switch | Changes the luminaire state to the opposite (0 / 254). RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SwitchOn | Turns on the luminaire. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SwitchOff | Turns off the luminaire. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| Hold | Executes the function of illuminating / dimming the luminaire |
| HoldUp | Executes the function of illuminating the luminaire |
| HoldDown | Executes the function of dimming the luminaire |
| SetHSVValue | Sets brightness value (0.00-1.00). RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetHSVSaturation | Sets saturation value (0.00-1.00). RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetHSVHue | Sets hue value (0-360). RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetRGBValue | Sets the value of the R (Red), G (Green), B (Blue) channels. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetWAFValue | Sets the value of the W (White) channel, and the A (Amber) and F (Freecolor) parameters. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| SetColourTemperature | Sets the color temperature value, where 0 - physical minimum, 100 - physical maximum. RampTime parameter set on a logarithmic scale 0.8 - 90 [s] |
| **Events:** | |
| OnDAPCValueChange | Event occuring when changing the DAPCValue |
| OnSwitchOn | Event occuring when the DAPCValue value is changed from 0 to the greater value |
| OnSwitchOff | Event occuring when the DAPCValue value is changed to 0 |

## 5. Technical Data

| | |
|---|---|
| Device power supply | $24V_{dc}$ |
| Maximum power consumption | 2,2W |
| Maximum device current | 91mA (for $24V_{dc}$) |
| Maximum number of addresses | 64 |
| Maximum number of group | 16 |
| Maximal DALI current | 250mA |
| Maximum wire cross section | $2,5mm^2$ |
| Weight | 55g |
| Size [DIN] | 2 |
| Fixing | electrical box, rail DIN-3 / TH 35 / TS 35 |
| Dimensions (H/W/D) | 90/36/58mm |
| Operating temperature range | 0 to +45°C |
| Standard | IEC 62386-102 |

## 6. Wiring Diagram




| | |
|---|---|
| DA+ | DA+ Dali signal |
| DA- | DA- Dali signal |

# 7. Module Configuration

LED signaling

- The blue diode indicates the voltage on the DALI bus,
- The green diode indicates the current state of the module:
  - ON – no ballast configuration on module, DALI Discovery must be performed,
  - Flashes at 200ms interval – DALI Discovery, the ballasts connected to the DALI bus are searched and local addresses assigned to them,
  - Flashes at 1 second interval – ballast configuration is on the module.

Adding a module to the project

After the CLU Discovery process has been executed, two objects appear in the project:

- DALI_MASTER - main object used to manage the module configuration,
- PowerSupplyVoltage - object for monitoring the voltage on the system bus.

Ballast addressing

The module configuration should start with addressing the DALI ballasts connected to the bus. The DALI Controller enables two types of addressing: fully automatic or manual.

Automatic addressing allows you to address the entire installation with one click, using the DALI Discovery process.

- In the DALI_MASTER object in the Control tab, call the ResetGear (Broadcast) method and then the DALI_Discovery with chosen parameter:
  - GetConfiguration,
  - NewWithoutLocalAddress,
  - ResetAllLocalAddress.
- Calling the method with the GetConfiguration parameter initiates automatic retrieval of local ballast addresses located on the bus from the range 0 to 63.
  **NOTE! During this process all addresses are retrieved, if there are duplicates on the bus they will remain unchanged, in which case the conflicts should be resolved using the ResolveAddressDuplicate method! The controller memory is not deleted, the previous configuration will remain!**
- Calling the method with the NewWithoutLocalAddress parameter initiates automatic addressing of new ballasts without an assigned address on the bus, which will receive local addresses from the range 0 to 63. The address assignment will be confirmed by lighting up the given luminaire for 300ms. During DALI Discovery with the NewWithoutLocalAddress parameter, the addresses of ballasts that were already on the bus will remain unchanged.
- Calling the method with the ResetAllLocalAddress parameter initiates automatic addressing of all ballasts on the bus, which will receive local addresses from 0 to 63. The assignment of the address will be confirmed by lighting up the given luminaire for 300ms. It should be noted that after starting the addressing, all previous addresses will be deleted. During DALI Discovery with the ResetAllLocalAddress parameter, addresses are assigned to ballasts randomly,
- During DALI Discovery:
  - The green LED on the DALI Controller flashes at 200ms interval,
  - The embedded feature State of the DALI_MASTER object takes the value 1.

The duration of the DALI Discovery depends on the number of ballasts (it can take up to several minutes for the maximum number of devices).

**NOTE! Do not perform any operations on the DALI Controller during DALI Discovery!**

Manual addressing allows you to address individual ballasts using the ChangeLocalAddress method. It is helpful in the event that the ballast is not found after DALI Discovery, the address is doubled or we want a specific sequence of addresses in accordance with the assembly order.

In the DALI_MASTER object, after going to the Control tab, call the ChangeLocalAddress method with the parameters:

- ActualAddress - current ballast address,
- AddressToSet - new unoccupied address that will be assigned to the device,

In the DALI_MASTER object, after going to the Control tab, call the ResolveAddressDuplicate method with the Address parameter:

- Calling the method resolves address conflicts on the Dali bus, in the case when the address is duplicated for one of the ballasts, the first free address that is not in the module configuration is assigned,
- During ResolveAddressDuplicate:
  - The green diode on the DALI Controller module flashes at an interval of 200ms,
  - The built-in feature State of the DALI_MASTER object takes the value 1.

**NOTE! Do not perform any operations on the DALI Controller during ResolveAddressDuplicate!**

After the DALI Discovery

- The green LED on the DALI Controller flashes every 1s (ballasts found) or is on continuously (no ballasts found),
- The embedded feature State of the DALI_MASTER object takes the value:
  - 3 - ballasts found,
  - 0 - no ballasts found,
- The embedded feature NumberOfGear of the DALI_MASTER returns the number of correctly found and addressed devices,
- The event OnDALI_DiscoveryCompleated is generated.

Operations possible on devices after DALI Discovery has ended

Using the methods of the DALI_MASTER object we can:

- Verify the device reporting to the given address - the Identify method,
- Restart the device at the given address - the ResetGear method,
- Set the value of the luminaire for the device at the given address - the SetDAPCValue method.

Adding ballasts to the project

After the ballast addressing process is completed with the DALI_Discovery and SetLocalAddress methods, CLU Discovery should be performed:

- New GEAR objects are added to the project to represent each DALI device (address) correctly found and added during the addressing process,
- The embedded GearAddresses feature of the DALI_MASTER object returns address numbers in the range 0 - 63, occupied by DALI devices,
- GEAR objects are in the DALI_GEAR and DALI_GEAR_DT8 - Device Type 8 versions:
  - DALI_GEAR - all ballasts with basic control methods,
  - DALI_GEAR_DT8 - ballasts for color control (RGBWA control mode) or color temperature (Tc control mode).

**NOTE! For correct operation of GEAR configuration and objects, CLU Discovery should be performed after each change in ballast addressing!**

Ballast control

The control of a single ballast is carried out using a given DALI_GEAR / DALI_GEAR_DT8 object using available methods or using the methods of the DALI_MASTER object (detailed functionalities can be found in the description of individual objects).

The ballast groups are controlled by the DALI_MASTER object using the SetGroupDAPCValue, GroupSwitch, GroupSwitchOn, GroupSwitchOff methods. In order to be able to control a given group of devices, it is necessary to:

- For the desired GEAR objects, set the value of the embedded feature Group. Each object can be assigned to 16 groups in the range 1 - 16, the next groups are given after a decimal point,
- After assigning objects to groups, send the configuration to CLUZ,
- After sending the configuration, the groups are sent by the DALI Controller. Embedded feature State of the DALI_MASTER object takes the value 4. The duration of the process depends on the number of devices for which the value of the Group feature has been changed, it can last up to 60 seconds,
- After correct grouping, the embedded feature of the DALI_MASTER object takes the value 3.

**NOTE! When assigning groups (after CLUZ restart / configuration sending) it is not possible to control the objects!**

RampTime

The DALI Controller supports the smooth change of the DAPCValue value using the RampTime parameter, in a logarithmic manner:

| RampTime | Minimum fade time [s] | Nominal fade time [s] | Maximum fade time [s] |
|---|---|---|---|
| 1 | 0,6 | 0,7 | 0,8 |
| 2 | 0,9 | 1,0 | 1,1 |
| 3 | 1,3 | 1,4 | 1,6 |
| 4 | 1,8 | 2,0 | 2,2 |
| 5 | 2,5 | 2,8 | 3,1 |
| 6 | 3,6 | 4,0 | 4,4 |
| 7 | 5,1 | 5,7 | 6,2 |
| 8 | 7,2 | 8,0 | 8,8 |
| 9 | 10,2 | 11,3 | 12,4 |
| 10 | 14,4 | 16,0 | 17,6 |
| 11 | 20,4 | 22,6 | 24,9 |
| 12 | 28,8 | 32,0 | 35,2 |
| 13 | 40,7 | 45,3 | 49,8 |
| 14 | 57,6 | 64,0 | 70,4 |
| 15 | 81,5 | 90,5 | 99,6 |

# 8. Warnings and Cautionary Statements

ATTENTION !

● Before proceeding with the assembly, read the installation schematics and full instructions available at www.grenton.com. Failure to follow the guidelines contained in the instructions and other requirements of due care valid as a result of the nature of the equipment (device) may be dangerous to life / health, damage the device or installation to which it is connected, damage other property or violate other applicable regulations. The manufacturer of the device, Grenton Sp. z o. o. does not bear any responsibility for the damage (property and non-property related) resulting from the assembly and / or use of the equipment not in accordance with the instructions and / or due diligence in handling the equipment (device). ● Device power supply, permissible load or other characteristic parameters have to be in accordance with the device specification, described in particular in the "Technical data" section.
● The product is not intended for children and animals.
● If you have technical questions or comments about the device operation, contact Grenton Technical Support.
● Answers to frequently asked questions can be found at: www.support.grenton.com.

DANGER !

● Danger to life caused by electric current!
● The components of the installation (individual devices) are designed to work in a home electrical installation or directly in its vicinity. Incorrect connection or use may cause a fire or electric shock.
● All work related to the installation of the device, in particular works involving interference in the electrical installation, may be performed only by a person with appropriate qualifications or licences.
● When installing the device, make sure that the power supply voltage is disconnected from the circuit in which the device is connected or near which the assembly takes place.

# 9. CE Marking

The manufacturer declares that the device is in full compliance with the requirements of EU legislation that includes the directives of a new approach appropriate for this equipment. In particular, Grenton Sp. z o. o. declares that the device fulfills the requirements on safety, specified by law, and that it conforms to the national regulations that implement the appropriate directives: The Directive on the electromagnetic compatibility (EMC - 2014/30/UE) and the Directive on the limitation of the use of specific substances in electrical and electronic equipment (RoHS II - 2011/65/UE).

# 10. Warranty

Warranty available at www.grenton.com/warranty.

# 11. Manufacturer Contact Details

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