Manual 53KNX-DALI1

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General information

The 53KNX-DALI1 gateway is a category I control device, consisting of a DALI MASTER unit complete with **integrated power supply** to control DALI slave devices. It allows the switching and dimming of DALI devices, either individually or in groups. It can also notify on KNX single error messages of each connected ballast or lamp. The device is equipped with an interface module integrated in the KNX bus and is housed in a case with four DIN modules, designed for mounting on an unified guide inside electrical panels. During operation, the module receives communication telegrams from the KNX bus sent by another device (e.g. a manual control, sensor, timer, etc.). The unit is powered from the 230 VAC mains supply. This is also used to generate the DALI bus voltage.

Characteristics

The characteristics are described with reference to fig. 1
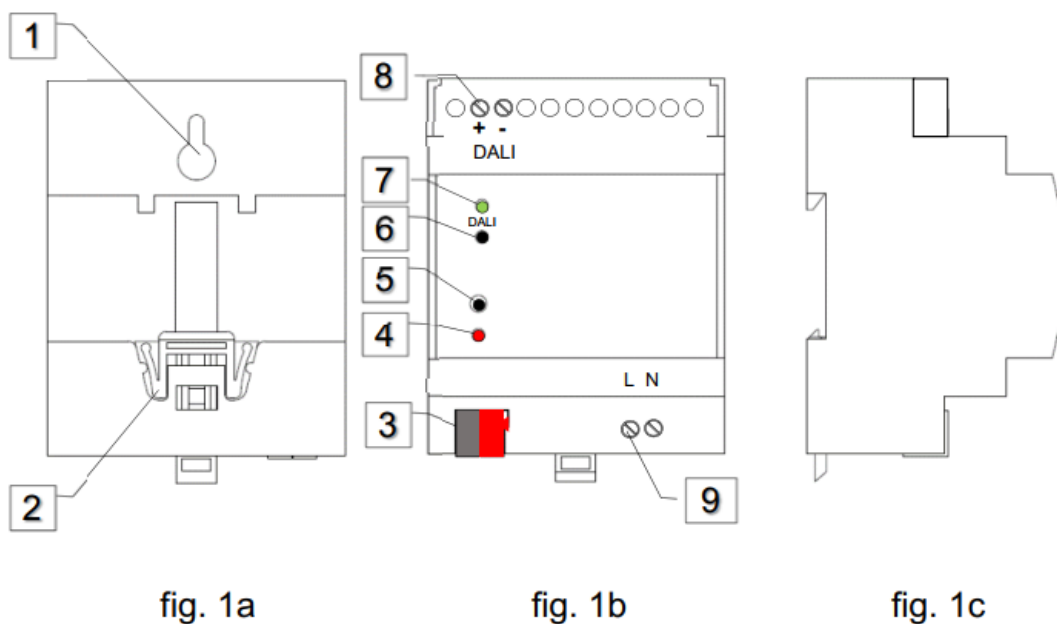
fig. 1a   fig. 1b   fig. 1c

Legend - fig. 1

1. Wall fixing slot
2. DIN rail coupling tooth
3. KNX bus line connection terminals
4. Programming LEDs
5. Programming button
6. DALI line configuration button
7. DALI line status indicator LED
8. DALI line connection terminals
9. Mains power supply: L= Line, N= Neutral

Mechanical

- Mechanical classification according to EN 50491-2: 3M2
- Container: 4 DIN modules (71.5 l x 90 h x 64 d) mm
- Protection rating: IP20 (IP40 when installed)
- Container colour: grey RAL 7035
- Mounting: on DIN EN 50022 rail or directly to the wall using the fixing slot ⏋ (see fig. 1a)
- Weight: 148 g

Connections

Screw terminals (fig. 1b positions ⑧ and ⑨) are used to connect the mains supply and the DALI line:

- Insulation stripping: 6 mm
- Screw: head for flat-head screwdriver 3 x 1 mm
- Tightening torque: 0.5 Nm
- Capacity: 0.14 mm2 ÷ 2.5 mm2 flexible (26 ÷ 13 AWG), 0.14 mm2 ÷ 4 mm2 rigid (26 ÷ 11 AWG)
- Opening: 2.5 mm x 3 mm

For the bus connection (fig. 1b position ③) there is a 2-pole removable spring-loaded terminal block standard KNX TP1 (red + black) for rigid cables:

- Insulation stripping: 6 mm
- Tightening: spring-loaded
- Capacity: 4 x rigid wire; $\emptyset$ 0.6 ÷ 0.8 mm
- Terminal +V: BUS positive
- Terminal -V: GND

Weather conditions

- Climate class according to EN 50491-2: 3K5
- Operating ambient temperature range: -5 °C ÷ +45 °C
- Relative humidity: max. 90 % non-condensing
- Storage conditions: -5 °C to ÷ 45 °C; 90 % RH max
- Transport conditions: -25 °C ÷ +70 °C
- Max altitude: 2000 m a.s.l.

Power supply

KNX bus line

- Bus rated voltage: 30 VDC
- Max. Bus absorption: < 20 mA

AC Network

- Input voltage range: 100 V~ ÷ 240 V~
- Maximum voltage limits: 90 V~ ÷ 253 V~
- Frequency: 50 ÷ 60 Hz
- Max. consumption @ V_i = 230 V~; 50 Hz; I_o = 0 (no load)
- Active power: P = 0.6 W
  - reactive: Q = 1.6 VAR
  - apparent: S = 2.8 VA (12 mA cosµ 0.34)
- Max. consumption @ V_i = 230 V~; 50 Hz; I_o = 200 mA

- Active power: P = 2.4 W
  - reactive: Q = 0.7 VAR
  - apparent: S = 5.2 VA (22.6 mA cosμ 0.96)
- Max. consumption @ Vi = 115 V~; 60 Hz; Io = 0 (no load)
- Active power: P = 0.6 W
  - reactive: Q = 0.4 VAR
  - apparent: S = 1.5 VA (12.6 mA cosμ 0.83)
- Max. consumption @ Vi = 115 V~; 60 Hz; Io = 200 mA
- Active power: P = 2.3 W
  - reactive: Q = 0.4 VAR
  - apparent: S = 4.3 VA (37 mA cosμ 0.98)

DALI Line

- Bus rated voltage: 17 VDC
- Bus voltage range: 16 - 20 VDC
- Delivered current: 200 mA
- Max. current delivered: 250 mA
- Protection: Overload and short-circuit. Self-resetting.

Programming LED ④

Normally off, it turns red when the device is in address programming mode (the ⑤button is momentarily pressed). The red light flashes when ETS initiates address detection.

Programming button ⑤

When it is pressed for a short time, the device will enter the programming mode.

DALI line configuration button ⑥

Short or long presses allow DALI devices to be identified or added to the line.

DALI LED ⑦

Green LED, indicates the DALI line signal.
If the device has already been programmed on the DALI bus side, the LED will be lit: this means that several devices have already been detected and are ready to be controlled.
Otherwise, the LED is off.

Application and general information

DALI Bus System Features

DALI (Digital Addressable Lighting Interface) technology brings digital technology to lighting, making a simple lighting fixture compatible with the most sophisticated applications. In addition to
controlling the lighting fixture, it is possible to exchange detailed information about its operating status or about the presence of faults and anomalies. The lighting fixtures thus become real devices with the possibility of customising parameters. The system allows sending switching and dimming commands and setting a defined brightness level, up to 64 Dali ballast, possibly divided into 16 groups. In addition, the DALI protocol can be used to display other status information and ballast failure indications. Up to 64 ballasts (slaves) can be connected in a DALI segment.

Finally, 16 KNX scenarios are available for dimming.

Device functions

The gateway is used to transform commands sent from the KNX bus (e.g. switching and dimming commands) into DALI telegrams. In turn, status information from the DALI bus can be transformed into KNX telegrams, giving bi-directional information.

The gateway is Category 1 (according to EN 62386-103), which means that the device should only be used in segments with connected DALI ballasts (slaves) and not with other DALI control devices (masters), so no multi-master function is allowed.

The gateway, as Master device, supplies power to up to 64 ballasts/devices.

The device is capable of:

- Managing 16 DALI groups and/or individually addressing up to 64 ballasts.
- Addressing from button or group addresses.
- Different operating modes for groups and ballasts such as permanent mode, night mode or 'staircase light' mode. Individual switching for each light with specific burn-in.
- Fault recognition objects for each light/ballast.
- Scenario module to extend the programming of scenarios to groups and individual ballasts.
- Quick 'exchange' function for quick and easy replacement of defective ballasts

Commissioning

The DALI gateway can be commissioned using the front button ⑥for new installation and post-installation. For the rest of the configuration, an ETS project must be created in which group addresses are created and assigned to the Communication Objects for the respective configurations to be made.

The parameters of the DALI drivers/groups/scenarios can be configured by assigning the respective group address before the electrical installation is carried out.

This allows the system integrator using ETS and the electrician carrying out the installation to operate independently of each other.

Once the electrical installation is complete, commissioning is completed via ETS as is its configuration.

The first step for a successful configuration is to start the learning process named **Inventory**. This procedure allows all drivers connected on the DALI bus to be recognised: they will be automatically recognised and each DALI driver will be assigned an address between 0 and 63.

To identify the DALI drivers, it is necessary to select the group address within which the data point that allows this function to be controlled via KNX is assigned.

In order to be able to re-assign the random order of the DALI numbering, it is possible to use the group address within which the Communication Object allowing control of this function via KNX will have been assigned.

To download the DALI configuration, the Gateway application program with ETS must be downloaded: the data will be downloaded to the DALI drivers and the Gateway will signal the process by rapidly flashing the green LED⑦.

After programming within the ETS project, it is necessary to download the configuration to the gateway: the device will signal the procedure with the fast blinking of the green LED ⑦.

Gateway Start-up

When the DALI Gateway device is powered from the 230 V~ mains, it performs initialisation when switched on, searching for the connection to the KNX bus and the connection to the DALI bus.
If the device is new, no DALI and KNX signal LEDs will light up: the device is waiting to perform configuration procedures.
If the device has already been programmed on the DALI bus side, the LED ⑦will be lit: this means that several devices have already been detected and are ready to be controlled.
When the Gateway is first connected to a DALI line, automatic recognition of the connected ballasts must be performed and to each of them a unique identification address must be assigned for subsequent communication.

The Inventory procedure can be carried out in two different ways:

- Front button
- Using and assigning a group address to the relevant communication object.

The two modes are illustrated in details here below.

Inventory from front 'long press' button

The procedure for recognising and programming the 'Short Address' addresses of the Ballast, known as '**Inventory / New Installation**', is started by pressing the ⑥ button for more than 5 s. It must be held down until the green LED⑦ starts flashing very rapidly.
At the end of the Short Address recognition and assignment procedure, if the gateway has found and recognised at least one ballast, it will light up the LED ⑦ to indicate the successful completion of the procedure. Another possibility is to use the ETS programme.
Depending on the size of the DALI segment, the process can take up to 3 / 5 minutes.

Post-installation from front 'short press' button

To expand a DALI segment after the first Inventory with new ballasts or to replace more than one faulty ballast, use the 'post-installation' function. Post-installation can be carried out directly from the gateway by briefly pressing the front button ⑥: in this case the LED will start flashing immediately and rapidly.
Another possibility is to use the ETS programme. Depending on the size of the DALI segment, the process can take up to 3 / 5 minutes.

ETS library

This manual describes the functions of the device and how they can be set up and configured using the ETS configuration software. The aim is to be able to program DALI addressing with a single button, without the need for a complex user interface with a display screen, thus simplifying the procedure and reducing programming time.
First of all, it is necessary to know the number of identified devices in order to set them up using the procedure described below, to flash a specific channel and then locate it on the system, or to program a single device with the desired identifier. These are now operations that can be performed via the ETS and bus monitor.

- Max. number of group addresses: **1024**
- Maximum number of associations: **680**

Common Parameters

This area can be used to enable general device functionality.

Number of installed devices

Within this parameter, we recommend setting the number of Ballasts to be controlled, which are in turn connected to the Gateway. This makes individual DALI devices visible within the menu and allows individual parameterisation: numbering ranges from 1 to 64 devices. This information can also be set as a result of the number of Ballasts found. Setting the value to 0 will not open any device setting sub-menu.

DALI front button

This parameter can be used to disable the front button ⓞ reserved for DALI programming.

By default, as well as in the ETS library, the button is enabled.

Configuration Messages

Enabling this parameter is essential to access the gateway configuration, thus enabling the Communication Objects for its full configuration.

Below are the Communication Objects made visible.

▪↕50	Configurazione	Dispositivi DALI rilevati	1 byte	C	R	-	T	-	8-bit unsigned value, counter...	Low
▪↕53	Configurazione	Inizio processo enumerazione	1 bit	C	-	W	-	-	1-bit, start/stop	Low
▪↕54	Configurazione	Stato processo enumerazione	1 bit	C	R	-	T	-	1-bit, state	Low
▪↕55	Configurazione	Inizio processo post-installazione	1 bit	C	-	W	-	-	1-bit, start/stop	Low
▪↕56	Configurazione	Stato processo post-installazione	1 bit	C	R	-	T	-	1-bit, state	Low
▪↕57	Configurazione	Inizio processo acquisizione	1 bit	C	-	W	-	-	1-bit, start/stop	Low
▪↕58	Configurazione	Stato processo acquisizione	1 bit	C	R	-	T	-	1-bit, state	Low
▪↕59	Configurazione	Prova di un dispositivo	1 byte	C	-	W	-	-	8-bit unsigned value, counter...	Low
▪↕60	Configurazione	Dispositivo in prova	1 byte	C	R	-	T	-	8-bit unsigned value, counter...	Low
▪↕61	Configurazione	Progr. indirizzo di tutti i dispositivi connessi	1 byte	C	R	W	T	-	8-bit unsigned value, counter...	Low
▪↕62	Configurazione	Reset dispositivo (255=tutti)	1 byte	C	R	W	T	-	8-bit unsigned value, counter...	Low
▪↕63	Configurazione	Imposta indirizzo dispositivo (1)	1 byte	C	R	W	T	-	8-bit unsigned value, counter...	Low
▪↕64	Configurazione	Imposta indirizzo dispositivo (2)	1 byte	C	R	W	T	-	8-bit unsigned value, counter...	Low
▪↕65	Configurazione	Esito progr/reset dispositivo	1 bit	C	R	-	T	-	1-bit, boolean	Low

Communication object #50 DALI devices detected

▪↕50	Configurazione	Dispositivi DALI rilevati	1 byte	C	R	-	T	-	8-bit unsigned value, counter...	Low

1-byte communication object. If associated with a dedicated group address, at the end of the inventory the gateway will send a value between 1 and 64: this will indicate the number of ballasts found on the DALI line. In case the telegram is lost, it is possible to make a reading on it by asking the gateway directly for the information. This transmission takes place whether the inventory command is executed from the front button or from the communication object.

Communication object #53 Start enumeration process

▪↕53	Configurazione	Inizio processo enumerazione	1 bit	C	-	W	-	-	1-bit, state	Low

This 1-bit Communication Object, if associated with a group address, provides the option of writing the 'active' value via the ETS bus monitor. This will start the recognition and programming of the Ballast Short Addresses called Inventory / New Installation. The LED ⑦ will start flashing very rapidly indicating the start of the Inventory. At the end of the Short Address recognition and assignment procedure, if the gateway has found and recognised at least one ballast, it will light the LED ⑦ to indicate the successful completion of the procedure. Another possibility is to use the DALI programming button. Depending on the size of the DALI segment, the process can take up to 3 / 5 minutes.

Communication object #54 Enumeration process status

▪↕54	Configurazione	Stato processo enumerazione	1 bit	C	R	-	T	-	1-bit, state	Low

This 1-bit Communication Object, if associated with a group address, provides the option of writing the 'active' value via the ETS bus monitor. In case the telegram is lost, it is possible to make a reading on it by asking the gateway directly for the information.

Active	Inventory running	Green LED⑦ flashing
Inactive	Inventory terminated	Steady ⑦ green LED

Communication object #55 Start of post-installation process

| ⇄ 55 | Configurazione | Inizio processo post-installazione | 1 bit | C - W - - | 1-bit, state | Low |

This 1-bit Communication Object, if associated with a group address, provides the option of writing the 'active' value via the ETS bus monitor. This will start the 'post-installation' function: the LED ⑦ will start flashing immediately and rapidly. This function is used to expand a DALI segment after the first Inventory with new ballasts or to replace more than one faulty ballast. Post-installation can also be performed directly from the gateway, using the front button ⑥, with a short press. Depending on the size of the DALI segment, the process can take up to 3 / 5 minutes.

Communication object #56 Post-installation process status

| ⇄ 56 | Configurazione | Stato processo post-installazione | 1 bit | C R - T - | 1-bit, state | Low |

This 1-bit Communication Object, if associated with a group address, provides the option of writing the 'active' value via the ETS bus monitor. In case the telegram is lost, it is possible to make a reading on it by asking the gateway directly for the information.

Active	Inventory running	Green LED⑦ flashing
Inactive	Inventory terminated	Steady ⑦ green LED

Communication object #57 Start acquisition process

| ⇄ 57 | Configurazione | Inizio processo acquisizione | 1 bit | C - W - - | 1-bit, state | Low |

This 1-bit Communication Object, if associated with a group address, provides the option of writing the 'active' value via the ETS bus monitor. This will initiate the acquisition of the short addresses of the ballasts connected on the DALI line. The green LED ⑦ will start flashing very rapidly, indicating the start of the acquisition. At the end of the Short Address recognition and assignment procedure, if the gateway has found and recognised at least one ballast, it will light up the green LED ⑦ to indicate the successful completion of the procedure. Depending on the size of the DALI segment, the process can take up to 3 / 5 minutes.
This procedure is particularly suitable for acquiring installations made with gateways from different manufacturers: the assignment will always follow the numbering from 1 to 64.
Pay special **attention** to the following: if a new numbering has been given using a table within the existing gateway, the gateway will acquire the Short Address present on the Ballast.

Communication object #58 Acquisition process status

| ⇄ 58 | Configurazione | Stato processo acquisizione | 1 bit | C R - T - | 1-bit, state | Low |

This 1-bit communication object, if associated with a group address, will allow receiving the status of the acquisition process on the ETS Bus Monitor.
In case the telegram is lost, it is possible to make a reading on it by asking the gateway directly for the information.

Active	Inventory running	Green LED⑦ flashing
Inactive	Inventory terminated	Steady ⑦ green LED

Communication object #59 Testing a device

◼↕ 59	Configurazione	Prova di un dispositivo	1 byte	C - W - -	8-bit unsigned value, co...	Low

This 1-byte Communication Object, when associated with a group address, allows testing the individual Ballast by retrieving the Short Address number assigned to it by the gateway during acquisition.
The hexadecimal value can be set in the range 1 to 64. If a valid index is set, the corresponding lamp
starts flashing for a few seconds: it ends after about 15 flashes. If the value is set to zero, the test is aborted. If the value 254 is set, any test in progress is aborted and the test for the subsequent index is initiated.

Communication object #60 Device being tested

◼↕ 60	Configurazione	Dispositivo in prova	1 byte	C R - T -	8-bit unsigned value, co...	Low

This 1-byte communication object, when associated with a group address, allows receiving on the ETS Bus Monitor the status showing the index (1 - 64) of the DALI device currently being tested (or the last one tested).

Communication Object #61 Program the Address of all connected devices

◼↕ 61	Configurazione	Progr. indirizzo di tutti i dispositivi connessi	1 byte	C R W T -	8-bit unsigned value, counter pulses (0..255)	Low

This 1-byte Communication Object, when associated with a group address, allows a Short Address from 1-64 to be written to the currently connected DALI line. This communication object is particularly useful to pre-program DALI drivers prior to an installation; these must be connected in sequence, one at a time.

ATTENTION: If more than one Driver is connected at the same time, they will be written with the same Short Address sent at that time, so care should be taken when using this.
Refer to communication object **#65** for the outcome of the sent command.

Communication Object #62 Device Reset (255=all)

◼↕ 62	Configurazione	Reset dispositivo (255=tutti)	1 byte	C R W T -	8-bit unsigned value, counter pulses (0..255)	Low

This 1-byte Communication Object allows a factory reset of a specific DALI driver. By writing the short address from 1-64 on the KNX bus, a reset will be sent to the selected DALI driver.

WARNING: the existing Short Address will also be deleted. By writing 255, a factory reset will be sent to all DALI drivers currently connected on that line, deleting the respective Short Address.
Refer to communication object **#65** for the outcome of the sent command.

Communication Object #63 - #64 Set Device Address (1)-(2)

◼↕ 63	Configurazione	Imposta indirizzo dispositivo (1)	1 byte	C R W T -	8-bit unsigned value, counter pulses (0..255)	Low
◼↕ 64	Configurazione	Imposta indirizzo dispositivo (2)	1 byte	C R W T -	8-bit unsigned value, counter pulses (0..255)	Low

These 1-byte Communication Objects, in combination with a group address, allow a DALI driver to be assigned a different "DALI driver number" Short Address compared to the one assigned during inventory and after installation. To execute the command, a value from 1-64 must be sent to the KNX bus, and both communication objects must be used. These are in no particular order, but must be completed in sequence.
By sending the first value on the KNX bus and then the second, the DALI gateway will invert the two short addresses. This new assignment will be written to the DALI Driver, assuming the two Drivers are present in the system. If one of the two

is not present on the system, the Gateway will assign the new number to the existing Driver and delete the previously assigned number.

This can also be useful when replacing a faulty Driver. Refer to communication object **#65**for the outcome of the sent command.

Communication Object #65 Device programming-reset outcome

↕ 65	Configurazione	Esito progr/reset dispositivo	1 bit	C R - T - 1-bit, boolean	Low

This 1-byte Communication Object, when associated with a group address, allows the DALI gateway to receive confirmation of **#61-#62-#63-#64**.

General Fault Messages

By enabling this parameter, ballast and lamp faults can be detected. The gateway supports this function by making a 1-bit Communication Object available.

Messaggio guasto generale	○ Disabilita ⦿ Abilita

The fault message corresponds to a faulty device or lamp.

↕ 6	Generale	Stato guasto	1 bit	C R - T - 1-bit, state	Low

The message will be sent regardless of the actual fault status with the following meaning assigned to the value sent:

1	Fault on ballast/lamp
0	No fault on ballast/lamp

Within the individual DALI device settings, it will then be possible to have the error status of the DALI ballast with the individual Communication Object to send the information to the 1-bit KNX bus.

General on/off status

By enabling this parameter, it is possible to detect a general status value; when any status of the acquired DALI lamps changes, this Group Object will change status. In short, it is like a logic gate in OR on the feedback of the statuses of the entire gateway.

Stato on/off generale	○ Disabilita ⦿ Abilita

All devices/groups	= 1	Communication object 1
All devices/groups	= 0	Communication object 0

When enabled, the 'On/off status' object will appear:

↕ 5	Generale	Stato on/off	1 bit	C R - T - 1-bit, switch	Low

1-bit communication object.

Emergency activation value

This parameter is part of the always-active Broadcasting messages. It is possible to vary its activation value:

Valore attivazione emergenza	⦿ Emergenza con 0 ◯ Emergenza con 1

The purpose of this object is to start or stop the emergency-panic mode in Broadcast on all DALI devices.

▪️⇅8	Generale	Attiva emergenza	1 bit	C - W - -	1-bit, alarm	Low

This 1-bit communication object receives the on/off commands. In Broadcast, all devices enabled for this function are retrieved, with the possibility of assigning a specific setting to each Ballast.

General staircase light activation value

This parameter is part of the always-active Broadcasting messages; it is possible to vary its activation value:

Valore attivazione generale luci scale	⦿ Avvio con 0 ◯ Avvio con 1

The purpose of this object is to start the staircase light function in Broadcast on all DALI Devices.

▪️⇅3	Generale	Avvio luci scale	1 bit	C - W - -	1-bit, start/stop	Low

This 1-bit communication object receives start/stop commands. In Broadcast, all devices enabled for this function are retrieved, with the possibility of assigning a specific setting to each Ballast.

Group messages

This parameter enables the display of Group Objects dedicated to the 16 DALI Groups.

Messaggi gruppi	⦿ Disabilita ◯ Abilita

There are 47 communication objects in total, numbered from 100 (group 1) to 192 (group 16); individual groups can be managed with different values and commands.

Behaviour of the KNX bus in case of power failure

This parameter enables the definition of a certain behaviour of the gateway on DALI groups and devices in case of a power failure on the KNX Bus.

Comportamento alla caduta del bus KNX	Livello minimo	▼
Comportamento al ripristino del bus KNX	Nessuna azione	
	Livello minimo	✓
	Livello massimo	
	Livello specifico	

The 'Specific Level' allows configuring the level of brightness to be reached following the KNX bus failure. In the 'Specific level' parameter, a value from 0-100 (%) can be set:

Livello specifico di errore	60 ▲▼

KNX bus reset behaviour

This parameter enables the definition of a certain behaviour of the gateway on DALI groups and devices when the KNX Bus is reset.

Comportamento al ripristino del bus KNX	Livello minimo	▼
	Nessuna azione	
	Livello minimo	✓
	Livello massimo	
	Livello specifico	

The 'Specific Level' allows configuring the level of brightness to be reached following the KNX bus reset. In the 'Specific level' parameter, a value from 0-100 (%) can be set:

Livello specifico di ripristino	30 ▲▼

General communication objects

Some communication objects in this section are always visible: this allows sending Broadcast and Gateway status messages.

Broadcast object #1 Set on/off

This 1-bit object is used to switch on all lights connected to the gateway. A delay between the switching off of the first and last light may be visible. If no ballast is in special mode, switching takes place simultaneously via DALI broadcast telegrams. The Broadcast function always switches to 0 or 100%.

1	Generale	Imposta on/off	1 bit	C - W - -	1-bit, switch	Low

Broadcast Object #2 Set Level%

This 1-byte object is used to set all connected lights to a certain percentage value. A delay between the switching off of the first and last light may be visible. If no ballast is in special mode, switching takes place simultaneously via DALI broadcast telegrams.

	2	Generale	Imposta livello %		1 byte	C - W - -	8-bit unsigned value, pe... Low

Broadcast object #7 System status signal

This 1-bit communication object allows monitoring the gateway status via the ETS bus monitor.

Active	1	Gateway running: post-installation enumeration, DALI Bus download
Inactive	0	Free' gateway not running: enumeration, post installation, DALI bus download

	7	Generale	Stato del sistema		1 bit	C R - T -	1-bit, state	Low

DALI Device Parameters xx

To set the parameters of the DALI Ballast, select the desired Device

The number of devices must be defined within the Common Parameters (see dedicated section).

DALI device xx - General

Minimum level

This parameter is used to set the minimum value of brightness, as a percentage, to which the Ballast can be set.

Allowed values: from 0 to 100 (%).

Maximum level

This parameter is used to set the maximum value of brightness, as a percentage, to which the Ballast can be set.

Livello massimo	100

Allowed values: from 0 to 100 (%).

On command level

When the ON value (1) is received, the gateway sets the Ballast x to the same percentage value as before it was switched off.

Livello al comando On	◉ Ultimo livello ○ Livello specifico

By enabling the 'Specific Level' parameter, a fixed percentage value can be set on switch-on.

Livello al comando On	○ Ultimo livello ◉ Livello specifico
Livello specifico	75

Allowed values: from 0 to 100 (%).

DALI Bus switch on value

With this parameter it is possible to configure the level that the Ballasts must reach after switching on the DALI bus.

Livello all'accensione del bus DALI	Livello minimo ▼
	Livello minimo ✓
Livello in caso di errore di bus DALI	Livello massimo
	Livello specifico
Tempo variazione	Ultimo livello

The 'Specific Level' allows configuring the brightness level to be reached after switching on the DALI bus: if a specific level is chosen, a value from 0 to 100 (%) can be set.
The last level allows setting the Ballast to the same value as the one it had before it was switched off, when the DALI bus is switched on.

Level in case of DALI bus error

With this parameter it is possible to configure the level to be reached by the Ballasts in the event of an error on the DALI bus,more precisely, in the event of an interruption of the DALI bus lines due to a malfunction of a Ballast in the field; if a specific level is selected, a value from 0 to 100 (%) can be set.

Livello in caso di errore di bus DALI	Livello minimo ▼
	Livello minimo ✓
Tempo variazione	Livello massimo
	Livello specifico

Time variation

This parameter can be used to configure the time it takes for the Ballast to adjust the brightness from the current level to the desired level. The time will always be the same, regardless of the starting and finishing level.

Tempo variazione	6 s ▾

Adjustment curve

With this parameter it is possible to configure a DALI Device Type 6 that contains specific commands for light fixtures with LED light sources.

Curva di regolazione	◉ Logaritmica ○ Lineare

In particular, support is provided for changing the dimming curve from logarithmic (default) to linear in the case of user-replaceable light fixtures with different wattages.
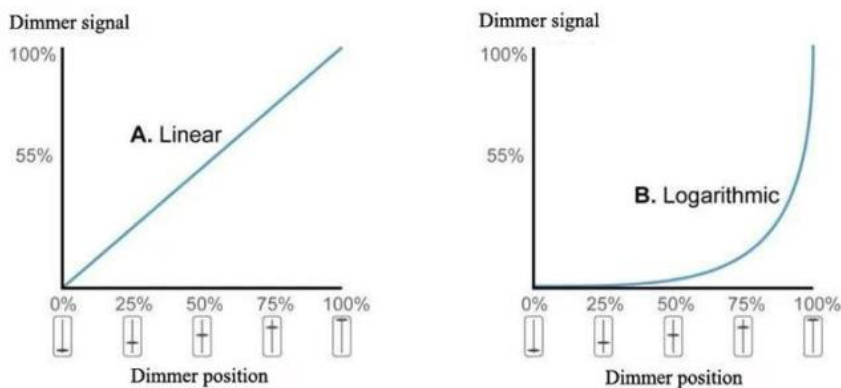
A logarithmic-based dimming curve is used by default in the DALI protocol. This is because our eyes do not perceive the change in intensity in a linear way, as conventional lamps are very similar to this type of logarithmic control.

Block function

It is possible to lock the Ballast in a specific state after receiving the communication object that activates the lock function; until it is deactivated, all commands received on all other incoming communication objects will not be executed.
This means that the block function is the function with the highest priority.

Funzione blocco	○ Disabilita ◉ Abilita

Enabling the block function automatically opens the corresponding menu on the General root of the device and displays the object:

■‡ 202	Dispositivo 1	Imposta blocco	1 bit	C - W - -	1-bit, enable	Low

Two activation modes can be selected to determine which logic value received via the Communication object will activate the function:

The blocked device can then be set to perform no action or to go to a specific Level. In the latter case, the corresponding field appears to assign the percentage level

Similarly, it is possible to define the behaviour on releasing: the device can perform no action, or it can set the minimum level, the maximum level, a specific level, the last level before blocking, or execute pending commands received while it was blocked.

Also for the release, if a specific level is chosen, the corresponding field for assignment appears:

The 'Block Status' Communication Object is also available for transmitting active/deactivated status information.

Block Function priority

If there is an adjustment in progress when the block command is sent, there will be a different behaviour depending on the 'Block function' parameter set and indicated above.

Disable	Function disabled: block not activated
No action	The current setting is terminated at the original level
Specific level	The current adjustment is interrupted and a new adjustment is activated at the level specified by the 'Specific level' parameter.

Emergency function

With this parameter the emergency function can be enabled, in which case the Ballast will be retrieved by the Broadcast message of the general commands.

Funzione emergenza	◯ Disabilita ◉ Abilita

Enabling the emergency function automatically opens the relevant menu on the General root of the device and displays the relevant communication object:

■↕8	Generale	Attiva emergenza	1 bit	C - W - -	1-bit, alarm	Low

Parametri comuni	Livello di emergenza	50
− Dispositivo DALI 1	Azione a fine emergenza	Nessuna azione
− Generale		
Emergenza		
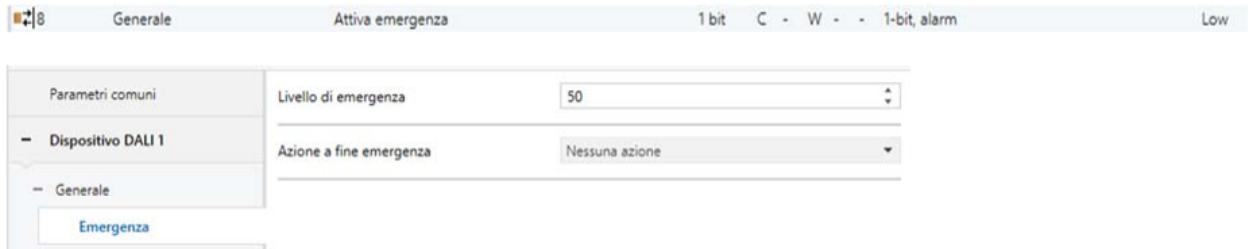
A percentage level can be assigned to the emergency status and define the behaviour at the end of the emergency status.

Azione a fine emergenza	Nessuna azione ▼
	Nessuna azione ✔
	Livello minimo
	Livello massimo
	Livello specifico
	Ultimo livello
	Esegui comandi pendenti
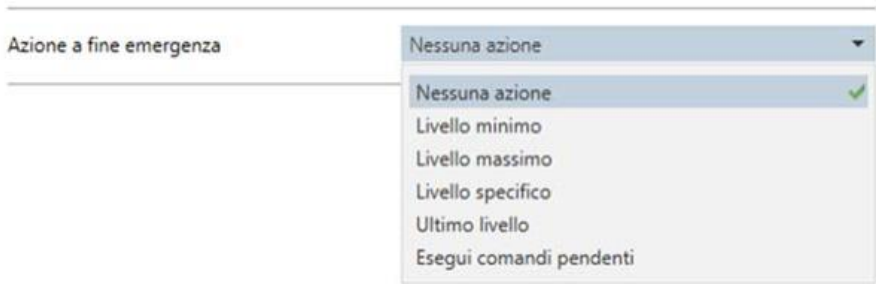
Staircase light function

This parameter can be set and is only available for individual Ballasts. It can also be retrieved by the Broadcast message of the general commands.

Funzione luce scale	◯ Disabilita ◉ Abilita

Enabling the function automatically opens the relevant menu on the general root of the device:

Parametri comuni	Livello luce scale	◉ Ultimo livello ◯ Livello specifico
− Dispositivo DALI 1	Intervallo (sec)	30
− Generale	Reset intervallo	◯ Disabilita ◉ Abilita
Luce scale	Valore attivazione	◯ Avvio con 0 ◉ Avvio con 1
	Livello alla fine del tempo	◉ Off ◯ Ultimo livello

It can be activated via the individual Communication Object.

| ■⇄|201 | Dispositivo 1 | Avvio luce scale | | 1 bit | C - W - - | 1-bit, start/stop | Low |

Upon activation, it will be possible to choose the 'Staircase Light Level' to be taken:
When Last level is set, the current level for the duration of the Time Interval is maintained.
When Specific level is set, again for the duration of the Interval, a new level will be assumed instead:

| Livello luce scale | ○ Ultimo livello ◉ Livello specifico |
| Livello | 85 |

If the 'Interval reset' option is enabled, the interval timer is reset to zero when another command is received with the 'Staircase timer start' communication object, restarting the set time and effectively extending the switch-on time.

| Reset intervallo | ○ Disabilita ◉ Abilita |

It is also possible to select the logic value received via the Communication Object that will activate the function:

| Valore attivazione | ○ Avvio con 0 ◉ Avvio con 1 |

Finally, it is possible to define the status the device should assume at the end of the time: Off or previous level.

| Livello alla fine del tempo | ◉ Off ○ Ultimo livello |

On/off status

With this parameter, the On/Off status object can be enabled for the transmission of On/Off status information:

| Stato On/Off | ○ Disabilita ◉ Abilita |

1-bit communication object.

| ■⇄|206 | Dispositivo 1 | Stato on/off | | 1 bit | C R - T - | 1-bit, switch | Low |

Percentage status

With this parameter, the 'Percentage Status Level' object can be enabled for the transmission of status information with percentage value:

| Stato percentuale | ○ Disabilita ◉ Abilita |

1-byte communication object

| ■⇄|207 | Dispositivo 1 | Stato livello % | | 1 byte | C R - T - | 8-bit unsigned value, percentage (0..100%) | Low |

Fault Status

With this parameter, the 'Fault Status' object can be enabled for the transmission of fault information:

Stato guasto	⚪ Disabilita ⚫ Abilita

1-bit communication object.

◼|209	Dispositivo 1	Stato guasto	1 bit	C R - T -	1-bit, state	Low

Groups

This parameter can be used to enable the area within the parameters of each individual DALI device for association with DALI groups.

Gruppi	⚪ Disabilita ⚫ Abilita

Within the Groups area, it is possible to assign the 16 groups for all possible 64 ballasts, once they have been identified on the system. The special feature of the gateway is that it allows the assignment of a Ballast to different Groups. Enabling the function automatically opens the relevant menu on the General root of the device:

Parametri comuni	Gruppo 1	⚫ Disabilita ⚪ Abilita
— Dispositivo DALI 1	Gruppo 2	⚫ Disabilita ⚪ Abilita
	Gruppo 3	⚫ Disabilita ⚪ Abilita
— Generale	Gruppo 4	⚫ Disabilita ⚪ Abilita
Gruppi	Gruppo 5	⚫ Disabilita ⚪ Abilita
	Gruppo 6	⚫ Disabilita ⚪ Abilita
	Gruppo 7	⚫ Disabilita ⚪ Abilita
	Gruppo 8	⚫ Disabilita ⚪ Abilita
	Gruppo 9	⚫ Disabilita ⚪ Abilita
	Gruppo 10	⚫ Disabilita ⚪ Abilita
	Gruppo 11	⚫ Disabilita ⚪ Abilita
	Gruppo 12	⚫ Disabilita ⚪ Abilita
	Gruppo 13	⚫ Disabilita ⚪ Abilita
	Gruppo 14	⚫ Disabilita ⚪ Abilita
	Gruppo 15	⚫ Disabilita ⚪ Abilita
	Gruppo 16	⚫ Disabilita ⚪ Abilita

Scenarios

With this parameter, the individual ballast scenario can be enabled for a total of 16 scenarios.

Scenari	○ Disabilita ◉ Abilita

Enabling the function automatically opens the relevant menu on the General root of the device. Within the Scenarios area, it is possible to assign the 16 scenarios for the selected ballast. The gateway only allows scenario assignment on the individual Ballast:

Parametri comuni	Scenario 1	◉ Disabilita ○ Abilita
— Dispositivo DALI 1	Scenario 2	◉ Disabilita ○ Abilita
— Generale	Scenario 3	◉ Disabilita ○ Abilita
Scenari	Scenario 4	◉ Disabilita ○ Abilita
	Scenario 5	◉ Disabilita ○ Abilita
	Scenario 6	◉ Disabilita ○ Abilita
	Scenario 7	◉ Disabilita ○ Abilita
	Scenario 8	◉ Disabilita ○ Abilita
	Scenario 9	◉ Disabilita ○ Abilita
	Scenario 10	◉ Disabilita ○ Abilita
	Scenario 11	◉ Disabilita ○ Abilita
	Scenario 12	◉ Disabilita ○ Abilita
	Scenario 13	◉ Disabilita ○ Abilita
	Scenario 14	◉ Disabilita ○ Abilita
	Scenario 15	◉ Disabilita ○ Abilita
	Scenario 16	◉ Disabilita ○ Abilita

The scenarios function allows replicating a specific scenario that has been previously set in the Level area or stored by activating the Save function. When the scenario execution command is received on the dedicated communication object, the desired scenario will be called up.

Parametri comuni	Scenario 1	○ Disabilita ◉ Abilita
Dispositivo DALI 1	Livello	5
— Generale	Salva	◉ Disabilita ○ Abilita
Scenari	Scenario 2	◉ Disabilita ○ Abilita

1-byte communication object

| ‖205 | Dispositivo 1 | Scenario | 1 byte | C - W - - | scene control, scene control | Low |

Communication Objects Dedicated to Devices

The objects available for each individual Ballast are displayed in the 'DALI x Device' menu.
There are ten communication objects with different values. These are available for the 64 devices connected to the DALI gateway. Objects can be set for the actual number of Ballasts recognised during DALI Bus Acquisition. The connected lamps can then be controlled either individually or in
dedicated groups. The available objects are as follows:

‖200	Dispositivo 1	Imposta on/off	1 bit	C - W - -	1-bit, switch	Low
‖201	Dispositivo 1	Avvio luce scale	1 bit	C - W - -	1-bit, start/stop	Low
‖202	Dispositivo 1	Imposta blocco	1 bit	C - W - -	1-bit, enable	Low
‖203	Dispositivo 1	Regola livello	4 bit	C - W - -	3-bit controlled, dimming control	Low
‖204	Dispositivo 1	Imposta livello %	1 byte	C - W - -	8-bit unsigned value, percentage (0..100%)	Low
‖205	Dispositivo 1	Scenario	1 byte	C - W - -	scene control, scene control	Low
‖206	Dispositivo 1	Stato on/off	1 bit	C R - T -	1-bit, switch	Low
‖207	Dispositivo 1	Stato livello %	1 byte	C R - T -	8-bit unsigned value, percentage (0..100%)	Low
‖208	Dispositivo 1	Stato blocco	1 bit	C R - T -	1-bit, state	Low
‖209	Dispositivo 1	Stato guasto	1 bit	C R - T -	1-bit, state	Low

Set on/off

It is used to control a ballast only if it is not in a particular mode (see function priority). This 1-bit communication object receives On/Off commands.

Set level percentage

It is used to set the brightness value at the ballast to a specific percentage value unless it is in a special mode (see function priority).
This 1-byte communication object receives value commands from 0% to 100%

Level adjustment

It is only used to dim a ballast if it is not in a particular mode. The standard coding of the control allows both the differentiation of the adjustment direction (increase or decrease) and the value of the adjustment step itself. This 4-bit communication object receives the increase/decrease commands.

Communication Objects Dedicated to Groups

The objects available for each individual group are activated in the 'Common Parameters' menu. There are three Communication Objects with different values. These are available for the 16 Groups. Objects will be enabled for the total of 16 available groups; those identified in the individual Ballast properties can be used, leaving the group not involved in the function unused.

100	Gruppo 1	Imposta on/off	1 bit	C - W - -	1-bit, switch	Low
101	Gruppo 1	Regola livello	4 bit	C - W - -	3-bit controlled, dimming control	Low
102	Gruppo 1	Imposta livello %	1 byte	C - W - -	8-bit unsigned value, percentage (0..100%)	Low

Set on/off

This object is used to control a group of ballasts; this command will not be executed by the individual unit if it is in a particular mode (see function priority). This 1-bit Communication Object receives ON/OFF commands.

Level adjustment

This object is used to dim a group of ballasts: this command will not be executed by the individual unit if it is in a particular mode (see function priority). The standard coding of the control allows both the differentiation of the adjustment direction (increase or decrease) and the value of the adjustment step itself. This 4-bit Communication Object receives the increase/decrease commands.

Set level percentage

This object is used to set the brightness value of a ballast group to a specific percentage value. This command will not be executed by the individual unit if it is in a particular mode (see function priority). This 1-byte Communication Object receives value commands from 0% to 100%.

Priority of functions

All 'normal' commands have the same priority, i.e. the last to arrive wins. One interrupts the other and activates its specific action. Block, emergency, DALI bus error, KNX bus drop/reset have priority over normal commands sent by communication objects, but there is an order of priority between them. The priority between functions is shown in the table below:

Function	Priority	
Block	1	Low
Emergency	2	Medium
KNX power failure	3	High

Reference standards

- RoHS directive 2011/65/EU
- REACh regulation (EC) No. 1907/2006

- EN 50491-2 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 2: Environmental conditions.

- EN 50491-3 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) Part 3: Electrical safety requirements.

- EN 50491-4-1 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) Part 4-1: General functional safety requirements for products intended to be integrated in Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS).

- EN 50491-5-1 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) -- Part 5-1: EMC requirements, conditions and test setup.

- EN 50491-5-2 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment.

- IEC 62386-101 Digital addressable lighting interface - Part 101: General requirements - System components.

- IEC 62386-102 Digital addressable lighting interface - Part 102: General requirements - Control gear.

Communication objects sequential list

No.	Object name	Enabling condition	Dim.	Flags					DPT
1	General Set on/off	Always	1 Bit	C		W			[1.001] switch
2	General Set % level	Always	1 Byte	C		W			[5.001] Percentage (0..100%)
3	General Start stairs light	Always	1 Bit	C		W			[1.010] start/stop
5	General On/off status	General on/off status = Enable	1 Bit	C	R		T		[1.001] switch
6	General Fault status	General fault message = Enable	1 Bit	C	R		T		[1.011] state
7	General System status	Always	1 Bit	C	R		T		[1.011] state
8	General Set emergency	Always	1 Bit	C		W			[1.005] alarm
9	General Emergency status	Always	1 Bit	C	R		T		[1.005] alarm
50	Setup DALI device detected	Setup messages = Enable	1 Byte	C	R		T		[5.010] counter pulses (0..255)
53	Setup Start discovery process	Setup messages = Enable	1 Bit	C		W			[1.010] start/stop
54	Setup Discovery process status	Setup messages = Enable	1 Bit	C	R		T		[1.011] state
55	Setup Start post-installation process	Setup messages = Enable	1 Bit	C		W			[1.010] start/stop
56	Setup Post-installation process status	Setup messages = Enable	1 Bit	C	R		T		[1.011] state
57	Setup Start take-over process	Setup messages = Enable	1 Bit	C		W			[1.010] start/stop
58	Setup Take-over process status	Setup messages = Enable	1 Bit	C	R		T		[1.011] state
59	Setup Test of a device	Setup messages = Enable	1 Byte	C		W			[5.010] counter pulses (0..255)
60	Setup Device under test	Setup messages = Enable	1 Byte	C	R		T		[5.010] counter pulses (0..255)
61	Setup Addr. progr. to all conn. devices	Setup messages = Enable	1 Byte	C	R	W	T		[5.010] counter pulses (0..255)
62	Setup Device reset (255=all)	Setup messages = Enable	1 Byte	C	R	W	T		[5.010] counter pulses (0..255)
63	Setup Program device address (1)	Setup messages = Enable	1 Byte	C	R	W	T		[5.010] counter pulses (0..255)
64	Setup Program device address (2)	Setup messages = Enable	1 Byte	C	R	W	T		[5.010] counter pulses (0..255)
65	Setup Device prog/reset feedback	Setup messages = Enable	1 Bit	C	R		T		[1.002] boolean
100 +[n-1]*6	Group n Set on/off	Groups messages = Enable (1 ≤ n ≤ 16)	1 Bit	C		W			[1.001] switch
101 +[n-1]*6	Group n Dim level	Groups messages = Enable (1 ≤ n ≤ 16)	4 Bit	C		W			[3.007] dimming control
102 +[n-1]*6	Group n Set % level	Groups messages = Enable (1 ≤ n ≤ 16)	1 Byte	C		W			[5.001] Percentage (0..100%)
106 ... 192	Group n								
200 +[n-1]*10	Device n Set on/off	Device installed ≥ n (1 ≤ n ≤ 64)	1 Bit	C		W			[1.001] switch
201 +[n-1]*10	Device n Start stairs light	Stairs light function = Enable	1 Bit	C		W			[1.010] start/stop
202 +[n-1]*10	Device n Set lock	Lock function = Enable	1 Bit	C		W			[1.003] enable
203 +[n-1]*10	Device n Dim level	Device installed ≥ n (1 ≤ n ≤ 64)	4 Bit	C		W			[3.007] dimming control
204 +[n-1]*10	Device n Set % level	Device installed ≥ n (1 ≤ n ≤ 64)	1 Byte	C		W			[5.001] Percentage (0..100%)
205 +[n-1]*10	Device n Scene	Scenes = Enable	1 Byte	C		W			[18.001] scene control
206 +[n-1]*10	Device n Status on/off	On/Off status = Enable	1 Bit	C	R		T		[1.001] switch

No.	Object name	Enabling condition	Dim.	Flags					DPT
207 +[n-1]*10	Device n Level % status	Percentage status = Enable	1 Byte	C	R		T		[5.001] Percentage (0..100%)
208 +[n-1]*10	Device n Lock status	Lock function = Enable	1 Bit	C	R		T		[1.011] state
209 +[n-1]*10	Device n Fault status	Failure status = Enable	1 Bit	C	R		T		[1.011] state
210 ... 839	Device n								

Links and use

A slow-blow 1.25 A high-breaking capacity fuse (T1.25AH) must be provided to protect the mains supply line.
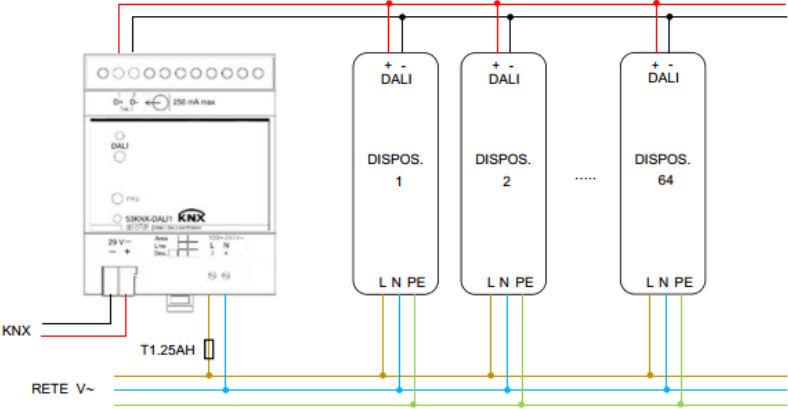
Max. length of DALI line connections:

Cable cross-section	Max. length
1.5 mm^2	300 m
1 mm^2	238 m
0.75 mm^2	174 m
0.5 mm^2	116 m

The use of a twisted and possibly shielded cable is recommended.