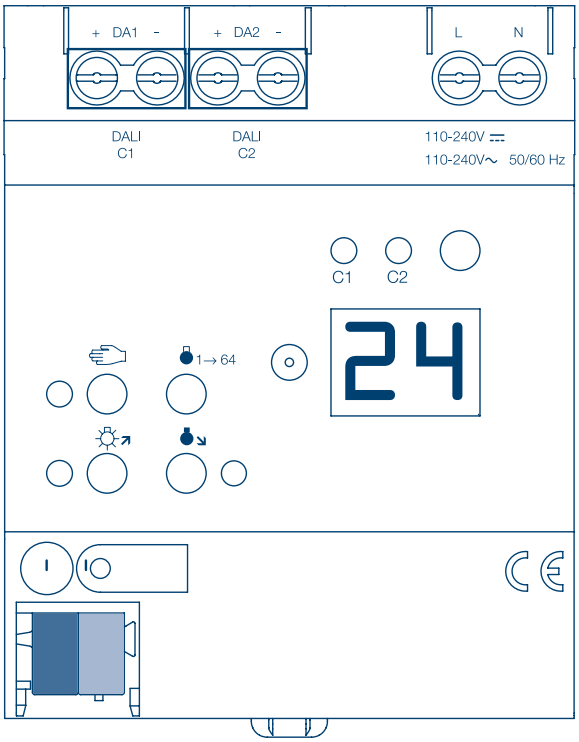
Operating and assembly instructions

KNX Building system technology

DALI Gateway



KNX DALI 2 Gateway, Secure,
1-cannel/ 2-channel
TYFS671D/ TYFS672D

hager

EN

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1 Safety instructions

Electrical devices may be mounted and connected only by electrically skilled persons.

Serious injuries, fire or property damage are possible. Please read and follow the manual fully.

Danger of electric shock. Always disconnect before carrying out work on the device or load. In so doing, take all the circuit breakers into account, which support dangerous voltages to the device and or load.

DALI is an FELV (functional extra-low voltage). On installing, ensure safe isolation between KNX and DALI and mains voltage. A minimum distance of at least 4 mm must be maintained between bus conductors and DALI/mains voltage cores.

These instructions are an integral part of the product, and must remain with the end customer.

2 Function

Intended use

- Controlling of luminaires and other applications with DALI operating device in KNX installations, e.g. electronic ballast
- Mounting on DIN rail according to EN 60715 in distribution boxes

Product characteristics

- DALI-2 certified
- Control of up to 64 DALI devices in up to 32 groups ("1-fold" device variant)
- Control of max. 2x 64 DALI devices in max. 2x 32 groups ("2-fold" device variant)
- Setting the colour temperature or light colour (RGB, RGBW) for luminaires with DALI Device Type 8 in accordance with IEC 62386-209
- Short-circuit, overload and overvoltage protected
- Operating hours counter
- Automatic colour wheel sequence or brightness sequence
- HCL mode (Human Centric Lighting), automatic daytime colour temperature profile
- CT (Colour Transition) mode, automatic daytime colour profile
- Suitable for operation of emergency lighting systems with DC voltage
- Individual, group or central addressing
- 16 light scenes per DALI system
- Reading out of DALI device states via KNX, e.g. brightness or luminaire error
- Manual operation of the DALI groups, single devices or central (broadcast) separately for each DALI system

- Restraint or disabling functions
- Feedback of switching state and brightness value in bus and manual mode
- Collective feedback
- Central switching and dimming function
- Disabling function for each DALI group or each single device
- Separate switch-on and switch-off delay
- Staircase lighting timer with run-on time
- Online or offline project design of the DALI devices with ETS-DCA
- Standby switch-off of the DALI devices
- An individual DALI device of the same type can be exchanged during operation without software

Delivery state: Construction site mode, manual operation is enabled. The connected DALI operating devices of both DALI systems can be controlled via the keypad via the broadcast function.

The complete functionality of the DALI system can only be ensured if DALI-2 operating device is used exclusively.

A complete list of DALI-2 operating and control devices can be found here: https://www.dali-alliance.org/products

3 Operation

Controls and indicators for manual control

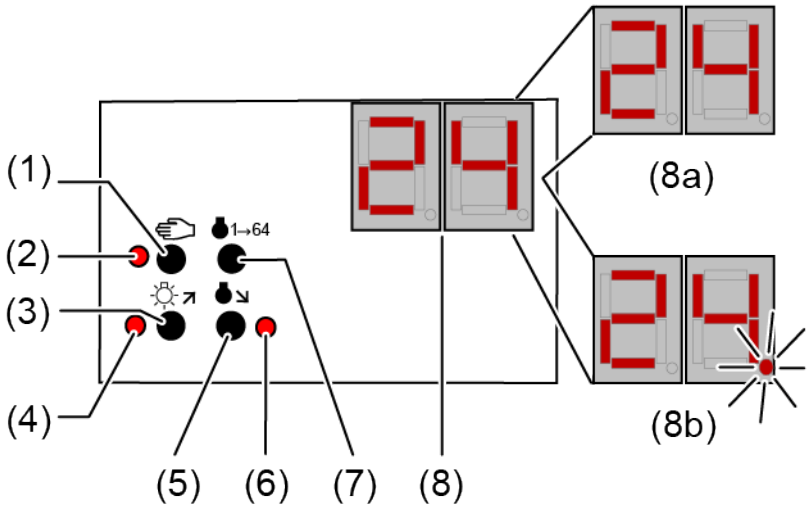

Figure 1: DALI gateway control panel, 1-gang

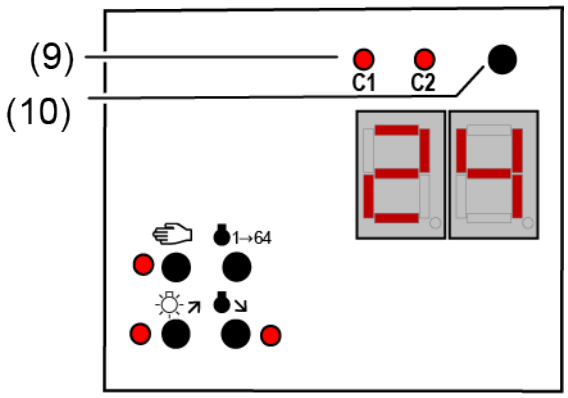

Figure 2: Extended DALI gateway control panel, 2-gang

(1) Button ☜
Manual operation

(2) LED ☜
On: continuous manual mode active
Flashing: temporary manual mode active

(3) Button ☼↗
Short press (< 1 s): ON / long press (1...5 s): dims brighter.

(4) LED ☼↗
LED ON in manual operation indicates a switched-on group/single device (brightness: 1...100 %).

(5) Button ●↘
Short press (< 1 s): OFF / long press (1...5 s): dims darker.

(6) LED ●↘
LED ON in manual operation indicates a switched-off group/single device (brightness: 0 %).

(7) Button ●1→64
All DALI subscribers OFF (only in permanent manual operation).

(8) Seven-segment display for indication of the number (1...16, 1...32) of a DALI group (8a) or the short address (1...64) of a single device (8b) selected by manual operation. In bus mode, there is no indication of the group number or short address. In addition, to display additional information:

- -: signals DALI initialisation phase, delay after ETS programming operation / mains voltage return or temporary status indication.

bc: indication during manual operation in broadcast mode (unprogrammed state, central control).

Er: indication of an impermissible external voltage at the DALI device connection terminals (e.g. mains voltage connected). DALI gateway without function. The gateway is not ready for operation again until the error has been eliminated and initialisation has been performed again (mains voltage return).

db: a high telegram load has been detected in the DALI system signalled by the LED (9). This high load can lead to disturbed operation (noticeable delays, telegram loss).

LE: signals automatic device replacement.

E: signals an error during automatic device replacement.

(9) LED of the active DALI system for manual operation (only with 2-gang device variant).
Permanently ON in manual mode or briefly ON (5 s) after pressing the changeover key in ongoing normal mode.

(10) Change-over button for DALI systems 1 and 2 (only with "2fold" device variant)

If (8) **bc** (broadcast operation) is indicated, all devices of a DALI system are controlled simultaneously. This is done in the following operating conditions:

- The device is not programmed (delivery state),
- In the KNX configuration, central control is set for the selected DALI system,
- In bus mode of manual operation, broadcast control is possible in addition to the control of groups and single devices.

With the 2-gang device variant, the change-over button (10) can be used to switch between operation of DALI systems 1 and 2. This is possible either while the device is in operation or during active temporary or permanent manual operation. Only the selected DALI system is ever operated via the keypad of the manual control. The LEDs (9) signal the DALI system effective for manual operation.

The change-over button (10) has no function during temporary status indication.

The LEDs (9) light up for the duration of the initialisation phase of the two DALI systems (after an ETS programming operation or after the mains voltage returns). The initialisation phase of the two systems may be of different length.

Switching on temporary manual operation mode

Manual operation is configured in the ETS and not disabled.

- Press the ☜ (1) button briefly (< 1 s).

  The LED ☜ (2) flashes. With the "2-gang" device variant, the LED (9) of the DALI system selected for manual operation is lit up.

  The first group number, short address or **bc** is indicated (8).

After five seconds without button actuation or after selecting the last DALI group or the last single device and pressing the button ☜ again, the device returns to bus mode.

Switching on/off the permanent manual mode

Manual operation is configured in the ETS and not disabled.

- Press the ☜ (1) button for at least 5 seconds.

The LED ☜ (2) lights up. With the "2-gang" device variant, the LED (9) of the DALI system selected for manual operation is lit up.

The first group number, short address or **bc.** is indicated (8). Permanent manual operation is switched on.

- or in case of repeated actuation for at least 5 seconds -

LED ☜ (2) is off, indication (8) is off, bus mode is switched on.

Operating DALI devices

The device is in temporary or permanent manual operation mode.

- Press the ☜ button (1) briefly as many times as necessary until the desired DALI group number or short address is indicated (8).
- Operate output with ☼↗ (3) button or ●↘ (5) button.
  Short: switch on/off.
  Long: dim brighter/darker.
  Release: Stop dimming.
  The LEDs ☼↗ (4) and ●↘ (6) indicate the status.

The numbers of the available DALI groups (8a) are indicated (8) first, and then the short addresses of the single devices (8b). If configured, **bc** for Broadcast appears at the beginning.

ⓘ After a device reset (mains voltage return, ETS programming operation), the switching state "OFF" may be signalled initially, regardless of the actual switching states of the DALI operating devices. In this case, the switching status is displayed correctly only after manual operation. This must be observed in particular in broadcast mode when individual operating devices of the DALI system are switched on before manual operation is carried out. The status LEDs then show the command of the last broadcast manual operation.

Switch off all DALI devices

The device is in permanent manual operation mode.

- Press the ●1→64 button (7).

Disabling/enabling individual DALI devices or groups

The device is in permanent manual operation mode and the lock is released.

Press ☜ (1) button briefly as many times as necessary until the desired DALI number is indicated (8).

- Press the buttons ☼↗ (3) and ●↘ (5) simultaneously for at least 5 seconds.
  The selected DALI number flashes on the display (8).

  DALI device or group is blocked.

  - or in case of repeated actuation -

The display (8) no longer flashes.

DALI device or group is enabled.

- Activate bus mode (see section Switching the permanent manual mode on/off).

DALI devices blocked via manual operation can be operated in manual mode.

4 Information for electrically skilled persons

4.1 Mounting and electrical connection

DANGER!

Electric shock when live parts are touched.

Electric shocks can be fatal.

Always disconnect device before carrying out work on it. To do so, switch off all corresponding circuit breakers, secure them against being switched on again and check that there is no voltage. Cover up any adjacent live parts.

Mount device

- Mount device on DIN rail.

Connect device

Control cable: appropriate type, cross-section and routing for the specifications for 230 V cables. DALI and mains voltage wires can be run together in a cable, e.g. NYM 5x1.5 mm².

- The DALI control voltage is a functional extra-low voltage (FELV). When installing, perform the installation in such a way that when an area is disconnected, the lines carrying both the DALI and also the mains voltage are disconnected.
- If multiple circuit breakers supply dangerous voltages to the device or load, couple the circuit breakers or label them with a warning to ensure tripping.
- DALI participants from some manufacturers have expanded functions and can be controlled, for example, via mains voltage on the DALI connection. When existing DALI installations are refitted, remove all corresponding operator controls.
- Connect device as shown in the connection example (see figure 3)

The mains voltage supply can also be provided by the DC voltage of an emergency lighting system.

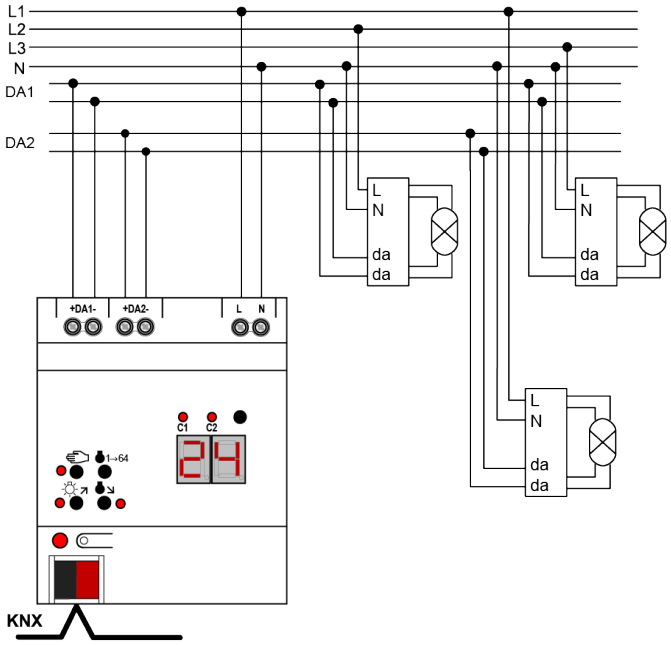

Figure 3: DALI gateway connection example, 2fold

- Attach the cover cap to the bus cable connection as protection against hazardous voltages.

If the display (8) shows **Er** (error), an installation fault occurred that causes mains voltage to reach the DALI cable. In this case disconnect the device and the DALI devices from mains voltage and disconnect bus voltage. Correct installation.

4.2 Commissioning

The device can be put into operation, after mounting of the device and connection of the bus line, the mains supply and the DALI cables. The following procedure is generally recommended...

Commissioning the device

- Switch on the mains supply of the gateway.
- Switch on the bus voltage.

  Voltage check: When the programming button is pressed, the red programming LED must light up.
- Configure and program the physical address with the help of the ETS
- Download the application program using the ETS.
- Commission the DALI system using commissioning software (DCA).
- Download the application program using the ETS again.

  The gateway is ready for operation.

It is not explicitly necessary to carry out DALI commissioning and reprogram the application program if the gateway has been integrated into an existing DALI installation (e.g. when replacing a device of the same type) and contin-

ues to be used with an unchanged DALI configuration (same short addresses, device types, group assignments, etc.). This is the case, for example, if a device is copied unchanged in the ETS project design or a configuration template is imported.

No ETS programming is possible if no mains voltage supply is connected.

Safe-state mode

If the device does not work properly - for instance as a result of errors in the project design or during commissioning - the execution of the loaded application program can be halted by activating the safe-state mode. In safe-state mode it is not possible to control the DALI operating devices via the KNX or by manual operation. The gateway remains passive in safe-state mode, since the application program is not being executed. Only the system software is still functional so that the ETS diagnosis functions and also programming of the device continue to be possible.

Activating safe-state mode

There are two options for activating the safe state mode.

Option 1:

- Switch off the mains voltage supply.
- Wait approx. 10 seconds.
- Press and hold down the programming button.
- Switch on the mains supply. Release the programming button only after the programming LED starts flashing slowly.

  Safe-state mode is activated.

Option 2:

Prerequisite: The mains voltage supply must be switched on without interruption.

- Switch off the bus voltage or disconnect the bus terminal.
- Press and hold down the programming button.
- Switch on the bus voltage or attach the bus terminal. Release the programming button only after the programming LED starts flashing slowly.

  Safe-state mode is activated.

Even in safe-state mode, a brief press of the programming button can switch the programming mode on or off as usual as long as the bus power supply is switched on. The programming LED then stops flashing, even though safe-state mode is still active.

Deactivating safe-state mode

- Switch off the mains voltage supply (wait approx. 10 s),

  or

- Perform the ETS programming operation,

  or

- Cause bus voltage failure.

Master reset

The master reset restores the default device settings (physical address 15.15.255, firmware is retained). The device must then be recommissioned with the ETS. Manual operation is possible.

In secure operation: A master reset deactivates the device security. The device can then be recommissioned with the device certificate.

Performing a master reset

Prerequisite: Safe-state mode is activated.

- Press and hold down the programming button for > 5 s.

  The programming LED flashes quickly.

  The device performs a master reset, restarts and is ready for operation again after approx. 5 s.

Restoring the device to factory settings

The device can be reset to factory settings with the Hager/Berker Firmware Update App. This function uses the firmware contained in the device that was active at the time of delivery (delivered state). Restoring the factory settings causes the device to lose its physical address and configuration.

5 Appendix

5.1 Technical data

KNX

KNX medium	TP 256
KNX commissioning mode	S mode
Rated voltage KNX	DC 21 ... 32 V SELV
KNX current consumption	4.5 ... 5.0 mA
Connection type for bus	Device connection terminal

Supply

Rated voltage	AC 110 ... 240 V ~
Mains frequency	50 / 60 Hz
Rated voltage	DC 110 ... 240 V
Power loss	max. 3 W

DALI

Rated voltage DALI	DC 16 V (typ.)
Output current per DALI system	Typ. 128 mA, max. 250 mA for short periods
Guaranteed bus current per DALI system	148 mA
Number of DALI subscribers	Max. of 64 per DALI system
DALI transmission rate	1.2 kBit/s
DALI protocol	EN 62386
Cable type	Sheathed cable 230 V, e. g. NYM

DALI cable length (see figure 4)

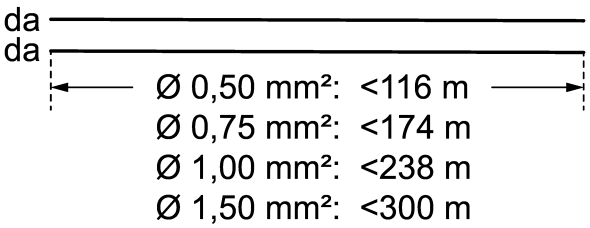

Figure 4: DALI cable length

Ambient conditions

Ambient temperature	-5 ... +45°C
Storage temperature	-5 ... +45°C
Transport temperature	-25 ... +70°C

Clampable cable cross-sections (see figure 5)

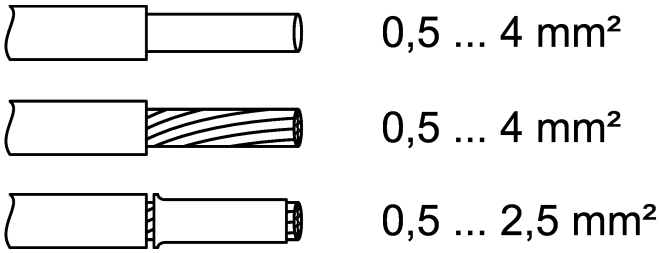

Figure 5: Clampable cable cross-sections

Installation width	72 mm / 4 HP
Connection mode	Screw terminal
Connection torque for screw terminals	Max. 0.8 Nm

5.2 Troubleshooting

Indication shows "Er", connected DALI devices have no function, no operation possible

Cause: Mains voltage on DALI cable.

Installation error. Disconnect device and connected DALI devices from mains voltage and disconnect bus voltage. Correct installation.

Indication shows "bc" in manual mode, control of individual luminaires not possible.

Cause: The device is not programmed or is programmed for central control.

Check device status or change operation from broadcast to group or individual control.

DALI groups or single devices cannot be operated

Cause 1: DALI groups or single devices disabled via bus or manual operation.

Cancel disabling.

Cause 2: Permanent manual mode is switched on.

Deactivate permanent manual operation mode.

Cause 3: Application programme has been stopped; programming LED is flashing.

Perform reset: Disconnect device from bus, switch on again after approx. 5 seconds.

Cause 4: Application programme is not loaded.

Check and correct the programming.

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