DALI 4Net

Datasheet

Central Control Device & Interface

Central control module for 4 DALI lines

> Art.Nr. 22176666 Art.Nr. 22176666-B





DALI 4Net Central DALI Control Device

Overview

- Independent light control of up to 256 DALI ballasts on 4 DALI-lines
- Configuration via Ethernet and PCsoftware tool DALI Cockpit
- Modbus TCP access (control & visualisation)
- With the DALI4Net control devices (input devices and sensors) and control devices on each DALI-line can be configured (Ethernet/DALI Interface)
- Addressing, configuration, status queries, monitoring
- Collision detection
- DIN rail mounting
- 24V power supply (e.g. 24V/300mA Art.Nr. 24166012-24HS)

- Basic version and standard version with additional central functions available
- Central functions:
 - crossline functions for input devices and sensors
 - programmable schedule, real time clock
 - o circadian daylight schedules
 - emergency function: starting of function and duration test





Specification, Characteristics

type	DALI 4Net	DALI 4Net Basic
article number	22176666	22176666-В

electrical data:

power supply	24VDC
typ. current consumption	90 mA
	1xEthernet 10/100Base-T, electrically isolated, isolation voltage
	1500VAC,
Ethernet	RJ45-connector
DALI	4 x DALI, electrically isolated

technical data:

-20°C +75°C
-20°C +60°C
II (when used/installed as intended)
IP40
IP20
2,5 mm ²
DIN rail
98 x 18 x 56 mm

type	DALI 4Net	DALI 4Net Basic
article number	22176666	22176666-В
supported functions:		
Gateway Modbus <-> DALI	\checkmark	\checkmark
ModBus TCP control	\checkmark	\checkmark
ModBus TCP queries	\checkmark	✓
Zone definition (areas over multiple lines)	\checkmark	✓
Real Time Clock	\checkmark	×
Central Scheduling	\checkmark	×
Crossline functions	\checkmark	×
Circadian daylight schedule	\checkmark	×
Emergency function	\checkmark	×
Sensor value polling	\checkmark	×









17,5mm

dimensions

connection plan



typical application

Installation

- supply voltage 24VDC (typ. current consumption 90mA)
- 4 DALI-outputs (DA0 ... DA3) for connecting 4 DALI circuits
- for the supply of the DALI-lines proper DALI power supplies (e.g. DALI PS) are required

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CUI		gu	ıa	u	

The DALI4Net and the DALI-lines can be configured with the help of the DALI-Cockpit software tool via Ethernet.

Network Settings, Date & Time

After Starting the Cockpit, the interface can be selected via the bus server menu (Menu: "DALI-Bus" -> "Bus Interface...").

Select **Ethernet -> Lunatone TCP** and enter IP of the device. Alternatively, the network can be scanned for devices (search-function). The DALI4Net is delivered with the following default network settings:

IP-Address:	192.168.0.99
Subnet mask:	255.255.255.0
Gateway:	192.168.0.1



After entering the IP-address, press "OK" to connect.

The network settings can be changed (Static IP/DHCP) in the DALI-Cockpit, after changing the settings the device reboots and has to be reconnected.

For the DALI-4Net the Real Time Clock can be set by pressing the "Change-Time" button. In case of a power loss an internal energy buffer keeps time and date up to date for 24 hours. (not supported by the DALI4Net Basic).

DALI 4 Net RTC Synchronizing	
Synchronize Device Clock	
22.03.2017 🔍 🛪 17:08:35 🚔 Set	
Close	
💡 🚛 read 🛛 💻 📸 🦞 save	
IP Address 192.168.0.174 IP Address 192.1666 Serial Number 22216666 Serial Number 1	Date 24.04.2017 Firmware Update Fime 14:53:24 Firmware Ver 0.2.112 Change time Network settings
DALI 4Net network setting	5
Network settings	automatically
Use the following IP a	address
IP Address:	192 . 168 . 0 . 99
Subnet Mask:	255 . 255 . 255 . 0
Default gateway:	0 . 0 . 0 . 0
	Change Cancel

Addressing

In the component tree on the left the 4 DALIlines can be selected. Each DALI-line can be addressed and configured separately. The corresponding connectors of each DALI-line are marked on the housing of the DALI 4Net. After addressing procedure all devices are listed as subset of the DALI-line in the component tree and can be accessed and configured by selection.



Crossline: Zones and Multiline-Access

With the DALI4Net it is possible to extend the effective range beyond a single DALI-line – by the definition of crossline zones:

A zone is a user-defined area across several DALI-lines. The number of zones is limited to 15. A group of each line can be assigned to a zone, i.e. groups with different numbers on each line can be combined in a zone (tab zones in DALI-Cockpit).



Zones can then be used as effective areas for control input devices or for control via Modbus TCP.

Apart from zones it is possible to access the same DALI-address (short address, group address broadcast) on several lines simultaneously.

Zones and multiline access can be tested in the tab "DALI-commands", at which these areas can be selected as destination of a DALIcommand.

DALI Commands	General	Zones	Scheduler	Trigger Actions	EM Device Setti	ngs	Cir	• •
Commands D	estinatio	n						
OALI Lin	es 🔳	Line 0	🔲 Line 1	Line 2	Line 3			
	AI	l (DALI Bi	oadcast)	•	•			
DALI Zo	ne Zo	one O		•				

Crossline functionality for Pushbuttons (Input Devices)

For the DALI MC+, DALI Switch, DALI MC4L, wDALI MC, wDALI Switch and wDALI Remote crossline settings are available on the respective device cockpit pages. Crossline functionality for other input devices can be realized via "Trigger Actions", see next section.

If one of the above mentioned input device is connected to one of the 4 DALI-lines the DALI-Cockpit offers options to select between local bus operation and DALI-line crossline functions (in the DALI4Net basic version only local bus operations are supported).

When using local bus operations a DALI-line internal destination address can be selected:



When using crossline operations for the destination address either a zone or a multiple line address (broadcast, group or DALI address) can be selected:



Crossline functionality - "Trigger Actions"

In the tab "Trigger Actions", links between the 4 lines can be created to forward DALI commands to other DALI lines.

With the template "Connect Areas" the DALI commands are forwarded bidirectionally between the defined areas of each line.

Frigger Actions:	ntion					
Iu Desch	puon					
	New DALI4Net	Trigger/Actio	ons from Templ	ate		×
	Trigger/Actio	ons template	e:		OK]
	Connect Are	eas		~	Cancel	
	Indu	de Sensors				
	Indu	de trigger on de fading and	Broadcast colour			
	Line 0 Are	ea: All (DAL	I Broadcast) 🗸		\sim	
	Line 1 Ar	ea: Group	~	G1	\sim	
	Line 2 Ar	ea: Single A	ddress 🗸 🗸	(A1)	\sim	
	Line 3 Ar	ea: none	~		\sim	

This means that the effective range of a push button can be extended to other lines via forwarding. The effective range of other lines can be: Broadcast, groups or addresses.

In order to create unidirectional or more complex links, a "Custom Trigger Action" can be created, where each trigger and following action can be selected individually.

New DALI4Net Trigger/Actions from Template	×
Trigger/Actions template: Custom Trigger Action ~	OK Cancel



Example: unidirectional forwarding of DALI commands from address A0 on Line0 to broadcast line1 and group1 line2

Hint: With double clicking on a created "Connect Area", this template can also be displayed and adapted in the form of individual triggers and actions.



"Connect Areas" Triggers and Actions editable via double click

The Trigger / Actions function can also be used to implement more special requirements, such as cross-line control and synchronization of sensors. Overview of the supported triggers / actions:

- 1. Connect areas
 - ➔ This allows areas to be logically connected on different DALI lines
 - Optional if connection is also applied to sensors: "Include sensors", higher-level broadcast commands "Include trigger on broadcast" and fading and colour: "include fading and colour"
- 2. Custom Trigger/Action
 - Here, DALI commands (or certain properties, such as an address match) can be used to trigger actions (DALI commands)
 - → Triggers can be:
 - Address match
 - Frame Match (exact command match)
 - Sensor Area Match
 - Special Command Match (colour, fading)
 - ➔ Actions can be:
 - Address change
 - Frame repeat
 - Sensor area forwarding
 - Special command forwarding

Example: Definition of a sensor area across DALI lines



Connecting the groups G0 on Line0 and Line1: All commands to G0 on one line are passed on to the other, this also includes sensor signals: "Include Sensors" and broadcast commands "Include Trigger on Broadcast", i.e. if G0 is, for example switched on by a broadcast command, G0 on line 1 is also switched on. By selecting "include sensors", DALI CS sensors can work across lines and synchronize.

Example: Broadcast commands should always affect all 4 DALI lines

Definition of trigger: address match broadcast

Trigger Action Group	
Triggers Add Edit Delete	Actions Add Edit Delete
Edit Trigger	×
Type: DALI ~	Mode: Address match V
☑ Line 0 ☑ Line 1	☑ Line 2 ☑ Line 3
Destination Address: Alle (DALI Broadcast) ~	~
	OK Cancel

Definition Action: Adress Change to Broadcast

Edit Trigger Action Group	×
Triggers Add Edit Delete Edit Action	Actions Add Edit Delete X
Settings	
Type: DALI V	Mode: Address change V
⊡Line 0 ⊡Line 1	☑ Line 2 ☑ Line 3
Destination Address: Alle (DALI Broadcast) ~	
	OK Cancel

Edit Trigger Action Group				×
Triggers		Actions		
Add Edit	Delete	Add	Edit	Delete
DALI Address Match	to B on L0,1,2,3 L0,1,2,3			

➔ If a command is sent Broadcast on any of the DALI lines, it will be forwareded broadcast on all other lines as well.

Scheduler Configuration

The DALI4Net offers a programmable scheduler function (not supported in the DALI4Net Basic).

In the "Scheduler"-tab the entries of the scheduler can be added, edited and deleted.

A maximum of 128 storage locations for scheduler entries are provided.



For each scheduler entry the following parameters can be set:

- name of entry (not stored in device, only in config file)
- effective range (zones and single addresses, groups or broadcast for each DALI-line)
- timestamp of action
- days (weekdays, days of month) and months on which action has to be executed
- action (DALI-command)

lit Scheduled Task					
Settings					
Enable	Name: Sched	uler entry 0			
Zones:	Line 0:	Line 1:	Line 2:	Line 3:	
Select	BG	A B G	A B G	A B G	Α
Zone 0	Group 11 Group 13 A0 A13 A32 A61				
Time 19:30	Active month	s 🗌 Jan 🗌 Feb	☐ Mar ☐ Apr ☐ Sep ☑ Oct	May Jun	
() Weekly	 Monthly 				
Toggle selection 1 2 11 12 21 22]3 □4 □ 9]13 ☑ 14 □ 9]23 □ 24 □ 2	5 6 7 (15 16 17 (25 26 27 (8 □9 ⊻10 □18 □19 ⊻20 □28 □29 □30	31	
Befehlstyp:					
DALI Command			POWER		~
		Data: 94	4.69 %		

Example: in the entry "Scheduler Entry O" from the screenshot above ZoneO, group 11, 13 and the single addresses AO, A13, A32, A61 on DALI-Line O are switched to 95% at 19:30 on 10th /13th /14th and 20th of october.

Please note that for a valid entry months as well as days have to be defined.

The "Scheduler Entry 0" in the example above requires 7 storage locations out of the 128 available, because for each of the 7 effective ranges a individual storagelocation is required.

Emergency Functions

In the "EM Device Settings" tab, emergency lighting devices (device type 1 (DT1)) can be divided into up to 8 emergency groups.

llgemein	Zones	Scheduler	Trigger Actions	EM Device S	ettings	Circadia	in Settings	1
Emergenc	y Devices	:						
N	Bus	Address			Group			,
0	0	A0			0			
32	0	A8			0			
33	0	A9			0			
34	0	A10			0			
8	DALI 4	Net EM Devid	e Config			×		
35								
36		ine 0	O Line 1	O Line 2	OL	ine 3		
37	0			0	0			
16	EM	Device Addre	ess:	EM Group	:			
38	(A)	0)	~	G0		~		
39								
40			_					
24				OK	Can	cel		
41								
42	3	A9			0			
43	3	A10			0			
1	0	A1			1			
44	0	A11			1			
9	1	A1			1			
45	1	A11			1			
17	2	A1			1			•

For the defined emergency groups, schedules with entries for function test, duration test and communication tests can then be specified.

Edit Scheduled Task				×
Settings				
🗹 Enable	Name: Function	Test		
Zones:	Line 0:	Line 1:	Line 2:	Line 3:
Select	B G A	B G A	B G A	B G A
Uhrzeit	Active months			
<mark>)2</mark> :00 👤	E Ali	⊿Jan ⊠Feb ⊠ ⊿Juli ⊠Aug ⊠	März ☑ Apr [Sept ☑ Okt [☑Mai ☑Juni ☑Nov ☑Dez
Wöchentlich	() Monatlich			
Mo Di Mi Do	Fr Sa So Feier	tagen		
Befehlstyp: Emergency Start Fun	ction Test	 EM group 	✓ EM gr	oup 0 V
				OK Cancel

Please note: Only the results of the last test carried out are saved in the DALI4Net, i.e. for the logging of the tests these results must be read out cyclically via Modbus commands. For details on the ModBus commands, please refer to the manual.

Circadian Daylight Schedule

With the circadian daylight function, the DALI4Net offers the option of automatically adjusting the colour temperature of DT8capable tunable white luminaires. In the "Circadian Settings" tab, two daily curves (for the longest and shortest day of the year) with each 24 support points (one for each hour) can be defined.

The colour temperature value is interpolated between each time point throughout the day, as well as between the two defined curves over the course of the year.

The colour temperature of the circadian function is updated and sent to the luminaires every minute.

As effective range for the circadian daylight function, the groups 0 to 15 can be selected for every line.

Allgem	ein Zones	Scheduler	Tr	igger Action	ns EM	Dev	ice Set	tings	Circadia	an Setti	ngs	•
Circadia	n configurati	on:										
Hour	Jun %	Dec %	^							_	2700	۹K
00:00	2700	2700									2700	
01:00	2700	2700		_						-		_
02:00	2700	2700									2700	٩K
03:00	2700	2700										
04:00	2700	2700										
05:00	2700	2700		Line 0 Act	ive Grou	ps						
06:00	2700	2700			1	2	3	4	5	6	7	
07:00	3412	2700										_
08:00	4101	2870		ø	la 🗆	110		L] 12	L] 13	14		5
09:00	4767	3336		Line 1 Acti	ve Group	os						
10:00	5318	3722			1	2	3	4	5	6	7	
11:00	5685	3979			· –	10			— 12			_
12:00	5800	4060		LI® L	19 []	10		L] 12		14		
13:00	5685	3979		Line 2 Act	ive Grou	ps						
14:00	5318	3722		∕0	1	2	3	4	5	6	7	
15:00	4767	3336				110		112	□ 12			_
16:00	4101	2870			1° L	110		12		L 14		
17:00	3412	2700		Line 3 Acti	ve Group	os						
18:00	2700	2700]1	2	3	4	5	6	7	
19:00	2700	2700			1 <u>0</u> []	10	11	11 2	□ 13	□ 14		
20:00	2700	2700		L	17 LI	10		L] 12	15	14		,
21.00	2200	2200	×									

10

ModBus-TCP/IP Access

Modbus TCP/IP is part of the serial modus communication protocol for TCP/IP networks using port 502. The following Modbus functions are supported for accessing the DALI4Net:

Function Name	Function Code	Description
Read Multiple	03	Read Data Blocks
Holding Registers		From Device
Write Multiple	16	Write Data Blocks
Holding Registers		To Device
Read/Write	23	First Write, then
Holding Registers		Read from Specific
		Address, function
		used to send DALI
		commands

The Read/Write operations to Modbus registers are used to configure DALI4Netfunctions as well as to access DALI-lines directly. Furthermore status and level of all control gear on a DALI-line can be polled simultaneously.

For further details to Modbus-TCP access please check the manual: <u>https://www.lunatone.com/wp-</u> <u>content/uploads/2018/03/22176666 DALI4Net M</u> <u>anual EN M0002.pdf</u>

and the Modbus TCP example collection: https://www.lunatone.com/wpcontent/uploads/2021/01/DALI-4Net-Access-via-Modbus-Sample-Collection.pdf

Sensor value polling- Registers 6100-7123

With the DALI 4Net it is also possible to automatically poll and log sensor values. The most recent value is saved in the DALI4Net and can be queried via registers 6100-7123. Supported sensors are DALI CS (Art.Nr. 86458621), DALI LS (Art.Nr. 86458674) and DALI Temp (Art.Nr. 86459544). To do this, the DALI4Net must first be configured accordingly. This is possible in the DALI Cockpit, under the tab "General" section "Sensor Polling", by adding the sensor via "New..." and specifying its line and address (if all sensors in the system are to be added, this can be done using the button "add all").

The index number in the table then indicates the register number for the query: index 0 corresponds to register 6101.

Lines Polli	ng				
🗹 Lin	e O	🗹 Line	• 1	☑ Line 2	🖂 Line 3
Sensors P	olling	_			
S	ettings				
Index 0	Line 1	Address eA0	Type Lightsensor (D	ALI CS/LS)	Instance Target
Nev	v	Edit	Delete		add all
Nev	v	Edit	Delete		add all
Nev LI 4Net S	v Sensor Poll	Edit	Delete Poll time [s]	⊡ En	add all
Nev LI 4Net S En	w iensor Poll Name Lightsens	Edit ing config sor (DALI CS/	Delete Poll time [s] . 255	∑ En Polit i	add all
Nev LI 4Net S En	v iensor Poll Name Lightsens Tempsen	Edit ing config sor (DALI CS/ sor (DALI CS)	Delete Poll time [s] 255	Poll ti	add all X able me:
Nev LI 4Net S En	v iensor Poll Name Lightsens DALI Tem DALI Tem	Edit ing config sor (DALI CS/ sor (DALI CS) up Ext	Delete Poll time [s] 255 255 255 255 255 255 255 255 255 25	Poll ti	add all X able me: 255 s
Nev Ll 4Net S En	w Name Lightsen: DALI Tem DALI Tem	Edit ing config war (DALI CS/ sor (DALI CS/ vp p Ext	Delete Poll time [s] 255 255 255 255	Poll ti	add all X able me: 255 s

Under "Settings..." the polling time for the various sensor types (light and temperature) can be set.

Purchase Order Information

Art.Nr. 22176666: DALI 4 Net, 4 Line ModBus to DALI gateway with central controller functions

Art.Nr. 22176666-B: DALI 4 Net Basic, 4 Line ModBus to DALI gateway

Accessories: Art. Nr.: 24166012-24HS, 24VDC/300mA power supply, DIN rail, 1DU

Additional Information and Equipment

DALI-Cockpit – free configuration tool from Lunatone for DALI systems <u>https://www.lunatone.com/en/product/dalicockpit/</u>

Lunatone DALI products http://www.lunatone.at/en/

Lunatone datasheets and manuals http://lunatone.at/en/downloads/

DALI 4NET Modbus TCP Manual https://www.lunatone.com/wpcontent/uploads/2018/03/22176666 DALI4N et_Manual_EN_M0002.pdf

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Disclaimer

Subject to change. Information provided without guarantee. The datasheet refers to the current delivery.

The compatibility with other devices must be tested in advance to the installation.