OPTOTRONIC® LINEAR (non-isolated)

Approval marks in July 2013

OTi DALI 90/220-240V/1A0 LT2 L (SMART Interface)

TOUCH DIM SENSOR | CORRIDOR FUNCTION | SMART GRID | DALI | STAND-BY < 0.3W

EPBD European Building Directive

Fit for SMART Grid

Diversity. Quality. Efficiency.

Driver product features

- Supply voltage: 198-264 V (AC) / 176-276 V (DC)
- Output Data: 54-240 V / 250-1000 mA / 1.5-90 W
- Line frequency: 0 Hz, Pulsating DC, 50 - 60 Hz
- Suitable for use in emergency lighting systems as per EN 50172/DIN VDE 0108-100
- Dimming range: 1 to 100 % luminous flux (Combi PWM / Linear Dimming)
- Energy efficiency > 92 % (Full Load) / > 90 % (Half Load)
- Lifetime up to 100,000 hours and more (Tc – 10 °C)
- Suitable for luminaires of protection class I
- Suitable for New OSRAM SELV and NON-SELV (SLIM) Modules
- Smooth Dimming behaviour
- Effective Overtemperature Protection of the dimmable System (Intelligent Thermomanagement of the Driver)
- Very low Stand-By consumption < 0.3 W
- Tc = +75 °C (max.)
- Max. cable cross section for plug contact*: “s”: 0.5...1.5 mm² / “f”: 0.75...1.5 mm²

* “s“ = “solid“ = Single-wire conductor, “f“ = Multi-wire conductor

DALI product features

- Compliance with the DALI standard to IEC 62386 latest Edition 2012
- DALI Control Input protected against overvoltage and polarity reversal
- **Touch DIM®** and **Touch DIM® Sensor** function: Manual dimming (Touch DIM®) without any controller and with standard switches, incl. memory function (double click) and soft start (Last Switch-On Level)

Approbations (in July 2013)

- Safety: to EN 61347-1, 61347-2-3, 61347-2-13, 62384
- Lamp operation: to EN 60929
- DALI standard: to IEC 62386 – 101, 102, 207
- RFI requirements: to EN 55015: 2007+A1:2007 (300 MHz compliance)/CDN
- Line harmonics: to EN 61000-3-2
- Immunity: to EN 61547
- EL (Emergency Lighting): to IEC 61347-2-3 / App. J
- Emergency Installation: to EN 60598-2-22
- Suited for Central Battery Systems: to EN 50172

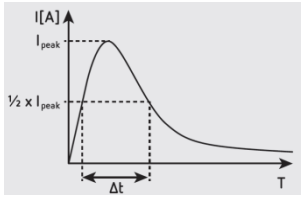
Easy. Flexible. FIT.

- **SELV / NON-SELV System FIT**
  - Operation Area for SELV-/NON-SELV Modules (Combination of Serial/Parallel Module Connection)
- **Corridor Functionality** on 3 Dimming Level Basis
  - Triggered via Commodity Relay Presence-Sensor or Push Button for 220-240V
  - NO DALI Controls needed
- **TouchDIM RELEASE**
  - **Auto Switch-Off @ sufficient Light Levels**
  - Optimized Synchronity of DALI participants in one control loop
  - Suitable for Pulsating DC Input → No limitations in length of control loops
- **SMART Interface** Driver/Module: Auto Current Set
- **Easy FIT for Emergency**
  - Automatic DC detection (0 Hz, Pulsating DC (50/60 Hz), On/Off switchable)
  - Configurable emergency power characteristics (1…100 % Lum. Flux / DEFAULT: 15% Arc. Power);
  - Locking Functionality of DALI parameters for Higher Safety (Read Only Mode)
  - Re-Installation of AC Level/Conditions before DC operation (Auto AC/DC)
- **Constant Lumen Output (CLO) / Flex. Current Setting**
  - Compensation of Lm-Degeneration over Module Lifetime
  - Pre-Set CLO Functionalities
  - Current Setting for highest Module-Variety
- **Power2Module Technology**
  - Power Boost Mode for Higher Lm-Packages on demand / CLO via Flexible Flag Setting
- **Smart Monitoring & Management**
  - Feedback of Power Consumption (High Range/Resolution)
  - Feedback of Detected Module & Module Operation Counter (Resettable)
  - Overvoltage Monitoring (Detection of up to 3 sep. OV events)
- Switching b/w Linear/Logarithmic Dimming Curve for Daylight Simulations / Special Effects
- Memory Bank Usage: **Public Information Management** w/ Internet XML description

GREY: Available > 2014

Technical Specification

Input (Mains) Specification		
Nominal Voltage		220-240 V
Nominal Frequency		0 / 50…60 Hz / Pulsating DC
Min. AC Voltage for Starting		176 V
AC Operation on		198-264 V
Min. DC Voltage for Starting		198 V
DC Operation on		176-276 V
Max. allowed Input Voltage (2h)		350 V (AC)
Output (LED Module) Specification		
Rated Output Operating Voltage		54-240 V
Rated Output Operating Current		250 – 1000 mA
Max. Output Voltage (w/ Open Circuit)		<250 V DC
Output Current Accuracy		±5 %
Max. Output Current Ripple		<10 % (@ 100 Hz)
Total Harmonic Distortion (THD)		<10 %
Max. allowed cable length (SUM all Modules)		2 m
Leakage Current / ECG		<0.5 mA
Efficiency / Stand-By Power		
Energy efficiency		> 92 % (Full Load) > 90 % (Half Load)
No Load Power (EuP 2009/125/EC – r)		< 0.5 W
Stand-By Power (AC + DC Mode)		< 0.3 W
Power Factor (@ Pmax.)		> 0.95
Dimming Interface		
Dimming Range		1…100 %, DALI
Way of Dimming: Smart Combination (PWM < 250 mA / Linear Dimming ≥ 250 mA)		PWM (463 Hz) / Linear Dimming
Constant Lumen Output (CLO)		70…100 % settable
Starting Time		< 0.3 s
Temperature / Lifetime Conditions		
Ambient Temperature Range		-25…+50 °C
Max. allowed Tc - Temperature		+75 °C
Ballast Lifetime	Advanced Lifetime	Failure Rate
50.000	100.000	<10 %
Tc = +75 °C	Tc = +65 °C	
Protection Class		IP 20
Push In Terminals (Wago 250) Max. cable cross section for plug contact*		"s": 0.5...1.5 mm² "f": 0.75...1.5 mm² * "s" = "solid" = Single-wire conductor, "f" = Multi-wire conductor

Inrush Current / Max. ECG per Circuit Breaker (unipolar version)					
typ. $I_{peak}/\Delta t$ ($V_{Mains} = 230\ V$, network impedance 1Ω)					
	CB Type	**10 A**	**16 A**	**20 A**	**25 A**
53 A / 200 µs / 22 µF Cap.	**B**	8	13	16	20
	C	13	22	27	34

Max. allowed cable capacitance	
Any Lead to Ground	100 pF
Ballast to Ballast (all leads)	5 pF
Mounting Screws	M4 max.

Tab. 1: **Driver`s Technical Specification**

Operation Areas: Combinations w/ OSRAM NON-SELV/SELV Modules 630/1000/2000 lm

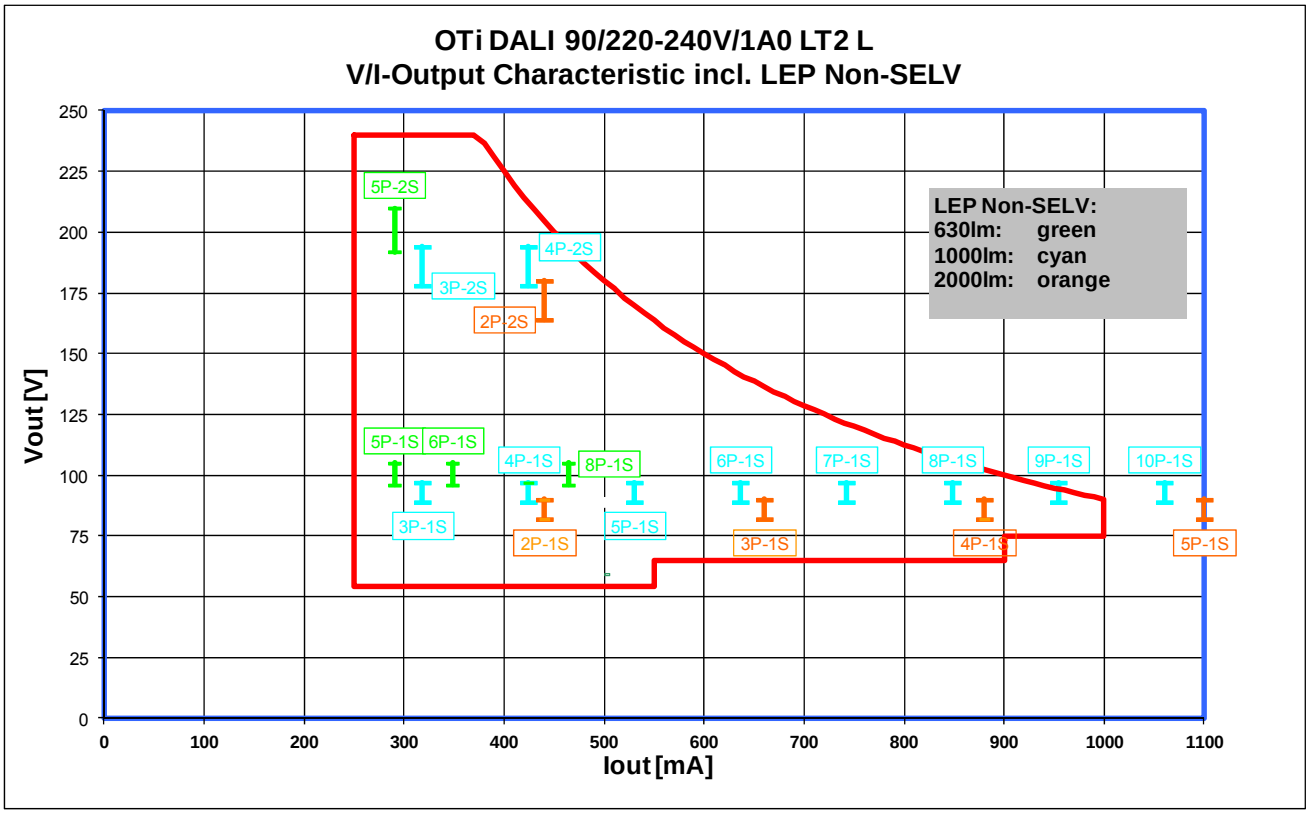


Fig. 1: **Different Lm-Packages w/ NON-SELV** Module Combinations (Example w/ Luminous Color 830)
P: Parallel / **S**: Serial Wirings

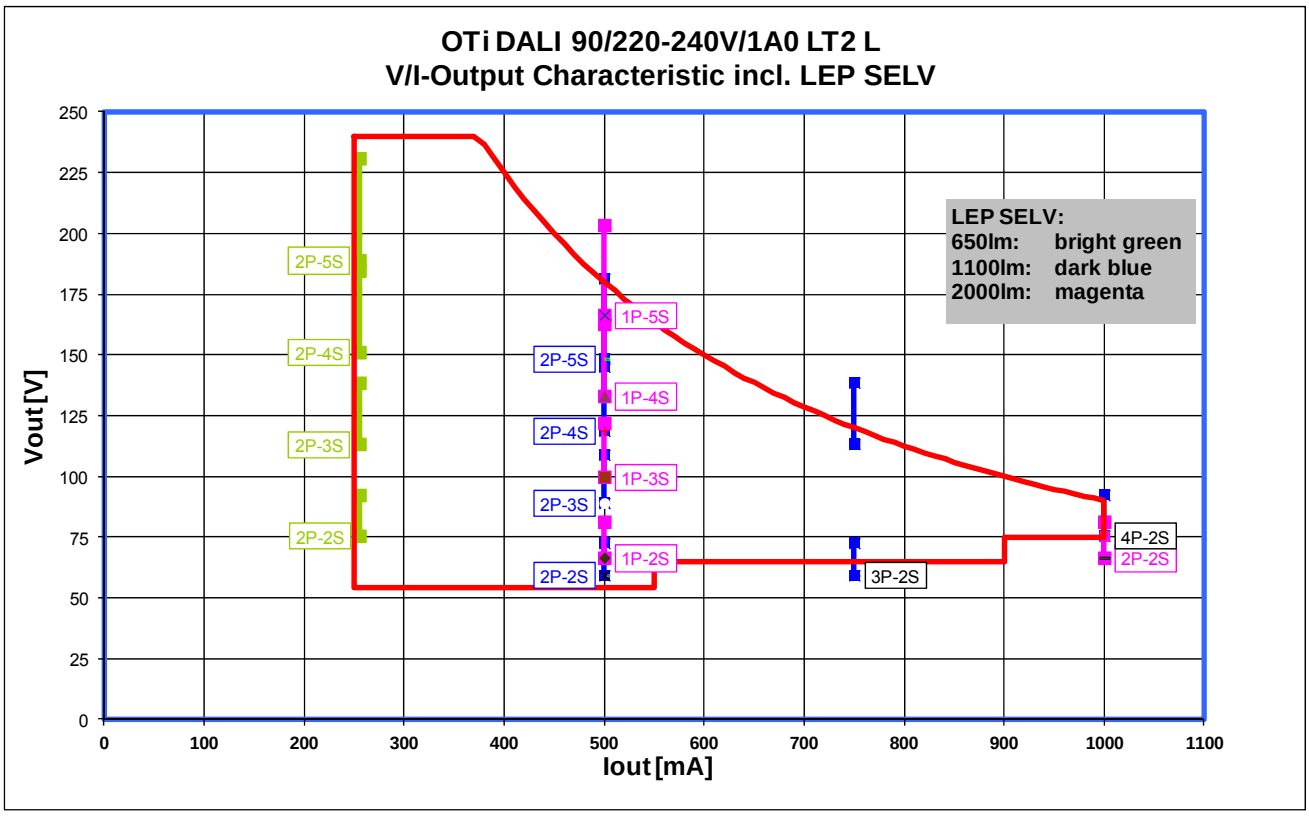


Fig. 2: **Different Lm-Packages w/ SELV Module** Combinations (Example w/ Luminous Color 830)
P: Parallel / **S**: Serial Wirings

DALI (GII): Corridor Function & Parametrization Possibilities

a) Description

The Corridor Function is a Driver`s **Automatic Dimming Functionality** of ALL OSRAM DALI (GII) ECGs having the **Corridor Function Symbol** on their Rate Stamp. **Switching the mains voltage** (220-240V, 50/60Hz) **on the DALI Inputs** (DA, DA) of the ballasts via commercial Relay Presence detectors (or Staircase Automates) **triggers the Automatic Corridor Dimming** behaviour. This solution is used for cost-effective Energy Saving installations in Floors, Staircases, Storage Halls etc. w/o add. Light Management Peripheries. OSRAM DALI (GII) drivers being in Corridor Mode are **synchronized via the mains frequency** (50/60 Hz) to guarantee SAME operation behaviour when controlled by the SAME sensor – the number of participants in one Corridor Mode control loop is only limited by the Sum of participants` Inrush Currents allowed per Phase.

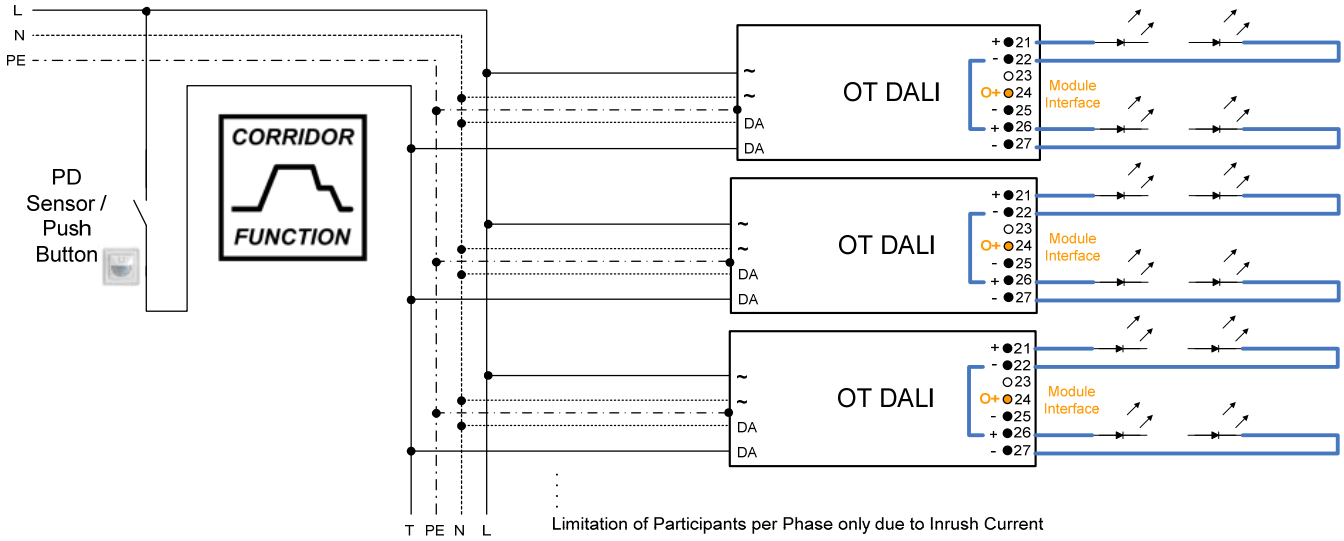


Fig. 3: Wiring diagram of OSRAM DALI (GII) drivers, being in Corridor Operation Mode

b) Entering/Leaving the Corridor Mode

The **Corridor Mode can be entered** (from DALI or TouchDIM Mode) by providing a **220-240V/50,60Hz Signal** on driver`s **DALI input** for longer than **120 (50 Hz), 100 (60 Hz) seconds, permanent**. Defined **change-over from Corridor Mode to TouchDIM Mode** by **5 single short push events** (Push Button, switching mains 220-240V/50,60Hz) **w/in 3 seconds**.

c) Parametrization of Corridor Function

The 3-Levels Corridor Function can be **easy set via DALI magic/wizard System** (see also DALI wizard manual). The settings (Light Levels (A, B, C), Delay- & Stand-By Times (D0, T1, T2), Fade Down Times (F1, F2)) are stored in the ballast - no intelligent external peripheries are needed.

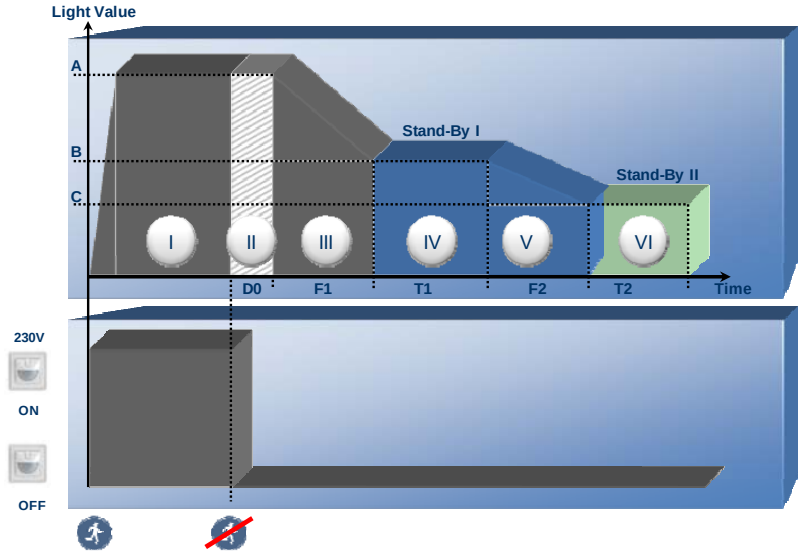


Fig. 4:
3 Dimming levels (1….100%)
Free parameterization (I…VI) via DALI magic

DEFAULT Values:
A: 100%, D0: 120s, F1: 32s
B: 10%, T1: Endless
C: OFF

DALI (GII): TouchDIM® Function & Parametrization Possibilities

a) Description

The Standard TouchDIM® Function is used to ALL OSRAM DALI drivers – pls. refer to OSRAM Application Notes / Installation hints for detailed description. OSRAM DALI (GII) ECGs offer **extended TouchDIM® features** as follows:

- **Flexible Setting of TouchDIM® parameters** via **DALI magic/wizard system**
- **Automatic LED Modules` Switch-Off at sufficient light level** (Controlled via Light- / Presence Detection Sensor)
- Additional **Operation in Pulsating DC** (i.e. via mains rectifying diode) for control loop lengths w/o limitations
- **Optimized Synchronity of participants in SAME control loop** (lowest asynchronity)

b) Parametrization of TouchDIM® Function in OSRAM DALI (GII) drivers

ALL OSRAM DALI (GII) ECGs allow the **free setting of TouchDIM® parameters** (i.e. min./max. Levels, Fade Up- & Down Times, Time Outs, Standby Times, Switch On Levels etc.) via DALI magic/wizard System (see also DALI wizard manual). Advanced Setting options allow the enabling/disabling of TouchDIM® specific control options (i.e. Short/Long Push, Double Push etc.) or the Automatic LED Modules` Switch-Off at sufficient light level.

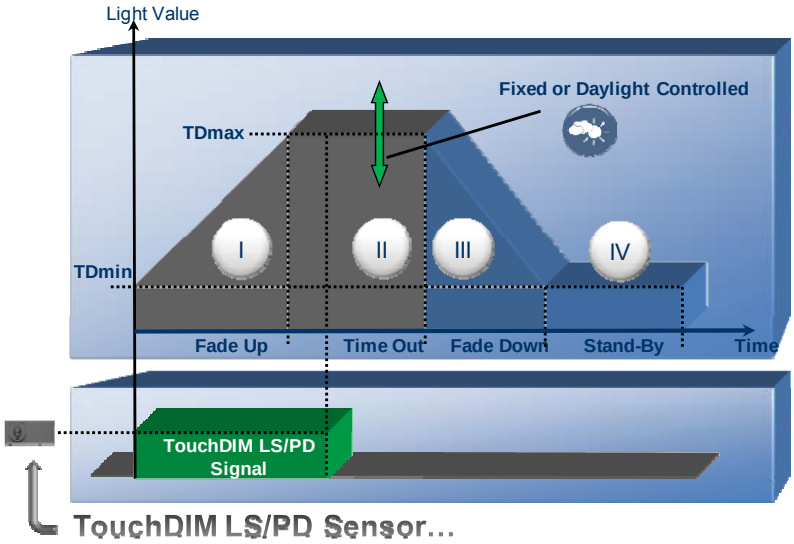


Fig. 5:
TouchDIM® Functionality
Free parameterization (I…IV) via DALI magic

DEFAULT Values:
Fade Up Time: 0.7 s
Fade Down Time: 32 s
Time Out: 15 min.
Standby Time: 5 s

c) Automatic LED Modules` Switch-Off at sufficient light level

Using TouchDIM® Functionality in **Light- /Presence Detection Sensor Mode** (LS/PD Signal), OSRAM drivers perform a regulation of luminous flux to guarantee **constant light levels on working areas** during presence. The correlation: **The more natural light incidence, the less artificial light is necessary for getting constant light levels**.

Being already on Control Limits (min. Dimming Level (TD min.)), OSRAM DALI (GII) ballasts offer the possibility to **Switch-Off Light** (disable PIR signals of the TouchDim® Sensor) as long as the **Light Sensor detects a Light Level which is above the set Threshold level** (Default 25 Lux) for **more than 1 min.** (incl. 5 s Standby Time). A reduction of the natural light incidence causes a value drop below the Threshold Setpoint and reactivates the driver to guarantee constant light levels on working areas during presence (Enabling of PIR signals).

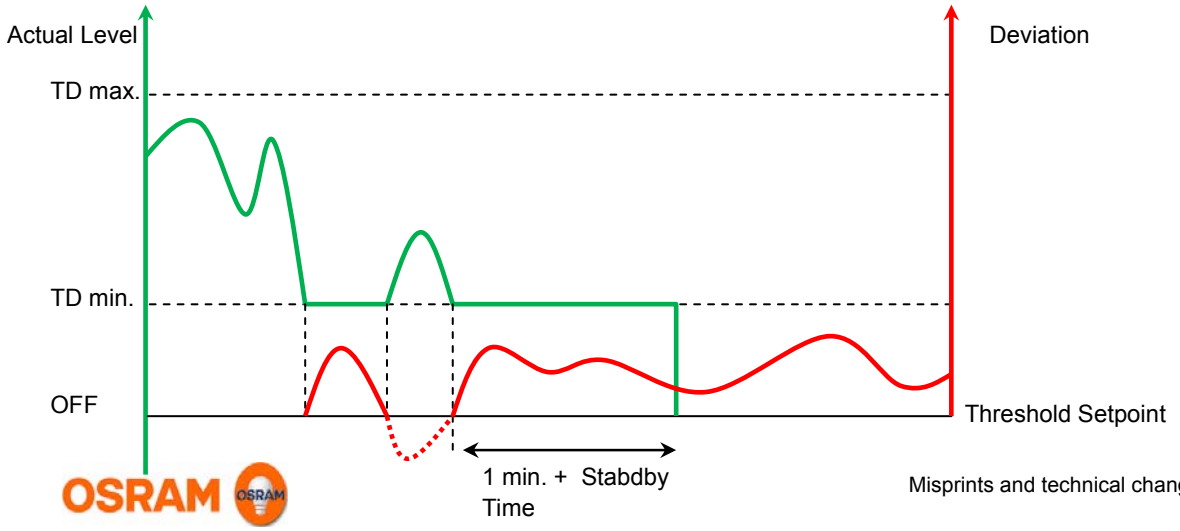
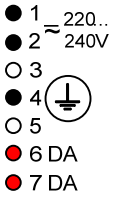
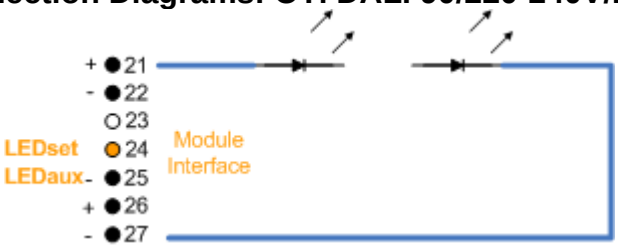


Fig. 6: **TouchDIM®** Automatic Switch-Off Concept for OSRAM DALI (GII) drivers

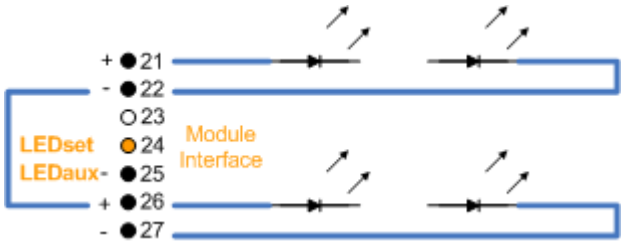
Pinning / Connection Diagrams: OTi DALI 90/220-240V/1A0 LT2 L



Input Pinning
Fig. 7



Output Pinning
Fig. 8



Output Pinning w/ ECG Internal Through Wiring

Lines 21/27 (21/22–26/27) max. 2 m whole length (incl. ALL Modules)

SMART Module Interface: OTi DALI 90/220-240V/1A0 LT2 L

a) General Description

LEDSet2 is a 1-wire analogue interface (Pin 24 / in Fig. 8) designed for OPTOTRONIC® constant-current LED drivers. The interface uses LEDaux (-) as reference Ground (PIN 25 or 27 for external Resistor Connection) and supports the following functionalities:

- Output current setting of the constant current LED driver (LED module self recognition)
- Handling of Parallel LED modules connection (Multiple parallel LED strings)
- Thermal protection of the LED module

The output current can be set by a simple external resistor placed between the Driver`s PINs 24, 25 or by intelligent Modules themselves, supporting LEDSet2 . The interface is safe proof in case of broken connection of the control wire.

b) LEDSet2 Connector Configuration

- PIN 21, (26) is the positive power line LED (+) to the LED load, RED coloured on the Driver.
- PIN 24 is the output of the internal constant voltage source LEDSet2 (O+), WHITE coloured.
- PIN 22, (27) is the power return line LED (-) from the LED load as well as the ground reference for the interface logic (signal ground), BLACK coloured.

c) LEDSet2 characteristic

The relation between Rset and the driver output current (Iout) is defined by the following equation:

$$Iout = \frac{Kv}{Rset} \times 1000 \quad (1)$$

Where Kv is a fixed voltage source of 5 V generated by the driver`s interface circuit and delivered by the control wire to the external resistor Rset used to set the desired LED operating current. Rset-Iout characteristic is shown in Fig. 9. The relation is valid for values of Iout w/in the current range 0.1–5 A.

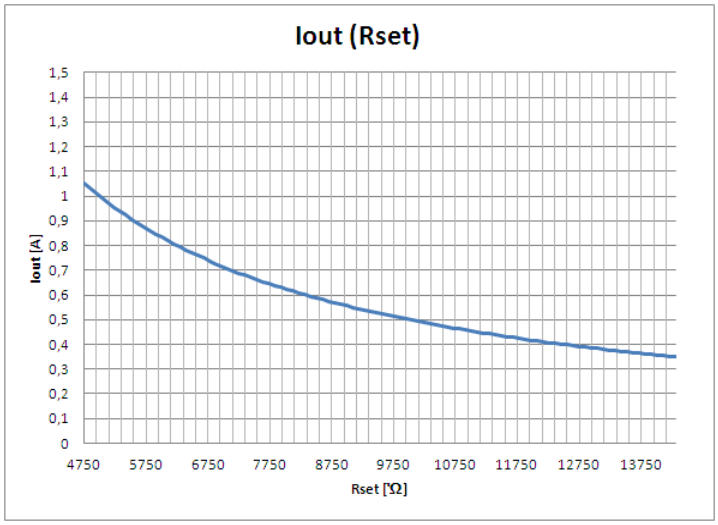


Fig. 9: LEDSet2 / Iout vs. Rset Characteristica

Easy FIT for Emergency Installations

a) Description

OSRAM DALI (GII) ballasts are able to **detect DC operation** (Operation range: 176 – 276V (0Hz / Pulsating DC)) w/o add. DALI commands / System Failure Levels. Due to flexible Enabling/Disabling via DALI magic/wizard (see also DALI wizard manual), highest flexibility in ALL installations is guaranteed:

- Operation range: **176 – 276V (0Hz / Pulsating DC)**
- Flexible enabling / disabling via DALI magic
- DC level has higher priority than system failure level
- **DEFAULT DC Level** of 15% Arc. Power
- **Locking functionality of DALI communication**
- SMART Thermomanagement when DC Level is applied → **FIT for IEC 60598-2-22 (LUMINAIRE in Emergency Installations)**
- **Auto re-installation of AClevel** / conditions before DC operation w/o external controls
- **EL approval marks** (acc. IEC 61347-2-3) w/ EBLF, EMC, overvoltage, endurance test …

Constant Lumen Output (CLO) / Flexible Current Setting

a) Description

OSRAM DALI (GII) ballasts support the **Constant Lumen Output Setting** (CLO) Functionality via DALI magic / OSRAM Optotronic Tool 2.0 (2.1). The user has the possibility to define own CLO profiles and to set min./max./nom. Currents for Module operations. ALL settings can be password protected – for detailed info pls. see 3DIM Tool Manual, page 18 - 24 (SW and manual downloadable under: http://www.osram.com/osram_com/tools-and-services/tools/dali-magic/index.jsp)

OSRAM DALI magic/wizard: Diagnostics, Analysis & Parametrization of DALI Installations

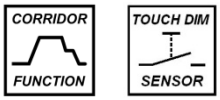
The **ONE Parametrization-, Analysis- & Diagnostics Tool**.
Suited for ALL DALI ECGs BUT specialized for OSRAM DALI (GII) models.

Dimensions [mm] 120 x 79 x 28
L=120 / B=79 / H=28 (DALI magic)

ONE System – ONE Solution – Highest Flexibility in Applications.

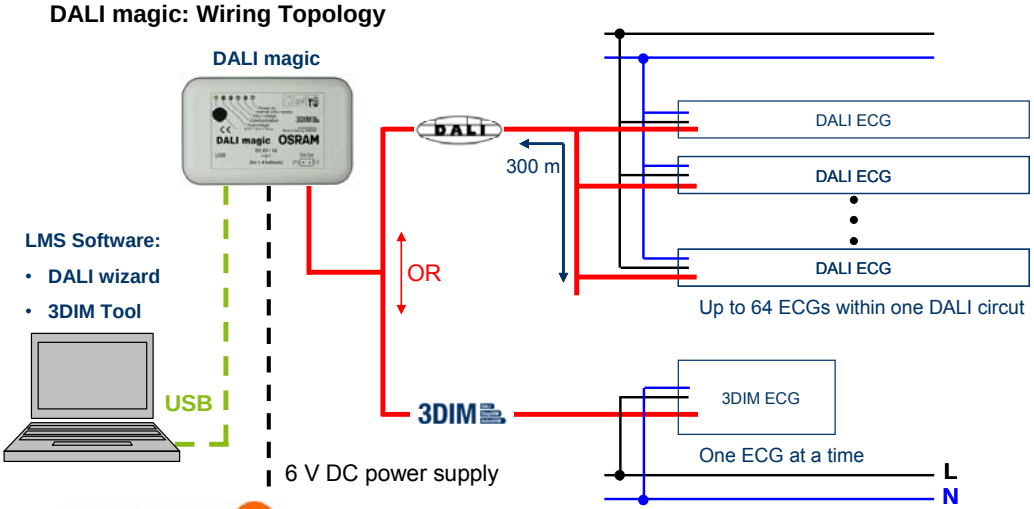
- Easy **Diagnostics/Analysis/Parametrization** of DALI Installations
- Fast Search of Failures in Adressing/Programming
- Easy Programming of OSRAM 3DIM ECG

NEW



- Corridor Functionality & TouchDIM Configuration Tool: GUI based setting of dimming levels + Fade Timing via Drag & Drop
- Emergency Package Tooling: Setting of Emergency Level (DC, AC), Locking Flag, DALI System Failure Level etc.
- Constant Lumen Output (CLO) / Power2Module Functionality: Compensation of Lm-Degeneration over Module Lifetime
- DALI magic **EAN40 (1 pc.): 4008321582768** / Software Download: **www.osram.com/lms-magic**

DALI magic: Wiring Topology



Installation Instructions

Radio interference suppression of dimmable SSL luminaires

General hints:	Operation of multiple drivers in a luminaire:
• Mains cables and control lines may be routed together and should be laid close to the luminaire wall • Mains and control cables must not be laid close to the module cables • If crossovers of mains and modul cables are unavoidable, they should cross perpendicularly • Do not lay the PE conductor together with the module cables • Do not use shielded module cables (reduction of capacity leakage currents) • The OSRAM DALI ECG must always be installed near the module(s) so that the module cables can be kept short in the interests of good radio interference protection • Lay the module cables close together and close to the module • Module cables must not be laid in metal pipes and must not be shielded cables Guide the cables of the different module ends separately	There should be a minimum spacing of 12 cm between the module circuits (module and cables) of different ECGs. If this is not possible, the module wiring must be carefully installed so coupling between the module circuits is reduced to a minimum: • Lay the module cables close to the appropriate modules so that the area covered by the module circuit is as small as possible. The module circuits of the two ECGs must not overlap. This is particularly important for color control if adjacent ECGs are dimmed to different levels. • There should be a spacing of several centimeters between the module cables of two ECGs • Mains and control cables should not be laid close to the module cables (prevents undesired couplings into the control cable)All the mains and control cables may be routed together. To ensure that radio interference suppression is not impaired, there should be a gap of several centimeters to the module cables.

Housing dimensions/article numbers OTi DALI 90/220-240V/1A0 LT2 L

Product description	l [mm]	b [mm]	h [mm]	l1 [mm]	DALI EAN10 1 pc.	DALI EAN40 20 pcs.
OTi DALI 90/220-240V/1A0 LT2 L	280	30	**21**	270	4008321867568	4008321867575

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