TR40-DA-200-1050-W/B/G

Helvar Components

40 W **Dimmable DALI-2** mains track adapter for LEDs

Product code: 5949xxx
(see last page)

40 W 220-240 V 0 / 50 – 60 Hz

- In-track adapter with integrated LED driver for luminaires designed for mains voltage track systems
- DALI-2 certified, 1-100 % dimming range
- D4i compatible Smart Data features (DALI 251-253)
- Wide operating window
- DIP switch setting for the output current for simple adjustment
- Low current ripple, complying with IEEE 1789 recommendations
- Available in white, black and grey enclosures
- Optional accessory nipple available for mounting the luminaire part

CONSTANT LIGHT OUTPUT (CLO) CORRIDOR CONTROL smart DATA Push to Fade DALI 2 SELV

Functional Description

- Adjustable constant current output:200 mA to 1050 mA
- Output current adjustable through DIP switches
- Suitable for e.g. flicker-free camera recording applications
- D4i compatible Smart Data features*, e.g. OEM customer and luminaire data, energy reporting, diagnostics and maintenance
- Open circuit, short circuit and overload protection
- See the compatibility chart for different track systems on last page
- Corridor Control for straightforward lighting control with e.g. external sensors with built-in relay*
- Constant Light Output (CLO), adjustable up to 100 000 h* (default disabled)

** Support for reading and adjustment via HDC from revision B onwards.*

Mains Characteristics

Nominal rated voltage range	220 V – 240 V, 0 / 50 – 60 Hz
AC voltage range	198 VAC – 264 VAC
DC voltage range	180 VDC - 280 VDC
Mains current at full load	Max. 0.25 A
Input power at full load	Max. 46.5 W
Frequency	50 Hz – 60 Hz
Standby power consumption	< 0.5 W
THD at full power	< 20 %
Tested surge protection	1 kV L-N (IEC 61000-4-5)
	2 kV L/N-GND (IEC 61000-4-5)
Tested fast transient protection	2 kV (IEC 61000-4-4)

Insulation between circuits & driver case

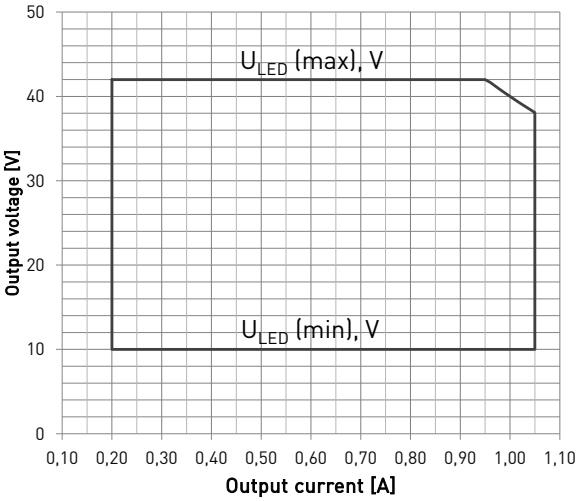
Mains circuit - SELV circuit	Double/reinforced insulation
DALI circuit - SELV circuit	Double/reinforced insulation
Mains circuit - DALI circuit	Basic insulation
Mains, DALI and output - Driver case	Double/reinforced insulation

Load Output (SELV <60 V)

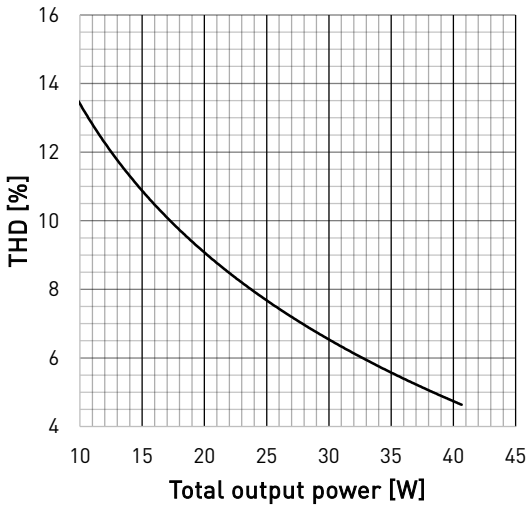
Output current (I_{out})	200 mA – 1050 mA (default)
Accuracy	± 5 %*
Ripple	< 5 % at ⩽ 120 Hz
	*) Accuracy ± 7.5 % when current output < 400 mA
PstLM	< 1*
SVM	< 0.4*
	*) At full power
U_{out} (max) (abnormal)	59 V

I_{LED}	200 mA	350 mA	500 mA	700 mA	1050 mA
P_{Rated}	2...8.4 W	3.5...14.7 W	5...21 W	7...29.4 W	10.5...40 W
U_{LED}	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 38 V
PF (λ) at full load	0.80	0.88	0.90	0.94	0.97
Efficiency (η) at full load	84 %	86 %	87 %	88 %	90 %

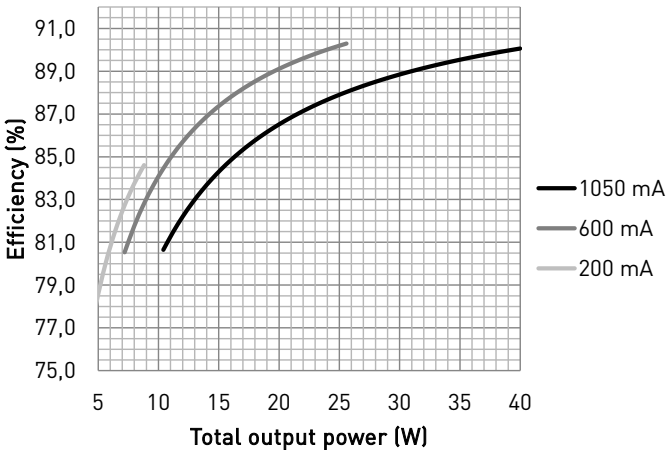
Operating window and driver performance



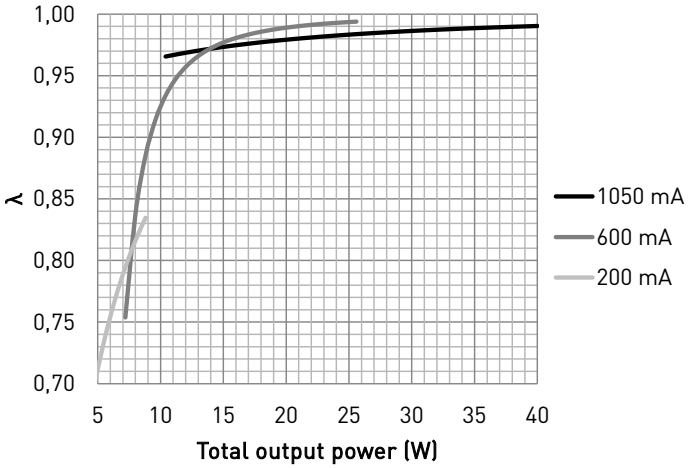
Current THD



Typical efficiency



Typical power factor



Operating Conditions and Characteristics

Absolute highest allowed t_c point temperature	70 °C
Tc life (50 000 h) temperature	65 °C
Ambient temperature range	–20 °C ... +35 °C*
Storage temperature range	–35 °C ... +85 °C
Maximum relative humidity	No condensation
Life time (90 % survival rate)	44 000 h, at t_c = 70 °C 50 000 h, at t_c = 65 °C 100 000 h, t_c = 57 °C

**) For other than independent use, higher t_a of the controlgear possible as long as highest allowed t_c point temperature is not exceeded*

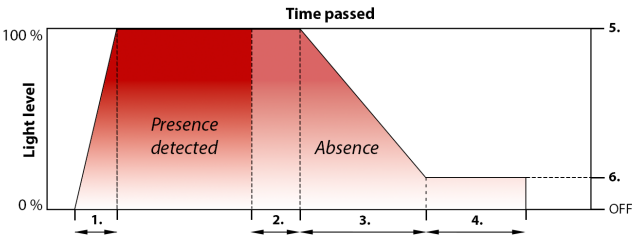
Corridor Control

Corridor Control is a feature which enables simple and cost-efficient lighting control with relay-based PIR/multisensors. Corridor Control offers straightforward install-and-forget lighting control solution, ensuring increased energy efficiency, lighting comfort and added feeling of safety in various environments. Large base of available different 3rd party PIR sensors with relay can be used in implementing a Corridor Control installation on site.

By installing an external mains voltage sensor and connecting it to the DALI terminal, the track adapter adapts to preset default mode to increase the light level when presence is detected, while decreasing the light level when no one is nearby anymore.

Corridor Control feature can be activated by connecting mains voltage in the DALI terminal for 55 seconds without interruption. Configuring the Corridor Control parameters is possible via Helvar Driver Configurator* via DALI bus.

**From revision B onwards.*



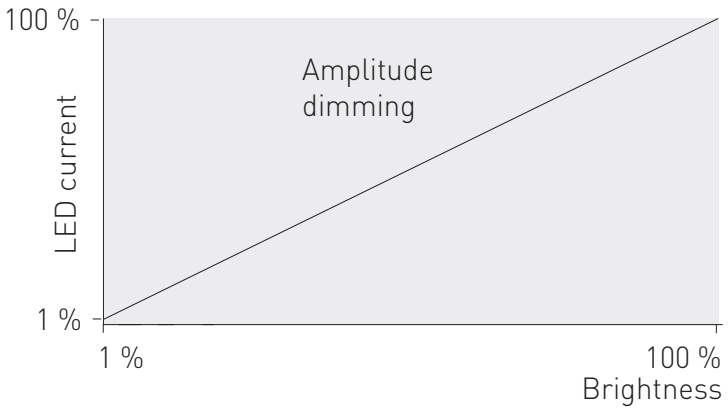
1. Fade in time
2. Presence light prolong time
3. Fade out time
4. Absence light period
5. Presence level
6. Absence level

D4i-compatible Smart Data Features (DALI 251-253)

TR40-DA-200-1050 track LED adapter has integrated Smart Data features, which monitor, gather and provide key data about the LED adapter usage and internal parameters through DALI. This useful data provided by track adapter enables various applications and integrations into data management and IoT services, establishing the Helvar Components LED drivers as key components in the latest generation of smart luminaires.
The DALI parts 251-253 include:

- OEM Customer data (DALI part 251)
- Energy reporting (DALI part 252)
- Diagnostics and maintenance (DALI part 253)

Amplitude dimming technology



Dimming range	Dimming technology
1 % – 100 %	Amplitude (DC)

TR40-DA-200-1050 LED driver implements amplitude dimming technology across whole dimming range. Amplitude dimming offers the best available technology for dimming the light output in an accurate and flicker-free way to ensure high quality lighting in even the most demanding situations such as camera recording applications. Amplitude dimming technology complies with IEEE 1789-2015 recommendations of current modulation to mitigate health risks to viewers.

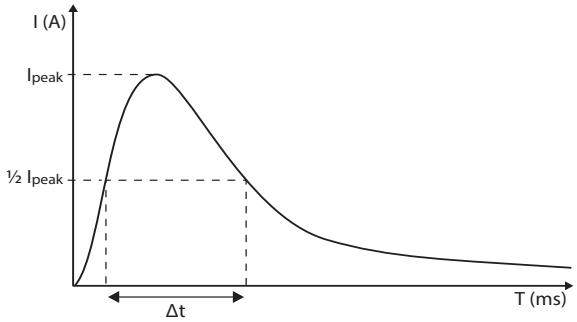
Quantity of drivers per miniature circuit breaker 16 A Type C

Based on inrush current I_{peak}	Typ. peak inrush current I_{peak}	1/2 value time, Δt	Calculated energy, $I_{peak}^2 \Delta t$
> 100 pcs*	10 A	39 µs	**0.0027 A^2s**

**Inrush current is not the limiting factor for the products per C 16 A MCB, please notice the continuous current limitations.*

CONVERSION TABLE FOR OTHER TYPES OF MINIATURE CIRCUIT BREAKER

MCB type	Relative quantity of LED drivers
B 10 A	37 %
B 16 A	60 %
B 20 A	75 %
C 10 A	62 %
C 16 A	100 % (see table above)
C 20 A	125 %



CONTINOUS CURRENT

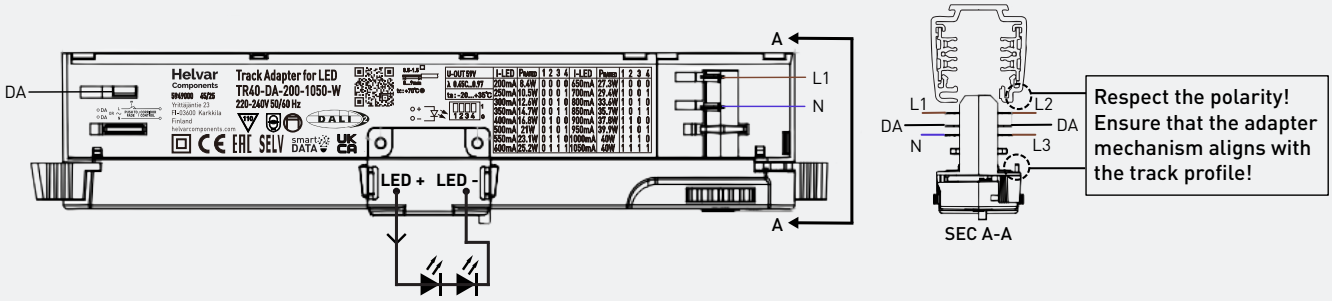
Total continous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continous current: n(I_{cont}) = (16 A ($I_{nom,Ta}$) / "nominal mains current with full load") x 0.76). This calculation is an example according to recommended precautions due to multiple adjacent circuit breakers (> 9 MCBs) and installation environment (T_a 30 degrees); variables may vary according to the use case. Both inrush current and continous current calculations are based on ABB S200 series circuit breakers. More specific information in ABB series S200 circuit breaker documentation.

NOTE! Type C MCB's are strongly recommended to use with LED lighting. Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

Connections and Mechanical Data

Wire size	0.5...1.5 mm^2
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	20 cm
Weight of the track adapter	161 g
Max withstand weight for luminaire part	5 kg / 50 N (horizontal track installations)
IP rating	IP20

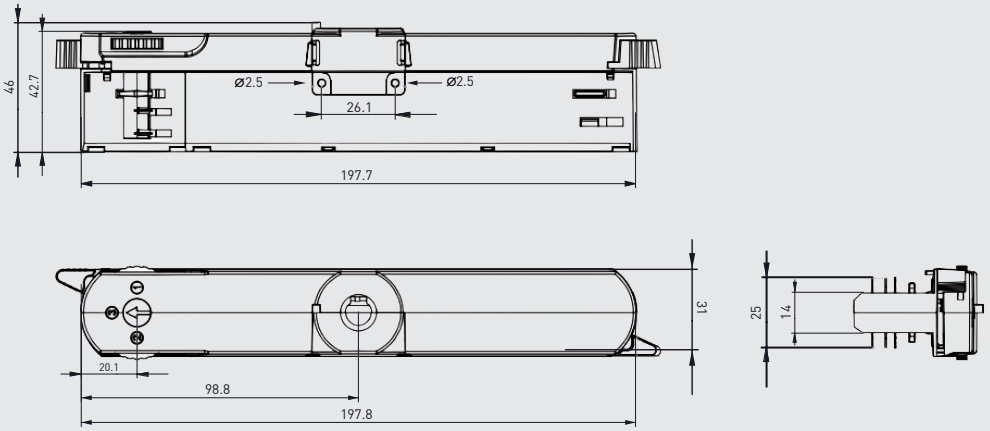
Connections



Note:

- *Not suitable for load side switching operation*

Dimensions



In TR40-DA-200-1050, the current can be set with DIP switches. With each combination of switch setup, a different output current value can be set. The maximum value can be reached with all switches set to "1" (pushed away from the output connectors see connections picture above) and minimum with all switches set to "0". The output current values according to the DIP switch settings are presented below.

DIP switch combinations, output currents and voltage ranges

DIP switch combination	0000	0001	0010	0011	0100	0101	0110	0111
I_{out} (mA)	200	250	300	350	400	500	550	600
Voltage range	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V
DIP switch combination	1000	1001	1010	1011	1100	1101	1110	1111
I_{out} (mA)	650	700	800	850	900	950	1000	1050
Voltage range	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 42 V	10 - 40 V	10 - 38 V

TR40-DA-200-1050 LED driver is suited for usage in mains voltage track systems and luminaires. In order to have safe and reliable LED driver operation, the LED luminaires will need to comply with the relevant standards and regulations (e.g. IEC/EN 60598-1). The LED luminaire shall be designed to adequately protect the LED driver from dust, moisture and pollution. The luminaire manufacturer is responsible for the correct choice and installation of the LED drivers according to the application and product datasheets. Operating conditions of the LED drivers may never exceed the specifications as per the product datasheet.

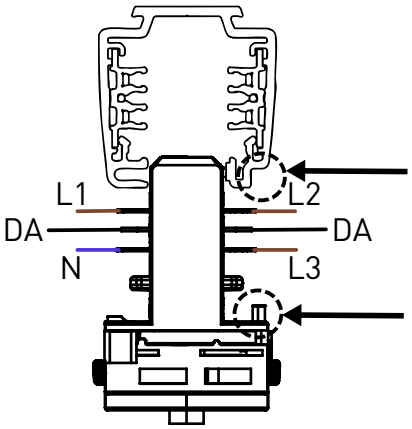
Installation & operation

Maximum ambient and t_c temperature:

- For built-in components inside luminaires, the t_a ambient temperature range is a guideline given for the optimum operating environment. However, integrator must always ensure proper thermal management (i.e. mounting base of the driver, air flow etc.) so that the t_c point temperature does not exceed the t_c maximum limit in any circumstance.
- Reliable operation and lifetime is only guaranteed if the maximum t_c point temperature is not exceeded under the conditions of use.

Mounting the adapter into the track profile:

- The track adapter enclosure has a mechanical key that is designed to match the groove in the track profiles to ensure correct polarity of the connection.
- Confirm that the adapter mechanism aligns with track profile!
- The adapter should fit snugly into the track profile without excessive use of force, and the locking lever shall rotate into the locked position gently.
- If mounted improperly in the track system there is a risk of physical damage to the adapter or input overvoltage!



Miniature Circuit Breakers (MCB)

- Type-C MCB's with trip characteristics in according to EN 60898 are recommended.
- Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

Functionality in abnormal conditions

No load

Output voltage will rise to maximum and return to normal level when load is reconnected.

Short circuit

The driver can withstand short circuit at output side and continue normal operation once the connection fault has been resolved.

Overload

The driver can withstand temporary overload situation and continue normal operation once the load has been corrected.

Push to Fade & Corridor Control

Push to Fade solution includes additional fading behavior, which provides smooth transition between on and off states. Please note that Push to Fade is not compatible to be installed in the same circuit with Helvar Switch-Control or Switch-Control 2/3 devices.

Before installation and for troubleshoot and guidance, refer to user guide at www.helvarcomponents.com.

Use of Push to Fade functionality

- Maximum numbers of LED drivers to be connected to one switch is 30.
- Ensure that all components connected to Push to Fade circuitry are mains rated.
- The transition between 0 to 100% (when turned ON / OFF) is ~ 1 second.

Use of Corridor Control

- Activate Corridor Control feature by connecting mains voltage to the DALI terminal for 55 seconds without interruption.
- Disable Corridor Control feature by giving exactly 5 short mains voltage signal pulses (less the 350 ms) to the DALI terminal within 3 seconds.
- Ensure that all components connected to Corridor Control circuitry are mains rated.
- Default settings are described in the User Guide.

See more details in Push to Fade and Corridor Control User Guides at www.helvarcomponents.com.

Conformity & standards

General and safety requirements	EN 61347-1
Particular safety requirements for DC or AC supplied electronic control gear for LED modules	EN 61347-2-13
Thermal protection class	EN 61347, C5e
Mains current harmonics	EN IEC 61000-3-2
Limits for voltage fluctuations and flicker	EN 61000-3-3
Radio frequency interference	EN IEC 55015
Immunity standard	EN 61547
Performance requirements	EN IEC 62384
Digital addressing lighting interface:	
General requirements for DALI system	EN 62386-101 (DALI-2)
Requirements for DALI control gear	EN 62386-102 (DALI-2)
Requirements for control gear of LED modules (DALI Device Type 6)	EN 62386-207 (DALI-2)
Memory Bank 1 extension	DALI Part 251
Energy Reporting	DALI Part 252
Diagnostics & Maintenance	DALI Part 253
Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers	IEEE 1789-2015
Compliant with relevant EU directives	
RoHS/REACH compliant	
CE / UKCA marked	

Label symbols

Safety isolating control gear with short circuit protection (SELV control gear).

Double insulated control gear suitable for independent use.

Symbol for independent control gear.

Driver is capable of monitoring and measuring key data about driver usage and providing access to that data via DALI, complying with DALI parts 251-253. This includes data sets such as OEM customer data, energy reporting and diagnostics.

Thermally controlled control gear, incorporating means of protection against overheating to prevent the case temperature under any conditions of use from exceeding 110 °C.

DALI-2 certified control gear.

Order codes and compatibility

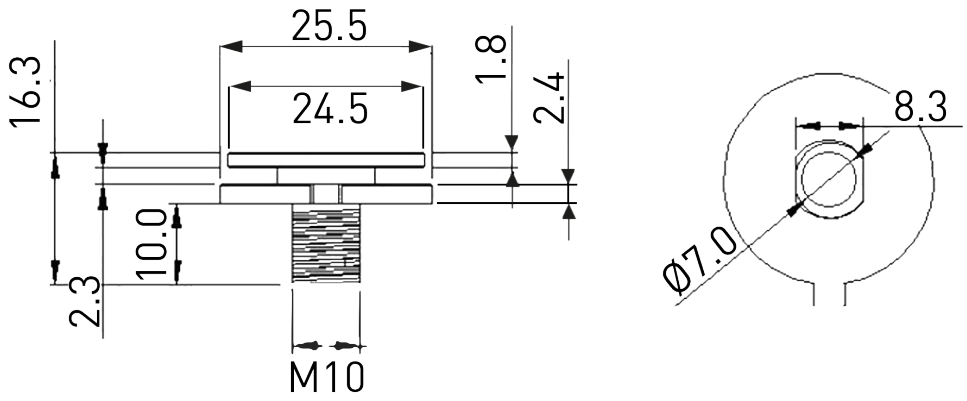
ORDER CODES FOR DIFFERENT COLOURS

	Order code	Product name	Driver enclosure colour	Colour code
TR40-DA-200-1050				
Product order codes	5949000	TR40-DA-200-1050-W	White	RAL 9016
	5949100	TR40-DA-200-1050-B	Black	RAL 9004
	5949200	TR40-DA-200-1050-G	Grey	RAL 9006

ORDER CODE FOR ACCESSORY NIPPLE

Optional accessory nipple is available for mounting the luminaire part, details and order code presented below.

	Order code	Product name	Dimensions	Material
Product order code	9500005	TRACK DRIVER ACCESSORY NIPPLE	M10 x 10 mm	Zinc alloy



COMPATIBILITY FOR TRACK SYSTEMS

	Manufacturer	Track system type
TR40-DA-200-1050 compatibility		
Track system (3P+DALI)	A.A.G. Stucchi	One Track 9000XX Series
	Global	XTSC 6xxx
	Unipro	TC33B
	Powergear	PRO-0610

Note: The list is not exhaustive, but includes the track system variants tested for compatibility. Helvar Components can't take responsibility on any possible changes made by different track system manufactures that could affect the compatibility between 3rd party track systems and Helvar Components adapters for LEDs.