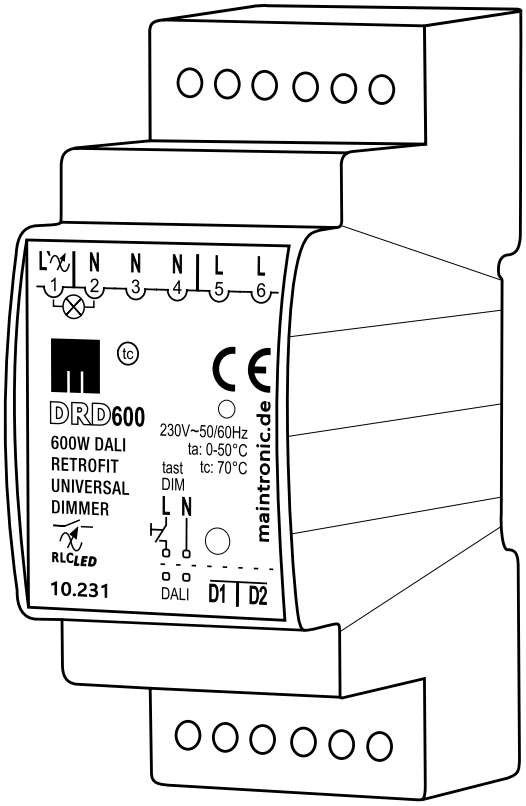
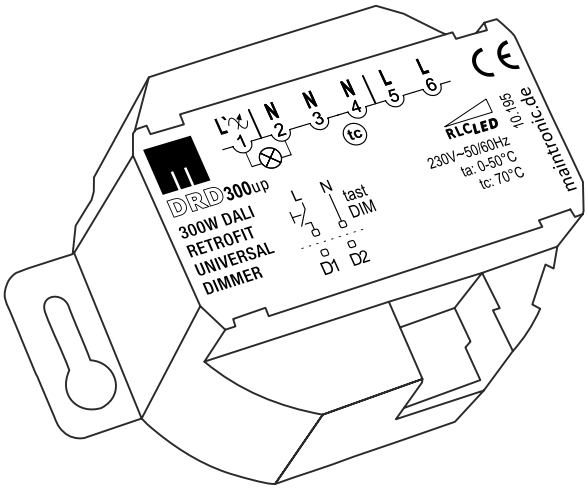
DALI-Retrofit-Dimmer





Manual

Valid from Version: (H=Hardware F=Firmware):

10.231	-	**DRD600 REG**	H2	F3.1.0
10.195	-	**DRD300 up**	H1b	F3.1.0
10.196	-	**DRD150 up**	H2	F3.1.0

Creation date: 24.06.2020

Document: 1023x_MA_en_A4_DRDfamily_20200624

maintronic

Table of contents

1. Safety instructions

Attention

For your own safety, read all instructions and information in this manual carefully before initial operation. Keep this manual for future reference.

The instructions are an integral part of the product and must be handed to the end customer.

All information and instructions in this manual must be observed completely and in detail. The manufactuer is not responsible for any direct or consequential damage that results from disregarding any information in this manual.

Waste disposal

In accordance with European Directive 2002/96/EC (it`s) not longer usable electronic devices and defective or used batteries (European Directive 2006/66EG)
must collected separately and disposed by an environmentally sound recycling.
This symbol indicates that electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime. Should these product are no longer be useable, the user is required by law to dispose of old appliances separately from their household waste e. g. at a local authority collection point or recycling center.

CE-marking

At the time of placing the devices on the market, they comply with the EU directives in the version valid for the respective device. Declarations of conformity are available for all products.
The CE marking is marked on the devices and is shown in the applicable documents.

Danger

The interior and the connectors of the amplifier holds hazardous voltages.
The unit must only be installed and serviced by a proven electrican specialist, in accordance of all relevant regulations, safety and accident prevention directives of the country.

Be sure that the existing mains voltage corresponds with the specified operating voltage before operating the device.

Risk of electric shock. Do not operate the device without a cover. Even when switched off, voltage may be present at the outputs. When working on the device or connected loads, always disconnect the upstream fuse from the power supply.

Only install the device in places with a good ventilation and without humidity or high temperatures. Do not expose the unit to rain or snow. Do not operate the unit near heat sources, e.g. radiators.

Do not open the device. Otherwise you will risk a damage and void the warranty.

The unit should be serviced by qualified personnel when the unit:

- objects have fallen or liquid has been spilled into the unit
- does not appear to operate normally
- has been dropped or has a broken housing

For cleaning only use a dry, soft cloth, by no means liquids.

2. Introduction

2.1 Thanks a lot

Congratulations and thank you for choosing this *maintronic* product and the trust you have placed in us. We, the team of *maintronic*, wish you a lot of fun with this product.

2.2 About this Document

Due to continuous product development, some of the information may not be complete and up-to-date.
The information in this document is subject to change without prior notice. Please check our website www.maintronic.de, if there is a newer version.

2.3 Contact

You can find downloads, manuals, onlinehelp as well as frequently asked questions (FAQ) on our Website www.maintronic.de. Please contact us, should any problems regarding your product arise.

2.4 Legals

2.5 Disclaimer

The contents of this document are for product information purposes only. Features of the products may be differing during the continuous product development and may be changed by maintronic at any time without notice.
maintronic does not assume any liability or warranty concerning this manual or the described products.

2.6 Return consignment

You can find a return form on our homepage in the service section. Please fill out the return form with a detailed error description and attach the purchase receipt. Our product must be returned well packed in a package.

3. Device properties

3.1 Intended use

One-channel phase dimmer for brightness control of R,L,C including LED retrofit loads. Operates as a digital leading and trailing edge phase dimmer with automatic load detection. Control with DALI or a push button.

Please use this product only for its intended purpose:

- As a dimmer for switching and dimming luminaires
- Solid in dry and clean environment
- Only approved for indoor use
- Access is only possible with tools
- Only operate on 1 phase with 230V AC
- With a back-up fuse of max. 16A
- Installation see models

3.2 Functions and features

- DMX retrofit-universal-dimmer
- Control DALI or push button input
- Load types: LED retrofit, NV halogen lamps with coiled or electronic transformers and incandescent lamps
- Different construction and power rating models available:
  top-hat rail REG; flush mounted boxes UP
- Adaptive dimming
- Manual min-level
- Load number display
- Zero load dimming
- Soft-Off
- Fadetime

3.3 Applicable Documents

Please also refer to the applicable documents for this product:

- Datasheet
- Installation guide
- Manual (this document)

Download unter www.maintronic.de.

4. Models

4.1 DRD600 REG (top-hat rail)

Module	Item.No.	Power	Construction
DRD600 REG	10.231	600W	top-hat rail housing (REG)

Rail-mounted device according to DIN 43 880 for mounting on a top-hat rail in a switch cabinet (2TE = 36mm), in a junction box or small distributor (insulated enclosure).

4.1.1. Housing dimensions

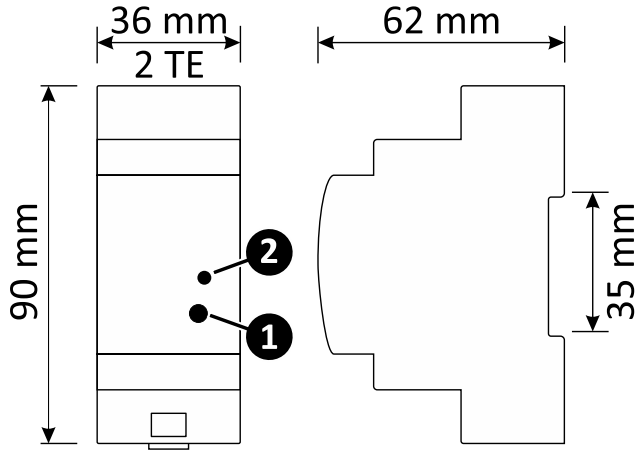
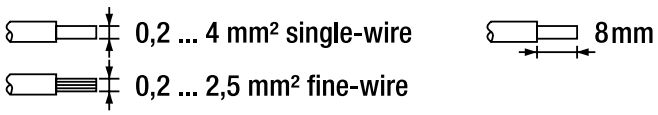


Fig. 1 - Dimensions and operating elements - DRD600 REG

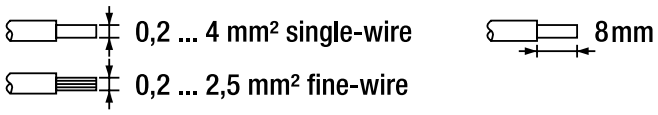
Operating elements and indicators		
1	Device button	Commissioning; Programming
2	Status LED	Display Status of the device

4.1.2. Connections

Top connections **(-X1)**					
L'	1	Load output	N	4	Neutral conductor
N	2	Neutral conductor	L	5	Input Voltage 230V AC
N	3	Neutral conductor	L	6	Input Voltage 230V AC



Bottom connections **(-X2)**					
DA	7	DALI Data (alt. tastDIM **)			
DA	8	DALI Data (alt. tastDIM **)			



4.1.3. Connection diagram

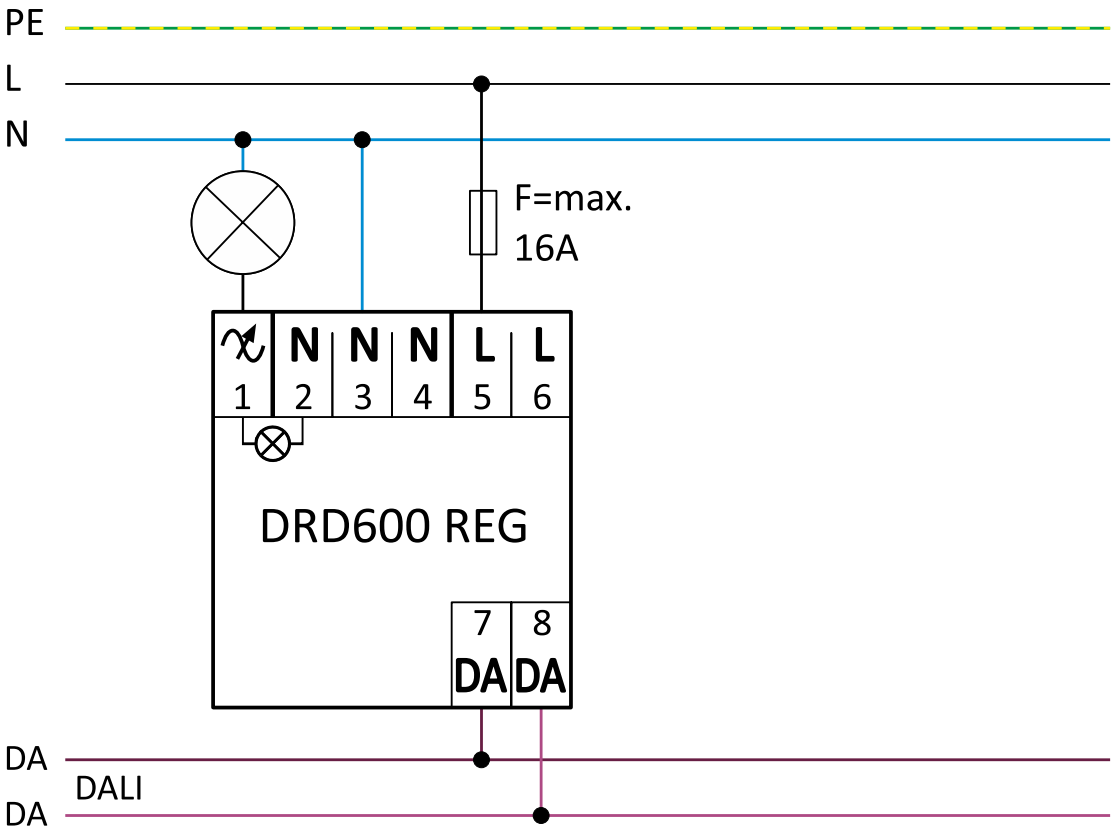


Fig. 2 - Connection diagram with DALI - DRD600 REG

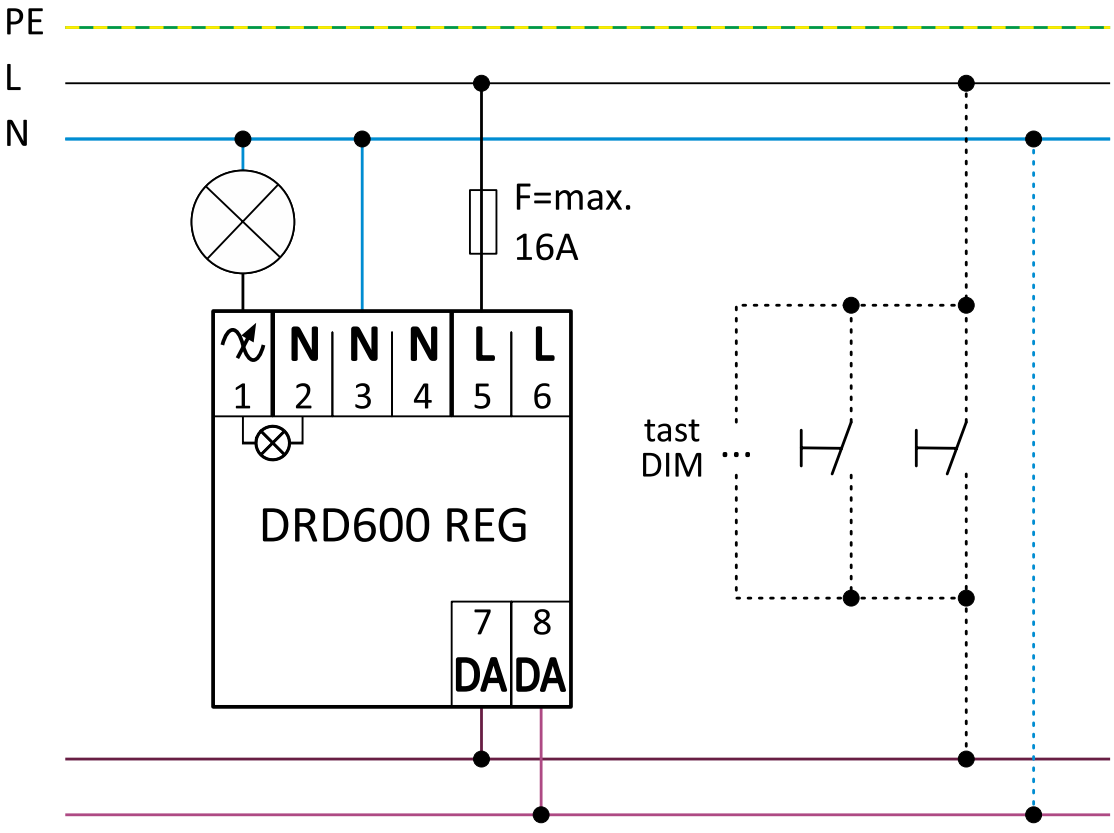


Fig. 3 - Connection diagram with 230 VAC push button (tastDIM) - DRD600 REG

4.2 DRD150 up / DRD300 up (flush mounted boxes)

Module	Item.No.	Leistung	Construction
DRD150 up	10.196	150W	flush mounted boxes (up)
DRD300 up	10.195	300W	flush mounted boxes (up)

Flush-mounted housing for installation in switch boxes or junction boxes. Attachment with two eyelets, these can be removed for installation..

4.2.1. Housing dimensions

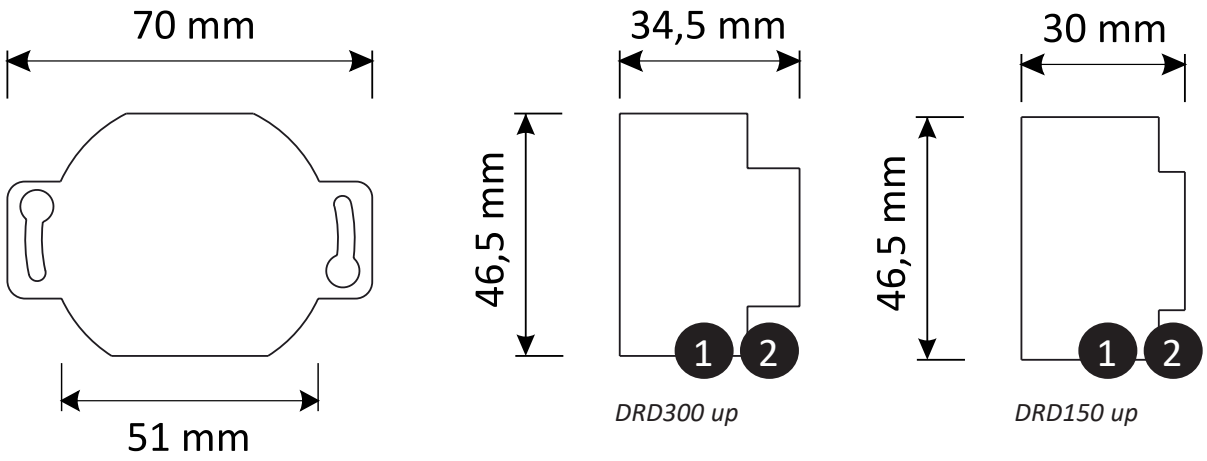
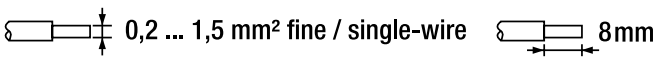


Fig. 4 - Dimensions and operating elements - DRD150/300 up

Operating elements and indicators		
1	Device button	Commissioning; Programming
2	Status LED	Display Status of the device

4.2.2. Connections

Anschlüsse oben **(-X1)**					
L'	1	Load output	N	4	Neutral conductor
N	2	Neutral conductor	L	5	Input Voltage 230V AC
N	3	Neutral conductor	L	6	Input Voltage 230V AC



Anschlüsse unten **(-X2)**					
DA	7	DALI Data (alt. tastDIM **)			
DA	8	DALI Data (alt. tastDIM **)			

4.2.3. Connection diagram

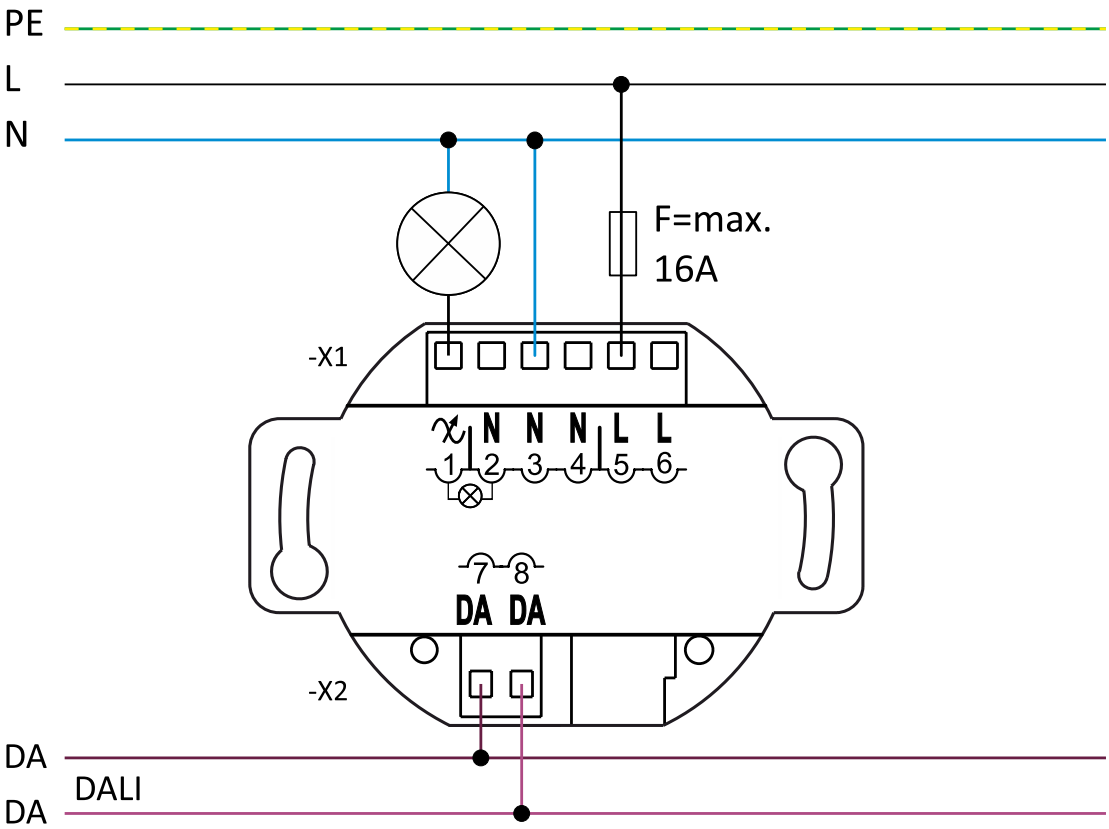


Fig.5 - Connection diagram with DALI - DRD150/300 up

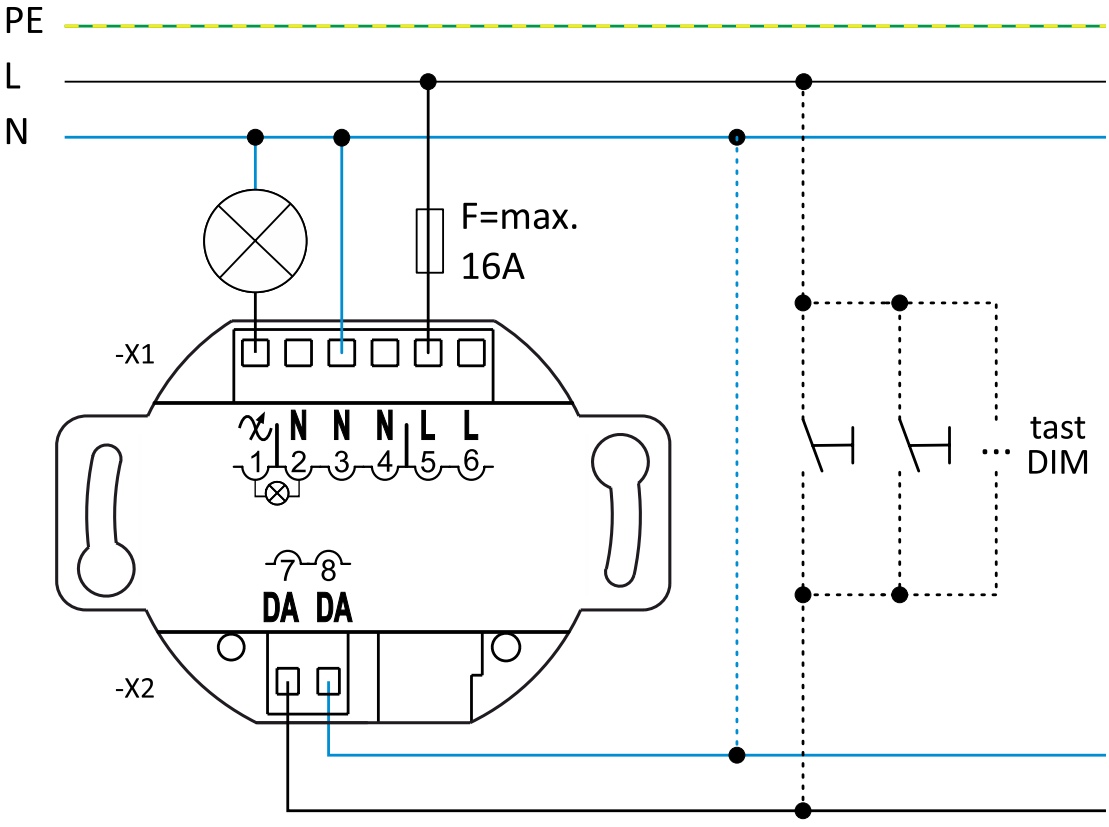


Fig. 6 - Connection diagram with 230 VAC push button (tastDIM) - DRD150/300 up

5. Comissioning

5.1 Measuring procedure (AdaptivDIM)

When starting up for the first time (voltage is applied to the device for the first time after installation), the dimmer will start a measuring procedure and calibrate accordingly to the connected load.

For minor calibration, the dimmer decides which cutting method (leading or trailing edge) is used and adjusts itself to load type 3 or 4.

Should a new calibration be required by changing the light source or to set a different load type, the device must be recalibrated, for a new calibration see 7.

NOTE - During calibration, the connected lights may flicker. This is system-conditioned and not a defect of the device. The calibration must be completed and can not be interrupted by switching off the device.

The maximum load is possible up to an ambient temperature of 50 ° C. Between 50 ° C and 70 ° C, the power is reduced by 15 watts / ° C, please consider this during installation.

5.2 Power rating of retrofit dimmers

Load type	cutting method	Power output in percent	Calculated power load		
			DRD600 REG	DRD300 up	DRD150 up
Ohmic	trailing edge	approx. 100% of the rated power	600 VA	300 VA	150 VA
LED	trailing edge	approx. 70% of the rated power	420 VA	210 VA	105 VA
LED	leading edge	approx. 20% of the rated power	120 VA	60 VA	30 VA
As a rule: Example 28x 4W (rated power LED) + 20% power factor = 135 VA power to be processed. Specifications depend on the light source used and may vary upwards and downwards.					

6. Operation via buttons

6.1 Device button ❶

It is possible to operate and program the device via the device button.

NOTE - Operation via the device button is always possible and has a higher priority than a DALI telegram.

6.2 230V push button input (tastDIM *)

As an alternative, the DALI input can also be used as a push button input. A conventional push button with 230V is connected against N to the DALI inputs of the device (not SELV)!

NOTE - When using the DALI input as tastDIM, no other DALI control gear may be connected in the same circuit, because 230V are present.

Multiple push buttons possible at the same time, multiple tastDIM capable devices can be operated in parallel.

6.3 Functions button operation:

Geräte-taster	tastDIM		Funktionen:	Last	Status LED
		1x	On / Off		☀ / ○
		> 1s	Dimmen up / down	↑/↓	LED ↑/↓
		2x	Max-Level 100%	100%	LED
		4x	Programmierung Min-Level	↑/↓	LED ↑/↓
		2x	Lasttyp / Lastzahl anzeigen	100%	LED flash N. times
		3x	DALI Kurzadresse anzeigen	100%	LED flash N. times

Bedienung entweder über Gerätetaster oder tastDIM

Max-Level 100% - When double-clicking 100%, the brightness jumps to maximum 100%. The previous dimming level will not be overwritten and will be reactivated the next time it is switched on. If the brightness is subsequently „lowered“ again with a single keystroke, the previous output brightness is restored.

So you can quickly switch from a low level to full brightness and back.

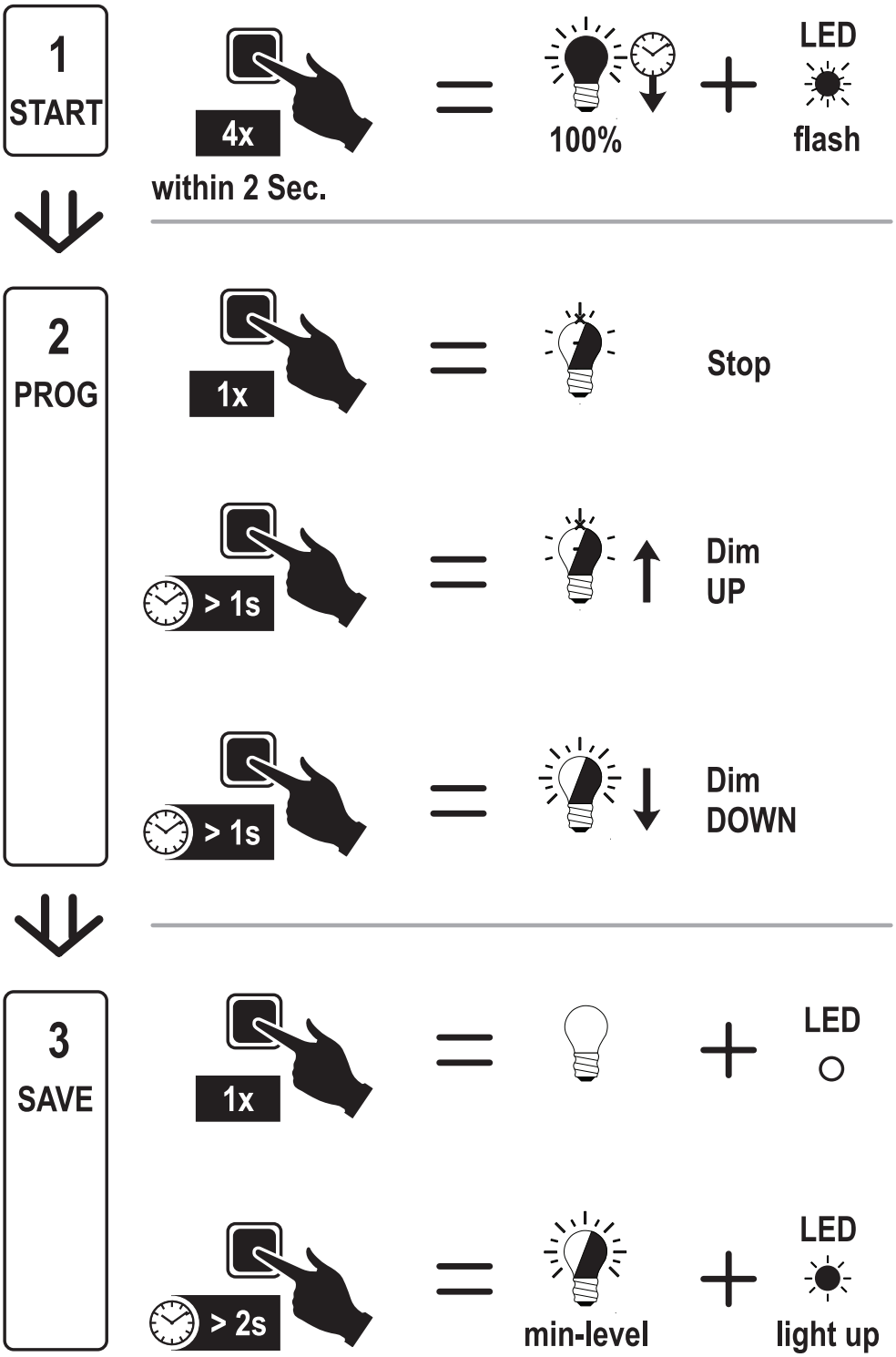
Last Memory Level - The last set brightness level is saved and will be recalled at next power up.

6.4 Set min-level with push button

In case of a flickering load or if the load remains too bright, the in-level (the lowest dimming value) can be adjusted via a push button connected to the push button input (tastDIM).

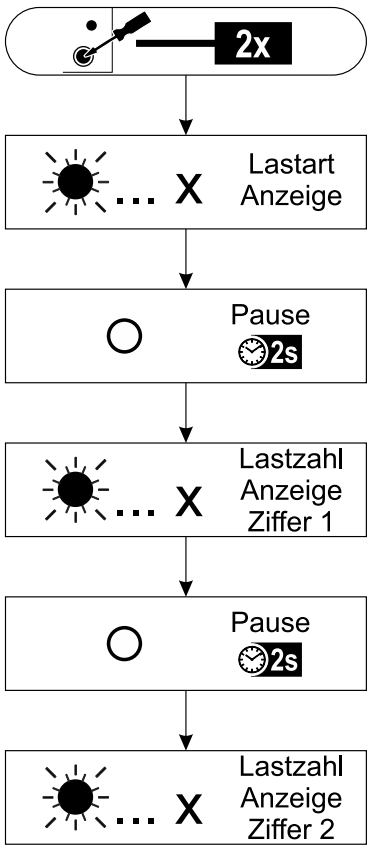
(Alternatively the min level can be configured via DALI).

Perform the configuration with the following steps:



6.5 Commissioning and diagnosis

The device button can be used to display the current dimming mode (load type) and the load number (max. Luminaires of the same type).



Press device button twice briefly

A single digit is displayed for the load type.

The number of luminaires is displayed as a two-digit number with half brightness. For each digit, the LED flashes/ blinks as many times as the value of the digit. For the number 0, the LED flashes/blinks longer.

6.5.1. Display load type (currently used dimming mode)

Display load type	Blinking pattern Status-LED 100%
Ohmic load (trailing edge)	✸
Inductive load halo. (leading edge)	✸ ✸
LED / CFL load (trailing edge)	✸ ✸ ✸
LED / CFL load (leading edge)	✸ ✸ ✸ ✸
Inductive load (leading edge)	✸ ✸ ✸ ✸ ✸
Non-dimmable load	✸ ✸ ✸ ✸ ✸ ✸
No load connected	quick flashing

If the load used is not compatible with the selected dimming mode, the system switches to a compatible mode.

6.5.2. Determine load no. (max. number of lamps of the same type)

In order to optimally use the dimmer and to see how many luminaires of the same type can be used, it is possible to determine the load number of the luminaire. To do this, measure with a single luminaire. After the measurement, the load type is displayed and afterwards the load number is indicated by the LED flashing.

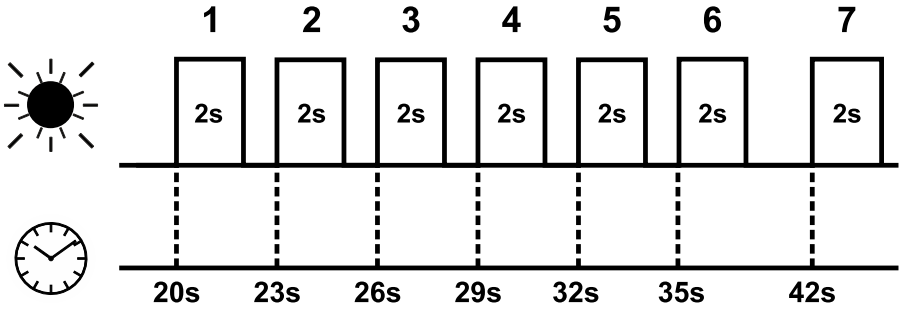
Display Load No.	
value as number	Flashing pattern with half brightness - Load No.
10	✸---------✸ ✸ ✸ ✸ ✸ ✸
1x short; pause; 1x long for 0	
35	✸-✸-✸---------✸-✸-✸-✸-✸
3x short; pause; and 5x short	

NOTE - A load number is only available for load type LED.

The integrated load number display is a recommendation and helps to determine the maximum number of lamps.

7. Start new measument with the device button

Some situations may require a re-measuring of the dimmer, e.g. if the load is changed or the load type is modified. To start programming, press and hold the device button or push button . After 20 sec. the programming mode starts (LED and load turns off), each parameter is indicated by a flashing of the LED and load for 2 seconds. To activate, release the button ***within*** these 2 seconds, a flashing pattern follows and the parameter will be processed. If the button is released outside this 2 sec. window, the programming will be terminated.



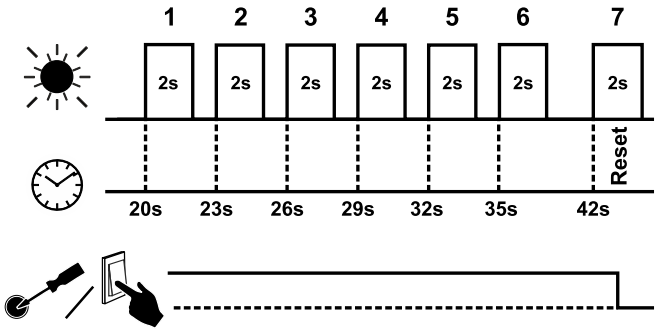
Select a parameter from below table.

NOTE - Programming must be done within the first 60min after power-on.
The key must be released within the active phase for each parameter (as long as the LED is on).

Parameter	Load / Function	Features	
1	any load	Automatic calibration - the load type is determined automatically, dimming parameters are set automatically and the dimming curve is adjusted to achieve the best possible dimming result	Dimmmode
2	Ohm Induktiv	; Dimming curve (linear characteristic)	
3 *	LED 1 CFL	; Dimming curve (fixed LED curve) * Factory setting	
4	LED 2 Induktiv	; Dimming curve (automatic)	
5	LED 3 Induktiv	; Dimming curve (fixed)	
6	corridor mode	! Nur mit To leave a set corridor mode, it is necessary to perform a factory reset.	
7	Reset	reset to factory default settings	

For example, perform a factory reset:

Press one of the two buttons (device button or push button , after 20 seconds the LED illuminates for 2 seconds, which shows phase 1. Hold the button pressed in, phase 6 is followed by a slightly longer pause until phase 7 is activated. During these 2 seconds of the activated phase the push button must be released.



The dimmer is now reset to the factory settings.

8. Operation via DALI

A DALI short address is assigned to the module using the DALI device search. Please refer to the operating manual of your DALI controller or gateway.

8.1 DALI Commands

DALI parameters	Value range	Default setting
Power On Level	0 – 100 % (0 – 254)	100 %
	Brightness value after power-on (DALI Wert 255 = MASK)	
System Failure Level	0 – 100 % (0 – 254)	100 %
	Brightness value for DALI signal error (DALI Wert 255 = MASK)	
Min Level	0 – 100 % (0 – 254)	0,1 %
	Lowest possible brightness level	
Max Level	0 – 100 % (0 – 254)	100 %
	Maximum achievable brightness value	
Fade Time	von 0 – 90,5 Sekunden	< 0,7 S
	Fading speed when changing the brightness value	
Fade Rate	from 1 – 72 Steps/s	45 Steps/s
	Steps when changing the brightness value with DALI commands „darker“ and „brighter“	

8.2 DALI information

Because the DALI signal is not SELV (safety extra-low voltage), the installation regulations for mains voltage apply.
The maximum cable length of a DALI control line cannot exceed 300m (with 1.5mm² cable diameter) or 2V voltage drop.

8.3 DALI general

DALI (Digital Addressable Lighting Interface) is a standardized digital communication interface in the field of building auto-mation.
The module works accordingly to the following regulations:

- IEC 62386-101, General requirements; System
- IEC 62386-102, General requirements; Control gear
- IEC 62386-205, Supply voltage controller for incandescent lamps (device type 4)

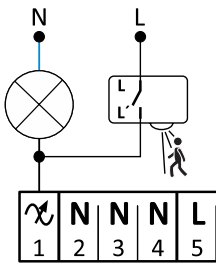
8.4 smartGX (=smart Gear Xtensions) *

(*) Extended functions for DALI operating devices.
- **Output characteristic** - **output calibration**
- **PWM-invert** - **Power-On delay**
- **Power-Off delay**
- **Reverse relay switching state** ...

The smartGX functions can be adjusted with the maintronic DALI Device Manager software. This also requires a DALI USB controller (DALI mouse).

8.5 Bypass switch function

To switch the dimmer during DALI operation manually to 100%, a motion detector can be connected between L‘ and L. As soon as the motion detector is deactivated, the dimmer returns to the previously set DALI brightness value.



8.6 Operating notes

8.6.1. Derating

In the event of over temperature, an automatic derating occurs (status derating is indicated by the LED), which means that the dimmer‘s power is reduced and the load dimmed down.

8.6.2. Short circuit

Automatic shutdown in the event of a short circuit. Every 30 sec. it is tested whether the short circuit is still present. As soon as the short circuit is eliminated, an automatic restart takes place. If the error is still present after 5 min, the device is switched off completely.

Turn off the power and remove the error.

8.6.3. Noise emission

It may occur that the dimmers cause acoustic noise when they are not used under unfavourable conditions or with certain consumers.

Make sure the phases are evenly balanced.

8.6.4. Flickering

The dimmer requires a faultless mains, flickering may occur in case of mains supply fluctuations or ripple control signals as well as during calibration. This circumstance is system related and not a defect of the device.

9. Excerpt from technical data

Rated Voltage				
Connected Load	 DRD600 REG	 DRD300 up	 DRD150 up	see: Power rating of retrofit dimmers
Power loss	Standby - 0,75W; Operation at full load - 1,8W			
DALI				IEC 62386 - Device Type 4 Current consumption from DALI aus DALI - < 2mA
Alternative control				tastDIM * 230V push button over DALI input
     				

Detailed technical data can be found in the datasheet of the product.

9.1 LED indicator

Operating states are indicated with the LED.

Status LED indicators	Blinking pattern approx. 3 sec. 0s 1,5s 3s
Modulstart INIT	OOOOOOOOO----------
Once when applying the operating voltage	
Standby	O-------------------
During operation with switched off channel	
Output Switched On	OOOOOOOOOOOOOOOOOOO
Switched on, the brightness of the LED depends on the output level	
Receive bus event	O-O-----------------
DMX-telegram received	
Operation via push button input	OOOO-OO-------------
DMX input button is pressed, mains voltage is present	
Programming mode	OOOOO-----OOOOO-----
DMX identification display; ready for load calibration	
Error 1	O-O-O-O-O-O---O-----
Switching off outputs due to overload.	
Error 2	O-O-O-O-O-O---O-O---
Reduction of output level due to overload.	
Fatal Error	O-O-O-O-O-O-O-O-O-O-
Shutdown due to overload or overtemperature	
Measuring procedure	O--O--O--O--O--O--O-
Performing calibration with dimming mode	
Corridor function activated	OOOOOOOO--OOOOOOOO--
If the corridor mode is activated	

9.2 Appendix - Symbols

Symbols / legend	
	Connected load ON = full brightness
	Connected load dimmed
	Connected load OFF = Off
	Device LED ON = full brightness
	Device LED LED - dimmed
	Device LED OFF = Off
	Load type with leading edge
	Load type with trailing edge
	Device button
	External push button input
	Time for a key press in this case, press the button for more than 2 sec.

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