LED Lamps & Ballasts: - Dimmer Compatibility

Key

Excellent	Very Good	Good	Neutral	Bad	Not applicable	Not Tested

1(10) Shows 1 unit was tested

Figure in brackets = estimated max number of units per circuit

TYPES			DIMMER TYPES												
BRAND	**MODEL**	**DESCRIPTION**	**RDT500**	**RDL250**	**RDL500**	**RAK4T**	**RAK4L**	**RAK4F**	**RADALI**	**RADSI**	**RDF800**	**RLED18-1ACI**	**RLED36-3DCI**	**RLED50-1DCV**	**RLED90-3DCV**
Actec	DIM350mA/18W	18W 350mA ballast 15-52V	1(20)	1	1	1(30)									
Alt	Alt CD2DW204RF-85	4W LED Candle	2 (20)		2(15)	2 (30)									
Ansell	ATILED/CW	9W Fire Light	2(?)	2(?)	2(?)	2(?)									
Aurora	Luna Au-DGU1060/30 Au-DGU1060W-40	6W GU10	10(20)												
Aurora	Au-DGU1040W/40	4W GU10	20(20)	15(15)	20(20)	20 (30)									
Aurora	AU-FRLD811/30 LED Downlight Fire Protection	LED Downlight	10(20)	(15)	10(20)	10(30)	(30)								
Aurora	Au-DGU107/40	7W GU10	10(20)	(15)	10(20)	10(30)	(30)								
Bell	05174, 05176, 05177, 05178,	6W and 7W GU10 LED	10(20)	(15)	10(20)	10(30)	(30)								
Collingwood	Halers H2 Pro	8.5W downlight	6(20)	6	6	6(30)									
Dazz-LED	DAZ-P-GU10-6W-45-D	6W GU10 LED	1(20)	1(20)	1(20)	1(20)									
DecoLED	LPLED6WGU10	6W GU10	2 (20)	2(15)	2 (20)	2 (30)									
Ecopac	EPC701	Constant Volt driver						1 (20)			1 (20)				
Energetic		6W GU10	1(20)	(10)	1(15)										
Energetic	YKMR16G1-4.5W-D	4.5W GU10	20(20)	(15)	20(20)	20(30)									
Enlight	EN-DGU1006/40	6W GU10	20(20)		20(20)										
Fusion	EDLED/PAR16/4X1W W/DIM	5W GU10 Lamp	1(20)	1(10)	1(15)										
Freestyle Lighting	690D +F690/LED	500mA output driver with lamp	1 (15)		1(10)	1 (30)									
GE	GE LEDBulb	9W LED bulb with E27 fitting	1 (15)		1(10)	1(20)									
Harvard	CLK20-1050-24-C	1050mA Constant current driver	1 (15)		1(15)	1(25)									
Harvard	CLK20-700P-240-C	700mA Phase dimmable LED driver	1(15)		1(15)	1(25)									
John Cullen	DRM48350	Mains dimmable ballast + Lamp	1(20)	1	1										
Kosnic	KFDL7.5Dim	Fire rated downlight	1(20)	1(15)	1(20)										
Kosnic	KTC08DIM/GU10	8W GU10	6(20)	6(15)	6(20)										
KSA	KSRFRD200	12W LED with integrated ballast	1(20)		1(15)	1(25)									
LED Brite	GU104WDDIMCW	4W GU10	1(?)		1(?)	1(?)									
LED Brite	G6W-D	6W GU10	1(?)		1(?)	1(?)									
LEDOUX	LM2W-9	700mA Constant Current driver	1(20)	1(10)	1(15)	1(30)									
LL-Elan	KAA-8E18IAD	Phase dimmable driver and lamp combination	4(20)		4(15)	4(20)									
Lucent	LUCLED 50-30-22	Phase dimmable LED tested with 700mA driver	2 (20)		2(15)	2 (30)									
Lucent	Xicato 1050mA	Lamp with 1050mA driver	1(20)		2(?)	2(25)									
Lumanor	DBGU100106-220	6W GU10	6 (20)	6 (10)	6(15)										
Lumanor	Lumanor COB GU10	7W GU10	6 (20)	6(15)	6 (20)	6 (30)	(30)								
Lumeno	LM-MX50DGU10	5W GU10	1(?)		3(?)	4(?)									
Lumotech	L05016i	1 – 20W LED Driver						1 (20)			1 (20)				
MeanWell	LPF-16D-12	12V 1.34A Const Volt driver 0-10V						1 (20)			1 (20)				
Megaman	LR1206dDGv2-WLF	6W GU10 LED	10(20)		10(15)	10(25)									
Megaman	Various	Mains dimmable lamps	1(20)	1(15)	1(20)	1(30)									
National Lighting	84708	Dimmable 5W GU10	1	1	1										
Osram	Parathom LED Bulb	10W Screw fitting bulb	1(15)		1(10)	1(20)									
Osram	Parathom	7W GU10 PAR16 50 35°	1(15)	1(10)	1(15)										
Osram	Parathom Par16 50 36° AA44119	GU10 LED	6(20)	6(10)	6(15)	6(30)									
Ovia	Inceptor LED4400SC8WD	8W Integrated LED IP65 downlight	20(30?)	15(15)	20(20)										
Phillips	Master LEDbulb MV Dimtone	8W screw fitting LEDBulb	1 (15)		1(10)	1(20)									
Philips	LEDspot GU10 MV	8W GU10	5(20)			5(30)									
Philips	LEDspot GU10 MV Dimmable	6W GU10 Lamp	3	3 (10)	3 (15)										
PowerLED	PCC35018TD	18W 350mA ballast 15-52V	1 (20)	1	1	1 (30)									
Premier	LED-Integra	11W fire rated downlight + ballast	1(20)	1(15)	1(20)	1(30)									
Save Light	ST-GUD-73-6K	7W GU10	10(20)		10(15)	10(25)									
Sovereign	S98125	12V LED Driver	See report												
Sovereign	S98215/700/010	700mA Constant Current driver	1	1	1	1									
Sylvania	Hi-Spot RefLED ES50dimmable	5.5W GU10	5(20)	5	5	5(30)									
Teucer	GU10 5W WW LED	5W GU10 Lamp	5(?)	5(10?)	5(15?)	5(?)									
Unbranded	DL2.5-21-500mA LED Driver & Downlight	Mains dimmableLED Driver & Downlight	1(20)	1(15)	1(20)	1(30)									
Unbranded		GU10 LED	2	2	2	2									

LED Test Results

Type

Osram Parathom Par16 50 35° 7W 350lm 2700K

Test Date 28th Feb 2013

Recommended Dimmers

RDT500

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2%	1%

Smoothness of Dimming

There is no flicker seen at any brightness level
Visible steps between dimmer levels.
Start Up is smooth with RDT500 dimmer, but has an annoying flash with RDL500 dimmer

Audible Noise

Slight Buzz when using any dimmer. Using many lamps in a quiet room could be an issue?

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	15 - 20 (Using RDT500) see notes below

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering

(100mA / cm)

Notes:

If attempt is made to start the lamp below 2% then a slight pulsing buzz can be heard from the lamp as it attempts to start. If a second lamp on the same circuit has already struck, then that lamp will flash in synchronisation with the pulsing of the Osram lamp. As soon as the Osram lamp strikes there is no problem. (when we did this test we only had a single Osram sample, an Aurora lamp was placed on the circuit with it). Possibly there could be problems with multiple lamps striking together at low levels.
There is a small amount of hysteresis in the dimming performance. From OFF the lamp will strike at about 2% brightness. If dimming down then it can go to about 1% of maximum. This is not an unusual feature, but could cause slight issue if scenes are set to a very low level.

LED Test Results

Type

Aurora Au-DGU1060/30
Aurora Au-DGU1060/40

Test Date 28th Feb 2013 & 20th May 2013

(These appear to be basically the same lamp as each other, differing in colour temperature etc).

Recommended Dimmers

RDT500

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<1%	<1%

Smoothness of Dimming

There is no flicker seen at any brightness level

Visible steps between dimmer levels.

Start Up is smooth

Audible Noise

Virtually silent with RDT500. 10 lamps buzzing too loudly to be recommended when using RDL500

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
10	20 (Using RDT500)

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering (100mA / cm)

Notes:

This lamp operates very smoothly when using RDT500 dimmer.
Cannot recommend use with leading edge dimmer due to the audible buzz.

LED Test Results

Type

Philips 6W GU10

Test Date 11 March 2013

Recommended Dimmers

RDL250

RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<1%	<1%

Smoothness of Dimming

There is erratic flicker seen at random times using RDT500

There is shimmer seen a random low levels when using RDL500

Visible steps between dimmer levels.

Start Up is smooth

Audible Noise

Virtually silent with RDT500. High Freq whistle & Buzzing slight with RDL500 – acceptable

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
3	15 possibly with RDL500 dimmer (would make 10amp peak currents)

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering

(500mA / cm)

Leading Edge dimmer

Trailing Edge

Notes:

RDT500: Lamp is unacceptably flickery with RDT500 dimmer. When 3 lamps are on the same dimmer, all will seem OK for a while as they are dimmed up & down. Then, at a certain level one of them just starts flickering. Altering the brightness will normally fix it. Can happen at different levels at different times on different lamps randomly. A 100K ballast resistor has a big effect on the brightness, but does not affect the flicker.

RDL500: Lamp is unusual in that it works much better with Leading edge dimmer. There is no erratic flicker as above. There is occasional shimmer which is a fast rhythmic pulsating of brightness. It's not ideal, but if must use this lamp, then go Leading Edge.

LED Test Results

Type

Fusion 5W GU10

Test Date 20 March 2013

Recommended Dimmers

RDT500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<1%	<1%

Smoothness of Dimming

There is erratic flicker seen at very lowest dimmed levels (less than 3%) using RDT500.

Flicker is much worse (5 times more flickery) using RDL500

Visible steps between dimmer levels (not unusual).

Start Up is smooth

Audible Noise

No audible noise noticed

Multiple lamps per dimmer circuit

Number Tested:	**Estimated maximum number per circuit**
1	20 using RDT500.

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering (200mA / cm)

Leading Edge dimmer

Trailing Edge (100mA/cm)

Notes:

RDT500: Based on the single sample tested this is a lamp that dims well when used with a Trailing edge dimmer (RDT500). There is a little flicker at the very lowest levels, but this is not at all unusual with this general style of lamp. There is nothing in the electrical waveform that suggests trouble with using several lamps on a single circuit. Should be possible to avoid the flicker being noticed by setting the dimmer to avoid levels below 4% or so.

RDL500: The lamp dims reasonably with a leading edge dimmer down to about 3% without flicker. But the flicker below that is objectionable, so would use an RDT500 in preference. However, if a site already had RDL500 fitted, this lamp might be a good retro fit choice as long as the scenes were set above 4 or 5%.

LED Test Results

Type

Lumotech LEDlight 1-20Watt

L05016i Dimmable LED Driver Dimmable 1-10V or pulse switch

Test Date 27th March 2013

Recommended Dimmers

RDF800C

RAK4F

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2%	2%

Smoothness of Dimming

There is no flicker seen at any brightness level
Smooth dimming at all dimmer levels.

Audible Noise

Slight Buzz when using any dimmer. Particularly when fully loaded.

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	20 – estimate only

Notes:

The ballast has a rotary switch to allow selection of different output currents. Various conditions exist regarding lamp connections for higher output settings.

Test were performed at 350mA using various numbers of LEDs.

4 x 1W LED (approx 12V) @ 350mA output 1

8 x 1W LED (approx 24V) @ 350mA output 1

8 x 1W LED (approx 24V) @ 350mA output 1, plus 4 x 1W LED output 2

8 x 1W LED (approx 24V) @ 350mA output 1, plus 8 x 1W LED output 2

For each test the performance was the same: Smooth dimming down to approx 2%

LED Test Results

Type

MeanWell LPF-16D-12 12V Constant Voltage LED Driver

Test Date 27th March 2013

Recommended Dimmers

RDF800

RAK4F

Important Notes:

This type of ballast needs to be understood to get the best from it.

When dimmed the ballast goes into Constant Current mode. (It is really a constant current ballast with a 12V maximum output voltage)

This means that the dimming performance is very dependant on the lamps connected.

The closer the ballast is to maximum loading, then the better the lamps appear to dim.

Dimming Performance

1. Using 1 metre 12V LED tape (Ballast at full capacity)

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
6%	6%

There is no flicker seen at any brightness level

Smooth dimming from 100% down to 6% then snaps off crisply

1. Using a single MR16 equivalent LED lamp (20% of ballast capacity)

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
20-25%%	20-25%%

There is no flicker seen at any brightness level

Dimming all occurs at the very bottom part of the dimming curve (Is still at full brightness on scene 4)

If the load is increased by addition of extra lamps the dimming performance will be greatly improvedI

Audible Noise

None noticed

Multiple Units per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	20 (Estimate)

Notes:

This is a good dimming ballast, but could result in frustration if it is no carefully matched to its load.

LED Test Results

Type

Lumanor 6W LED Spotlight DBGU100106-220

(Lamp itself is marked KGU10/6W/W/D)

Test Date 10th April 2013

Recommended Dimmers

RDT500
RAK4T
RDL250
RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<1%	<1%

Smoothness of Dimming

Performance is very good down to approx 1%. Below this level is some flicker
Can Only Just see visible steps between dimmer levels – good

Audible Noise

Silent

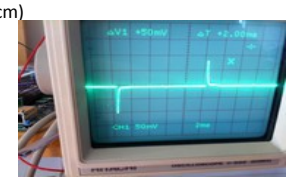
Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
6	20 (Using RDT500) see notes below

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering (500mA / cm)

RDT500



RDL500

Notes:

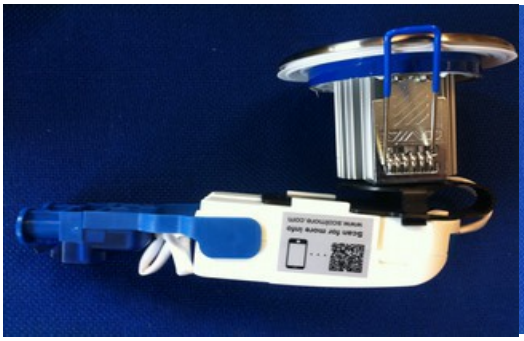
This is a good lamp. Visual performance is same when used with either Trailing or leading edge dimmers. Trailing edge dimmer is preferred as this gives lower peak currents (see pictures above). However, with a leading edge dimmer this lamp is pretty well behaved compared with many other lamp types. Might be a good choice if lamp was being retrofitted where leading edge dimmers already existed. A flicker below 1% brightness is the only noticeable feature of an otherwise excellent lamp, but this is at a brightness level that many other lamps can't even get down to.

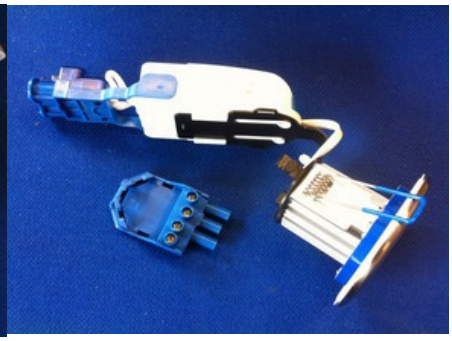
[LED Test Results]

Type

OVIA INCEPTOR LED440SC8WD

8W Integrated LED IP65 Downlight, Fire & Acoustic Rated. Pre-wired with Dimmable Driver & Flow Connector





www.scolmore.com

Test Date 15th April 2013

Retested on 06th Aug 2014

Recommended Dimmers

RDT500

RAK4T

RDL250

RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<1%	<1%

Slight flicker on some samples at the very lowest levels.

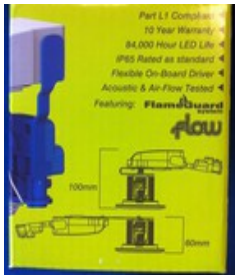
This is at a level well below 1%, however the dimming profile is heavily skewed towards the top end bottom 25% of dimmer output works in the bottom 5% of light output.

Smoothness of Dimming

Dimming is smooth with only very slight visible steps between levels

Audible Noise

Silent with RDT500, slight buzz with RDL500

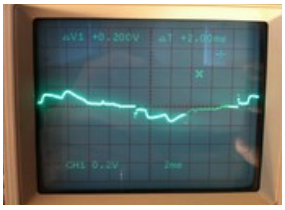


Multiple lamps per dimmer circuit	Probably maximum number per circuit
Number Tested:	>20 (perhaps as much as 30 when using RDT500)
20	

Electrical Performance

Traces show current taken by 20 samples on a single circuit.

Left hand picture shows RDT500, Right Hand picture shows RDL500



Peak lamp current using RDT500 is less than 1/4 that when using RDL500

Notes:

We rate this lamp “Very Good”.Dimming performance is very good with either Trailing edge or Leading edge dimmers with only very slight flickering in the lower output range. The trailing edge dimmer is preferred as it results in lower peak mains currents and silent operation.

LED Test Results

Type

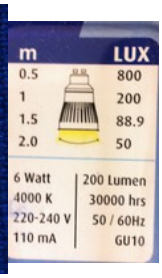
Energetic 6W GU10

(Lamp itself is marked MR16 6W 35D 4000K Dimmable)

Test Date 24th April 2013

Recommended Dimmers

RDT500
RAK4T
RDL250
RDL500



Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0.5% Approx	0.5% Approx%

Smoothness of Dimming

Performance is very good down to the very dimmest level. There is a just a suggestion of shimmer below 2% - very good
Can Only Just see visible steps between dimmer levels – very good
If anything: The visual performance is slightly better using Leading Edge dimmer

Audible Noise

Slight buzz with Leading Edge. Silent with Trailing edge

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	20 perhaps (Using RDT500) – estimate only

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering (200mA / cm)

RDT500

RDL500

Notes:

This is a good lamp. Visual performance is almost equal when used with either Trailing or leading edge dimmers. Trailing edge dimmer is preferred as this gives lower peak currents (see pictures above). A good choice if lamp was being retrofitted where leading edge dimmers already existed.

LED Test Results

Type

John Cullen RDM48350 ballast with 350mA 36V lamp

Test Date 30th April 2013

Recommended Dimmers

RDT500

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0.5% Approx	0.5% Approx%

Smoothness of Dimming

RDT500: Very smooth dimming down to 1%.
RDL500: Very smooth dimming down to 1%
If anything: The visual performance is slightly better using Trailing Edge dimmer
Slight flickering seen below 1% on occasion – not a criticism

Audible Noise

Moderate buzz from ballast with Leading Edge (Would be annoying). Silent with Trailing edge

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	20 perhaps (Using RDT500) – estimate only

Electrical Performance

Current taken from ac supply is typical for a ballast with good filtering

(500mA / cm)

RDT500

RDL500

Notes:

This is a good lamp. Trailing edge dimmer is much preferred as this operates silently & gives lower peak currents (see pictures above). The dimming gives a slightly smoother effect with trailing edge dimmer too.
The lamp itself is rated at 36V 350mA which makes it more than 12W – It is very bright.

LED Test Results

Type

Kosnic KFDL7.5DIM

http://www.kosnic.com/products/2813
Test Date 30th April 2013

Recommended Dimmers

RDT500
RAK4T
RDL500
RDL250

Dimming Performance

Minimum brightness from OFF
2%

Minimum Brightness dimming down to OFF
2%

Smoothness of Dimming

Very similar performance with trailing or leading edge
Reasonably smooth above 5 – 10%, but visible steps at lower levels.
Prone to flash of light as it strikes from OFF
Only slight flickering seen at less than 3%

Audible Noise

Silent operation

Multiple lamps per dimmer circuit

Number Tested:
1

Probably maximum number per circuit
20 perhaps (Using RDT500) – estimate only

Electrical Performance

Peak Current taken from ac supply using RDL500 is not much greater than the RDT500 current
(200mA / cm)

RDT500

RDL500

Notes:

This lamp gives Fire rating and has option for Emergency lighting connection.
Dimming performance is adequate with some lack of finesse at the lower end.
Electrical performance is better than average for Leading edge and there is little advantage in using Trailing edge in this case.

[LED Test Results]

Type

Kosnic KTC08DIM/GU10

http://www.kosnic.com/products/2813

Test Date 10th May 2013

Recommended Dimmers

RDT500

RAK4T

RDL500

RDL250

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2%	2%

Kosnic

Smoothness of Dimming

Very similar performance with trailing or leading edge

Reasonably smooth above 5 – 10%, but visible steps at lower levels.

Prone to flash of light as it strikes from OFF

Only slight flickering seen at less than 3%

Video Of strobing at low levels

Audible Noise

Silent operation

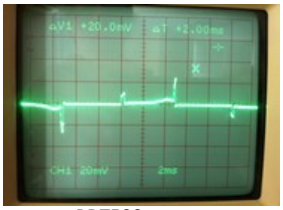
Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
6	20 perhaps (Using RDT500) – estimate only

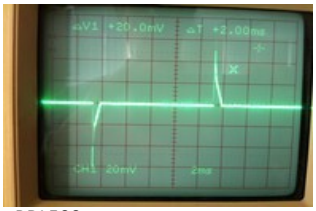
Electrical Performance

Peak Current taken from ac supply using RDL500 is not much greater than the RDT500 current

(200mA / cm)



RDT500



RDL500

Notes:

Dimming performance is adequate with some lack of finesse at the lower end.

Electrical performance is better than average for Leading edge and there is little advantage in using Trailing edge in this case.

There is a strange strobing effect which occurs when trying to dim these up to a low level from off. See video. This could be avoided by preventing dimmers from going to lowest levels, but is definitely undesirable.

Video

LED Test Results

Type

ENLITE EN-DGU1006/40

Test Date 20 March 2013

Recommended Dimmers

RDL500

RDL250

RAK4L

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
7%	<1%

Smoothness of Dimming

No Flicker was seen with Leading or Trailing edge dimming

Startup from Off is somewhat abrupt & prone to flashes. Especially at dim levels.

Performance above 7% brightness is good

With multiple lamps on a circuit lamps do not all come on together. Is somewhat better with Leading edge.

Audible Noise

Some buzzing noticed with both Leading & Trailing edge. Would probably be acceptable in most environments.

Multiple lamps per dimmer circuit

Number Tested:	**Estimated maximum number per circuit**
20	20 using RDT500.

Electrical Performance

Trailing edge current is not greatly less than leading edge compared with other products

(200mA / cm)

Leading Edge dimmer

Trailing Edge (200mA/cm)

Notes:

RDT500: Twenty samples tested. At switch on the lamps do not all strike at once and must be dimmed up to about 7% before they are all on. This is the most noticeable limitation of the overall performance.
At higher levels the lamps perform very well.

RDL500: Twenty samples tested. At switch on the lamps do not all strike at once. However, this effect is less noticeable with Leading edge. Most users would consider this performance to be satisfactory
At higher levels the lamps perform very well.

Overall: This lamp has been designed to work with a Leading edge dimmer. (Probably works very well with rotary dimmers). With RDL type dimmers would be a good choice. Not particularly good choice for trailing edge, though some may find it acceptable.

LED Test Results

Type

Aurora Au-DGU1040W/40

Test Date 10th May 2013

Recommended Dimmers

RDT500

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<0.1% Trailing. <1% Leading	<0.1% Trailing. <1% Leading

Smoothness of Dimming

Using Leading edge performance is very good, but it is harder to adjust the lamp to very low levels

Can see some digital steps between levels if dimming slowly, but very good

Audible Noise

Virtually silent with Trailing Edge. Some buzzing when Leading Edge

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
20	20 (Using RDT500)

Electrical Performance

Good clean waveforms. The Trailing edge peak currents are very much lower than the leading edge
So there is good reason to favour Trailing Edge.

(200mA / cm)

Notes:

This lamp works very well with either Leading or Trailing edge dimmers.
Trailing edge dimmer is to be preferred for the following reasons:
Dims smoothly down to very low level approx 0.1%.
Lamps all came on together at very low level.
Lower peak currents when dimming Trailing Edge.
If anything, the performance was better with RAK4T than with RDT500

LED Test Results

Type

Energetic YKMR16G1-4.5W-D

Test Date 20th May 2013

Recommended Dimmers

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2%	2%

Smoothness of Dimming

RAK4T: Good Flicker free performance. Most dimming occurs in bottom third of dimmer curve.

RDT500: As RAK4T, but some flicker seen at various brightness levels

RDL500: Leading edge gives better dimming profile. Some flicker seen at various brightness levels.

Audible Noise

Virtually silent with Trailing Edge. Some buzzing when Leading Edge

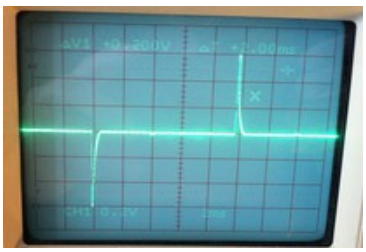
Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
20	30 (Using RAK4T)

Electrical Performance

Good clean waveforms. The Trailing edge peak currents are very much lower than the leading edge
So there is good reason to favour Trailing Edge.

(200mA / cm)



Notes:

This lamp works very well with RAK4T dimmer. Some (slight) flicker seen with RDL500 & RDT500.
Lamp has interesting switch off effect. Lamps has an afterglow for twenty seconds or more after power is removed. Not offensive, but worth knowing about.
At very low input levels the lamp is actually gets brighter as the level is reduced. Causes a slight flash as lamp strikes sometimes. This only occurs below 1.5% brightness & wouldn't be noticed by most people.

LED Test Results

Type

decoLED6W GU10

http://www.decoledlight.co.uk/led-6w-%5Bgu10%5D-retrofit-spotlight-%5Bdimmable%5D~557

Test Date 20th May 2013

Recommended Dimmers

RAK4T
RDT500
RDL500
RDL250

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0%	0%

Smoothness of Dimming

Almost Faultless dimming

Audible Noise

Virtually silent. Tiny whistle at lowest brightness.

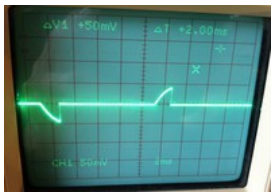
Multiple lamps per dimmer circuit

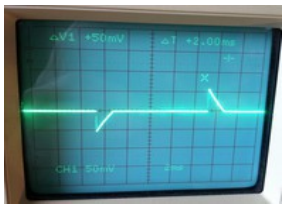
Number Tested:	Probably maximum number per circuit
2	30 (Using RAK4T)

Electrical Performance

Very good clean power factor corrected waveforms. Equally good with Trailing edge & leading edge

(50mA / cm) This is the current for TWO lamps





Notes:

The sample lamps performed exceptionally with both Trailing Edge & Leading Edge dimmers.
It is possible to make the lamp flicker/flash dimly by applying an extreme dimmed input to it. This is a very slight niggle indeed & wouldn't normally be noticed.
Only two lamps were received for testing, so unable to promise that performance of many lamps on a circuit will be perfect, but the indications are very good.

LED Test Results

Type

Ansell ATILED/CW
Titan LED Fire Rated Downlight

Test Date 20th May 2013

Recommended Dimmers

RAK4T

RDT500

The ballast was tested using a 20V, 350mA LED lamp (Type G4B3X830M-GCH www.detaillighting.co.uk)

0.5% Approx

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
10%	10%

Smoothness of Dimming Titan

Buzz from ballast with Leading Edge would be annoying. Silent with Trailing edge

Dimming below 10% with two lamps on a single circuit causes flicker/flashing problems with Leading & Trailing (video below)

http://www.youtube.com/watch?v=uz5jJX5Y8_A&feature=youtu.be

Audible Noise

Virtually silent.

Multiple lamps per dimmer circuit ballast.	**Probably maximum number per circuit**
2	(100mA / cm)

Electrical Performance

Current Waveforms are typical for a reasonably well filtered ballast.

(50mA / cm) This is the current for TWO lamps

Notes:

The sample lamps performed well at medium to high brightness levels. Probably not best for installations where subdued mood lighting is required due to limited dimming capability.
Lower peak currents when trailing edge dimmed mean that RAK4T or RDT500 are the recommended dimmers

LED Test Results

Type

Collingwood Halers H2 Pro

Dimmable fire-rated LED downlight 8.5W

Test Date 21st May 2013

Re-test & Updated 9th July 2014

Recommended Dimmers

RMT500

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5%	5%

All six lamps tested switched on within a second of each other when when dimmed up slowly.

Smoothness of Dimming

RDT500/RAK4T: No flicker seen on sample at any brightness level

RDL500: Mainly flicker free, but did see some instability at lowest settings when a single lamp used

Visible steps only visible between dimmer levels at dim settings.

There was no evidence of any 50Hz shimmering

Light Flash when Lamp starts - click Link Here

Audible Noise

Slight Buzz from ballast when using any dimmer. Using many lamps in a quiet room could be an issue. Probably OK if ceiling blocks the sound enough.

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
6	RMT500 20
	RAK4T 30

No problems were encountered when adding extra lamps (6) to the circuit

E

C ical for a ballast with reasonable filtering

(50mA / cm)

LED Test Results

Type

Actec DIM350mA/18W

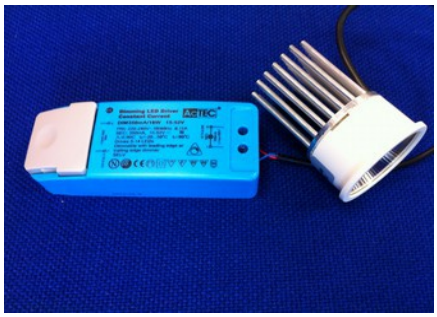
350mA LED Driver 15 – 52V

Test Date 21st May 2013

Recommended Dimmers

RAK4T

RDT500



The ballast was tested using a 20V, 350mA LED lamp (Type G4B3X830M-GCH www.detaillighting.co.uk)

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0.5% Approx	0.5% Approx

Smoothness of Dimming

RDT500: Very smooth dimming down to 1%.
RDL500: Very smooth dimming down to 1%
If anything: The visual performance is slightly better using Trailing Edge dimmer
Slight flickering seen below 1% on occasion – not a criticism

Audible Noise

Buzz from ballast with Leading Edge would be annoying. Silent with Trailing edge

Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	20 perhaps (Using RDT500) – estimate only

Electrical Performance

Trailing edge makes much lower peak currents than Leading edge

(100mA / cm)

RDT500

RDL500

Notes:

The Ballast/Lamp combination performed very well with RDT500 and RAK4T Dimmers.
Trailing edge is much preferred due to audible buzz when using Leading edge dimmers.

LED Test Results

Type

Sovereign S98215 Dimmable LED Drivers

Triac Dimmable Constant Voltage LED Drivers
Test Date 12th June 2013

Two Versions:
S98215/12/034 33.6W Max
S98215/12/026 26W Max

Recommended Dimmers
RAK4T
RDT500

Each Ballast was tested with a 2.5 metre length of 12V White LED tape. That is equivalent to a 20W load.
In each case the test was done with a Leading edge dimmer and a Trailing edge dimmer for comparison

Whilst the two ballasts look very similar, they perform quite differently:

S98215/12/026 26W Max

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5% approx	5% approx

Smoothness of Dimming

RDT500: Reasonably smooth dimming down to 5%
RDL500: Bad flicker at level just below 100% brightness

Audible Noise

Unacceptable buzzing from ballast when using Leading Edge (Triac) dimmer
Some buzz from ballast when using Trailing Edge dimmer

S98215/12/034 33.4W Max

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5% approx	5% approx

Smoothness of Dimming

RDT500: smooth dimming down to 5%
RDL500: Reasonably smooth dimming down to 5%

Audible Noise

Some buzzing from ballast when using Leading Edge (Triac) dimmer
Almost silent when using Trailing Edge dimmer

Notes:

The 33.4W ballast performed better than the 26W version and based on the samples received we would recommend that the 33.4W version be used in preference. Use a Trailing edge dimmer (RDT500 or RAK4T) because this will give virtually silent dimming.

LED Test Results

Type

ECOPAC EPC-701

Constant Voltage LED Dimmer (0-10V input)

Test Date 12th June 2013

Recommended Dimmers

RDF800

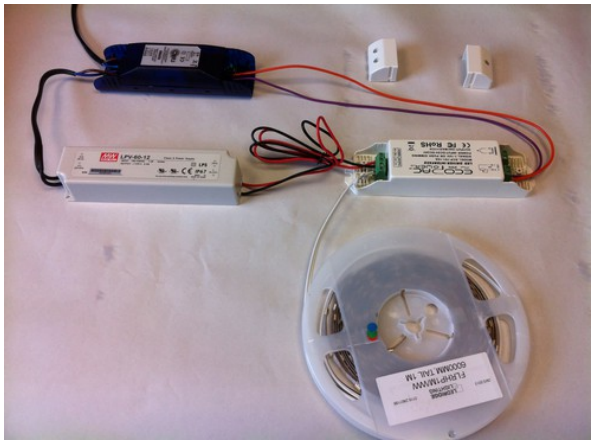
RAK4F

The ballast was tested with a 6metre length of 12V LED tape

12V DC was provided by a Meanwell LPV-60-12 Power Supply

Dimming was provided by an RDF800 wireless dimmer

AC supply to the Meanwell power supply was switched on/off through the RDF800



Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
1%	1%

Smoothness of Dimming

Dimming was smooth down to the very lowest level. Very good.

This is a linear (NOT PWM) dimmer – light quality therefore very good – no strobe effect

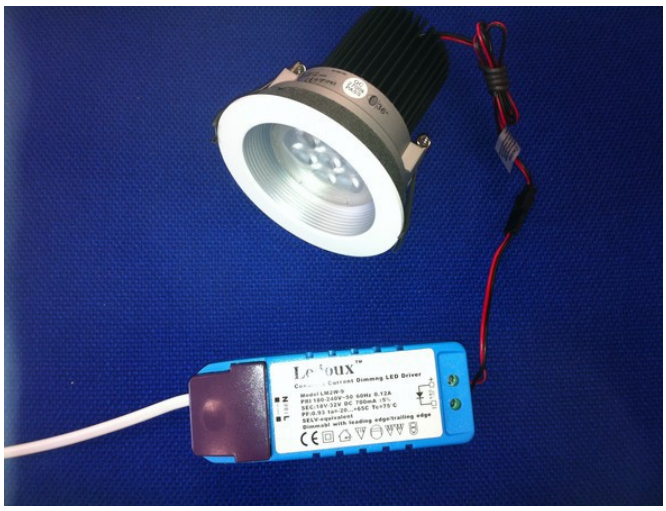
Audible Noise

No audible noise

Notes:

This is a good dimmer for LED tape. Can be used 12V or 24V DC, though we only tested with 12V

LED Test Results



Type

LEDOUX LM2W-9

Constant Current LED Driver 700mA 18-32V

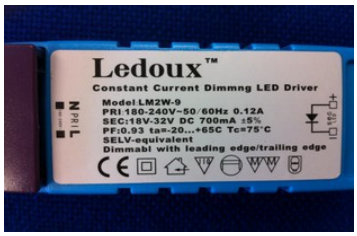
Test Date 26th June 2013

Recommended Dimmers

RDT500

RAK4T

The ballast was tested with a 700mA Spot lamp at 22VDC



Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2% (Trailing edge)	0.5% (Trailing edge)
3% (Leading edge)	3% (Leading edge)

Smoothness of Dimming

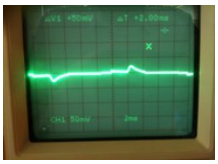
Dimming was smooth down to the very lowest level. Very good.
No flicker seen

Audible Noise

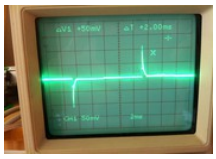
Slight buzz from ballast – leading edge & trailing edge

Electrical Performance

Trailing edge makes much lower peak currents than Leading edge (50mA / cm)



RDT500



RDL500

Notes:

This is a good ballast for 700mA LEDs of 18-32V.
Much in the same style as Hamilton, Actel, PowerLED

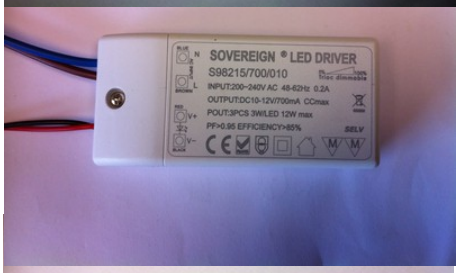
LED Test Results

Type

Sovereign S98215/700/010
And (Unbranded) DR-24-700-18D
And ECOPAC ELED-12-700T

Constant Current LED Drivers

Test Date 26th June 2013



Recommended Dimmers

RDT500

RAK4T

The Ecopac ballast was supplied with two 700mA spot lamps. At full brightness these lamps required 9.0V DC each

Dimming Performance

The Ecopac ELED-12-700T was tested with RDT500 and RDL500 dimmers (two lamps connected)
Performance was good with RDT500, but there was a flash at switch on with RDL500,
So all further tests were done using Trailing Edge dimmers

DR-24-700-18D with two lamps in series

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2%	2%

Smoothness of Dimming

Dimming was smooth down to around 10%. Below this there were visible step between levels.
At low levels could see slight flicker when using RDT500, No flicker at all with RAK4T.

Audible Noise

Very slight buzz – not objectionable

DR-24-700-18D with a single lamp

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
25%	25%

Smoothness of Dimming

Dimming was reasonable smooth once the lamp had struck, bearing in mind the very limited dimming range
At low levels the lamp will flash about twice a second as it tries to strike – not good

Audible Noise

Very slight buzz – not objectionable

ECOPAC ELED-12-700T ith two lamps

The DR-24-700 flashes the lamps uncontrollably at all brightness settings

ECOPAC ELED-12-700T with one lamp

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
7%	4%

Smoothness of Dimming

Dimming was smooth down to around 10%. Below this there were visible step between levels.
No flicker seen
Single Flash seen from lamp as it starts if dimmed up slowly from zero

Audible Noise

Very slight buzz – not objectionable

Sovereign S98215/700/010with a Single Lamp

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<10% approx	<10% approx

Smoothness of Dimming

Dimming was smooth down to around 20%. Below this there were visible step between levels.
At low levels could see slight flicker when using RDT500, No flicker at all with RAK4T.

Audible Noise

Very slight buzz – not objectionable

Notes:

Sovereign S98215/700/010 can drive a single lamp with dimming down to under 10%
RD-24-700-18D can drive two lamps in series with similar performance.
The **ELED-12-700** did not seem to be matched very well to these lamps at all.

LED Test Results

Type

Megaman LED Lamps
LC0602dCSv2 7Watt W14 candle
LG1907DV2 7 Watt E27
LU0104d 4W G9

Test Date 26th June 2013

Recommended Dimmers

RDT500

RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<1%	<1%

Smoothness of Dimming

There is no flicker seen at any brightness level

No steps between brightness levels

Audible Noise

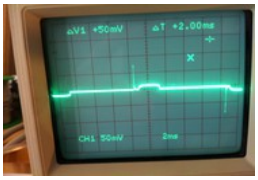
Slight Buzz when using an RDL500 (leading edge dimmer) – Not bad at all

Multiple lamps per dimmer circuit

Number Tested:	Probably maximum number per circuit
1	15 (Using RDT500) estimate

Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering



Notes:

All three types performed very similarly & very well.
Megaman make a consistently good range of LED lamps

LED Test Results

Type

DL2.5-21-500mA LED Driver & Downlight

Mains dimmable Constant Current LED Driver & Lamp

Test Date 9th 2013

Recommended Dimmers

RDT500

RAK4T

(RDL500)

The ballast & lamp combination was tested with Trailing Edge & Leading edge dimmers

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
<0.1%	<0.1%

Smoothness of Dimming

Dimming was smooth down to the very lowest level. Very good.

No flicker was seen of any sort

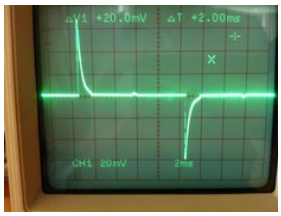
Audible Noise

No audible noise

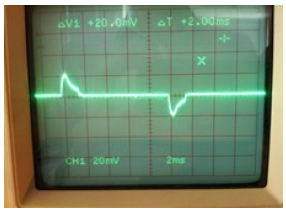
Electrical Performance

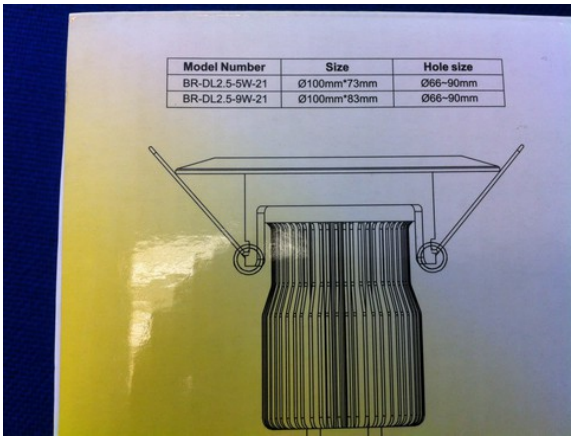
Waveforms show current taken from ac supply when using Leading edge & Trailing edge dimmers. Peak currents are much lower with Trailing edge dimmer

RDL500 20mA/cm



RDT500 20mA/cm





Model Number	Size	Hole size
BR-DL2.5-5W-21	Ø100mm*73mm	Ø66~90mm
BR-DL2.5-9W-21	Ø100mm*83mm	Ø66~90mm

Notes:

A very good performing Lamp/Ballast combination. RDT500 or RAK4T Trailing Edge dimmers are preferred as this results in lower peak ac current.

LED Test Results

Type

Bell 7W GU10

Test Date 5th Aug 1013

Recommended Dimmers

RDL500 , RDL250

RAK4T

RDT500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0.5% (RDT500) <0.1% (RDL500)	< 0.1%

Smoothness of Dimming

There is slight flicker seen below 7 – 8% max brightness when using RDT500

Flicker is better with Leading edge – none above about 1% of maximum

Similarly, RAK4 good down to about 1%

Smoothness of Dimming

Nice & smooth generally. Can only just make out digital stepping between brightness levels at low settings.

Audible Noise

Barely audible – need to be 6” from lamp to hear slight buzz

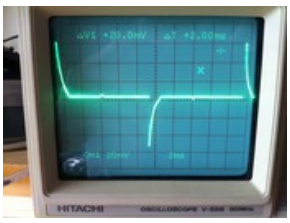
Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	15 - 20 (Using RDT500) see notes below

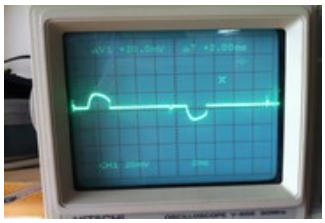
Electrical Performance

Current taken from ac supply is typical for a GU10 LED with reasonable filtering

(200mA / cm)



Leading edge



Trailing edge

Notes:

RDT500: Based on the single sample tested this is a lamp that dims well when used with a Trailing edge dimmer (RDT500). There is a little flicker at low levels, but this is not at all unusual with this general style of lamp. There is nothing in the electrical waveform that suggests trouble with using several lamps on a single circuit. Should be possible to avoid the flicker being noticed by setting the dimmer to avoid levels below 8% or so.

RDL500: The lamp actually dims better with a leading edge dimmer, which is relatively unusual. Peak currents are higher with a leading edge dimmer – see waveforms above.

LED Test Results

Type

Aurora AU-FRLD811/30 LED Downlight Fire Protection

Test Date 12th Aug 2013

Recommended Dimmers

RAK4T
RDT500
RDL500
RDL250

10 Lamps were provided by the manufacturer for test purposes. We tested these with Trailing edge dimmers, (RAK4T & RDT500) and with leading edge dimmer (RDL500). In each case the performance was checked with a single lamp, 3 lamps and 10 lamps connected to the dimmer.

USING RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5%	5%

Adding additional lamps to the circuit made no visible difference to the brightness of the lamps. With multiple lamps connected they all came on and went off together as the dimmer was gradually faded up & down to off.

Below approx 20% of maximum brightness there is 50Hz shimmering which some users may notice.

Smooth dimming between levels – can just see digital stepping at low levels

Audible Noise

Virtually silent.

USING RDT500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5%	5%

Results were same as for the RAK4T except could see an intermittent flicker at levels below 20% as well as the shimmering

Smooth dimming between levels – can just see digital stepping at low levels

Audible Noise

Virtually silent.

USING RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5%	5%

Results same as for RAK4T

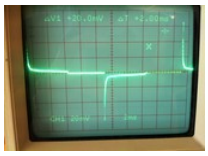
Audible Noise

Virtually silent.

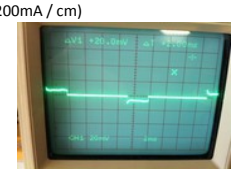
Electrical Performance

Current Waveforms are typical for a reasonably well filtered ballast.

(200mA / cm)



Leading edge



Trailing edge

Notes:

The sample lamps performed well at all brightness levels

Lower peak currents when trailing edge dimmed mean that RAK4T or RDT500 are the recommended dimmers

LED Test Results

Type

Aurora AU-DGU107/40

220-240V GU10 7W Dimmable

Test Date 12th Aug 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

RDL250

10 Lamps were provided by the manufacturer for test purposes. We tested these with Trailing edge dimmers, (RAK4T & RDT500) and with leading edge dimmer (RDL500). In each case the performance was checked with a single lamp, 3 lamps and 10 lamps connected to the dimmer.

Performance was similar with all dimmer types tested

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5%	2%

Adding additional lamps to the circuit made no visible difference to the brightness of the lamps. With multiple lamps connected there was a slight tendency for certain lamps to come on at lower levels than others as the dimmer was gradually faded up & down to off. This was only slight.

Below approx 20% of maximum brightness there is 50Hz shimmering which some users may notice.

Smooth dimming between levels – can just see digital stepping at low levels

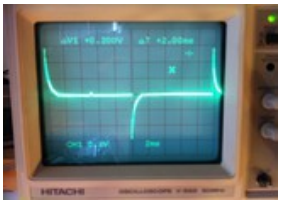
Audible Noise

Virtually silent.

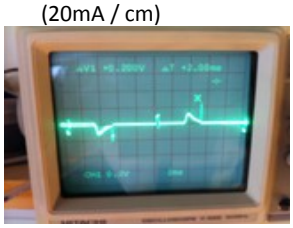
Electrical Performance

Current Waveforms are typical for a reasonably well filtered ballast.

(20mA / cm)



Leading edge



Trailing edge

Notes:

The sample lamps performed well at all brightness levels

Lower peak currents when trailing edge dimmed mean that RAK4T or RDT500 are the recommended dimmers

LED Test Results

Type

Lumanor COB GU10 Dimmable 220-240V 50/60Hz 7W 520lm

Test Date 14th Aug 2013

Recommended Dimmers

RAK4T
RDT500
RDL500
RDL250

6 Lamps were provided by the manufacturer for test purposes. We tested these with Trailing edge dimmers, (RAK4T & RDT500) and with leading edge dimmer (RDL500). In each case the performance was checked with a single lamp, 3 lamps and 6 lamps connected to the dimmer.

Performance was similar with all dimmer types tested

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
less than 1%	less than 1%

Adding additional lamps to the circuit made no visible difference to the brightness of the lamps. With multiple lamps connected the lamps came on and off together well as the dimmer was gradually faded up & down to off. It is possible to find a level where only some lights are illuminated – not an issue.

Smooth dimming between levels – cannot see digital stepping between levels

Audible Noise

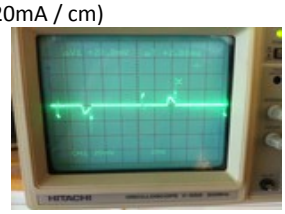
Virtually silent.

Electrical Performance

Current Waveforms are typical for a reasonably well filtered ballast.

(20mA / cm)

Leading edge



Trailing edge

Notes:

The sample lamps performed very well at all brightness levels
Lower peak currents when trailing edge dimmed mean that RAK4T or RDT500 are the recommended dimmers

An excellent lamp

LED Test Results

Type

National Lighting
Dimmable 5W GU10
84708

Test Date 15th Aug 2013

Recommended Dimmers

RDL500

RDL250

Single lamp supplied for testing. Was tried with RDT500 trailing edge dimmer & RDL500 leading edge dimmer

USING RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
30%	30%%

Smooth dimming between levels – cannot see digital stepping between levels

Audible Noise

Virtually silent.

USING RDT500

Dimming Performance

Lamp flickers uncontrollably. Clearly is not designed for use with trailing edge dimmer

Electrical Performance

Current Waveforms are typical for a
reasonably well filtered ballast.

(20mA / cm)

Leading edge

Notes:

Lamp works reasonably well with a leading edge dimmer with somewhat limited dimming range.
Do not try to use with a trailing edge dimmer

LED Test Results

Type

POWERLED PCC35018TD

350mA LED Driver 15 – 52V

Test Date 21st June 2013

Recommended Dimmers

RAK4T

RDT500

The ballast was tested using a 20V, 350mA LED lamp (Type G4B3X830M-GCH www.detaillighting.co.uk)

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0.5% Approx	0.5% Approx

Smoothness of Dimming

RDT500: Very smooth dimming down to 1%.
RDL500: Very smooth dimming down to 1%
If anything: The visual performance is slightly better using Trailing Edge dimmer
Slight flickering seen below 1% on occasion – not a criticism

Audible Noise

Buzz from ballast with Leading Edge would be annoying. Silent with Trailing edge

Multiple lamps per dimmer circuit

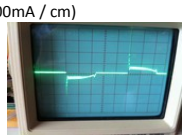
Number Tested:	**Probably maximum number per circuit**
1	20 perhaps (Using RDT500) – estimate only

Electrical Performance

Current taken from ac supply shows some switching noise from the ballast. Trailing edge makes much lower peak currents than Leading edge

(100mA / cm)

RDT500



RDL500

Notes:

The Ballast/Lamp combination performed very well with RDT500 and RAK4T Dimmers.
Trailing edge is much preferred due to audible buzz when using Leading edge dimmers.

This driver has a 15V to 52V output which means it can drive from 5 to 14 LED chips in series. Typical LED luminaires have several chips within them and very commonly fall within the range of this driver. When coupled with an RDT500 or RAK4T dimmer this makes a particularly versatile combination which will contribute to trouble free installation of LEDs.

LED Test Results

Type

Philips

Master LEDspot GU10 MV

84708

Test Date 22nd Aug 2013

Recommended Dimmers

RDT500

RAK4T

Five lamps supplied for testing. Were tried with RDT500 & RAK4T trailing edge dimmers.
(Philips recommend trailing edge on the product leaflet)

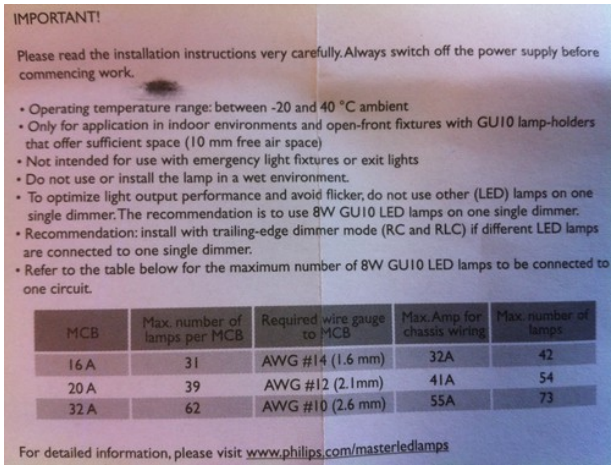
-

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
2%	2%

Smooth dimming between levels – cannot see digital stepping between levels

Noticed that varying the number of lamps on the circuit made no difference
To the brightness of the connected lamps



IMPORTANT!

Please read the installation instructions very carefully. Always switch off the power supply before commencing work.

- Operating temperature range: between -20 and 40 °C ambient
- Only for application in indoor environments and open-front fixtures with GU10 lamp-holders that offer sufficient space (10 mm free air space)
- Not intended for use with emergency light fixtures or exit lights
- Do not use or install the lamp in a wet environment.
- To optimize light output performance and avoid flicker, do not use other (LED) lamps on one single dimmer. The recommendation is to use 8W GU10 LED lamps on one single dimmer.
- Recommendation: install with trailing-edge dimmer mode (RC and RLC) if different LED lamps are connected to one single dimmer.
- Refer to the table below for the maximum number of 8W GU10 LED lamps to be connected to one circuit.

MCB	Max. number of lamps per MCB	Required wire gauge to MCB	Max. Amp for chassis wiring	Max. number of lamps
16 A	31	AWG #14 (1.6 mm)	32A	42
20 A	39	AWG #12 (2.1mm)	41A	54
32 A	62	AWG #10 (2.6 mm)	55A	73

For detailed information, please visit www.philips.com/masterledlamps

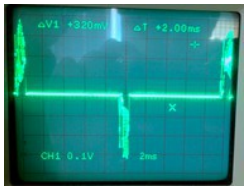
Audible Noise

Buzzing could be an issue amongst discerning clients. (Though is quiet at full brightness)

Electrical Performance

Current Waveforms are not as smooth
as many others.

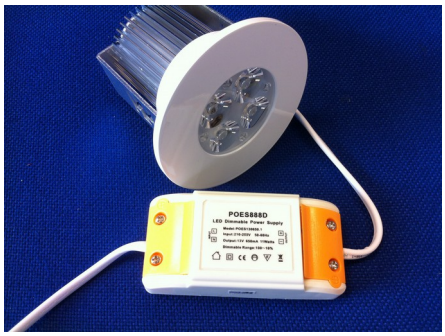
(20mA / cm)



Notes:

The dimming performance is perfectly good with no flicker seen.
The audible buzz could put some people off.

LED Test Results



Type

Premier LED-Integra

11W Fire rated downlight

Test Date 23rd Aug 2013

Recommended Dimmers

RDT500
RAK4T
(RDL500)

The ballast & lamp combination was tested with Trailing Edge & Leading edge dimmers

Dimming Performance

Minimum brightness from OFF
2%
50Hz/100Hz shimmer can be seen.

Minimum Brightness dimming down to OFF
2%

Smoothness of Dimming

Dimming was smooth down to 3%.
In the range 2% to 3% it will flicker.
I would advise to alter the dimmer profile to make sure it does not operate in this zone.

Audible Noise

Only a faint buzz. Louder with leading edge, but quite acceptable.

Electrical Performance

Waveforms show current taken from ac supply when using Leading edge & Trailing edge dimmers. Peak currents are much lower with Trailing edge dimmer

RDL500 20mA/cm

RDT500 20mA/cm

Notes:

A good performing Lamp/Ballast combination.
Need to avoid that lowest setting to prevent visible flicker.
RDT500 or RAK4T Trailing Edge dimmers are preferred as this results in lower peak ac current.

LED Test Results

Type

Sylvania
Hi-Spot RefLED ES50 Dimmable
Code: 0026363

Test Date 3rd Sept 2013

Recommended Dimmers

RDT500

RAK4T

Five lamps supplied for testing. Were tried with RDT500 & RAK4T trailing edge dimmers And RDL500 Leading edge dimmer

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
10%	10%

Reasonably smooth dimming between levels – can see some digital stepping between levels

Noticed that varying the number of lamps on the circuit made no difference
To the brightness of the connected lamps

With RDL500 leading edge dimmer there is a flicker and shimmer at most brightness levels.

With RDT500 trailing edge dimmer there is flicker and shimmer at levels below 30% of maximum brightness

With RAK4T trailing edge dimmer there is shimmer (only) below 30% of maximum brightness

Audible Noise

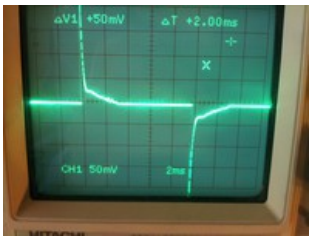
Using Trailing edge dimmers the lamps are reasonable silent. When using Leading edge dimmer (RDL500) there is buzzing from the lamps which is objectionable.

Lamps are silent when at full brightness

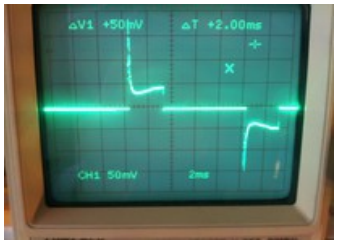
Electrical Performance

Current Waveforms are fairly typical for a reasonably well filtered lamp.

RDL500 50mA/cm



RDT500 50mA/cm (These are waveforms for 5 lamps on the circuit)



Notes:

These lamps are perfectly good at full brightness.
When dimmed, they are best when the brightness is kept above 30% of maximum. Below this level 50Hz shimmer is very visible.
Should only be used with trailing edge dimmer due to buzzing when dimmed with leading edge
Best results with RAK4T

LED Test Results

Type

UNBRANDED
GU10 LED Lamp

Test Date 3rd Sept 2013
Recommended Dimmers
RAK4T
(RDT500)

Two lamps supplied for testing. Were tried with RDT500 & RAK4T trailing edge dimmers
And RDL500 Leading edge dimmer

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
3%	3%

Reasonably smooth dimming between levels – can see some digital stepping between levels

Noticed that varying the number of lamps on the circuit made no difference
To the brightness of the connected lamps

There is shimmer at low brightness levels below approx 50% of maximum. It is worse with RDL500 Leading edge dimmer

this as the lamps won't dim below
that level with these dimmers

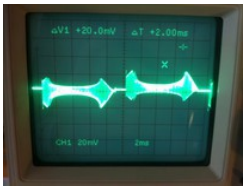
Audible Noise

No audible noise noticed with any dimmer

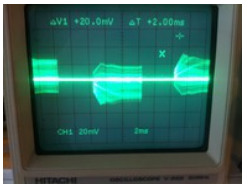
Electrical Performance

Current waveforms are quite noisy – possible radio interference?

RDL500 20mA/cm



RDT500 20mA/cm



Notes:
These lamps work best with trailing edge dimmers: The shimmer when dimmed with leading edge is quite pronounced.
Works best with RAK4T – there is small issue with start up flash/flicker with RDT500, though this can be avoided by preventiung RDT500 from going to very dim (less than 3%) levels.

LED Test Results

Type

Dazz-LED

GU10 LED Lamp

DAZ-P-GU10-6W-45-D

Test Date 4th Sept 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

Single lamp supplied for testing. Was tried with RDT500 & RAK4T trailing edge dimmers
And RDL500 Leading edge dimmer

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
0.1%	0.1%

Very smooth dimming between levels – can only just see digital stepping between levels at very low brightness

There is no shimmer at any brightness level using any of the dimmers tested

No flicker seen at any time

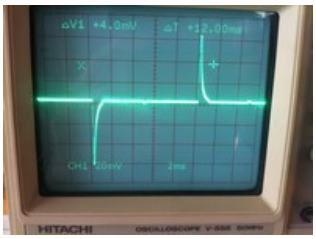
Audible Noise

No audible noise noticed with any dimmer

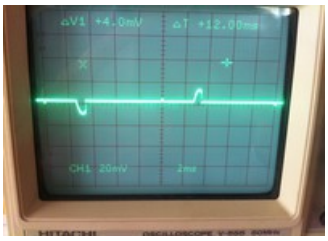
Electrical Performance

Current waveforms are normal for a reasonably well filtered ballast circuit?

RDL500 20mA/cm



RDT500 20mA/cm



Notes:

Based upon the single sample tested this is a very good lamp

Dims perfectly with leading or trailing edge dimmers.

As usual, we recommend using Trailing Edge dimmer in order to reduce peak currents on the ac supply

LED Test Results

Type

Bell

6W GU10 LED Lamp Type 05174

7W GU10 LED Lamp Type 05177

Test Date 16th Sept 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

Ten lamps of each type supplied for testing. These were tested with RDL500 Leading edge and RDT500 & RAK4T Trailing edge dimmers And RDL500 Leading edge dimmer

The performance was roughly consistent between each of the three dimmer types.

The two lamp types performed equally with exception of brighter performance of the 7W version

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
3%*	3%*

* The lamps actually begin to function at levels as low as 0.2% of maximum brightness. But performance at this low level is inconsistent between lamp samples and suffers flicker. 3% is the minimum useful level.

Very smooth dimming between levels – can only see digital stepping between levels at very low brightness

There is no shimmer (50Hz strobing effect) at any brightness level using any of the dimmers tested

No flicker seen other than described above

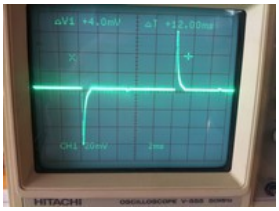
Audible Noise

Virtually silent with Trailing edge dimmers. Slight buzz with Leading edge at middle brightness levels.

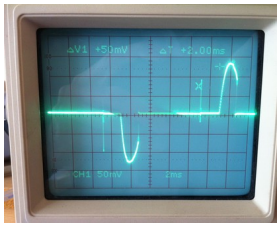
Electrical Performance

Current waveforms are normal for a reasonably well filtered ballast circuit

RDL500 500mA/cm



RDT500 500mA/cm (These are currents for 10 lamps on a single circuit)



Notes: The two lamp types dim similarly and (unusually) it should be possible to mix the two types on a single circuit.

Running the lamps at below 3% of maximum brightness should be avoided. If the lamps are dimmed too far then there will be obvious flickering from them and some lamps on the same circuit will shine brighter than others.

RAK4T and RDT500 are the recommended dimmers – for silent dimming and low peak AC currents.

LED Test Results

Type

Osram
GU10 LED Lamp
Parathom Par16 50 36° AA44119

Test Date 30th Sept 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

Six lamps supplied for testing. Were tried with RDT500 & RAK4T trailing edge dimmers And RDL500 Leading edge dimmer

RDT500 and RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
4.0%	<1%

Very smooth dimming between levels – can barely see digital stepping between levels

There is no shimmer at any brightness level.

If attempt is made to dim lamps below 4% then some lamps on same circuit will switch off before others. Also prone to flicker at these low levels. (Best to avoid dimming below 4%).

Audible Noise

Slight buzz

RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
4.0%	4.0%

Very smooth dimming between levels – can barely see digital stepping between levels

There is no shimmer at any brightness level.

The lamps snap on and off together at the 4% level

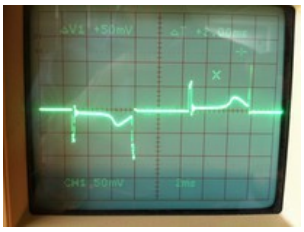
Audible Noise

Moderate buzz

Electrical Performance

Current waveforms are normal for a reasonably well filtered ballast circuit?

RDL500 50mA/cm



RDT500 50mA/cm (These are currents for 6 lamps)

Notes:

These lamps could easily be confused with the sample that we tested in feb 2013. But there seems to be some improvements made since then.

The previous specification was 350 lumens, now is 390 lumens. The previously reported “flash” at switch on has gone.

A pretty good lamp that does not flicker unless dimmed too far with a trailing edge dimmer.

Absolute dimming performance is only “fair”, but I could easily live with these lamps.

Be a bit wary of buzzing if fitting in a quiet room – especially if using a leading edge dimmer.

LED Test Results

Type

Teucer
GU10 LED Lamp
5W 420 lumen COB LED

Test Date 3rd Oct 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

Five lamps supplied for testing. Were tried with RDT500 & RAK4T trailing edge dimmers And RDL500 Leading edge dimmer

RDT500 and RAK4T

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
5.0%	5.0%

Reasonable dimming between levels – can see digital stepping between levels

There is shimmer at most brightness levels.

With RDT500 the lamps can be made to flicker at a sub 5% level. This effect not seen with RAK4T

Audible Noise

Slight

RDL500

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
10.0%	10.0%

Reasonable dimming between levels – can see digital stepping between levels

There is shimmer at most brightness levels.

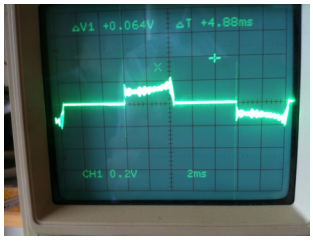
Audible Noise

Moderate

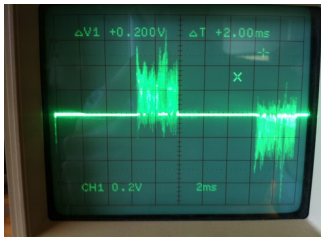
Electrical Performance

Current waveforms are noisy. Especially when using trailing edge.

RDL500 50mA/cm



RDT500 50mA/cm (These are currents for 5 lamps)



Notes:

Visual performance is pretty good: Best dimming performance was seen with RAK4T.

Leading edge dimmer only went down to 10% of maximum.

Waveforms are noisy & could cause radio interference – especially with trailing edge dimmers

Cannot make an informed estimate of the maximum number of lamps for use with a trailing edge dimmer due to the noisy waveform

LED Test Results

Type

Harvard CLK20-1050-24-C

1050mA Phase dimmable LED driver

9V to 19V Output

Test Date 3rd Oct 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

The ballast was tested using a constant current LED at 13V DC approx

Dimming Performance

Minimum brightness from OFF	Minimum Brightness dimming down to OFF
Harvard	0.5% Approx

Smoothness of Dimming

Very smooth dimming down to 1%. Barely able to see digital steps between levels
Appears to be equally good with with trailing & leading edge dimmers
No flicker seen at any level

No shimmer (strobing) seen at any level

Audible Noise

Very slight buzz – hardly audible

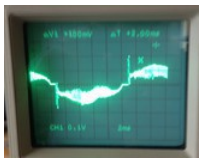
Multiple lamps per dimmer circuit

Number Tested:	**Probably maximum number per circuit**
1	15 perhaps (Using RDT500) – estimate only

Electrical Performance

Current taken from ac supply shows some switching noise from the ballast.
Trailing edge makes much lower peak currents than Leading edge

(100mA / cm)



RDT500

RDL500

Notes:

The Ballast/Lamp combination performed very well with all 3 dimmer types.

This driver has a 9 to 19V output which means it can drive from 3 to 5 (or 6) LED chips in series. Many LED luminaires have several chips within them and fall within the range of this driver. The Maximum output current 1050mA is relatively high & makes this driver useful when that current is required.
The only slight negative issue with visual performance was a flash of light as the ballast started up – especially if trying to go to a low brightness level. Was only a slight effect – have seen much worse.

Type

LL-Elan KAA-8E18IAD and Elan-10 Lamp

Phase dimmable driver and lamp combination

Test Date 21st Oct 2013

Recommended Dimmers

RDT500
RDL500
RAK 4-T

Dimming Performance

RDT 500 and RDL500:
Minimum brightness from OFF: 2%
Minimum Brightness dimming down to OFF: 2%

RAK 4-T
Minimum brightness from OFF: 0.5%
Minimum Brightness dimming down to OFF: 0.5%

Smoothness of Dimming
Smooth dimming in general, small step visible in RDT500 and RDL 500
In general, due to lower minimum output, RAK4T dimming outperforms RDL500 and RDT500

Audible Noise
No audible noise when used with RDT500 and RDL 500
Moderate noise with RAK 4T but still acceptable for most uses

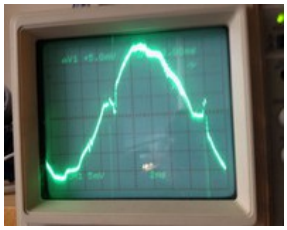
Multiple lamps per dimmer circuit:

Number Tested: 4

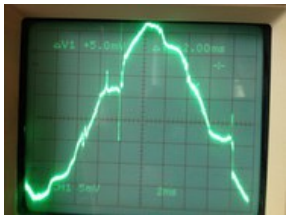
Probably maximum number per circuit: 20 (Using RDT500)

Electrical Performance

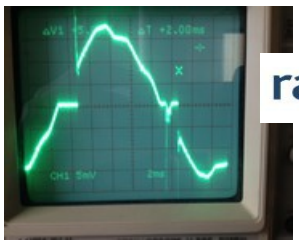
RDT 500



RDL500



RAK4T



Notes
When used with RAK4T the product was excellent with 0.5% of max dimming and good visual performance. While it performed less well with the other dimmers tested it is still more than adequate.
There is little noise on the signal meaning no interference with nearby radio signals should occur

LED Test Results

Type

Harvard CLK20-700P-240-C

700mA Phase dimmable LED driver

14V to 28.6V Output

Test Date 17th Oct 2013

Recommended Dimmers

RAK4T

RDT500

RDL500

The ballast was tested using a Projection Lighting alpha LED lamp

Dimming Performance

Minimum brightness from OFF

Approx 0.5%

Minimum Brightness dimming down to OFF

Approx 0.5%

Harvard

Dimming down to 1% is very smooth with no visible steps.

No flicker seen at any stage throughout dimming

No shimmer (strobing) seen at any level

Audible Noise

Some noise audible during operation although not significant in most environments

Multiple lamps per dimmer circuit

Number Tested:

1

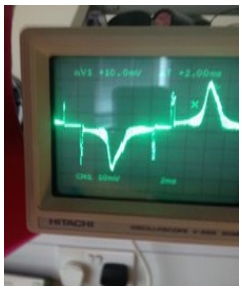
Probably maximum number per circuit

15

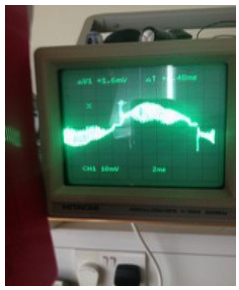
Electrical Performance

RDL500:

RAK4T:



RDT500:



Notes:

The Ballast/Lamp combination performed fairly well with all of the RAK4-T, RDL 500 and RDT 500
The Maximum output current 700mA which is very common.
While the visual and dimming performance of this driver is good some audible buzzing is made.
Electrical noise on the signal when used with the RDT500 may interfere with some radio systems.

Type

FR 690D dimmable LED driver with Freestyle Lighting lamp F690/LED

Phase dimmable driver and lamp combination
500mA output
Test Date 23rd Oct 2013
Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance
Minimum brightness from OFF: 5%
Minimum Brightness dimming down to OFF: 2%

Smoothness of Dimming
Dimming performance is good, although there is a very small flash when turned on, and slight flickering near minimum output
The minimum output is fair across all dimmers
No strobing visible at any output for all dimmers
Audible Noise
No noise heard when used with any dimmers

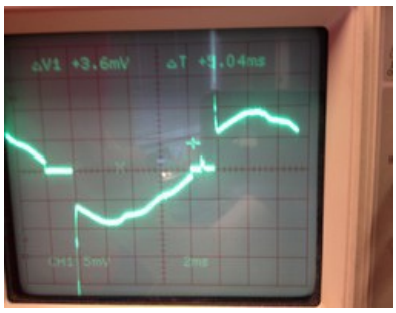
Multiple lamps per dimmer circuit:

Number Tested: 1

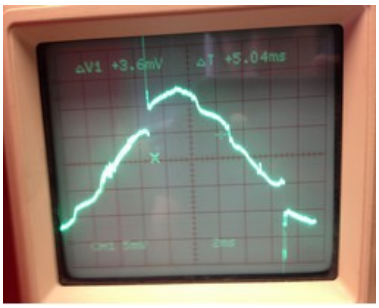
Probably maximum number per circuit: 15

Electrical Performance

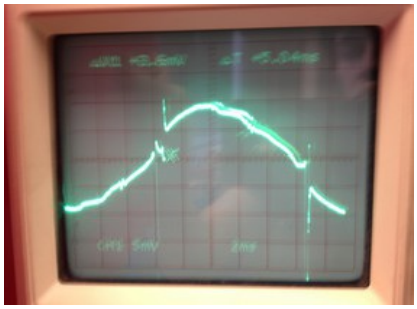
RDT 500



RDL500



RAK4T

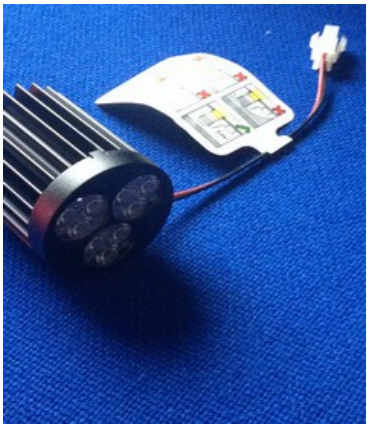


Notes
While all round performance is good visually when used with the RAK4T the minimum output when dimming from off was significantly higher than other dimmers tested.
The minimum output is reasonable although short of the best LEDs capable of dimming to 0.5%
Aside from this performance is good and consistent with no drawbacks in terms of signal noise, and buzzing from driver.

LED Test Results

Type

Lucent LUCLED 50-30-22



Phase dimmable LED tested with coolLED driver
Driver: CollLED CL700P-240-HV-C 700mA driver

Test Date 31st Oct 2013
Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance
Minimum brightness from OFF: 2%
Minimum Brightness dimming down to OFF: 1%

The RAK 4T was able to achieve minimum outputs of around 1%, the RDT500 Around 0.5% and the RDL 500 in the range 2-3%.

Smoothness of Dimming
The dimming is in general smooth and in the good to very good range of LEDs we see. Performance is superior with the RDL and RDT500 as steps are visible with the RAK 4T although they are not enough to significantly detract from visual performance.

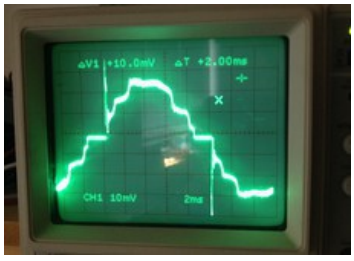
Audible Noise
No noise heard from drivers or LEDs when used with any dimmers in any combination
Lucent
Multiple lamps per dimmer circuit:

Number Tested: 2

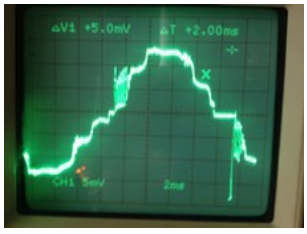
Probably maximum number per circuit: 15

Electrical Performance

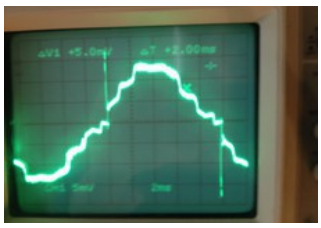
RAK4T



RDL500



RDT500



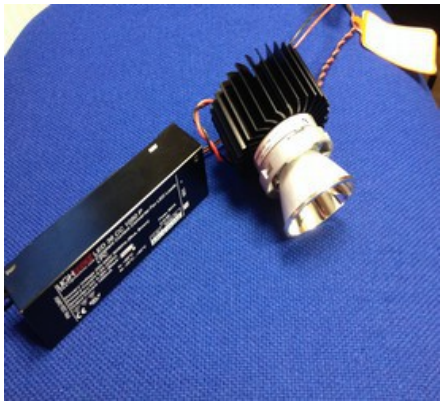
Notes

The LEDs consist of three sets of three LED chips arranged into separate luminaries within the mounting.
Generally this is a very good LED: it performs well visually, has very little signal interference and dims to a low minimum output

LED Test Results

Type

Lucent Xiacato 1050mA LED



Phase dimmable LED tested with Lightech LED 36 CC 1050mA driver

Test Date 31st Oct 2013

Recommended Dimmers

RDT500

RDL500

RAK 4-T

Dimming Performance

Minimum brightness from OFF: 1%

Minimum Brightness dimming down to OFF: 1%

Smoothness of Dimming

The minimum output achieved by all dimmers was of magnitude one percent and visual performance was fair to good. However at low output strobing was visible with all dimmers and with the RAK 4T and RDL500 step changes occurring during dimming

Audible Noise

No noise heard from drivers or LEDs when used with any dimmers in any combination

Multiple lamps per dimmer circuit:

Number Tested: 2

Probably maximum number per circuit:

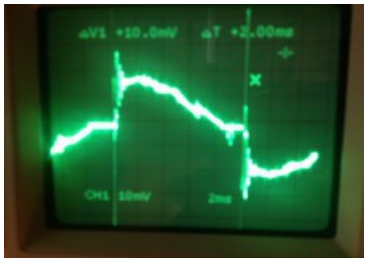
RAK 4-T: 25

RDL500: cannot tell due to signal noise

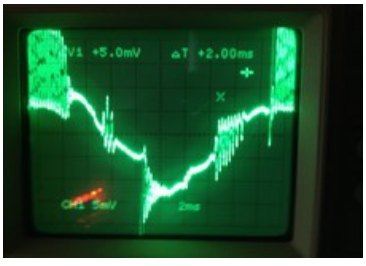
RDT 500: 20

Electrical Performance

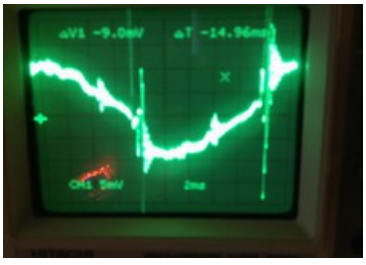
RAK 4T



RDL500



RDT500



Notes:

The signal for the RDL is extremely noisy and may interfere with nearby radio equipment. It is therefore advised that a RDT is used with this lamp and ballast combination

LED Test Results

Type

Lumeno 5W Energy saving LED lamp

Dimmable GU10 LED lamp
Lumeno LM-MX50DGU10

Test Date 11th November 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

RDT500:
Minimum brightness from OFF: 1%
Minimum Brightness dimming down to OFF: 1%
RDL500:
Minimum brightness from OFF: 10%
Minimum Brightness dimming down to OFF: 10%
RAK 4-T
Minimum brightness from OFF: 5%
Minimum Brightness dimming down to OFF: 5%

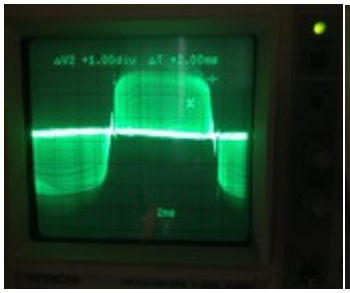
Smoothness of Dimming
All round visual performance is good with two out of three dimmers dimming to a reasonable minimum output. While there was some strobing with the RDL500 and small steps visible in the lower output range of the trailing edge dimmers these problems are not so obvious as to ruin visual performance.

Audible Noise
No noise heard from LED during operation

Multiple lamps per dimmer circuit:
Number Tested: 1
The probably maximum number per dimmer circuit cannot be accurately estimated due to the degree of signal noise when used with all three dimmers

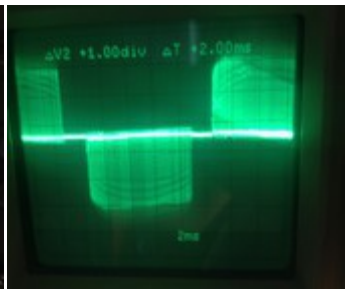
Electrical Performance

RDT500



RDL500

RAK 4-T



Notes:

When used with trailing edge dimmers and to a lesser degree with leading edge dimmers a very large amount of signal noise is present. With trailing edge dimmers it is possible this may cause interference with nearby audio and visual equipment.

LED Test Results

Type

KSA Lighting lamp with integrated ballast

Four chip LED lamp and integrated ballast
KSA Lighting KSFRD200

Test Date 11th November 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: <1%
Minimum Brightness dimming down to OFF: <1%

Smoothness of Dimming

This lamp and ballast combination performed very well with all three dimmers.
All achieved an excellent minimum output with good dimming performance throughout range.
No strobing or shimmering was observed at any level

Audible Noise
No noise heard from LED during operation

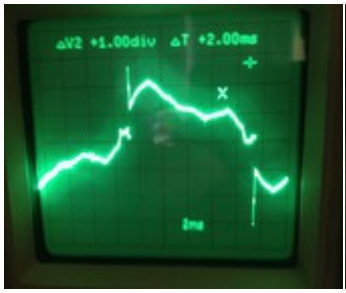
Multiple lamps per dimmer circuit:
Number Tested: 1

Probably maximum number per circuit:

RDT500: 20
RDL500: 15
RAK 4-T: 25

Electrical Performance

RDT500



RDL500

RAK 4-T

Notes:

An all round very good LED and ballast with consistent performance with all dimmers and no significant negative features.

LED Test Results

Type

Save Light 7 Watt GU10

Six chip dimmable LED lamp
Save Light ST-GUD-73-6K

Test Date 19th November 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

RDT500:
Minimum brightness from OFF: 3%
Minimum Brightness dimming down to OFF: 1%
RDL500:
Minimum brightness from OFF: 3%
Minimum Brightness dimming down to OFF: 3%
RAK 4-T
Minimum brightness from OFF: <1%
Minimum Brightness dimming down to OFF: <1%

Smoothness of Dimming

Dimming is very smooth across nearly all of the output range.
With the RDT500 there is minor stepping during dimming at low outputs

Audible Noise
Some noise could be heard when ten lamps were run simultaneously
but this was not considerable enough to be a significant problem.

Multiple lamps per dimmer circuit:

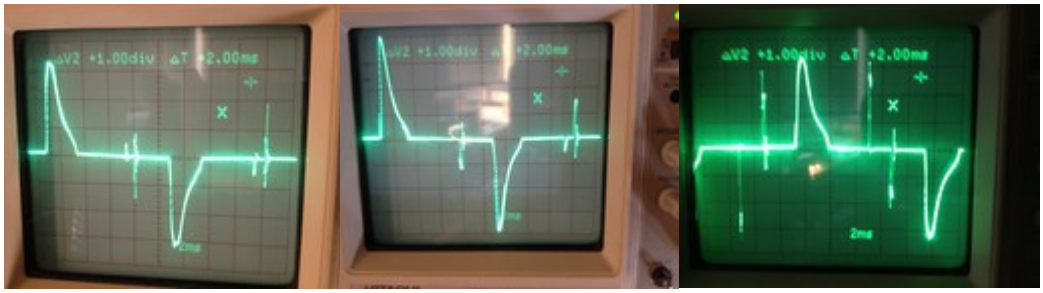
Number Tested: 10

Probably maximum number per circuit:

RDT500: 20
RDL500: 15
RAK 4-T: 25

Electrical Performance:

RDT500 RDL500 RAK 4-T



Notes:

LED Test Results

Type

Megaman 6 Watt GU10

Megaman LR1206dGv2-WLF

Test Date 19th November 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: <1%
Minimum Brightness dimming down to OFF: <1%

Smoothness of Dimming

For all dimmers visual performance was excellent with no flickering, strobing or steps. All dimmers achieved a minimum output of less than 1% of maximum

Audible Noise

No audible noise with any dimmers

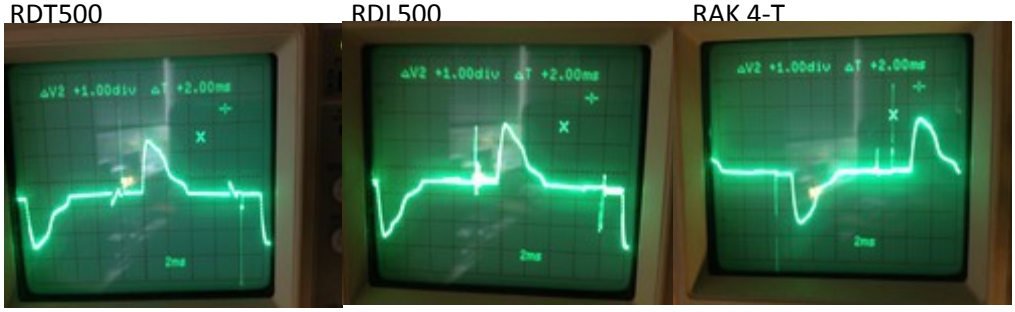
Multiple lamps per dimmer circuit:
Number Tested: 10

Probably maximum number per circuit:

RDT500: 20
RDL500: 15
RAK 4-T: 25

Electrical Performance:

RDT500 RDL500 RAK 4-T



Notes:

This is a very good lamp, dimming to less than one percent of maximum output with no drawbacks worthy of note.

LED Test Results

Type

LED Brite 6W GU10

Three chip mains dimmable LED lamp

G6W-D

Test Date 26th November 2013

Recommended Dimmers

RDT500

RDL500

RAK 4-T

Dimming Performance

RDT500:
Minimum brightness from OFF: 1%
Minimum Brightness dimming down to OFF: 1%
RDL500:
Minimum brightness from OFF: 5%
Minimum Brightness dimming down to OFF: 5%
RAK 4-T
Minimum brightness from OFF: 5%
Minimum Brightness dimming down to OFF: 5%

Smoothness of Dimming

A degree of strobing was observed from all dimmers, this was most notably in the lower output range. With the RDT500 and RDL500 there was some shimmering during dimming. Overall the visual performance of the RAK4T was better.

Audible Noise

No audible noise with any dimmers

Multiple lamps per dimmer circuit:

Number Tested: 1
Probably maximum number per circuit:
Cannot make valid estimate due to amount of signal noise

Electrical Performance:

RDL500 RAK 4-T RDT500

Notes:

While this lamp achieved fair visual performance with all three dimmers the strobing may cause it to be unacceptable for some. The degree of signal noise as shown above may result in interference with audio visual equipment.

LED Test Results

Type

LED Brite 4W GU10

Three chip mains dimmable LED lamp
GU104WDDIMCW

Test Date 26th November 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: 3%
Minimum Brightness dimming down to OFF: 3%

Smoothness of Dimming

Some strobing and and shimmering occurred in the low output range with all dimmers. Aside from this visual performance was fairly good with no steps during dimming and a reasonable minimum output achieved with all dimmers

Audible Noise

No audible noise with any dimmers

Multiple lamps per dimmer circuit:

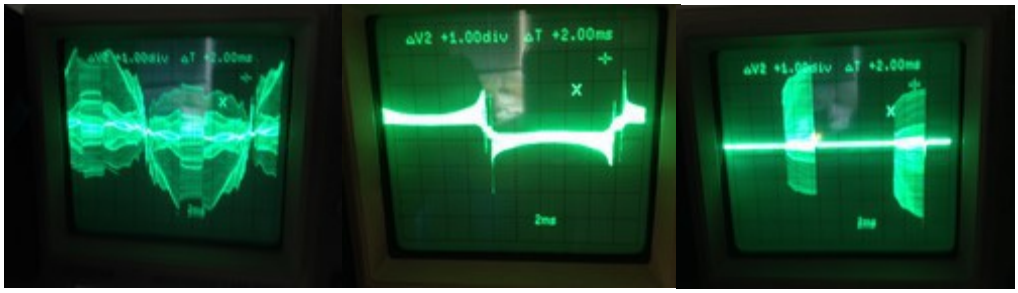
Number Tested: 1

Probably maximum number per circuit:

Cannot make valid estimate due to amount of signal noise

Electrical Performance:

RDT500 RDL500 RAK 4-T



Notes:

While not as noisy as the signal for the equivalent 6W GU10 it is still not possible to make a recommendation on the number of lamps that could be used. This signal noise may also cause interference with audio visual equipment. While this lamp achieved fair visual performance with all three dimmers the strobing may cause it to be unacceptable for some.

LED Test Results

Type

Phillips LEDBulb

Master LEDBulb MV Dimtone E27 fitting

Test Date: 13/12/13

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: <1%
Minimum Brightness dimming down to OFF: <1%

Smoothness of Dimming

While overall visual performance is fairly good the following problems were observed: A slight flash was emitted from the bulb when turned on and there was some strobing in the low output range. There were also some steps visible during dimming.

Audible Noise

No audible noise with any dimmers

Multiple lamps per dimmer circuit:

Number tested: 1

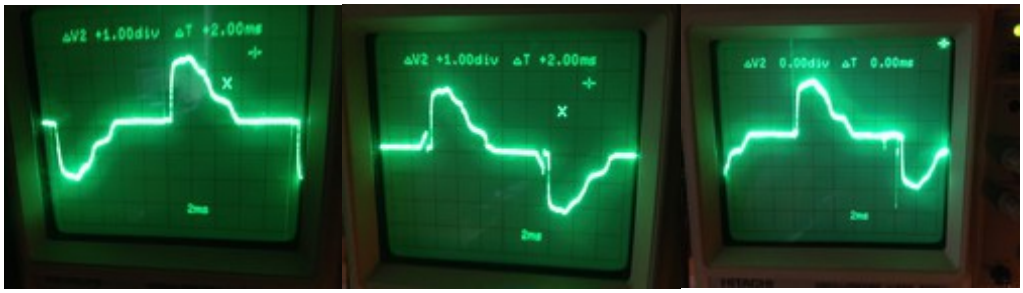
Probable maximum number per circuit:

RDT500: 15
RDL500: 10
RAK 4-T: 20

Phillips LEDBulb

Electrical Performance:

RDT500 RDL500 RAK 4-T



Notes:

While this lamp performs fairly well in most ways the strobing in the bottom 20% of the output may make it unsuitable for low level lighting applications.

LED Test Results

Type

Osram Papthom

10W LED Bulb E27 fitting

Test Date 13th December 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: 2%
Minimum Brightness dimming down to OFF: 2%

Smoothness of Dimming

Excellent visual performance across the board. No visible strobing or flickering.
Very small steps can be seen during dimming but this is a very minor fault.

Audible Noise

No audible noise with any dimmers

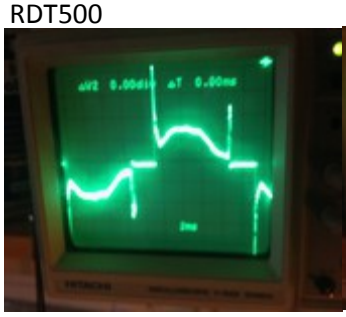
Multiple lamps per dimmer circuit:
Number Tested: 1

Probably maximum number per circuit:

RDT500: 15
RDL500: 10
RAk 4-T: 20

Electrical Performance:

RDT500



RDL500

Notes:

An all round very good lamp with excellent visual performance with no significant drawbacks.

LED Test Results

Type

GE LED Bulb

9W E27 fitting LED bulb

Test Date 13th December 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: 2%
Minimum Brightness dimming down to OFF: 1%

Smoothness of Dimming

Overall very good general visual and dimming performance. This bulb was capable of dimming down to 1-2% of maximum output with no strobing flickering or steps.
A very slight flash is observed when turned on at a low output.

Audible Noise

No audible noise with any dimmers

Multiple lamps per dimmer circuit:

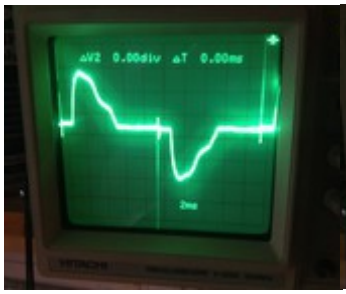
Number Tested: 1

Probably maximum number per circuit:

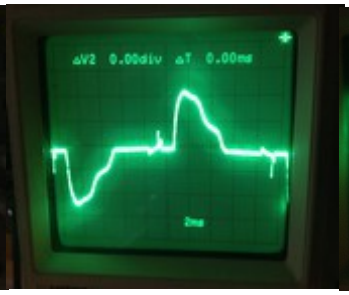
RDT500: 15
RDL500: 10
RAK 4-T: 20

Electrical Performance:

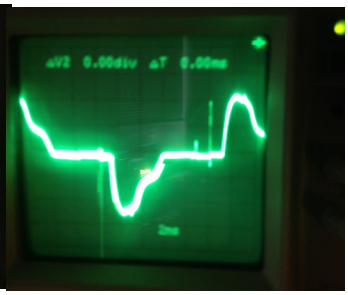
RDT500



RDL500



RAK 4-T



LED Test Results

Type

ALT 4w led CANDLES

Alt CD2DW204RF-85

Test Date 16th December 2013

Recommended Dimmers
RDT500
RDL500
RAK 4-T

Dimming Performance

Minimum brightness from OFF: <1%
Minimum Brightness dimming down to OFF: <1%

Smoothness of Dimming

For all dimmers visual performance was excellent with no flickering, strobing or steps. All dimmers achieved a minimum output of less than 1% of maximum

Audible Noise

No audible noise with any dimmers

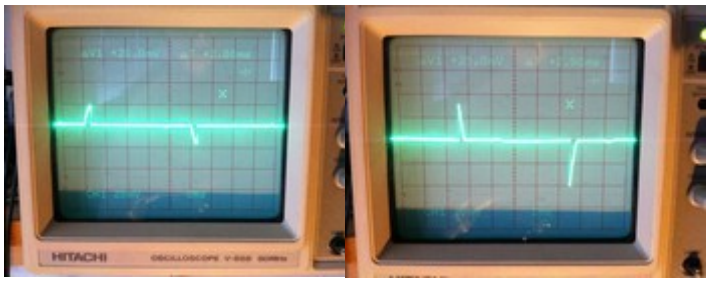
Multiple lamps per dimmer circuit:
Number Tested: 2

Probably maximum number per circuit:

RDT500: 20
RDL500: 15
RAK 4-T: 30

Electrical Performance:

RDT500 RDL500



Notes:

This is an excellent lamp, dimming to less than one percent of maximum output with no drawbacks worthy of note.