

# SORAA

## Electrical compatibility – AR111 18.5W 12V lamps – North America

### Table of contents

- General compatibility guidelines.....Page 2
- Transformer compatibility.....Page 3-4
- Dimming compatibility.....Page 5-8
  - 120V Dimming compatibility (Electronic/DC).....Page 5
  - 120V Dimming compatibility (Magnetic).....Page 6
  - 277V Dimming compatibility.....Page 7
  - 120V Dimming compatibility (Tests by Crestron and ETC).....Page 7

## Scope

This document provides the basic guidelines regards electrical compatibility of SORAA 12V AR111 & PAR36 18.5W lamps and compatibility tables for transformers and dimmers.

## Transformer Compatibility

SORAA 12V AR111 & PAR36 lamps are made to work with 12V AC magnetic (MLV) and electronic (ELV) transformers and 12V DC transformers. Transformer compatibility tables are on pages 3-4. If multiple lamps are installed on one transformer, they need to be connected in parallel. They cannot be installed in series.

- 12V AC Magnetic transformers and 12V DC transformers are in general compatible.
- 12V AC Electronic transformers generally have a minimum load, and SORAA recommends using only transformers that have been tested and found compatible. In general we recommend to use transformers with very little or no minimum load (0W). If your transformer is not in the compatibility tables below, it does not mean it is incompatible, but it means that we have not tested it to date, please contact [techsupport@soraa.com](mailto:techsupport@soraa.com) for guidance.

For transformer-lamp compatibility, Soraa only tests up to 5 transformers per circuit. Consult Soraa, controls provider and transformer manufacturer for latest compatibility when installing 5 or more fixtures per circuit. Lamp performance may vary based on field conditions, including but not limited to THD, shared neutral wires, power-quality. Whenever possible, test lamps in-situ to verify satisfactory performance.

## Dimmer Compatibility

SORAA 12V AR111 & PAR36 lamps are made to work with trailing edge (reverse phase) and leading edge (forward phase) phase cut dimmers.

Electronic dimmable transformers need trailing edge dimmers, while Magnetic transformers need leading edge dimmers.

On the dimmer compatibility, the percentages for each transformer/dimmer combination are the percentage of measured light output that we were able to dim down to without seeing any problems like flicker/shimmer. Anything 30% or above is considered not compatible and you will see a "NC" in a grey cell. There might be a minimum wattage load on the transformer/dimmer. If this minimum load is not met, there might be compatibility issues.

## Maximum number of lamps on a dimmer/transformer

The following need to be considered when determining the amount of lamps on a dimmer/transformer.

1. SORAA tests have been carried out with 1 lamp unless stated otherwise.
2. There is a repetitive, very brief current spike the LED lamp will see twice per cycle. This current spike has to be provided by the transformer and/or dimmer, and will affect the recommended lamp load on each transformer or dimmer.
3. Ultimately the transformer/dimmer manufacturer is the only one with authority to rate their product, but SORAA can give an Engineering estimate.
4. For transformers, we recommend to use a 1.4 de-rating factor:  
**For example for a 50W transformer it would mean  $50/1.4=35W$  of LED, so an estimated maximum of 1 lamp 18.5W.**
5. For dimmers, we recommend to use a 2.0 de-rating factor for leading edge dimmers with magnetic transformers; and a 4.0 de-rating factor for trailing edge dimmers driving Low Voltage lamps on electronic transformers.

**For example for a 500W leading edge dimmer it would mean  $500/2=250W$  of LED, so an estimated maximum of 13 lamps 18.5W.**

**For example for a 400W trailing edge dimmer it would mean  $400/4=100W$  of LED, so an estimated maximum of 5 lamps 18.5W.**

## Distance between transformer and lamp(s)

- 12V AC Magnetic transformers and 12V DC transformers do not have a limitation regards the maximum length of the wires between transformer and lamp. Only the voltage drop has to be taken into account (losses because of the inner resistance of the conductors).
- 12V AC Electronic transformers have a limitation in the length of the wires between transformer and lamp(s). This length is usually stated by the transformer manufacturer on its specs or on the transformer itself, and generally it is limited to 2 meters (6 feet).

## Disclaimer

Compatibility tests are conducted by Soraa only as guidance for the user. All tests are conducted under bench conditions; results may differ from test results depending on conditions at the application site. Results may vary due to variability in component choices and manufacturing processes by the transformer and dimmer manufacturers. For more information on the dimmers/transformers, please find specs on the manufacturer's website.

## SORAA AR111 12V 18.5W - TRANSFORMER COMPATIBILITY - North America

**PASS** - The transformer supports one or more lamps up to the maximum wattage;

**NC** - SORAA does not recommend this transformer for use with its lamps;

**2 Lamp Min** - The transformer supports two or more lamps upto the maximum lamp wattage limit;

**3 Lamp Min** - The transformer supports three or more lamps upto the maximum lamp wattage limit

Mfg	Model	Wattage	Voltage	Country	Transformer Type	1 Lamp
<b>North America</b>						
B+L	FX95100 (version RF1)	75	120	USA	Electronic	Pass
Fulham	T1M1UNV012V-60L	60	120-277	USA	DC	Pass
Hatch	RL12-75A	60	120	USA	Electronic	Pass
Hatch	RS12-60	60	120	USA	Electronic	Pass
Hatch	RS12-60M-LED-277	60	277	USA	Electronic	Pass
Hatch	RS12-80M	80	120	USA	Electronic	Pass
Hatch	RS12-150	150	120	USA	Electronic	Pass
Hatch	VS12-60	60	120	USA	Electronic	Pass
Hatch	RS12-60M-LED	60	120	USA	Electronic	Pass
Hatch	RL12-60M-LED (*)	60	120	USA	Electronic	Pass
Lightech	LET-60, LET 60 BF	60	120	USA	Electronic	Pass
Lightech	LET60-LW	60	120	USA	Electronic	Pass
Lightech	LET-75	75	120	USA	Electronic	Pass
Lightech	LET-105	105	120	USA	Electronic	Pass
LTF	TA60WA12LED	60	120	USA	Electronic	Pass
LTF	TA150WA12LED-0000	150	120	USA	Electronic	Pass
LTF	TA300WDS12LEDRE	300	120	USA	DC	Pass
Meanwell	PWM-90-12 (300Hz version)	90	100-305	World	DC	Pass
WAC	EN1260	60	120	USA	Electronic	Pass
Q-TRAN	QHEX-M75-120-12	75	120	USA	Magnetic	Pass
Q-TRAN	QT50SV-120/12-RC	50	120	USA	Magnetic	Pass
Q-TRAN	QT20-120/12-TP-RC	20	120	USA	Magnetic	Pass
Vista	ITT-300	300	120	USA	Magnetic	Pass

## SORAA AR111 & PAR36 12V 18.5W - TRANSFORMER COMPATIBILITY - North America

### Transformer compatibility Notes:

- Compatibility tests are conducted by Soraa only as guidance for the user
- All tests are conducted under bench conditions; results may differ from test results depending on conditions at the application site
- Results may vary due to variability in component choices and manufacturing processes by the transformer manufacturer
- For transformer-lamp compatibility, Soraa only tests up to 5 transformers per circuit. Consult Soraa, controls provider and transformer manufacturer for latest compatibility when installing 5 or more fixtures per circuit. Lamp performance may vary based on field conditions, including but not limited to THD, shared neutral wires, power-quality. Whenever possible, test lamps in-situ to verify satisfactory performance.
- If the transformer's minimum wattage is not met, the lamp may only operate under nominal conditions (nominal line voltage and thermal conditions where the lamp is at full power).
- If the fixture/transformer is not listed as tested, please consult with Soraa first before making any recommendations to end customer.
- Above table is for applications where no dimmer is used. If a dimmer is used, the user should consult the Dimmer/Transformer table, or contact Soraa if their desired combination is not listed.
- Transformer maximum load should not be exceeded. Please follow transformer/dimmer manufacturer's guidelines regarding maximum load with LED lamps. To calculate the estimated maximum number of lamps, please download our calculator from the following link:  
<https://res.cloudinary.com/soraa/raw/upload/v1452276139/content/max-lamp-load-calculator.xlsx>  
Or following the guidelines stated on page 2 of this document.
- (\*) This transformer added to the compatibility list as of this Revision

**SORAA AR111 12V 18.5W - DIMMER/TRANSFORMER COMPATIBILITY - North America**

Dimmer (120V) →	Transformer (120V) ↓		Number of lamps tested ↓	0-10V	Crestron DIN-1DIMU4	Leviton 6615-P 300W	Lutron Diva DVELV-300P	Lutron SPSELV-600	Lutron Maestro Wireless MRF2-6ELV-120	Lutron Maestro MAELV-600	Lutron Nova T NTELV-300	Lutron Skylark SELV-300P	Lutron Radio RA2 RRD-6NA- WH 600W	Lutron FAELV-500M	Lutron VTELV-600M-B	Lutron LCP LP-RPM-4A-120	Lutron Grafik Eye QS + PHPM- PA-DV	Lutron Caseta PD-5NE-XX	MARLIN Stellar P/N 6-3-08-20-3-103T
B+L	FX95100 (version RF1)	ELV	1				6%	11%		10%	11%	17%			6%	12%	6%	9%	11%
Hatch	RL12-75A	ELV	1				6%	8%		8%	7%	9%			6%	12%	6%	8%	12%
Hatch	RS12-60M	ELV	1			NC	24%	9%		11%	8%	8%	NC	13%	29%	21%	9%	9%	10%
Hatch	RS12-60M-LED	ELV	1				10%	24%		10%	7%	10%			8%	15%	8%	9%	5%
Hatch	RL12-60M-LED (*)	ELV	1		6%		3%		5%				9%			10%	4%	8%	10%
Hatch	RS12-80M	ELV	1			NC	NC	9%		11%	7%	9%	9%		4%	21%	NC	8%	11%
Hatch	RS12-150	ELV	1				7%	11%		12%	7%	7%			5%	29%	20%	9%	19%
Hatch	VS12-60	ELV	1			NC	7%	NC		NC	18%	13%	NC	NC	NC				
Lightech	LET60	ELV	1			NC	4%	9%		NC	7%	8%	10%	10%	3%	16%	8%	8%	11%
Lightech	LET60-LW	ELV	1				7%	9%		9%	6%	9%			4%	19%	11%	8%	8%
Lightech	LET75 (120V)	ELV	1			24%	4%	8%		9%	NC	7%	6%	12%	NC	NC	6%	11%	15%
Lightech	LET 105	ELV	1			24%	8%	12%		12%	13%	13%	7%	11%	8%				
Lightech	LET 105	ELV	2				6%	9%		10%	8%	6%			8%	12%	7%	8%	14%
LTF	TA60WA12LED-0000	ELV	1			NC	7%	11%		11%	13%	13%	9%	NC	8%	15%	6%	8%	13%
LTF	TA150WD12LED-0000	ELV	2				9%	NC		16%	8%	13%			9%	15%	8%	13%	19%
LTF	TA300WDS12LEDRE	DC	3				7%	NC		12%	8%	8%			13%	7%	17%	11%	9%
WAC	EN1260-RB2	ELV	1				8%	9%		9%	7%	9%			7%	13%	9%	11%	12%
Fulham	T1M1UNV012V-60L	DC	1	18%															
Meanwell	PWM-90-12 (300Hz version)	DC	1	14%															

**SORAA AR111 12V 18.5W - DIMMER/TRANSFORMER COMPATIBILITY - North America (Magnetic)**

Dimmer (120V) →														
Transformer (120V) ↓			Number of lamps tested ↙	Lutron Grafik Eye QS	Lutron Skylark SLV-600P	Lutron Diva DVLV-600P	Lutron Nova-T NTLV-600	Lutron Ceana CNLV-600P	Lutron Caseta PD-10NXD-XX	Lutron Caseta PD-5NE-XX	Lutron Radio RA2 RRD-6NA-WH 600W	Lutron Radio RA2 RRD-10D-SW 800W	Lutron RPM-4U-120	Marlin Controls Stellar
<b>North America</b>														
<b>Cooper</b>	T50W120VSL	MLV	1	NC	21%	23%	14%		27%	16%	7%	19%	NC	24%
<b>Cooper</b>	TF-149911	MLV	1	NC	19%	22%	13%		19%	16%	6%	18%	NC	NC
<b>Cooper</b>	TF 149911-TP120	MLV	1	NC	19%	20%	18%		20%	19%	7%	20%	17%	28%
<b>Cooper</b>	TFA4120	MLV	1	NC	21%	23%	NC		20%	15%	9%	NC	NC	27%
<b>Hatch</b>	LS1275EN/12V	MLV	1	NC	20%	20%	19%		26%	19%	5%	23%	NC	19%
<b>Hatch</b>	LS1250EN	MLV	1	NC	17%	19%	21%		27%	20%	9%	16%	28%	17%
<b>Juno</b>	310-1333	MLV	1	NC	24%	24%	NC		19%	19%	8%	NC	20%	17%
<b>Q-TRAN</b>	QHEX-M75-120-12	MLV	2										5%	
<b>Q-TRAN</b>		MLV	1	NC	17%	19%	8%		9%	20%	10%	22%	22%	16%
<b>Q-TRAN</b>	QT50SV-120/12-RC	MLV	1	15%	NC	24%		26%			6%	11%		
<b>Q-TRAN</b>	QT20-120/12-TP-RC	MLV	1	13%	21%	21%		23%			4%	15%		
<b>Q-TRAN</b>	QSET-300-120/12	MLV	3	NC	24%	26%	16%		15%	26%	7%	20%	14%	16%
<b>Q-TRAN</b>	QT50SV-120/12-RC	MLV	1	NC	22%	24%	23%		14%	21%	7%	17%	12%	16%
<b>Vista</b>	ITT-300	MLV	7										10%	

**SORAA AR111 & PAR36 12V 18.5W - DIMMER/TRANSFORMER COMPATIBILITY - North America**

Dimmer (277V) →  Transformer (277V) ↓		Leviton Renoir II AWSMT-EA (TE)
North America		
Hatch	RS12-60M-LED-277	Electronic 9%

TESTED BY DIMMER MANUFACTURER  Transformer ↓	Dimmer →	CRESTRON											ETC								
		CLS-C6 (any suffix) CLS-EXP-DIM	CLS-EXP-DIMU	CLX-1DIM(any suffix) CLX-2DIM(any suffix)	CLX-1DELV4	DIN-1DIM4	DIN-1DIMU4	CLW-DIMEX-(E or P) CLW-DIMSWEX-(E or P)	P-DIMEX / GLXX-2DIM8	GLX-DIM6	CLW-DELVEX-E CLW-DELVEX-P	CLX-1DIMU4 CLX-2DIMU8	(Unison DRd) D20	(Unison Legacy) D20	(Sensor 3) D20	(Unison DRd) ELV10	(Unison Legacy) ELV10	(Sensor 3) ELV10-S	(Echo) ELVD	(Echo) ERP 300W	
<b>North America</b>																					
<b>Hatch</b>	RS12-60M-LED	Electronic												NC	NC	NC	PASS	PASS	PASS	PASS	PASS
<b>Lichtech</b>	LET60	Electronic	NC	10%	NC	15%	NC	10%	NC	NC	10%	15%	12%								
<b>Q-TRAN</b>	Q6S-300	Magnetic												PASS	PASS	PASS					

**Dimming compatibility Notes:**

- Compatibility tests are conducted by Soraa (unless stated otherwise) under bench conditions as guidance for the user; results at the application site may differ due to variability in usage conditions or in dimmer or transformer components/manufacturing.
- Regards compatibility tests conducted by dimmer manufacturer, please contact the manufacturer or Soraa for more details and/or reports.
- If the transformer's minimum wattage is not met, the lamp may only operate under nominal conditions (nominal line voltage and thermal conditions where the lamp is at full power).
- The lamp load (or number of lamps) should meet minimum load requirement of respective dimmer.
- If the dimmer and transformer is not listed, please consult with Soraa before making recommendations to the end customer.
- Transformer/dimmer maximum load should not be exceeded. Please follow transformer/dimmer manufacturer's guidelines regarding maximum load with LED lamps. To calculate the estimated maximum number of lamps, please download our calculator from the following link:  
<https://res.cloudinary.com/soraa/raw/upload/v1452276139/content/max-lamp-load-calculator.xlsx>  
Or following the guidelines stated on page 2 of this document.
- (\*) One or more test results with this transformer added to the compatibility list as of this Revision