

# SORAA

## Electrical compatibility – Warm Dim MR16 12V GU5.3 lamps - North America

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## Scope

This document provides the basic guidelines regards electrical compatibility of SORAA 12V MR16 lamps and compatibility tables for transformers and dimmers.

## Transformer Compatibility

SORAA 12V MR16 lamps are made to work with 12V AC magnetic (MLV) and electronic (ELV) transformers and 12V DC transformers. Transformer compatibility tables are on this document. 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 MR16 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.

The percentages for each transformer/dimmer combination in the compatibility tables 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. We have added the maximum amount of MR16 lamps we recommend for each transformer in the transformer compatibility tables.
5. For dimmers, we recommend to use a 2.0 de-rating factor forward phase dimmers with magnetic transformers; and a 4.0 de-rating factor for incandescent/halogen reverse phase dimmers driving Low Voltage lamps on electronic transformers.

**For example for a 500W forward phase dimmer it would mean  $500/2=250W$  of LED, so an estimated maximum of 33 lamps 7.5W.**

**For example for a 400W reverse phase dimmer it would mean  $400/4=100W$  of LED, so an estimated maximum of 13 lamps 7.5W.**

## 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 MR16 12V 7.5W WARM DIM - TRANSFORMER COMPATIBILITY LIST - 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

Brand	Model	Wattage	Voltage (Vac)	Transformer Type	7.5W		Maximum Number of 7.5W Lamps per Transformer
					Free Air or Open Fixture	Enclosed Fixture	
<b>North America</b>							
Ambiance	9454-12	15-60	120	Electronic	2 Lamp min	2 Lamp min	6
B+L	CV90010	10-105	120	Electronic	PASS	PASS	9
B+L	CV90012	10-150	120	Electronic	3 Lamp min	3 Lamp min	12
B+L	CV90021	10-200	120	Electronic	3 Lamp min	3 Lamp min	17
B+L	FX95100	0-75	120	Electronic	PASS	PASS	5
B+L	LS94117	75	120	Electronic	NC	NC	NC
B+L	MS90117	35-75	120	Electronic	NC	NC	NC
B+L	MS90119	35-75	120	Electronic	PASS	PASS	6
ELG	250LT2512	75	120	Electronic	PASS	PASS	6
ELG	250EL7512	75	120	Electronic	2 Lamp min	2 Lamp min	6
Fulham	T1M1UNV012V-20L	20	120-277	Electronic/DC	PASS	PASS	1
Fulham (*)	T1M1UNV012V-60L	60	120-277	Electronic/DC	PASS	PASS	2
Hatch	RL12-75A-EPL	75	120	Electronic	2 Lamp min	2 Lamp min	5
Hatch	RS1215BFLED	15	120	Electronic	PASS	PASS	1
Hatch	RS12-150	150	120	Electronic	PASS	PASS	14
Hatch	RS12-300	300	120	Electronic	PASS	PASS	5
Hatch	RS12-60(AS)	60	120	Electronic	2 Lamp min	2 Lamp min	4
Hatch	RS12-15M-LED	15	120	Electronic	PASS	PASS	1
Hatch	RS12-30M-LED	30	120	Electronic	PASS	PASS	2
Hatch	RS12-60M-LED	60	120	Electronic	PASS	PASS	5
Hatch	RS12-60M-LED-FCC	60	120	Electronic	PASS	PASS	5
Hatch	RL12-60M-LED	60	120	Electronic	PASS	PASS	5
Hatch	RS12-75BF-LED	75	120	Electronic	NC	NC	NC
Hatch	RS12-80(AS)	80	120	Electronic	NC	NC	NC
Hatch	VS12-150	150	120	Electronic	2 Lamp min	2 Lamp min	12
Hatch	VS12-105	105	120	Electronic	NC	NC	NC
Hatch	VS12-60WD	60	120	Electronic	2 Lamp min	2 Lamp min	4
Hatch	VS12-75WD	75	120	Electronic	NC	NC	NC
Juno	T537QJU	60	120	Electronic	PASS	PASS	5
Juno	T537U	60	120	Electronic	PASS	PASS	5
Juno	T538	75	120	Electronic	NC	NC	NC
LighTech	LET-60, LET-60 BF	60	120	Electronic	PASS	PASS	4
LighTech	LET-105W	105	120	Electronic	PASS	PASS	7
LighTech	LET-151	150	120	Electronic	PASS	PASS	7
LighTech	LET-303-12	300	120	Electronic	PASS	PASS	24
LighTech	LET60-LW	60	120	Electronic	PASS	PASS	4
LighTech	LET-75-120	75	120	Electronic	PASS	PASS	5

**SORAA MR16 12V 7.5W WARM DIM - TRANSFORMER COMPATIBILITY LIST - 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

Brand	Model	Wattage	Voltage (Vac)	Transformer Type	7.5W		Maximum Number of 7.5W Lamps per Transformer
					Free Air or Open Fixture	Enclosed Fixture	
<b>North America</b>							
LTF	TA15WA12LED	15	120	Electronic	PASS	PASS	1
LTF	TA60WA12LED	60	120	Electronic	PASS	PASS	5
LTF	TA75WA12-0000	75	120	Electronic	PASS	PASS	5
LTF	TA105WA12LED-0000	105	120	Electronic	PASS	PASS	8
Lutron	L3DA4U1UKS-AV120	20	120 & 277	Electronic/DC	NC	NC	NC
Lutron	LTEA4U1UKL-AV120	20	120 & 277	Electronic/DC	NC	NC	NC
Meanwell	PWM-90-12 (300Hz version)	90	120 & 277	Electronic/DC	PASS	PASS	8
Meanwell	PWM-120-12 (300Hz version)	120	120 & 277	Electronic/DC	PASS	PASS	10
MDL Corp	316-0002	150	120	Electronic	2 Lamp min	2 Lamp min	12
Philips	EHC150F	60	120	Electronic	PASS	PASS	5
PONY	PET-120-12-75	75	120	Electronic	PASS	PASS	5
PowerSelect Inc	PS20B75A	75	120	Electronic	PASS	PASS	5
PowerSelect Inc	PS20B75S	75	120	Electronic	PASS	PASS	6
Prescolite	JK-347A	75	120	Electronic	PASS	PASS	6
RSA	RT60A	60	120	Electronic	NC	NC	NC
TCI	DC JOLLY DALI (cod.123424)	10	120	Electronic/DC	NC	NC	NC
Tech Lighting	700FJ4RFS(LTF TA75WA12-0000)	75	120	Electronic	NC	NC	NC
Tech Lighting	LTF TA105WA12LED-0000	105	120	Electronic	NC	NC	NC
TOPSTAR	SL-728	150	120	Electronic	NC	NC	NC
TOPSTAR	SL-518	60	120	Electronic	2 Lamp min	2 Lamp min	4
Twicebright	CL1220 Series	20	120	Electronic	PASS	PASS	1
WAC	EN-12100-R-AR	100	120	Electronic	2 Lamp min	2 Lamp min	8
WAC	EN-1260-RB2	60	120	Electronic	2 Lamp min	2 Lamp min	6
WAC	EN-1275-R-AR	75	120	Electronic	2 Lamp min	2 Lamp min	6
Tech Lighting	700AT152EL(LTF TA150WD12LEDRE)	150	120	Electronic/DC	PASS	PASS	13
Basler electronic	MI-5481E	50	120	Magnetic	PASS	PASS	4
Cooper	TF-149911	50	120	Magnetic	PASS	PASS	4
Cooper	TF149911-TP120XFMR	50	120	Magnetic	PASS	PASS	4
Cooper	TFA4120	50	120	Magnetic	PASS	PASS	4
Cooper	TF-E4-120	10	120	Magnetic	PASS	PASS	1
Cooper	TF-E4-UNV	10	120 & 277	Magnetic	PASS	PASS	1
Hammond Mfg	166Q12	75	120	Magnetic	PASS	PASS	1
Hatch	LT12-75-JIG-1	75	120	Magnetic	PASS	PASS	7
Hatch	RL12-50(E, EN, ENT)	50	120	Magnetic	PASS	PASS	4
Hatch	RL12-75(E, EN, ENT)	75	120	Magnetic	PASS	PASS	7
Iris	TFT-212	75	120	Magnetic	PASS	PASS	7
Iris	TFA-311T	50	120	Magnetic	PASS	PASS	4

**SORAA MR16 12V 7.5W WARM DIM - TRANSFORMER COMPATIBILITY LIST - North America**

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**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

Brand	Model	Wattage	Voltage (Vac)	Transformer Type	7.5W		Maximum Number of 7.5W Lamps per Transformer
					Free Air or Open Fixture	Enclosed Fixture	
<b>North America</b>							
Iris	TFA-3TR	50	120	Magnetic	PASS	PASS	4
Iris	TFA-400	75	120	Magnetic	PASS	PASS	7
Iris	TFA-51T	75	120	Magnetic	PASS	PASS	7
Juno	310-1333	300	120	Magnetic	PASS	PASS	28
Magnitude	E60L12DC-KO	60	120	Magnetic (DC)	PASS	PASS	5
MDL Corp	315-0071A-IRIS RPN3MR Fixt Dim Tab	50	120	Magnetic	PASS	PASS	4
MDL Corp	315-0071A-IRIS RPN3MR Fixt Norm Tab	50	120	Magnetic	PASS	PASS	4
MDL Corp	315-0126-12.3V	50	120	Magnetic	PASS	PASS	4
MDL Corp	315-0005-1	150	120	Magnetic	PASS	PASS	14
LINEA	701970	300	120	Magnetic	PASS	PASS	28
Orientronic	DLR1250BN	50	120	Magnetic	PASS	PASS	4
Orientronic	DLR1250BN	50	120 & 277	Magnetic	PASS	PASS	4
Q-Tran (*)	QT10-120/12-TP-RC	10	120	Magnetic	PASS	PASS	1
Q-Tran (*)	QT20-120/12-TP-RC	20	120	Magnetic	PASS	PASS	1
Q-Tran	QT50-75CK-PT	50	120	Magnetic	PASS	PASS	4
Q-Tran	QT50SV-120/12-RC	50	120	Magnetic	PASS	PASS	4
Q-Tran	QTMS-300MV	300	120	Magnetic	PASS	PASS	10
Q-Tran	QSET-300-120/12	300	120	Magnetic	PASS	PASS	20
B+L	CV90112 277 (*1)	75	277	Electronic	NC	NC	NC
B+L	GX95301 277 (*1)	60	277	Electronic	PASS	NC	4
BK Lighting	TRSS150-277 (*1)	150	277	Electronic	2 Lamp min	2 Lamp min	12
Cooper	TF-E4-277	10	277	Magnetic	PASS	PASS	1
Hatch	LT12-75-JIG-2	75	277	Magnetic	PASS	PASS	7
Hatch	RL12-75-ABF-277 (*1) (*2)	60	277	Electronic	NC	NC	NC
Hatch	RS12-105-277 (*1) (*2)	105	277	Electronic	NC	NC	NC
Hatch	RS12-80-277 (*1) (*2)	80	277	Electronic	NC	NC	NC
Hatch	RS12-60M LED 277 (*1)	60	277	Electronic	PASS	PASS	5
Lightech	LET75 277 R (*1)	75	277	Electronic	PASS	NC	5
LTF	TE15WA12LED-0000 (*1)	15	277	Electronic	PASS	PASS	1
Q-Tran	QT10-277/12-TP-RC	10	277	Magnetic	NC	NC	NC
Q-Tran	QT20-277/12-TP-RC	20	277	Magnetic	PASS	PASS	1
Q-Tran	QT50-75CK-PT-277-RC	50-75	277	Magnetic	PASS	PASS	4

**Notes:**

- Compatibility tests are conducted by Soraa under bench conditions as guidance for the user; results at the application site may differ due to variability in usage conditions or in transformer components/manufacturing
- 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 transformer is not listed, please consult with Soraa before making recommendations to the end customer
- 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.
- 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.
- (AS) means "Any Suffix"
- (\*1) Soraa does not recommend 277V Electronic transformers for dimming applications, unless stated on our dimming compatibility list.
- (\*2) Hatch does not warranty their electronic 277V transformers when used with LED lamps unless their product number ends with -LED
- (\*) This transformer added to the compatibility list as of this Revision

**SORAA WARM DIM MR16 12V 7.5W - DIMMING COMPATIBILITY LIST - ELV - North America**

Transformer manufacturer ↓	Transformer model ↓	Transformer type ↓	Number of lamps per transformer ←	Dimmer →	Creston DIN-1DIMU4	Legrand Radiant RH703PTU	Lutron Caseta PD-5NE	Lutron Diva DVELV-300P	Lutron Grafik Eye QS + ELV Interface PHPM	Lutron Maestro MAELV-600	Lutron Maestro PRO MA-PRO	Lutron Maestro Wireless MRF2-6ELV-120	Lutron Nova-T NTELV-600	Lutron Radio RAZ RRD-6NA	Lutron Remote Power Modules HW / LP-RPM-4A-120	Lutron Skylark SELV-300P	Lutron Spacer SPSELV-600	Marlin Stellar RMS 4
				Dimming Phase →	Reverse	Reverse	Reverse	Reverse	Reverse	Reverse	Reverse w/ neutral	Reverse	Reverse	Reverse	Reverse	Reverse	Reverse	Reverse
<b>B+L</b>	FX95100/RFI	ELV	1		0%	16%	8%	7%	5%	6%		5%		5%	0%	7%	11%	6%
<b>Hatch</b>	RL12-60M-LED (*)	ELV	1		4%	21%	7%	7%	6%	6%	3%	6%	4%	6%	5%	7%	7%	7%
<b>Hatch</b>	RS12-60M	ELV	2		4%	5%	7%	7%	5%	6%		6%		5%	5%	7%	7%	7%
<b>Hatch</b>	RS12-60M-LED	ELV	1		13%	6%	10%	7%	8%	7%		6%		7%	6%	7%	7%	7%
<b>Hatch</b>	RS12-15BF-LED	ELV	1		13%	6%	7%	7%	6%	6%		6%		6%	6%	7%	7%	7%
<b>L.T.F.</b>	TA15WA12LED-0000	ELV	1		5%	9%	7%	6%	5%	6%		5%		6%	6%	6%	7%	7%
<b>L.T.F.</b>	TA60WA12LED	ELV	1		4%	5%	7%	7%	6%	6%		6%		6%	5%	7%	7%	7%
<b>L.T.F.</b>	TA300WDS12LEDR E-0000	ELV / DC	3		4%	15%	7%	7%	5%	6%		5%		5%	0%	7%	8%	6%
<b>Ligtech</b>	LET60	ELV	1		6%	13%	10%	6%	7%	6%		5%		7%	6%	6%	7%	6%
<b>Ligtech</b>	LET60 LW	ELV	1		4%	19%	7%	7%	5%	6%		5%		6%	6%	7%	7%	7%
<b>Ligtech</b>	LET75	ELV	1		4%	11%	7%	5%	5%	7%		6%		6%	5%	5%	7%	7%
<b>WAC Lighting</b>	EN1260-R2	ELV	2		0%	6%	7%	7%	5%	6%		5%		6%	0%	7%	7%	6%

**SORAA WARM DIM MR16 12V 7.5W - DIMMING COMPATIBILITY LIST - MLV - North America**

Transformer manufacturer ↓	Transformer model ↓	Transformer type ↓	Number of Lamps per transformer ←	Dimmer →	Crestion DIN-1DIMU4	Lutron Caseta PD-5NE-XX	Lutron Grafik Eye QS QSGR	Lutron Maestro MA-PRO	Lutron Radio RA2 RRD-6NA	Lutron Remote Power Modules HW / LP-RPM-4A-120	Lutron Remote Power Modules HW / LP-RPM-4U-120	Marlin SNP ELV Dimmer 600-10-001-00-4 (set to forward phase)
				Dimming Phase →								
Q-Tran (*)	QT10-120/12-TP	MLV	1 (7.5W)					7%				
Q-Tran	QT50SV-120/12-RC	MLV	1		13%	12%	0%		8%	0%	0%	0%

**120V NON PHASE-DIMMABLE TRANSFORMERS WITH DIFFERENT CONTROLS**

Transformer	Model		Number of lamps per transformer during test	Controllers, Potentiometers, PWM dimmers -->	Potentiometer	0/1-10V
<b>NA</b>						
<b>Fulham</b>	T1M1UNV012V-20L (120V & 277V) (*)	Electronic/DC	1		8%	8%
<b>Fulham</b>	T1M1UNV012V-60L (120V & 277V) (*)	Electronic/DC	1			12%
<b>Meanwell</b>	PWM-90-12 (300Hz version) (*) (120V & 277V)	Electronic/DC	1		7%	7%
<b>Meanwell</b>	PWM-120-12 (300Hz version) (*) (120V & 277V)	Electronic/DC	1		7%	7%
<b>Tivoli</b>	ADUL801512DOT (*)	Electronic/DC	1 - 3 (max)			0%



## Notes:

- Compatibility tests are conducted by Soraa (unless stated otherwise) under bench conditions as guidance for the user.
- Regards compatibility tests conducted by dimmer/transformer manufacturer, please contact Soraa or the manufacturer for more details and/or reports.
- Results at the application site may differ due to variability in usage conditions or in dimmer or transformer components/manufacturing.
- 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).
- Transformer maximum load listed in the transformer compatibility table should not be exceeded.
- If the dimmer and/or transformer is not listed, please consult with Soraa before making recommendations to the end customer.
- (\*) One or more test results with this transformer added to the compatibility list as of this Revision

--%	Dims to < 20% (of the measured light output)
--%	Dims to 20-30% (of the measured light output)
NC	Not compatible (or dims to >30%)
Blank cell	Not tested