

# LED Driver

## USVI RDL Series

# USVI RDL

### Highlights & Features

- 24 V constant voltage built-in in luminaires design
- Up to 90% efficiency for 240W, 150W, 100W and 80W
- Wide operating temperature range
- Dry and Damp location rated
- Particular in refrigeration display lighting application
- Safety certificated for household and refrigerator appliances
- Suitable for Class I and Class II systems



### Safety Standards



### Dimensions (L x W x D):

USVI-240024FR	240 x 70 x 37.5 mm (9.45 x 2.75 x 1.48 inch)
USVI-150024FR	230 x 60 x 34.0 mm (9.05 x 2.36 x 1.34 inch)
USVI-100024FR1	241.3 x 43.1 x 30.0 mm (9.50 x 1.70 x 1.18 inch)
USVI-080024FR1	241.3 x 43.1 x 30.0 mm (9.50 x 1.70 x 1.18 inch)
USVI-060024FR	241.3 x 43.1 x 30.0 mm (9.50 x 1.70 x 1.18 inch)
USVI-020024FR	132 x 34 x 25.4 mm (5.2 x 1.34 x 1.0 inch)

### General Description

Delta's USVI-RDL series of fixed output voltage LED drivers are suitable for refrigerated display lighting, retail display lighting and linear accent lighting applications. These drivers are global approbations and certifications: SELV 24V output, which ensures safety even if wiring or LED boards was damaged; Installation friendly by designing drivers for Class I and Class II systems. Moreover, energy savings can be carried out through high efficiency rate to meet 2021 ErP regulations, and best EMC performance was also taken into consideration in product developing. They are meticulously designed and rigorously tested to work under various refrigeration display lighting conditions. Ultimate robustness, offering peace of mind and lower maintenance costs for customers.

### Model Information

#### USVI RDL LED Driver

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
USVI-240024FR	198 - 264Vac	24Vdc	10.00A
USVI-150024FR	108- 264Vac		6.25A
USVI-100024FR1	108 - 305Vac		4.00A
USVI-080024FR1			3.33A
USVI-060024FR			2.50A
USVI-020024FR	198 - 264Vac		0.83A

### Model Numbering

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Safety Approval cULus CSA CE ENEC	Constant Voltage	Indoor		Output Power 240 – 240W 150 – 150W 100 – 100W 080 – 80W 060 – 60W	Output Voltage 024 – 24Vdc	Function F – Fixed output	Variable R – refrigerated display lighting application

# LED Driver

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### Specifications

Model Number	USVI-240024FR	USVI-150024FR	USVI-100024FR1	USVI-080024FR1	USVI-060024FR	USVI-020024FR
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### Input Ratings / Characteristics

Normal Input Voltage	220-240Vac	120-240Vac	120-277Vac	120-277Vac	120-277Vac	220-240Vac	
Input Voltage Range	198-264Vac	108-264Vac	108-305Vac	108-305Vac	108-305Vac	198-264Vac	
Normal Input Frequency	50-60 Hz	50-60 HZ	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	
Input Frequency Range	47-63 Hz	47-63 HZ	47-63 Hz	47-63 Hz	47-63 Hz	47-63 Hz	
Input Current	1.12 typ.	1.3 Typ.	0.91 typ.	0.76 typ.	0.59 typ.	0.20 typ.	
Efficiency <sup>1)</sup> @ 230Vac	92.5% typ.	93% typ.	90% typ.	90% typ.	87.0% typ.	85.4 % typ.	
Inrush Current Peak >50% Duration	125A/ 200us	80A/200us	70A/ 200us	70A/ 200us	50A/ 200us	20A/ 150us	
Max. no. of LED Driver for Circuit Breaker	B16	4pcs	6pcs	10pcs	10pcs	14pcs	48pcs
	C16	7pcs	10pcs	12pcs	14pcs	18pcs	56pcs
Power Factor @ max. Load.	> 0.95					0.5 min.	
Total Harmonic Distortion @ max. Load.	Meet IEC 61000-3-2 Class C						
Leakage Current	< 0.7mA @ 230Vac						

1) 100% Load (typical) and tested after 30 minutes warm up.

### Output Ratings / Characteristics

Nominal Output Voltage	24.0Vdc					
Output Current Range	0.1 - 10.00A	0.1 – 6.25A	0.1 - 4.00A	0.1 - 3.33A	0.1 - 2.50A	0.1 - 0.833A
Max. No Load Output Voltage	25.6Vdc					
Max. Output Power	240W	150W	96W	80W	60W	20W
Output Voltage Tolerance	± 3%					
Line Regulation	± 1%					
Load Regulation	± 3%					
Output Voltage Ripple	400mV					
Rise Time	< 50ms					
Start-up Time	< 1.0s					

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### Mechanical

Casing	Metal sheet, Color: Black				Plastic, Color: Black	
Dimensions (L x W x H) [mm] [inch]	240 x 70 x 37.5 9.45 x 2.75 x 1.48	230 x 60 x 34 9.05 x 2.36 x 1.34	241.3 x 43.1 x 30.0 9.50 x 1.70 x 1.18		132 x 34 x 25.4 5.2 x 1.34 x 1.0	
Unit Weight [kg] [lb]	1.04 2.28	0.90 1.98	0.60 1.32		0.10 0.22	
Cooling System	Convection					
Commercial Packaging Carton Box: Pieces per carton box	10pcs	10pcs	10pcs		50pcs	
Commercial Packaging Carton Box: Weight/ carton box [kg] [lb]	11.4 25.1	10.0 22	7.0 15.5		10.0 22.0	
Input Wire	Line: Black, Neutral: White, Wire Length 300mm					
Output Wire	Positive: Red, Negative: Black, Wire Length 300mm					
Noise (30cm distance)	Sound Pressure Level (SPL) < 24dBA					

### Environment

Ambient Temperature	Operating	-40°C to +55°C (150W: +50°C),				-40°C to +60°C
	Storage	-40°C to +85°C				
Maximum Case Temperature	+85°C	+80°C	+85°C	+85°C	+85°C	+85°C
Lifetime Case Temperature	+75°C	+70°C	+80°C	+80°C	+75°C	+85°C
Relative Humidity	Operating	10 to 90% RH (Non-Condensing)				
	Storage	5 to 95% RH (Non-Condensing)				
Environmental Locations	IP54; Dry and Damp Location					
Operating Altitude	< 2,000m				Up to 5,000 m	

### Protections

Over Voltage	Auto-Recovery when the fault is removed	Yes, Latch mode
Overload / Overcurrent	Auto-Recovery when the fault is removed	Yes, Latch mode
Short Circuit	Auto-Recovery when the fault is removed	Yes, Latch mode
Over Temperature	Auto-Recovery when the fault is removed	Yes, Latch mode
Suitable for Luminaires Class	Class I and Class II, Insulation Class according to IEC 60598	

### Reliability Data

Lifetime	50,000 hrs. at lifetime case temperature
MTTF	850,000 hrs. @ta: +45°C (as per Telcordia SR-332, total failure rate less than 10%)

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### Safety Standards / Directives

Safety	UL	N/A	UL 8750, Class P, type "HL" UL1310 Class 2 Output for 60/80/100W			N/A
	CSA	N/A	N/A	CAN/CSA C22.2 No.250.13		N/A
	CB scheme	IEC 61347-1, IEC 61347-2-13, SELV Output IEC 60335-1, IEC 60335-2-89 and Annex BB, IEC 60335-2-24 and Annex CC				
	CCC	GB 17625.1-2012, GB/T 17743-2021; GB 19510.1-2009, GB 19510.14-2009	N/A	GB 17625.1-2012, GB/T 17743-2021; GB 19510.1-2009, GB 19510.14-2009		
	RCM	N/A	N/A	AS 61347.2.13:2018 AS/NZS 61347.1:2016 Inc A1	N/A	N/A
CE	In conformance with : Low Voltage Directive 2014/35/EU ; EMC Directive 2014/30/EU ; RoHS Directive 2011/65/EU+ (EU) 2015/863 and Erp Directive 2009/125/EC Implementing measure Commission Regulation (EU) 2019/2020.					
UKCA	In conformance with : Electrical Equipment (Safety) Regulations 2016; Electromagnetic Compatibility Regulations 2016 and The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (as amended 2019,2020)					
Isolation (Excluding 20W model)		Input	Output	Case		
	Input	N/A	3000Vac	3000Vac		
	Output	3000Vac	N/A	500Vac		
	Case	3000Vac	500Vac	N/A		
Isolation for USVI-020024FR	Input	N/A	3000Vac	N/A		
	Output	3000Vac	N/A	N/A		
	Case	N/A	N/A	N/A		

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### EMC

Emissions	Compliance to BS EN/ IEC 55015 Compliance to FCC Part 15 Class A (Excluding 20W and 240W models)	
Immunity	Compliance to BS EN/ IEC 61547	
Electrostatic Discharge	IEC 61000-4-2	ESD, Criteria A <sup>1)</sup> or B <sup>2)</sup> Air Discharge: 8kV; Contact Discharge: 4kV
Radiated Field	IEC 61000-4-3	RS, Criteria A <sup>1)</sup> 80MHz-1GHz, 3V/m with 1kHz Sine Wave / 80% AM Modulation
Electrical Fast Transient / Burst	IEC 61000-4-4	1kV, Criteria A <sup>1)</sup> or B <sup>2)</sup>
Surge	IEC 61000-4-5	Common Mode: 2kV; Differential Mode: 1kV, Criteria A <sup>1)</sup> or B <sup>2)</sup> Excluding 20W model For USVI-020024FR model: Differential Mode: 0.5kV 1.2/50 $\mu$ s, 8/20 $\mu$ s Combination Wave with 2ohms (L-N), 12ohms (L-PE & N-PE) source impedance
	ANSI C62.41	Meet category A1 with a 2.5kV/100kA ring wave, Criteria A <sup>1)</sup> Excluding 20W and 240W models
Conducted Disturbance	IEC 61000-4-6	150kHz-80MHz, 3Vrms, Criteria A <sup>1)</sup>
Power Frequency Magnetic Fields	IEC 61000-4-8	3A/Meter, Criteria A <sup>1)</sup>
Voltage Dips	IEC 61000-4-11	Criteria A <sup>1)</sup> or B <sup>2)</sup> ; 100% dip; 0.5 cycle; Self Recoverable 30% dip; 10 cycle; Self Recoverable
Harmonic Current Emission	IEC 61000-3-2	Class C (230Vac @ 100% load)
Voltage Fluctuation and Flicker	IEC 61000-3-3	$P_{st} \leq 1.0$ ; $d_{max} \leq 4\%$ ; $P_{it} \leq 0.65$ ; $d_c \leq 3.3\%$ ; $T_{max} \leq 500ms$

1) Criteria A: Normal performance within the specification limits

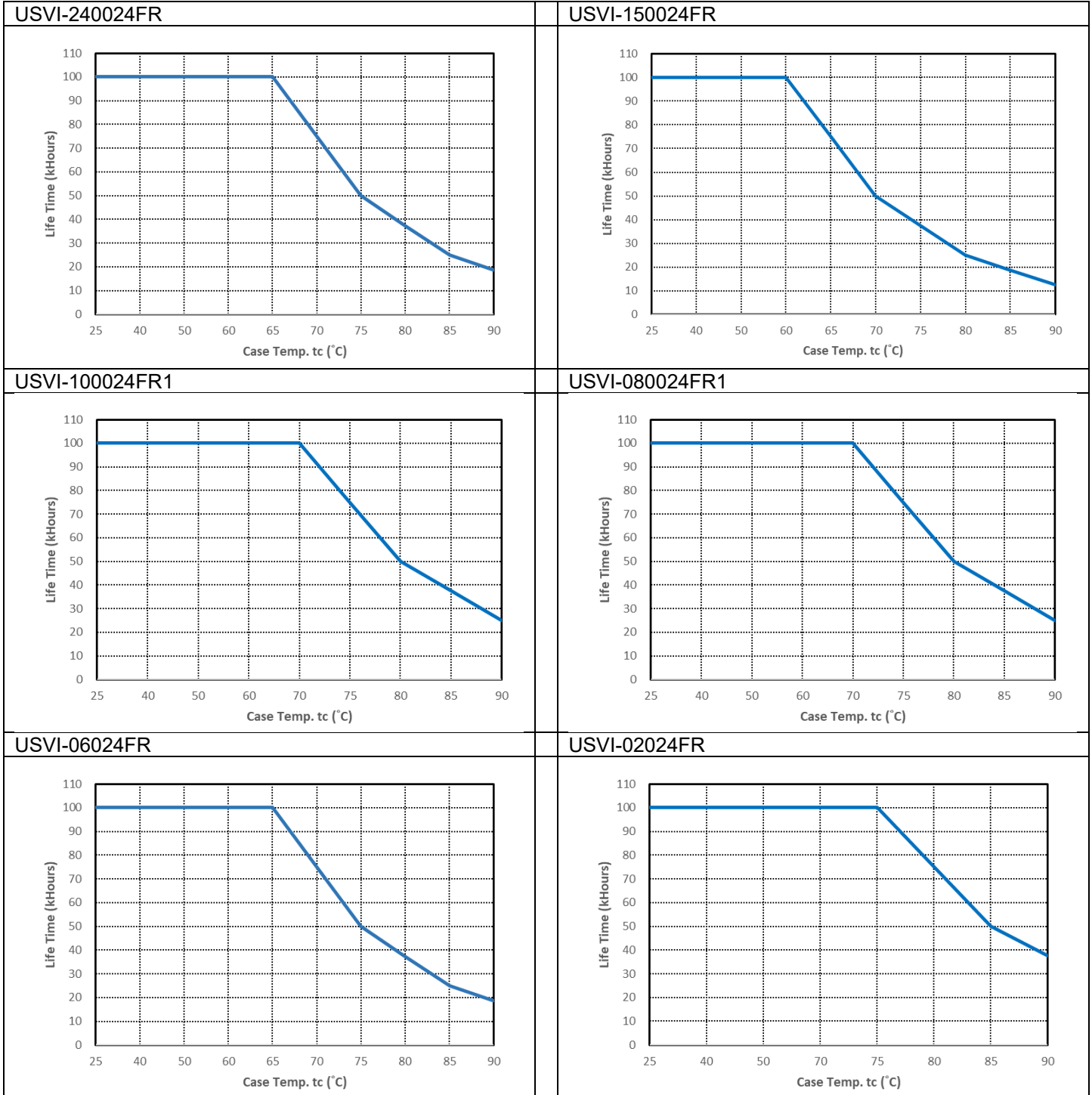
2) Criteria B: Temporary degradation or loss of function, which is self-recoverable

3) FCC Part 15, Class A and ANSI C62.41 are not included in USVI-240024FR and USVI-020024FR

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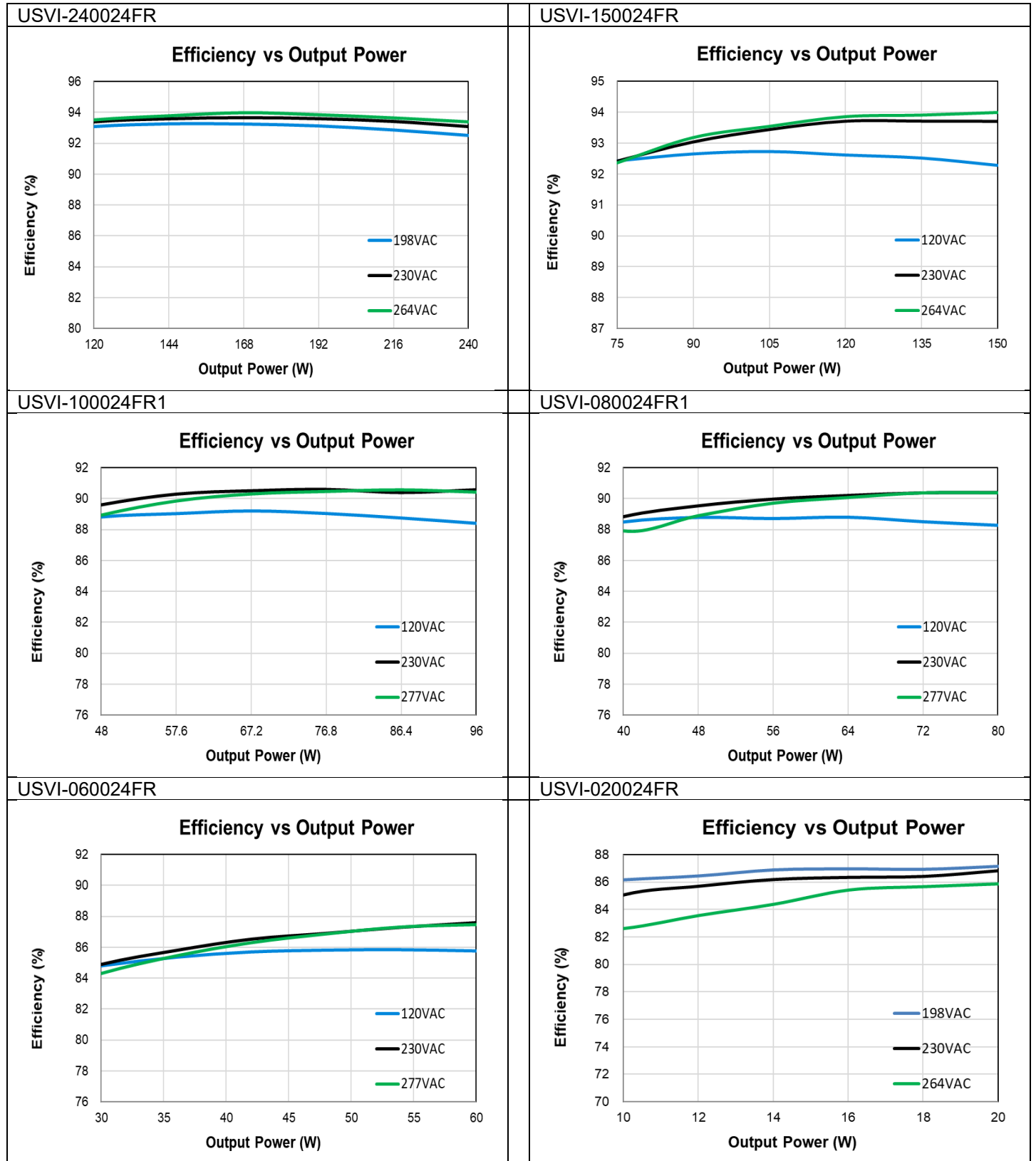
### Driver Lifetime vs. Case Temperature



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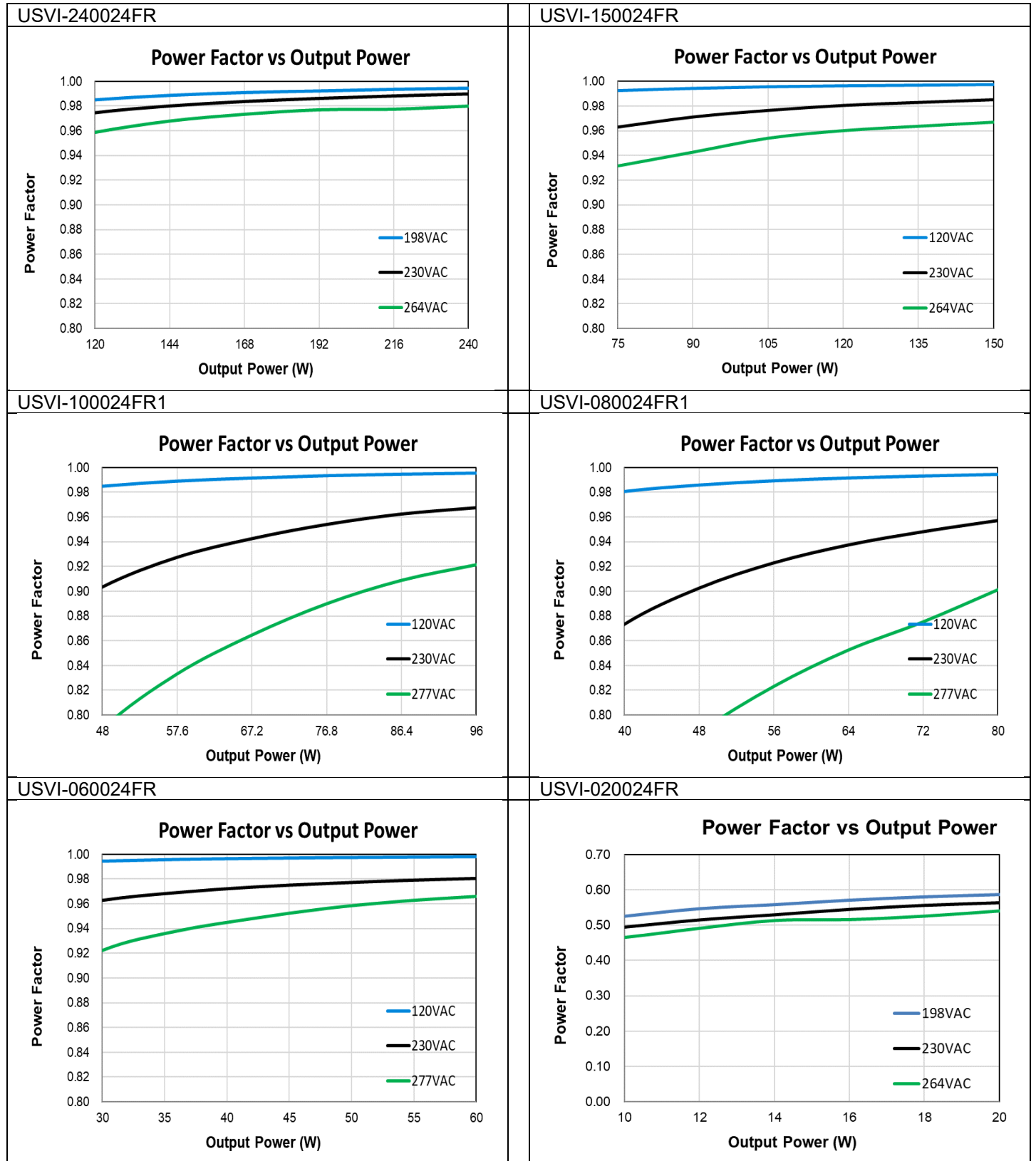
### Efficiency vs. Output Power



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### Power Factor vs. Output Power

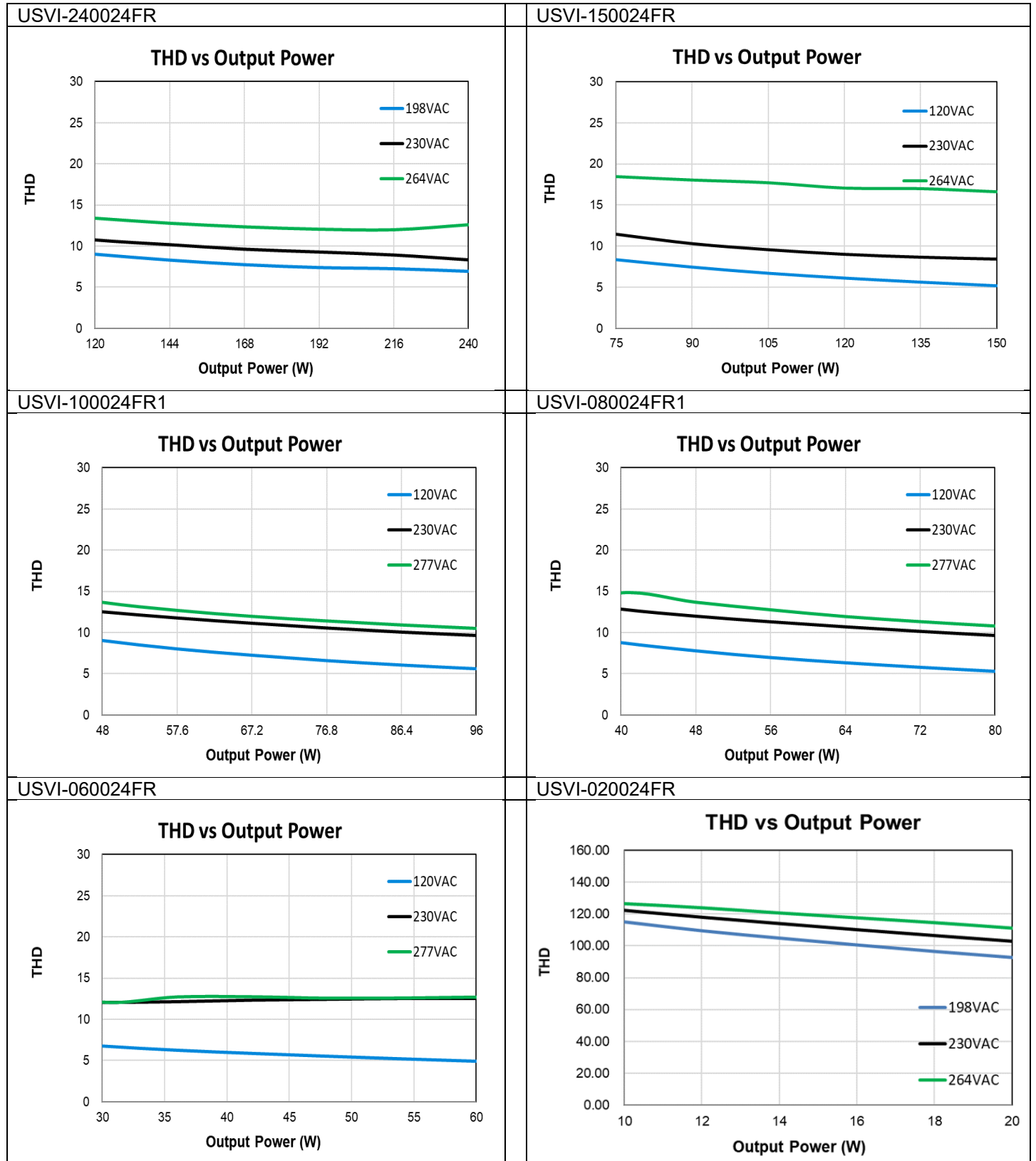




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### Total Harmonic Distortion vs. Output Power

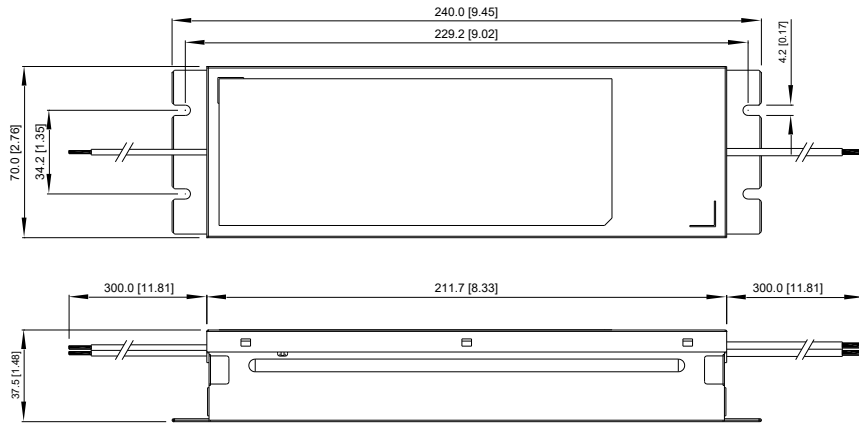


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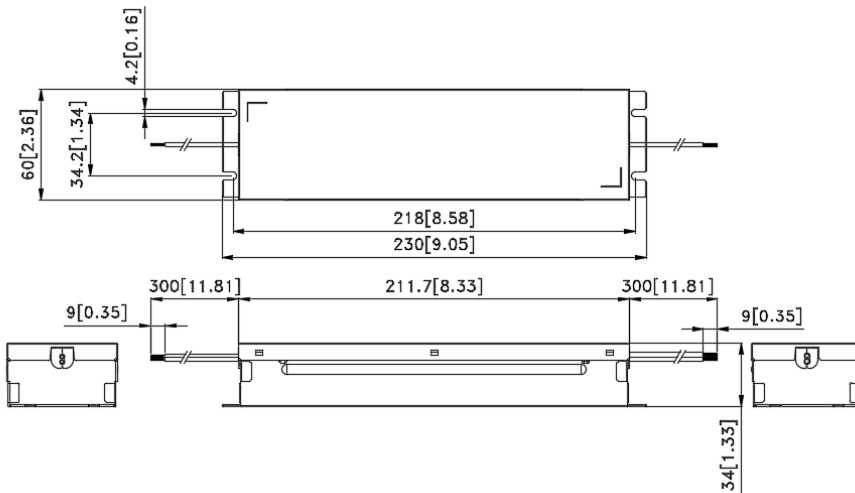
### Dimensions

USVI-240024FR



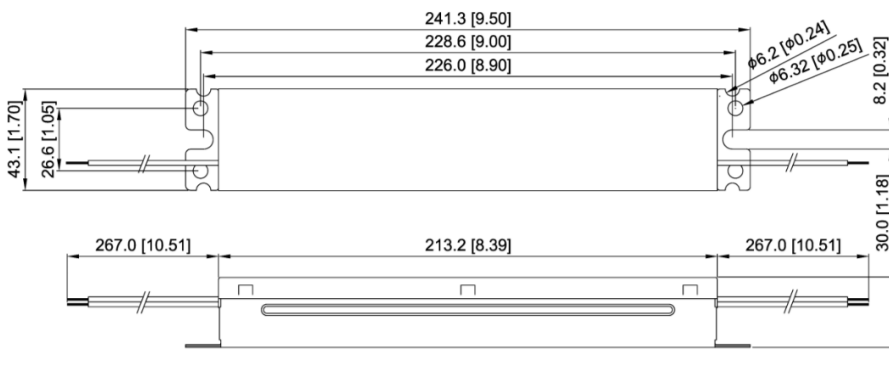
Unit:mm

USVI-150024FR



Unit:mm

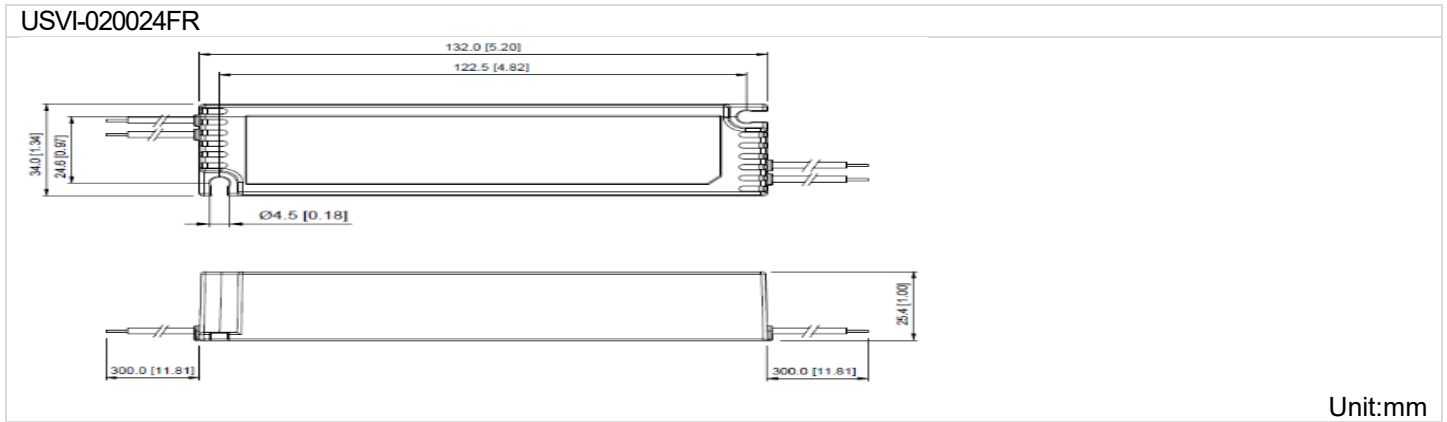
USVI-100024FR1 / USVI-080024FR1 / USVI-060024FR



Unit:mm

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### Others

#### Warranty Policy

Please reach out our [Warranty Policy](#) should you require any further clarification.