

# ARTESYN ADN-C SERIES

Single Phase  
DIN Rail



## PRODUCT DESCRIPTION

Advanced Energy's Artesyn ADN-C series has improved upon the superior reliability of the ADN Series of AC-DC power supplies with increased Mean Time Between Failure (MTBF) by reducing the part count and strategic use of high quality components. In addition to being extremely reliable by design, the ADN-C has built-in protection from over temperature, overloads and short circuits. This ensures that reliability is not compromised by operation temporarily outside of normal conditions. Intuitive visual diagnostics help ensure easy troubleshooting when such conditions occur so that equipment downtime can be minimized.

## AT A GLANCE

### Total Power

120 to 960 Watts

### Input Voltage

85 to 264 Vac

### # of Outputs

Single



## SPECIAL FEATURES

- Slim form factor
- Five year warranty
- High Efficiency > 90% Typ.
- Full Power at 60°C
- Power Boost™
- Industrial Grade Design
- Patented metal mounting clip
- Metal case
- MTBF > 450Khr demonstrated at 25°C
- Active PFC > 0.92
- Adjustable output
- Overvoltage protection with autorecovery
- Continuous short circuit and overload protection

- SEMI F47 Sag Immunity
- 3 Status LEDs  
Input / Output / Alarm
- DCOK Relay
- Parallel operation capability
- Screw terminal connections
- No tools required for mounting

## SAFETY

- UL 508, cULus Listed
- UL 60950-1, cURus
- IEC 60950-1
- Class I, Div 2 Hazardous Locations
- ATEX Certified on selected models
- IP20
- CE

**MODEL NUMBERS**

Standard	Output Voltage	Minimum Load	Maximum Load	Maximum Power
ADN5-24-1PM-C	24Vdc	0A	5A	120W
ADN10-24-1PM-C	24Vdc	0A	10A	240W
ADN20-24-1PM-C	24Vdc	0A	20A	480W
ADN40-24-1PM-C	24Vdc	0A	40A	960W

**Options**

None

## ELECTRICAL SPECIFICATIONS

## Absolute Maximum Ratings

Stress in excess of those listed in the “Absolute Maximum Ratings” may cause permanent damage to the power supply. These are stress ratings only and functional operation of the unit is not implied at these or any other conditions above those given in the operational sections of this TRN. Exposure to any absolute maximum rated condition for extended periods may adversely affect the power supply’s reliability.

Table 1. Absolute Maximum Ratings							
Parameter	Model	Symbol	Min	Typ	Max	Unit	
Input Voltage	AC continuous operation	All models	$V_{IN,AC}$	85	-	264	Vac
	DC continuous operation	All models	$V_{IN,DC}$	90	-	375	Vdc
Maximum Output Power, continuous	ADN5-24-1PM-C	$P_{O,max}$	-	-	120	W	
	ADN10-24-1PM-C		-	-	240	W	
	ADN20-24-1PM-C		-	-	480	W	
	ADN40-24-1PM-C		-	-	960	W	
Isolation Voltage	ADN5-24-1PM-C		Input to output	-	-	3000	Vac
			Input to safety ground	-	-	2034	Vac
			Output to safety ground	-	-	3000	Vac
Isolation Voltage	ADN10-24-1PM-C		Input to output	-	-	4243	Vdc
			Input to safety ground	-	-	2850	Vdc
			Output to safety ground	-	-	3000	Vac
Isolation Voltage	ADN20-24-1PM-C		Input to output	-	-	3000	Vac
			Input to safety ground	-	-	1707	Vac
			Output to safety ground	-	-	3000	Vac
Isolation Voltage	ADN40-24-1PM-C		Input to output	-	-	3000	Vac
			Input to safety ground	-	-	1772	Vac
			Output to safety ground	-	-	3000	Vac
Ambient Operating Temperature	All models	$T_A$	-25	-	+70 <sup>1,2</sup>	°C	
Storage Temperature	All models	$T_{STG}$	-40	-	+85	°C	
Humidity (non-condensing)	Operating	All models	5	-	95	%	
	Non-operating	All models	0	-	95		
Altitude	Operating	All models	0	-	10,000	feet	
	Non-operating	All models	-1,000	-	50,000		

Note 1 - Derate each output at 5% per degree C from 60°C to 70°C.

Note 2 - Operation up to 50% load permissible with sideways (horizontal) or front side up (top) mounting orientation.

## ELECTRICAL SPECIFICATIONS

## Input Specifications

Table 2. Input Specifications						
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Operating Input Voltage, AC	All	$V_{IN,AC}$	85	115/230	264	Vac
Operating Input Voltage, DC	All	$V_{IN,DC}$	90	-	375	Vdc
Input AC Frequency	All	$f_{IN}$	43	50/60	67	Hz
Maximum steady state Input Current	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C $V_{IN,AC} = 85Vac$	$I_{IN,max}$	-	-	4 6 8 13	A
Harmonic Line Currents	All	THD	Per EN61000-3-2			
Power Factor	$I_O = I_{O,max}$ $V_{IN,AC} = 85$ to $264Vac$	PF	0.92	-	-	
Startup Surge Current (Inrush) @ 25°C	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C $V_{IN,AC} = 264Vac$	$I_{IN,surge}$	-	-	15 30 40 60	$A_{PK}$
Input Fuse	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C Internal, L line 250VAC rated MXEP type		-	-	3 5 10 15	A
Input AC Low Line Start-up Voltage	$I_O = I_{O,max}$	$V_{IN,AC-start}$	70	-	78	Vac
PFC Switching Frequency	All	$f_{SW,PFC}$	43	-	53	kHz
Efficiency ( $T_A = 25^\circ C$ )	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C $V_{IN,AC} = 230Vac$ $I_O = I_{O,max}$	$\eta$	-	90 90 92 94	- - - -	%
Hold Up Time	$V_{IN,AC} = 100Vac$ $P_O = P_{O,max}$ $T_A = 25^\circ C$	$t_{Hold-Up}$	20	-	-	mSec
Turn On Delay	Resistive Load Capacitive Load $V_{IN,AC} = 85Vac$ $I_O = I_{O,max}$	$t_{Turn-On}$	-	-	1.0 1.5	Sec

## ELECTRICAL SPECIFICATIONS

## Output Specifications

Table 3. Output Specifications							
Parameter		Conditions	Symbol	Min	Typ	Max	Unit
Factory Set Voltage		$I_O = 0A$	$V_{O,Factory}$	24.25	24.50	24.75	V
Output Adjust Range	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C	$I_O = 0A$	$V_O$	22.5	-	28.5	V
				22.5	-	28.5	
				24.0	-	28.0	
				24.0	-	28.0	
Line / Load Regulation		$V_{IN,AC} = 85 \text{ to } 264V_{ac}$ $I_O = 0 \text{ to } I_{O,max}$	$\%V_O$	-2.0	-	+2.0	%
Total Regulation		Inclusive of line, load temperature change, warm-up drift	$\%V_O$	-2.0	-	+2.0	%
Output Ripple, pk-pk	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C	See note 1	$V_O$	-	-	50	$mV_{PK-PK}$
				-	-	50	
				-	-	100	
				-	-	100	
Output Current, continuous	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C	See note 2 and 3	$I_{O,max}$	0	-	5	A
				0	-	10	
				0	-	20	
				0	-	40	
Maximum Output Power, continuous	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C	See note 2 and 3	$P_{O,max}$	-	-	120	W
				-	-	240	
				-	-	480	
				-	-	960	
Output Current, peak	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C ADN40-24-1PM-C	$V_O \geq 20.0V, 4 \text{ sec max}$	$I_{O,peak}$	-	-	7.5	A
				-	-	15	
				-	-	30	
				-	-	60	
Output Current, short circuit		$V_O \leq 0.5V, \text{ auto recovery}$	$I_{O,SC}$	160	-	-	$\% I_{O,max}$
Dynamic Response	Peak Deviation Setting Time	50% to 100% load change Slew rate = $1A/\mu S$ Output cap = $100\mu F/A$	$\pm\%V_O$	-	-	2	%
				$t_s$	-	-	5
Turn On Overshoot		$I_O = 0$	$\%V_O$	-	-	2	%
Rise Time	Resistive Load Capacitive Load	$I_O = I_{O,max}$ $I_O = I_{O,max}$ with $7000\mu F$	$t_r$	-	-	150	mSec
				-	-	500	
DCDC Switching Frequency		All	$f_{SW,DC-DC}$	84	-	90	kHz
Over Voltage Protection		Auto recovery	$V_O$	30.5	-	33.0	V
Back EMF Immunity		No damage, auto recovery	$V_O$	-	-	35.0	V
Load Capacitance		Startup	$C_O$	0	-	7000	$\mu F$
Over Temperature Protection		All		Auto Recovery			
MTBF	Telcordia Issue 2, at full load, $25^\circ C$	$V_{IN,AC} = 115V_{ac}$ $V_{IN,AC} = 230V_{ac}$		550,000	-	-	Hrs
				570,000	-	-	

Note 1 - Measure with a  $0.1\mu F$  ceramic capacitor in parallel with a  $10\mu F$  tantalum capacitor using a 20MHz bandwidth limited oscilloscope.

Note 2 - Standard operating orientation is front side facing forward.

Note 3 - Operation up to 50% load permissible with sideways (horizontal) or front side up (top) mounting orientation.

# ELECTRICAL SPECIFICATIONS

## ADN5-24-1PM-C Performance Curves

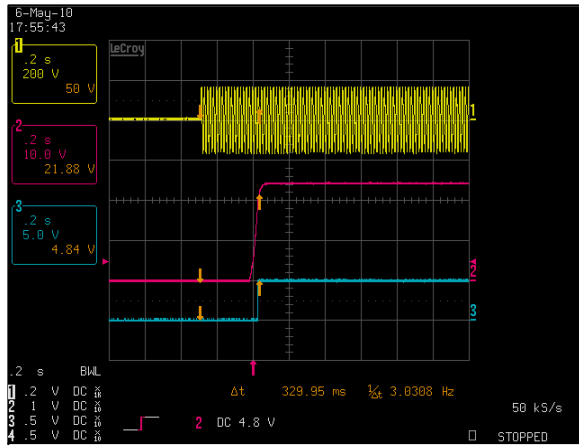


Figure 1: ADN5-24-1PM-C Turn-on delay by AC Mains  
 Vin = 115Vac Load: I<sub>o</sub> = 5.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

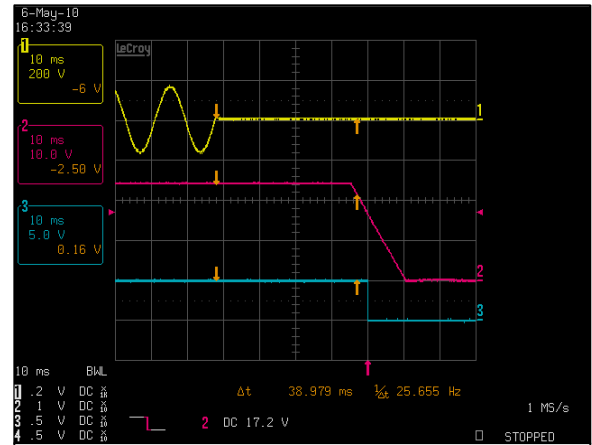


Figure 2: ADN5-24-1PM-C Hold-up Time (time to decay)  
 Vin = 115Vac Load: I<sub>o</sub> = 5.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

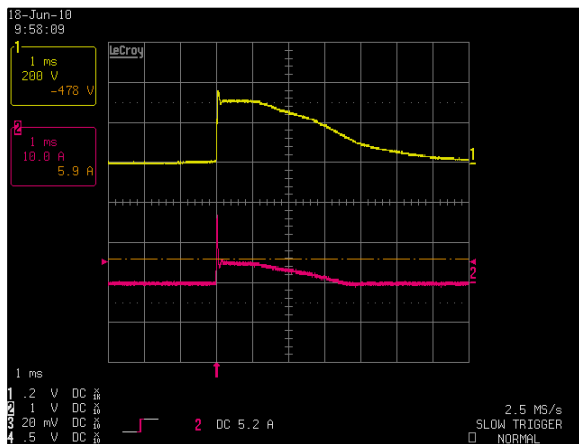


Figure 3: ADN5-24-1PM-C Inrush Current  
 Vin = 230Vac Load: I<sub>o</sub> = 0A, Turn on at 90 deg  
 Ch 1: V<sub>IN</sub> Ch 2: I<sub>IN</sub>

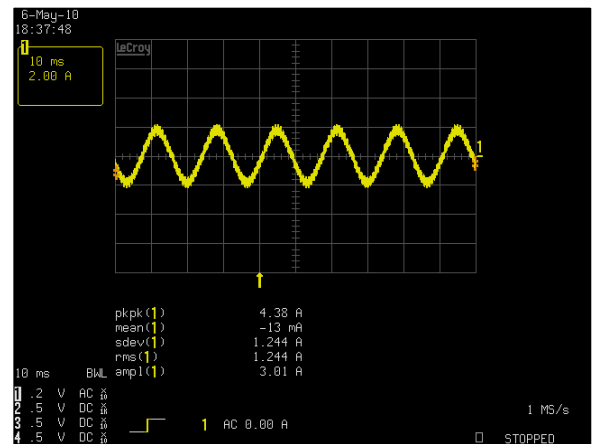


Figure 4: ADN5-24-1PM-C Input Current Waveform  
 Vin = 115Vac Load: I<sub>o</sub> = 5.0A  
 Ch 1: I<sub>IN</sub>

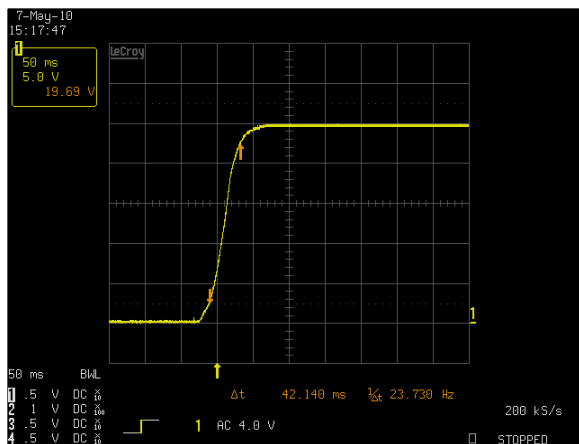


Figure 5: ADN5-24-1PM-C Output Voltage Startup Waveform  
 Vin = 90Vac Load: I<sub>o</sub> = 5.0A  
 Ch 1: V<sub>o</sub> Output Capacitance = 330uF/A

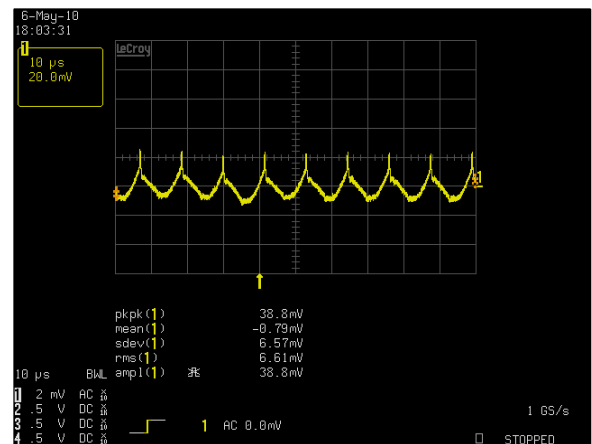


Figure 6: ADN5-24-1PM-C Ripple and Noise Measurement  
 Vin = 115Vac Load: I<sub>o</sub> = 5.0A  
 Ch 1: V<sub>o</sub>

# ELECTRICAL SPECIFICATIONS

## ADN5-24-1PM-C Performance Curves

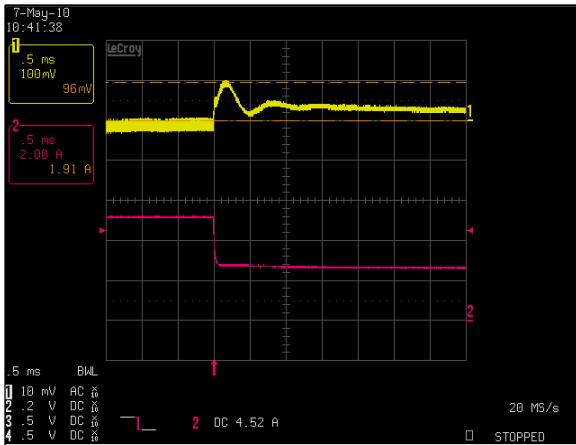


Figure 7: ADN5-24-1PM-C Transient Response – Vo Deviation  
 Vin = 115Vac Load: Io = 100% to 50%, 1A/us slew rate  
 Ch 1: Vo Ch 2: Io

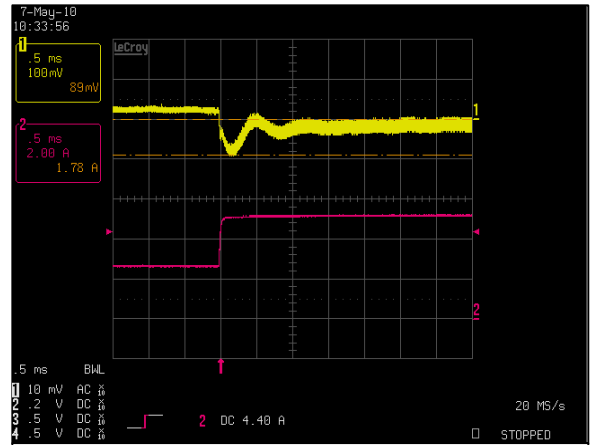


Figure 8: ADN5-24-1PM-C Transient Response – Vo Deviation  
 Vin = 115Vac Load: Io = 50% to 100%, 1A/us slew rate  
 Ch 1: Vo Ch 2: Io

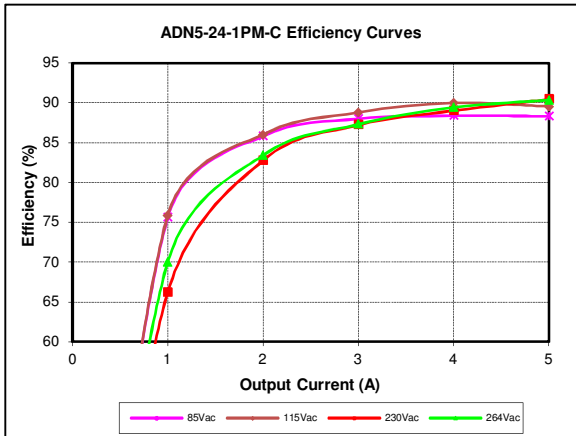


Figure 9: ADN5-24-1PM-C Efficiency Curves @ 25 degC  
 Convection Cooling  
 Vin = 85 to 264Vac Load: Io = 0 to 5.0A

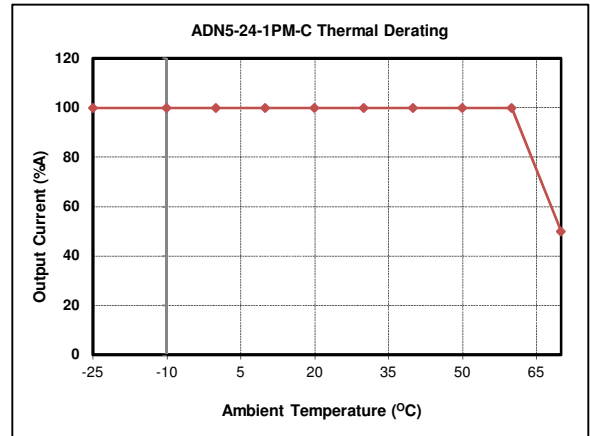


Figure 10: ADN5-24-1PM-C Derating Curve  
 Vin = 115Vac Load: Io = 5.0A

# ELECTRICAL SPECIFICATIONS

## ADN10-24-1PM-C Performance Curves

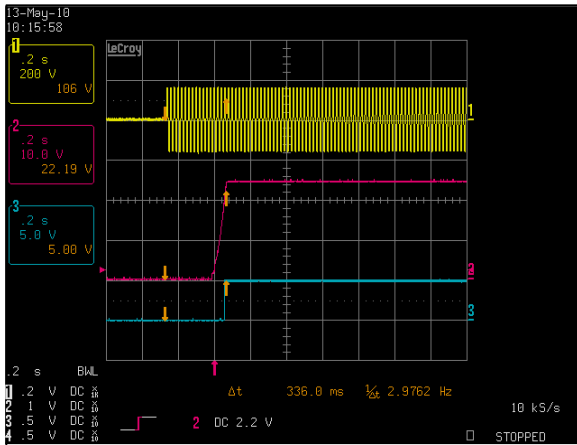


Figure 11: ADN10-24-1PM-C Turn-on delay by AC Mains  
 Vin = 115Vac Load: I<sub>o</sub> = 10.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

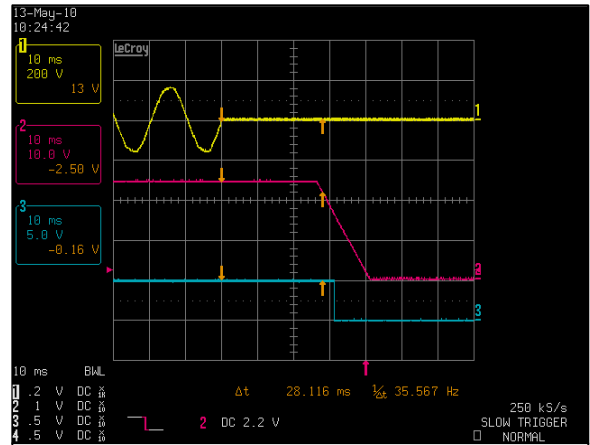


Figure 12: ADN10-24-1PM-C Hold-up Time (time to decay)  
 Vin = 115Vac Load: I<sub>o</sub> = 10.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

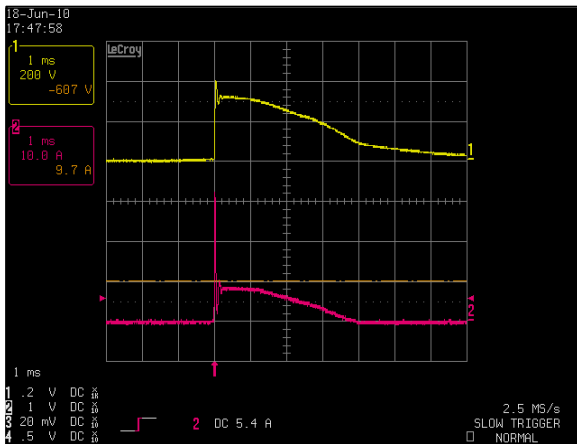


Figure 13: ADN10-24-1PM-C Inrush Current  
 Vin = 230Vac Load: I<sub>o</sub> = 0A, Turn on at 90 deg  
 Ch 1: V<sub>IN</sub> Ch 2: I<sub>IN</sub>

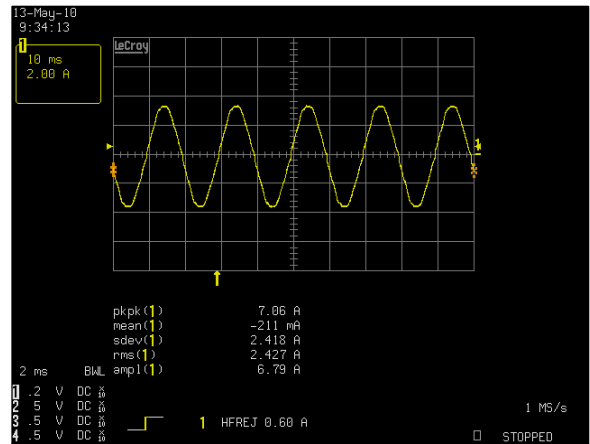


Figure 14: ADN10-24-1PM-C Input Current Waveform  
 Vin = 115Vac Load: I<sub>o</sub> = 10.0A  
 Ch 1: I<sub>IN</sub>

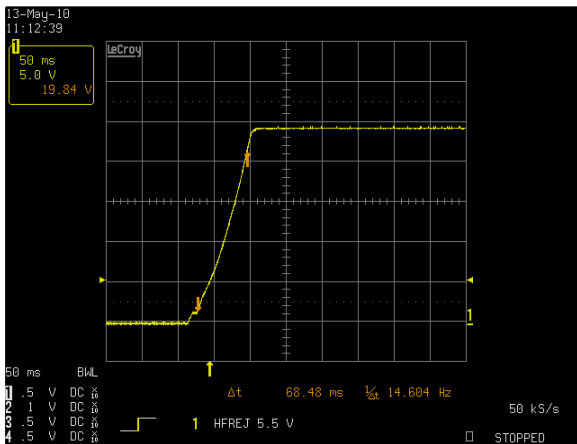


Figure 15: ADN10-24-1PM-C Output Voltage Startup Waveform  
 Vin = 90Vac Load: I<sub>o</sub> = 10.0A  
 Ch 1: V<sub>o</sub> Output Capacitance = 330uF/A

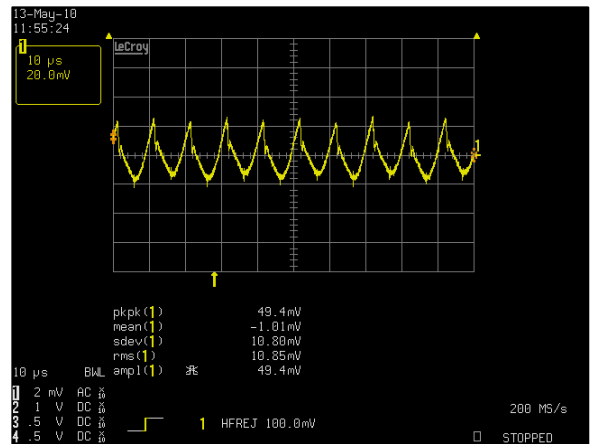


Figure 16: ADN10-24-1PM-C Ripple and Noise Measurement  
 Vin = 115Vac Load: I<sub>o</sub> = 10.0A  
 Ch 1: V<sub>o</sub>



# ELECTRICAL SPECIFICATIONS

## ADN10-24-1PM-C Performance Curves

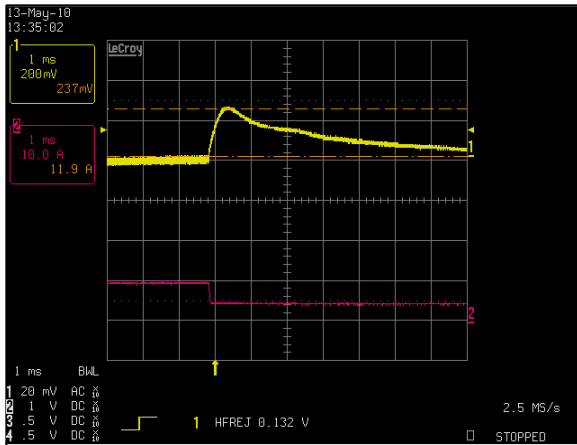


Figure 17: ADN10-24-1PM-C Transient Response – Vo Deviation  
 Vin = 115Vac Load: Io = 100% to 50%, 1A/us slew rate  
 Ch 1: Vo Ch 2: Io

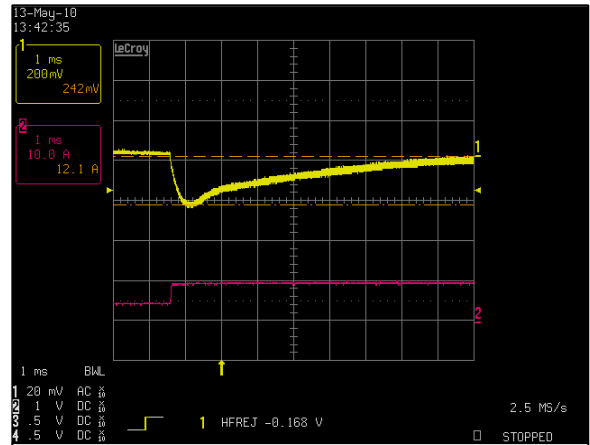


Figure 18: ADN10-24-1PM-C Transient Response – Vo Deviation  
 Vin = 115Vac Load: Io = 50% to 100%, 1A/us slew rate  
 Ch 1: Vo Ch 2: Io

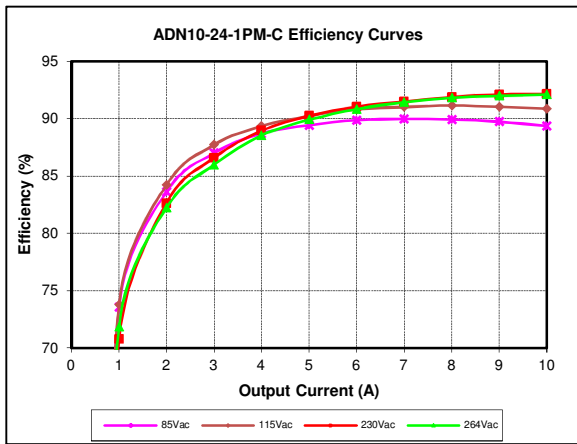


Figure 19: ADN10-24-1PM-C Efficiency Curves @ 25 degC  
 Convection Cooling  
 Vin = 85 to 264Vac Load: Io = 0 to 10.0A

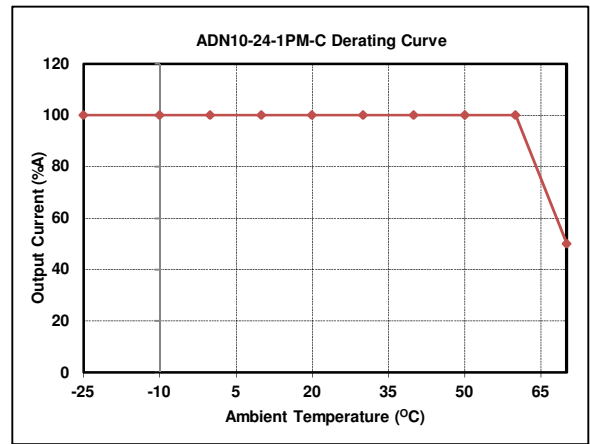


Figure 20: ADN10-24-1PM-C Derating Curve  
 Vin = 115Vac Load: Io = 10.0A

# ELECTRICAL SPECIFICATIONS

## ADN20-24-1PM-C Performance Curves

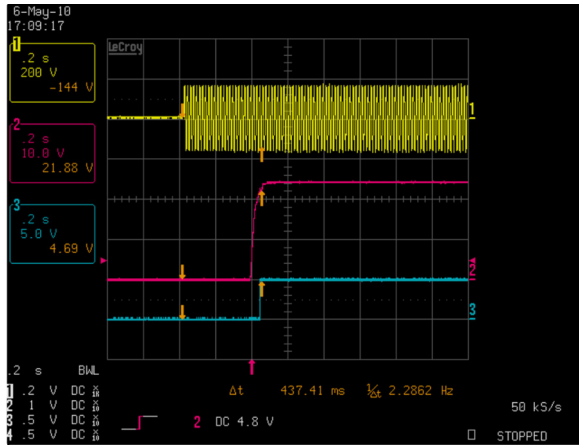


Figure 21: ADN20-24-1PM-C Turn-on delay by AC Mains  
 Vin = 115Vac Load: I<sub>o</sub> = 20.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

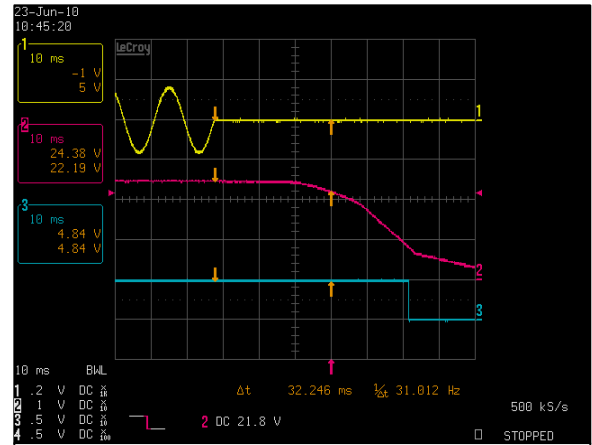


Figure 22: ADN20-24-1PM-C Hold-up Time (time to decay)  
 Vin = 115Vac Load: I<sub>o</sub> = 20.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

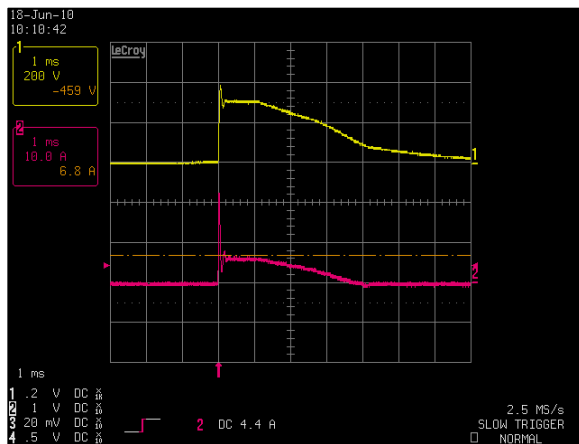


Figure 23: ADN20-24-1PM-C Inrush Current  
 Vin = 230Vac Load: I<sub>o</sub> = 0A, Turn on at 90 deg  
 Ch 1: V<sub>IN</sub> Ch 2: I<sub>IN</sub>

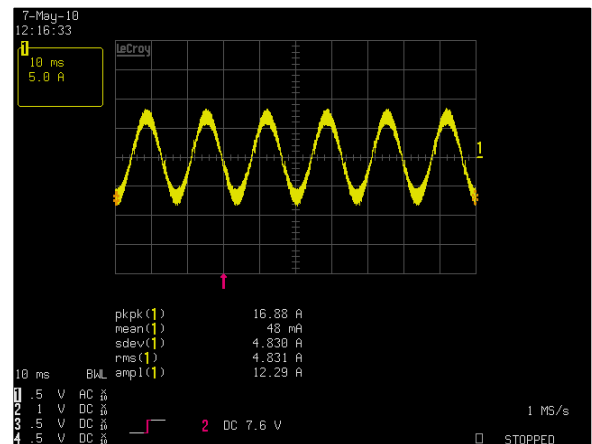


Figure 24: ADN20-24-1PM-C Input Current Waveform  
 Vin = 115Vac Load: I<sub>o</sub> = 20.0A  
 Ch 1: I<sub>IN</sub>

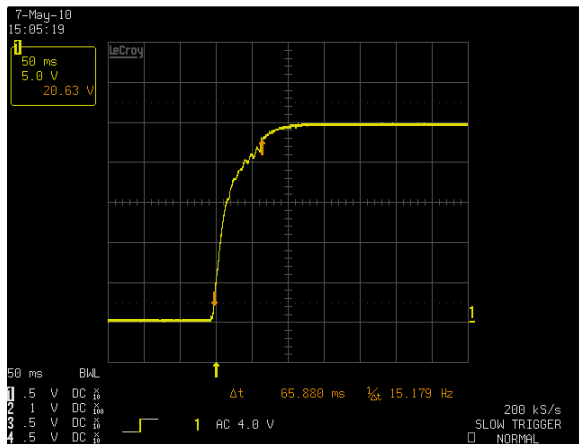


Figure 25: ADN20-24-1PM-C Output Voltage Startup Waveform  
 Vin = 90Vac Load: I<sub>o</sub> = 20.0A  
 Ch 1: V<sub>o</sub> Output Capacitance = 330uF/A

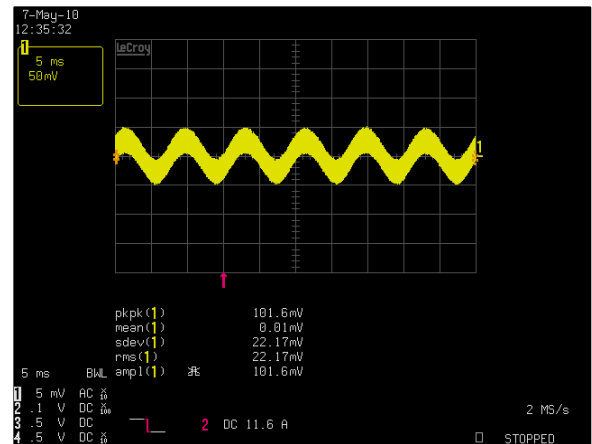
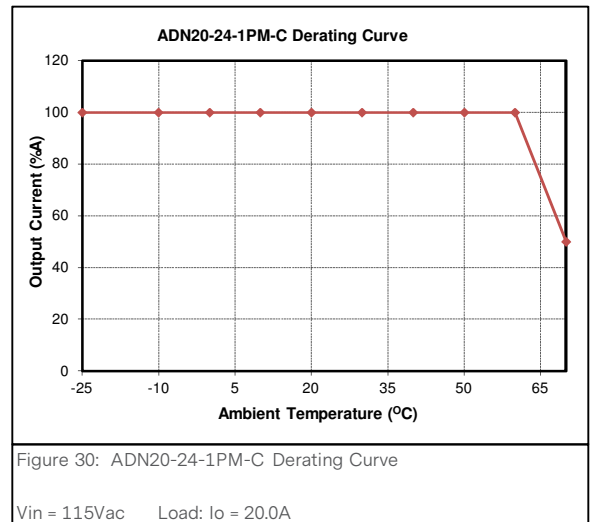
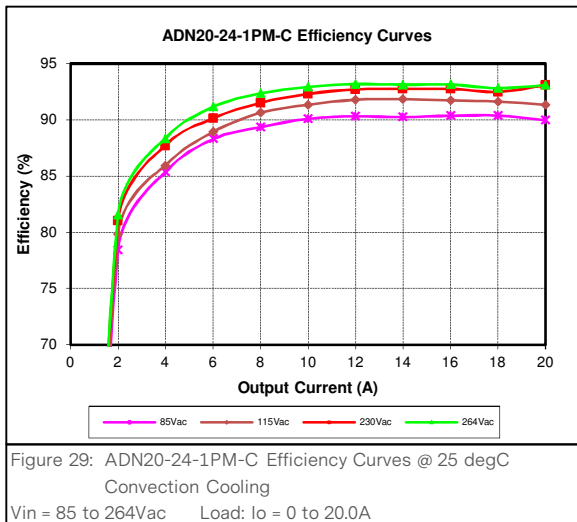
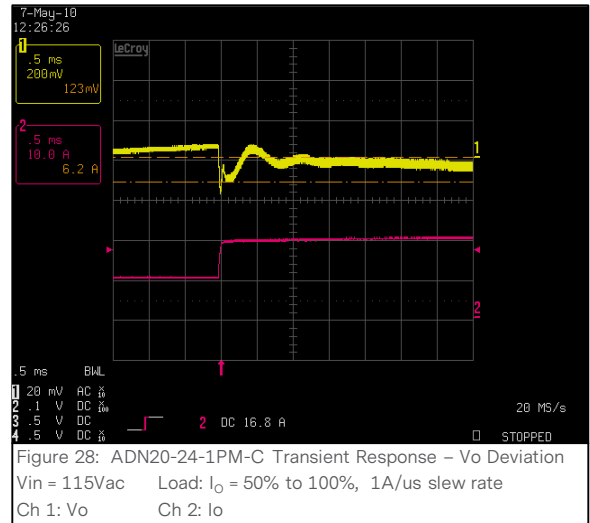
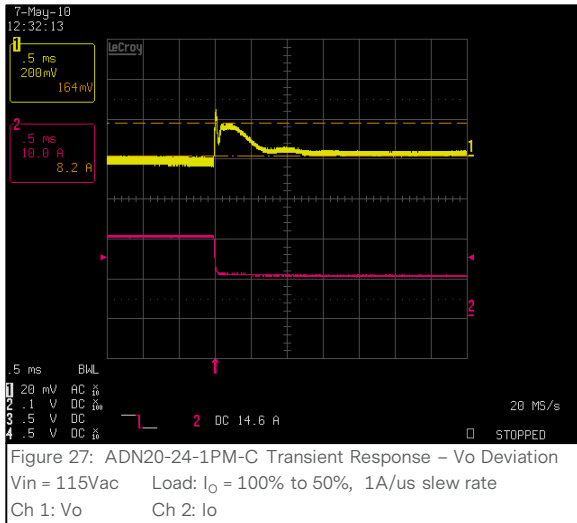


Figure 26: ADN20-24-1PM-C Ripple and Noise Measurement  
 Vin = 115Vac Load: I<sub>o</sub> = 20.0A  
 Ch 1: V<sub>o</sub>

# ELECTRICAL SPECIFICATIONS

## ADN20-24-1PM-C Performance Curves



# ELECTRICAL SPECIFICATIONS

## ADN40-24-1PM-C Performance Curves

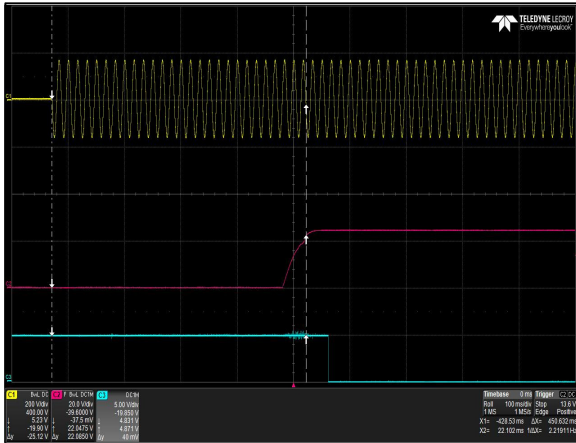


Figure 31: ADN40-24-1PM-C Turn-on delay by AC Mains  
 Vin = 115Vac Load: I<sub>o</sub> = 40.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

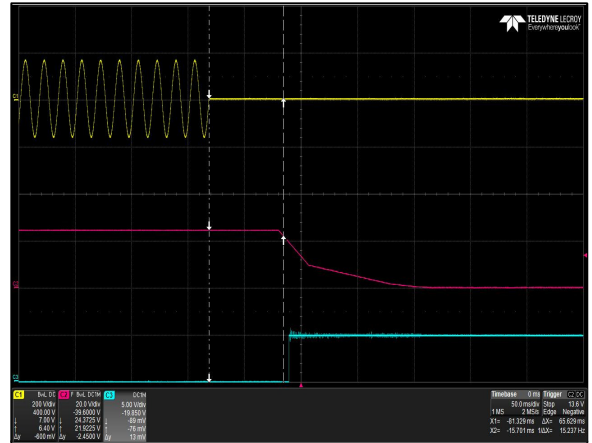


Figure 32: ADN40-24-1PM-C Hold-up Time (time to decay)  
 Vin = 115Vac Load: I<sub>o</sub> = 40.0A  
 Ch 1: V<sub>IN</sub> Ch 2: V<sub>o</sub> Ch 3: DCOK

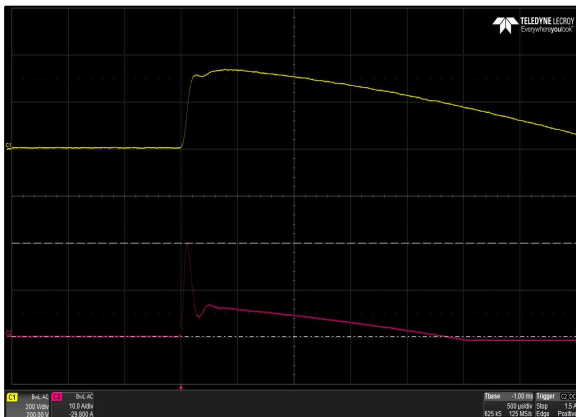


Figure 33: ADN40-24-1PM-C Inrush Current  
 Vin = 230Vac Load: I<sub>o</sub> = 0A, Turn on at 90 deg  
 Ch 1: V<sub>IN</sub> Ch 2: I<sub>IN</sub>

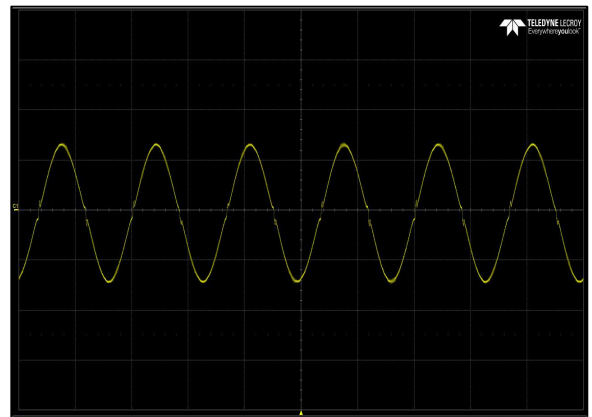


Figure 34: ADN40-24-1PM-C Input Current Waveform  
 Vin = 115Vac Load: I<sub>o</sub> = 40.0A  
 Ch 1: I<sub>IN</sub>

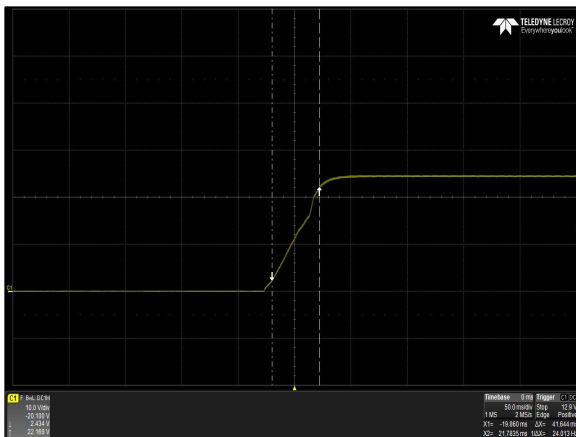


Figure 35: ADN40-24-1PM-C Output Voltage Startup Waveform  
 Vin = 90Vac Load: I<sub>o</sub> = 40.0A  
 Ch 1: V<sub>o</sub> Output Capacitance = 330uF/A

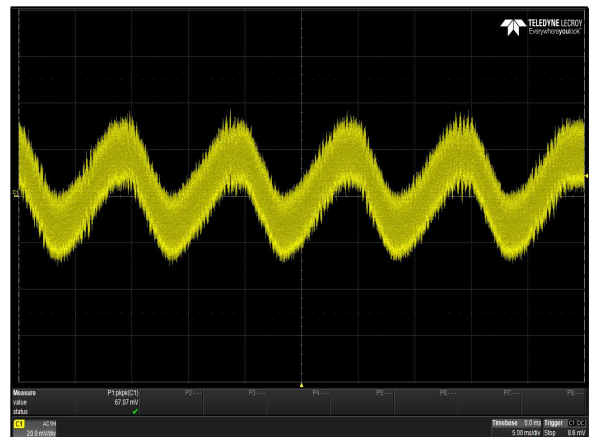


Figure 36: ADN40-24-1PM-C Ripple and Noise Measurement  
 Vin = 115Vac Load: I<sub>o</sub> = 40.0A  
 Ch 1: V<sub>o</sub>

ELECTRICAL SPECIFICATIONS

ADN40-24-1PM-C Performance Curves

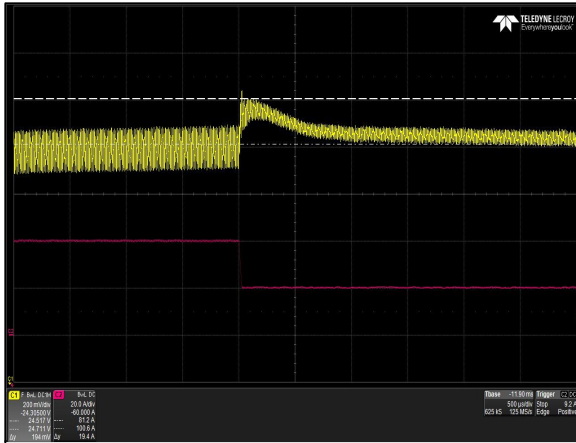


Figure 37: ADN40-24-1PM-C Transient Response – Vo Deviation  
 Vin = 115Vac Load: I<sub>o</sub> = 100% to 50%, 1A/us slew rate  
 Ch 1: Vo Ch 2: Io

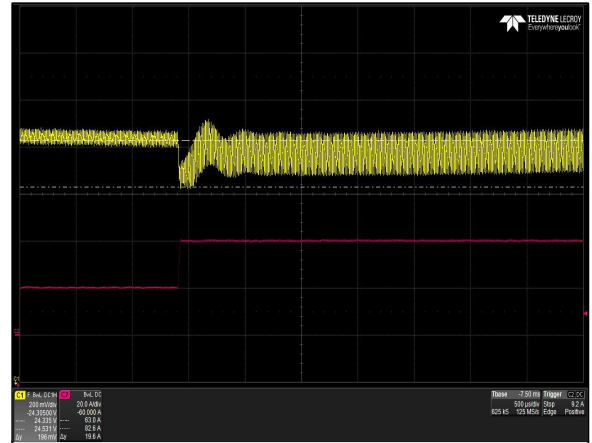


Figure 38: ADN40-24-1PM-C Transient Response – Vo Deviation  
 Vin = 115Vac Load: I<sub>o</sub> = 50% to 100%, 1A/us slew rate  
 Ch 1: Vo Ch 2: Io

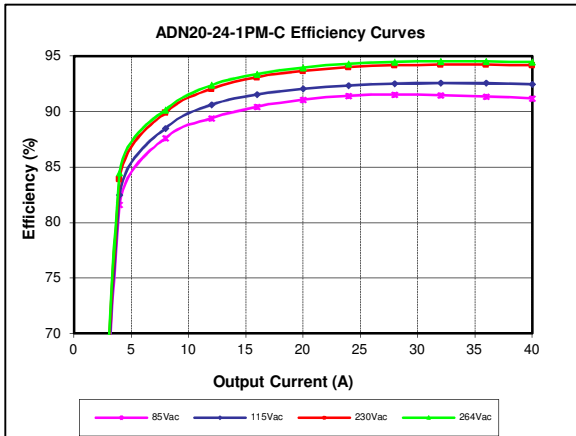


Figure 39: ADN40-24-1PM-C Efficiency Curves @ 25 degC  
 Convection Cooling  
 Vin = 85 to 264Vac Load: I<sub>o</sub> = 0 to 40.0A

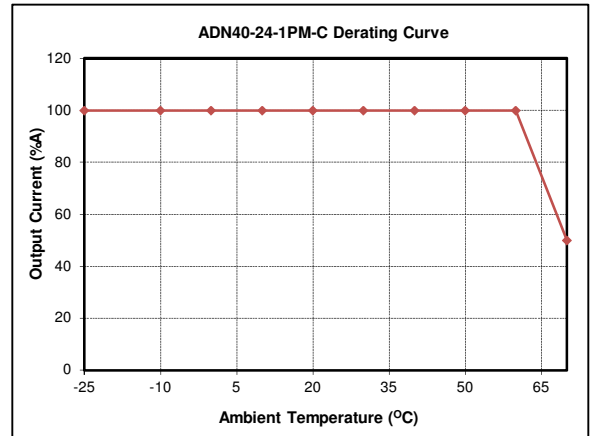


Figure 40: ADN40-24-1PM-C Derating Curve  
 Vin = 115Vac Load: I<sub>o</sub> = 40.0A

## ELECTRICAL SPECIFICATIONS

### Protection Function Specifications

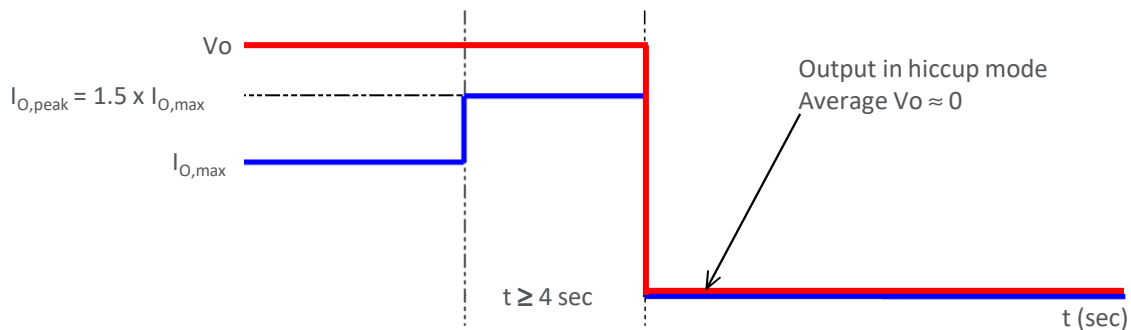
#### Over Voltage Protection (OVP)

The power supply main Vo output will shutdown and auto recover after remove output over voltage.

Parameter	Min	Typ	Max	Unit
24V Output Overvoltage	30.5	/	33.0	V

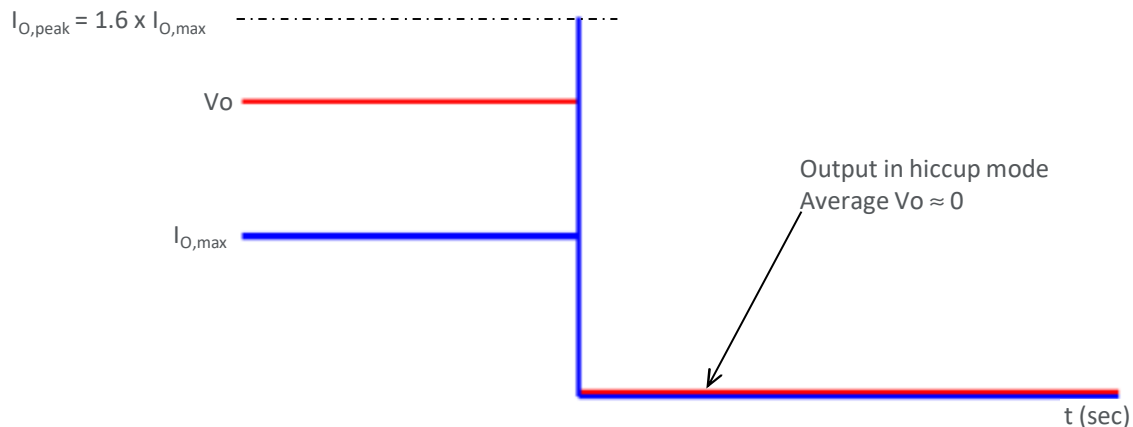
#### Over Current Protection and PowerBoost™

With PowerBoost™, the ADN-C power supplies can supply a higher output current for a short period of time without the output voltage breaking down. When an overload occurs, the output current can increase up to 1.5 times its nominal rating for four seconds. If the overload lasting for longer than 4 seconds, the power supply will go into hiccup mode for protection. Refer to PowerBoost™ diagram below for details.



#### Short Circuit Protection (SCP)

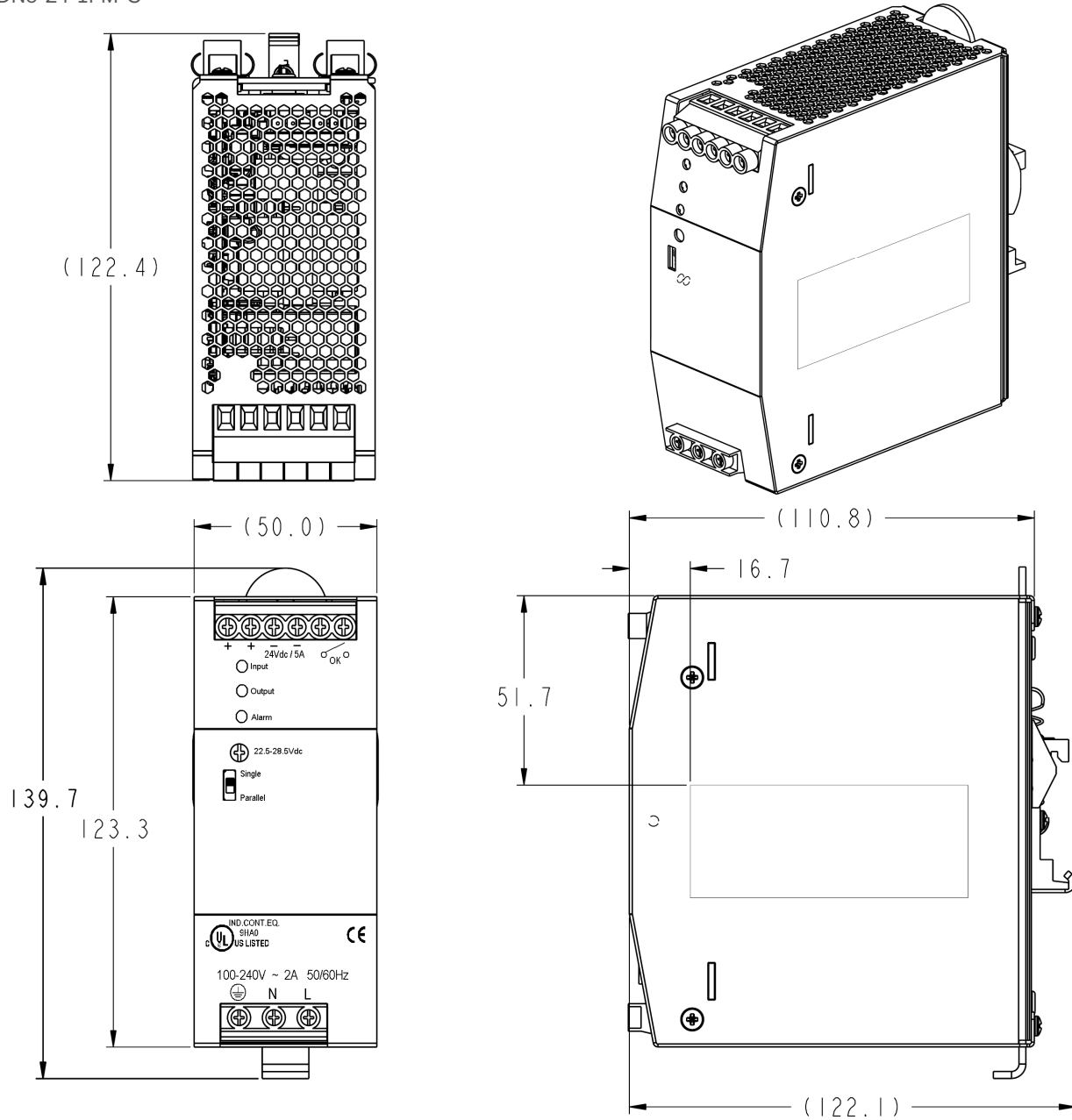
The ADN-C series power supply is protected against short circuit to its output. A short circuit is defined as 0.03 ohm resistance or less between the output terminals. When a short circuit condition occurs, the output current can reach 160% of the rated current or higher, the output will shut off immediately and goes into hiccup mode.



# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning and Mounting Locations)

ADN5-24-1PM-C

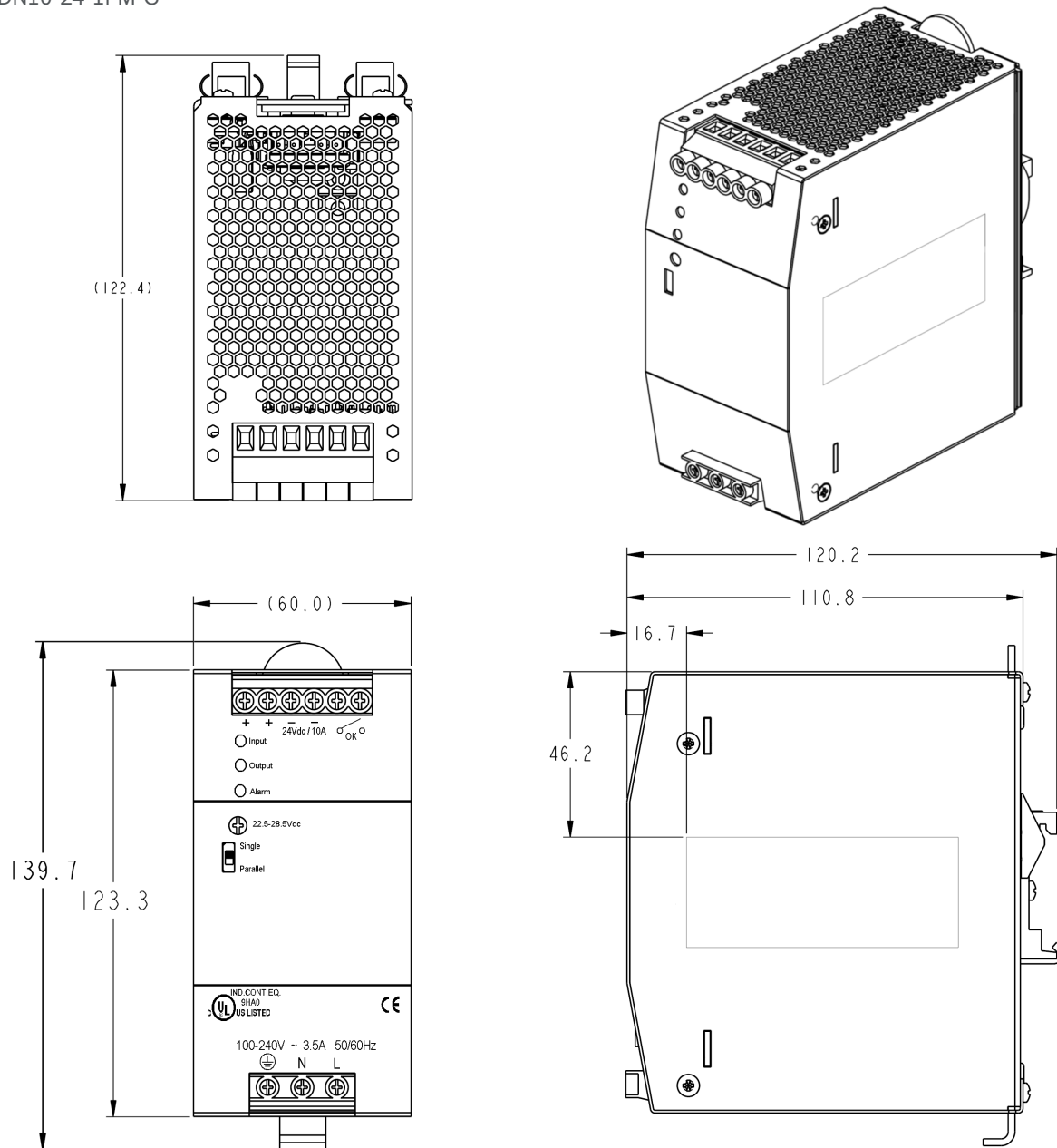


Note: All dimensions in mm.

# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning and Mounting Locations)

ADN10-24-1PM-C



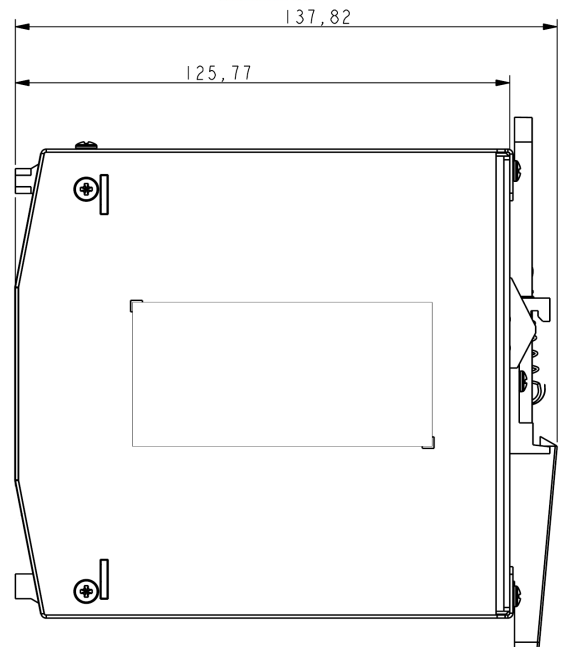
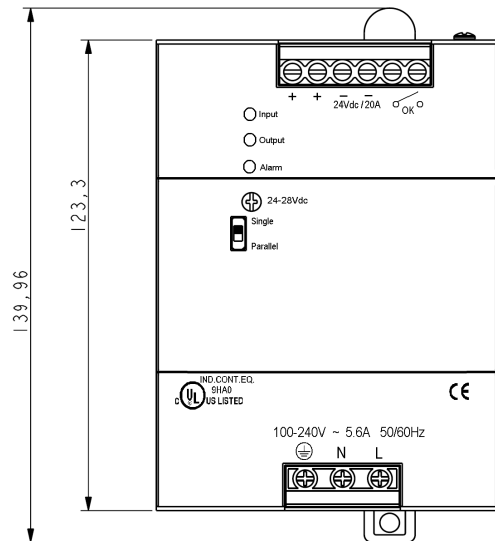
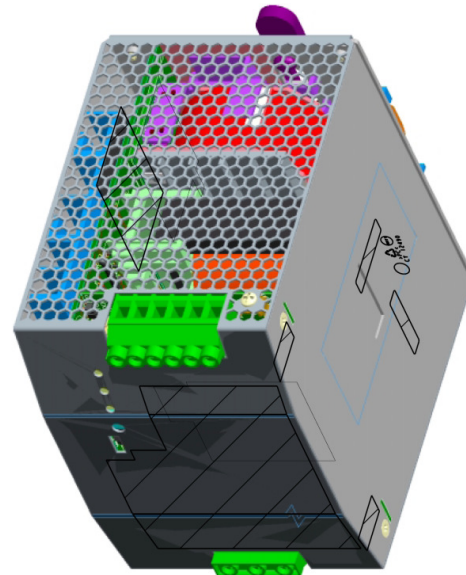
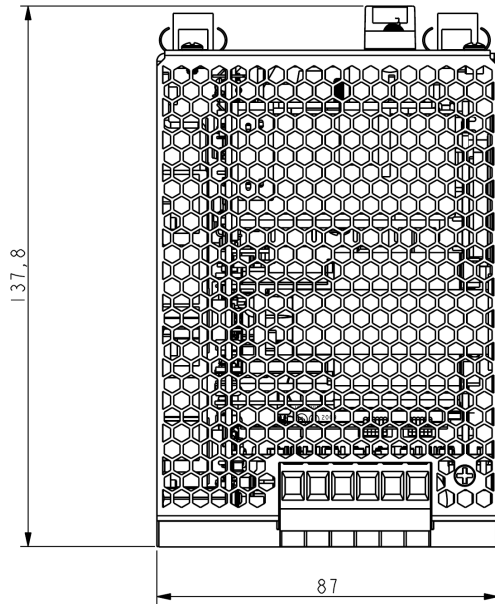
Note: All dimensions in mm.



# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning and Mounting Locations)

ADN20-24-1PM-C

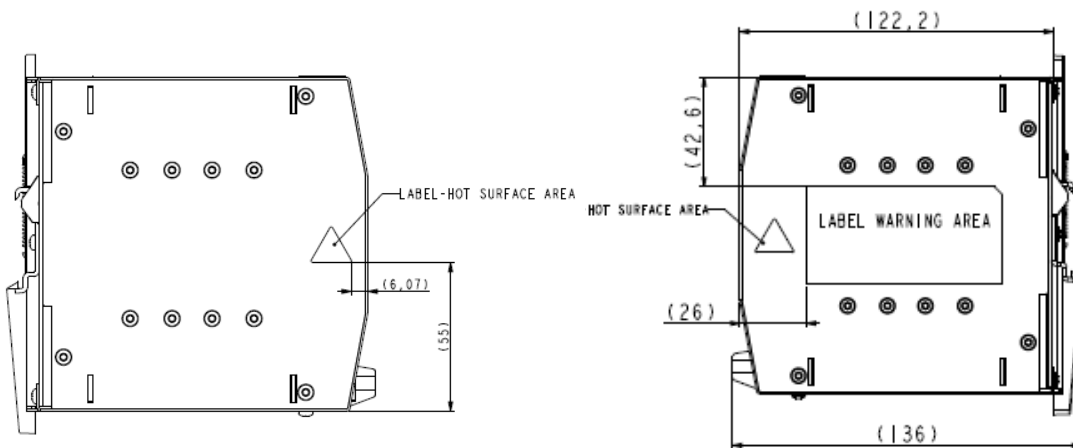
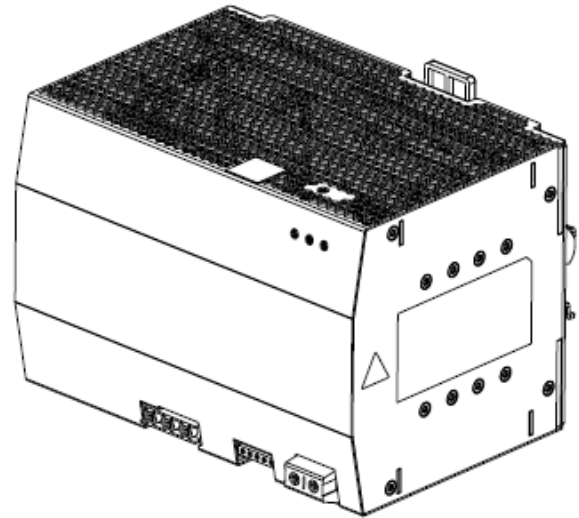
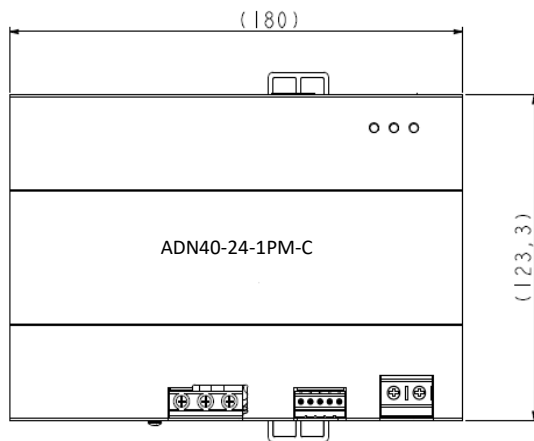


Note: All dimensions in mm.

# MECHANICAL SPECIFICATIONS

## Mechanical Outlines (Dimensioning and Mounting Locations)

ADN40-24-1PM-C



Note: All dimensions in mm.

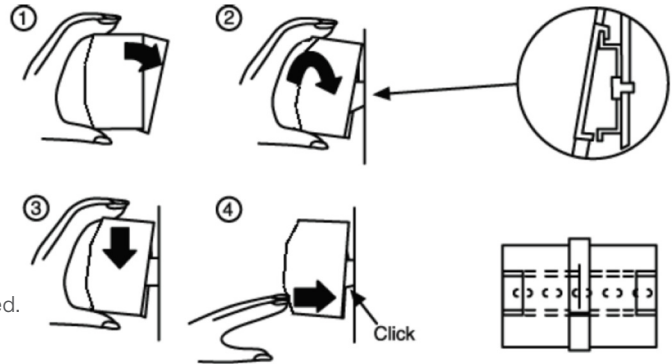
# MECHANICAL SPECIFICATIONS

## Mounting

DIN rail mounting:

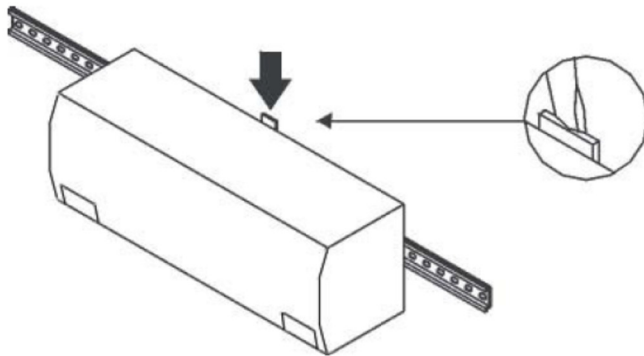
(DIN TS35/7.5 or TS35/15 rail system)

1. Tilt unit slightly backwards
2. Put it onto the DIN Rail
3. Push downwards until stopped
4. Push at the lower front edge to lock
5. Shake the unit slightly to ensure that the retainer has locked.



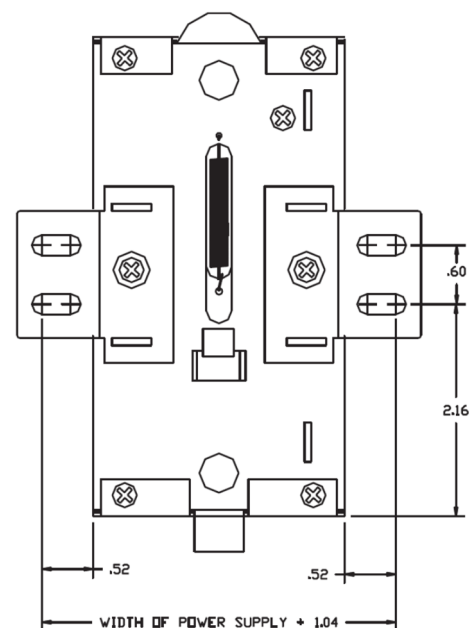
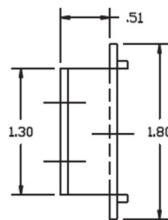
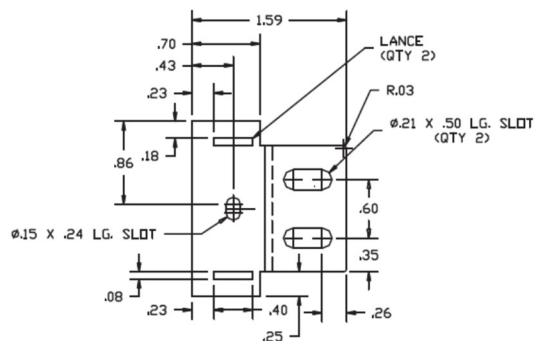
Alternative Panel Mount: Using the optional accessory, the unit can be screw mounted to a panel.

Detachment from DIN rail:



Chassis mounting:

Instead of mounting on DIN rail, a ADN-C series power supply can also be attached to chassis by using two metal brackets, which replace the existing two aluminum profiles.

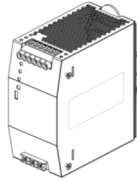


## MECHANICAL SPECIFICATIONS

### Mounting Orientations

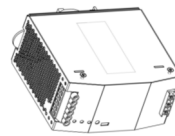
#### Vertical (Standard)

- AC Input connector on TOP
- LED indicators face FRONT
- No derating required



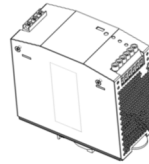
#### Horizontal (Sideways mount)

- AC Input and Output connectors on horizontal plane
- LED indicators face FRONT
- Maximum output = 50% rated output current



#### Top Mount (Front side up)

- LED indicators face UP
- Maximum output = 50% rated output current



### Mounting Space

Free space (minimum)

ADN5-24-1PM-C / ADN10-24-1PM-C

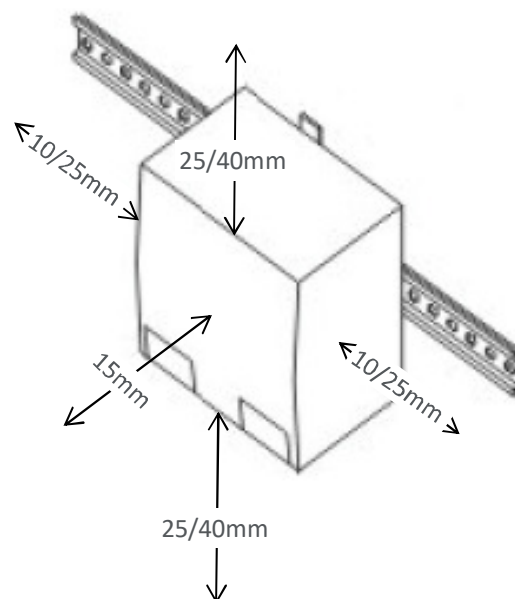
ADN20-24-1PM-C

ADN40-24-1PM-C

- 15mm in front, 25mm above and below, 10mm left and right

- 15mm in front, 40mm above and below, 10mm left and right

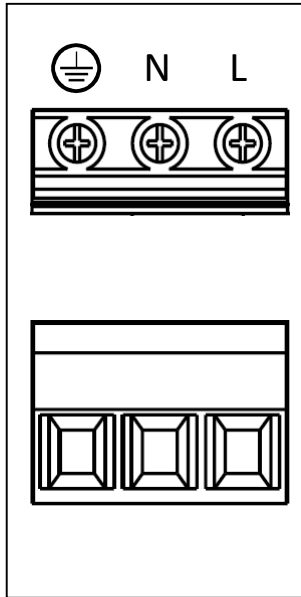
- 15mm in front, 25mm above and below, 25mm left and right



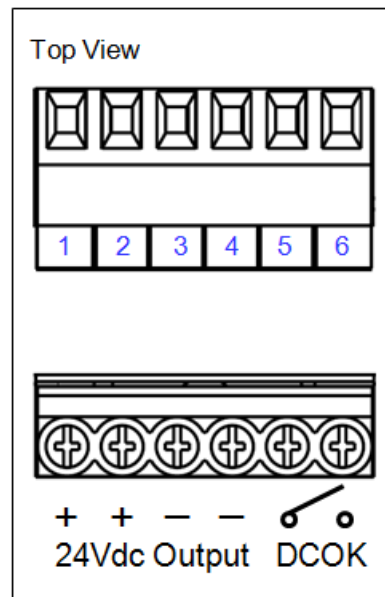
# MECHANICAL SPECIFICATIONS

## Connector Definitions

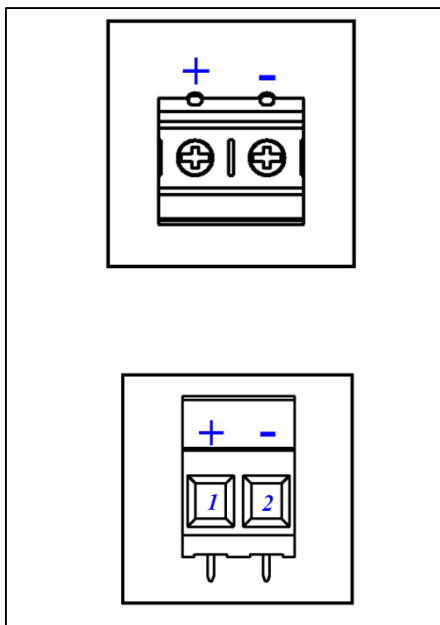
AC Input Connector



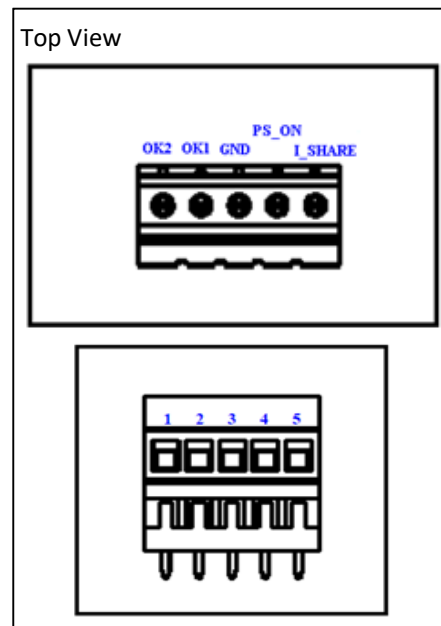
Output Connector



Output Connector (For ADN40 only)



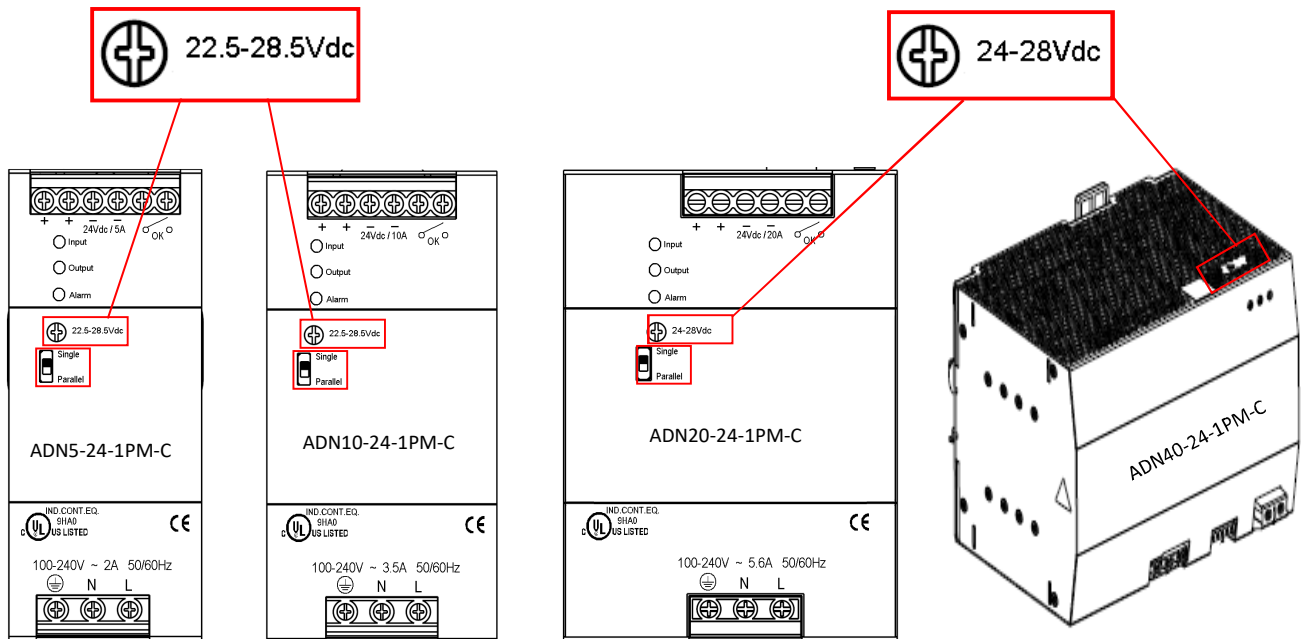
Signal Connector (For ADN40 only)



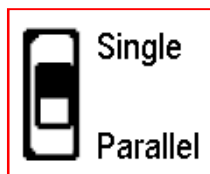
## MECHANICAL SPECIFICATIONS

### Switches and Potentiometer Definitions

Vo adjustment - The output of the ADN-C series power supply can be adjusted from its nominal output voltage via the front trim pot screw. Clockwise rotation will increase the output voltage while counterclockwise rotation will decrease the output voltage.



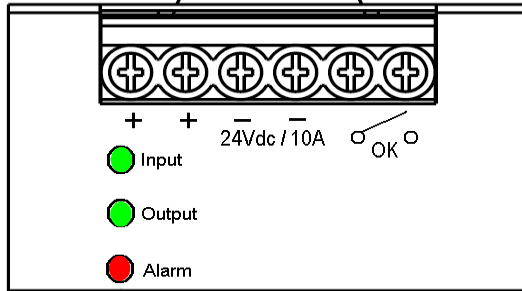
Single / Parallel switch - The outputs of two or more of ADN-C series power supplies can be connected in parallel to increase the total current capability. When operate the ADN-C power supplies in parallel, the Single / Parallel switch on each of the ADN-C power supply should be placed in the parallel position. Units will not be damaged by parallel operation (regardless of switch position setting)



## MECHANICAL SPECIFICATIONS

### LED Indicator Definitions

Three user-friendly LEDs for status and diagnostics shows status of input power, output power and alarm condition. Valuable troubleshooting aid to reduce system downtime.



LED	Normal	ACoor	DCHL	DC Fail	AC Fail	Overload	OTPending	OTShutdown
Input	Green	Amber	Green	Green	Off	Green	Green	Green
Output	Green	Green	Amber	Off	Off	Amber	Green	Off
Alarm	Off	Off	Amber	Red	Off	Red	Amber	Amber

Normal - AC input in range and DC output OK

ACoor - AC out of Range. AC input < 85Vac

DCHL - DC Heavy Load. Output current > 90% of Nominal load current

DC Fail - DC Failure. Output shutdown, but AC is good

AC Fail - AC Failure. AC failure leading to output failure

Overload - DC failure due to overcurrent. Output current > 110% of Nominal load current

OTPending - Over Temperature Pending. Unit near OTP shutdown

OTShutdown - Over Temperature Shutdown. Unit shutdown due to OTP

## MECHANICAL SPECIFICATIONS

### Weight

ADN5-24-1PM-C	- 1.10 lb (0.50kg)
ADN10-24-1PM-C	- 1.98 lb (0.90kg)
ADN20-24-1PM-C	- 2.60 lb (1.20kg)
ADN40-24-1PM-C	- 6.00 lb (2.75kg)



## MECHANICAL SPECIFICATIONS

### Power / Signal Mating Connectors and Pin Types

Table 4. Connectors on AND-C Series			
Reference		Description	Wire Size
Input AC Connector	All models	3-Pole, 9.52mm Pitch, Euro Type, Cage Clamp Terminal Block	16 to 10 AWG (1.5 to 6 mm <sup>2</sup> ) solid wire
Output Connector	ADN5-24-1PM-C ADN10-24-1PM-C ADN20-24-1PM-C	6-Pole, 6.35mm Pitch, Euro Type, Cage Clamp Terminal Block	16 to 10 AWG (1.5 to 6 mm <sup>2</sup> ) solid wire
	ADN40-24-1PM-C	2-Pole, 10.16mm Pitch, Euro Type, Cage Clamp Terminal Block	7 to 6 AWG (10.6 to 13 mm <sup>2</sup> ) solid wire
Signal Connector	ADN40-24-1PM-C	5-Pole, 3.81mm Pitch, Euro Type, Cage Clamp Terminal Block	30 to 14 AWG (0.05 to 2 mm <sup>2</sup> ) solid wire

## POWER AND CONTROL SIGNAL DESCRIPTIONS

### AC Input (SK1)

This connector supplies the AC Mains to the AND-C series power supply.

- Pin 1 – Earth Ground (Safety Ground)
- Pin 2 – Neutral
- Pin 3 – Line

### Output Connector

These terminals provide the main output for the ADN-C power supply and the DCOK contact output.

- Pin 1 & 2 - (+) 24V Output (Vo)
- Pin 3 & 4 - (-) 24V Output (Vo Return)
- Pin 5 & 6 - DCOK

The Vo and the Vo Return terminals are the positive and negative rails, respectively of the main output of the ADN-C series power supply. The Main Output is electrically isolated from the Earth Ground and can be operated as a positive or negative output.

### DCOK – (Pin 5 and Pin 6)

DCOK is a dry relay contact output capable of switching up to a maximum of 0.2A / 50Vdc .

- Relay contact close - DC OK - Output 24V available
- Relay contact open - DC Fail - Output 24V failed

### Signal Connector (ADN40 only)

Signal Connector (ADN40 only)

- Pin 1 - OK2 (DC OK2 Signal)
- Pin 2 - OK1 (DC OK1 Signal)
- Pin 3 - GND (Ground)
- Pin 4 - PS\_ON (Active low remote power on)
- Pin 5 - I\_SHARE (Share voltage at parallel operation)

## ENVIRONMENTAL SPECIFICATIONS

### EMC Immunity

ADN-C series power supply is designed to meet the following EMC immunity specifications.

Table 5. Environmental Specifications	
Document	Description
EN55011, Class B	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radiofrequency equipment
EN55032, Radiated and Conducted including Annex A	Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
EN61000-3-2	EMC limits for harmonic current emissions for equipment with input current up to and including 16A per phase
EN61000-6-3: 2001	EMC Emission standard for residential, commercial and light industrial environments
EN61000-6-1: 2001	Immunity Standard for Residential, Commercial and Light-Industrial Environments
EN61000-6-2: 2001	Immunity Standard for Industrial Environments
EN61000-4-2 Level 4	ESD, Electrostatic Discharge
EN61000-4-3 Level 3	Radiated, radio-frequency, electromagnetic field immunity test
EN61000-4-4 Level 4 input EN61000-4-4 Level 3 output	Electrical Fast Transient/Burst Immunity Test
EN61000-4-5 Isolation Class 4	Surge immunity test
EN61000-4-6 Level 3	Immunity to conducted disturbances, induced by radio-frequency fields
EN61000-4-11	EMC standard is applicable to power supplies whose input current ( $I_{IN}$ ) is below 16A
IEC 61000-4-34	Voltage dip immunity standard
SEMI F47 Sag Immunity	

## ENVIRONMENTAL SPECIFICATIONS

### Safety Certifications

The ADN-C series is suitable for use in Class I, Division 2, Groups A, B, C, and D hazardous locations or non-hazardous locations only.

Table 6. Safety Certifications for ADN-C Series Power Supply System	
Document	Description
UL508 Listed, cULus	Standard for Industrial Control Equipment
UL60950-1, cRUus	Safety of information Technology Equipment
IEC/EN60950-1	Safety of information Technology Equipment
ATEX Certification	Class 1, Division 2 hazardous location, Groups A, B, C, D w/ T3A temp class up to 40°C Ambient
CB Certificate and Report	(All CENELEC Countries)
CE Mark	LVD (73/23 & 2004/108/EC) EMC (89/336 & 93/68/EEC)
IEC536	Protection Class 1
IEC60529	IP20
IEC60950-1	SELV

## ENVIRONMENTAL SPECIFICATIONS

### Storage and Shipping Temperature / Humidity

The ADN-C series power supplies can be stored or shipped at temperatures between -40°C to +85°C and relative humidity from 0% to 95% non-condensing.

### Altitude

The ADN-C series will operate within specifications at altitudes up to 10,000 feet above sea level.

### Humidity

The ADN-C series will operate within specifications when subjected to a relative humidity from 5% to 95% non-condensing. The ADN-C series can be stored in a relative humidity from 0% to 95% non-condensing.

### Vibration

The ADN-C series power supply will pass the following vibration specifications:

Vibration  Operating	ADN5-24-1PM-C	Accordance to Vibration (Sinusoidal) per IEC 68-2-6 0.15 gravity (g) peak, 5–500 Hz (swept sine); 5–500 Hz(random); vertical axis only
	ADN10-24-1PM-C	4.0 gravity (g) peak, 10–2000 Hz (random); 3 axes for 20 mins. each per IEC 60068-2-6
	ADN20-24-1PM-C	15 gravity (g) peak, 5–500 Hz (swept sine); 5–500 Hz (random); vertical axis only
	ADN40-24-1PM-C	Accordance to Vibration (Sinusoidal) per IEC 60068-2-6 0.21 gravity (g) peak, 5–500 Hz (swept sine); 5–500 Hz (random); vertical axis only

### Shock

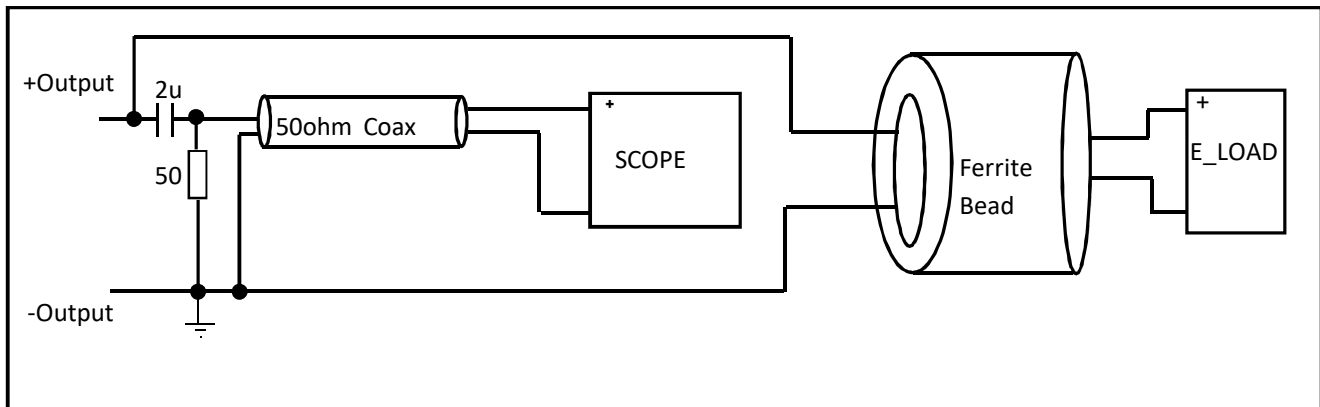
The ADN-C series power supply will pass the following vibration specifications:

Shock  Operating	ADN5-24-1PM-C	Accordance to IEC 68-2-27 3g peak, 11 milliseconds half-sine pulse
	ADN10-24-1PM-C	15g peak, 11 milliseconds per IEC 60068-2-6
	ADN20-24-1PM-C	3g peak, 11 milliseconds half-sine pulse
	ADN40-24-1PM-C	30g peak, 11 milliseconds half-sine pulse based on QP4205

## APPLICATION NOTES

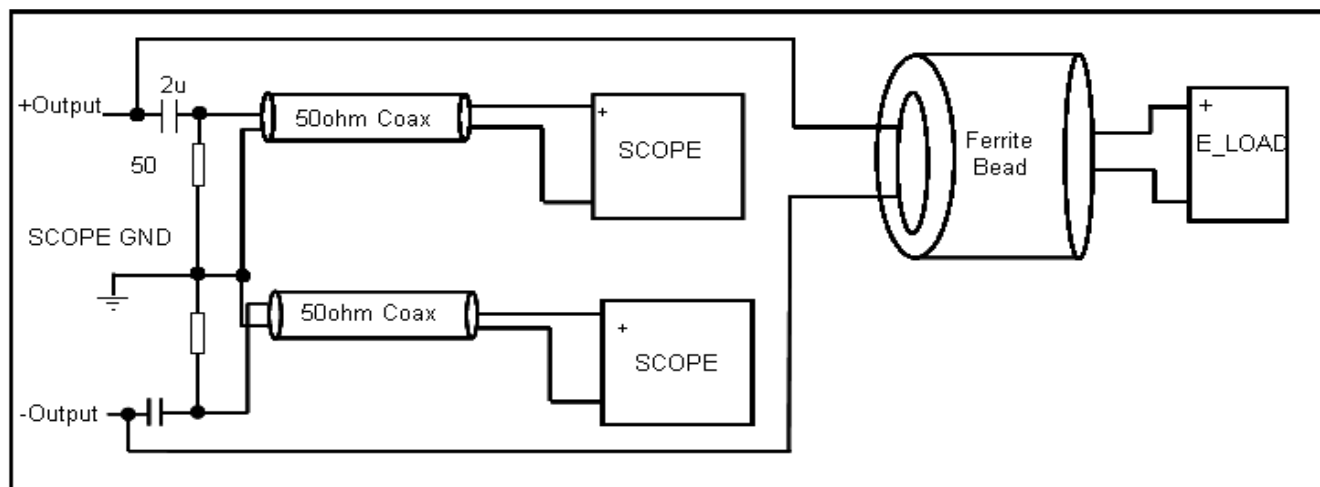
### Output Ripple and Noise Measurement

The setup outlined in the diagram below has been used for output voltage ripple and noise measurements on the ADN Series. When measuring output ripple and noise, the scope is connected to the circuit via an RGU58-50Ω cable. One side is BNC and the other is soldered to the PCB. Shield is grounded. Oscilloscope should be set to 50Ω input with 20 MHz bandwidth for this measurement.



### Common-Mode Noise

The setup outlined in the diagram below has been used for output voltage common-mode noise measurements on the ADN Series. The measurements are made individually (+) to GND or (-) to GND. The scope is connected to the circuit via an RGU58-50Ω cable. One side is BNC and the other is soldered to the PCB. Shield is grounded. Oscilloscope should be set to 50Ω input with 20 MHz bandwidth for this measurement.



**RECORD OF REVISION AND CHANGES**

Issue	Date	Description	Originators
1.0	12.09.2015	First Issue	A. Zhang
1.1	04.10.2020	Update the product logo	A. Zhang
1.2	04.30.2020	Update the MTBF data	K. Wang
1.3	10.19.2020	Update isolation spec	K. Wang



For international contact information,  
visit [advancedenergy.com](http://advancedenergy.com).

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[productsupport.ep@aei.com](mailto:productsupport.ep@aei.com) (Technical Support)  
+1 888 412 7832

## **ABOUT ADVANCED ENERGY**

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Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

## **PRECISION | POWER | PERFORMANCE**

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