For information on Bulletin Numbers 1321-3R* Series D or later and 1321-RWR Series B or later, see 1321 Power Conditioning Products, publication 1321-TD001.

Technical Data

Original Instructions

1321-3R* and 1321-RWR Power Conditioning Products

Bulletin Numbers 1321-3R Series A, B, C; 1321-3RA Series A, B, C; 1321-3RB Series A, B, C; 1321-RWR Series A

Don't Ignore the Cost of Power Line Disturbance

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

These labels may also be on or inside the equipment to provide specific precautions.

SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

The following icon may appear in the text of this document.

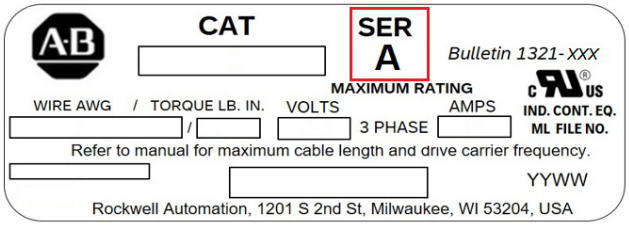
Identifies information that is useful and can help to make a process easier to do or easier to understand.

Product Overview

Allen-Bradley® line reactors help keep equipment running longer by absorbing many of the power line disturbances that can shut down your drive. Allen-Bradley isolation transformers can provide both voltage change and isolation for your variable speed drive. These designs are harmonic compensated and insulated gate bi-polar transistor (IGBT) protected to help assure optimum performance in the presence of harmonics.

IMPORTANT This publication covers several series of products. Verify your series letter before you begin.

Example Product Label with Product Series Location



PRODUCT ID LABEL RWR

Storage Guidelines

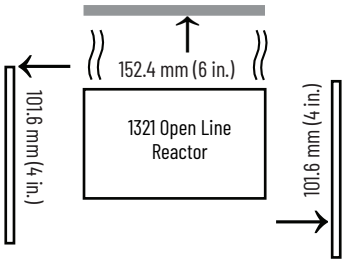
1321 Line Reactor products that are not installed and energized immediately should follow the storage guidelines. Following these guidelines will help reduce the appearance of oxidation from forming on the laminate surface and edges.

- Do not remove the protective packaging.
- Do not store the product outdoors or in an unprotected area.
- Do not store the product in an area where it is exposed to a corrosive atmosphere.
- Do not store the product where condensation could occur.
- Store the product in a climate-controlled building with adequate air circulation.
- Store the product in a clean, dust free, and dry atmosphere.
- Maintain a relative humidity level of less than 60% non-condensing.
- Limit rate of relative humidity change to less than 10% per hour.
- Store products on a vapor barrier membrane to help prevent water vapor migration.

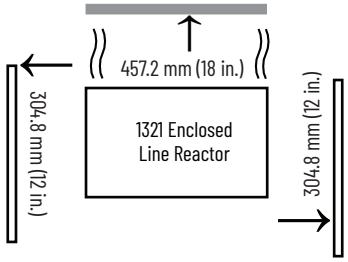
ATTENTION: The presence of oxidation does not indicate performance issues.

Mounting Clearance

The ventilation clearance on open line reactors must have a minimum of 101.6 mm (4 in.) from all surfaces, such as walls and other equipment. The figure that follows shows the minimum mounting clearance.



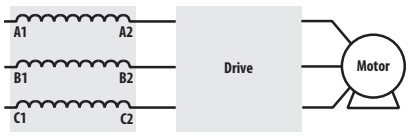
For the enclosed version of the line reactor, the ventilation clearance must have a minimum of 304.8 mm (12 in.) from all surfaces, such as walls and other equipment. The figure that follows shows the minimum mounting clearances.



1321-3R, 1321-3RA, and 1321-3RB Series A, B, C Line Reactors

The diagrams that follow show how to apply the Allen-Bradley Line Reactors.

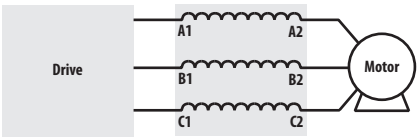
At the Input of the Drive



At the input of a drive, a line reactor helps protect against surges or spikes on the incoming power lines and help reduce harmonic distortion.

- Eliminate spurious tripping
- Extend semiconductor life
- Reduce harmonic distortion
- Improve true power factor
- Reduce voltage notching
- Meet IEEE-519 or EN-61800

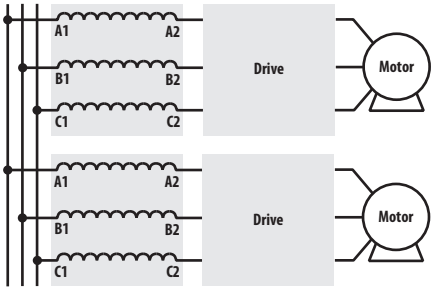
At the Output of the Drive



In long motor lead applications, Allen-Bradley load reactors that are located between the drive and motor help reduce dv/dt and motor terminal peak voltages. The use of a load reactor also helps protect the drive from surge currents that are caused by rapid changes in the load.

- Protect motors from long lead effects
- Reduce output voltage dv/dt
- Extend semiconductor life
- Reduce surge currents
- Reduce motor temperature
- Reduce audible motor noise

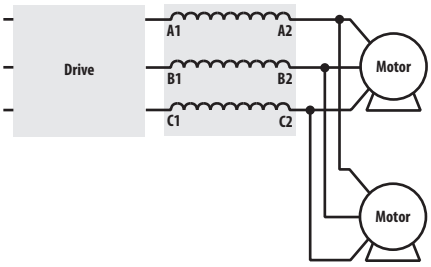
With Multiple Drives



Multiple drives on a common power line should each have their own line reactor. Individual line reactors provide filtering between each drive to help reduce any crosstalk while providing optimum surge protection for each drive.

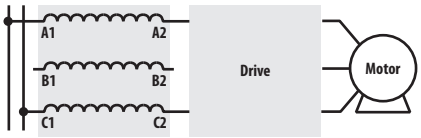
With Multiple Motors

When multiple motors are controlled by one drive, a line reactor can typically be used between the drive and all of the motors. Size the line reactor based on the total motor/load horsepower.



With Single-Phase Input

A three-phase reactor can be used for single-phase applications by routing each of the two input power conductors to the outside two coils and leaving the center coil disconnected. The sum of the inductance of the two coils is the total inductance that is applied to the circuit. Contact Rockwell Automation Support for assistance in specifying the proper reactor.



Selecting the Correct Impedance Rating

Knowing the proper level of impedance is important when selecting a line reactor because, line reactors protect your sensitive equipment from harmful line disturbances. Line reactors are designed to protect DC motor drives, AC variable frequency drives, and the motors they power. The information that follows provides guidance on understanding impedance selection, voltage spike protection, and motor protection.

Why is the Correct Impedance Rating Important?

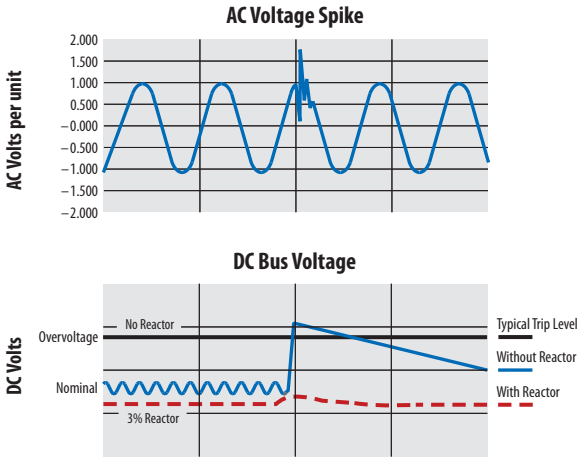
Selecting the correct impedance rating is critical for your job. An impedance value that is too low may not limit peak current. An impedance value that is too high may reduce input voltage. Allen-Bradley line reactors offer two impedance ratings.

- 3% Impedance Rated Reactors to Reduce Spurious Trips
  - Allen-Bradley line reactors that are rated at 3% are typically sufficient to absorb line spikes and motor current surges and will help prevent spurious tripping of drive and circuit breakers in most applications.
- 5% Impedance Rated Reactors to Reduce Harmonic Content
  - Allen-Bradley reactors that are rated at 5% are best for reducing harmonic current and frequencies. These line reactors help comply with IEEE-519 (not normally used as load reactors).

Voltage Spike Protection

Voltage spikes on AC power lines can cause elevation of the DC bus voltage, which may cause the drive to trip on an overvoltage condition.

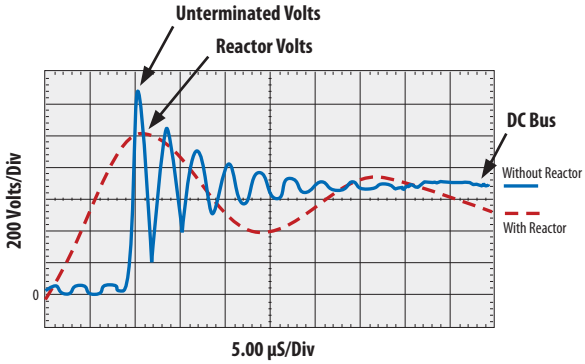
3% impedance reactors are effective at helping to protect drives against voltage spikes and spurious tripping. Allen-Bradley line reactors absorb these line spikes which help protect the drive from spurious tripping and damage.



Motor Protection

Allen-Bradley load reactors can help protect motors from high peak voltages.

For IGBT drive applications with long drive-to-motor lead lengths, Allen-Bradley load reactors can help protect against fast dv/dt rise times.



Catalog Number Explanation

Position Number

1-4		6	7	8		10
1321	–	3	R	4	–	B
a		b	c	d		e

a

Product	
Code	Type
1321	1321 Power Component

b

Phases	
Code	Description
3	Three-Phase

c

Device	
Code	Description
R, RB	Reactor, Open
RA/RAB (1)	Reactor, NEMA 1

(1) RAB is only available in cabinet style 2 or 3.

d

Fundamental Amps	
Code	Amps
1	1
2	2
4	4
8	8
12	12
18	18
25	25
35	35
45	45
55	55
80	80
100	100
130	130
160	160
200	200
250	250
320	320
400	400
500	500
600	600
750	750
850	850
1000	1000

e

Inductance Rating	
Code	Description
A	Each reactor current rating has four inductance ratings also available. See the IP00 dimension table.
B	
C	
D	

Table 1 - 1321-3R, 1321-3RA, and 1321-3RB Series A, B, C Line Reactors Common Specifications

Specification		Rating
Material	Enclosures	IP11 (NEMA/UL Type 1) – Sheet steel in accordance with UL, NEMA requirements
		IP66 (Open) or IP20 (Open – with finger-safe terminals)
	Terminations (1)	1…45 A (fundamental) Ratings – Finger guard IP20 terminal block
		55…160 A (fundamental) Ratings – Solid copper box lugs
		160…400 A (fundamental) Ratings – Copper tab terminals (2)
		401 A and above – Copper tab terminals (2)
Harmonic Compensation	All line reactors are compensated for the additional currents and high frequencies that are caused by the presence of harmonics	
General Protection	Impedance	1.5%, 3%, or 5% based on the fundamental current ratings
	Overload Rating	200% of fundamental current for 30 minutes 300% of fundamental current for 1 minute
	dv/dt Protection	Meets NEMA MG-1, part 31

Table 1 - 1321-3R, 1321-3RA, and 1321-3RB Series A, B, C Line Reactors Common Specifications (Continued)

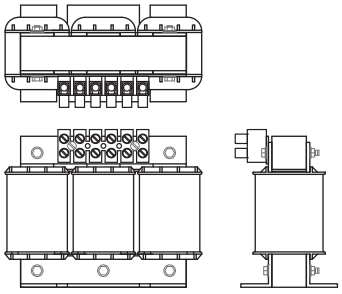
Specification		Rating
Electrical	Maximum Rated Voltage	600V AC (units with terminal blocks) 690V AC (units with box lugs or tab terminals)
	Maximum Switching Freq.	20 kHz
	Fundamental Frequency	Line/Load - 50/60 Hz
	Temperature Rise	135 °C (275 °F) average
	Dielectric Strength	3000 Volts rms (4243 volts peaks)
	Inductance Curve (Typical)	100% at 100% current 100% at 150% current 50% at 350% current (minimum)
	Inductance Tolerance	±10%
	Insulation System	Class N (200 °C / (392 °F))
	Impregnation	High bond strength solventless epoxy, 200 °C (392 °F), UL94HB recognized
Environmental	Ambient Temperature	50 °C (122 °F) Open Style Reactor (maximum) 40 °C (104 °F) Enclosed Style Reactor (maximum)
	Altitude	1000 meters (3280 feet)
	Storage Temperature (all const.)	-40...+70 °C (-40...+158 °F)
	Humidity	5...95% noncondensing
Agency Approvals	cULus UL 508 CSA C22.2 Class N200C	File E196302 Component Listed (1...2400 A) File E196302 UL Listed NEMA Type 1 units (1...2400 A) Note: Short Circuit rating not required under Exception No.1 of UL508A SB4.2.1 effective 4/25/06
	CE	Certified to EN61558-2-20:2011 and EN50581:2012
	Morocco	Compliance to NM EN 61800-5-1
	UKCA	Compliance to EN 61800-3, EN 61800-5-1, EN IEC 63000

(1) For 160 A rating, see the Termination section of this document for additional information.
(2) For applications with reactors rated 160 A or more with copper tab terminals, cable-style connections are recommended.

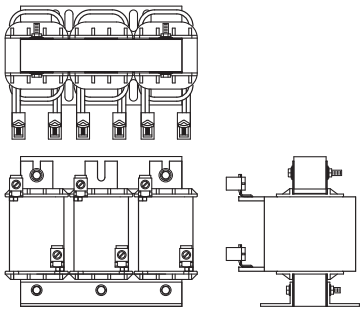
Termination

Reactors are supplied with either an integral-mounted terminal block, box lugs, or copper tabs which are front facing or side facing. See the tables that follow and the Catalog Number Explanation for specific information. The '3R' and '3RA' designations for the 1321 line reactors indicate the following: 3R = Open Enclosure Line Reactor and 3RA = NEMA 1 Enclosure Line Reactor. The dimensions and weights that are provided on the pages that follow are for estimating purposes only. Tab orientation may vary.

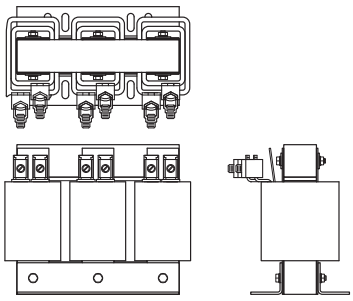
1321-3R1-A to 1321-3R160-A Typical Termination Types



20, 65, or 85 A Terminal Blocks



SLU-125
Box Lugs

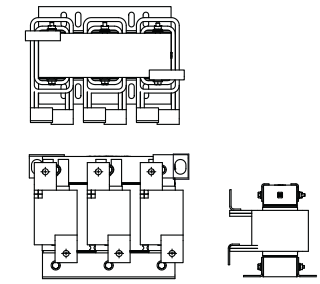


SLU-225
Box Lugs

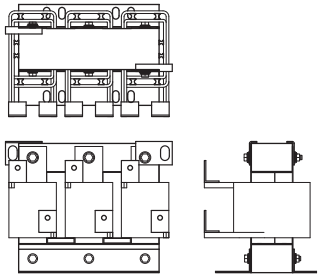
Table 2 - 1321-3R1-A to 1321-3R160-A Specifications

Reactor Catalog Number		**Termination**	**Max/Min Wire Size**	**Max Torque**
IP00 (Open) or IP20	*IP11 (NEMA/UL Type 1)*	*Type*	*mm^2 (AWG)*	*N•m (lb•in)*
1321-3R1-A to 1321-3R8-D	1321-3RA1-A to 1321-3RA8-D	20 A Terminal Block	5.26 / 0.3 (10/22)	0.51 (4.5)
1321-3R12-A to 1321-3R35-B	1321-3RA12-A to 1321-3RA35-B	65 A Terminal Block	16.0/0.3 (5/22)	1.81 (16.0)
1321-3R35-C to 1321-3R45-C	1321-3RA35-C to 1321-3RA45-C	85 A Terminal Block	21.2/0.8 (4/18)	2.26 (20.0)
1321-3R55-A to 1321-3R100-C	1321-3RA55-A to 1321-3RA100-C	SLU-125 Box Lug	50.0/10.0 (0/6)	5.09 (45.0)
1321-3R130-A to 1321-3R160-A	1321-3RA130-A to 1321-3RA160-A	SLU-225 Box Lug	120.0/27.0 (0000/2)	16.95 (150.0)

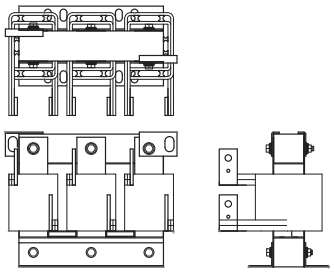
1321-3R160-B to 1321-3R1000-C Typical Termination Types



Front Facing Copper Tabs Pointed Up and Down



Front Facing Copper Tabs



Side Facing Copper Tabs

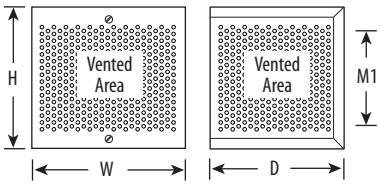
Table 3 - 1321-3R160-B to 1321-3R1000-C Specifications

Reactor Catalog Number		**Termination**	**Contact Surface** *(H x W)*	**Hole Diameter**
IP00 (Open) or IP20 (R, RB)	*IP11 (NEMA/UL Type 1) (RA, RAB)*	*Type*	*mm (in.)*	*mm (in.)*
1321-3R160-B to 1321-3R200-C	1321-3RA160-B to 1321-3RA200-C	Front or Side Facing Copper Tab	44.5 x 38.1 (1.75 x 1.5)	10.31 (0.406)
1321-3RB250-A to 1321-3RB250-C	1321-3RAB250-A to 1321-3RAB250-C		47.63 x 38.10 (1.88 x 1.5)	10.31 (0.406)
1321-3RB320-A to 1321-3R500-A	1321-3RAB320-A to 1321-3RA500-A		47.63 x 38.10 (1.88 x 1.5)	10.31 (0.406)
1321-3R500-B to 1321-3R500-C	1321-3RA500-B to 1321-3RA500-C	Side Facing Copper Tab	76.2 x 38.1 (3.00 x 1.5)	13.49 and 6.35 (0.531 and 0.25)
1321-3R600-A to 1321-3R600-C	1321-3RA600-A to 1321-3RA-600-C		76.2 x 38.1 (3.00 x 1.5)	13.49 and 6.35 (0.531 and 0.25)
1321-3R750-A to 1321-3R750-C	1321-3RA750-A to 1321-3RA750-C		76.2 x 38.1 (3.00 x 1.5)	13.49 and 6.35 (0.531 and 0.25)
1321-3R850-A to 1321-3R1000-C	1321-3RA850-A to 1321-3RA1000-C	Front Facing Copper Tab	95.25 x 95.25 (3.75 x 3.75)	[x4] 13.46 (0.53)

Mounting Dimensions and Weights

IMPORTANT The dimensions and weights that are provided on the following pages are for estimating purposes only. Conduit entry locations for floor-mounted enclosures are the responsibility of the installer. Contact your Rockwell Automation sales office if certified drawings are required for planning and installation.

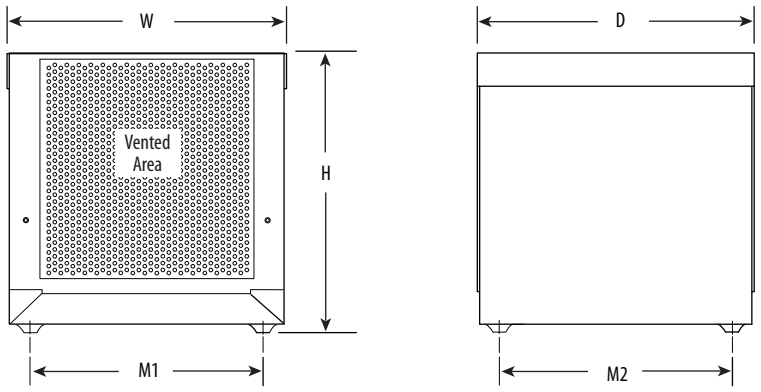
IP11 (NEMA/UL Type 1)



Cabinet 1 – Wall Mounted

Table 4 - Cabinet 1 – Wall Mounted IP11 (NEMA/UL Type 1)

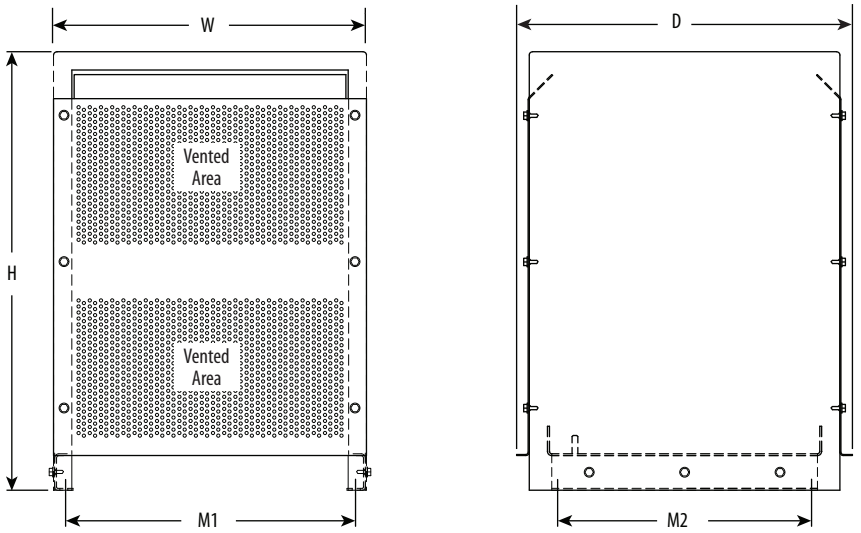
Catalog Number	Unit	*Dimensions in mm (in.) and Weights in kg (lb)*				
		H	**W**	**D**	**M1**	**Weight *(Cabinet Only)***
1321-3RA1-A to 1321-3RA18-B	Cabinet 1	203 (8.0)	203 (8.2)	152 (6.3)	140 (5.5)	3.2 (7.0)



Cabinet 2 – Floor Mounted

Table 5 - Cabinet 2 – Floor Mounted IP11 (NEMA/UL Type 1)

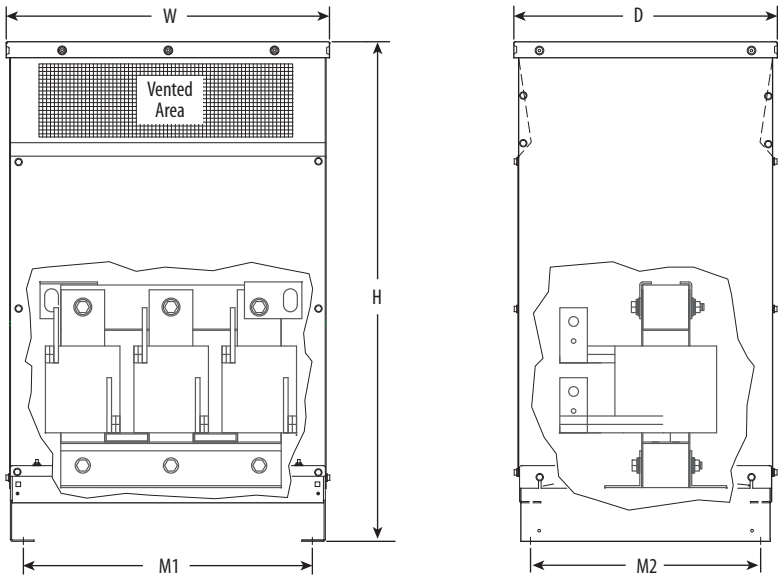
Catalog Number	Unit	*Dimensions in mm (in.) and Weights in kg (lb)*					
		H	**W**	**D**	**Feet M1**	**Feet M2**	**Weight *(Cabinet Only)***
1321-3RA18-C to 1321-3RAB250-A	Cabinet 2	330 (13.0)	336 (13.2)	332 (13.1)	279 (11.0)	279 (11.0)	8.2 (18.0)



Cabinet 3 – Floor Mounted

Table 6 - Cabinet 3 – Floor Mounted IP11 (NEMA/UL Type 1)

Catalog Number	Unit	*Dimensions in mm (in.) and Weights in kg (lb)*					
		H	**W**	**D**	**Feet M1**	**Feet M2**	**Weight *(Cabinet Only)***
1321-3RAB250-B to 1321-3RA500-A	Cabinet 3	610 (24.0)	429 (16.9)	467 (18.4)	406 (16.0)	343 (13.5)	12.2 (27.0)



Cabinet 4 and Cabinet 5 – Floor Mounted

Table 7 - Cabinet 4 and 5 – Floor Mounted IP11 (NEMA/UL Type 1)

Catalog Number	Unit	*Dimensions in mm (in.) and Weights in kg (lb)*					
		H	**W**	**D**	**Feet M1**	**Feet M2**	**Weight[(1)] *(Cabinet Only)***
1321-3RA500-B to 1321-3RA850-B	Cabinet 4	1194 (47.0)	674 (26.6)	633 (24.9)	592 (23.3)	552 (21.8)	62.14 (137.0)
1321-3RA850-C to 1321-3RA1000-C	Cabinet 5	1829 (72.0)	674 (26.6)	633 (24.9)	592 (23.3)	552 (21.8)	75.3 (166.0)

(1) For total weight - add enclosure weight to specific reactor weight.

IP00/Open

Use the reactor outline shown to reference dimensions. This diagram is for reference only - your actual product may differ in terminal location and type, as well as the number and type of mounting options. Dimensions A, B, and C show the width, height, and depth, respectively. Dimensions D, E, and F show the mounting dimensions. Dimensions are for reference only and should not be used for manufacturing purposes.

Fundamental amps are used for sizing the reactor to be equal to or slightly higher than the total motor FLA. Sizing reactors to drive ampere ratings alone may result in mis-sizing the reactor.

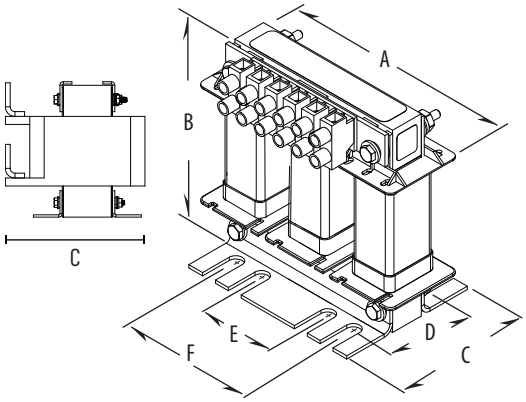


Table 8 - IP00/Open Approximate Dimensions, Weights, and Wire Size

Catalog Number	Fundamental Amps	Inductance - *mH* (Based on Fundamental Amps)	Watts Loss	*Dimensions in mm (in.) and Weight in kg (lb)*						
				A	B	C [1]	D [2]	E	F	Weight (apx.)
1321-3R1-A	1	100	14.1	106.7 (4.2)	101.6 (4.0)	76.2 (3.0)	61 (2.4)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R1-B		50	14.8	111.8 (4.4)	104.1 (4.1)	71.1 (2.8)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R1-C		36	12	111.8 (4.4)	104.1 (4.1)	71.1 (2.8)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R1-D		18	8	111.8 (4.4)	104.1 (4.1)	71.1 (2.8)	50 (2.0)	37 (1.4)	65 (2.6)	1.4 (3.0)
1321-3R2-A	2	12	7.5	106.7 (4.2)	101.6 (4.0)	66 (2.6)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R2-B		20	11.3	106.7 (4.2)	101.6 (4.0)	66 (2.6)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R2-C		32	16	106.7 (4.2)	101.6 (4.0)	66 (2.6)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R2-D		6	10.7	106.7 (4.2)	101.6 (4.0)	66 (2.6)	44 (1.7)	37 (1.4)	65 (2.6)	1.4 (3.0)
1321-3R4-A	4	3	14.5	106.7 (4.2)	101.6 (4.0)	66 (2.6)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R4-B		6.5	20	106.7 (4.2)	101.6 (4.0)	66 (2.6)	50 (2.0)	37 (1.4)	65 (2.6)	1.8 (4.0)
1321-3R4-C		9	20	106.7 (4.2)	101.6 (4.0)	76.2 (3.0)	60 (2.4)	37 (1.4)	65 (2.6)	2.3 (5.0)
1321-3R4-D		12	21	106.7 (4.2)	101.6 (4.0)	83.8 (3.3)	66 (2.6)	37 (1.4)	65 (2.6)	2.7 (6.0)
1321-3R8-A	8	1.5	19.5	149.9 (5.9)	116.8 (4.6)	73.7 (2.9)	53 (2.1)	51 (2.0)	76.2 (3.0)	3.2 (7.0)
1321-3R8-B		3	29	149.9 (5.9)	116.8 (4.6)	73.7 (2.9)	53 (2.1)	51 (2.0)	76.2 (3.0)	3.6 (8.0)
1321-3R8-C		5	25.3	149.9 (5.9)	119.4 (4.7)	83.8 (3.3)	67 (2.6)	51 (2.0)	76.2 (3.0)	5.0 (11.0)
1321-3R8-D		7.5	28	149.9 (5.9)	119.4 (4.7)	83.8 (3.3)	63 (2.5)	51 (2.0)	76.2 (3.0)	5.9 (13.0)
1321-3R12-A	12	1.25	26	149.9 (5.9)	127 (5.0)	81.3 (3.2)	53 (2.1)	51 (2.0)	76.2 (3.0)	4.1 (9.0)
1321-3R12-B		2.5	31	149.9 (5.9)	127 (5.0)	81.3 (3.2)	53 (2.1)	51 (2.0)	76.2 (3.0)	4.5 (10.0)
1321-3R12-C		4.2	41	149.9 (5.9)	127 (5.0)	96.5 (3.8)	70 (2.8)	51 (2.0)	76.2 (3.0)	8.2 (18.0)
1321-3R18-A	18	0.8	36	149.9 (5.9)	129.5 (5.1)	81.3 (3.2)	54 (2.1)	51 (2.0)	76.2 (3.0)	4.1 (9.0)
1321-3R18-B		1.5	43	149.9 (5.9)	129.5 (5.1)	88.9 (3.5)	63 (2.5)	51 (2.0)	76.2 (3.0)	5.4 (12.0)
1321-3R18-C		2.5	43	180.3 (7.1)	144.8 (5.7)	94 (3.7)	66 (2.6)	76 (3.0)	76.2 (3.0)	7.3 (16.0)
1321-3R25-A	25	0.5	48	180.3 (7.1)	144.8 (5.7)	86.7 (3.4)	60 (2.4)	76 (3.0)	76.2 (3.0)	5.0 (11.0)
1321-3R25-B		1.2	52	180.3 (7.1)	147.3 (5.8)	86.7 (3.4)	60 (2.4)	76 (3.0)	76.2 (3.0)	6.4 (14.0)
1321-3R25-C		1.8	61	180.3 (7.1)	147.3 (5.8)	106.7 (4.2)	79 (3.1)	76 (3.0)	76.2 (3.0)	9.1 (20.0)
1321-3R35-A	35	0.4	49	180.3 (7.1)	144.8 (5.7)	94 (3.7)	66 (2.6)	76 (3.0)	76.2 (3.0)	6.4 (14.0)
1321-3R35-B		0.8	54	180.3 (7.1)	147.3 (5.8)	94 (3.7)	70 (2.8)	76 (3.0)	76.2 (3.0)	7.3 (16.0)
1321-3R35-C		1.2	54	226.1 (8.9)	182.9 (7.2)	116.8 (4.6)	80 (3.2)	76 (3.0)	108 (4.3)	11.8 (26.0)
1321-3R45-A	45	0.3	54	226.1 (8.9)	180.3 (7.1)	116.8 (4.6)	80 (3.2)	76 (3.0)	108 (4.3)	10.0 (22.0)
1321-3R45-B		0.7	62	226.1 (8.9)	182.9 (7.2)	116.8 (4.6)	80 (3.2)	76 (3.0)	108 (4.3)	11.8 (26.0)
1321-3R45-C		1.2	65	226.1 (8.9)	185.4 (7.3)	129.5 (5.1)	93 (3.7)	76 (3.0)	108 (4.3)	15.4 (34.0)
1321-3R55-A	55	0.25	64	228.6 (9.0)	175.3 (6.9)	134.6 (5.3)	80 (3.2)	76 (3.0)	108 (4.3)	10.9 (24.0)
1321-3R55-B		0.5	67	228.6 (9.0)	175.3 (6.9)	134.6 (5.3)	80 (3.2)	76 (3.0)	108 (4.3)	11.8 (26.0)
1321-3R55-C		0.85	71	226.1 (8.9)	175.3 (6.9)	160 (6.3)	99 (3.9)	76 (3.0)	108 (4.3)	15.4 (34.0)

Table 8 - IP00/Open Approximate Dimensions, Weights, and Wire Size (Continued)

Catalog Number	Fundamental Amps	Inductance - *mH* (Based on Fundamental Amps)	Watts Loss	*Dimensions in mm (in.) and Weight in kg (lb)*						
				A	B	C (1)	D (2)	E	F	Weight (apx.)
1321-3R80-A	80	0.2	82	226.1 (8.9)	175.3 (6.9)	144.8 (5.7)	88 (3.5)	92 (3.63)	108 (4.3)	11.3 (25.0)
1321-3R80-B		0.4	86	226.1 (8.9)	180.3 (7.1)	144.8 (5.7)	88 (3.5)	92 (3.63)	108 (4.3)	15 (33.0)
1321-3R80-C		0.7	96	274.3 (10.8)	215.9 (8.5)	167.6 (6.6)	106 (4.2)	92 (3.63)	141.7 (5.6)	28.6 (63.0)
1321-3R100-A	100	0.15	94	226.1 (8.9)	177.8 (7.0)	152.4 (6.0)	88 (3.5)	92 (3.63)	108 (4.3)	13.2 (29.0)
1321-3R100-B		0.3	84	226.1 (8.9)	177.8 (7.0)	167.6 (6.6)	93 (3.7)	92 (3.63)	108 (4.3)	16.8 (37.0)
1321-3R100-C		0.45	108	274.3 (10.8)	213.4 (8.4)	198.1 (7.8)	106 (4.2)	92 (3.63)	141.7 (5.6)	30.4 (67.0)
1321-3R130-A	130	0.1	108	243.8 (9.6)	185.4 (7.3)	149.9 (5.9)	80 (3.2)	76 (3.0)	108 (4.3)	13.2 (29.0)
1321-3R130-B		0.2	180	243.8 (9.6)	182.9 (7.2)	152.4 (6.0)	93 (3.7)	92 (3.63)	108 (4.3)	19.5 (43.0)
1321-3R130-C		0.3	128	274.3 (10.8)	215.9 (8.5)	185.4 (7.3)	106 (4.2)	92 (3.63)	141.7 (5.6)	29 (64.0)
1321-3R160-A	160	0.075	116	243.8 (9.6)	182.9 (7.2)	152.4 (6.0)	80 (3.2)	92 (3.63)	108 (4.3)	18.6 (41.0)
1321-3R160-B		0.15	149	274.3 (10.8)	213.4 (8.4)	170.2 (6.7)	88 (3.5)	92 (3.63)	141.7 (5.6)	24.5 (54.0)
1321-3R160-C		0.23	138	274.3 (10.8)	215.9 (8.5)	187 (7.4)	118 (4.7)	92 (3.63)	141.7 (5.6)	33.6 (74.0)
1321-3R200-A	200	0.055	124	243.8 (9.6)	182.9 (7.2)	180.3 (7.1)	106 (4.2)	92 (3.63)	108 (4.3)	17.2 (38.0)
1321-3R200-B		0.11	168	243.8 (9.6)	182.9 (7.2)	200.7 (7.9)	112 (4.4)	92 (3.63)	108 (4.3)	24.5 (54.0)
1321-3R200-C		0.185	146	274.3 (10.8)	210.8 (8.3)	231.1 (9.1)	150 (5.9)	92 (3.63)	141.7 (5.6)	45.4 (100.0)
1321-3RB250-A	250	0.045	154	243.8 (9.6)	177.8 (7.0)	205.7 (8.1)	106 (4.2)	92 (3.63)	108 (4.3)	21.3 (47.0)
1321-3RB250-B		0.09	231	274.3 (10.8)	215.9 (8.5)	193 (7.6)	131 (5.2)	117 (4.6)	141.7 (5.6)	36.3 (80.0)
1321-3RB250-C		0.15	588	363.2 (14.3)	284.5 (11.2	221 (8.7)	148 (5.8)	117 (4.6)	182.89 (7.2)	56.7 (125.0)
1321-3RB320-A	320	0.04	224	274.3 (10.8)	213.4 (8.4)	200.7 (7.9)	131 (5.2)	117 (4.6)	141.7 (5.6)	36.3 (80.0)
1321-3RB320-B		0.075	264	274.3 (10.8)	213.4 (8.4)	226.1 (8.9)	149 (5.9)	117 (4.6)	141.7 (5.6)	46.3 (102.0)
1321-3RB320-C		0.125	642	363.2 (14.3)	281.9 (11.1)	238.8 (9.4)	181 (7.1)	117 (4.6)	182.9 (7.2)	72.6 (160.0)
1321-3RB400-A	400	0.03	213	279.4 (11.0)	213.4 (8.4)	218.4 (8.6)	131 (5.2)	117 (4.6)	141.7 (5.6)	38.1 (84.0)
1321-3RB400-B		0.06	571	363.2 (14.3)	281.9 (11.1)	238.8 (9.4)	172 (6.8)	117 (4.6)	182.9 (7.2)	53.5 (118.0)
1321-3RB400-C		0.105	293	363.2 (14.3)	281.9 (11.1)	276.9 (10.9)	184 (7.3)	117 (4.6)	182.9 (7.2)	67.6 (149.0)
1321-3R500-A	500	0.025	226	274.3 (10.8)	215.9 (8.5)	238.8 (9.4)	140 (5.5)	117 (4.6)	141.7 (5.6)	42.2 (93.0)
1321-3R500-B		0.05	694	363.2 (14.3)	281.9 (11.1)	269.2 (10.6)	172 (6.8)	117 (4.6)	182.9 (7.2)	72.6 (160.0)
1321-3R500-C		0.085	985	363.2 (14.3)	281.9 (11.1)	330.2 (13.0)	248 (9.8)	117 (4.6)	182.9 (7.2)	95.3 (210.0)
1321-3R600-A	600	0.02	609	363.2 (14.3)	281.9 (11.1)	223.5 (8.8)	134 (5.3)	117 (4.6)	182.9 (7.2)	54.4 (120.0)
1321-3R600-B		0.04	689	363.2 (14.3)	281.9 (11.1)	279.4 (11.0)	203 (8.0)	117 (4.6)	182.9 (7.2)	79.4 (175.0)
1321-3R600-C		0.065	406	363.2 (14.3)	281.9 (11.1)	342.9 (13.5)	235 (9.3)	117 (4.6)	182.9 (7.2)	122.5 (270.0)
1321-3R750-A	750	0.015	713	363.2 (14.3)	284.5 (11.2)	264.2 (10.4)	168 (6.6)	183 (7.2)	182.9 (7.2)	63.5 (140.0)
1321-3R750-B		0.029	630	363.2 (14.3)	281.9 (11.1)	292.1 (11.5)	204 (8.0)	183 (7.2)	182.9 (7.2)	86.2 (190.0)
1321-3R750-C		0.048	552	355.6 (14.0)	358.1 (14.1)	330.2 (13.0)	242 (9.5)	183 (7.2)	182.9 (7.2)	120.2 (265.0)
1321-3R850-A	850	0.015	798'	452.1 (17.8)	393.7 (15.5)	375.9 (14.8)	199.6 (7.9)	183 (7.2)	182.9 (7.2)	88.5 (195.0)
1321-3R850-B		0.027	930	452.1 (17.8)	393.7 (15.5)	393.7 (15.5)	–	–	182.9 (7.2)	97.5 (215.0)
1321-3R850-C		0.042	1133	452.1 (17.8)	401.3 (15.8)	444.5 (17.5)	–	–	182.9 (7.2)	142.9 (315.0)
1321-3R1000-B	1000	0.022	1080	431.8 (17.0)	370.8 (14.6)	373.4 (14.7)	–	–	182.9 (7.2)	97.5 (215.0)
1321-3R1000-C		0.038	1250	431.8 (17.0)	370.8 (14.6)	436.9 (17.2)	–	–	182.9 (7.2)	142.9 (315.0)

(1) Dimension C is measured at the widest point of the line reactor. This could be at the base or at the terminal depending on the catalog number. See Termination on page 7 for examples of line reactor types.
(2) Removable lifting rings are supplied with the unit.

1321 Reflective Wave Reduction (RWR) Series A Devices

Description of Reflected Wave Phenomenon:

The inverter section of a drive does not produce sinusoidal voltage, but rather a series of voltage pulses created from the DC bus, this is known as the reflective wave phenomenon. These pulses travel down the motor cables to the motor and then reflected back to the drive. The reflection is dependent on the rise time of the drive output voltage, cable characteristics, cable length, and motor impedance. If the voltage reflection is combined with another subsequent pulse, peak voltages can be at a destructive level. An IGBT drive output may have reflected wave transient voltage stresses of up to twice (2 pu or per unit) the DC bus voltage between its own output wires. Multiple drive output wires in a single conduit or wire tray further increase output wire voltage stress between multi-drive output wires that are touching. Drive #1 may have a (+) 2 pu stress while drive #2 may simultaneously have a (–) 2 pu stress.

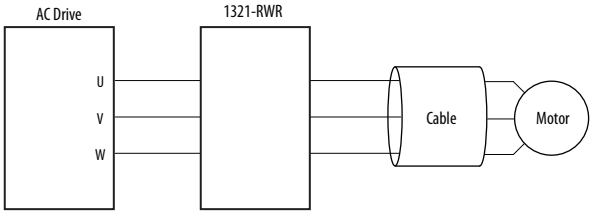
For more details, see the Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001.

Applying RWR Devices

The diagrams that follow show how to apply the Allen-Bradley Line Reactors.

At the Output of the Drive

In long motor lead applications, an Allen-Bradley 1321 RWR located between the drive and motor helps to reduce dv/dt and motor terminal peak voltages. The use of an RWR device also helps protect the drive from surge currents that are caused by rapid changes in the load.

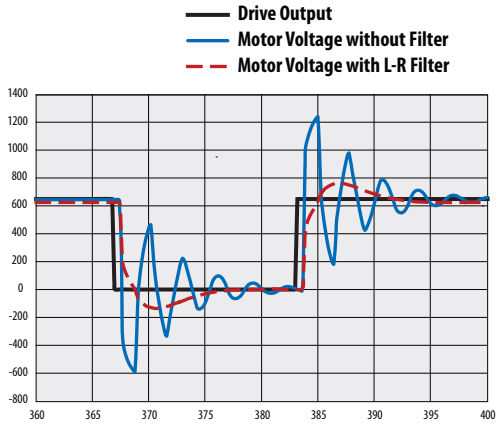


- Protect motors from long lead effects
- Reduce output voltage dv/dt
- Extend semiconductor life
- Reduce surge currents
- Reduce motor temperature
- Reduce audible motor noise

Motor Protection

Allen-Bradley RWR devices can help protect motors from high peak voltages.

For IGBT drive applications with long drive-to-motor lead lengths, Allen-Bradley RWR devices can help protect against fast dv/dt rise times.



Catalog Number Explanation

IMPORTANT 1321-RWR products replace existing 1204-RWR products. However, 1204-RWRC modules (RWR and Common Mode Choke assembly) are still available.

Position	1-8	9		11	12
	1321 – RWR	8	–	D	P
	a	b		c	d

a

Product	
Code	Type
1321-RWR	Reflective Wave Reduction Device

c

Voltage Rating	
Code	Voltage
D	400/480V AC
E	600V AC

d

Enclosure	
Code	Description
P	Panel Mount

b1

Rating	
400-480V AC	
Code	Fundamental Amps
8	8
12	12
18	18
25	25
35	35
45	45
55	55
80	80
100	100
130	130
160	160
200	200
250	250
320	320

b2

Rating	
600V AC	
Code	Fundamental Amps
8	8
12	12
18	18
25	25
35	35
45	45
55	55
80	80
100	100
130	130
160	160
200	200
250	250

Table 9 - 1321-RWR Series A Common Specifications

Specification		Rating
Material	Enclosures	IP00 (Open)
	Terminations	1...45 A (fundamental) Ratings – Finger guard IP20 terminal block
		80...160 A (fundamental) Ratings – Solid copper box lugs
		200...400 A (fundamental) Ratings – Copper tab terminals (1)
		401 A and above – Copper tab terminals (1)
Harmonic Compensation	All line reactors are compensated for the additional currents and high frequencies that are caused by the presence of harmonics	
General Protection	Impedance	3%
	Overload Rating	300% of fundamental current for (1) minute
IGBT Protection	First turn triple insulated offering protection up to 16 kV	16,000 Volts per microsecond dv/dt protection 20 kHz maximum switching frequency
Electrical	Maximum Rated Voltage	600V AC, 50/60 Hz frequency
	Maximum Switching Freq.	4 kHz
	Temperature Rise	115 °C (239 °F)
	Dielectric Strength	4000 Volts rms (5600 volts peaks)
	Inductance Curve	100% at 100% current, 100% at 150% current, 50% at 350% current
	Insulation System	Class H (180 °C or better) (356 °F)
	Impregnation	High bond strength epoxy impregnation, 4000V high dielectric strength
Environmental	Ambient Temperature	45 °C (113 °F)
	U.L. Listed	UL-508, IP00, IP20, and IP11
	International	Conforms to VDE 0550
	CE	Not certified
	Storage Temperature (all const.)	-40...+70 °C (-40...+158 °F)
	Humidity	5...95% noncondensing

(1) For applications with RWR devices rated 200 A or more, cable-style connections are recommended.

Termination

Allen-Bradley 1321 RWR devices rated 45 amps (fundamental) and below are supplied with an integral mounted terminal block. Devices that are rated 55...160 amps (fundamental) are supplied with box lugs. Devices rated 200...400 amps (fundamental) can be supplied with box lugs or copper tabs. Above 400 amps (fundamental), solid copper tabs are used.

Mounting Dimensions and Weights

The dimensions and weights that are provided on the following page is for estimating purposes only. Contact your Rockwell Automation sales office if certified drawings are required for planning and installation.

Table 10 - 1321-RWR Approximate Dimensions, Weights, Wire Size, and Terminal Blocks

RWR Catalog No. x = D (400V), E (600V)	Fund. Amps	Cont. Amps	Wire Size	Watts Loss		Figure (see page 16)	Dimensions *mm (in.)*					Weight
			mm 2 (AWG)	400V	600V		A	B	C	D	E	*kg (lb)*
1321-RWR8-xP	8	12	2.5...4.0 (14...12)	389	536	1	282.6 (11.13)	298.5 (11.75)	171.5 (6.75)	7.4 (0.29)	7.4 x 11.6 (0.29 x 0.46)	4.8 (10.5)
1321-RWR12-xP	12	18	2.5...4.0 (14...12)	391	406	1	282.6 (11.13)	298.5 (11.75)	174.6 (6.88)	7.4 (0.29)	7.4 x 11.6 (0.29 x 0.46)	5.7 (12.5)
1321-RWR18-xP	18	27	2.5...4.0 (14...12)	403	551	1	282.6 (11.13)	298.5 (11.75)	174.6 (6.88)	7.4 (0.29)	7.4 x 11.6 (0.29 x 0.46)	7.3 (16.0)
1321-RWR25-xP	25	37.5	6.0 (10)	412	562	1	282.6 (11.13)	298.5 (11.75)	193.7 (7.63)	7.4 (0.29)	7.4 x 11.6 (0.29 x 0.46)	7.7 (17.0)
1321-RWR35-xP	35	52.5	10.0...16.0 (8...6)	414	429	1	282.6 (11.13)	298.5 (11.75)	193.7 (7.63)	7.4 (0.29)	7.4 x 11.6 (0.29 x 0.46)	8.8 (19.5)
1321-RWR45-xP	45	67.5	16.0 (6)	422	572	2	319.1 (12.56)	392.1 (15.44)	158.8 (6.25)	10.5 (0.41)	10.3 x 17.9 (0.41 x 0.70)	17.5 (38.5)
1321-RWR55-xP	55	82.5	25.0 (4)	427	577	2	320.7 (12.63)	392.1 (15.44)	158.8 (6.25)	10.5 (0.41)	10.3 x 17.9 (0.41 x 0.70)	18.4 (40.5)
1321-RWR80-xP	80	120	35.0...50.0 (2...1/0)	446	341	2	322.3 (12.69)	395.3 (15.56)	177.8 (7.00)	10.5 (0.41)	10.3 x 17.9 (0.41 x 0.70)	20.4 (45.0)
1321-RWR100-xP	100	150	50.0...70.0 (1/0...2/0)	444	339	2	320.7 (12.63)	393.7 (15.50)	187.3 (7.38)	10.5 (0.41)	10.3 x 17.9 (0.41 x 0.70)	22.5 (49.5)
1321-RWR130-xP	130	195	70.0...120.0 (2/0...4/0)	630	495	2	317.5 (12.50)	390.5 (15.38)	187.3 (7.38)	10.5 (0.41)	10.3 x 17.9 (0.41 x 0.70)	24.5 (54.0)
1321-RWR160-xP	160	240	120.0 (4/0)	599	464	3	355.6 (14.00)	438.2 (17.25)	250.8 (9.88)	10.5 (0.41)	10.3 x 25.8 (0.41 x 1.02)	30.8 (68.0)
1321-RWR200-xP	200	300	120.0...185.0 (4/0...350 MCM)	618	612	2	317.5 (12.50)	393.7 (15.50)	214.3 (8.44)	10.5 (0.41)	10.3 x 17.9 (0.41 x 0.70)	29.9 (66.0)
1321-RWR250-xP	250	375	185.0 (350 MCM)	681	546	3	358.8 (14.13)	439.8 (17.31)	225.4 (8.88)	10.5 (0.41)	10.3 x 25.8 (0.41 x 1.02)	41.7 (92.0)
1321-RWR320-DP	320	480	240.0 (500 MCM)	489	—	3	358.8 (14.13)	438.2 (17.25)	250.8 (9.88)	10.5 (0.41)	10.3 x 25.8 (0.41 x 1.02)	52.2 (115.0)

Table 11 - 1321-RWR Assembly Components

400/480V			
Reactor	Resistor		Wire Size (AWG)
	Ohms	Watts	
1321-3R8-B	50	250	14...12
1321-3R12-B	50	250	14...12
1321-3R18-B	50	250	14...12
1321-3R25-B	50	250	10
1321-3R35-B	50	250	8...6
1321-3R45-B	50	250	6
1321-3R55-B	50	250	4
1321-3R80-B	50	250	2...1/0
1321-3R100-B	50	250	1/0...2/0
1321-3R130-B	50	300	2/0...4/0
1321-3R160-B	50	300	4/0
1321-3R200-B	50	300	4/0...350 MCM
1321-3RB250-B	50	300	350 MCM
1321-3R320-B	50	300	500 MCM

600V			
Reactor	Resistor		Wire Size (AWG)
	Ohms	Watts	
1321-3R8-B	50	375	14...12
1321-3R12-B	50	375	14...12
1321-3R18-B	50	375	14...12
1321-3R25-B	50	375	10
1321-3R35-B	50	375	8...6
1321-3R45-B	50	375	6
1321-3R55-B	50	375	4
1321-3R80-B	50	375	2...1/0
1321-3R100-B	50	375	1/0...2/0
1321-3R130-B	50	420	2/0...4/0
1321-3R160-B	50	420	4/0
1321-3R200-B	50	420	4/0...350 MCM
1321-3RB250-B	50	420	350 MCM

1321-RWR Dimension Reference

Dimensions are in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

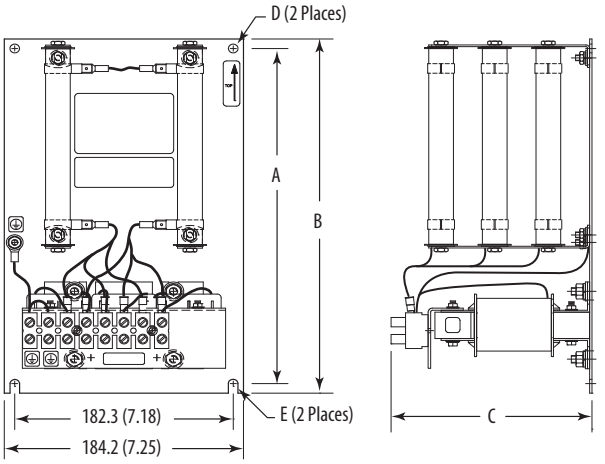


Figure 1

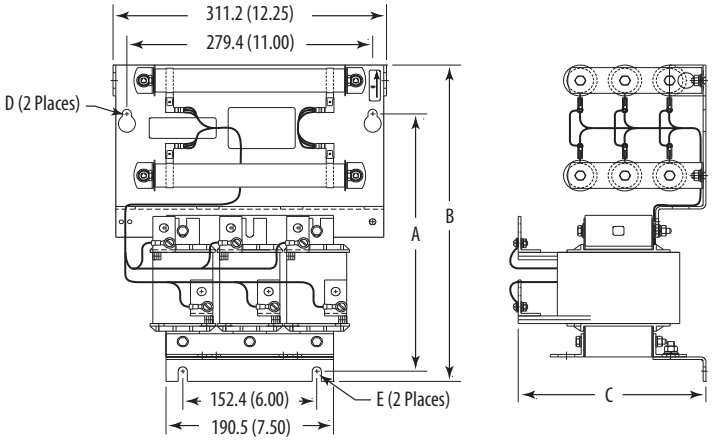


Figure 2

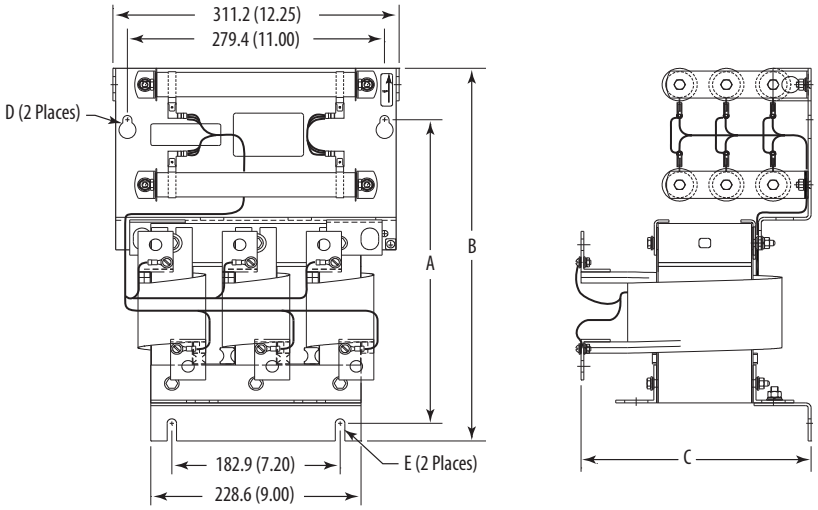
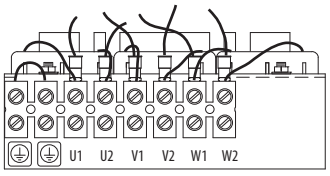
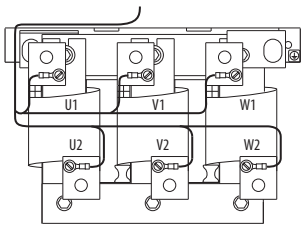


Figure 3

1321-RWR Terminal Block Details



Details for Figure 1



Details for Figure 2 and Figure 3

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001	Basic information that is needed to properly wire and ground PWM AC drives.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control, publication SGI-1.1	General guidelines for the application, installation, and maintenance of solid-state control.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication IC-AT001	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752, İçerenköy, İstanbul, Tel: +90 (216) 5698400 EEE Yönetmeliğine Uygundur

Connect with us.

rockwellautomation.com — expanding **human possibility**™

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000
EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2663 0600
ASIA PACIFIC: Rockwell Automation SEA Pte Ltd, 2 Corporation Road, #04-05, Main Lobby, Corporation Place, Singapore 618494, Tel: (65) 6510 6608
UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44) (1908) 838-800

Publication 1321-TD002A-EN-P - April 2024 | Supersedes Publication 1321-TD001S-EN-P | October 2022