



1204 Reflected Wave Reduction Device

(Catalog Number 1204-RWR2-09-B, C)

This publication will guide you through installation (including mounting, wiring and grounding procedures) of the 1204 Reflected Wave Reduction Device.

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Where this Option is Used

The 1204 Reflected Wave Reduction Device (RWR2) is designed to be used with Allen-Bradley 1305 and 160 AC Drives. When installed near the drive, the device can reduce potentially destructive reflected wave spikes that can occur with long motor leads. The following table lists the Allen-Bradley drives that are compatible with the RWR2.

Device Catalog Number	Series	Compatible with . . .
1204-RWR2-09-B, 1204-RWR2-09-C	A	• 1305-BA01 • 1305-BA02 • 1305-BA03 • 1305-BA04 • 1305-BA06 • 1305-BA09 • 160-BA01 • 160-BA02 • 160-BA03 • 160-BA04 • 160-BA06

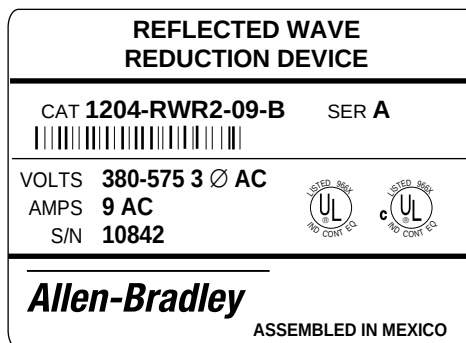
Catalog Number Explanation

1204	- RWR2	- 09	- B
<i>First Position</i>	<i>Second Position</i>	<i>Third Position</i>	<i>Fourth Position</i>
Description	Type	Current Rating	Size & Mounting Config.
Bulletin Number	Letter Description RWR2 Reflected Wave Reduction Device IP 20 (NEMA Type 1)	Code Rating 09 9 Amps	Letter Description Mounting B B Frame ¹ Stack or Book Style C C Frame ¹ Stack Mount Only

¹ Same footprint size as corresponding 1305 Frame. See page 3 for details.

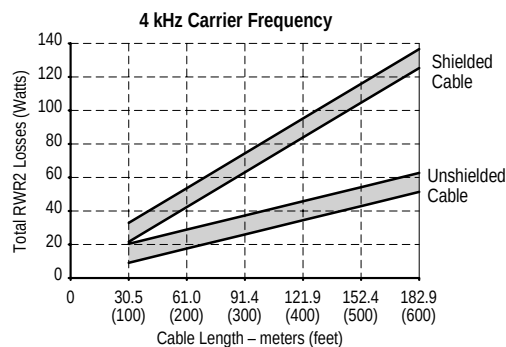
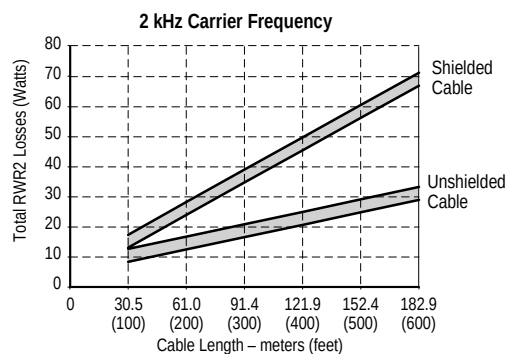
Nameplate Information

The nameplate is located on the bottom of the unit. In addition, a manufacturing date is stamped on the unit bottom near the nameplate.



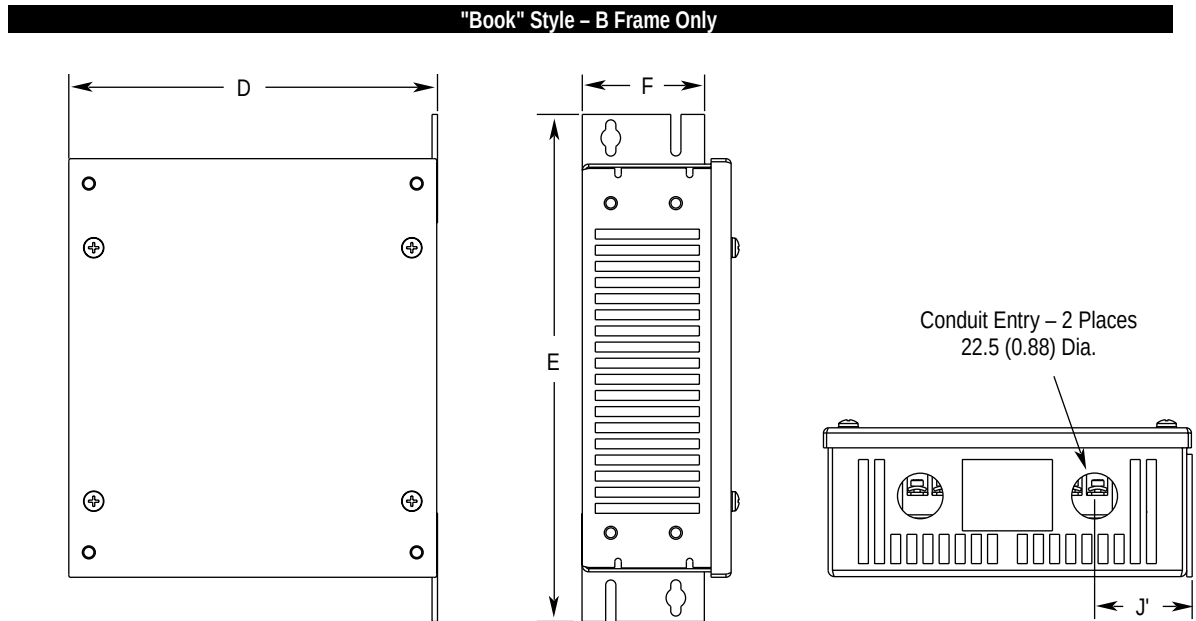
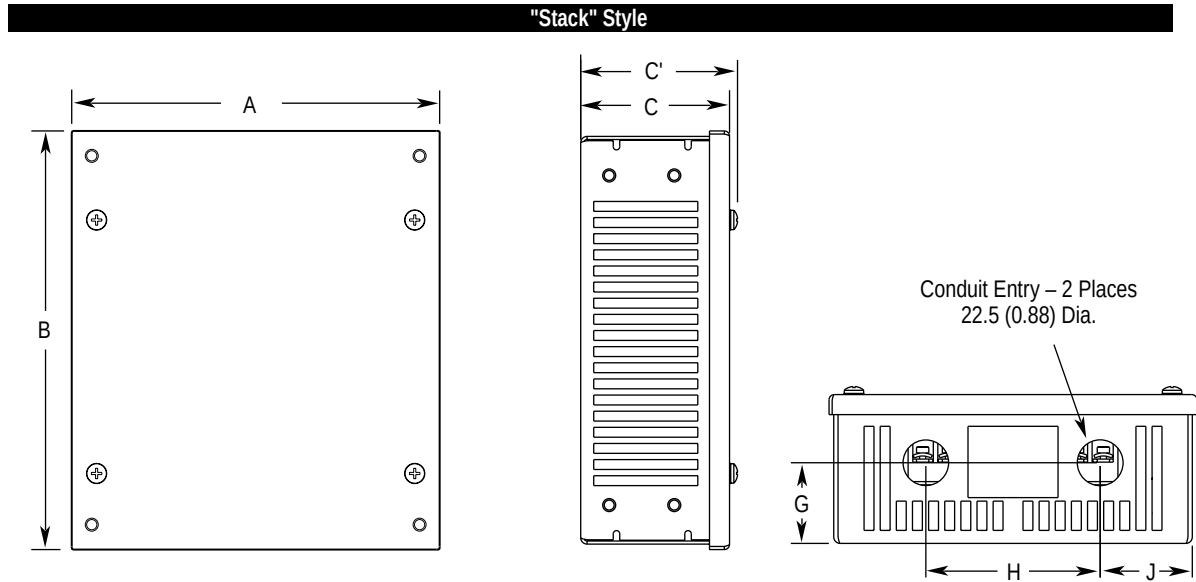
Specifications

Input Power	380-575VAC, Three-Phase.
Drive Carrier Frequency	2 kHz Recommended (used for most applications). Important: 4 kHz Absolute Maximum – Refer to Chart below and pages 4 & 5 for application restrictions.
Ambient Temperature	0-50 Degrees C. (32-122 Degrees F.).
Humidity	0-95% Non-Condensing.
Atmosphere	IP 20 (NEMA Type 1) Atmosphere should not contain hazardous (volatile) dust, vapor, gas or liquid.
Current Rating	9 Amperes.
Vibration	1.0 G Operational.
Agency Certification	
Altitude Derating	Above 1000 meters (3300 feet) derate at 6% of RWR2 rated amperes per 1000 meters (3300 feet) elevation.
Heat Dissipation	Use the cable length and drive carrier frequency to find the approximate RWR2 losses for your system. Vertical movement inside the loss band will be dependent on exact cable type and motor load.



Dimensions and Weights

Dimensions, weights and conduit entry locations for the “Stack” and “Book” style units are provided below.



Dimensions are in millimeters and (inches)

Catalog Number	A	B	C	C'	D	E	F	G	H	J	J'	Approx. Weights
1204-RWR2-09-B	180.0 (7.09)	205.0 (8.07)	72.9 (2.87)	76.5 (3.01)	180.0 (7.09)	248.2 (9.77)	60.0 (2.35)	40.0 (1.57)	85.0 (3.35)	45 (1.77)	47.5 (1.87)	3.47 kg (7.66 lb.)
1204-RWR2-09-C	220.0 (8.66)	205.0 (8.07)	72.9 (2.87)	76.5 (3.01)	NA	NA	NA	40.0 (1.57)	125.0 (4.92)	45 (1.77)	NA	3.80 kg (8.33 lb.)

Determining the Maximum Cable Length for your System

The following tables will help you determine the maximum cable length for your system.

Important: The values shown in the following tables are for nominal input voltage. If you are running at high line conditions (nominal line voltage plus 10%), multiply the listed values by 0.85.

Table A 1305 Maximum Motor Cable Length Restriction in meters (feet) – 380-460V Drives

Drive Carrier Frequency	Drive kW (HP)	Motor kW (HP)	w/1204-RWR2 and Motor w/Insulation of V _{p-p}			
			1000 Volt		1200 or 1600 Volt	
			Cable Type		Cable Type	
			Shielded	Unshielded	Shielded	Unshielded
2 kHz	4.0 (5)	4.0 (5)	182.9 (600)	152.4 (500)	182.9 (600)	182.9 (600)
		2.2 (3)	182.9 (600)	152.4 (500)	182.9 (600)	182.9 (600)
		1.5 (2)	182.9 (600)	152.4 (500)	182.9 (600)	182.9 (600)
	2.2 (3)	2.2 (3)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
		1.5 (2)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
		0.75 (1)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
	1.5 (2)	1.5 (2)	121.9 (400)	167.6 (550)	121.9 (400)	167.6 (550)
		0.75 (1)	137.2 (450)	152.4 (500)	137.2 (450)	182.9 (600)
		0.55 (0.75)	137.2 (450)	152.4 (500)	137.2 (450)	182.9 (600)
		0.37 (0.5)	137.2 (450)	152.4 (500)	137.2 (450)	182.9 (600)
	0.75 (1)	0.75 (1)	76.2 (250)	152.4 (500)	76.2 (250)	152.4 (500)
		0.55 (0.75)	76.2 (250)	152.4 (500)	76.2 (250)	152.4 (500)
		0.37 (0.5)	76.2 (250)	152.4 (500)	76.2 (250)	152.4 (500)
	0.55 (0.75)	0.55 (0.75)	61.0 (200)	121.9 (400)	61.0 (200)	121.9 (400)
		0.37 (0.5)	61.0 (200)	121.9 (400)	61.0 (200)	121.9 (400)
	0.37 (0.5)	0.37 (0.5)	45.7 (150)	106.7 (350)	45.7 (150)	106.7 (350)

Important: The recommended drive carrier frequency is 2 kHz. This carrier frequency should be used for the majority of applications.

If a carrier frequency greater than 2 kHz must be used, the absolute maximum is 4 kHz. Refer to the information below and the chart on page 2 for additional application restrictions.

In addition, if you are using a 1305, Parameter 143 (Cable Length) should be set to "Long."

4 kHz	4.0 (5)	4.0 (5)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
		2.2 (3)	167.6 (550)	152.4 (500)	167.6 (550)	182.9 (600)
		1.5 (2)	167.6 (550)	152.4 (500)	167.6 (550)	182.9 (600)
	2.2 (3)	2.2 (3)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
		1.5 (2)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
		0.75 (1)	152.4 (500)	152.4 (500)	152.4 (500)	182.9 (600)
	1.5 (2)	1.5 (2)	121.9 (400)	167.6 (550)	121.9 (400)	167.6 (550)
		0.75 (1)	137.2 (450)	152.4 (500)	137.2 (450)	182.9 (600)
		0.55 (0.75)	137.2 (450)	152.4 (500)	137.2 (450)	182.9 (600)
		0.37 (0.5)	137.2 (450)	152.4 (500)	137.2 (450)	182.9 (600)
	0.75 (1)	0.75 (1)	61.0 (200)	152.4 (500)	61.0 (200)	152.4 (500)
		0.55 (0.75)	61.0 (200)	152.4 (500)	61.0 (200)	152.4 (500)
		0.37 (0.5)	76.2 (250)	152.4 (500)	76.2 (250)	152.4 (500)
	0.55 (0.75)	0.55 (0.75)	45.7 (150)	121.9 (400)	45.7 (150)	121.9 (400)
		0.37 (0.5)	45.7 (150)	121.9 (400)	45.7 (150)	121.9 (400)
	0.37 (0.5)	0.37 (0.5)	30.5 (100)	106.7 (350)	30.5 (100)	106.7 (350)

The following table will help you determine the maximum cable length for your system with a Series B 160 Drive.

Table B Series B, 160 Max. Motor Cable Length Restriction in meters (feet) – 380-460V Drives

Drive Carrier Frequency	Drive kW (HP)	Motor kW (HP)	w/1204-RWR2 and Motor w/Insulation of V _{P-P}			
			1000 Volt		1200 or 1600 Volt	
			Cable Type		Cable Type	
			Shielded	Unshielded	Shielded	Unshielded
2 kHz	2.2 (3)	2.2 (3)	109.7 (360)	91.4 (300)	109.7 (360)	182.9 (600)
		1.5 (2)	109.7 (360)	91.4 (300)	109.7 (360)	182.9 (600)
		0.75 (1)	109.7 (360)	91.4 (300)	109.7 (360)	182.9 (600)
	1.5 (2)	1.5 (2)	91.4 (300)	91.4 (300)	91.4 (300)	164.6 (540)
		0.75 (1)	91.4 (300)	91.4 (300)	91.4 (300)	164.6 (540)
		0.55 (0.75)	91.4 (300)	91.4 (300)	91.4 (300)	164.6 (540)
		0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	164.6 (540)
	0.75 (1)	0.75 (1)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
		0.55 (0.75)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
		0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
	0.55 (0.75)	0.55 (0.75)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
		0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
	0.37 (0.5)	0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
4 kHz	2.2 (3)	2.2 (3)	102.1 (335)	91.4 (300)	102.1 (335)	182.9 (600)
		1.5 (2)	102.1 (335)	91.4 (300)	102.1 (335)	182.9 (600)
		0.75 (1)	102.1 (335)	91.4 (300)	102.1 (335)	182.9 (600)
	1.5 (2)	1.5 (2)	91.4 (300)	91.4 (300)	91.4 (300)	129.5 (425)
		0.75 (1)	91.4 (300)	91.4 (300)	91.4 (300)	129.5 (425)
		0.55 (0.75)	91.4 (300)	91.4 (300)	91.4 (300)	129.5 (425)
		0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	129.5 (425)
	0.75 (1)	0.75 (1)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
		0.55 (0.75)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
		0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
	0.55 (0.75)	0.55 (0.75)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
		0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)
	0.37 (0.5)	0.37 (0.5)	91.4 (300)	91.4 (300)	91.4 (300)	114.3 (375)

Important:

The recommended drive carrier frequency is 2 kHz. This carrier frequency should be used for the majority of applications.

If a carrier frequency greater than 2 kHz must be used, the absolute maximum is 4 kHz. Refer to the information below and the chart on page 2 for additional application restrictions.

Installation

The following steps will guide you through mounting the Reflected Wave Reduction Device.



ATTENTION: To avoid a shock hazard, ensure that all power to the drive has been removed before proceeding. In addition, wait 1-2 minutes for the DC bus to discharge.



ATTENTION: The Reflected Wave Reduction Device surfaces may become hot enough to cause serious burns. This must be considered when mounting and during use.

1. Assure that all power has been removed from the drive.

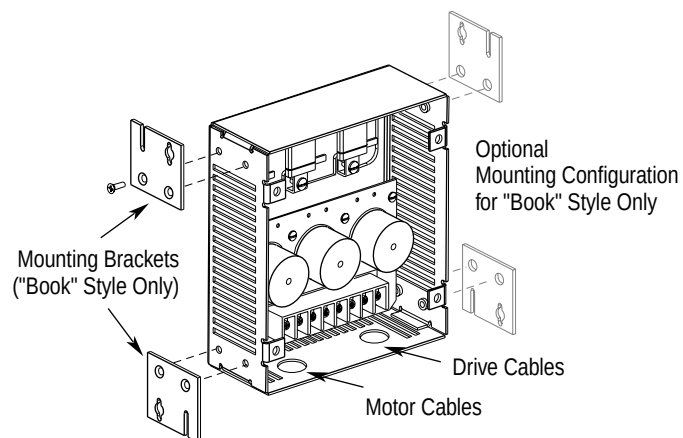
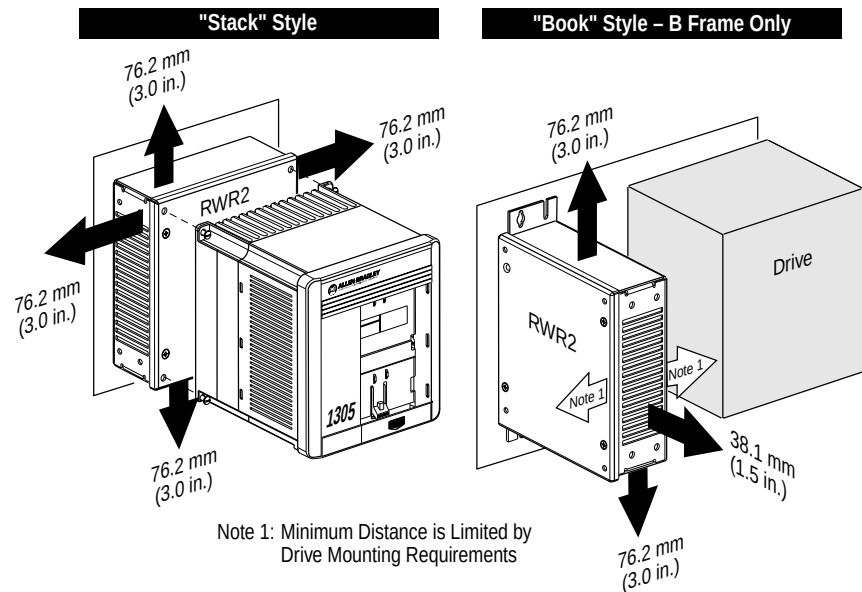
Mounting

2. Determine the best mounting location for your device style. The device must be mounted on a vertical metal surface and oriented so the wiring knockouts are on the bottom – The device must be mounted within 3.0 meters (10 feet) of the drive. The 160 AC Drive may not be mounted on top of the RWR2 in the “Stack” configuration.

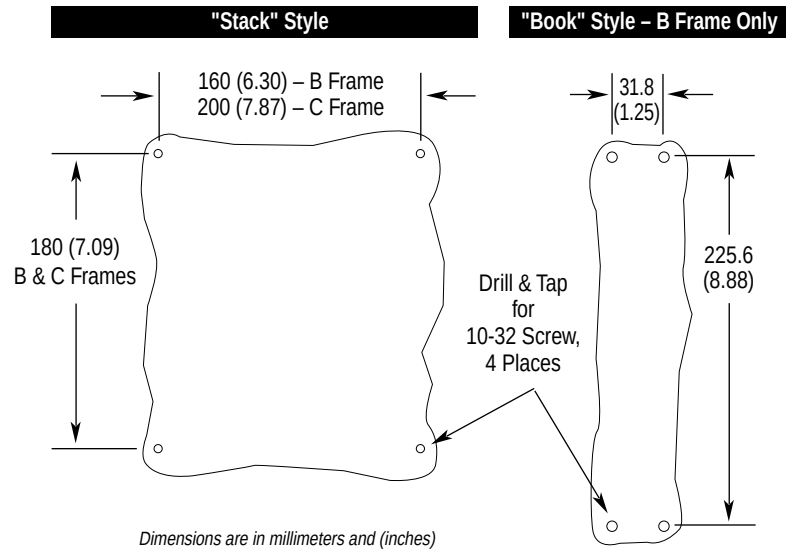
The mounting brackets on “Book” style devices can be placed on either side of the chassis, allowing different mounting configurations (see drawing below).

Important: To assure proper heat dissipation, minimum clearances must be maintained as shown below.

Dimensions indicate minimum clearances.

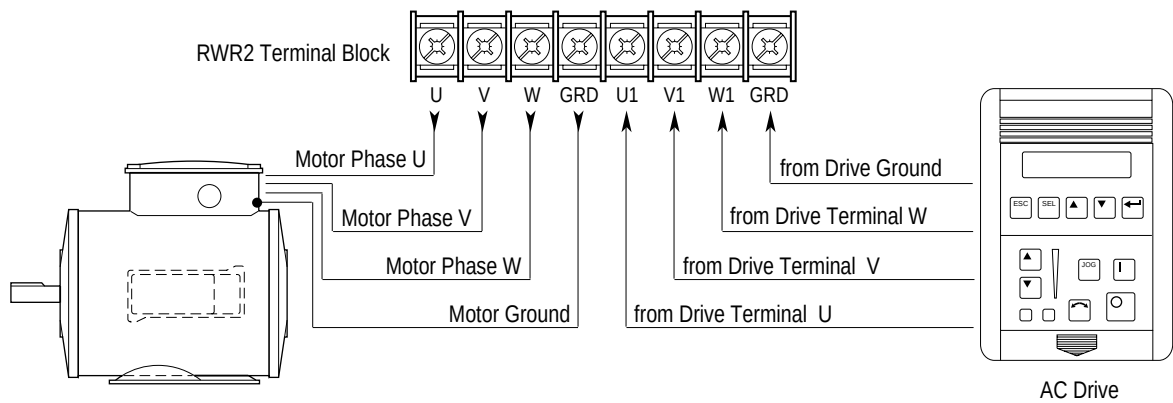


3. Use the figure below or an actual unit to mark the mounting holes. Drill and tap the four (4) device mounting holes.



Wiring

4. Wire the device as indicated below. The maximum and minimum wire size accepted by the RWR2 terminal block is 4.0 and 0.75 mm² (10 and 18 AWG). Use Copper wire only with a minimum temperature rating of 75 degrees C. Maximum torque is 1.81 N-m (16 lb.-in.).

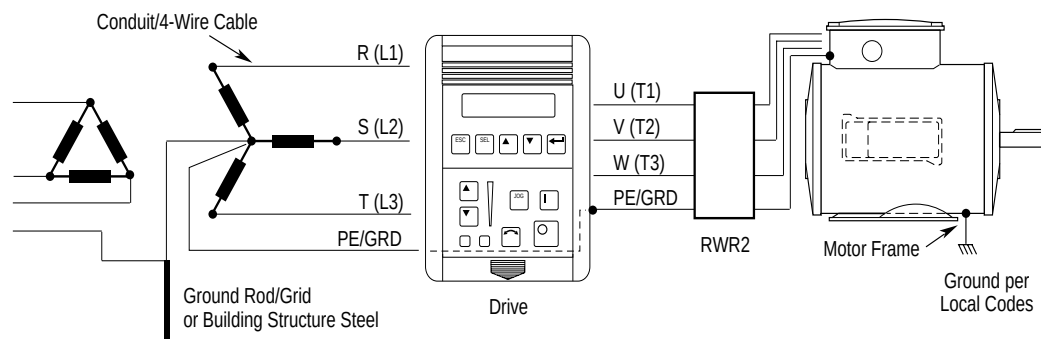


Grounding

- Follow the recommended grounding practices provided in your drive User Manual. The following diagram shows an example of system grounding practices.



ATTENTION: National Codes and standards (NEC, VDE, BSI, etc.) and local codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire types, conductor sizes, branch circuit protection and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.



Drive Programming

- The recommended drive carrier frequency for optimal RWR2 performance is 2 kHz. The maximum carrier frequency allowed is 4 kHz. If the drive default is higher than this maximum, the drive must be reprogrammed. Refer also to the Maximum Cable Length tables on pages 4 and 5 for further information.
- 1305 Drives – Parameter 143 (Cable Length) should be set to “Long” when using the RWR2.
- Check for proper operation.



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