

1321-Mxxx Common Mode Chokes

Catalog Number 1321-M001, 1321-M009, 1321-M048, 1321-M180, and 1321-M670)

What these Instructions Contain

These instructions contain information to install a 1321-Mxxx Open Style Common Mode choke properly. Recommended mounting and connection procedures are included. Major topics and page numbers are listed below.

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Where this Option is Used

The 1321-Mxxx Common Mode Choke Option can be installed with the following Allen-Bradley products:

PowerFlex Drives

- PowerFlex® 4-Class AC drives
- PowerFlex® 520-Series AC drives
- PowerFlex® 7-Class AC drives
- PowerFlex® 750-Series AC drives

Allen-Bradley Legacy Drives

- 1305 AC drives
- 1336 PLUS™ AC drives
- 1336 PLUS™ II AC drives
- 1336 IMPACT™ AC drives
- 1336 FORCE™ AC drives

When installed at the drive output, the common mode choke helps to guard against interference with other electrical equipment (programmable controllers, sensors, analog circuits, and so forth). In addition, reducing the PWM carrier frequency reduces the effects and lowers the risk of common mode noise interference. [Table 1](#) and [Table 2](#) list the common mode chokes available for each drive rating.

What this Option Contains

Each 1321-Mxxx Common Mode Choke Kit includes the Common Mode core and a mounting bracket where applicable. Some models also contain a terminal block and wiring.

More Resources

The following table lists publications that provide information on power conditioning devices.

Resource	Description
1321 Power Conditioning Products Technical Data, publication 1321-TD001	Information on products that condition power line disturbances for AC drives.
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001	Basic information needed to properly wire and ground PWM AC drives.
Drives in Common Bus Configurations, publication DRIVES-AT002	Guidelines, considerations, and limitations for the installation of PowerFlex drives used in common bus applications.

You can view or download publications at <http://literature.rockwellautomation.com>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or sales representative.

To find your local Allen-Bradley distributor or sales representative, visit <http://www.rockwellautomation.com/locations>.

Selection Guidelines

See [Table 1](#) or [Table 2](#) when selecting an open style 1321-M type Common Mode Choke for your particular drive.

Table 1 Common Mode Choke Selection for PowerFlex Drives

Type of Choke	PowerFlex Drive	Ratings	Choke Catalog No.
Open Style, 1 A	All PowerFlex Drives	Communication Cables, Analog Signal Cables, and so forth	1321-M001
Open Style, 9 A (with terminal strip)	PowerFlex 4M/4/40/40P	0.2...1.1 kW (0.25...2 HP) 100...115V 0.2...1.5 kW (0.25...2 HP) 200...240V 0.4...2.2 kW (0.5...3 HP) 380...480V	1321-M009
	PowerFlex 400	2.2 kW (3 HP) 400...480V	
	PowerFlex 520-Series	0.2...1.1 kW (0.25...1.5 HP) 100...120V 0.2...1.1 kW (0.25...2 HP) 208...240V 0.4...2.2 kW (0.5...3 HP) 400...480V	
	PowerFlex 7-Class	0.3...2.2 kW (0.5...3 HP) 208...230V 0.4...4 kW (0.5...5 HP) 400...480V	
	PowerFlex 750-Series	0.75...4 kW (0.5...5 HP) 400...480V	
Open Style, 48 A	PowerFlex 4M/4/40/40P	2.2...7.5 kW (3...10 HP) 200...240V 2.2...11 kW (3...15 HP) 380...480V 2.2...11 kW (3...15 HP) 600V	1321-M048
	PowerFlex 400	2.2...11 kW (3...15 HP) 200...240V 4...22 kW (5...30 HP) 380...480V	
	PowerFlex 520-Series	2.2...14 kW (3...20 HP) 200...240V 4...22 kW (5...30 HP) 400...480V 5.5...22 kW (7.5...30 HP) 600V	
	PowerFlex 7-Class	2.2...11 kW (3...15 HP) 208...240V 4...22 kW (5...30 HP) 400...480V 5.5...37 kW (10...40 HP) 600V	
	PowerFlex 750-Series	5.5...22 kW (7.5...30 HP) 400...480V 5.5...37 kW (7.5...40 HP) 600...690V	
Open Style, 180 A	PowerFlex 7-Class	14...44 kW (20...60 HP) 208...240V 30...110 kW (40...150 HP) 400...480V 45...132 kW (50...150 HP) 600V	1321-M180
	PowerFlex 750-Series	30...90 kW (40...125 HP) 400...480V 45...132 kW (50...150 HP) 600...690V	

Type of Choke	PowerFlex Drive	Ratings	Choke Catalog No.
Open Style, 670 A	PowerFlex 7-Class	55...75 kW (75...100 HP) 208...240V 149...373 kW (200...500 HP) 400...480V 149...522 kW (200...700 HP) 600V	1321-M670
	PowerFlex 750-Series	110...447 kW (150...600 HP) 400...480V 149...597 kW (200...800 HP) 600...690V	

Table 2 Common Mode Choke Selection for Allen-Bradley Legacy Drives

Type of Choke	Allen-Bradley Drive	Ratings	Choke Catalog No.
Open Style, 1 A	All Legacy Drives	Communication Cables, Analog Signal Cables, and so forth	1321-M001
Open Style, 9 A (with terminal strip)	1305, 1336 PLUS, and 1336 PLUS II	0.37...2.2 kW (0.5...2 HP) 230V 0.37...3.7 kW (0.5...5 HP) 480V	1321-M009
	1336 IMPACT	0.37...3.7 kW (0.5...5 HP) 480V	
	1336 FORCE	0.75 kW (1 HP) 230V 0.75...2.2 kW (1...3 HP) 480V	
Open Style, 48 A	1336 PLUS and 1336 PLUS II	2.2...11 kW (3...15 HP) 230V 5.5...22 kW (7.5...30 HP) 480V 0.75...30 kW (1...40 HP) 600V	1321-M048
	1336 IMPACT	5.5...22 kW (7.5...30 HP) 480V 5.5...30 kW (7.5...40 HP) 600V	
	1336 FORCE	2.2...11 kW (3...15 HP) 230V 2.2...22 kW (3...30 HP) 480V 0.75...30 kW (1...40 HP) 600V	
Open Style, 180 A	1336 PLUS and 1336 PLUS II	15...45 kW (20...60 HP) 230V 30...112 kW (40...150 HP) 480V 37...112 kW (50...150 HP) 600V	1321-M180
	1336 IMPACT	30...112 kW (40...150 HP) 480V 37...93 kW (50...125 HP) 600V	
	1336 FORCE	15...45 kW (20...60 HP) 230V 30...112 kW (40...150 HP) 480V 37...112 kW (50...150 HP) 600V	
Open Style, 670 A	1336 PLUS and 1336 PLUS II	56...93 kW (75...125 HP) 230V 112...448 kW (150...600 HP) 480V 149...448 kW (200...600 HP) 600V	1321-M670
	1336 IMPACT	112...448 kW (150...600 HP) 480V 149...448 kW (200...600 HP) 600V	
	1336 FORCE	56...93 kW (75...125 HP) 230V 112...448 kW (150...600 HP) 480V 149...448 kW (200...600 HP) 600V	

Installation

Mount all choke assemblies as close to the bottom of the drive as possible. Leave sufficient distance between the choke assembly and the drive to provide clearance for cables and wires to be installed at the drive. All choke assemblies, except catalog number 1321-M001 and 1321-M009 assemblies, are supplied with mounting brackets. Dimensions for mounting each assembly are provided in the [Mounting Dimensions](#) section of this publication. We recommend that you tie wrap the 1321-M001 or 1321-M009 choke assemblies to a solid object such as cabinet sheet metal or brackets when wiring is completed.

1321-M001 Choke Assembly Mounting and Wiring

To install the choke assembly, follow these steps.

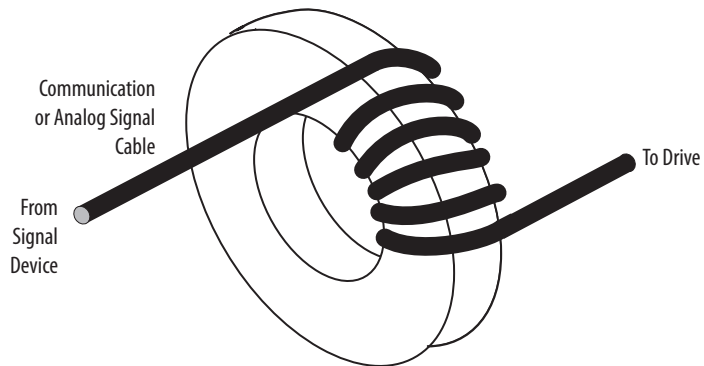
1. Remove all power that is connected to the system.



ATTENTION: Electric shock can cause injury or death. Remove all power before working with this product. Verify that the voltage on the drive bus capacitors has discharged. The voltage must be zero.

2. Wrap the communication or analog signal cable through the choke assembly five times as shown in the following figure.

If the wire gauge is too large to allow five wraps, use fewer wraps. However, fewer wraps diminish the effectiveness of the installation.



3. Leave enough cable between the choke assembly and the drive to provide the following:
 - Suitable clearance for the communication cable to be terminated at the drive.
 - Sufficient space for the choke assembly to be mounted near the bottom of the drive cabinet.
4. After terminating the communication or analog signal wire at each end, tie wrap the choke assembly to the cabinet sheet metal or another suitable location to provide support for the assembly.

1321-M009 Choke Assembly Mounting and Wiring

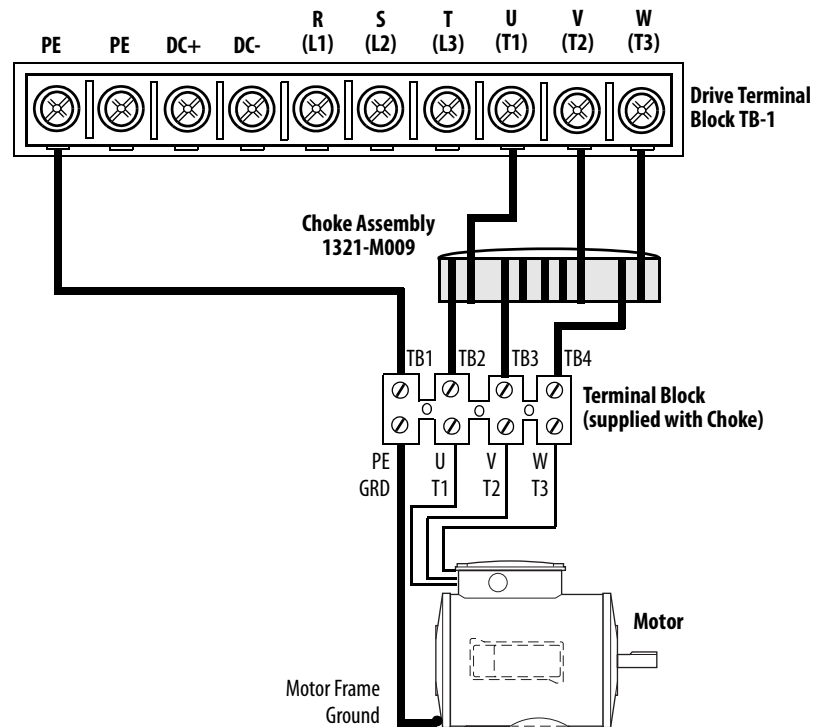
To install the choke assembly, follow these steps.

1. Remove all power that is connected to the system.



ATTENTION: Electric shock can cause injury or death. Remove all power before working with this product. Verify that the voltage on the drive bus capacitors has discharged. The voltage must be zero.

2. A 4-position terminal block with pre-installed wires is included with the 1321-M009 choke assembly.
 - a. Connect the choke assembly terminal block wires to terminals U/T1, V/T2, and W/T3 on drive terminal block TB-1.
 - b. Leave at least 2 inches (50 mm) clearance between the choke assembly and the drive terminals.
 - c. Route the green 12 AWG wire from the choke terminal block **outside** of the choke assembly, and connect it to the PE (Power Earth) ground terminal on drive terminal block TB-1 as shown in the following figure.
3. Route motor wires to the U/T1, V/T2, and W/T3 choke terminals, and connect them as shown in the following figure.



4. Connect a 12 AWG ground wire from the choke terminal block PE GRD terminal to the ground point on the motor frame.
5. When all wiring is completed, tie wrap the choke assembly to the cabinet sheet metal or another suitable location to provide support for the assembly.

If the terminal block supplied with the choke is to be panel mounted, an insulation sheet must be used between the terminal block and the sheet metal.

1321-M048 Choke Assembly Mounting and Wiring

To install the choke assembly, follow these steps.

1. Remove all power that is connected to the system.



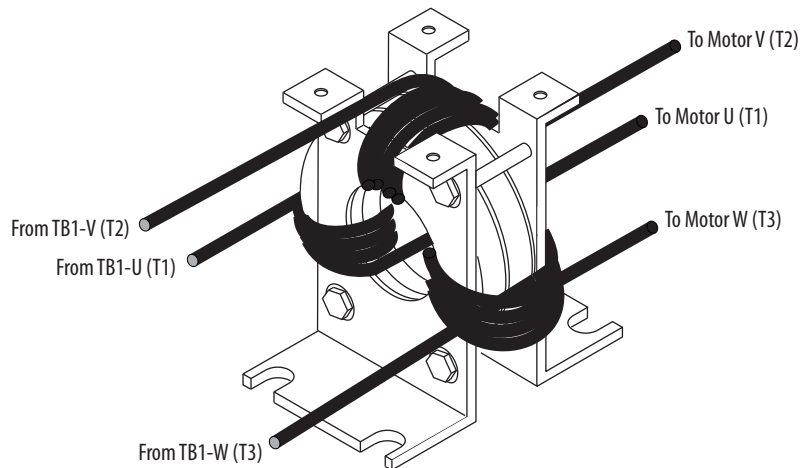
ATTENTION: Electric shock can cause injury or death. Remove all power before working with this product. Verify that the voltage on the drive bus capacitors has discharged. The voltage must be zero.

2. Mount the 1321-M048 choke assembly on a metal surface as near as possible to the bottom of the drive cabinet using 1/4-20 hardware.

Leave sufficient clearance between the choke assembly and the drive terminals to allow access to the terminals and provide proper bend radius for the wires.

3. Route the wires through the choke assembly and wrap each wire around the choke four times as shown in the following figure before routing the wires to the drive.

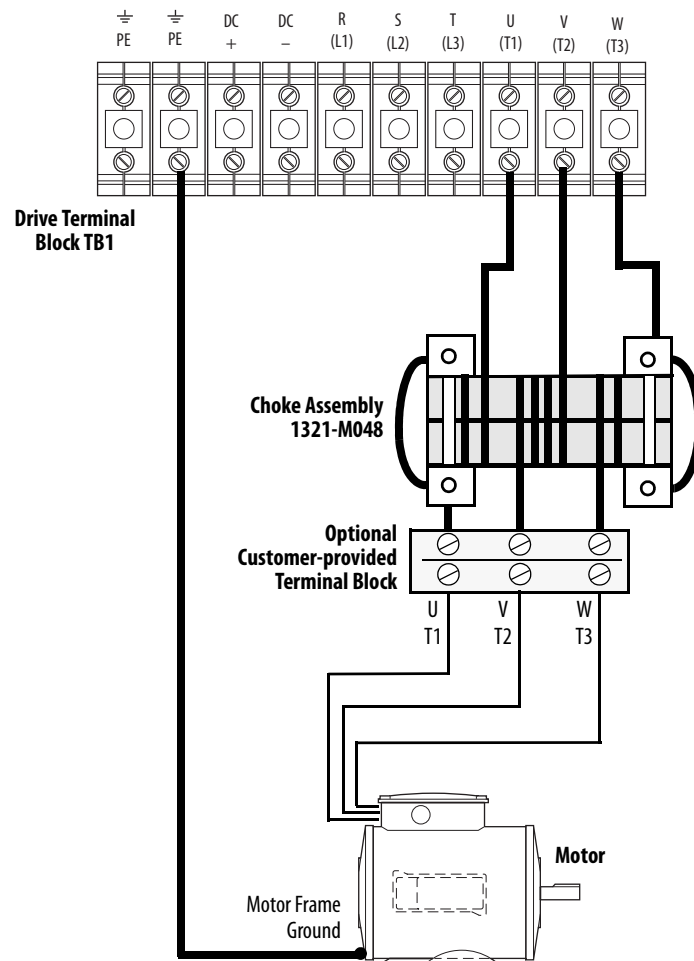
Wrap each wire in the same direction; start on the outside of the coil and exit inside the coil. If possible, maintain a 120° radial separation of the wire wraps.



4. Connect one end of the wrapped wires from the choke assembly to drive terminals U (T1), V (T2), and W (T3) on terminal block TB1.

- Connect the other end of the wrapped wires to motor terminals U/T1, V/T2, and W/T3 as shown in the following figure.

An optional customer-provided terminal block, which is shown in the following figure, can be used between the choke assembly and the motor if desired. A properly sized ground conductor from the motor frame is also required.



1321-M180 Choke Assembly Mounting and Wiring

To install the choke assembly, follow these steps.

1. Remove all power that is connected to the system.



ATTENTION: Electric shock can cause injury or death. Remove all power before working with this product. Verify that the voltage on the drive bus capacitors has discharged. The voltage must be zero.

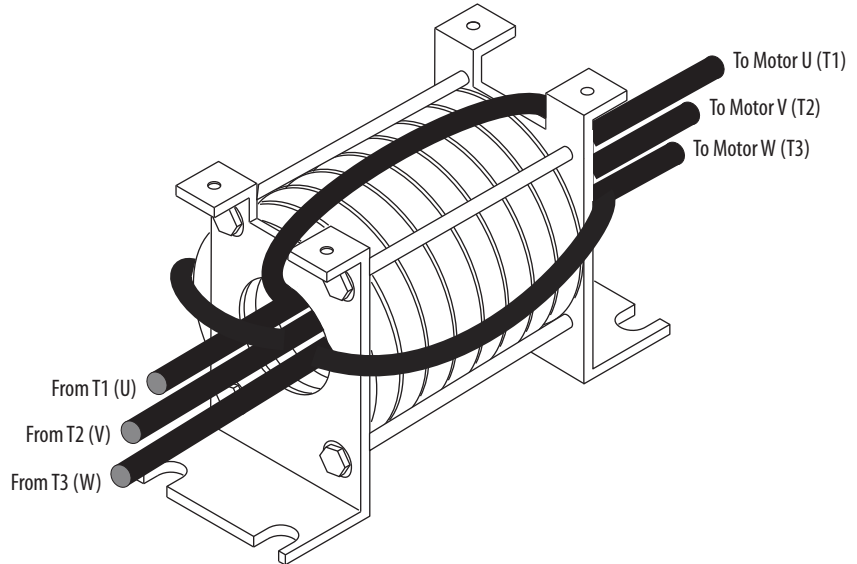
2. Mount the 1321-M180 choke assembly on a metal surface near the bottom of the drive cabinet using 1/4-20 hardware.

Leave sufficient clearance between the choke assembly and the drive terminals to allow access to the terminals and provide proper bend radius for the wires.

3. If possible, wrap each wire once around the core as shown in the following figure before terminating it at the drive terminals.

If possible, maintain a 120° radial separation of the wire wraps.

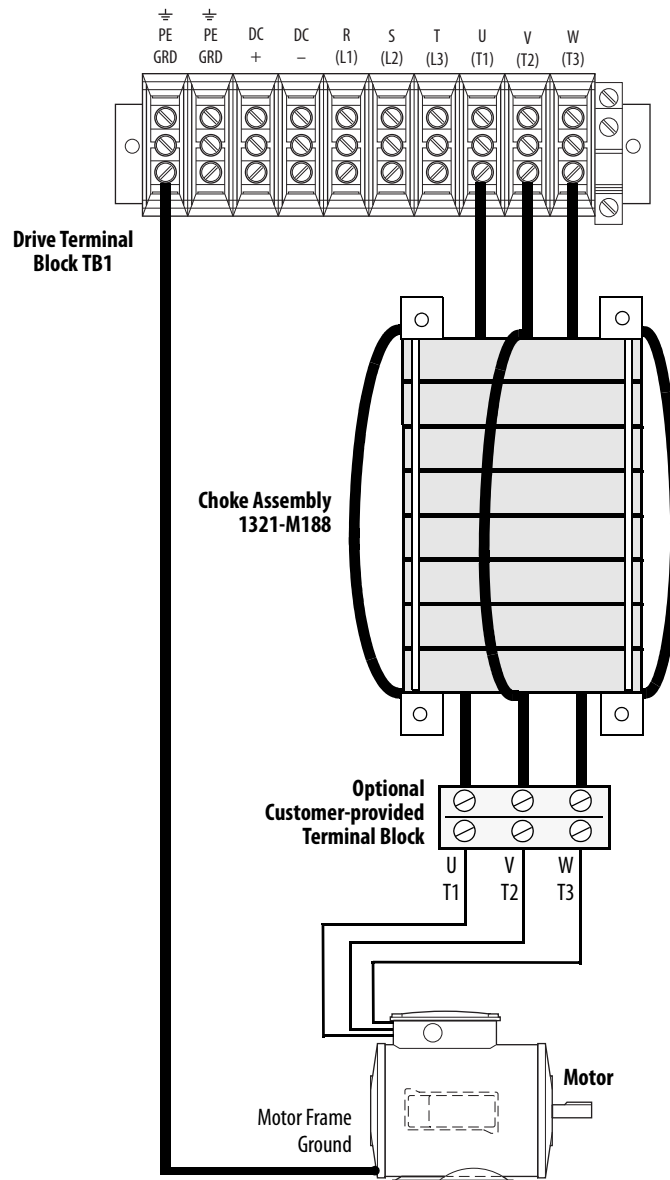
If the motor wire gauge is too thick to allow one wrap, route the wires straight through the choke assembly to the drive TB-1 block. However, routing the motor wires straight through the core diminishes the effectiveness of the installation.



4. Connect the motor wires to the U (T1), V (T2), and W (T3) terminals on drive terminal block TB1 as shown in the following figure.

An optional terminal strip can be used between the choke assembly and the motor if desired. A properly sized ground conductor from the motor frame is also required.

5. Route the ground conductor around (not through) the choke and connect it to the PE (Power Earth) ground terminal on drive terminal block TB1.



1321-M670 Choke Assembly Mounting and Wiring

To install the choke assembly, follow these steps.

1. Remove all power that is connected to the system.

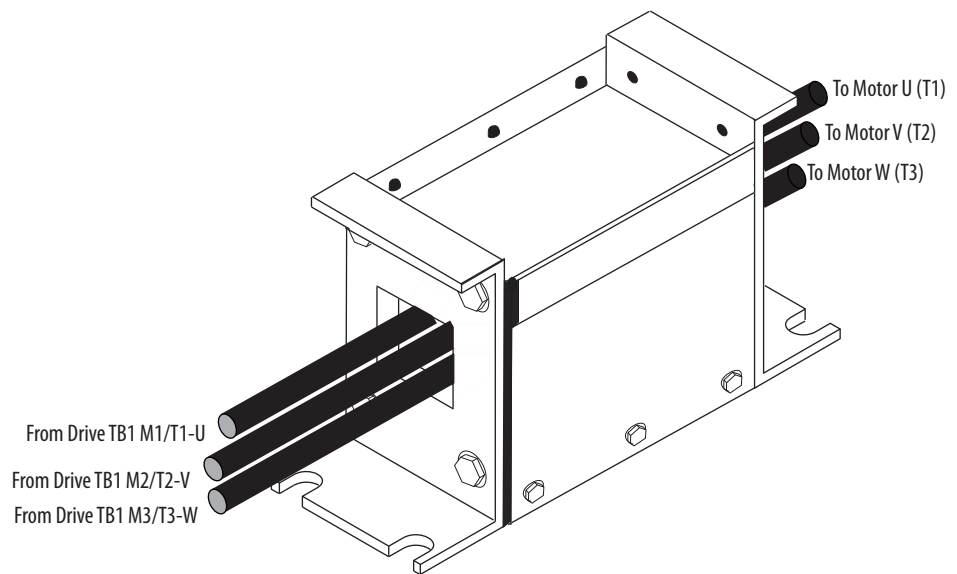


ATTENTION: Electric shock can cause injury or death. Remove all power before working with this product. Verify that the voltage on the drive bus capacitors has discharged. The voltage must be zero.

2. Mount the 1321-M670 choke assembly on a metal surface near the bottom of the drive cabinet using 1/4-20 hardware.

Leave sufficient clearance between the choke assembly and the drive terminals to allow access to the terminals and provide proper bend radius for the wires.

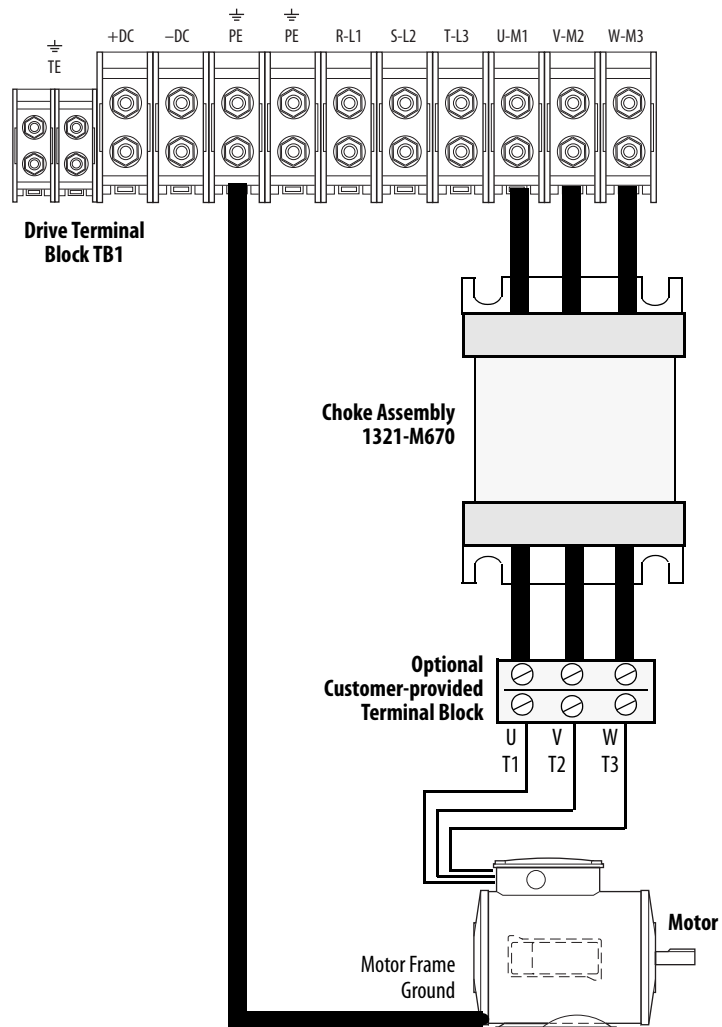
3. Route the motor wires straight through the choke assembly to the drive terminal block TB1 as shown in the following figure, and connect them to the U-M1, V-M2, and W-M3 terminals.



- Connect the motor wires at the U, V, and W terminals on the motor as shown in the following figure.

An optional terminal block can be used between the choke assembly and the motor if desired. A properly sized ground conductor from the motor frame is also required.

- Route the ground conductor around (not through) the choke and connect it to a drive PE (Power Earth) ground terminal on TB1.

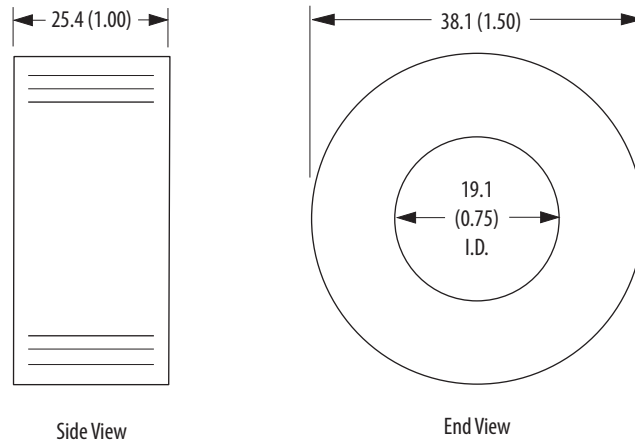


Mounting Dimensions

Dimensions for mounting the choke assemblies that are described in this document are shown in this section.

1321-M001 Choke Assembly

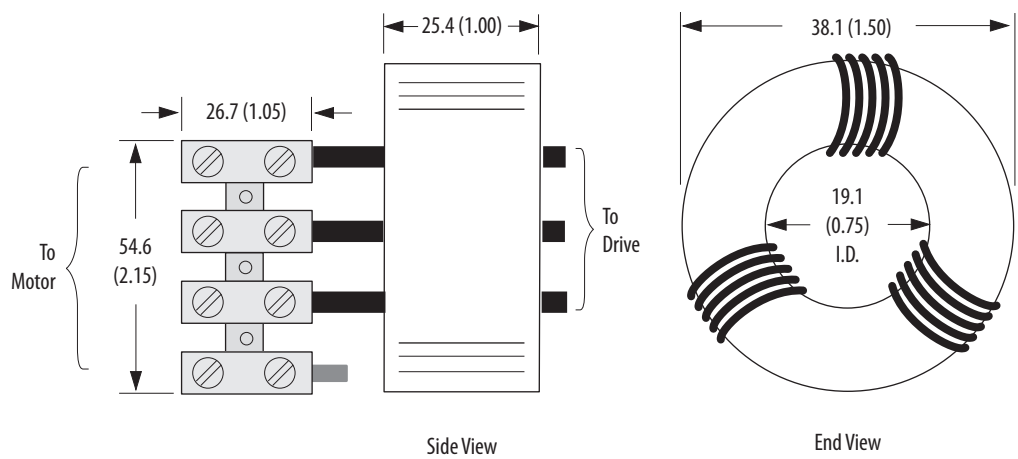
1321-M001 Choke Assembly



Dimensions in mm (inches)

1321-M009 Choke Assembly

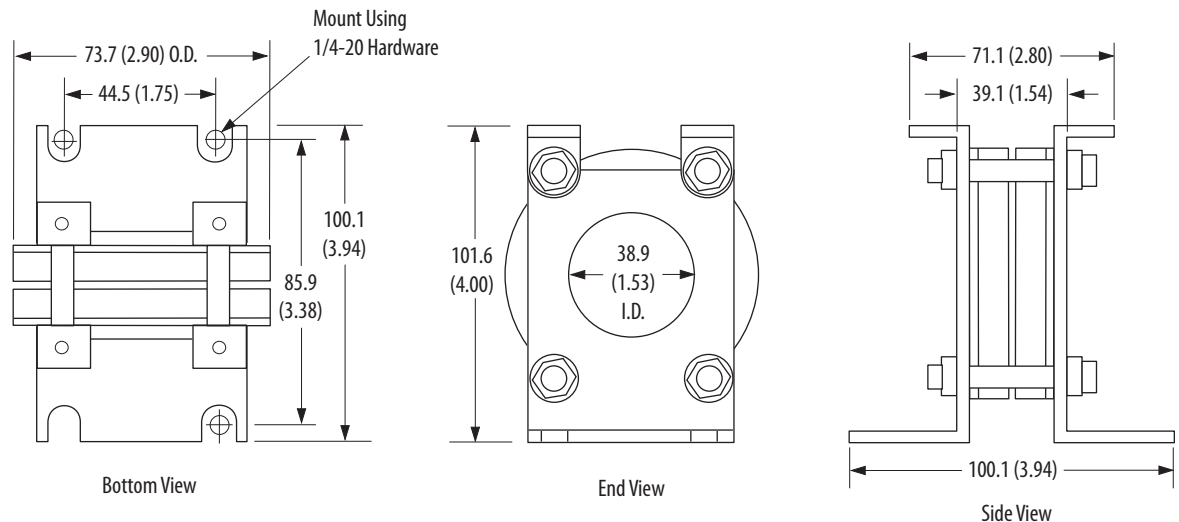
1321-M009 Choke Assembly



Dimensions in inches (mm)

1321-M048 Choke Assembly

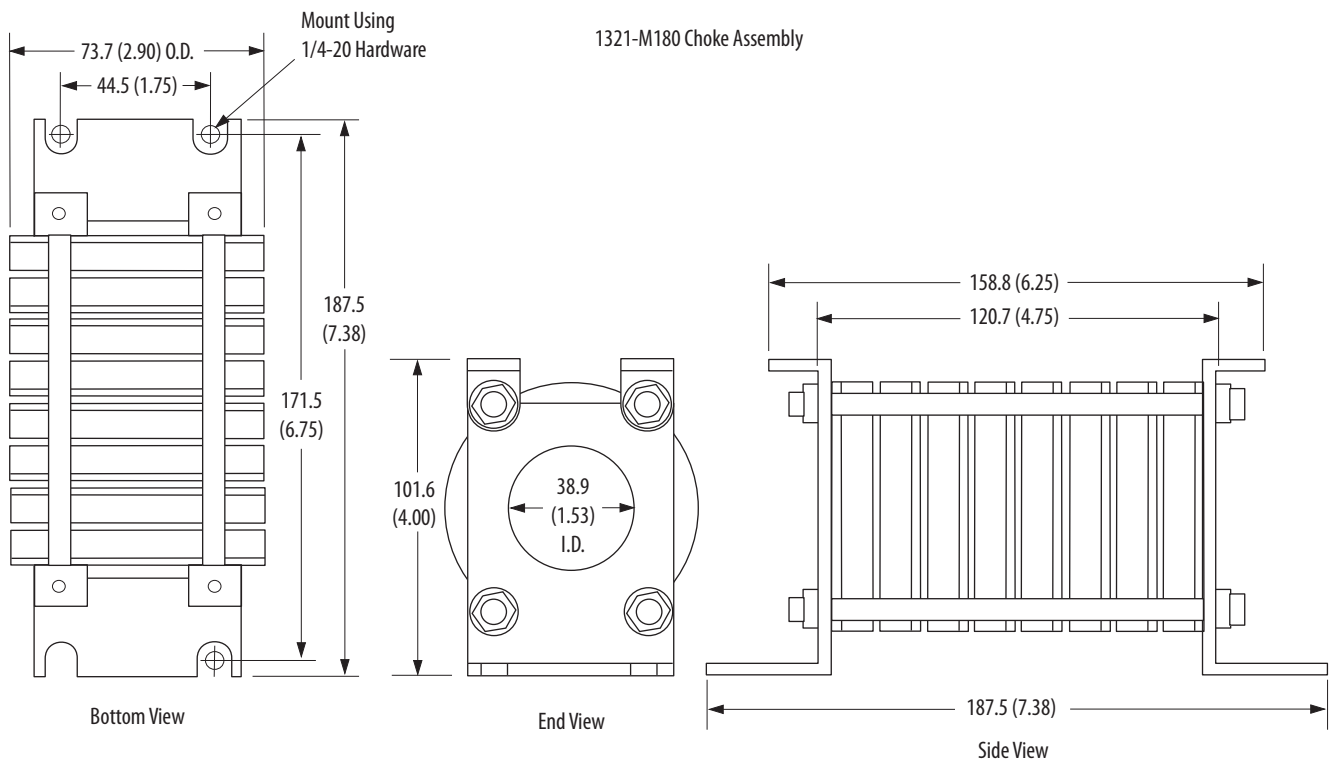
1321-M048 Choke Assembly



Dimensions are in mm (in.)

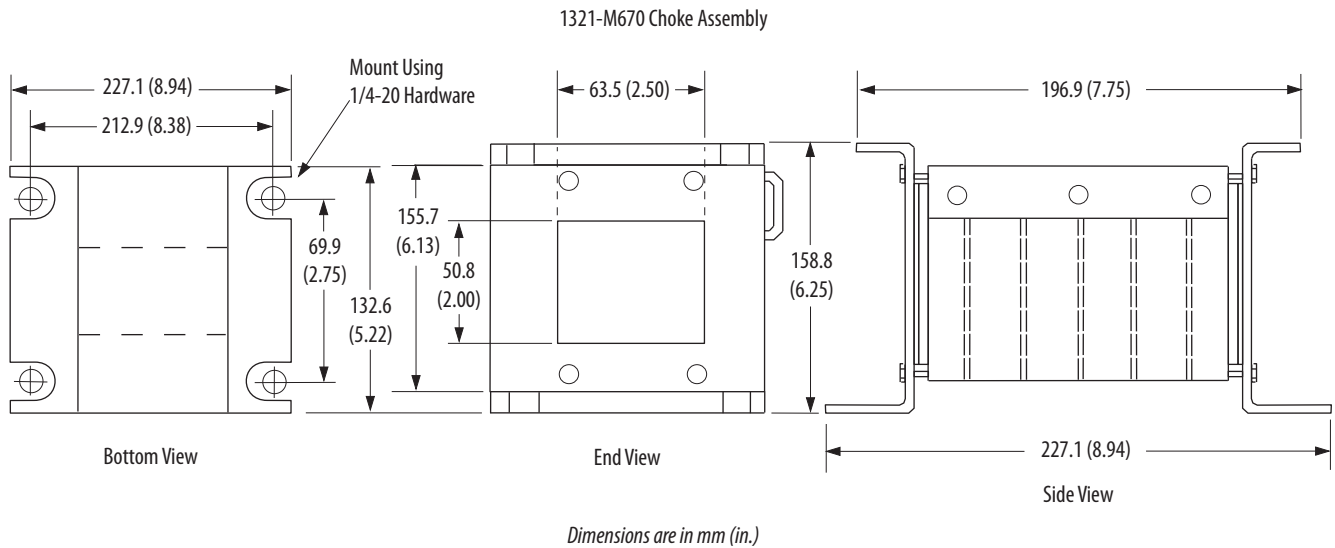
1321-M180 Choke Assembly

1321-M180 Choke Assembly



Dimensions are in mm (in.)

1321-M670 Choke Assembly



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