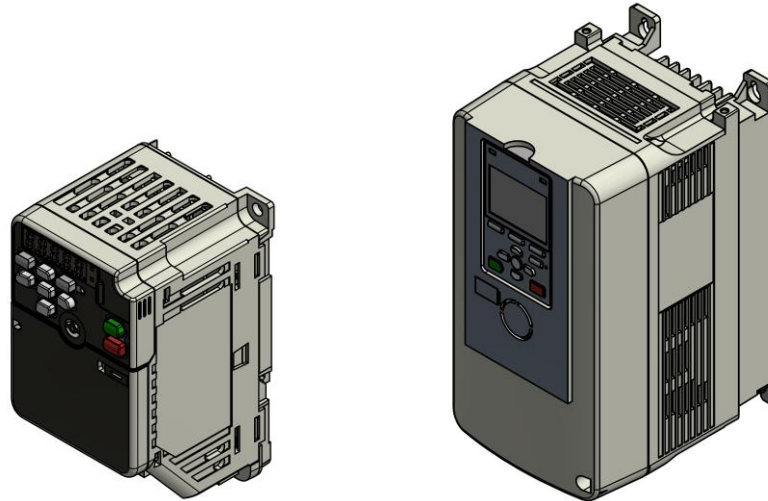


DR Series

DR... Variable Frequency Drives (VFD's)



Product Description

DR... series VFDs precisely control the speed of an AC induction motor. They come pre-programmed for each application to simplify installation.

Optional Accessories

In addition to the VFD, the following optional components may be ordered with the drive:

- NEMA 1 Kit
- Braking Resistor
- Braking Unit
- Line Reactor
- Load Reactor

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Recommended Installation Tools

The following tools are recommended for installing the drives:

- Drill
- Drill bit (See DR-1000 for mounting dimensions)
- #2 Phillips screwdriver
- Flathead screwdriver (Sizes Required: 3mm, 6mm)
- Pencil
- Wire strippers
- Wire cutters
- Wire crimpers
- Hacksaw (for Conduit)
- Masking Tape
- Round File
- ¼" or ⅜" Drive Metric Socket Set (larger drives use up to 17mm)

Recommended Installation Consumables

- Conduit and conduit fittings (½", ¾", 1", or larger size depending on wire size)
- Wires (See Table 2 for wire gauge recommendation)
- Mounting Fasteners
- Crimp-on fittings (optional)

Mounting Notes

Installation Inside an Electrical Enclosure

When installing a drive in an electrical enclosure, mount the drive vertically. A DR-...B can be mounted horizontally but requires an external fan mounted in the panel to ensure sufficient airflow to the drive.

Stand-Alone Installation:

When installing a drive stand-alone (not in an electrical enclosure) the drive must be installed vertically and typically a NEMA 1 kit is required by local electrical codes. The NEMA 1 kit allows the installer to attach conduit directly to the drive. See Document DR-1000 for a complete listing of NEMA 1 kit part numbers.

The NEMA 1 kits vary in size between drives and come in different variations. Installation instructions are below for all configurations.

DRN1-Bx-x NEMA 1 Procedure A Kit Install

Compatible with DR...B (GA500) drives under 10HP:

DR-240F16-1B, DR-240F14-1B, DR-240F34-1B, DR-240001-1B, DR-240002-1B, DR-240003-1B, DR-240005-1B, DR-240F16-3B, DR-240F14-3B, DR-240F34-3B, DR-240001-3B, DR-240002-3B, DR-240003-3B, DR-240005-3B, DR-240007-3B, DR-480F12-3B, DR-480001-3B, DR-480002-3B, DR-480003-3B, DR-480005-3B, DR-480007-3B

Components Supplied

Figure 1 shows the components supplied with the DRN1-Bx-x NEMA 1 kit:

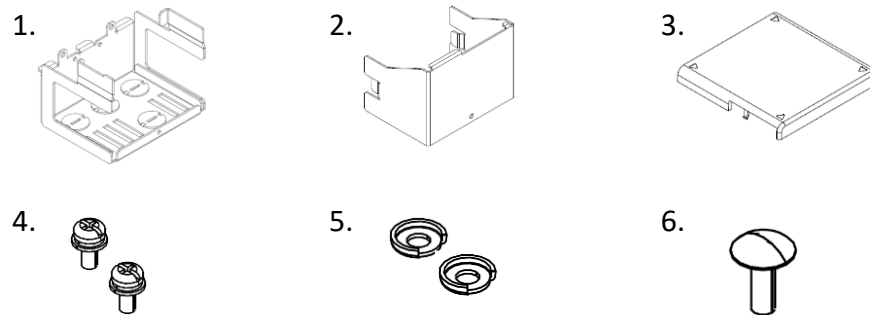


Figure 1: Pieces Supplied with the Procedure A DRN1-Bx-x NEMA 1 Kit

- | | |
|----------------|--------------------------------------|
| 1. Base | 4. (2) Pan head screws |
| 2. Front cover | 5. (2) C-washers |
| 3. Top cover | 6. M4 x 10 mounting truss head screw |

Installation

1. To install the top cover, insert the hooks on the rear side of the top cover into the drive placement holes as shown below. Then push the top cover into place.

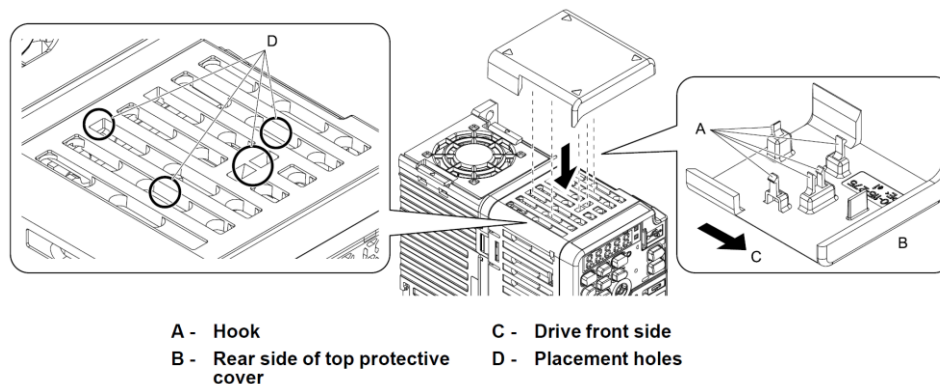


Figure 2: Installing the Top Cover (Procedure A DRN1-Bx-x)

DRN1-Bx-x NEMA 1 Procedure A Kit Install (continued)

- Remove the knock-out holes on the base before installing. This can be done by putting the end of a flathead screwdriver into the center hole and moving up and down. Then file the rough surface to smooth the edges.

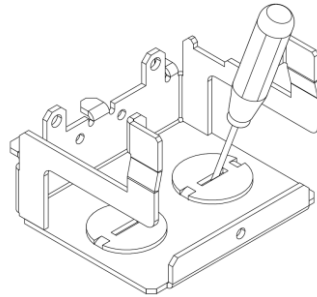
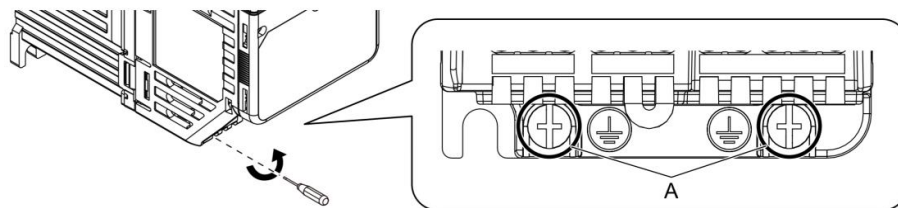


Figure 3: Removing Knock-Out Holes (Procedure A DRN1-Bx-x)

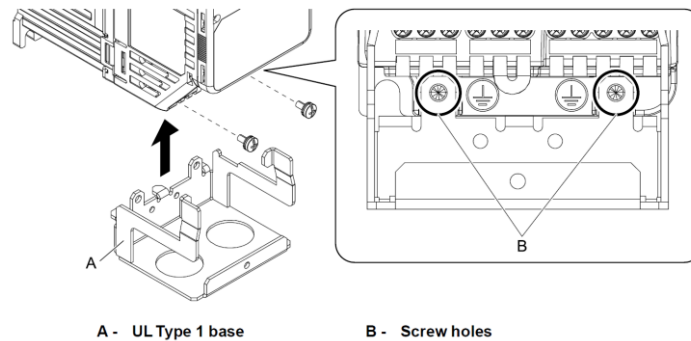
- Remove the drive ground terminal screws



A - Screws

Figure 4: Removing Ground Terminal Screws (Procedure A DRN1-Bx-x)

- Align the base holes with the ground screw holes on the drive. Using the supplied screws, tighten the screws.



A - UL Type 1 base

B - Screw holes

Figure 5: Installing the Base (Procedure A DRN1-Bx-x)

DRN1-Bx-x NEMA 1 Procedure A Kit Install (continued)

- Using the (2) C-Washers and pan head screws, connect one or two ground wires to the base.

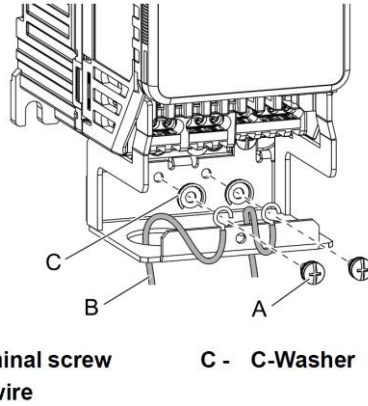


Figure 6: Ground Wiring and Screws (Procedure A DRN1-Bx-x)

- The front cover will slide over the front face of the base and lock into place with the mounting truss head screw. For higher horsepower drives, the cover may have hooks that clip into the drive. If so, refer to the second image below. Insert the clips into the positions shown, then slide down to lock into place and install the mounting truss head screw.

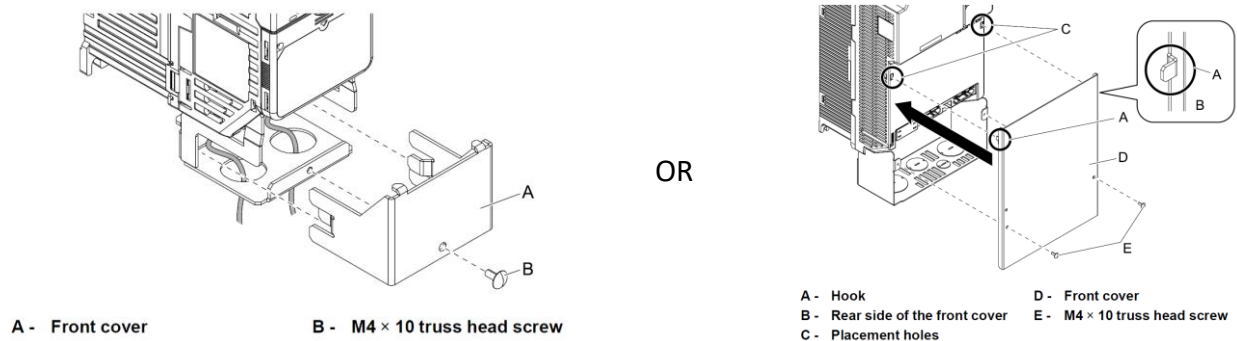


Figure 7: Installing the Front Cover (Procedure A DRN1-Bx-x)

DRN1-Bx-x NEMA 1 Procedure B Kit Install

Compatible with DR...B (GA500) drives 10HP and over:

DR-240015-3B, DR-240020-3B, DR-240025-3B, DR-240030-3B, DR-480010-3B, DR-480015-3B, DR-480020-3B, DR-480025-3B, DR-480030-3B, DR-480040-3B

Components Supplied

Figure 1 shows the components supplied with the DRN1-Bx-x NEMA 1 kit:

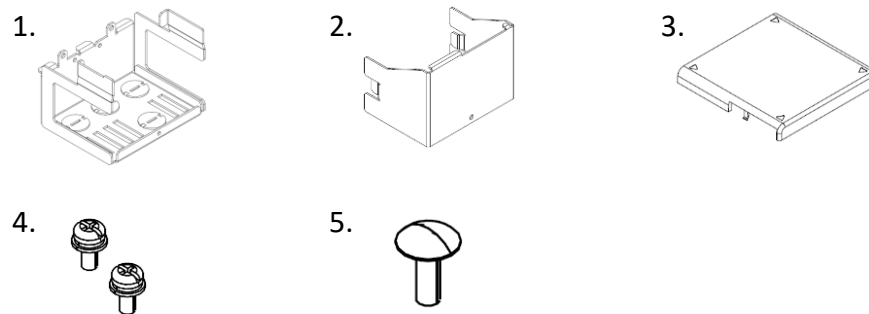


Figure 8: Pieces Supplied with the Procedure B DRN1-Bx-x NEMA 1 Kit

- | | |
|----------------|------------------------|
| 1. Base | 4. (2) Pan head screws |
| 2. Front cover | 5. (2) Mounting Screw |
| 3. Top cover | |

Installation

- To install the top cover, insert the hooks on the rear side of the top cover into the drive placement holes as shown below. The top cover has a single arrow to point towards the front of the drive.

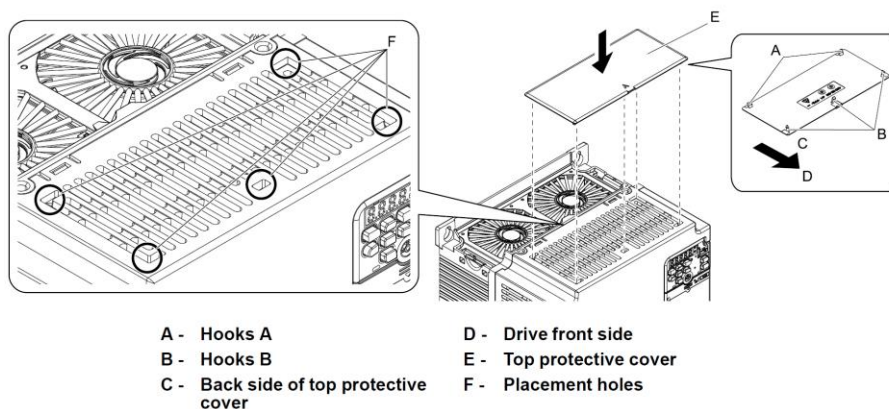


Figure 9: Installing the Top Cover (Procedure B DRN1-Bx-x)

DRN1-Bx-x NEMA 1 Procedure B Kit Install (continued)

2. Remove the knock-out holes on the base before installing. This can be done by putting the end of a flathead screwdriver into the center hole and moving up and down. Then file the rough surface to smooth the edges.

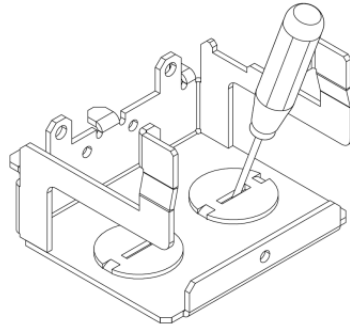
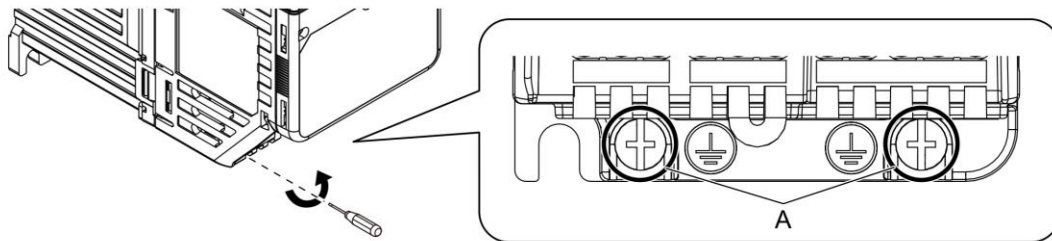


Figure 10: Removing Knock-Out Holes (Procedure B DRN1-Bx-x)

3. Remove the drive ground terminal screws



A - Screws

Figure 11: Removing Ground Terminal Screws (Procedure B DRN1-Bx-x)

4. Align the base holes with the ground screw holes on the drive. Using the supplied screws, tighten the screws.

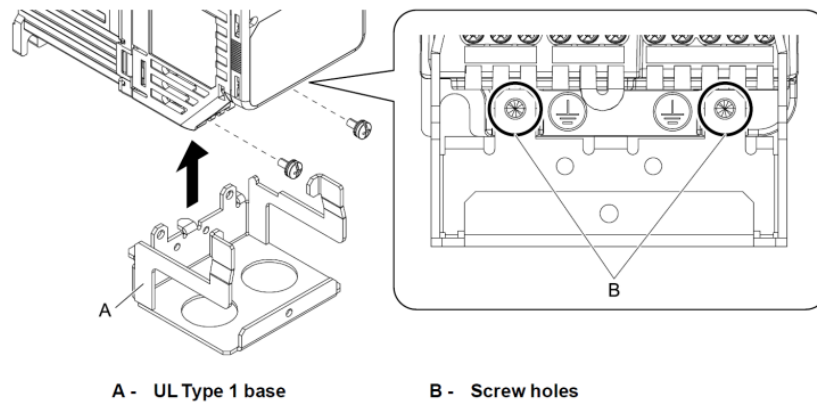
DRN1-Bx-x NEMA 1 Procedure B Kit Install (continued)

Figure 12: Installing the Base (Procedure B DRN1-Bx-x)

5. Using the (2) C-Washers and pan head screws, connect one or two ground wires to the base.

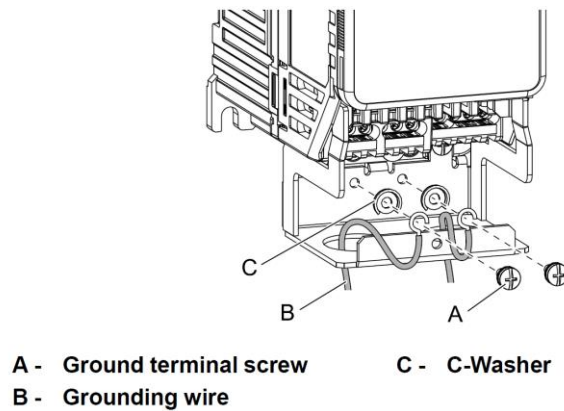


Figure 13: Ground Wiring and Screws (Procedure B DRN1-Bx-x)

DRN1-Bx-x NEMA 1 Procedure B Kit Install (continued)

6. The front cover will slide over the front face of the base and lock into place with the mounting truss head screw. For higher horsepower drives, the cover may have hooks that clip into the drive. If so, refer to the second image below. Insert the clips into the positions shown, then slide down to lock into place and install the mounting truss head screw.

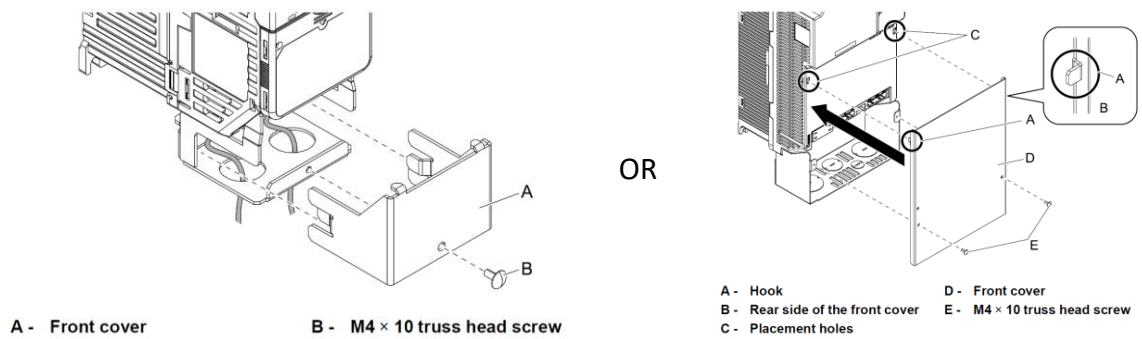


Figure 14: Installing the Front Cover (Procedure B DRN1-Bx-x)

DRN1-C1-5 NEMA 1 Kit Install

Compatible with the following DR...C (GA800) drives:
DR-240040-3C (40HP 240V drive), DR-480050-3C (50HP 480V drive)

Components Supplied

Figure 8 shows the components supplied with the DRN1-C1-5 NEMA 1 kit:

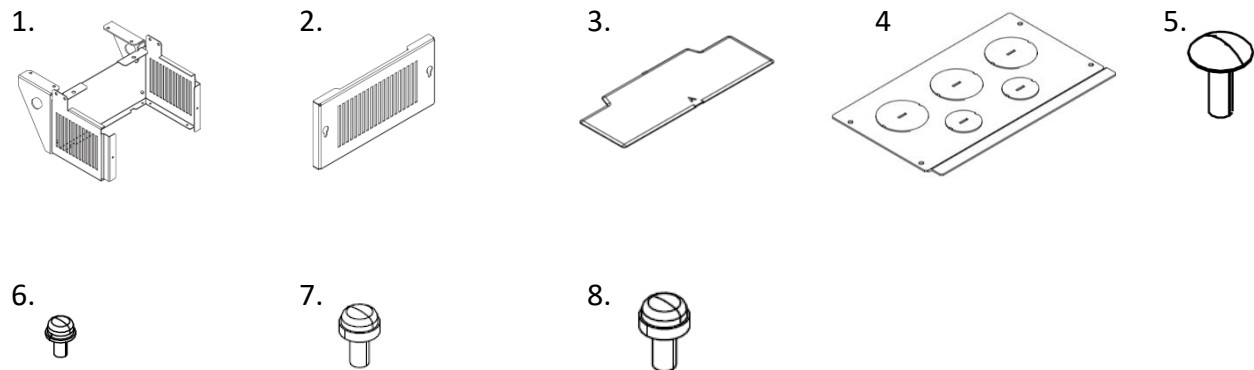


Figure 15: Pieces Supplied with the DRN1-C1-5 NEMA 1 Kit

- | | |
|-------------------------|------------------------------------|
| 1. Base | 5. (2) M4 x 10mm truss head screws |
| 2. Front cover | 6. (8) M4 x 10mm pan head screws |
| 3. Top protective cover | 7. (4) M5 x 14mm pan head screws |
| 4. Conduit bracket | 8. (2) M6 x 14mm pan head screws |

Installation

1. Remove the knock-out holes that will be used on the conduit bracket before installing. This can be done by putting the end of a flathead screwdriver into the center hole and moving up and down. Then file the rough surface to smooth the edges.

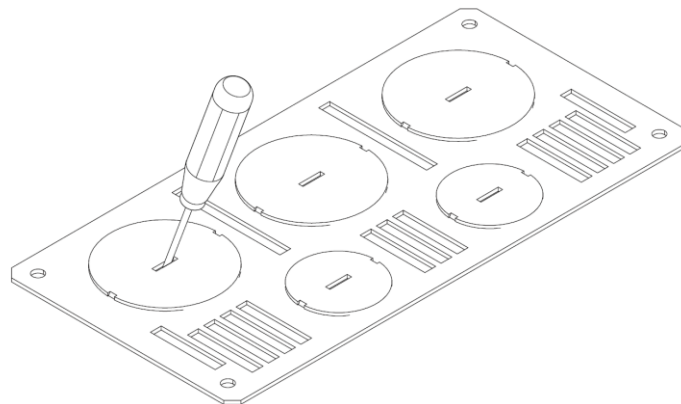
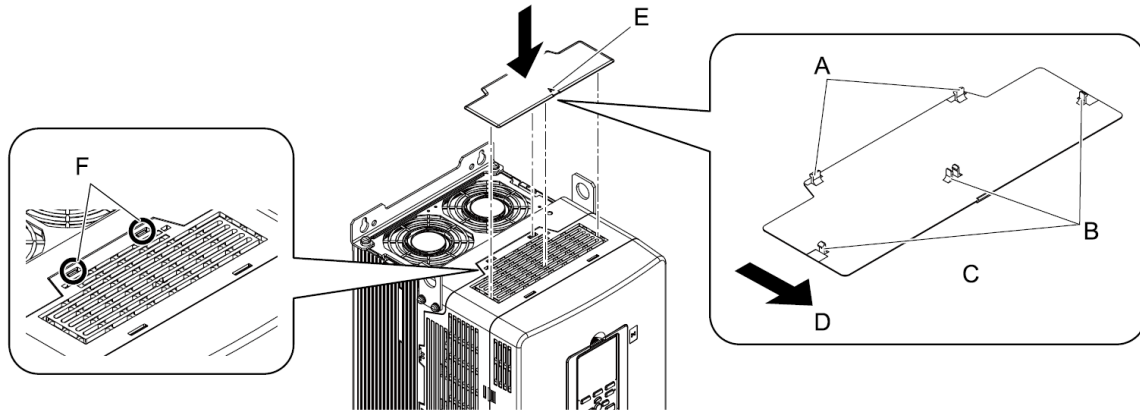


Figure 16: Removing Knock-Out Holes (DRN1-C1-5)

DRN1-C1-5 NEMA 1 Kit Install (continued)

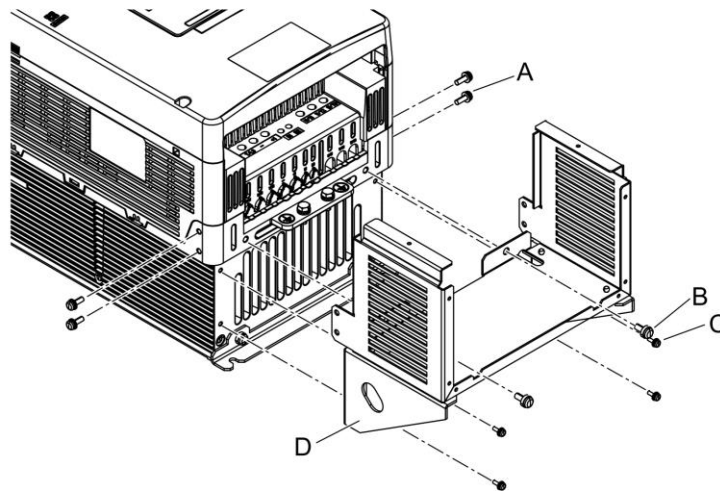
2. Install the top protective cover by snapping into place as shown. The arrow should point towards the front of the drive.



- | | |
|---------------------------------------|-------------------------------|
| A - Back hooks | D - Drive front side |
| B - Front hooks | E - Mark |
| C - Back side of top protective cover | F - Temporary placement holes |

Figure 17: Installing the Top Cover (DRN1-C1-5)

3. Mount the base to the drive as shown below.



- | | |
|-----------------------------|-----------------------------|
| A - M5 × 14 pan head screws | C - M4 × 10 pan head screws |
| B - M6 × 14 pan head screws | D - Base |

Figure 18: Installing the Base (DRN1-C1-5)

DRN1-C1-5 NEMA 1 Kit Install (continued)

4. Install the conduit bracket to the base.

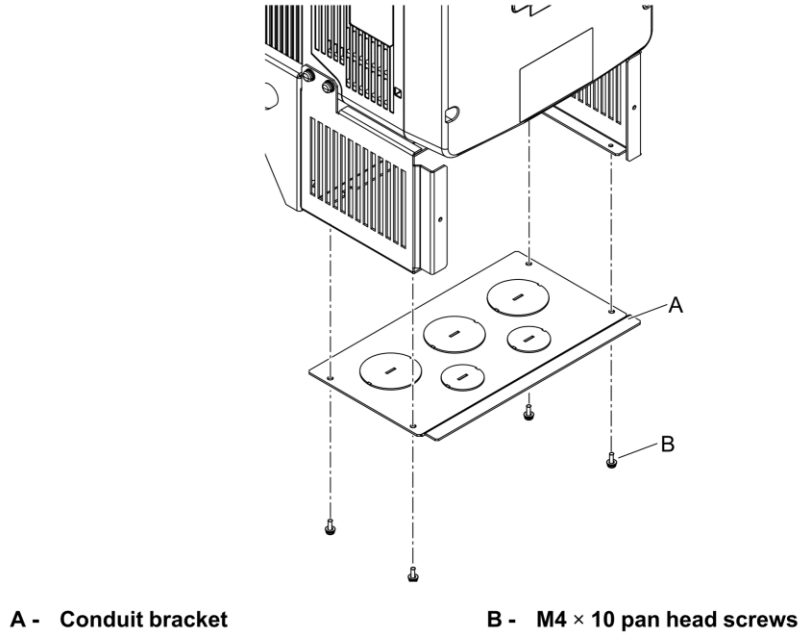


Figure 19: Install the Conduit Bracket (DRN1-C1-5)

5. Install the front cover.

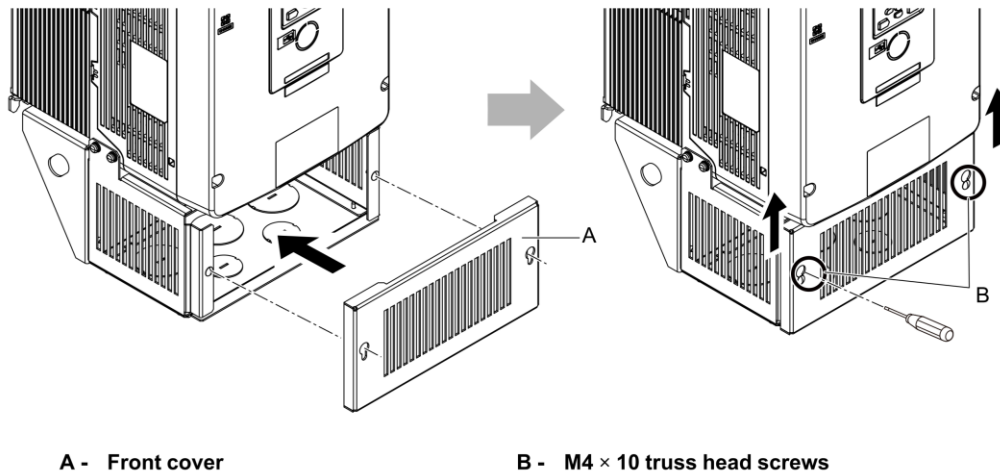


Figure 20: Install the Front Cover (DRN1-C1-5)

DRN1-C1-6 NEMA 1 Kit Install

Compatible with the following DR...C (GA800) drives:

DR-240050-3C (50HP 240V drive), DR-480060-3C (60HP 480V drive), DR-480075-3C (75HP 480V drive)

Components Supplied

Figure 14 shows the components supplied with the DRN1-C1-6 NEMA 1 kit:

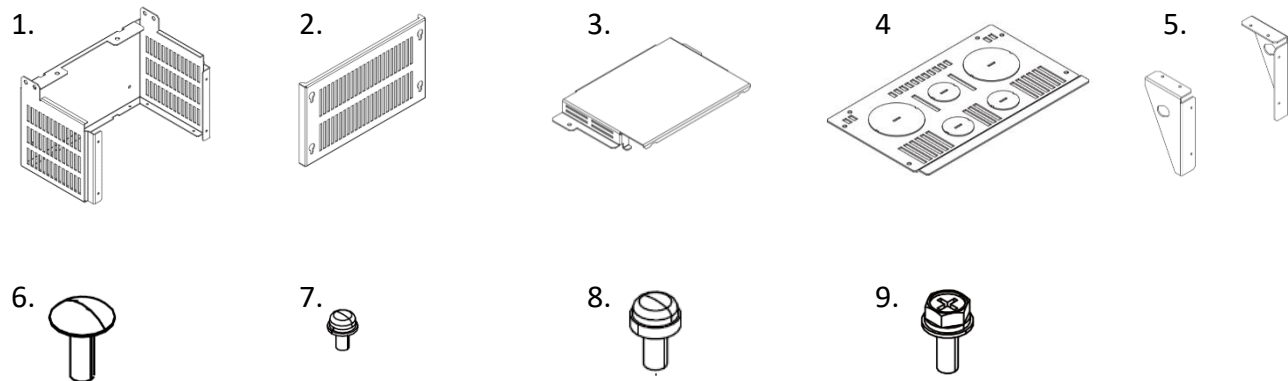


Figure 21: Pieces Supplied with the DRN1-C1-6 NEMA 1 Kit

- | | |
|-------------------------|------------------------------------|
| 1. Base | 6. (4) M4 x 10mm truss head screws |
| 2. Front cover | 7. (16) M4 x 8mm pan head screws |
| 3. Top protective cover | 8. (2) M6 x 14mm pan head screws |
| 4. Conduit bracket | 9. (4) M6 x 16mm upset head bolts |
| 5. (2) stay brackets | |

Installation

1. Remove the knock-out holes that will be used on the conduit bracket before installing. This can be done by putting the end of a flathead screwdriver into the center hole and moving up and down. Then file the rough surface to smooth the edges.

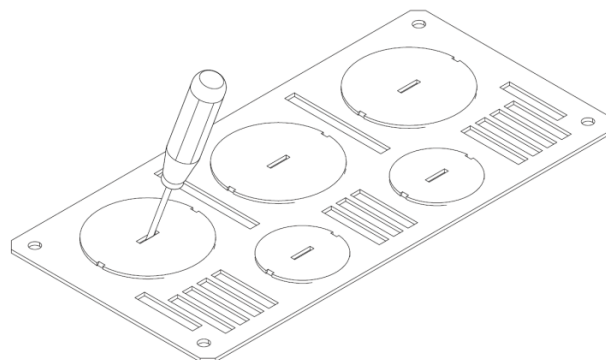


Figure 22: Removing Knock-Out Holes (DRN1-C1-6)

DRN1-C1-6 NEMA 1 Kit Install (continued)

2. Install the top protective cover by putting the hooks into the hook holes on the top of the drive and slide forward to align screw holes. Tighten screws to install.

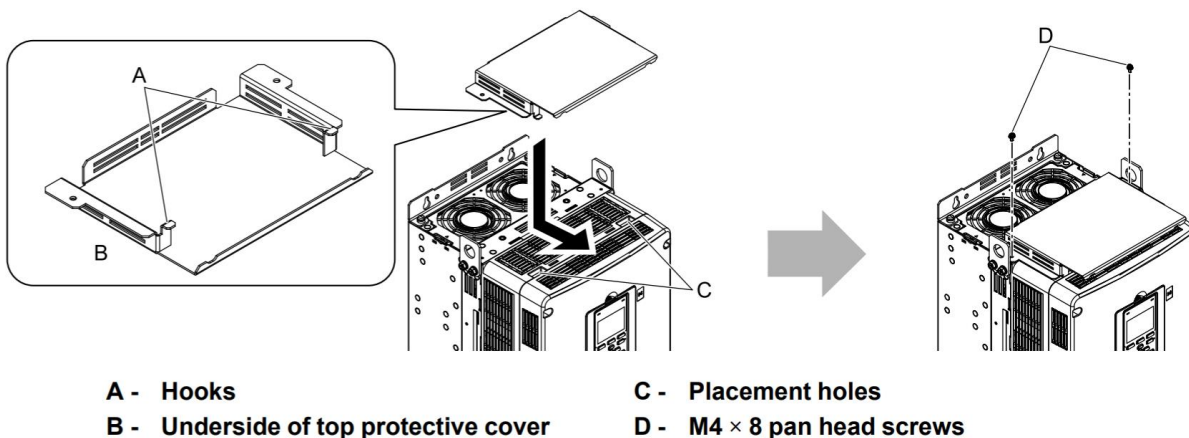


Figure 23: Installing the Top Cover (DRN1-C1-6)

3. Install the (s) stay brackets to the drive as shown below.

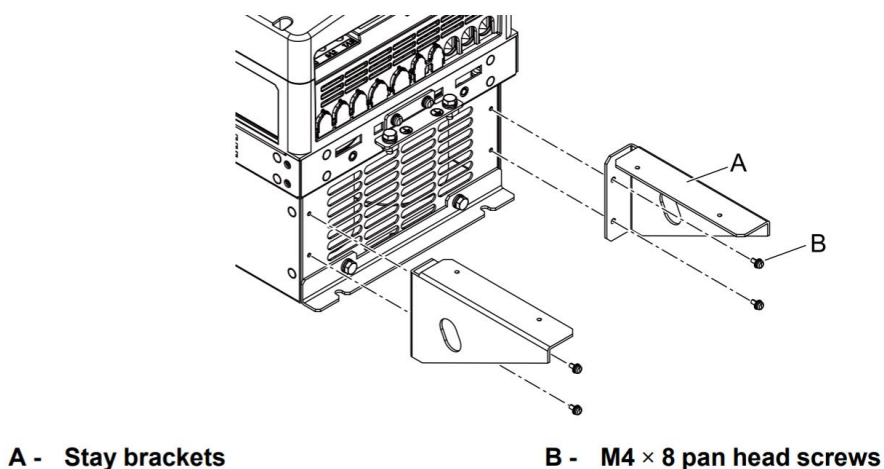
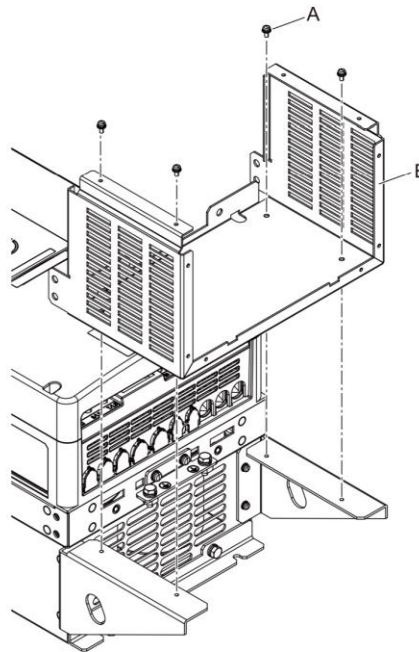


Figure 24: Installing the Stay Bracket (DRN1-C1-6)

DRN1-C1-6 NEMA 1 Kit Install (continued)

4. Install the base to the stay brackets.

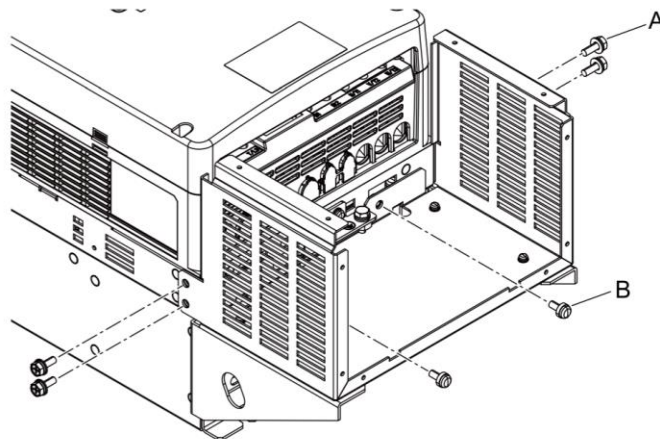


A - M4 × 8 pan head screws

B - Base

Figure 25: Install the Base to the Stay Brackets (DRN1-C1-6)

5. Secure the base to the drive.



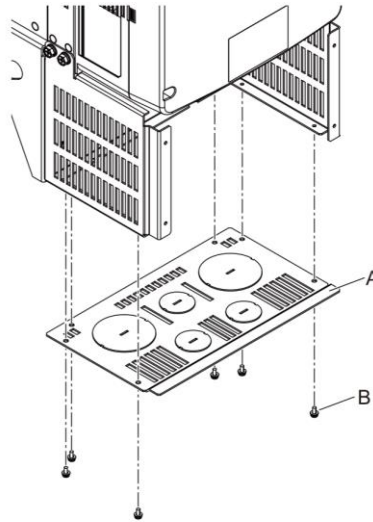
A - M6 × 16 upset head bolts

B - M6 × 14 pan head screws

Figure 26: Securing Base (DRN1-C1-6)

DRN1-C1-6 NEMA 1 Kit Install (continued)

6. Install the conduit bracket.

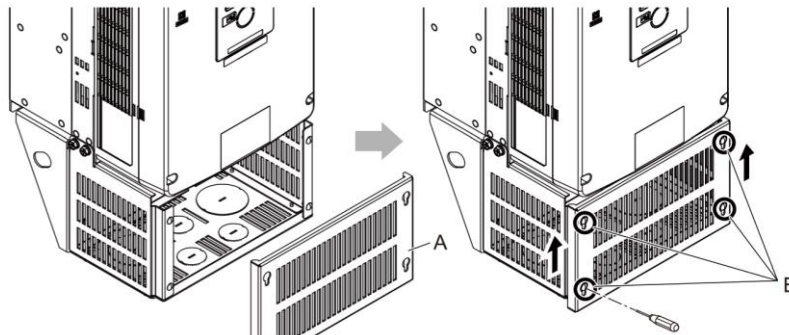


A - Conduit bracket

B - M4 × 8 pan head screws

Figure 27: Install the Conduit Bracket (DRN1-C1-6)

7. Install the front cover.



A - Front cover

B - M4 × 10 truss head screws

Figure 28: Install the Front Cover (DRN1-C1-6)

DRN1-C1-7/8 NEMA 1 Kit Install

Compatible with the following DR...C (GA800) drives:

DR-240060-3C (60HP 240V drive), DR-240075-3C (75HP 240V drive), DR-480100-3C (100HP 480V drive), DR-480125-3C (125HP 480V drive)

Components Supplied

Figure 22 shows the components supplied with the DRN1-C1-7/8 NEMA 1 kit:

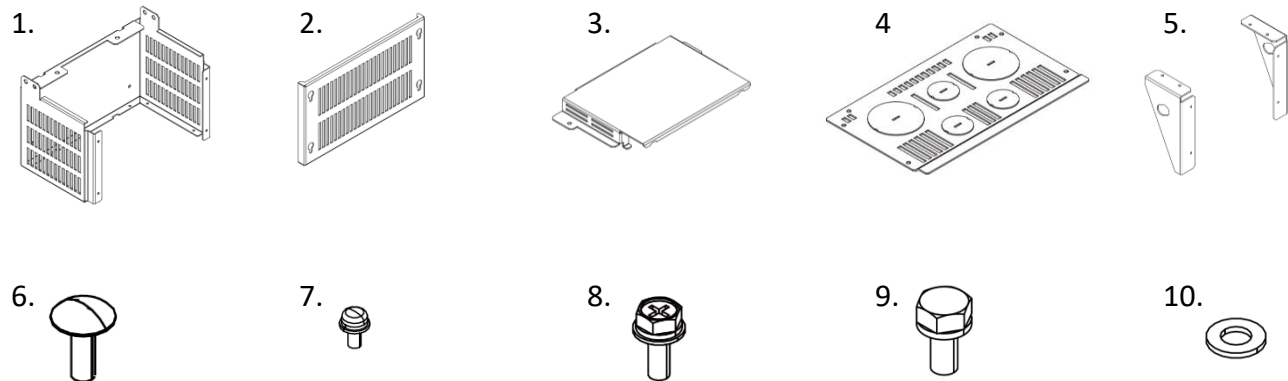


Figure 29: Pieces Supplied with the DRN1-C1-7/8 NEMA 1 Kit

- | | |
|-------------------------|--------------------------------------|
| 1. Base | 6. (4-6) M4 x 10mm truss head screws |
| 2. Front cover | 7. (16-18) M4 x 8mm pan head screws |
| 3. Top protective cover | 8. (4) M6 x 16mm upset head bolts |
| 4. Conduit bracket | 9. (2) M8 x 16mm hex bolts |
| 5. (2) stay brackets | 10. (2) M8 plain washers |

Installation

1. Remove the knock-out holes that will be used on the conduit bracket before installing. This can be done by putting the end of a flathead screwdriver into the center hole and moving up and down. Then file the rough surface to smooth the edges.

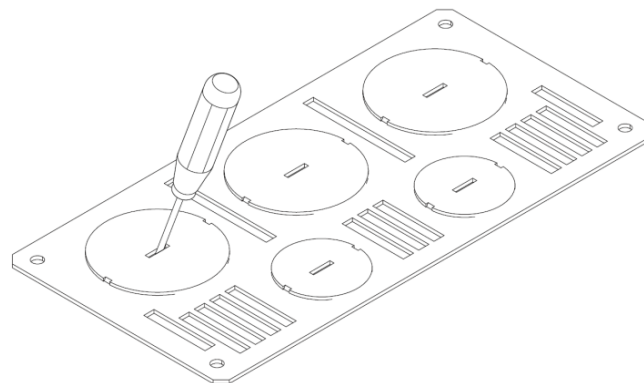


Figure 30: Removing Knock-Out Holes (DRN1-C1-7/8)

DRN1-C1-7/8 NEMA 1 Kit Install (continued)

2. Install the top protective cover by putting the hooks into the hook holes on the top of the drive and slide forward to align screw holes. Tighten screws to install.

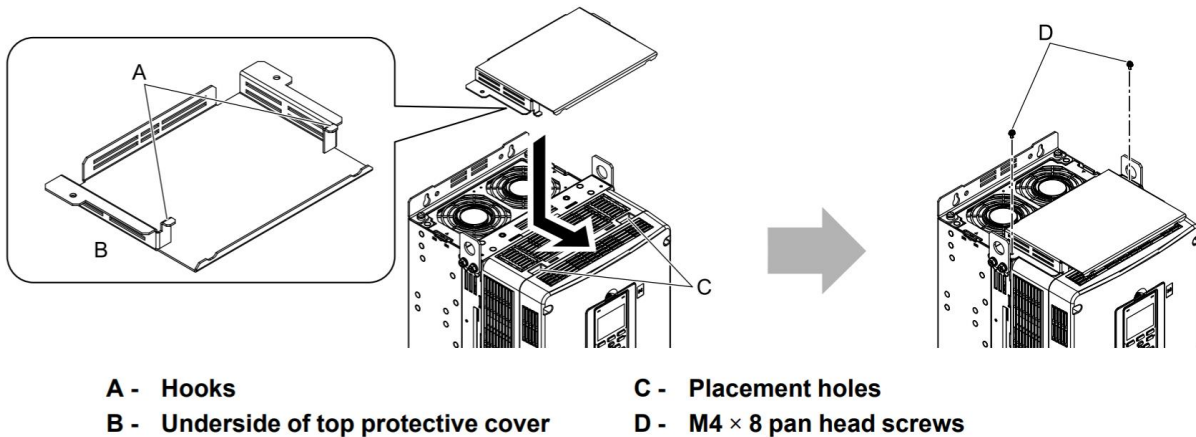


Figure 31: Installing the Top Cover (DRN1-C1-7/8)

3. Install the (2) stay brackets to the drive as shown below.

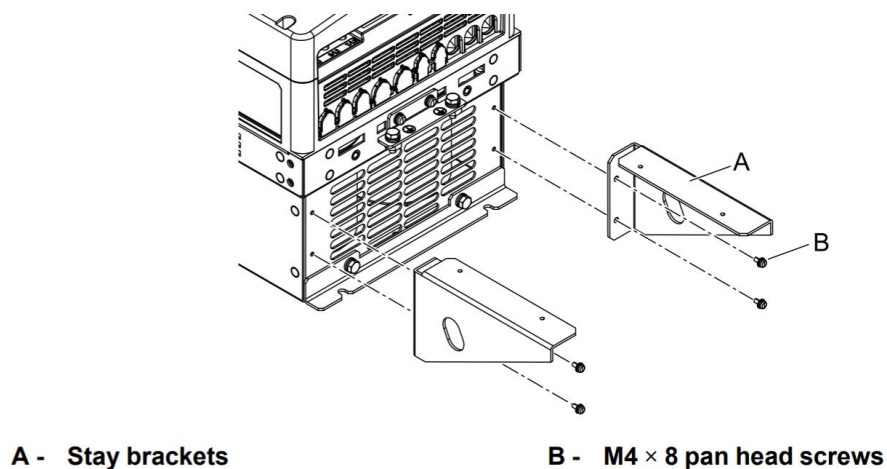
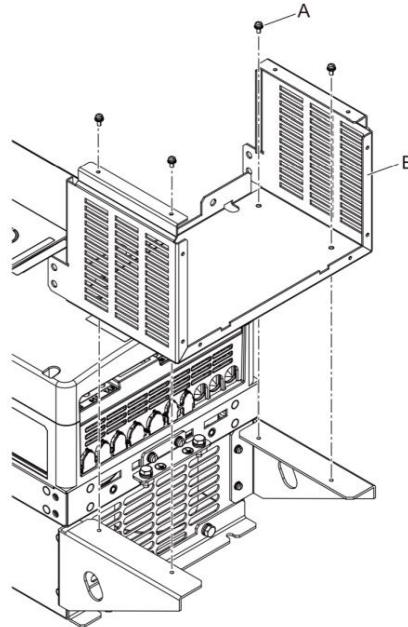


Figure 32: Installing the Conduit Bracket (DRN1-C1-7/8)

DRN1-C1-7/8 NEMA 1 Kit Install (continued)

4. Install the base on the stay brackets.
 - DRN1-C1-7 will use 4 screws
 - DRN1-C1-8 will use 6 screws

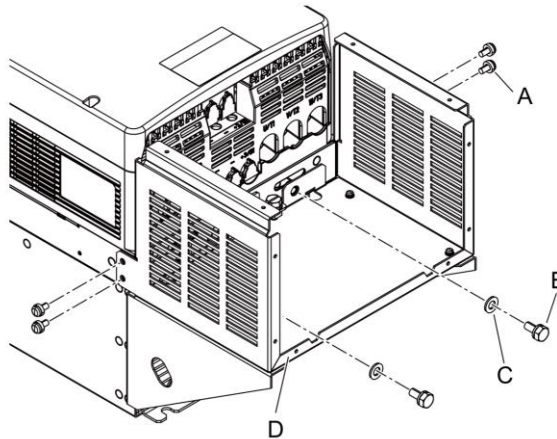


A - M4 × 8 pan head screws

B - Base

Figure 33: Install the Base to the Drive (DRN1-C1-7/8)

5. Secure the base to the drive.



A - M6 × 16 upset head bolts

B - M8 × 16 hex bolts

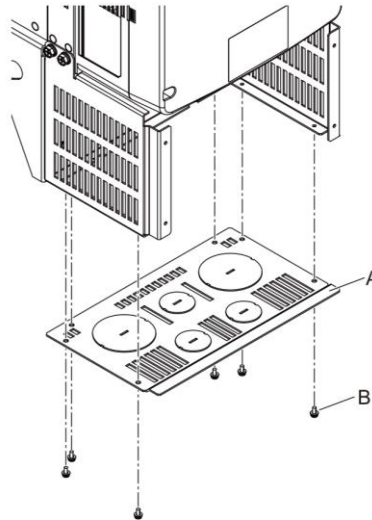
C - M8 plain washers

D - Base

Figure 34: Securing Base (DRN1-C1-7/8)

DRN1-C1-7/8 NEMA 1 Kit Install (continued)

6. Install the conduit bracket.



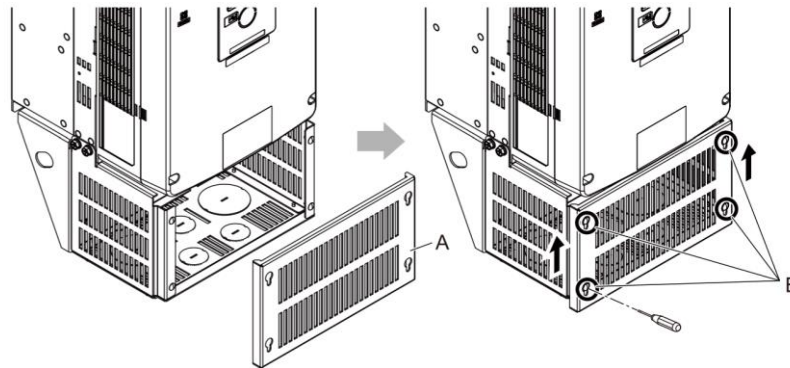
A - Conduit bracket

B - M4 × 8 pan head screws

Figure 35: Install the Conduit Bracket (DRN1-C1-7/8)

7. Install the front cover.

- DRN1-C1-7 will use 4 screws
- DRN1-C1-8 will use 6 screws



A - Front cover

B - M4 × 10 truss head screws

Figure 36: Install the Front Cover (DRN1-C1-7/8)

DRN1-C1-9 NEMA 1 Kit Install

Compatible with the following DR...C (GA800) drives:

DR-240100-3C (100HP 240V drive), DR-480150-3C (150HP 480V drive), DR-480200-3C (200HP 480V drive)

Components Supplied

Figure 30 shows the components supplied with the DRN1-C1-9 NEMA 1 kit:

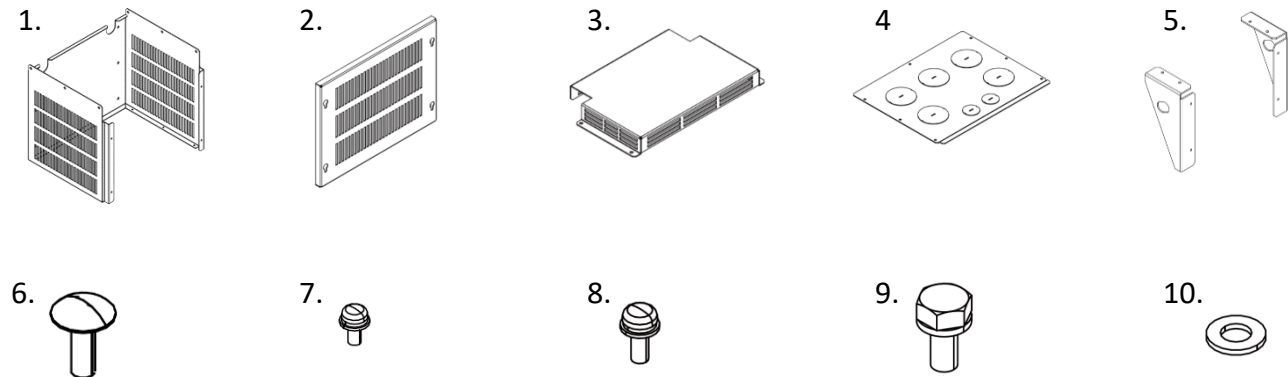


Figure 37: Pieces Supplied with the DRN1-C1-9 NEMA 1 Kit

- | | |
|-------------------------|------------------------------------|
| 1. Base | 6. (4) M4 x 10mm truss head screws |
| 2. Front cover | 7. (11) M4 x 10mm pan head screws |
| 3. Top protective cover | 8. (16) M5 x 12mm pan head screws |
| 4. Conduit bracket | 9. (2) M10 x 20mm hex bolts |
| 5. (2) stay brackets | 10. (2) M10 plain washers |

Installation

1. Remove the knock-out holes that will be used on the conduit bracket before installing. This can be done by putting the end of a flathead screwdriver into the center hole and moving up and down. Then file the rough surface to smooth the edges.

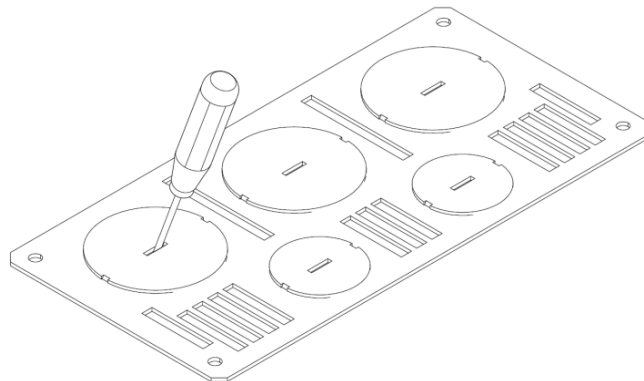
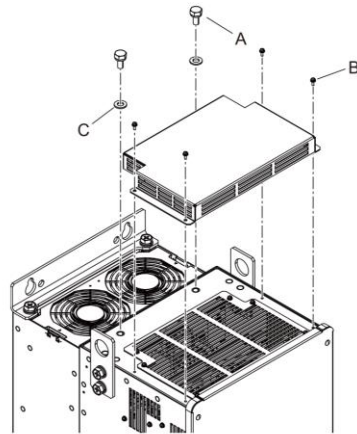


Figure 38: Removing Knock-Out Holes (DRN1-C1-9)

DRN1-C1-9 NEMA 1 Kit Install (continued)

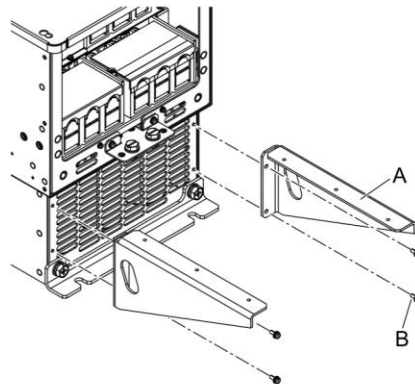
2. Install the top protective cover by putting the hooks into the hook holes on the top of the drive and slide forward to align screw holes. Tighten screws to install.



A - M10 × 20 hex bolts */
B - M4 × 10 pan head screws
C - M10 plain washers

Figure 39: Installing the Top Cover (DRN1-C1-9)

3. Install the (2) stay brackets to the drive as shown below.

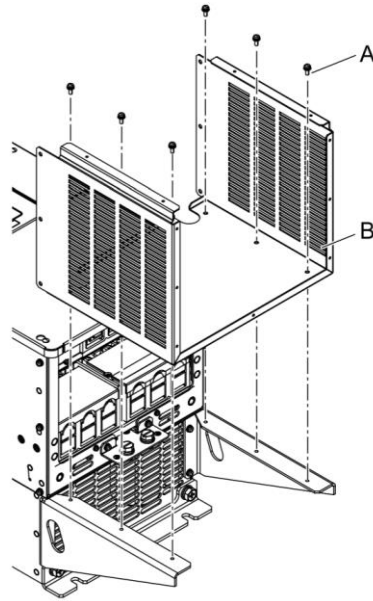


A - Stay brackets
B - M5 × 12 pan head screws

Figure 40: Installing the Stay Brackets (DRN1-C1-9)

DRN1-C1-9 NEMA 1 Kit Install (continued)

4. Install the base to the stay brackets.

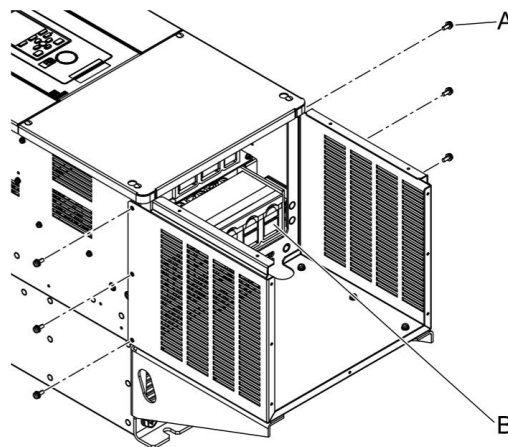


A - M5 × 12 pan head screws

B - Base

Figure 41: Install the Base to the Stay Brackets (DRN1-C1-9)

5. Secure the base to the drive.



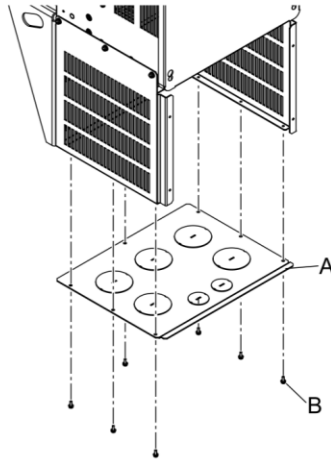
A - M5 × 12 pan head screws

B - IP20 cover

Figure 42: Securing Base (DRN1-C1-9)

DRN1-C1-9 NEMA 1 Kit Install (continued)

6. Install the conduit bracket.

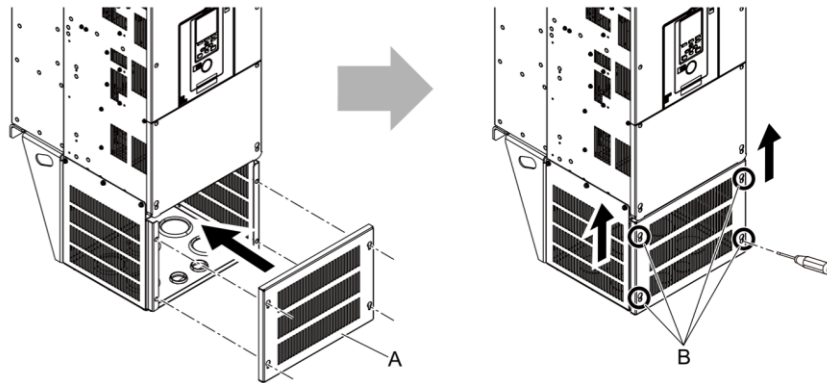


A - Conduit bracket

B - M4 × 10 pan head screws

Figure 43: Install the Conduit Bracket (DRN1-C1-9)

7. Install the front cover.



A - Front cover

B - M4 × 10 truss head screws

Figure 44: Install the Front Cover (DRN1-C1-9)

Installing the Drive

A template is provided with each drive to mark the location of the mounting holes. Using a level and masking tape, position the template and fasten the template to the surface where the drive will be installed. Mark the four mounting hole locations through the template with a center punch. Drill pilot holes if necessary. See below for an example of the template provided.

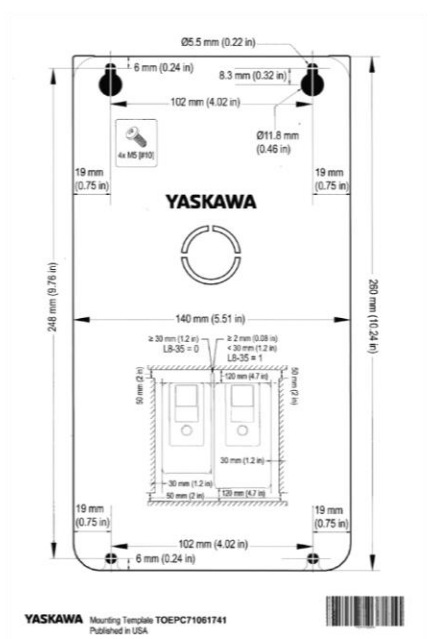


Figure 45: Example of a Template for Mounting

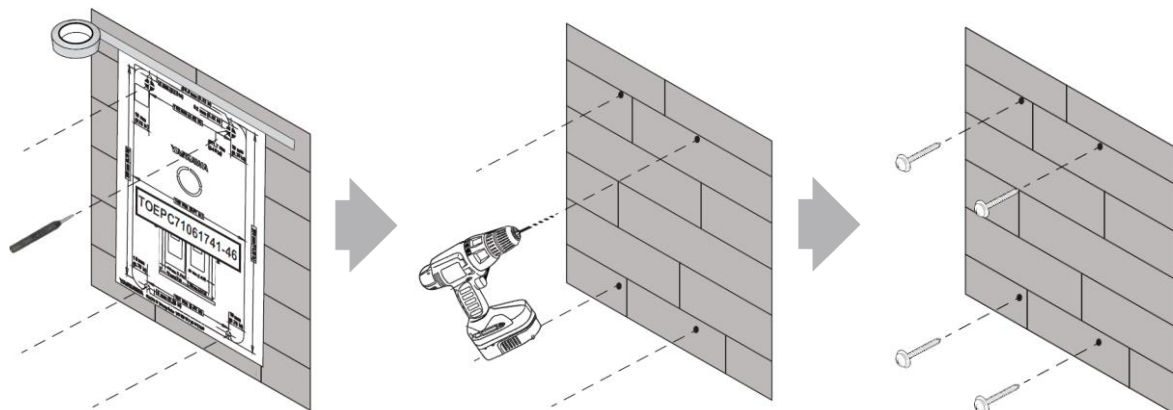


Figure 46: Drilling Pilot Holes

Installing the Drive (continued)

For drives 10hp and under, screw the drive directly to the surface. Anchor the screws depending on the surface material. Dimensions for mounting holes can be found in technical literature DR-1000.

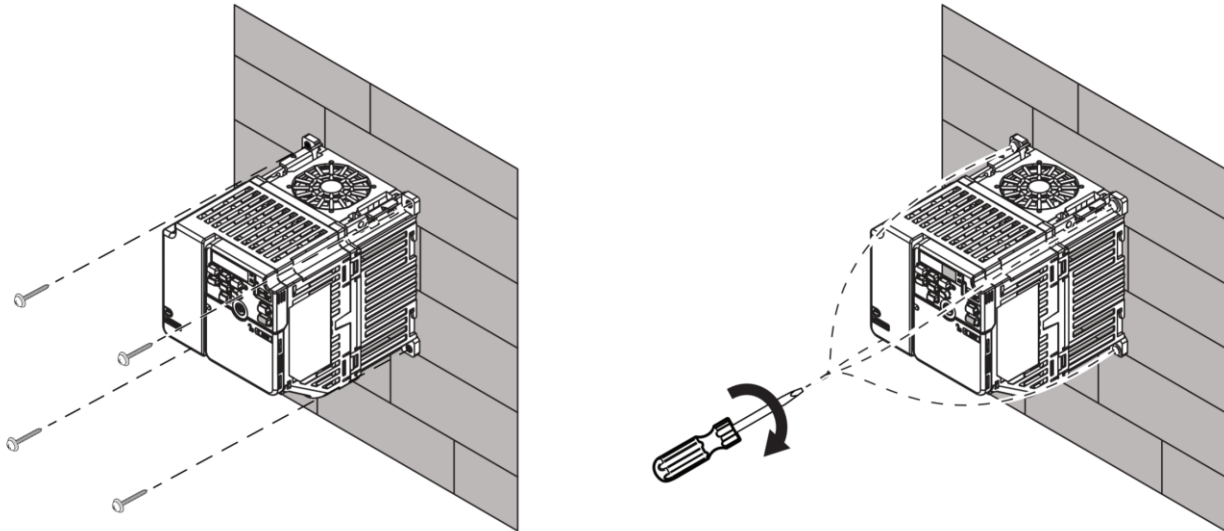


Figure 47: Mounting the Drive (10hp and under)

On drives over 10hp, thread screws till the heads are roughly $\frac{1}{4}$ " away from the surface. Place the drive on the screws and slide the drive into the locked position. Then tighten the screws to securely mount the drive.

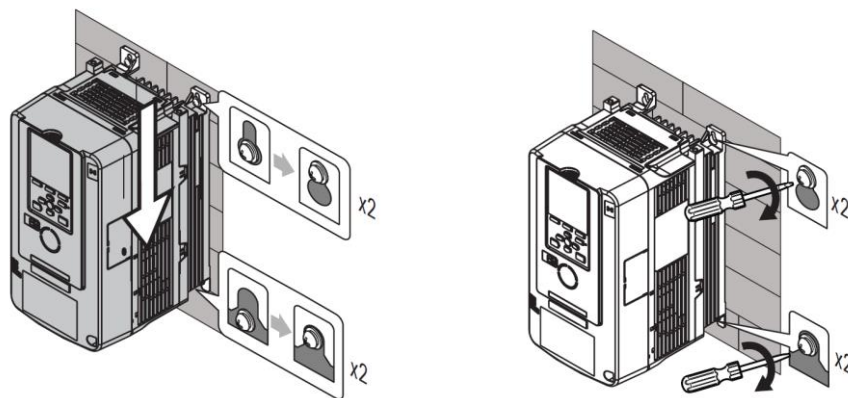


Figure 48: Mounting the Drive (over 10hp)

Fuses and Wiring

To access the terminals on the DR-...B (GA500) drives, first remove the NEMA 1 kit cover. Next, the low voltage terminals can be accessed by sliding the tab located above the NEMA 1 kit to the unlock position. Pull down on the cover, then pull away to remove.

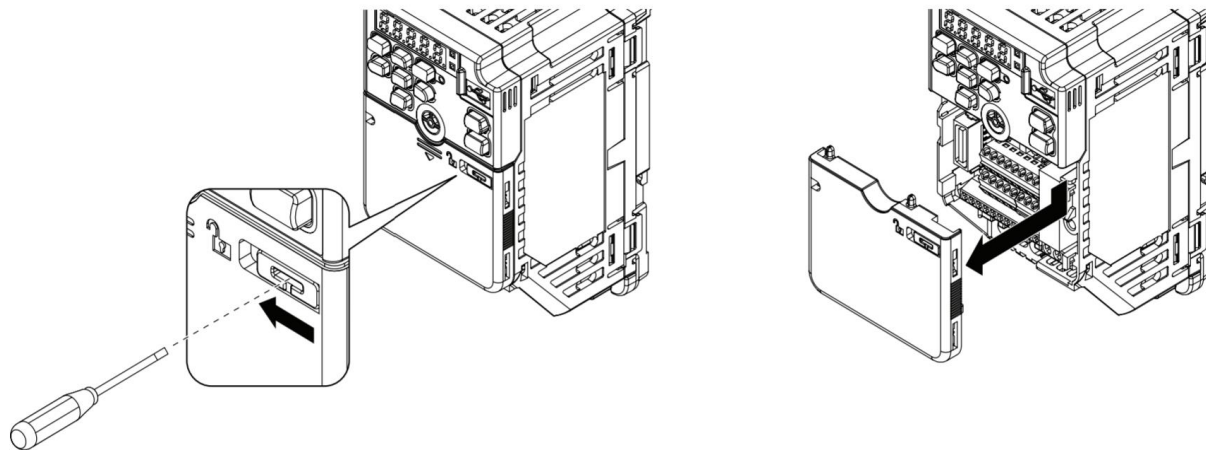


Figure 49: Accessing DR-...B (GA500) Wiring

To access the wiring on the DR-...C (GA800) drives, first remove the keypad by pushing down the tab on the top of the keypad and pulling the keypad forward. Next pull the keypad connector out from the drive horizontally and put it in the holder. Unscrew the screw holding the front cover and remove the wiring cover.

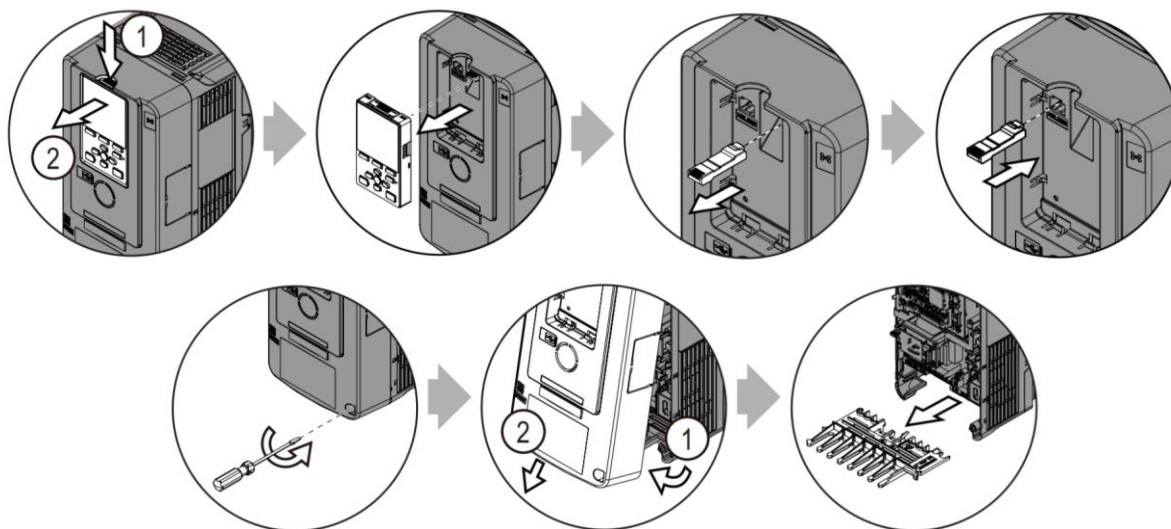



Figure 50: Accessing DR-...C (GA800) Wiring

See Tables 1 and 2 for a complete listing of recommended wire gauges and fuse sizes.

Fuses and Wiring (continued)


Table 1: Suggested Wire Gauge and Fuses for DR-240... (Single and Three Phase 240V Drives)

Model	Drive Horsepower	R/L1, S/L2, T/L3	U/T1, V/T2, W/T3	-	+1	+2	+3	B1, B2		Incoming Power Busmann Semiconductor Fuse	Class CC, J, or T Fuse Maximum Size (Amps)
Single Phase											
DR-240F16-1B	1/6	14 (14)	14 (14)	14 (14)	N/A			14 (14)	14 (14)	FWH-25A14F	2
DR-240F14-1B	1/4	14 (14)	14 (14)	14 (14)				14 (14)	14 (14)	FWH-25A14F	3.5
DR-240F34-1B	3/4	14 (14)	14 (14)	14 (14)				14 (14)	14 (14)	FWH-60B	9
DR-240001-1B	1	14 – 10 (12)	14 – 12 (14)	14 – 10 (12)				14 – 12 (14)	14 – 10 (10)	FWH-80B	15
DR-240002-1B	2	12 – 10 (10)	14 – 12 (14)	12 – 10 (10)				14 – 12 (14)	14 – 10 (10)	FWH-100B	20
DR-240003-1B	3	14 – 6 (8)	14 – 10 (12)	14 – 6 (8)				14 – 12 (14)	14 – 10 (10)	FWH-125B	30
DR-240005-1B	5	12 – 6 (8)	14 – 8 (10)	12 – 6 (8)				14 – 12 (14)	12 – 8 (8)	FWH-150B	40
Three Phase											
DR-240F16-3B	1/6	14 (14)	14 (14)	14 (14)	N/A			14 (14)	14 (14)	FWH-25A14F	3
DR-240F14-3B	1/4	14 (14)	14 (14)	14 (14)				14 (14)	14 (14)	FWH-25A14F	3.5
DR-240F34-3B	3/4	14 (14)	14 (14)	14 (14)				14 (14)	14 (14)	FWH-25A14F	6
DR-240001-3B	1	14 (14)	14 (14)	14 (14)				14 (14)	14 (14)	FWH-25A14F	10
DR-240002-3B	2	14 – 12 (14)	14 – 12 (14)	14 – 10 (12)				14 – 12 (14)	14 – 10 (10)	FWH-70B	15
DR-240003-3B	3	14 – 12 (14)	14 – 12 (14)	14 – 10 (12)				14 – 12 (14)	14 – 10 (10)	FWH-70B	15
DR-240005-3B	5	14 – 6 (8)	14 – 8 (10)	14 – 6 (8)				14 – 10 (14)	14 – 8 (8)	FWH-90B	35
DR-240007-3B	7	14 – 6 (8)	14 – 8 (10)	14 – 6 (8)				14 – 10 (14)	14 – 8 (8)	FWH-90B	35
DR-240010-3B	10	12 – 6 (8)	12 – 6 (8)	12 – 6 (6)				12 – 8 (12)	10 – 6 (8)	FWH-100B	50
DR-240015-3B	15	12 – 6 (6)	12 – 6 (6)	10 – 2 (4)				14 – 6 (10)	10 – 6 (6)	FWH-150B	70
DR-240020-3B	20	10 – 2 (4)	10 – 2 (4)	8 – 2 (2)				12 – 6 (8)	8 – 4 (6)	FWH-200B	90
DR-240025-3B	25	6 – 1 (2)	8 – 1 (2)	6 – 1/0 (1)				12 – 6 (8)	6 – 4 (4)	FWH-200B	110
DR-240030-3B	30	6 – 1/0 (1)	6 – 1 (2)	2 – 2/0 (2/0)				10 – 6 (6)	6 – 4 (4)	FWH-225A	125
DR-240040-3C	40	6 – 1/0 (1/0)	6 – 1/0 (1/0)	2 – 2/0 (2/0)				10 – 4 (4)	6 – 4 (6)	FWH-225A or FWH-250A	175
DR-240050-3C	50	2 – 2/0 (2/0)	2 – 2/0 (2/0)	2 – 4/0 (4/0)				10 – 3 (3)	4 (4)	FWH-275A or FWH-300A	225
DR-240060-3C	60	2/0 – 250 (4/0)	3/0 – 300 (4/0)	1/0 – 2/0 (1)				N/A	1 – 2/0 (1/0)	N/A	4 -1/0 (4)
DR-240075-3C	75	2/0 – 250 (250)	3/0 – 300 (300)	1/0 – 2/0 (2/0)	1 – 2/0 (2/0)	4 -1/0 (4)	FWH-325A or FWH-450A		350		
DR-240100-3C	100	2/0 – 4/0 x 2P (2/0 x 2P)	2/0 – 4/0 x 2P (2/0 x 2P)	4/0 – 250 x 2P (4/0 x 2P)	1/0 x 2P (1/0 x 2P)	3 – 350 (3)	FWH-600A		400		

Note: Recommended wire gauge shown in parentheses.

Fuses and Wiring (continued)

Table 2: Suggested Wire Gauge and Fuses for DR-480... (480V Three Phase Drives)

Model	Drive Horsepower	R/L1, S/L2, T/L3	U/T1, V/T2, W/T3	-	+1	+2	+3	B1, B2		Incoming Power Bussmann Semiconductor Fuse	Class CC, J, or T Fuse Maximum Size (Amps)
Three Phase											
DR-480F12-3B	1/2	14 - 12 (14)	14 - 12 (14)	14 - 12 (14)			N/A	14 - 12 (14)	14 - 10 (14)	FWH-40B	3
DR-480001-3B	1	14 - 12 (14)	14 - 12 (14)	14 - 12 (14)				14 - 12 (14)	14 - 10 (14)	FWH-40B	3.5
DR-480002-3B	2	14 - 12 (14)	14 - 12 (14)	14 - 12 (14)				14 - 12 (14)	14 - 10 (10)	FWH-50B	7
DR-480003-3B	3	14 - 12 (14)	14 - 12 (14)	14 - 12 (14)				14 - 12 (14)	14 - 10 (10)	FWH-70B	9
DR-480005-3B	5	14 - 12 (14)	14 - 12 (14)	14 - 12 (14)				14 - 12 (14)	14 - 10 (10)	FWH-70B	15
DR-480007-3B	7	14 - 10 (12)	14 - 12 (14)	12 - 8 (10)				14 - 12 (14)	14 - 10 (10)	FWH-90B	20
DR-480010-3B	10	12 - 8 (10)	12 - 8 (10)	14 - 8 (10)				14 - 12 (14)	14 - 6 (10)	FWH-80B	30
DR-480015-3B	15	14 - 6 (8)	14 - 8 (10)	12 - 6 (8)				14 - 10 (12)	10 - 6 (10)	FWH-100B	40
DR-480020-3B	20	12 - 6 (8)	12 - 6 (8)	12 - 4 (6)				12 - 8 (10)	10 - 6 (8)	FWH-125B	50
DR-480025-3B	25	12 - 6 (8)	12 - 6 (8)	10 - 2 (4)				14 - 6 (10)	10 - 6 (6)	FWH-175B	60
DR-480030-3B	30	10 - 2 (4)	12 - 4 (6)	8 - 2 (2)				12 - 6 (8)	10 - 6 (6)	FWH-200B	70
DR-480040-3B	40	8 - 2 (2)	10 - 2 (4)	6 - 2 (2)				12 - 6 (8)	10 - 6 (6)	FWH-200B	100
DR-480050-3C	50	10 - 2 (2)	10 - 2 (2)	10 - 2 (2)	N/A			14 - 6 (6)	6 - 4 (6)	FWH-250A	125
DR-480060-3C	60	10 - 2 (2)	10 - 2 (2)	6 - 1/0 (1/0)				14 - 6 (6)	6 - 4 (4)	FWH-250A or FWH-275A	150
DR-480075-3C	75	2 - 2/0 (1/0)	2 - 2/0 (1)	2 - 4/0 (2/0)				10 - 3 (3)	6 - 4 (4)	FWH-250A or FWH-275A	175
DR-480100-3C	100	2/0 - 250 (3/0)	3/0 - 300 (2/0)	1/0 - 2/0 (2)				1/0 - 2/0 (2)	4 - 1/0 (4)	FWH-300A	225
DR-480125-3C	125	2/0 - 250 (4/0)	3/0 - 300 (4/0)	1/0 - 2/0 (1/0)				1/0 - 2/0 (1/0)	4 - 1/0 (4)	FWH-325A or FWH-400A	250
DR-480150-3C	150	2/0 - 4/0 x 2P (1/0 x 2P)	2/0 - 4/0 x 2P (1/0 x 2P)	4/0 - 250 x 2P (3/0 x 2P)	1/0 x 2P (1/0 x 2P)	4 - 350 (4)	FWH-500A	350			
DR-480200-3C	200	2/0 - 4/0 x 2P (2/0 x 2P)	2/0 - 4/0 x 2P (2/0 x 2P)	4/0 - 250 x 2P (3/0 x 2P)	1/0 x 2P (1/0 x 2P)	2 - 350 (2)	FWH-600A	400			

Note: Recommended wire gauge shown in parentheses.

Fuses and Wiring (continued)

Install the motor wiring and power wiring. For three phase power input use terminals R/L1, S/L2, and T/L3. For single phase power input use L/L1 and N/L2 (not shown in figure 51).

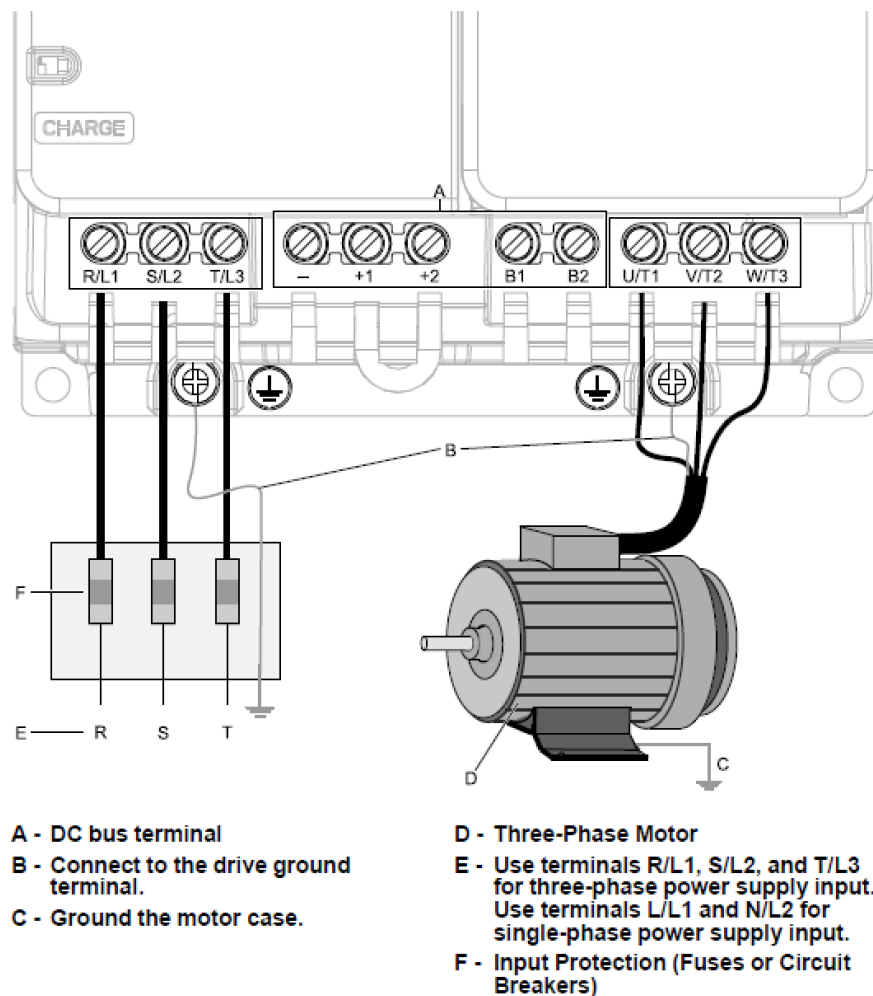


Figure 51: Example Main Circuit and Motor Connections

Main Circuit and Motor Connection Notes:

- If the motor turns the wrong direction, swap any two output wires such as U/T1 and V/T2 and the motor will turn the opposite direction.
- If input power is applied to T1, T2, and T3 **severe drive damage** will occur.

LMV52 Wiring

Note: A speed sensor must be installed on the motor to use a LMV52. Please see installation instructions LMV-3050 for more details on mounting an AGG5.305 speed sensor kit.

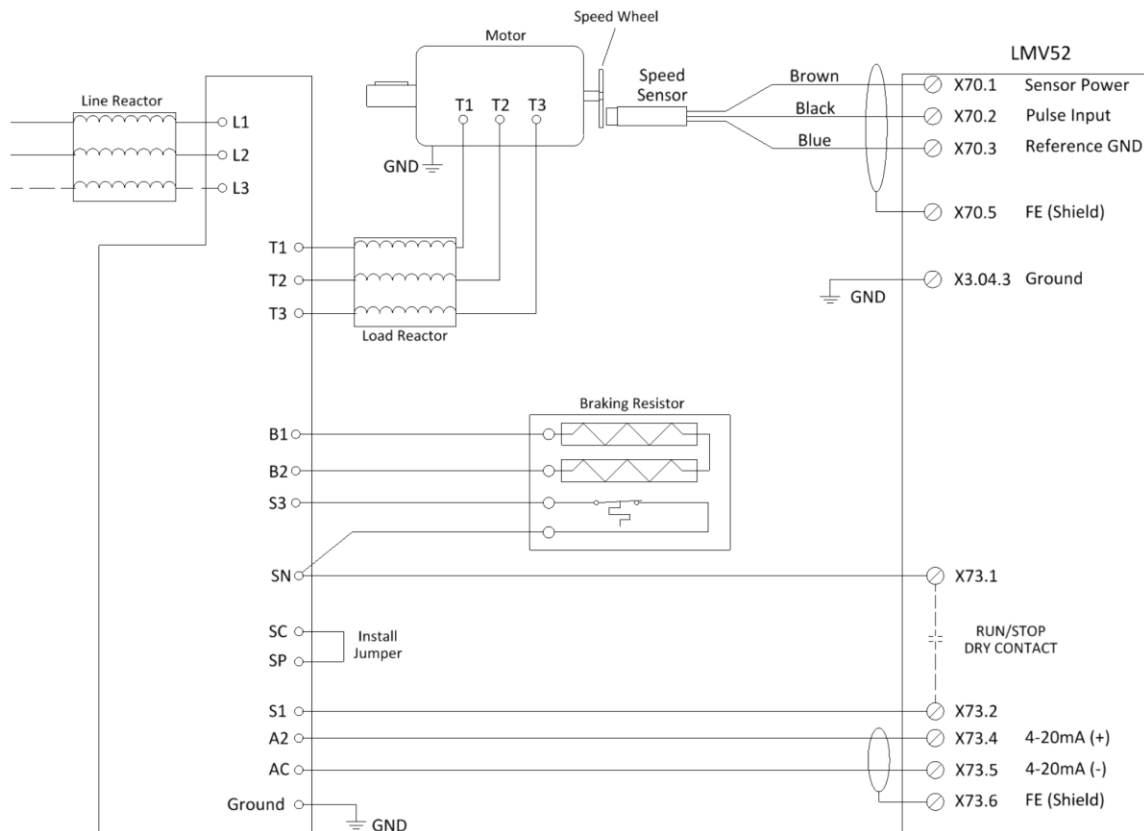


Figure 52: LMV52 Wiring to DR-...B (GA500) OR DR-...C (GA800) Drives

LMV52 Wiring (continued)

LMV52 Wiring Notes:

- Check the resistances between the ground terminals on the LMV5, drive, and the motor. Resistance must not exceed 20 ohms
- 4-20mA wiring and speed sensor cabling must be shielded cable
- Line reactors, load reactors, and braking resistors are optional. Refer to the Drive Technical Instructions (DR-1000) for more information.
- If only using single phase input power, do not wire L3
- See page 40 if using a braking unit with the braking resistor

LMV3 Wiring

Note: Most LMV3 applications require a speed sensor installed. Please see installation instructions LMV-3050 for more details on mounting an AGG5.305 speed sensor kit.

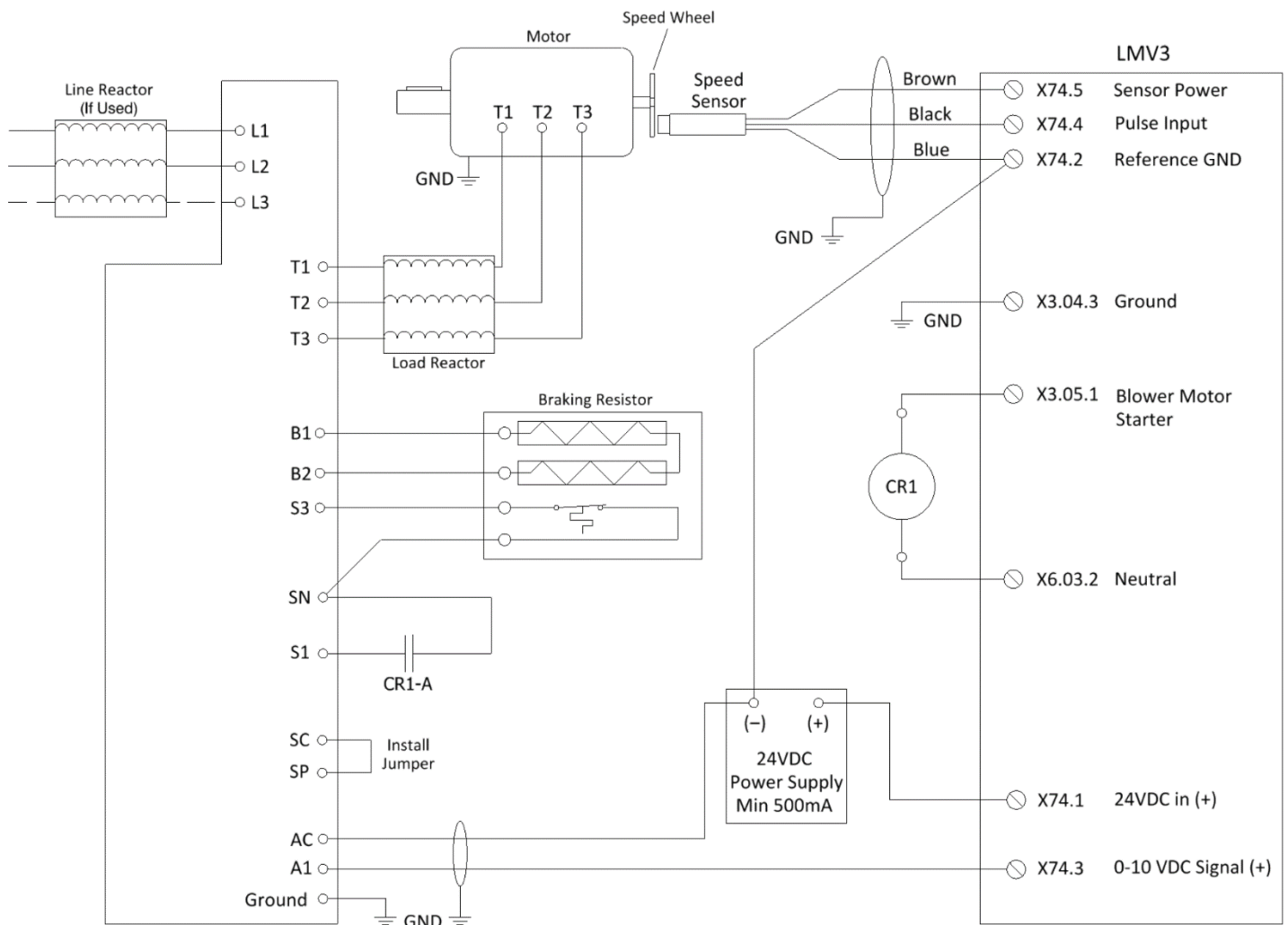


Figure 53: LMV3 Wiring to DR-...B (GA500) OR DR-...C (GA800) Drives

LMV3 Wiring (continued)

LMV3 Wiring Notes:

- Check the resistances between the ground terminals on the LMV3, drive, and the motor. Resistance must not exceed 20 ohms
- 4-20mA wiring and speed sensor cabling must be shielded cable
- Line reactors, load reactors, and braking resistors are optional. Refer to the Drive Technical Instructions DR-1000 for more information.
- If only using single phase input power, do not wire L3
- See page 40 if using a braking unit with the braking resistor

Terminals

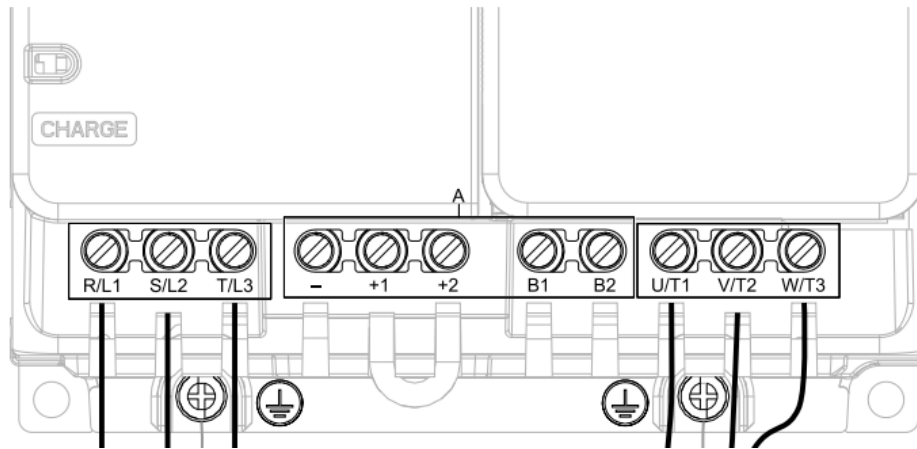
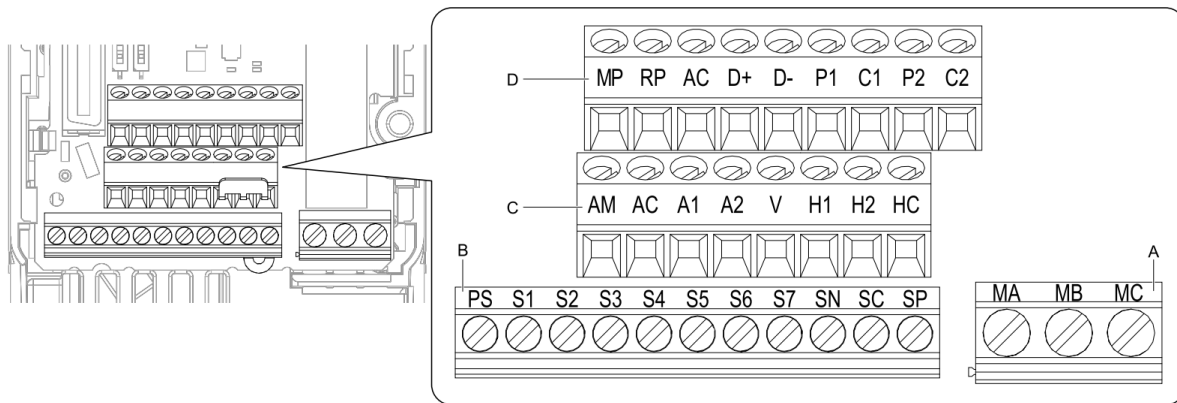


Figure 54: Main Circuit and Motor Terminals

Table 3: Main Circuit and Motor Connections

Terminal	Description		Function
	Single Phase	Three Phase	
R/L1	-	Power Supply	Incoming Power Supply Connection
S/L2			
T/L3			
L/L1	Power Supply	-	
N/L2			
U/T1	Drive Output		Motor Connection
V/T2			
W/T3			
B1	Braking Resistor Connection		Braking Resistor Connection
B2			
+3	DC Power Supply Input (+1 and -) DC Reactor Connection (+1 and +2) Braking Unit Connection (+3 and -)		Peripheral Device Connections (DC Power Input, Braking Unit, DC Link Choke when removing jumper between +1 and +2)
+2			
+1			
-			
Ground	Ground		240V: D Class Ground to 100 Ohms or less 480V: C Class Ground to 10 Ohms or less

Terminals (continued)



A - Terminal block (TB2)
B - Terminal block (TB1-1)

C - Terminal block (TB1-2)
D - Terminal block (TB1-3)

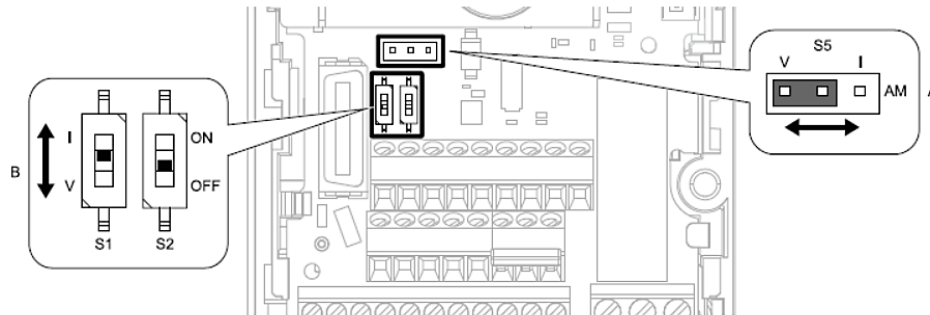
Figure 55: Multi-Function Input Terminals

Table 4: Commonly Used Input Terminals

Terminal	Description	Function
SP	Drive Inputs	Input Power Supply +24VDC
SN		Neutral
SC		Selection Common
S1		Forward Run Command
S3		External Fault: N/O
AC	Master Frequency Reference	Common
A1		Frequency Reference 1
A2		Frequency Reference 2

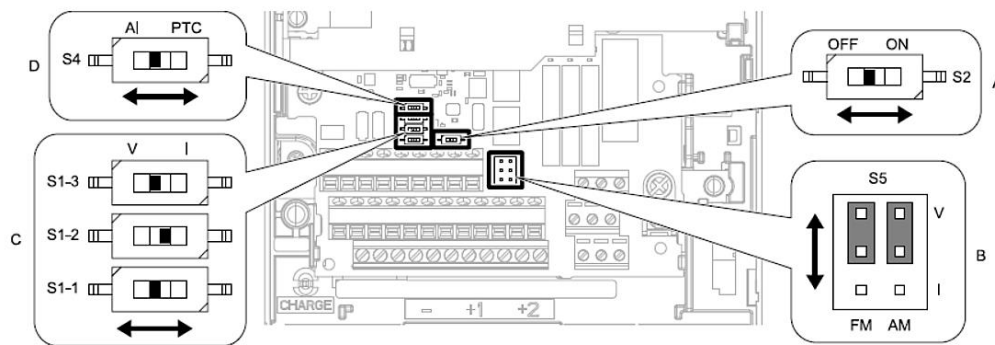
Dip Switches

Note: Dip switches will be correct at default positions. All the dip switches are listed here for verification purposes.



Position	Switch	Terminal	Function	Default
A	Jumper switch S5	AM	Sets the output method for terminal AM (voltage or current).	V (voltage output)
B	DIP switch S1	A2	Sets the input method for terminal A2 (voltage or current).	I (current input)
	DIP switch S2	-	Enables and disables the MEMOBUS/Modbus communications termination resistor.	OFF

Figure 56: DR...B (GA500) Dip Switches



Position	Switch	Terminal	Function	Default
A	DIP switch S2	-	Enables and disables the MEMOBUS/Modbus communications termination resistor.	OFF
B	Jumper switch S5	FM, AM	Sets terminals FM and AM to voltage or current output.	FM: V (voltage output) AM: V (voltage output)
C	DIP switch S1-1	A1	Sets the input signal type (voltage/current).	V (voltage input)
	DIP switch S1-2	A2	Sets the input signal type (voltage/current).	I (current input)
	DIP switch S1-3	A3	Sets the input signal type (voltage/current).	V (voltage input)
D	DIP switch S4	A3	Sets MFAI or PTC input.	AI (analog input)

Figure 57: DR...C (GA800) Dip Switches

Parameters

Note: All drives will come preprogrammed for each application. All parameters below are for setting the LMV52/LMV3 to work seamlessly with the drive.

Note: LO/REM button should be in REM mode to accept the LMV5/LMV3 signal.

LMV52:

The following parameters MUST be set in the LMV52:

- a. OperatRampMod = 30 seconds or greater
- b. TimeNoFlame = 30 seconds or greater
- c. ReleaseContactVSD = open if not using a braking resistor, closed if using a braking resistor
- d. Setpoint Output = 4-20mA
- e. Settling Time = 16

The LMV52 / drive / blower must also be standardized after installation and wiring are complete. This is accomplished by setting the following parameters in the LMV52:

- a. VSD = activated or air influenced
- b. Air Actuator = air influenced
- c. Standardization = activated

After “standardization” is set to activated, the air damper should open to the pre-purge position and the blower should ramp up to maximum speed. See LMV52 Technical Instructions (LV5-1000) for more details.

NOTE: The LMV52 will not standardize if the safety loop is open.

LMV3:

The following parameters MUST be set in the LMV3:

- a. 522 (VSD ramp up time) = 20 seconds or greater
- b. 523 (VSD ramp down time) = 20 seconds or greater
- c. 542 (activation of VSD) = 1 (activated)
- d. 645 (configuration of analog output) = 0 (0 to 10 VDC)

When a speed sensor is installed, a LMV3 / drive / blower must also be standardized after installation and wiring are complete. This is accomplished by setting the following parameters in the LMV3:

641 (activate VSD standardization) = 1 (activated). After “standardization” is set to activated, the air damper should open to the pre-purge position and the blower should ramp up to maximum speed. See LMV3 Technical Instructions (LV3-1000) for more details.

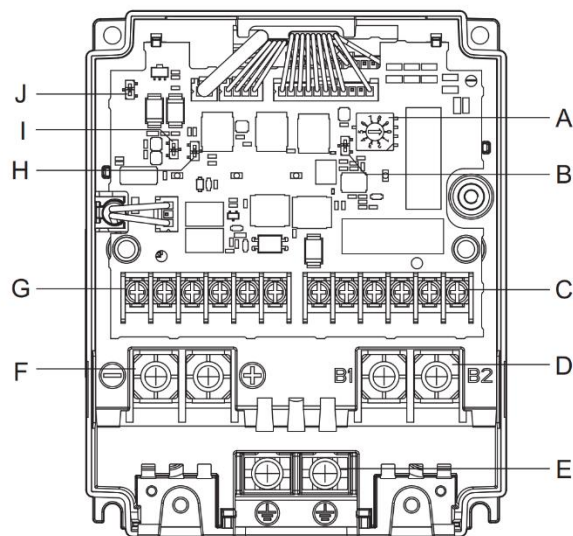
Braking Units

Drives listed in table 5 require braking units when using a braking resistor.

Table 5: Drives Requiring Braking Units

Voltage Class	Drive Part Number	Drive Horsepower
200V	DR-240060-3C	60
	DR-240075-3C	75
	DR-240100-3C	100
400V	DR-480150-3C	150
	DR-480200-3C	200

For mounting, install the braking unit upright with sufficient space around it for air flow and wiring. Once mounted, the Voltage Rotary Switch must be set to your field voltage. See figure 59 and table 6 for more information.



- | | |
|--|--|
| A – Braking Activation Voltage Rotary Switch S3 | F – + and - Main Circuit Terminals (TB3) |
| B – Master/Slave Selection DIP Switch S2 | G – Control Circuit Terminals (TB1) |
| C – Control Circuit Terminals (TB2) | H – Fault Relay Enable/Disable DIP Switch S5
Note: Available in Rev. B and later. |
| D – Main Circuit Terminals (B1, B2) | I – N.O./N.C. DIP Switch S4 |
| E – Grounding Terminal | J – Sink/Source DIP Switch S1 |

Figure 58: Braking Unit Terminals

Braking Units (continued)

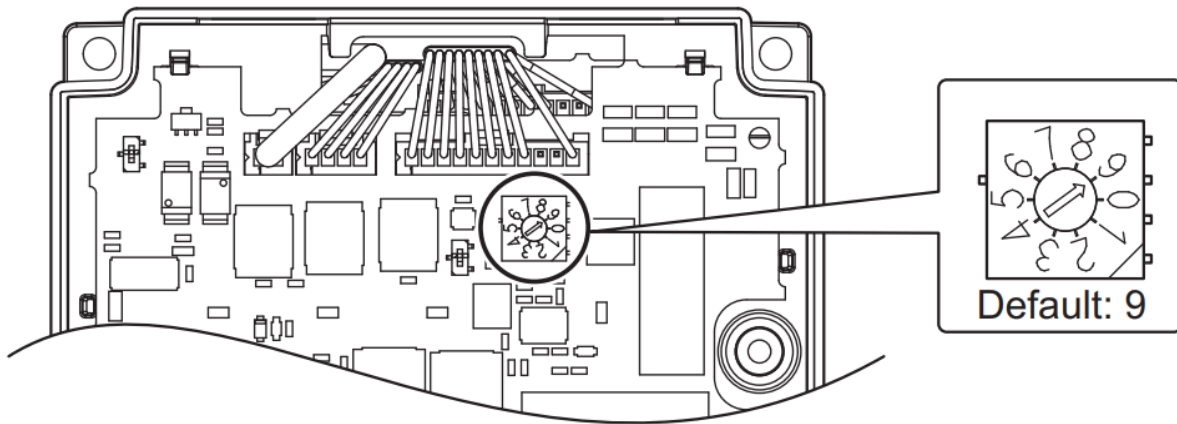


Figure 59: Voltage Rotary Switch Location

Table 6: Voltage Rotary Switch Settings

Setting	200 V Class		400 V Class	
	Input Voltage (V)	Braking Activation Voltage (V) (PN Bus Voltage)	Input Voltage (V)	Braking Activation Voltage (V) (PN Bus Voltage)
0	160	270 (TYP)	380	630 (TYP)
1	170	282 (TYP)	390	644 (TYP)
2	175	294 (TYP)	400	659 (TYP)
3	185	307 (TYP)	405	673 (TYP)
4	190	319 (TYP)	415	688 (TYP)
5	200	331 (TYP)	425	702 (TYP)
6	208	343 (TYP)	430	717 (TYP)
7	215	356 (TYP)	440	731 (TYP)
8	220	368 (TYP)	450	746 (TYP)
9 </>	230	380 (TYP)	460	760 (TYP)

</> = Default Setting

Braking Units (continued)

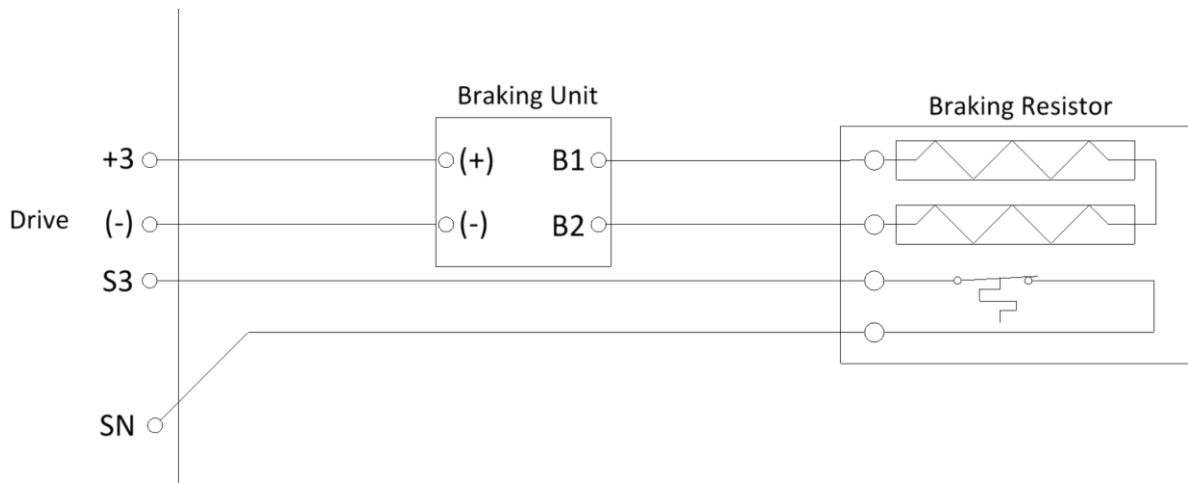


Figure 60: Braking Unit Wiring for DR-...B (GA500) OR DR-...C (GA800) Drives

Appendix A: Navigating the Parameters Using the Keypad

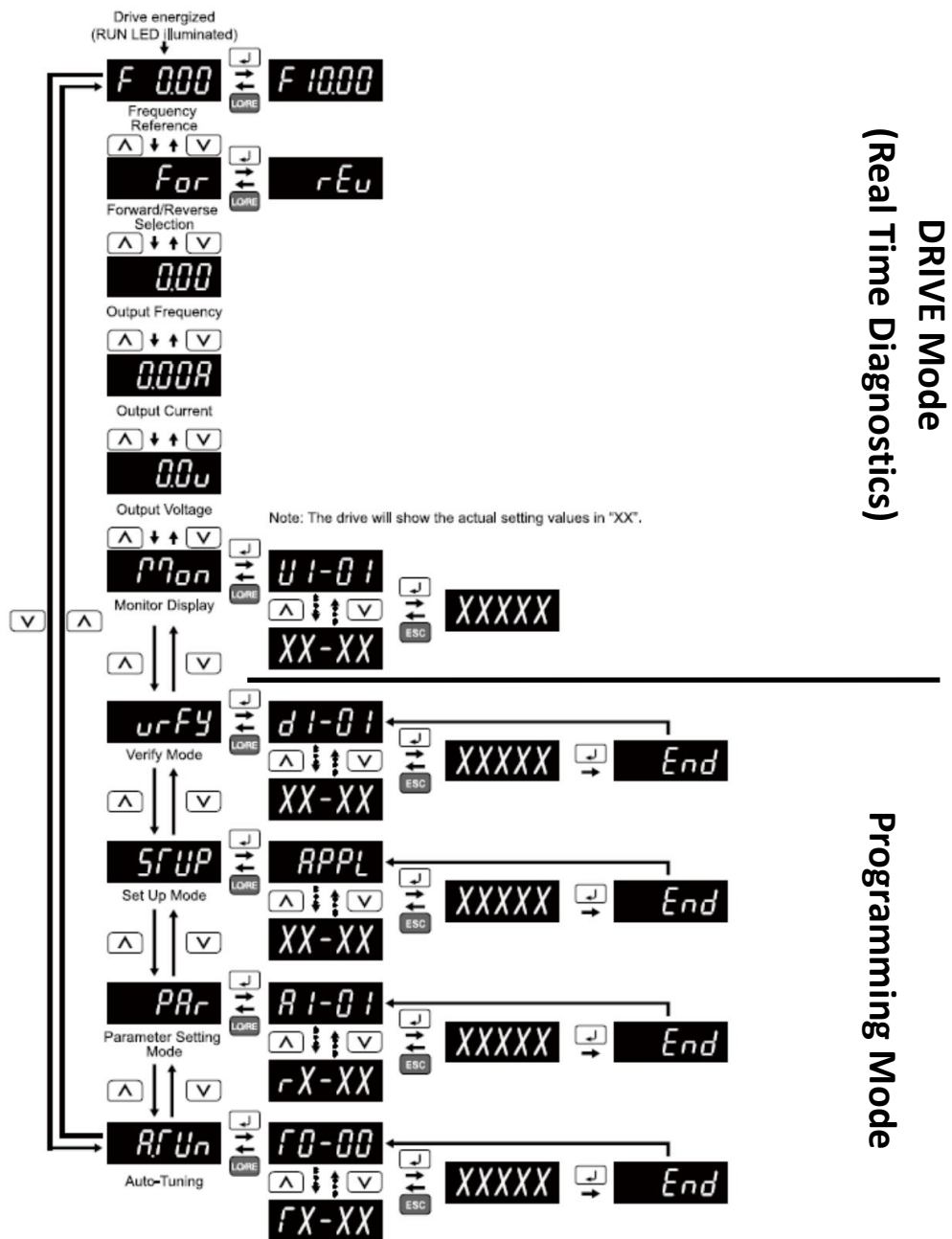


Figure 61: DR...B (GA500) Parameter Paths

Appendix A: Navigating the Parameters Using the Keypad (continued)

A: Initialization		d: Reference Settings		H: Terminal Functions		n: Special Adjustment		q: DriveWorksEZ Parameters	
A1	Initialization	d1	Frequency Reference	H1	Digital Inputs	n1	Hunting Prevention	r: DriveWorksEZ Connections	
A2	User Parameters	d2	Reference Limits	H2	Digital Outputs	n2	Auto Freq. Regulator (AFR)	T: Motor Tuning	
b: Application		d3	Jump Frequency	H3	Analog Inputs	n3	High Slip/Overexcite Braking	T0	Tuning Mode Selection
b1	Operation Mode Selection	d4	Freq. Ref. Up/Down & Hold	H4	Analog Outputs	n5	Feed Forward Control	T1	Induction Motor Auto-Tuning
b2	DC Injection Braking and Short Circuit Braking	d6	Field Weakening/Forcing	H5	Modbus Communication	n6	Online Tuning	T2	PM Motor Auto-Tuning
b3	Speed Search	d7	Offset Frequency	H6	Pulse Train Input/Output	n7	EZ Drive	T3	ASR and Inertia Tuning
b4	Timer Function	E: Motor		H7	Virtual Inputs/Outputs	n8	PM Motor Control Tuning	T4	EZ Tuning
b5	PID Control	E1	V/f Pattern for Motor 1	L: Protection Functions		nA	PM Motor Control Tuning	U: Monitors	
b6	Dwell Function	E2	Motor 1 Parameters	L1	Motor Protection	o: Keypad-Related Settings		U1	Operation Status Monitors
b8	Energy Saving	E3	V/f Pattern for Motor 2	L2	Power Loss Ride Through	o1	Keypad Display	U2	Fault Trace
C: Tuning		E4	Motor 2 Parameters	L3	Stall Prevention	o2	Keypad Operation	U3	Fault History
C1	Accel & Decel Time	E5	PM Motor Settings	L4	Speed Detection	o3	Copy Keypad Function	U4	Maintenance Monitors
C2	S-Curve Characteristics	E9	Motor Setting	L5	Fault Restart	o4	Maintenance Monitors	U5	PID Monitors
C3	Slip Compensation	F: Options		L6	Torque Detection	o5	Log Function	U6	Operation Status Monitors
C4	Torque Compensation	F1	PG Speed Control Fault Detection	L7	Torque Limit			U8	DriveWorksEZ Monitors
C5	Auto Speed Regulator (CSR)	F6	Communication Option	L8	Drive Protection				
C6	Duty & Carrier Frequency	F7	Ethernet Options						

Figure 62: DR...B (GA500) Parameter Groups

Appendix A: Navigating the Parameters Using the Keypad (continued)

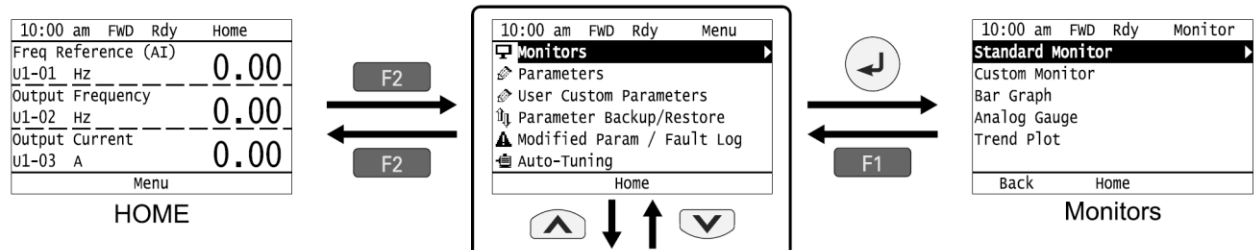


Figure 63: DR...C (GA800) Parameter Paths

A: Initialization	d: Reference Settings	H: Terminal Functions	n: Special Adjustment	q: DriveWorksEZ Parameters
A1 Initialization	d1 Frequency Reference	H1 Digital Inputs	n1 Hunting Prevention	r: DriveWorksEZ Connections
A2 User Parameters	d2 Reference Limits	H2 Digital Outputs	n2 Auto Freq. Regulator (AFR)	T: Motor Tuning
b: Application	d3 Jump Frequency	H3 Analog Inputs	n3 High Slip/Overexcite Braking	U: Monitors
b1 Operation Mode Selection	d4 Freq. Ref. Up/Down & Hold	H4 Analog Outputs	n4 AOLV Tuning	U1 Operation Status Monitors
b2 DC Injection Braking and Short Circuit Braking	d5 Torque Control	H5 Modbus Communication	n5 Feed Forward Control	U2 Fault Trace
b3 Speed Search	d6 Field Weakening/Forcing	H6 Pulse Train Input/Output	n6 Online Tuning	U3 Fault History
b4 Timer Function	d7 Offset Frequency	H7 Virtual Inputs/Outputs	n7 EZ Drive	U4 Maintenance Monitors
b5 PID Control	E: Motor	L: Protection Functions	n8 PM Motor Control Tuning	U5 PID Monitors
b6 Dwell Function	E1 V/f Pattern for Motor 1	L1 Motor Protection	o: Keypad-Related Settings	U6 Operation Status Monitors
b7 Droop Control	E2 Motor 1 Parameters	L2 Power Loss Ride Through	o1 Keypad Display	U8 DriveWorksEZ Monitors
b8 Energy Saving	E3 V/f Pattern for Motor 2	L3 Stall Prevention	o2 Keypad Operation	
b9 Zero Servo	E4 Motor 2 Parameters	L4 Speed Detection	o3 Copy Keypad Function	
C: Tuning	E5 PM Motor Settings	L5 Fault Restart	o4 Maintenance Monitors	
C1 Accel & Decel Time	E9 Motor Setting	L6 Torque Detection	o5 Log Function	
C2 S-Curve Characteristics	F: Options	L7 Torque Limit		
C3 Slip Compensation	F1 PG Option Setup (Encoder)	L8 Drive Protection		
C4 Torque Compensation	F2 Analog Input Option	L9 Drive Protection 2		
C5 Auto Speed Regulator (CSR)	F3 Digital Input Option			
C6 Duty & Carrier Frequency	F4 Analog Output Option			
	F5 Digital Output Option			
	F6 Communication Option			
	F7 Ethernet Options			

Figure 64: DR...C (GA800) Parameter Groups

Appendix B: DR...B (GA500) Control Circuit Wiring

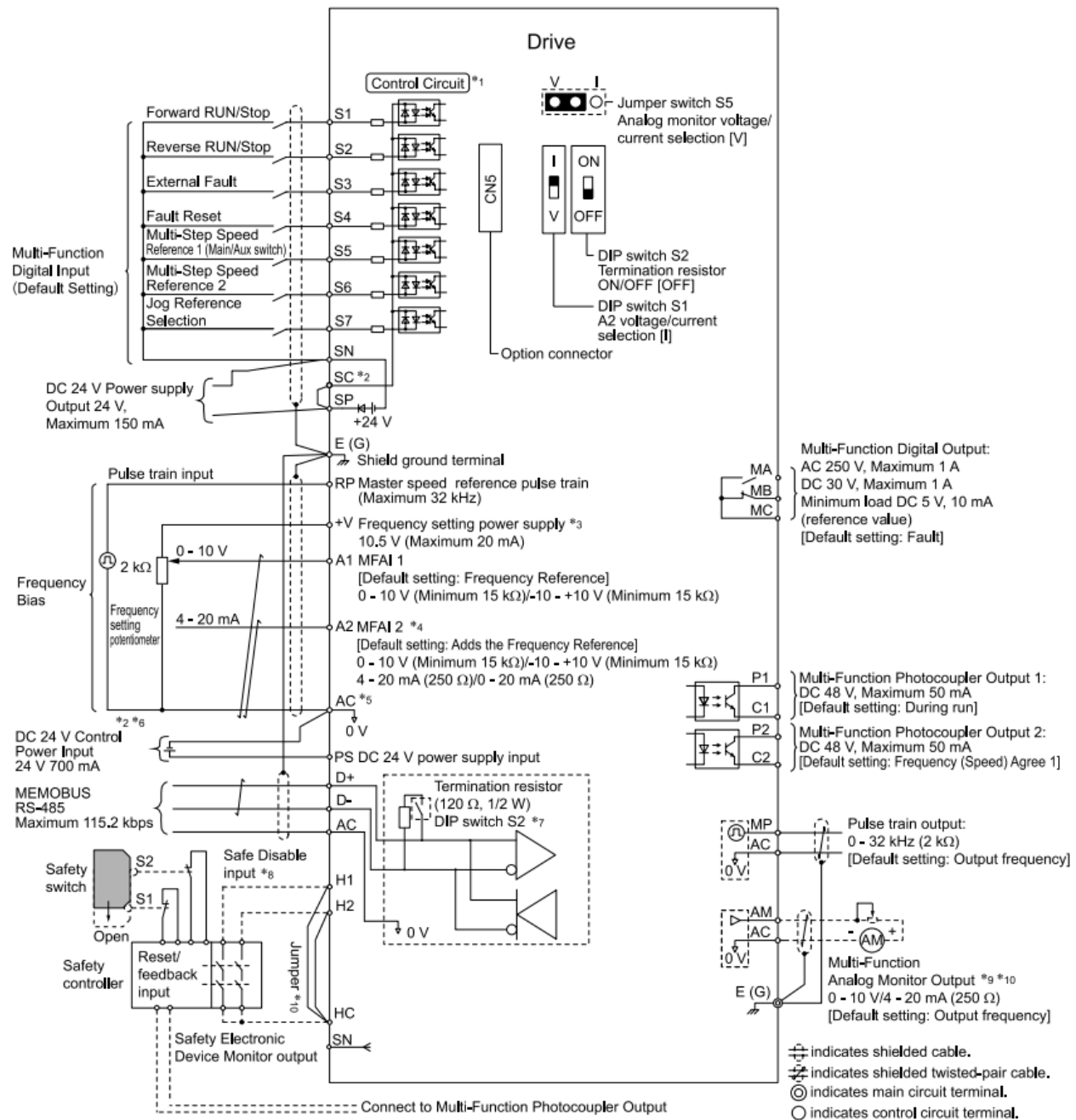


Figure 65: DR...B (GA500) Control Circuit

Appendix C: DR...C (GA800) Control Circuit Wiring

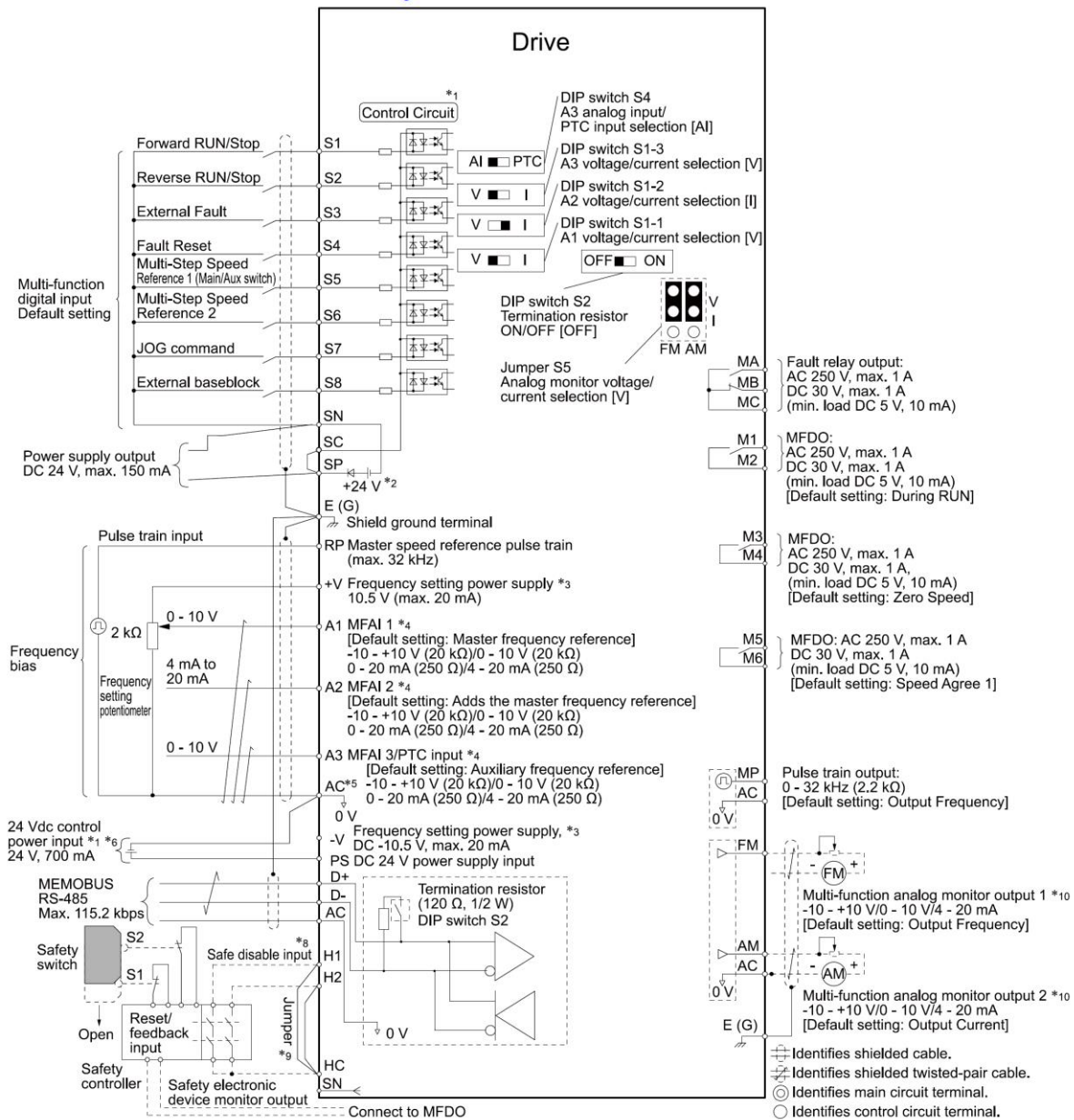


Figure 66: DR...C (GA800) Control Circuit

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