



Allen-Bradley 1333 Heavy Duty Dynamic Braking

Cat. No. 1333-MOD-KA1-5

Cat. No. 1333-MOD-KB1-5

Kit Instructions

Description

The Bulletin 1333 Heavy Duty Dynamic Braking Option Kit is a self contained NEMA Type 1 enclosed assembly that is wired to the Bulletin 1333 Adjustable Frequency Drive. The dynamic brake will increase the braking torque capability of the Drive from approximately 20% to 100%.

Brake kits must be mounted separately from the Drive and receive power directly from the Drive. Individual option kits are available for Drive ratings up to 20 HP. Above 20 HP, 10 and 20 HP braking kits are combined to match the drive HP. If multiple kits are required, interconnection wiring between the kits is also required.

IMPORTANT: Only 10 or 20 HP dynamic brake kits may be used in combination to provide dynamic braking above 20HP. For kit selection, refer to Publication 1333-2.4 – Selection Data – for Series B or C drives, or Appendix D – Application Data in Publication 1333-5.2 – for kit selection for Series D drives.

Kit Instructions

Heavy Duty Dynamic Braking

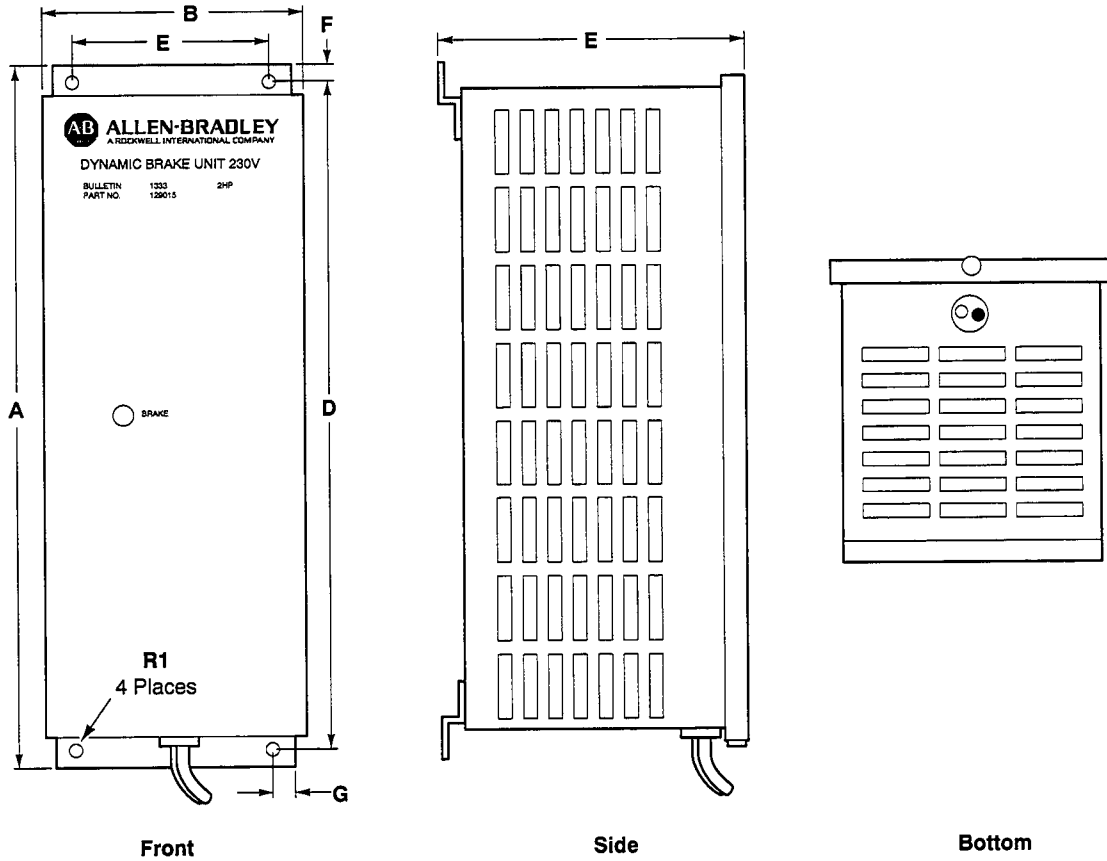
Catalog Number Description

Nominal Drive HP	Catalog Number (Quantity)	1333 – MOD – K A 1
3/4	(1) 1333–MOD–K_1	<p>Heavy Duty Dynamic Braking</p> <p>Voltage Rating A = 208/230V AC B = 380/415/460V AC</p> <p>Brake Kit Code 1 = 3/4 & 1HP 2 = 2HP 3 = 3 & 5HP 4 = 7–1/2 & 10HP 5 = 15 & 20HP</p>
1	(1) 1333–MOD–K_1	
2	(1) 1333–MOD–K_2	
3	(1) 1333–MOD–K_3	
5	(1) 1333–MOD–K_3	
7–1/2	(1) 1333–MOD–K_4	
10	(1) 1333–MOD–K_4	
15	(1) 1333–MOD–K_5	
20	(1) 1333–MOD–K_5	
25	(1) 1333–MOD–K_5 and (1) 1333–MOD–K_4	
30	(1) 1333–MOD–K_5 and (1) 1333–MOD–K_4	
40	(1) 1333–MOD–K_5	
50	(1) 1333–MOD–K_5 and (1) 1333–MOD–K_4	

Brake Specifications

Braking Torque	100% Torque for 20 seconds (typical)
Duty Cycle	20% (typical)
Input Power	Power from Drive DC Bus
Temperature	-10°C to 50°C (14°F to 122°F)
Humidity	5% to 95% non-condensing
Atmosphere	No corrosive gas or non-hazardous dust
Altitude	3,300 Feet (1,000 Meters) Maximum without derating
Enclosure Type	NEMA Type 1 (IP20)

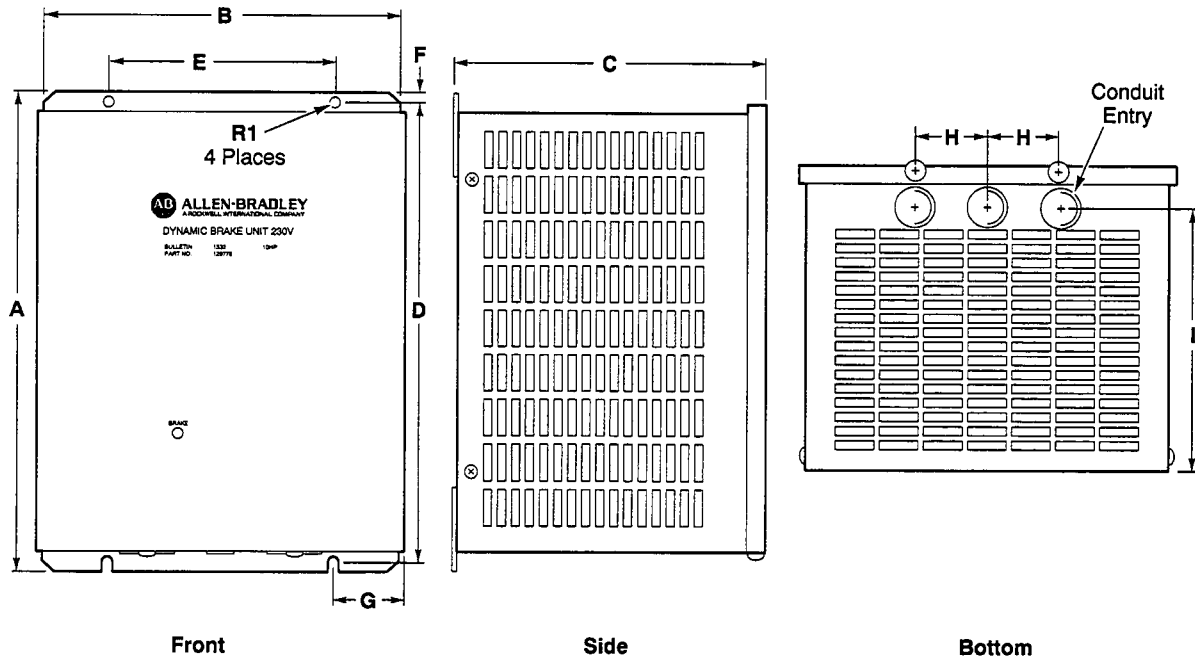
Dimensions



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Catalog Number	Dimensions and Weights in Inches (millimeters) and Pounds (kilograms)								
	A	B	C	D	E	F	G	RI diameter	Weight
1333-K_1	10.04 (255.0)	4.22 (107.2)	4.72 (119.0)	9.72 (247.0)	2.76 (70.1)	0.16 (4.1)	0.73 (18.5)	0.18 (4.6)	5.07 (2.3)
1333-K_2	11.27 (286.3)	4.22 (107.2)	5.31 (134.9)	10.67 (271.0)	2.76 (70.1)	0.30 (7.6)	0.73 (18.5)	0.23 (5.8)	6.84 (3.1)
1333-K_3	13.20 (335.3)	5.04 (128.0)	7.72 (196.1)	12.60 (320.0)	2.76 (70.1)	0.30 (7.6)	1.14 (29.0)	0.23 (5.8)	12.57 (5.7)

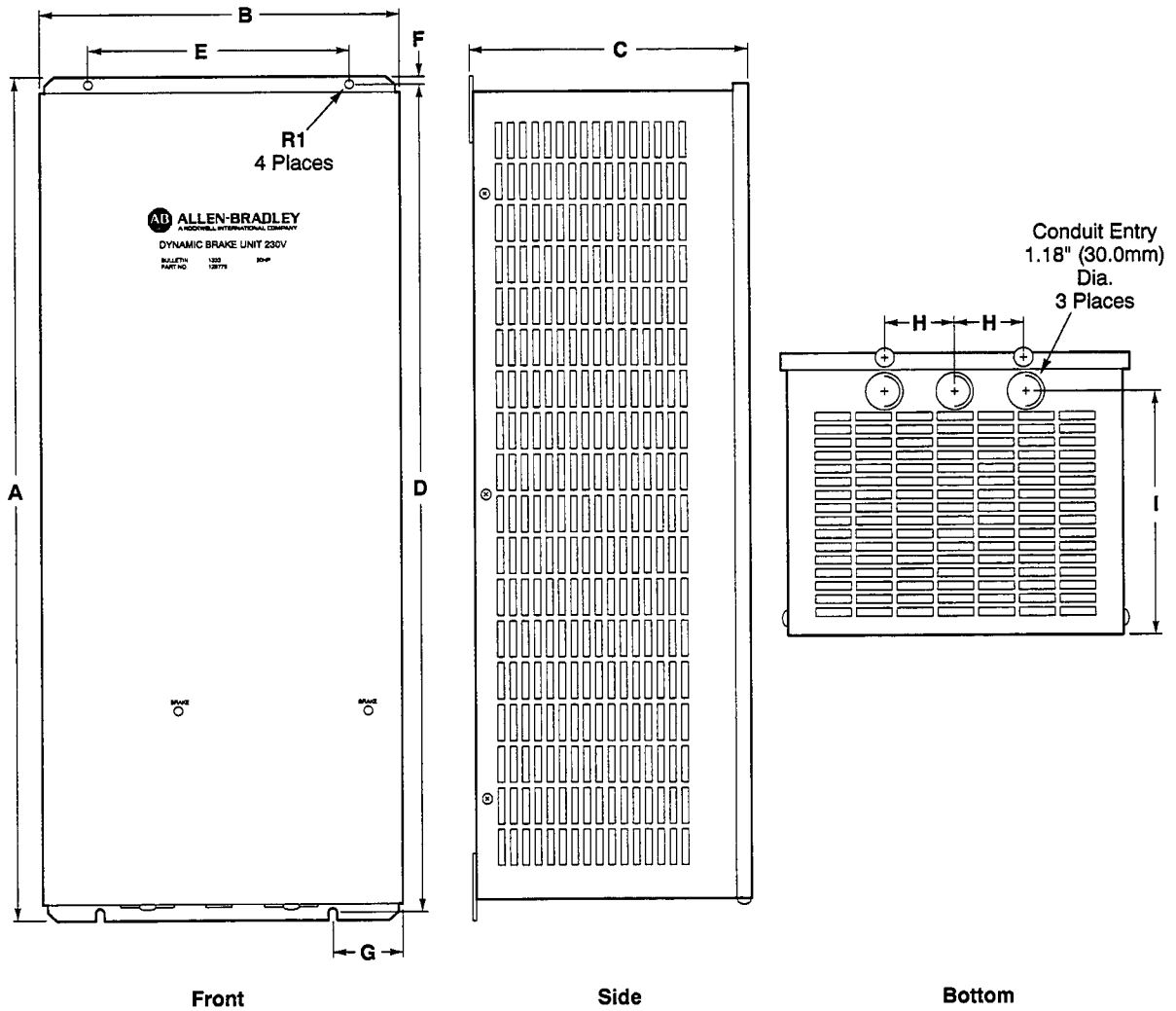
Kit Instructions
Heavy Duty Dynamic Braking



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Catalog Number	Dimensions and Weights in Inches (millimeters) and Pounds (kilograms)										
	A	B	C	D	E	F	G	H	I	RI diameter	Weight
1333-K_4	13.19 (335.0)	9.84 (250.0)	8.27 (210.0)	12.60 (320.0)	6.3 (160.0)	0.30 (7.5)	1.77 (45.0)	2.56 (65.0)	6.86 (174.2)	0.28 (7.0)	32.00 (14.4)

Kit Instructions
Heavy Duty Dynamic Braking



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Catalog Number	Dimensions and Weights in inches (millimeters) and Pounds (kilograms)										
	A	B	C	D	E	F	G	H	I	R1 diameter	Weight
1333-K_5	25.59 (650.0)	10.63 (270.0)	8.27 (210.0)	25.00 (635.0)	7.87 (200.0)	0.30 (7.5)	1.38 (35.0)	2.56 (65.0)	6.86 (174.2)	0.28 (7.0)	62.0 (27.9)

Installation



ATTENTION: Only personnel familiar with the Drive and its associated machinery should plan or implement the installation, startup and adjustment of replacement kits. Failure to comply may result in personal injury and/or equipment damage.

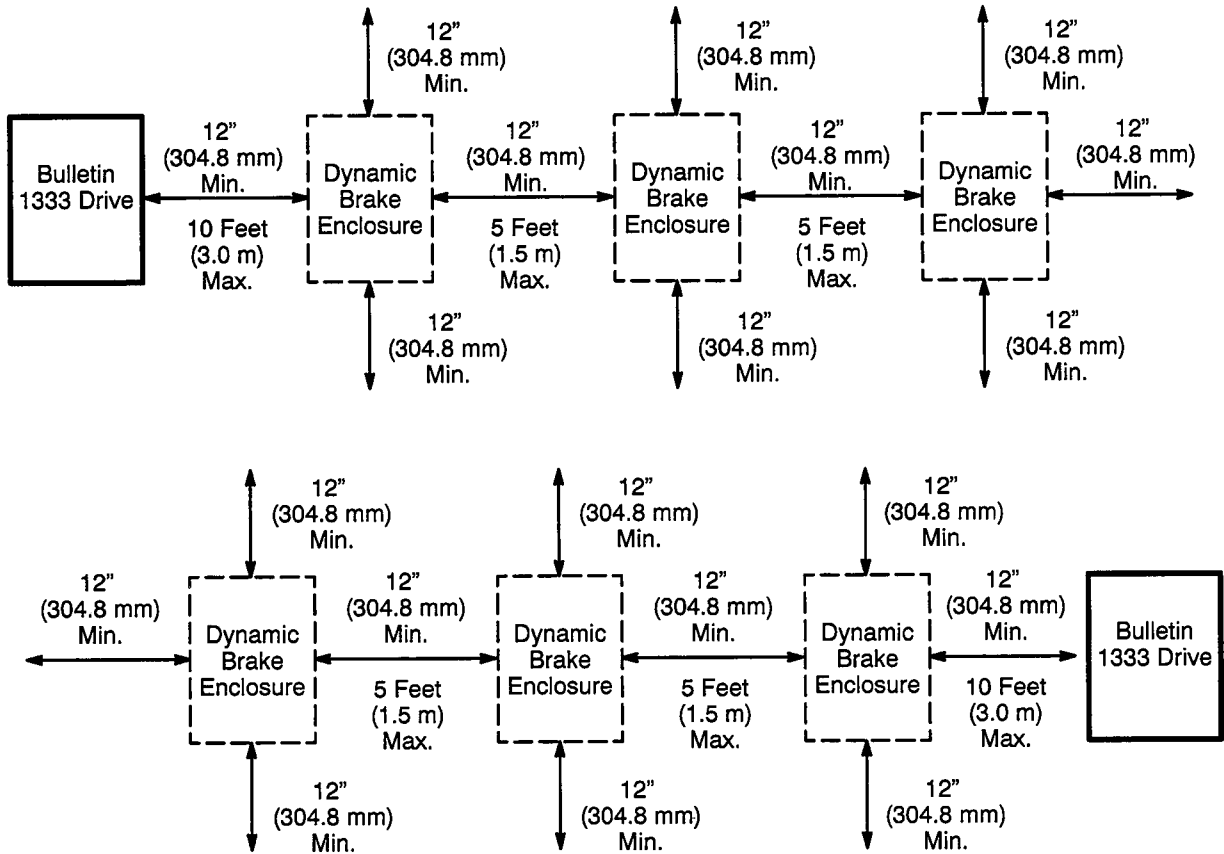
To guard against personal injury, always remove & lock out power to the Drive at the main supply disconnect and all other power source disconnects. Ensure that the Bus Charge LED is not lit when boards or wires are being installed or connected. Refer to the instruction manual for your Drive for LED location.



ATTENTION: Before proceeding with any maintenance or troubleshooting activity, allow at least one minute after input power has been removed to allow for bus circuit discharge. A Bus Charge LED is incorporated on the Drive to provide visual indication of the presence of bus voltage. The bus voltage should be verified by using a voltmeter to measure the voltage at the Power Terminal Block – Terminals P (+) and N (-) for Series B or C drives, the +Bus and -Bus Terminals for Series D drives. Do not attempt any servicing until the LED has extinguished or the bus voltage has diminished to (0). Hazards of electrical shock exist if accidental contact is made with parts carrying bus voltage.

Dynamic brake enclosures require field mounting and connection to the 1333 Drive. Select an appropriate location using the guidelines below and on the following pages.

Recommended Mounting Locations



- Each dynamic brake enclosure must be mounted outside of any other enclosure or cabinet and exposed to free circulating air for proper heat dissipation. Allow a minimum of 12 inches between brake enclosures and all other enclosures or cabinets including the Drive.
- Each enclosure must be mounted in an area where the environment does not exceed the values listed in the Specifications.
- If only one dynamic brake enclosure is required, the enclosure must be mounted within 10 feet of the Drive.
- If more than one dynamic brake enclosure is required, the first enclosure must be mounted within 10 feet of the Drive. Allow a maximum distance of 5 feet between each remaining brake enclosure.
- Separate conduit must be provided for the power connections between the brake enclosures and the Drive.
- Separate conduit must be provided for the control connections between the brake enclosures and the Drive.

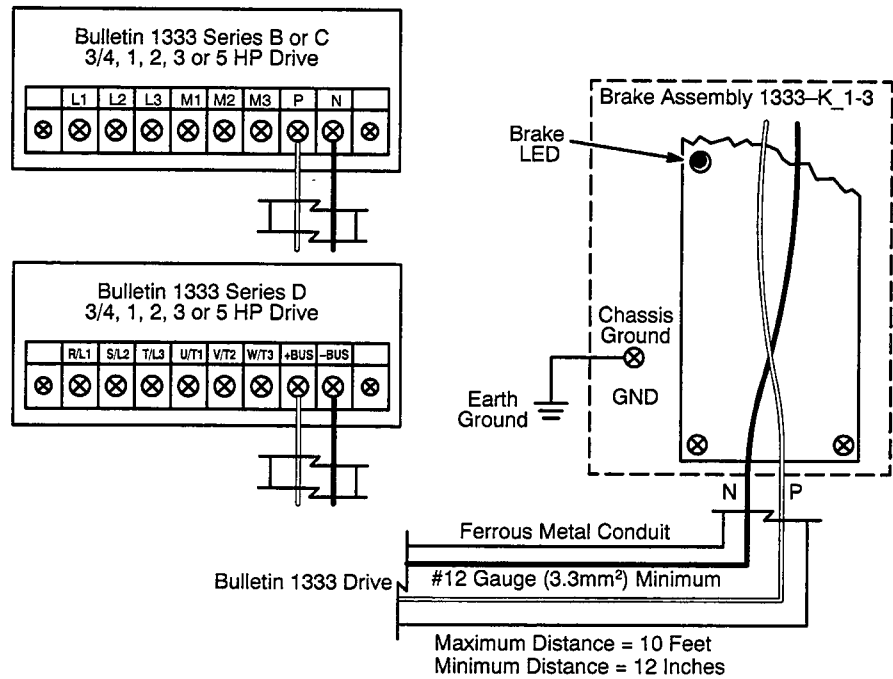
Kit Instructions
Heavy Duty Dynamic Braking

IMPORTANT: The National Electrical Code (NEC) and local regulations govern the installation and wiring of the Bulletin 1333 Heavy Duty Dynamic Brake. Power wiring, control wiring and conduit should be sized and installed in accordance with these codes and the information supplied on the following pages.

Interconnection Wiring
3/4 - 5HP Drives

(1) Catalog number 1333-MOD-K_1, 2 or 3

The dynamic brake kit for Drives up to 5 HP has a single brake module mounted in the brake enclosure. Two 12 gauge (3.3mm²), 18 inch interconnection leads are connected to the brake module for interconnection wiring. If longer leads are required, two wires – #12 gauge (3.3mm²) minimum – must be spliced to the existing leads in the enclosure. All interconnection wiring between the Drive and the brake must be run through conduit. The brake must be located within 10 feet of the Drive and have a minimum of 12 inches of air space around it for heat dissipation as shown below.

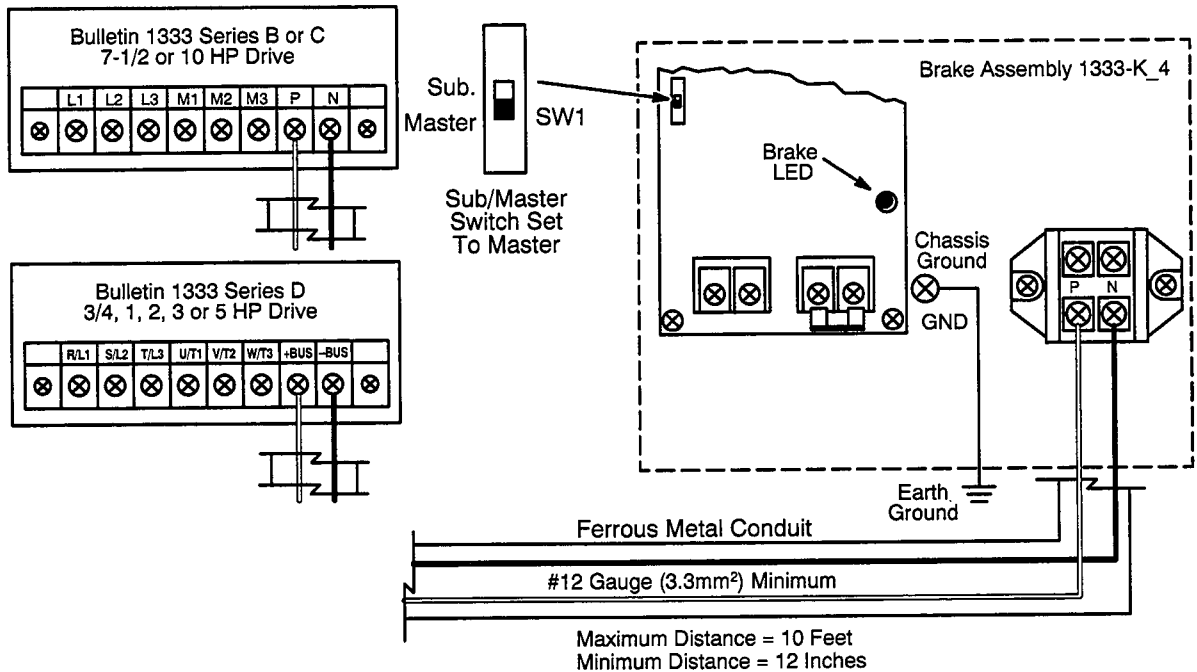


Interconnection Wiring
7-1/2 or 10HP Drives

(1) Catalog Number 1333-MOD-K_4

The dynamic brake kit for 7-1/2 or 10 HP Drives has a single brake module mounted in the brake enclosure. Two power wires – #12 gauge (3.3mm²) minimum – must be run through conduit between the Drive and the brake as shown. The enclosure must be located within 10 feet of the Drive and have a minimum of 12 inches of air space around it for heat dissipation.

The brake assembly has a SUB/MASTER Switch SW1 located on the module that is factory set to Master. It must remain set to Master for 7-1/2 or 10 HP Drive operation. Terminals B2 (-) and B1 (+) are factory jumpered. They must remain jumpered for 7-1/2 or 10 HP Drive operation.



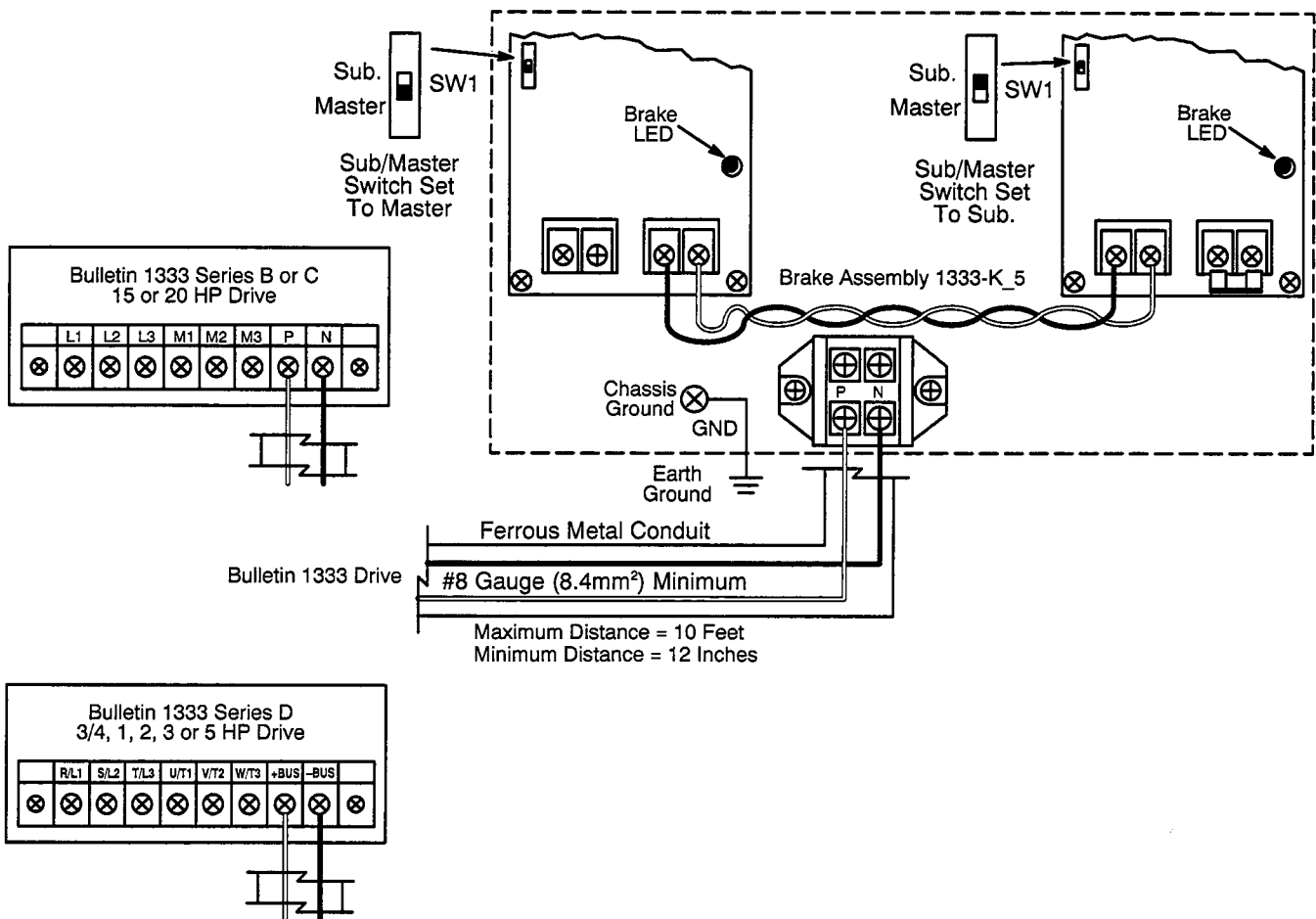
Kit Instructions
Heavy Duty Dynamic Braking

Interconnection Wiring
15 or 20 HP Drives

(1) Catalog Number 1333-MOD-K_5

The dynamic brake kit for 15 or 20 HP Drives has two brake modules mounted in the brake enclosure that are interconnected at the factory. Two power wires – #8 gauge (8.4mm²) minimum – must be run through conduit between the Drive and the enclosure as shown. The enclosure must be located within 10 feet of the Drive and have a minimum of 12 inches of air space around it for heat dissipation.

The brake assembly has a SUB/MASTER Switch SW1 located on each brake module. These switches are factory set to Master (left module) and Sub. (right module). They must remain at these settings for 15 or 20 HP Drive operation. Terminals B2 (-) and B1 (+) on the Sub. module are factory jumpered. They must remain jumpered for 15 or 20 HP Drive operation.

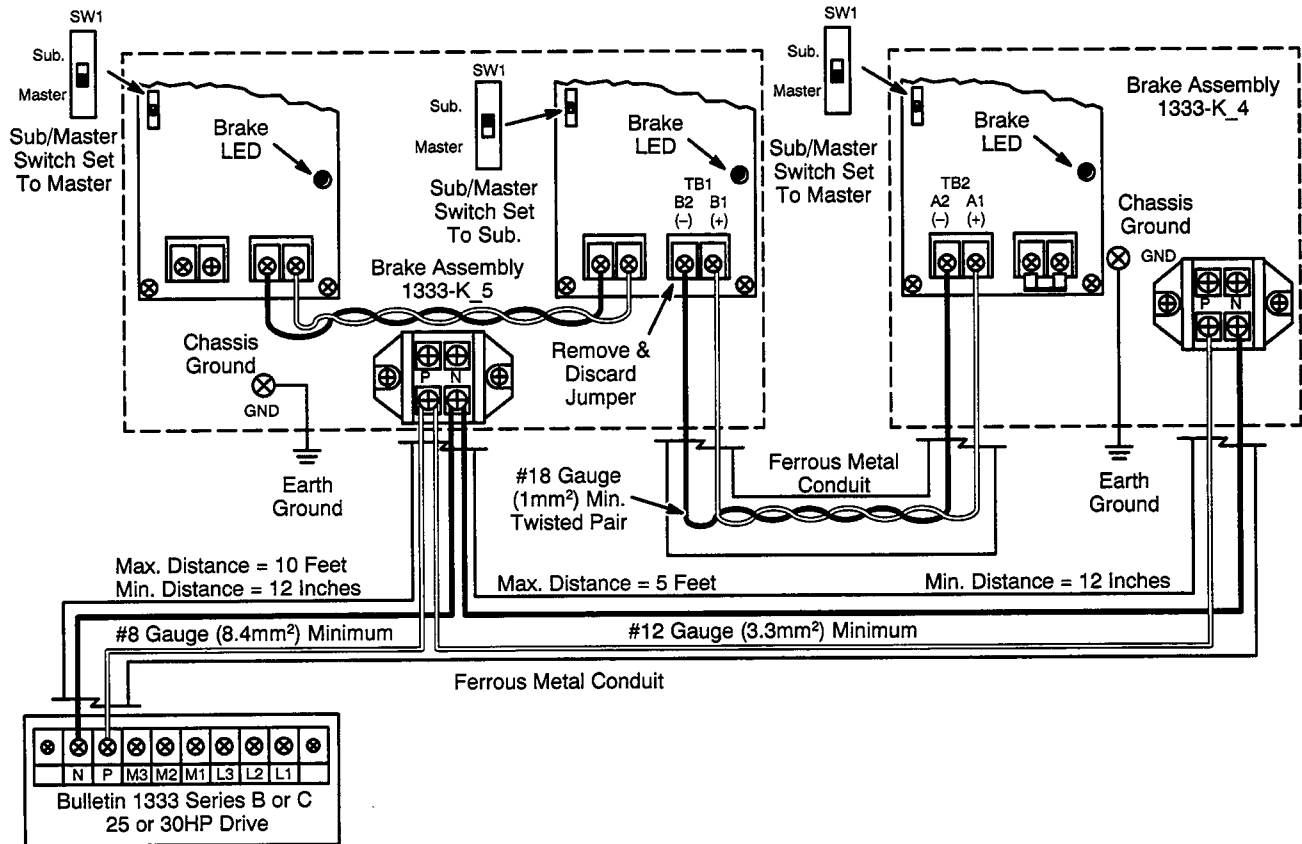


**Interconnection Wiring
25 or 30HP Drives**

- (1) Catalog Number 1333-MOD-K_5
- (1) Catalog Number 1333-MOD-K_4

(2) dynamic brake kits are required for 25 or 30 HP Drives – (1) 20 HP and (1) 10 HP. The 10 HP brake kit has a single brake module, while the 20 HP brake kit has two brake modules that are interconnected at the factory.

The 20 HP brake kit has a SUB/MASTER Switch SW1 located on each brake module. These switches are factory set to Master (left module) and Sub. (right module). They must remain at these settings for 25 or 30 HP Drive operation. The factory jumper between terminals B2 (-) and B1 (+) on the Sub. module must be removed for 25 or 30 HP Drive operation. The 20 HP assembly will have the master control module that controls all other brake modules. It must be located nearest the Drive – within 10 feet – and have a minimum of 12 inches of air space around it for heat dissipation.



The 10 HP dynamic brake assembly also has a SUB/MASTER Switch located on the brake module that is factory set to Master. It must be set to Sub. for 25 or 30 HP Drive operation. Terminals B2 (-) and B1 (+) are also factory jumpered. They must remain jumpered for 25 or 30 HP Drive operation. The 10 HP enclosure must be located within 5 feet of the 20 HP enclosure and have a minimum clearance of 12 inches around it for proper heat dissipation.

Interconnection power wiring must be run in conduit separate from control wiring. Power wiring between the 20 HP brake enclosure and the Drive must be single pair, #8 gauge (8.4mm²) minimum. Power wiring between the 20 HP brake enclosure and the 10 HP brake enclosure must be single pair, #12 gauge (3.3mm²) minimum.

Control wiring must be run in conduit separate from power wiring. Interconnection control wiring between the dynamic brake enclosures and the Drive should be twisted pair, #18 gauge (1mm²) minimum.

Interconnection Wiring 40HP Drives

(2) Catalog Number 1333-MOD-K_5s

(2) 20 HP Dynamic brake kits are required for 40 HP Drives. Each 20 HP brake kit has two brake modules that are interconnected at the factory. A SUB/MASTER Switch SW1 is located on each assembly. The left brake module is factory set to Master, the right to Sub. A factory jumper is installed between terminals B2 (-) and B1 (+) on the Sub. module.

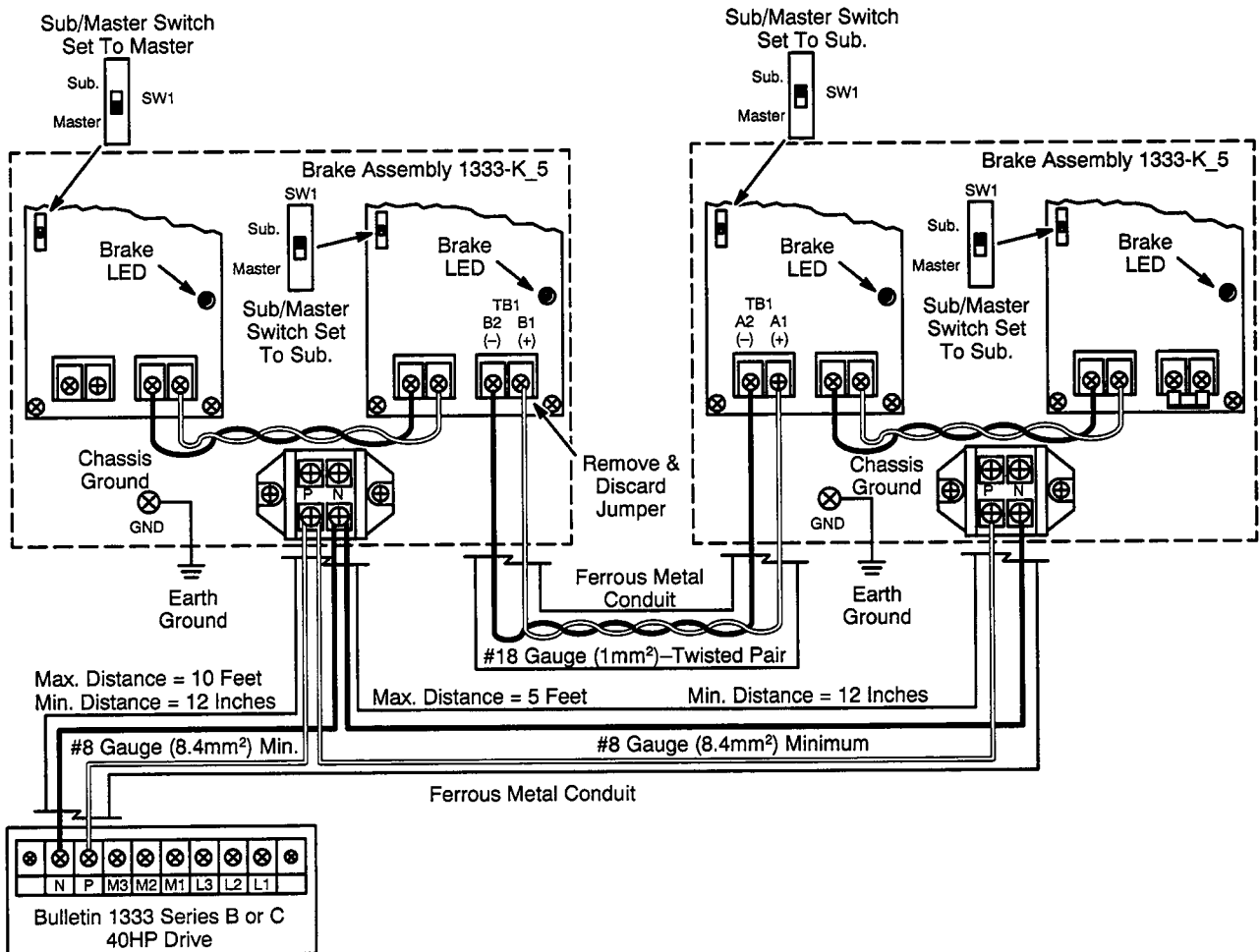
One of the 20 HP assemblies will have the master control module that will control all other brake modules. It must be positioned nearest the Drive – within 10 feet – and have a minimum of 12 inches of air space around it for heat dissipation. Both SUB/MASTER switches in this enclosure must remain at their factory settings. The factory jumper between terminals B2 (-) and B1(+) on the Sub. module in this assembly must be removed for 40 HP Drive operation as shown on the following page.

The other 20 HP assembly must have the SUB/MASTER Switches on both modules set to Sub. for 40 HP Drive operation. Terminals B2 (-) and B1 (+) must remain factory jumpered for 40 HP Drive operation. This assembly must be located within 5 feet of the other 20 HP assembly and have a minimum of 12 inches of air space around it for heat dissipation.

Power wiring must be run in conduit separate from control wiring as shown on the following page. Interconnection power wiring between the dynamic brake enclosures should be single pair, #8 gauge (8.4mm²) minimum. Interconnection power wiring between the drive and the closest dynamic brake enclosure should be single pair, #8 gauge (8.4mm²) minimum.

Control wiring must be run in conduit separate from power wiring as shown on the following page. Interconnection control wiring between the dynamic brake enclosures and the Drive should be twisted pair, #18 gauge (1mm²) minimum.

Kit Instructions
Heavy Duty Dynamic Braking



**Interconnection Wiring
50HP Drives**

(2) Catalog Number 1333-MOD-K_5s

(1) Catalog Number 1333-MOD-K_4

(3) Dynamic brake kits are required for 50 HP Drives – (2) 20 HP and (1) 10 HP. The 10 HP brake kit as a single brake module, while each 20 HP brake kit has two brake modules that are interconnected at the factory.

One of the 20 HP enclosures will have the master control module that will control all other brake modules. It must be positioned nearest the Drive – within 10 feet – and have a minimum of 12 inches of air space around it for heat dissipation. Both SUB/MASTER switches in this assembly must remain at their factory settings. The factory jumper between terminals B2 (-) and B1 (+) on the Sub. module in this assembly must be removed for 50 HP Drive operation.

The other 20 HP assembly must have the SUB/MASTER Switches on both modules set to Sub. for 50 HP Drive operation. Terminals B2 (-) and B1 (+) must remain factory jumpered for 50 HP operation.

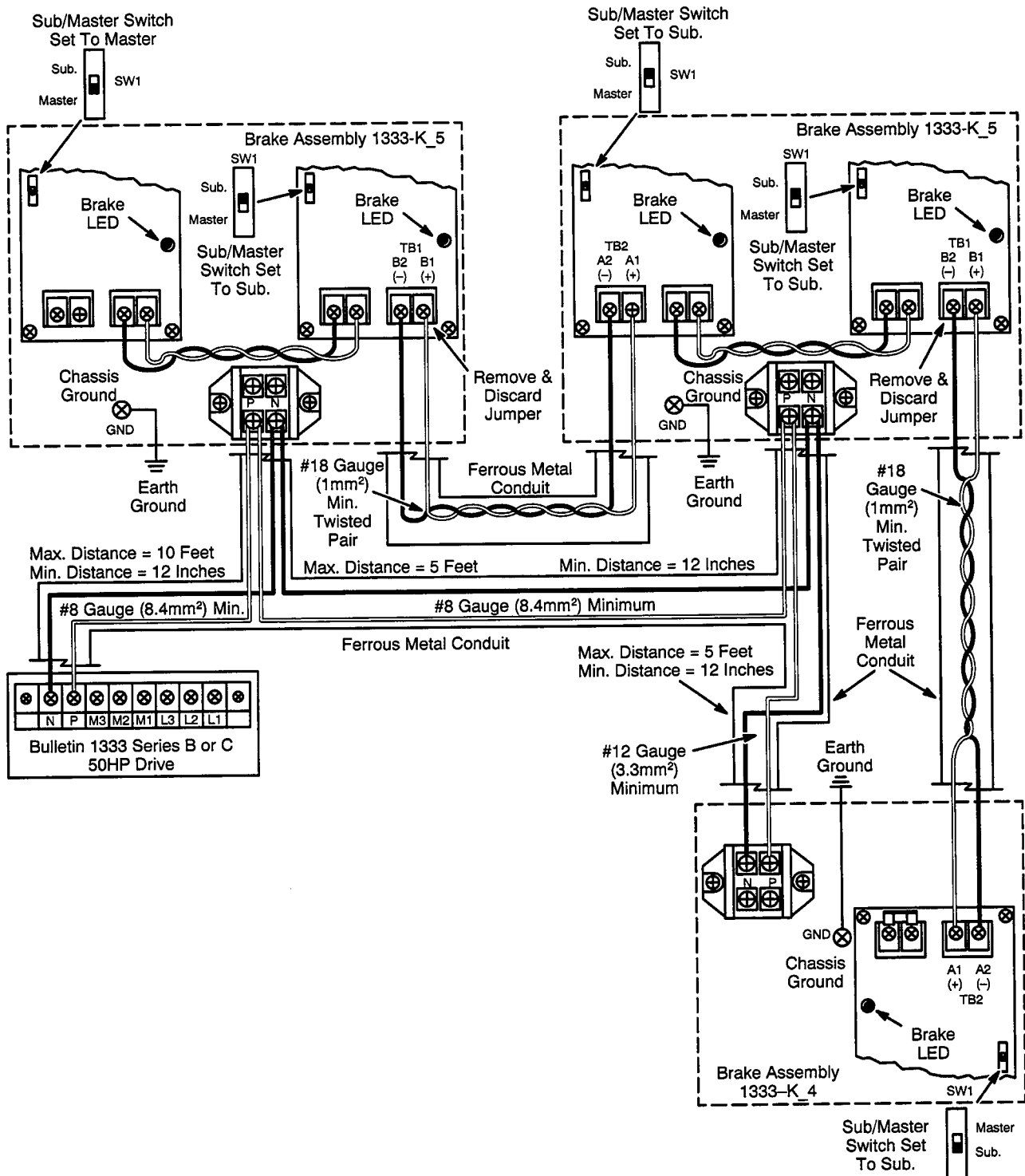
This assembly should be located within 5 feet of the other 20 HP assembly and have a minimum of 12 inches of air space around it for heat dissipation.

The 10 HP dynamic brake assembly also has a SUB/MASTER Switch located on the brake module that is factory set to Master but must be set to Sub. for 50 HP Drive operation. Terminals B2 (-) and B1 (+) are factory jumpered and must remain jumpered for 50 HP Drive operation. The 10 HP assembly should be located within 5 feet of the 20 HP assembly and have a minimum of 12 inches of air space around it for heat dissipation.

Power wiring must be run in conduit separate from control wiring. Interconnection power wiring between the drive and the closest 20 HP dynamic brake should be single pair, #8 gauge (8.4mm²) minimum. Interconnection power wiring between the (2) 20 HP dynamic brake enclosure should be single pair, #8 (8.4mm²) gauge minimum. Interconnection power wiring between the 10 and 20 HP dynamic brake enclosures should be single pair, #12 gauge (3.3mm²) minimum and run in conduit separate form control wiring.

All Interconnection control wiring between the dynamic brake enclosures and the Drive should be twisted pair, #18 gauge (1mm²) minimum. Control wiring must be run in a ferrous metal conduit separate from power wiring.

Kit Instructions
Heavy Duty Dynamic Braking



Operation

When a motor is turning faster than the synchronous speed set by the Drive output frequency, the motor can generate power which is returned to the Drive. Without Heavy Duty Dynamic Braking, power returned to the Drive bus can cause the bus voltage to rise above the rated limit of the Drive. The Drive has an overvoltage trip feature to detect this condition and shut down the Drive if necessary. This condition can occur if power returned to the Drive exceeds 20% of the Drive rating.

When the Heavy Duty Dynamic Brake is added to the Drive, excessive power is dissipated in the brake resistors. Increased braking action (over 20%) can now take place since an overvoltage trip condition will not occur within the increased limits of the Brake.

The Dynamic Brake monitors the Drive DC bus. When the brake senses a rise in bus voltage and braking action is required, the brake will turn on. Turning on the brake adds resistors in parallel to the DC bus, providing a load to dissipate the motor power generated during braking. When the DC bus voltage is lowered to within acceptable limits and braking is no longer required, the Dynamic Brake will shut off and disconnect the brake resistors from the bus.

The 10 and 20 HP dynamic brakes are specially designed to permit parallel operation. When more than one brake is needed, the controls of the brake modules can be interconnected to each other and the Drive to obtain the braking load required. One brake module becomes the main control module, while the others can be programmed through switch selection and interconnection to be subordinate modules. Subordinate modules respond to a signal from the main brake module to switch on at the same time as the main module. This subordinate operation helps ensure that all brake modules are operating at the same duty cycle to help minimize erratic operation and guard against excessive overheating of individual brakes.

The Dynamic Brake is designed to turn on only when required to dissipate the excessive energy returned to the DC bus. Typically the brake should come on only during a decelerating or stopping mode.

The brake LED on the front of the enclosure will be lit when the Brake is on. The Dynamic Brake should not be on during the following conditions:

- The Motor is Stopped — Deceleration Complete
- The Motor is Accelerating
- The Motor is At Speed with no Overhauling Load

If the Dynamic Brake is on during any of these conditions, improper brake operation is indicated. Contact your nearest Allen-Bradley Area Sales/Support Center, Drives Distributor, or Sales Office for assistance.

1333 Series B or C Set-Up

The following 1333 MODES must be set once the heavy duty dynamic brake has been installed and interconnection wiring has been made.

MODE 14 Stop Mode

If braking is required when the Drive is stopped, set MODE 14 to 0 (ramp-to-stop).

MODE 16 Decel Stall Protection

To prevent this feature from interfering with dynamic braking action, set MODE 16 to 0 (decel stall prevention off).

Refer to Bulletin 1333 Instruction Manual for programming procedures and record the changes for future reference.



ATTENTION: The heavy duty dynamic braking unit contains a thermostat to guard against overheating and component damage.

If the duty cycle, torque setting and/or ambient temperature exceeds the specifications listed in the Brake Specifications the thermostat is designed to trip and disable the braking units until the components cool to rated temperature. An 0V (overvoltage) fault indication at the Drive will normally indicate a dynamic brake trip. During this period, only 20% braking torque will be available to the motor.

If reduced braking torque represents a potential hazard to personnel, dynamic brake tripping must be considered in the machine and/or control circuit design.

1333 Series D Set-Up

The following 1333 Parameters must be set once the heavy duty dynamic brake has been installed and interconnection wiring has been made.

Parameter 11 Stop Select

If braking is required when the Drive is stopped, set Parameter 11 to 0 (ramp-to-stop).

Parameter 14 DC Hold Volts

To prevent this feature from interfering with dynamic braking action, set Parameter 14 to 0 (drive internal DC Brake dissabled).

Refer to Bulletin 1333 Instruction Manual for programming procedures and record the changes for future reference.



ATTENTION: The heavy duty dynamic braking unit contains a thermostat to guard against overheating and component damage.

If the duty cycle, torque setting and/or ambient temperature exceeds the specifications listed in the Brake Specifications the thermostat is designed to trip and disable the braking units until the components cool to rated temperature. An OV (overvoltage) fault indication at the Drive will normally indicate a dynamic brake trip. During this period, only 20% braking torque will be available to the motor.

If reduced braking torque represents a potential hazard to personnel, dynamic brake tripping must be considered in the machine and/or control circuit design.

Notes



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