SECTION 9 - MECHANICAL BRAKES

The Delta driver is equipped with special circuitry and software to sequence an electrically released mechanical brake. The full line of Delta motors are available with mechanical brakes to provide mechanical fail safe braking in the case of power loss and driver disable.

It is very important for proper operation to sequence the driver servo lock and mechanical brake to avoid loss of holding torque during the transition. The driver in conjunction with an external relay and brake power supply provide for the optimum sequencing to prevent loss of holding torque or driver damage.

9.1 NO MECHANICAL BRAKING

If a mechanical brake is not used, tie BRAKE CONFIRM input ON for the DSD-1.5 through DSD-17.5 driver sizes. For the DSD-35 and larger drivers, a jumper must be provided between B11 and B12. The factory installs a B11 to B12 jumper.

Set UP-16 to the default value of 0.

9.2 MECHANICAL BRAKING WITH HARD DECEL

The driver sequencing can be set to apply the mechanical brake immediately upon driver disable. Since the mechanical brake is applied immediately upon driver disable the deceleration of the motor will be abrupt and limited only by the brake torque and mechanical system.

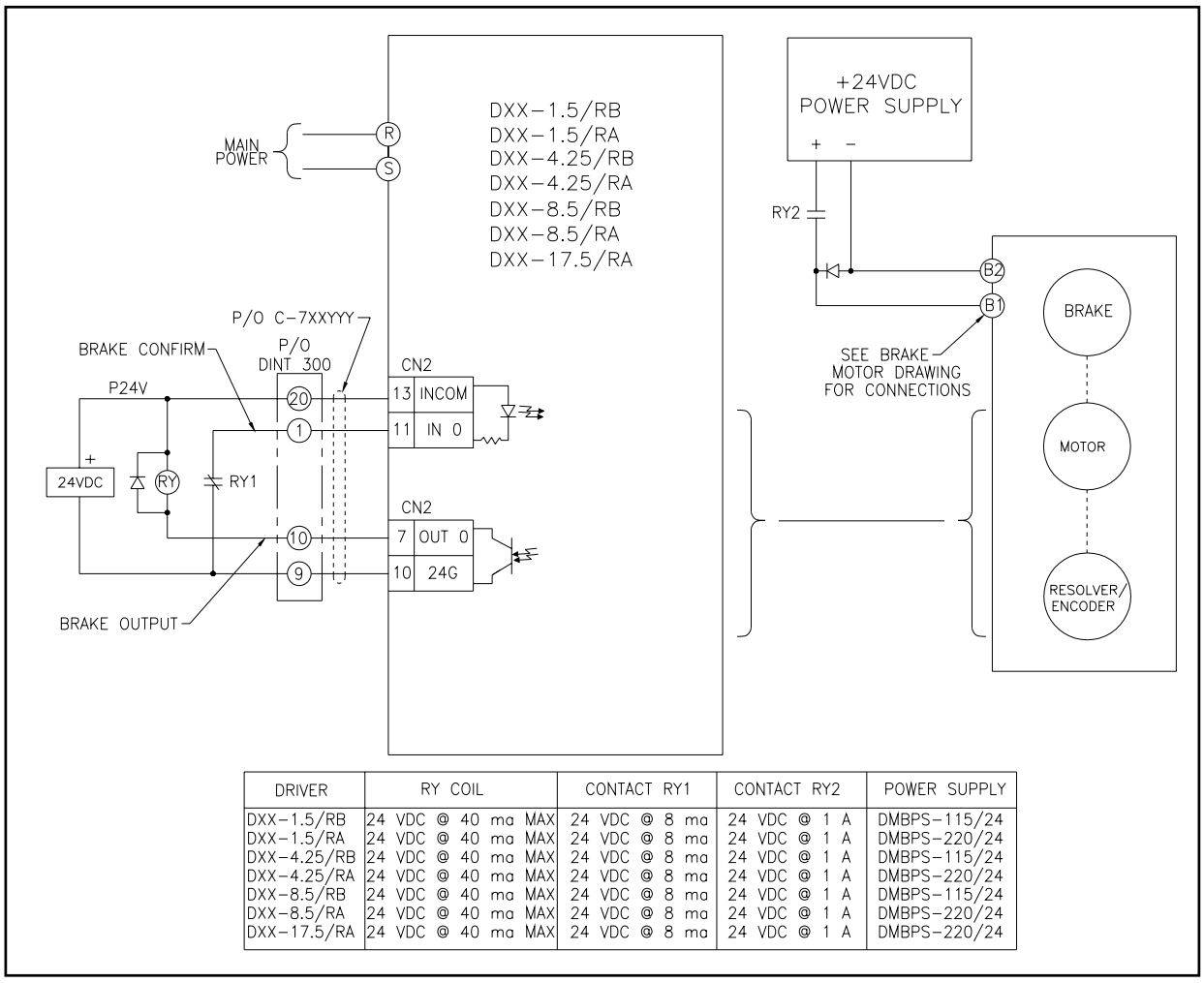
Connect the braking relay and power supply as shown in **Figures 9.1 or 9.2** and set UP-16 to a value of 02. The sequencing will be as shown in **Figure 9.3**.

9.3 MECHANICAL BRAKING WITH SOFT DECEL

The driver sequencing can be set to apply the mechanical brake after the driver has reduced the motor speed to a programmable set point. The decel rate is set by UP-13 and the speed set point at which the brake is applied is set by UP-28.

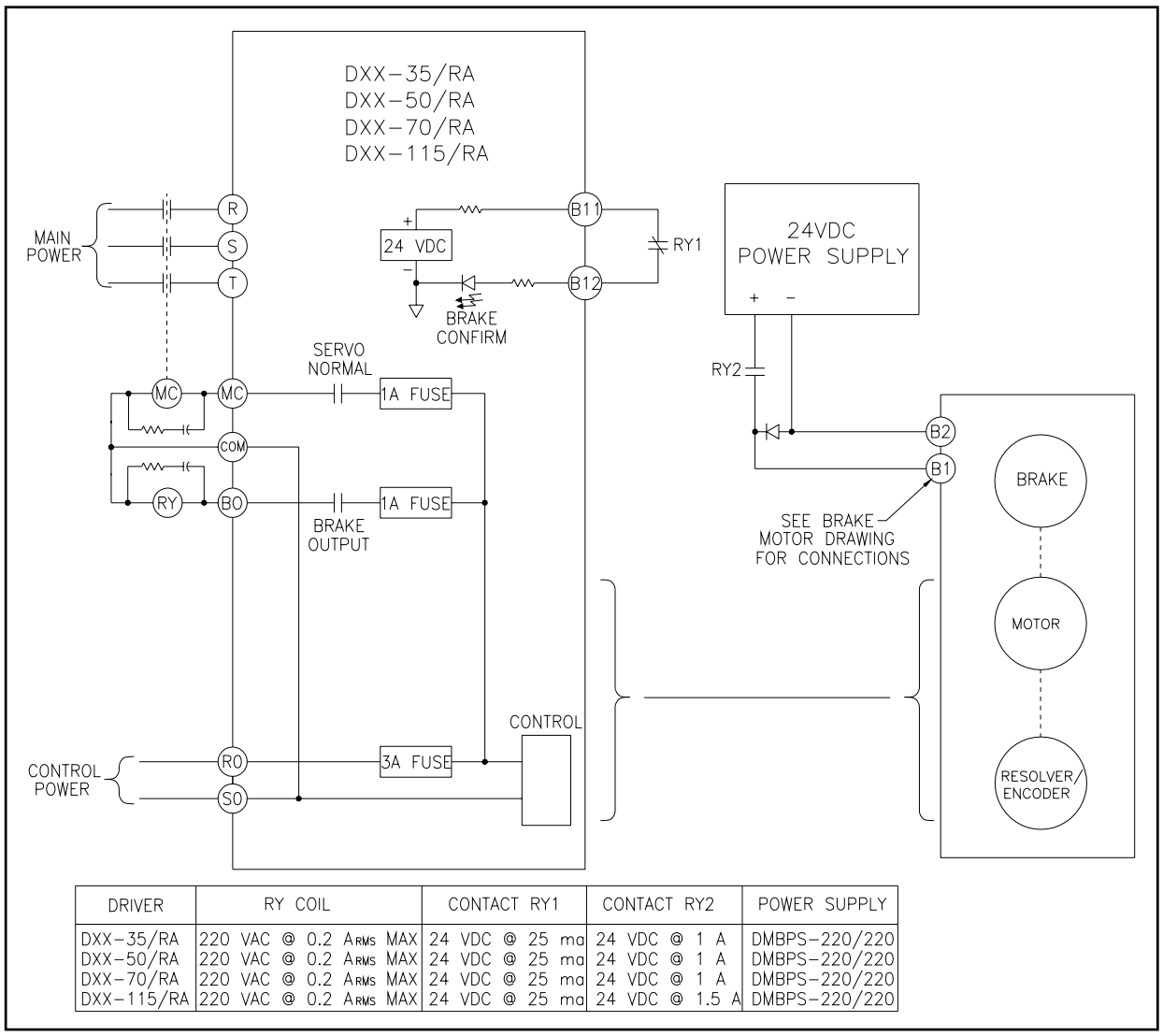
The mechanical brake is applied immediately upon driver alarm or loss of power.

Connect the braking relay and power supply as shown in **Figures 9.1 or 9.2** and set UP-16 to a value of 01. The sequencing will be as shown in **Figure 9.4**.



DRIVER	RY COIL	CONTACT RY1	CONTACT RY2	POWER SUPPLY
DXX-1.5/RB	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-115/24
DXX-1.5/RA	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-220/24
DXX-4.25/RB	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-115/24
DXX-4.25/RA	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-220/24
DXX-8.5/RB	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-115/24
DXX-8.5/RA	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-220/24
DXX-17.5/RA	24 VDC @ 40 ma MAX	24 VDC @ 8 ma	24 VDC @ 1 A	DMBPS-220/24

Figure 9.1 - Mechanical Brake Connection for the DSD-1.5 Through DSD-17.5 Drivers



DRIVER	RY COIL	CONTACT RY1	CONTACT RY2	POWER SUPPLY
DXX-35/RA	220 VAC @ 0.2 A_{RMS} MAX	24 VDC @ 25 ma	24 VDC @ 1 A	DMBPS-220/220
DXX-50/RA	220 VAC @ 0.2 A_{RMS} MAX	24 VDC @ 25 ma	24 VDC @ 1 A	DMBPS-220/220
DXX-70/RA	220 VAC @ 0.2 A_{RMS} MAX	24 VDC @ 25 ma	24 VDC @ 1 A	DMBPS-220/220
DXX-115/RA	220 VAC @ 0.2 A_{RMS} MAX	24 VDC @ 25 ma	24 VDC @ 1.5 A	DMBPS-220/220

Figure 9.2 - Mechanical Brake Connection for the DSD-35 Through DSD-115 Drivers

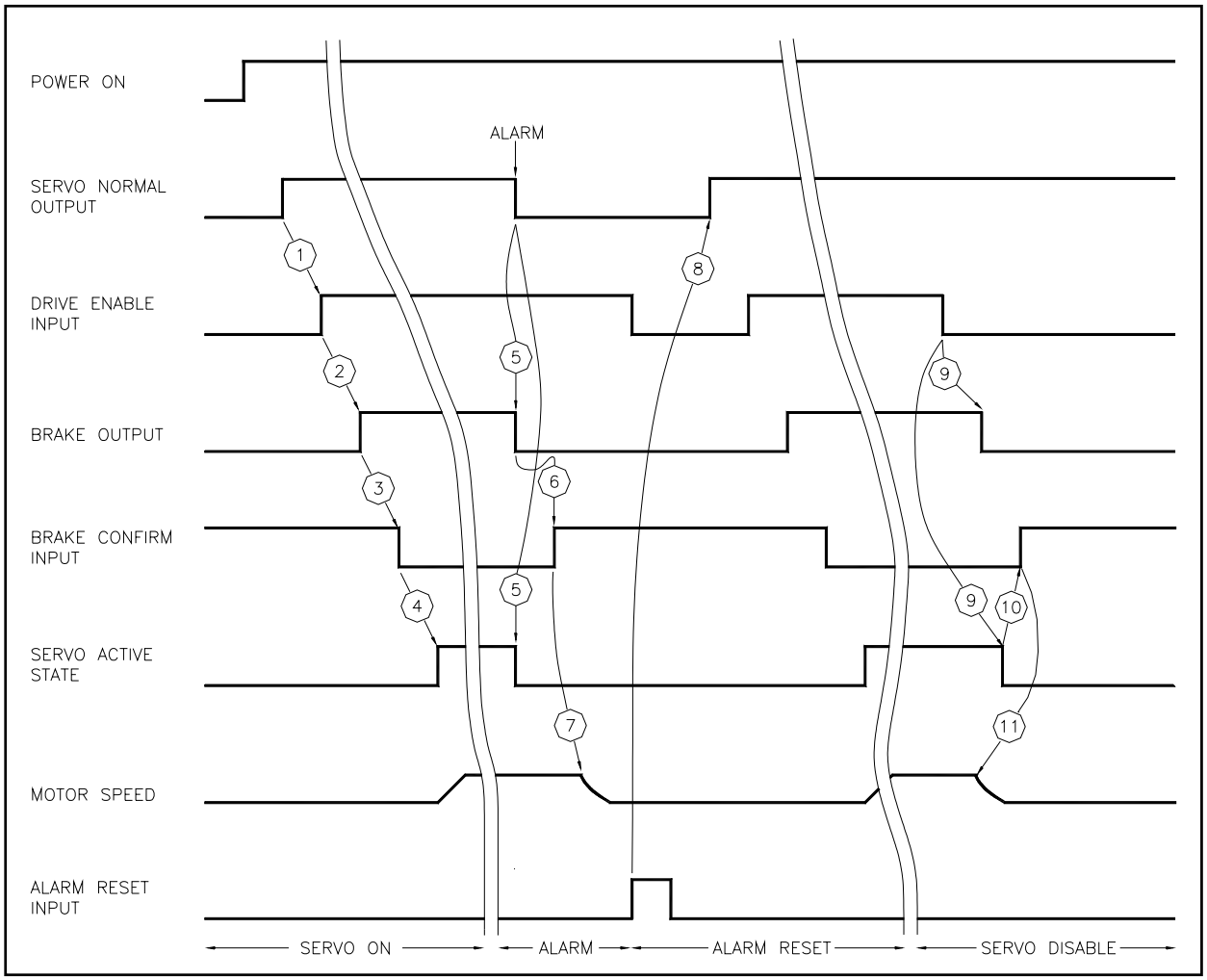


Figure 9.3 - Mechanical Brake Sequencing for Hard Decel

1. DRIVE ENABLE may be turned ON within 0.6 seconds of SERVO NORMAL.
2. BRAKE turns on within 800usec. of DRIVE ENABLE.
3. BRAKE CONFIRM must be returned within 100ms or AL-14 will be generated.
4. The servo will become active within 800usec of sensing BRAKE CONFIRM.
5. When an alarm is sensed, the SERVO NORMAL and BRAKE outputs are turned OFF and the servo becomes inactive.
6. The BRAKE CONFIRM turns ON indicating the braking relay has toggled.
7. The mechanical brake engages after a delay in the braking mechanism.
8. The DRIVE ENABLE must be turned OFF before alarm clearing can be accomplished. ALARM RESET causes driver to check for clearing of the alarm condition and if all alarm states are clear the SERVO NORMAL will turn ON within 30 ms. ALARM RESET should be turned OFF before DRIVE ENABLE is turned ON.
9. The servo applies maximum braking torque until the motor speed falls below UP-28. Then the brake output turns off. The servo goes inactive 200 ms later.
10. The BRAKE CONFIRM turns ON indicating the braking relay has toggled.
11. The mechanical brake engages after a delay in the braking mechanism.

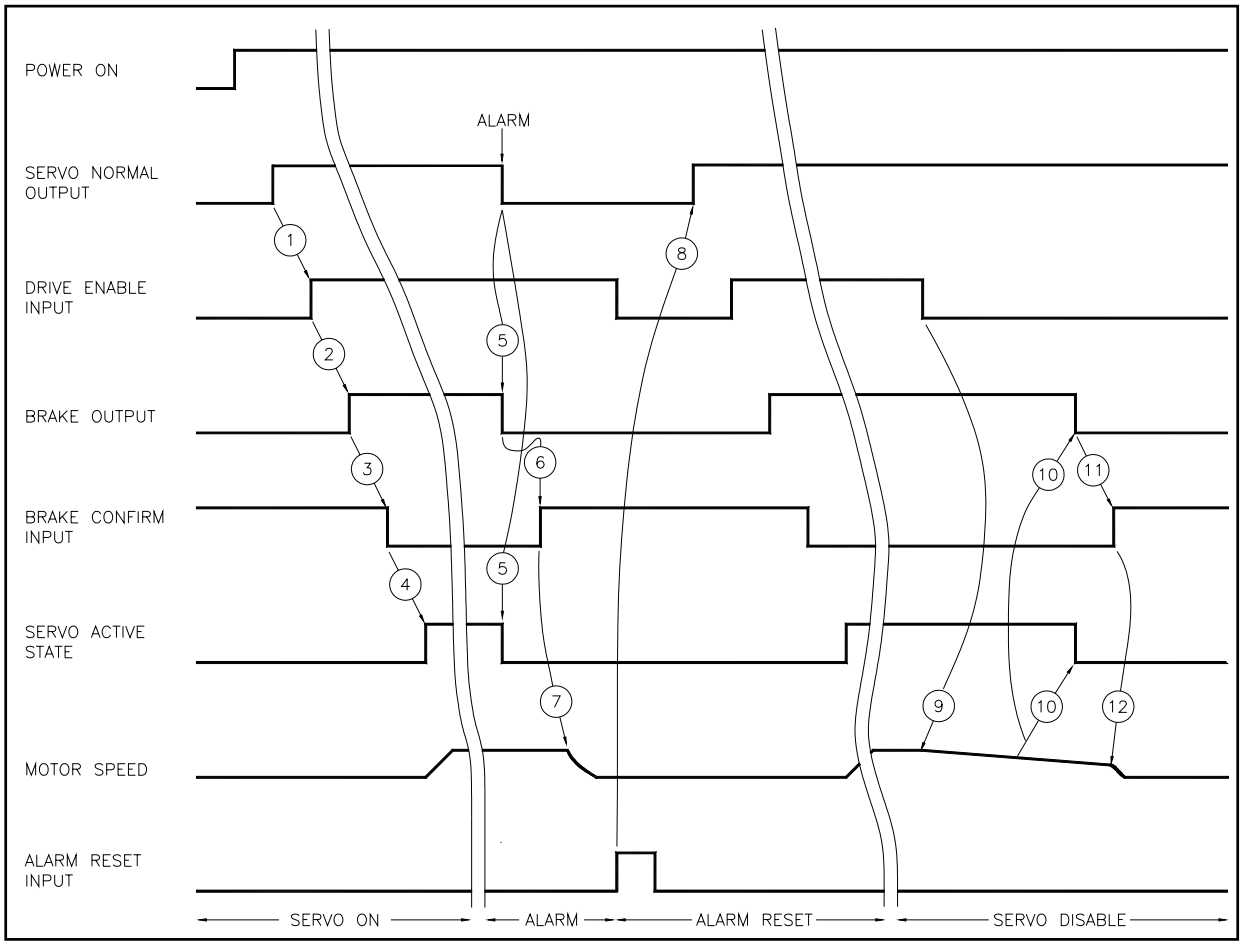


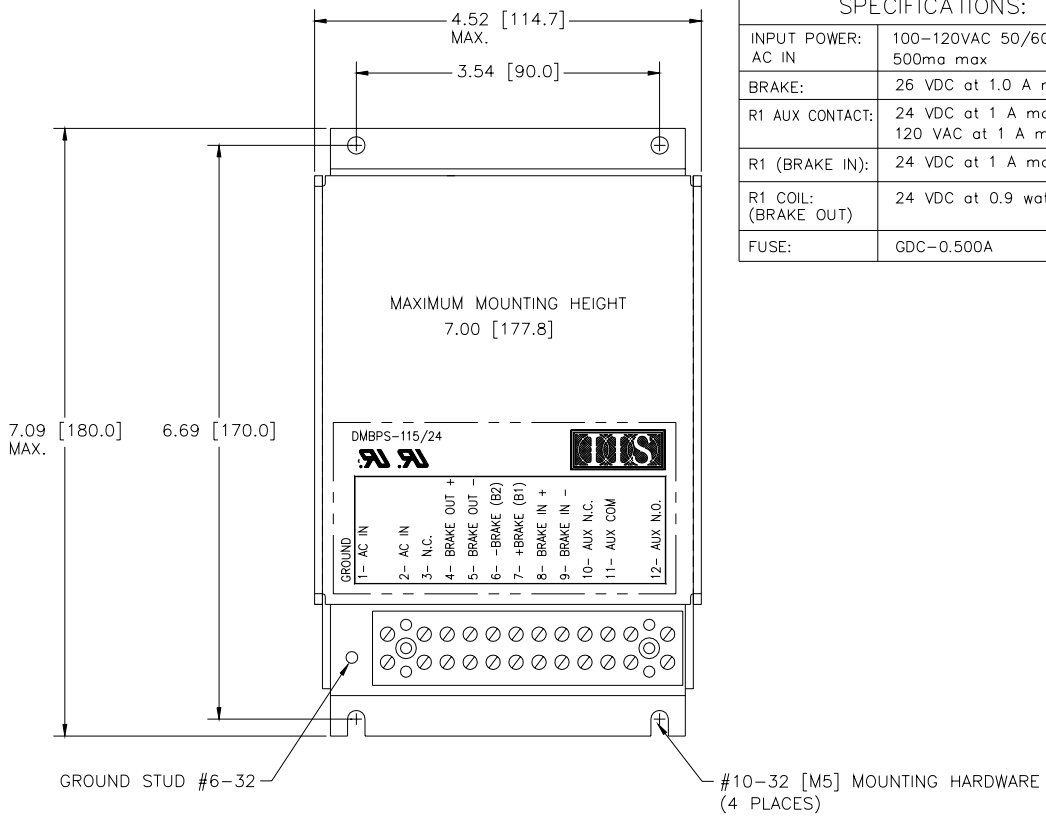
Figure 9.4 - Mechanical Brake Sequencing for Soft Decel

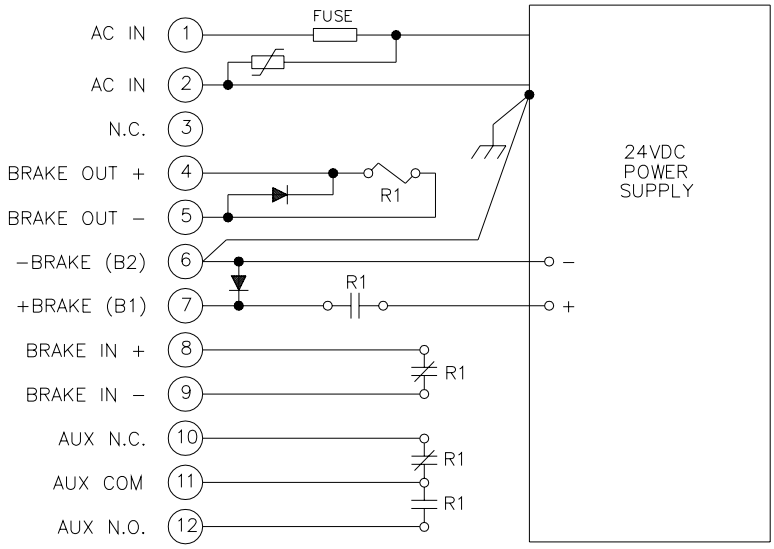
1. DRIVE ENABLE may be turned ON within 0.6 seconds of SERVO NORMAL.
2. BRAKE turns on within 800usec. of DRIVE ENABLE.
3. BRAKE CONFIRM must be returned within 100ms or AL-14 will be generated.
4. The servo will become active within 800usec of sensing BRAKE CONFIRM.
5. When an alarm is sensed, the SERVO NORMAL and BRAKE outputs are turned OFF and the servo becomes inactive.
6. The BRAKE CONFIRM turns ON indicating the braking relay has toggled.
7. The mechanical brake engages after a delay in the braking mechanism.
8. The DRIVE ENABLE must be turned OFF before alarm clearing can be accomplished. ALARM RESET causes driver to check for clearing of the alarm condition and if all alarm states are clear the SERVO NORMAL will turn ON within 30 ms. ALARM RESET should be turned OFF before DRIVE ENABLE is turned ON.
9. The servo starts to decelerate within 800usec of DRIVE ENABLE being turned OFF. Decel rate is specified in UP-13 and UP-14.
10. The servo becomes inactive and the BRAKE output turns OFF within 800usec of the motor speed dropping below the set point in UP-28.
11. The BRAKE CONFIRM turns ON indicating the braking relay has toggled.
12. The mechanical brake engages after a delay in the braking mechanism.

9.4 MECHANICAL BRAKE POWER SUPPLY

DRAWING NUMBER	DESCRIPTION
DMBPS-115/24	Mechanical Brake Power Supply
DMBPS-220/24	Mechanical Brake Power Supply
DMBPS-220/220	Mechanical Brake Power Supply

SPECIFICATIONS:	
INPUT POWER: AC IN	100–120VAC 50/60Hz 500ma max
BRAKE:	26 VDC at 1.0 A max.
R1 AUX CONTACT:	24 VDC at 1 A max./ 120 VAC at 1 A max.
R1 (BRAKE IN):	24 VDC at 1 A max.
R1 COIL: (BRAKE OUT)	24 VDC at 0.9 watts
FUSE:	GDC–0.500A





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TITLE: MECHANICAL BRAKE POWER SUPPLY

DRAWING NUMBER: DMBPS–115/24

DIMENSIONS ARE INCHES [mm]	TOLERANCES X.XX± 0.02 X.XXX± ––– ∠ ± ––	REV F		ECN 00–399	DATE 00–339	SH. 1 OF 2

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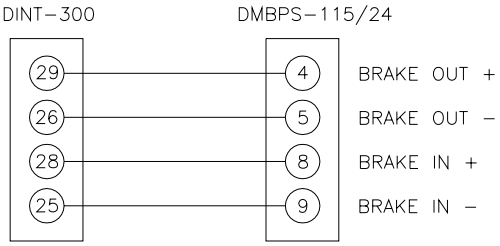
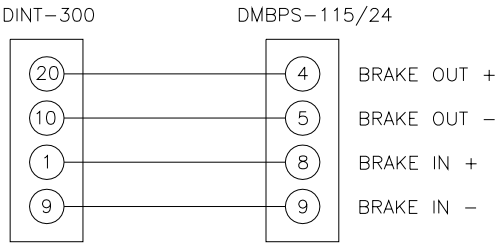


FOR DELTA DSD-8.5 AND DSD-17.5 DRIVES:



INDUSTRIAL INDEXING SYSTEMS, Inc. www.iis-servo.com				TITLE: MECHANICAL BRAKE POWER SUPPLY			
				DRAWING NUMBER: DMBPS-115/24			
DIMENSIONS ARE INCHES [mm]	TOLERANCES X.XX± 0.02	X.XXX± --	△ ± --	REV F		ECN 00-399	DATE 00-399	SH. 2 OF 2

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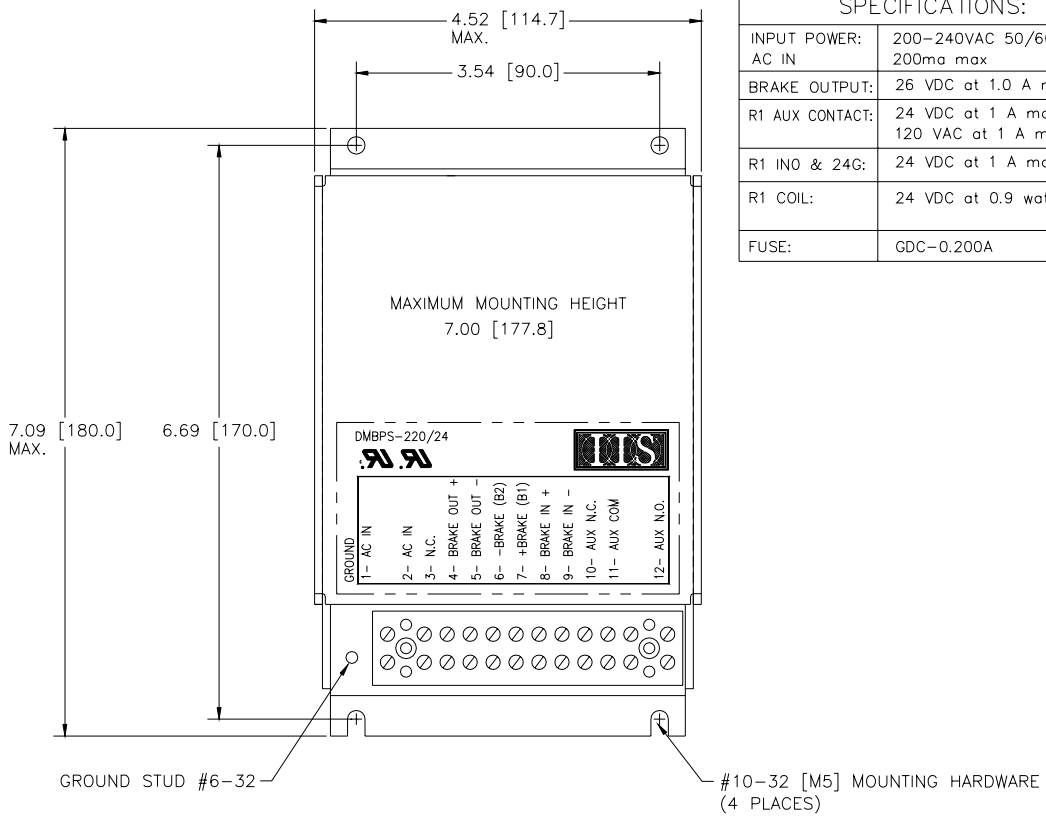
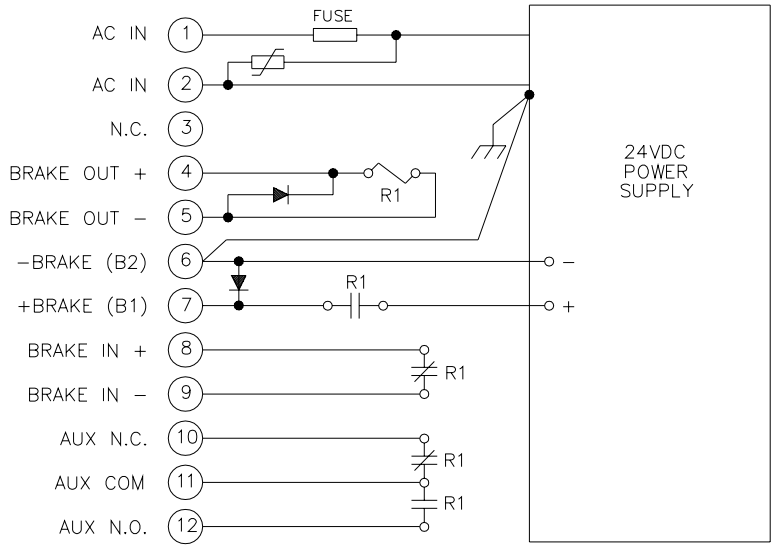
SPECIFICATIONS:	
INPUT POWER: AC IN	200–240VAC 50/60Hz 200ma max
BRAKE OUTPUT:	26 VDC at 1.0 A max.
R1 AUX CONTACT:	24 VDC at 1 A max./ 120 VAC at 1 A max.
R1 IN0 & 24G:	24 VDC at 1 A max.
R1 COIL:	24 VDC at 0.9 watts
FUSE:	GDC–0.200A





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TITLE: MECHANICAL BRAKE POWER SUPPLY

DRAWING NUMBER: DMBPS–220/24

DIMENSIONS ARE INCHES [mm]	TOLERANCES X.XX± 0.02 X.XXX± –– ∠ ± ––	REV J		ECN 02–186	DATE 19JUN96	SH. 1 OF 2

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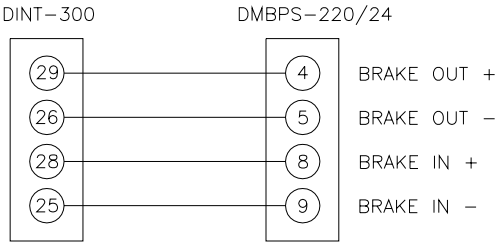

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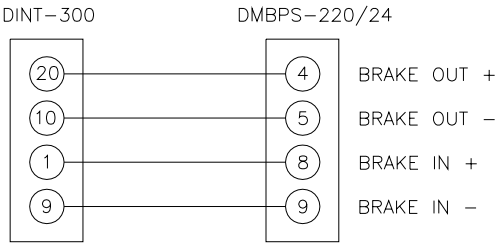
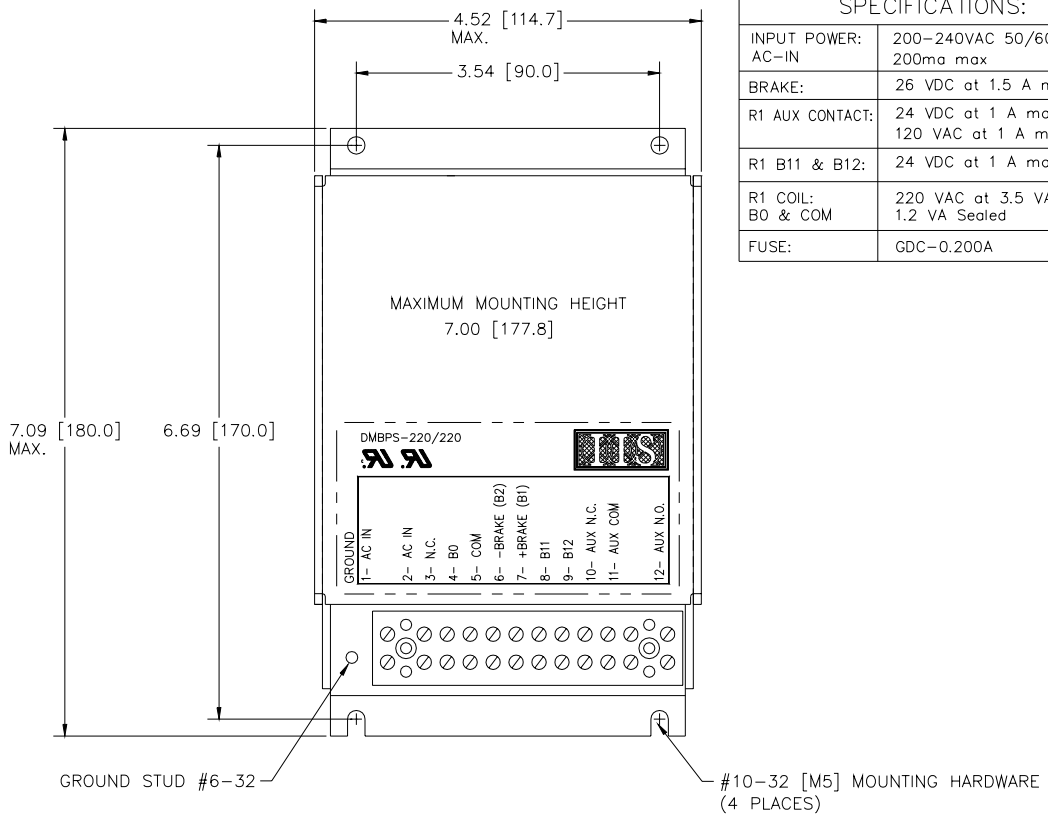
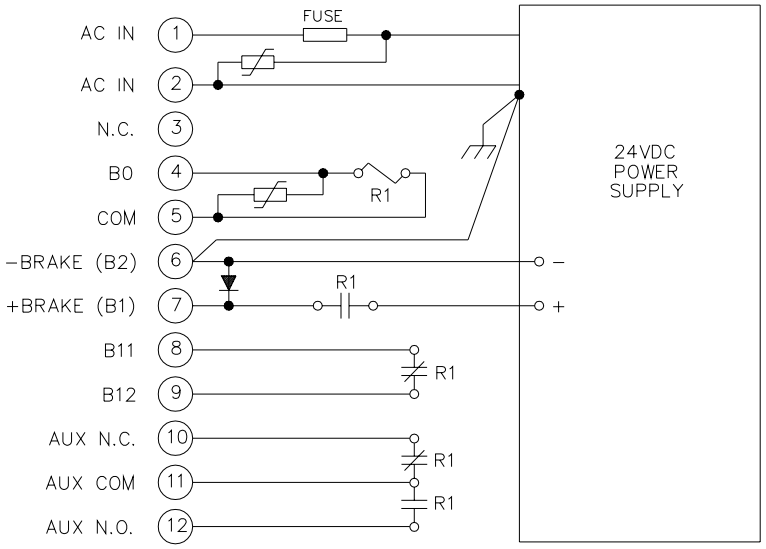


INDUSTRIAL INDEXING SYSTEMS, Inc. www.iis-servo.com			TITLE: MECHANICAL BRAKE POWER SUPPLY			
			DRAWING NUMBER: DMBPS-220/24			
DIMENSIONS ARE INCHES [mm]	TOLERANCES X.XX± 0.02 X.XXX± -- ∠ ± --	REV J		ECN 02-186	DATE 19JUN96	SH. 2 OF 2

Table of Contents

SPECIFICATIONS:	
INPUT POWER: AC-IN	200-240VAC 50/60Hz 200ma max
BRAKE:	26 VDC at 1.5 A max.
R1 AUX CONTACT:	24 VDC at 1 A max./ 120 VAC at 1 A max.
R1 B11 & B12:	24 VDC at 1 A max.
R1 COIL: B0 & COM	220 VAC at 3.5 VA Inrush 1.2 VA Sealed
FUSE:	GDC-0.200A





INDUSTRIAL INDEXING SYSTEMS, Inc.
www.iis-servo.com

TITLE: MECHANICAL BRAKE POWER SUPPLY

DRAWING NUMBER: DMBPS-220/220

DIMENSIONS ARE INCHES [mm]	TOLERANCES X.XX± 0.02 X.XXX± --- ∠ ± --	REV H		ECN 00-399	DATE 19JUN96	SH. 1 OF 1

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