



Ultra3000 Digital Servo Drive Installation Manual

Catalog Numbers

2098-DSD-005, -010, and -020

2098-DSD-xxxX

2098-DSD-xxxSE

2098-DSD-xxx-DN

2098-DSD-xxxX-DN

2098-DSD-030, -075, and -150

2098-DSD-xxxX

2098-DSD-xxxSE

2098-DSD-xxx-DN

2098-DSD-xxxX-DN

2098-DSD-HV030, -HV050, -HV100, -HV150, and -HV220

2098-DSD-xxxX

2098-DSD-xxxSE

2098-DSD-xxx-DN

2098-DSD-xxxX-DN

About This Publication

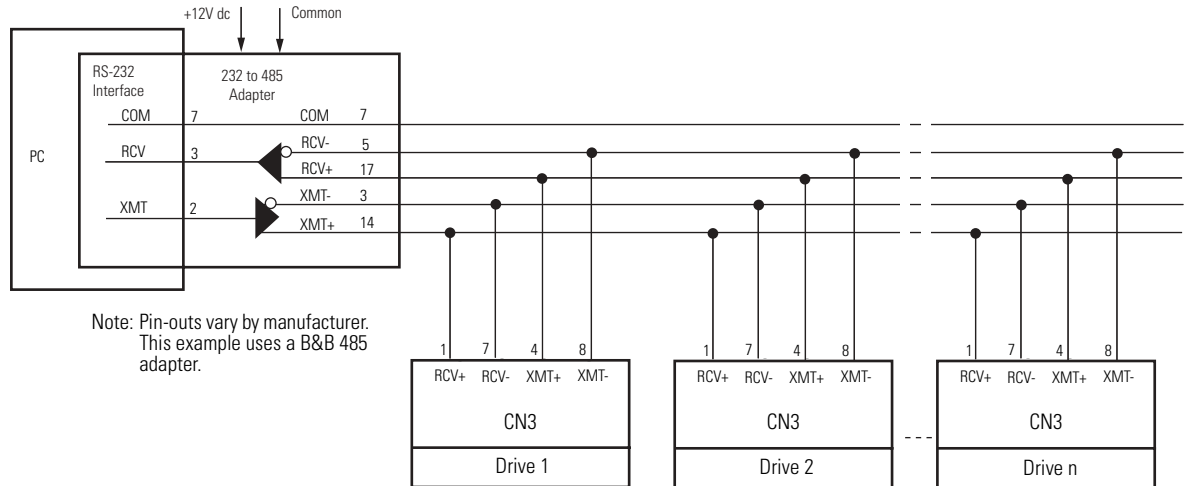
This document updates information about the Ultra3000 digital servo drive products. Use this document in conjunction with the Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003E-EN-P. To obtain a copy, contact your local Rockwell Automation sales office, distributor, or online at <http://literature.rockwellautomation.com>.

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Page 2-52

Replace Figure 2.57 on page 2-52 with the one shown below. The new figure correctly identifies the drive connector as CN3.

Figure 2.57
RS-232 to RS-485 Connection Diagram



Page 4-3

Update the Error Codes table beginning on page 4-3 with the following entries:

- Replace the error code entry for E02. In the new entry, the reference to firmware revisions prior to 1.10 is removed.
- Replace the error code entry for E03. In the new entry, the reference to firmware revisions prior to 1.10 is added.
- Add the lost motion fault (E44).

Error Codes

Error Code	Problem or Symptom	Possible Cause	Action/Solution
E02	Velocity exceeds position rollover /2	The velocity command or feedback exceeds half the machine cycle length per millisecond (applies only when the machine cycle position rollover is enabled).	Increase machine cycle size or reduce velocity profile.
E03	Absolute feedback range exceeded	The motor position exceeds +/- 2047 revolutions from the home position (applies only to systems with absolute feedback).	<ul style="list-style-type: none"> • Decrease application range of motion. • Upgrade firmware. This error only applies to firmware revisions prior to 1.10.
E44	Lost motion fault (only applies to applications with Stegmann feedback devices)	Detection occurs during a fault reset. Absolute position in the drive is incorrect and the motion has been lost due to line loss condition.	<ul style="list-style-type: none"> • Cycle power. • Cycle power and re-home drive if drive was homed in the same power cycle that the lost motion fault occurred.

Page A-2

Replace the Ultra3000 (230V) Power Specifications table on page A-2 with the one shown below. The new table includes inrush current specifications configured as Series A, B, or C.

- Ultra3000 drive firmware revision 1.45 is required to support the Series C hardware.
- Ultraware software, version 1.63, is required to download firmware to Series C drives containing the new power board.

Ultra3000 Drive (230V) Power Specifications

2098-DSD-005x-xx, 2098-DSD-010x-xx, and 2098-DSD-020x-xx

Specification	Description		
	2098-DSD-005	2098-DSD-010	2098-DSD-020
AC input voltage ⁽¹⁾	100...240V rms single-phase		
AC input frequency	47...63 Hz		
AC input current ^{(2) (3)} Nom (rms) 230V ac (0-pk) max inrush ⁽⁴⁾	5 A 100 A - Series A or B 20 A - Series C	9 A 100 A - Series A or B 20 A - Series C	18 A 100 A - Series A or B 20 A - Series C
Continuous output current (0-pk)	2.5 A	5 A	10 A
Intermittent output current (0-pk)	7.5 A	15 A	30 A
Bus capacitance	1410 μ F	1880 μ F	1880 μ F
Internal shunt resistance	N/A	N/A	N/A
Shunt on	N/A	N/A	N/A
Shunt off	N/A	N/A	N/A
Bus overvoltage	400V dc	400V dc	400V dc
Energy absorption capability 115V ac input 230V ac input	93 J 38 J	125 J 51 J	
Continuous power output 115V ac input 230V ac input	0.25 kW 0.5 kW	0.5 kW 1.0 kW	1.0 kW 2.0 kW

⁽¹⁾ Specification is for nominal voltage. The absolute limits are $\pm 10\%$, or 88...265V rms.

⁽²⁾ The 2098-DSD-005x-xx, -010x-xx, and -020x-xx (230V) drives are limited to:
Series A or B - one contactor cycle every two minutes.
Series C - one contactor cycle every 10 s for up to two minutes, not to exceed 12 cycles in five minutes.

⁽³⁾ Power initialization requires a short period of inrush current. Dual-element time delay (slow blow) fuses are recommended.

⁽⁴⁾ Inrush current-limiting circuitry is enabled within 3 s after removal of ac line power.

ATTENTION



The inrush current-limiting circuitry is limited in the number of power cycles it can withstand within a set period of time. If you exceed these limitations, the circuitry will be damaged.

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Page A-3

Replace the Ultra3000 (230V) Power Specifications table on page A-3 with the one shown below. The new table includes an updated value in the bus capacitance field for 2098-DSD-030 drives.

Ultra3000 Drive (230V) Power Specifications

2098-DSD-030x-xx, 2098-DSD-075x-xx, and 2098-DSD-150x-xx

Specification	Description		
	2098-DSD-030	2098-DSD-075	2098-DSD-150
AC input voltage ⁽¹⁾	100...240V rms Single-phase	100...240V rms Three-phase	
AC input frequency	47...63 Hz		
Main ac input current ⁽²⁾⁽³⁾ Nom (rms) 230V ac (0-pk) Max inrush	28 A 50 A	30 A 50 A	46 A 68 A
Auxiliary ac Input current 115V ac (rms) Nom 230V ac (rms) Nom 115V ac (0-pk) Max inrush ⁽⁴⁾ 230V ac (0-pk) Max inrush ⁽⁴⁾	1.0 A 0.5 A 47 A 95 A	1.0 A 0.5 A 47 A 95 A	1.0 A 0.5 A 47 A 95 A
Continuous output current (0-pk)	15 A	35 A	65 A
Intermittent output current (0-pk)	30 A	75 A	150 A
Bus capacitance	2820 μ F	4290 μ F	7520 μ F
Internal shunt resistance	35 Ω	16.5 Ω	9.1 Ω
Shunt on	420V dc	420V dc	420V dc
Shunt off	402V dc	402V dc	402V dc
Bus overvoltage	452V dc	452V dc	452V dc
Internal shunt Continuous power Peak power	50 W 4.5 kW	50 W 10 kW	180 W 18 kW
External shunt Resistance Continuous power Peak power	30 Ω (-0/+5%) 2.4 kW 6 kW	16.5 Ω (-0/+5%) 4 kW 10 kW	9 Ω (-0/+5%) 8 kW 19 kW
Energy absorption capability 115V ac input 230V ac input	211 J 117 J	381 J 211 J	669 J 370 J
Continuous power output 115V ac input 230V ac input	1.5 kW 3 kW	3.75 kW 7.5 kW	7.5 kW 15 kW

⁽¹⁾ Specification is for nominal voltage. The absolute limits are $\pm 10\%$, or 88...265V rms.

⁽²⁾ The 2098-DSD-030x-xx, -075x-xx, and -150x-xx(230V) drives are limited to one contactor cycles per two minutes.

⁽³⁾ Power initialization requires a short period of inrush current. Dual-element time delay (slow blow) fuses are recommended.

⁽⁴⁾ 400 μ s half wave sine.

ATTENTION



The inrush current-limiting circuitry is limited in the number of power cycles it can withstand within a set period of time. If you exceed these limitations, the circuitry will be damaged.

Page A-4

Add the attention statement (below) to the Ultra3000 (460V) Power Specifications table on page A-4. The table didn't change, however, the warning applies to all Ultra3000 drives.

Ultra3000 Drive (460V) Power Specifications

2098-DSD-HV030x-xx, -HV050x-xx, -HV100x-xx, -HV150x-xx, and -HV220x-xx

Specification	Description				
	2098-DSD-HV030	2098-DSD-HV050	2098-DSD-HV100	2098-DSD-HV150	2098-DSD-HV220
AC Input Voltage ⁽¹⁾⁽²⁾	230...480V rms Three-phase				
AC Input Frequency	47...63 Hz				
Main AC Input Current ⁽³⁾⁽⁴⁾ 460V ac (rms) Nom 460V ac (rms) Max inrush	4 A 6 A	7 A 6 A	14 A 6 A	20 A 6 A	28 A 6 A
Auxiliary AC Input Current 230V ac (rms) Nom 360V ac (rms) Nom 480V ac (rms) Nom 230V ac (0-pk) Max inrush ⁽⁵⁾ 480V ac (0-pk) Max inrush ⁽⁵⁾	0.55 A 0.35 A 0.25 A 47 A 68 A				
Continuous Output Current (0-pk)	7 A	11 A	23 A	34 A	47 A
Intermittent Output Current (0-pk)	14 A	22 A	46 A	68 A	94 A
Bus Capacitance	470 µF		705 µF	940 µF	1880 µF
Internal Shunt Resistance	120 Ω		40 Ω	25 Ω	20 Ω
Shunt On	800V dc				
Shunt Off	750V dc				
Bus Overvoltage	810V dc				
Internal Shunt Continuous power Peak power	100 W 5.3 kW		200 W 16 kW	200 W 25.6 kW	400 W 32 kW
External Shunt Resistance (-0/+5%) Continuous power Peak power	120 Ω 3 kW 5.3 kW		40 Ω 10 kW 16 kW	25 Ω 15 kW 25.6 kW	20 Ω 22 kW 32 kW
Energy Absorption Capability 230V ac input with 230V motor 230V ac input with 460V motor 460V ac input	15 J 129 J 55 J		22 J 194 J 82 J	29 J 259 J 109 J	59 J 517 J 219 J
Continuous Power Output 230V ac input 460V ac input	1.5 kW 3.0 kW	2.5 kW 5.0 kW	5.0 kW 10 kW	7.5 kW 15 kW	11 kW 22 kW

⁽¹⁾ Specification is for nominal voltage. The absolute limits are ±10%, or 207...528V rms.

⁽²⁾ The 2098-DSD-HVxxx-xx drives can be powered with 230-240 V rms in order to be used in conjunction with motors designed for 230V operation. In such cases, the voltage levels used for shunting and DC bus overvoltage limits are adjusted to be compatible with the voltage limit of the motor.

⁽³⁾ The 2098-DSD-HVxxx-xx (460V) drives are limited to three contactor cycles per minute.

⁽⁴⁾ Power initialization requires a short period of inrush current (processor controlled via soft start circuitry). Dual element time delay (slow blow) fuses are recommended (refer to Fuse Specifications on page 6-8).

⁽⁵⁾ 400 µs half wave sine.

ATTENTION



The inrush current-limiting circuitry is limited in the number of power cycles it can withstand within a set period of time. If you exceed these limitations, the circuitry will be damaged.

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Page B-2

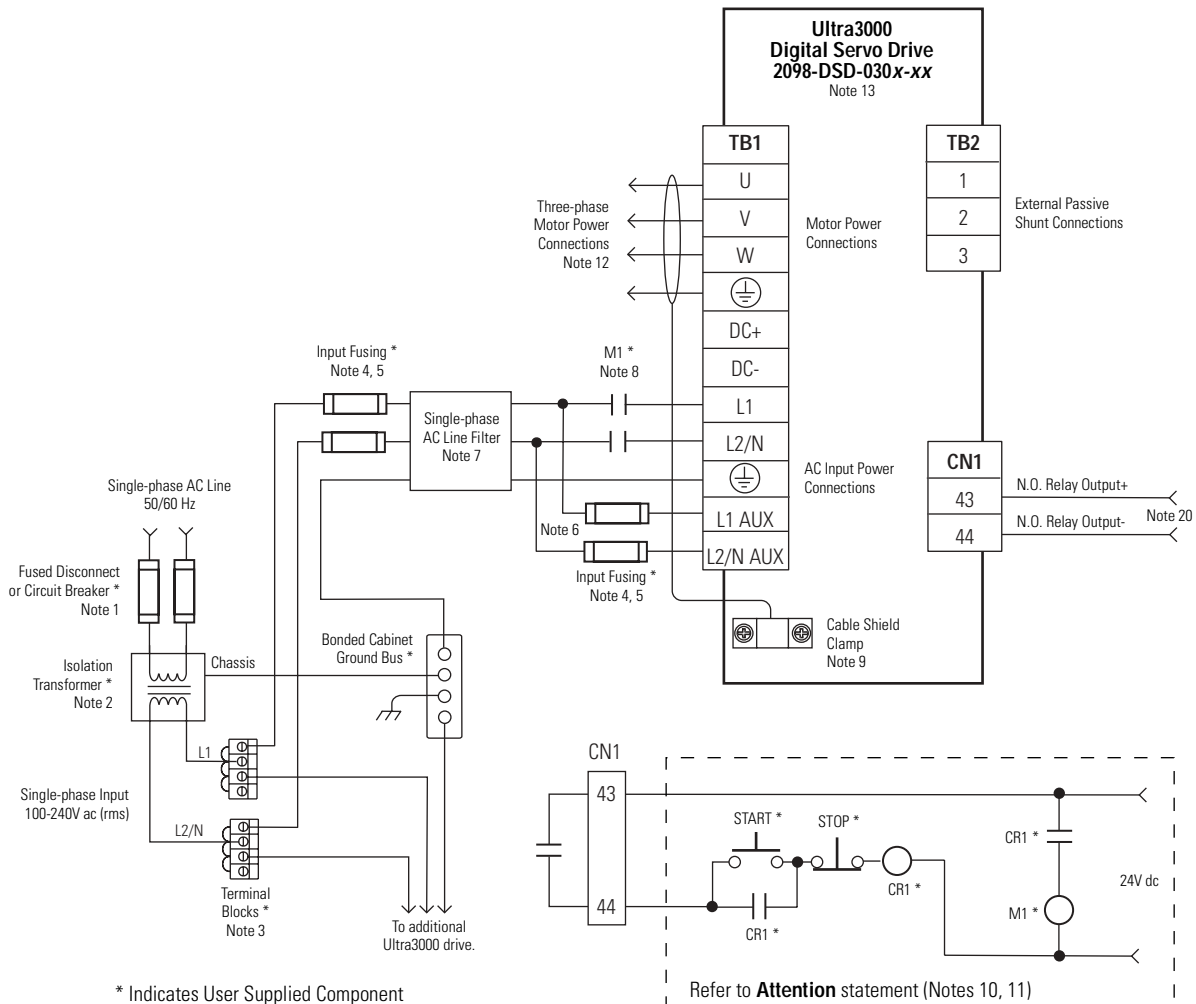
Replace notes 6 and 7 in the Ultra3000 Interconnect Diagram Notes with the ones shown below. The new versions include information regarding the placement of ac line filters and routing of wires.

Note:	Information:
6	May be used to maintain power to logic section of drive and status LED indicators when main ac input power is removed. A separate ac line source may be used if voltage is between 88-265V ac (rms) on 2098-DSD-xxx (230V drives) or 207-528V ac (rms) on 2098-DSD-HVxxx (460V drives). In this configuration, a separate line filter for logic power may be required.
7	Place the ac (EMC) line filter as close to the drive as possible and do not route very dirty wires in wireway (refer to Establishing Noise Zones, on page 1-13). If routing in wireway is unavoidable, use shielded cable with shields grounded to the drive chassis and filter case. For ac line filter specifications, refer to AC Line Filter Specifications in Appendix A.

Page B-4

Replace the interconnect diagram on page B-4 with the one shown below. The new diagram changes the recommended wiring of input fusing, ac line filter, and contactor.

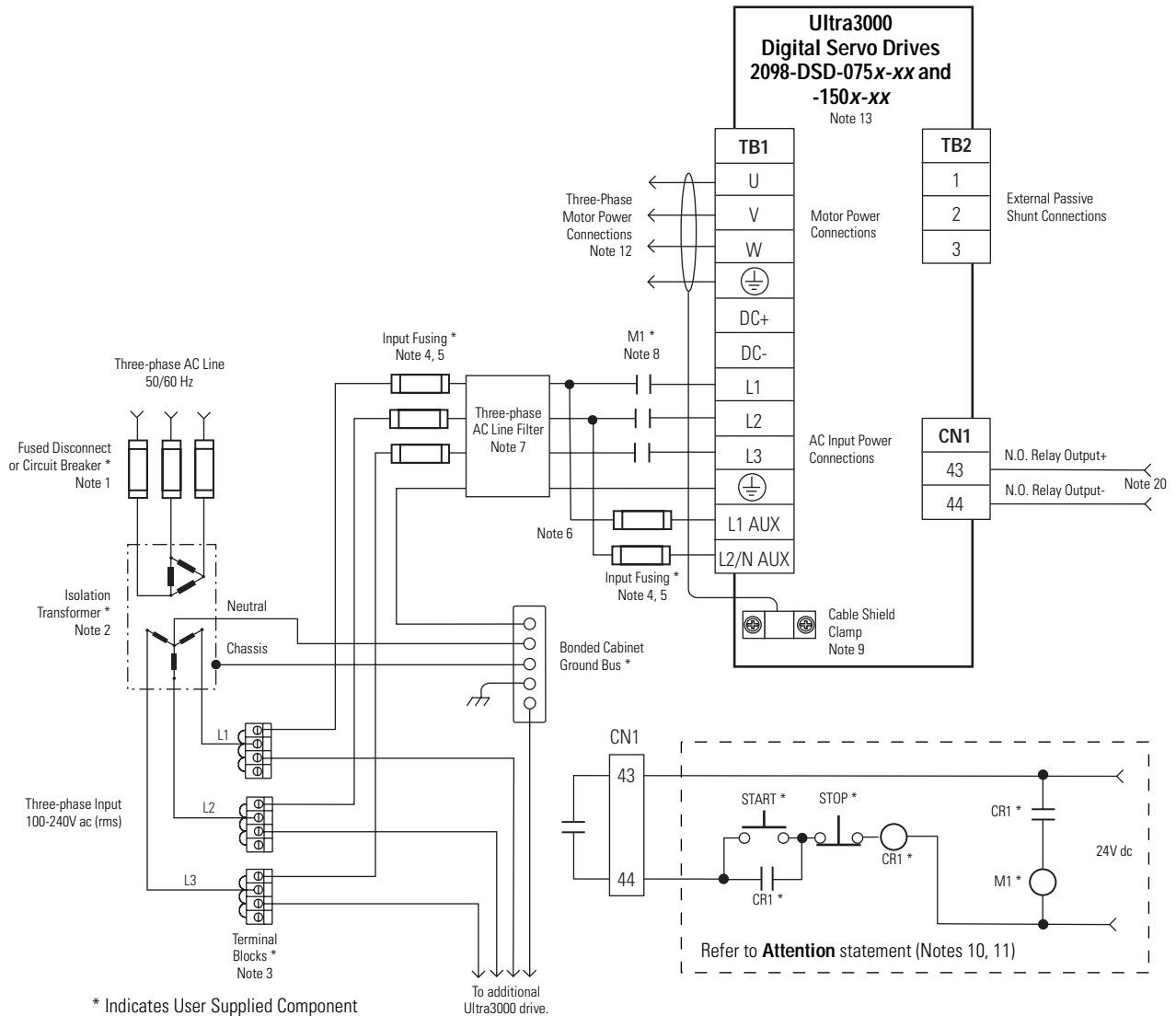
Figure B.2
Typical Power Wiring of Ultra3000 System
(2098-DSD-030x-xx)



Page B-5

Replace the interconnect diagram on page B-5 with the one shown below. The new diagram changes the recommended wiring of input fusing, ac line filter, and contactor.

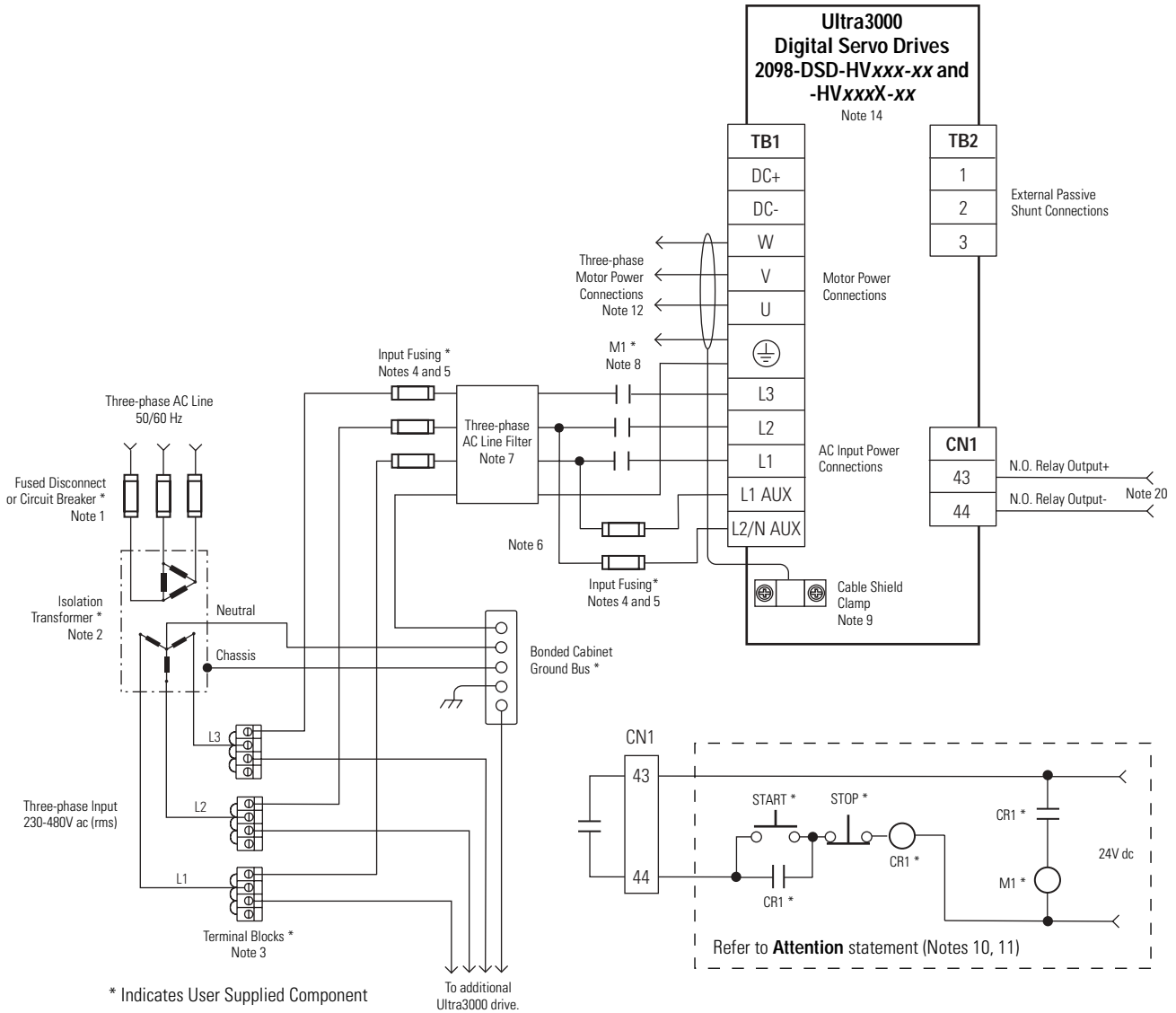
Figure B.3
Typical Power Wiring of Ultra3000 System
(2098-DSD-075x-xx and -150x-xx)



Page B-6

Replace the interconnect diagram on page B-6 with the one shown below. The new diagram changes the recommended wiring of input fusing, ac line filter, and contactor.

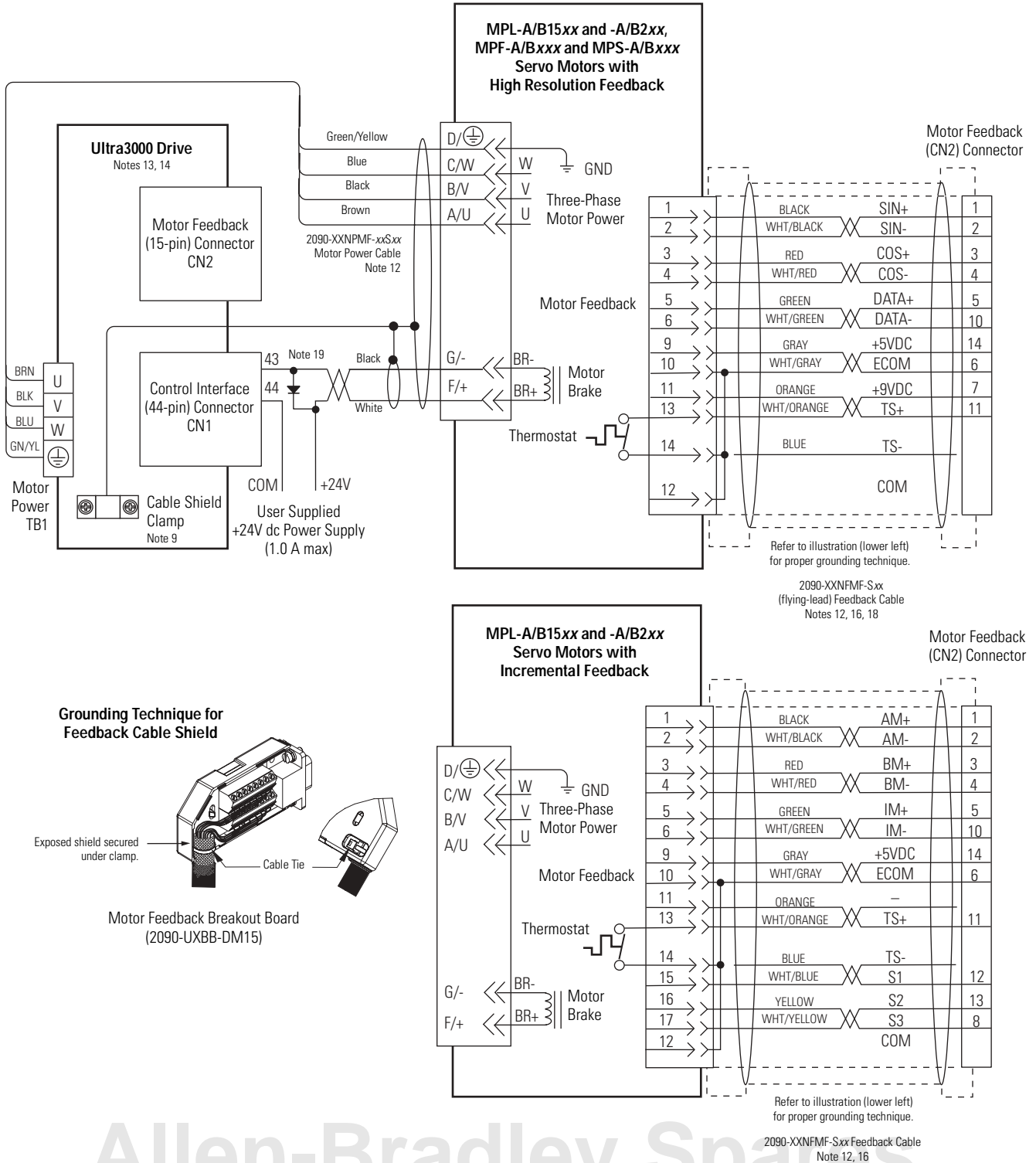
Figure B.4
Typical Power Wiring of Ultra3000 System
(2098-DSD-HVxxx-xx and -HVxxxX-xx)



Page B-12

Replace Figure B.12 on page B-12 with the one shown below. The new figure includes MP-Series food grade (MPF), stainless steel (MPS) and low inertia (MPL-A/B15xx and MPL-A/B2xx) motors. Also included is an illustration of grounding the feedback cable shield.

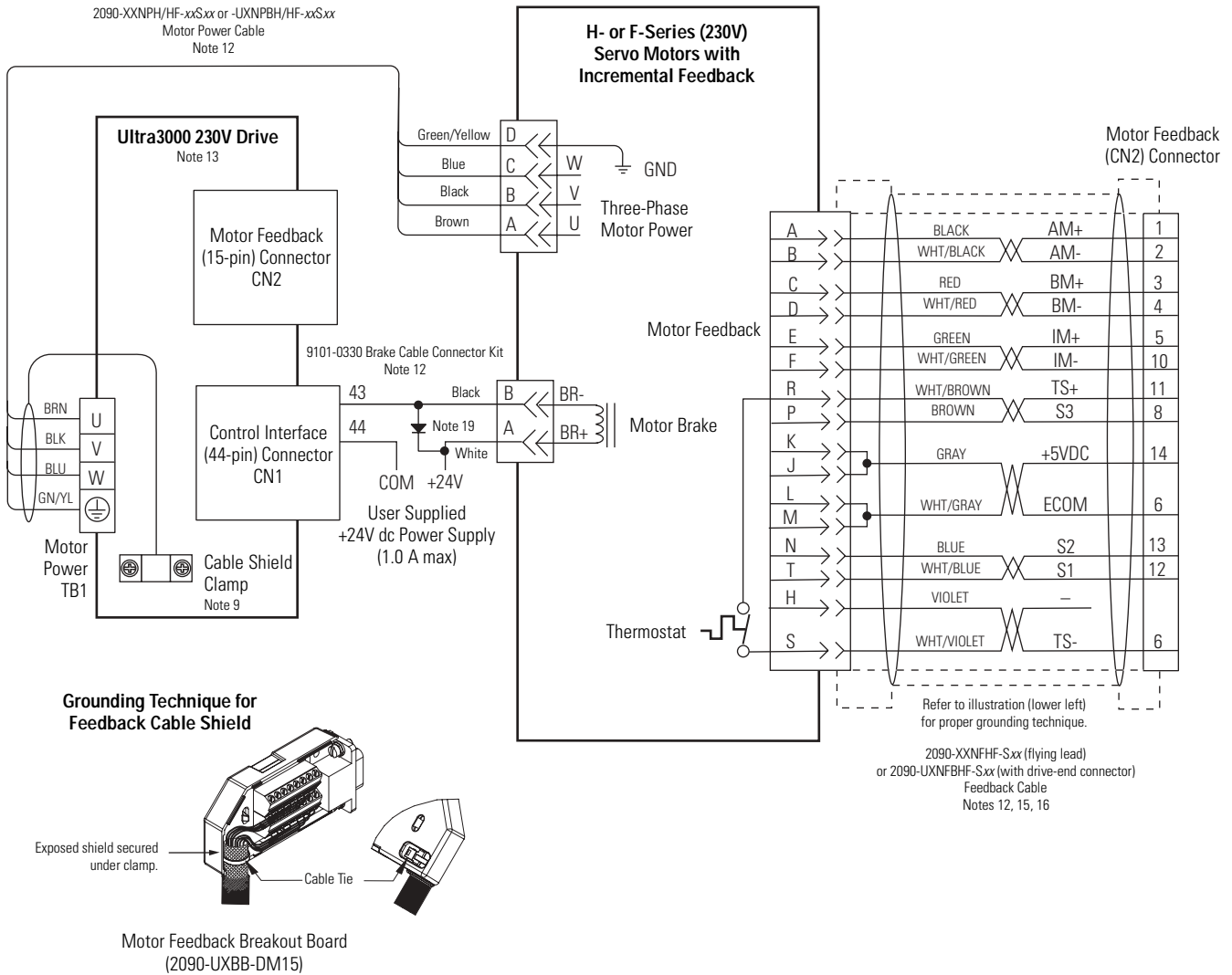
Figure B.12
Ultra3000 Drive to MP-Series (MPL-A/B, MPF-A/B, and MPS-A/B) Motors



Page B-13

Replace Figure B.13 on page B-13 with the one shown below. The new figure correctly identifies the motor brake-connector pins as A and B. Also included is an illustration of grounding the feedback cable shield.

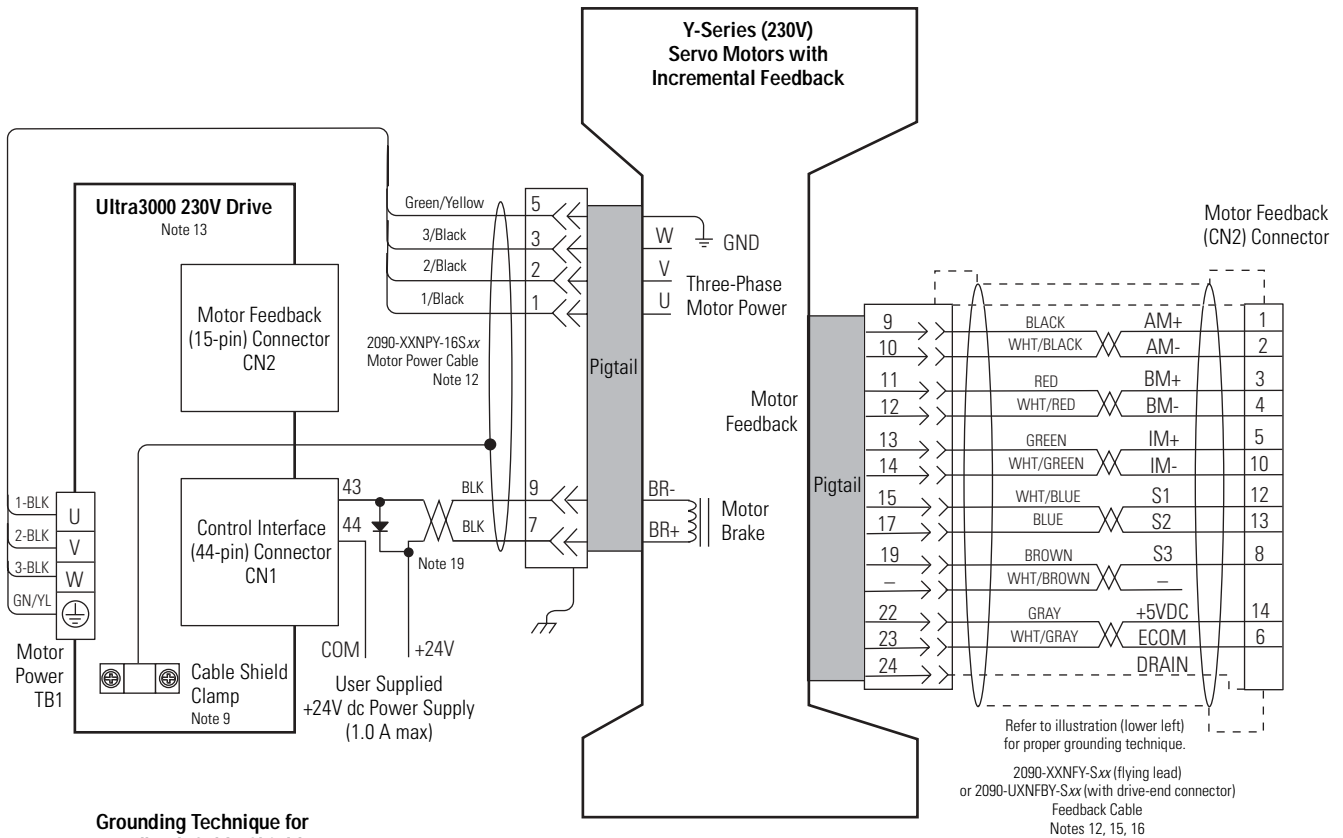
Figure B.13
Ultra3000 Drive to H- and F-Series (230V) Motors



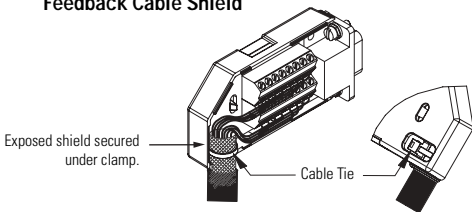
Page B-15

Replace Figure B.15 on page B-15 with the one shown below. The new figure correctly identifies the motor power-cable pins as 1, 2, 3, and 5. Also included is an illustration of grounding the feedback cable shield.

Figure B.15
Ultra3000 Drive to Y-Series (230V) Motors



Grounding Technique for Feedback Cable Shield



Motor Feedback Breakout Board
(2090-UXBB-DM15)

Replace the table on page B-19 with the one shown below. The new table includes the MPL-x15xx, MPL-x2xx, and TL-Series motors.

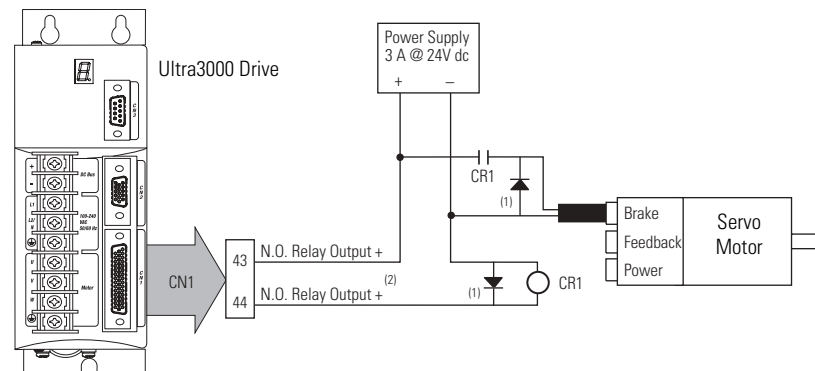
Compatible Brake Motors	Coil Current
MPL-x15xx ⁽¹⁾	0.48 A
MPL-x2xx ⁽¹⁾	0.51 A
MPL/MPF/MPS-x310, -x320, -x330 ⁽¹⁾	0.50 A
MPL-x420, -x430, -x4520, -x4530, -x4540 ⁽¹⁾	0.64 A
MPF-x430, -x4530, -x4540 ⁽¹⁾	
MPG-x004 ⁽¹⁾	0.33 A
MPG-x010 ⁽¹⁾	0.45 A
MPG-x025 ⁽¹⁾	
MPG-x050 ⁽¹⁾	0.50 A
MPG-x110 ⁽¹⁾	1.0 A

Compatible Brake Motors	Coil Current
1326AB-B4xxx	0.88 A
F-4030, -4050, and -4075	0.69 A
Y-1002 and -1003	0.26 A
Y-2006 and -2012	0.31 A
Y-3023	0.37 A
TL-A110P-H, -A120P-H, and -A130P-H	0.208 A
TL-A220P-H and -A230P-H	0.375 A
TL-A2530P-H and -A2540P-H	0.396 A
TL-A410P-H	0.746 A

⁽¹⁾ Applies to 230V and 460V motors.

Replace Figure B.19 with the one shown below. The new figure correctly identifies the relay output pins as CN1-43 and CN1-44.

Figure B.19
Example Configuration Controlling a Motor Brake



- (1) Flyback diode (1N4004 rated 1.0 A @ 400V dc) or MOV suppresses the collapsing field of the brake coil.
- (2) For non-SERCOS drive, the relay output (CN1-43 and -44) must be configured as a brake.

IMPORTANT Electrical arcing may occur at the relay contacts until the brake power dissipates. A customer-supplied diode or metal oxide varistor (MOV) is recommended to prevent arcing. Use of an MOV can also reduce the time to mechanically engage the brake.

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