Ultra3000 Digital Servo Drive Specifications

This section contains general power, physical/environmental, power dissipation, controller, I/O, operating modes command sources, serial communication, network communication, feedback, and connector specifications for the Ultra3000 digital servo drives.

Specifications apply to these Ultra3000 drive models:

- SE indicates the 2098-DSD-*xxx*-SE SERCOS interface drive
- DN indicates the 2098-DSD-*xxx*-DN DeviceNet interface drive
- X indicates the 2098-DSD-*xxx*X indexing drive
- X-DN indicates the 2098-DSD-*xxx*X-DN indexing DeviceNet interface drive

Power Specifications

2098-DSD-005*x-xx*, 2098-DSD-010*x-xx*, and 2098-DSD-020*x-xx* Ultra3000 (230V) Drives

Attribute	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 (rms)	1.8 A	3.5 A	7.1 A
Continuous output current (0-pk)	2.5 A	5.0 A	10 A
Peak output current (rms)	5.3 A	10.6 A	21.2 A
Peak output current (0-pk)	7.5 A	15 A	30 A
Bus capacitance	1410 µF	1880 µF	1880 µF
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 ±10%, or 88…265V rms.
(2) The 2098-DSD-005*x-xx*, 2098-DSD-010*x-xx*, and 2098-DSD-020*x-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 (refer to Fuse Specifications on page 367).
(4) In-rush current limiting circuitry is enabled within 3 s after removal of AC line power.

Fuse Specifications

Use class CC, G, J, L, R, or T fuses, with current ratings as indicated in the table below. The table below lists fuse examples recommended for use with the Ultra3000 (230V and 460V) drives.

Fuse Examples for Ultra3000 Drives

Drive Cat. No.	Input Voltage	Input Type	Recommended Fuse	
			Class CC (1)	Class J (1)
2098-DSD-005	230V AC	Input Power	FNQ-R-6	LPJ-6SP
2098-DSD-010			FNQ-R-10	LPJ-10SP
2098-DSD-020			FNQ-R-20	LPJ-20SP
2098-DSD-030			FNQ-R-30	LPJ-30SP
2098-DSD-075			FNQ-R-30	LPJ-30SP
2098-DSD-150			N/A	LPJ-60SP
2098-DSD-*xxx*		Auxiliary Input Power	FNQ-R-10	LPJ-10SP
2098-DSD-HV030	460V AC	Input Power	KTK-R-5	LPJ-5SP
2098-DSD-HV050			KTK-R-8	LPJ-8SP
2098-DSD-HV100			KTK-R-20	LPJ-17-1/2SP
2098-DSD-HV150			KTK-R-30	LPJ-30SP
2098-DSD-HV220			N/A	LPJ-35SP
2098-DSD-HV*xxx*		Auxiliary Input Power	FNQ-R-10	LPJ-10SP

(1) Part numbers shown are examples of Bussmann fuses.

Circuit Breaker Specifications

While circuit breakers offer some convenience, there are limitations for their use. Circuit breakers do not handle high current inrush as well as fuses.

Make sure the selected components are properly coordinated and meet acceptable codes including any requirements for branch circuit protection. Evaluation of the short-circuit available current is critical and must be kept below the short-circuit current rating of the circuit breaker.

Circuit Breaker Examples for Ultra3000 (460V) Drives

Drive Cat. No.	Input Voltage	Circuit Breakers
2098-DSD-HV030	460V	140M-F8E-C16
2098-DSD-HV050		140M-F8E-C20
2098-DSD-HV100		140M-F8E-C32
2098-DSD-HV150		140M-F8E-C45
2098-DSD-HV220		N/A

Contactor Ratings

Drive Cat. No.	Input Voltage	Contactor
2098-DSD-HV030	460V	100-C23*x*10 (AC coil) 100-C23Z*x*10 (DC coil)
2098-DSD-HV050		100-C30*x*10 (AC coil) 100-C30Z*x*10 (DC coil)
2098-DSD-HV100		100-C37*x*10 (AC coil) 100-C37Z*x*10 (DC coil)
2098-DSD-HV150		100-C43*x*10 (AC coil) 100-C43Z*x*10 (DC coil)
2098-DSD-HV220		100-C60*x*10 (AC coil) 100-C60Z*x*10 (DC coil)

Power Dissipation Specifications

Drive Cat. No.	Max Loss W
2098-DSD-005	48
2098-DSD-010	48
2098-DSD-020	50
2098-DSD-030	150 + dissipative shunt
2098-DSD-075	300 + dissipative shunt
2098-DSD-150	500 + dissipative shunt

Drive Cat. No.	Max Loss W
2098-DSD-HV030	175 + dissipative shunt
2098-DSD-HV050	175 + dissipative shunt
2098-DSD-HV100	350 + dissipative shunt
2098-DSD-HV150	350 + dissipative shunt
2098-DSD-HV220	600 + dissipative shunt

Communication Specifications

Attribute	Value
SERCOS (option)	
Communication rates	4 and 8 Mbps
Node addresses	01…99
DeviceNet (option)	
Power consumption from network	60 mA
Data rates	125, 250, and 500 kps, and auto-baud
Node addresses	00…63
Messaging capabilities	Explicit, Polled I/O, Change of State, and Cyclic Messaging
Serial	
Ports	One RS-232/RS-422/RS-485
Communication rates	1200, 2400, 4800, 9600, 19,200, and 38,400 bps

Inputs/Outputs Specifications

Attribute	Value
Digital inputs	8 optically isolated, 12…24V, active high, current sinking
Digital outputs	4 optically isolated, 12…24V, active high, current sourcing
Relay output	One normally open relay, 30V DC, max, 1 A, max
I/O response	100 µs
Digital I/O firmware scan period	1 ms
Analog inputs COMMAND ILIMIT	 14-bit A/D, ±10V 10-bit A/D, 0 to 10V
Analog output	±10V, 8 bits, 2 mA max

Auxiliary Feedback Specifications

Attribute	Value
Input modes	A quad B, Step/Direction, CW/CCW
Maximum input frequency	2.5 MHz
Input types	Differential, single-ended, open collector (1)

(1) Differential input types are recommended.

Physical and Environmental Specifications

Attribute	Value		Attribute	Value	
Weight, approx.			Weight, approx.		
2098-DSD-005	1.80 kg	(4.1 lb)	2098-DSD-HV030	8.55 kg	(18.8 lb)
2098-DSD-010	2.10 kg	(4.6 lb)	2098-DSD-HV050	8.55 kg	(18.8 lb)
2098-DSD-020	2.10 kg	(4.6 lb)	2098-DSD-HV100	10.44 kg	(22.9 lb)
2098-DSD-030	6.20 kg	(13.6 lb)	2098-DSD-HV150	10.44 kg	(22.9 lb)
2098-DSD-075	9.30 kg	(20.6 lb)	2098-DSD-HV220	14.1 kg	(31.0 lb)
2098-DSD-150	14.1 kg	(31.0 lb)			
Temperature, ambient Operating Storage	 0…55 °C (32…131 °F) -40…70 °C (-40…158 °F)				
Relative humidity	5…95% noncondensing				
Altitude	1500 m (4921.5 ft) - Derate 3% per 300 m (984.3 ft) above 1500 m (4921.5 ft)				
Vibration	5…2000 Hz @ 2.5 g peak, 0.0006 mm (0.015 in.) max displacement				
Shock	15 g, 11 ms half-sine				

Connector Specifications

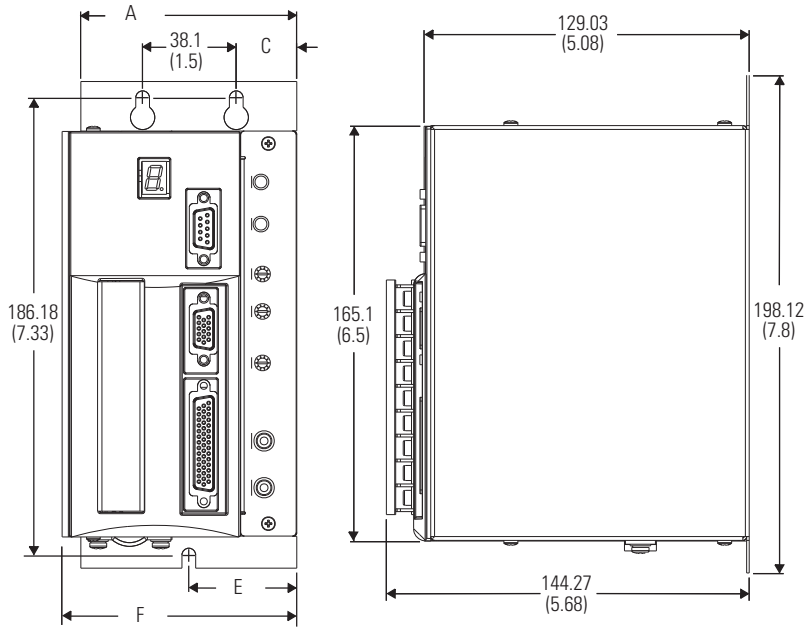
Connector	Description	Specification
CN1	User input/output	44-pin high-density female D-sub connector
CN2	Motor feedback connector	15-pin high-density female D-sub connector
CN3	Serial port connector	9-pin female D-sub connector
TB1 and TB2	Main and auxiliary AC, DC bus, motor power, and shunt connectors	Screw terminal block

Ultra3000 Digital Servo Drive Dimensions

This section contains dimensions for the Ultra3000 digital servo drives (X indicates indexing, -SE indicates SERCOS interface, -DN indicates DeviceNet interface, and X-DN indicates indexing DeviceNet interface).

In the figure below, *-xxx* is replaced by -005, -010, or -020 to represent the Ultra3000 500 W, 1 kW, and 2 kW drives respectively.

2098-DSD-*xxx*, 2098-DSD-*xxx*X, 2098-DSD-*xxx*-SE, 2098-DSD-*xxx*-DN, 2098-DSD-*xxx*X-DN Dimensions (230V)



Dimensions are in mm (in.)

Unit shown is the 2098-DSD-005-SE

Ultra3000 Drives	A mm (in.)	C mm (in.)	E mm (in.)	F mm (in.)
2098-DSD-005, 2098-DSD-005X	65.02 (2.56)	13.26 (0.52)	32.77 (1.29)	72.64 (2.86)
2098-DSD-010, 2098-DSD-010X, 2098-DSD-020, 2098-DSD-020X				98.1 (3.89)
2098-DSD-005-SE, 2098-DSD-005-DN, 2098-DSD-005X-DN	87.88 (3.46)	24.64 (0.97)	43.94 (1.73)	95.5 (3.76)
2098-DSD-010-SE, 2098-DSD-010-DN, 2098-DSD-010X-DN, 2098-DSD-020-SE, 2098-DSD-020-DN, 2098-DSD-020X-DN				121.54 (4.79)