

DigiFlex[®] Performance[™] Servo Drive

DZXRALTE-015L080

Description

The DZXRALTE-015L080 digital servo drive is designed to drive brushed and brushless servomotors from a compact form factor ideal for embedded applications. This fully digital drive operates in torque, velocity, or position mode and employs Space Vector Modulation (SVM), which results in higher bus voltage utilization and reduced heat dissipation compared to traditional PWM. The drive can be configured for a variety of external command signals. Commands can also be configured using the drive's built-in Motion Engine, an internal motion controller used with distributed motion applications. In addition to motor control, this drive features dedicated and programmable digital and analog inputs and outputs to enhance interfacing with external controllers and devices.

The DZXRALTE-015L080 features a RS-232 interface for drive configuration and setup as well as a RS-485 interface for drive networking. Drive commissioning is accomplished using DriveWare[®] 7, available for download at <u>www.a-m-c.com</u>. All drive and motor parameters are stored in non-volatile memory.

The DZXRALTE-015L080 conforms to the following specifications and is designed to the Environmental Engineering Considerations as defined in MIL-STD-810F.

Extended Environment Performance			
Ambient Temperature	-40°C to +75°C (-40°F to +167°F)		
Storage Temperature	-50°C to +100°C (-58°F to +212°F)		
Thermal Shock	-40°C to +75°C (-40°F to +167°F) in 2 min.		
Relative Humidity	0 to 95% Non-Condensing		
Vibration	30 Grms for 5 min. in 3 axes		

- Four Quadrant Regenerative Operation
- Space Vector Modulation (SVM) Technology
- Fully Digital State-of-the-art Design
- Programmable Gain Settings
- Fully Configurable Current, Voltage, Velocity and Position Limits

MODES OF OPERATION

- Current
- Hall Velocity
- Position
- Velocity

COMMAND SOURCE

- PWM and Direction
- Encoder Following
- Over the Network
- ±10 V Analog
- 5V Step and Direction
- Sequencing
- Indexing
- Jogging

FEEDBACK SUPPORTED

- Halls
- Incremental Encoder
- ±10 VDC Position
- Auxiliary Incremental Encoder

Power R	ange
Peak Current	15 A (10.6 A _{RMS})
Continuous Current	7.5 A (7.5 A _{RMS})
Supply Voltage	10 - 80 VDC





	PIDF	Velocity	Loop
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- PID + FF Position Loop
- Compact Size, High Power Density
- 12-bit Analog to Digital Hardware
- On-the-Fly Mode Switching
- On-the-Fly Gain Set Switching

INPUTS/OUTPUTS

Features

- 2 High Speed Captures
- 1 Programmable Analog Input (12-bit Resolution)
- 2 Programmable Digital Inputs (Differential)
- 3 Programmable Digital Inputs (Single-Ended)
- 3 Programmable Digital Outputs (Single-Ended)

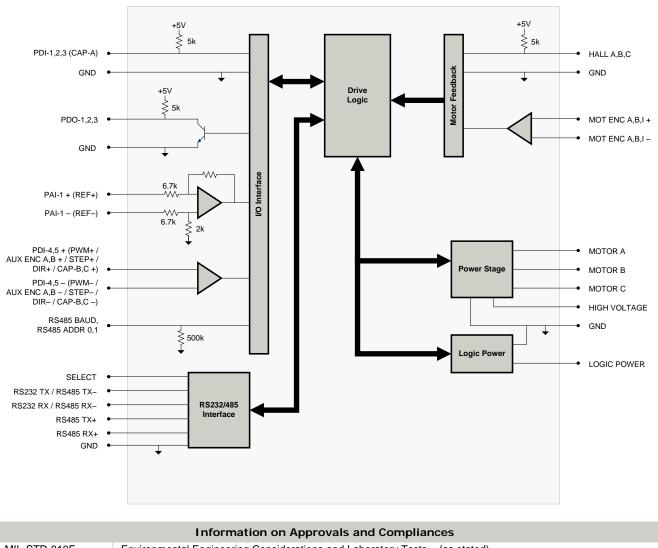
AGENCY APPROVALS & COMPLIANCE CONSIDERATIONS

- RoHS
- MIL-STD-810F (as stated)
- MIL-STD-1275D (optional)
- MIL-STD-461E (optional)
- MIL-STD-704F (optional)
- MIL-HDBK-217 (optional)
- UL
- cUL
- CE Class A (LVD)
- CE Class A (EMC)





BLOCK DIAGRAM



	Information on Approvals and Compliances
MIL-STD-810F	Environmental Engineering Considerations and Laboratory Tests – (as stated)
MIL-STD-1275D	Characteristics of 28 Volt DC Electrical Systems in Military Vehicles – (optional)
MIL-STD-461E	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment – (optional)
MIL-STD-704F	Aircraft Electric Power Characteristics – (optional)
MIL-HDBK-217	Reliability Prediction of Electronic Equipment (MTBF) – (optional)
c FL [®] us	US and Canadian safety compliance with UL 508c, the industrial standard for power conversion electronics. UL registered under file number E140173. Note that machine components compliant with UL are considered UL registered as opposed to UL listed as would be the case for commercial products.
CE	Compliant with European CE for both the Class A EMC Directive 2004/108/EC on Electromagnetic Compatibility (specifically EN 61000-6-4:2007 and EN 61000-6-2:2005) and LVD requirements of directive 2006/95/EC (specifically EN 60204-1:2006), a low voltage directive to protect users from electrical shock.
COMPLIANCE	RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.





SPECIFICATIONS

Description Units Value CS Suppl Voltage Imin VDC 8 DC Bur Joort Voltage Limin VDC 8 Do Bur Joort Voltage Limin VDC 8 Do Bur Joort Voltage Limin VDC 8 Suppl Voltage Limin VDC 8 Maintum Death Output Current VAC 8 Maintum Death Output Current W 30 Maintum Dever Designation at Continuous Current W 90 Maintum Doutput Durent Limina Blus Capacitance W 20 Maintum Doutput PVM Duby Cycle W 20 Description Units Value Communication Interfaces - R5 498722 Communication Interfaces - R5 498722 Communication Interfaces - R5 498722 Communication Interfaces - R5 498724 Communication Interfaces - R5 498724 Communication Interfaces - 10 Valuer, Passer Partecion Motors Supported - 10 Valor Liming, Six Step and Direcions, Step Anaser Partec		Power	Specifications		
DC Buil Over Volkage Linit VDC 88 DC Buil Under Volkage Linit VDC 8 Dogic Supply Voltage VDC 8 Dogic Supply Voltage VDC 8 Maximum Continuous Output Current ¹ A (Arms) 15 (10.8) Maximum Continuous Output Power W 50 Maximum Continuous Output Power W 30 Maximum Continuous Output PMU Buy Cycle W 30 Maximum Output PMU Buy Cycle W 92 Command Sources Control Specifications Value Command Sources - R=48/5/32 Value Command Sources - Sequencing, Indexing, Jogen Point Value Command Sources - Sequencing, Indexing, Jogen Point Sequencing, Indexing, Jogen Point Modes of Operation - Corrent, Hal V Modes (Pointon, Voice Col, Inductive Load), Three Phase (Bruablese) Pregrammable	Description		•		
DC Bis Under Vollage Limit VDC 8 Logic Supply Voltage VDC 5 (4/- 5%) Maximum Pak Ougut Current ¹ A (Arms) 15 (10.6) Maximum Continuous Ougut Current ¹ A (Arms) 7.5 (7.5) Maximum Power Dissipation at Continuous Current W 570 Maximum Power Dissipation at Continuous Current W 30 Internal Bus Capacitance ¹ WH 20 Maximum Output PWM Duty Cycle WH 20 Control Specifications Value Communication Interfaces - R5-485023 Communication Interfaces - R5-485023 Communication Methods - Situadodd, Trapezoidal Maxies of Operation - Situadodd, Trapezoidal Maxies of Operation - Gituadot, Nationg, Noticin, Aunicing Internetinal Encoder, Halls, Incramental Encoder, Halls, Incramental Encoder, Halls, Incramental Encoder Communition Methods - Situadotd, Trapezoidal Maximum Poxet Displat Instructure (Situa & Maxing), Civer Voltage, Situadota, Trapezoidal - Maximum Encotection - Gitua Contentital E	DC Supply Voltage Range	VDC	10 - 80		
Ligit Supply Voltage VDC 6 (4 / 5%) Maximum Rex Nopau Current ¹ A (Arma) 15 (10.6) Maximum Continuous Output Current ¹ A (Arma) 7.5 (7.5) Maximum Continuous Output Power W 570 Maximum Power Displation at Continuous Current ¹ W 30 Intermal Bus Capacitance µF 20 Minimum Load Inductance (Line T-CLINe) ¹ µH 250 Switching Frequency MHz 20 Maximum Over MVM Duty Cycle % 92 92 Communication Interfaces - RS-485/232 Securence, Indiversity, Secure August Command Sources - Situ V Analog, SV Step and Direction, Encoder Following, Over the Network, PVM and Direction, Securence, Indiversity, August Secure August Contraduction Methods - Situ V Analog, SV Step and Direction, Encoder, Halls, Incremental Encoder Contraduction Methods - Situ V Analog, SV Step and Direction, Encoder, Halls, Incremental Encoder Contraduction Methods - Situ V Analog, SV Step and Direction, Encoder, Halls, Incremental Encoder Contraduction Methods - Closed Loop Vector, Single Phase (Strucher, Vect	DC Bus Over Voltage Limit	VDC	88		
Mainmun Peak Ouput Current!A (Arms)15 (10.6)Maximun Continuous Ouput PowerW570Maximun Continuous Ouput PowerW30Maximun Dower Dssipation at Continuous CurrentW30Internal Bus Capacitance!µF20Minimu Load Inductance (Line-To-Line)!µH250Maximun Coutput PVM OUty Cycle%92Control SpecificationsControl SpecificationsValueCommuncation Interfaces-R5-485/232Communcation Interfaces-10 Vanalog, 5V Step and Direction, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, JoggingFeedback Supported-410 VC Position, Auditing Intermental Encoder, Halls, Incremental EncoderCommuncation Interfaces-Sinusoidin, TrapezoidalMoters Supported-Sinusoidin, TrapezoidalMoters Supported-Sinusoidin, TrapezoidalMoters Supported-50Programmable Analog Inputs/Outputs (PDIs/PDOs)-50Programmable Analog Inputs/Outputs (PDIs/PDOs)-50Programmable Analog Inputs/Outputs (PAIs/PAGs)-100Primary U Logic Level-50Programmable Analog Inputs/Outputs (PAIs/PAGs)-100Primary U Logic Level-50Posico Logis Sample Timeµs100Adexing Departing Timeµs100Posico Logis Sample Time-50Sample Time(PG 4-0.167)Matrue Logis Sample Time-<	DC Bus Under Voltage Limit	VDC	8		
Maximum Continuous Output Current? A (Arms) 7.5 (2.5) Maximum Continuous Output Power W 570 Maximum Continuous Output Power W 30 Internal Bus Capacitance ¹ µF 20 Minimum Load Inductance (Line-To-Line) ¹ µF 20 Switching Frequency MHz 20 Maximum Continuous Output PW Duty Cycle % 92 Communication Interfaces - R5-485/232 Communication Interfaces - 810 Vaniso, RV Size and Direction, Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexisen, Josping. Command Sources - 10 VCP Constinn, Auxiliary Incremental Encoder, Halls, Incremental Encoder Commutation Methods - Current, Hall Velocity, Posion, Velocity Motors Supported - Consect Loop Vector, Single Phase (Rivelet, Voice Coil, Inductive Load), Three Phase (Brushless) Motors Supported - Sinusoidal, Trapezcidal	Logic Supply Voltage	VDC			
Maximum Continuous Output Power W 970 Maximum Power Obsigation al Continuous Current W 30 Internal Bus Capacitance ¹ µF 20 Minimum Load Inductance (Line-To-Line) ¹ µH 250 Maximum Output PVM Outp Oycle % 92 Description Control Specifications Value Communication Interfaces - RS-485/232 Communication Interfaces - st/0 V Analog, 5V Step and Direction, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indewing, Jogging Feedback Supported - st/0 V Or Position, Availing Intermental Encoder, Halis, Incremental Encoder Communication Methods - Simusodial, Trappazoidal Moters Opperation - Current, Hall Velocity, Position, Valuity Intermental Encoder, Halis, Incremental Encoder Communitation Methods - Simusodial, Trappazoidal Moters Opperation - Current, Hall Velocity, Position, Valuity Intermental Encoder, Halis, Incremental Encoder Communitation Methods - Simusodial, Trappazoidal Moters Opperation - Cortex (Hasalin, Neichopis), Molocity Moters Supp	Maximum Peak Output Current ¹	A (Arms)	15 (10.6)		
Maximum Power Dissipation at Continuous Current W 30 Internal Bus Capacitance' µF 20 Minimum Lad Inductance (Line-To-Line)' µH 250 Switching Frequency KHz 20 Maximum Output PWM Duty Cycle % 92 Control Specifications Value Control Specifications Value Control Specifications Value Control Specifications Value Value Value Control Specifications Value Control Specifications Value Value <td< td=""><td>Maximum Continuous Output Current²</td><td>A (Arms)</td><td>7.5 (7.5)</td></td<>	Maximum Continuous Output Current ²	A (Arms)	7.5 (7.5)		
Internal Bus Capacitance' μF 20 Minimum Load Inductance (Line-To-Line)* μH 250 Maximum Output PVM Duty Cycle % 92 Control Specifications Units Value Control Specifications Control Colspan="2">Control Colspan= 2"Colspan="2">Control Colspan="2">Control Colspan="2"C	Maximum Continuous Output Power	W	570		
Minimum Laad Inductance (Line-To-Line) ⁴ µH 250 Switching Frequency KH2 20 Maximum Output FVM Duty Cycle % 92 Control Specifications Description Value Communication Interfaces - R5-485/232 Command Sources - 85-485/232 Feedback Supported - s10 VDC Position, Auxiliary Incremental Encoder Commutation Methods - s10 VDC Position, Auxiliary Incremental Encoder Commutation Methods - Sussodial, Trapezoidal Motors Supported - Corset Loop Vector, Single Phase (Rushed, Voice Coll, Inductive Load), Three Phase (Rusheles) Motors Supported - Corset Loop Vector, Single Phase (Rusheles) Programmable Analog Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) - 5/3 Programmable Analog Inputs/O	Maximum Power Dissipation at Continuous Current	W	30		
Witching Frequency HHz 20 Maximum Output PVM Duty Cycle % 92 Communication Interfaces Imits Value Command Sources -1 8485/232 Command Sources -1 st0 V Analog, 5V Step and Direction, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging Feedback Supported -1 st10 VDC Position, Auxiliary Incremental Encoder Communication Methods -2 Stropported Communication Methods -3 Stropported Motors Supported -2 Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushed, Voice Coil, New Yorkage, Bhort Programmable Analog Inputs/Cutputs (PAIs/PAOs) -3 50 Programmable Analog Inputs/Cutputs (PAIs/PAOs) -4 10 Primary UC Logic Level -4 50 Quicel Loop Sample Time µs 50 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Masima Encoder Frequency -7 Fo	Internal Bus Capacitance ³	μF	20		
Maximum Output PVM Duty Cycle % 92 Description Control Specifications Command Sources - RS-485/23 Command Sources - 84/45/232 Command Sources - 84/45/232 Command Sources - 84/45/232 Command Sources - 84/45/232 Command Sources - Sequencing, Indexing, Logging Feedback Supported - 21/45/242 Command Sources - Sinusoidal, Trapezodal Modes of Operation - Current, Hall Velocity, Position, Velocity Modes of Operation - Current, Hall Velocity, Position, Velocity Modes of Operation - Current, Hall Velocity, Position, Velocity Programmable Analog InputS/Outputs (PDIs/PDOs) - 5/3 Programmable Analog InputS/Outputs (PAIs/PAOs) - 1/0 Primary IOL Lopic Lavel μs 100 Position Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Materia 20 (5 pre-	Minimum Load Inductance (Line-To-Line)4	μΗ	250		
Control Specifications Description Units Value Communication Interfaces - R5-485/232 Command Sources +10 V Analog, SU Step and Direction, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Joggring Feedback Supported - +10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder Commutation Methods - Supported - Modes of Operation - Current, Hall Velocity, Position, Velocity Motors Supported - Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushelss) Hardware Protection - Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushelss) Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Digital Inputs/Outputs (PAIs/PAOS) - 1/0 Primary I/O Logic Leavel - 50 Current Loop Sample Time µs 100 Postion Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Value Nethon Conder </td <td>Switching Frequency</td> <td>kHz</td> <td>20</td>	Switching Frequency	kHz	20		
Description Units Value Communication Interfaces R-848/232 #10 V Analog, 5V Step and Direction, Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexing, Jogging Feedback Supported - #10 VDC Position, Audinary, Jogging Feedback Supported - #10 VDC Position, Audinary Incremental Encoder, Halls, Incremental Encoder Communication Methods - Sinuscidal, Trapezcidal Modes of Operation - Closed Looy Vector, Single Phase (Brushed, Voice) (Inductive Load), Three Phase (Brusheds) Modes of Operation - Closed Looy Vector, Single Phase (Brushed, Voice) (Inductive Load), Three Phase (Brushed, Voice) (Inductive Load), Three Phase (Brushed, Voice) (Vector, Single Phase, Brushed, Noice Coll, Inductive Load), Three Phase (Brushed, Voice) (Vector, Single Phase, Brushed, Noice) (Vector, Single Phase, Brushed, Brushed, Brushed, Single Phase, Brushed, Brushed, Single Phase,	Maximum Output PWM Duty Cycle	%	92		
Communication Interfaces RS-485/22 Command Sources ±10 VA Pralog, 5V Step and Direction, Encoder Following, Over the Network, PWM and Direction, Bequencing, Indexing, Jogging Feedback Supported ±10 VCC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder Commatiation Methods ≤10 VCC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder Moters Supported Current, Hall Velocity, Position, Velocity Motors Supported Current, Hall Velocity, Position, Velocity Motors Supported 40- Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Shortt Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Analog Inputs/Outputs (PDIs/PDOs) 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) 1/0 Primary UO Logo Sample Time µs 50 Valcot Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pr-cuardirule) Agency Approvals RoHS, MIL-STD-810F (as stated), MIL-STD-475D (optional),		Control	Specifications		
at 10 V Analog, 5V Step and Direction, Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexing, Jogging Feedback Supported - ±10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder Commutation Methods - Sinusoidal, Trapezcidal Modes of Operation - Closed Loop Vector, Single Phase (Brushled, Voice Coil, Inductive Load), Three Phase (Brushless) Markware Protection - Closed Loop Vector, Single Phase (Brushled, Voice Coil, Inductive Load), Three Phase (Brushless) Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) - 5/3 Programmable Digital Inputs/Outputs (PAIs/PAOs) - 5/3 Programmable Digital Inputs/Outputs (PAIs/PAOs) - 5/3 Programmable Sample Time µs 50 Velocity Loop Sample Time µs 100 Postion Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Agency Approvals - RoHS, MIL-STD-810F (os stated), MIL-STD-461E (optional), MIL-STD-601E (optional), MIL-STD-461E (optional), MIL-STD-4704 (optional), MIL-STD	Description	Units	Value		
Commands Sequencing, Indexing, Jogging Feedback Supported - ±10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Current, Hall Velocity, Position, Velocity Motors Supported - Current, Hall Velocity, Position, Velocity Motors Supported - Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushless) Hardware Protection - 5/3 Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) - 10 Primary I/O Logic Level - 5/3 Current Loop Sample Time µs 50 Velocity Loop Sample Time µs 100 Position Loop Sample Time µs 100 Maximum Encoder Frequency UHz 20 (5 pre-quadrature) Maximum Encoder Frequency Units Value Value 0 63.5 x 50.8 x 22 (9.5 x 2 x 0.9) Weight g (oz) 105 (3.7) Baseplate Ope	Communication Interfaces	-	RS-485/232		
Commutation Methods - Sinusoidal, Trapezoidal Modes of Operation - Current, Hall Velocity, Position, Velocity Motors Supported - Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushless) Hardware Protection - Closed Loop Vector, Single Phase (Brushled, Voice Coil, Inductive Load), Three Phase (Brushless) Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) - 1/0 Primary I/O Logic Level - 5/3 Current Loop Sample Time µs 50 Velocity Loop Sample Time µs 100 Position Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Size (H x W x D) mm (m) 63 5 x 50.8 x 22.9 (2.5 x 2 x 0.9) Weight g (oz) 106 (3.7) Baseplate Operating Temperature Range °C (°F) 40-75 (4.0 - 167) Size (H x W x D) mm (m) 63 5 x 50.8 x 22.9 (2.5 x 2 x 0.9) Weight g (oz) 106 (3.7) Baseplate Oper	Command Sources	-			
Modes of Operation - Current, Hall Velocity, Position, Velocity Motors Supported - Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushelss) Hardware Protection 40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) - 1/0 Primary I/O Logic Level - 5/0 Current Loop Sample Time µs 50 Velocity Loop Sample Time µs 100 Position Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Value Null-STD-12750 (optional), MIL-STD-461E (optional), MIL-STD-476E (Feedback Supported	-	±10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder		
Motors Supported - Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushless) Hardware Protection - 40- Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PDIs/PAOs) - 1/0 Primary I/O Logic Level - 5/7 Current Loop Sample Time µs 50 Velocity Loop Sample Time µs 100 Position Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Value Operating Temperature Range - Rech, MIL-STD-410F (as stated), MIL-STD-475D (optional), MIL-STD-461E (op	Commutation Methods	-	Sinusoidal, Trapezoidal		
Hardware Protection-A0+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under VoltageProgrammable Digital Inputs/Outputs (PDIs/PDOs)-5/3Programmable Analog Inputs/Outputs (PAIs/PAOs)-1/0Primary I/O Logic Level-5 VTLCurrent Loop Sample Timeµs50Velocity Loop Sample Timeµs100Position Loop Sample Timeµs100Maximum Encoder FrequencyMHz20 (5 pre-quadrature)Mechanical Specifications UnitsValueAgency Approvals-RoHS, MIL-STD-810F (as tated), MIL-STD-461E (optional), MIL-STD-461E (option	Modes of Operation	-	Current, Hall Velocity, Position, Velocity		
Hardware Protection Circuit (Phase-Phase & Phase-Ground), Under Voltage Circuit (Phase-Phase & Phase-Ground), Under Voltage Programmable Digital Inputs/Outputs (PDIs/PDOs) - 5/3 Programmable Analog Inputs/Outputs (PAIs/PAOs) - 5/3 Primary I/O Logic Level - 5V TTL Current Loop Sample Time μs 50 Veloity Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Maximum Encoder Frequency Units Value Agency Approvals - 63.5 x50.8 x22.9 (2.5 x2 x0.9) Weight 9 (c) (°F) -40 × 55 (40 · 185) Ambient Temperature Range °C (°F) -40 - 75 (40 · 167) Storage Temperature Range °C (°F) -40 - 75 (40 · 167) in 2 minutes Vibration °C (°F) -40 - 75 (40 · 167) in 2 minutes Vibration °C (°F) -40 - 75 (40 · 167) in 2 minutes Vibration °C (°F) -40 - 75 (40 · 167) in 2 minutes Relative Humidity °C (°F) -40 - 75 (40 · 167) in 2 minutes Vibration °C (°F) -40 - 75 (40	Motors Supported	-			
Programmable Analog Inputs/Outputs (PAIs/PAOs) - 1/0 Primary I/O Logic Level - 5V TTL Current Loop Sample Time µs 50 Velocity Loop Sample Time µs 100 Position Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Value Agency Approvals Value Size (H × W × D) mm (in) 63.5 × 50.8 × 22.9 (2.5 × 2 × 0.9) Weight g (oz) 105 (3.7) Baseplate Operating Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Notation °C (°F) -40 - 75 (-40 - 167) Vibration Grms 30 for 5 minutes in 3 axes Relative Humidity - 0 - 95% Non-Condensing Convection - Natural Convection Form Factor - - Pic Connector - Natural Convection	Hardware Protection	-			
Primary I/O Logic Level-5V TTLCurrent Loop Sample Timeμs50Velocity Loop Sample Timeμs100Position Loop Sample Timeμs100Maximum Encoder FrequencyMHz20 (5 pre-quadrature)Mechanical Specifications UnitsValueRoHS, MIL-STD-810F (as stated), MIL-STD-461E (optional), MIL-STD-461E (optional), MIL-STD-704F (optional), MIL-STD-461E (optional), MIL-STD-704F (optional), MIL-STD-461E (optional), MIL-STD-704F	Programmable Digital Inputs/Outputs (PDIs/PDOs)	-	5/3		
Current Loop Sample Timeµs50Velocity Loop Sample Timeµs100Position Loop Sample Timeµs100Maximum Encoder FrequencyMHz20 (5 pre-quadrature)Mechanical SpecificationsValueNether Sample TimeMechanical SpecificationsValueNether Sample TimeNether Sample TimeMechanical SpecificationsValueNether Sample Time NumNether Sample Time NumNether Sample Time NumMechanical SpecificationsValueNational Mill-STD-4275D (optional), Mill-STD-461E (optional), M	Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	1/0		
Velocity Loop Sample Time μs 100 Position Loop Sample Time μs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Memory Description Memory Methanical Units Specifications Value Agency Approvals Value Null-STD-1275D (optional), MIL-STD-461E (optional), M	Primary I/O Logic Level	-	5V TTL		
Position Loop Sample Time µs 100 Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Description Mechanical Units Value Agency Approvals C ROHS, MIL-STD-810F (as stated), MIL-STD-1275D (optional), MIL-STD-461E (optional), MIL-STD-704F (optional), MIL-HDBK-217 (optional), UL, cUL, CE Class A (LVD), CE Class A (EMC) Size (H x W x D) mm (in) 63.5 x 50.8 x 22.9 (2.5 x 2 x 0.9) Weight g (2) 105 (3.7) Baseplate Operating Temperature Range ⁶ °C (°F) -40 e 55 (-40 - 185) Ambient Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Vibration Grms 30 for 5 minutes in 3 axes Relative Humidity O - 95% Non-Condensing Convection Form Factor O PCB Mounted PCB Mounted P1 Connector O PCB Mounted PCB Mounted	Current Loop Sample Time	μs	50		
Maximum Encoder Frequency MHz 20 (5 pre-quadrature) Mechanical Specifications Units Value Agency Approvals Units Value Size (H x W x D) mm (in) 63.5 x 50.8 x 22.9 (2.5 x 2 x 0.9) Weight g (oz) 105 (3.7) Baseplate Operating Temperature Range ⁵ °C (°F) -40 - 85 (-40 - 185) Ambient Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) Storage Temperature Range °C (°F) -40 - 75 (-40 - 167) in 2 minutes Vibration Grms 30 for 5 minutes in 3 axes Relative Humidity -0 0 - 95% Non-Condensing Cooling System - Natural Convection Form Factor - PCB Mounted P1 Connector -	Velocity Loop Sample Time	μs	100		
Mechanical DescriptionMechanical UnitsSpecificationsAgency ApprovalsInitsValueAgency ApprovalsRoHS, MIL-STD-810F (as stated), MIL-STD-1275D (optional), MIL-STD-461E (optional), MIL-STD- 704F (optional), MIL-MDBK-217 (optional), UL, cUL, CE Class A (LVD), CE Class A (EMC)Size (H x W x D)mm (in)63.5 x 50.8 x 22.9 (2.5 x 2 x 0.9)Weightg (oz)105 (3.7)Baseplate Operating Temperature Range°C (°F)-40 - 85 (-40 - 185)Ambient Temperature Range°C (°F)-40 - 75 (-40 - 167)Storage Temperature Range°C (°F)-50 - 100 (-58 - 212)Thermal Shock°C (°F)-40 - 75 (-40 - 167) in 2 minutesVibrationGrms30 for 5 minutes in 3 axesRelative Humidity-0 - 95% Non-CondensingCooling System-Natural ConvectionForm Factor-PCB MountedP1 Connector-30-pin, 2.54 mm spaced, dual-row header	Position Loop Sample Time	μs	100		
DescriptionUnitsValueAgency ApprovalsRoHS, MIL-STD-810F (as stated), MIL-STD-1275D (optional), MIL-STD-461E (o	Maximum Encoder Frequency	MHz	20 (5 pre-quadrature)		
Agency ApprovalsRoHS, MIL-STD-810F (as stated), MIL-STD-1275D (optional), MIL-STD-461E (optional), MIL-STD- 704F (optional), MIL-HDBK-217 (optional), UL, cUL, CE Class A (LVD), CE Class A (EMC)Size (H x W x D)mm (in)63.5 x 50.8 x 22.9 (2.5 x 2 x 0.9)Weightg (oz)105 (3.7)Baseplate Operating Temperature Range ⁵ °C (°F)-40 - 85 (-40 - 185)Ambient Temperature Range°C (°F)-40 - 75 (-40 - 167)Storage Temperature Range°C (°F)-50 - 100 (-58 - 212)Thermal Shock°C (°F)-40 - 75 (-40 - 167) in 2 minutesVibrationGrms30 for 5 minutes in 3 axesRelative Humidity-0 - 95% Non-CondensingCooling System-Natural ConvectionForm Factor-PCB MountedP1 Connector-30-pin, 2.54 mm spaced, dual-row header		Mechanica	al Specifications		
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Vibration Grms 30 for 5 minutes in 3 axes Relative Humidity - 0 - 95% Non-Condensing Cooling System - Natural Convection Form Factor - PCB Mounted P1 Connector - 30-pin, 2.54 mm spaced, dual-row header	Storage Temperature Range	°C (°F)	-50 - 100 (-58 - 212)		
Relative Humidity 0 - 95% Non-Condensing Cooling System - Natural Convection Form Factor - PCB Mounted P1 Connector - 30-pin, 2.54 mm spaced, dual-row header	Thermal Shock	°C (°F)	-40 - 75 (-40 - 167) in 2 minutes		
Cooling System - Natural Convection Form Factor - PCB Mounted P1 Connector - 30-pin, 2.54 mm spaced, dual-row header	Vibration	Grms	30 for 5 minutes in 3 axes		
Form Factor PCB Mounted P1 Connector - 30-pin, 2.54 mm spaced, dual-row header	Relative Humidity	-	0 - 95% Non-Condensing		
P1 Connector - 30-pin, 2.54 mm spaced, dual-row header	Cooling System	-	Natural Convection		
	Form Factor	-	PCB Mounted		
P2 Connector - 24-pin, 2.54 mm spaced, dual-row header	P1 Connector	-	30-pin, 2.54 mm spaced, dual-row header		
	P2 Connector	-	24-pin, 2.54 mm spaced, dual-row header		

Notes

Capable of supplying drive rated peak current for 2 seconds with 10 second foldback to continuous value. Longer times are possible with lower current limits. Continuous A_{rms} value attainable when RMS Charge-Based Limiting is used. It is recommended to connect a 100μ F / 100V electrolytic capacitor between High Voltage and Power Ground. 1.

2.

3.

Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.

4. 5. Additional cooling and/or heatsink may be required to achieve rated performance.





PIN FUNCTIONS

		P1 - Signal Connector	
Pin	Name	Description / Notes	1/0
1	RS485 ADDR 0	RS-485 Network Address Selector	
2	RS485 ADDR 1		
3	PAI-1 + (REF+)		I
4	PAI-1 - (REF-)	Differential Programmable Analog Input or Reference Signal Input (12-bit Resolution)	I
5	GND	Ground	GND
6	RS485 BAUD	RS-485 Baud Rate Selector	I
7	PDO-1	Programmable Digital Output	0
8	PDO-2	Programmable Digital Output	0
9	PDO-3	Programmable Digital Output	0
10	PDI-1	Programmable Digital Input	I
11	PDI-2	Programmable Digital Input	I
12	PDI-3 (CAP-A)	Programmable Digital Input or High Speed Capture	I
13	RS232 RX / RS485 RX-	Receive Line (RS-232 or RS-485)	I
14	RS485 RX+	Receive Line (RS-485)	I
15	RS232 TX / RS485 TX-	Transmit Line (RS-232 or RS-485)	0
16	RS485 TX+	Transmit Line (RS-485)	0
17	PDI-4 + (PWM+ / STEP+ / AUX ENC A+ / CAP-B+)	Programmable Digital Input or PWM or Step+ or Auxiliary Encoder or High Speed Capture	I
18	PDI-4 - (PWM- / STEP- / AUX ENC A- / CAP-B-)	(For Single-Ended Signals see DZ HW Installation Manual)	
19	PDI-5 + (DIR+ / AUX ENC B+ / CAP-C+)	Programmable Digital Input or Direction or Auxiliary Encoder or High Speed Capture (For	I
20	PDI-5 - (DIR- / AUX ENC B- / CAP-C-)	Single-Ended Signals see DZ HW Installation Manual)	I
21	GND	Ground	GND
22	HALL A	Circle and d Commutation Concerning to the Differential lands Conc MOAVD704 Datashard	I
23	HALL B	Single-ended Commutation Sensor Input (For Differential Inputs See MC1XDZ01 Datasheet	I
24	HALL C	For Recommended Signal Conditioning)	
25	MOT ENC I+	Differential Encoder Index Input (See MC1XDZ01 Datasheet For Recommended Signal	I
26	MOT ENC I-	Conditioning)	
27	MOT ENC A+	Differential Encoder A Channel Input (See MC1XDZ01 Datasheet For Recommended	I
28	MOT ENC A-	Signal Conditioning)	I
29	MOT ENC B+	Differential Encoder B Channel Input (See MC1XDZ01 Datasheet For Recommended	I
30	MOT ENC B-	Signal Conditioning)	

P2 - Power Connector

Р	in	Name	Description / Notes	1/0
1a		LOGIC PWR	Logic Supply Input	I
	1b	RESERVED	Reserved	-
2a	2b	GND	Ground	GND
3a	3b	GND	Ground	GND
4a	4b	HIGH VOLTAGE	DC Power Input. 3A Continuous Current Rating Per Pin. 100µF, 100V external capacitor	I
5a	5b	HIGH VOLTAGE	recommended between High Voltage and Ground.	
6a	6b	RESERVED	Reserved	-
7a	7b	MOTOR C		0
8a	8b	MOTOR C	Motor Phase Outputs. Current output distributed equally across 4 pins per motor phase, 3A continuous current carrying capacity per pin.	
9a	9b	MOTOR B		
10a	10b	MOTOR B		
11a	11b	MOTOR A		
12a	12b	MOTOR A		

Pin Details

RS485 ADDR 0 (P1-1)

This pin, RS485 ADDR 0, as well as RS485 ADDR 1, are used for RS-485 network addressing. To set the address of a drive, use the formula

$$RS485Address = \frac{7*Addr0}{3} + 8*\frac{7*Addr1}{3}$$

where *RS485Address* is the desired node address and *Addr0* and *Addr1* represent the voltage that should be applied by the range of and RS485 ADDR 0 and RS485 ADDR 1, respectively. The values for *Addr0* and *Addr1* are always integer multiples of 3 within the range 0-3 V. Examples of the voltages required to set certain node addresses are given in the table below. Note that the set of the voltage of the voltages stored in non-volatile memory.



RS485 ADDR 0 Value (V)	RS485 ADDR 1 Value (V)	RS485 ADDR Tolerance (V)	RS485 Address (Address #)
0	0	±0.1	Address stored in non-volatile memory
3/7 (0.43)	0	±0.1	1
6/7 (0.86)	0	±0.1	2
9/7 (1.3)	0	±0.1	3
		±0.1	
18/7 (2.57)	21/7 (3.0)	±0.1	62
21/7 (3.0)	21/7 (3.0)	±0.1	63

RS485 BAUD (P1-6)

The RS-485 baud rate is set by applying the appropriate voltage to the RS485 BAUD pin as given in the table below.

RS485 BAUD Value (V)	RS485 BAUD Tolerance (V)	RS485 Baud Rate (bits/s)
0	±0.388	Bit rate stored in non-volatile memory
1	±0.388	9.6k
2	±0.388	38.4k
3	±0.388	115.2k

HARDWARE SETTINGS

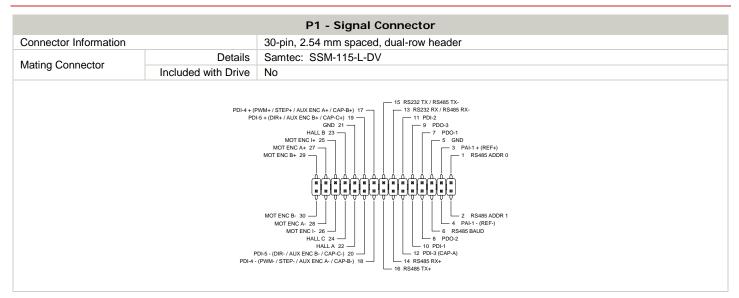
Jumper Settings

Jumper	Description		Configuration	
	Header Jumper	Not Installed	Pins 1-2	Pins 2-3
J1	Reserved.	-	-	N/A
J2	Reserved.	-	-	N/A
J3	RS-485 selection. Install this jumper (2mm) to select RS-485 communication. This jumper is located on a 6-pin header between the PCB and heatsink. It consists of the two pins closest to the corner of the PCB.	RS-232	RS-485	N/A





MECHANICAL INFORMATION

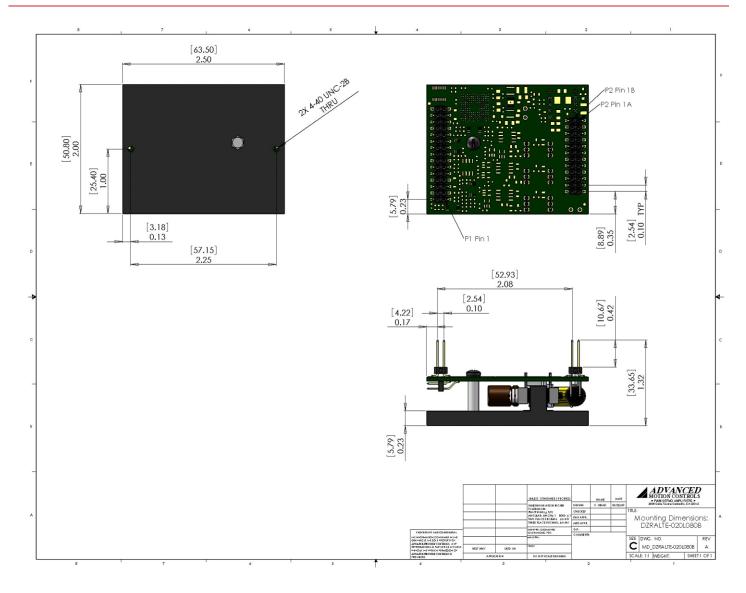


P2 - Power Connector			
Connector Information 24-pin, 2.54 mm spaced, dual-row header		24-pin, 2.54 mm spaced, dual-row header	
Details		Samtec: BCS-112-L-D-PE	
Mating Connector	Included with Drive	No	
		HIGH VOLTAGE 5a GND 2a LOGIC PWR 1a GND 2b HIGH VOLTAGE 5b COND 2b HIGH VOLTAGE 5b COND 2b HIGH VOLTAGE 5b HIGH VOLTAGE 5b HIGH VOLTAGE 5b HIGH VOLTAGE 5b Ta MOTOR A Ta MOTO	





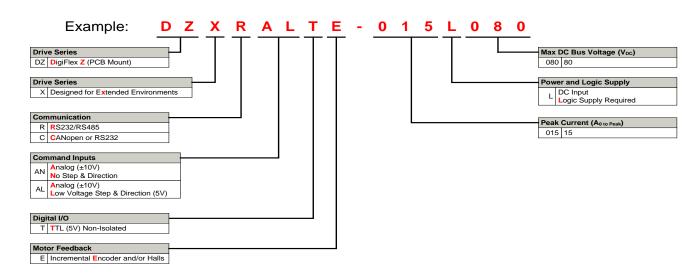
MOUNTING DIMENSIONS







PART NUMBERING INFORMATION



DigiFlex® Performance[™] series of products are available in many configurations. Note that not all possible part number combinations are offered as standard drives. All models listed in the selection tables of the website are readily available, standard product offerings.

ADVANCED Motion Controls also has the capability to promptly develop and deliver specified products for OEMs with volume requests. Our Applications and Engineering Departments will work closely with your design team through all stages of development in order to provide the best servo drive solution for your system. Equipped with on-site manufacturing for quick-turn customs capabilities, *ADVANCED* Motion Controls utilizes our years of engineering and manufacturing expertise to decrease your costs and time-to-market while increasing system quality and reliability.

Examples of Customized Products				
Optimized Footprint	Tailored Project File			
Private Label Software	Silkscreen Branding			
OEM Specified Connectors	Optimized Base Plate			
No Outer Case	Increased Current Limits			
Increased Current Resolution	Increased Voltage Range			
Increased Temperature Range	Conformal Coating			
Custom Control Interface	Multi-Axis Configurations			
Integrated System I/O	Reduced Profile Size and Weight			
	_			

Feel free to contact Applications Engineering for further information and details.

Available Accessories

ADVANCED Motion Controls offers a variety of accessories designed to facilitate drive integration into a servo system. Visit <u>www.a-m-c.com</u> to see which accessories will assist with your application design and implementation.



All specifications in this document are subject to change without written notice. Actual product may differ from pictures provided on sate detection this document.