

#### Description

The DigiFlex® Performance™ (DP) Series digital servo drives are designed to drive brushed and brushless servomotors. These fully digital drives operate in torque, velocity, or position mode and employ 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, these drives feature dedicated and programmable digital and analog inputs and outputs to enhance interfacing with external controllers and devices.

This DP Series drive features a CANopen interface for networking and a RS-232 interface for drive configuration and setup. Drive commissioning is accomplished using DriveWare® 7, available for download at www.a-m-c.com.

All drive and motor parameters are stored in non-volatile memory.

Power Range	
Peak Current	15 A (10.6 A <sub>RMS</sub> )
Continuous Current	7.5 A (7.5 A <sub>RMS</sub> )
Supply Voltage	40 - 190 VDC



#### **Features**

- ▲ 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

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

## MODES OF OPERATION

- Profile Current
- Profile Velocity
- Profile Position
- Cyclic Synchronous Current Mode
- Cyclic Synchronous Velocity Mode
- Cyclic Synchronous Position Mode

#### **COMMAND SOURCE**

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

# FEEDBACK SUPPORTED

- ±10 VDC Position
- Auxiliary Incremental Encoder
- Heidenhain EnDat®
- Stegmann Hiperface®
- Tachometer (±10 VDC)

## INPUTS/OUTPUTS

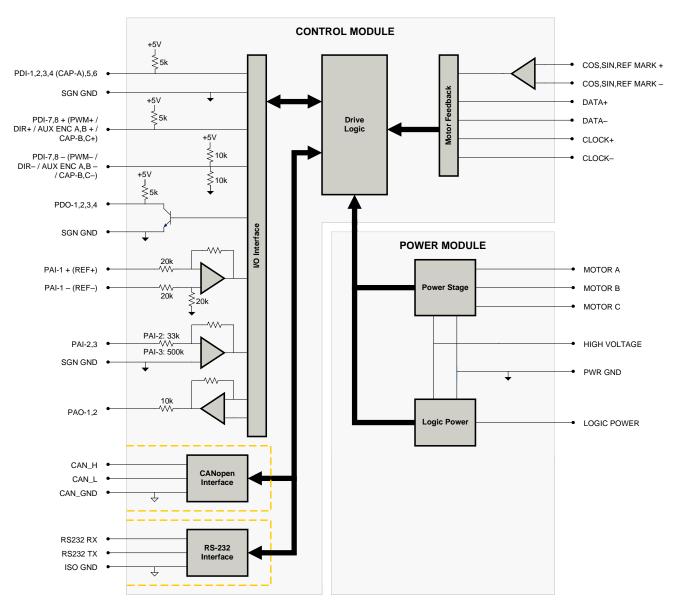
- 3 High Speed Captures
- 3 Programmable Analog Inputs (16-bit/12-bit Resolution)
- 2 Programmable Analog Outputs (10-bit Resolution)
- 2 Programmable Digital Inputs (Differential)
- 6 Programmable Digital Inputs (Single-Ended)
- 4 Programmable Digital Outputs (Single-Ended)

#### **COMPLIANCES & AGENCY APPROVALS**

- UL
- cUL
- CE Class A (LVD)
- CE Class A (EMC)
- RoHS



## **BLOCK DIAGRAM**



# 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. 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. 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			Power Specifications		
DC Bus Lorder Voltage Limit         VCC         198           CD Bus Linder Voltage         VDC         4.0 ± 190           Logic Supply Voltage         VDC         4.0 ± 190           Maximum Peak Output Current <sup>1</sup> A (Arms)         15 (10.6)           Maximum Centinous Output Dever         W         1.353.8           Maximum Centinous Output Dever         W         1.353.8           Maximum Development Continuous Current         W         7.5           Internal Bus Capacitance         µF         20           Minimum Load Inductione (Line-To-Line) <sup>1</sup> µH         250           Switching Frequency         H± 2         20           Low Voltage Supply Outputs         %         100           Description         Units         Control Specifications         Value           Communication Interfaces         .         CANAppen (RS-232 for configuration)         Value           Communication Interfaces         .         CANAppe			10000		
DC Bus Under Voltage Lindin         VDC Ling Supply Voltage         VDC Ling Supply Voltage         VDC Linding Supply Voltage         VDC Linding Supply Voltage         VDC Linding Supply Sup	DC Supply Voltage Range		40 - 190		
Logic Supply Voltage	DC Bus Over Voltage Limit	VDC	198		
Maximum Peak Output Current         IA (Arms)         15 (10s)           Maximum Continuous Output Current         W         1353.8           Maximum Dominuous Output Power         W         1353.8           Maximum Power Desipation at Continuous Current         W         71.3           Internal Bus Capadatence         µF         20           Minimum Load Inductance (Line-To-Line)         µH         250           Maximum Output PWM Duty Cycle         %         100           Lov Vottage Supply Outputs         1°         4° VO (250 rA)           Control Specifications           Units         Value           Control Specifications           Units         Value           Command Sources         1°         CANopen (RS-22 for configuration)           Co	DC Bus Under Voltage Limit	VDC	35		
Maximum Continuous Output Current*         A Arms (	Logic Supply Voltage	VDC	40 - 190		
Maximum Continuous Output Prever         W         153.8.8           Maximum Power Dissipation at Continuous Current         W         71.3           Maximum Power Dissipation at Continuous Current         µF         20           Minimum Load Inductance (Inte-To-Line) <sup>1</sup> µH         250           Maximum Output PVM Duty Cycle         ½         100           Control Specifications           Control Specifications           Description         Volts         Value           Command Sources         -         CNAppen (RS 232 for configuration)           Feedback Supported         -         -         CNAppen (RS 232 for configuration)           Feedback Supported         -         -         CNAppen (RS 232 for configuration)           Feedback Supported         -         -         410 VaC Position, Auxiliary Incremental Encoder, Heldenhain EnDatitis, Stegmann Hiperface®, Tachonester (±10 VCC)           Commandation Methods         -         -         410 VCC Position, Auxiliary Incremental Encoder, Heldenhain EnDatitis, Stegmann Hiperface®, Tachonester (±10 VCC)           Modes of Operation         -         -         410 VCC Position, Auxiliary Incremental Encoder, Heldenhain EnDatitis, Stegmann Hiperface®, Tachonester (±10 VCC)           Motors Supported         -         -         10 VCC Position Auxiliary Incremental En	Maximum Peak Output Current <sup>1</sup>	A (Arms)	15 (10.6)		
Maximum Power Dissipation at Continuous Current         W P 20           Internal Bus Capacitance         μP 20           Minimum Load Inductionas (InenTo Line)¹         μP 20           Switching Frequency         kHz 20           Maximum Output PWM Duty Cycle         % 100           Low Voltage Supply Outputs         *** VDC (250 mA)           Control Specifications           Communication Interfaces         Units         Value           Communication Interfaces         - 2         CANpoper (RS-232 for configuration)           Communication Interfaces         - 3         CANpoper (RS-232 for configuration)           Communication Interfaces         - 4         CANpoper (RS-232 for configuration)           Communication Interfaces         - 3         CANpoper (RS-232 for configuration)           Communication Methods         - 3         CANpoper (RS-232 for configuration), Over the Nativork, PWM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         - 3         Profit Current, Profite Velocity, Profite Position, Over the Nativork, PWM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         - 3         Profite Current, Profite Velocity, Profite Position, Over the Nativork, PWM and Direction, Sequencing, Indexing, Jogging           Motors Supported         - 3         Colosed Loop Vector, Single Phase (Brush	Maximum Continuous Output Current <sup>2</sup>	A (Arms)	7.5 (7.5)		
Internal Bus Capacitance         μF         20           Minimum Load inductance (Line-To-Line)**         μH         250           Maximum Output PVM Duty Cycle         %         100           Low Voltage Supply Outputs         %         100           Control Specifications           Voltage           Operation         Value           Command Sources         —         CANopen (RS-232 for configuration)           Command Sources         —         CANopen (RS-232 for configuration)           Command Sources         —         CANopen (RS-232 for configuration)           Command Sources         —         CAN popen (RS-232 for configuration)           Command Sources         —         CAN popen (RS-232 for configuration)           Command Sources         —         —         CAN popen (RS-232 for configuration)         —           Command Sources         —         —         CAN popen (RS-232 for configuration)         —         —         —         —           Command Sources         —         —         —         —         —         —         —         —         —         —         —         —         — <th< td=""><td>Maximum Continuous Output Power</td><td>W</td><td>1353.8</td></th<>	Maximum Continuous Output Power	W	1353.8		
Minimum Load Inductance (Line-To-Line)¹         µH         250           Switching Frequency         kHz         20           Switching Frequency         %Hz         100           Low Voltage Supply Outputs         5         4 5 VDC (250 mA)           Communication Interfaces         Units         Value           Communication Interfaces         CANopen (RS-322 for configuration)           Communication Interfaces         = 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDaté, Stegmann Hiperface®, Tachometer (10 VDC)           Feedback Supported         = 6         Sinusoidal           Communication Methods         = 6         Sinusoidal           Communication Methods         = 6         Sinusoidal           Motors Supported         = 6         Profite Current, Profile Velocity, Profile Position, Cyclic Synchronous Current Mode, Cyclic Synchronous Velocity Mode, Cyclic Synchronous Velocity Cyclic Synchronous Veloci	Maximum Power Dissipation at Continuous Current	W	71.3		
Switching Frequency         M±Z         20           Maximum Output PVM Duty Cycle         %         100           Low Vottage Supply Outputs         control Specifications           Description         Units         Value           Command Sources         -         4 5 VDC (250 mA)           Command Sources         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Command Sources         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Command Sources         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Command Sources         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Command Sources         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Modes of Operation         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Modes of Operation         -         4 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (±10 VDC)           Modes of Operation         -         4 10 VDC Position, Stephanne, Stegmann Hiperface®, Tachometer	Internal Bus Capacitance	μF	20		
Maximum Output PWM Duty Cycle         %         100           Low Voltage Supply Outputs         1 5 VDC (250 mA)           Description         Units         Value           Communication Interfaces         1 0 CANpen (RS-232 for configuration)           Command Sources         1 0 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Feedback Supported         1 0 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Feedback Supported         2 10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         2 1 10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         2 1 10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         2 2 1 10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         2 2 1 10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         4 1 10 V Analog, Encoder Following, Albertane Reposition, Availiary Incremental Encoder, Heiderhan Encoder,	Minimum Load Inductance (Line-To-Line)3	μH	250		
Low Voltage Supply Outputs         Control Specifications           Obsertiption         Control Specifications           Command Sources         5         CANOgen (RS-232 for configuration)           Command Sources         5         CANOgen (RS-232 for configuration)           Feedback Supported         40 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Feedback Supported         40 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Modes of Operation         2 - 0         Sinusoidal           Motors Supported         2 - 0         Sinusoidal           Motors Supported         2 - 0         Closed Loop Vector, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brusheds)           Motors Supported         2 - 0         Closed Loop Vector, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brusheds)           Motors Supported         2 - 0         Closed Loop Vector, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brusheds)           Programmable Analog Inputs/Outputs (PDIs/PDOs)         3 - 0         32           Programmable Analog Inputs/Outputs (PAIs/PAOs)         3 - 0         32           Value (Level         3 - 0         32         32           Value (Level         3 - 0         3 - 0         3 - 0 <t< td=""><td>Switching Frequency</td><td>kHz</td><td>20</td></t<>	Switching Frequency	kHz	20		
Description         Units         Value           Communication Interfaces         -         CANopen (RS-232 for configuration)           Command Sources         -         2.10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Feedback Supported         -         2.10 V Analog, Encoder Following, Over the Network, PVM and Direction, Sequencing, Indexing, Jogging           Communiation Methods         -         3. Invalidation (VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDate), Stegmann Hiperface®, Tachometer (£10 VDC)           Modes of Operation         -         8. Profile Current, Profile Velocity, Profile Position, Cycle Synchronous Current Mode, Cycle Synchronous Position Mode           Motors Supported         -         Closed Loop Vestor, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brushless)           Hardware Protection         -         Closed Loop Vestor, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brushless)           Hardware Protection         -         Closed Loop Vestor, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brushless)           Programmable Analog Inputs/Outputs (PDIs/PDOs)         -         4.0 Configurable Huncitions, Over Current, Cover Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage           Programmable Analog Inputs/Outputs (PDIs/PADA)         -         9. VTTL           Valench Land Land Land Land La	Maximum Output PWM Duty Cycle	%	100		
Obescription         Units         Value           Communication Interfaces         -         CANopen (RS-232 for configuration)           Command Sources         -         ±10 V Analog, Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexing, Jogging           Feedback Supported         ±10 VDC Position, Auxiliary Incremental Encoder, Heiderhain EnDatils, Stegmann Hiperfaces, Tachometer (±10 VDC)           Commutation Methods         -         Sinusoidal           Modes of Operation         -         Profile Current, Profile Velocity, Profile Position, Cyclic Synchronous Current Mode, Cyclic Synchronous Velocity           Motors Supported         -         Cisced Loop Vector, Single Phase (Brushed, Voice Coll, Inductive Load), Three Phase (Brushles)           Hardware Protection         -         Cisced Loop Vector, Single Phase (Brushed, Voice Coll, 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 Analog Inputs/Outputs (PDIs/PObs)         -         8/4           Programmable Analog Inputs/Outputs (PDIs/PObs)         -         8/4           Programmable Analog Inputs/Outputs (PDIs/PObs)         -         8/4           Value         -         5 VTL           Current Loop Sample Time         µs	Low Voltage Supply Outputs	-	+5 VDC (250 mA)		
Communication Interfaces         -         CANopen (RS-232 for configuration)           Command Sources         -         ± 10 V Analog. Encoder Following. Over the Network, PWM and Direction, Sequencing, Indexing, Jogging and 10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDatile, Stegmann Hiperfaces®, Tachometer (±10 VDC)           Commutation Methods         -         Sinusoidal           Modes of Operation         -         Profile Current, Profile Velocity, Profile Position, Cyclic Synchronous Current Mode, Cyclic Synchronous Velotity Mode, Cyclic Synchronous Position Mode           Motors Supported         -         Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushless)           Hardware Protection         -         Adv Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage           Programmable Digital Inputs/Outputs (PAIs/PAOs)         -         84           Value         -         84         100           Current Loop Sample Time         µs         100			Control Specifications		
Command Sources         ±10 V Analog, Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexing, Jogging           Feedback Supported         ±10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachemeter (±10 VDC)           Commutation Methods         -         Sinusoidal           Modes of Operation         -         Profile Current, Profile Velocity, Profile Position, Cyclic Synchronous Current Mode, Cyclic Synchronous Position Mode (by Cyclic Synchronous Current Mode (by Cyclic Synchronous Position Mode (by Cyclic Synchronous Current Mode (by Cyclic Synchronous Current Mode (by Cyclic Synchronous Current Mode (by Cyclic Synchronous Curren	Description	Units	Value		
Feedback Supported         x.10 VDC Position, Auxiliary Incremental Encoder, Heidenhain EnDat®, Stegmann Hiperface®, Tachometer (x10 VDC)           Commutation Methods         x. Sinusoidal           Modes of Operation         x. Sinusoidal           Motors Supported         x. Closed Loop Vector, Singh Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushes)           Hardware Protection         x. 40 + Configurable Functions, Over Emperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage           Programmable Digital Inputs/Outputs (PDIs/PDOs)         x. 84           Programmable Analog Inputs/Outputs (PAIs/PAOs)         x. 32           Primary I/O Logic Level         x. 55           Velocity Loop Sample Time         ys         100           Valocity Loop Sample Time         ys         100           Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         ys         5 (EC Isas A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         31.2.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)         40 - 85 (40 - 185)           Form Factor         Panel Mount           Cooling System         x         Natural Convecti	Communication Interfaces	-	CANopen (RS-232 for configuration)		
VDC    Commutation Methods	Command Sources	-	±10 V Analog, Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexing, Jogging		
Modes of Operation         Profile Current, Profile Position, Cyclic Synchronous Current Mode, Cyclic Synchronous Velocity Mode, Cyclic Synchronous Position Mode           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)         -         8/4           Programmable Analog Inputs/Outputs (PAIs/PAOs)         -         8/4           Primary I/O Logic Level         -         5 V TTL           Current Loop Sample Time         µs         100           Velocity Loop Sample Time         µs         100           Maximum Sin/Cos Incoder Frequency         kHz         200           Maximum Sin/Cos Incoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         Units         *** ** ** ** ** ** ** ** ** ** **           Description         Units         ** ** ** ** ** ** ** ** ** **           Agency Approvals         • ** ** ** ** ** ** ** ** ** ** **         Yalue           Size (H x w x)         mm (in)         13:2,5 x 99.5 x 35.9 (52 x 3.5 x 1.4)         ***           Weight         g (oz)         49.5 (17.5)	Feedback Supported	-			
Modes of Operation         - Image: Color of Color	Commutation Methods	-	Sinusoidal		
Hardware Protection         40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Inder Voltage           Programmable Digital Inputs/Outputs (PDIs/PDOs)         -         8/4           Programmable Analog Inputs/Outputs (PAIs/PAOs)         -         3/2           Primary I/O Logic Level         -         5 VT TL           Current Loop Sample Time         μs         50           Velocity Loop Sample Time         μs         100           Postion Loop Sample Time         μs         100           Maximum Sin/Cos Interpolation         ±b         200           Maximum Sin/Cos Interpolation         ±b         2048 counts per sin/cos cycle           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (c)         495 (17.5)           Heatsink (Base) Temperature Range         °C (°F)         -6 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         -         Natural Convection           Form Factor         -         Natural Convection           For Plant         -         Natural Convection </td <td>Modes of Operation</td> <td>-</td> <td></td>	Modes of Operation	-			
FlatOware Protection         (Phase-Phase & Phase-Ground), Under Voltage           Programmable Digital Inputs/Outputs (PDIs/PDOs)         -         8/4           Programmable Analog Inputs/Outputs (PAIs/PAOs)         -         3/2           Primary I/O Logic Level         -         5 V TTL           Current Loop Sample Time         μs         50           Velocity Loop Sample Time         μs         100           Position Loop Sample Time         μs         100           Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         -         2 v48 counts per sin/cos cycle           *** Protection Support Time           Description         *** Units         *** Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         13.25 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (7.5)           Heatsink (Base) Temperature Range*         "C (*F)         0 - 65 (32 - 149)           Storage Temperature Range         "C (*F)         40 - 85 (40 - 185)           Form Factor         -         Panel Mount           Cooling System         -         Natural Convection           I	Motors Supported	-	Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushless)		
Programmable Analog Inputs/Outputs (PAIs/PAOs)         -         3/2           Primary I/O Logic Level         -         5V TTL           Current Loop Sample Time         μs         100           Velocity Loop Sample Time         μs         100           Position Loop Sample Time         μs         100           Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         -         2048 counts per sin/cos cycle           ***********************************	Hardware Protection	-			
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 Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         -         2048 counts per sin/cos cycle           Merchanical Specifications           Description         Units         Value           Agency Approvals         -         C EC Class A (EMC), CE Class A (LVD), cUL, ROHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 · 149)           Storage Temperature Range         °C (°F)         40.68 (34 · 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         Natural Convection           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         15-pin, high-density, female D-sub           I/O Connector	Programmable Digital Inputs/Outputs (PDIs/PDOs)	-	8/4		
Current Loop Sample Time         μs         50           Velocity Loop Sample Time         μs         100           Position Loop Sample Time         μs         100           Maximum Sin/Cos Encoder Frequency         kHz         200           Mechanical Specifications           Value           Description         Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         Natural Convection           IP Rating         -         Spielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         Spielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	3/2		
Velocity Loop Sample Time         µs         100           Position Loop Sample Time         µs         100           Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         -         2048 counts per sin/cos cycle           Web Thatical Specifications           Description         Units         Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         -         Panel Mount           Colling System         -         Natural Convection           IP Rating         -         Natural Convection           IP Rating         -         Natural Convection           AUX COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         15-pin, high-density, female D-sub </td <td>Primary I/O Logic Level</td> <td>-</td> <td>5V TTL</td>	Primary I/O Logic Level	-	5V TTL		
Position Loop Sample Time         μs         100           Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         -         2048 counts per sin/cos cycle           Wethanical Specifications           Units         Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range¹         °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         Natural Convection           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Current Loop Sample Time	μs	50		
Maximum Sin/Cos Encoder Frequency         kHz         200           Maximum Sin/Cos Interpolation         -         2048 counts per sin/cos cycle           Merbanical Specifications           Description         Value           Agency Approvals         C E Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         Natural Convection           IP Rating         -         Natural Convection           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         3-pin, high-density, female D-sub           I/O Connector         -         46-pin, high-density, female D-sub	Velocity Loop Sample Time	μs	100		
Maximum Sin/Cos Interpolation         -         2048 counts per sin/cos cycle           Mechanical Specifications           Description         Units         Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (c²)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         - 40 - 85 (-40 - 185)           Form Factor         - Panel Mount           Cooling System         - Natural Convection           IP 10           AUX COMM Connector         - IP10           AUX COMM Connector         - Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         - Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         - Shielded, dual RJ-45 socket with LEDs           - VO Connector         - Shielded, dual RJ-45 socket w	Position Loop Sample Time	μs	100		
Mechanical Specifications           Units         Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range⁴         °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Maximum Sin/Cos Encoder Frequency	kHz	200		
Description         Units         Value           Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         IP10           AUX COMM Connector         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Maximum Sin/Cos Interpolation	-	2048 counts per sin/cos cycle		
Agency Approvals         -         CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL           Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub		r	Mechanical Specifications		
Size (H x W x D)         mm (in)         132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)           Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Description	Units	Value		
Weight         g (oz)         495 (17.5)           Heatsink (Base) Temperature Range <sup>4</sup> °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Agency Approvals	-	CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL		
Heatsink (Base) Temperature Range⁴         °C (°F)         0 - 65 (32 - 149)           Storage Temperature Range         °C (°F)         -40 - 85 (-40 - 185)           Form Factor         -         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Size (H x W x D)	mm (in)	132.5 x 89.5 x 35.9 (5.2 x 3.5 x 1.4)		
Storage Temperature Range       °C (°F)       -40 - 85 (-40 - 185)         Form Factor       -       Panel Mount         Cooling System       -       Natural Convection         IP Rating       -       IP10         AUX COMM Connector       -       3-pin, 2.5 mm spaced, enclosed, friction lock header         COMM Connector       -       Shielded, dual RJ-45 socket with LEDs         FEEDBACK Connector       15-pin, high-density, female D-sub         I/O Connector       26-pin, high-density, female D-sub	Weight	g (oz)	495 (17.5)		
Form Factor         -         Panel Mount           Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Heatsink (Base) Temperature Range <sup>4</sup>	°C (°F)	0 - 65 (32 - 149)		
Cooling System         -         Natural Convection           IP Rating         -         IP10           AUX COMM Connector         -         3-pin, 2.5 mm spaced, enclosed, friction lock header           COMM Connector         -         Shielded, dual RJ-45 socket with LEDs           FEEDBACK Connector         -         15-pin, high-density, female D-sub           I/O Connector         -         26-pin, high-density, female D-sub	Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)		
IP Rating - IP10 AUX COMM Connector - 3-pin, 2.5 mm spaced, enclosed, friction lock header COMM Connector - Shielded, dual RJ-45 socket with LEDs FEEDBACK Connector - 15-pin, high-density, female D-sub I/O Connector - 26-pin, high-density, female D-sub	Form Factor	-	Panel Mount		
AUX COMM Connector - 3-pin, 2.5 mm spaced, enclosed, friction lock header  COMM Connector - Shielded, dual RJ-45 socket with LEDs  FEEDBACK Connector - 15-pin, high-density, female D-sub  I/O Connector - 26-pin, high-density, female D-sub	Cooling System	-	Natural Convection		
COMM Connector - Shielded, dual RJ-45 socket with LEDs  FEEDBACK Connector - 15-pin, high-density, female D-sub  I/O Connector - 26-pin, high-density, female D-sub	IP Rating	-	IP10		
FEEDBACK Connector - 15-pin, high-density, female D-sub 1/O Connector - 26-pin, high-density, female D-sub	AUX COMM Connector	-	3-pin, 2.5 mm spaced, enclosed, friction lock header		
I/O Connector - 26-pin, high-density, female D-sub	COMM Connector	-	- Shielded, dual RJ-45 socket with LEDs		
I/O Connector - 26-pin, high-density, female D-sub	FEEDBACK Connector	-	- 15-pin, high-density, female D-sub		
POWER Connector - 6-pin, 3.96 mm spaced, friction lock header	I/O Connector	-			
	POWER Connector	-	6-pin, 3.96 mm spaced, friction lock 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<sub>rms</sub> value attainable when RMS Charge-Based Limiting is used. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements. 1.
- 2. 3.
- Additional cooling and/or heatsink may be required to achieve rated performance.



# **PIN FUNCTIONS**

	AUX COMM - RS232 Communication Connector			
Pin	Name	Description / Notes	1/0	
1	RS232 RX	Receive Line (RS-232)	I	
2	RS232 TX	Transmit Line (RS-232)	0	
3	ISO GND	Isolated Signal Ground	IGND	

	COMM - CAN Communication Connector			
Pin	Name	Description / Notes	1/0	
1	CAN_H	CAN_H Line (Dominant High)	I	
2	CAN_L	CAN _L Line (Dominant Low)	I	
3	CAN_GND	CAN Ground	CGND	
4	RESERVED	Reserved	-	
5	RESERVED	Reserved	-	
6	RESERVED	Reserved	-	
7	CAN_GND	CAN Ground	CGND	
8	RESERVED	Reserved	-	

		FEEDBACK - Feedback Connector	
Pin	Name	Description / Notes	1/0
1	COS+	Cosine Input	I
2	COS -	Cosille iliput	I
3	SIN +	Sine Input	I
4	SIN -	Sine input	I
5	SGN GND	Signal Ground	SGND
6	DATA-	Differential Data Line	I/O
7	DATA+	Dillerential Data Line	I/O
8	CLOCK+	Differential Clock Line	0
9	CLOCK-	Differential Clock Line	0
10	REF MARK +	Reference mark from sine/cosine encoder	I
11	RESERVED	Reserved	-
12	RESERVED	Reserved	-
13	+5V OUT	+5V Encoder Supply Output (Short Circuit Protected)	0
14	PAI-3	Programmable Analog Input (12-bit Resolution)	I
15	REF MARK -	Reference mark from sine/cosine encoder	1

Status:

Active



		I/O - Signal Connector	
Pin	Name	Description / Notes	1/0
1	PDO-1	Programmable Digital Output	0
2	SGN GND	Signal Ground	SGND
3	PDO-2	Programmable Digital Output	0
4	PAI-1 + (REF+)	D''' 6 1 D 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1
5	PAI-1 - (REF-)	Differential Programmable Analog Input or Reference Signal Input (16-bit Resolution)	1
6	PAI-2	Programmable Analog Input (12-bit Resolution)	- 1
7	PAO-1	Programmable Analog Output (10-bit Resolution)	0
8	PAO-2	Programmable Analog Output (10-bit Resolution)	0
9	PDI-8 - (DIR- / AUX ENC B- / CAP-C-)	Programmable Digital Input or Direction or Auxiliary Encoder or High Speed Capture (Leave Open for Single-Ended Signal)	1
10	PDO-3	Programmable Digital Output	0
11	PDI-1	Programmable Digital Input	I
12	PDI-2	Programmable Digital Input	I
13	PDI-3	Programmable Digital Input	I
14	PDO-4	Programmable Digital Output	0
15	+5V OUT	+5V Encoder Supply Output (Short Circuit Protected)	0
16	SGN GND	Signal Ground	SGND
17	PDI-7 + (PWM + / AUX ENC A+ / CAP- B+)	Programmable Digital Input or PWM or Auxiliary Encoder or High Speed Capture	ı
18	PDI-8 + (DIR+ / AUX ENC B+ / CAP-C+)	Programmable Digital Input or Direction or Auxiliary Encoder or High Speed Capture	I
19	PDI-4 (CAP-A)	Programmable Digital Input or High Speed Capture	I
20	PDI-5	Programmable Digital Input	I
21	PDI-6	Programmable Digital Input	I
22	SGN GND	Signal Ground	SGND
23	RESERVED	Reserved	-
24	RESERVED	Reserved	-
25	RESERVED	Reserved	-
26	PDI-7 - (PWM- / AUX ENC A- / CAP-B-)	Programmable Digital Input or PWM or Auxiliary Encoder or High Speed Capture (Leave Open for Single-Ended Signals)	ı

	POWER - Power Connector			
Pin	Name	Description / Notes	1/0	
1	MOTOR A	Motor Phase A	0	
2	MOTOR B	Motor Phase B	0	
3	MOTOR C	Motor Phase C	0	
4	HIGH VOLTAGE	DC Power Input	I	
5	PWR GND	Power Ground (Common With Signal Ground)	PGND	
6	LOGIC PWR	Logic Supply Input	I	



## HARDWARE SETTINGS

## **Switch Functions**

Switch	Description	Setting	
Switch	Description	On	Off
1	Bit 0 of binary CANopen node ID. Does not affect RS-232 settings.	1	0
2	Bit 1 of binary CANopen node ID. Does not affect RS-232 settings.	1	0
3	Bit 2 of binary CANopen node ID. Does not affect RS-232 settings.	1	0
4	Bit 3 of binary CANopen node ID. Does not affect RS-232 settings.	1	0
5	Bit 4 of binary CANopen node ID. Does not affect RS-232 settings.	1	0
6	Bit 5 of binary CANopen node ID. Does not affect RS-232 settings.	1	0
7	Bit 0 of drive CANopen bit rate setting. Does not affect RS-232 settings.	1	0
8	Bit 1 of drive CANopen bit rate setting. Does not affect RS-232 settings.	1	0

# Additional Details

The drive can be configured to use the address and/or bit rate stored in non-volatile memory by setting the address and/or bit rate value to 0. Use the table below to map actual bit rates to a bit rate setting.

Bit Rate (kbits/sec)	Value For Bit Rate Setting
Load from non-volatile memory	0
500	1
250	2
125	3

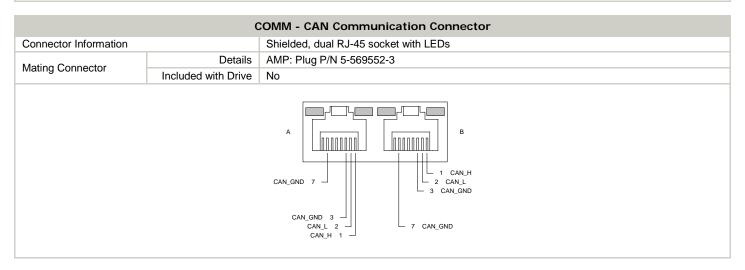
# **Jumper Settings**

Jumper	Description		Configuration	
	Header Jumper	Not Installed	Pins 1-2	Pins 2-3
J1	CAN bus termination. Install this jumper (2.54mm) on the last drive in a CAN network. This jumper is located on a 4-pin header adjacent to the RS-232 connector. It consists of the two pins furthest from the connector.	Non- terminating Node	Terminating Node	N/A
J2	Reserved.	-	-	N/A



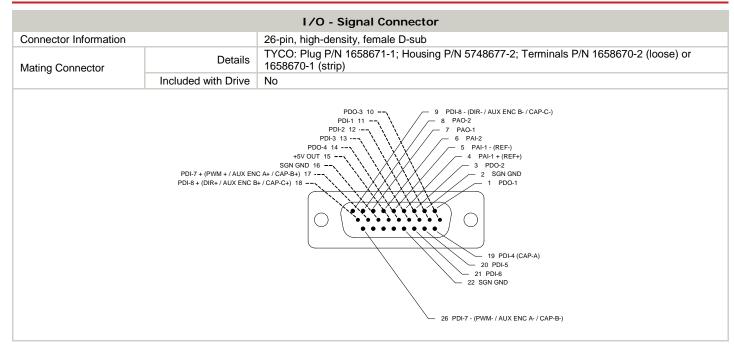
# **MECHANICAL INFORMATION**

	AUX	COMM - RS232 Communication Connector
Connector Information		3-pin, 2.5 mm spaced, enclosed, friction lock header
Matina Compostor	Details	Phoenix: Plug P/N 1881338
Mating Connector	Included with Drive	Yes
3 ISO GND 2 RS232 TX 1 RS232 RX		



		FEEDBACK - Feedback Connector
Connector Information		15-pin, high-density, female D-sub
Mating Connector	Details	TYCO: Plug P/N 748364-1; Housing P/N 5748677-1; Terminals P/N 1658670-2 (loose) or 1658670-1 (strip)
	Included with Drive	No
		DATA- 6 5 SGN GND DATA- 7 4 SIN- CLOCK- 8 2 COS- REF MARK + 10 1 COS+  13 +5V OUT 14 PAI-3 15 REF MARK -

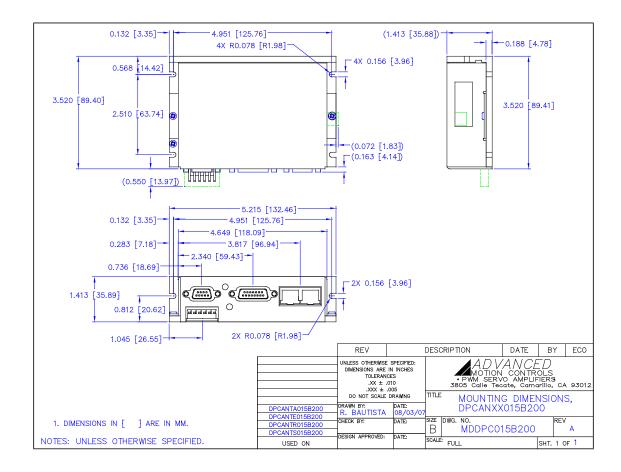




POWER - Power Connector		
Connector Information		6-pin, 3.96 mm spaced, friction lock header
Mating Connector	Details	AMP: Plug P/N 770849-6; Terminals P/N 770522-1 (loose) or 770476-1 (strip)
	Included with Drive	Yes
6 LOGIC PWR  5 PWR GND  4 HIGH VOLTAGE  3 MOTOR C  2 MOTOR B  1 MOTOR A		

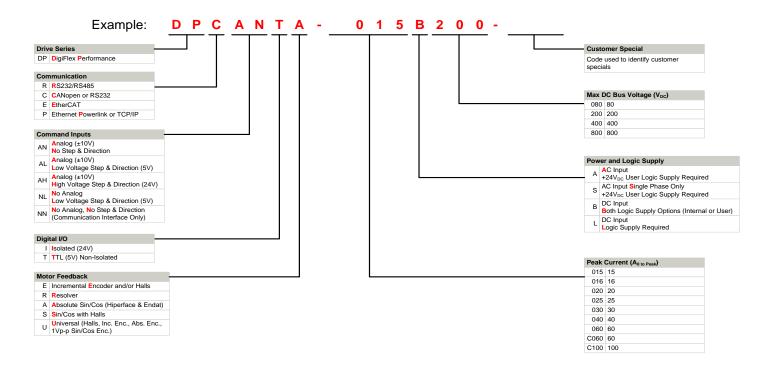


## MOUNTING DIMENSIONS





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

### **Examples of Customized Products**

- Optimized Footprint
- ▲ Private Label Software
- OEM Specified Connectors
- ▲ No Outer Case
- ▲ Increased Current Resolution
- ▲ Increased Temperature Range
- Custom Control Interface
- ▲ Integrated System I/O

- ✓ Tailored Project File
- ▲ Silkscreen Branding
- ▲ Optimized Base Plate
- ✓ Increased Current Limits
- ▲ Increased Voltage Range
- ▲ Conformal Coating
- ▲ Multi-Axis Configurations
- ▲ Reduced Profile Size and Weight

## **Available Accessories**

ADVANCED Motion Controls offers a variety of accessories designed to facilitate drive integration into a servo system. Visit www.a-m-c.com 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 in this document.