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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 command source can be generated internally or can be supplied externally. 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 single RS-232/RS-485 interface used for drive configuration and setup. Drive commissioning is accomplished using DriveWare, available at www.a-m-c.com.

All drive and motor parameters are stored in nonvolatile memory.

Power Range	
Peak Current	16 A (11.3 A _{RMS})
Continuous Current	8 A (5.7 A _{RMS})
Supply Voltage	20 - 80 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

MODES OF OPERATION

- Current
- Position
- Velocity
- Hall Velocity

COMMAND SOURCE

- ±10 V Analog
- 5V Step and Direction
- **Encoder Following**
- Over the Network

FEEDBACK SUPPORTED

- Halls
- Incremental Encoder
- ±10 VDC Position
- Auxiliary Incremental Encoder
- Tachometer (±10 VDC)

INPUTS/OUTPUTS

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

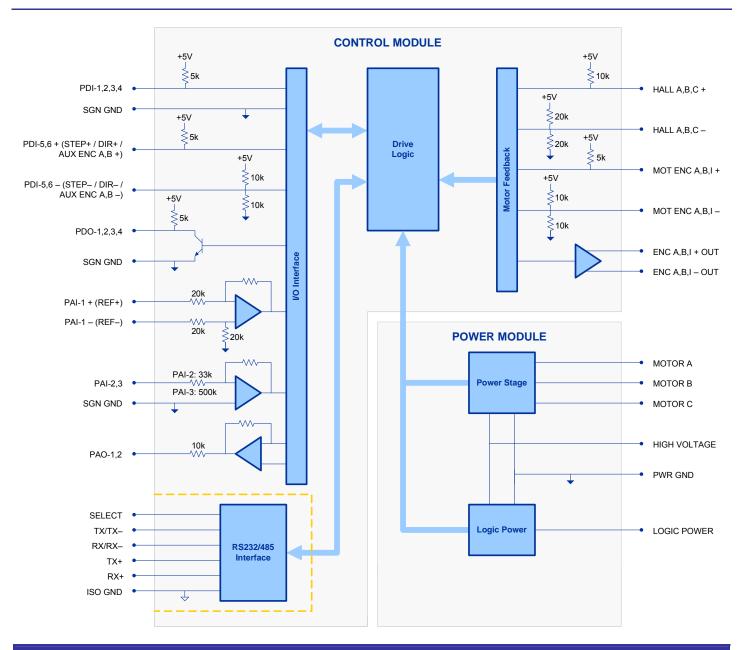
COMPLIANCES & AGENCY APPROVALS

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





BLOCK DIAGRAM



Information on Approvals and Compliances



Compliant with European CE for both the Class A EMC Directive 89/336/EEC on Electromagnetic Compatibility (specifically EN 61000-6-4:2001, EN 61000-6-2:2001, EN 61000-3-2:2000, and EN 61000-3-3:1995/A1:2001) and LVD requirements of directive 73/23/EEC (specifically EN 60204-1), 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

	Power S	pecifications	
Description	Units	Value	
DC Supply Voltage Range	VDC	20 - 80	
DC Bus Over Voltage Limit	VDC	89	
DC Bus Under Voltage Limit	VDC	17.5	
Logic Supply Voltage	VDC	20 - 80	
Maximum Peak Output Current	A (Arms)	16 (11.3)	
Maximum Continuous Output Current	A (Arms)	8 (5.7)	
Maximum Continuous Output Power	W	608	
Maximum Power Dissipation at Continuous Current	W	32	
Internal Bus Capacitance	μF	66	
Minimum Load Inductance (Line-To-Line) ¹	μH	250	
Switching Frequency	kHz	20	
Low Voltage Supply Outputs	-	+5 VDC (250 mA)	
	Control S	Specifications	
Description	Units	Value	
Communication Interfaces	-	RS-485/232	
Command Sources	-	±10 V Analog, 5V Step and Direction, Encoder Following, Over the Network	
Feedback Supported	-	±10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder, Tachometer (±10 VDC)	
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	-	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)	-	6/4	
Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	3/2	
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)	
	Mechanica	I Specifications	
Description	Units	Value	
Agency Approvals	-	CE Class A (EMC), CE Class A (LVD), RoHS	
Size (H x W x D)	mm (in)	127 x 79.9 x 36.5 (5 x 3.1 x 1.4)	
Weight	g (oz)	401 (14.1)	
Heatsink (Base) Temperature Range ²	°C (°F)	0 - 65 (32 - 149)	
Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)	
Cooling System	-	Natural Convection	
Form Factor	-	Panel Mount	
IP Rating	-	IP10	
COMM Connector	-	9-pin, female D-sub	
FEEDBACK Connector	-	15-pin, high-density, female D-sub	
I/O Connector	-	26-pin, high-density, female D-sub	
POWER Connector	-	6-pin, 3.96 mm spaced, friction lock header	

Notes

- Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements. Additional cooling and/or heatsink may be required to achieve rated performance.





PIN FUNCTIONS

	COMM - RS232/RS485 Communication Connector				
Pin	Name	Description / Notes	1/0		
1	SELECT	RS232/485 selection. Pull to ground (CN1-5) for RS485.	I		
2	RS232 TX / RS485 TX-	Transmit Line (RS-232 or RS-485)	0		
3	RS232 RX / RS485 RX-	Receive Line (RS-232 or RS-485)	I		
4	RESERVED	Reserved	-		
5	ISO GND	Isolated Signal Ground	IGND		
6	RS485 TX+	Transmit Line (RS-485)	0		
7	RESERVED	Reserved	-		
8	RS485 RX+	Receive Line (RS-485)	I		
9	RESERVED	Reserved	-		

FEEDBACK - Feedback Connector			
Pin	Name	Description / Notes	1/0
1	HALL A+		I
2	HALL B+	Commutation Sensor Inputs	I
3	HALL C+		I
4	MOT ENC A+	Differential Encoder A Channel Input (For Single Ended Signals Use Only The Positive	I
5	MOT ENC A-	Input)	I
6	MOT ENC B+	Differential Encoder B Channel Input (For Single Ended Signals Use Only The Positive	I
7	MOT ENC B-	Input)	I
8	MOT ENC I+	Differential Encoder Index Input (For Single Ended Signals Use Only The Positive Input)	
9	MOT ENC I-	Differential Encoder flidex input (For Single Ended Signals use Only The Positive Input)	I
10	HALL A-	Commutation Sensor Input (For Differential Signals Only)	I
11	HALL B-	Commutation Sensor Input (For Differential Signals Only)	I
12	SGN GND	Signal Ground	SGND
13	+5V OUT	+5V Encoder Supply Output (Short Circuit Protected)	0
14	PAI-3	Programmable Analog Input (12-bit Resolution)	I
15	HALL C-	Commutation Sensor Input (For Differential Signals Only)	I

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+)	Differential Programmable Analog Input or Reference Signal Input (16-bit Resolution)	I
5	PAI-1 - (REF-)	Differential Programmable Arialog input of Neterlefice Signal input (10-bit Nesolution)	I
6	PAI-2	Programmable Analog Input (12-bit Resolution)	I
7	PAO-1	Programmable Analog Output (10-bit Resolution)	0
8	PAO-2	Programmable Analog Output (10-bit Resolution)	0
9	PDI-6 - (DIR- / AUX ENC B-)	Programmable Digital Input or Direction- or Auxiliary Encoder (For Differential Signals Only)	I
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-5 + (STEP+ / AUX ENC A+)	Programmable Digital Input or Step+ or Auxiliary Encoder	I
18	PDI-6 + (DIR+ / AUX ENC B+)	Programmable Digital Input or Direction+ or Auxiliary Encoder	I
19	PDI-4	Programmable Digital Input	I
20	ENC A+ OUT	Buffered Encoder Channel A Output	0
21	ENC A- OUT	Bulleted Effooder Chairner A Output	0
22	ENC B+ OUT	Buffered Encoder Channel B Output	0
23	ENC B- OUT	Bulleted Encoder Chaillet & Output	0
24	ENC I+ OUT	Buffered Encoder Index Output	0
25	ENC I- OUT	Buriered Encoder Index Output	
26	PDI-5 - (STEP- / AUX ENC A-)	Programmable Digital Input or Step- or Auxiliary Encoder (For Differential Signals Only)	I





	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 RS-485 drive address. Does not affect RS-232 settings.	1	0
2	Bit 1 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0
3	Bit 2 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0
4	Bit 3 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0
5	Bit 4 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0
6	Bit 5 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0
7	Bit 0 of drive RS-485 baud rate setting. Does not affect RS-232 settings.	1	0
8	Bit 1 of drive RS-485 baud 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.

Baud Rate (kbps)	Value For Bit Rate Setting
Load from non-volatile memory	0
9.6	1
38.4	2
115.2	3





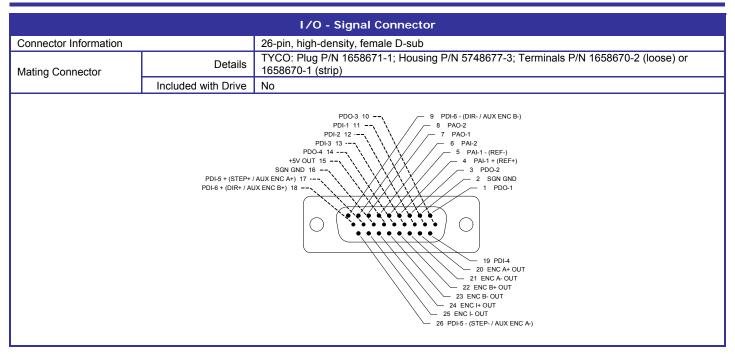
MECHANICAL INFORMATION

COMM - RS232/RS485 Communication Connector		
Connector Information	Connector Information 9-pin, female D-sub	
Mating Connector	Details	TYCO: Plug P/N 205204-4; Housing P/N 5748677-1; Terminals P/N 1658540-5 (loose) or 1658540-4 (strip)
-	Included with Drive	No
		5 ISO GND 3 RS232 RX / RS485 RX- 2 RS232 TX / RS485 TX- 1 SELECT 6 RS485 TX+ 8 RS485 RX+

FEEDBACK - Feedback Connector			
Connector Information	Connector Information 15-pin, high-density, female D-sub		
Mating Connector Details		TYCO: Plug P/N 748364-1; Housing P/N 5748677-2; Terminals P/N 1658670-2 (loose) or 1658670-1 (strip)	
	Included with Drive	No	
		MOT ENC B+ 6 5 MOT ENC A- MOT ENC B+ 8 4 MOT ENC A+ MOT ENC F 9 2 HALL B+ HALL A- 10 12 SGN GND 13 +5V OUT 14 PAI-3 15 HALL C-	





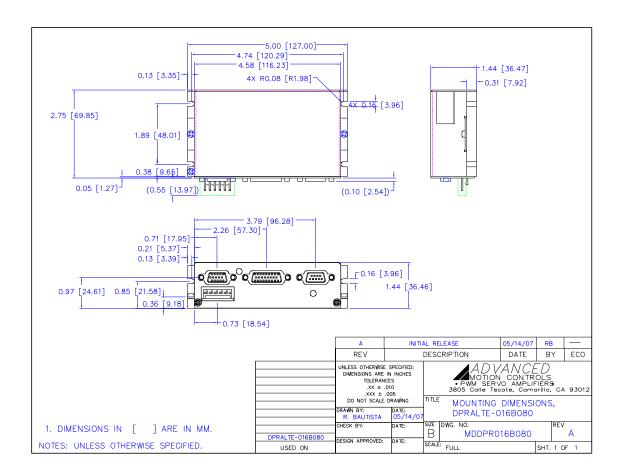


POWER - Power Connector		
Connector Information 6-pin, 3.96 mm spaced, friction lock header		
Mating Connector	Details	AMP: Plug P/N 770849-6; Terminals P/N 770522-1 (loose) or 770476-1 (strip)
Mating Connector	Included with Drive Yes	
	6 LOGIC PWR 5 PWR GND 4 HIGH VOLTAGE 3 MOTOR C 2 MOTOR B 1 MOTOR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





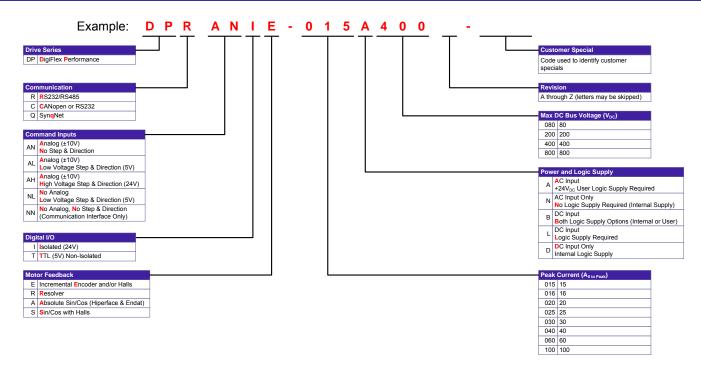
MOUNTING DIMENSIONS







PART NUMBERING INFORMATION



DigiFlex® Performance™ series of products are available in many configurations. 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 guickturn 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.

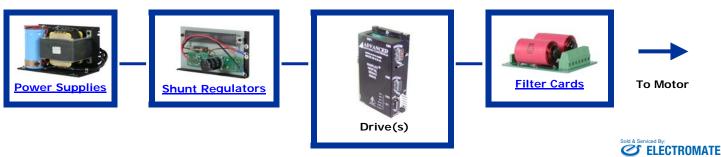
Examples of Customized Products

- Optimized Footprint
- Private Label Software
- **OEM Specified Connectors**
- No Outer Case 4
- 4 **Increased Current Resolution**
- Increased Temperature Range
- **Custom Control Interface**
- Integrated System I/O

- Tailored Project File
- Silkscreen Branding
- Optimized Base Plate
- **Increased Current Limits** 1
- Increased Voltage Range 4
- Conformal Coating 4
- 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.



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