

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 single RS-232/RS-485 interface used 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	100 A (70.7 A _{RMS})
Continuous Current	50 A (35.4 A _{RMS})
Supply Voltage	200 - 240 VAC



Features

- ▲ Four Quadrant Regenerative Operation
- Space Vector Modulation (SVM) Technology
- ✓ Fully Digital State-of-the-art Design
- 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
- Built-in brake/shunt regulator
- On-the-Fly Mode Switching
- On-the-Fly Gain Set Switching

MODES OF OPERATION

- Current
- Position
- Velocity
- Hall Velocity

COMMAND SOURCE

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

FEEDBACK SUPPORTED

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

INPUTS/OUTPUTS

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

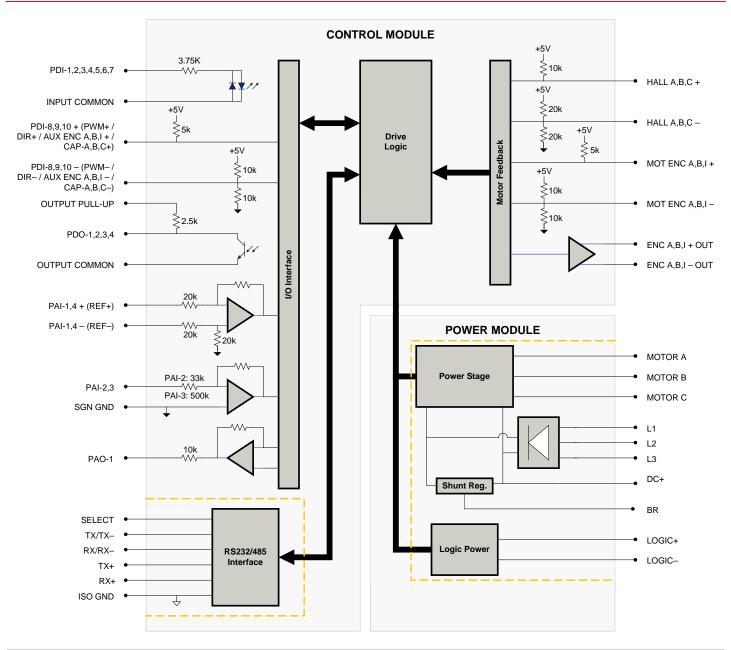
COMPLIANCES & AGENCY APPROVALS

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





BLOCK DIAGRAM



	Information on Approvals and Compliances			
US and Canadian safety compliance with UL 508c, the industrial standard for power conversion electronics. registered under file number E140173. Note that machine components compliant with UL are considered U 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 Compatibe (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	RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.			





SPECIFICATIONS

		pecifications	
Description	Units	Value	
Rated Voltage	VAC (VDC)	240 (339)	
AC Supply Voltage Range	VAC	200 - 240	
AC Supply Minimum	VAC	180	
AC Supply Maximum	VAC	264	
AC Input Phases ¹	-	3	
AC Supply Frequency	Hz	50 - 60	
DC Supply Voltage Range ²	VDC	255 - 373	
DC Bus Over Voltage Limit	VDC	429	
DC Bus Under Voltage Limit	VDC	205	
Logic Supply Voltage	VDC	20 - 30 (@ 850 mA)	
Maximum Peak Output Current ³	A (Arms)	100 (70.7)	
Maximum Continuous Output Current	A (Arms)	50 (35.4)	
Max. Continuous Output Power @ Rated Voltage4	W	11400	
Max. Continuous Power Dissipation @ Rated Voltage	W	600	
Internal Bus Capacitance	μF	1500	
External Shunt Resistor Minimum Resistance ⁵	Ω	10	
Minimum Load Inductance (Line-To-Line)6	μH	600	
Switching Frequency	kHz	16	
Maximum Output PWM Duty Cycle	%	100	
Low Voltage Supply Outputs	-	+5 VDC (250 mA)	
	Control S	Specifications	
Description	Units	Value	
Communication Interfaces	-	RS-485/232	
Command Sources	-	±10 V Analog, Encoder Following, Over the Network, PWM and Direction, Indexing, Jogging	
		±10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder, Tachometer (±10	
Feedback Supported	-	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)	-	10/4	
Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	4/1	
Primary I/O Logic Level	-	24 VDC	
Current Loop Sample Time	μs	62.5	
Velocity Loop Sample Time	μs	125	
Position Loop Sample Time	μs	125	
Maximum Encoder Frequency	MHz	20 (5 pre-quadrature)	
Internal Shunt Regulator	-	Yes	
Internal Shunt Resistor	-	No	
	Mechanica	I 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)	272.8 x 230.4 x 149.4 (10.7 x 9.1 x 5.9)	
Weight	g (oz)	5500 (194)	
Heatsink (Base) Temperature Range ⁷	°C (°F)	0 - 75 (32 - 167)	
Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)	
Form Factor	-	Panel Mount	
Cooling System		Forced Convection	
IP Rating	-	IP10	
AUX ENCODER Connector	-	15-pin, high-density, male D-sub	
BRAKE/LOGIC Connector	-	4-contact, 13 mm spaced, dual-barrier terminal block	
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	
MOTOR POWER Connector	-	4-contact, 13 mm spaced, dual-barrier terminal block	
POWER Connector	-	4-contact, 13 mm spaced, dual-barrier terminal block	

Notes

- Can operate on single-phase VAC if peak/cont. current ratings are reduced by at least 30%.

 DC Supply operation will reduce peak/cont. current ratings by at least 30%.

 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.

 P = (DC Rated Voltage) * (Cont. RMS Current) * 0.95.
- ADVANCED Motion Controls recommends using an external fuse in series with the the shunt resistor. A 3 amp motor delay fuse is typical.
- 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

AUX ENCODER - Auxiliary Feedback Connector			
Pin	Name	Description / Notes	1/0
1	RESERVED	Reserved	-
2	RESERVED	Reserved	-
3	RESERVED	Reserved	-
4	PDI-8 + (PWM+ / AUX ENC A+ / CAP-B+)	Programmable Digital Input or PWM or Auxiliary Encoder or High Speed Capture (For	I
5	PDI-8 - (PWM- / AUX ENC A- / CAP-B-)	Single-Ended Signals Leave Negative Terminal Open)	I
6	PDI-9 + (DIR+ / AUX ENC B+ / CAP-C+)	Programmable Digital Input or Direction Input or Auxiliary Encoder or High Speed Capture (For Single-Ended Signals Leave Negative Terminal Open)	
7	PDI-9 - (DIR- / AUX ENC B- / CAP-C-)		
8	PDI-10 + (AUX ENC I+ / CAP-A+)	Programmable Digital Input or Auxiliary Encoder or High Speed Capture (For Single-Ended	I
9	PDI-10 - (AUX ENC I- / CAP-A-)	Signals Leave Negative Terminal Open)	I
10	SGN GND	Signal Ground	SGND
11	SGN GND	Signal Ground	SGND
12	SGN GND	Signal Ground	SGND
13	+5V OUT	+5V Encoder Supply Output (Short Circuit Protected)	0
14	PAI-4 +	Differential Programmable Analog Input (12-bit Resolution)	
15	PAI-4 -		

	BRAKE/LOGIC - Logic Power Connector			
Pin	Name	Description / Notes	1/0	
1	LOGIC GND	Logic Supply Ground	GND	
2	LOGIC PWR	Logic Supply Input	I	
3	3 BR External Brake Resistor Connection -		-	
4	4 DC+ Brake Resistor DC+. Connection for brake resistor. O		0	

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)	1
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)	1
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 Input)	
7	MOT ENC B-		
8	MOT ENC I+	Differential Encoder Index Input (For Single Ended Signals Use Only The Positive Input)	
9	MOT ENC I-	Differential Encoder findex input (For Single Ended Signals ose 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

Sold & Serviced By:

ELECTROMATE

Toll Free Phone (877) SERV098

Top age aw 48 of SERV099

www.electromate.com
sales@electromate.com

Release Date: Revision: 2/11/2013 2.02



I/O - Signal Connector			
Pin	Name	Description / Notes	1/0
1	PDO-1	Isolated Programmable Digital Output	0
2	OUTPUT COMMON	Digital Output Common	OGND
3	PDO-2	Isolated Programmable Digital Output	0
4	PAI-1 + (REF+)	Differential Drogrammable Angles Input or Deference Cignal Input (46 hit Decelution)	I
5	PAI-1 - (REF-)	Differential Programmable Analog Input or Reference Signal Input (16-bit Resolution)	I
6	PAI-2	Programmable Analog Input (12-bit Resolution)	I
7	PAO-1	Programmable Analog Output (10-bit Resolution)	0
8	OUTPUT PULL-UP	Digital Output Pull-Up For User Outputs	I
9	PDI-5	Isolated Programmable Digital Input	I
10	PDO-3	Isolated Programmable Digital Output	0
11	PDI-1	Isolated Programmable Digital Input	I
12	PDI-2	Isolated Programmable Digital Input	I
13	PDI-3	Isolated Programmable Digital Input	I
14	PDO-4	Isolated Programmable Digital Output	0
15	INPUT COMMON	Digital Input Common (Can Be Used To Pull-Up Digital Inputs)	IGND
16	SGN GND	Signal Ground	SGND
17	PDI-4	Isolated Programmable Digital Input	I
18	PDI-6	Isolated Programmable Digital Input	1
19	PDI-7	Isolated Programmable Digital Input	1
20	ENC A+ OUT	Duffered Enceder Channel A Quitaut	0
21	ENC A- OUT	Buffered Encoder Channel A Output	0
22	ENC B+ OUT	Puffered Encoder Channel P. Outnut	0
23	ENC B- OUT	Buffered Encoder Channel B Output	
24	ENC I+ OUT	Duffered Freeder Index Outrut	0
25	ENC I- OUT	Buffered Encoder Index Output	
26	SGN GND	Signal Ground	SGND

	MOTOR POWER - Motor Power Connector			
Pin	Name	Description / Notes	1/0	
1	SHIELD	Motor cable shield. Internally connected to protective earth ground.	-	
2	MOTOR POWER U	Motor Phase U	0	
3	MOTOR POWER V	Motor Phase V	0	
4	MOTOR POWER W	Motor Phase W	0	

	POWER - AC Power Connector			
Pin	Name	Description / Notes	1/0	
1	L1		I	
2	L2	AC Supply Input (Three Phase)	I	
3	L3		I	
4	PE	Protective Earth Ground	-	

Sold & Serviced By:

ELECTROMATE

Toll Free Phone (877) SERVO98

Top are Exp 38 of SERVO99

www.electromate.com
sales@electromate.com



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.

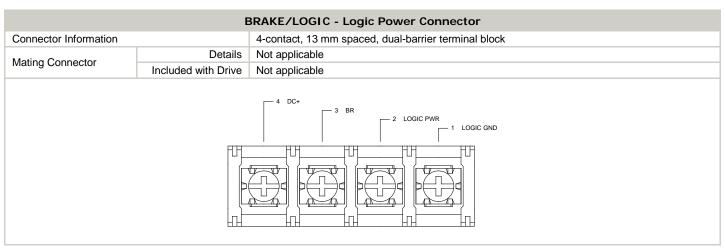
Baud Rate (kbps)	Value For Bit Rate Setting
Load from non-volatile memory	0
9.6	1
38.4	2
115.2	3





MECHANICAL INFORMATION

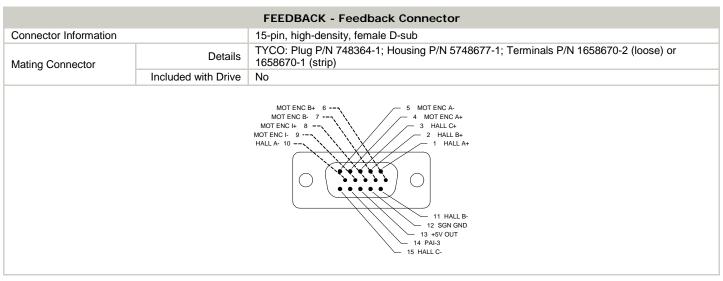
AUX ENCODER - Auxiliary Feedback Connector					
Connector Information		15-pin, high-density, male D-sub			
Mating Connector	Details	TYCO: Plug P/N 1658681-1; Housing P/N 5748677-1; Terminals P/N 1658686-2 (loose) or 1658686-1 (strip)			
	Included with Drive	No			
SGN GND 10 PDI-10 - (AUX ENC I- / CAP-A+) 9 PDI-9 - (DIR- / AUX ENC I- / CAP-A+) 8 PDI-9 + (DIR+ / AUX ENC B- / CAP-C+) 6 15 PAI-4 14 PAI-4 15 PAI-4 15 SGN GND 11 SGN GND 11 SGN GND					

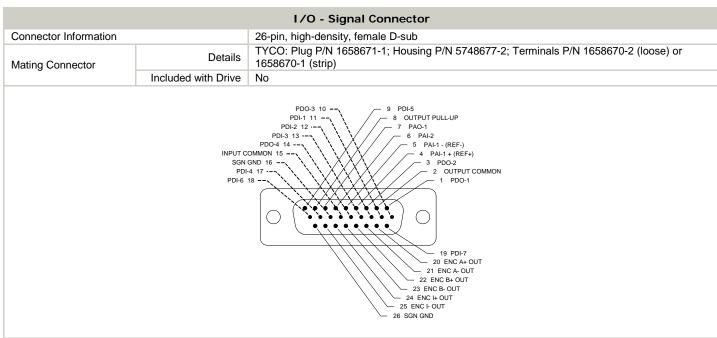


COMM - RS232/RS485 Communication Connector					
Connector Information		9-pin, female D-sub			
Mating Connector	Details	TYCO: Plug P/N 205204-4; Housing P/N 5748677-1; Terminals P/N 1658540-5 (loose) or 1658540-4 (strip)			
	Included with Drive	No			
5 ISO GND 3 RS232 RX / RS485 RX- 2 RS232 TX / RS485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









	M	IOTOR POWER - Motor Power Connector		
Connector Information		4-contact, 13 mm spaced, dual-barrier terminal block		
Mating Connector	Details	Not applicable		
	Included with Drive	Not applicable		
4 MOTOR POWER V 2 MOTOR POWER U 1 SHIELD				



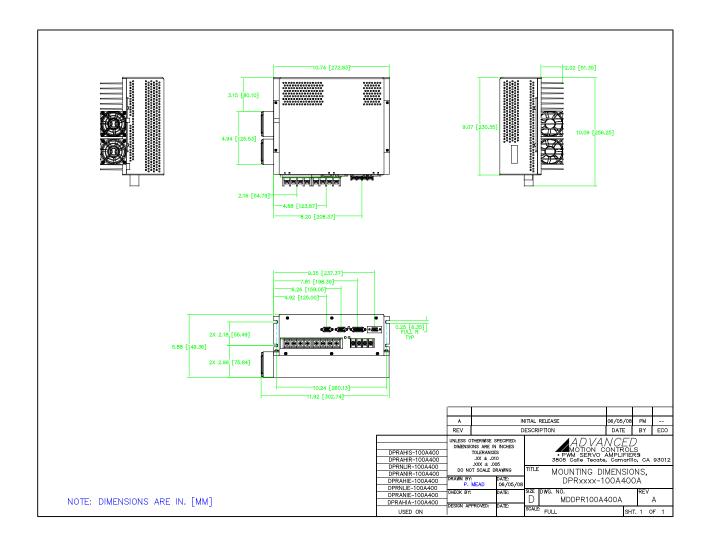


POWER - AC Power Connector					
Connector Information		4-contact, 13 mm spaced, dual-barrier terminal block			
Mating Connector	Details	Not applicable			
	Included with Drive	Not applicable			
4 PE					



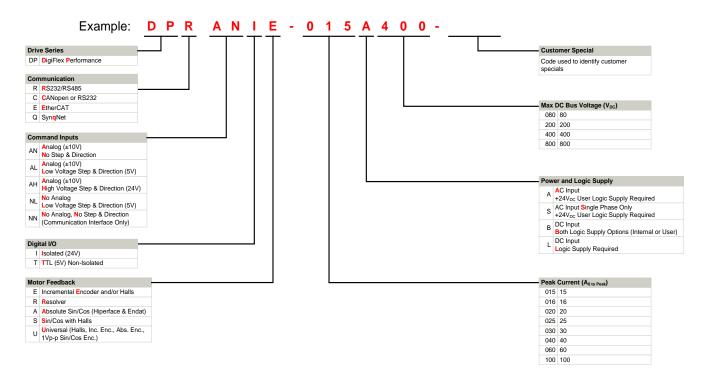


MOUNTING DIMENSIONS





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

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

Sold & Serviced By:

**ELECTROWATE

Toll Free Phone (877) SERV099

**Www.electromate.com

sales@electromate.com