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 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 SynqNet™ interface for networking and a RS-232 interface 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 non-volatile memory.

Power Range

Peak Current	60 A (42.4 A_{RMS})
Continuous Current	30 A (21.2 A_{RMS})
Supply Voltage	90 - 264 VAC

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

MODES OF OPERATION
- Current
- Position
- Velocity

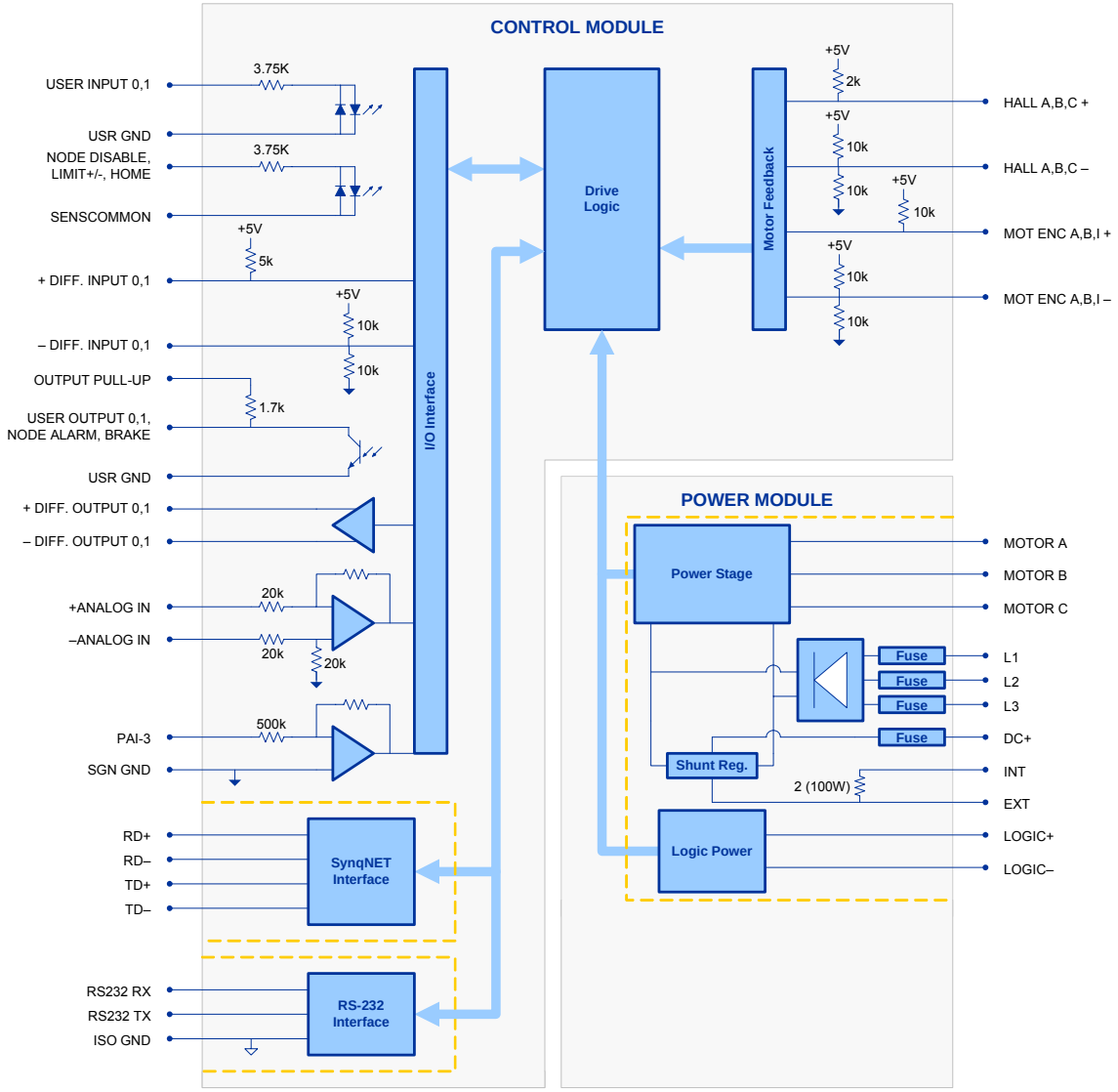
COMMAND SOURCE
- Communication Interface

FEEDBACK SUPPORTED
- Halls
- Incremental Encoder
- ±10 V Analog
- Auxiliary Incremental Encoder

INPUTS/OUTPUTS
- 3 Dedicated Digital Inputs
- 2 Dedicated Digital Outputs
- 2 High Speed Captures
- 1 Programmable Analog Input
- 2 Programmable Digital Inputs (Differential)
- 2 Programmable Digital Inputs (Single-Ended)
- 2 Programmable Digital Outputs (Differential)
- 2 Programmable Digital Outputs (Single-Ended)

COMPLIANCES & AGENCY APPROVALS
- RoHS
- UL/cUL Pending
- CE Pending

BLOCK DIAGRAM



Approvals and Compliances	
c UL 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 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 COMPLIANCE	RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.

SPECIFICATIONS

Power Stage Specifications		
Description	Units	Value
AC Supply Voltage[1]	VAC	90 - 264 (3-phase)
DC Supply Voltage	VDC	127 - 373
Over Voltage Limit	VDC	430
Under Voltage Limit	VDC	55
Logic Supply Voltage	VDC	20 - 30
Peak Output Current	A	60
Maximum Continuous Output Current	A	30
Maximum Continuous Output Power	W	11190
Maximum Power Dissipation at Continuous Current	W	559.5
Internal Bus Capacitance	µF	1650
Internal Braking Resistor	-	Yes
Minimum Load Inductance (Line-To-Line)[2]	µH	600
Switching Frequency	kHz	20
Control Specifications		
Description	Units	Value
Communication Interfaces	-	RS-232, SynqNet
Command Sources	-	Communication Interface
Feedback Supported	-	±10 V Analog, Auxiliary Incremental Encoder, Halls, Incremental Encoder
Commutation Methods	-	Sinusoidal, Trapezoidal
Modes of Operation	-	Current, Position, Velocity
Motors Supported	-	Brushed, Brushless, Induction, Voice Coil
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)	-	4/2
Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	1/0
Current Loop Sample Time	µs	50
Velocity Loop Sample Time	µs	100
Position Loop Sample Time	µs	100
Maximum Encoder Frequency	MHz	16 (4 pre-quadrature)
Mechanical Specifications		
Description	Units	Value
Size (H x W x L)	mm (in)	234.7 x 161.8 x 151.3 (9.2 x 6.4 x 6)
Heatsink (Base) Temperature Range[3]	°C (°F)	0 - 65 (32 - 149)
Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)
Cooling System	-	Natural Convection
Form Factor	-	Stand Alone
IP Rating	-	IP10
+24V LOGIC Connector	-	2-port, 5.08 mm spaced, enclosed, friction lock header with threaded flange
AUX COMM Connector	-	3-pin, 2.5 mm spaced, enclosed, friction lock header
COMMa Connector	-	Shielded RJ-45 socket with LEDs
COMMb Connector	-	Shielded RJ-45 socket with LEDs
DC BUS / BRAKE RESISTOR Connector	-	5-contact, 13 mm spaced, dual-barrier terminal block
FEEDBACK Connector	-	15-pin, high-density, female D-sub
I/O Connector	-	26-pin, high-density, female D-sub
MOTOR POWER / DC BUS Connector	-	5-contact, 13 mm spaced, dual-barrier terminal block
POWER Connector	-	5-contact, 13 mm spaced, dual-barrier terminal block

Notes

1. Can operate on single-phase 120/240 VAC if peak/cont. current ratings are reduced by at least 30%.
2. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
3. Additional cooling and/or heatsink may be required to achieve rated performance.

PIN FUNCTIONS

+24V LOGIC - Logic Power Connector			
Pin	Name	Description / Notes	I/O
1	LOGIC GND	Logic Supply Ground	GND
2	LOGIC PWR	Logic Supply Input	I

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

COMMa - SynqNet Communication Connector			
Pin	Name	Description / Notes	I/O
1	RD+	Receiver Line (100BaseT)	I
2	RD-		I
3	TD+	Transmitter Line (100BaseT)	O
4	RESERVED	Reserved	-
5	RESERVED	Reserved	-
6	TD-	Transmitter Line (100BaseT)	O
7	RESERVED	Reserved	-
8	RESERVED	Reserved	-

COMMb - SynqNet Communication Connector			
Pin	Name	Description / Notes	I/O
1	TD+	Transmitter Line (100BaseT)	O
2	TD-		O
3	RD+	Receiver Line (100BaseT)	I
4	RESERVED	Reserved	-
5	RESERVED	Reserved	-
6	RD-	Receiver Line (100BaseT)	I
7	RESERVED	Reserved	-
8	RESERVED	Reserved	-

DC BUS / BRAKE RESISTOR - Power Connector			
Pin	Name	Description / Notes	I/O
1	HIGH VOLTAGE	DC Bus Output	O
2	POWER GND		PGND
3	EXT	External Brake Resistor Connection.	-
4	DC+	Brake Resistor DC+. Connection for brake resistor.	O
5	INT	Internal Brake Resistor. Jumper to Brake Resistor DC+ to activate.	-

FEEDBACK - Feedback Connector			
Pin	Name	Description / Notes	I/O
1	HALL A+	Commutation Sensor Inputs	I
2	HALL B+		I
3	HALL C+		I
4	MOT ENC A+	Differential Encoder A Channel Input (For Single Ended Signals Use Only The Positive Input)	I
5	MOT ENC A-		I
6	MOT ENC B+	Differential Encoder B Channel Input (For Single Ended Signals Use Only The Positive Input)	I
7	MOT ENC B-		I
8	MOT ENC I+	Differential Encoder Index Input (For Single Ended Signals Use Only The Positive Input)	I
9	MOT ENC I-		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)	O
14	RESERVED	Reserved	-
15	HALL C-	Commutation Sensor Input (For Differential Signals Only)	I

I/O - Signal Connector			
Pin	Name	Description / Notes	I/O
1	USER OUTPUT 0	Isolated Programmable Digital Output (Referenced To USER GND)	O
2	USER OUTPUT 1	Isolated Programmable Digital Output (Referenced To USER GND)	O
3	USR GND	Ground Reference For User Outputs And Inputs	ISOGND
4	NODE ALARM	Network Error (Isolated Output Referenced To USER GND)	O
5	BRAKE	Brake (Isolated Output Referenced to USER GND)	O
6	SGN GND	Signal Ground	SGND
7	+ DIFF. INPUT 0	Non-Isolated Differential Digital Input (Programmable Capture Function)	I
8	- DIFF. INPUT 0		I
9	OUTPUT PULL-UP	Digital Output Pull-Up	I
10	NODE DISABLE	Node Disable (Isolated Input Referenced to SENSCOMMON)	I
11	LIMIT +	Positive Limit (Isolated Input Referenced To SENSCOMMON)	I
12	LIMIT -	Nagative Limit (Isolated Input Referenced To SENSCOMMON)	I
13	HOME	Home Switch (Isolated Input Referenced To SENSCOMMON)	I
14	USER INPUT 0	Isolated Programmable Digital Input (Referenced To USER GND)	I
15	USER INPUT 1	Isolated Programmable Digital Input (Referenced To USER GND)	I
16	SENSCOMMON	Sensor Common (Can Be Used To Pull-Up Related Inputs)	CMN
17	+ DIFF. INPUT 1	Non-Isolated Differential Digital Input (Programmable Capture Function)	I
18	- DIFF. INPUT 1		I
19	SGN GND	Signal Ground	SGND
20	+ DIFF. OUTPUT 0	Non-Isolated Differential Digital Input (Programmable Step & Direction Or Divide-By-N Function)	O
21	- DIFF. OUTPUT 0		O
22	+ DIFF. OUTPUT 1	Non-Isolated Differential Digital Input (Programmable Step & Direction Or Divide-By-N Function)	O
23	- DIFF. OUTPUT 1		O
24	+ ANALOG IN	Programmable Differential Analog Input (±10V Range)	I
25	- ANALOG IN		I
26	SGN GND	Signal Ground	SGND

MOTOR POWER / DC BUS - Power Connector			
Pin	Name	Description / Notes	I/O
1	MOTOR A	Motor Phase A	O
2	MOTOR B	Motor Phase B	O
3	MOTOR C	Motor Phase C	O
4	HIGH VOLTAGE	DC Power Input	I
5	POWER GND	Power Ground (Isolated From Signal Ground)	PGND

POWER - Power Connector			
Pin	Name	Description / Notes	I/O
1	L1	AC Supply Input (Three Phase)	I
2	L2		I
3	L3		I
4	CASE GND	Case Ground	PE
5	RESERVED	Reserved	-

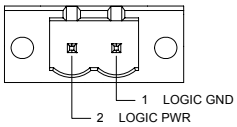
HARDWARE SETTINGS

Switch Functions

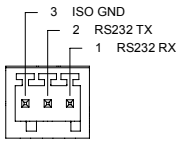
Switch	Description	Setting	
		On	Off
1	Reserved.	-	-
2	Reserved.	-	-
3	Reserved.	-	-
4	Reserved.	-	-
5	Reserved.	-	-
6	Reserved.	-	-
7	Reserved.	-	-
8	Reserved.	-	-

MECHANICAL INFORMATION

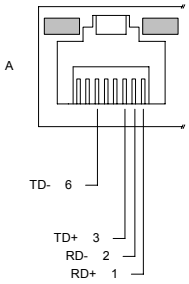
+24V LOGIC - Logic Power Connector	
Connector Information	2-port, 5.08 mm spaced, enclosed, friction lock header with threaded flange
Mating Connector	Phoenix Contact: P/N 1777808



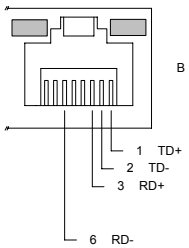
AUX COMM - RS232 Communication Connector	
Connector Information	3-pin, 2.5 mm spaced, enclosed, friction lock header
Mating Connector	Phoenix: Plug P/N 1881338



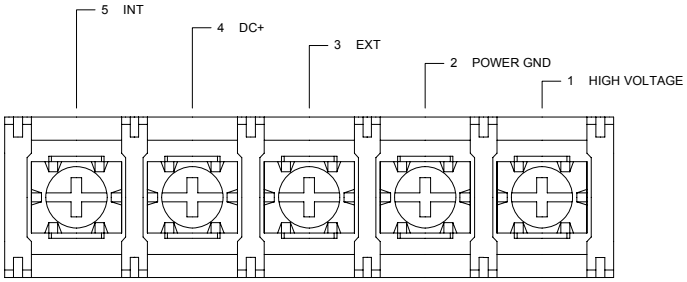
COMMa - SynqNet Communication Connector	
Connector Information	Shielded RJ-45 socket with LEDs
Mating Connector	AMP: Plug P/N 5-569552-3



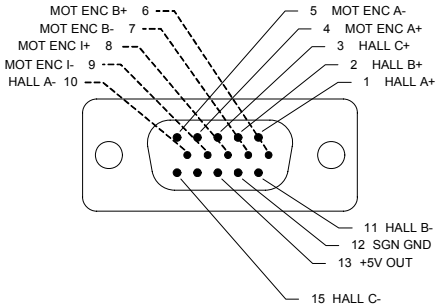
COMMb - SynqNet Communication Connector	
Connector Information	Shielded RJ-45 socket with LEDs
Mating Connector	AMP: Plug P/N 5-569552-3



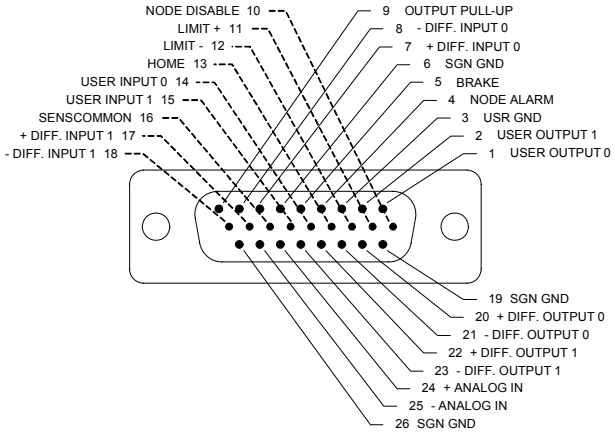
DC BUS / BRAKE RESISTOR - Power Connector	
Connector Information	5-contact, 13 mm spaced, dual-barrier terminal block
Mating Connector	Not applicable.



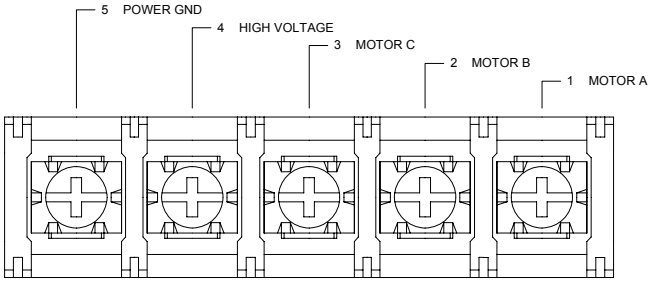
FEEDBACK - Feedback Connector	
Connector Information	15-pin, high-density, female D-sub
Mating Connector	AMP: Plug P/N 748364-1; Housing P/N 748677-1; Terminals P/N 748333-4 (loose) or 748333-2 (strip)



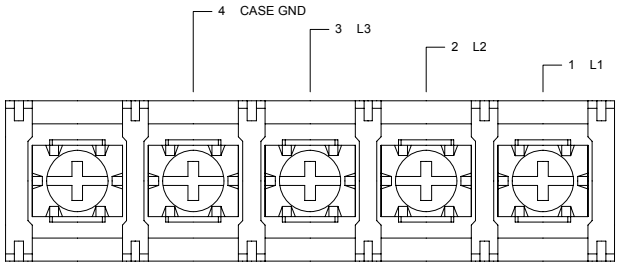
I/O - Signal Connector	
Connector Information	26-pin, high-density, female D-sub
Mating Connector	AMP: Plug P/N 748365-1; Housing P/N 748677-2; Terminals P/N 748333-4 (loose) or 748333-2 (strip)



MOTOR POWER / DC BUS - Power Connector	
Connector Information	5-contact, 13 mm spaced, dual-barrier terminal block
Mating Connector	Not applicable.



POWER - Power Connector	
Connector Information	5-contact, 13 mm spaced, dual-barrier terminal block
Mating Connector	Not applicable.



PART NUMBERING INFORMATION

Example: **D P R A N I E - 0 1 5 A 4 0 0 - -**

Drive Series	
DP	DigiFlex Performance

Communication	
R	RS232/RS485
C	CANopen or RS232
Q	SynqNet

Command Inputs	
AN	Analog (±10V) No Step & Direction
AL	Analog (±10V) Low Voltage Step & Direction (5V)
AH	Analog (±10V) High Voltage Step & Direction (24V)
NL	No Analog Low Voltage Step & Direction (5V)
NN	No Analog, No Step & Direction (Communication Interface Only)

Digital I/O	
I	Isolated (24V)
T	TTL (5V) Non-Isolated

Motor Feedback	
E	Incremental Encoder and/or Halls
R	Resolver
A	Absolute Sin/Cos (Hiperface & Endat)
S	Sin/Cos with Halls

Customer Special
Code used to identify customer specials

Revision
A through Z (letters may be skipped)

Max DC Bus Voltage (V_{DC})	
080	80
200	200
400	400
800	800

Power and Logic Supply	
A	AC Input +24V_{DC} User Logic Supply Required
N	AC Input Only No Logic Supply Required (Internal Supply)
B	DC Input Both Logic Supply Options (Internal or User)
L	DC Input Logic Supply Required
D	DC Input Only Internal Logic Supply

Peak Current ($A_{0\ to\ Peak}$)	
015	15
016	16
020	20
025	25
030	30
040	40
060	60
100	100

DigiFlex®Performance™ series of products are available in many configurations. All models listed on the website are readily available, standard product offerings. Other combinations or possibilities can be made available for OEMs with volume requests of 100 or more. Contact Applications Engineering for further information and details.