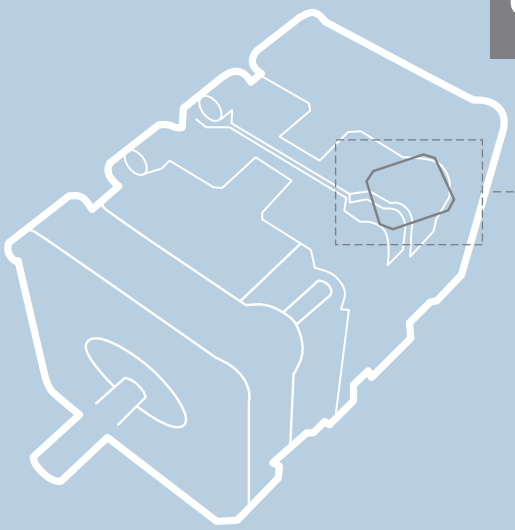
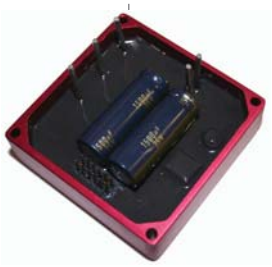
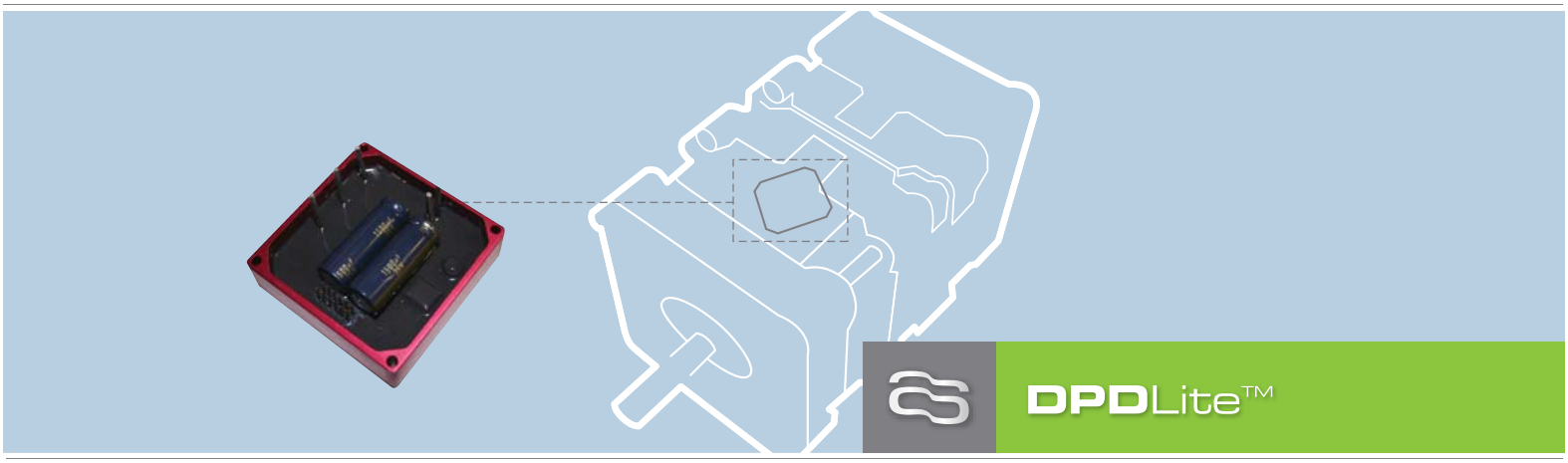
agile
SYSTEMS

DPDLite™





The digital engine that drives motors more efficiently and quietly



DPDLite™

The digital engine that drives motors more efficiently and quietly

Brushless DC motors and drives are replacing tradional electric motor technologies such as single phase AC induction motors and universal motors. These motors are found in increasing numbers, driving fans, pumps and compressors used in industrial and commercial applications.

DPDLite™ eliminates the need for Hall sensor feeback necessary for motor commutation in conventional brushless DC motor drives. DPDLite™ detects motor rotor position at motor stand still, through an innovative algorithm based on motor phase-inductance measurement. This is used to start the motor reliably, unidirectionaly and without any startup delay. DPDLite™ provides sensorless control of BLDC motors at performance levels that exceeds the performance of conventional Hall commutated drives. DPDLite™ can be integrated into the motor bell-end or operate as a separately mounted device.

Key Features

- Closed loop torque and velocity control
- High power density
- Over-voltage protection
- Under-voltage protection
- Over-current
- Over-temperature protection
- PID loop compensation parameters
- Two wire power connection
- Ready for motor integration
- Compact, single board design

Product Benefits

- Increased reliability
- Increased performance
- Reduced motor cost due to elimination of Hall sensors and related wiring
- Integrates into the motor bell end at the customer's option
- High starting torque

Typical Applications

Introduction

DPDLite™ is the digital engine that drives motors efficiently and quietly. With the use of advanced patent-pending technology, DPDLite™ is leading the way for energy efficient drives.

Applications

- Fans
- Pumps
- Compressors
- Centrifuges
- HVAC
- Drills and mills
- Conveyors
- Office equipment
- Medical equipment
- Applicances
- Automotive subsystems

Verticals

- Motor Manufacturers
- White Goods
- Pumps, Fans and Compressors
- HVAC
- Automotive

Tray Changer

Today's office equipment has stringent demands in terms of speed control, robustness and performance. It is essential that brushless direct current motor controls eliminate traditional problems with hall sensors, poor reliability and low performance.

DPDLite™ is a patent pending technology that solves the traditional problems associated with the high demands of office equipment.

Pump and Fan Combination

There is significant burdens being placed on pumps especially with the added strain of driving fans with the same motor. These combination units require reliable start-up. Most of these units are placed in confined spaces so high power to size ratio's are essential. Agile Systems technology is able to solve these challenges.

Pumps also require significant energy and DPDLite™ offers power reduction for these demanding applications.

Respirator

Stability and reliability are paramount in a machine that controls the very breath of life. The robust start-up algorithm embedded in DPDLite™ ensures that your drive will be stable and start reliably under load every time.

Software

Introduction

Agile provides software tools for set-up and configuring the DPDLite™

Application Software

- DP·D™ – Setup, tuning and programming application

Software Support

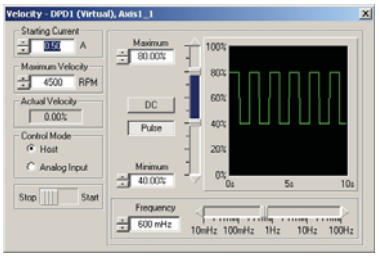
- DP·D™ tuning tools with graphical analysis, data logging and frequency analysis

DP·D™

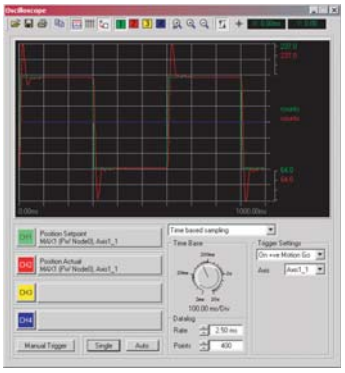
DP·D™ is a Windows based application software product for the DPDLite™ family. family of drivers.

DP·D™ was designed to assist the user in the following

1. Motor set-up and configuration
2. I/O set-up and configuration
3. Motor verification and performance Analysis
4. Integrated Help System



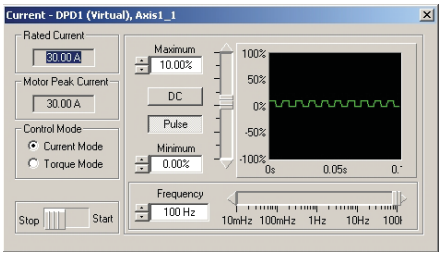
Windows Configuration and Diagnostics, Motor and System Tuning, Oscilloscope Views, Graphical Configuration of I/O, Interactive Help Screens with User Manual Content, Diagnostic and Error display through text descriptions, Parameter Configuration file creation for download and save, Download Firmware updates



DP·D™ is a compatible DPDLite™ product providing a consistent interface across Agile's line of Digital Motor Control and Distributed Servo products. When the PC is connected to a digital power product, DP·D™ determines which product type is connected and provides access to the appropriate parameters and tools for that product. Easily accessible and integrated within DP·D™ is detailed documentation that follows the current operation of a digital power product. Background information is provided for setup and mechanical configuration, applicable command set, and detailed operation within each functional block.

DP·D™ can be used both with and without a physical connection to a digital power product. By operating in virtual mode a user is able to access all documentation and help functions, access and set up all parameter settings and save to a file for later use. A four-channel oscilloscope feature allows the user to visually monitor results on the PC while adjusting tuning parameters.

DP·D™ is capable of automatically finding the resistance and inductance of the motor to set up current loop. In addition, it will automatically find the motor start-up parameters.



DP·D™

A Windows 2000/XP application that was designed to assist the user in tuning, configuring and programming the driver. DP·D™ commands are sent to the driver via an RS-232 interface.

DP·D™ Tuning Tools

DP·D ™ is a Windows 2000/XP graphical environment which is universal across Agile Sytems digital power products. The following list describes the key features:

> Quickly set up, tune and program the driver
> An oscilloscope tool to datalog system registers real time
> Auto-calculates the optimum current loop settings which allows the use of any motortype
> Performs cyclic motion to exercise the axes
> View and set inputs
> Motor Verfication Tool

Product Specifications

Input Voltage

Description	Min Volts (DC)	Max Volts (DC)
System Power	15	30

Output Power

Description	Continuous (Amps DC)	Peak (Amps DC)
Output Phase Current	Up to 18A	30A
Logic Supply Current	200 mA	
PWM Output	20 KHz center-weighted with 100% maximum DC MOSFET H-bridge	

Protections

Type	Description
Over/Under-voltage	Voltage must be within pre-determined range
Current Limiting	Driver shuts down if phase current exceeds a pre-determined threshold
Driver Over Temperature	Drive shuts down in the event that the driver temperature exceeds a pre-defined threshold

Performance

Description	Range
Speed Regulation	+/- 5% Range Top Speed
Speed Range	Min (rpm) 10:1
Minimum Motor Time Constant	150 usec.
Drive and Control Efficiency	> 92% at 30 °C
Minimum Motor phase-to-phase inductance	100 uH
Communtation	Six step BEMF based
Minimum commutation time	250 usec.

Motors Support

Type
Brushless AC
Brushless DC

Environmental

Name	Range
Ambient Operating Temperature	-30 to 70° C
Storage Temperature	-40 to + 125°C

Input Specifications

Type	Quantity	Description	Voltage	VMin (DC)	VMax (DC)
Digital Inputs 1&2	2	Non Isolated Used as direction and Enable/Disable selector Sampling rate of 20kHz	Logic Low	0 V	0.5 V
			Logic High	0.7 V	5 V
Analog Inputs	1	Input voltage 0 to 5 VDC Single ended sampling rate of 20kHz Minimum 8-bit resolution used for velocity/torque control Sampling rate of 20kHz			

Network I/O

Introduction

DPDLite™ communicates over networks

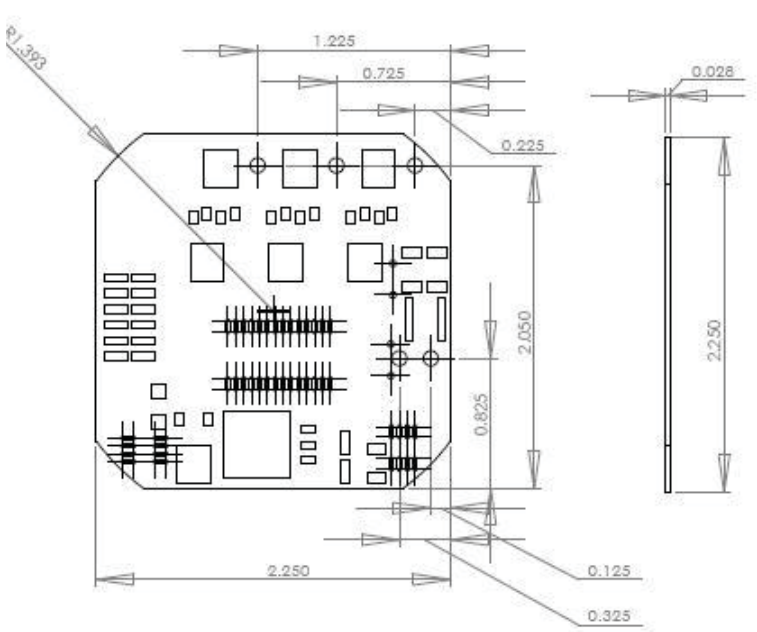
- RS-232

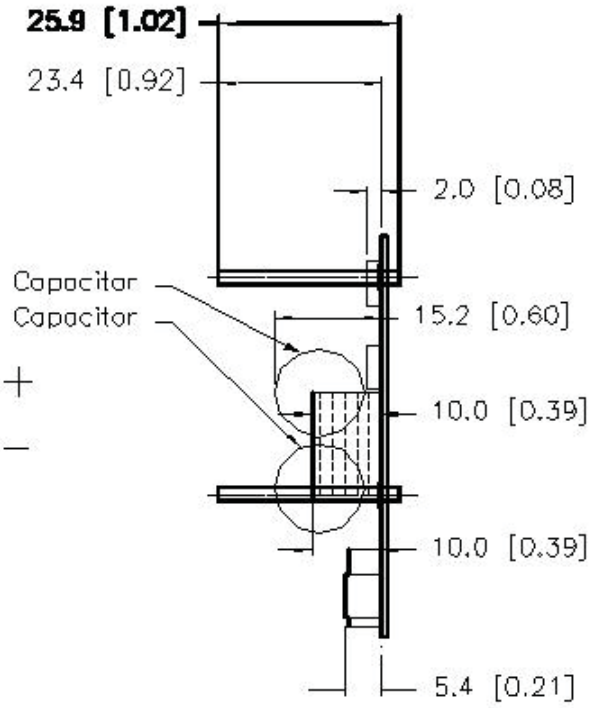
Network	Bandwidth	Overview
RS-232	115 Kbps	Used for application development and trouble-shooting

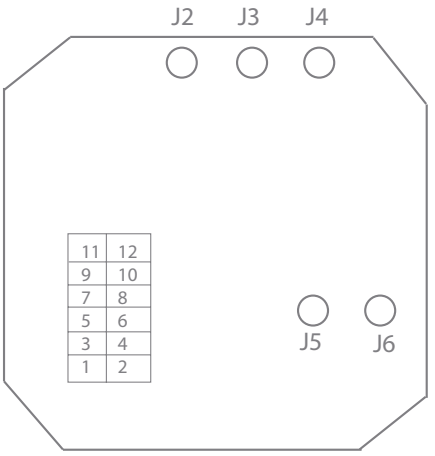
DPDLite™ has built-in serial communicaton and trouble shooting

DPDLite™ Mechanical Drawings

Note: all units are displayed in inches.







Connector Pinouts

I/O Connector (IO-1)

Pin Number	Function
1	Power Ground*
2	External Power*
3	Digital Input 1
4	Do Not Connect
5	RS232 Receive
6	RS232 Transmit
7	5 Volt DC
8	Do Not Connect
9	Analog Ground
10	Analog Input
11	Digital Input 2
12	Logic Ground

Motor Connector

Pin Number	Function
J2	Motor Phase A
J3	Motor Phase B
J4	Motor Phase C

Power Connector

Pin Number	Function
J5	Power
J6	Power Ground

About Agile Systems

Agile Systems is a world leader in the design, development and manufacturing of advanced motion control technology including motor control and power conversion. Our team is highly skilled in integrating power electronics, digital controls and network communications into small, compact and cost effective packages.

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