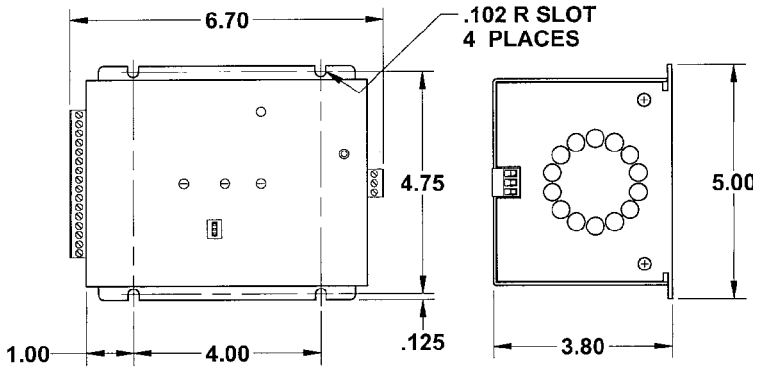
DPL DRIVER PACK

- **Onboard Pulse Generator**
- **Onboard Regulated +5Vdc Output**
- **Unregulated 12Vdc Output**
- **No Dropping Resistors**
- **Higher Torque/speed Output**
- **Improved Start-Stop Speeds**
- **Reduced Power Requirements**
- **Full and Half-step Operation**
- **Motor Turnoff Provisions**
- **TTL-CMOS Compatible Inputs**
- **Compact and Rugged**
- **Onboard Power Supply**



GENERAL DESCRIPTION

The DPL employs bilevel (or dual voltage) drive for high performance operation of step motors. It operates 4-phase step motors providing significantly improved motor speed torque (power) output and higher start-stop speeds. High-wattage dropping resistors required with L/R type drivers, are not used.

BILEVEL DRIVE

The basic function of a motor driver is to provide the rated motor phase current to the motor windings in the shortest possible time. The bilevel driver uses a high voltage to get a rapid rate of current rise in the motor windings in the least amount of time. When the current reaches the present trip current level, the driver turns off the high voltage and sustains the current from the low voltage supply. While the motor is at standstill, it's energy comes from the low voltage supply. When the motor is stepping, the high voltage drives the current into the windings, supplying more of the required current as the stepping rate increases. This low-high -low voltage switching scheme results in higher efficiency and lower cost than that obtainable from chopping or other more exotic schemes. The efficiency of bilevel drive makes possible step motor performance that is far superior to that produced by practical L/R drives. Step Motor curves graphically depicted in Figure 5, illustrate output torque versus stepping rate for several different motors. As the curves show, maximum torque is at low to moderate stepping rates. Eventually, as the stepping rate increases, there is a fall off in torque output.

EXCITATION MODE SELECTION

Users have a choice of dual-phase, full-step operation or half-step operation. Dual-phase, full-step operation is accomplished by energizing two phases at a time, which rotates a typical motor 1.8 degrees per step. Half-step operation is accomplished by alternately energizing one, and then two, phases at a time, which rotates the motor 0.9 degrees per step. Half-step operation is more stable and produces finer resolution, along with relative freedom from resonance. Full-step operation is only for applications that specifically require that mode, such as when retrofitting existing full-step systems.

POWER TURN-OFF OPTION

The power turn-off option allows de-energizing a motor without disturbing the positioning logic, allowing a routine to continue when re-energized. This reduces motor heating and conserves power, especially in applications where motors stop for extended periods.

MOTOR CONNECTIONS

Figure 1 and 2 show hookup diagrams for typical DPL driver applications. Wiring connected to inputs must be separated from motor connections and all other possible sources of interference.

ADJUSTING KICK CURRENT

By following the silkscreen instructions on the cover, use a small screwdriver to adjust potentiometer. Line up arrow to the number corresponding to the motors rated current (amps/phase). There is no need to multiply any numbers as the scaling is preset internally for a forty (40) percent kick over the motors rated current.

ANAHEIM AUTOMATION
910 East Orangefair Lane, Anaheim, CA 92801 (714) 992-6990 fax: (714) 992-0471
e-mail: info@anaheimautomation.com website: www.anaheimautomation.com

SPECIFICATIONS

Power Requirement:
105(min) - 125 (max) Vac (rms) input on TB1. See silkscreen markings on cover for proper hookup.
L1-Hot, L2-Neutral, L3-Ground

Control inputs:(All) (Terminals 5,6,7,10 & 11)
TTL-CMOS compatible.
Logic "O" O to 0.8Vdc
Logic "1" 3.5 to 5.0Vdc

Clock Output: (Terminal 4)
Square wave pulse train out, TTL compatible.

Excilation Mode Select:(Terminal 10)
Logic "1" (open)-half step
Logic "0" dual full step

Power Turn-Off: (Terminal 7)
Logic "1" (open)-motor energized
Logic "0" motor de-energized

Output Current Rating
(Terminals 1,2,3,14,15, & 16)
3.0 Amperes per phase maximum, over the operating voltage and temperature range. Motor phase ratings of 0.5 Amperes minimum are required to meet the minimum kick level.

+12Vdc Unregulated Output (Terminal 13) Unregulated 10 to 14Vdc. Output level dependent on load requirement of +5Vdc. Output current must not exceed 1.5amps.

Run/Stop Control Input:(Terminal 5)
Logic "0" output pulses from Pulse Generator
Logic "1" (open) no pulses from generator

Operating: 0 to 60 degrees C
Weight: 3lbs 2oz

The following are recommended motors for use with the DPL:

Anaheim Automation	Rapidsyn	Superior Electric
23D102	23D6102	MO61-FD02
23D104	**	**
23D204	23D6204	M062-FD04
23D306	23D6306	M063-FD06
23A102A*	23A6102A*	**
23A102B*	23A6102B*	**
23A104A*	23A6104A*	**
34D106	34D9106	M091-FD06
34D207	**	**
34D307	**	**

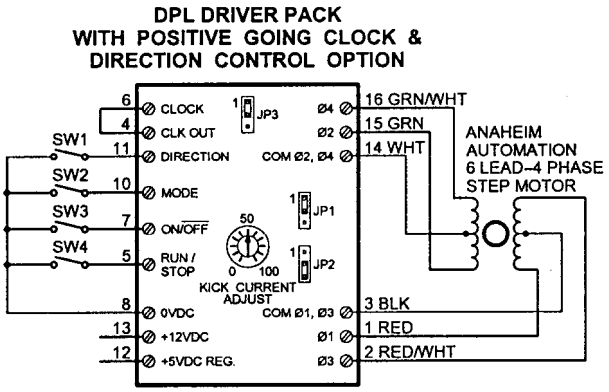


Figure 1

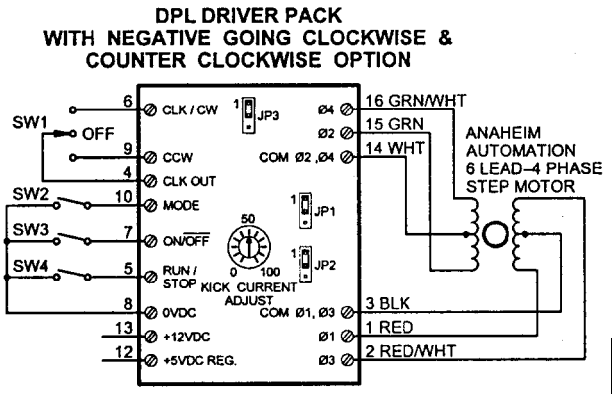


Figure 2

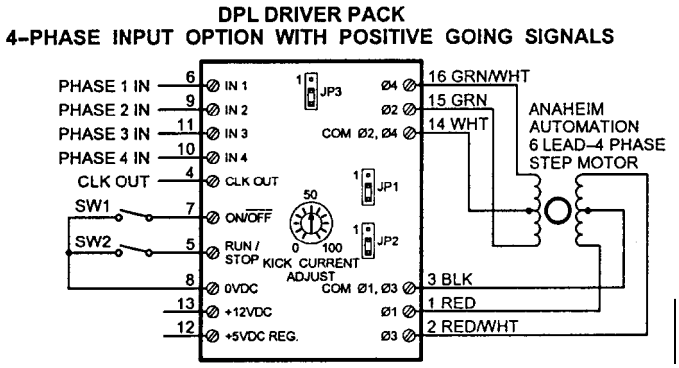


Figure 3

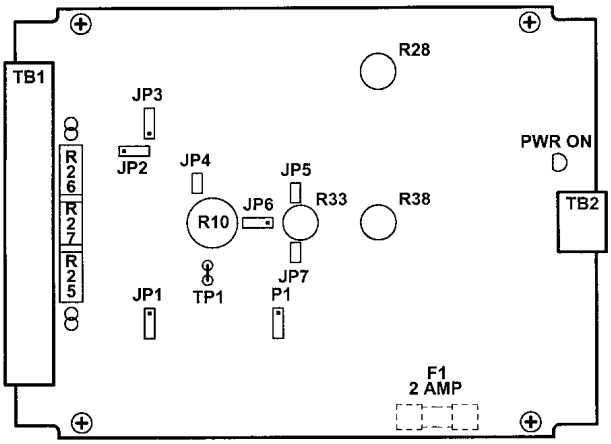
***LINEAR STEP MOTOR ACTUATOR**
****NOT AVAILABLE**

PULSE GENERATOR

The pulse generator provided in the DPL is an independent pulse generator. Several operating modes are jumper selectable: 1) Manual, 2) Ramp up only, 3) Ramp up and down and 4) remote maximum speed control. Two different speed ranges are also jumper selectable: 168-2000 steps per second or 358-21000 steps per second. The jumpering requires removal of the DPL cover. Before making any adjustments under the cover, detach the 110Vac power cord.

JP4	IN PLACE	SLOW SPEED RANGE (2kHz)
	REMOVED	FAST SPEED RANGE (21kHz)
JP5	IN PLACE	RAMPING
	REMOVED	NO RAMPING
JP6	POSITION 1-2	NO RAMP DOWN
	POSITION 2-3	RAMP DOWN
JP7	IN PLACE	USE ON-BOARD POT
	REMOVED	USE EXTERNAL POT

See Figure 4 for remote potentiometer wiring diagram.



OPERATION

After the desired jumper selections have been made, connect the 110Vac power to the unit. If jumper JP7 was removed, plug in remote potentiometer and adjust for maximum speed (fully CW). Adjust onboard maximum rate potentiometer to the desired maximum speed required. You now have use of the minimum to desired maximum speed on the remote potentiometer. This eliminates the problems with external potentiometer being turned up to a rate at which the machine will not operate successfully.

If JP7 is installed, set the maximum rate potentiometer (R28) to full CW (clockwise) position and use the maximum speed potentiometer (R38) to set desired maximum speed. To cause the pulse generator (PG) to output pulses, the RUN/STOP terminal is tied to 0Vdc. At that time the PG will send pulses out of the clock output terminal and if ramping is selected, will start to ramp up to the maximum speed. Disconnecting the RUN/STOP from 0Vdc causes the PG to decelerate to minimum speed and stop. If JP6 is selected for no downslope, when the RUN/STOP line is disconnected the unit will stop outputting pulses immediately and the motor will stop as fast as possible (load and speed dependent). Ramping is used to significantly increase the operating speed of a step motor, especially when driving large inertial loads, without stalling the motor. The motor starts running at a speed below the start/stop limit (base speed),accelerated (ramped) at a rate that avoids stalling, thereby reaching speeds ten times the base speed or more. At the end of a run the motor is decelerated (ramped) to the base speed for accurate stopping.

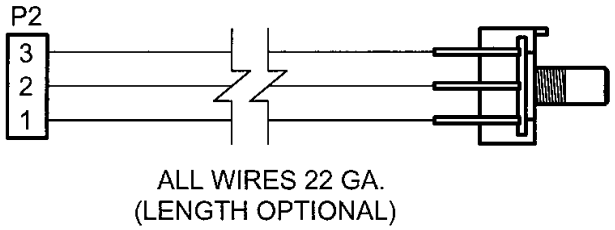


Figure 4

Torque Speed Curves

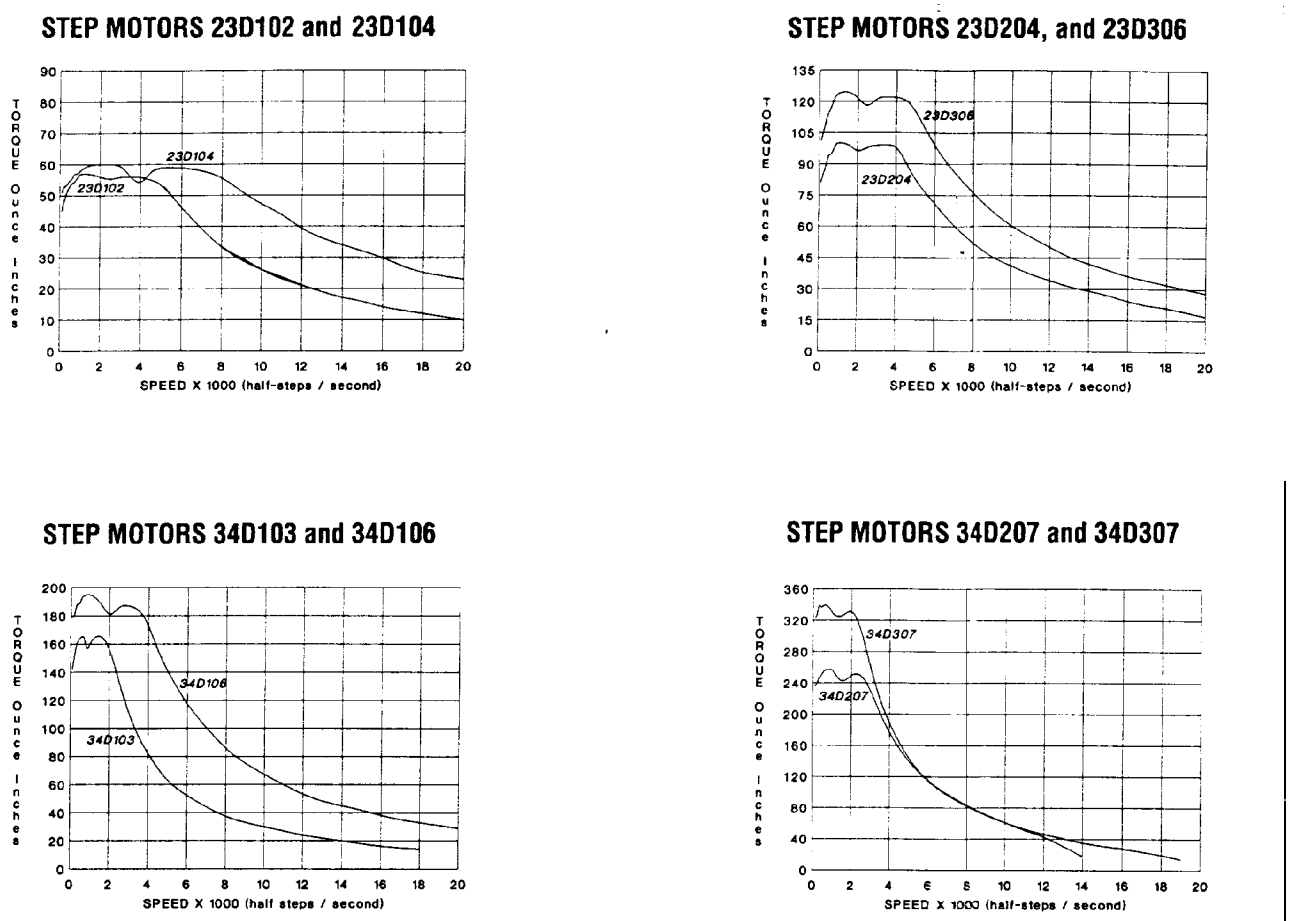


Figure 5. Typical torque/speed curves of Anaheim's stock 23 and 34 size motors using the DPL Driver Pack.