The Eclipse:
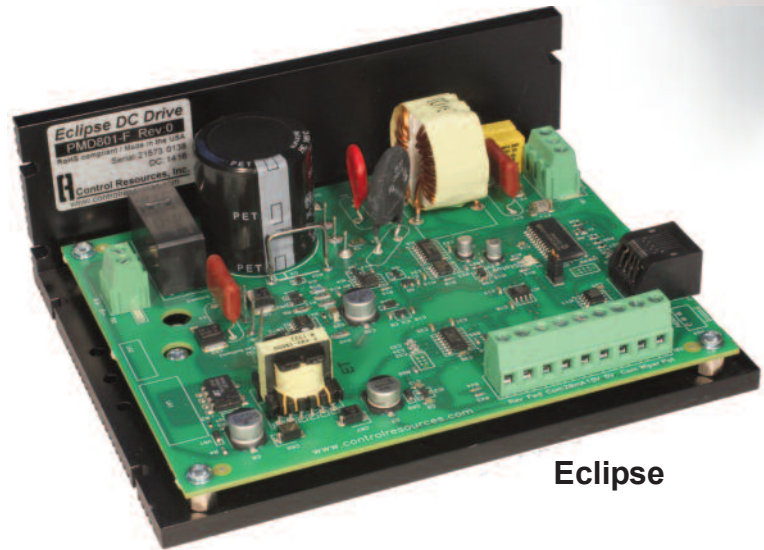## Variable Speed DC Brushed Motor Drive

Navigator

Eclipse

The Eclipse variable speed DC brushed motor drive with **Navigator Programmer** is the next generation in PWM motor control. It features digital programming, a 1.01 form factor, 5 amp rating and a 16kHz PWM frequency resulting in low noise, a cooler motor and longer motor life. Programming the Eclipse is made simple and repeatable by using the menu-driven Navigator hand-held remote programmer. With the Navigator, there are **no potentiometer set-up adjustments**, programming is quick, accurate and easily copied from unit to unit. Control inputs include a 5k potentiometer, 0-5VDC, 0-15VDC or 0-20mA signal. Programmable settings include: min. and max. speed, acceleration and deceleration rates, current compensation and current limit. The **Navigator** programmer can be used to program any number of drives or units can be programmed to your specification at the factory for as few as 50 units.

+ *Power Quality Form Factor: 1.01*

+ *PWM Frequency: 16kHz (lower noise, cooler motor, longer motor life)*

+ *Menu-driven digital programming and copying means perfect repeatabilty and no potentiometer set-up adjustments*

+ *Hand-held remote programmer reduces costs and potential tampering*

| Part Number	Description	Power Source	Output Voltage
PMD801-F	Eclipse Motor Drive	80-132 VAC	0-140 VDC
PMD802-F	Eclipse Motor Drive	160 - 264 VAC	0-280 VDC
POT50-F	Potentiometer, 5k Linear, Chassis Mount		
PRG00-F	Navigator Hand-held Remote Programmer		

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SPECIFICATIONS

- Power Source (PMD801-F): 80 -132VAC, 45 – 65Hz
- Power Source (PMD802-F): 160 - 264VAC, 45 – 65Hz
- Output Voltage (PMD801-F): 0 – 140VDC
- Output Voltage (PMD802-F): 0 – 280VDC
- Form Factor: 1.01
- 1/2 HP
- Output Current Rating: 5A
- Speed Range: 50:1
- PWM Frequency: 16kHz
- Input Sources (Isolated):
  - 5 Kohm potentiometer (sold separately)
  - 0 - 5 VDC
  - 0 -15 VDC
  - 0 - 20 mA
- Navigator Programmable Parameters:
  - Maximum Speed: 0 – 100%
  - Minimum Speed: 0 – 100%
  - IR Gain: 1 - 20
  - IR Compensation: 0 - 100%
  - Current Limit: .25 - 8.0 Amps
  - Acceleration time: 0.5 – 8.0 sec
  - Deceleration time: 0.5 – 8.0 sec
- RoHS compliant
- Weight: 1.28 lbs, (581 grams)
- Operating Environment: -20 to 50°C, 0-95% RH

FEATURES

- Menu-driven programming no potentiometer set-up adjustments
- Digital programming and copying for perfect repeatability
- Hand-held remote progrmmer reduces costs and tampering
- Analog control loop for virtually infinite resolution and instant response time
- Electronic hardware current limit for protection against shorted output
- FORWARD - OFF - REVERSE contact closure inputs
- On-board relay reverse with electronic zero current switching prevents drive and motor damage during directional changes
- 2 Quadrant Operation
- POWER/FAULT LED indicates green for power, orange for soft current limit, and red for latched faults
- Typical DC bus ripple limited to 15% @ 8A full load limit
- Fusing provided on both power feeds
- Factory programming for orders as few as 50 units
- 2 year warranty
- Made in the USA

OPTIONS (contact CRI for details)

- 5k chassis mount speed control Potentiometer #POT50-F
- DIN Rail Bracket Mount
- 1/4" Spade terminals for power and motor connections
- 5k on-board speed control Potentiometer
- Safety Cover
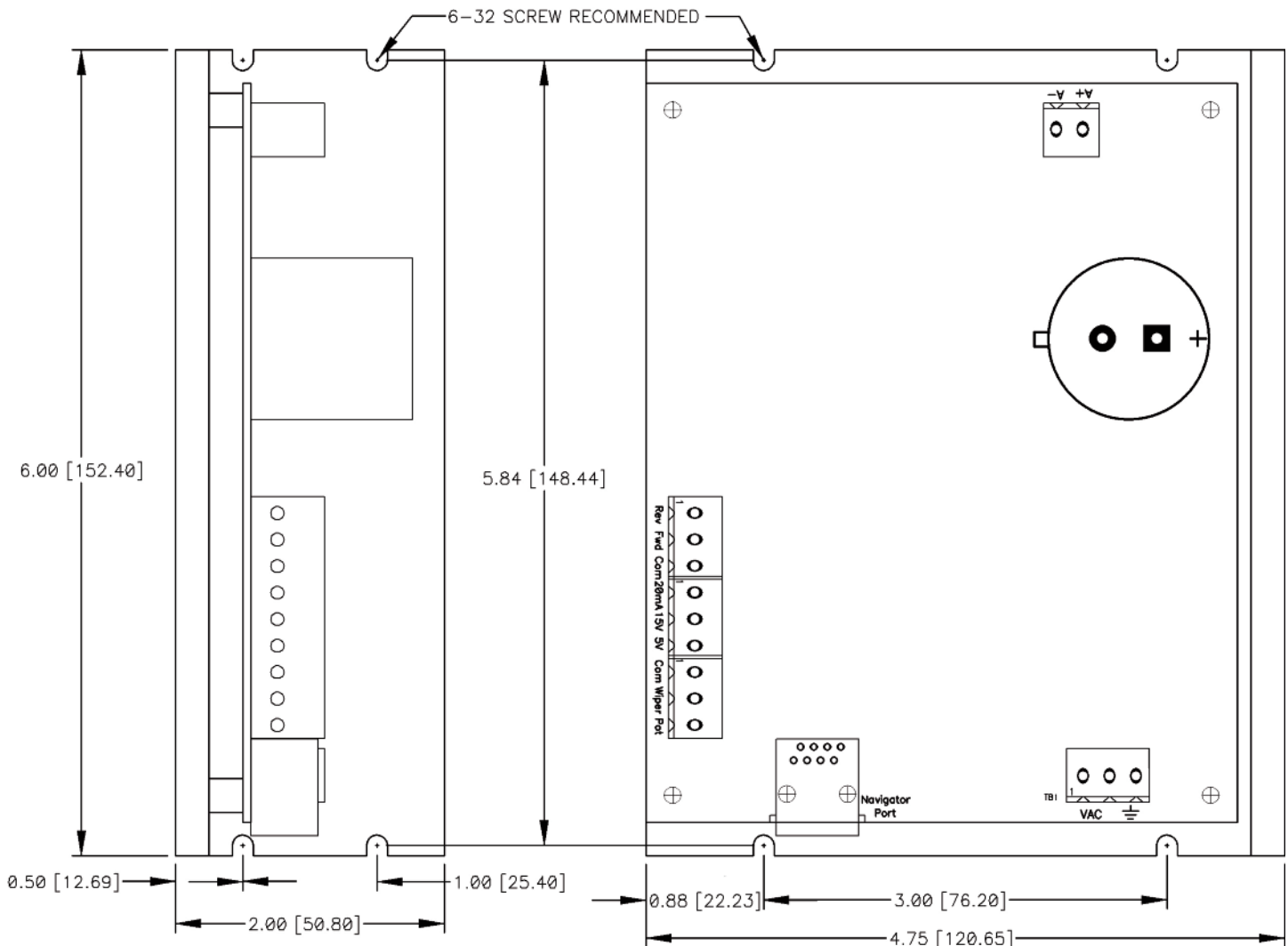
CONNECTIONS

WARNING: Dangerous voltages are present when connected to the power line and for some time after power is removed. Power must be removed for 15 seconds before making any connections or adjustments to avoid electrical shock or damage. Heat sink temperatures may rise to 90°C in some applications.

Mounting: The Eclipse can be mounted on either of the 2 faces of the L shaped heat sink bracket using 4 #6-32 screws. No additional heat sinking is required to meet the current rating; however, product life may be increased with additional cooling. Reference the dimensional drawing on page 2. The Eclipse is also available with a bracket for DIN rail mounting, contact customer service for details.
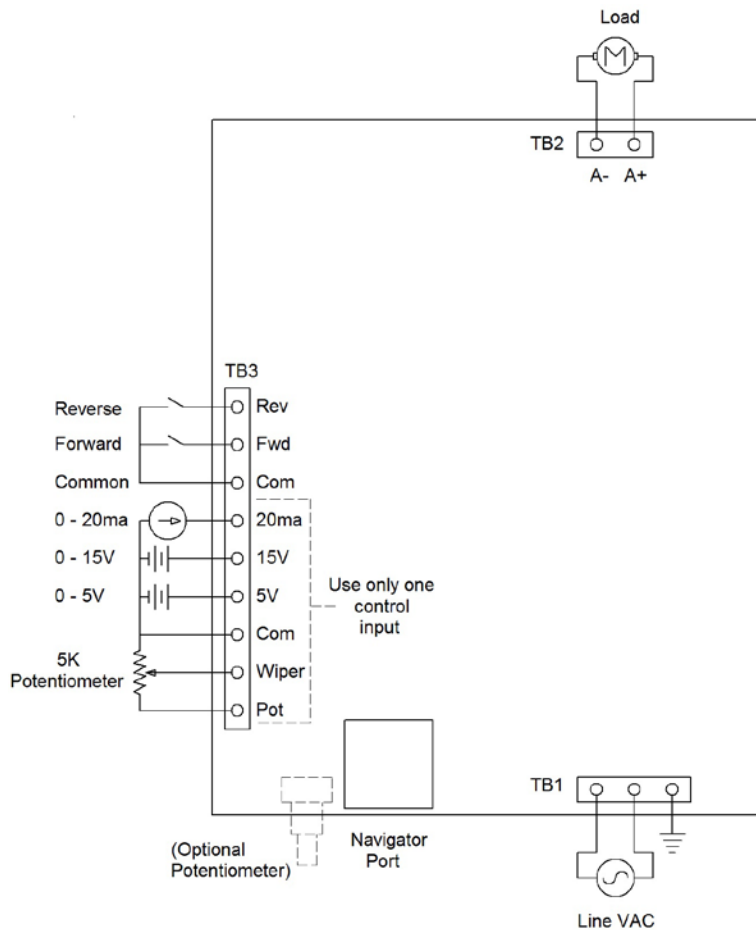
For safety purposes, it is recommended that this product be mounted in an enclosure. This product generates heat, to maintain product ratings, the temperature inside the enclosure must remain below 50°C.

Motor Connections: With the power disconnected, connect the motor to terminal block TB2 as shown below. Max. wire gauge 12 AWG. The Eclipse can also be supplied with .250" spade connections for the motor, contact customer service for details.

Control Signal Connections: 0-5VDC, 0-15VDC, 0-20mA, potentiometer, forward, reverse and off control signals are made through terminal block TB3. Although these signals are isolated from high voltage, it is recommended that power be turned off before making these connections, see below for wiring locations. Max. wire gauge 12 AWG.

Power Connections: Connect power and ground at terminal block TB1 as shown below. Max. wire gauge 12 AWG. The Eclipse can also be supplied with .250" spade connections for power, contact customer service for details.

WIRING DIAGRAM

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OPERATING MODES

ON – OFF - FORWARD – REVERSE Contact Closure:
The Eclipse will not run until a connection is made between Fwd and Com (motor will run forward) or Rev and Com (motor will reverse direction) at terminal block TB3.

Status LED: Under normal conditions the Status LED (D1) will glow green. An orange glow indicates that the programmable current limit has been reached (see **ILimit** under NAVIGATOR PROGRAMMING). A constant red LED indicates an over temperature condition. This will shut down the motor until the temperature cools and power is cycled. A flashing red LED indicates that a current condition of over 12 Amps has been sensed. This will shut down the motor until the power is cycled and the current drops below 12 Amps.

Status LED	Condition
Green	Normal Operation
Orange	Programmable current limit ILimit is reached
Red	Over temperature condition, motor shuts down, cycle power to restart
Flashing Red	Current over 12 Amps is sensed, motor shuts down, cycle power to restart

Voltage Control: The Eclipse can accept a 0-5VDC or 0-15VDC input signal to proportionally control motor speed. Refer to **Wiring Diagram** for connections. To modify the control slope, see NAVIGATOR PROGRAMMING instructions below.

Current Control: The Eclipse can accept a 0-20mA input signal to proportionally control motor speed. Refer to **Wiring Diagram** for connections. To modify the control slope, see NAVIGATOR PROGRAMMING instructions below.

Potentiometer Control: The Eclipse can accept a control signal from a 5KΩ potentiometer such as CTS# series 026 (sold separately) to proportionally control motor speed. Refer to **Wiring Diagram** for connections. The Eclipse can also be configured with an on-board potentiometer, contact customer service for details. To modify the control slope, see NAVIGATOR PROGRAMMING instructions below.

NAVIGATOR PROGRAMMING

The SmartFan Navigator PRG00-F can be used to set max. and min. speed, IR gain and compensation, current limit, acceleration and deceleration rates and save and copy settings to another drive.

To begin, connect Navigator to the Eclipse through the RJ45 connector using the Ethernet cable supplied with the Navigator. Apply power to the Eclipse to enable programming via the Navigator. Navigator will display its current revision briefly then it will show the product type connected.
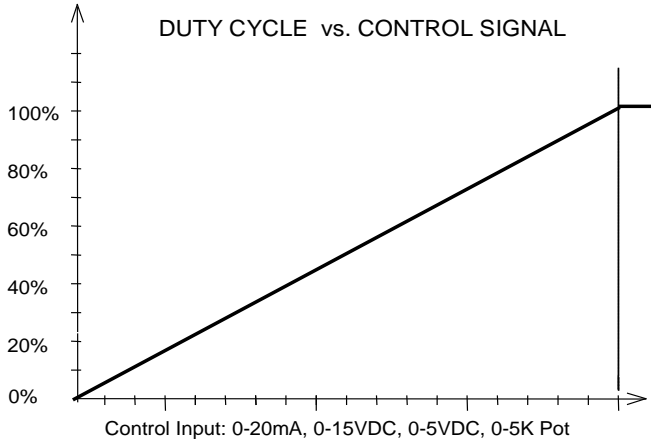
```
   Eclipse
   is ready
```

Press the **Next** key to advance to the next menu, press the **Previous** key to retreat to the previous menu. Use the ▲ or ▼ keys to adjust values in real time in each menu.

Navigator Programming Menus		
Menu	Range	Default
Max speed	0.0 – 100% PWM duty cycle	100%
Min speed	0.0 – 100% PWM duty cycle	0.0%
IR Gain	1 - 20	1
IR Comp	0.0 – 100%	0.0%
I Limit	0.25 – 8.00A	7.5A
Acceleration	0.5 – 8.0 sec	4.0 sec
Deceleration	0.5 – 8.0 sec	2.5 sec

Max Speed: Sets the PWM duty cycle from 0% to 100% in 0.1% increments. The display will show the current maximum duty cycle programmed. Use the ▲ or ▼ keys to adjust values, once the desired output duty cycle is displayed, press the **Next** key.

```
Set max speed
 →100.0%
```

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Eclipse Datasheet

DUTY CYCLE vs. CONTROL SIGNAL

Control Input: 0-20mA, 0-15VDC, 0-5VDC, 0-5K Pot

Min Speed: Sets the PWM duty cycle from 0% to 100% in 0.1% increments. The display will show the current minimum duty cycle programmed. Use the ▲ or ▼ keys to adjust values, once the desired output duty cycle is displayed, press the **Next** key. Note: the minimum speed can be set higher than the max speed to reverse the control slope.

```
Set min speed
→  0.0%
```

IR Gain: Used to adjust the gain of the IR compensation amplifier. The gain can be set to 1 - 20. A higher gain adds more output voltage per amperage when compensating for motor load. Use the ▲ or ▼ keys to adjust values, once the desired gain is displayed, press the **Next** key.

```
Set IRGain
  →1
```

IR Comp: IR compensation adjusts how much the drive compensates for motor loss under load cycle from 0% to 100% in 0.5% increments. Use the ▲ or ▼ keys to adjust values, once the desired IR compensation setting is displayed, press the **Next** key.

```
Set IRComp
 →  0.0%
```

I Limit: Adjusts the current limit for the motor. The drive will soft limit the output once this load current is reached and the Status LED will turn orange to indicate a soft limit. Current limit can be set from 0.25A to 8.00A in 0.25A increments. Use the ▲ or ▼ keys to adjust values, once the desired trip point setting is displayed, press the **Next** key.

```
Set ILimit
→ 7.50%
```

Acceleration: Used to adjust the acceleration motor time from 0% to 100% output from 0.5 to 8.0 sec in 0.5 sec increments. Use the ▲ or ▼ keys to adjust values, once the desired acceleration is displayed, press the **Next** key. Note: This setting adjusts the rate of PWM duty cycle change to the motor, actual motor speed will lag due to inertia.

```
Set Acceleration
 →  4.0 sec
```

Deceleration: Used to adjust the deceleration motor time from 0% to 100% output from 0.5 to 8.0 sec in 0.5 sec increments. Use the ▲ or ▼ keys to adjust values, once the desired deceleration is displayed, press the **Next** key. Note: This setting adjusts the rate of PWM duty cycle change to the motor, actual motor speed will lag due to inertia.

```
Set Deceleration
→2.5 sec
```

Programming Completion

To review the existing parameters of a programmed Eclipse, scroll through parameters using the **Next** or **Previous** keys. Parameters can be changed at any time using the ▲ or ▼ keys. When you are satisfied with all parameters, press the **Write Drive** key to save the settings in the Eclipse. Disconnecting power from the Eclipse before pressing **Write Drive** will discard any changes and reload the parameters from its previous memory.

Copying, Saving, Naming and Recalling Navigator Programs

Refer to the Datasheet supplied with the Navigator or download the datasheet from: www.controlresources.com/pdf/navigator.pdf.

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Troubleshooting

Navigator automatically verifies the type and version of the connected unit. It can display prompts to help the user identify possible problems.

```
Can't connect
Pls check wiring
```

Indicates the Navigator cannot receive any valid data. It is possible some wires or contacts are damaged, or the unit revision is not compatible with Navigator.

```
Please update
programmer.
```

Indicates the Navigator has found an Eclipse, but the revision is newer than the Navigator firmware supports. Navigator includes an upgrade port for future updates.

```
Older drive need
previous codes
```

Indicates the Navigator has found an older version of the Eclipse that is no longer compatible with its current firmware. The upgrade port can be used to load an older version of firmware to update the Eclipse, or it may be possible to update the Eclipse to the newer version.

TECHNICAL

HiPot Testing: The Eclipse is designed to withstand HiPot testing to 1500Vrms, line input to analog input, motor output to analog input.

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