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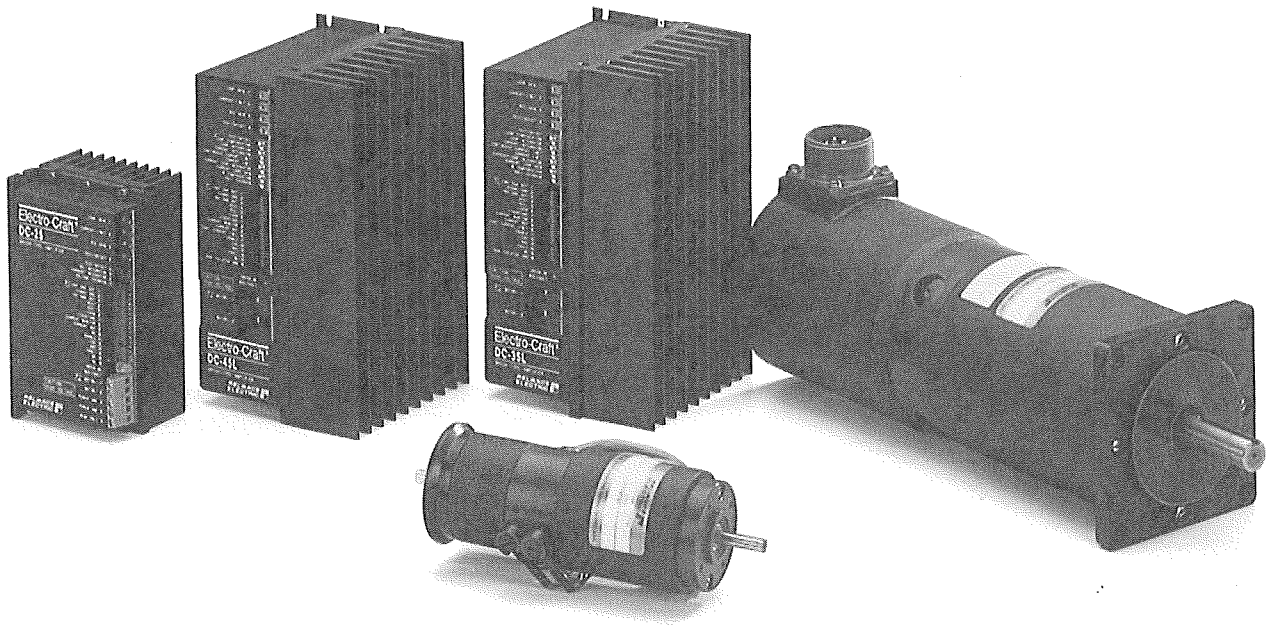
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ELECTRO-CRAFT DC MINI-SERIES AMPLIFIERS



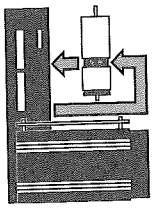
The economical DC Mini-Series PWM amplifiers are designed to drive brushtype DC motors at a high switching frequency. A single red/green LED indicates operating status. All models are fully protected against over-voltage, over-current, over-heating and against short-circuits across motor, ground, and power leads. All models interface with digital controllers or can be used as stand alone amplifiers. Loop gain, current limit, VCS gain, and offset can be adjusted using 15-turn potentiometers. The offset adjusting potentiometer can also be used as an on-board input signal for test purposes when SW4 (DIP switch) is "On".

FEATURES

- Surface-mount technology
- Small size, low cost, ease of use
- DIP switch selectable:
  current, velocity, IR compensation, position loop control
- Four quadrant regenerative operation
- Short circuit protection
- AC Power cord for off line models

TYPICAL APPLICATIONS

- Medical equipment
- Packaging machiney
- Material handling
- Textile machinery
- Robotics
- Specialty machinery
- Machine tool



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DC MINI-SERIES SPECIFICATIONS

ORDERING INFORMATION	
Description	**Order Number**
DC-25 with heatsink	DC-25
DC-35L with heatsink	DC-35L
DC-45L with heatsink	DC-45L
ELECTRICAL CHARACTERISTICS	
Automatic Current Foldback	Approx. 50%
Output Current/Phase:	
DC-25 (Cont/Peak) (1)	6/12 Amps
DC-35L (Cont/Peak) (1)	8/16 Amps
DC-45L (Cont/Peak) (1)	15/30 Amps
Switching Frequency	33 kHz
Minimum Load Inductance	200 µH
Continuous Shunt Power	30 watts (DC-45L only)
Input Signal Range	±10 V (±15 VDC Max)
Input Impedance	50 kOhm
Current Output Monitor	(MCO) Amps to Volts
Max. Cont. Shunt Power Dissipation	30 WATTS (DC-45L only)
Aux. ±5 VDC Supply (DC-25) (3)	5 mAmps Max
Aux. ±10 VDC Supply(DC-25L, DC-35L) (3)	5 mAmps Max
INPUT POWER REQUIREMENTS	
DC-25	20-80 VDC (2)
DC-35L	25-130 VAC
DC-45L	25-130 VAC

PHYSICAL CHARACTERISTICS	
Weight lbs (Kg)	
DC-25	1 lb, 6.0 oz (.7 Kg)
DC-35L	4 lb, 2.5 oz (1.9 Kg)
DC-45L	4 lb, 5.0 oz (2.0 Kg)
Ambient Temperature:	
Operating	32° to 122 ° F (0° to 50° C)
Storage Temperature	-40° to 176° F (-40° to 80° C)
Relative Humidity	5% to 95% non-condensing

ADJUSTMENTS	
I Limit	Adjusts both continuous and peak current limits by maintaining their ratio (50%)
Offset/Test	Adjusts the zero velocity offset On board signal generator
Reference Gain	Adjusts ratio between input signal and output variables (voltage, current, velocity)
Loop Gain	Adjusts the system response

(1) Mini-series amplifiers without heatsinks are available. Output current must be derated when the heatsink and cooling fan are not used. Consult local sales engineer or factory for details.
(2) Power Supplies Avalable, see Page 108.
(3) Mini-Series Amplifiers are not capable of sourcing optical encoder power.

DC MINI-SERIES MODES OF OPERATION (DIP SWITCH SELECTABLE)

OLTAGE MODE

voltage mode, the VCS input voltage commands a roportional motor voltage regardless of power supply ltage variations. This mode is recommended for velocity ntrol when velocity feedback is unavailable.

COMPENSATION MODE

here is a load torque variation when running in voltage ode, the motor current will vary, as torque is proportional to otor current. Since the motor windings have resistance, e actual motor voltage is reduced by the product of motor rrent and resistance. So motor speed - which is oportional to motor voltage (terminal voltage minus IR op) - varies with the load torque.

To compensate for the internal motor voltage drop, a tage proportional to motor current can be added to the erence voltage. The amount of compensation is adjusted an internal resistor. Use caution when adjusting the IR mpensation level. If the feedback voltage is high enough cause a rise in motor voltage with increased motor rent, instability occurs. This is due to the fact that reased voltage increases motor speed and load current ch, in turn, increases motor voltage. If a great deal of tor torque change is anticipated, it may be wise to nsider the addition of a tachometer to the motor.

VELOCITY MODE

The addition of a tachometer to the motor shaft produces a voltage proportional to speed. The tachometer output voltage replaces the motor terminal voltage as the controlled variable. Since this voltage is proportional to the motor speed, the operating mode is velocity mode.

Note that the speed is dependent on terminal voltage and motor current. The motor current is, in turn, dependent on the load torque which includes both constant friction torque and the torque to accelerate or decelerate the load. Velocity mode is more complex than voltage mode, but also results in the best performance among all the operating modes.

Performance in the velocity mode is dependent on the load inertia and characteristics, and should be verified with the motor connected to the actual load.

CURRENT (TORQUE) MODE

Current mode produces a torque output from the motor proportional to the VCS voltage input. DC motor output torque is proportional to the motor current. Current mode is particularly important if the servo amplifier is used with a digital position controller. Under this condition, a movement of the motor shaft from the desired position causes a large correcting torque, or "stiffness". Therefore, this mode may produce a "run away" condition if operated without a controller.

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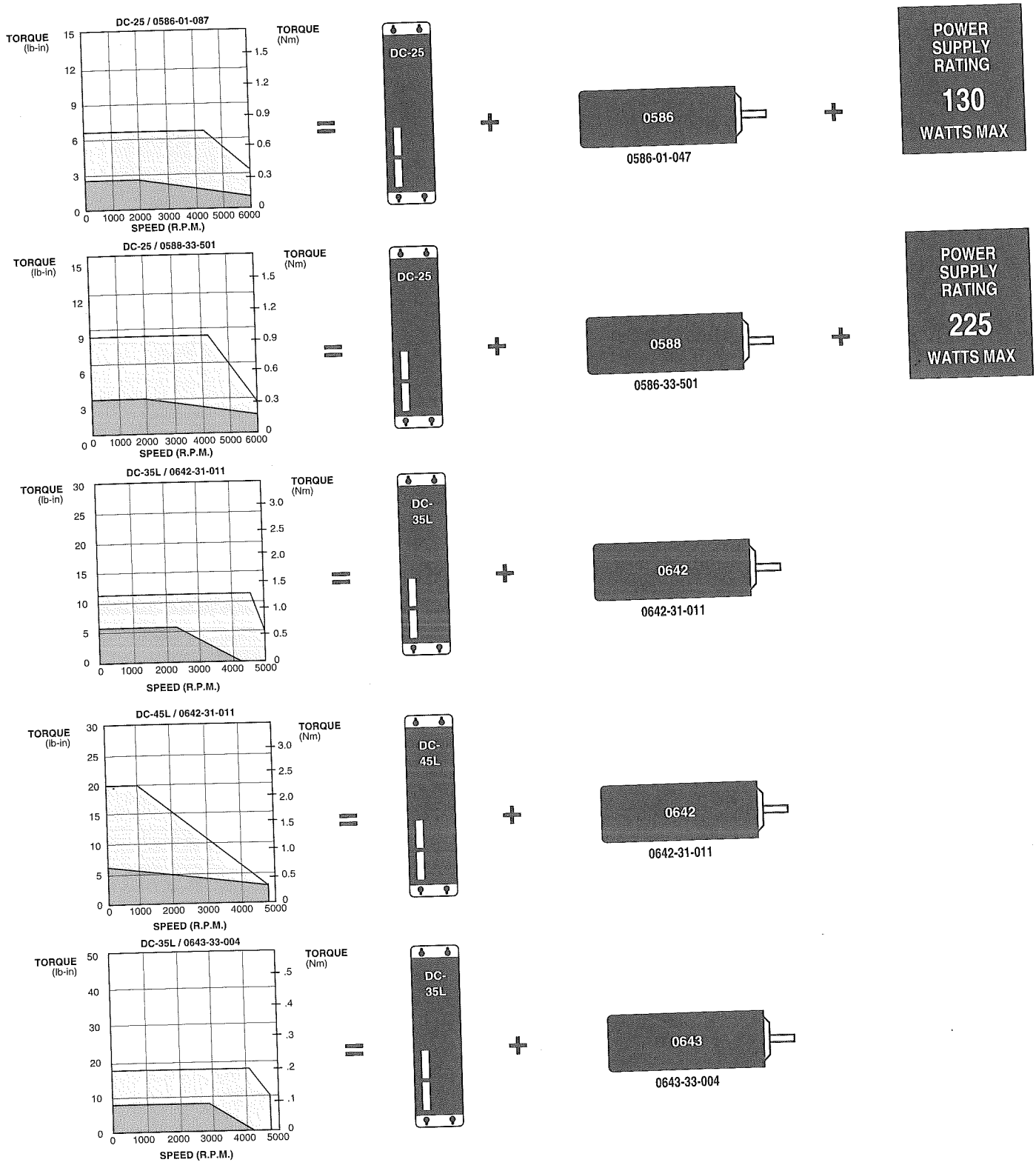
DC-25 AND DC 35L STANDARD SYSTEMS ORDERING GUIDE

System Speed-Torque Characteristics
Heatsink and Cooling Fan required to meet this performance

= Intermittent Operating Region
= Continuous Operating Region

For recommended Cooling Fan, see Page 108

Power Supply Ratings – A power supply rating is suppplied for DC-25 amplifier/motor combinations. Sum the power supply ratings and select a power supply with a larger wattage. For Power Supply details, see Page 108.



Detailed Motor Information Located in Brushless Motor Section
For Optical Encoder Options, see Page 118

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DC-35L AND DC 45L STANDARD SYSTEMS ORDERING GUIDE

System Speed-Torque Characteristics

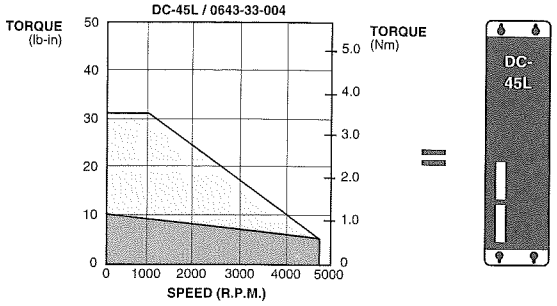
Heatsink and Cooling Fan required to meet this performance

= Intermittent Operating Region

= Continuous Operating Region

For recommended Cooling Fan, see Page 108

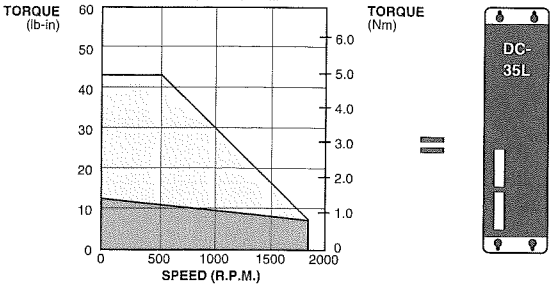
DC-45L / 0643-33-004



= DC-45L + 0643

0643-33-004

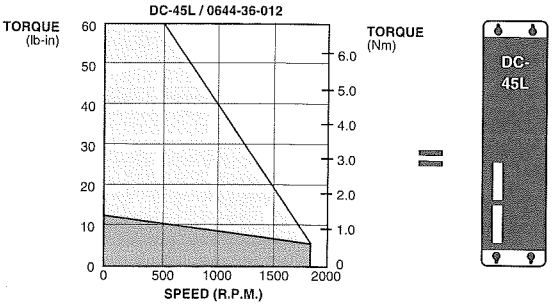
DC-35L / 0644-36-012



= DC-35L + 0644

0644-36-012

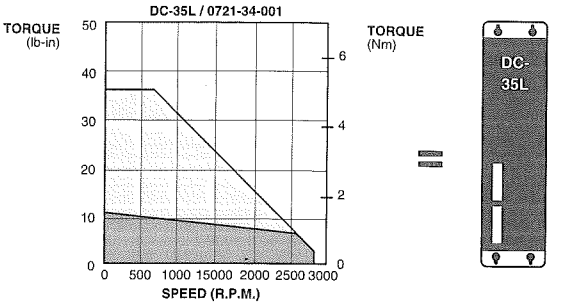
DC-45L / 0644-36-012



= DC-45L + 0644

0644-36-012

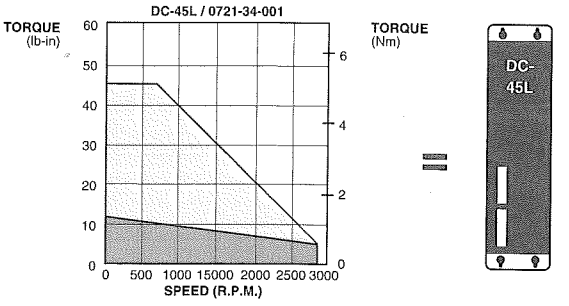
DC-35L / 0721-34-001



= DC-35L + 0721

0721-34-001
(ENV. SEALED)

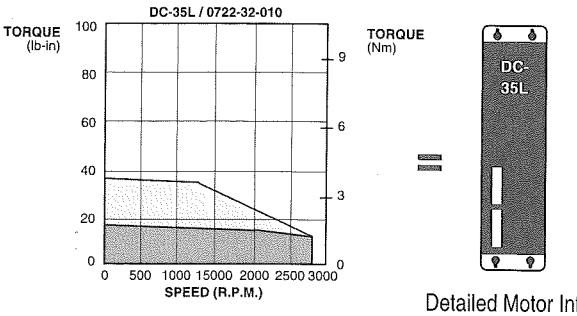
DC-45L / 0721-34-001



= DC-45L + 0721

0721-34-001
(ENV. SEALED)

DC-35L / 0722-32-010



= DC-35L + 0722

0722-32-010
(ENV. SEALED)

Detailed Motor Information Located in Brushless Motor Section
For Optical Encoder Options, see Page 118

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DC-35L AND DC 45L STANDARD SYSTEMS ORDERING GUIDE

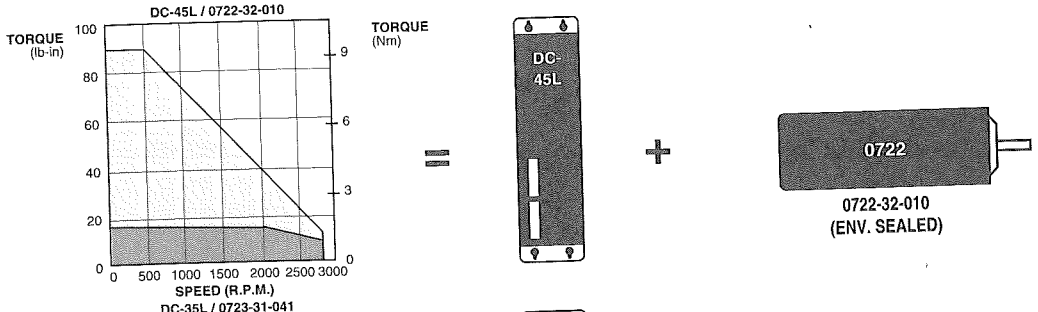
System Speed-Torque Characteristics

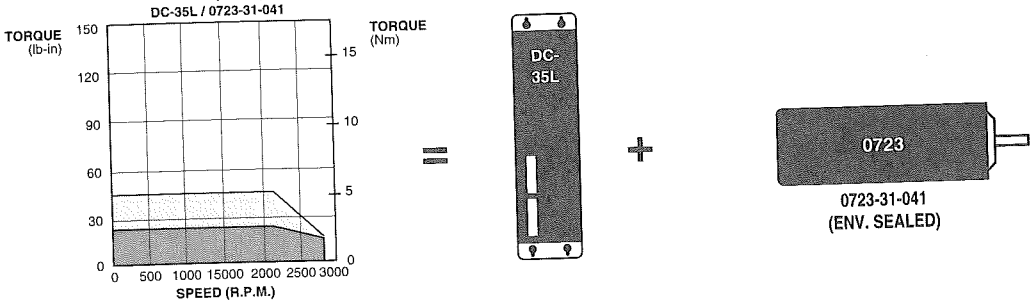
Heatsink and Cooling Fan required to meet this performance

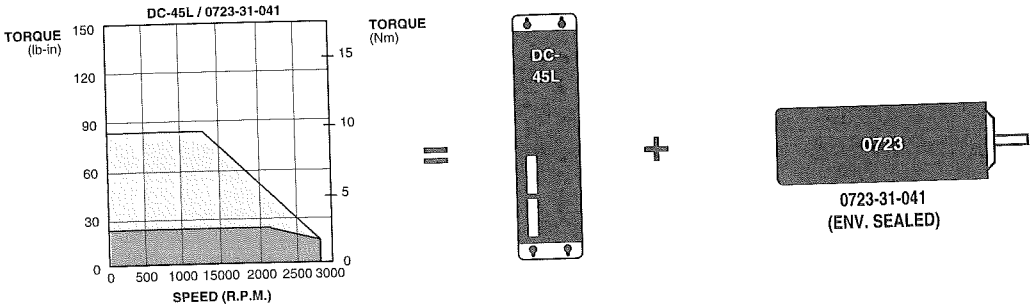
= Intermittent Operating Region

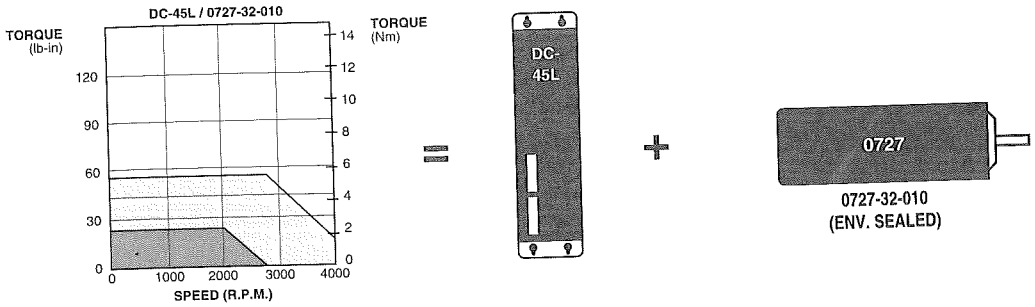
= Continuous Operating Region

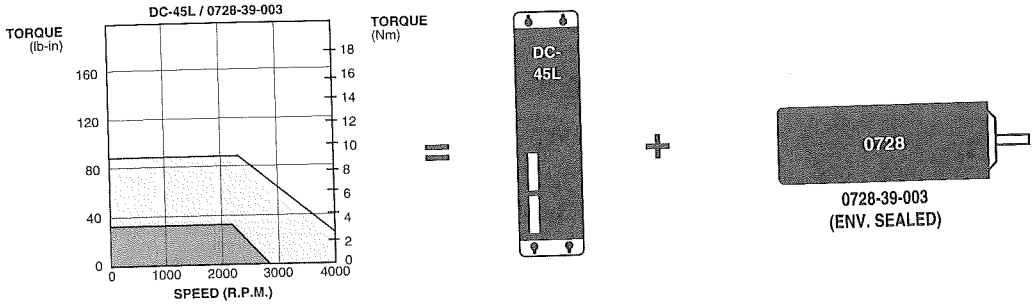
For recommended Cooling Fan, see Page 108









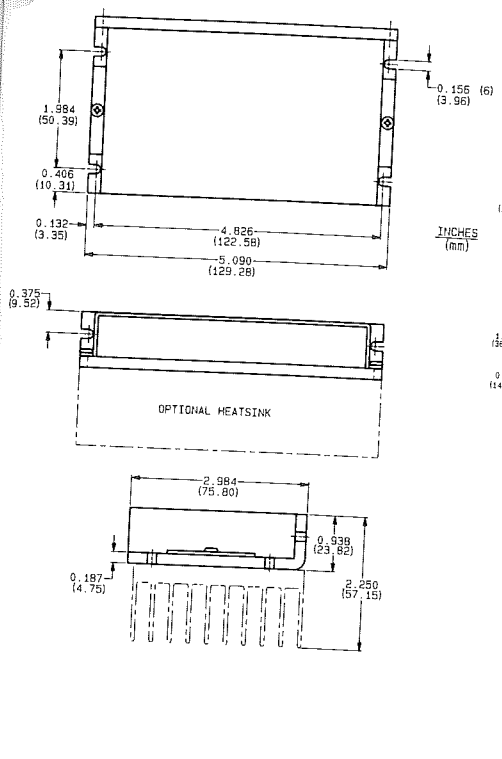


Detailed Motor Information Located in Brushless Motor Section
For Optical Encoder Options, see Page 118

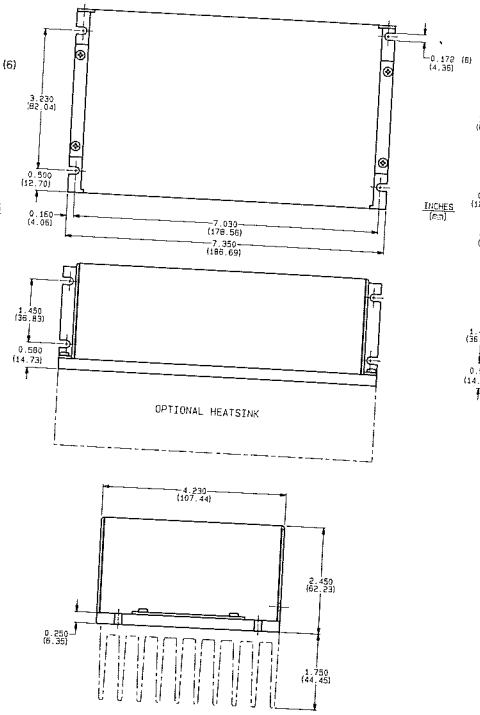
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DC MINI-SERIES OUTLINE AND MOUNTING DIMENSIONS

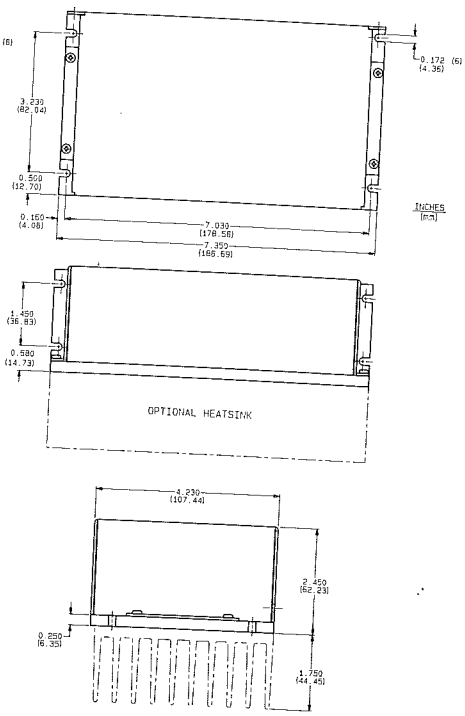
DC-25



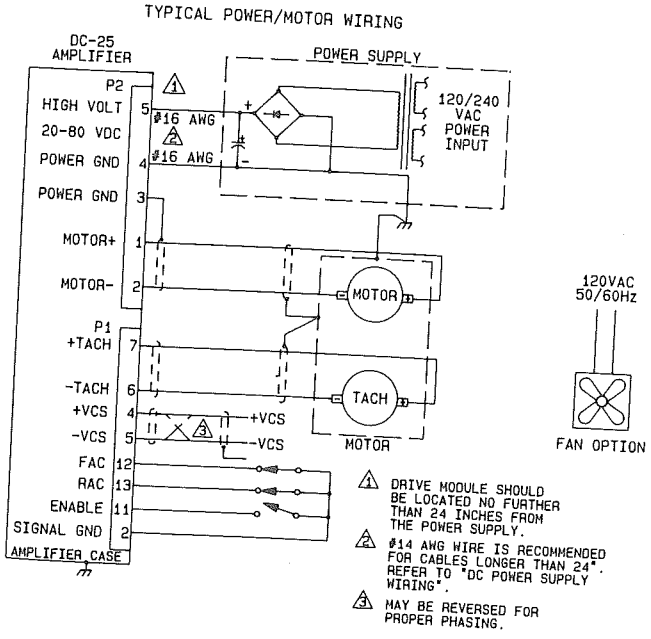
DC-35L



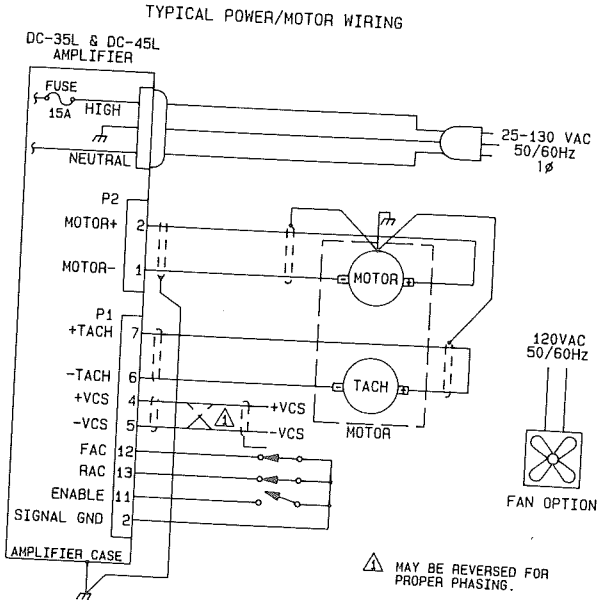
DC-45L



DC MINI-SERIES INTERFACE WIRING DIAGRAM



NOTE: Cooling Fans and Power Supply are available, See Page 108



NOTE: Cooling Fans are available, See Page 108

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