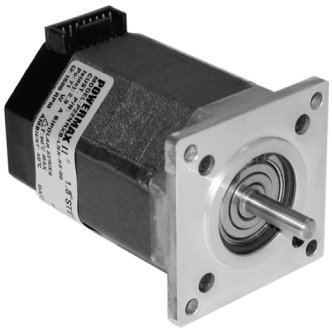
INSTALLATION BULLETIN

POWERMAX II® Hybrid Step Motors

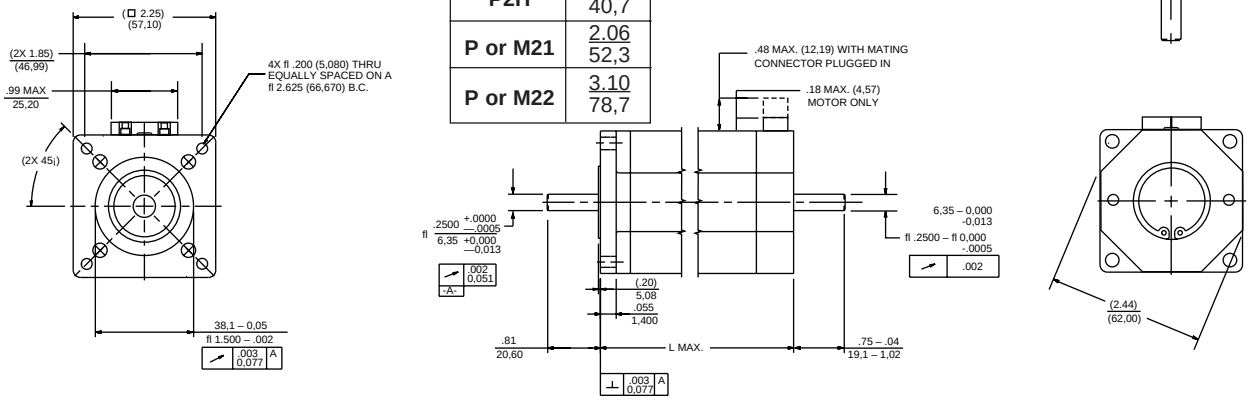
- **Dimensions**
- **Connections**
- **Encoder Option**
- **Installation Guidelines**
- **Warranty/Return Authorization**



DIMENSIONS...POWERMAX II® Hybrids

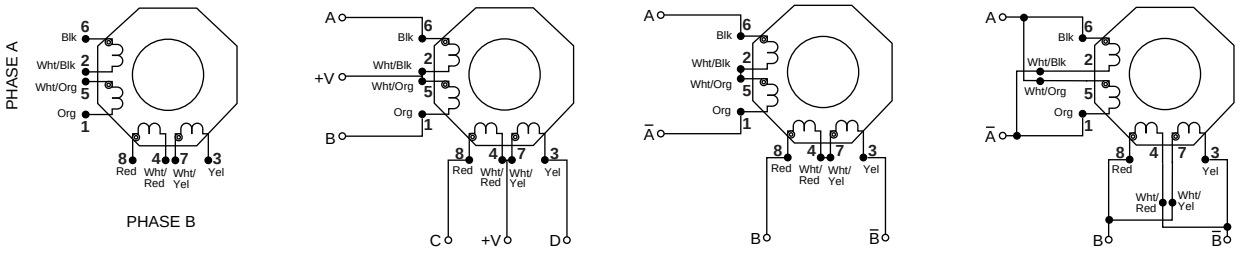
in. / mm (metric dim. for ref. only)

Motor Model	L Max.
P2H	1.60 / 40,7
P or M21	2.06 / 52,3
P or M22	3.10 / 78,7



CONNECTION INFORMATION...Terminations and phase sequencing

NOTE: Phase sequencing direction of rotation as viewed from mounting end of motor



8 lead motor (reference only)

DRIVER CONNECTION ⚠

STEP	A	B	C	D
1	GND	O	GND	O
2	O	GND	GND	O
3	O	GND	O	GND
4	GND	O	O	GND
1	GND	O	GND	O

CCW ↓ CW ↑

Unipolar full step

6-Lead connection (Unipolar)

DRIVER CONNECTION ⚠

STEP	A	$\overline{A}$	B	$\overline{B}$
1	+	−	−	+
2	−	+	−	+
3	−	+	+	−
4	+	−	+	−
1	+	−	−	+

CCW ↓ CW ↑

Bipolar full step

4-Lead motor (Bipolar)

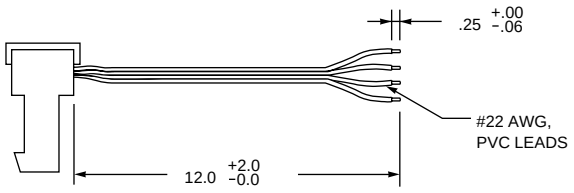
Notes:

⚠ 0 = off or open
\+ = positive current flow
\- = negative current flow
GND = ground

Optional Flying Lead Connection Information

CONNECTION	LEAD COLOR	DRIVER CONNECTION
4-LEAD BIPOLAR	BLK	A
SERIES	ORG	$\overline{A}$
	RED	B
	YEL	$\overline{B}$
	WHT/BLK & WHT/ORG	—
	WHT/RED & WHT/YEL	—
4-LEAD BIPOLAR	BLK & WHT/ORG	A
PARALLEL	ORG & WHT/BLK	$\overline{A}$
	RED & WHT/YEL	B
	YEL & WHT/RED	$\overline{B}$
6-LEAD UNIPOLAR	BLK	A
	ORG	B
	RED	C
	YEL	D
	WHT/BLK & WHT/ORG	+V
	WHT/RED & WHT/YEL	+V

Typical leaded connector (4-lead shown)



. . . Optional mating connector only

A separate mating connector housing and strain relief cover are available from Pacific Scientific or AMP. The user attaches leads to the connector.

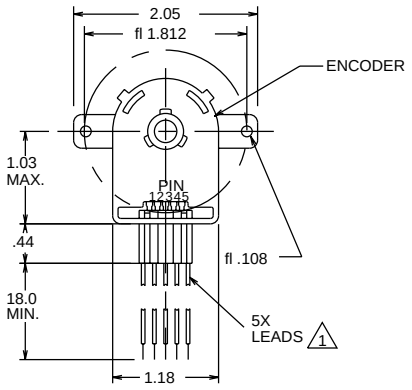
ITEM	PACIFIC SCIENTIFIC	AMP
STANDARD HOUSING	GP00012	641653-8
STANDARD COVER	GP00013	643077-8

NEMA 23 Encoder Option

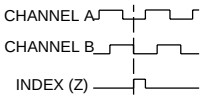
The standard encoder offered on the NEMA 23 motor is the Agilent Technologies HEDS 5600 series.

PIN	COLOR	FUNCTION
1	BLACK	GROUND
2	BLUE	Z
3	WHITE	A
4	RED	+5V
5	BROWN	B

NON-LINE DRIVER ENCODER



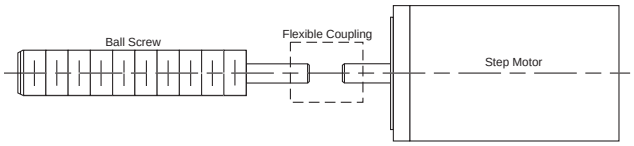
ENCODER OUTPUT
FOR CW DIRECTION OF ROTATION WHEN VIEWED FROM MOTOR DRIVE SHAFT END.



⚠1 Leads are terminated with Agilent Technolgies HEDS-8903 connector.

Installing the motor

1. Mounting
   - Mount the motor tightly against a metal surface with good thermal conductivity, such as aluminum or steel.
   - Secure the motor firmly using hexagonal socket screws and nuts or an equivalent method.
2. Alignment of the load
   - When connecting the load to the shaft, assure that the longitudinal axes of both load and shaft are aligned. Use of a flexible coupling or similar device is recommended.



   - When machining the motor shaft, or connecting it to a pulley or other device, do not subject to shaft to a thrust load, overhanging load or shock.

CAUTION

1. Do not disassemble the motor, drop it or subject it to shock
   - Disassembly results in a considerable reduction in motor performance. Dropping it or subjecting it to shock may cause internal damage. Any of the above conditions may void the warranty.
2. Do not subject the motor to any of the following conditions:
   - Locations where strong vibrations or shock occur
   - Dusty locations
   - Locations where water, oil or other liquids are likely to come in contact with the motor
   - Locations where the ambient temerature is outside the permissible temperature range of -20°C (-4°F) to +40°C (+104°F)
3. Temperature rise
   - The temperature rise of the motor's outer surface should not exceed +100°C (+212°F). Note that operating the motor with a constant-current driver can lead to a sharp rise in temperature under certain drive conditions. Employ forced-air cooling if the temperature exceeds +100°C (+212°F).

Warranty Policy / Return Authorization

1. Pacific Scientific warrants motor to be free from defects in material and workmanship for two years from the date of manufacture as determined by the date code on the product label. The warranty does not include damage resulting from misapplication, or damage resulting from abuse, overload or overheat conditions, or from failure to provide adequate maintenance.

2. Prior to returning any products for repair, authorization must first be received from the Pacific Scientific Customer Response Center (Phone 815-226-3100, Fax 815-226-3124). The Customer Response Center will issue a Return Material Authorization number which must be referenced on the packing slip and on the outside of the shipping container of the returned product(s). Returns without a valid Return Material Authorization number will not be accepted.

PACIFIC SCIENTIFIC
HIGH PERFORMANCE MOTORS & DRIVES

4301 Kishwaukee Street
P.O. Box 106
Rockford, IL 61105-0106
(815) 226-3100
Fax (815) 226-3080
www.pacsci.com