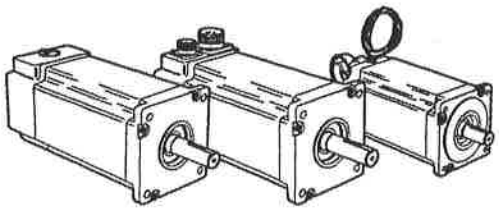
INSTALLATION BULLETIN

POWERPAC™ NEMA 34 & 42 Hybrid Step Motors and Synchronous Motors

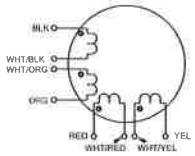
- Power Connections
- Phase Sequencing Tables
- Encoder Options
- Installation Guidelines
- Warranty/Return Authorization



Power Connections: 8 flying leads (NEMA 34 only) or 8 Terminals (not available in systems construction - MS connector).

The 8-lead motor is the most versatile configuration. It may be connected by the user in choice of 8-lead, 4-lead (series or parallel) or 6-lead configuration.

CONNECTION	DRIVER CONNECTION	LEAD COLOR	TERMINAL #
4-LEAD BIPOLAR	A	BLACK (BLK)	1
SERIES	$\overline{A}$	ORANGE (ORG)	3
	B	RED	2
	$\overline{B}$	YELLOW (YEL)	4
	NONE	WHT/BLK & WHT/ORG	6 & 5
	NONE	WHT/RED & WHT/YEL	8 & 7
4-LEAD BIPOLAR	A	BLK & WHT/ORG	1 & 5
PARALLEL	$\overline{A}$	ORG & WHT/BLK	3 & 6
	B	RED & WHT/YEL	2 & 7
	$\overline{B}$	YEL & WHT/RED	4 & 8
6-LEAD UNIPOLAR	A	BLACK (BLK)	1
	B	ORANGE (ORG)	3
	C	RED	2
	D	YELLOW (YEL)	4
	+V	WHT/BLK & WHT/ORG	6 & 5
	+V	WHT/RED & WHT/YEL	8 & 7
GND		GREEN/YELLOW	



8-Lead Configuration
NEMA 34 only

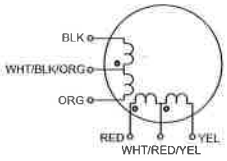
Terminal Board
NEMA 34 and 42

NOTE:
1. See phase sequencing tables.

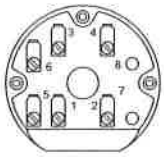
Power Connections: 6 flying leads (NEMA 34 only) or 6 Terminals (not available in systems construction - MS connector).

The 6-lead motor is normally used with unipolar drives. In some cases, the 6-lead motor can be used in a 4-lead series configuration for use with bipolar drives.

CONNECTION	DRIVER CONNECTION	LEAD COLOR	TERMINAL #
6-LEAD UNIPOLAR	A	BLACK (BLK)	1
	B	ORANGE (ORG)	3
	C	RED	2
	D	YELLOW (YEL)	4
	+V	WHT/BLK/ORG	5
	+V	WHT/RED/YEL	6
4-LEAD BIPOLAR	A	BLACK (BLK)	1
SERIES	$\overline{A}$	ORANGE (ORG)	3
	B	RED	2
	$\overline{B}$	YELLOW (YEL)	4
	NONE	WHT/BLK/ORG	5
	NONE	WHT/RED/YEL	6
GND		GREEN/YELLOW	



6-Lead Configuration
NEMA 34 only



Terminal Board
NEMA 34 and 42

8-9-19

8 ID-E
TG3
RAIL

NOTE:
1. Terminals 7 and 8 are not used.
2. See phase sequencing tables.

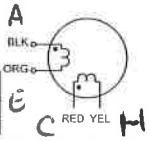
Power Connections: 4 flying leads, 4 terminals or MS connector.

The 4-lead motor is for use with bipolar drives.

CONNECTION	DRIVER CONNECTION	LEAD COLOR	TERMINAL #	MS PIN OUT
4-LEAD BIPOLAR	A	BLACK	1	A
	$\overline{A}$	ORANGE	3	B
	B	RED	2	C
	$\overline{B}$	YELLOW	4	D
GND		GREEN/YELLOW		E

MOTOR POWER CONNECTOR
NEMA 34 & 42
M53102R14S-5P

SUGGESTED MATING CONNECTOR	
NEMA 34 & 42	PAC SCI P.N.
MS3106F14S-5S	SZ00019



4-Lead Configuration

Terminal Board

MS Connector
NEMA 34 and 42

NOTE:
1. Terminals 5, 6, 7 and 8 are not used.
2. See phase sequencing tables.

Phase Sequencing Tables:

DRIVER CONNECTION

STEP	A	$\overline{A}$	B	$\overline{B}$
1	+	—	0	0
2	+	—	+	—
3	0	0	+	—
4	—	+	+	—
5	—	+	0	0
6	—	+	—	+
7	0	0	—	+
8	+	—	—	+

CCW ↑ CW

BIPOLAR HALF STEP PHASE SEQUENCING

DRIVER CONNECTION

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

CCW ↑ CW

BIPOLAR FULL STEP PHASE SEQUENCING

STEP	A	B	C	D
1	GND	0	GND	0
2	0	GND	GND	0
3	0	GND	0	GND
4	GND	0	0	GND
1	GND	0	GND	0

CCW ↑ CW

UNIPOLAR FULL STEP PHASE SEQUENCING

NOTES:
1. 0 = OFF OR OPEN.
2. + = POSITIVE CURRENT FLOW.
3. — = NEGATIVE CURRENT FLOW.

Limits bypassed

ELCO → MTR

A — BLK → 5+6
E — ORG → 1+2
C — RED → 7+8
H — YEL → 3+4

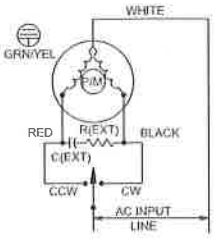
?

Synchronous Motor Connections

Splashproof Construction = L or M
Terminal Board

TERMINAL NUMBER	LEAD COLOR
1	RED
2	WHT
3	BLACK

Schematic Diagram
All Constructions



Note:
MIL spec standard circular connector MS3102R14S-5P.
Suggested mating connector MS3106F14S-5S

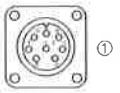
Regular Construction = R
Flying Leads

Motor Leads #22 AWG.
See schematic for hookup

System Construction = C
MS Connectors

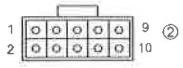
PIN	LEAD COLOR
A	BLK
B	WHT
C	RED
D	-----
E	GRN/YEL

NEMA 34 & NEMA 42 Encoder Options



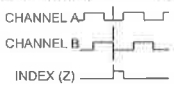
ENCODER CONNECTOR

PIN	FUNCTION
A	CHANNEL A
B	CHANNEL $\overline{A}$
C	CHANNEL B
D	CHANNEL $\overline{B}$
E	CHANNEL Z
F	CHANNEL $\overline{Z}$
G	+ 5 VDC
H	5 VDC RTN



PIN	FUNCTION
1	N/C
2	+5V
3	GROUND
4	N/C
5	$\overline{A}$
6	A
7	$\overline{B}$
8	B
9	$\overline{Z}$
10	Z

ENCODER OUTPUT
FOR CW DIRECTION OF ROTATION WHEN VIEWED FROM MOTOR DRIVE SHAFT END. (COMPLEMENTS NOT SHOWN) MIN. EDGE SEPARATION 45°. INDEX GATED TO $\overline{A}$ AND $\overline{B}$.



Notes:
① NEMA 34, NEMA 42 system construction with MS connector
② NEMA 34, regular construction only

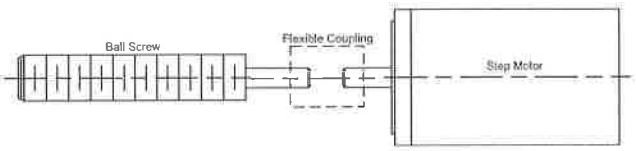
MOTOR FEEDBACK CONNECTOR
CA3102E20-7P-A206-F80-FO

SUGGESTED MATING CONNECTOR	
PAC SCI P.N.	CANNON P.N.
CZ00008	MS3106A20-7S-621

MATING CONNECTOR NOT OFFERED
SUGGESTED MFR. PART NUMBERS
BERG P/N 65846-010 MOLEX P/N 22-55-2102

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 (unless IP65)
   - Locations where water, oil or other liquids are likely to come in contact with the motor (unless IP65)
   - 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 of the motor's outer surface should not exceed +140°C (+284°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 Danaher Motion Customer Support Group (Phone 815-226-3100, Fax 815-226-3148). The Customer Support Group 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.

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