

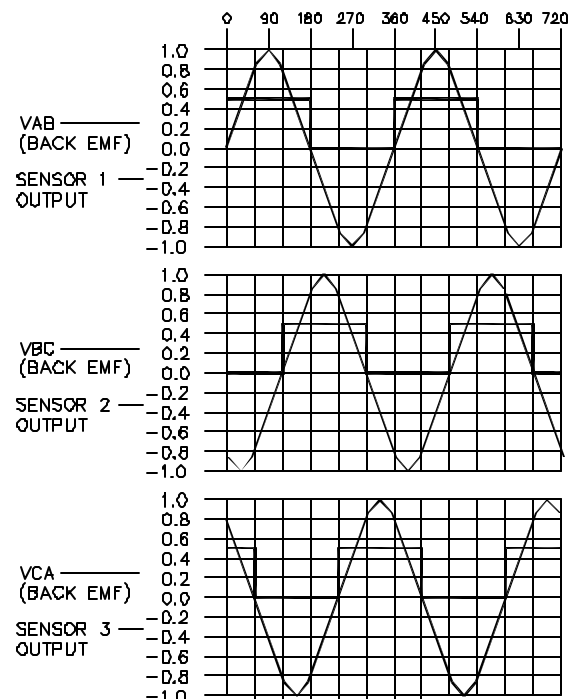
LTR	ECD NO.	DESCRIPTION	DRN	APP'D	DATE
A	080439	PRODUCTION RELEASE	JWT	BD	11/11/08
B	090136	CHG'D LEAD LENGTH AND SHAFT EXTENSION	JWT	MG	7/14/09

WINDING CONSTANTS*	UNITS	TOL	SYM	WDG Z
DC RESISTANCE	OHMS	±12.5%	R	0.13
VOLTAGE @ T <sub>p</sub>	VOLTS	NOMINAL	V <sub>p</sub>	6.59
CURRENT @ T <sub>p</sub>	AMPERES	NOMINAL	I <sub>p</sub>	50.7
TORQUE SENSITIVITY	OZ-IN/AMP	±10%	K <sub>t</sub>	4.93
BACK EMF CONSTANT	VOLTS/(RAD/SEC)	±10%	K <sub>b</sub>	0.0348
INDUCTANCE @ 1Khz	MILLIHENRIES	±30%	L	0.165

MOTOR PARAMETERS*	UNITS	SYM	VALUE
PEAK TORQUE	OZ-IN	T <sub>p</sub>	250.0
CONTINUOUS STALL TORQUE**	OZ-IN	T <sub>cs</sub>	63.8
MOTOR CONSTANT	OZ-IN/√WATT	K <sub>M</sub>	13.7
ELECTRICAL TIME CONSTANT	MILLISECONDS	τ <sub>E</sub>	1.27
MECHANICAL TIME CONSTANT	MILLISECONDS	τ <sub>M</sub>	1.74
POWER I²R @ T <sub>p</sub>	WATTS	P	334
DAMPING FACTOR (ZERO IMPEDANCE)	OZ-IN/(RAD/SEC)	F <sub>D</sub>	1.32
FRICTION TORQUE	OZ-IN	T <sub>F</sub>	3.0
ROTOR INERTIA	OZ-IN-SEC²	J <sub>M</sub>	2.3x10 <sup>-3</sup>
THEO. NO LOAD SPEED	RPM	S <sub>0</sub>	5270
THEO ACC @ T <sub>p</sub>	RAD/SEC²	α <sub>T</sub>	1.1x10 <sup>5</sup>
THERMAL RESISTANCE	°C/WATT	θ <sub>TH</sub>	4.0
MAX ALLOWABLE WINDING TEMP	°C	TEMP	155
PHASES/WINDING TYPE			3/Δ
POLES			4
WEIGHT	OZ	W <sub>T</sub>	28.0

\* 25°C AMBIENT TEMP  
 \*\* 25°C AMBIENT, 155° WINDING TEMP

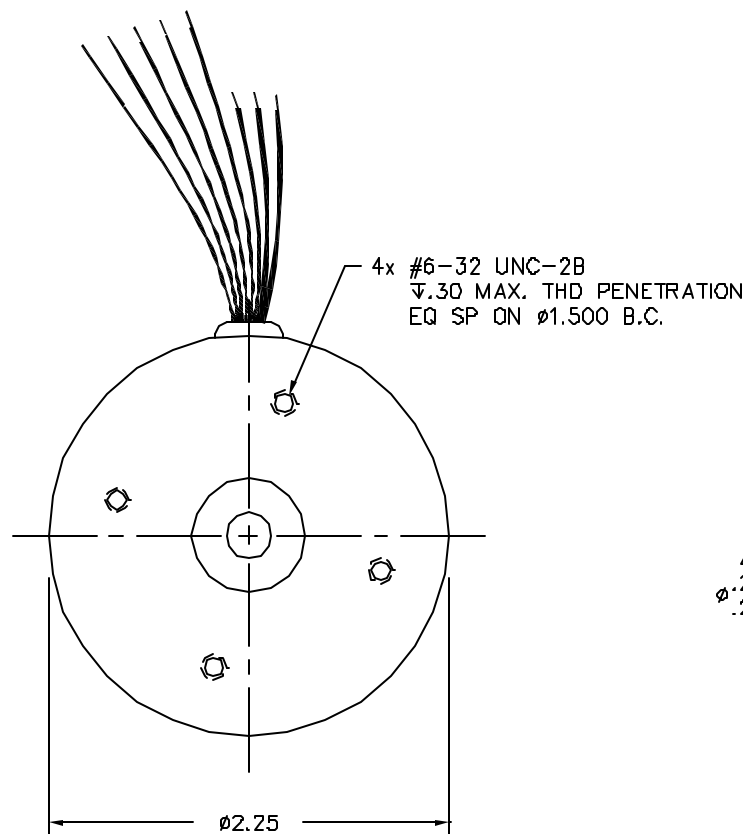
BACK EMF AND SENSOR WAVEFORMS  
 (ROTATION OF MOTOR = CLOCKWISE FACING LEAD SIDE)



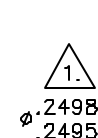
MOTOR LEADS	COLOR	1	2	3	4	5	6
A	RED	+	+	-	-	-	-
B	BLK	-	+	+	-	-	-
C	GRN	-	-	+	+	-	-
1	BRN	1	1	0	0	1	1
2	BLU	0	1	1	1	0	0
3	ORG	0	0	0	1	1	1
Vcc+	YEL						
GND	GRY						

1. SHAFT RUNOUT TO BE .003 MAX.

NOTES: UNLESS OTHERWISE SPECIFIED



LEAD WIRE: TEFLON TYPE E  
 3x #18 AWG  
 5.0 MIN. LONG  
 5x #24 AWG  
 8.0 MIN. LONG  
 STRIP AND TIN  
 ENDS .25 ± .05 EA



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THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
 -ALL DIMENSIONS ARE IN INCHES  
 -BREAK SHARP EDGES .015 MAX.  
 -SURFACE ROUGHNESS √63  
 -DIMENSIONS APPLY AFTER FINISH  
 -MAX FILLET R .100  
 -DIAMETERS SHALL NOT EXCEED A RUNOUT OF .005 FIN.

TOLERANCES:  
 DECIMALS  
 X ± .03  
 XX ± .01  
 XXX ± .005

ANGULAR  
 ±0° 30'

DO NOT SCALE DRAWING

**BEI KIMCO MAGNETICS DIVISION**  
 VISTA, CA 92081

DRAWN <b>J. THOMPSON</b>	DATE 7/30/08	TITLE <b>BRUSHLESS DC MOTOR</b>
MECH CHECK <b>S. MCGHEE</b>	DATE 8/18/08	
APPD <b>B. DU</b>	DATE 8/18/08	
FILE NO. M:\TOPLEVEL\DIH23-30-013Z	SIZE <b>B</b>	FSCM NO. 55789
	DWG NO. DIH23-30-013Z	REV <b>B</b>
	SCALE: NONE	SHEET 1 OF 1

# DIH23<sup>BDN</sup> Series

## DIH23-□□-BDN Series

BEI's proven performer, the DIH23-BDN Series, provides a complete, compact package to drop into any design where you need the reliability and long life of brushless motors. These housed motors boast all the advantages of DC permanent-magnet motors, plus linear speed/torque curves, long life, no risk of demagnetizing, freedom from brush dust, quieter operation, and better thermal performance.

### Description

Elimination of brushes and mechanical commutators, coupled with the low inertia and shorter mechanical time-constant resulting from internal rotor placement, make DIH23-BDN Series motors ideal for high speed operations as well as incremental or start-stop motion.

### Brushless vs. Brush-Type Benefits

- Smaller motor packages
- High speed operation
- Greater through-put
- Inherently explosion resistant

### Options

Choose from feedback components to suit any requirements, including an optional mounted BEI encoder. Select a winding configuration and stack length to match your performance parameters. Specify a standard or double-ended shaft. These standard options can be defined in the part number. Or consult a BEI specialist for advice on other custom features such as a wye center-tap, skewed windings, and alternate magnet materials.



### Applications

- Medical equipment
- Optical scanners
- Incremental and streaming tape drives
- Test and measurement devices
- Machine tools and pumps
- Blowers and fans
- Automated manufacturing – robotics, pick-and-place
- Semi-conductor processing equipment
- Computer peripherals, printers and plotters

## Ordering Information

DIH23 - □□ - BDN □

23 Standard Diameter (in tenths of an inch; i.e., 2.25 inches) □  
Housing Length (// in tenths of an inch; i.e. 13, 16, 19, 22) □  
Factory Contolled □  
Rear shaft extension/encoder mounting provisions □  
N = No  
Y = Yes  
Winding option (select A-E, see selection chart, over) or specify. □

DIH23  
D - Direct Current  
I - Internal Rotor  
H - Standard Housing

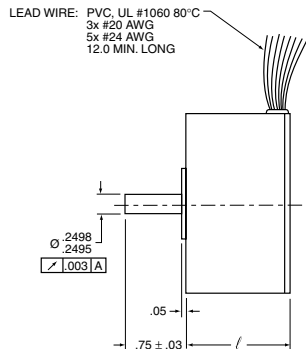
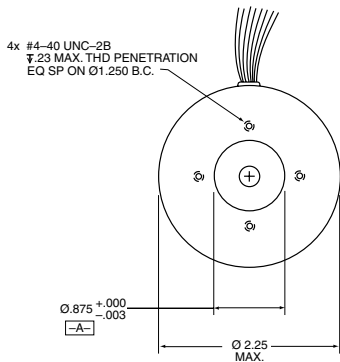
### TO DETERMINE WATTS OUTPUT:

$$\text{Watts}_{\text{out}} = \text{Torque (oz}\cdot\text{in)} \times \text{Speed (rpm)} \times (7.49 \times 10^{-4})$$

1 HP = 746 Watts

The data, specifications, and electrical parameters presented in this data sheet illustrate typical applications, are for reference only and are subject to change without notice. Although efforts have been made to ensure the accuracy of the information given, nothing herein is intended or should be construed as a warranty of the performance or design of BEI products. Product and data warranties are described solely in BEI contractual documents.

# DIH23--BDN DC Brushless Motors



LEAD COLOR	CIRCUIT TERMINAL	WIRE SIZE AWG.
BRN	SENSOR 1	24
BLU	SENSOR 2	24
ORG	SENSOR 3	24
YEL	SENSOR SUPPLY	24
GRY	SENSOR RETURN	24
RED	PHASE A	20
BLK	PHASE B	20
GRN	PHASE C	20

## GENERAL CHARACTERISTICS:

Ambient Operating Temperature: -55°C to 65°C  
 Insulation Resistance @ 500VDC: 1000 Megaohms Min.  
 Bearings: Grease Packed, Double Shielded