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BODINE ELECTRIC COMPANY

BODINE ELECTRIC COMPANY

Small Motors Gearmotors Motion Controls







Stock Catalog NR-2

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General Information

Safety and Installation Precautions

Bodine products are designed and manufactured to comply with applicable safety standards. Since even well-built apparatus can be installed or operated in a hazardous manner, it is important that safety considerations be observed by the user. With respect to the load and environment, the user must properly select, install, and use the apparatus.

It is the responsibility of the equipment manufacturer or the individual installing the apparatus to take diligent care in installing it. Local electrical and safety codes should be followed when installing the apparatus to reduce hazards to persons and property.

Bodine totally enclosed (IP- 44) products are not explosion proof nor dust-ignition proof. Bodine does not offer products for locations which are exposed to flammable/explosive gas, vapor or dust. An approved explosion proof or dust-ignition proof product is recommended for hazardous locations.

For more safety information request Motor / Gearmotor Safety, Installation, Use and Maintenance Information PN 074 00045.

Conversions

Shown below are conversions from English and Metric units to SI (System International) units.

1 Lb-in. = { 0.113 N·m / 113 mN·m

1 Kp-m = { 1 Kgf-m / 9.81 N·m

1 Hp = 746 W

1 Rpm = { 1 r/min. / 1 U/min. / 1 t/min.

1 in. = 25.400 mm

Example:
Convert 18 Lb-in. to N·m

$$18 \text{ Lb-in.} \left(\frac{0.113 \text{ N·m}}{1 \text{ Lb-in.}} \right) = 2.0 \text{ N·m}$$

Introduction

The Bodine line of small motors, gearmotors, and electronic motion controls is unusually complete. This catalog describes Bodine's N-Line, which has been used successfully in applications popular in Europe, North America and many other parts of the world since 1930. Catalog S-12 contains products and selection information for new applications.

How to Order
Most stock items are available from Authorized Bodine Distributors. *To order any stocked product just specify the Model Number.* For products without model numbers, large quantities or specials contact Bodine or your nearest Representative.

If the model number you select is not available or it is footnoted with a ☆, refer to the Model Number History (pages 19-23) for an alternative product.

Applications

Consistent performance, long life, and reliability are fundamental to Bodine designs. Since 1905 Bodine motors, gearmotors, and controls have been used in assembly equipment, conveyers, packaging equipment, copiers, lab instruments, photographic processors, medical and other scientific apparatus...wherever component size, weight, reliability and integrity are prime considerations.

If you need selection assistance, please contact your Representative or the Home Office. For new applications, please request catalog S-12 and use Form 1476 or supply the following information:

- Your machine and ambient conditions
- Voltage and frequency
- Direction of rotation, reversing
- Maximum speed and speed range
- Starting torque and running load
- Duration of continuous run and rest periods
- Size, weight, and noise limitations
- Motor mounting position
- Life requirement
- Estimated annual requirements
- Gear driveshaft speed and torque

For existing Bodine applications, all we need is a Type and Serial No.–both on the nameplate.

Construction Recognition

Most Bodine products are "third party approved" with respect to construction. Motors, gearmotors, and controls are "recognized by U.L. Inc." and are registered in U.L. Construction Recognition File No. E47177 and E44529. Many stock products are also CSA certified and appear in CSA File No. LR2797 and LR26397.

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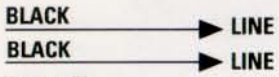
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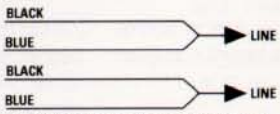
CONNECTION DIAGRAMS

074 10001; 2 Lead



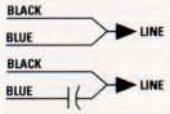
Non-reversible

074 10004; 4 Lead



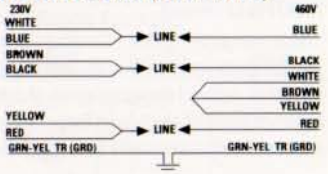
To reverse direction, transpose blue leads.

074 10005; 4 Lead



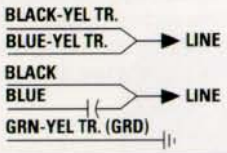
To reverse direction, transpose blue leads.

074 10011; 6 Lead (3Ø, 230/460V)

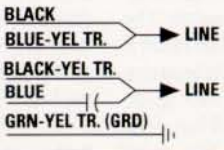


To reverse direction, transpose any two leads or combinations.

074 10296



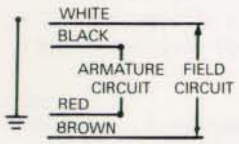
074 10297



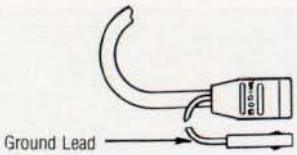
Connect as shown above for clockwise rotation while viewing the output shaft. To reverse direction transpose the black and black-yel. tr. leads.

074 10085; 5 Lead
(Shunt, 4 wire with grd. lead)

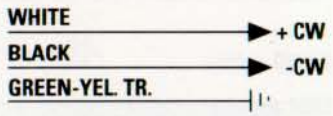
To reverse direction, transpose red and black leads.



Control -type Shunt wound motors and gearmotors have 18" long cable with molded plug as illustrated below. Plug mates with receptacle on matching Bodine speed controls. Plug can be omitted if not required. See connection diagram No. 074 10085 for color coding of leads within the cable.

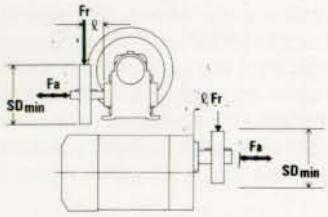


074 10101; 3 Lead
(PM, 2 wire with ground lead)



Direction of rotation indicated relates to motor only. Direction of gearmotor drive shaft rotation varies depending on gear ratio.

Note: All *stock* items have a ground lead or terminal which is not always illustrated in the corresponding connection diagram.



Radial (Fr) and Axial (Fa) Loads

When choosing a motor or gearmotor, it is important that the maximum radial and axial loads for the motor or gearmotor be considered. Simplified allowable radial load information is provided for the motors and gearmotors listed in this catalog. The following engineering assumptions are made:

1) That the radial load is in the most disadvantageous radial direction with respect to the shaft axis.
2) That the motor or gearmotor is delivering maximum rated torque.
3) That the radial load is a specified distance from either the hub (seal face) or mounting surface of the unit. (Fr will increase if the radial load is closer to the drive unit, and decrease if further out on the shaft.)
4) That a chain and sprocket is employed to transmit torque from the unit to the driven device. Divide Fr values by 1.1 for gear and pinions, 1.5 for V-belts; 1.2 for timing belts and 2.5 for flat belts.

Notes

a) Radial loads on a unit can be avoided by transmitting the torque through a coupling of the type that does not induce or transmit radial loads.
b) Exceeding allowable radial loads will result in failure and/or premature wear-out of the drive unit.
c) Higher loads may be possible. Consult Bodine if radial or axial loads not covered by the provided data are contemplated.

The notations used for radial and axial load calculations on specific motor and gearmotor pages are as follows:

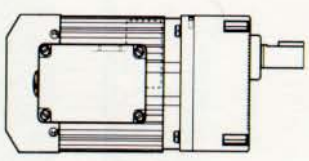
d = Distance from center of load to motor face
Fr = Permissible radial load on the output shaft (Lbs.)
Fa = Permissible axial load on the output shaft (Lbs.)

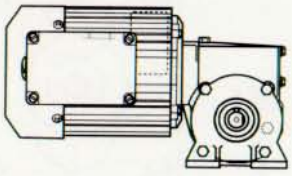
Other Definitions

P = Input power to motor (electrical)
P_1 = Shaft power from motor – also input to gearhead (mechanical)
P_2 = Shaft power from gearbox (mechanical)

Mounting Positions

The preferred mounting position for each motor and gearmotor in this catalog is horizontal, as illustrated in their respective dimension diagrams. Gearmotor mountings other than shown are not recommended on some *gearmotors* due to (a) the possibility of gearhead lubricant leakage into the motor portion, (b) possible leakage from gearhead breather and oil level holes, and (c) insufficient lubrication. By making the proper adjustments (normally done at the factory), mountings other than the preferred positions of gearmotors are possible.





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APPLICATION NOTE

Shunt Wound (SH) Field vs. Permanent Magnet (PM) Field Drives

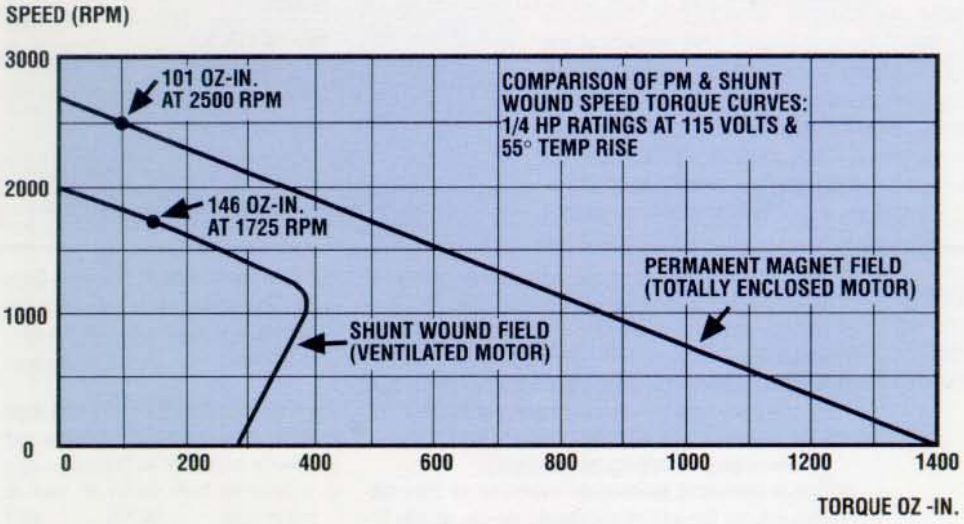
The accompanying chart illustrates and compares the performance curves of two Bodine 1/4 hp DC *motors* as operated *without* speed controls at rated voltage and direct-current of unity form factor (FF=1.0). For *gearmotors* the speeds would be divided by the ratio.

Operation of the motors *with Bodine* SCR speed-torque controls is illustrated on pages 19. Essentially, the Bodine SCR speed controls flatten the slope (improve the regulation) of the speed-torque curves between the no-load and rated load points. Furthermore, the speed controls permit, by the turn of a knob, adjustment of speed throughout the rated speed range. In addition, all Bodine type FPM controls have torque (current) limiting circuitry which limit the maximum starting and running torque obtainable to 200-350 % of rated- this is especially important to assist in protecting gearheads when PM systems are used. Certain models of Bodine controls have an *adjustable* torque feature in addition to the adjustable speed feature.

The speed given for shunt wound motors and gearmotors in this catalog is the maximum obtainable when using the motor or gearmotor with a matching Bodine speed control. Note that this number differs from what is printed on the motor or gearmotor nameplate. The speed given on the nameplate is what would result if 115 VDC was applied to both the field and the armature windings. However, Bodine shunt wound motor speed controls have a built-in "field weakening" circuit. At its maximum speed setting this circuit provides much higher voltage to the armature than the field. This allows our shunt wound products to run faster than the nameplate rating. To help our customers make better comparison between our shunt wound and our permanent magnet motors and gearmotors, the tables in this catalog show the maximum speed obtainable when using a speed control, rather than the nameplate speed ratings.

Other differences in SH vs. PM drives not shown by the chart are: for a given horsepower, PM drives are physically smaller and more electrically efficient than SH drives; PM motors have inherent self-braking due to the PM field; in addition to the ground lead, SH motors are 4-lead while PM are 2-lead.

Both types of DC motors have respective advantages- the choice of system design (SH or PM) depends upon the intended application and/or individual preference of the design engineer.



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BODINE ELECTRIC COMPANY

Self-ventilated or enclosed



"N-1" Motor



"30R" Motor

- High Efficiency Windings for Low Current Draw
- Class B Insulation for Long Life
- Locked Bearings for Minimal Endplay

General

"N-1" motors incorporate four piece construction—center ring, two shields, and base—provides design flexibility and easy maintenance. The shields are carefully fitted to the center ring with rabbeted joints and held by four screws. This assures rigidity for positive bearing alignment and the accurate, uniform air gap required for quiet, efficient operation.

The "30R" motor features efficient permanent split capacitor windings. This winding type provides long life, low heat dissipation and low current draw for continuous duty applications. For intermittent duty applications, the "30R" motor can provide up to 10 start-stop cycles per minute without overheating. Capacitors are required for operation and may be mounted externally or inside the operational terminal box kit, model number 5982. Face mounting is standard.

Notes

✱ See page 3.

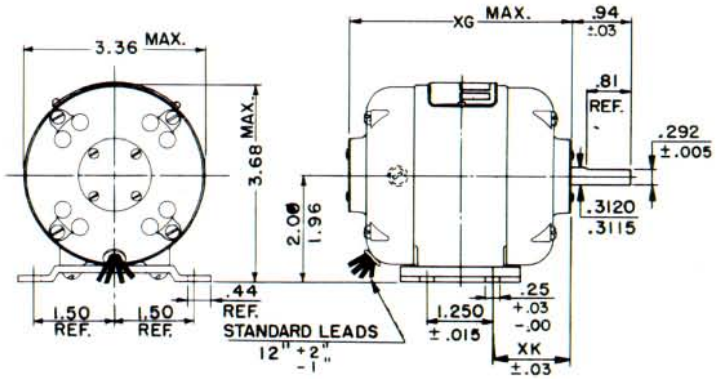
✱✱ Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

"S" (4) 10-32 UNC-2B x .32" on a 3.75" B.C.

☆ Available while supplies last after December 31, 1997

Speed Rpm	Motor Hp	Bodine Type	Model No.	Connection Diagram✱	Rotation✱	Capacitor Part No.✱✱
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed						
1725 1725	1/70 1/60	NSI-12 NSI-13	**211** ☆ **217** ☆	074 10004 4-lead	Reversible	None
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self Ventilated						
1725 1725 3450	1/50 1/40 1/40	NSI-12 NSI-13 NSI-13	**210** ☆ **215** ☆ **219** ☆	074 10004 4-lead	Reversible	None
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self Ventilated						
1725 1725	1/50 1/40	NCI-12 NCI-13	**238** ☆ **240** ☆	074 10005 4-lead	Reversible	494 00028 494 00028
SPLIT PHASE, SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self Ventilated						
1800	1/75	NSY-12	**229** ☆	074 10004 4 -lead	Reversible	None
PERMANENT SPLIT CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed						
1700 3400	1/30	30R2BECI 30R2BECI	**5240** **5219**	074 10296 074 10296	Reversible	494 29449 494 29449
PERMANENT SPLIT CAPACITOR, SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed						
1800	1/40	30R2BEYC	**5246**	074 10296	Reversible	494 29449

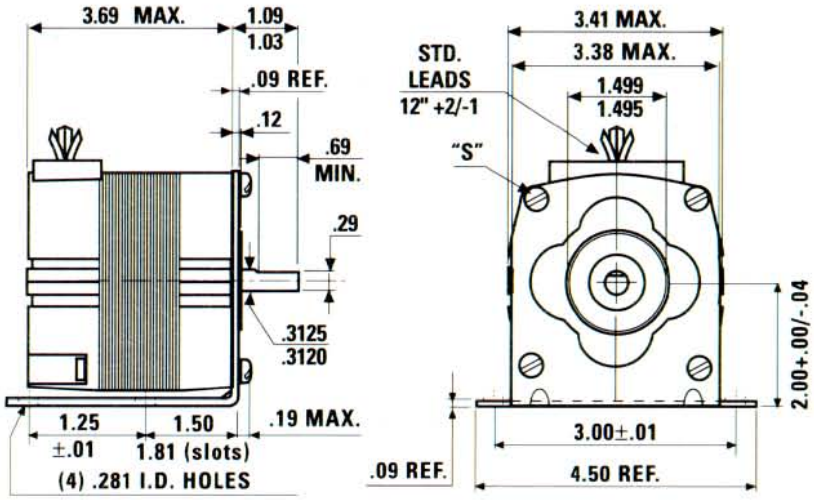
"N-1" Motor



Dimensions (inches)

Bodine Type	XG	XK	Approx. Ship. Wt. Lbs.
N-12	4.56	1.62	4-1/2
N-13	4.94	1.81	5-1/4

"30R" Motor shown with optional "L" Bracket (Model 5968)
(Approximate shipping weight: 5 Lbs.)



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TYPE "N" AND "24A" MOTORS (DC)

Self-ventilated or enclosed



"N-1" Motor (DC)



"24A" Motor (DC)

Speed Rpm	Motor Hp	Bodine Type	Model No.	Connection Diagram*	Rotation*
SERIES WOUND—115 V.—Universal—60 Hz. (DC)—Self Ventilated ❑					
7500 (8500)	1/12 (1/10)	NSE-12	**007** ☆	074 10001 2-lead	CW
7500 (8500)	1/10 (1/9)	NSE-13	**011** ☆		
10,000 (10,500)	1/10 (1/9)	NSE-12	**008** ☆		
10,000 (10,500)	1/7 (1/7)	NSE-13	**009** ☆		
SHUNT WOUND—115 VDC—Totally Enclosed					
1725	1/50	NSH-12	**276** ☆	074 10085 5-lead	Reversible
130 VDC FF=1.0 Continuous Duty					
2500	1/29	24A2BEPM	**042**	074 10101 2-lead	Reversible

- Long-Life Oversize Brushes
- Skewed Armature for Smooth Operation
- Inherent High Starting Torque
- Noise-Tested Ball Bearings
- Light and Compact
- External Access for Brush Inspection
- Encoder-Ready Model Available

General

The "N-1" motor incorporates four piece construction—center ring, two shields, and base—provides design flexibility and easy maintenance. The shields are carefully fitted to the center ring with rabbeted joints and held by four screws. This assures rigidity for positive bearing alignment and the accurate, uniform air gap required for quiet, efficient operation.

"24 Frame" PM motors are totally enclosed non-ventilated (TENV) models, 2.4 inches in diameter, with high coercivity ceramic magnets and long-life oversize brushes. They have been designed for durability, high torque, reduced weight and size, and better heat dissipation.

DC Power supply available. See Pg. 20

Notes

✱ See page 3.

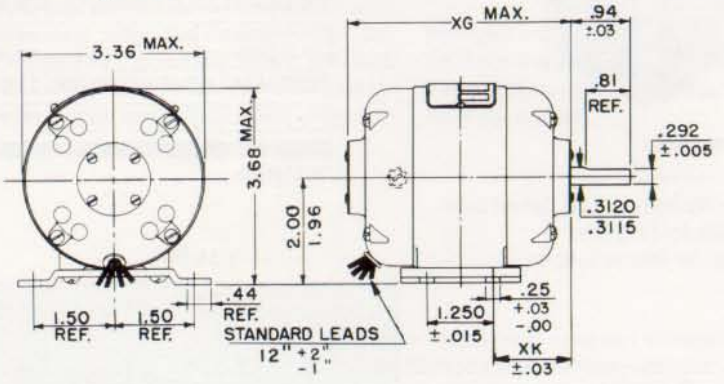
❑ Speeds will vary from listed ratings dependent on actual torque loading. Speed and Hp ratings shown are AC/(DC).

"S" (4) slots .186 in. wide on a 2.7 to 2.83 B.C.

● Motor has "accessory ready" shaft extension.

☆ Available while supplies last after December 31, 1997.

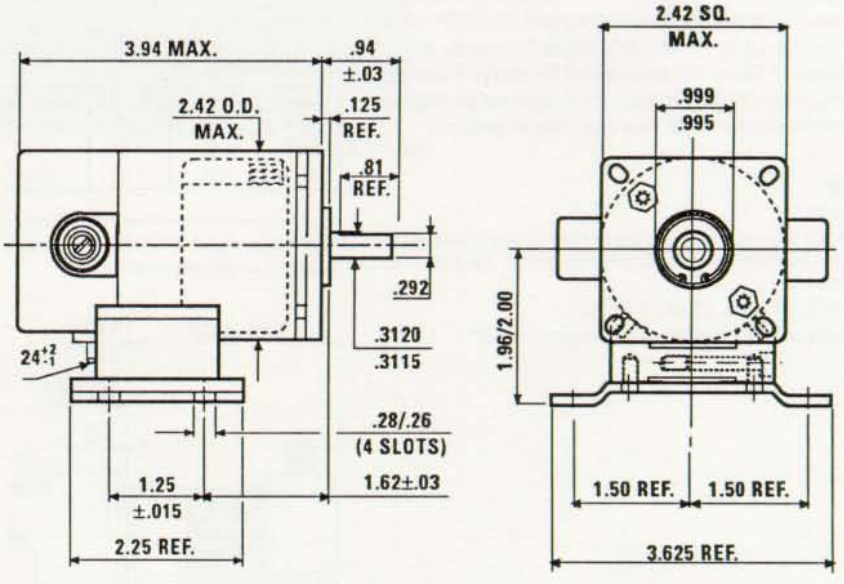
"N-1" Brush Type Motor



Dimensions (inches)

Bodine Type	XG	XK	Approx. Ship. Wt. Lbs.
N-12	4.56	1.62	4-1/2
N-13	4.94	1.81	5-1/4

"24A" Motor



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TYPE "N-3" AND "34R" MOTORS (AC or DC)

BODINE® ELECTRIC COMPANY

Self-ventilated or enclosed



"N-3" Motors



"34R" Motors

- Removable Rigid Base Mounting
- Fan Cooled for High Output Power
- Lower Operating Temperature Prolongs Winding and Lubricant Life
- Aluminum Center Ring and End Shields for High Thermal Efficiency and Light Weight
- Locked Bearing Minimizes Shaft Endplay
- Noise Tested Ball Bearings
- Permanent Grease Lubrication

General

Self-ventilated N-frame motors employ highly effective forced fan ventilation systems which make possible greater output for a given frame size, and lower operating temperatures to preserve insulation and prolong lubricant life.

The "34R" frame totally enclosed, fan-cooled (TEFC), induction motors feature thermally efficient, weight-saving aluminum center rings and endshields for "cool-to-the-touch" operation. Fan covers are of sturdy steel construction. A "locked" bearing at the shaft extension end of the motor results in essentially no free endplay of the shaft. Permanently lubricated ball bearings are used throughout.

Notes

✱ See page 3.

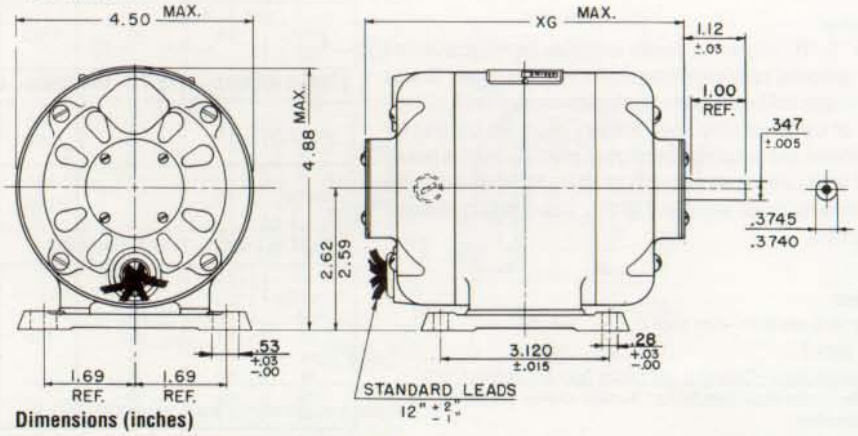
✱✱ Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

"S" (4) 1/4-20, UNF-2B, .31/.38 in. deep minimum on a 2.75 in. B.C.

☆ Available while supplies last after December 31, 1997.

Speed Rpm	Motor Hp	Bodine Type	Model No.	Connection Diagram*	Rotation*	Capacitor Part No.**
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated						
1725	1/20	NSI-33	**221** ☆	074 10004 4-lead	Reversible	None
1725	1/15	NSI-34	**225** ☆			
3450	1/20	NSI-33	**223** ☆			
3450	1/15	NSI-34	**227** ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated						
1725	1/20	NCI-33	**242** ☆	074 10005 5-lead	Reversible	494 00029
1725	1/15	NCI-34	**244** ☆			
SHUNT WOUND—115 VDC—Totally Enclosed						
1725	1/20	NSH-33	**277** ☆	074 10085 5-lead	Reversible	None
1725	1/15	NSH-34	**278** ☆			
CAPACITOR, PERMANENT SPLIT, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed						
1700	1/15	34R4BFCI	**0290**	074 10296	Reversible	494 00081
1700	1/9	34R6BFCI	**0291**			494 00082
3400	1/7	34R6BFCI	**0293**			494 00097
CAPACITOR, PERMANENT SPLIT, SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed						
1800	1/15	34R6BFYC	**0297**	074 10296	Reversible	494 00097

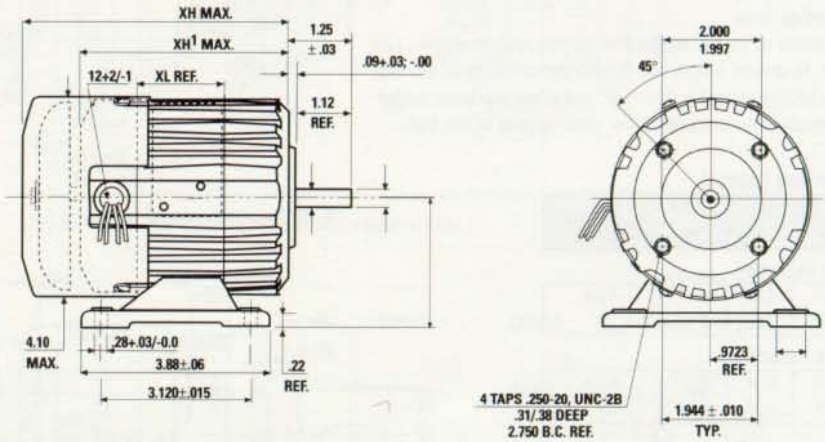
"N-3" Motor



Dimensions (inches)

Bodine Type	XG	Approx. Ship. Wt. Lbs.
N-33	6.16	3.86
N-34	5.94	9-3/4
N-35	6.50	11-1/2

"34R" Motor shown with NEMA C face mount and with optional base mounting kit (Model 994)



Dimensions (inches)

Bodine Type	XH[1]	XH	XL	Approx. Ship Wt. Lbs.
34R4	4.69	5.69	1.810	7
34R5	5.19	6.19	2.310	8
34R6	5.69	6.69	2.810	9

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TYPE "N-1R" GEARMOTORS (AC or DC)

Single (to 4.8 Lb-in.) and double (to 7 Lb-in.) reduction, right angle



"N-1R" Gearmotor (double reduction)

- Die Cast Motor Shield and Gear Housing
- Tapped Holes Permit Rotating Gear Head
- Porous Bronze Output Shaft Bearings
- Lip-Type Oil Seals
- Shielded Ball Bearings on Motor Shaft
- Motor Shaft Extension ✦

General

The "N-1R" single and double reduction worm gearmotors are designed for transmitting relatively low torques. Grease lubricated ball bearings are employed on motor shaft. Worms are of hardened alloy steel. Primary gears are bakelite for quietness and durability. Secondary gears (on double reduction units) are bronze for ratios of 180 to 1 and up; laminated bakelite for ratios less than 180 to 1. Gear housing lubricant is grease.

Notes

Mounting positions—see page 3.

✱ See page 3.

✱✱ Capacitor Data—Capacitor and rubber boot not included with motor. Order separately by Part Number shown. See page 21 for dimensions.

❑ Speeds will vary from listed ratings dependent on actual torque loading. Speed and Hp ratings shown are AC/(DC).

● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

✦ To obtain approximate speed of motor shaft extension at safe output torque, multiply output speed by gear ratio.

☆ Available while supplies last after December 31, 1997.

Application Note

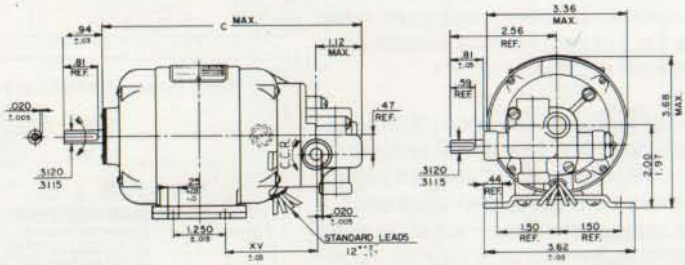
Dimensions of "N-1R" single and double reduction units are similar. However, single and double reduction units are not strictly interchangeable. The "XV" and other gearhead output shaft location dimensions differ with respect to the base.

Dimensions (inches)

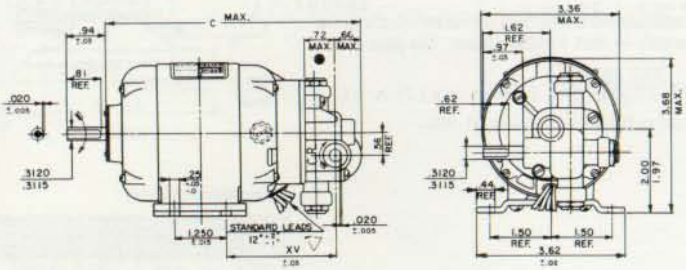
Bodine Type	C	XV	Approx. Ship. Wt. Lbs.
Single Reduction			
N-11R	5.96	2.07	4-1/4
N-12R	6.21	2.19	5
Double Reduction			
N-11R	5.96	2.54	4-1/4
N-12R	6.21	2.66	5

Speed Rpm (Max.)	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram*	Rotation*	Capacitor Part No.**
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed								
2.9	3.4	600	1/70	NSI-12R (Double Reduction)	**335** ☆	074 10004 4-lead	Reversible	None
6.0	5.1	288			**333** ☆			
9.6	7.0	180			**332** ☆			
24	4.7	72			**330** ☆			
48	4.7	36			**328** ☆			
58	3.5	30	1/70	NSI-12R Reduction)	**327** ☆	074 10004 4-lead	Reversible	None
96	4.8	18			**325** ☆			
145	3.4	12			**324** ☆			
170	3.7	10			**323** ☆			
290	2.3	6			**322** ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed								
9.6	7.0	180	1/70	NCI-12R (Double Reduction)	**411** ☆	074 10005 4-lead	Reversible	494 00028
96	4.8	18	1/70	NCI-12R (Single Reduction)	**408** ☆	074 10005 4-lead	Reversible	494 00028
290	2.3	6			**406** ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Totally Enclosed								
10	7.0	180	1/125	NYC-12R (Double Reduction)	**430** ☆	074 10005 4-lead	Reversible	494 00027
60.0	3.5	30	1/125	NYC-12R (Single Reduction)	**429** ☆	074 10005 4-lead	Reversible	494 00027
SERIES WOUND—115 V.—Universal—60 Hz. (DC)—Self-Ventilated ❑								
97(123)	4.0	72	1/60 (1/40)	NSE-11R (Double Reduction)	**112** ☆	074 10001 2-lead	CW	None
500(700)	1.5	10	1/60 (1/40)	NSE-11R (Single Reduction)	**107** ☆	074 10001 2-lead	CCW	None
SHUNT WOUND—Totally Enclosed								
4	5.7	432	1/50	NSH-12R	**548** ☆	074 10085 5-Lead	Reversible	None
5.3	6.6	324			**547** ☆			
9.6	7.0	180			**546** ☆			
17	4.2	100			**545** ☆			
48	4.7	36			**544** ☆			
96	5.8	18			**543** ☆			
173	4.2	10			**542** ☆			
288	3.3	6			**541** ☆			

"N-1R" Gearmotor (single reduction)



"N-1R" Gearmotor (double reduction)

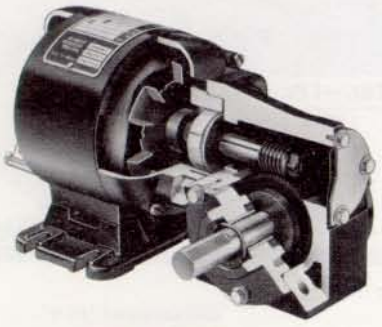


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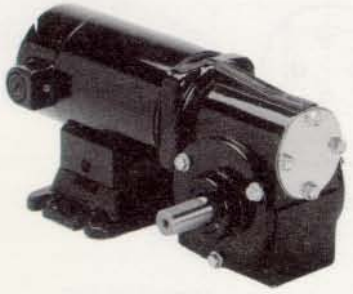
TYPE "N-3R", "N-1RH" AND "24A-3F" GEARMOTORS (DC)

BODINE ELECTRIC COMPANY

Single reduction, right angle...to 22 Lb-in.



"N-1RH" Gearmotor (DC)



"24A-3F" Gearmotor (DC)

- Die Cast Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- External Access for Brush Inspection

General

The "N-1RH" and "N-3R" gearmotor combines our "3R" gearhead with our "N-1" motor frame and is designed for transmitting moderate torque. The worm is separable, hardened and ground, and driven by a cross pin and slot. The gearhead has a laminated bakelite gear for moderate torque and quietness. Gearmotor mounting is via a base attached to the motor frame. Bronze sleeve bearings support the output shaft.

The "24A-3F" gearmotor combines our "3F" gearhead with our "24" frame permanent magnet DC motor. The gearhead features a bronze gear for greater shock load capability and is mounted via four tapped holes in the bottom of the gearhead (an optional baseplate is available). The output shaft is supported by bronze sleeve bearings which are lubricated through felt wicks and reservoirs. The "24A-3F" has an oil seal on both the drive shaft and the motor shaft.

Notes

Mounting positions—see page 3.

*See page 3.

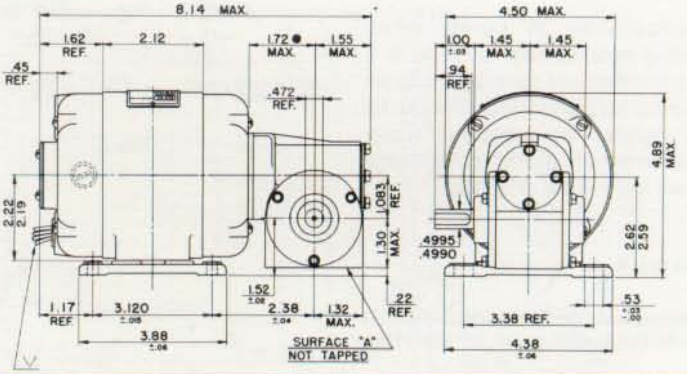
❑ Speeds will vary from listed ratings dependent on actual torque loading. Speed and Hp ratings shown are AC/(DC).

● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

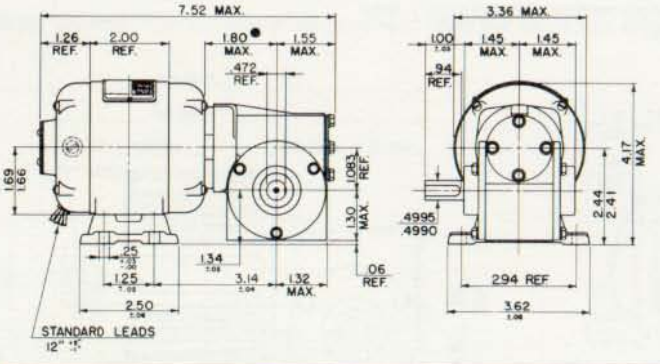
☆ Available while supplies last after December 31, 1997.

Speed Rpm (Max.)	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram*	Rotation*	Capacitor Part No.
SHUNT WOUND—115 VDC.—Totally Enclosed, Non-Ventilated								
43 57 86 173	20 21 21 13	40 30 20 10	1/20 (1725)	NSH-33R	**569** ☆ **568** ☆ **567** ☆ **565** ☆	074 10085 5-lead	Reversible	None
SERIES WOUND—115 VDC.—Universal—60 Hz. (DC)—Self-Ventilated ❑								
125 (175) 500 (700)	14 5.3	40 10	1/18 (1/12)	NSE-12RH	**122** ☆ **120** ☆	074 10001 2-lead	CW	None
SHUNT WOUND—115 V.—Totally Enclosed ❑								
31 43 58 86	13 15 9.9 8.8	60 40 30 20	1/50	NSH-12RH	**564** ☆ **562** ☆ **561** ☆ **560** ☆	074 10085 5-lead	Reversible	None
PERMANENT MAGNET FIELD—130VDC—Total Enclosed								
42 63 125 250 500	22 19 16 10 5.2	60 40 20 10 5	1/17	24A48EPM-3F	**089** **088** **087** **086** **084**	074 10101 3-lead	Reversible	None

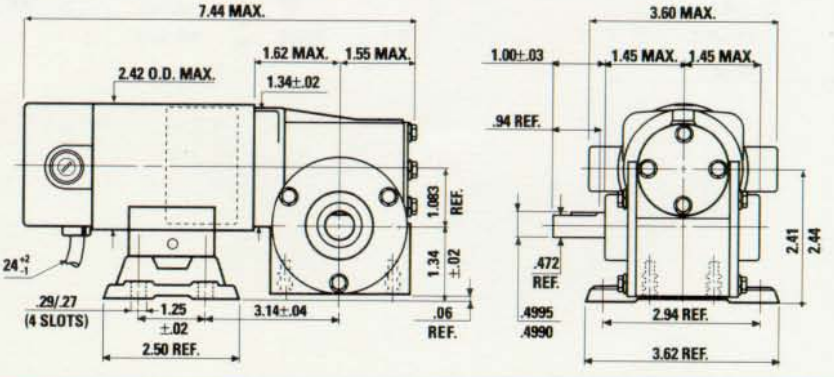
"N-3R" Gearmotor



"N-1RH" Gearmotor (Approximate shipping weight: 6 Lbs.)



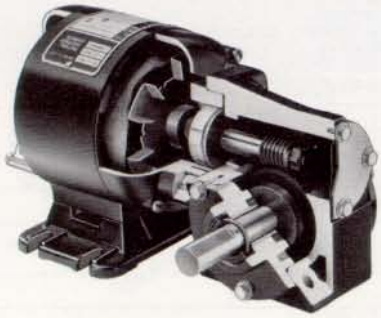
"24A-3F" Gearmotor (Approximate shipping weight: 5.3 Lbs.)



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TYPE "N-1RH" GEARMOTORS (AC)

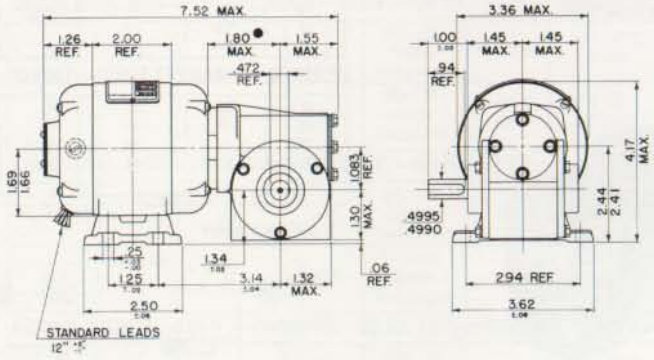
Single reduction, right angle...to 15 Lb-in.



"N-1RH" Gearmotor

Speed Rpm	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type ★	Model No.	Connection Diagram*	Rotation*	Capacitor Part No.**
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self Ventilated								
29	13	60	1/50	NSI-12RH	**353** ☆	074 10004 4-lead	Reversible	None
43	15	40			**351** ☆			
58	9.9	30			**350** ☆			
86	8.8	20			**349** ☆			
115	6.6	15			**348** ☆			
170	5.1	10			**347** ☆			

"N-1RH" Gearmotor (Approximate shipping weight: 6 Lbs.)



- Die Cast Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- Oil Seal on Drive Shaft

General

These gearmotors are based on our "3R" gearhead and are designed for transmitting moderate torque. The worm is separable, hardened and ground, and driven by a cross pin and slot. The "3R" gearhead has a laminated bakelite gear for moderate torque and quietness. The output shaft is supported by bronze sleeve bearings which are lubricated through felt wicks and reservoirs and includes an oil seal.

Notes

Mounting positions—see page 3.

*See page 3.

**Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

☆ Available while supplies last after December 31, 1997.

★ Replacements for NSI-12RH gearmotors are listed on page 11. Refer to Model Numbers 487-492.

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BODINE ELECTRIC COMPANY

Single reduction, right angle...to 37 Lb-in.



"N-3R" Gearmotor (AC)



"34R-3F" Gearmotor

- Die Cast Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- Oil Seal on Drive Shaft

General

These gearmotors are based on our "3R" and "3F" gearheads and are designed for transmitting moderate torque. The "N-3R" employs our "N-3" motor frame while the "34R-3F" utilizes our thermally efficient "34R" Frame design. The worm is separable, hardened and ground, and driven by a cross pin and slot. The "3R" gearhead has a laminated bakelite gear for moderate torque and quietness. The "3F" gearhead features a bronze gear for strength and greater shock load capability and is mounted via four tapped holes in the bottom of the gearhead. To mount from the gearhead a Model 967 baseplate is available; to mount from the 34R motor a Model 994 base mounting kit is required. The output shaft on both gearmotors is supported by bronze sleeve bearings which are lubricated through felt wicks and reservoirs and includes an oil seal. The "N-3R" is mounted by a base attached to the motor frame.

Notes

Mounting positions—see page 3.

*See page 3.

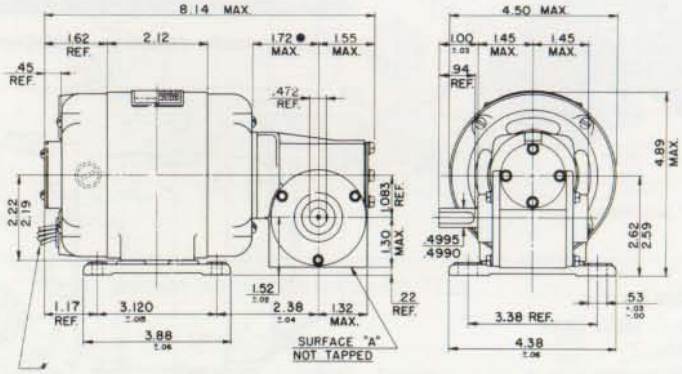
**Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

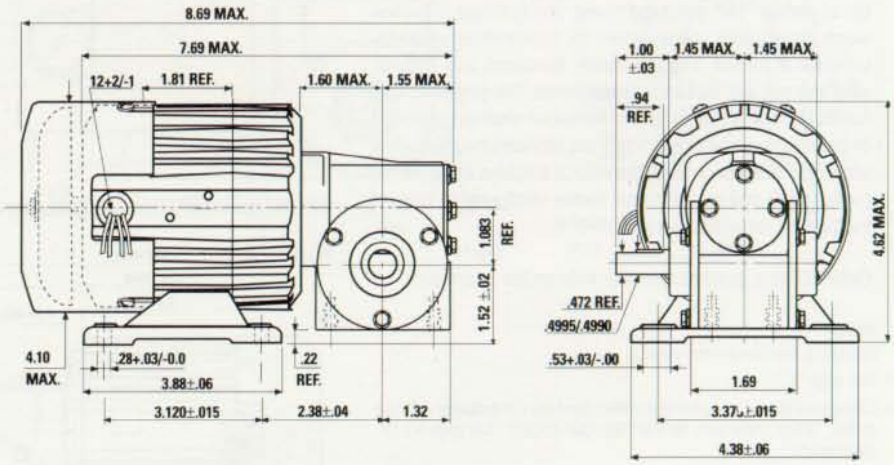
☆ Available while supplies last after December 31, 1997.

Speed Rpm	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram *	Rotation *	Capacitor Part No. **
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
43	20	40	1/20	NSI-33R	358 ☆	074 10004 4-Lead	Reversible	None
58	21	30			357 ☆			
86	21	20			356 ☆			
115	16	15			355 ☆			
170	13	10			354 ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
43	20	40	1/20	NCI-33R	422 ☆	074 10005 4-Lead	Reversible	494 00029
58	21	30			421 ☆			
86	21	20			420 ☆			
170	13	10			419 ☆			
PERMANENT SPLIT CAPACITOR—115 V. —60Hz. —1 Ph. TEFC								
28	37	60	1/15	34R4BFCI-3F	492	074 10005 4-Lead	Reversible	494 00081
43	22	40			491			
58	23	30			487			
86	21	20			490			
113	20	15			489			
173	17	10			488			

"N-3R" Gearmotor (AC) (Approximate shipping weight: 9-3/4 Lbs.)



"34R-3F" Gearmotor shown with optional base mounting kit (Model 994) Approximate shipping weight: 9-1/4 Lbs.



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BODINE ELECTRIC COMPANY

TYPE "N-5RL" AND "42R-5L" GEARMOTORS (AC)

Single reduction, right angle...to 77 Lb-in.



"N-5RL" Gearmotor



"42R-5L" Gearmotor

Speed Rpm	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram *	Rotation *	Capacitor Part No. **
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
43	77	40	1/8	NSI-54RL	372 ☆	074 10004 4-Lead	Reversible	None
58	75	30			371 ☆			
86	54	20			370 ☆			
170	31	10			369 ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
43	77	40	1/8	NCI-54RL	444 ☆	074 10005 4-Lead	Reversible	494 00032
58	75	30			443 ☆			
86	54	20			442 ☆			
170	31	10			441 ☆			
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1Ph.—TEFC								
43	77	40	1/8	42R4BFSI-5L	620	074 10004 4-Lead	Reversible	None
57	75	30			619			
85	54	20			618			
170	31	10			617			
CAPACITOR, NON-SYNCHRONOUS—115V,—60Hz.—1Ph.—TEFC								
43	77	40	1/8	42R4BFCI-5L	627	074 10005 4-Lead	Reversible	494 00082
57	75	30			626			
85	54	20			624			
170	31	10			623			

- Die Cast Shield and Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- Oil Seal on Drive Shaft

General

Based on our "5R" gearhead, these sturdy single reduction worm gearmotors are designed for transmitting relatively substantial torque. The separable, hardened and ground, steel worm is key-slot and tongue driven. The gearhead is oil lubricated with a bronze gear. The output shaft is supported by bronze sleeve bearings which are lubricated via felt oiling wicks and reservoirs. Each gearmotor employs a seal on the output shaft and an additional motor shaft seal to prevent seepage to the motor portion.

Detail "C" is a gearbox breather hole on the gearmotor.

Notes

Mounting positions—see page 3.

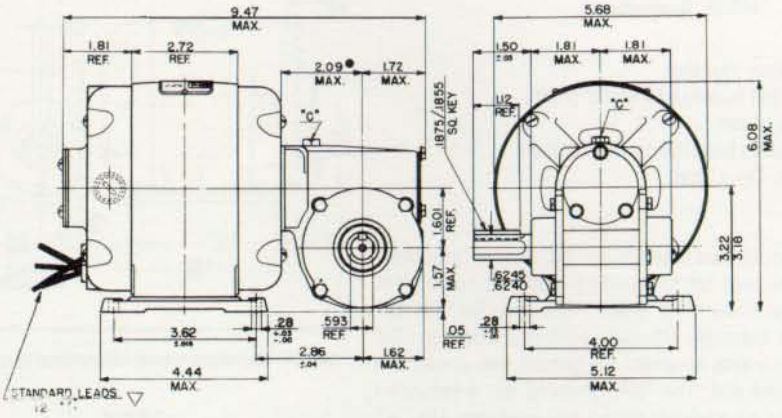
* See page 3.

** Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

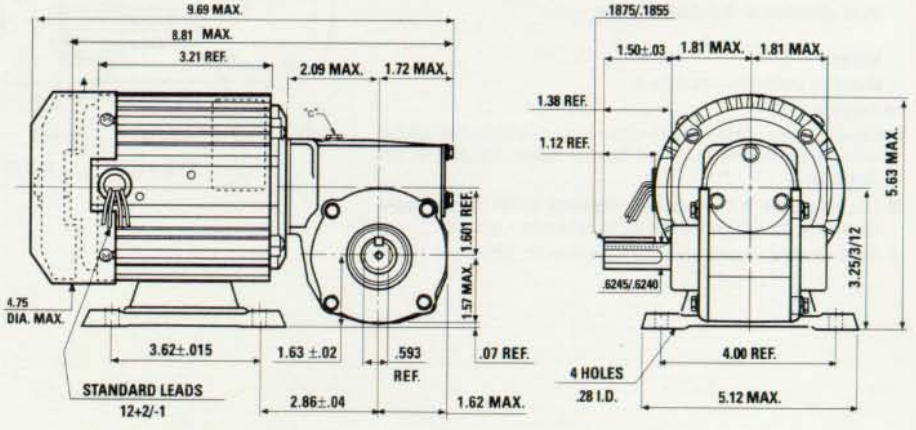
● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

☆ Available while supplies last after December 31, 1997.

"N-5RL" Gearmotor (Approximate shipping weight: 23 Lbs.)



"42R-5L" Gearmotor (Approximate shipping weight: 13.5 Lbs.)



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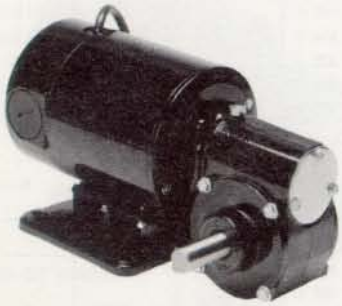
TYPE "N-5RL" AND "42A-5L" GEARMOTORS (DC)

BODINE® ELECTRIC COMPANY

Single reduction, right angle...to 77 Lb-in.



"N-5RL" Gearmotor



"42A-5L" Gearmotor

- Die Cast Shield and Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- Oil Seal on Drive Shaft

General

Based on our "5R" gearhead, these sturdy single reduction worm gearmotors are designed for transmitting relatively substantial torque. The separable, hardened and ground, steel worm is key-slot and tongue driven. The gearhead is oil lubricated with a bronze gear. The output shaft is supported by bronze sleeve bearings which are lubricated via felt oiling wicks and reservoirs. Each gearmotor employs a seal on the output shaft and an additional motor shaft seal to prevent seepage to the motor portion.

Detail "C" is a gearbox breather hole on the gearmotor.

Notes

Mounting positions—see page 3.

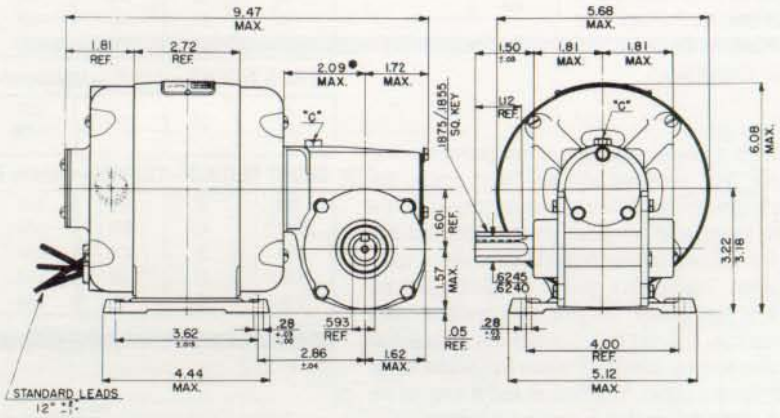
* See pages 3.

● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

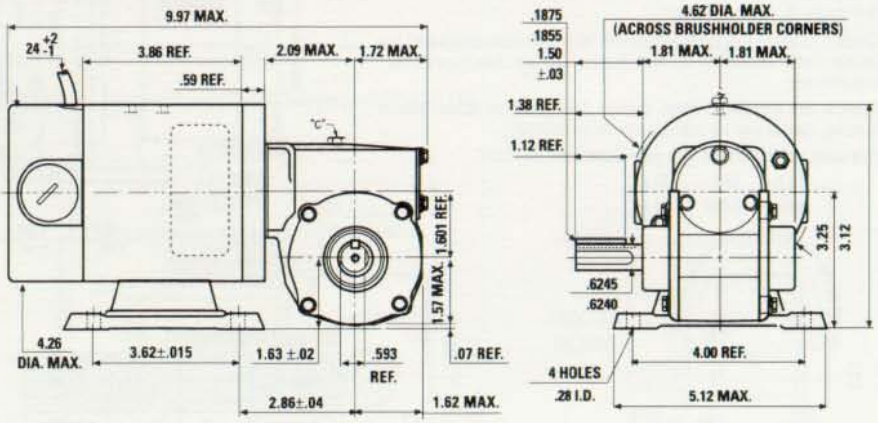
☆ Available while supplies last after December 31, 1997.

Speed Rpm (Max.)	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram *	Rotation *	Capacitor Part No.
SHUNT WOUND—115 VDC—Totally Enclosed								
44	77	40	1/8	NSH-54RL	589 ☆	074 10085 5-Lead	Reversible	None
58	75	30			588 ☆			
86	54	20			587 ☆			
170	31	10			586 ☆			
PERMANENT MAGNET FIELD—130VDC—Totally Enclosed								
50	77	40	1/6	42A4BEPM-5L	4119	074 10101 3-Lead	Reversible	None
67	75	30			4118			
100	63	20			4117			
200	37	10			4116			

"N-5RL" Gearmotor (Approximate shipping weight: 23 Lbs.)



"42A-5L" Gearmotor (Approximate shipping weight: 15 Lbs.)



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TYPE "N-1RG" GEARMOTORS (AC or DC)

Double reduction, right angle...to 43 Lb-in.



- Shielded Ball Bearings on Motor Shaft
- Porous Bronze Sleeve Bearings on Gear Shafts
- Worms Cut on Alloy Steel Shafts
- Laminated Bakelite Primary Gear
- Bronze Secondary Gear
- Oil Seal on Output Shaft

General

The "N-1RG" is a double reduction worm gearmotor that combines our "RG" gearhead with our "N-1" motor. The "N-1RG" is engineered to deliver moderate torques at low speeds. The motor shaft employs grease lubricated ball bearings. The primary and secondary worms are of hardened alloy steel. The primary gear is of bakelite and the secondary is of hard bronze. The gear reducer shafts rotate in sleeve bearings. Internal thrust provisions include ball bearing against disc for downward action and needle thrust bearings for upward action. A lip-type oil seal is used on the output shaft. The gear housing is grease lubricated.

Notes

Mounting positions—see page 3.

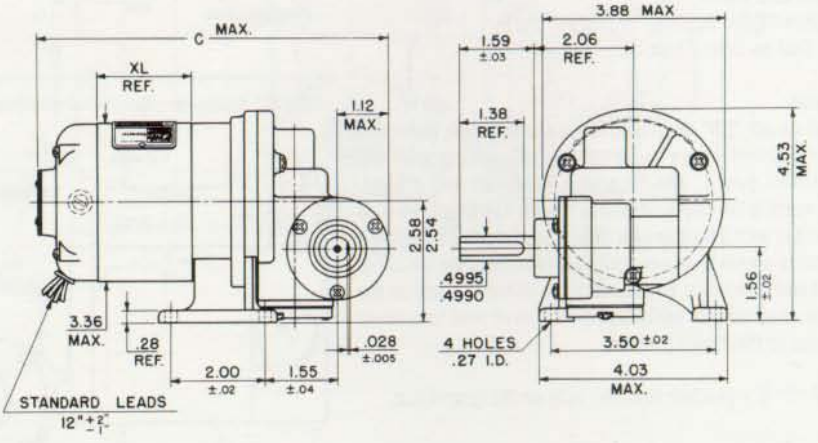
* See pages 3.

** Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

❑ Speeds will vary from listed ratings dependent on actual torque loading. Speed and Hp ratings shown are AC/(DC).

☆ Available while supplies last after December 31, 1997.

Speed Rpm (Max.)	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram *	Rotation *	Capacitor Part No. **
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
1.6	43	1080	1/125	NSI-12RG	346 ☆	074 10004 4-lead	Reversible	None
3.6	38	480	1/70		344 ☆			
4.8	37	360	1/70		343 ☆			
7.2	40	240	1/50		342 ☆			
9.6	39	180	1/50		341 ☆			
14	35	120	1/50		339 ☆			
19	26	90	1/50		338 ☆			
29	20	60	1/50		337 ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
1.6	43	1080	1/125	NCI-12RG	418 ☆	074 10005 4-Lead	Reversible	494 00027
3.6	38	480	1/70		417 ☆			494 00028
7.1	40	240	1/50		440 ☆			494 00028
9.6	39	180	1/50		416 ☆			494 00028
14	35	120	1/50		415 ☆			494 00028
19	26	90	1/50		414 ☆			494 00028
29	20	60	1/50		413 ☆			494 00028
SERIES WOUND—115 V.—Universal—60 Hz. (DC)—Self-Ventilated ❑								
49 (65)	25	120	1/25 (1/18)	NSE-11RG	118 ☆	074 10001 2-lead	CW	None
SHUNT WOUND—115 VDC—Totally Enclosed ‡ §								
3.6	38	480	1/50	NSH-12RG	557 ☆	074 10085 5-lead	Reversible	None
7.2	40	240	1/50		556 ☆			
14	35	120	1/50		553 ☆			
19	26	90	1/50		552 ☆			
29	20	60	1/50		551 ☆			



Dimensions (inches)

Bodine Type	C	XL	Approx. Ship.Wt. Lbs.
N-11RG	7.25	1.75	7-1/2
N-12RG	7.50	2.00	8-1/2

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TYPE "N-3RH" AND "34R-5R" GEARMOTORS (AC)

BODINE® ELECTRIC COMPANY

Single reduction, right angle...to 49 Lb-in.



"N-3RH" Gearmotor



"34R-5R" Gearmotor

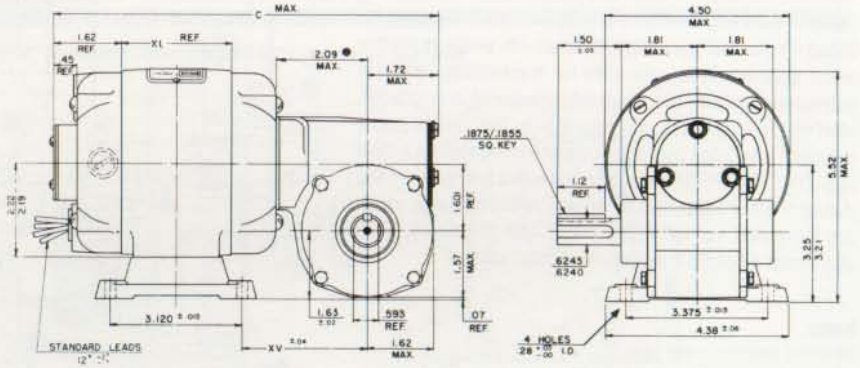
- Die Cast Shield and Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- Oil Seal on Drive Shaft

General

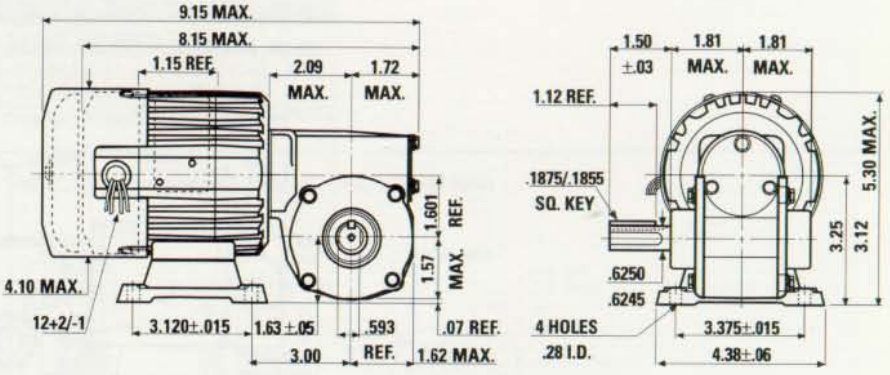
Based on our "5R" gearhead, these sturdy single reduction worm gearmotors are designed for transmitting relatively substantial torque. The separable, hardened and ground, steel worm is key-slot and tongue driven. The 34RH frame is grease lubricated with a bakelite gear mounted on a steel hub. The 34R-5R grease lubricated with a bronze gear. The output shaft is supported by bronze sleeve bearings which are lubricated via felt oiling wicks and reservoirs. Each gearmotor employs a seal on the output shaft.

Speed Rpm	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram *	Rotation *	Capacitor Part No. **
SPLIT PHASE, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
29	33	60	1/15	NSI-34RH	362 ☆	074 10004 4-Lead	Reversible	None
43	49	40			361 ☆			
86	32	20			360 ☆			
170	18	10			359 ☆			
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self-Ventilated								
29	33	60	1/15	NCI-34RH	426 ☆	074 10005 4-Lead	Reversible	494 00029
43	49	40			425 ☆			
86	32	20			424 ☆			
170	18	10			423 ☆			
CAPACITOR, PERMANENT SPLIT, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—TEFC								
29	33	60	1/15	34R4BFCI-5R	469	074 10005 4-Lead	Reversible	494 00081
43	49	40			468			
86	32	20			466			
170	18	10			465			

"N-3RH" Gearmotor



"34R-5R" Gearmotor Approximate shipping weight: 11.0 Lbs.



Dimensions (inches)

Bodine Type	C	XL	XV	Approx. Ship. Wt. Lbs.
N-33RH	8.71	2.12	2.75	11-1/4
N-34RH	9.21	2.62	3.00	12

Notes

Mounting positions—see page 3.

* See page 3.

** Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

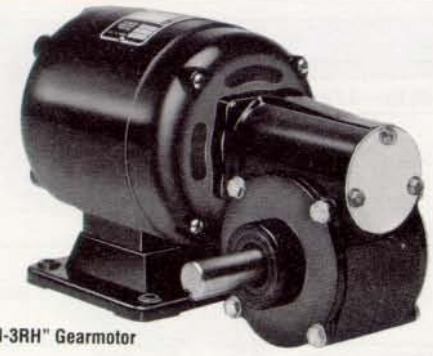
● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

☆ Available while supplies last after December 31, 1997.

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TYPE "N-3RH" AND "32A-5R" GEARMOTORS (DC)

Single reduction, right angle...to 49 Lb-in.



"N-3RH" Gearmotor

Speed Rpm (Max.)	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram*	Rotation*
SERIES WOUND—115 V. —Universal—60 Hz. (DC)—Self Ventilated							
250 (300)	22	20	1/8	NSE-34RH	127 ☆	074 10001	CW
SHUNT WOUND—115 VDC—Totally Enclosed							
43	49	40	1/15	NSH-34RH	577 ☆	074 10085 5-lead	Reversible
58	44	30			576 ☆		
86	32	20			575 ☆		
170	18	10			574 ☆		
PERMANENT MAGNET FIELD—130 VDC. —Totally Enclosed							
50	45	40	1/12	32A4BEPM-5R	4128	074 10101 3-lead	Reversible
67	41	30			4127		
100	29	20			4126		
200	17	10			4125		

- Die Cast Shield and Gear Housing
- Shielded Ball Bearings on Motor Shaft
- Separable Worm
- Bronze Sleeve Bearings on Output Shaft
- Oil Seal on Drive Shaft

General

Based on our "5R" gearhead, these sturdy single reduction worm gearmotors are designed for transmitting relatively substantial torque. The separable, hardened and ground, steel worm is key-slot and tongue driven. The "34RH" frame is grease lubricated with a bakelite gear mounted on a steel hub. The "32A-5R" grease lubricated with a bronze gear. The output shaft is supported by bronze sleeve bearings which are lubricated via felt oiling wicks and reservoirs. Each gearmotor employs a seal on the output shaft.

Notes

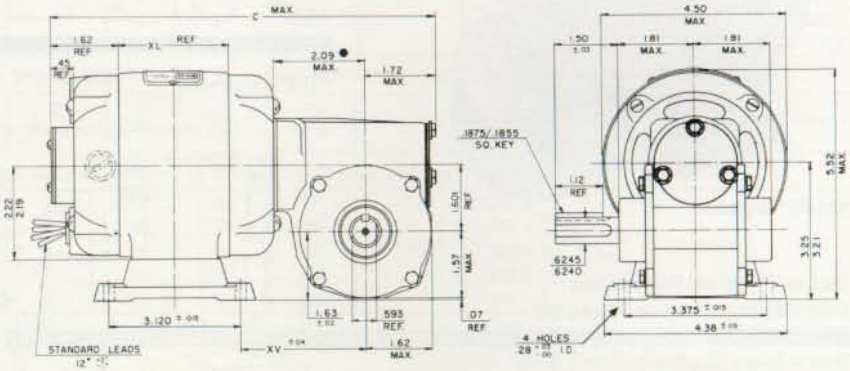
Mounting positions—see page 3.

✱ See page 3.

● This dimension is the maximum allowable radius of any device attached to the drive shaft in order to clear motor housing.

☆ Available while supplies last after December 31, 1997.

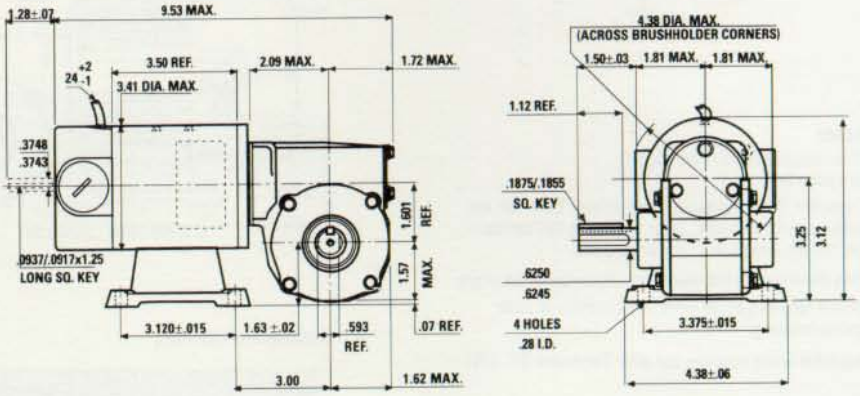
"N-3RH" Gearmotor



Dimensions (inches)

Bodine Type	C	XL	XV	Approx. Ship. Wt. Lbs.
N-33RH	8.71	2.12	2.75	11-1.4
N-34RH	9.21	2.62	3.00	12

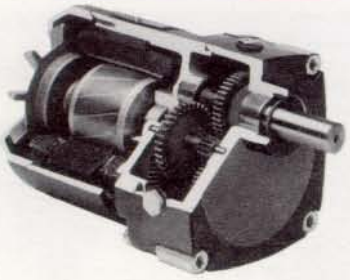
"32A-5R" Gearmotor Approximate shipping weight: 11.0 Lbs.



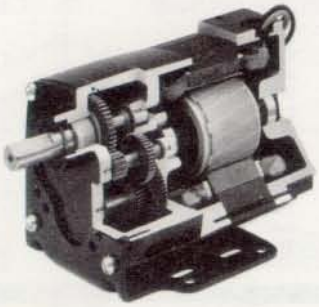
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BODINE ELECTRIC COMPANY

Parallel shaft, helical and spur gearing...to 40 Lb-in.



"N-1D" Gearmotor



"30R-D" Gearmotor

- Lip-Type Oil Seals
- Needle Bearings on Output Shaft
- Wide Primary Gear—Helical and of a Reinforced Thermoplastic for Strength
- All Steel Gearing Case Hardened

General

The "N-1D" parallel shaft gearmotor is designed for applications requiring consistently long life and high output torque in relation to gearmotor size. The "30R-D" gearmotor mates the efficient "30R" motor to the rugged "D" gearhead.

The gearmotors are oil lubricated for long life. The helical first stage pinion is hobbed on the motor shaft to precisely align it with the reinforced thermoplastic primary gear and provide low noise and maximum strength. All other stages use case hardened steel spur gearing. Grease lubricated ball bearings are employed on the motor shaft. The output shaft is made of selectively hardened alloy steel and is supported by needle bearings to provide long life and high radial load capacity. Leads are color coded for simple wiring. Capacitors are required for operation and may be mounted externally or inside the optional terminal box kit, model number 5982. The stock units may be face mounted or base mounted using the optional "L" bracket kit, model 5968.

Notes

★ Nomenclature—The number after the "D" designation indicates the number of gear stages.

✱ See page 3.

✱✱ Capacitor Data—Capacitor and rubber boot are not included with the motor. Order separately by Part Number shown. See page 21 for dimensions.

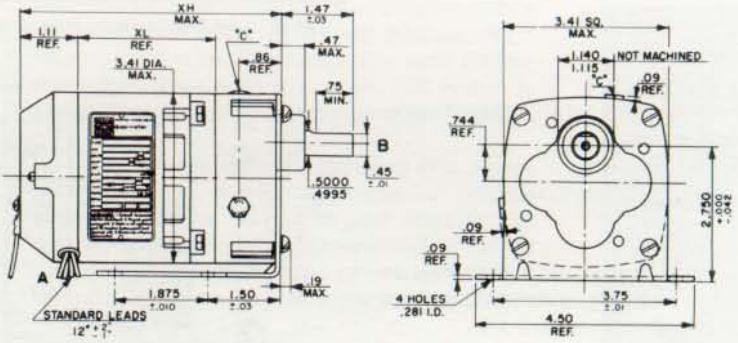
C Standard location of breather hole.

"S" (4) 10-32 UNF 2B, .38 in. deep on 3.75 in. B.C.

☆ Available while supplies last after December 31, 1997.

Speed Rpm	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type ★	Model No.	Connection Diagram*	Rotation*	Capacitor Part No.**
CAPACITOR, NON-SYNCHRONOUS—115 V.—60 Hz.—1 Ph.—Self Ventilated								
1.9	40	900	1/150	NCI-11D6	**464** ☆	074 10005 4-lead	Reversible	494 00028
3.8	40	450	1/90	NCI-11D5	**463** ☆			
9.4	40	180	1/50	NCI-11D4	**462** ☆			
19	40	90	1/50	NCI-11D4	**461** ☆			
28	30	60	1/50	NCI-11D3	**460** ☆			494 00028
28	40	60	1/30	NCI-13D3	**474** ☆			494 00029
57	15	30	1/50	NCI-11D3	**459** ☆			494 00028
57	27	30	1/30	NCI-13D3	**473** ☆			494 00029
94	8.9	18	1/50	NCI-11D3	**458** ☆			494 00028
94	16	18	1/30	NCI-13D3	**472** ☆			494 00029
140	5.9	12	1/50	NCI-11D3	**457** ☆			494 00028
140	11	12	1/30	NCI-13D3	**471** ☆			494 00029
285	5	6	1/30	NCI-13D3	**470** ☆			494 00029
PERMANENT SPLIT CAPACITOR, NON SYNCHRONOUS—115 V.—60 Hz.—1 Ph. Totally Enclosed								
3.8	40	450	1/50	30R1BECI-D5	**5463**	074 10297	Reversible	494 26812
9.4	40	180	1/50	30R1BECI-D4	**5462**	074 10296		494 26812
19	40	90	1/50	30R1BECI-D4	**5461**			
28	40	60	1/30	30R2BECI-D3	**5474**	074 10297		494 29449
57	27	30	1/30	30R2BECI-D3	**5473**			
94	16	18	1/30	30R2BECI-D3	**5472**			
140	11	12	1/30	30R2BECI-D3	**5471**			
285	5	6	1/30	30R2BECI-D3	**5470**			

"N-1D" Gearmotor shown with optional "L" bracket (Model 5968)

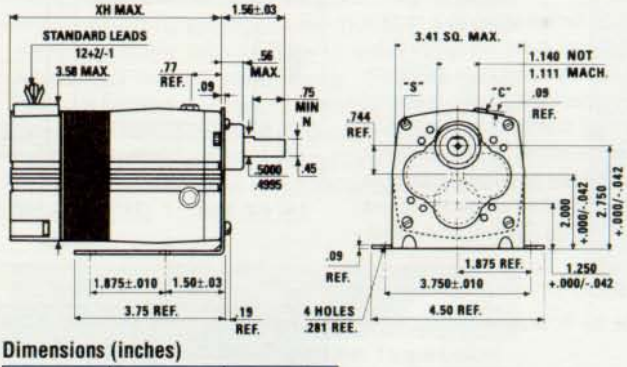


Dimensions (inches)

Bodine Type	XL Face Mount	XL "L" Bracket Mount	XL	Approx. Ship. Wt. Lbs.
"NCI-1D" INDUCTION TYPE				
11D (3,4,5,6)	5.19	5.28	2.75	4-1/2
13D (3,4,5,6)	5.94	6.03	3.50	5-1/2

Number of gear stages shown in parenthesis.

"30R-D" Gearmotor shown with optional "L" bracket (Model 5968)



Dimensions (inches)

Bodine Type	XH	Approx. ship. Wt. Lbs.
30R1-D	5.23	5.8
30R2-D	5.48	6.3

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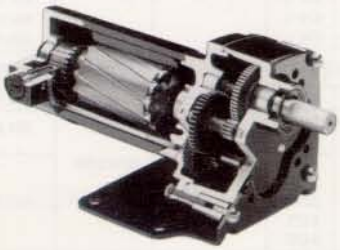
BODINE ELECTRIC COMPANY

TYPE "N-1D" AND "24A-D" GEARMOTORS (DC)

Parallel shaft, helical and spur gearing...to 40 Lb-in.



"N-1D" Gearmotor (DC) with optional base mount "L" bracket kit (Model No. 5968).



"24A-D" Gearmotor (DC) with optional base mount "L" bracket kit (Model No. 5963).

- Totally Enclosed
- Lip-Type Oil Seals
- Needle Bearings on Output Shaft
- Wide Primary Gear—Helical, and of a Reinforced Thermoplastic for Strength and Low Noise
- All Steel Gearing Case Hardened
- External Brush Access on DC Gearmotors

General

The "N-1D" and "24A-D" parallel shaft gearmotors are designed for applications requiring consistently long life and high output torque in relation to gearmotor size.

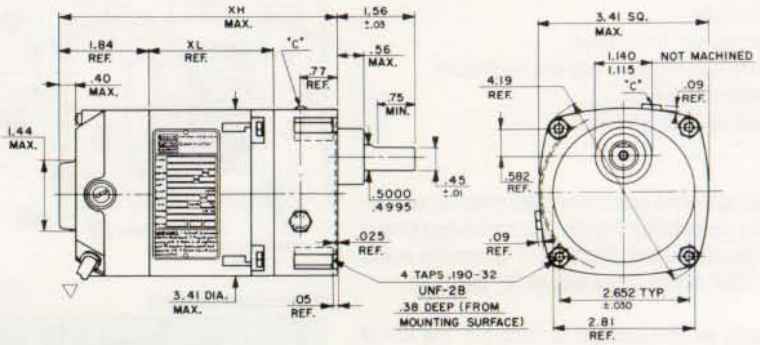
The wide helical primary gear is accurately molded of a reinforced thermoplastic material for quietness, strength, and long life. Secondary gear stages are precisely hobbed, spur type, and of case hardened steel. The gear reduction housing is lubricated with a proven oil for long life. Lip-type oil seals are utilized on the motor and drive shafts.

Grease lubricated ball bearings are employed on the motor shaft. The output shaft is made of selectively hardened alloy steel and is supported by needle bearings to provide long life and high radial load capacity.

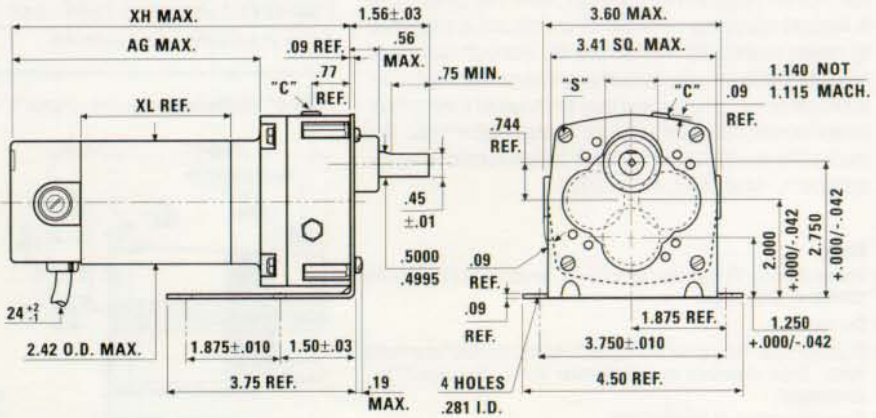
These gearmotors are designed for mounting to a vertical surface utilizing four .190-32 tapped holes. An optional "L" bracket kit (Model No. 5968) is available for floor, ceiling, or sidewall mounting—maximum radial load to minimize bracket deflection is 50 Lbs. The gearhead breather hole (Detail "C") is positioned for 12 o'clock mounting as shown in the dimension diagram. 3, 6, and 9 o'clock positions available on special order. Vertical mounting (shaft up or down) requires application review by Bodine. Shaft up is not recommended.

Speed Rpm (Max.)	Safe Torque Lb-in.	Gear Ratio to 1	Motor Hp	Bodine Type	Model No.	Connection Diagram*	Rotation*
SHUNT WOUND—115 VDC Totally Enclosed							
3.8	40	450	1/50	NSH-11D5	536 ☆	074 10085 5-lead	Reversible
5.8	40	300			535 ☆		
9.6	40	180		NSH-11D4	533 ☆		
19	40	90			531 ☆		
29	29	60		NSH-11D3	530 ☆		
58	15	30			529 ☆		
96	8.7	18			528 ☆		
144	5.8	12			527 ☆		
288	2.7	6			526 ☆		
130 VDC, FF=1.0 Continuous Duty ■							
5.6	40	450	1/29	24A2BEPM-D5	0199	074 10101	Reversible
8.3	40	300			0198		
14	40	180		24A2BEPM-D4	0197		
28	40	90			0196		
42	36	60		24A2BEPM-D3	0195		
83	18	30			0194		
139	11	18			0193		
208	7.1	12			0192		
417	3.3	6			0191		
42	40	60	1/17	24A4BEPM-D3	0190		
83	29	30			0189		
139	17	18			0188		
208	12	12			0187		
417	5.4	6			0186		

"NSH-1D" Brush Type Gearmotor (Approximate shipping weight: 4 3/4 Lbs.)



"24A-D" Brush Type Gearmotor with optional "L" bracket (Model 5968)



Bodine Type	XH	AG	XL	Approx. Ship. Wt. Lbs.
24A2-D (3,4,5)	5.97	4.20	2.25	4
24A4-D (3,4,5)	6.72	4.95	3.00	4.5

Notes

★ Nomenclature—The number after the "D" designation indicates the number of gear stages.

✱ See page 3.

Shunt Wound DC gearmotors have a 5-lead cord and plug.

"C" Standard location of breather hole.

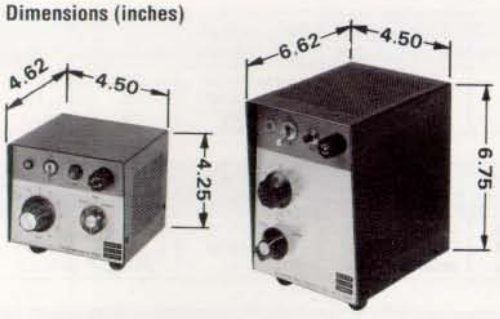
"S" (4) 10-32 UNF-2B, .38 in. deep minimum on a 3.75" B.C.

☆ Available while supplies last after December 31, 1997.

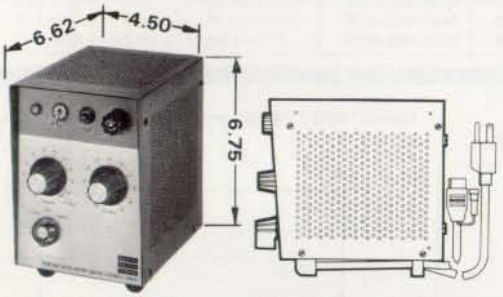
■ FPM control available. See page 20.

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Dimensions (inches)



Model No. 901 **Model Nos. 903, 906**



Model Nos. 905, 907, 914, 915

Diagram illustrates side view and connection cords of ASH and BSH controls.



Model Nos. 911, 913, 916

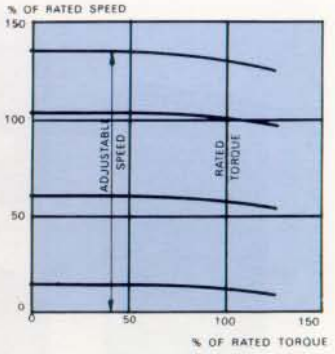
The type BSH and ASH chassis kit controls, in addition to the complete chassis, include a speed control potentiometer with knob and dial plate, and an 18" cable with color coded receptacle at one end. All SH controls are supplied with connection diagram/operating instructions card, and a mounting template.

Dimensions (inches)

Model No.	Bodine Type	A	B	C
911	BSH-250	4.44	4.50	3.12
913	ASH-450	6.62	4.50	3.12
916	ASH-550	6.62	4.50	4.38

Basic Speed Range Systems

By means of a single potentiometer, speed can be controlled over a wider range than with comparable controls, and with greater stability over the entire range. Freedom from cogging at low speeds, and exceptionally good regulation are unique features of the Bodine system. Full rated torque is delivered over the basic speed range.

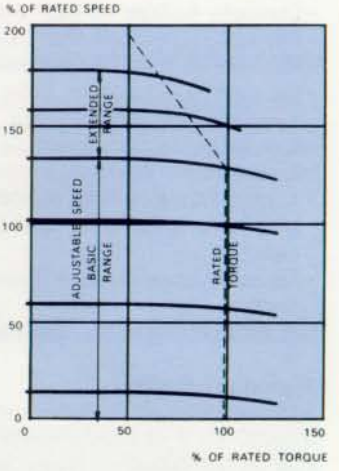


Motor Rating (1725 Rpm) Hp	AC Input Amps	Bodine Type	Model No.	Approx. Ship. Wt. Lbs.
ENCASED CONTROLS—Basic Speed				
1/50	1.4	BSH-200	**901**	3-1/2
1/20 & 1/15	3.4	ASH-400	**903**	4
1/8	4.8	ASH-500	**906**	4-1/2
CHASSIS KIT CONTROLS				
1/50	1.4	BSH-250	**911**	2-1/2
1/20 & 1/15	3.4	ASH-450	**913**	2-3/4
1/8	4.8	ASH-550	**916**	3-1/2

Basic plus Extended Speed Range Systems

These controls have an extended speed range potentiometer in addition to the basic speed potentiometer. When operating in the basic speed range, the extended range speed potentiometer should be set in the "OFF" or fully CCW position, to provide full rated torque capability and good speed regulation.

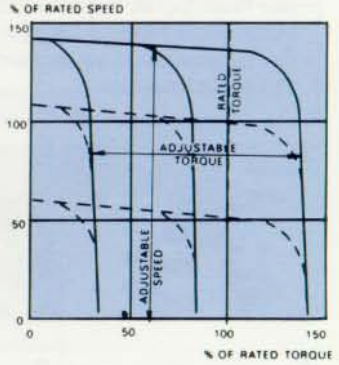
Full rated torque is available on a continuous basis over the basic speed range, and full rated horsepower over the extended speed range. Note that the graph shows that if an application requires a particular torque throughout both the basic and the extended speed ranges a drive unit with a torque rating of twice that of the particular torque should be selected.



Motor Rating (1725 Rpm) Hp	AC Input Amps	Bodine Type	Model No.	Approx. Ship. Wt. Lbs.
ENCASED CONTROLS—Basic plus Extended Speed				
1/50	1.4	ASH-203	**914**	4
1/20 & 1/15	3.4	ASH-403	**915**	4

Basic Speed Range plus Torque Control Systems

These models have a torque control potentiometer in addition to the basic speed range potentiometer. The torque selected on the torque control knob is delivered within close limits, regardless of the basic speed selected. The torque control feature is sometimes referred to as "torque limiting"; it can provide soft starts or regulated acceleration. The torque control feature can also be disengaged from the rest of the circuitry thus allowing regular speed control without sacrifice in regulation.



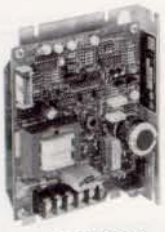
Motor Rating (1725 Rpm) Hp	AC Input Amps	Bodine Type	Model No.	Approx. Ship. Wt. Lbs.
ENCASED CONTROLS—Basic Speed plus Torque Control				
1/20 & 1/15	3.4	ASH-402	**905**	4-1/4
1/8	4.8	ASH-502	**907**	4-3/4

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TYPE "FPM" CONTROLS FOR PM MOTORS



Model 0830, 0850



Model 0810



Model 0818, 0838, 0858

Manual Speed Controls

Encased without F-B-R	Encased with Electronic F-B-R	Chassis without F-B-R	Chassis with Electronic F-B-R	For Use With Motors Rated	Amps	
					AC Input	DC Output
0815 0835 0855	0818 0838 0858	0810 0830 0850	0810+0890 0830+0890 0850+0890	1/50 to 1/17 HP 1/12 to 1/6 HP 1/4 to 1/3	2.9 4.2 9.0	Up to 0.50 Up to 1.25 Up to 2.3

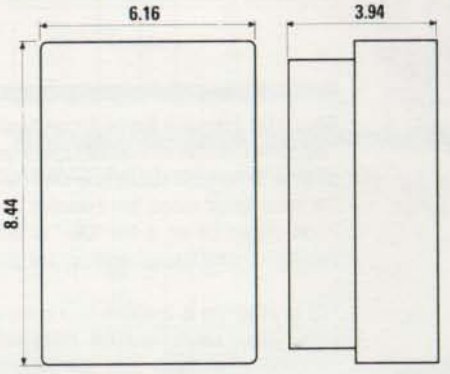
Analog Interface Models

Encased without F-B-R	Encased with Electronic F-B-R	Chassis without F-B-R	Chassis with Electronic F-B-R	For Use With Motors Rated	Amps	
					AC Input	DC Output
0816 0836 0856	N/A N/A N/A	0810+0888 0830+0888 0850+0888	0810+0888+0890 0830+0888+0890 0850+0888+0890	1/50 to 1/17 HP 1/12 to 1/6 HP 1/4 to 1/3	2.9 4.2 9.0	Up to 0.50 Up to 1.25 Up to 2.3

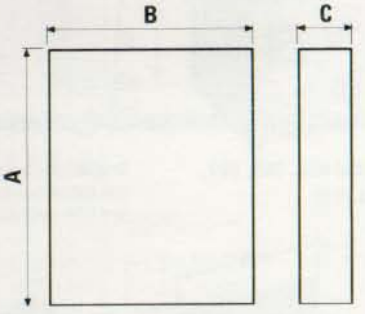
Digital Interface Models

Encased without F-B-R	Encased with Electronic F-B-R	Chassis without F-B-R	Chassis with Electronic F-B-R	For Use With Motors Rated	Amps	
					AC Input	DC Output
0817 0837 0857	N/A N/A N/A	0810+0889 0830+0889 0850+0889	0810+0889+0890 0830+0889+0890 0850+0889+0890	1/50 to 1/17 HP 1/12 to 1/6 HP 1/4 to 1/3	2.9 4.2 9.0	Up to 0.50 Up to 1.25 Up to 2.3

All Encased Controls



Models "0810," "0830" and "0850" Chassis Controls



Selection Features

- Commonly Available 115 VAC Input
- Filtered Output Provides Wide Usable Speed Range and Maximum Continuous Output Torque
- Dip Switch Calibration for Motor Size Gives Excellent Speed Regulation Without Tuning
- Line Voltage and Temperature Compensation Minimize Speed Drift
- Adjustable Current Limiting on PC Board Enables Users to Limit Available Torque to Protect Equipment from Overloads
- Adjustable Acceleration on PC Board Can be Used for Soft Starting
- 100% Tested and Calibrated for Dependability

Application Information

- Encased Models are Totally Enclosed Non-Ventilated IP-40 Standard or IP-44 with Optional Sealing Kit, Model 0895
- UL and CSA Component Recognized
- Optional Analog Interface Card Allows Operation With External Programmable Controllers or Computers Using ±5VDC, ±10 VDC, ±4-20 mA or ±2-10- mA Logic Levels
- Optional Digital Interface Card Allows Operation With External Programmable Controllers or Computers Using 8 Bit Parallel TTL Logic
- Optional Electronic Forward-Brake-Reverse Card Enables Low Power Signals to Brake or Change Direction of the Motors Without External Timers or Relays
- Encased Controls can Accommodate Basic Speed Control plus one Optional Card

Dimensions (inches) Approximate Shipping Weight: 8 Lbs.

Type	A	B	C	Lbs.
0810	6.03	4.75	2.125	2.5
0810+0888, 0810+0889	6.03	4.75	2.875	2.75
0810+0890	6.03	4.75	3.25	2.75
0810+0888+0890, 0810+0889+0890	6.03	4.75	3.75	3.0
0830, 0850	9.25	5.00	2.25	3.4
0830+0888, 0830+0889, 0850+0888, 0850+0889	9.25	5.00	3.12	3.75
0830+0890, 0850+0890	9.25	5.00	3.5	3.75
0830+0888+0890, 0830+0889+0890, 0850+0888+0890, 0850+0889+0890	9.25	5.00	4.0	4.0

A



B



C



D



Items for Type FPM Permanent Magnet Controls

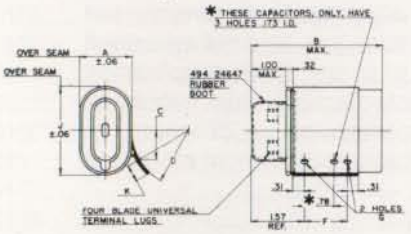
Item	Model No.	For FPM Model No.	Description	Notes
A	0890	0810, 0835 0850, 0855 0815, 0830	Electronic F-B-R Kit	Provides electronic reversing and dynamic braking for analog or digital output
B	0894 0891 0892	0810 0830 0850	Mechanical F-B-R Kit	Manual rotary F-B-R switch kit plugs into driver board
C	0893	0888, 0889	Local/ Remote Control Kit	Provides manual override for analog or digital inputs
D	0895	0815, 0816, 0817, 0818, 0835, 0836 0837, 0838, 0855, 0856, 0857, 0858	Sealing Kit	Provides IP 44 splash-proof protection (comparable to NEMA 12)

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BODINE® ELECTRIC COMPANY

Capacitor Dimensions (inches)

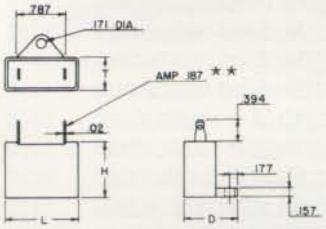
Oil Filled Type



Capacitor Dimensions (inches)

Part No.	Mfd. and Volts AC	A	B	C	D	F	G	J	K
494 00027	2.5 -370	1.31	3.18	0.88	1.62	1.12	.173	2.16	0.34
494 00028 ★	3.75-370		3.18						
494 00029 ★	5.0 -370		3.68						
494 00031	7.5 -370		4.56						
494 00032	10.0 -370	1.91	3.51	1.08	2.50	1.50	.196	2.91	0.31
494 00033	12.5 -370		3.51						
494 00034	15.0 -370		3.51						
494 00035	20.0 -370		4.01						

Metalized Mylar Type



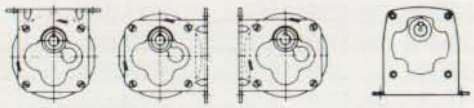
Capacitor Dimensions (inches)

Part No.	Mfd. and Volts AC	L	H	T	D
494 00081	10.00-250	1.89	1.24	0.75	1.14
494 00082	12.50-250	2.28	1.22	0.83	1.22
494 00097	15.00-250	2.08	1.43	0.92	1.39
494 26812	4.00-250	1.51	1.07	0.64	1.11
494 29449	5.00-250	1.51	1.07	0.64	1.11

★★Instead of AMP blade-type terminals, 10 and 12.5 Mfd. Capacitors have 20 GA (stranded) blue PVC wire, 3.75" long. (These capacitors fit inside Bodine Model No. 984 terminal box kit.)

Model 5968 "L" Shaped Brackets

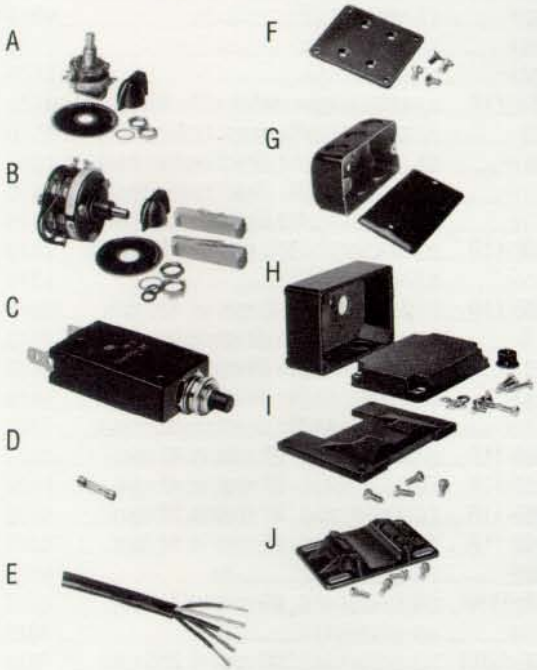
- 50 deflection Lbs. This number represents the maximum permissible radial load to minimize bracket deflection.
- "L" Bracket Mounting Kit for "32A" and "30R Motors" and "N-1D", "24A-D", "24A-Z", "32A-Z," and "30R-D" Gearmotors. Approximate shipping weight: 1-1/4 Lbs.



CEILING MOUNT | SIDEWALL MOUNT | BASE MOUNT

Most parallel shaft stock gearmotors have a breather hole on top and require driveshaft to remain at 12 o'clock position with respect to the horizon as shown in the illustration above. See "Mounting Positions" on page 3.

Other Motor/Gearmotor/Control Kits



ITEMS FOR TYPES ASH/BSH SHUNT WOUND CONTROLS

Item	Description			For Use with Chassis Controls: BSH-250 (1/50 Hp)	ASH-450 (1/20 & 1/15)	ASH-550 (1/8 Hp)	Bodine Part or Model No.
A	Forward-Brake-Reverse (F-B-R) Switch Kit						971
B	Forward-Brake-Reverse (F-B-R) Switch Kit						972
C	Circuit Breaker	Amps					
			1.5				973
			3.5				974
			5				975
			10				
D	Line Fuse						
	Make	Type	Amps				
	Bussman	ABC, 3A	3				
	Bussman	ABC, 6A	6				
	Bussman	ABC, 8A	8				
E	100 Feet of 5 Conductor Cable (without plug or receptacle)						43300107

Item	Description	Model No.	Approx. Ship. Wt. Lbs.
F	Base Mounting Kit for "3F" Gearmotors	967	1/2
G	Steel Terminal Box Kit for "42R" and "48R" Motors Gearmotors	982	2
H	Die Cast Terminal Kit for "32A", "34R", "42A", "42R", and "48R" Motors and Gearmotors	984	1
I	Die Cast Rigid Base Kit for "48R-F" Gearmotors	989	2-1/2
J	Die Cast Base Kit for "42A" Motors	991	1/3
	Die Cast Rigid Base Kit for "34R" Motors and "34R-3F" Gearmotors	994	1/2

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Model	Shown on NR Page	Type	Ratio	Possible Alternate Model Number	Alternate Type	Deviations from original
0001	-	V-10	-	-	-	No direct replacement
0002	-	V-10	-	-	-	No direct replacement
0003	-	NSE-11	-	-	-	No direct replacement
0004	-	NSE-11	-	-	-	No direct replacement
0005	-	NSE-11	-	0008	NSE-12	.25" Longer
0006	-	NSE-12	-	0007	NSE-12	7500 rpm vs 5000 rpm
0007	6	NSE-12	-	-	-	-
0008	6	NSE-12	-	-	-	-
0009	6	NSE-13	-	-	-	-
0010	-	NSE-13	-	0011	NSE-13	7500 rpm vs 5000 rpm
0011	6	NSE-13	-	-	-	-
0012	-	NSE-33	-	-	-	No direct replacement
0013	-	NSE-34	-	-	-	No direct replacement
0014	-	NSE-33	-	-	-	No direct replacement
0015	-	NSE-34	-	-	-	No direct replacement
0016	-	32A3BEPM	-	4016	32A3BEPM	Metal vs plastic shield
0019	-	32A5BEPM	-	4019	32A5BEPM	Metal vs plastic shield
0020	-	32A5BEPM	-	4020	32A5BEPM	Metal vs plastic shield
0023	-	42A4BEPM	-	4023	42A4BEPM	No direct replacement
0024	-	42A4BEPM	-	4024	42A4BEPM	Metal vs plastic shield
0025	-	42A7BEPM	-	4025	42A4BEPM	No direct replacement
0026	-	42A7BEPM	-	4026	42A7BEPM	Metal vs plastic shield
0027	-	42A5BEPM	-	4027	42A5BEPM	Metal vs plastic shield
0028	-	42A3BEPM	-	4028	42A3BEPM	Metal vs plastic shield
0029	-	42A3BEPM	-	4029	42A3BEPM	Metal vs plastic shield
0032	-	NPM-13	-	0043	24A4BEPM	Smaller motor, different mounting
0034	-	42A5BEPM	-	4034	42A5BEPM	Metal vs plastic shield
0035	-	42A5BEPM	-	4035	42A5BEPM	Metal vs plastic shield
0037	-	42A7BEPM	-	4037	42A7BEPM	Metal vs plastic shield
0042	6	24A2BEPM				-
0084	9	24A4BEPM-3F	5:1	-	-	-
0086	9	24A4BEPM-3F	10:1	-	-	-
0087	9	24A4BEPM-3F	20:1	-	-	-
0088	9	24A4BEPM-3F	40:1	-	-	-
0089	9	24A4BEPM-3F	60:1	-	-	-
0101	-	V-10R	10:1	0107	NSE-11R	Larger motor, different mounting
0102	-	V-10R	24:1	-	-	No direct replacement
0103	-	V-10R	100:1	-	-	No direct replacement
0104	-	V-10R	154:1	-	-	No direct replacement
0105	-	V-10R	432:1	-	-	No direct replacement
0106	-	NSE-11R	6:1	0107	NSE-11R	500 rpm vs 835 rpm
0107	8	NSE-11R (single reduction)	10:1	-	-	-
0108	-	NSE-11R	12:1	0107	NSE-11R	500 rpm vs 420 rpm
0109	-	NSE-11R	18:1	-	-	No direct replacement
0110	-	NSE-11R	24:1	-	-	No direct replacement
0111	-	NSE-11R	36:1	-	-	No direct replacement
0112	8	NSE-11R (double reduction)	72:1	-	-	No direct replacement
0113	-	NSE-11R	180:1	0112	NSE-11R	97 rpm vs 48 rpm
0114	-	NSE-11R	216:1	0112	NSE-11R	97 rpm vs 42 rpm
0115	-	NSE-11R	324:1	0112	NSE-11R	97 rpm vs 28 rpm
0116	-	NSE-11R	768:1	0112	NSE-11R	97 rpm vs 14 rpm
0118	14	NSE-11RG	120:1	-	-	-
0119	-	NSE-11RG	240:1	0118	NSE-11RG	49 rpm vs 21 rpm
0120	9	NSE-12RH	10:1	-	-	-
0121	-	NSE-12RH	20:1	0120	NSE-12RH	500 rpm vs 250 rpm
0122	9	NSE-12RH	40:1	-	-	-
0123	-	NSE-33R	10:1	-	-	No direct replacement
0124	-	NSE-33R	15:1	-	-	No direct replacement
0125	-	NSE-33R	20:1	0127	NSE-34RH	Different mounting

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Model	Shown on NR Page	Type	Ratio	Possible Alternate Model Number	Alternate Type	Deviations from original
0126	16	NSE-34RH	10:1	-	-	-
0127	16	NSE-34RH	20:1	-	-	-
0128	-	NSE-34RH	40:1	0127	NSE-34RH	250 rpm vs 125 rpm
0129	-	32A3BEPM-3F	5:1	-	-	No direct replacement
0130	-	32A3BEPM-3F	10:1	-	-	No direct replacement
0131	-	32A3BEPM-3F	20:1	-	-	No direct replacement
0132	-	32A3BEPM-3F	40:1	-	-	No direct replacement
0133	-	32A3BEPM-3F	60:1	-	-	No direct replacement
0134	-	42A5BEPM-5N	5:1	4134	42A5BEPM-5N	Metal vs plastic shield
0135	-	42A5BEPM-5N	10:1	4135	42A5BEPM-5N	Metal vs plastic shield
0136	-	42A5BEPM-5N	20:1	4136	42A5BEPM-5N	Metal vs plastic shield
0137	-	42A5BEPM-5N	30:1	4137	42A5BEPM-5N	Metal vs plastic shield
0138	-	42A5BEPM-5N	40:1	4138	42A5BEPM-5N	Metal vs plastic shield
0140	-	32A5BEPM-5F	5:1	4140	32A5BEPM-5F	Metal vs plastic shield
0141	-	32A5BEPM-5F	10:1	4141	32A5BEPM-5F	Metal vs plastic shield
0142	-	32A5BEPM-5F	20:1	4142	32A5BEPM-5F	Metal vs plastic shield
0144	-	32A5BEPM-5F	40:1	4144	32A5BEPM-5F	Metal vs plastic shield
0146	-	32A3BEPM-W4	172.1:1	4146	32A3BEPM-W4	Metal vs plastic shield
0147	-	32A3BEPM-W4	312.4:1	4147	32A3BEPM-W4	Metal vs plastic shield
0148	-	32A5BEPM-W2	3.8:1	4148	32A5BEPM-W2	Metal vs plastic shield
0149	-	32A5BEPM-W2	5.5:1	4149	32A5BEPM-W2	Metal vs plastic shield
0150	-	32A5BEPM-W2	9.4:1	4150	32A5BEPM-W2	Metal vs plastic shield
0151	-	32A5BEPM-W2	13.8:1	4151	32A5BEPM-W2	Metal vs plastic shield
0152	-	32A5BEPM-W2	20.4:1	4152	32A5BEPM-W2	Metal vs plastic shield
0153	-	32A5BEPM-W3	29.7:1	4153	32A5BEPM-W3	Metal vs plastic shield
0154	-	32A5BEPM-W3	43.9:1	4154	32A5BEPM-W3	Metal vs plastic shield
0155	-	32A5BEPM-W3	65.5:1	4155	32A5BEPM-W3	Metal vs plastic shield
0156	-	32A5BEPM-W4	97.5:1	4156	32A5BEPM-W4	Metal vs plastic shield
0165	-	32A3BEPM-Z2	6:1	4165	32A3BEPM-Z2	Metal vs plastic shield
0166	-	32A3BEPM-Z2	12:1	4166	32A3BEPM-Z2	Metal vs plastic shield
0167	-	32A3BEPM-Z2	18:1	4167	32A3BEPM-Z2	Metal vs plastic shield
0168	-	32A3BEPM-Z3	30:1	4168	32A3BEPM-Z2	Metal vs plastic shield
0169	-	32A3BEPM-Z2	60:1	4169	32A3BEPM-Z2	Metal vs plastic shield
0173	-	42A3BEPM-E4	120:1	4173	42A3BEPM-E4	Metal vs plastic shield
0174	-	42A3BEPM-E4	180:1	4174	42A3BEPM-E4	Metal vs plastic shield
0175	-	42A3BEPM-E4	300:1	4175	42A3BEPM-E4	Metal vs plastic shield
0179	-	42A5BEPM-E1	5:1	4179	42A5BEPM-E1	Metal vs plastic shield
0180	-	42A5BEPM-E2	10:1	4180	42A5BEPM-E2	Metal vs plastc shield
0181	-	42A5BEPM-E2	15:1	4181	42A5BEPM-E2	Metal vs plastic shield
0182	-	42A5BEPM-E3	20:1	4182	42A5BEPM-E3	Metal vs plastic shield
0183	-	42A5BEPM-E3	30:1	4183	42A5BEPM-E3	Metal vs plastic shield
0184	-	42A5BEPM-E3	40:1	4184	42A5BEPM-E3	Metal vs plastic shield
0185	-	42A5BEPM-E3	60:1	4185	42A5BEPM-E3	Metal vs plastic shield
0186	18	24A4BEPM-D3	6:1	-	-	-
0187	18	24A4BEPM-D3	12:1	-	-	-
0188	18	24A4BEPM-D3	18:1	-	-	-
0189	18	24A4BEPM-D3	30:1	-	-	-
0190	18	24A4BEPM-D3	60:1	-	-	-
0191	18	24A2BEPM-D3	6:1	-	-	-
0192	18	24A2BEPM-D3	12:1	-	-	-
0193	18	24A2BEPM-D3	18:1	-	-	-
0194	18	24A2BEPM-D3	30:1	-	-	-
0195	18	24A2BEPM-D3	60:1	-	-	-
0196	18	24A2BEPM-D4	90:1	-	-	-
0197	18	24A2BEPM-D4	180:1	-	-	-
0198	18	24A2BEPM-D5	300:1	-	-	-
0199	18	24A2BEPM-D5	450:1	-	-	-
0201	-	NSH-12	-	0276	NSH-12	Enclosed, cord&plug, ball bearings

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Model	Shown on NR Page	Type	Ratio	Possible Alternate Model Number	Alternate Type	Deviations from original
0202	-	NSH-12	-	0276	NSH-12	Enclosed, cord& plug
0203	-	NSH-33	-	0277	NSH-33	Enclosed, cord& plug
0204	-	NSH-33	-	0277	NSH-33	Enclosed, cord& plug
0206	-	NSH-34	-	0278	NSH-34	Enclosed, cord& plug
0207	-	NSH-54	-	4024	42A4BEPM	PM, enclosed, cord, ball bearings
0208	-	NSH-54	-	4024	42A4BEPM	PM, enclosed, cord
0209	-	NSI-12	-	0210	NSI-12	Ball bearings
0210	5	NSI-12	-	5240	30R2BECI	New Design
0211	5	NSI-12	-	5240	30R2BECI	New Design
0213	-	NSI-12	-	0219	NSI-13	0.38 Inches longer
0214	-	NSI-13	-	0215	NSI-13	Ball bearings
0215	5	NSI-13	-	5240	30R2BECI	New Design
0217	5	NSI-13	-	5240	30R2BECI	New Design
0219	5	NSI-13	-	5219	30R2BECI	New Design
0220	-	NSI-33	-	0221	NSI-33	Ball bearings
0221	7	NSI-33	-	-	-	-
0223	7	NSI-34	-	-	-	-
0224	-	NSI-34	-	0225	NSI-34	Ball bearings
0225	7	NSI-34	-	-	-	-
0227	7	NSI-34	-	-	-	-
0228	-	NSY-12	-	0229	NSY-12	Ball bearings
0229	5	NSY-12	-	-	-	-
0230	-	NSY-12	-	0229	NSY-12	Replace open shields with closed
0231	-	NSY-34	-	-	-	No direct replacement
0232	-	NSY-34	-	-	-	No direct replacement
0234	-	NSY-54	-	-	-	No direct replacement
0236	-	NSY-55	-	-	-	No direct replacement
0238	5	NCI-12	-	5240	30R2BECI	New Design
0240	5	NCI-13	-	5240	30R2BECI	New Design
0242	7	NCI-33	-	-	-	-
0244	7	NCI-34	-	-	-	-
0245	-	NYC-12	-	-	-	No direct replacement
0246	-	NYC-12	-	5246	30R2BECI	New Design
0248	-	NYC-34	-	-	-	No direct replacement
0249	4	NPP-34	-	0295	34R6BFPP	1/5 H.P. 230 V. Only, longer & smaller
0250	-	NPP-55	-	0274	42R5BFPP	Different mounting
0252	-	42R3BFSI	-	0251	42R3BFSI	Base vs face mount
0256	-	42R3BFCI	-	0258	42R5BFCI	1.06 Inches longer
0259	-	42R3BFCI	-	0260	42R3BFCI	1.06 Inches longer
0267	-	42R5BFSY	-	-	-	No direct replacement
0272	-	42R5BFYP	-	-	-	No direct replacement
0275	-	42R5BFPP	-	274	42R5BFPP	Base vs face mount
0276	6	NSH-12	-	-	-	-
0277	7	NSH-33	-	4016	32A3BEPM	PM motor, shorter & smaller dia.
0278	7	NSH-34	-	4020	32A5BEPM	PM motor, longer & smaller dia.
0280	-	NSH-54	-	4024	42A4BEPM	PM vs shunt
0282	-	NSH-55	-	4026	42A7BEPM	PM vs shunt
0287	-	48R6BFCI	-	-	-	No direct replacement
0288	-	48R6BFSI	-	-	-	No direct replacement
0290	7	34R4BFCI	-	-	-	-
0291	7	34R6BFCI	-	-	-	-
0293	7	34R6BFCI	-	-	-	-
0297	7	34R6BFYC	-	-	-	-
0301	-	NSH-12R	18:1	0543	NSH-12R	Enclosed, cord&plug
0302	-	NSH-12R	100:1	0545	NSH-12R	Enclosed, cord&plug
0303	-	NSH-12R	180:1	0546	NSH-12R	Enclosed, cord&plug
0304	-	NSH-12R	324:1	0547	NSH-12R	Enclosed, cord&plug
0305	-	NSH-12R	432:1	0548	NSH-12R	Enclosed, cord&plug
0306	-	NSH-12RG	60:1	0551	NSH-12RG	Enclosed, cord&plug

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0307	-	NSH-12RG	90:1	0552	NSH-12RG	Enclosed, cord&plug
0308	-	NSH-12RG	120:1	0553	NSH-12RG	Enclosed, cord&plug
0309	-	NSH-12RG	240:1	0556	NSH-12RG	Enclosed, cord&plug
0310	-	NSH-33R	10:1	0565	NSH-33R	Enclosed, cord&plug
0311	-	NSH-33R	20:1	0567	NSH-33R	Enclosed, cord&plug
0312	-	NSH-33R	30:1	0568	NSH-33R	Enclosed, cord&plug
0313	-	NSH-33R	40:1	0569	NSH-33R	Enclosed, cord&plug
0314	-	NSH-34RH	10:1	0574	NSH-34RH	Enclosed, cord&plug
0315	-	NSH-34RH	20:1	0575	NSH-34RH	Enclosed, cord&plug
0316	-	NSH-34RH	30:1	0576	NSH-34RH	Enclosed, cord&plug
0317	-	NSH-34RH	40:1	0577	NSH-34RH	Enclosed, cord&plug
0318	-	NSH-54RL	10:1	0586	NSH-54RL	Enclosed, cord&plug
0319	-	NSH-54RL	20:1	0587	NSH-54RL	Enclosed, cord&plug
0320	-	NSH-54RL	30:1	0588	NSH-54RL	Enclosed, cord&plug
0321	-	NSH-54RL	40:1	0589	NSH-54RL	Enclosed, cord&plug
0322	8	NSI-12R (single reduction)	6:1	-	-	-
0323	8	NSI-12R	10:1	-	-	-
0324	8	NSI-12R	12:1	-	-	-
0325	8	NSI-12R	18:1	-	-	-
0326	-	NSI-12R	24:1	0325	NSI-12R	96 rpm vs 72 rpm
0327	8	NSI-12R	30:1	-	-	-
0328	8	NSI-12R (double reduction)	36:1	-	-	-
0329	-	NSI-12R	60:1	0330	NSI-12R	24 rpm vs 29 rpm
0330	8	NSI-12R	72:1	-	-	-
0331	-	NSI-12R	100:1	0330	NSI-12R	24 rpm vs 17 rpm
0332	8	NSI-12R	180:1	-	-	-
0333	8	NSI-12R	288:1	-	-	-
0334	-	NSI-12R	432:1	0333	NSI-12R	6 rpm vs 4 rpm
0335	8	NSI-12R	600:1	-	-	-
0336	-	NSI-12R	900:1	0335	NSI-12R	2.9 Rpm vs 1.9 Rpm
0337	14	NSI-12RG	60:1	-	-	-
0338	14	NSI-12RG	90:1	-	-	-
0339	14	NSI-12RG	120:1	-	-	-
0340	-	NSI-12RG	150:1	-	-	-
0341	14	NSI-12RG	180:1	-	-	-
0342	14	NSI-12RG	240:1	-	-	-
0343	14	NSI-12RG	360:1	-	-	-
0344	14	NSI-12RG	480:1	-	-	-
0345	-	NSI-12RG	720:1	-	-	-
0346	14	NSI-12RG	1080:1	-	-	-
0347	10	NSI-12RH	10:1	-	-	-
0348	10	NSI-12RH	15:1	-	-	-
0349	10	NSI-12RH	20:1	-	-	-
0350	10	NSI-12RH	30:1	-	-	-
0351	10	NSI-12RH	40:1	-	-	-
0353	10	NSI-12RH	60:1	-	-	-
0354	11	NSI-33R	10:1	0488	34R4BFCI-3F	0.55"Longer, need base#994
0355	11	NSI-33R	15:1	0489	34R4BFCI-3F	0.55"Longer, need base#994
0356	11	NSI-33R	20:1	0490	34R4BFCI-3F	0.55"Longer, need base#994
0357	11	NSI-33R	30:1	0487	34R4BFCI-3F	0.55"Longer, need base#994
0358	11	NSI-33R	40:1	0491	34R4BFCI-3F	0.55"Longer, need base#994
0359	15	NSI-34RH	10:1	0465	34R4BFCI-5R	Base included
0360	15	NSI-34RH	20:1	0466	34R4BFCI-5R	Base included
0361	15	NSI-34RH	40:1	0468	34R4BFCI-5R	Base included
0362	15	NSI-34RH	60:1	0469	34R4BFCI-5R	Base included
0363	-	NSI-34RJ	72:1	5260	42R5BFCI-GB	28 rpm vs 24 rpm, different frame
0364	-	NSI-34RJ	144:1	5260	42R5BFCI-GB	14 rpm vs 12 rpm, different frame
0365	-	NSI-34RJ	300:1	5266	42R5BFCI-GB	5.9 rpm vs 5.8 rpm, different frame
0366	-	NSI-53R	10:1	0617	42R4BFSI-5L	Different frame

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0367	-	NSI-53R	20:1	0618	42R4BFSI-5L	Different frame
0368	-	NSI-53R	40:1	0620	42R4BFSI-5L	Different frame
0369	12	NSI-54RL	10:1	0617	42R4BFSI-5L	Different frame
0370	12	NSI-54RL	20:1	0618	42R4BFSI-5L	Different frame
0371	12	NSI-54RL	30:1	0619	42R4BFSI-5L	Different frame
0372	12	NSI-54RL	40:1	0620	42R4BFSI-5L	Different frame
0373	-	NSI-55RH	10:1	-	-	No direct replacement
0374	-	NSI-55RH	18:1	-	-	No direct replacement
0375	-	NSI-55RH	24:1	-	-	No direct replacement
0376	-	NSI-55RH	30:1	-	-	No direct replacement
0377	-	NSI-55RH	36:1	-	-	No direct replacement
0378	-	NSI-55RH	48:1	-	-	No direct replacement
0380	-	32A5BEPM-5F	5:1	4122	32A5BEPM-5F	200 vs 500rpm, Metal vs plastic shield
0381	-	32A5BEPM-5F	10:1	4122	32A5BEPM-5F	Metal vs plastic shield
0382	-	32A5BEPM-5F	20:1	4124	32A5BEPM-5F	62 vs 125 rpm, Metal vs plastic shield
0384	-	32A5BEPM-5F	40:1	4124	32A5BEPM-5F	Metal vs plastic shield
0393	-	NSY-12R	6:1	-	-	No direct replacement
0394	-	NSY-12R	10:1	-	-	No direct replacement
0395	-	NSY-12R	12:1	-	-	No direct replacement
0396	-	NSY-12R	18:1	-	-	No direct replacement
0398	-	NSY-12R	30:1	-	-	No direct replacement
0400	-	NSY-12R	60:1	-	-	No direct replacement
0401	-	NSY-12R	72:1	-	-	No direct replacement
0402	-	NSY-12R	180:1	-	-	No direct replacement
0403	-	NSY-12R	900:1	-	-	No direct replacement
0406	8	NCI-12R	6:1	-	-	-
0407	-	NCI-12R	12:1	0408	NCI-12R	96 rpm vs 145 rpm
0408	8	NCI-12R	18:1	-	-	-
0409	-	NCI-12R	36:1	0411	NCI-12R	9.6 Rpm vs 48 rpm
0410	-	NCI-12R	72:1	0411	NCI-12R	9.6 Rpm vs 24 rpm
0411	8	NCI-12R	180:1	-	-	-
0412	-	NCI-12R	600:1	0411	NCI-12R	9.6 vs 2.9 rpm
0413	14	NCI-12RG	60:1	-	-	-
0414	14	NCI-12RG	90:1	-	-	-
0415	14	NCI-12RG	120:1	0416	NCI-12RG	9.6 Rpm vs 14 rpm
0416	14	NCI-12RG	180:1	-	-	-
0417	14	NCI-12RG	480:1	-	-	-
0418	14	NCI-12RG	1080:1	-	-	-
0419	11	NCI-33R	10:1	0488	34R4BFCI-3F	0.55" Longer, need base model#994
0420	11	NCI-33R	20:1	0490	34R4BFCI-3F	0.55" Longer, need base model#994
0421	11	NCI-33R	30:1	0491	34R4BFCI-3F	0.55" Longer, need base model#994
0422	11	NCI-33R	40:1	0491	34R4BFCI-3F	0.55" Longer, need base model#994
0423	15	NCI-34RH	10:1	0465	34R4BFCI-5R	Different frame
0424	15	NCI-34RH	20:1	0466	34R4BFCI-5R	Different frame
0425	15	NCI-34RH	40:1	0468	34R4BFCI-5R	Different frame
0426	15	NCI-34RH	60:1	0469	34R4BFCI-5R	Different frame
0427	-	NYC-12R	6:1	-	-	No direct replacement
0428	-	NYC-12R	18:1	-	-	No direct replacement
0429	8	NYC-12R	30:1	-	-	No direct replacement
0430	8	NYC-12R	180:1	-	-	No direct replacement
0431	-	NYC-12R	900:1	-	-	No direct replacement
0432	-	NYC-12RG	60:1	-	-	No direct replacement
0433	-	NYC-12RG	600:1	-	-	No direct replacement
0434	-	NSH-12R	6:1	0541	NSH-12R	Cord & plug
0435	-	NSH-12R	36:1	0544	NSH-12R	Cord & plug
0436	-	NSH-12RH	20:1	0560	NSH-12RH	Enclosed, cord & plug
0437	-	NSH-12RH	30:1	-	-	No direct replacement
0438	-	NSH-12RH	40:1	0562	NSH-12RH	Enclosed, cord & plug
0439	-	NSH-12RH	60:1	0564	NSH-12RH	Enclosed, cord & plug

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0440	14	NCI-12RG	240:1	-	-	-
0441	12	NCI-54RL	10:1	0623	42R4BFCI-5L	Different frame
0442	12	NCI-54RL	20:1	0624	42R4BFCI-5L	Different frame
0443	12	NCI-54RL	30:1	0626	42R4BFCI-5L	Different frame
0444	12	NCI-54RL	40:1	0627	42R4BFCI-5L	Different frame
0457	17	NCI-11D3	12:1	5471	30R2BECI-D3	New design
0458	17	NCI-11D3	18:1	5472	30R2BECI-D3	New design
0459	17	NCI-11D3	30:1	5473	30R2BECI-D3	New design
0460	17	NCI-11D3	60:1	5474	30R2BECI-D3	New design
0461	17	NCI-11D4	90:1	5461	30R1BECI-D4	New design
0462	17	NCI-11D4	180:1	5462	30R1BECI-D4	New design
0463	17	NCI-11D5	450:1	5463	30R1BECI-D5	New design
0464	17	NCI-11D6	900:1	5463	30R1BECI-D5	3.8 vs 1.9 Rpm
0465	15	34RBFCI-5R	10:1	-	-	-
0466	15	34RBFCI-5R	20:1	-	-	-
0468	15	34RBFCI-5R	40:1	-	-	-
0469	15	34RBFCI-5R	60:1	-	-	-
0470	17	NCI-13D3	6:1	5470	30R2BECI-D3	New design
0471	17	NCI-13D3	12:1	5471	30R2BECI-D3	New design
0472	17	NCI-13D3	18:1	5472	30R2BECI-D3	New design
0473	17	NCI-13D3	30:1	5473	30R2BECI-D3	New design
0474	17	NCI-13D3	60:1	5474	30R2BECI-D3	New design
0487	11	34R4BFCI-3F	30:1	-	-	-
0488	11	34R4BFCI-3F	10:1	-	-	-
0489	11	34R4BFCI-3F	15:1	-	-	-
0490	11	34R4BFCI-3F	20:1	-	-	-
0491	11	34R4BFCI-3F	40:1	-	-	-
0492	11	34R4BFCI-3F	60:1	-	-	-
0493	-	34R6BFCI-3F	10:1	-	-	No direct replacement
0494	-	34R6BFCI-3F	20:1	-	-	No direct replacement
0495	-	34R6BFCI-3F	30:1	-	-	No direct replacement
0501	-	NCI-11D3	12:1	0457	NCI-11D3	0.24 Inches longer
0502	-	NCI-11D3	18:1	0458	NCI-11D3	0.24 Inches longer
0503	-	NCI-11D3	30:1	0459	NCI-11D3	0.24 Inches longer
0504	-	NCI-11D3	60:1	0460	NCI-11D3	0.24 Inches longer
0505	-	NCI-11D4	90:1	0461	NCI-11D4	0.24 Inches longer
0507	-	NCI-11D4	180:1	0462	NCI-11D4	0.24 Inches longer
0510	-	NCI-11D5	450:1	0463	NCI-11D5	0.24 Inches longer
0512	-	NCI-11D6	900:1	0464	NCI-11D6	0.24 Inches longer
0515	-	NYC-11D3	18:1	-	-	No direct replacement
0516	-	NYC-11D3	30:1	-	-	No direct replacement
0517	-	NYC-11D3	60:1	-	-	No direct replacement
0520	-	NYC-11D4	180:1	-	-	No direct replacement
0525	-	NYC-11D6	900:1	-	-	No direct replacement
0526	18	NSH-11D3	6:1	0191	24A2BEPM-D3	PM motor
0527	18	NSH-11D3	12:1	0192	24A2BEPM-D3	PM motor
0528	18	NSH-11D3	18:1	0193	24A2BEPM-D3	PM motor
0529	18	NSH-11D3	30:1	0194	24A2BEPM-D3	PM motor
0530	18	NSD-11D3	60:1	0195	24A2BEPM-D3	PM motor
0531	18	NSH-11D4	90:1	0196	24A2BEPM-D4	PM motor
0533	18	NSH-11D4	180:1	0197	24A2BEPM-D4	PM motor
0535	18	NSH-11D5	300:1	0198	24A2BEPM-D5	PM motor
0536	18	NSH-11D5	450:1	0199	24A2BEPM-D5	PM motor
0541	8	NSH-12R	6:1	-	-	-
0542	8	NSH-12R	10:1	-	-	-
0543	8	NSH-12R	18:1	-	-	-
0544	8	NSH-12R	36:1	-	-	-
0545	8	NSH-12R	100:1	-	-	-
0546	8	NSH-12R	180:1	-	-	-

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0547	8	NSH-12R	324:1	-	-	-
0548	8	NSH-12R	432:1	-	-	-
0551	14	NSH-12RG	60:1	-	-	-
0552	14	NSH-12RG	90:1	-	-	-
0553	14	NSH-12RG	120:1	-	-	-
0556	14	NSH-12RG	240:1	-	-	-
0557	14	NSH-12RG	480:1	-	-	-
0560	9	NSH-12RH	20:1	0088	24A4BEPM-3F	PM motor, different mounting
0561	9	NSH-12RH	30:1	0088	24A4BEPM-3F	PM motor, different mounting
0562	9	NSH-12RH	40:1	0089	24A4BEPM-3F	PM motor, different mounting
0564	9	NSH-12RH	60:1	0088	24A4BEPM-3F	PM motor, different mounting
0565	9	NSH-33R	10:1	0087	24A4BEPM-3F	PM motor, different mounting
0567	9	NSH-33R	20:1	0088	24A4BEPM-3F	PM motor, different mounting
0568	9	NSH-33R	30:1	0088	24A4BEPM-3F	PM motor, different mounting
0569	9	NSH-33R	40:1	0089	24A4BEPM-3F	PM motor, different mounting
0574	16	NSH-34RH	10:1	4125	32A4BEPM-5R	PM motor, different mounting
0575	16	NSH-34RH	20:1	4126	32A4BEPM-5R	PM motor, different mounting
0576	16	NSH-34RH	30:1	4127	32A4BEPM-5R	PM motor, different mounting
0577	16	NSH-34RH	40:1	4128	32A4BEPM-5R	PM motor, different mounting
0578	-	NSH-34RJ	72:1	4060	42A5BEPM-GB	Different gearhead, more powerful PM motor
0579	-	NSH-34RJ	144:1	4062	42A5BEPM-GB	Different gearhead, more powerful PM motor
0580	-	NSH-34RJ	300:1	4066	42A5BEPM-GB	Different gearhead, more powerful PM motor
0581	-	NSH-34RJ	1080:1	-	-	No direct replacement
0586	13	NSH-54RL	10:1	4116	42A4BEPM-5L	PM motor
0587	13	NSH-54RL	20:1	4117	42A4BEPM-5L	PM motor
0588	13	NSH-54RL	30:1	4118	42A4BEPM-5L	PM motor
0589	13	NSH-54RL	40:1	4119	42A4BEPM-5L	PM motor
0594	-	NSH-55RH	10:1	4194	42A7BEPM-5H	PM motor, 1.4" Longer
0596	-	NSH-55RH	18:1	4196	42A7BEPM-5H	PM motor, 1.4" Longer
0598	-	NSH-55RH	36:1	4198	42A7BEPM-5H	PM motor, 1.4" Longer
0599	-	NSH-55RH	48:1	4199	42A7BEPM-5H	PM motor, 1.4" Longer
0600	-	NCH-13	-	-	-	No direct replacement
0601	-	NCH-13	-	-	-	No direct replacement
0602	-	NCH-34	-	-	-	No direct replacement
0603	-	NCH-34	-	-	-	No direct replacement
0604	-	NCH-34	-	-	-	No direct replacement
0605	-	NPM-13D3	6:1	0186	24A4BEPM-D3	Physically smaller motor
0606	-	NPM-13D3	12:1	0187	24A4BEPM-D3	Physically smaller motor
0607	-	NPM-13D3	18:1	0188	24A4BEPM-D3	Physically smaller motor
0608	-	NPM-13D3	30:1	0189	24A4BEPM-D3	physically smaller motor
0609	-	NPM-13D3	60:1	0190	24A4B3PM-D3	Physically smaller motor
0612	-	NPM-13RF	5:1	0093	24A4BEPM-3F	Physically smaller motor
0613	-	NPM-13RF	10:1	0094	24A4BEBM-3F	Physically smaller motor
0614	-	NPM-13RF	20:1	0096	24A4BEPM-3F	Physically smaller motor
0615	-	NPM-13RF	40:1	0098	24A4BEPM-3F	Physically smaller motor
0616	-	NPM-13RF	60:1	0099	24A4BEPM-3F	Physically smaller motor
0617	12	42R4BFSI-5L	10:1	-	-	-
0618	12	42R4BFSI-5L	20:1	-	-	-
0619	12	42R4BFSI-5L	30:1	-	-	-
0620	12	42R4BFSI-5L	40:1	-	-	-
0623	12	42R4BFCI-5L	10:1	-	-	-
0624	12	42R4BFCI-5L	20:1	-	-	-
0625	-	NCI-13	-	5625	30R2BECI	Different frame
0626	12	42R4BFCI-5L	30:1	-	-	—
0627	12	42R4BFCI-5L	40:1	-	-	-
0628	-	NCI-34	-	2628	42R6BECI	Different frame
0629	-	42R5BFPP-5N	5:1	0630	42R5BFPP-5N	170 rpm vs. 340 rpm
0631	-	NCI-55	-	0632	48R6BECI	Different mounting
0638	-	42R3BFSI-E4	240:1	0637	42R3BFSI-E4	9.4 Vs 7.1 Rpm

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0656	-	48R6BFSI-5N	5:1	-	-	No direct replacement
0657	-	48R6BFSI-5N	10:1	-	-	No direct replacement
0658	-	48R6BFSI-5N	20:1	-	-	No direct replacement
0668	-	42R3BFCI-E4	120:1	0669	42R3BFCI-E4	9.4 Vs 14 rpm
0673	-	48R6BFSI-5H	10:1	-	-	No direct replacement
0674	-	48R6BFSI-5H	18:1	-	-	No direct replacement
0675	-	48R6BFSI-5H	36:1	-	-	No direct replacement
0676	-	48R6BFSI-5H	48:1	-	-	No direct replacement
0686	-	48R6BFCI-5N	5:1	-	-	No direct replacement
0687	-	48R6BFCI-5N	10:1	-	-	No direct replacement
0688	-	48R6BFCI-5N	20:1	-	-	No direct replacement
0696	-	48R6BFCI-5H	10:1	-	-	No direct replacement
0697	-	48R6BFCI-5H	18:1	-	-	No direct replacement
0698	-	48R6BFCI-5H	36:1	-	-	No direct replacement
0699	-	48R6BFCI-5H	48:1	-	-	No direct replacement
0702	-	KYC-23	-	0710	KYC-24	0.359 Inches longer
0703	-	KYC-26	-	-	-	No direct replacement
0716	-	KCI-23A2	6:1	0728	KCI-24A2	0.359 Inches longer
0717	-	KCI-23A2	12:1	0729	KCI-24A2	0.359 Inches longer
0720	-	KCI-23T3	60:1	0732	KCI-24T3	0.359 Inches longer
0721	-	KCI-23T4	72:1	0733	KCI-24T4	0.359 Inches longer
0725	-	KCI-22T5	600:1	0726	KCI-24T5	2.8 Rpm vs 1.9 Rpm
0738	-	KCI-23A2	30:1	0749	KCI-24A2	0.359 Inches longer
0739	-	KCI-23T3	60:1	0750	KCI-24T3	0.359 Inches longer
0740	-	KCI-23T4	72:1	-	-	No direct replacement
0742	-	KCI-23T4	180:1	0741	KCI-23T4	7.9 Rpm vs 10 rpm
0745	-	KCI-22T5	1200:1	-	-	No direct replacement
0746	-	KCI-22T5	1800:1	-	-	No direct replacement
0751	-	KCI-22T4	72:1	0750	KCI-24T3	17 rpm vs 20 rpm
0760	-	KYC-23T3	60:1	-	-	No direct replacement
0761	-	KYC-23T4	72:1	0774	KYC-24T4	0.359 Inches longer
0763	-	KYC-22T4	180:1	0776	KYC-24T4	0.484 Inches longer
0764	-	KYC-22T4	300:1	-	-	No direct replacement
0766	-	KYC-22T5	900:1	0767	KYC-22T5	1 vs 2 rpm
0768	-	KYC-24A2	6:1	-	-	No direct replacement
0770	-	KYC-24A2	12:1	0771	KYC-24A2	100 vs 150 rpm
0773	-	KYC-24T3	60:1	0774	KYC-24T4	30 rpm vs 25 rpm
0777	-	KYC-24T4	300:1	0765	KYC-22T5	6 rpm vs 3 rpm
0801	-	KYC-23B2	6:1	-	-	No direct replacement
0802	-	KYC-23B2	9:1	-	-	No direct replacement
0803	-	KYC-23B2	12:1	-	-	No direct replcement
0804	-	KYC-23B2	18:1	0771	KYC-24A2	0.515 Inches longer
0805	-	KYC-23B2	30:1	0772	KYC-24A2	0.515 Inches longer
0806	-	KYC-22C3	72:1	0774	KYC-24T4	0.671 Inches longer
0807	-	KYC-22C4	120:1	0762	KYC-22T4	0.187 Inches longer
0808	-	KYC-22C4	180:1	-	-	No direct replacement
0809	-	KYC-22C4	300:1	-	-	No direct replacement
0810	-	KYC-22C4	600:1	0765	KYC-22T5	0.187 Inches longer
0811	-	FPM-0811C	-	0810/0888	FPM/AIC	Not factory assembled
0812	-	FPM-0812C	-	0810/0889	FPM/DIC	Not factory assembled
0813	-	FPM-0813C	-	0810/0890	FPM/FBR	Not factory assembled
0814	-	KYC-26RM	72:1	0774	KYC-24T4	Different bearing hub
0815	-	KYC-26RM	120:1	0775	KYC-24T4	Different bearing hub
0816	-	KYC-26RM	180:1	0776	KYC-24T4	Different bearing hub
0817	-	KYC-26RM	300:1	0777	KYC-24T4	Different bearing hub
0818	-	KYC-22RM	600:1	0765	KYC-22T5	0.187 Inches longer
0819	-	KYC-22RM	900:1	-	-	No direct replacement
0820	-	KYC-22RM	1800:1	0767	KYC-22T5	0.187 Inches longer
0821	-	KCI-23B2	6:1	0728	KCI-24A2	0.515 Inches longer

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0822	-	KCI-23B2	12:1	0729	KCI-24A2	0.515 Inches longer
0823	-	KCI-23B2	18:1	0718	KCI-23A2	0.156 Inches longer
0824	-	KCI-23B2	30:1	0719	KCI-23A2	0.156 Inches longer
0825	-	KCI-22C3	72:1	-	-	No direct replacement
0826	-	KCI-22C4	120:1	0722	KCI-23T4	0.312 Inches longer
0827	-	KCI-22C4	180:1	0723	KCI-22T4	0.187 Inches longer
0827	-	DPM-4130E	-	0815	FPM-0815E	More features, dif. Pot. & Mounting
0828	-	KCI-22C4	300:1	0724	KCI-22T4	0.187 Inches longer
0828	-	DPM-4132E	-	0815	FPM-0815E	More features, dif. Pot. & Mounting
0829	-	DPM-4130C	-	0810	FPM-0810C	More features, dif. Pot. & Mounting
0829	-	KCI-22C5	900:1	0726	KCI-22T5	0.187 Inches longer
0830	-	KCI-22C5	1200:1	0726	KCI-22T5	1.9 vs 1.4 Rpm, .187" Longer
0831	-	FPM-0831C	-	0830/0888	FPM/AIC	Not factory assembled
0832	-	FPM-0832C	-	0830/0889	FPM/DIC	Not factory assembled
0833	-	FPM-0833C	-	0830/0890	FPM/FBR	Not factory assembled
0834	-	KCI-26RM	18:1	0730	KCI-24A2	Different bearing hub
0835	-	KCI-23RM	30:1	0719	KCI-23A2	0.156 Inches longer
0836	-	KCI-23RM	72:1	-		No direct replacement
0837	-	KCI-23RM	120:1	0722	KCI-23T4	0.187 Inches longer
0838	-	KCI-23RM	180:1	0723	KCI-22T4	Different bearing hub
0839	-	KCI-22RM	300:1	0724	KCI-22T4	0.187 Inches longer
0840	-	KCI-22RM	600:1	-	-	No direct replacement
0841	-	KCI-22RM	900:1	0726	KCI-22T5	0.187 Inches longer
0842	-	KCI-22RM	1800:1	0727	KCI-22T5	0.187 Inches longer
0843	-	KCI-23B2	6:1	0747	KCI-24A	0.5157 Inches longer
0844	-	KCI-23B2	12:1	-	-	No direct replacement
0845	-	KCI-23B2	18:1	0737	KCI-23A2	0.156 Inches longer
0846	-	KCI-23B2	30:1	-	-	No direct replacement
0847	-	KCI-22C3	72:1	-	-	No direct replacement
0848	-	KCI-22C4	120:1	0741	KCI-23T4	0.312 Inches longer
0849	-	KCI-22C4	180:1	0741	KCI-23T4	0.312 Inches longer
0850	-	KCI-22C4	300:1	0743	KCI-22T4	0.187 Inches longer
0851	-	FPM-0851C	-	0850/0888	FPM/AIC	Not factory assembled
0852	-	FPM-0852C	-	0850/0889	FPM/DIC	Not factory assembled
0853	-	FPM-0853C	-	0850/0890	FPM/FBR	Not factory assembled
0854	-	KCI-22C5	1800:1	0746	KCI-22T5	0.187 Inches longer
0855	-	KCI-26RM	6:1	0747	KCI-24A2	Different bearing hub
0856	-	KCI—26RM	18:1	-	-	No direct replacement
0857	-	KCI—23RM	30:1	0749	KCI-23A2	0.156 Inches longer
0858	-	KCI—23RM	120:1	0741	KCI-23T4	0.187 Inches longer
0859	-	KCI—23RM	180:1	-	-	No direct replacement
0860	-	KCI-22RM	300:1	0743	KCI-22T4	0.187 Inches longer
0861	-	KCI-22RM	600:1	0744	KCI-22T5	0.187 Inches longer
0862	-	KCI-22RM	900:1	-	-	No direct replacement
0863	-	KCI-22RM	1800:1	-	-	No direct replacement
0899	-	KCI-41	-	-	-	No direct replacement
0900	-	KCI-41	-	-	-	No direct replacement
0901	19	BSH-200	-	-	-	-
0902	-	ASH-201	-	0914	ASH-203	Ext range pot operates differently
0903	19	ASH-400	-	-	-	-
0904	-	ASH-401	-	0915	ASH-403	Ext range pot operates differently
0905	19	ASH-402	-	-	-	-
0906	19	ASH-500	-	-	-	-
0907	19	ASH-502	-	-	-	-
0908	-	ASH-600	-	-	-	No direct replacement
0909	-	ASH-602	-	-	-	No direct replacement
0911	19	BSH-250	-	-	-	-
0913	19	ASH-450	-	-	-	-
0914	19	ASH-203	-	-	-	-

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0915	19	ASH-403	-	-	-	-
0916	19	ASH-550	-	-	-	-
0918	-	ASH-650	-	-	-	No direct replacement
0930	-	DPM-4330E	-	0835	FPM-0835E	More features, dif. Pot. & Mounting
0931	-	DPM-4332E	-	0835	FPM-0835E	More features, dif. Pot. & Mounting
0932	-	DPM-4330C	-	0830	FPM-0830C	More features, dif. Pot. & Mounting
0933	-	DPM-5030E	-	0835	FPM-0835E	More features, dif. Pot. & Mounting
0934	-	DPM-5032E	-	0835	FPM-0835E	More features, dif. Pot. & Mounting
0935	-	DPM-5030C	-	0830	FPM-0830C	More features, dif. Pot. & Mounting
0937	-	DPM-5130E	-	0835	FPM-0835E	More features, dif. Pot. & Mounting
0938	-	DPM-5132E	-	0835	FPM-0835E	More features, dif. Pot. & Mounting
0939	-	DPM-5132E	-	0830	FPM-0830C	More features, dif. Pot. & Mounting
0944	-	DPM-6130E	-	0855	FPM-0855E	More features, dif. Pot. & Mounting
0945	-	DPM-6132E	-	0855	FPM-0855E	More features, dif. Pot. & Mounting
0946	-	DPM-6130C	-	0850	FPM-0850C	More features, dif. Pot. & Mounting
0971	21	F-B-R Kit	-	-	-	-
0972	21	F-B-R Kit	-	-	-	-
0973	21	Circuit Breaker	-	-	-	-
0974	21	Circuit Breaker	-	-	-	-
0975	21	Circuit Breaker	-	-	-	-
0977	-	COVER FOR OLD PMs		0984	T-BOX KIT	Use T-box instead of cover
0981	-	DPM- F-B-R KIT		0972	F-B-R KIT	Hook up externally vs plug in
0983	-	COVER FOR OLD PMs		0984	T-BOX KIT	Use T-box instead of cover
0985	-	DPM POT KIT	-	-	-	Pot included w/ fpm controls
0986	-	DPM F-B-R KIT		0972	F-B-R KIT	Hook up externally vs plug in
0987	-	DPM F-B-R KIT		0972	F-B-R KIT	Hook up externally vs plug in
1018	-	32A5BEPM	-	-	-	No direct replacement
1020	-	32A5BEPM		4320	32A5BEPM	Metal vs plastic shield
1034	-	42A5BEPM		4334	42A5BEPM	Metal vs plastic shield
1100	-	32A5BEPM-3F	5:1	-	-	No direct replacement
1101	-	32A5BEPM-3F	10:1	-	-	No direct replacement
1102	-	32A5BEPM-3F	20:1	-	-	No direct replacement
1104	-	32A5BEPM-3F	40:1	-	-	No direct replacement
1106	-	32A5BEPM-W2	5.5:1	-	-	No direct replacement
1109	-	32A5BEPM-W2	20.4:1	4309	32A5BEPM-W2	Metal vs plastic shield
1113	-	32A5BEPM-W4	97.5:1	4313	32A5BEPM-W4	Metal vs plastic shield
1115	-	32A5BEPM-W4	312.4:1	4315	32A5BEPM-W4	Metal vs plastic shield
1130	-	32A5BEPM-3F	5:1	-	-	No direct replacement
1131	-	32A5BEPM-3F	10:1	-	-	No direct replacement
1132	-	32A5BEPM-3F	20:1	-	-	No direct replacement
1134	-	32A5BEPM-3F	40:1	-	-	No direct replacement
1149	-	32A5BEPM-W2	5.5:1	4349	32A5BEPM-W2	Metal vs plastic shield
1150	-	32A5BEPM-W2	9.4:1	4350	32A5BEPM-W2	Metal vs plastic shield
1152	-	32A5BEPM-W2	20.4:1	4352	32A5BEPM-W2	Metal vs plastic shield
1154	-	32A5BEPM-W3	43.9:1	4354	32A5BEPM-W3	Metal vs plastic shield
1156	-	32A5BEPM-W4	97.5:1	4356	32A5BEPM-W4	Metal vs plastic shield
1158	-	32A5BEPM-W4	312.4:1	4358	32A5BEPM-W4	Metal vs plastic shield
1179	-	42A5BEPM-E1	5:1	4379	42A5BEPM-E1	Metal vs plastic shield
1180	-	42A5BEPM-E2	10:1	4380	42A5BEPM-E2	Metal vs plastic shield
1182	-	42A5BEPM-E3	20:1	4382	42A5BEPM-E3	Metal vs plastic shield
1184	-	42A5BEPM-E3	40:1	4384	42A5BEPM-E3	Metal vs plastic shield
1185	-	42A5BEPM-E3	60:1	4385	42A5BEPM-E3	Metal vs plastic shield
1187	-	42A5BEPM-E4	120:1	4387	42A5BEPM-E4	Metal vs plastic shield
1188	-	42A5BEPM-E4	300:1	4388	42A5BEPM-E4	Metal vs plastic shield
1240	-	NCI-13	-	-	-	No direct replacement
1244	-	NCI-34	-	-	-	No direct replacement
1258	-	42R5BFCI	-	1358	42R5BFCI	100 watts vs. 85 Watts
1283	-	48R6BFCI	-	-	-	No direct replacement
1406	-	NCI-12R	6:1	-	-	No direct replacement

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1408	-	NCI-12R	18:1	-	-	No direct replacement
1409	-	NCI-12R	36:1	-	-	No direct replacement
1411	-	NCI-12R	180:1	-	-	No direct replacement
1413	-	NCI-12RG	60:1	-	-	No direct replacement
1415	-	NCI-12RG	120:1	-	-	No direct replacement
1416	-	NCI-12RG	180:1	-	-	No direct replacement
1419	-	NCI-33R	10:1	-	-	No direct replacement
1420	-	NCI-33R	20:1	-	-	No direct replacement
1423	-	NCI-34RH	10:1	1488	34R4BFC1-3F	Gearhead vs. Base mount
1424	-	NCI-34RH	20:1	1490	34R4BFCI-3F	Gearhead vs. Base mount
1425	-	NCI-34RH	40:1	1491	34R4BFCI-3F	Gearhead vs. Base mount
1426	-	NCI-34RH	60:1	1491	34R4BFCI-3F	35 rpm vs. 23 Rpm
1440	-	NCI-12R	60:1	-	-	No direct replacement
1445	-	NCI-13RH	10:1	-	-	No direct replacement
1446	-	NCI-13RH	20:1	-	-	No direct replacement
1447	-	NCI-13RH	40:1	-	-	No direct replacement
1448	-	NCI-13RH	60:1	-	-	No direct replacement
1461	-	NCI-11D4	90:1	-	-	No direct replacement
1605	-	NPM-13D3	6:1	1192	24A4BEPM-D3	208 vs 417 rpm, smaller motor portion
1606	-	NPM-13D3	12:1	1192	24A4BEPM-D3	Smaller motor portion
1608	-	NPM-13D3	30:1	1194	24A4BEPM-D3	Smaller motor portion
1609	-	NPM-13D3	60:1	1195	24A4BEPM-D3	Smaller motor portion
1610	-	NPM-13D4	90:1	1195	24A4BEPM-D3	42 vs 28 rpm, smaller motor portion
1611	-	NPM-13D4	180:1	1195	24A4BEPM-D3	42 vs 14 rpm, smaller motor portion
1621	-	KCI-26	-	-	-	No direct replacement
1625	-	NCI-13	-	-	-	No direct replacement
1628	-	NCI-35	-	-	-	No direct replacement
1632	-	48R6BECI	-	-	-	No direct replacement
1686	-	48R6BFCI-5N	5:1	-	-	No direct replacement
1687	-	48R6BFCI-5N	10:1	-	-	No direct replacement
1688	-	48R6BFCI-5N	20:1	-	-	No direct replacement
1691	-	48R6BFCI-F1	5:1	-	-	No direct replacement
1692	-	48R6BFCI-F2	10:1	-	-	No direct replacement
1693	-	48R6BFCI-F3	20:1	-	-	No direct replacement
1694	-	48R6BFCI-F3	30:1	-	-	No direct replacement
1700	-	KYC-26	-	-	-	No direct replacement
1703	-	KYC-26	-	-	-	No direct replacement
1715	-	KCI-26	-	-	-	No direct replacement
1755	-	KCI-26T4	120:1	-	-	No direct replacement
1756	-	KCI-26T4	300:1	-	-	No direct replacement
1778	-	KCI-26A2	6:1	-	-	No direct replacement
1779	-	KCI-26A2	18:1	-	-	No direct replacement
1780	-	KCI-26A2	30:1	-	-	No direct replacement
1781	-	KCI-26T4	120:1	-	-	No direct replacement
1782	-	KCI-26T4	300:1	-	-	No direct replacement
1783	-	KYC-26A2	6:1	-	-	No direct replacement
1784	-	KYC-26A2	18:1	-	-	No direct replacement
1785	-	KYC-26A2	30:1	-	-	No direct replacement
1786	-	KYC-26T4	120:1	-	-	No direct replacement
1787	-	KYC-26T4	300:1	-	-	No direct replacement
1933	-	DPM-5070E	-	1855	FPM-1855E	Updated electronics
1934	-	DPM-5072E	-	1855	FPM-1855E	Updated electronics
1935	-	DPM-5070C	-	1850	FPM-1850C	Updated electronics
1944	-	DPM-6170E	-	1855	FPM-1855E	Updated electronics
1945	-	DPM-6172E	-	1855	FPM-1855E	Updated electronics
1946	-	DPM-6170C	-	1850	FPM-1850C	Updated electronics
1987	-	FBR KIT	-	1890	FBR KIT	Match for fpm control
1990	-	DPM-4170E	-	1855	FPM-1855E	Updated electronics
1991	-	DPM-4172E	-	1855	FPM-1855E	Updated electronics

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1992	-	DPM-4170C	-	1850	FPM-1850C	Updated elecronics
2003	-	34T1BEHD	-	2433	34T1BEHD	Can be used with chopper type controls
2004	-	34T2BEHD	-	2434	34T2BEHD	Can be used with chopper type controls
2005	-	34T3BEHD	-	2435	34T3BEHD	Can be used with chopper type controls
2006	-	42T1BEHD	-	2436	42T1BEHD	0.38" Longer and is also chopper rated
2007	-	42T2BEHD	-	2437	42T2BEHD	0.38" Longer and is also chopper rated
2009	-	23T1BEHH	-	2409	23T1BEHH	0.12" Longer
2010	-	23T2BEHH	-	2410	23T2BEHH	0.12" Longer
2011	-	23T3BEHH	-	2411	23T3BEHH	0.12" Longer
2015	-	42T1BEHH	-	2415	42T1BEHH	0.38"Longer
2016	-	42T2FEHH	-	2516	42T2FEHH	0.38"Longer
2018	-	23T1BEHY	-	2418	23T1BEHY	0.12" Longer
2019	-	23T2BEHY	-	2419	23T2BEHY	0.12" Longer
2020	-	23T3BEHY	-	2420	23T3BEHY	0.12" Longer
2024	-	42T1BEHY	-	2424	42T1BEHY	0.38" Longer
2025	-	42T2BEHY	-	2425	42T2BEHY	0.38" Longer
2100	-	23T1FEHD	-	2530	23T1FEHD	0.12" Longer and is also chopper rated
2101	-	23T2FEHD	-	2531	23T2FEHD	0.12" Longer and is also chopper rated
2102	-	23T3FEHD	-	2532	23T3FEHD	0.12" Longer and is also chopper rated
2003	-	34T1FEHD	-	2533	34T1FEHD	Can be used with chopper type controls
2004	-	34T2FEHD	-	2534	34T2FEHD	Can be used with chopper type controls
2005	-	34T3FEHD	-	2535	34T3FEHD	Can be used with chopper type controls
2106	-	42T1FEHD	-	2536	42T1FEHD	0.38" Longer and is also chopper rated
2107	-	42T2FEHD	-	2537	42T2FEHD	0.38" Longer and is also chopper rated
2109	-	23T1FEHH	-	2509	23T1FEHH	0.12" Longer
2110	-	23T2FEHH	-	2510	23T2FEHH	0.12" Longer
2111	-	23T3FEHH	-	2511	23T3FEHH	0.12" Longer
2115	-	42T1FEHH	-	2515	42T1FEHH	0.38" Longer
2116	-	42T2FEHH	-	2516	42T2FEHH	0.38" Longer
2400	-	23T1BEHD	-	2430	23T1BEHD	Can be used with chopper type controls
2401	-	23T2BEHD	-	2431	23T2BEHD	Can be used with chopper type controls
2402	-	23T3BEHD	-	2432	23T3BEHD	Can be used with chopper type controls
2406	-	42T1BEHD	-	2436	42T1BEHD	Can be used with chopper type controls
2407	-	42T2BEHD	-	2437	42T2BEHD	Can be used with chopper type controls
2500	-	23T1BEHD	-	2530	23T1BEHD	Can be used with chopper type controls
2501	-	23T2BEHD	-	2531	23T2BEHD	Can be used with chopper type controls
2502	-	23T3BEHD	-	2532	23T3BEHD	Can be used with chopper type controls
2506	-	42T1BEHD	-	2536	42T1BEHD	Can be used with chopper type controls
2507	-	42T2BEHD	-	2537	42T2BEHD	Can be used with chopper type controls
2901	-	THD-1810C	-	-	-	No replacement
2902	-	THD-1830E	-	-	-	No replacement
2903	-	THD-1850E	-	-	-	No replacement
2904	-	THD-1001B	-	-	-	No replacement
2920	-	THD-1831E	-	-	-	No replacement
2921	-	THD-1851E	-	-	-	No replacement
2922	-	THD-1811C	-	-	-	No replacement
2923	-	THD-1801B	-	-	-	No replacement
2930	-	THD-2010B	-	-	-	No replacement
2931	-	THD-2020B	-	-	-	No replacement
2932	-	THD-2100B	-	-	-	No replacement
2933	-	THD-2200B	-	-	-	No replcement
31XX	-	Stepper controls	-	-	-	No replacement
32XX	-	Stepper controls	-	-	-	No replacement
3931	-	ABL-3931	-	-	-	No replacement
3932	-	ABL-3932	-	-	-	No replacement
4023	-	42A4BEPM	-	-	-	-
4024	-	42A4BEPM	-	4035	42A5BEPM	Need base kit
4025	-	42A7BEPM	-	4037	42A7BEPM	1/3 h.p. @ 2500 Rpm
4026	-	42A7BEPM	-	4037	42A7BEPM	1/3 h.p. @ 2500 Rpm

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Model	Shown on NR Page	Type	Ratio	Possible Alternate Model Number	Alternate Type	Deviations from original
4116	13	42A4BEPM-5L	10:1	-	-	-
4117	13	42A4BEPM-5L	20:1	-	-	-
4118	13	42A4BEPM-5L	30:1	-	-	-
4119	13	42A4BEPM-5L	40:1	-	-	-
4121	-	32A5BEPM-5F	5:1	4122	32A5BEPM-5F	250 rpm vs. 500 Rpm
4123	-	32A5BEPM-5F	20:1	4124	32A5BEPM-5F	62 rpm vs. 125 Rpm
4125	16	32A4BEPM-5R	10:1	-	-	-
4126	16	32A4BEPM-5R	20:1	-	-	-
4127	16	32A4BEPM-5R	30:1	-	-	-
4128	16	32A4BEPM-5R	40:1	-	-	-
4129	-	32A3BEPM-3F	5:1	-	-	No direct replacement
4130	-	32A3BEPM-3F	10:1	-	-	No direct replacement
4131	-	32A3BEPM-3F	20:1	-	-	No direct replacement
4132	-	32A3BEPM-3F	40:1	-	-	No direct replacement
4133	-	32A3BEPM-3F	60:1	-	-	No direct replacement
4309	-	32A5BEPM-W2	20.4:1	4652	32A5BEPM-W2	"Inch vs. Metric"
4313	-	32A5BEPM-W4	97.5:1	4656	32A5BEPM-W4	"Inch vs. Metric"
4315	-	32A5BEPM-W4	312.4:1	4647	32A5BEPM-W4	"Inch vs. Metric"
4318	-	32A5BEPM	-	4019	32A5BEPM	2500 rpm vs. 1725 rpm
4320	-	32A5BEPM	-	4218	32A5BEPM	2500 rpm vs. 1725 rpm
4334	-	42A5BEPM	-	4230	42A5BEPM	2500 rpm vs. 1725 rpm
4349	-	32A5BEPM-W2	5.5:1	4249	32A5BEPM-W2	2500 rpm vs. 1725 rpm
4350	-	32A5BEPM-W2	9.4:1	-	-	No direct replacement
4352	-	32A5BEPM-W2	20.4:1	4252	32A5BEPM-W2	2500 rpm vs. 1725 rpm
4354	-	32A5BEPM-W3	43.9:1	4254	32A5BEPM-W3	2500 rpm vs. 1725 rpm
4356	-	32A5BEPM-W4	97.5:1	4256	32A5BEPM-W4	2500 rpm vs. 1725 rpm
4358	-	32A5BEPM-W4	312.4:1	4247	32A5BEPM-W4	2500 rpm vs. 1725 rpm
4379	-	42A5BEPM-E1	5:1	4279	42A7BEPM-E1	2500 rpm vs. 1725 rpm
4380	-	42A5BEPM-E2	10:1	4280	42A7BEPM-E2	2500 rpm vs. 1725 rpm
4382	-	42A5BEPM-E3	20:1	4282	42A7BEPM-E3	2500 rpm vs. 1725 rpm
4384	-	42A5BEPM-E3	40:1	4284	42A7BEPM-E3	2500 rpm vs. 1725 rpm
4385	-	42A5BEPM-E3	60:1	4285	42A7BEPM-E3	2500 rpm vs. 1725 rpm
4387	-	42A5BEPM-E4	120:1	-	-	No direct replacement
4388	-	42A5BEPM-E4	300:1	-	-	No direct replacement
5219	5	30R2BECI	-	-	-	-
5240	5	30R2BECI	-	-	-	-
5246	5	30R2BECY	-	-	-	-
5461	17	30R1BECI-D4	90	-	-	-
5462	17	30R1BECI-D4	180	-	-	-
5463	17	30R1BECI-D5	450	-	-	-
5470	17	30R2BECI-D3	6	-	-	-
5471	17	30R2BECI-D3	12	-	-	-
5472	17	30R2BECI-D3	18	-	-	-
5473	17	30R2BECI-D3	30	-	-	-
5474	17	30R2BECI-D3	60	-	-	-

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