

BONFIGLIOLI RIDUTTORI



A



BONFIGLIOLI

Power & Control Solutions

NEMA

ORDERING NUMBERS

Speed reducer designation

A 30 2 NUH 76.5 S2 B3

OPTIONS

MOUNTING POSITION

B3 (default), B6, B7, B8, VA, VB

INPUT OPTIONS

NHS + speed reducer with solid input shaft (inch dims.)

HS + speed reducer with solid input shaft (metric)

P + IEC motor frame size = gear head with IEC motor adaptor

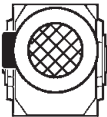
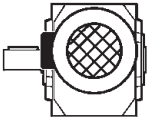
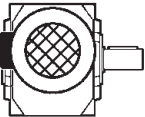
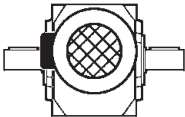
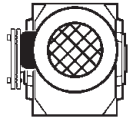
S + motor size = integral gearmotor

Specify for NEMA inputs:

N + 56C	for motors:	56C
140TC		143TC and 145TC
180TC		182TC and 184TC
210TC		213TC and 215TC

GEAR RATIO

VERSION

					shaft dims.
NUH : hollow shaft (A10...A60)	NUL (A10...A60)	NUR (A10...A60)	NUD (A10...A60)	—	inch
UH : hollow shaft (A70...A90)	—	UR (A70...A90)	UD (A70...A90)	US : shrink disc (A10...A90)	metric

REDUCTIONS

2, 3, 4

FRAME SIZE

10, 20, 30, 41, 50, 60, 70, 80, 90

SERIES

A = bevel-helical

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Revisions

Refer to page 150 for the catalogue revision index.

Visit www.bonfiglioli.com to search for catalogues with latest revision index.

1.0 GENERAL INFORMATION

1.1 SYMBOLS AND UNITS

Symb.	U.m.	Description	Symb.	U.m.	Description
A_c	[lbs]	Calculated thrust load	P_t	[hp]	Thermal capacity
A_n	[lbs]	Rated thrust load	P_r	[hp]	Power required
f_m	–	Adjusting duty factor	R_c	[lbs]	Calculated radial load
f_t	–	Thermal correction factor	R_n	[lbs]	Rated OHL
i	–	Gear ratio	R_x	[lbs]	Radial OHL for load shifted from shaft midpoint
I	–	Intermittence	S	–	Safety factor
J_c	[lb·ft ²]	Load moment of inertia	S.F.	–	Service factor
J_m	[lb·ft ²]	Mass moment of inertia for motor	t_a	[°C/ °F]	Ambient temperature
J_r	[lb·ft ²]	Mass moment of inertia for gearbox	t_f	[min]	Operating time under constant load
K	–	Acceleration factor of masses	t_r	[min]	Rest time
K_r	–	Transmission element factor	W	[ft·lb]	Brake dissipated energy between two successive air-gap adjustments
T_b	[lb·in]	Brake torque	W_{max}	[ft·lb]	Maximum energy for each braking operation
T	[lb·in]	Torque	x	[in]	Load application distance from shaft shoulder
T_c	[lb·in]	Calculated torque	Z	[1/h]	Number of permitted starts in loaded conditions
T_n	[lb·in]	Speed reducer rated torque	Z_r	[1/h]	Number of starts
T_r	[lb·in]	Torque required			Dynamic efficiency
n	[rpm]	Speed			
P	[hp]	Power			
P_c	[hp]	Calculated power			
P_n	[hp]	Motor rated power			
P_n	[hp]	Rated horsepower			

η_d

Footnotes:

□

1

Applies to input shaft

NOMENCLATURE

1.2 TORQUE

Nominal output torque

 T_{n2}

Torque transmitted at output shaft under uniform load, referred to input speed n_1 and corresponding output speed n_2 .

It is calculated according to service factor S.F. = 1.

Application torque

 T_{r2}

This is torque corresponding to application requirements. It must be equal to or less than rated output torque T_{n2} for the gearmotor selected.

Calculated torque

 T_{c2}

Torque value to be used for selecting the gearbox, considering required torque T_{r2} and service factor S.F., and is obtained by:

$$T_{c2} = T_{r2} \times S.F. \leq T_{n2}$$

1.3 POWER

Rated input horsepower

 P_{n1}

In the speed reducer selection charts, this is power applicable at input shaft referred to speed n_1 and considering a service factor S.F. = 1.

Output horsepower

 P_{n2}

Value represents rated HP as referred to speed reducer output shaft.

$$P_{n2} = P_{n1} \times \eta_d$$

$$P_{n2} = \frac{T_{n2} \times n_2}{63025}$$

P_{n2} in [hp]; M_{n2} in [lb·in]

1.4 THERMAL CAPACITY

 P_t

The value indicates the speed reducer thermal limit and corresponds to the power transmission capacity under continuous duty at an ambient temperature of 20°C [70°F] without using a supplementary cooling system.

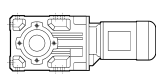
For short operating periods with sufficiently long pauses to allow the unit to cool, thermal power is not a factor important and it does not need to be taken into consideration.

For ambient temperature different from 20°C [70°F] and intermittent duty, P_t value can be adjusted according to thermal factor f_t listed in table (A1), provided the following condition is satisfied.

$$P_{r1} \leq P_t \times f_t$$

Gear units A 10 through A 30 are not thermally limited and the thermal verification does not apply.

(A0)

	P_t [hp] [20 °C / 70 °F]	
	$n_1 = 1750 \text{ rpm}$	$n_1 = 3500 \text{ rpm}$
A 10 2	6.4	5.4
A 20 2	8.0	7.2
A 30 2	10.7	8.9
A 41 2	13.4	11.7
A 50 2	27	24.1
A 60 2	36	31
A 70 3	42	35
A 80 3	59	52
A 90 3	86	76

(A1)

f_t					
ta max. °C [°F]	Continuous duty	Intermittent duty			
		Intermittence % (I)			
		80	60	40	20
40 [105]	0.8	1.1	1.3	1.5	1.6
30 [85]	0.85	1.3	1.5	1.6	1.8
20 [70]	1.0	1.5	1.6	1.8	2.0
50 [10]	1.15	1.6	1.8	2.0	2.3

Intermittence (I)% is obtained dividing operating time under load [t_f] by total time, expressed as a percentage:

$$I = \frac{t_f}{t_f + t_r} \times 100$$

1.5 EFFICIENCY

η

Obtained from the relationship of output power P_2 to input power P_1 , according to the following equation:

$$\eta = \frac{P_2}{P_1}$$

Torque value M_{n2} specified in this catalogue takes the dynamic efficiency η_d into account.

1.6 MASS MOMENT OF INERTIA J_r

Values for the moment of inertia specified in the catalogue refer to gear unit input shaft.

They are therefore related to motor speed, in the case of direct motor mounting.

1.7 SERVICE FACTOR $S.F.$

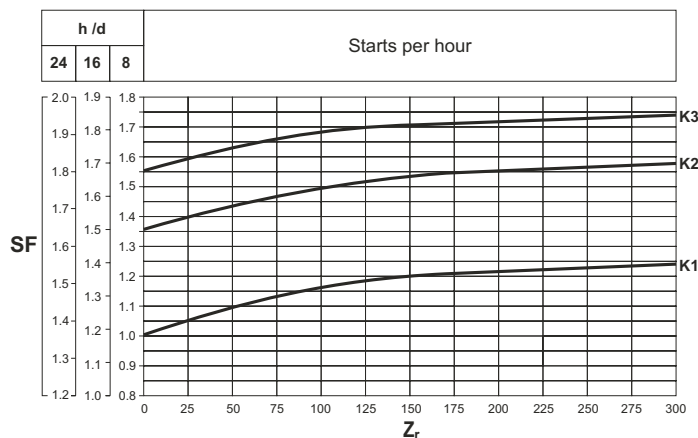
The service factor is the numerical parameter that describes the severity of the application. Its value results from the combination of the actual duty the gearbox is operated at, the number of starts per hour and the daily operating hours.

The graph (A2) here after comes handy when calculating the actual value for the service factor:

1. Enter the chart with the starts per hour [Z_r]
2. Intersect the K _ curve that applies for the application
3. Read the service factor $S.F.$ from the column marked with the applicable hours per day [h/d]

Intermediate values can be obtained by interpolation.

(A2)



Acceleration factor of masses K

K

Used for establishing the service factor and obtained from the following equation:

$$K = \frac{J_c}{J_m}$$

Where:

J_c [lb·ft²]

moment of inertia of the driven masses in proportion to the speed of the applied motor

J_m [lb·ft²]

motor moment of inertia

K1 uniform load

$K \leq 0.25$

K2 moderate shock load

$K \leq 3$

K3 heavy shock load

$K \leq 10$

For values of $K > 10$, please contact our Technical Service.

1.8 SELECTION

AGMA Service Factor charting 24hr service (continuous duty)

(A3)

Application	S.F.
AGITATORS	
Pure Liquids	1.25
Liquids & Solids	1.50
Liquids - variable density	1.50
BLOWERS	
Centrifugal	1.25
Lobe	1.50
Vane	1.50
BREWING AND DISTILLING	
Bottling Machinery	1.25
Brew Kettles - Continuous Duty	1.25
Cookers - Continuous Duty	1.25
Mash Tubs - Continuous Duty	1.25
Scale Hopper - Frequent Starts	1.50
CAN FILLING MACHINES	1.25
CAR DUMPERS	2.00
CAR PULLERS	1.50
CLARIFIERS	1.25
CLASSIFIERS	1.50
CLAY WORKING MACHINERY	
Brick Press	2.00
Briquette Machine	2.00
Pug Mill	1.50
COMPACTORS	2.00
COMPRESSORS	
Centrifugal	1.25
Lobe	1.50
Reciprocating, Multi-Cylinder	1.75
Reciprocating, Single-Cylinder	2.00
CONVEYORS - GENERAL PURPOSE	
<i>includes Apron, Assembly, Belt, Bucket, Chain, Flight, Oven and Screw</i>	
Uniformly Loaded or Fed	1.25
Heavy Duty - Not Uniformly Fed	1.50
Severe Duty - Reciprocating or Shaker	2.00
CRANES	
Dry Dock	
Main Hoist	2.50
Auxiliary Hoist	3.00
Boom Hoist	3.00
Slewing Hoist	3.00
Traction Drive	3.00

Application	S.F.
Container	
Main Hoist	3.00
Boom Hoist	2.00
Trolley Drive	
Gantry Drive	3.00
Traction Drive	2.00
Mill Duty	
Main Hoist	3.50
Auxiliary	3.50
Bridge Travel	3.00
Trolley Travel	3.00
Industrial Duty	
Main	3.00
Auxiliary	3.00
Bridge Travel	3.00
Trolley Travel	3.00
CRUSHERS	
Stone or Ore	2.00
DREDGES	
Cable Reels	1.50
Conveyors	1.50
Cutter Head Drives	2.00
Pumps	2.00
Screen Drives	2.00
Stackers	1.50
Winches	1.50
ELEVATORS	
Bucket	1.50
Centrifugal Discharge	1.25
Escalators	1.25
Freight	1.50
Gravity Discharge	1.25
EXTRUDERS	
General	1.50
Plastics	
Variable Speed Drive	1.50
Fixed Speed Drive	1.75
Rubber	
Continuous Screw Operation	1.75
Intermittent Screw Operation	1.75
FANS	
Centrifugal	1.25
Cooling Towers	2.00
Forced Draft	1.25
Induced Draft	1.50
Industrial & Mine	1.50
FEEDERS	
Apron	1.50
Belt	1.50
Disc	1.25
Reciprocating	2.00
Screw	1.50

Application	S.F.
FOOD INDUSTRY	
Cereal Cooker	1.25
Dough Mixer	1.50
Meat Grinder	1.50
Slicers	1.50
GENERATORS AND EXITORS	1.25
HAMMER MILLS	2.00
HOISTS	
Heavy Duty	2.00
Medium Duty	1.50
Skip Hoist	1.50
LUMBER INDUSTRY	
Barkers	
Spindle Feed	1.50
Main Drive	1.75
Conveyors	
Burner	1.50
Main or Heavy Duty	1.50
Main Log	2.00
Re-saw, Merry-Go-Round	1.50
Slab	2.00
Transfer	1.50
Chains	
Floor	1.50
Green	1.75
Cut-Off Saws	
Chain	1.75
Drag	1.75
Debarking Drums	2.00
Feeds	
Edger	1.50
Gang	1.75
Trimmer	1.50
Log Deck	1.75
Log Hauls - Incline - Well Type	1.75
Log Turning Devices	1.75
Planer Feed	1.50
Planer Tilting Hoists	1.50
Rolls - Live-off brg. - Roll Cases	1.75
Sorting Table	1.50
Tipple Hoist	1.50
Transfer	
Chain	1.75
Craneway	1.75
Tray Drives	1.50
Veneer Lathe Drives	1.50
METAL MILLS	
Draw Bench Carriage and Main Drive	1.50
Runout Table	
Non-reversing	1.50
Group Drives	1.50
Individual Drives	2.00

Application	S.F.
Reversing	2.00
Slab Pushers	1.50
Shears	2.00
Wire Drawing	1.50
Wire Winding Machine	1.50
METAL STRIP PROCESSING MACHINERY	
Bridles	1.50
Coilers & Uncoilers	1.25
Edge Trimmers	1.50
Flatteners	1.50
Loopers (Accumulators)	1.25
Pinch Rolls	1.50
Scrap Choppers	1.50
Shears	2.00
Slitters	1.50
MILLS, ROTARY TYPE	
Ball & Rod	
Spur Ring Gear	2.00
Helical Ring Gear	1.50
Direct Connected	2.00
Cement Kilns	1.50
Dryers & Coolers	1.50
MIXERS, CEMENT	1.50
PAPER MILLS	
Agitator (Mixer)	1.50
Agitator for Pure Liquors	1.25
Barking Drums	2.00
Barkers - Mechanical	2.00
Beater	1.50
Breaker Stack	1.25
Calendar	1.25
Chipper	2.00
Chip Feeder	1.50
Coating Rolls	1.25
Conveyors	
Chip, Bark, Chemical	1.25
Log (including Slab)	2.00
Couch Rolls	1.25
Cutter	2.00
Cylinder Molds	1.25
Dryers	
Paper Machine	1.25
Conveyor Type	1.25
Embosser	1.25
Extruder	1.50
Fourdrinier Rolls	1.25
(includes Lump breaker, dandy roll, wire turning, and return rolls)	
Jordan	1.50
Kiln Drive	1.50
Mt. Hope Roll	1.25
Paper Rolls	1.25
Platter	1.50

Application	S.F.
Presses - Felt & Suction	1.25
Pulper	2.00
Pumps - Vacuum	1.50
Reel (Surface Type)	1.25
Screens	
Chip	1.50
Rotary	1.50
Vibrating	2.00
Size Press	1.25
Super Calender	1.25
Thickener (AC Motor)	1.50
Thickener (DC Motor)	1.25
Washer (AC Motor)	1.50
Washer (DC Motor)	1.25
Wind and Unwind Stand	1.25
Winders (Surface Type)	1.25
Yankee Dryers	1.25
PLASTICS INDUSTRY - PRIMARY PROCESSING	
Intensive Internal Mixers	
Batch Mixers	1.75
Continuous Mixers	1.50
Batch Drop Mill - 2 smooth rolls	1.25
Continuous Feed, Holding & Blend Mill	1.25
Calender	1.50
PLASTICS INDUSTRY - SECONDARY PROCESSING	
Blow Molder	1.50
Coating	1.25
Film	1.25
Pipe	1.25
Pre-Plasticizer	1.50
Rods	1.25
Sheet	1.25
Tubing	1.50
PULLER - BARGE HAUL	1.50
PUMPS	
Centrifugal	1.25
Proportioning	1.50
Reciprocating	
Single Acting, 3 or more cylinders	1.50
Double Acting, 2 or more cylinders	1.50
Rotary	
Gear Type	1.25
Lobe	1.25
Vane	1.25
RUBBER INDUSTRY	
Intensive Internal Mixers	
Batch Mixers	1.75
Continuous Mixers	1.50
Mixing Mill	
2 smooth rolls	1.50
1 or 2 corrugated rolls	
Batch Drop Mill - 2 smooth rolls	1.50

Application	S.F.
Cracker - 2 corrugated rolls	2.00
Holding, Feed & Blend Mill - 2 rolls	1.25
Refiner - 2 rolls	1.50
Calender	1.50
SAND MULLER SEWAGE DISPOSAL EQUIPMENT	1.50
Bar Screens	1.25
Chemical Feeders	1.25
Dewatering Screens	1.50
Scum Breakers	1.50
Slow or Rapid Mixers	1.50
Sludge Collectors	1.25
Thickener	1.50
Vacuum Filters	1.50
SCREENS	
Air Washing	1.25
Rotary - Stone or Gravel	1.50
Traveling Water Intake	1.25
SUGAR INDUSTRY	
Beet Slicer	2.00
Cane Knives	1.50
Crushers	1.50
Mills (low speed end)	1.75
TEXTILE INDUSTRY	
Batchers,	1.50
Calenders	1.50
Cards	1.50
Dry Cans	1.50
Dyeing Machinery	1.50
Looms	1.50
Mangles	1.50
Nappers	1.50
Pads	1.50
Slashers	1.50
Soapers	1.50
Spinners	1.50
Tenter Frames	1.50
Washers	1.50
Winders	1.50

Recommended procedure for correct selection of drive unit:

Selecting a gearmotor

A) Determine service factor S.F. according to type of duty (factor K), number of starts per hour Z_r and hours of operation.

B) Once torque T_{r2} , speed n_2 and dynamic efficiency η_d are known, input power can be calculated as follows:

$$P_{r1}(\text{hp}) = \frac{T_{r2}(\text{lb in}) \times n_2(\text{rpm})}{63,025 \times \eta_d}$$

Values for η_d for the different sizes of speed reducer are indicated in table (A4) below:

(A4)

	Reductions		
	2	3	4
η_d	0.95	0.93	0.91

C) Consult the gearmotor selection charts and locate the table corresponding to power

$$P_n \geq P_{r1}$$

Unless otherwise specified, power P_n of motors indicated in the catalogue refers to continuous duty S1. For motors used in conditions other than S1, the type of duty required by reference to CEI 2-3/IEC 60034-1 Standards must be mentioned.

For duties from S2 to S8 in particular, and for IEC motor frame 132 or smaller, extra power can be obtained with respect to continuous duty, consequently the following condition must be satisfied:

$$P_n \geq \frac{P_{r1}}{f_m}$$

The adjusting duty factor f_m can be obtained from chart (A5).

(A5)

	Duty						Please consult factory	
	S2			S3*				S4 - S8
	Cycle duration [min]			Intermittence (I)				
	10	30	60	25%	40%	60%		
fm	1.35	1.15	1.05	1.25	1.15	1.1		

* Cycle duration, in any event, must be 10 minutes or less. If it is longer, please contact our Technical Service Department.

Intermittence:

$$I = \frac{t_l}{t_l + t_r} \times 100$$

t_l = operating time at constant load
 t_r = rest time

Next, according to output speed n_2 , select a gearmotor featuring a safety factor S greater than or equal to service factor S.F.

$$S \geq S.F.$$

The gearmotor selection charts features combination with 2, 4 and 6 pole motors.

If motors with different speed shall be used, refer to the selection procedure for speed reducers and choose the most suitable gear unit.

For applications such as hoisting and travelling, contact our Technical Service Department.

Selecting a speed reducer with a motor adapter

A) Determine service factor S.F. based on application. See pages 5 - 7.

B) Assuming the required output torque for the application T_{r2} is known, the calculated torque can be defined as:

$$T_{c2} = T_{r2} \times S.F.$$

C) The gear ratio is calculated according to requested output speed n_2 and the drive input speed n_1

$$i = \frac{n_1}{n_2}$$

Once the torque T_{c2} and gear ratio $[i]$ are calculated consult the speed reducer rating chart for the actual drive speed n_1 and select the unit that features a torque rating T_{n2} that equals or exceeds the computational torque T_{c2} :

$$T_{n2} \geq T_{c2}$$

If an electric motor, with either a NEMA or a IEC flange, is going to be fitted onto the captioned gear unit, check that matching is feasible at chapter "Motor availability".

D) Thrust loads

Thrust loads, if applicable, must also be compared to the permitted values indicated in the catalogue. In the event of extremely high thrust loads, or a combination of thrust and radial loads, contact our Technical Service for advise.

E) Electric motors

For duties with considerable number of starts per hour, factor Z must be considered (it can be sorted from the motor rating chart). Factor Z defines the maximum number of starts for the application under consideration.

1.9 VERIFICATIONS

After the selection of the speed reducer, or gearmotor, is complete:

A) Thermal capacity

Make sure that the thermal capacity of the speed reducer is equal to or higher than power required by the application. If this condition is not verified, select a larger speed reducer or apply a supplementary cooling system.

B) Maximum torque

The maximum torque (intended as momentary peak load) applicable to the speed reducer must not, in general, exceed 200% of rated torque T_{n2} . Therefore, check that this limit is not exceeded, using suitable torque limiting devices, if necessary.

For three-phase two speed motors, it is important to pay attention to switching torque generated (from high to low speed), because it could be significantly higher than maximum torque.

C) Radial loads

Check that forces applying on input and/or output shafts are within permitted catalogue values. If they are higher, select a larger speed reducer or change bearing arrangement.

Remember that all values listed in the catalogue refer to loads acting at mid-point of the shaft. The permissible radial load value should be adjusted if the radial load is not acting at mid point of shaft.

See para 2.8.

1.10 INSTALLATION

The following installation instructions must be followed:

A) Make sure that the speed reducer is adequately secured to avoid vibrations. If shocks, prolonged overloading, or the possibility of locking are expected, install hydraulic couplings, clutches, torque limiters, etc.).

B) Prior to painting the gear unit,, the outer face of the oil seals must be protected to prevent the solvent drying out the rubber, thus jeopardizing the sealing function.

C) Contact surfaces must be cleaned and treated with suitable protective products before mounting to avoid oxidation and, as a result, seizure of parts.

D) Before starting up the machine, make sure that oil level is correct for the actual mounting position, and that viscosity is suitable for the specific duty. See table (B1).

1.11 STORAGE

Observe the following instructions to ensure correct storage of products:

- A) Do not store outdoors, in areas exposed to weather or with excessive humidity.
- B) Always place boards, wood, or other material between the products and the floor. The gearbox should not have direct contact with the floor.
- C) For long term storage (over 60 days), all machined surfaces such as flanges, shafts and couplings must be protected with a suitable rust inhibiting product (Mobilarna 248 or equivalent).
- D) The following measures must be taken when products are stored for a period exceeding 6 months:
 - For life lubricated products, the machined areas must be greased to prevent oxidation.
 - In addition to above, products originally supplied w/o oil must be positioned with the breather plug at the highest point, and filled with oil.
 - Before operating the speed reducer, restore the correct quantity of oil.

1.12 MAINTENANCE

Speed reducers A 10 through A 30 are lubricated and do not require periodical oil change.

For larger speed reducers, the first oil change must take place after about 300 hours of operation, flushing the interior of the unit using suitable detergents.

Do not mix mineral oils with synthetic oils.

Check oil periodically and restore the level, if necessary.

2.0 BEVEL-HELICAL GEARMOTORS



A SERIES

2.1 ORDERING NUMBERS

Speed reducer designation

A 30 2 NUH F1A 76.5 S1 B3

OPTIONS

MOUNTING POSITION

B3 (default), B6, B7, B8, VA, VB

INPUT OPTIONS

NHS for speed reducer with solid input shaft (inch dims.)

HS for speed reducer with solid input shaft (metric dims.)

P + IEC frame size for gear head with IEC motor adapter

S + motor size for integral gearmotor

Specify for NEMA inputs:

	56C		56C
	140TC		143TC and 145TC
	180TC		182TC and 184TC
N +	210TC	for motors:	213TC and 215TC
	250TC		254TC and 256TC
	280TC		284TC and 286TC
	320TC		324TC and 326TC

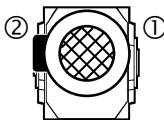
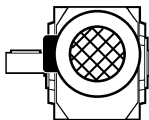
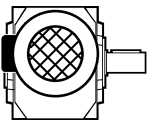
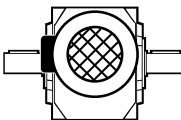
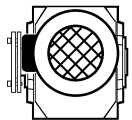
GEAR RATIO

F = flange

1 = R.H. mount; **2** = L.H. mount

A, B, C = size of flange

VERSION

					shaft dims.
NUH : hollow shaft (A 10...A 60)	NUL (A 10...A 60)	NUR (A 10...A 60)	NUD (A 10...A 60)	—	inch
UH : hollow shaft (A 70...A 90)	—	UR (A 70...A 90)	UD (A 70...A 90)	US : shrink disc (A 10...A 90)	metric

REDUCTIONS

2, 3, 4

FRAME SIZE

10, 20, 30, 41, 50, 60, 70, 80, 90

SERIES

A = bevel-helical

Bonfiglioli motor

MOTOR							BRAKE							
M	1LA	4	230/460-60	IP54	CLF		W	FD	15	R	SB	220	SA	
														OPTIONS
														BRAKE SUPPLY
														AC/DC RECTIFIER NB, NBR, SB, SBR
														BRAKE HAND RELEASE (optional) R, RM
														BRAKE TORQUE [specify Nm!] [1 ft • lb = 1.356 Nm]
														BRAKE TYPE FD (DC brake) FA (AC brake)
														TERMINAL BOX W (default), N, S, E
														MOUNTING blank for compact motor B5 for IEC motor
														INSULATION CLASS CL F default
														PROTECTION CLASS IP 55 standard (IP 54 standard for brake motors)
														VOLTAGE - FREQUENCY
														NUMBER OF POLES
														MOTOR FRAME SIZE 05A...5LA - integral motor 63A...225S4 - IEC style motor

TYPE OF MOTOR

M = AC, 3-ph, integral style

BN = AC, 3-ph, IEC face motor

NEMA motors to be specified thru their ordering numbers

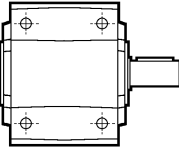
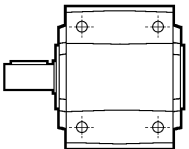
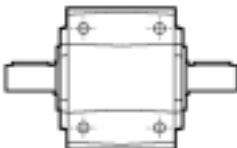
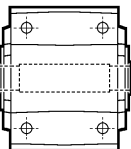
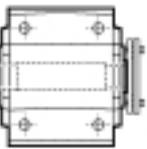
2.2 DESIGN ADVANTAGES

The main design characteristics are:

- modularity
- compact design
- universal mounting
- high efficiency
- low noise
- gears in hardened and case-hardened steel
- aluminium housing for sizes 10, 20, 30, unpainted, high strength painted cast-iron housings for larger sizes.
- input and output shafts in high grade steel

2.3 VERSIONS

Available version for A series gearbox and gearmotors are illustrated below.

	NUL (inch series)
	UR (metric series) NUR (inch series)
	UD (metric series) NUD (inch series)
	UH (metric series) NUH (inch series)
	US (metric series)

2.4 SPEED REDUCER OPTIONS

AL, AR

Anti-run back device.

The gear units the device can be specified for and the direction of free rotation are described at chapter 2.11

SO

Gearboxes A 10, A 20, A 30, are supplied without oil.

LO

Gearboxes A 41, A 50, A 60, A 70, A 80, A 90, usually supplied without oil, to be factory filled with synthetic oil currently used by BONFIGLIOLI RIDUTTORI according to the mounting position specified.

DV

Two oil seals on input shaft.
(Available only for compact gearmotors).

VV

Viton® oil seal on input shaft.

PV

All oil seals in Viton® material.

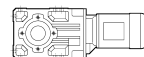
Terminal box location

Location of motor terminal box can be specified by viewing the motor from the fan side; default position is highlighted in bold (**W**).

Angular position of the brake release lever

Unless otherwise specified, brake motors have the manual device side located, 90° apart from terminal box. Different angles can be specified through the relevant options available.

2.5 SYMBOLS



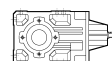
Gearmotor with compact motor.



Gearmotor with motor adapter.



Gearbox with NEMA input.



Gearbox with solid input shaft.



2 Reduction



3 Reduction



4 Reduction



The symbol shows the page the information can be sorted from.

2.6 LUBRICATION

Speed reducer size A 10...A 30 are supplied with life lubrication and do not have oil filling, level, and drain plugs.

These long-life lubricated units are capable of operating at an ambient temperature range of 0 °C to +50 °C [32 to 122 °F]. For temperatures below 0 °C [32 °F], contact our Technical Service.

Speed reducers for which the SO options is specified come without oil and must be filled by the user prior to be put into operation.

In this case refer to charts (B1) and (B2) for the most appropriate type of oil and relevant change interval.

Customers must always advise mounting position to ensure the correct arrangement of the filling, level and drain plugs.

Periodical oil changes are not required for sizes A 10...A 30 as they are lubricated for life with synthetic oil.

(B1)

Duty	Ambient temp. 0 - 20 °C [32 - 70 °F]		Ambient temp. 20 - 40 °C [70 - 104 °F]	
	Mineral oil	Synthetic oil	Mineral oil	Synthetic oil
	ISO VG	ISO VG	ISO VG	ISO VG
Light duty	150	150	220	220
Medium duty	150	150	320	220
Heavy duty	220	220	460	320

(B2)

Oil temperature °C [°F]	Oil change interval [hours]	
	Mineral oil	Synthetic oil
< 65 [< 150 °F]	8000	25000
65 - 80 [150 °F - 175 °F]	4000	15000
80 - 95 [175 °F - 200 °F]	2000	12500

(B3)

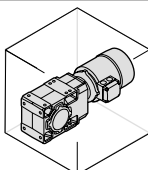
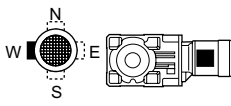
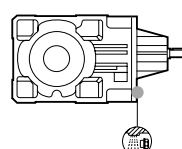
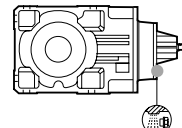
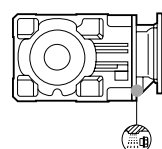
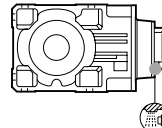
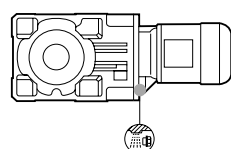
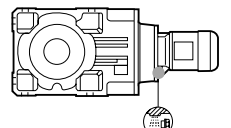
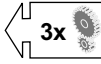
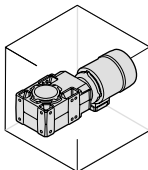
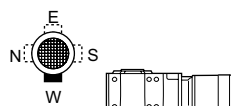
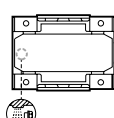
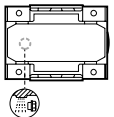
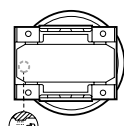
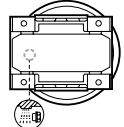
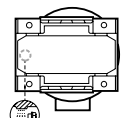
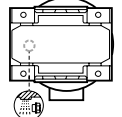
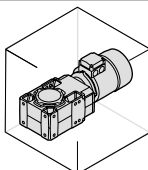
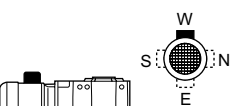
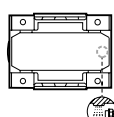
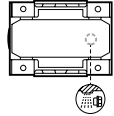
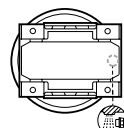
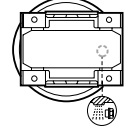
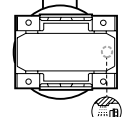
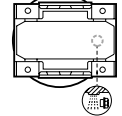
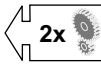
Oil quantity						
	Mounting positions					
	B3	B6	B7	B8	VA	VB
A 10 2	0.37	0.37	0.37	0.37	0.37	0.37
	1.4	1.4	1.4	1.4	1.4	1.4
A 20 2	0.61	0.61	0.61	0.61	0.61	0.61
	2.3	2.3	2.3	2.3	2.3	2.3
A 20 3	0.69	0.69	0.69	0.69	0.69	0.69
	2.6	2.6	2.6	2.6	2.6	2.6
A 30 2	0.84	0.84	0.84	0.84	0.84	0.84
	3.2	3.2	3.2	3.2	3.2	3.2
A 30 3	0.95	0.95	0.95	0.95	0.95	0.95
	3.6	3.6	3.6	3.6	3.6	3.6
A 41 2	1.06	1.08	1.08	1.24	1.37	1.16
	4.0	4.1	4.1	4.7	5.2	4.4
A 41 3	1.06	1.06	1.06	1.24	1.61	1.03
	4.0	4.0	4.0	4.7	6.1	3.9
A 50 2	1.29	2.14	1.24	2.22	2.90	2.43
	4.9	8.1	4.7	8.4	11	9.2
A 50 3	1.35	2.14	1.24	2.22	2.90	2.43
	5.1	8.1	4.7	8.4	11	9.2
A 50 4	1.66	2.16	1.40	2.19	3.43	2.40
	6.3	8.2	5.3	8.3	13	9.1
A 60 2	1.80	2.14	3.17	3.96	4.75	3.96
	6.8	8.1	12	15	18	15
A 60 3	1.80	2.14	3.17	3.96	4.75	3.96
	6.8	8.1	12	15	18	15
A 60 4	1.90	2.90	1.95	4.22	5.02	3.70
	7.2	11	7.4	16	19	14
A 70 3	2.64	3.70	2.64	3.96	5.28	3.70
	10	14	10	15	20	14
A 70 4	3.43	3.70	2.64	3.96	6.07	3.70
	13	14	10	15	23	14
A 80 3	3.96	5.81	3.96	6.86	9.24	5.81
	15	22	15	26	35	22
A 80 4	5.28	5.81	3.96	6.86	10.30	5.81
	20	22	15	26	39	22
A 90 3	8.18	9.24	9.77	11.62	17.42	10.30
	31	35	37	44	66	39
A 90 4	10.82	9.24	9.77	11.62	19.27	10.30
	41	35	37	44	73	39

Life lubricated

Quantities are ^{gallons}
litres

2.7 MOUNTING POSITION AND TERMINAL BOX SPECIFICATION

	Fill / breather plug		Level plug		Drain plug
--	----------------------	---	------------	---	------------

Input:	HS	P (IEC) N (NEMA)	S
B3   W = Default	 	 	   
B6   W = Default	 	 	   
B7   W = Default	 	 	   

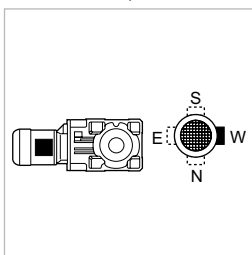
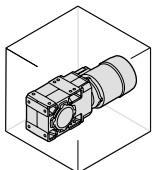
Input:

HS

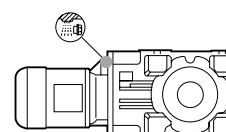
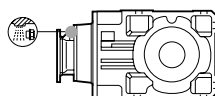
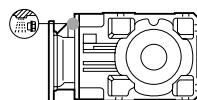
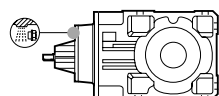
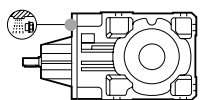
P (IEC)
N (NEMA)

S

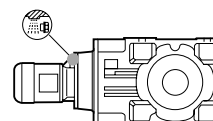
B8



W = Default

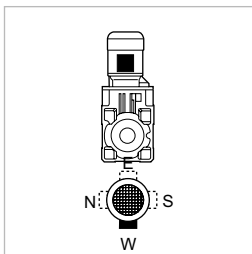
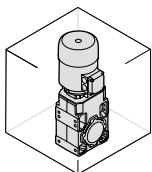


2x

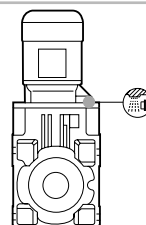
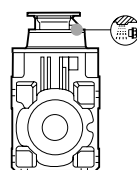
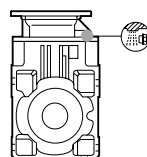
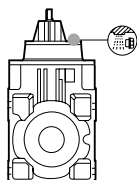
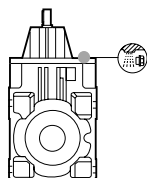


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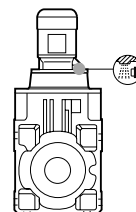
VA



W = Default

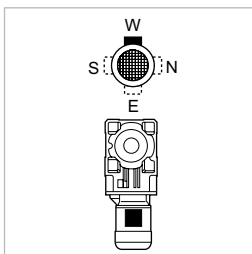
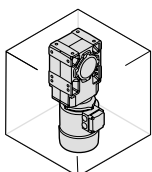


2x

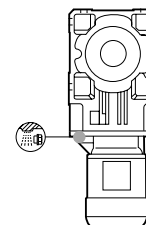
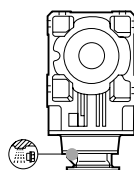
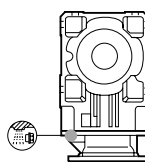
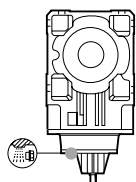
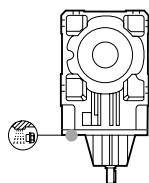


3x

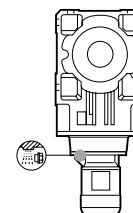
VB



W = Default



2x



3x

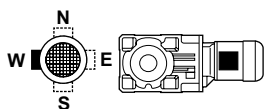
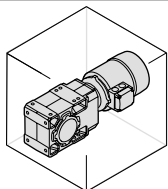
Input:

HS

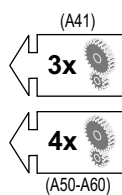
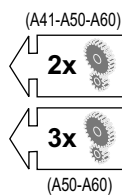
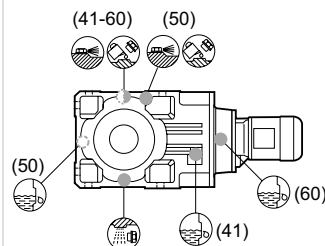
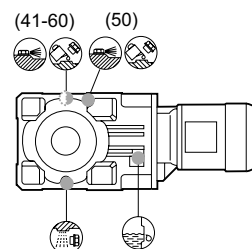
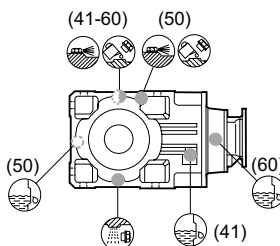
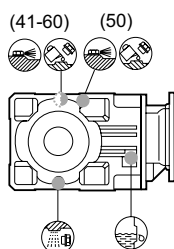
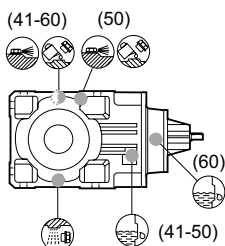
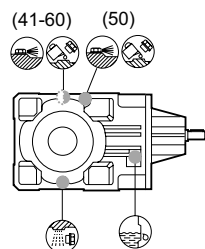
**P (IEC)
N (NEMA)**

S

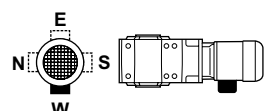
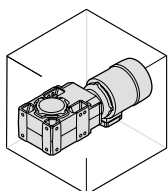
B3



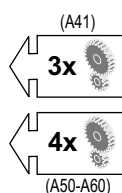
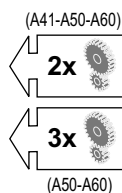
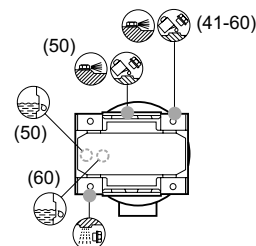
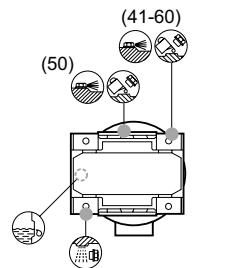
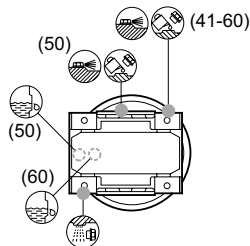
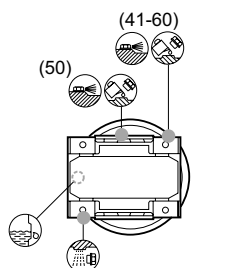
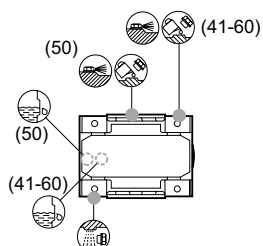
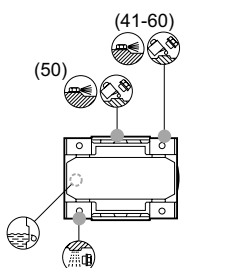
W = Default



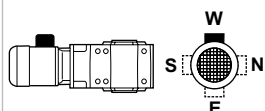
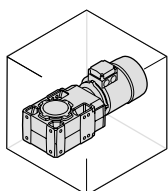
B6



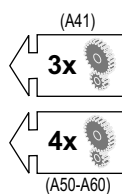
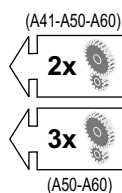
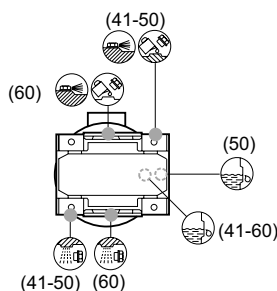
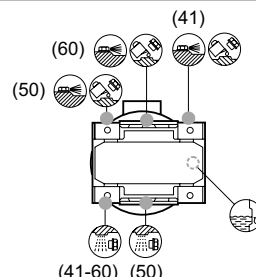
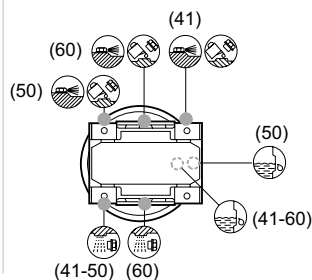
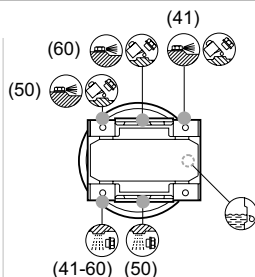
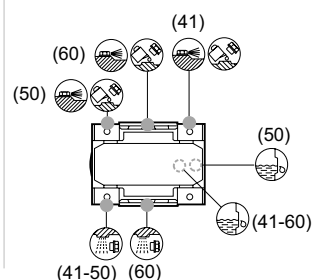
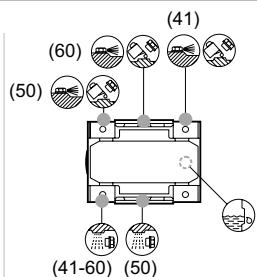
W = Default



B7



W = Default



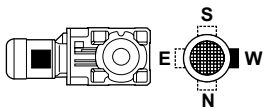
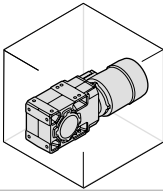
Input:

HS

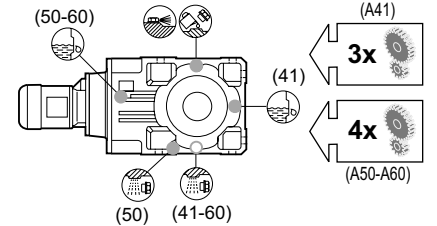
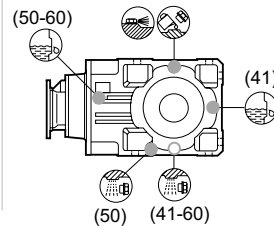
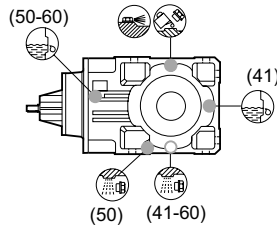
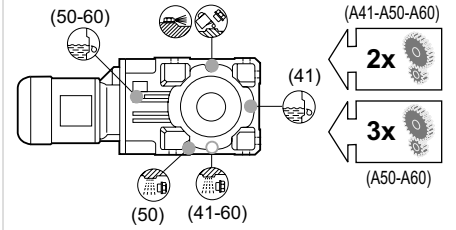
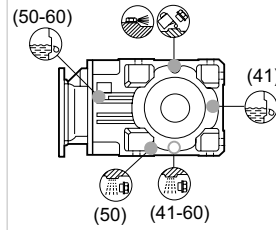
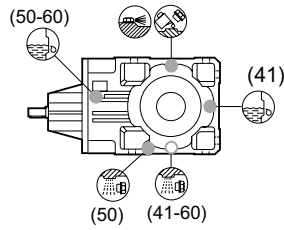
**P (IEC)
N (NEMA)**

S

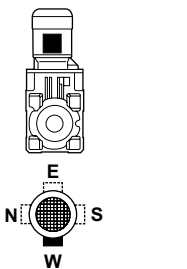
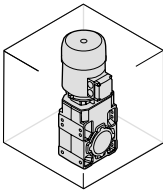
B8



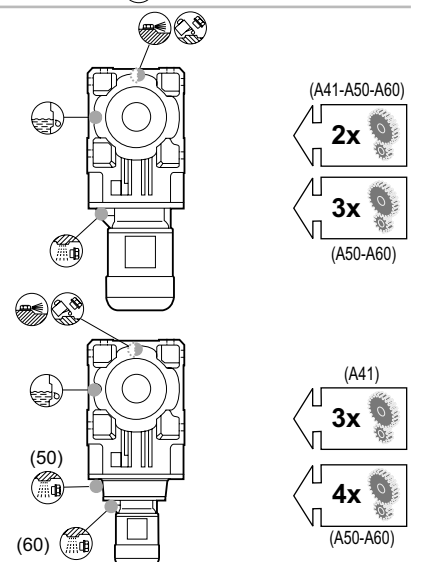
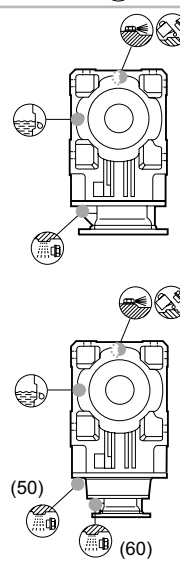
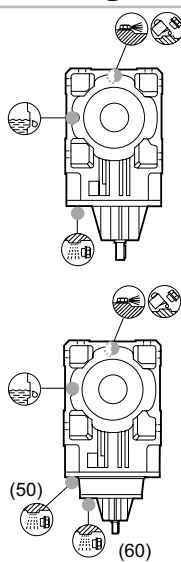
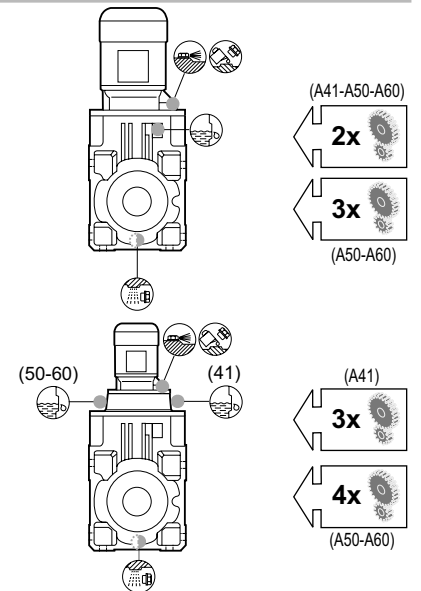
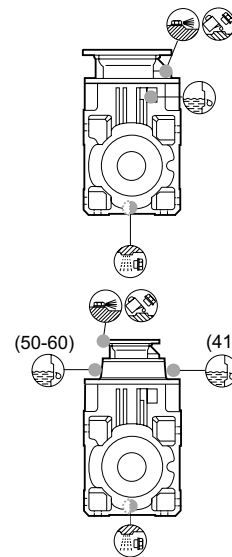
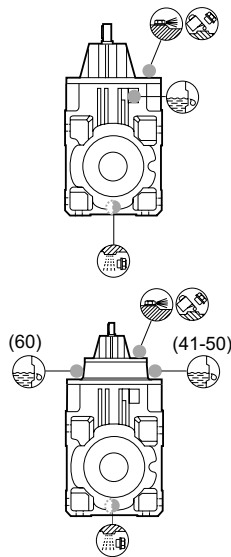
W = Default



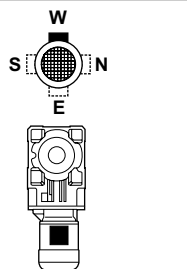
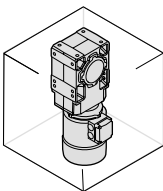
VA



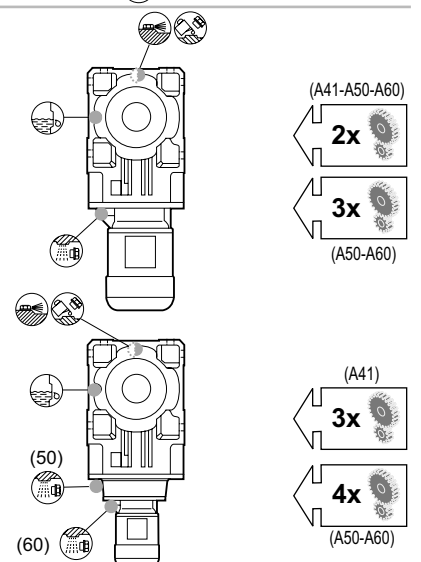
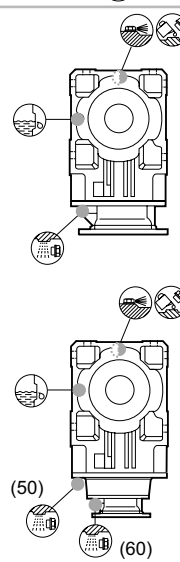
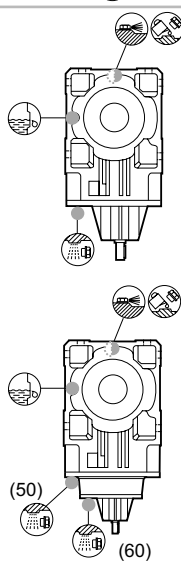
W = Default



VB



W = Default



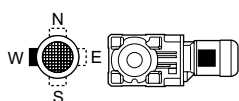
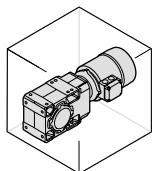
Input:

HS

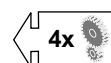
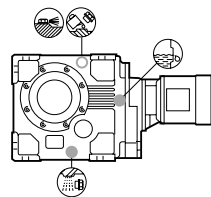
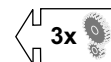
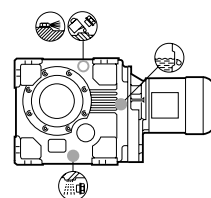
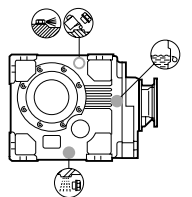
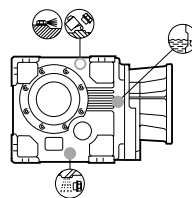
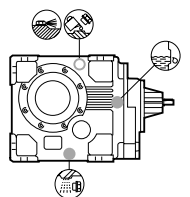
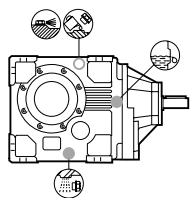
**P (IEC)
N (NEMA)**

S

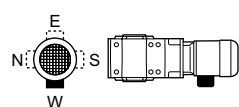
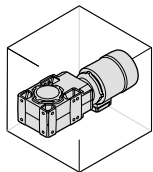
B3



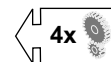
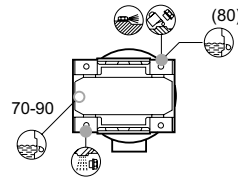
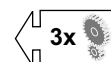
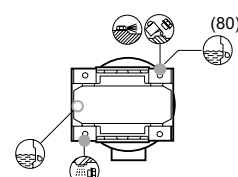
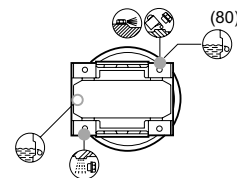
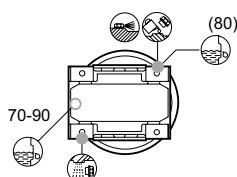
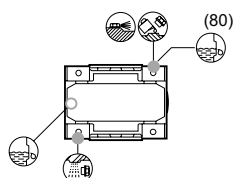
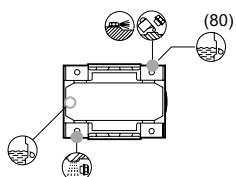
W = Default



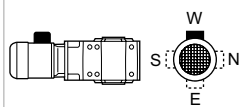
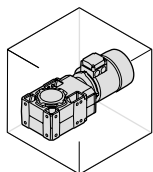
B6



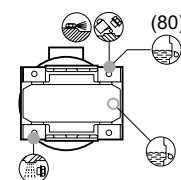
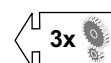
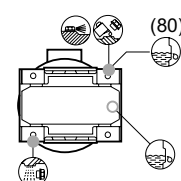
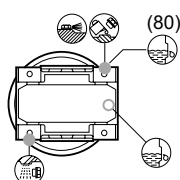
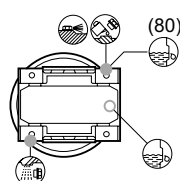
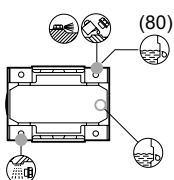
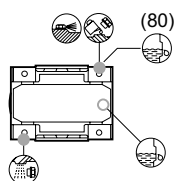
W = Default



B7



W = Default



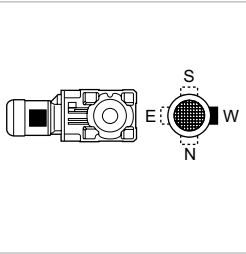
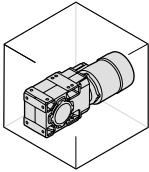
Input:

HS

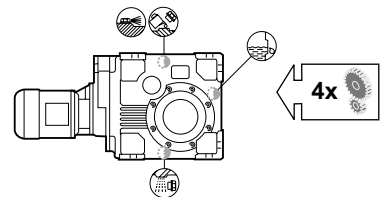
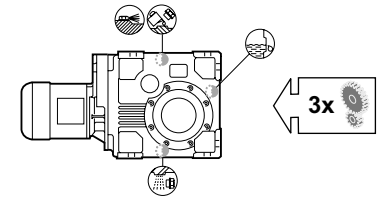
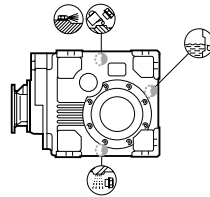
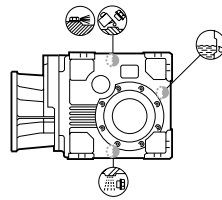
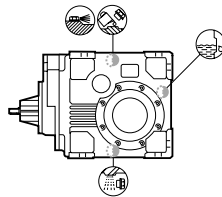
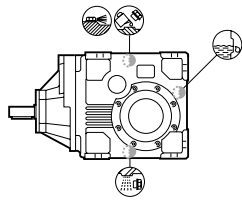
**P (IEC)
N (NEMA)**

S

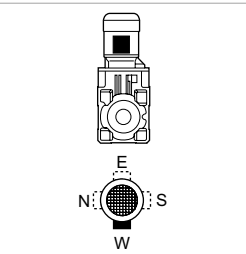
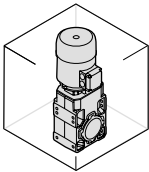
B8



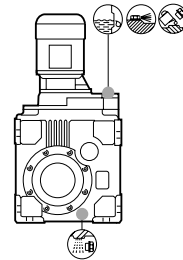
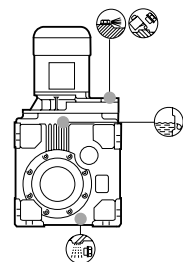
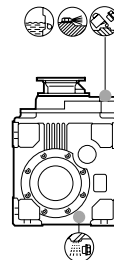
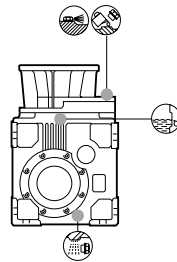
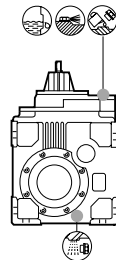
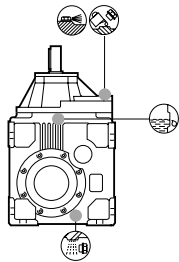
W = Default



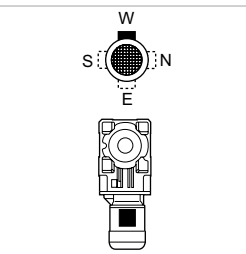
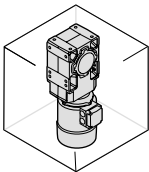
VA



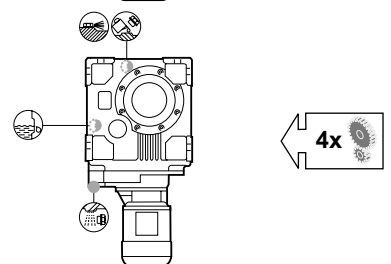
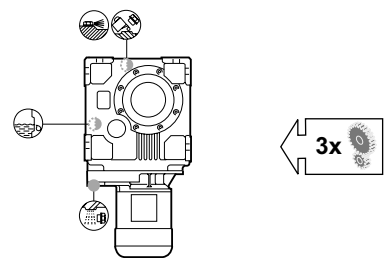
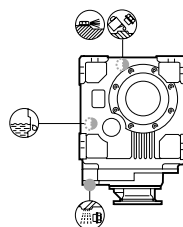
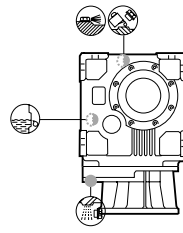
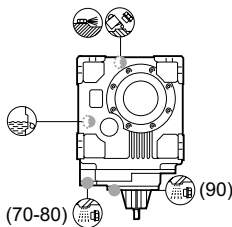
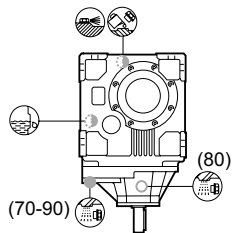
W = Default



VB



W = Default



2.8 OVERHUNG LOADS

Input and output shaft of speed reducer can be subject to loading generated by the transmission keyed on the shaft itself.

Overhung load can be calculated with the following formula where all factors are determined at shaft under study.

[N.B. (1) = input shaft; (2) = output shaft]

$$R_c = \frac{2 \times T \times K_r}{d}$$

R_c = overhung load in [lbs]

T = torque in [lb-in]

d = pitch diameter in inches of sprocket, pinion, sheave or pulley

K_r = transmission element factor

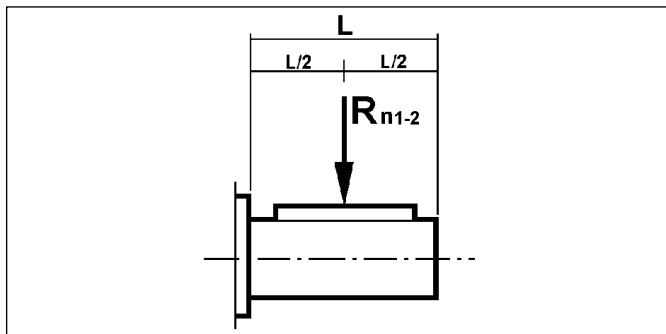
Sprocket (single or multiple strand)	1.0
Spur or helical pinion	1.25
V-belt sheave	1.50
Flat belt pulley	2.50

a) load R_{c1} or R_{c2} applied at midpoint of shaft as indicated in table (B4).

This value can be directly compared with rated OHL capacity by observing the condition:

$$R_{c1} \leq R_{n1} \quad ; \quad R_{c2} \leq R_{n2}$$

(B4)



b) load applied at distance "x" from shaft shoulder as shown in table (B5).

Conversion to the new permitted overhung load values R_{x1} and R_{x2} is obtained from the following equation:

$$R_{x1} = R_{n1} \times \frac{a}{b + "x"} \quad ; \quad R_{x2} = R_{n2} \times \frac{a}{b + "x"}$$

as long as $\frac{L}{2} < "x" < c$

R_{n1}, R_{n2} = permitted OHL on shaft
mid-point [lbs] (radial load table)

a = load location factor

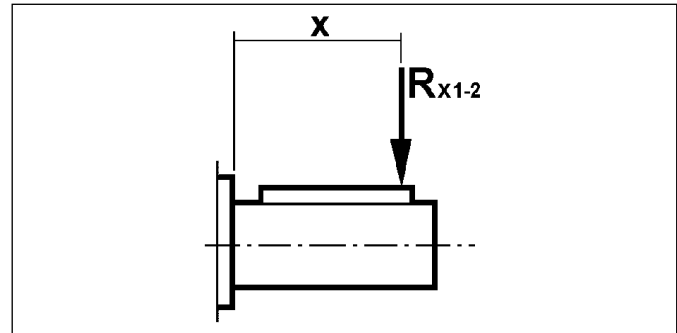
b = load location factor

c = load location factor

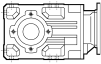
x = distance of load from shaft shoulder [in]

load location factors **a, b, c** are shown in table (B6).

(B5)



(B6)

	Load location factors [in]					
	Output shaft			Input shaft		
	a	b	c	a	b	c
A 102	4.8	4.0	23.6	0.8	0	11.8
A 202	5.9	4.7	29.5	1.6	0.8	13.8
A 203	5.9	4.7	29.5	0.8	0	11.8
A 302	6.6	5.4	35.4	1.5	0.7	13.8
A 303	6.6	5.4	35.4	0.8	0	11.8
A 412	7.8	6.2	41.3	1.9	1.0	17.7
A 413	7.8	6.2	41.3	1.6	0.8	13.8
A 502 - A503	9.5	7.9	51.2	1.9	1.0	17.7
A 504	9.5	7.9	51.2	1.5	0.7	13.8
A 602 - A603	9.5	7.5	61.0	2.2	1.0	23.6
A 604	9.5	7.5	61.0	1.9	1.0	17.7
A 703	11.6	9.1	74.8	3.4	1.2	39.4
A 704	11.6	9.1	74.8	1.9	1.0	17.7
A 803	13.6	11.0	94.5	3.4	1.2	39.4
A 804	13.6	11.0	94.5	1.9	1.0	17.7
A 903	17.0	12.9	122.4	4.6	1.8	55.1
A 904	17.0	12.9	122.4	1.9	1.0	17.7

Overhung load capacity of output shaft, R_{n2}

Rated values for radial load referred to mid-point of the output shaft are listed in the gearmotor and speed reducer rating charts. They are based on transmitted torque T_2 and rated torque T_{n2} respectively and for the most unfavourable condition as far as the load angle and rotation direction.

If permitted values are below required values, please consult our Technical Service Department reporting the load angle and shaft rotation direction.

Overhung load capacity of input shaft, R_{n1}

These values which are shown in the speed reducer selection charts refer to input speed and are calculated at mid-point of the input shaft.

If permitted values are below required values, please consult our Technical Service reporting load orientation and shaft rotation direction.

Thrust loads, A_{n1} A_{n2}

Maximum permitted thrust loads can be calculated as follows:

$$A_{n1} = R_{n1} \cdot 0.2$$

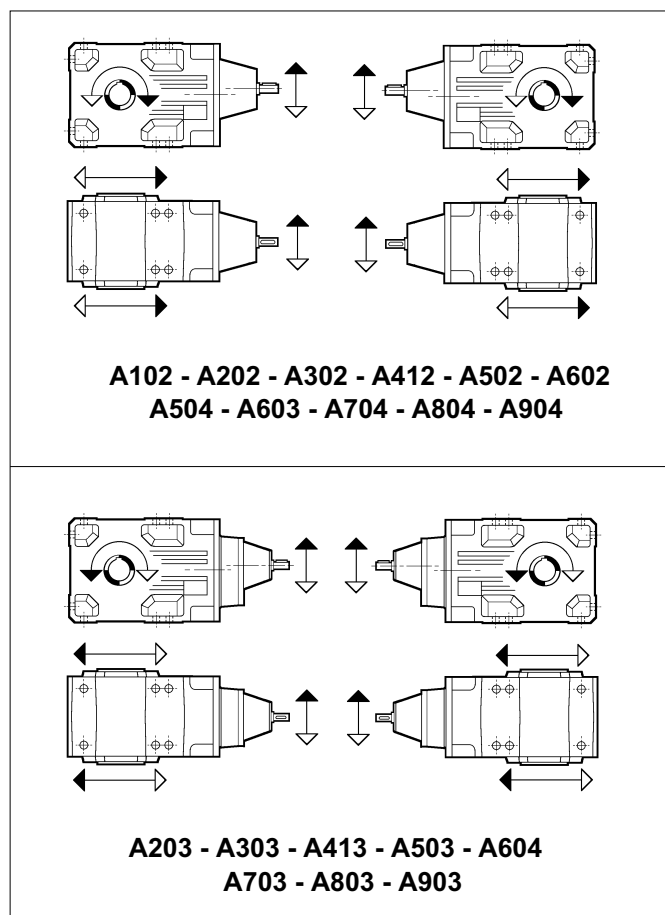
$$A_{n2} = R_{n2} \cdot 0.2$$

If thrust load exceeds permitted value, consult our Technical Service.

2.9 SHAFT ARRANGEMENT

Table (B7) shows standard directions of rotation for 2, 3 and 4 stage helical-bevel gearboxes.

(B7)



2.10 ANTI-RUN BACK DEVICE

An anti-run back device is available upon request to allow rotation of the output shaft in one direction only (option AL-AR).

Table (B8) shows the models in which the anti-run back device can be installed. Please specify in the order the required rotation direction through option AL or AR (table B9) in the gearbox or motor designation. Default setting is as per rotation AR.

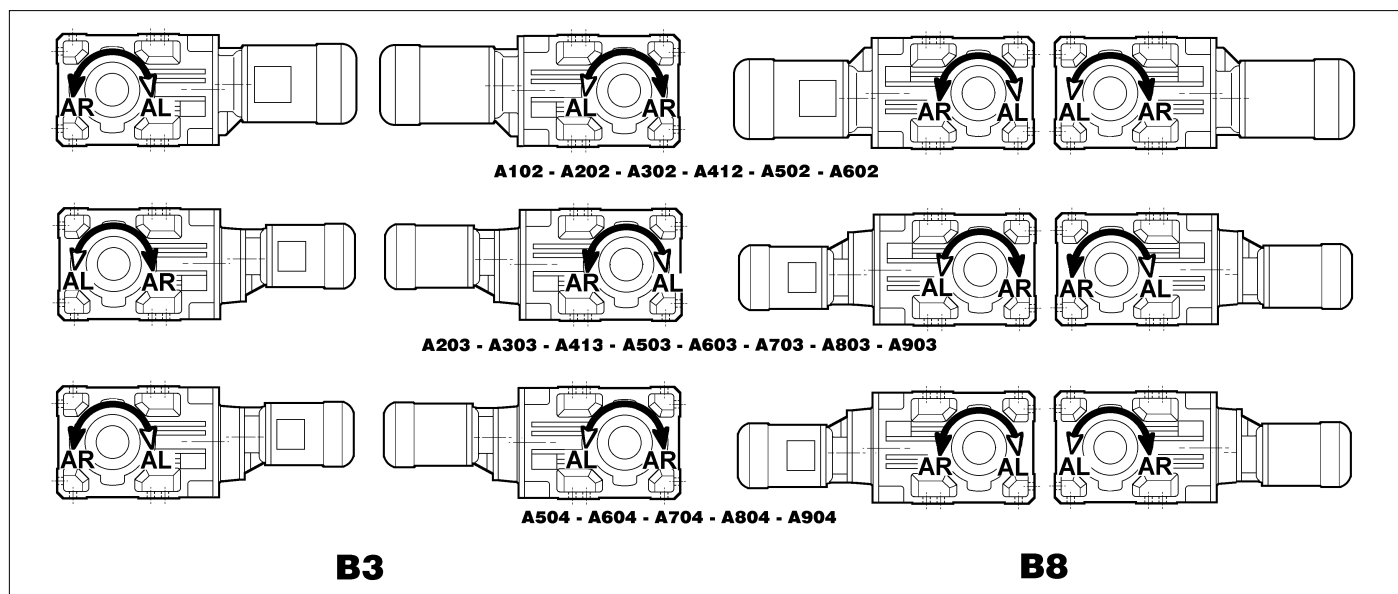
(B8)

Type										
A102	A202 A203	A302 A303	A412 A413	A502	A503 A504	A602	A603 A604	A703 A704	A803 A804	A903 A904
•	•	•	•	•		•				

• Anti-run back device can be fitted to compact motor only

■ Anti-run back device can be fitted either onto compact motor or onto the gearbox

(B9)

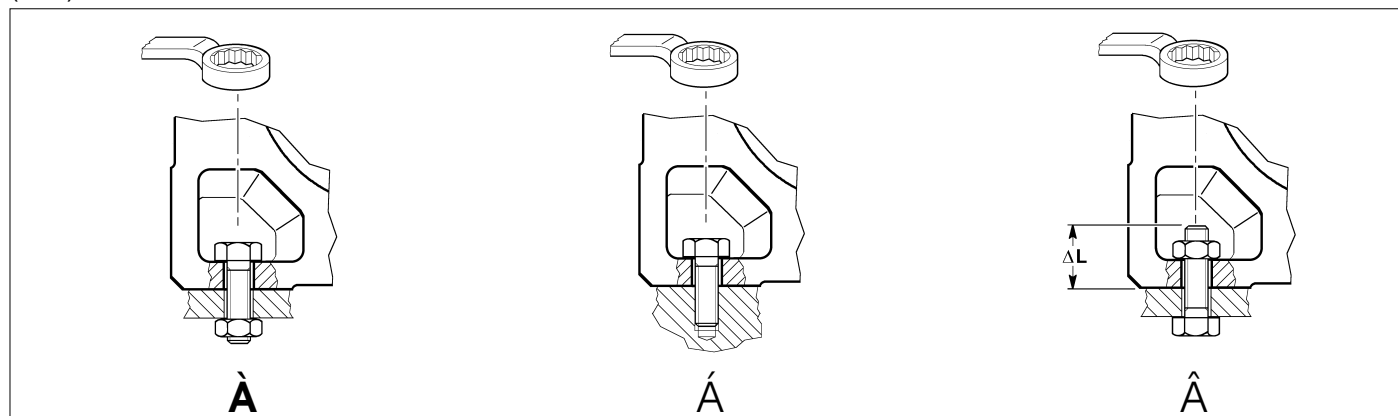


2.11 INSTALLATION INSTRUCTIONS

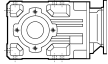
Schemes in table (B10) show the 3 possible patterns for bolting the A units onto the machine.
For each of these cases, table (B11) indicates the size

for the hexagonal head bolt to be used. Besides, for an easier installation, we suggest to use a wrench of the type shown in table (B10).

(B10)



(B11)

	Bolts pattern			
	A	A'	A''	ΔL (mm)
A 10	M8 x 25	M8 x 20	M8 x...	20
A 20	M8 x 25	M8 x 20	M8 x...	20
A 30	M10 x 30	M10 x 25	M10 x...	25
A 41	M12 x 35	M12 x 30	M12 x...	30
A 50	M14 x 45	M14 x 40	M14 x...	35
A 60	M16 x 50	M16 x 45	M16 x...	40
A 70	M20 x 60	M20 x 55	M20 x...	45
A 80	M24 x 70	M24 x 65	M24 x...	55

2.12 GEARMOTOR RATING CHARTS

0.16 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
309	31	40.4	5.5:1	680	A102_5.5	S05 + M05A4	P63 + BN63A4	N56C	76...79
234	40	30.6	7.2:1	740	A102_7.2	S05 + M05A4	P63 + BN63A4	N56C	76...79
201	47	26.3	5.5:1	780	A102_5.5	S05 + M05B6	P63 + BN63B6	N56C	76...79
176	54	23.0	9.6:1	820	A102_9.6	S05 + M05A4	P63 + BN63A4	N56C	76...79
160	59	22.4	10.6:1	840	A102_10.6	S05 + M05A4	P63 + BN63A4	N56C	76...79
137	69	18.0	12.3:1	890	A102_12.3	S05 + M05A4	P63 + BN63A4	N56C	76...79
121	78	17.0	13.9:1	920	A102_13.9	S05 + M05A4	P63 + BN63A4	N56C	76...79
104	91	14.6	10.6:1	970	A102_10.6	S05 + M05B6	P63 + BN63B6	N56C	76...79
91	104	12.7	18.6:1	1010	A102_18.6	S05 + M05A4	P63 + BN63A4	N56C	76...79
79	120	11.1	13.9:1	1060	A102_13.9	S05 + M05B6	P63 + BN63B6	N56C	76...79
71	133	10.0	23.8:1	1090	A102_23.8	S05 + M05A4	P63 + BN63A4	N56C	76...79
59	160	8.3	28.6:1	1160	A102_28.6	S05 + M05A4	P63 + BN63A4	N56C	76...79
48	197	6.7	35.1:1	1230	A102_35.1	S05 + M05A4	P63 + BN63A4	N56C	76...79
37	255	5.2	45.4:1	1240	A102_45.4	S05 + M05A4	P63 + BN63A4	N56C	76...79
33	287	4.6	51.3:1	1240	A102_51.3	S05 + M05A4	P63 + BN63A4	N56C	76...79
31	303	4.4	35.1:1	1240	A102_35.1	S05 + M05B6	P63 + BN63B6	N56C	76...79
25.6	370	3.6	65.9:1	1240	A102_65.9	S05 + M05A4	P63 + BN63A4	N56C	76...79
22.1	429	3.1	76.4:1	1240	A102_76.4	S05 + M05A4	P63 + BN63A4	N56C	76...79
21.5	442	3.0	51.3:1	1240	A102_51.3	S05 + M05B6	P63 + BN63B6	N56C	76...79
18.4	514	2.2	91.6:1	1240	A102_91.6	S05 + M05A4	P63 + BN63A4	N56C	76...79
18.3	518	3.4	92.3:1	1390	A202_92.3	S05 + M05A4	P63 + BN63A4	N56C	80...83
16.7	568	2.3	65.9:1	1240	A102_65.9	S05 + M05B6	P63 + BN63B6	N56C	76...79
14.4	658	2.0	76.4:1	1240	A102_76.4	S05 + M05B6	P63 + BN63B6	N56C	76...79
14.0	654	2.8	120.5:1	1390	A203_120.5	S05 + M05A4	P63 + BN63A4	N56C	80...83
13.8	688	2.7	79.9:1	1390	A202_79.9	S05 + M05B6	P63 + BN63B6	N56C	80...83
12.0	790	1.5	91.6:1	1240	A102_91.6	S05 + M05B6	P63 + BN63B6	N56C	76...79
11.9	796	2.2	92.3:1	1390	A202_92.3	S05 + M05B6	P63 + BN63B6	N56C	80...83
11.6	794	2.6	146.1:1	1390	A203_146.1	S05 + M05A4	P63 + BN63A4	N56C	80...83
9.5	968	2.2	178.3:1	1390	A203_178.3	S05 + M05A4	P63 + BN63A4	N56C	80...83
9.5	969	3.1	178.5:1	2160	A303_178.5	S05 + M05A4	P63 + BN63A4	N56C	84...87
7.8	1176	2.7	216.6:1	2160	A303_216.6	S05 + M05A4	P63 + BN63A4	N56C	84...87
7.6	1202	1.8	221.3:1	1390	A203_221.3	S05 + M05A4	P63 + BN63A4	N56C	80...83
6.5	1414	1.6	260.5:1	1390	A203_260.5	S05 + M05A4	P63 + BN63A4	N56C	80...83
6.2	1474	2.3	271.5:1	2160	A303_271.5	S05 + M05A4	P63 + BN63A4	N56C	84...87
5.4	1708	2.0	314.6:1	2160	A303_314.6	S05 + M05A4	P63 + BN63A4	N56C	84...87
5.2	1760	4.3	324.2:1	3370	A413_324.2	S05 + M05A4	P63 + BN63A4	N56C	88...91
5.1	1789	1.2	329.4:1	1390	A203_329.4	S05 + M05A4	P63 + BN63A4	N56C	80...83
4.5	2046	3.7	376.8:1	3370	A413_376.8	S05 + M05A4	P63 + BN63A4	N56C	88...91
4.2	2176	1.5	400.8:1	2160	A303_400.8	S05 + M05A4	P63 + BN63A4	N56C	84...87
4.2	2189	3.4	262.5:1	3370	A413_262.5	S05 + M05B6	P63 + BN63B6	N56C	88...91
3.5	2624	1.4	314.6:1	2160	A303_314.6	S05 + M05B6	P63 + BN63B6	N56C	84...87

0.16 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
3.4	2704	2.8	324.2:1	3370	A413_324.2	S05 + M05B6	P63 + BN63B6	N56C	88...91
2.9	3144	2.4	376.8:1	3370	A413_376.8	S05 + M05B6	P63 + BN63B6	N56C	88...91
2.7	3379	3.9	621.3:1	4500	A504_621.3		P63 + BN63A4	N56C	92...95
2.3	3850	3.4	707.9:1	4500	A504_707.9		P63 + BN63A4	N56C	92...95
2.1	4320	3.1	529.5:1	4500	A504_529.5		P63 + BN63B6	N56C	92...95
1.8	5069	2.6	621.3:1	4500	A504_621.3		P63 + BN63B6	N56C	92...95
1.6	5776	2.3	707.9:1	4500	A504_707.9		P63 + BN63B6	N56C	92...95
1.5	6163	4.0	755.4:1	6740	A604_755.4		P63 + BN63B6	N56C	96...99
1.4	6349	2.1	778.2:1	4500	A504_778.2		P63 + BN63B6	N56C	92...95
1.2	7559	5.9	926.5:1	11200	A704_926.5		P63 + BN63B6	N56C	100...103
1.0	8746	5.1	1072:1	11200	A704_1072		P63 + BN63B6	N56C	100...103
0.82	10982	4.0	1346:1	11200	A704_1346		P63 + BN63B6	N56C	100...103
0.64	13992	3.2	1715:1	11200	A704_1715		P63 + BN63B6	N56C	100...103

0.25 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
306	48	25.6	5.5:1	680	A102_5.5	S05 + M05B4	P63 + BN63B4	N56C	76...79
232	64	19.4	7.2:1	740	A102_7.2	S05 + M05B4	P63 + BN63B4	N56C	76...79
201	74	16.8	5.5:1	780	A102_5.5	S1 + M1SC6	P71 + BN71A6	N56C	76...79
174	85	14.5	9.6:1	810	A102_9.6	S05 + M05B4	P63 + BN63B4	N56C	76...79
158	94	14.2	10.6:1	840	A102_10.6	S05 + M05B4	P63 + BN63B4	N56C	76...79
136	109	11.4	12.3:1	880	A102_12.3	S05 + M05B4	P63 + BN63B4	N56C	76...79
120	124	10.7	13.9:1	910	A102_13.9	S05 + M05B4	P63 + BN63B4	N56C	76...79
114	129	9.6	9.6:1	930	A102_9.6	S1 + M1SC6	P71 + BN71A6	N56C	76...79
104	142	9.3	10.6:1	960	A102_10.6	S1 + M1SC6	P71 + BN71A6	N56C	76...79
90	165	8.1	18.6:1	1000	A102_18.6	S05 + M05B4	P63 + BN63B4	N56C	76...79
79	188	7.1	13.9:1	1040	A102_13.9	S1 + M1SC6	P71 + BN71A6	N56C	76...79
70	211	6.3	23.8:1	1080	A102_23.8	S05 + M05B4	P63 + BN63B4	N56C	76...79
58	253	5.2	28.6:1	1140	A102_28.6	S05 + M05B4	P63 + BN63B4	N56C	76...79
48	311	4.3	35.1:1	1210	A102_35.1	S05 + M05B4	P63 + BN63B4	N56C	76...79
46	320	4.1	23.8:1	1230	A102_23.8	S1 + M1SC6	P71 + BN71A6	N56C	76...79
37	403	3.3	45.4:1	1240	A102_45.4	S05 + M05B4	P63 + BN63B4	N56C	76...79
33	455	2.9	51.3:1	1240	A102_51.3	S05 + M05B4	P63 + BN63B4	N56C	76...79
31	473	2.8	35.1:1	1240	A102_35.1	S1 + M1SC6	P71 + BN71A6	N56C	76...79
26.4	560	3.9	63.1:1	1390	A202_63.1	S05 + M05B4	P63 + BN63B4	N56C	80...83
25.3	585	2.3	65.9:1	1240	A102_65.9	S05 + M05B4	P63 + BN63B4	N56C	76...79
21.9	678	2.0	76.4:1	1240	A102_76.4	S05 + M05B4	P63 + BN63B4	N56C	76...79
20.9	708	2.6	79.9:1	1390	A202_79.9	S05 + M05B4	P63 + BN63B4	N56C	80...83

0.25 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
18.2	813	1.4	91.6:1	1240	A102_91.6	S05 + M05B4	P63 + BN63B4	N56C	76...79
18.1	819	2.2	92.3:1	1390	A202_92.3	S05 + M05B4	P63 + BN63B4	N56C	80...83
17.1	865	3.1	97.5:1	2160	A302_97.5		P63 + BN63B4	N56C	84...87
14.4	1029	1.3	76.4:1	1240	A102_76.4	S1 + M1SC6	P71 + BN71A6	N56C	76...79
14.4	1030	3.0	76.5:1	2160	A302_76.5	S1 + M1SC6	P71 + BN71A6	N56C	84...87
13.9	1034	2.6	120.5:1	2160	A303_120.5	S05 + M05B4	P63 + BN63B4	N56C	84...87
13.9	1035	1.8	120.5:1	1390	A203_120.5	S05 + M05B4	P63 + BN63B4	N56C	80...83
13.8	1075	1.7	79.9:1	1390	A202_79.9	S1 + M1SC6	P71 + BN71A6	N56C	80...83
11.9	1243	1.4	92.3:1	1390	A202_92.3	S1 + M1SC6	P71 + BN71A6	N56C	80...83
11.4	1255	1.6	146.1:1	1390	A203_146.1	S05 + M05B4	P63 + BN63B4	N56C	80...83
11.1	1294	2.3	150.7:1	2160	A303_150.7	S05 + M05B4	P63 + BN63B4	N56C	84...87
9.4	1531	1.4	178.3:1	1390	A203_178.3	S05 + M05B4	P63 + BN63B4	N56C	80...83
9.4	1533	2.0	178.5:1	2160	A303_178.5	S05 + M05B4	P63 + BN63B4	N56C	84...87
7.7	1859	1.7	216.6:1	2160	A303_216.6	S05 + M05B4	P63 + BN63B4	N56C	84...87
7.7	1867	4.0	217.4:1	3370	A413_217.4	S05 + M05B4	P63 + BN63B4	N56C	88...91
7.5	1900	1.2	221.3:1	1390	A203_221.3	S05 + M05B4	P63 + BN63B4	N56C	80...83
7.3	1964	1.7	150.7:1	2160	A303_150.7	S1 + M1SC6	P71 + BN71A6	N56C	84...87
6.4	2253	3.3	262.5:1	3370	A413_262.5	S05 + M05B4	P63 + BN63B4	N56C	88...91
6.2	2331	1.4	271.5:1	2160	A303_271.5	S05 + M05B4	P63 + BN63B4	N56C	84...87
6.0	2403	3.1	184.4:1	3370	A413_184.4	S1 + M1SC6	P71 + BN71A6	N56C	88...91
5.3	2701	1.3	314.6:1	2160	A303_314.6	S05 + M05B4	P63 + BN63B4	N56C	84...87
5.2	2783	2.7	324.2:1	3370	A413_324.2	S05 + M05B4	P63 + BN63B4	N56C	88...91
4.4	3235	2.3	376.8:1	3370	A413_376.8	S05 + M05B4	P63 + BN63B4	N56C	88...91
4.2	3421	2.2	262.5:1	3370	A413_262.5	S1 + M1SC6	P71 + BN71A6	N56C	88...91
4.1	3413	3.9	406.4:1	4500	A504_406.4		P63 + BN63B4	N56C	92...95
3.7	3752	3.5	446.8:1	4500	A504_446.8		P63 + BN63B4	N56C	92...95
3.4	4225	1.8	324.2:1	3370	A413_324.2	S1 + M1SC6	P71 + BN71A6	N56C	88...91
3.2	4446	3.0	529.5:1	4500	A504_529.5		P63 + BN63B4	N56C	92...95
2.9	4912	1.5	376.8:1	3370	A413_376.8	S1 + M1SC6	P71 + BN71A6	N56C	88...91
2.9	4822	2.8	574.3:1	4500	A504_574.3		P63 + BN63B4	N56C	92...95
2.7	5217	2.5	621.3:1	4500	A504_621.3		P63 + BN63B4	N56C	92...95
2.4	5944	2.2	707.9:1	4500	A504_707.9		P63 + BN63B4	N56C	92...95
2.2	6378	3.9	500.3:1	6740	A604_500.3	S1 + M1SC6	P71 + BN71A6	N56C	96...99
2.1	6535	2.0	778.2:1	4500	A504_778.2		P63 + BN63B4	N56C	92...95
1.9	7320	1.8	574.2:1	4500	A504_574.2	S1 + M1SC6	P71 + BN71A6	N56C	92...95
1.9	7468	3.3	585.8:1	6740	A604_585.8	S1 + M1SC6	P71 + BN71A6	N56C	96...99
1.6	8889	2.8	697.3:1	6740	A604_697.3	S1 + M1SC6	P71 + BN71A6	N56C	96...99
1.4	9921	1.3	778.2:1	4500	A504_778.2	S1 + M1SC6	P71 + BN71A6	N56C	92...95
1.2	11302	3.9	1346:1	11200	A704_1346		P63 + BN63B4	N56C	100...103
1.1	13293	3.3	1583:1	11200	A704_1583		P63 + BN63B4	N56C	100...103
0.97	14401	3.1	1715:1	11200	A704_1715		P63 + BN63B4	N56C	100...103
0.82	17159	2.6	1346:1	11200	A704_1346	S1 + M1SC6	P71 + BN71A6	N56C	100...103
0.64	21863	2.0	1715:1	11200	A704_1715	S1 + M1SC6	P71 + BN71A6	N56C	100...103

0.33 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
306	64	19.4	5.5:1	680	A102_5.5	S05 + M05C4	P71 + BN71A4	N56C	76...79
232	84	14.7	7.2:1	740	A102_7.2	S05 + M05C4	P71 + BN71A4	N56C	76...79
174	113	11.0	9.6:1	810	A102_9.6	S05 + M05C4	P71 + BN71A4	N56C	76...79
158	124	10.7	10.6:1	830	A102_10.6	S05 + M05C4	P71 + BN71A4	N56C	76...79
153	128	9.7	7.2:1	840	A102_7.2	S1 + M1SD6	P71 + BN71B6	N56C	76...79
136	144	8.6	12.3:1	870	A102_12.3	S05 + M05C4	P71 + BN71A4	N56C	76...79
120	163	8.1	13.9:1	900	A102_13.9	S05 + M05C4	P71 + BN71A4	N56C	76...79
114	171	7.3	9.6:1	920	A102_9.6	S1 + M1SD6	P71 + BN71B6	N56C	76...79
104	188	7.1	10.6:1	950	A102_10.6	S1 + M1SD6	P71 + BN71B6	N56C	76...79
90	217	6.1	18.6:1	990	A102_18.6	S05 + M05C4	P71 + BN71A4	N56C	76...79
79	248	5.4	13.9:1	1030	A102_13.9	S1 + M1SD6	P71 + BN71B6	N56C	76...79
70	278	4.8	23.8:1	1060	A102_23.8	S05 + M05C4	P71 + BN71A4	N56C	76...79
58	334	4.0	28.6:1	1120	A102_28.6	S05 + M05C4	P71 + BN71A4	N56C	76...79
48	411	3.2	35.1:1	1180	A102_35.1	S05 + M05C4	P71 + BN71A4	N56C	76...79
46	422	3.1	23.8:1	1190	A102_23.8	S1 + M1SD6	P71 + BN71B6	N56C	76...79
37	531	2.5	45.4:1	1240	A102_45.4	S05 + M05C4	P71 + BN71A4	N56C	76...79
33	600	2.2	51.3:1	1240	A102_51.3	S05 + M05C4	P71 + BN71A4	N56C	76...79
31.1	628	3.5	53.7:1	1390	A202_53.7	S05 + M05C4	P71 + BN71A4	N56C	80...83
26.4	739	2.9	63.1:1	1390	A202_63.1	S05 + M05C4	P71 + BN71A4	N56C	80...83
25.3	772	1.7	65.9:1	1240	A102_65.9	S05 + M05C4	P71 + BN71A4	N56C	76...79
22.2	880	3.5	76.5:1	2160	A302_76.5		P71 + BN71A4	N56C	84...87
21.9	894	1.5	76.4:1	1240	A102_76.4	S05 + M05C4	P71 + BN71A4	N56C	76...79
20.9	935	2.0	79.9:1	1390	A202_79.9	S05 + M05C4	P71 + BN71A4	N56C	80...83
18.1	1081	1.6	92.3:1	1390	A202_92.3	S05 + M05C4	P71 + BN71A4	N56C	80...83
17.4	1121	2.4	97.5:1	2160	A302_97.5		P71 + BN71A4	N56C	84...87
13.9	1365	1.9	120.5:1	2160	A303_120.5	S05 + M05C4	P71 + BN71A4	N56C	84...87
13.9	1366	1.4	120.5:1	1390	A203_120.5	S05 + M05C4	P71 + BN71A4	N56C	80...83
11.4	1656	1.2	146.1:1	1390	A203_146.1	S05 + M05C4	P71 + BN71A4	N56C	80...83
11.4	1665	4.5	146.9:1	3370	A413_146.9	S05 + M05C4	P71 + BN71A4	N56C	88...91
11.3	1733	1.5	97.5:1	2160	A302_97.5	S05 + M1SD6	P71 + BN71B6	N56C	84...87
11.1	1707	1.7	150.7:1	2160	A303_150.7	S05 + M05C4	P71 + BN71A4	N56C	84...87
9.4	2023	1.5	178.5:1	2160	A303_178.5	S05 + M05C4	P71 + BN71A4	N56C	84...87
9.1	2089	3.6	184.4:1	3370	A413_184.4	S05 + M05C4	P71 + BN71A4	N56C	88...91
7.7	2454	1.3	216.6:1	2160	A303_216.6	S05 + M05C4	P71 + BN71A4	N56C	84...87
7.7	2464	3.1	217.4:1	3370	A413_217.4	S05 + M05C4	P71 + BN71A4	N56C	88...91
6.4	2974	2.5	262.5:1	3370	A413_262.5	S05 + M05C4	P71 + BN71A4	N56C	88...91
5.9	3123	4.3	286.8:1	4500	A504_286.8		P71 + BN71A4	N56C	92...95
5.2	3674	2.0	324.2:1	3370	A413_324.2	S05 + M05C4	P71 + BN71A4	N56C	88...91
5.1	3622	3.7	332.6:1	4500	A504_332.6		P71 + BN71A4	N56C	92...95
4.6	3981	3.3	365.6:1	4500	A504_365.6		P71 + BN71A4	N56C	92...95
4.4	4271	1.8	376.8:1	3370	A413_376.8	S05 + M05C4	P71 + BN71A4	N56C	88...91
4.2	4516	1.7	262.5:1	3370	A413_262.5	S1 + M1SD6	P71 + BN71B6	N56C	88...91
4.2	4425	3.0	406.4:1	4500	A504_406.4		P71 + BN71A4	N56C	92...95

0.33 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
3.8	4865	2.7	446.8:1	4500	A504_446.8		P71 + BN71A4	N56C	92...95
3.6	5175	2.6	481.6:1	4500	A504_481.6		P71 + BN71A4	N56C	92...95
3.2	5765	2.3	529.5:1	4500	A504_529.5		P71 + BN71A4	N56C	92...95
3.1	5902	4.2	542.0:1	4500	A604_542.0		P71 + BN71A4	N56C	96...99
2.7	6765	2.0	621.3:1	4500	A504_621.3		P71 + BN71A4	N56C	92...95
2.7	6910	3.6	634.6:1	6740	A604_634.6		P71 + BN71A4	N56C	96...99
2.4	7593	3.3	697.3:1	6740	A604_697.3		P71 + BN71A4	N56C	96...99
2.4	7708	1.7	707.9:1	4500	A504_707.9		P71 + BN71A4	N56C	92...95
2.2	8419	2.9	500.3:1	6740	A604_500.3	S1 + M1SD6	P71 + BN71B6	N56C	96...99
2.2	8473	1.6	778.2:1	4500	A504_778.2		P71 + BN71A4	N56C	92...95
1.9	9858	2.5	585.8:1	6740	A604_585.8	S1 + M1SD6	P71 + BN71B6	N56C	96...99
1.8	10088	4.4	926.5:1	11200	A704_926.5		P71 + BN71A4	N56C	100...103
1.5	12652	3.5	1162:1	11200	A704_1162		P71 + BN71A4	N56C	100...103
1.5	12712	1.9	755.4:1	6740	A604_755.4	S1 + M1SD6	P71 + BN71B6	N56C	96...99
1.3	14656	3.0	1346:1	11200	A704_1346		P71 + BN71A4	N56C	100...103
0.99	18674	2.4	1715:1	11200	A704_1715		P71 + BN71A4	N56C	100...103
0.82	22650	2.0	1346:1	11200	A704_1346	S1 + M1SD6	P71 + BN71B6	N56C	100...103
0.64	28859	1.5	1715:1	11200	A704_1715	S1 + M1SD6	P71 + BN71B6	N56C	100...103

0.5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
311	95	13.0	5.5:1	670	A102_5.5	S1 + M1SD4	P71 + BN71B4	N56C	76...79
236	126	9.9	7.2:1	730	A102_7.2	S1 + M1SD4	P71 + BN71B4	N56C	76...79
201	147	8.4	5.5:1	760	A102_5.5	S1 + M1LA6	P80 + BN80A6	N56C	76...79
177	168	7.4	9.6:1	790	A102_9.6	S1 + M1SD4	P71 + BN71B4	N56C	76...79
161	184	7.2	10.6:1	820	A102_10.6	S1 + M1SD4	P71 + BN71B4	N56C	76...79
138	214	5.8	12.3:1	850	A102_12.3	S1 + M1SD4	P71 + BN71B4	N56C	76...79
122	243	5.5	13.9:1	890	A102_13.9	S1 + M1SD4	P71 + BN71B4	N56C	76...79
114	259	4.8	9.6:1	890	A102_9.6	S1 + M1LA6	P80 + BN80A6	N56C	76...79
104	284	4.7	10.6:1	920	A102_10.6	S1 + M1LA6	P80 + BN80A6	N56C	76...79
92	324	4.1	18.6:1	960	A102_18.6	S1 + M1SD4	P71 + BN71B4	N56C	76...79
79	375	3.5	13.9:1	990	A102_13.9	S1 + M1LA6	P80 + BN80A6	N56C	76...79
72	414	3.2	23.8:1	1030	A102_23.8	S1 + M1SD4	P71 + BN71B4	N56C	76...79
59	498	2.7	28.6:1	1080	A102_28.6	S1 + M1SD4	P71 + BN71B4	N56C	76...79
58	509	4.3	29.2:1	1170	A202_29.2	S1 + M1SD4	P71 + BN71B4	N56C	80...83
48	612	2.2	35.1:1	1130	A102_35.1	S1 + M1SD4	P71 + BN71B4	N56C	76...79
48	617	3.6	35.4:1	1230	A202_35.4	S1 + M1SD4	P71 + BN71B4	N56C	80...83
39	753	2.9	43.2:1	1300	A202_43.2	S1 + M1SD4	P71 + BN71B4	N56C	80...83

0.5 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
37	791	1.7	45.4:1	1200	A102_45.4	S1 + M1SD4	P71 + BN71B4	N56C	76...79
33	893	1.5	51.3:1	1230	A102_51.3	S1 + M1SD4	P71 + BN71B4	N56C	76...79
32	918	4.0	52.7:1	1980	A302_52.7	S1 + M1SD4	P71 + BN71B4	N56C	84...87
32	935	2.4	53.7:1	1370	A202_53.7	S1 + M1SD4	P71 + BN71B4	N56C	80...83
26.9	1100	2.0	63.1:1	1390	A202_63.1	S1 + M1SD4	P71 + BN71B4	N56C	80...83
25.8	1149	1.2	65.9:1	1240	A102_65.9	S1 + M1SD4	P71 + BN71B4	N56C	76...79
25.7	1151	3.0	66.0:1	2100	A302_66.0	S1 + M1SD4	P71 + BN71B4	N56C	84...87
22.2	1333	2.3	76.5:1	2160	A302_76.5	S1 + M1SD4	P71 + BN71B4	N56C	84...87
21.3	1391	1.3	79.9:1	1390	A202_79.9	S1 + M1SD4	P71 + BN71B4	N56C	80...83
18.3	1565	4.5	92.8:1	3370	A413_92.8	S1 + M1SD4	P71 + BN71B4	N56C	88...91
17.4	1699	1.6	97.5:1	2160	A302_97.5	S1 + M1SD4	P71 + BN71B4	N56C	84...87
14.7	1954	3.8	115.9:1	3370	A413_115.9	S1 + M1SD4	P71 + BN71B4	N56C	88...91
14.1	2032	1.3	120.5:1	2160	A303_120.5	S1 + M1SD4	P71 + BN71B4	N56C	84...87
13.9	2134	3.3	79.2:1	3370	A412_79.2	S1 + M1LA6	P80 + BN80A6	N56C	88...91
11.9	2418	2.9	92.8:1	3370	A413_92.8	S1 + M1LA6	P80 + BN80A6	N56C	88...91
11.6	2478	3.0	146.9:1	3370	A413_146.9	S1 + M1SD4	P71 + BN71B4	N56C	88...91
11.3	2541	1.1	150.7:1	2160	A303_150.7	S1 + M1SD4	P71 + BN71B4	N56C	84...87
9.2	3110	2.4	184.4:1	3370	A413_184.4	S1 + M1SD4	P71 + BN71B4	N56C	88...91
8.1	3481	3.8	211.0:1	4500	A504_211.0	S1 + M1SD4	P71 + BN71B4	N56C	92...95
7.8	3667	2.1	217.4:1	3370	A413_217.4	S1 + M1SD4	P71 + BN71B4	N56C	88...91
7.5	3829	2.0	146.9:1	3370	A413_146.9	S1 + M1LA6	P80 + BN80A6	N56C	88...91
6.5	4427	1.7	262.5:1	3370	A413_262.5	S1 + M1SD4	P71 + BN71B4	N56C	88...91
6.0	4806	1.6	184.4:1	3370	A413_184.4	S1 + M1LA6	P80 + BN80A6	N56C	88...91
5.9	4732	2.8	286.8:1	4500	A504_286.8	S1 + M1SD4	P71 + BN71B4	N56C	92...95
5.2	5468	1.4	324.2:1	3370	A413_324.2	S1 + M1SD4	P71 + BN71B4	N56C	88...91
5.1	5487	2.4	332.6:1	4500	A504_332.6	S1 + M1SD4	P71 + BN71B4	N56C	92...95
4.6	6032	2.2	365.6:1	4500	A504_365.6	S1 + M1SD4	P71 + BN71B4	N56C	92...95
4.5	6357	1.2	376.8:1	3370	A413_376.8	S1 + M1SD4	P71 + BN71B4	N56C	88...91
4.2	6677	3.7	404.7:1	6740	A604_404.7	S1 + M1SD4	P71 + BN71B4	N56C	96...99
4.2	6705	2.0	406.4:1	4500	A504_406.4	S1 + M1SD4	P71 + BN71B4	N56C	92...95
3.8	7371	1.8	446.8:1	4500	A504_446.8	S1 + M1SD4	P71 + BN71B4	N56C	92...95
3.5	7945	1.7	481.6:1	4500	A504_481.6	S1 + M1SD4	P71 + BN71B4	N56C	92...95
3.2	8736	1.5	529.5:1	4500	A504_529.5	S1 + M1SD4	P71 + BN71B4	N56C	92...95
3.1	8942	2.8	542.0:1	6740	A604_542.0	S1 + M1SD4	P71 + BN71B4	N56C	96...99
2.7	10413	1.3	631.2:1	4500	A504_631.2	S1 + M1SD4	P71 + BN71B4	N56C	92...95
2.7	10469	2.4	634.6:1	6740	A604_634.6	S1 + M1SD4	P71 + BN71B4	N56C	96...99
2.6	10634	4.2	644.6:1	11200	A704_644.6	S1 + M1SD4	P71 + BN71B4	N56C	100...103
2.4	11679	1.1	707.9:1	4500	A504_707.9	S1 + M1SD4	P71 + BN71B4	N56C	92...95
2.3	12462	2.0	755.4:1	6740	A604_755.4	S1 + M1SD4	P71 + BN71B4	N56C	96...99
2.2	12603	3.5	763.9:1	11200	A704_763.9	S1 + M1SD4	P71 + BN71B4	N56C	100...103
1.8	15285	2.9	926.5:1	11200	A704_926.5	S1 + M1SD4	P71 + BN71B4	N56C	100...103
1.7	16180	1.5	634.6:1	6740	A604_634.6	S1 + M1LA6	P80 + BN80A6	N56C	96...99
1.6	17900	4.0	1085:1	14600	A804_1085	S1 + M1SD4	P71 + BN71B4	N56C	104...107

0.5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
1.5	19170	2.3	1162:1	11200	A704_1162	S1 + M1SD4	P71 + BN71B4	N56C	100...103
1.3	22107	3.2	1340:1	14600	A804_1340	S1 + M1SD4	P71 + BN71B4	N56C	104...107
1.3	22206	2.0	1346:1	11200	A704_1346	S1 + M1SD4	P71 + BN71B4	N56C	100...103
1.0	27664	2.6	1085:1	14600	A804_1085	S1 + M1LA6	P80 + BN80A6	N56C	104...107
0.99	28294	1.6	1715:1	11200	A704_1715	S1 + M1SD4	P71 + BN71B4	N56C	100...103
0.70	40150	3.1	1632:1	16900	A904_1632		P80 + BN80A6	N56C	108...111
0.69	40361	1.1	1583:1	11200	A704_1583	S1 + M1LA6	P80 + BN80A6	N56C	100...103

0.75 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
313	142	8.7	5.5:1	660	A102_5.5	S1 + M1LA4	P80 + BN80A4	N56C	76...79
237	187	6.6	7.2:1	710	A102_7.2	S1 + M1LA4	P80 + BN80A4	N56C	76...79
209	213	5.8	5.5:1	740	A102_5.5	S2 + M2SA6	P80 + BN80B6	N140TC	76...79
178	250	5.0	9.6:1	770	A102_9.6	S1 + M1LA4	P80 + BN80A4	N56C	76...79
162	274	4.8	10.6:1	790	A102_10.6	S1 + M1LA4	P80 + BN80A4	N56C	76...79
158	281	4.4	7.2:1	800	A102_7.2	S2 + M2SA6	P80 + BN80B6	N140TC	76...79
139	320	3.9	12.3:1	830	A102_12.3	S1 + M1LA4	P80 + BN80A4	N56C	76...79
123	362	3.7	13.9:1	850	A102_13.9	S1 + M1LA4	P80 + BN80A4	N56C	76...79
119	375	3.3	9.6:1	860	A102_9.6	S2 + M2SA6	P80 + BN80B6	N140TC	76...79
108	411	3.2	10.6:1	880	A102_10.6	S2 + M2SA6	P80 + BN80B6	N140TC	76...79
92	483	2.8	18.6:1	920	A102_18.6	S1 + M1LA4	P80 + BN80A4	N56C	76...79
82	543	2.4	13.9:1	940	A102_13.9	S2 + M2SA6	P80 + BN80B6	N140TC	76...79
74	601	3.7	23.1:1	1050	A202_23.1	S1 + M1LA4	P80 + BN80A4	N56C	80...83
72	618	2.1	23.8:1	970	A102_23.8	S1 + M1LA4	P80 + BN80A4	N56C	76...79
60	742	1.8	28.6:1	1010	A102_28.6	S1 + M1LA4	P80 + BN80A4	N56C	76...79
59	759	2.9	29.2:1	1120	A202_29.2	S1 + M1LA4	P80 + BN80A4	N56C	80...83
49	912	1.5	35.1:1	1060	A102_35.1	S1 + M1LA4	P80 + BN80A4	N56C	76...79
48	921	2.4	35.4:1	1170	A202_35.4	S1 + M1LA4	P80 + BN80A4	N56C	80...83
47	952	3.8	36.6:1	1720	A302_36.6	S1 + M1LA4	P80 + BN80A4	N56C	84...87
40	1123	2.0	43.2:1	1220	A202_43.2	S1 + M1LA4	P80 + BN80A4	N56C	80...83
39	1128	3.2	43.4:1	1800	A302_43.4	S1 + M1LA4	P80 + BN80A4	N56C	84...87
38	1180	1.1	45.4:1	1100	A102_45.4	S1 + M1LA4	P80 + BN80A4	N56C	76...79
32	1369	2.7	52.7:1	1890	A302_52.7	S1 + M1LA4	P80 + BN80A4	N56C	84...87
32	1394	1.6	53.7:1	1270	A202_53.7	S1 + M1LA4	P80 + BN80A4	N56C	80...83
27.1	1641	1.3	63.1:1	1310	A202_63.1	S1 + M1LA4	P80 + BN80A4	N56C	80...83
26.7	1667	4.5	64.2:1	3370	A412_64.2	S1 + M1LA4	P80 + BN80A4	N56C	88...91
25.9	1716	2.0	66.0:1	2000	A302_66.0	S1 + M1LA4	P80 + BN80A4	N56C	84...87
25.3	1757	4.3	45.1:1	3370	A412_45.1	S2 + M2SA6	P80 + BN80B6	N140TC	88...91

0.75 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
22.3	1988	1.6	76.5:1	2060	A302_76.5	S1 + M1LA4	P80 + BN80A4	N56C	84...87
21.6	2059	3.7	79.2:1	3370	A412_79.2	S1 + M1LA4	P80 + BN80A4	N56C	88...91
21.5	2071	3.6	53.1:1	3370	A412_53.1	S2 + M2SA6	P80 + BN80B6	N140TC	88...91
18.4	2334	3.0	92.8:1	3370	A413_92.8	S1 + M1LA4	P80 + BN80A4	N56C	88...91
14.8	2914	2.6	115.9:1	3370	A413_115.9	S1 + M1LA4	P80 + BN80A4	N56C	88...91
14.4	3088	2.3	79.2:1	3370	A412_79.2	S2 + M2SA6	P80 + BN80B6	N140TC	88...91
12.3	3500	2.0	92.8:1	3370	A413_92.8	S2 + M2SA6	P80 + BN80B6	N140TC	88...91
11.6	3695	2.0	146.9:1	3370	A413_146.9	S1 + M1LA4	P80 + BN80A4	N56C	88...91
9.9	4361	3.0	173.4:1	4500	A503_173.4	S1 + M1LA4	P80 + BN80A4	N56C	92...95
9.8	4372	1.7	115.9:1	3370	A413_115.9	S2 + M2SA6	P80 + BN80B6	N140TC	88...91
9.3	4638	1.6	184.4:1	3370	A413_184.4	S1 + M1LA4	P80 + BN80A4	N56C	88...91
9.0	4794	2.8	190.6:1	4500	A503_190.6	S1 + M1LA4	P80 + BN80A4	N56C	92...95
8.1	5191	2.6	211.0:1	4500	A504_211.0	S1 + M1LA4	P80 + BN80A4	N56C	92...95
7.9	5469	1.4	217.4:1	3370	A413_217.4	S1 + M1LA4	P80 + BN80A4	N56C	88...91
7.4	5708	2.3	232.0:1	4500	A504_232.0	S1 + M1LA4	P80 + BN80A4	N56C	92...95
6.6	6419	2.1	260.9:1	4500	A504_260.9	S1 + M1LA4	P80 + BN80A4	N56C	92...95
6.5	6602	1.1	262.5:1	3370	A413_262.5	S1 + M1LA4	P80 + BN80A4	N56C	88...91
6.5	6502	3.8	264.3:1	6740	A604_264.3	S1 + M1LA4	P80 + BN80A4	N56C	96...99
6.0	7044	3.5	286.3:1	6740	A604_286.3	S1 + M1LA4	P80 + BN80A4	N56C	96...99
6.0	7056	1.9	286.8:1	4500	A504_286.8	S1 + M1LA4	P80 + BN80A4	N56C	92...95
5.3	7976	3.1	324.2:1	6740	A604_324.2	S1 + M1LA4	P80 + BN80A4	N56C	96...99
5.1	8183	1.6	332.6:1	4500	A504_332.6	S1 + M1LA4	P80 + BN80A4	N56C	92...95
4.9	8640	2.9	351.2:1	6740	A604_351.2	S1 + M1LA4	P80 + BN80A4	N56C	96...99
4.7	8994	1.5	365.6:1	4500	A504_365.6	S1 + M1LA4	P80 + BN80A4	N56C	92...95
4.2	9956	2.5	404.7:1	6740	A604_404.7	S1 + M1LA4	P80 + BN80A4	N56C	96...99
4.2	9998	1.3	406.4:1	4500	A504_406.4	S1 + M1LA4	P80 + BN80A4	N56C	92...95
3.9	10785	2.3	438.4:1	6740	A604_438.4	S1 + M1LA4	P80 + BN80A4	N56C	96...99
3.8	10992	1.2	446.8:1	4500	A504_446.8	S1 + M1LA4	P80 + BN80A4	N56C	92...95
3.6	11848	1.1	481.6:1	4500	A504_481.6	S1 + M1LA4	P80 + BN80A4	N56C	92...95
3.4	12308	2.0	500.3:1	6740	A604_500.3	S1 + M1LA4	P80 + BN80A4	N56C	96...99
3.3	12680	3.5	515.4:1	11200	A704_515.4	S1 + M1LA4	P80 + BN80A4	N56C	100...103
2.9	14412	1.7	585.8:1	6740	A604_585.8	S1 + M1LA4	P80 + BN80A4	N56C	96...99
2.9	14638	3.0	595.0:1	11200	A704_595.0	S1 + M1LA4	P80 + BN80A4	N56C	100...103
2.5	17155	1.4	697.3:1	6740	A604_697.3	S1 + M1LA4	P80 + BN80A4	N56C	96...99
2.4	17307	4.1	703.5:1	14600	A804_703.5	S1 + M1LA4	P80 + BN80A4	N56C	104...107
2.4	17347	2.6	705.1:1	11200	A704_705.1	S1 + M1LA4	P80 + BN80A4	N56C	100...103
2.1	20407	3.5	829.5:1	14600	A804_829.5	S1 + M1LA4	P80 + BN80A4	N56C	104...107
2.0	21042	2.1	855.3:1	11200	A704_855.3	S1 + M1LA4	P80 + BN80A4	N56C	100...103
1.7	24626	2.9	1001:1	14600	A804_1001	S1 + M1LA4	P80 + BN80A4	N56C	104...107
1.6	26373	1.7	1072:1	11200	A704_1072	S1 + M1LA4	P80 + BN80A4	N56C	100...103
1.4	30433	2.3	1237:1	14600	A804_1237	S1 + M1LA4	P80 + BN80A4	N56C	104...107
1.4	30556	1.4	1242:1	11200	A704_1242	S1 + M1LA4	P80 + BN80A4	N56C	100...103
1.1	38330	1.8	1558:1	14600	A804_1558	S1 + M1LA4	P80 + BN80A4	N56C	104...107

0.75 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
1.1	38945	1.1	1583:1	11200	A704_1583	S1 + M1LA4	P80 + BN80A4	N56C	100...103
1.0	40150	3.1	1632:1	16900	A904_1632	S1 + M1LA4	P80 + BN80A4	N56C	108...111
0.73	57495	1.2	1558:1	14600	A804_1558	S2 + M2SA6	P80 + BN80B6	N140TC	104...107
0.70	60225	2.1	1632:1	16900	A904_1632	S2 + M2SA6	P80 + BN80B6	N140TC	108...111

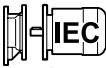
1 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
315	188	6.6	5.5:1	640	A102_5.5	S2 + M2SA4	P80 + BN80B4	N56C	76...79
239	248	5.0	7.2:1	690	A102_7.2	S2 + M2SA4	P80 + BN80B4	N56C	76...79
209	284	4.4	5.5:1	720	A102_5.5	S2 + M2SB6	P90 + BN90S6	N140TC	76...79
179	331	3.7	9.6:1	750	A102_9.6	S2 + M2SA4	P80 + BN80B4	N56C	76...79
163	364	3.7	10.6:1	760	A102_10.6	S2 + M2SA4	P80 + BN80B4	N56C	76...79
158	375	3.3	7.2:1	770	A102_7.2	S2 + M2SB6	P90 + BN90S6	N140TC	76...79
140	424	2.9	12.3:1	790	A102_12.3	S2 + M2SA4	P80 + BN80B4	N56C	76...79
123	480	2.8	13.9:1	820	A102_13.9	S2 + M2SA4	P80 + BN80B4	N56C	76...79
122	487	3.8	9.4:1	890	A202_9.4	S2 + M2SB6	P90 + BN90S6	N140TC	80...83
119	500	2.5	9.6:1	830	A102_9.6	S2 + M2SB6	P90 + BN90S6	N140TC	76...79
110	537	4.1	10.3:1	920	A202_10.3	S2 + M2SB6	P90 + BN90S6	N140TC	80...83
108	549	2.4	10.6:1	850	A102_10.6	S2 + M2SB6	P90 + BN90S6	N140TC	76...79
95	624	3.5	18.1:1	950	A202_18.1	S2 + M2SA4	P80 + BN80B4	N56C	80...83
93	640	2.1	18.6:1	870	A102_18.6	S2 + M2SA4	P80 + BN80B4	N56C	76...79
82	724	1.8	13.9:1	890	A102_13.9	S2 + M2SB6	P90 + BN90S6	N140TC	76...79
74	796	2.8	23.1:1	1010	A202_23.1	S2 + M2SA4	P80 + BN80B4	N56C	80...83
72	819	1.6	23.8:1	910	A102_23.8	S2 + M2SA4	P80 + BN80B4	N56C	76...79
60	984	1.3	28.6:1	940	A102_28.6	S2 + M2SA4	P80 + BN80B4	N56C	76...79
59	1006	2.2	29.2:1	1060	A202_29.2	S2 + M2SA4	P80 + BN80B4	N56C	80...83
59	1009	3.6	29.3:1	1560	A302_29.3	S2 + M2SA4	P80 + BN80B4	N56C	84...87
49	1220	1.8	35.4:1	1100	A202_35.4	S2 + M2SA4	P80 + BN80B4	N56C	80...83
40	1489	1.5	43.2:1	1140	A202_43.2	S2 + M2SA4	P80 + BN80B4	N56C	80...83
40	1496	2.4	43.4:1	1720	A302_43.4	S2 + M2SA4	P80 + BN80B4	N56C	84...87
38	1552	4.7	45.1:1	3370	A412_45.1	S2 + M2SA4	P80 + BN80B4	N56C	88...91
32	1841	1.2	35.4:1	1170	A202_35.4	S2 + M2SB6	P90 + BN90S6	N140TC	80...83
32	1866	4.0	35.9:1	3370	A412_35.9	S2 + M2SB6	P90 + BN90S6	N140TC	88...91
31	1905	1.9	36.6:1	1820	A302_36.6	S2 + M2SB6	P90 + BN90S6	N140TC	84...87
26.8	2210	3.4	64.2:1	3370	A412_64.2	S2 + M2SA4	P80 + BN80B4	N56C	88...91
26.0	2274	1.5	66.0:1	1880	A302_66.0	S2 + M2SA4	P80 + BN80B4	N56C	84...87
25.3	2342	3.2	45.1:1	3370	A412_45.1	S2 + M2SB6	P90 + BN90S6	N140TC	88...91
22.5	2635	1.2	76.5:1	1930	A302_76.5	S2 + M2SA4	P80 + BN80B4	N56C	84...87

1 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
21.7	2729	2.8	79.2:1	3370	A412_79.2	S2 + M2SA4	P80 + BN80B4	N56C	88...91
18.5	3093	2.3	92.8:1	3370	A413_92.8	S2 + M2SA4	P80 + BN80B4	N56C	88...91
17.8	3334	2.3	64.2:1	3370	A412_64.2	S2 + M2SB6	P90 + BN90S6	N140TC	88...91
17.3	3319	4.0	99.5:1	4500	A503_99.5	S2 + M2SA4	P80 + BN80B4	N56C	92...95
15.7	3649	3.6	109.4:1	4500	A503_109.4	S2 + M2SA4	P80 + BN80B4	N56C	92...95
14.8	3863	1.9	115.9:1	3370	A413_115.9	S2 + M2SA4	P80 + BN80B4	N56C	88...91
14.6	3933	3.4	118.0:1	4500	A503_118.0	S2 + M2SA4	P80 + BN80B4	N56C	92...95
14.4	4118	1.7	79.2:1	3370	A412_79.2	S2 + M2SB6	P90 + BN90S6	N140TC	88...91
12.2	4689	2.8	140.6:1	4500	A503_140.6	S2 + M2SA4	P80 + BN80B4	N56C	92...95
11.7	4898	1.5	146.9:1	3370	A413_146.9	S2 + M2SA4	P80 + BN80B4	N56C	88...91
11.1	5155	2.6	154.6:1	4500	A503_154.6	S2 + M2SA4	P80 + BN80B4	N56C	92...95
10.0	5717	4.3	171.5:1	6740	A603_171.5	S2 + M2SA4	P80 + BN80B4		96...99
9.9	5781	2.3	173.4:1	4500	A503_173.4	S2 + M2SA4	P80 + BN80B4	N56C	92...95
9.3	6148	1.2	184.4:1	3370	A413_184.4	S2 + M2SA4	P80 + BN80B4	N56C	88...91
8.2	6806	3.6	208.7:1	6740	A604_208.7	S2 + M2SA4	P80 + BN80B4	N56C	96...99
8.2	6881	1.9	211.0:1	4500	A504_211.0	S2 + M2SA4	P80 + BN80B4	N56C	92...95
7.4	7566	1.8	232.0:1	4500	A504_232.0	S2 + M2SA4	P80 + BN80B4	N56C	92...95
6.6	8508	1.6	260.9:1	4500	A504_260.9	S2 + M2SA4	P80 + BN80B4	N56C	92...95
6.5	8619	2.9	264.3:1	6740	A604_264.3	S2 + M2SA4	P80 + BN80B4	N56C	96...99
6.0	9337	2.7	286.3:1	6740	A604_286.3	S2 + M2SA4	P80 + BN80B4	N56C	96...99
6.0	9353	1.4	286.8:1	4500	A504_286.8	S2 + M2SA4	P80 + BN80B4	N56C	92...95
5.4	10318	4.3	316.4:1	11200	A704_316.4	S2 + M2SA4	P80 + BN80B4	N56C	100...103
5.3	10576	2.3	324.2:1	6740	A604_324.2	S2 + M2SA4	P80 + BN80B4	N56C	96...99
5.2	10847	1.2	332.6:1	4500	A504_332.6	S2 + M2SA4	P80 + BN80B4	N56C	92...95
4.9	11453	2.2	351.2:1	6740	A604_351.2	S2 + M2SA4	P80 + BN80B4	N56C	96...99
4.7	11923	1.1	365.6:1	4500	A504_365.6	S2 + M2SA4	P80 + BN80B4	N56C	92...95
4.3	13051	3.4	400.2:1	11200	A704_400.2	S2 + M3SA4	P80 + BN80B4	N56C	100...103
4.3	13198	1.9	404.7:1	6740	A604_404.7	S2 + M2SA4	P80 + BN80B4	N56C	96...99
3.9	14297	1.7	438.4:1	6740	A604_438.4	S2 + M2SA4	P80 + BN80B4	N56C	96...99
3.6	15517	2.9	475.8:1	11200	A704_475.8	S2 + M2SA4	P80 + BN80B4	N56C	100...103
3.3	16808	2.6	515.4:1	11200	A704_515.4	S2 + M2SA4	P80 + BN80B4	N56C	100...103
3.2	17676	1.4	542.0:1	6740	A604_542.0	S2 + M2SA4	P80 + BN80B4	N56C	96...99
3.0	18426	2.4	565.0:1	11200	A704_565.0	S2 + M2SA4	P80 + BN80B4	N56C	100...103
2.9	19104	1.3	585.8:1	6740	A604_585.8	S2 + M2SA4	P80 + BN80B4	N56C	96...99
2.7	20676	1.2	634.6:1	6740	A604_634.6	S2 + M2SA4	P80 + BN80B4	N56C	96...99
2.7	21022	2.1	644.6:1	11200	A704_644.6	S2 + M2SA4	P80 + BN80B4	N56C	100...103
2.4	22942	3.1	703.5:1	14600	A804_703.5	S2 + M2SA4	P80 + BN80B4	N56C	104...107
2.4	22995	1.9	705.1:1	11200	A704_705.1	S2 + M2SA4	P80 + BN80B4	N56C	100...103
2.1	27051	2.6	829.5:1	14600	A804_829.5	S2 + M2SA4	P80 + BN80B4	N56C	104...107
2.0	27893	1.6	855.3:1	11200	A704_855.3	S2 + M3SA4	P80 + BN80B4	N56C	100...103
1.7	32644	2.2	1001:1	14600	A804_1001	S2 + M2SA4	P80 + BN80B4	N56C	104...107
1.7	33427	3.7	1025:1	16900	A904_1025	S2 + M2SA4	P80 + BN80B4	N56C	108...111
1.6	34960	1.3	1072:1	11200	A704_1072	S2 + M2SA4	P80 + BN80B4	N56C	100...103

1 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
1.5	37895	1.2	1162:1	11200	A704_1162	S2 + M2SA4	P80 + BN80B4	N56C	100...103
1.4	39852	3.1	1222:1	16900	A904_1222	S2 + M2SA4	P80 + BN80B4	N56C	108...111
1.4	40341	1.8	1237:1	14600	A804_1237	S2 + M2SA4	P80 + BN80B4	N56C	104...107
1.1	49146	2.5	1507:1	16900	A904_1507	S2 + M2SA4	P80 + BN80B4	N56C	108...111
1.1	50809	1.4	1558:1	14600	A804_1558	S2 + M2SA4	P80 + BN80B4	N56C	104...107
0.92	60865	1.2	1237:1	14600	A804_1237	S2 + M2SB6	P90 + BN90S6	N140TC	104...107
0.70	80300	1.5	1632:1	16900	A904_1632	S2 + M2SB6	P90 + BN90S6	N140TC	108...111

1.5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
315	282	4.4	5.5:1	620	A102_5.5	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
239	373	3.3	7.2:1	660	A102_7.2	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
209	426	2.9	5.5:1	680	A102_5.5	S3 + M3SA6	P90 + BN90L6	N180TC	76...79
183	484	3.8	9.4:1	770	A202_9.4	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
179	497	2.5	9.6:1	710	A102_9.6	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
166	534	3.7	10.3:1	790	A202_10.3	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
163	545	2.4	10.6:1	720	A102_10.6	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
140	636	1.9	12.3:1	740	A102_12.3	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
123	720	1.8	13.9:1	760	A102_13.9	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
122	727	3.0	14.1:1	850	A202_14.1	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
110	806	2.7	10.3:1	870	A202_10.3	S3 + M3SA6	P90 + BN90L6	N180TC	80...83
108	823	1.6	10.6:1	780	A102_10.6	S3 + M3SA6	P90 + BN90L6	N180TC	76...79
96	929	3.8	18.0:1	1320	A302_18.0	S2 + M2SB4	P90 + BN90S4	N140TC	84...87
95	936	2.4	18.1:1	890	A202_18.1	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
93	960	1.4	18.6:1	800	A102_18.6	S2 + M2SB4	P90 + BN90S4	N140TC	76...79
82	1086	1.2	13.9:1	810	A102_13.9	S3 + M3SA6	P90 + BN90L6	N180TC	76...79
81	1097	2.0	14.1:1	920	A202_14.1	S3 + M3SA6	P90 + BN90L6	N180TC	80...83
76	1175	3.1	22.8:1	1400	A302_22.8	S2 + M2SB4	P90 + BN90S4	N140TC	84...87
74	1194	1.9	23.1:1	930	A202_23.1	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
61	1463	4.4	28.3:1	3010	A412_28.3	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
59	1510	1.5	29.2:1	960	A202_29.2	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
59	1514	2.4	29.3:1	1480	A302_29.3	S2 + M2SB4	P90 + BN90S4	N140TC	84...87
49	1830	1.2	35.4:1	980	A202_35.4	S2 + M2SB4	P90 + BN90S4	N140TC	80...83
48	1855	3.7	35.9:1	3210	A412_35.9	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
47	1893	1.9	36.6:1	1550	A302_36.6	S2 + M2SB4	P90 + BN90S4	N140TC	84...87
40	2244	1.6	43.4:1	1600	A302_43.4	S2 + M2SB4	P90 + BN90S4	N140TC	84...87
38	2328	3.2	45.1:1	3370	A412_45.1	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
33	2722	1.3	52.7:1	1640	A302_52.7	S2 + M2SB4	P90 + BN90S4	N140TC	84...87

1.5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
32	2746	2.7	53.1:1	3370	A412_53.1	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
26.8	3315	2.3	64.2:1	3370	A412_64.2	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
25.3	3513	2.1	45.1:1	3370	A412_45.1	S3 + M3SA6	P90 + BN90L6	N180TC	88...91
24.5	3513	3.8	70.2:1	4500	A503_70.2	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
21.7	4094	1.8	79.2:1	3370	A412_79.2	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
21.1	4074	3.3	81.5:1	4500	A503_81.5	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
18.5	4640	1.5	92.8:1	3370	A413_92.8	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
17.8	5001	1.5	64.2:1	3370	A412_64.2	S3 + M3SA6	P90 + BN90L6	N180TC	88...91
17.3	4978	2.7	99.5:1	4500	A503_99.5	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
15.7	5473	2.4	109.4:1	4500	A503_109.4	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
14.8	5795	1.3	115.9:1	3370	A413_115.9	S2 + M2SB4	P90 + BN90S4	N140TC	88...91
14.6	5900	2.3	118.0:1	4500	A503_118.0	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
13.3	6486	2.0	129.7:1	4500	A503_129.7	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
12.9	6666	3.7	133.3:1	6740	A603_133.3	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
12.2	7033	1.9	140.6:1	4500	A503_140.6	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
11.9	7205	3.4	144.0:1	6740	A603_144.0	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
11.1	7732	1.7	154.6:1	4500	A503_154.6	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
11.0	7805	3.2	156.0:1	6740	A603_156.0	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
10.0	8576	2.9	171.5:1	6740	A603_171.5	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
9.9	8671	1.5	173.4:1	4500	A503_173.4	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
9.3	9291	2.7	185.8:1	6740	A603_185.8	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
9.0	9533	1.4	190.6:1	4500	A503_190.6	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
8.2	10322	1.3	211.0:1	4500	A504_211.0	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
7.8	10777	4.1	220.3:1	11200	A704_220.3	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
7.6	11060	2.2	226.1:1	6740	A604_226.1	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
7.4	11349	1.2	232.0:1	4500	A504_232.0	S2 + M2SB4	P90 + BN90S4	N140TC	92...95
7.2	11672	3.8	238.6:1	11200	A704_238.6	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
6.5	12929	1.9	264.3:1	6740	A604_264.3	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
6.0	14005	1.8	286.3:1	6740	A604_286.3	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
5.4	15478	2.9	316.4:1	11200	A704_316.4	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
5.3	15864	1.6	324.3:1	6740	A604_324.2	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
4.9	17180	1.4	351.2:1	6740	A604_351.2	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
4.7	18070	2.4	369.4:1	11200	A704_369.4	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
4.3	19577	2.3	400.2:1	11200	A704_400.2	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
4.3	19797	1.3	404.7:1	6740	A604_404.7	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
3.9	21446	1.2	438.4:1	6740	A604_438.4	S2 + M2SB4	P90 + BN90S4	N140TC	96...99
3.6	23275	1.9	475.8:1	11200	A704_475.8	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
3.6	23427	3.0	478.9:1	14600	A804_478.9	S2 + M2SB4	P90 + BN90S4	N140TC	104...107
3.3	25212	1.8	515.4:1	11200	A704_515.4	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
3.1	27418	2.6	560.5:1	14600	A804_560.5	S2 + M2SB4	P90 + BN90S4	N140TC	104...107
2.9	29106	1.5	595.0:1	11200	A704_595.0	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
2.8	29703	2.4	607.2:1	14600	A804_607.2	S2 + M2SB4	P90 + BN90S4	N140TC	104...107
2.4	34414	2.1	703.5:1	14600	A804_703.5	S2 + M2SB4	P90 + BN90S4	N140TC	104...107

1.5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
2.4	34492	1.3	705.1:1	11200	A704_705.1	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
2.4	34629	3.6	707.9:1	16900	A904_707.9	S2 + M2SB4	P90 + BN90S4	N140TC	108...111
2.3	37368	1.2	763.9:1	11200	A704_763.9	S2 + M2SB4	P90 + BN90S4	N140TC	100...103
2.1	40577	1.7	829.5:1	14600	A804_829.5	S2 + M2SB4	P90 + BN90S4	N140TC	104...107
2.0	42319	2.9	865.1:1	16900	A904_865.1	S2 + M2SB4	P90 + BN90S4	N140TC	108...111
1.7	48967	1.4	1001:1	14600	A804_1001	S2 + M2SB4	P90 + BN90S4	N140TC	104...107
1.7	50141	2.5	1025:1	16900	A904_1025	S2 + M2SB4	P90 + BN90S4	N140TC	108...111
1.4	59777	2.1	1222:1	16900	A904_1222	S2 + M2SB4	P90 + BN90S4	N140TC	108...111
1.4	60511	1.2	1237:1	14600	A804_1237	S2 + M2SB4	P90 + BN90S4	N140TC	104...107
1.1	79834	1.6	1632:1	16900	A904_1632	S2 + M2SB4	P90 + BN90S4	N140TC	108...111
0.76	111225	1.1	1507:1	16900	A904_1507	S3 + M3SA6	P90 + BN90L6	N180TC	108...111

2 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
315	377	3.3	5.5:1	590	A102_5.5	S3 + M3SA4	P90 + BN90LA4	N140TC	76...79
239	497	2.5	7.2:1	630	A102_7.2	S3 + M3SA4	P90 + BN90LA4	N140TC	76...79
236	502	3.7	7.3:1	690	A202_7.3	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
213	556	3.3	5.4:1	710	A202_5.4	S3 + M3LA6	P100 + BN100LA6	N180TC	80...83
209	568	2.2	5.5:1	640	A102_5.5	S3 + M3LA6	P100 + BN100LA6	N180TC	76...79
183	646	2.9	9.4:1	730	A202_9.4	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
179	662	1.9	9.6:1	660	A102_9.6	S3 + M3SA4	P90 + BN90LA4	N140TC	76...79
166	712	2.8	10.3:1	750	A202_10.3	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
163	727	1.8	10.6:1	670	A102_10.6	S3 + M3SA4	P90 + BN90LA4	N140TC	76...79
144	824	2.3	12.0:1	770	A202_12.0	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
140	848	1.5	12.3:1	680	A102_12.3	S3 + M3SA4	P90 + BN90LA4	N140TC	76...79
127	934	3.5	13.6:1	1180	A302_13.6	S3 + M3SA4	P90 + BN90LA4	N140TC	84...87
123	960	1.4	13.9:1	690	A102_13.9	S3 + M3SA4	P90 + BN90LA4	N140TC	76...79
122	970	2.2	14.1:1	790	A202_14.1	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
110	1074	2.1	10.3:1	800	A202_10.3	S3 + M3LA6	P100 + BN100LA6	N180TC	80...83
109	1087	3.2	10.5:1	1220	A302_10.5	S3 + M3LA6	P100 + BN100LA6	N180TC	84...87
96	1239	2.9	18.0:1	1260	A302_18.0	S3 + M3SA4	P90 + BN90LA4	N140TC	84...87
95	1247	1.8	18.1:1	820	A202_18.1	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
84	1410	2.6	13.6:1	1290	A302_13.6	S3 + M3LA6	P100 + BN100LA6	N180TC	84...87
81	1463	1.5	14.1:1	840	A202_14.1	S3 + M3LA6	P100 + BN100LA6	N180TC	80...83
76	1562	3.9	22.7:1	2740	A412_22.7	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
76	1567	2.3	22.8:1	1320	A302_22.8	S3 + M3SA4	P90 + BN90LA4	N140TC	84...87
74	1592	1.4	23.1:1	850	A202_23.1	S3 + M3SA4	P90 + BN90LA4	N140TC	80...83
61	1951	3.3	28.3:1	2920	A412_28.3	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91

2 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
59	2019	1.8	29.3:1	1380	A302_29.3	S3 + M3SA4	P90 + BN90LA4	N140TC	84...87
48	2473	2.8	35.9:1	3100	A412_35.9	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
47	2525	1.4	36.6:1	1420	A302_36.6	S3 + M3SA4	P90 + BN90LA4	N140TC	84...87
40	2992	1.2	43.4:1	1450	A302_43.4	S3 + M3SA4	P90 + BN90LA4	N140TC	84...87
38	3105	2.4	45.1:1	3300	A412_45.1	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
33	3446	3.9	51.7:1	4430	A503_51.7	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
32	3661	2.1	53.1:1	3370	A412_53.1	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
26.9	4261	3.1	63.9:1	4500	A503_63.9	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
26.8	4420	1.7	64.2:1	3370	A412_64.2	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
25.3	4684	1.6	45.1:1	3370	A412_45.1	S3 + M3LA6	P100 + BN100LA6	N180TC	88...91
24.5	4684	2.8	70.2:1	4500	A503_70.2	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
21.7	5459	1.4	79.2:1	3370	A412_79.2	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
21.1	5432	2.4	81.5:1	4500	A503_81.5	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
19.9	5759	4.3	86.4:1	6740	A603_86.4	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
19.2	5972	2.2	89.5:1	4500	A503_89.5	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
18.5	6187	1.1	92.8:1	3370	A413_92.8	S3 + M3SA4	P90 + BN90LA4	N140TC	88...91
17.3	6636	3.7	99.5:1	6740	A603_99.5	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
17.3	6638	2.0	99.5:1	4500	A503_99.5	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
15.7	7297	1.8	109.4:1	4500	A503_109.4	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
14.0	8205	3.0	123.0:1	6740	A603_123.0	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
13.3	8648	1.5	129.7:1	4500	A503_129.7	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
12.9	8888	2.8	133.3:1	6740	A603_133.3	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
12.2	9378	1.4	140.6:1	4500	A503_140.6	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
11.9	9606	2.6	144.0:1	6740	A603_144.0	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
11.2	10249	4.3	153.7:1	11200	A703_153.7	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
11.1	10310	1.3	154.6:1	4500	A503_154.6	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
11.0	10407	2.4	156.0:1	6740	A603_156.0	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
10.1	11075	4.0	169.8:1	11200	A704_169.8	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
10.0	11435	2.2	171.5:1	6740	A603_171.5	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
9.9	11561	1.1	173.4:1	4500	A503_173.4	S3 + M3SA4	P90 + BN90LA4	N140TC	92...95
9.4	11995	3.7	183.9:1	11200	A704_183.9	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
9.3	12388	2.0	185.8:1	6740	A603_185.8	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
8.2	13612	1.8	208.7:1	6740	A604_208.7	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
7.8	14369	3.1	220.3:1	11200	A704_220.3	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
7.6	14747	1.7	226.1:1	6740	A604_226.1	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
7.2	15562	2.8	238.6:1	11200	A704_238.6	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
6.5	17239	1.4	264.3:1	6740	A604_264.3	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
6.0	18674	1.3	286.3:1	6740	A604_286.3	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
5.9	19045	2.3	292.0:1	11200	A704_292.0	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
5.4	20637	2.1	316.4:1	11200	A704_316.4	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
5.3	21152	1.2	324.2:1	6740	A604_324.2	S3 + M3SA4	P90 + BN90LA4	N140TC	96...99
4.7	24094	1.8	369.4:1	11200	A704_369.4	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
4.5	25013	2.8	383.5:1	14600	A804_383.5	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107

2 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
4.3	26102	1.7	400.2:1	11200	A704_400.2	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
3.9	28835	2.5	442.1:1	14600	A804_442.1	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107
3.6	31033	1.4	475.8:1	11200	A704_475.8	S3 + M3SA4	P90 + BN90LA4	N140TC	100...103
3.6	31236	2.3	478.9:1	14600	A804_478.9	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107
3.5	31738	3.9	486.6:1	16900	A904_486.6	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
3.1	36219	3.4	555.3:1	16900	A904_555.3	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
3.1	36558	1.9	560.5:1	14600	A804_560.5	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107
2.9	39238	3.2	601.6:1	16900	A904_601.6	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
2.8	39604	1.8	607.2:1	14600	A804_607.2	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107
2.4	45885	1.5	703.5:1	14600	A804_703.5	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107
2.4	46172	2.7	707.9:1	16900	A904_707.9	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
2.0	56425	2.2	865.1:1	16900	A904_865.1	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
1.9	58616	1.2	898.7:1	14600	A804_898.7	S3 + M3SA4	P90 + BN90LA4	N140TC	104...107
1.5	72463	1.7	1111:1	16900	A904_1111	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
1.3	86356	1.4	1324:1	16900	A904_1324	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111
1.1	106445	1.2	1632:1	16900	A904_1632	S3 + M3SA4	P90 + BN90LA4	N140TC	108...111

3 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
321	553	3.4	5.4:1	610	A202_5.4	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
315	565	2.2	5.5:1	550	A102_5.5	S3 + M3LA4	P100 + BN100LA4	N180TC	76...79
245	726	3.7	7.0:1	950	A302_7.0	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
239	745	1.7	7.2:1	570	A102_7.2	S3 + M3LA4	P100 + BN100LA4	N180TC	76...79
236	753	2.5	7.3:1	640	A202_7.3	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
213	834	2.2	5.4:1	660	A202_5.4	S3 + M3LC6	P112 + BN112M6		80...83
211	844	3.1	5.4:1	990	A302_5.4	S3 + M3LC6	P112 + BN112M6		84...87
209	852	1.5	5.5:1	580	A102_5.5	S3 + M3LC6	P112 + BN112M6		76...79
185	962	2.8	9.3:1	1020	A302_9.3	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
183	969	1.9	9.4:1	670	A202_9.4	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
179	994	1.2	9.6:1	580	A102_9.6	S3 + M3LA4	P100 + BN100LA4	N180TC	76...79
170	1047	4.5	10.1:1	2130	A412_10.1	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
166	1068	1.9	10.3:1	680	A202_10.3	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
165	1080	2.8	10.5:1	1050	A302_10.5	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
163	1091	1.2	10.6:1	580	A102_10.6	S3 + M3LA4	P100 + BN100LA4	N180TC	76...79
146	1213	4.0	11.7:1	2220	A412_11.7	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
146	1217	2.2	11.8:1	1070	A302_11.8	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
144	1236	1.5	12.0:1	690	A202_12.0	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
127	1402	2.3	13.6:1	1100	A302_13.6	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87

3 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
125	1421	3.6	13.8:1	2320	A412_13.8	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
122	1454	1.5	14.1:1	700	A202_14.1	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
113	1579	3.4	10.1:1	2380	A412_10.1	S3 + M3LC6	P112 + BN112M6	N210TC	88...91
110	1611	1.4	10.3:1	700	A202_10.3	S3 + M3LC6	P112 + BN112M6		80...83
109	1630	2.1	10.5:1	1130	A302_10.5	S3 + M3LC6	P112 + BN112M6		84...87
97	1836	3.0	17.8:1	2500	A412_17.8	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
96	1858	1.9	18.0:1	1160	A302_18.0	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
95	1871	1.2	18.1:1	710	A202_18.1	S3 + M3LA4	P100 + BN100LA4	N180TC	80...83
84	2115	1.7	13.6:1	1180	A302_13.6	S3 + M3LC6	P112 + BN112M6		84...87
83	2145	2.8	13.8:1	2590	A412_13.8	S3 + M3LC6	P112 + BN112M6	N210TC	88...91
76	2343	2.6	22.7:1	2650	A412_22.7	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
76	2351	1.5	22.8:1	1190	A302_22.8	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
61	2927	2.2	28.3:1	2790	A412_28.3	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
59	3028	1.2	29.3:1	1210	A302_29.3	S3 + M3LA4	P100 + BN100LA4	N180TC	84...87
48	3710	1.9	35.9:1	2940	A412_35.9	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
47	3630	3.7	24.0:1	3840	A503_24.0	S3 + M3LC6	P112 + BN112M6	N210TC	92...95
38	4502	2.9	45.0:1	4020	A503_45.0	S3 + M3LA4	P100 + BN100LA4	N180TC	92...95
38	4657	1.6	45.1:1	3080	A412_45.1	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
32	5491	1.4	53.1:1	3170	A412_53.1	S3 + M3LA4	P100 + BN100LA4	N180TC	88...91
30	5683	2.3	56.8:1	4200	A503_56.8	S3 + M3LA4	P100 + BN100LA4	N180TC	92...95
24.5	7026	1.9	70.2:1	4340	A503_70.2	S3 + M3LA4	P100 + BN100LA4	N180TC	92...95
24.4	7043	3.5	70.4:1	6740	A603_70.4	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
19.2	8957	1.5	89.5:1	4450	A503_89.5	S3 + M3LA4	P100 + BN100LA4	N180TC	92...95
16.0	10784	2.3	107.8:1	6740	A603_107.8	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
15.7	10946	1.2	109.4:1	4500	A503_109.4	S3 + M3LA4	P100 + BN100LA4	N180TC	92...95
13.2	13071	3.4	130.7:1	11200	A703_130.7	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
12.9	13333	1.9	133.3:1	6740	A603_133.3	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
12.1	14191	3.1	141.9:1	11200	A703_141.9	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
11.9	14409	1.7	144.0:1	6740	A603_144.0	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
11.2	15373	2.9	153.7:1	11200	A703_153.7	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
11.0	15610	1.6	156.0:1	6740	A603_156.0	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
10.1	16612	2.7	169.8:1	11200	A704_169.8	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
10.0	17152	1.4	171.5:1	6740	A603_171.5	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
9.3	18002	2.5	184.0:1	11200	A704_183.9	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
9.3	18582	1.3	185.8:1	6740	A603_185.8	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
8.2	20418	1.2	208.7:1	6740	A604_208.7	S3 + M3LA4	P100 + BN100LA4	N180TC	96...99
7.8	21553	2.1	220.3:1	11200	A704_220.3	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
7.4	22756	3.1	232.6:1	14600	A804_232.6	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
7.2	23344	1.9	238.6:1	11200	A704_238.6	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
6.2	27130	2.6	277.3:1	14600	A804_277.3	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
5.9	28568	1.5	292.0:1	11200	A704_292.0	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
5.7	29390	2.4	300.4:1	14600	A804_300.4	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
5.4	30955	1.4	316.4:1	11200	A704_316.4	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103

3 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
4.9	34634	2.0	354.0:1	14600	A804_345.0	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
4.5	37520	1.9	383.5:1	14600	A804_383.5	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
4.5	37706	3.3	385.4:1	16900	A904_385.4	S3 + M3LA4	P100 + BN100LA4	N180TC	108...111
4.3	39154	1.1	400.2:1	11200	A704_400.2	S3 + M3LA4	P100 + BN100LA4	N180TC	100...103
3.9	43253	1.6	442.1:1	14600	A804_442.1	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
3.6	46853	1.5	478.9:1	14600	A804_478.9	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
3.5	47607	2.6	486.6:1	16900	A904_486.6	S3 + M3LA4	P100 + BN100LA4	N180TC	108...111
3.1	54328	2.3	555.3:1	16900	A904_555.3	S3 + M3LA4	P100 + BN100LA4	N180TC	108...111
3.1	54837	1.3	560.5:1	14600	A804_560.5	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
2.8	59406	1.2	607.2:1	14600	A804_607.2	S3 + M3LA4	P100 + BN100LA4	N180TC	104...107
2.4	69258	1.8	707.9:1	16900	A904_707.9	S3 + M3LA4	P100 + BN100LA4	N180TC	108...111
2.0	84637	1.5	865.1:1	16900	A904_865.1	S3 + M3LA4	P100 + BN100LA4	N180TC	108...111
1.5	108695	1.1	1111:1	16900	A904_1111	S3 + M3LA4	P100 + BN100LA4	N180TC	108...111

5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
323	916	2.0	5.4:1	520	A202_5.4	S3 + M3LC4	P100 + BN100LC4	N180TC	80...83
320	927	2.9	5.4:1	810	A302_5.4	S3 + M3LC4	P100 + BN100LC4	N180TC	84...87
317	936	1.3	5.5:1	430	A102_5.5	S3 + M3LC4	P100 + BN100LC4	N180TC	76...79
246	1203	2.2	7.0:1	850	A302_7.0	S3 + M3LC4	P100 + BN100LC4	N180TC	84...87
243	1220	4.0	7.1:1	1840	A412_7.1	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
237	1248	1.5	7.3:1	520	A202_7.3	S3 + M3LC4	P100 + BN100LC4	N180TC	80...83
188	1575	3.1	9.2:1	1960	A412_9.2	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
186	1594	1.7	9.3:1	880	A302_9.3	S3 + M3LC4	P100 + BN100LC4	N180TC	84...87
171	1734	2.7	10.1:1	2010	A412_10.1	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
165	1790	1.7	10.5:1	890	A302_10.5	S3 + M3LC4	P100 + BN100LC4	N180TC	84...87
147	2010	2.4	11.7:1	2080	A412_11.7	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
147	2017	1.3	11.8:1	890	A302_11.8	S3 + M3LC4	P100 + BN100LC4	N180TC	84...87
128	2323	1.4	13.6:1	900	A302_13.6	S3 + M3LC4	P100 + BN100LC4	N180TC	84...87
126	2355	2.2	13.8:1	2160	A412_13.8	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
114	2609	2.1	10.1:1	2200	A412_10.1	S4 + M4LA6	P132 + BN132M6	N210TC	88...91
104	2837	3.7	16.6:1	3210	A502_16.6	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
97	3042	1.8	17.8:1	2270	A412_17.8	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
84	3543	1.7	13.8:1	2340	A412_13.8	S4 + M4LA6	P132 + BN132M6	N210TC	88...91
83	3582	3.0	20.9:1	3420	A502_20.9	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
76	3883	1.6	22.7:1	2380	A412_22.7	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91

5 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
72	3986	3.3	24.0:1	3150	A503_24.0	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
65	4382	3.0	26.4:1	3190	A503_26.4	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
61	4849	1.3	28.3:1	2450	A412_28.3	S3 + M3LC4	P100 + BN100LC4	N180TC	88...91
50	5686	4.4	34.3:1	6740	A603_34.3	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
49	5901	2.2	35.6:1	3300	A503_35.6	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
38	7460	1.8	45.0:1	3350	A503_45.0	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
38	7490	3.3	45.2:1	6740	A603_45.2	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
31	9217	2.7	55.6:1	6740	A603_55.6	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
30	9417	1.4	56.8:1	3350	A503_56.8	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
27.1	10590	1.3	63.9:1	3330	A503_63.9	S3 + M3LC4	P100 + BN100LC4	N180TC	92...95
25.8	11096	4.0	66.9:1	11200	A703_66.9	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
24.6	11670	2.1	70.4:1	6740	A603_70.4	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
20.1	14245	3.1	85.9:1	11200	A703_85.9	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
20.0	14315	1.7	86.4:1	6740	A603_86.4	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
16.6	17278	2.6	104.2:1	11200	A703_104.2	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
16.0	17869	1.4	107.8:1	6740	A603_107.8	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
14.3	19993	2.2	120.6:1	11200	A703_120.6	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
14.1	20393	1.2	123.0:1	6740	A603_123.0	S3 + M3LC4	P100 + BN100LC4	N180TC	96...99
12.2	23515	1.9	141.9:1	11200	A703_141.9	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
12.0	23992	3.0	144.7:1	14600	A803_144.7	S3 + M3LC4	P100 + BN100LC4	N180TC	104...107
11.3	25474	1.7	153.7:1	11200	A703_153.7	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
11.0	25991	2.7	156.8:1	14600	A803_156.8	S3 + M3LC4	P100 + BN100LC4	N180TC	104...107
10.2	27527	1.6	169.8:1	11200	A704_169.8	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
10.1	27771	2.5	171.3:1	14600	A804_171.3	S3 + M3LC4	P100 + BN100LC4	N180TC	104...107
9.6	29181	4.2	180.0:1	16900	A904_180.0	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111
9.4	29813	1.5	183.9:1	11200	A704_183.9	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
7.9	35714	1.2	220.3:1	11200	A704_220.3	S3 + M3LC4	P100 + BN100LC4	N180TC	100...103
7.6	36703	3.4	226.4:1	16900	A904_226.4	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111
7.4	37708	1.9	232.6:1	14600	A804_232.6	S3 + M3LC4	P100 + BN100LC4	N180TC	104...107
6.2	44955	1.6	277.3:1	14600	A804_277.3	S3 + M3LC4	P100 + BN100LC4	N180TC	104...107
5.7	49429	2.5	304.9:1	16900	A904_304.9	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111
4.9	57389	1.2	354.0:1	14600	A804_354.0	S3 + M3LC4	P100 + BN100LC4	N180TC	104...107
4.5	62480	2.0	385.4:1	16900	A904_385.4	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111
3.6	78886	1.6	486.6:1	17100	A904_486.6	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111
3.1	90023	1.4	555.3:1	17100	A904_555.3	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111
2.9	97529	1.3	601.6:1	16900	A904_601.6	S3 + M3LC4	P100 + BN100LC4	N180TC	108...111

7.5 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
330	1347	3.6	5.2:1	1630	A412_5.2	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
243	1829	2.7	7.1:1	1750	A412_7.1	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
217	2044	2.4	5.2:1	1800	A412_5.2	S4 + M4LB6	P132 + BN132MB6		88...91
188	2362	2.1	9.2:1	1850	A412_9.2	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
171	2602	1.8	10.1:1	1900	A412_10.1	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
160	2776	1.8	7.1:1	1920	A412_7.1	S4 + M4LB6	P132 + BN132MB6		88...91
147	3015	1.6	11.7:1	1950	A412_11.7	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
132	3366	2.9	13.1:1	2900	A502_13.1	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
126	3533	1.5	13.8:1	2010	A412_13.8	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
113	3948	1.4	10.1:1	2050	A412_10.1	S4 + M4LB6	P132 + BN132MB6		88...91
104	4256	2.5	16.6:1	3080	A502_16.6	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
97	4562	1.2	17.8:1	2090	A412_17.8	S4 + M4SA4	P132 + BN132S4	N210TC	88...91
84	5289	3.3	20.6:1	6740	A602_20.6	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
83	5373	2.0	20.9:1	3260	A502_20.9	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
72	5979	2.2	24.0:1	2830	A503_24.0	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
67	6393	3.9	25.7:1	6740	A603_25.7	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
62	6925	3.6	27.9:1	6740	A603_27.9	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
55	8027	2.2	20.6:1	6740	A602_20.6	S4 + M4LB6	P132 + BN132MB6		96...99
53	8051	1.6	32.4:1	2850	A503_32.4	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
50	8528	2.9	34.3:1	6740	A603_34.3	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
49	8851	1.5	35.6:1	2850	A503_35.6	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
41	10371	2.4	41.7:1	6740	A603_41.7	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
38	11190	1.2	45.0:1	2810	A503_45.0	S4 + M4SA4	P132 + BN132S4	N210TC	92...95
35	12183	3.6	49.0:1	11200	A703_49.0	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
34	12762	1.9	51.3:1	6740	A603_51.3	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
31	13825	1.8	55.6:1	6740	A603_55.6	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
30	14339	3.1	57.7:1	11200	A703_57.7	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
25.8	16644	2.7	66.9:1	11200	A703_66.9	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
24.6	17505	1.4	70.4:1	6740	A603_70.4	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
21.8	19724	2.2	79.3:1	11200	A703_79.3	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
21.7	19821	1.3	79.7:1	6740	A603_79.7	S4 + M4SA4	P132 + BN132S4	N210TC	96...99
21.0	20468	3.5	82.3:1	14600	A803_82.3	S4 + M4SA4	P132 + BN132S4	N210TC	104...107
18.0	23876	3.0	96.0:1	14600	A803_96.0	S4 + M4SA4	P132 + BN132S4	N210TC	104...107
18.0	23924	1.8	96.2:1	11200	A703_96.2	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
14.9	28831	2.5	116.0:1	14600	A803_116.0	S4 + M4SA4	P132 + BN132S4	N210TC	104...107
14.3	29990	1.5	120.6:1	11200	A703_120.6	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
12.4	34659	3.3	139.4:1	16900	A903_139.4	S4 + M4SA4	P132 + BN132S4	N210TC	108...111
12.2	35272	1.3	141.9:1	11200	A703_141.9	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
12.0	35988	2.0	144.7:1	14600	A803_144.7	S4 + M4SA4	P132 + BN132S4	N210TC	104...107
10.2	41291	1.1	169.8:1	11200	A704_169.8	S4 + M4SA4	P132 + BN132S4	N210TC	100...103
10.1	41656	1.7	171.3:1	14600	A804_171.3	S4 + M4SA4	P132 + BN132S4	N210TC	104...107
7.6	55055	2.3	226.4:1	16900	A904_226.4	S4 + M4SA4	P132 + BN132S4	N210TC	108...111
7.4	56562	1.3	232.6:1	14600	A804_232.6	S4 + M4SA4	P132 + BN132S4	N210TC	104...107

7.5 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
5.7	74144	1.7	304.9:1	16900	A904_304.9	S4 + M4SA4	P132 + BN132S4	N210TC	108...111
4.5	93719	1.3	385.4:1	16900	A904_385.4	S4 + M4SA4	P132 + BN132S4	N210TC	108...111
3.7	112517	1.1	304.9:1	16900	A904_304.9	S4 + M4LB6	P132 + BN132MB6		108...111

10 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
332	1786	2.7	5.2:1	1560	A412_5.2	S4 + M4LA4	P132 + BN132MA4	N210TC	88...91
244	2425	2.0	7.1:1	1660	A412_7.1	S4 + M4LA4	P132 + BN132MA4	N210TC	88...91
189	3132	1.6	9.2:1	1730	A412_9.2	S4 + M4LA4	P132 + BN132MA4	N210TC	88...91
172	3449	1.4	10.1:1	1760	A412_10.1	S4 + M4LA4	P132 + BN132MA4	N210TC	88...91
148	3998	1.2	11.7:1	1790	A412_11.7	S4 + M4LA4	P132 + BN132MA4	N210TC	88...91
133	4463	2.2	13.1:1	2790	A502_13.1	S4 + M4LA4	P132 + BN132MA4	N210TC	92...95
105	5642	1.9	16.6:1	2940	A502_16.6	S4 + M4LA4	P132 + BN132MA4	N210TC	92...95
104	5698	3.1	16.7:1	6740	A602_16.7	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
84	7012	2.5	20.6:1	6740	A602_20.6	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
83	7122	1.5	20.9:1	3080	A502_20.9	S4 + M4LA4	P132 + BN132MA4	N210TC	92...95
72	7927	1.7	24.0:1	2430	A503_24.0	S4 + M4LA4	P132 + BN132MA4	N210TC	92...95
66	8714	1.5	26.4:1	2430	A503_26.4	S4 + M4LA4	P132 + BN132MA4	N210TC	92...95
62	9181	2.7	27.9:1	6740	A603_27.9	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
51	11306	2.2	34.3:1	6740	A603_34.3	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
49	11734	1.1	35.6:1	2270	A503_35.6	S4 + M4LA4	P132 + BN132MA4	N210TC	92...95
39	14895	1.7	45.2:1	6740	A603_45.2	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
38	14909	2.8	45.2:1	11200	A703_45.2	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
32	18189	3.9	55.2:1	14100	A803_55.2	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107
31	18328	1.4	55.6:1	6740	A603_55.6	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
30	19009	2.3	57.7:1	11200	A703_57.7	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
26.8	21421	1.2	65.0:1	6740	A603_65.0	S4 + M4LA4	P132 + BN132MA4	N210TC	96...99
26.0	22019	3.2	66.8:1	14600	A803_66.8	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107
26.0	22065	2.0	66.9:1	11200	A703_66.9	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
21.9	26148	1.7	79.3:1	11200	A703_79.3	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
21.1	27134	2.6	82.3:1	14600	A803_82.3	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107
20.2	28326	1.6	85.9:1	11200	A703_85.9	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
19.5	29395	2.4	89.2:1	14600	A803_89.2	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107
18.1	31715	1.4	96.2:1	11200	A703_96.2	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
16.7	34290	2.1	104.0:1	14600	A803_104.0	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107
16.7	34358	1.3	104.2:1	11200	A703_104.2	S4 + M4LA4	P132 + BN132MA4	N210TC	100...103
16.3	35209	3.5	106.8:1	16900	A903_106.8	S4 + M4LA4	P132 + BN132MA4	N210TC	108...111
13.9	41405	1.7	125.6:1	14600	A803_125.6	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107

10 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
13.7	41744	2.8	126.6:1	16900	A903_126.6	S4 + M4LA4	P132 + BN132MA4	N210TC	108...111
10.5	53546	2.3	166.1:1	16900	A904_166.1	S4 + M4LA4	P132 + BN132MA4	N210TC	108...111
10.2	55222	1.3	171.3:1	14600	A804_171.3	S4 + M4LA4	P132 + BN132MA4	N210TC	104...107
7.7	72984	1.7	226.4:1	16900	A904_226.4	S4 + M4LA4	P132 + BN132MA4	N210TC	108...111
5.7	98290	1.3	304.9:1	16900	A904_304.9	S4 + M4LA4	P132 + BN132MA4	N210TC	108...111

15 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
225	3951	2.1	7.7:1	2320	A502_7.7	S4 + M4LC4	P160 + BN160MR4	N250TC	92...95
179	4971	1.8	9.7:1	2450	A502_9.7	S4 + M4LC4	P160 + BN160MR4	N250TC	92...95
169	5268	3.4	10.3:1	6740	A602_10.3	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
150	5927	1.4	7.7:1	2540	A502_7.7		P160 + BN160L6		92...95
137	6488	2.7	12.7:1	6740	A602_12.7	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
133	6694	1.5	13.1:1	2590	A502_13.1	S4 + M4LC4	P160 + BN160MR4	N250TC	92...95
119	7457	1.2	9.7:1	2650	A502_9.7		P160 + BN160L6		92...95
105	8463	1.3	16.6:1	2700	A502_16.6	S4 + M4LC4	P160 + BN160MR4	N250TC	92...95
104	8548	2.1	16.7:1	6740	A602_16.7	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
88	9723	3.4	19.7:1	10000	A703_19.7	S4 + M4LC4	P160 + BN160MR4	N250TC	100...103
84	10518	1.7	20.6:1	6740	A602_20.6	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
74	11629	3.3	23.5:1	10500	A703_23.5		P160 + BN160MR4	N250TC	100...103
72	11890	1.1	24.0:1	1750	A503_24.0	S4 + M4LC4	P160 + BN160MR4	N250TC	92...95
68	12712	1.9	25.7:1	6740	A603_25.7	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
63	13737	2.7	27.8:1	10900	A703_27.8		P160 + BN160MR4	N250TC	100...103
62	13771	1.8	27.9:1	6740	A603_27.9	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
51	16959	1.5	34.3:1	6740	A603_34.3	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
45	18977	2.3	38.4:1	11200	A703_38.4	S4 + M4LC4	P160 + BN160MR4	N250TC	100...103
45	19035	3.5	38.5:1	12500	A803_38.5		P160 + BN160MR4	N250TC	104...107
39	22342	1.1	45.2:1	6740	A603_45.2	S4 + M4LC4	P160 + BN160MR4	N250TC	96...99
38	22363	1.9	45.2:1	11200	A703_45.2	S4 + M4LC4	P160 + BN160MR4	N250TC	100...103
36	23823	3.0	48.2:1	13100	A803_48.2	S4 + M4LC4	P160 + BN160MR4	N250TC	104...107
32	27283	2.6	55.2:1	13500	A803_55.2	S4 + M4LC4	P160 + BN160MR4	N250TC	104...107
30	28513	1.6	57.7:1	11200	A703_57.7	S4 + M4LC4	P160 + BN160MR4	N250TC	100...103
24.0	35781	2.0	72.4:1	14200	A803_72.4	S4 + M4LC4	P160 + BN160MR4	N250TC	104...107
24.0	35855	1.2	72.5:1	11200	A703_72.5	S4 + M4LC4	P160 + BN160MR4	N250TC	100...103
20.0	43049	2.9	87.1:1	16900	A903_87.1	S4 + M4LC4	P160 + BN160MR4	N250TC	108...111
19.5	44092	1.6	89.2:1	14600	A803_89.2	S4 + M4LC4	P160 + BN160MR4	N250TC	104...107
15.0	57331	1.2	116.0:1	14600	A803_116.0	S4 + M4LC4	P160 + BN160MR4	N250TC	104...107
14.9	57800	2.1	116.9:1	16900	A903_116.9	S4 + M4LC4	P160 + BN160MR4	N250TC	108...111

15 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
8.3	101063	1.2	209.0:1	16900	A904_209.0	S4 + M4LC4	P160 + BN160MR4	N250TC	108...111
7.7	111993	1.1	151.0:1	16900	A903_151.0	S5 + M5SB6	P160 + BN160L6		108...111

20 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
223	5325	3.3	7.9:1	6380	A602_7.9	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
180	6591	1.3	9.7:1	2270	A502_9.7		P160 + BN160L4	N250TC	92...95
170	6984	2.5	10.3:1	6740	A602_10.3	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
138	8601	2.1	12.7:1	6740	A602_12.7	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
134	8578	4.0	13.1:1	8830	A703_13.1	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
134	8874	1.1	13.1:1	2380	A502_13.1		P160 + BN160L4	N250TC	92...95
114	10097	3.2	15.4:1	9190	A703_15.4	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
105	10939	3.2	16.7:1	9370	A703_16.7	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
105	11332	1.6	16.7:1	6740	A602_16.7	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
85	13944	1.3	20.6:1	6740	A602_20.6	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
84	13731	4.2	20.9:1	10500	A803_20.9	S5 + M5SB4	P160 + BN160L4	N250TC	104...107
82	13964	2.5	21.3:1	9910	A703_21.3	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
68	16852	1.5	25.7:1	6740	A603_25.7	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
63	18212	2.0	27.8:1	10500	A703_27.8		P160 + BN160L4	N250TC	100...103
62	18500	3.2	28.2:1	11200	A803_28.2		P160 + BN160L4	N250TC	104...107
51	22482	1.1	34.3:1	6740	A603_34.3	S5 + M5SB4	P160 + BN160L4	N250TC	96...99
46	25159	1.7	38.4:1	11200	A703_38.4	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
45	25235	2.7	38.5:1	12000	A803_38.5		P160 + BN160L4	N250TC	104...107
36	31582	2.2	48.2:1	12500	A803_48.2	S5 + M5SB4	P160 + BN160L4	N250TC	104...107
36	31659	3.9	48.3:1	16900	A903_48.3	S5 + M5SB4	P160 + BN160L4	N250TC	108...111
36	32118	1.4	49.0:1	11200	A703_49.0	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
32	36169	2.0	55.2:1	12800	A803_55.2	S5 + M5SB4	P160 + BN160L4	N250TC	104...107
30	37800	1.2	57.7:1	11200	A703_57.7	S5 + M5SB4	P160 + BN160L4	N250TC	100...103
25.5	45063	2.7	68.8:1	16900	A903_68.8	S5 + M5SB4	P160 + BN160L4	N250TC	108...111
24.2	47435	1.5	72.4:1	13300	A803_72.4	S5 + M5SB4	P160 + BN160L4	N250TC	104...107
20.1	57070	2.2	87.1:1	16900	A903_87.1	S5 + M5SB4	P160 + BN160L4	N250TC	108...111
19.6	58454	1.2	89.2:1	13600	A803_89.2	S5 + M5SB4	P160 + BN160L4	N250TC	104...107
15.0	76626	1.6	116.9:1	16900	A903_116.9	S5 + M5SB4	P160 + BN160L4	N250TC	108...111
12.6	91367	1.2	139.4:1	16900	A903_139.4	S5 + M5SB4	P160 + BN160L4	N250TC	108...111
10.5	106479	1.2	166.1:1	16900	A904_166.1		P160 + BN160L4	N250TC	108...111

25 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
226	6548	1.3	7.7:1	2080	A502_7.7		P180 + BN180M4	N280TC	92...95
223	6656	2.7	7.9:1	6290	A602_7.9	S5 + M5LA4	P180 + BN180M4	N280TC	96...99
185	7734	3.4	9.4:1	8000	A703_9.4	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
180	8238	1.1	9.7:1	2140	A502_9.7		P180 + BN180M4	N280TC	92...95
171	8378	3.4	10.2:1	8180	A703_10.2	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
170	8731	2.0	10.3:1	6720	A602_10.3	S5 + M5LA4	P180 + BN180M4	N280TC	96...99
145	9898	3.2	12.1:1	8520	A703_12.1	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
138	10752	1.6	12.7:1	6740	A602_12.7	S5 + M5LA4	P180 + BN180M4	N280TC	96...99
134	10722	3.2	13.1:1	8680	A703_13.1	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
114	12621	2.6	15.4:1	9010	A703_15.4	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
105	13673	2.6	16.7:1	9190	A703_16.7	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
105	14165	1.2	16.7:1	6740	A602_16.7	S5 + M5LA4	P180 + BN180M4	N280TC	96...99
90	15844	3.4	19.3:1	10100	A803_19.3	S5 + M5LA4	P180 + BN180M4	N280TC	104...107
89	16112	2.0	19.7:1	9510	A703_19.7	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
77	18529	3.0	22.6:1	10400	A803_22.6		P180 + BN180M4	N280TC	104...107
74	19271	2.0	23.5:1	9890	A703_23.5		P180 + BN180M4	N280TC	100...103
63	22765	1.6	27.8:1	10200	A703_27.8		P180 + BN180M4	N280TC	100...103
63	22820	1.1	27.9:1	6740	A603_27.9	S5 + M5LA4	P180 + BN180M4	N280TC	96...99
62	23125	2.5	28.2:1	10900	A803_28.2		P180 + BN180M4	N280TC	104...107
49	29029	1.4	35.4:1	10600	A703_35.4	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
49	29118	2.1	35.5:1	11400	A803_35.5		P180 + BN180M4	N280TC	104...107
39	36441	1.8	44.5:1	11800	A803_44.5	S5 + M5LA4	P180 + BN180M4	N280TC	104...107
39	36529	3.4	44.6:1	16100	A903_44.6	S5 + M5LA4	P180 + BN180M4	N280TC	108...111
39	37059	1.1	45.2:1	11000	A703_45.2	S5 + M5LA4	P180 + BN180M4	N280TC	100...103
32	45088	2.7	55.0:1	16900	A903_55.0	S5 + M5LA4	P180 + BN180M4	N280TC	108...111
32	45212	1.6	55.2:1	12200	A803_55.2	S5 + M5LA4	P180 + BN180M4	N280TC	104...107
25.5	56329	2.2	68.8:1	16900	A903_68.8	S5 + M5LA4	P180 + BN180M4	N280TC	108...111
24.2	59294	1.2	72.4:1	12500	A803_72.4	S5 + M5LA4	P180 + BN180M4	N280TC	104...107
17.7	80788	1.5	98.6:1	16900	A903_98.6	S5 + M5LA4	P180 + BN180M4	N280TC	108...111
13.8	103764	1.1	126.6:1	16900	A903_126.6	S5 + M5LA4	P180 + BN180M4	N280TC	108...111

30 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
226	7858	1.1	7.7:1	1970	A502_7.7		P180 + BN180L4	N280TC	92...95
223	7987	2.2	7.9:1	6210	A602_7.9		P180 + BN180L4	N280TC	96...99
185	9281	2.9	9.4:1	7890	A703_9.4		P180 + BN180L4	N280TC	100...103
171	10054	2.9	10.2:1	8050	A703_10.2		P180 + BN180L4	N280TC	100...103
170	10477	1.7	10.3:1	6590	A602_10.3		P180 + BN180L4	N280TC	96...99

30 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
138	12902	1.4	12.7:1	6750	A602_12.7		P180 + BN180L4	N280TC	96...99
134	12867	2.6	13.1:1	8520	A703_13.0		P180 + BN180L4	N280TC	100...103
114	15146	2.2	15.4:1	8840	A703_15.4		P180 + BN180L4	N280TC	100...103
113	15192	3.5	15.5:1	9400	A803_15.5		P180 + BN180L4	N280TC	104...107
105	16408	2.2	16.7:1	8990	A703_16.7		P180 + BN180L4	N280TC	100...103
105	16458	3.5	16.7:1	9550	A803_16.7		P180 + BN180L4	N280TC	104...107
89	19335	1.7	19.6:1	9290	A703_19.7		P180 + BN180L4	N280TC	100...103
84	20597	2.8	20.9:1	10000	A803_20.9		P180 + BN180L4	N280TC	104...107
77	22235	2.5	22.6:1	10200	A803_22.6		P180 + BN180L4	N280TC	104...107
74	23125	1.6	23.5:1	9620	A703_23.5		P180 + BN180L4	N280TC	100...103
63	27318	1.4	27.8:1	9870	A703_27.8		P180 + BN180L4	N280TC	100...103
62	27750	2.1	28.2:1	10600	A803_28.2		P180 + BN180L4	N280TC	104...107
60	28588	4.0	29.1:1	14400	A903_29.0		P180 + BN180L4	N280TC	108...111
49	34835	1.1	35.4:1	10200	A703_35.4		P180 + BN180L4	N280TC	100...103
49	34941	1.8	35.5:1	11000	A803_35.5		P180 + BN180L4	N280TC	104...107
49	35221	3.5	35.8:1	15100	A903_35.8		P180 + BN180L4	N280TC	108...111
39	43729	1.5	44.5:1	11300	A803_44.5		P180 + BN180L4	N280TC	104...107
39	43835	2.8	44.6:1	15700	A903_44.6		P180 + BN180L4	N280TC	108...111
32	54106	2.3	55.0:1	16300	A903_55.0		P180 + BN180L4	N280TC	108...111
32	54254	1.3	55.2:1	11600	A803_55.2		P180 + BN180L4	N280TC	104...107
26.2	65679	1.1	66.8:1	11700	A803_66.8		P180 + BN180L4	N280TC	104...107
25.5	67595	1.8	68.8:1	16900	A903_68.8		P180 + BN180L4	N280TC	108...111
20.1	85606	1.4	87.1:1	16900	A903_87.0		P180 + BN180L4	N280TC	108...111
15.0	114939	1.1	116.9:1	16900	A903_116.9		P180 + BN180L4	N280TC	108...111

40 hp

n_2 [rpm]	T_2 [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
185	12374	2.0	9.4:1	7640	A703_9.4		P200 + BN200L4		100...103
178	12890	2.7	9.8:1	8210	A803_9.8		P200 + BN200L4	N320TC	104...107
171	13406	2.1	10.2:1	7800	A703_10.2		P200 + BN200L4		100...103
145	15836	1.8	12.1:1	8050	A703_12.1		P200 + BN200L4		100...103
143	16087	2.4	12.3:1	8610	A803_12.3		P200 + BN200L4	N320TC	104...107
134	17156	1.7	13.1:1	8180	A703_13.1		P200 + BN200L4		100...103
132	17427	2.2	13.3:1	8770	A803_13.3		P200 + BN200L4	N320TC	104...107
114	20194	1.5	15.4:1	8430	A703_15.4		P200 + BN200L4		100...103
113	20256	1.8	15.5:1	9020	A803_15.5		P200 + BN200L4	N320TC	104...107
105	21877	1.5	16.7:1	8570	A703_16.7		P200 + BN200L4		100...103
105	21944	1.8	16.7:1	9150	A803_16.7		P200 + BN200L4	N320TC	104...107

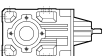
40 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
83	27529	4.0	21.0:1	13000	A903_21.0		P200 + BN200L4	N320TC	108...111
73	31604	3.7	24.1:1	13300	A903_24.1		P200 + BN200L4	N320TC	108...111
71	32118	1.9	24.5:1	9730	A803_24.5		P200 + BN200L4	N320TC	104...107
62	36999	1.6	28.2:1	9910	A803_28.2		P200 + BN200L4	N320TC	104...107
60	38118	3.0	29.1:1	13800	A903_29.1		P200 + BN200L4	N320TC	108...111
49	46588	1.3	35.5:1	10100	A803_35.5		P200 + BN200L4	N320TC	104...107
49	46961	2.6	35.8:1	14300	A903_35.8		P200 + BN200L4	N320TC	108...111
36	63164	1.1	48.2:1	10300	A803_48.2		P200 + BN200L4	N320TC	104...107
36	63317	2.0	48.3:1	15000	A903_48.3		P200 + BN200L4	N320TC	108...111
32	72141	1.7	55.0:1	15300	A903_55.0		P200 + BN200L4	N320TC	108...111
29.4	78153	1.6	59.6:1	15400	A903_59.6		P200 + BN200L4	N320TC	108...111
23.5	97637	1.3	74.5:1	15700	A903_74.5		P200 + BN200L4	N320TC	108...111
20.1	114141	1.1	87.1:1	15800	A903_87.1		P200 + BN200L4	N320TC	108...111

50 hp

n₂ [rpm]	T₂ [lb·in]	S Safety factor	i (ratio)	R_{n2} [lb]					
178	16112	3.3	9.8:1	7980	A803_9.8		P225 + BN225S4	N320TC	104...107
164	17455	3.3	10.6:1	8120	A803_10.7		P225 + BN225S4	N320TC	104...107
142	20155	2.7	12.3:1	8340	A803_12.3		P225 + BN225S4	N320TC	104...107
132	21784	2.7	13.2:1	8480	A803_13.3		P225 + BN225S4	N320TC	104...107
113	25320	2.1	15.4:1	8680	A803_15.5		P225 + BN225S4	N320TC	104...107
112	25522	3.8	15.5:1	11800	A903_15.6		P225 + BN225S4	N320TC	108...111
90	31688	1.7	19.3:1	8950	A803_19.3		P225 + BN225S4	N320TC	104...107
90	31765	3.2	19.3:1	12400	A903_19.4		P225 + BN225S4	N320TC	108...111
84	34329	1.7	20.9:1	9060	A803_20.9		P225 + BN225S4	N320TC	104...107
83	34412	3.2	21.0:1	12600	A903_21.0		P225 + BN225S4	N320TC	108...111
73	39505	2.9	24.1:1	12900	A903_24.1		P225 + BN225S4	N320TC	108...111
71	40147	1.5	24.5:1	9220	A803_24.5		P225 + BN225S4	N320TC	104...107
57	50103	1.1	30.5:1	9350	A803_30.6		P225 + BN225S4	N320TC	104...107
56	51617	2.4	31.5:1	13500	A903_31.5		P225 + BN225S4	N320TC	108...111
45	63088	1.1	38.5:1	9380	A803_38.5		P225 + BN225S4	N320TC	104...107
45	63593	1.9	38.8:1	13900	A903_38.8		P225 + BN225S4	N320TC	108...111
36	79147	1.6	48.3:1	14200	A903_48.3		P225 + BN225S4	N320TC	108...111
32	90176	1.4	55.0:1	14300	A903_55.0		P225 + BN225S4	N320TC	108...111
25.5	112658	1.1	68.7:1	14400	A903_68.8		P225 + BN225S4	N320TC	108...111

2.13 SPEED REDUCER RATING CHARTS

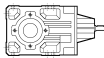
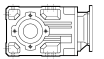
A 10											1,330 lb·in
 	i	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
	(ratio)	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 102_	5.5	636	650	6.9	—	410	318	650	3.5	220	550
A 102_	7.2	486	810	6.6	—	430	243	820	3.3	140	580
A 102_	9.6	365	900	5.5	—	470	182	1130	3.4	—	600
A 102_	10.6	330	1110	6.1	120	450	165	1330	3.7	180	580
A 102_	12.3	285	970	4.6	—	510	142	1220	2.9	—	650
A 102_	13.9	252	1190	5.0	140	500	126	1330	2.8	240	670
A 102_	18.6	188	1300	4.1	150	550	94	1330	2.1	270	760
A 102_	23.8	147	1330	3.3	170	620	74	1330	1.6	270	850
A 102_	28.6	122	1330	2.7	190	670	61	1330	1.4	280	920
A 102_	35.1	100	1330	2.2	200	740	50	1330	1.1	290	1000
A 102_	45.4	77	1330	1.7	200	830	39	1330	0.86	290	1120
A 102_	51.3	68	1330	1.5	200	880	34	1330	0.76	290	1180
A 102_	65.9	53	1330	1.2	210	980	26.6	1330	0.59	290	1240
A 102_	76.4	46	1330	1.0	210	1040	22.9	1330	0.51	290	1240
A 102_	91.6	38	1150	0.73	230	1160	19.1	1150	0.37	290	1240

A 10											
 	i	n ₁ = 1100 rpm					n ₁ = 600 rpm				
	(ratio)	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 102_	5.5	200	650	2.2	290	660	109	650	1.2	290	840
A 102_	7.2	153	820	2.1	260	700	83	820	1.1	290	890
A 102_	9.6	115	1130	2.2	110	730	63	1130	1.2	290	940
A 102_	10.6	104	1330	2.3	290	720	57	1330	1.3	290	940
A 102_	12.3	89	1330	2.0	40	770	49	1330	1.1	230	1000
A 102_	13.9	79	1330	1.8	290	820	43	1330	1.0	290	1050
A 102_	18.6	59	1330	1.3	290	930	32	1330	0.72	290	1180
A 102_	23.8	46	1330	1.0	290	1030	25.2	1330	0.56	290	1120
A 102_	28.6	38	1330	0.85	290	1110	21.0	1330	0.47	290	1120
A 102_	35.1	31	1330	0.70	290	1210	17.1	1330	0.38	290	1120
A 102_	45.4	24.2	1330	0.54	290	1240	13.2	1330	0.29	290	1120
A 102_	51.3	21.4	1330	0.48	290	1240	11.7	1330	0.26	290	1120
A 102_	65.9	16.7	1330	0.37	290	1240	9.1	1330	0.20	290	1120
A 102_	76.4	14.4	1330	0.32	290	1240	7.9	1330	0.17	290	1120
A 102_	91.6	12.0	1150	0.23	290	1240	6.6	1150	0.13	290	1120

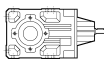
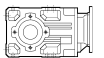
(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 20

2,210 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 202_ 5.4		648	800	8.7	—	440	324	1010	5.5	—	550
A 202_ 7.3		479	920	7.4	—	480	240	1160	4.6	—	600
A 202_ 9.4		372	1020	6.3	—	520	186	1280	4.0	—	650
A 202_ 10.3		340	1620	9.2	—	440	170	1990	5.6	—	570
A 202_ 12.0		292	1130	5.5	—	560	146	1420	3.5	—	700
A 202_ 14.1		248	1760	7.3	—	500	124	2170	4.5	—	630
A 202_ 18.1		193	1910	6.2	—	540	97	2210	3.6	20	710
A 202_ 23.1		152	2050	5.2	—	590	76	2210	2.8	50	800
A 202_ 29.2		120	2200	4.4	—	640	60	2210	2.2	90	900
A 202_ 35.4		99	2210	3.6	—	710	49	2210	1.8	120	980
A 202_ 43.2		81	2210	3.0	—	780	41	2210	1.5	140	1080
A 202_ 53.7		65	2210	2.4	—	860	33	2210	1.2	150	1180
A 202_ 63.1		55	2170	2.0	—	940	27.7	2170	1.0	170	1280
A 202_ 79.9		44	1860	1.4	—	1100	21.9	1860	0.68	250	1390
A 202_ 92.3		38	1770	1.1	140	1180	19.0	1770	0.56	280	1390
A 203_ 120.5		29.0	1490	0.74	250	1370	14.5	1860	0.46	290	1390
A 203_ 146.1		24.0	1620	0.66	260	1390	12.0	2040	0.42	290	1390
A 203_ 178.3		19.6	1730	0.58	270	1390	9.8	2170	0.36	290	1390
A 203_ 221.3		15.8	1800	0.49	280	1390	7.9	2210	0.30	290	1390
A 203_ 260.5		13.4	1890	0.43	290	1390	6.7	2210	0.25	290	1390
A 203_ 329.4		10.6	1960	0.36	290	1390	5.3	2210	0.20	290	1390
A 203_ 380.9		9.2	2000	0.31	290	1390	4.6	2210	0.17	290	1390

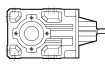
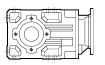
A 20

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 202_ 5.4		204	1170	4.0	—	640	111	1420	2.6	—	780
A 202_ 7.3		151	1350	3.4	—	700	82	1640	2.2	—	850
A 202_ 9.4		117	1490	2.9	—	760	64	1810	1.9	—	920
A 202_ 10.3		107	1650	2.9	—	670	58	2210	2.1	140	890
A 202_ 12.0		92	2210	3.4	—	810	50	1860	1.6	—	1010
A 202_ 14.1		78	2210	2.9	70	780	43	2210	1.6	240	1030
A 202_ 18.1		61	2210	2.2	130	880	33	2210	1.2	300	1160
A 202_ 23.1		48	2210	1.8	160	990	26.0	2210	0.96	330	1280
A 202_ 29.2		38	2210	1.4	200	1100	20.5	2210	0.76	370	1390
A 202_ 35.4		31	2210	1.1	230	1200	16.9	2210	0.62	400	1390
A 202_ 43.2		25.5	2210	0.94	250	1300	13.9	2210	0.51	420	1390
A 202_ 53.7		20.5	2210	0.76	250	1390	11.2	2210	0.41	420	1390
A 202_ 63.1		17.4	2170	0.63	280	1390	9.5	2170	0.34	440	1390
A 202_ 79.9		13.8	1860	0.43	360	1390	7.5	1860	0.23	460	1390
A 202_ 92.3		11.9	1770	0.35	360	1390	6.5	1770	0.19	470	1390
A 203_ 120.5		9.1	2170	0.34	290	1390	5.0	2210	0.19	290	1390
A 203_ 146.1		7.5	2210	0.28	290	1390	4.1	2210	0.16	290	1390
A 203_ 178.3		6.2	2210	0.23	290	1390	3.4	2210	0.13	290	1390
A 203_ 221.3		5.0	2210	0.19	290	1390	2.7	2210	0.10	290	1390
A 203_ 260.5		4.2	2210	0.16	290	1390	2.3	2210	0.09	290	1390
A 203_ 329.4		3.3	2210	0.13	290	1390	1.8	2210	0.07	290	1390
A 203_ 380.9		2.9	2210	0.11	290	1390	1.6	2210	0.06	290	1390

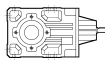
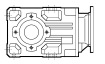
(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 30

3,630 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 302_ 5.4		648	1550	16.8	—	560	324	1950	10.5	—	700
A 302_ 7.0		500	1720	14.3	—	600	250	2170	9.1	—	760
A 302_ 9.3		376	1890	11.9	—	660	188	2390	7.5	—	830
A 302_ 10.5		333	2460	13.7	150	620	167	3010	8.4	220	800
A 302_ 11.8		297	2040	10.1	—	720	148	2570	6.4	—	910
A 302_ 13.6		257	2660	11.4	170	680	129	3270	7.0	240	870
A 302_ 18.0		194	2890	9.4	180	750	97	3540	5.7	260	960
A 302_ 22.8		154	3110	8.0	180	820	77	3630	4.6	300	1070
A 302_ 29.3		119	3350	6.7	180	890	60	3630	3.6	360	1210
A 302_ 36.6		96	3580	5.7	160	970	48	3630	2.9	400	1350
A 302_ 43.4		81	3630	4.9	170	1050	40	3630	2.4	420	1460
A 302_ 52.7		66	3630	4.0	190	1150	33	3630	2.0	430	1590
A 302_ 66.0		53	3450	3.1	250	1310	26.5	3450	1.5	450	1780
A 302_ 76.5		46	3100	2.4	330	1460	22.9	3100	1.2	470	1950
A 302_ 97.5		36	2660	1.6	360	1680	17.9	2660	0.80	490	2160
A 303_ 120.5		29.0	2150	1.1	250	1920	14.5	2660	0.66	290	2160
A 303_ 150.7		23.2	2310	0.92	260	2070	11.6	2920	0.58	290	2160
A 303_ 178.5		19.6	2420	0.81	270	2160	9.8	3050	0.51	290	2160
A 303_ 216.6		16.2	2540	0.70	280	2160	8.1	3190	0.44	290	2160
A 303_ 271.5		12.9	2660	0.59	290	2160	6.4	3360	0.37	290	2160
A 303_ 314.5		11.1	2730	0.52	290	2160	5.6	3450	0.33	290	2160
A 303_ 400.8		8.7	2830	0.42	290	2160	4.4	3190	0.24	290	2160

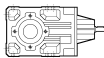
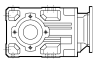
A 30

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 302_ 5.4		204	2260	7.7	—	820	111	2660	4.9	—	1000
A 302_ 7.0		157	2510	6.6	—	880	86	2660	3.8	190	1130
A 302_ 9.3		118	2660	5.2	—	980	65	2660	2.9	330	1280
A 302_ 10.5		105	3460	6.0	270	930	57	3630	3.5	490	1210
A 302_ 11.8		93	2660	4.1	120	1100	51	2660	2.3	420	1420
A 302_ 13.6		81	3630	4.9	330	1030	44	3630	2.7	490	1370
A 302_ 18.0		61	3630	3.7	430	1190	33	3630	2.0	490	1560
A 302_ 22.8		48	3630	2.9	490	1330	26.3	3630	1.6	490	1730
A 302_ 29.3		38	3630	2.3	490	1490	20.5	3630	1.2	490	1930
A 302_ 36.6		30	3630	1.8	490	1650	16.4	3630	0.99	490	2120
A 302_ 43.4		25.3	3630	1.5	490	1780	13.8	3630	0.84	490	2160
A 302_ 52.7		20.9	3630	1.3	490	1930	11.4	3630	0.69	490	2160
A 302_ 66.0		16.7	3450	0.96	490	2150	9.1	3450	0.52	490	2160
A 302_ 76.5		14.4	3100	0.74	490	2160	7.8	3100	0.41	490	2160
A 302_ 97.5		11.3	2660	0.50	490	2160	6.2	2660	0.27	490	2160
A 303_ 120.5		9.1	3130	0.49	290	2160	5.0	3630	0.31	290	2160
A 303_ 150.7		7.3	3370	0.42	290	2160	4.0	3630	0.25	290	2160
A 303_ 178.5		6.2	3540	0.37	290	2160	3.4	3630	0.21	290	2160
A 303_ 216.6		5.1	3630	0.32	290	2160	2.8	3630	0.17	290	2160
A 303_ 271.5		4.1	3630	0.25	290	2160	2.2	3630	0.14	290	2160
A 303_ 314.5		3.5	3630	0.22	290	2160	1.9	3630	0.12	290	2160
A 303_ 400.8		2.7	3190	0.15	290	2160	1.5	3190	0.08	290	2160

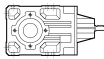
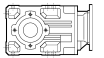
(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 41

7,520 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 412_ 5.2		673	3980	45	—	980	337	4870	27	—	1250
A 412_ 7.1		493	4340	36	—	1090	246	4870	20	—	1450
A 412_ 9.2		380	4690	30	—	1190	190	4870	15.5	—	1630
A 412_ 10.1		347	3850	22	340	1360	173	4730	13.7	460	1720
A 412_ 11.7		299	4870	24	—	1320	150	4870	12.2	—	1810
A 412_ 13.8		254	4250	18.0	360	1500	127	5180	11.0	490	1910
A 412_ 17.8		197	4560	15.0	390	1640	98	5580	9.2	520	2090
A 412_ 22.7		154	4870	12.5	380	1790	77	6020	7.7	500	2270
A 412_ 28.3		124	5270	10.9	350	1930	62	6460	6.7	480	2450
A 412_ 35.9		97	5620	9.1	330	2100	49	6900	5.6	460	2650
A 412_ 45.1		78	6020	7.8	310	2270	39	7350	4.8	440	2880
A 412_ 53.1		66	6200	6.8	310	2410	33	7520	4.1	440	3080
A 412_ 64.2		55	6550	6.0	270	2590	27.3	7520	3.4	470	3330
A 412_ 79.2		44	7080	5.2	200	2770	22.1	7080	2.6	560	3370
A 413_ 92.8		38	5750	3.7	—	3150	18.9	7080	2.3	—	3370
A 413_ 115.9		30	7080	3.7	—	3280	15.1	7520	1.9	—	3370
A 413_ 146.9		23.8	7520	3.1	—	3370	11.9	7520	1.5	120	3370
A 413_ 184.4		19.0	7520	2.4	—	3370	9.5	7520	1.2	230	3370
A 413_ 217.4		16.1	7520	2.1	160	3370	8.0	7520	1.0	300	3370
A 413_ 262.5		13.3	7520	1.7	220	3370	6.7	7520	0.86	320	3370
A 413_ 324.2		10.8	7520	1.4	260	3370	5.4	7520	0.69	340	3370
A 413_ 376.8		9.3	7520	1.2	270	3370	4.6	7520	0.60	350	3370

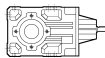
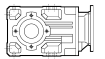
A 41

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 412_ 5.2		212	4870	17.2	—	1540	115	4870	9.4	—	2000
A 412_ 7.1		155	4870	12.6	—	1770	85	4870	6.9	180	2270
A 412_ 9.2		120	4870	9.7	—	1980	65	4870	5.3	400	2540
A 412_ 10.1		109	5400	9.8	560	2010	59	6460	6.4	710	2450
A 412_ 11.7		94	4870	7.6	—	2190	51	4870	4.2	520	2790
A 412_ 13.8		80	5930	7.9	580	2230	43	7080	5.1	740	2720
A 412_ 17.8		62	6370	6.6	630	2430	34	7520	4.2	790	2990
A 412_ 22.7		48	6900	5.6	590	2630	26.4	7520	3.3	790	3330
A 412_ 28.3		39	7350	4.8	580	2860	21.2	7520	2.7	790	3370
A 412_ 35.9		31	7520	3.8	620	3150	16.7	7520	2.1	790	3370
A 412_ 45.1		24.4	7520	3.1	680	3370	13.3	7520	1.7	790	3370
A 412_ 53.1		20.7	7520	2.6	710	3370	11.3	7520	1.4	790	3370
A 412_ 64.2		17.1	7520	2.1	740	3370	9.3	7520	1.2	790	3370
A 412_ 79.2		13.9	7080	1.6	790	3370	7.6	7080	0.89	790	3370
A 413_ 92.8		11.9	7080	1.4	—	3370	6.5	7080	0.78	120	3370
A 413_ 115.9		9.5	7520	1.2	—	3370	5.2	7520	0.67	250	3370
A 413_ 146.9		7.5	7520	0.96	230	3370	4.1	7520	0.53	400	3370
A 413_ 184.4		6.0	7520	0.77	340	3370	3.3	7520	0.42	450	3370
A 413_ 217.4		5.1	7520	0.65	370	3370	2.8	7520	0.36	470	3370
A 413_ 262.5		4.2	7520	0.54	390	3370	2.3	7520	0.29	490	3370
A 413_ 324.2		3.4	7520	0.44	400	3370	1.9	7520	0.24	490	3370
A 413_ 376.8		2.9	7520	0.38	410	3370	1.6	7520	0.20	490	3370

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 50

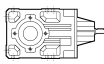
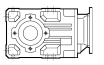
13,300 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 502_ 7.7		455	4870	37	—	1780	227	6200	24	—	2240
A 502_ 9.7		361	5310	32	—	1920	180	6640	20	—	2430
A 502_ 13.1		267	5310	24	—	2160	134	6640	14.8	—	2720
A 502_ 16.6		211	5660	19.9	—	2340	105	7080	12.5	—	2940
A 502_ 20.9		167	5660	15.8	120	2560	84	7080	9.9	160	3240
A 503_ 24.0		146	10200	25	180	1580	73	13300	16.6	180	1920
A 503_ 26.4		133	10600	24	240	1610	66	13300	15.1	320	2050
A 503_ 32.4		108	11400	21	170	1040	54	13300	12.3	330	2340
A 503_ 35.6		98	11900	20	240	1760	49	13300	11.2	460	2470
A 503_ 40.9		86	12500	18.3	160	1830	43	13300	9.7	440	2680
A 503_ 45.0		78	13000	17.3	220	1870	39	13300	8.9	560	2830
A 503_ 51.7		68	13300	15.4	140	2020	34	13300	7.7	500	3060
A 503_ 56.8		62	13300	14.0	250	2140	31	13300	7.0	610	3240
A 503_ 63.9		55	13300	12.5	200	2320	27.4	13300	6.2	550	3440
A 503_ 70.2		50	13300	11.3	300	2450	24.9	13300	5.7	660	3620
A 503_ 81.5		43	13300	9.8	260	2680	21.5	13300	4.9	620	3890
A 503_ 89.5		39	13300	8.9	360	2830	19.6	13300	4.5	690	4090
A 503_ 99.5		35	13300	8.0	280	3010	17.6	13300	4.0	640	4320
A 503_ 109.4		32	13300	7.3	380	3170	16.0	13300	3.6	690	4500
A 503_ 118.0		29.7	13300	6.8	310	3300	14.8	13300	3.4	670	4500
A 503_ 129.7		27.0	13300	6.1	410	3460	13.5	13300	3.1	700	4500
A 503_ 140.6		24.9	13300	5.7	320	3620	12.4	13300	2.8	680	4500
A 503_ 154.6		22.6	13300	5.2	420	3800	11.3	13300	2.6	710	4500
A 503_ 173.4		20.2	13300	4.6	330	4020	10.1	13300	2.3	690	4500
A 503_ 190.6		18.4	13300	4.2	430	4230	9.2	13300	2.1	710	4500
A 504_ 211.0		16.6	13300	3.9	300	4500	8.3	13300	1.9	460	4500
A 504_ 232.0		15.1	13300	3.5	340	4500	7.5	13300	1.8	470	4500
A 504_ 260.9		13.4	13300	3.1	360	4500	6.7	13300	1.6	490	4500
A 504_ 286.8		12.2	13300	2.8	370	4500	6.1	13300	1.4	490	4500
A 504_ 332.6		10.5	13300	2.5	390	4500	5.3	13300	1.2	490	4500
A 504_ 365.6		9.6	13300	2.2	400	4500	4.8	13300	1.1	490	4500
A 504_ 406.4		8.6	13300	2.0	410	4500	4.3	13300	1.0	490	4500
A 504_ 446.8		7.8	13300	1.8	410	4500	3.9	13300	0.91	490	4500
A 504_ 481.6		7.3	13300	1.7	420	4500	3.6	13300	0.85	490	4500
A 504_ 529.5		6.6	13300	1.5	420	4500	3.3	13300	0.77	490	4500
A 504_ 574.2		6.1	13300	1.4	430	4500	3.0	13300	0.71	490	4500
A 504_ 631.2		5.5	13300	1.3	440	4500	2.8	13300	0.65	490	4500
A 504_ 707.9		4.9	13300	1.2	440	4500	2.5	13300	0.58	490	4500
A 504_ 778.2		4.5	13300	1.0	450	4500	2.2	13300	0.52	490	4500

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 50

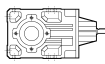
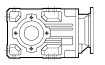
13,300 lb·in

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 502_ 7.7		143	6810	16.2	—	2630	78	7970	10.4	—	3210
A 502_ 9.7		113	7350	13.9	—	2830	62	8850	9.1	—	3440
A 502_ 13.1		84	7350	10.3	160	3190	46	8850	6.8	210	3890
A 502_ 16.6		66	7790	8.6	200	3460	36	8850	5.3	390	4250
A 502_ 20.9		53	7790	6.8	280	3780	28.7	8850	4.2	480	4500
A 503_ 24.0		46	13300	10.4	450	2540	25.0	13300	5.7	790	3530
A 503_ 26.4		42	13300	9.5	590	2700	22.7	13300	5.2	790	3710
A 503_ 32.4		34	13300	7.7	610	3010	18.5	13300	4.2	790	4110
A 503_ 35.6		31	13300	7.0	740	3190	16.9	13300	3.8	790	4320
A 503_ 40.9		26.9	13300	6.1	720	3440	14.7	13300	3.3	790	4500
A 503_ 45.0		24.4	13300	5.6	790	3600	13.3	13300	3.0	790	4500
A 503_ 51.7		21.3	13300	4.8	780	3870	11.6	13300	2.6	790	4500
A 503_ 56.8		19.4	13300	4.4	790	4070	10.6	13300	2.4	790	4500
A 503_ 63.9		17.2	13300	3.9	790	4320	9.4	13300	2.1	790	4500
A 503_ 70.2		15.7	13300	3.6	790	4500	8.5	13300	1.9	790	4500
A 503_ 81.5		13.5	13300	3.1	790	4500	7.4	13300	1.7	790	4500
A 503_ 89.5		12.3	13300	2.8	790	4500	6.7	13300	1.5	790	4500
A 503_ 99.5		11.1	13300	2.5	790	4500	6.0	13300	1.4	790	4500
A 503_ 109.4		10.1	13300	2.3	790	4500	5.5	13300	1.2	790	4500
A 503_ 118.0		9.3	13300	2.1	790	4500	5.1	13300	1.2	790	4500
A 503_ 129.7		8.5	13300	1.9	790	4500	4.6	13300	1.1	790	4500
A 503_ 140.6		7.8	13300	1.8	790	4500	4.3	13300	0.97	790	4500
A 503_ 154.6		7.1	13300	1.6	790	4500	3.9	13300	0.88	790	4500
A 503_ 173.4		6.3	13300	1.4	790	4500	3.5	13300	0.79	790	4500
A 503_ 190.6		5.8	13300	1.3	790	4500	3.1	13300	0.72	790	4500
A 504_ 211.0		5.2	13300	1.2	490	4500	2.8	13300	0.66	490	4500
A 504_ 232.0		4.7	13300	1.1	490	4500	2.6	13300	0.60	490	4500
A 504_ 260.9		4.2	13300	0.98	490	4500	2.3	13300	0.54	490	4500
A 504_ 286.8		3.8	13300	0.90	490	4500	2.1	13300	0.49	490	4500
A 504_ 332.6		3.3	13300	0.77	490	4500	1.8	13300	0.42	490	4500
A 504_ 365.6		3.0	13300	0.70	490	4500	1.6	13300	0.38	490	4500
A 504_ 406.4		2.7	13300	0.63	490	4500	1.5	13300	0.34	490	4500
A 504_ 446.8		2.5	13300	0.57	490	4500	1.3	13300	0.31	490	4500
A 504_ 481.6		2.3	13300	0.53	490	4500	1.2	13300	0.29	490	4500
A 504_ 529.5		2.1	13300	0.48	490	4500	1.1	13300	0.26	490	4500
A 504_ 574.2		1.9	13300	0.45	490	4500	1.0	13300	0.24	490	4500
A 504_ 631.2		1.7	13300	0.41	490	4500	0.95	13300	0.22	490	4500
A 504_ 707.9		1.6	13300	0.36	490	4500	0.85	13300	0.20	490	4500
A 504_ 778.2		1.4	13300	0.33	490	4500	0.77	13300	0.18	490	4500

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 60

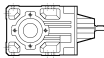
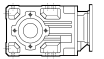
24,800 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 602_ 7.9		443	8410	62	—	5060	222	10600	39	—	6230
A 602_ 10.3		340	8410	48	—	5530	170	10600	30	—	6740
A 602_ 12.7		276	8850	41	—	5890	138	11100	26	130	6740
A 602_ 16.7		210	9740	34	150	6430	105	11500	20	230	6740
A 602_ 20.6		170	24400	69	160	6740	85	12400	17.6	180	6740
A 603_ 25.7		136	24800	58	—	6050	68	24800	29	130	6740
A 603_ 27.9		125	24800	53	—	6230	63	24800	27	320	6740
A 603_ 31.7		110	24800	47	—	6520	55	24800	23	310	6740
A 603_ 34.3		102	24800	43	—	6740	51	24800	22	490	6740
A 603_ 41.7		84	24800	36	—	6740	42	24800	17.8	490	6740
A 603_ 45.2		77	24800	33	110	6740	39	24800	16.4	650	6740
A 603_ 51.3		68	24800	29	—	6740	34	24800	14.5	600	6740
A 603_ 55.6		63	24800	27	210	6740	31	24800	13.4	750	6740
A 603_ 65.0		54	24800	23	160	6740	26.9	24800	11.4	690	6740
A 603_ 70.4		50	24800	21	300	6740	24.9	24800	10.6	840	6740
A 603_ 79.7		44	24800	18.6	220	6740	22.0	24800	9.3	760	6740
A 603_ 86.4		41	24800	17.2	360	6740	20.3	24800	8.6	900	6740
A 603_ 99.5		35	24800	14.9	280	6740	17.6	24800	7.5	820	6740
A 603_ 107.8		32	24800	13.8	420	6740	16.2	24800	6.9	910	6740
A 603_ 123.0		28.5	24800	12.1	340	6740	14.2	24800	6.0	880	6740
A 603_ 133.3		26.3	24800	11.1	470	6740	13.1	24800	5.6	920	6740
A 603_ 144.0		24.3	24800	10.3	360	6740	12.2	24800	5.2	900	6740
A 603_ 156.0		22.4	24800	9.5	500	6740	11.2	24800	4.8	930	6740
A 603_ 171.5		20.4	24800	8.7	380	6740	10.2	24800	4.3	910	6740
A 603_ 185.8		18.8	24800	8.0	510	6740	9.4	24800	4.0	930	6740
A 604_ 208.7		16.8	24800	7.3	400	6740	8.4	24800	3.6	700	6740
A 604_ 226.1		15.5	24800	6.7	470	6740	7.7	24800	3.4	720	6740
A 604_ 264.3		13.2	24800	5.8	560	6740	6.6	24800	2.9	750	6740
A 604_ 286.3		12.2	24800	5.3	570	6740	6.1	24800	2.7	760	6740
A 604_ 324.2		10.8	24800	4.7	590	6740	5.4	24800	2.3	780	6740
A 604_ 351.2		10.0	24800	4.3	600	6740	5.0	24800	2.2	790	6740
A 604_ 404.7		8.6	24800	3.8	620	6740	4.3	24800	1.9	790	6740
A 604_ 438.4		8.0	24800	3.5	620	6740	4.0	24800	1.7	790	6740
A 604_ 500.3		7.0	24800	3.0	640	6740	3.5	24800	1.5	790	6740
A 604_ 542.0		6.5	24800	2.8	640	6740	3.2	24800	1.4	790	6740
A 604_ 585.8		6.0	24800	2.6	650	6740	3.0	24800	1.3	790	6740
A 604_ 634.6		5.5	24800	2.4	660	6740	2.8	24800	1.2	790	6740
A 604_ 697.3		5.0	24800	2.2	660	6740	2.5	24800	1.1	790	6740
A 604_ 755.4		4.6	24800	2.0	670	6740	2.3	24800	1.0	790	6740

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 60

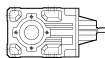
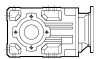
24,800 lb·in

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 602_ 7.9		139	11500	27	—	6740	76	13700	17.4	—	6740
A 602_ 10.3		107	11500	20	250	6740	58	13700	13.3	370	6740
A 602_ 12.7		87	12400	17.9	250	6740	47	15000	11.8	310	6740
A 602_ 16.7		66	12800	14.1	380	6740	36	15000	9.0	570	6740
A 602_ 20.6		53	13700	12.2	330	6740	29.1	15900	7.7	560	6740
A 603_ 25.7		43	24800	18.2	550	6740	23.3	24800	9.9	1060	6740
A 603_ 27.9		39	24800	16.7	740	6740	21.5	24800	9.1	1060	6740
A 603_ 31.7		35	24800	14.7	720	6740	18.9	24800	8.0	1060	6740
A 603_ 34.3		32	24800	13.6	900	6740	17.5	24800	7.4	1060	6740
A 603_ 41.7		26.4	24800	11.2	910	6740	14.4	24800	6.1	1060	6740
A 603_ 45.2		24.3	24800	10.3	1040	6740	13.3	24800	5.6	1060	6740
A 603_ 51.3		21.4	24800	9.1	1010	6740	11.7	24800	5.0	1060	6740
A 603_ 55.6		19.8	24800	8.4	1060	6740	10.8	24800	4.6	1060	6740
A 603_ 65.0		16.9	24800	7.2	1050	6740	9.2	24800	3.9	1060	6740
A 603_ 70.4		15.6	24800	6.6	1060	6740	8.5	24800	3.6	1060	6740
A 603_ 79.7		13.8	24800	5.9	1060	6740	7.5	24800	3.2	1060	6740
A 603_ 86.4		12.7	24800	5.4	1060	6740	6.9	24800	2.9	1060	6740
A 603_ 99.5		11.1	24800	4.7	1060	6740	6.0	24800	2.6	1060	6740
A 603_ 107.8		10.2	24800	4.3	1060	6740	5.6	24800	2.4	1060	6740
A 603_ 123.0		8.9	24800	3.8	1060	6740	4.9	24800	2.1	1060	6740
A 603_ 133.3		8.3	24800	3.5	1060	6740	4.5	24800	1.9	1060	6740
A 603_ 144.0		7.6	24800	3.2	1060	6740	4.2	24800	1.8	1060	6740
A 603_ 156.0		7.1	24800	3.0	1060	6740	3.8	24800	1.6	1060	6740
A 603_ 171.5		6.4	24800	2.7	1060	6740	3.5	24800	1.5	1060	6740
A 603_ 185.8		5.9	24800	2.5	1060	6740	3.2	24800	1.4	1060	6740
A 604_ 208.7		5.3	24800	2.3	790	6740	2.9	24800	1.3	790	6740
A 604_ 226.1		4.9	24800	2.1	790	6740	2.7	24800	1.2	790	6740
A 604_ 264.3		4.2	24800	1.8	790	6740	2.3	24800	0.99	790	6740
A 604_ 286.3		3.8	24800	1.7	790	6740	2.1	24800	0.91	790	6740
A 604_ 324.2		3.4	24800	1.5	790	6740	1.9	24800	0.81	790	6740
A 604_ 351.2		3.1	24800	1.4	790	6740	1.7	24800	0.74	790	6740
A 604_ 404.7		2.7	24800	1.2	790	6740	1.5	24800	0.65	790	6740
A 604_ 438.4		2.5	24800	1.1	790	6740	1.4	24800	0.60	790	6740
A 604_ 500.3		2.2	24800	0.96	790	6740	1.2	24800	0.52	790	6740
A 604_ 542.0		2.0	24800	0.88	790	6740	1.1	24800	0.48	790	6740
A 604_ 585.8		1.9	24800	0.82	790	6740	1.0	24800	0.45	790	6740
A 604_ 634.6		1.7	24800	0.75	790	6740	0.95	24800	0.41	790	6740
A 604_ 697.3		1.6	24800	0.69	790	6740	0.86	24800	0.37	790	6740
A 604_ 755.4		1.5	24800	0.63	790	6740	0.79	24800	0.35	790	6740

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

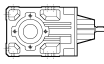
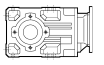
A 70

44,300 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 703_ 9.4		372	20400	130	430	5820	186	24800	79	570	7170
A 703_ 10.2		343	21200	125	560	5930	172	28300	83	330	7170
A 703_ 12.1		289	21200	105	540	6290	145	28300	70	310	7620
A 703_ 13.1		267	23000	105	540	6380	134	29600	68	470	7780
A 703_ 15.4		227	23900	93	470	6720	114	29600	58	550	8250
A 703_ 16.7		210	25200	90	560	6830	105	31900	57	580	8360
A 703_ 19.7		178	25700	78	460	7220	89	32700	50	400	8830
A 703_ 21.3		164	26600	75	620	7400	82	35400	50	410	8950
A 703_ 23.5		149	31000	79	1110	7400	74	38100	49	1410	9100
A 703_ 27.8		126	30500	66	1120	7890	63	37200	40	1420	9730
A 703_ 30.1		116	32700	65	1120	8000	58	40300	40	1420	9870
A 703_ 35.4		99	32300	55	1130	8520	49	39800	34	1430	10500
A 703_ 38.4		91	35000	55	1130	8630	46	42900	33	1430	10600
A 703_ 45.2		77	34500	46	1140	9170	39	42500	28	1440	11200
A 703_ 49.0		71	37600	46	1140	9280	36	44300	27	1450	11200
A 703_ 53.2		66	36300	41	1130	9640	33	44300	25	1430	11200
A 703_ 57.7		61	39400	41	1130	9760	30	44300	23	1460	11200
A 703_ 66.9		52	38500	34	1140	10300	26.2	44300	19.8	1460	11200
A 703_ 72.5		48	42000	35	1130	10500	24.1	44300	18.3	1480	11200
A 703_ 79.3		44	40700	31	1130	10900	22.1	44300	16.7	1470	11200
A 703_ 85.9		41	43800	31	1130	11000	20.4	44300	15.4	1490	11200
A 703_ 96.2		36	42900	27	1120	11200	18.2	44300	13.8	1480	11200
A 703_ 104.2		34	44300	25	1140	11200	16.8	44300	12.7	1500	11200
A 703_ 120.6		29.0	44300	22	1130	11200	14.5	44300	11.0	1490	11200
A 703_ 130.7		26.8	44300	20	1150	11200	13.4	44300	10.2	1500	11200
A 703_ 141.9		24.7	44300	18.7	1130	11200	12.3	44300	9.4	1490	11200
A 703_ 153.7		22.8	29200	11.4	1220	11200	11.4	35800	7.0	1560	11200
A 704_ 169.8		20.6	44300	16.0	250	11200	10.3	44300	8.0	570	11200
A 704_ 183.9		19.0	44300	14.8	330	11200	9.5	44300	7.4	600	11200
A 704_ 220.3		15.9	44300	12.4	350	11200	7.9	44300	6.2	610	11200
A 704_ 238.6		14.7	44300	11.4	420	11200	7.3	44300	5.7	620	11200
A 704_ 292.0		12.0	44300	9.3	430	11200	6.0	44300	4.7	630	11200
A 704_ 316.4		11.1	44300	8.6	470	11200	5.5	44300	4.3	640	11200
A 704_ 369.4		9.5	44300	7.4	470	11200	4.7	44300	3.7	640	11200
A 704_ 400.2		8.7	44300	6.8	490	11200	4.4	44300	3.4	650	11200
A 704_ 475.8		7.4	44300	5.7	480	11200	3.7	44300	2.9	650	11200
A 704_ 515.4		6.8	44300	5.3	490	11200	3.4	44300	2.6	660	11200
A 704_ 595.0		5.9	44300	4.6	490	11200	2.9	44300	2.3	660	11200
A 704_ 644.6		5.4	44300	4.2	500	11200	2.7	44300	2.1	670	11200
A 704_ 705.1		5.0	44300	3.9	490	11200	2.5	44300	1.9	660	11200
A 704_ 763.9		4.6	44300	3.6	510	11200	2.3	44300	1.8	670	11200
A 704_ 855.3		4.1	44300	3.2	500	11200	2.0	44300	1.6	670	11200
A 704_ 926.5		3.8	44300	2.9	510	11200	1.9	44300	1.5	670	11200
A 704_ 1072		3.3	44300	2.5	500	11200	1.6	44300	1.3	670	11200
A 704_ 1161		3.0	44300	2.3	510	11200	1.5	44300	1.2	680	11200
A 704_ 1242		2.8	44300	2.2	510	11200	1.4	44300	1.1	670	11200
A 704_ 1346		2.6	44300	2.0	510	11200	1.3	44300	1.0	680	11200
A 704_ 1583		2.2	44300	1.7	510	11200	1.1	44300	0.86	670	11200
A 704_ 1715		2.0	44300	1.6	520	11200	1.0	44300	0.79	680	11200

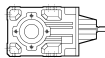
A 70

44,300 lb-in

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 703_ 9.4		117	26600	53	960	8300	64	26600	29	1570	10200
A 703_ 10.2		108	28800	53	960	8410	59	28800	29	1570	10400
A 703_ 12.1		91	32300	50	360	8700	50	32300	27	1450	10800
A 703_ 13.1		84	35000	50	370	8810	46	35000	27	1460	10900
A 703_ 15.4		71	32700	40	790	9490	39	32700	22	1570	11200
A 703_ 16.7		66	35400	40	800	9620	36	35400	22	1570	11200
A 703_ 19.7		56	32700	31	1100	10400	30	32700	17.0	1570	11200
A 703_ 21.3		52	35400	31	1110	10500	28.2	35400	17.1	1570	11200
A 703_ 23.5		47	43400	35	1570	10400	25.5	44300	19.4	1570	11200
A 703_ 27.8		40	42500	29	1570	11100	21.6	44300	16.4	1570	11200
A 703_ 30.1		37	44300	28	1570	11200	19.9	44300	15.1	1570	11200
A 703_ 35.4		31	44300	24	1570	11200	16.9	44300	12.9	1570	11200
A 703_ 38.4		28.6	44300	22	1570	11200	15.6	44300	11.8	1570	11200
A 703_ 45.2		24.3	44300	18.5	1570	11200	13.3	44300	10.1	1570	11200
A 703_ 49.0		22.4	44300	17.0	1570	11200	12.2	44300	9.3	1570	11200
A 703_ 53.2		20.7	44300	15.7	1570	11200	11.3	44300	8.6	1570	11200
A 703_ 57.7		19.1	44300	14.5	1570	11200	10.4	44300	7.9	1570	11200
A 703_ 66.9		16.4	44300	12.5	1570	11200	9.0	44300	6.8	1570	11200
A 703_ 72.5		15.2	44300	11.5	1570	11200	8.3	44300	6.3	1570	11200
A 703_ 79.3		13.9	44300	10.5	1570	11200	7.6	44300	5.7	1570	11200
A 703_ 85.9		12.8	44300	9.7	1570	11200	7.0	44300	5.3	1570	11200
A 703_ 96.2		11.4	44300	8.7	1570	11200	6.2	44300	4.7	1570	11200
A 703_ 104.2		10.6	44300	8.0	1570	11200	5.8	44300	4.4	1570	11200
A 703_ 120.6		9.1	44300	6.9	1570	11200	5.0	44300	3.8	1570	11200
A 703_ 130.7		8.4	44300	6.4	1570	11200	4.6	44300	3.5	1570	11200
A 703_ 141.9		7.8	44300	5.9	1570	11200	4.2	44300	3.2	1570	11200
A 703_ 153.7		7.2	40700	5.0	1570	11200	3.9	44300	3.0	1570	11200
A 704_ 169.8		6.5	44300	5.0	710	11200	3.5	44300	2.7	790	11200
A 704_ 183.9		6.0	44300	4.7	730	11200	3.3	44300	2.5	790	11200
A 704_ 220.3		5.0	44300	3.9	740	11200	2.7	44300	2.1	790	11200
A 704_ 238.6		4.6	44300	3.6	750	11200	2.5	44300	2.0	790	11200
A 704_ 292.0		3.8	44300	2.9	750	11200	2.1	44300	1.6	790	11200
A 704_ 316.4		3.5	44300	2.7	770	11200	1.9	44300	1.5	790	11200
A 704_ 369.4		3.0	44300	2.3	770	11200	1.6	44300	1.3	790	11200
A 704_ 400.2		2.7	44300	2.1	780	11200	1.5	44300	1.2	790	11200
A 704_ 475.8		2.3	44300	1.8	780	11200	1.3	44300	0.98	790	11200
A 704_ 515.4		2.1	44300	1.7	790	11200	1.2	44300	0.91	790	11200
A 704_ 595.0		1.8	44300	1.4	780	11200	1.0	44300	0.78	790	11200
A 704_ 644.6		1.7	44300	1.3	790	11200	0.93	44300	0.72	790	11200
A 704_ 705.1		1.6	44300	1.2	790	11200	0.85	44300	0.66	790	11200
A 704_ 763.9		1.4	44300	1.1	790	11200	0.79	44300	0.61	790	11200
A 704_ 855.3		1.3	44300	1.0	790	11200	0.70	44300	0.55	790	11200
A 704_ 926.5		1.2	44300	0.92	790	11200	0.65	44300	0.50	790	11200
A 704_ 1072		1.0	44300	0.80	790	11200	0.56	44300	0.44	790	11200
A 704_ 1161		0.95	44300	0.74	790	11200	0.52	44300	0.40	790	11200
A 704_ 1242		0.89	44300	0.69	790	11200	0.48	44300	0.38	790	11200
A 704_ 1346		0.82	44300	0.64	790	11200	0.45	44300	0.35	790	11200
A 704_ 1583		0.69	44300	0.54	790	11200	0.38	44300	0.29	790	11200
A 704_ 1715		0.64	44300	0.50	790	11200	0.35	44300	0.27	790	11200

A 80

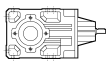
70,800 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 803_ 9.8		357	27400	167	—	5910	179	34500	105	—	7220
A 803_ 10.7		327	30500	171	—	5910	164	38100	107	—	7260
A 803_ 12.3		285	30500	149	—	6230	142	38100	93	—	7640
A 803_ 13.3		263	30500	137	260	6450	132	38100	86	260	7910
A 803_ 15.5		226	29200	113	350	6880	113	36300	70	390	8450
A 803_ 16.7		210	31900	114	320	6950	105	39800	71	330	8520
A 803_ 19.3		181	31000	96	420	7370	91	38900	60	420	9040
A 803_ 20.9		167	34000	97	380	7440	84	42500	61	390	9130
A 803_ 22.6		155	44700	118	1010	7010	77	55300	73	1310	8630
A 803_ 24.5		143	48700	119	1000	7040	71	59700	73	1310	8680
A 803_ 28.2		124	47300	100	1060	7530	62	58400	62	1340	9260
A 803_ 30.6		114	46500	91	1090	7850	57	57100	56	1380	9670
A 803_ 35.5		99	50400	85	1060	8090	49	62000	52	1350	9960
A 803_ 38.5		91	54400	85	1060	8140	45	67300	52	1350	10000
A 803_ 44.5		79	53500	72	1080	8680	39	65900	44	1360	10700
A 803_ 48.2		73	58000	72	1080	8720	36	70800	44	1370	10800
A 803_ 55.2		63	56600	61	1060	9280	32	69900	38	1360	11400
A 803_ 59.8		59	61500	62	1050	9330	29.3	70800	35	1390	11800
A 803_ 66.8		52	60200	54	1050	9820	26.2	70800	32	1380	12300
A 803_ 72.4		48	65000	54	1050	9890	24.2	70800	29	1410	12700
A 803_ 82.3		43	63700	46	1030	10500	21.3	70800	26	1400	13300
A 803_ 89.2		39	69000	46	1030	10500	19.6	70800	24	1430	13800
A 803_ 96.0		36	66400	41	990	11000	18.2	70800	22	1410	14200
A 803_ 104.0		34	70800	41	1010	11100	16.8	70800	20	1430	14600
A 803_ 116.0		30	70400	36	950	11600	15.1	70800	18.3	1420	14600
A 803_ 125.6		27.9	70800	34	1040	12000	13.9	70800	16.9	1440	14600
A 803_ 144.7		24.2	70800	29	970	12700	12.1	70800	14.7	1430	14600
A 803_ 156.8		22.3	70800	27	1070	13100	11.2	70800	13.5	1450	14600
A 804_ 171.3		20.4	70800	25	—	14600	10.2	70800	12.7	280	14600
A 804_ 214.7		16.3	70800	20	—	14600	8.2	70800	10.1	310	14600
A 804_ 232.6		15.0	70800	18.7	—	14600	7.5	70800	9.3	410	14600
A 804_ 277.3		12.6	70800	15.7	120	14600	6.3	70800	7.8	430	14600
A 804_ 300.4		11.7	70800	14.5	200	14600	5.8	70800	7.2	510	14600
A 804_ 354.0		9.9	70800	12.3	180	14600	4.9	70800	6.1	490	14600
A 804_ 383.5		9.1	70800	11.3	260	14600	4.6	70800	5.7	570	14600
A 804_ 442.1		7.9	70800	9.8	230	14600	4.0	70800	4.9	550	14600
A 804_ 478.9		7.3	70800	9.1	310	14600	3.7	70800	4.5	600	14600
A 804_ 560.5		6.2	70800	7.8	280	14600	3.1	70800	3.9	590	14600
A 804_ 607.2		5.8	70800	7.2	350	14600	2.9	70800	3.6	610	14600
A 804_ 703.5		5.0	70800	6.2	320	14600	2.5	70800	3.1	600	14600
A 804_ 762.1		4.6	70800	5.7	390	14600	2.3	70800	2.9	620	14600
A 804_ 829.5		4.2	70800	5.2	340	14600	2.1	70800	2.6	610	14600
A 804_ 898.7		3.9	70800	4.8	410	14600	1.9	70800	2.4	620	14600
A 804_ 1001		3.5	70800	4.3	360	14600	1.7	70800	2.2	620	14600
A 804_ 1085		3.2	70800	4.0	430	14600	1.6	70800	2.0	630	14600
A 804_ 1237		2.8	70800	3.5	370	14600	1.4	70800	1.8	620	14600
A 804_ 1340		2.6	70800	3.2	440	14600	1.3	70800	1.6	630	14600
A 804_ 1438		2.4	70800	3.0	390	14600	1.2	70800	1.5	620	14600
A 804_ 1558		2.2	70800	2.8	450	14600	1.1	70800	1.4	640	14600

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 80

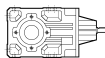
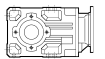
70,800 lb-in

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb-in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb-in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 803_ 9.8		112	39400	76	—	8250	61	46900	49	—	9800
A 803_ 10.7		103	43400	76	—	8300	56	51800	50	—	9900
A 803_ 12.3		89	43400	66	—	8750	49	51800	43	—	10400
A 803_ 13.3		83	43400	61	310	9040	45	51800	40	360	10800
A 803_ 15.5		71	41200	50	480	9670	39	49100	33	570	11500
A 803_ 16.7		66	45100	51	410	9760	36	54000	33	480	11600
A 803_ 19.3		57	44300	43	510	10300	31	53100	28	570	12300
A 803_ 20.9		53	48400	44	460	10400	28.7	57500	28	570	12500
A 803_ 22.6		49	62800	52	1530	9870	26.5	70800	32	1570	12000
A 803_ 24.5		45	68100	52	1530	9910	24.5	70800	30	1570	12400
A 803_ 28.2		39	66800	45	1560	10600	21.3	70800	26	1570	13100
A 803_ 30.6		36	65500	40	1570	11000	19.6	70800	24	1570	13600
A 803_ 35.5		31	70800	38	1570	11400	16.9	70800	20	1570	14400
A 803_ 38.5		28.6	70800	35	1570	11800	15.6	70800	18.9	1570	14600
A 803_ 44.5		24.7	70800	30	1570	12500	13.5	70800	16.3	1570	14600
A 803_ 48.2		22.8	70800	28	1570	12900	12.4	70800	15.1	1570	14600
A 803_ 55.2		19.9	70800	24	1570	13600	10.9	70800	13.2	1570	14600
A 803_ 59.8		18.4	70800	22	1570	14000	10.0	70800	12.2	1570	14600
A 803_ 66.8		16.5	70800	20	1570	14600	9.0	70800	10.9	1570	14600
A 803_ 72.4		15.2	70800	18.4	1570	14600	8.3	70800	10.0	1570	14600
A 803_ 82.3		13.4	70800	16.2	1570	14600	7.3	70800	8.8	1570	14600
A 803_ 89.2		12.3	70800	14.9	1570	14600	6.7	70800	8.2	1570	14600
A 803_ 96.0		11.5	70800	13.9	1570	14600	6.3	70800	7.6	1570	14600
A 803_ 104.0		10.6	70800	12.8	1570	14600	5.8	70800	7.0	1570	14600
A 803_ 116.0		9.5	70800	11.5	1570	14600	5.2	70800	6.3	1570	14600
A 803_ 125.6		8.8	70800	10.6	1570	14600	4.8	70800	5.8	1570	14600
A 803_ 144.7		7.6	70800	9.2	1570	14600	4.1	70800	5.0	1570	14600
A 803_ 156.8		7.0	70800	8.5	1570	14600	3.8	70800	4.6	1570	14600
A 804_ 171.3		6.4	70800	8.0	520	14600	3.5	70800	4.4	790	14600
A 804_ 214.7		5.1	70800	6.4	560	14600	2.8	70800	3.5	790	14600
A 804_ 232.6		4.7	70800	5.9	650	14600	2.6	70800	3.2	790	14600
A 804_ 277.3		4.0	70800	4.9	670	14600	2.2	70800	2.7	790	14600
A 804_ 300.4		3.7	70800	4.5	700	14600	2.0	70800	2.5	790	14600
A 804_ 354.0		3.1	70800	3.9	700	14600	1.7	70800	2.1	790	14600
A 804_ 383.5		2.9	70800	3.6	710	14600	1.6	70800	1.9	790	14600
A 804_ 442.1		2.5	70800	3.1	710	14600	1.4	70800	1.7	790	14600
A 804_ 478.9		2.3	70800	2.9	730	14600	1.3	70800	1.6	790	14600
A 804_ 560.5		2.0	70800	2.4	720	14600	1.1	70800	1.3	790	14600
A 804_ 607.2		1.8	70800	2.3	740	14600	0.99	70800	1.2	790	14600
A 804_ 703.5		1.6	70800	1.9	730	14600	0.85	70800	1.1	790	14600
A 804_ 762.1		1.4	70800	1.8	750	14600	0.79	70800	0.98	790	14600
A 804_ 829.5		1.3	70800	1.6	740	14600	0.72	70800	0.90	790	14600
A 804_ 898.7		1.2	70800	1.5	750	14600	0.67	70800	0.83	790	14600
A 804_ 1001		1.1	70800	1.4	740	14600	0.60	70800	0.74	790	14600
A 804_ 1085		1.0	70800	1.3	760	14600	0.55	70800	0.69	790	14600
A 804_ 1237		0.89	70800	1.1	740	14600	0.49	70800	0.60	790	14600
A 804_ 1340		0.82	70800	1.0	760	14600	0.45	70800	0.56	790	14600
A 804_ 1438		0.76	70800	0.95	750	14600	0.42	70800	0.52	790	14600
A 804_ 1558		0.71	70800	0.88	760	14600	0.39	70800	0.48	790	14600

(-) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 90

123,900 lb·in

 	i (ratio)	n ₁ = 3500 rpm					n ₁ = 1750 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 903_ 9.7		361	69000	426	550	6200	180	80100	247	1240	7870
A 903_ 10.5		333	73900	422	590	6230	167	86700	247	1240	7850
A 903_ 12.6		278	75200	358	610	6700	139	92500	220	1080	8250
A 903_ 13.7		255	71200	311	1050	7150	128	98700	216	1140	8300
A 903_ 15.6		224	78800	303	730	7190	112	96900	186	1220	8860
A 903_ 16.9		207	85400	303	730	7170	104	104900	186	1220	8830
A 903_ 19.4		180	83200	257	710	7710	90	102200	158	1200	9510
A 903_ 21.0		167	89800	256	720	7710	83	109700	156	1240	9530
A 903_ 22.3		157	87200	234	2170	8030	78	107500	144	2740	9870
A 903_ 24.1		145	94700	235	2170	7980	73	116400	145	2740	9850
A 903_ 29.1		120	93400	192	2200	8750	60	115100	118	2790	10800
A 903_ 31.5		111	101300	193	2200	8720	56	123900	118	2790	10800
A 903_ 35.8		98	98700	165	2230	9350	49	121700	102	2810	11500
A 903_ 38.8		90	107100	165	2230	9330	45	123900	96	2860	11800
A 903_ 44.6		78	104400	140	2230	10000	39	123900	83	2860	12600
A 903_ 48.3		72	113300	141	2230	10000	36	123900	77	2880	13000
A 903_ 55.0		64	111100	121	2240	10700	32	123900	67	2880	13800
A 903_ 59.6		59	119900	121	2240	10700	29.4	123900	62	2920	14300
A 903_ 68.8		51	118100	103	2240	11400	25.4	123900	54	2920	15200
A 903_ 74.5		47	123900	100	2250	11600	23.5	123900	50	2940	15700
A 903_ 80.4		44	123000	92	2230	12000	21.8	123900	46	2920	16200
A 903_ 87.1		40	123900	85	2270	12500	20.1	123900	43	2970	16700
A 903_ 98.6		35	123900	75	2250	13200	17.7	123900	38	2940	16900
A 903_ 106.8		33	123900	69	2270	13600	16.4	123900	35	2990	16900
A 903_ 116.9		29.9	123900	63	2270	14200	15.0	123900	32	2970	16900
A 903_ 126.6		27.6	94300	45	2380	16100	13.8	116400	28	3010	16900
A 903_ 139.4		25.1	91600	39	2380	16700	12.6	112800	24	3010	16900
A 903_ 151.0		23.2	99100	39	2380	16900	11.6	122100	24	3010	16900
A 904_ 166.1		21.1	123900	46	—	16900	10.5	123900	23	—	16900
A 904_ 180.0		19.4	123900	42	—	16900	9.7	123900	21	—	16900
A 904_ 209.0		16.7	123900	36	—	16900	8.4	123900	18.2	—	16900
A 904_ 226.4		15.5	123900	34	—	16900	7.7	123900	16.8	—	16900
A 904_ 281.4		12.4	123900	27	—	16900	6.2	123900	13.5	—	16900
A 904_ 304.9		11.5	123900	25	—	16900	5.7	123900	12.5	—	16900
A 904_ 355.8		9.8	123900	21	—	16900	4.9	123900	10.7	—	16900
A 904_ 385.4		9.1	123900	19.7	—	16900	4.5	123900	9.9	150	16900
A 904_ 449.2		7.8	123900	16.9	—	16900	3.9	123900	8.5	—	16900
A 904_ 486.6		7.2	123900	15.6	—	16900	3.6	123900	7.8	210	16900
A 904_ 555.3		6.3	123900	13.7	—	16900	3.2	123900	6.9	170	16900
A 904_ 601.6		5.8	123900	12.7	—	16900	2.9	123900	6.3	270	16900
A 904_ 707.9		4.9	123900	10.8	—	16900	2.5	123900	5.4	240	16900
A 904_ 766.9		4.6	123900	9.9	—	16900	2.3	123900	5.0	330	16900
A 904_ 865.1		4.0	123900	8.8	—	16900	2.0	123900	4.4	260	16900
A 904_ 937		3.7	123900	8.1	—	16900	1.9	123900	4.1	360	16900
A 904_ 1025		3.4	123900	7.4	—	16900	1.7	123900	3.7	300	16900
A 904_ 1111		3.2	123900	6.9	—	16900	1.6	123900	3.4	390	16900
A 904_ 1222		2.9	123900	6.2	—	16900	1.4	123900	3.1	310	16900
A 904_ 1324		2.6	123900	5.7	—	16900	1.3	123900	2.9	400	16900
A 904_ 1507		2.3	123900	5.1	—	16900	1.2	123900	2.5	320	16900
A 904_ 1632		2.1	123900	4.7	—	16900	1.1	123900	2.3	410	16900

(—) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

A 90

123,900 lb·in

 	i (ratio)	n ₁ = 1100 rpm					n ₁ = 600 rpm				
		n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]	n ₂ [rpm]	T _{n2} [lb·in]	P _{n1} [hp]	R _{n1} [lb]	R _{n2} [lb]
A 903_ 9.7		113	80100	155	2200	9510	62	80100	85	3370	12100
A 903_ 10.5		105	86700	155	200	9550	57	86700	85	3370	12200
A 903_ 12.6		87	104400	156	1510	9460	48	104400	85	3030	12300
A 903_ 13.7		80	112800	155	1520	9460	44	113300	85	3030	12300
A 903_ 15.6		71	102200	123	1960	10500	38	102200	67	3370	13500
A 903_ 16.9		65	110600	123	1970	10500	36	110600	67	3370	13600
A 903_ 19.4		57	102200	99	2160	11600	31	102200	54	3370	14700
A 903_ 21.0		52	109700	98	2200	11600	28.6	109700	54	3370	14900
A 903_ 22.3		49	122600	104	3190	11300	26.9	123900	57	3370	14500
A 903_ 24.1		46	123900	97	3240	11700	24.9	123900	53	3370	15000
A 903_ 29.1		38	123900	80	3280	12600	20.6	123900	44	3370	16200
A 903_ 31.5		35	123900	74	3330	13100	19.0	123900	40	3370	16800
A 903_ 35.8		31	123900	65	3350	13900	16.8	123900	36	3370	16900
A 903_ 38.8		28.4	123900	60	3370	14400	15.5	123900	33	3370	16900
A 903_ 44.6		24.7	123900	52	3370	15200	13.5	123900	29	3370	16900
A 903_ 48.3		22.8	123900	48	3370	15700	12.4	123900	26	3370	16900
A 903_ 55.0		20.0	123900	42	3370	16600	10.9	123900	23	3370	16900
A 903_ 59.6		18.5	123900	39	3370	16900	10.1	123900	21	3370	16900
A 903_ 68.8		16.0	123900	34	3370	16900	8.7	123900	18.5	3370	16900
A 903_ 74.5		14.8	123900	31	3370	16900	8.1	123900	17.1	3370	16900
A 903_ 80.4		13.7	123900	29	3370	16900	7.5	123900	15.8	3370	16900
A 903_ 87.1		12.6	123900	27	3370	16900	6.9	123900	14.6	3370	16900
A 903_ 98.6		11.2	123900	24	3370	16900	6.1	123900	12.9	3370	16900
A 903_ 106.8		10.3	123900	22	3370	16900	5.6	123900	11.9	3370	16900
A 903_ 116.9		9.4	123900	20	3370	16900	5.1	123900	10.9	3370	16900
A 903_ 126.6		8.7	123900	18.4	3370	16900	4.7	123900	10.0	3370	16900
A 903_ 139.4		7.9	123900	16.7	3370	16900	4.3	123900	9.1	3370	16900
A 903_ 151.0		7.3	123900	15.4	3370	16900	4.0	123900	8.4	3370	16900
A 904_ 166.1		6.6	123900	14.4	—	16900	3.6	123900	7.9	160	16900
A 904_ 180.0		6.1	123900	13.3	—	16900	3.3	123900	7.2	310	16900
A 904_ 209.0		5.3	123900	11.4	—	16900	2.9	123900	6.2	340	16900
A 904_ 226.4		4.9	123900	10.6	110	16900	2.7	123900	5.8	470	16900
A 904_ 281.4		3.9	123900	8.5	160	16900	2.1	123900	4.6	520	16900
A 904_ 304.9		3.6	123900	7.8	280	16900	2.0	123900	4.3	650	16900
A 904_ 355.8		3.1	123900	6.7	280	16900	1.7	123900	3.7	650	16900
A 904_ 385.4		2.9	123900	6.2	390	16900	1.6	123900	3.4	760	16900
A 904_ 449.2		2.4	123900	5.3	350	16900	1.3	123900	2.9	720	16900
A 904_ 486.6		2.3	123900	4.9	450	16900	1.2	123900	2.7	790	16900
A 904_ 555.3		2.0	123900	4.3	410	16900	1.1	123900	2.3	790	16900
A 904_ 601.6		1.8	123900	4.0	510	16900	1.0	123900	2.2	790	16900
A 904_ 707.9		1.6	123900	3.4	480	16900	0.85	123900	1.8	790	16900
A 904_ 766.9		1.4	123900	3.1	580	16900	0.78	123900	1.7	790	16900
A 904_ 865.1		1.3	123900	2.8	500	16900	0.69	123900	1.5	790	16900
A 904_ 937		1.2	123900	2.6	600	16900	0.64	123900	1.4	790	16900
A 904_ 1025		1.1	123900	2.3	540	16900	0.59	123900	1.3	790	16900
A 904_ 1111		0.99	123900	2.2	630	16900	0.54	123900	1.2	790	16900
A 904_ 1222		0.90	123900	2.0	550	16900	0.49	123900	1.1	790	16900
A 904_ 1324		0.83	123900	1.8	640	16900	0.45	123900	0.99	790	16900
A 904_ 1507		0.73	123900	1.6	540	16900	0.40	123900	0.87	790	16900
A 904_ 1632		0.67	123900	1.5	650	16900	0.37	123900	0.80	790	16900

(–) Contact our Technical Service advising radial load data (rotation direction, angle, offset)

2.14 MOTOR AVAILABILITY

Matches of motors and gearboxes listed in tables (B12), (B13) and (B14) here after are purely based on geometrical compatibility. When selecting a gearmotor refer to

procedure described at chapter 1.8, based on torque/hp rating. Combinations featuring the gear ratios within brackets are not possible.

(B12)

	 (IM B5)											
	63	71	80	90	100	112	132	160	180	200	225	250
A 10 2 i =	5.5_91.6	5.5_91.6	5.5_65.9	5.5_65.9	5.5_65.9	5.5_65.9						
A 20 2 i =	7.3_92.3 (10.3)	7.3_92.3 (10.3)	5.4_79.9	5.4_79.9	5.4_79.9	5.4_79.9						
A 20 3 i =	120.5_380.9	120.5_380.9	120.5_380.9	120.5_380.9	120.5_380.9	120.5_380.9						
A 30 2 i =	9.3_97.5 (10.5;13.6)	9.3_97.5 (10.5;13.6)	5.4_97.5	5.4_97.5	5.4_97.5	5.4_97.5						
A 30 3 i =	120.5_400.8	120.5_400.8	120.5_400.8	120.5_400.8	120.5_400.8	120.5_400.8						
A 41 2 i =	11.7_79.2 (13.8_17.8)	11.7_79.2 (13.8_17.8)	5.2_79.2	5.2_79.2	5.2_79.2	5.2_79.2	5.2_45.1					
A 41 3 i =	92.8_376.8	92.8_376.8	92.8_376.8	92.8_376.8	92.8_376.8	92.8_376.8						
A 50 2 i =	20.9	20.9	7.7_20.9	7.7_20.9	7.7_20.9	7.7_20.9	7.7_20.9	7.7_20.9	7.7_20.9			
A 50 3 i =	51.7_190.6	51.7_190.6	24_190.6	24_190.6	24_190.6	24_190.6	24_109.4	24_109.4	24_109.4			
A 50 4 i =	211_778.2	211_778.2	211_778.2	211_778.2	211_778.2	211_778.2						
A 60 2 i =			10.3_20.6	10.3_20.6	10.3_20.6	10.3_20.6	7.9_20.6	7.9_20.6	7.9_20.6			
A 60 3 i =	65.0_185.8	65.0_185.8	25.7_185.8	25.7_185.8	25.7_185.8	25.7_185.8	25.7_133.3	25.7_133.3	25.7_133.3			
A 60 4 i =	208.7_755.4	208.7_755.4	208.7_755.4	208.7_755.4	208.7_755.4	208.7_755.4						
A 70 3 i =			66.9_153.7	66.9_153.7	66.9_153.7	66.9_153.7	15.4;153.7 (23.5_30.1)	9.4_153.7	9.4_153.7	9.4_38.4 (19.7_21.3)		
A 70 4 i =	292_1715	292_1715	169.8_1715	169.8_1715	169.8_1715	169.8_1715	169.8_644.6					
A 80 3 i =			82.3_156.8	82.3_156.8	82.3_156.8	82.3_156.8	19.3_156.8 (22.6_38.5)	12.3_156.8 (22.6_24.5)	9.8_156.8	9.8_104	9.8_104	
A 80 4 i =	354_1558	354_1558	171.3_1558	171.3_1558	171.3_1558	171.3_1558	171.3_762.1					
A 90 3 i =			98.6_151	98.6_151	98.6_151	98.6_151	55_151	15.6_151 (22.3_31.5)	9.7_151	9.7_126.6	9.7_126.6	9.7_126.6
A 90 4 i =	449.2_1632	449.2_1632	166.1_1632	166.1_1632	166.1_1632	166.1_1632	166.1_937.2	166.1_937.2	166.1_937.2			

(B13)

 NEMA Motor frame										
				N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC
				0.16...1	1.5...2	3...5	7.5...10	15...20	25...30	40...50
A 10 2	i =			5.5_91.6	5.5_65.9	5.5_65.9				
A 20 2				7.3_92.3 ● (10.3)	5.4_79.9	5.4_79.9				
A 20 3				120.5_380.9	120.5_380.9	120.5_380.9				
A 30 2				9.3_97.5 ● (10.5_13.6)	5.4_97.5	5.4_97.5				
A 30 3				120.5_400.8	120.5_400.8	120.5_400.8				
A 41 2				11.7_79.2 ● (13.8_17.8)	5.2_79.2	5.2_79.2	5.2_45.1			
A 41 3				92.8_376.8	92.8_376.8	92.8_376.8				
A 50 2				20.9	7.7_20.9	7.7_20.9	7.7_20.9	7.7_20.9	7.7_20.9	
A 50 3				51.7_190.6	24.0_190.6	24.0_190.6	24.0_109.4	24.0_109.4	24.0_109.4	
A 50 4				211.0_778.2	211.0_778.2	211.0_778.2				
A 60 2					10.3_20.6	10.3_20.6	7.9_20.6	7.9_20.6	7.9_20.6	
A 60 3				65.5_185.8	25.7_185.8	25.7_185.8	25.7_133.3	25.7_133.3	25.7_133.3	
A 60 4				208.7_755.4	208.7_755.4	208.7_755.4	208.7_755.4			
A 70 3					66.9_153.7	66.9_153.7	15.4_153.7 ● (23.5_30.1)	9.4_153.7	9.4_153.7	
A 70 4				292_1715	169.8_1715	169.8_1715	169.8_644.6			
A 80 3						82.3_156.8	19.3_156.8 ● (22.6_38.5)	12.3_156.8 ● (22.6_24.5)	9.8_156.8	9.8_104.0
A 80 4				354.0_1558	171.3_1558	171.3_1558	171.3_762.1			
A 90 3						98.6_151.0	55.0_151.0	15.6_151.0 ● (22.3_31.5)	9.7_151.0	9.7_126.6
A 90 4				449.2_1632	166.1_1632	166.1_1632	166.1_937.2	166.1_937.2	166.1_937.2	

(B14)



Integral gearmotors

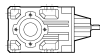
		M05	M1	M2	M3	M4	M5
A 10 2		5.5_91.6	5.5_91.6	5.5_65.9	5.5_65.9		
A 20 2		7.3_92.3 ● (10.3)	7.3_92.3 ● (10.3)	5.4_79.9	5.4_79.9		
A 20 3		120.5_380.9	120.5_380.9	120.5_380.9	120.5_380.9		
A 30 2			9.3_97.5 ● (10.5_13.6)	5.4_97.5	5.4_97.5		
A 30 3		120.5_400.8	120.5_400.8	120.5_400.8	120.5_400.8		
A 41 2			11.7_79.2 ● (13.8_17.8)	5.2_79.2	5.2_79.2	5.2_45.1	
A 41 3		92.8_376.8	92.8_376.8	92.8_376.8	92.8_376.8		
A 50 2			20.9	7.7_20.9	7.7_20.9	7.7_20.9	
A 50 3			51.7_190.6	24.0_190.6	24.0_190.6	24.0_109.4	
A 50 4	i =		211.0_778.2	211.0_778.2	211.0_778.2		
A 60 2				10.3_20.6	10.3_20.6	7.9_20.6	7.9_20.6
A 60 3				25.7_185.8	25.7_185.8	25.7_133.3	25.7_133.3
A 60 4			208.7_755.4	208.7_755.4	208.7_755.4		
A 70 3				66.9_153.7	66.9_153.7	15.4_153.7 ● (23.5_30.1)	15.4_153.7 ● (23.5_30.1)
A 70 4			292.0_1715	169.8_1715	169.8_1715	169.8_644.6	
A 80 3					82.3_156.8 ● (22.6_38.5)	19.3_156.8 ● (22.6_38.5)	19.3_156.8 ● (22.6_38.5)
A 80 4			354.0_1558	171.3_1558	171.3_1558	171.3_762.1	
A 90 3					98.6_151.0	55.0_151.0	55.0_151.0
A 90 4			449.2_1632	166.1_1632	166.1_1632	166.1_937.2	

2.15 MASS MOMENT OF INERTIA

A 10

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC	
A 102_5.5	24	59	90	121	—	—	—	—	43	
A 102_7.2	14	50	81	112	—	—	—	—	36	
A 102_9.6	7.1	43	74	105	—	—	—	—	31	
A 102_10.6	12	48	78	109	—	—	—	—	33	
A 102_12.3	4.8	40	71	102	—	—	—	—	26	
A 102_13.9	7.1	43	74	109	—	—	—	—	29	
A 102_18.6	4.8	40	71	102	—	—	—	—	24	
A 102_23.8	2.4	38	69	100	—	—	—	—	24	
A 102_28.6	2.4	38	69	100	—	—	—	—	21	
A 102_35.1	1.7	38	69	100	—	—	—	—	21	
A 102_45.4	1.2	38	69	100	—	—	—	—	21	
A 102_51.3	0.71	36	67	97	—	—	—	—	21	
A 102_65.9	0.48	36	67	97	—	—	—	—	21	
A 102_76.4	0.48	36	67	97	—	—	—	—	21	
A 102_91.6	0.24	36	67	97	—	—	—	—	21	

A 20

Type	i (ratio)	J ($\cdot 10^4$) [lb·ft ²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC	
A 202_5.5	57	—	124	154	—	—	—	—	102	
A 202_7.2	33	50	100	131	—	—	—	—	78	
A 202_9.6	21	43	88	119	—	—	—	—	67	
A 202_10.6	29	48	95	126	—	—	—	—	71	
A 202_12.3	12	40	78	109	—	—	—	—	57	
A 202_13.9	17	43	83	114	—	—	—	—	62	
A 202_18.6	9.5	40	76	107	—	—	—	—	57	
A 202_23.8	7.1	38	74	105	—	—	—	—	52	
A 202_28.6	4.8	38	71	102	—	—	—	—	50	
A 202_35.1	4.8	38	71	102	—	—	—	—	50	
A 202_45.4	2.4	38	69	100	—	—	—	—	48	
A 202_51.3	2.4	36	69	100	—	—	—	—	48	
A 202_65.9	2.4	36	69	100	—	—	—	—	48	
A 202_76.4	0.71	36	67	97	—	—	—	—	48	
A 202_91.6	0.48	36	—	—	—	—	—	—	48	
A 203_120.5	0.48	36	—	—	—	—	—	—	21	
A 203_146.1	0.48	36	—	—	—	—	—	—	21	
A 203_178.3	0.24	36	—	—	—	—	—	—	21	
A 203_221.3	0.24	36	—	—	—	—	—	—	21	
A 203_260.5	0.24	36	—	—	—	—	—	—	21	
A 203_329.4	0.24	36	—	—	—	—	—	—	21	
A 203_380.9	0.24	36	—	—	—	—	—	—	21	

A 30

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC	
A 302_5.4		107	—	—	204	—	—	—	—	164
A 302_7.0		69	—	138	166	—	—	—	—	124
A 302_9.3		38	74	105	135	—	—	—	—	95
A 302_10.5		55	—	121	152	—	—	—	—	109
A 302_11.8		26	62	93	124	—	—	—	—	81
A 302_13.6		36	—	—	133	—	—	—	—	93
A 302_18.0		21	57	88	119	—	—	—	—	76
A 302_22.8		14	50	81	112	—	—	—	—	71
A 302_29.3		9.5	45	76	107	—	—	—	—	67
A 302_36.6		7.1	43	74	105	—	—	—	—	64
A 302_43.4		4.8	40	71	102	—	—	—	—	62
A 302_52.7		4.8	40	71	102	—	—	—	—	59
A 302_66.0		2.4	38	69	100	—	—	—	—	59
A 302_76.5		2.4	38	69	100	—	—	—	—	59
A 302_97.5		2.4	38	—	—	—	—	—	—	57
A 303_120.5		2.4	38	—	—	—	—	—	—	21
A 303_150.7		2.4	38	—	—	—	—	—	—	21
A 303_178.6		2.4	38	—	—	—	—	—	—	21
A 303_216.6		2.4	38	—	—	—	—	—	—	21
A 303_271.5		2.4	38	—	—	—	—	—	—	21
A 303_314.6		2.4	38	—	—	—	—	—	—	21
A 303_400.8		0.95	38	—	—	—	—	—	—	21

A 41

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC	
A 412_5.2	304	—	—	401	753	—	—	—	553	
A 412_7.1	173	—	—	271	622	—	—	—	423	
A 412_9.2	107	—	—	204	556	—	—	—	356	
A 412_10.1	140	—	—	238	589	—	—	—	390	
A 412_11.7	69	105	135	166	518	—	—	—	318	
A 412_13.8	86	—	—	183	534	—	—	—	335	
A 412_17.8	52	—	119	150	501	—	—	—	271	
A 412_22.7	36	71	102	133	485	—	—	—	254	
A 412_28.3	26	62	93	124	—	—	—	—	242	
A 412_35.9	40	76	107	138	—	—	—	—	233	
A 412_45.1	36	71	102	133	—	—	—	—	228	
A 412_53.1	33	69	100	131	—	—	—	—	226	
A 412_64.2	31	67	97	128	—	—	—	—	223	
A 412_79.2	29	64	95	126	—	—	—	—	221	
A 413_92.8	26	62	93	124	—	—	—	—	219	
A 413_115.9	4.8	40	71	102	—	—	—	—	50	
A 413_146.9	2.4	38	69	100	—	—	—	—	50	
A 413_184.4	2.4	38	69	100	—	—	—	—	50	
A 413_217.4	2.4	38	69	100	—	—	—	—	48	
A 413_262.5	2.4	38	69	100	—	—	—	—	48	
A 413_324.2	2.4	38	69	100	—	—	—	—	48	
A 413_376.8	2.4	38	69	100	—	—	—	—	48	

A 50

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC	
A 502_7.7		356	—	—	454	808	2209	2162	—	572
A 502_9.7		242	—	—	340	691	2114	2043	—	458
A 502_13.1		150	—	—	245	599	2019	1948	—	363
A 502_16.6		100	—	—	195	549	1948	1900	—	314
A 502_20.9		67	100	133	164	515	1924	1876	—	283
A 503_24.0		143	—	209	240	591	1995	1948	—	356
A 503_26.4		138	—	204	235	587	1995	1948	—	352
A 503_32.4		95	—	162	192	544	1948	1900	—	309
A 503_35.6		93	—	159	190	542	1948	1900	—	306
A 503_40.9		64	—	131	162	513	1924	1876	—	280
A 503_45.0		62	—	128	159	511	1924	1876	—	278
A 503_51.7		45	81	112	143	494	1900	1853	—	261
A 503_56.8		45	78	109	140	494	1900	1853	—	259
A 503_63.9		33	67	100	131	482	1900	1829	—	249
A 503_70.2		33	67	97	128	482	1900	1829	—	247
A 503_81.5		21	57	88	119	470	1876	1829	—	238
A 503_89.5		21	57	88	119	470	1876	1829	—	238
A 503_99.5		14	50	81	112	463	1876	1829	—	230
A 503_109.4		14	50	81	112	463	1876	1829	—	230
A 503_118.0		12	48	78	109	—	—	—	—	228
A 503_129.7		12	48	78	109	—	—	—	—	228
A 503_140.6		9.5	43	76	105	—	—	—	—	223
A 503_154.6		9.5	43	76	105	—	—	—	—	223
A 503_173.4		7.1	40	71	102	—	—	—	—	221
A 503_190.6		4.8	40	71	102	—	—	—	—	221

For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.

A 60

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC	
A 602_7.9		855	—	—	—	1283	2708	2660	—	1354
A 602_10.3		537	—	603	634	974	2399	2352	—	1045
A 602_12.7		382	—	447	477	831	2233	2185	—	879
A 602_16.7		223	—	290	321	672	2090	2019	—	713
A 602_20.6		159	—	226	257	608	2019	1971	—	658
A 603_25.7		335	—	401	430	784	2185	2138	—	831
A 603_27.9		328	—	394	425	784	2185	2138	—	831
A 603_31.7		247	—	314	344	696	2114	2043	—	736
A 603_34.3		245	—	311	342	694	2114	2043	—	736
A 603_41.7		145	—	211	242	596	1995	1948	—	644
A 603_45.2		145	—	211	240	594	1995	1948	—	641
A 603_51.3		119	—	176	207	558	1971	1924	—	608
A 603_55.6		107	—	173	204	556	1971	1924	—	606
A 603_65.0		76	—	143	173	525	1948	1876	—	575
A 603_70.4		76	—	143	173	525	1924	1876	—	575
A 603_79.7		50	—	116	147	499	1900	1853	—	549
A 603_86.4		50	—	116	147	499	1900	1853	—	549
A 603_99.5		48	—	102	133	485	1900	1853	—	534
A 603_107.8		36	—	102	133	485	1900	1853	—	532
A 603_123.0		26	—	93	124	475	1876	1829	—	525
A 603_133.3		26	—	93	124	475	1876	1829	—	523
A 603_144.0		19	—	86	119	—	—	—	—	518
A 603_156.0		19	—	86	119	—	—	—	—	518
A 603_171.5		14	—	81	112	—	—	—	—	513
A 603_185.8		14	—	81	112	—	—	—	—	513

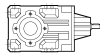
For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.

A 70

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]								
										
			NEMA Motor frame							
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC		N320TC
A 703_9.4	—	—	—	—	—	4442	4394	—	3563	
A 703_10.2	—	—	—	—	—	4347	4276	—	3468	
A 703_12.1	—	—	—	—	—	3563	3515	—	2684	
A 703_13.1	—	—	—	—	—	3492	3444	—	2637	
A 703_15.4	1069	—	—	—	1520	2945	2874	—	2067	
A 703_16.7	1045	—	—	—	1496	2898	2850	—	2019	
A 703_19.7	713	—	—	—	1164	2589	2542	—	1710	
A 703_21.3	689	—	—	—	1140	2565	2518	—	1686	
A 703_23.5	—	—	—	—	1354	2755	2708	—	1876	
A 703_27.8	—	—	—	—	1164	2803	2755	—	1924	
A 703_30.1	—	—	—	—	1164	2779	2732	—	1924	
A 703_35.4	610	—	—	—	1069	2470	2423	—	1591	
A 703_38.4	603	—	—	—	1045	2470	2399	—	1591	
A 703_45.2	435	—	—	—	879	2304	2233	—	1401	
A 703_49.0	432	—	—	—	879	2280	2233	—	1401	
A 703_53.2	356	—	—	—	808	2209	2162	—	1330	
A 703_57.7	356	—	—	—	808	2209	2162	—	1330	
A 703_66.9	230	—	—	316	679	2090	2043	—	1211	
A 703_72.5	228	—	—	314	675	2090	2043	—	1211	
A 703_79.3	162	—	—	252	610	2019	1971	—	1140	
A 703_85.9	159	—	—	249	608	2019	1971	—	1140	
A 703_96.2	128	—	—	223	580	1995	1948	—	1116	
A 703_104.2	128	—	—	223	577	1995	1924	—	1116	
A 703_120.6	81	—	—	178	530	1948	1876	—	1069	
A 703_130.7	81	—	—	176	530	1948	1876	—	1069	
A 703_141.9	57	—	—	154	506	1924	1853	—	1045	
A 703_153.7	57	—	—	154	506	1924	1853	—	1045	

For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.

A 80

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]							
									
			NEMA Motor frame						
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC
A 803_9.8	—	—	—	—	—	—	7601	14513	6793
A 803_10.7	—	—	—	—	—	—	7340	14276	6556
A 803_12.3	—	—	—	—	—	5677	5677	12613	4869
A 803_13.3	—	—	—	—	—	5511	5534	12447	4727
A 803_15.5	—	—	—	—	—	4442	4394	11354	3563
A 803_16.7	—	—	—	—	—	4347	4276	11259	3563
A 803_19.3	1639	—	—	—	2090	3492	3444	10451	2637
A 803_20.9	1568	—	—	—	2019	3444	3373	10380	2565
A 803_22.6	—	—	—	—	—	—	4869	11781	4062
A 803_24.5	—	—	—	—	—	—	4822	11734	4014
A 803_28.2	—	—	—	—	—	3919	3943	10855	3135
A 803_30.6	—	—	—	—	—	3895	3895	10831	3088
A 803_35.5	—	—	—	—	—	3325	3278	10261	2470
A 803_38.5	—	—	—	—	—	3325	3254	10238	2447
A 803_44.5	926	—	—	—	1378	2803	2732	9739	1924
A 803_48.2	926	—	—	—	1378	2779	2732	9739	2138
A 803_55.2	696	—	—	—	1140	2565	2494	9477	1663
A 803_59.8	689	—	—	—	1140	2542	2494	9477	1663
A 803_66.8	527	—	—	—	974	2399	2328	9287	1496
A 803_72.4	523	—	—	—	974	2375	2328	9287	1496
A 803_82.3	356	—	406.2	437	808	2233	2162	9121	1330
A 803_89.2	356	—	403.8	435	808	2209	2162	9169	1330
A 803_96.0	333	—	382.4	411	760	2185	2138	9074	1306
A 803_104.0	318	—	380.0	409	760	2185	2114	9074	1306
A 803_116.0	216	—	280.3	311	665	2067	2019	8979	1188
A 803_125.6	216	—	280.3	311	665	2067	2019	—	1188
A 803_144.7	128	—	194.8	238	580	1995	1948	—	1116
A 803_156.8	—	—	68.9	100	454	1853	1805	—	974

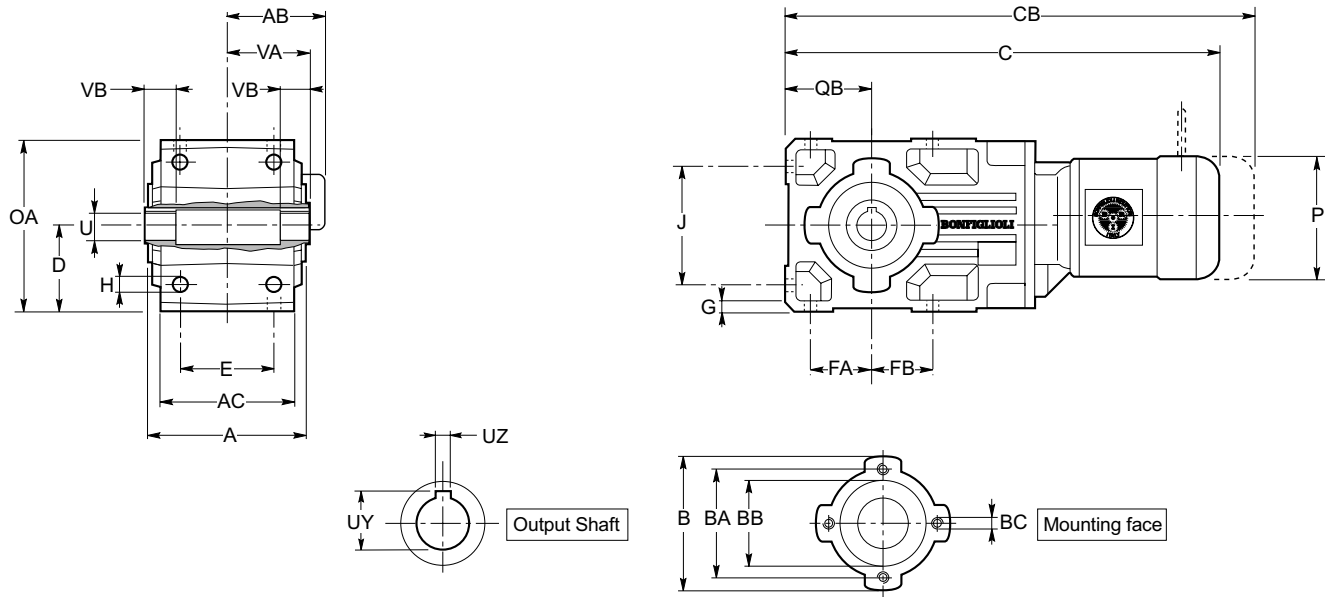
For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.

A 90

Type	i (ratio)	J ($\cdot 10^{-4}$) [lb·ft ²]							
									
			NEMA Motor frame						
			N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC
A 903_9.7	—	—	—	—	—	—	14181	21116	21330
A 903_10.5	—	—	—	—	—	—	13658	20594	20808
A 903_12.6	—	—	—	—	—	—	9549	16461	16698
A 903_13.7	—	—	—	—	—	—	9240	16176	16390
A 903_15.6	—	—	—	—	—	—	7268	14181	14418
A 903_16.9	—	—	—	—	—	—	7055	13990	14204
A 903_19.4	3539	—	—	—	—	5606	5558	12518	12589
A 903_21.0	3397	—	—	—	—	5487	5416	12399	12447
A 903_22.3	—	—	—	—	—	—	7743	14679	14893
A 903_24.1	—	—	—	—	—	—	7648	14584	14798
A 903_29.1	—	—	—	—	—	—	5772	12708	12922
A 903_31.5	—	—	—	—	—	—	5724	12637	12874
A 903_35.8	—	—	—	—	—	—	4774	11710	11924
A 903_38.8	—	—	—	—	—	—	4751	11663	11876
A 903_44.6	1924	—	—	—	—	4014	3943	10926	10974
A 903_48.3	1900	—	—	—	—	3990	3919	10903	10950
A 903_55.0	1568	—	—	—	2019	3420	3373	10380	10404
A 903_59.6	1568	—	—	—	1995	3420	3349	10356	10380
A 903_68.8	1140	—	—	—	1591	2993	2945	9929	9881
A 903_74.5	1116	—	—	—	1568	2993	2922	9905	9881
A 903_80.4	1021	—	—	—	1473	2874	2827	9786	9786
A 903_87.1	1021	—	—	—	1473	2874	2827	9786	9786
A 903_98.6	665	—	712.6	760.1	1116	2518	2470	9430	9477
A 903_106.8	665	—	712.6	736.3	1116	2518	2470	9430	9477
A 903_116.9	546	—	596.2	627.1	974	2399	2352	9287	9359
A 903_126.7	532	—	593.8	622.3	974	2399	2328	9287	9359
A 903_139.4	356	—	408.6	451.3	784	2209	2162	—	9169
A 903_151.0	—	—	71.3	102.1	456	1876	1805	—	8836

For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.

2.16 DIMENSIONS



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 10 2	4.61 117	3.74 95	4.72 120	3.94 100	3.150 80	$\begin{smallmatrix} -0.0012 \\ -0.0024 \\ -0.030 \\ -0.060 \end{smallmatrix}$	$M8 \times 12$ [mm]	2.76 70	2.95 75	1.97 50	1.97 50	0.35 9	0.37 9.5	3.94 100	5.51 140	2.76 70

Output shaft (Inch series)

		U	UY	UZ	VA	VB
A 10 2	NUH	1.000 $\begin{smallmatrix} +0.0011 \\ +0.0003 \end{smallmatrix}$	1.114	0.250	2.36	0.71

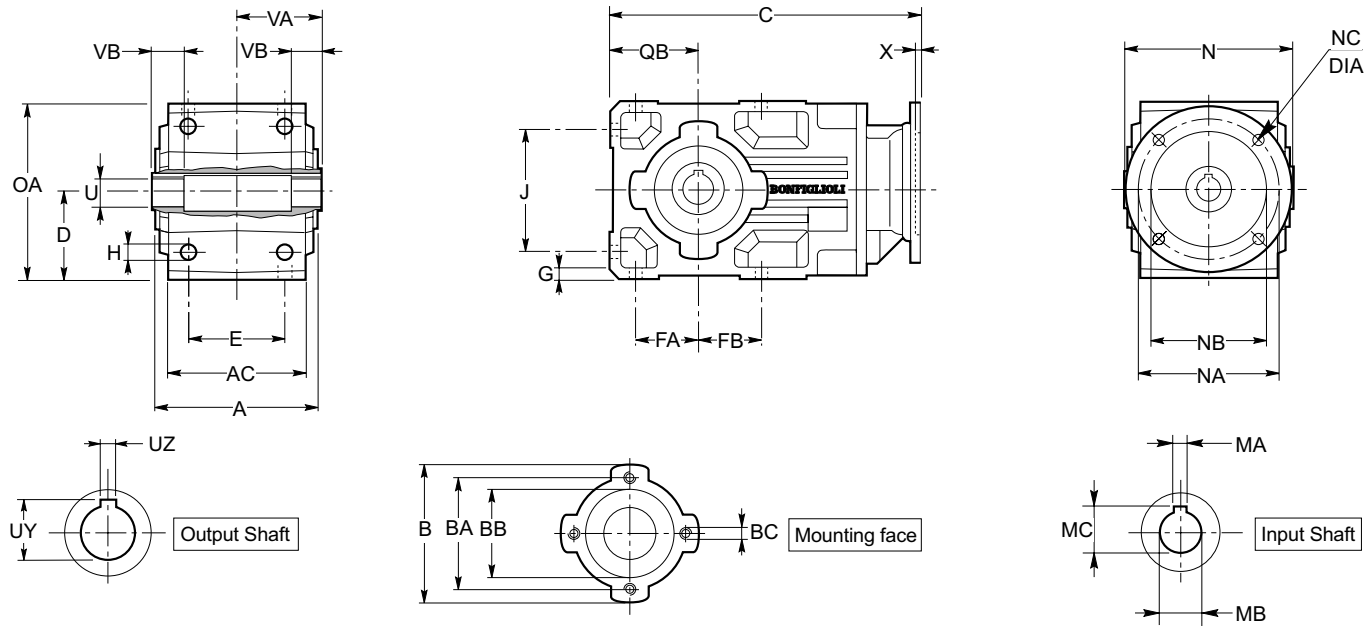
Motor



	AB	C	CB	P	Weight [lbs / kg]
A 10 2_S05 M05	3.74 95	16.08 408.5	18.68 474.5	4.76 121	31 / 14
A 10 2_S1 M1S	4.25 108	16.28 413.5	18.76 476.5	5.43 138	35 / 16
A 10 2_S1 M1L	4.25 108	17.22 437.5	19.63 498.5	5.43 138	37 / 17
A 10 2_S2 M2S	4.69 119	18.37 466.5	21.12 536.5	6.14 156	49 / 22
A 10 2_S3 M3S	5.59 142	20.06 509.5	23.84 605.5	7.68 195	66 / 30
A 10 2_S3 M3L	5.59 142	21.32 541.5	24.90 632.5	7.68 195	82 / 37

Dimensions are $\frac{\text{inch}}{\text{mm}}$

A 10 2 Shaft mount - NEMA C - face adapter



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 10 2	4.61	3.74	4.72	3.94	3.150	-0.0012 -0.0024	M8x12 [mm]	2.76	2.95	1.97	1.97	0.35	0.37	3.94	5.51	2.76
	117	95	120	100	80	-0.030 -0.060		70	75	50	50	9	9.5	100	140	70

Output shaft (Inch series)

		U	UY	UZ	VA	VB
A 10 2	NUH	1.000	$\begin{smallmatrix} +0.0011 \\ +0.0003 \end{smallmatrix}$	1.114	0.250	0.71

NEMA flange

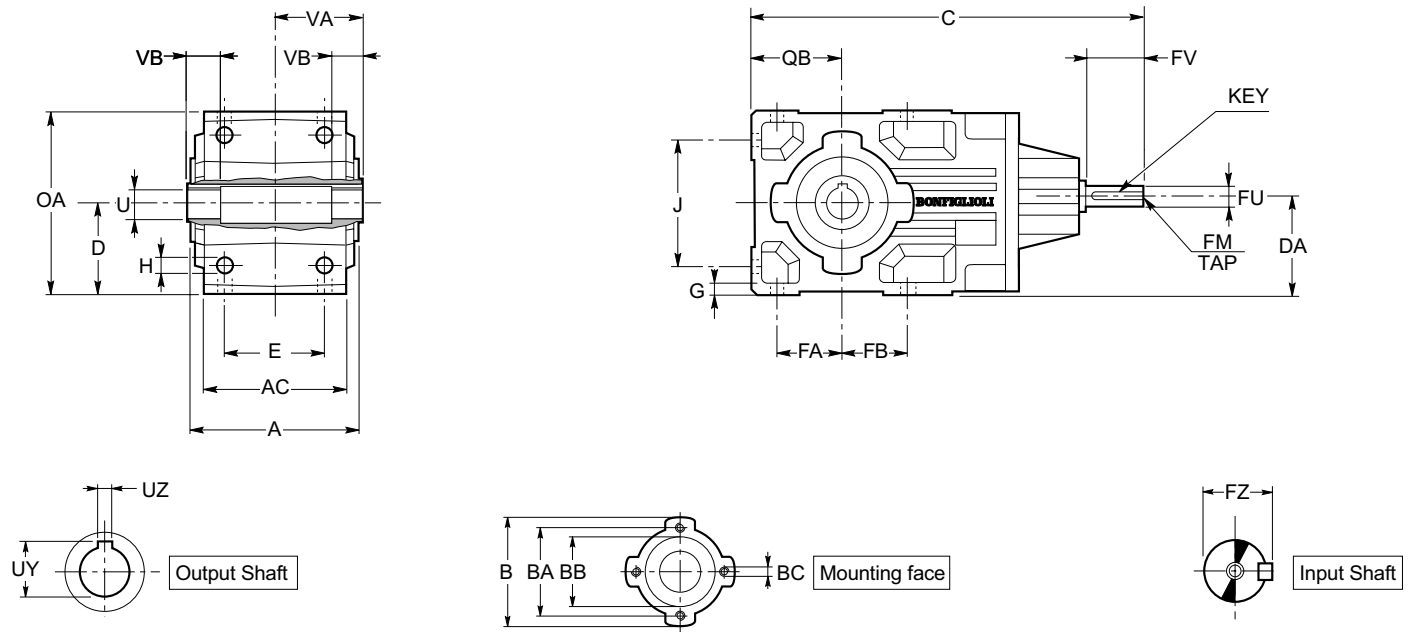
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	18 / 8
N140TC	6.496	5.875	4.500	0.394	0.196	20 / 9
N180TC	8.996	7.250	8.500	0.551	0.216	29 / 13

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241

	C		
	N56C	N140TC	N180TC
A 10 2	11.91	11.91	12.66
	302.5	302.5	321.5

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 10 2	4.61 117	3.74 95	4.72 120	3.94 100	3.150 80	$\begin{matrix} -0.0012 \\ -0.0024 \end{matrix}$ $\begin{matrix} -0.030 \\ -0.060 \end{matrix}$ M8x12 [mm]	2.76 70	2.95 75	1.97 50	1.97 50	0.35 9	0.37 9.5	3.94 100	5.51 140	2.76 70

Output shaft (Inch series)

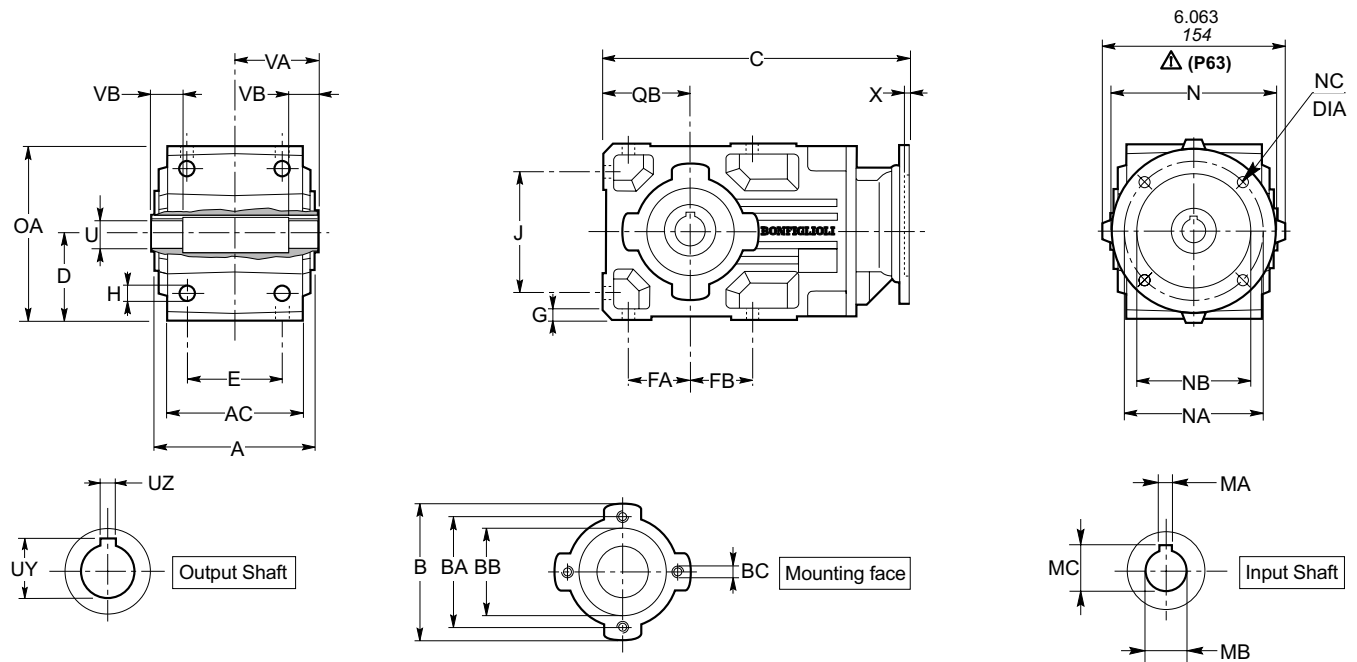
	U	UY	UZ	VA	VB
A 10 2 NUH	1.000 $\begin{matrix} +0.0011 \\ +0.0003 \end{matrix}$	1.114	0.250	2.36	0.71

Input shaft (Inch series)

	FU	FZ	FV	Key	FM
A 10 2 NHS	0.625 $\begin{matrix} +0 \\ -0.0004 \end{matrix}$	0.710	1.570	3/16 x 3/16 x 1 3/8	M6x16 [mm]

	C	Weight [lbs / kg]
A 10 2	11.40 289.5	18 / 8

A 10 2 Shaft mount - IEC B5 motor adapter



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 10 2	4.61	3.74	4.72	3.94	3.150	$M8 \times 12$ [mm]	2.76	2.95	1.97	1.97	0.35	0.37	3.94	5.51	2.76
	117	95	120	100	80		70	75	50	50	9	9.5	100	140	70

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 10 2	1.000	1.114	0.250	2.36	0.71

IEC flange (mm)

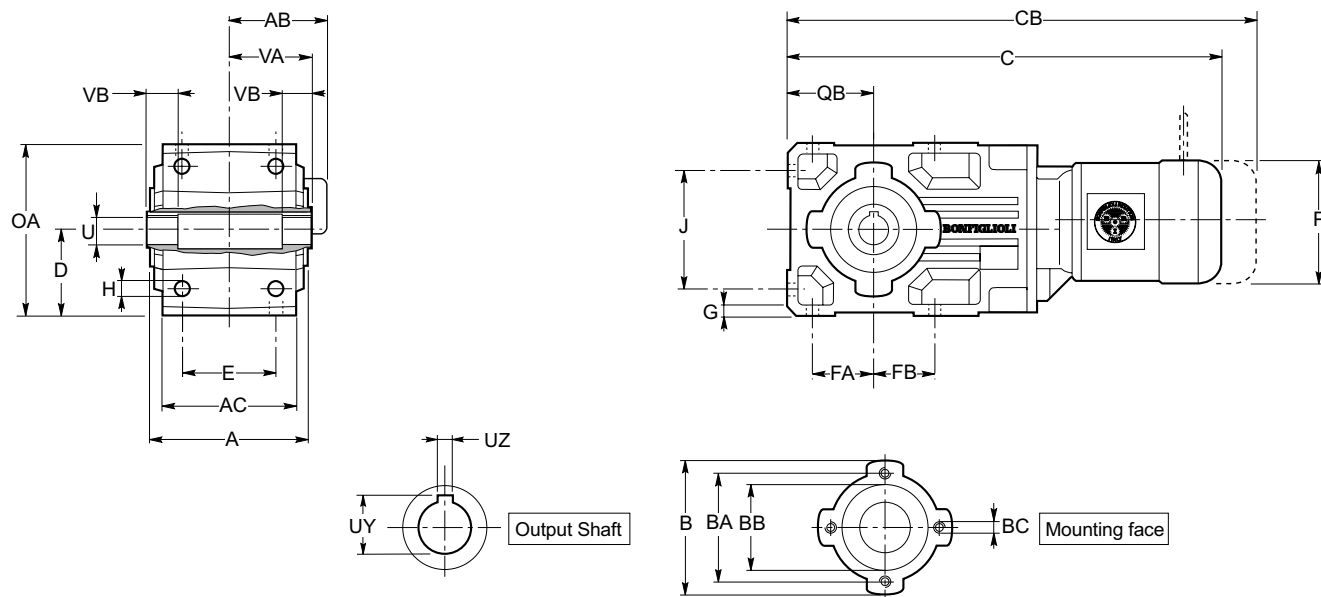
	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	18 / 8
P71	160	130	110	M8x16	4.5	18 / 8
P80, P90	200	165	130	M10x12	4	20 / 9
P100, P112	250	215	180	M12x16	4.5	29 / 13

Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3

	C		
	P63 P71	P80 P90	P100 P112
A 10 2	11.12 282.5	11.89 302	12.28 312

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 20 2, A 20 3	5.35 136	4.33 110	5.51 140	4.53 115	3.740 95	$\begin{matrix} -0.0014 \\ -0.0028 \end{matrix}$ $\begin{matrix} -0.036 \\ -0.071 \end{matrix}$ <i>M8x15 [mm]</i>	3.15 80	3.54 90	2.36 60	2.36 60	0.35 9	0.37 9.5	4.72 120	6.30 160	3.15 80

Output shaft (Inch series)

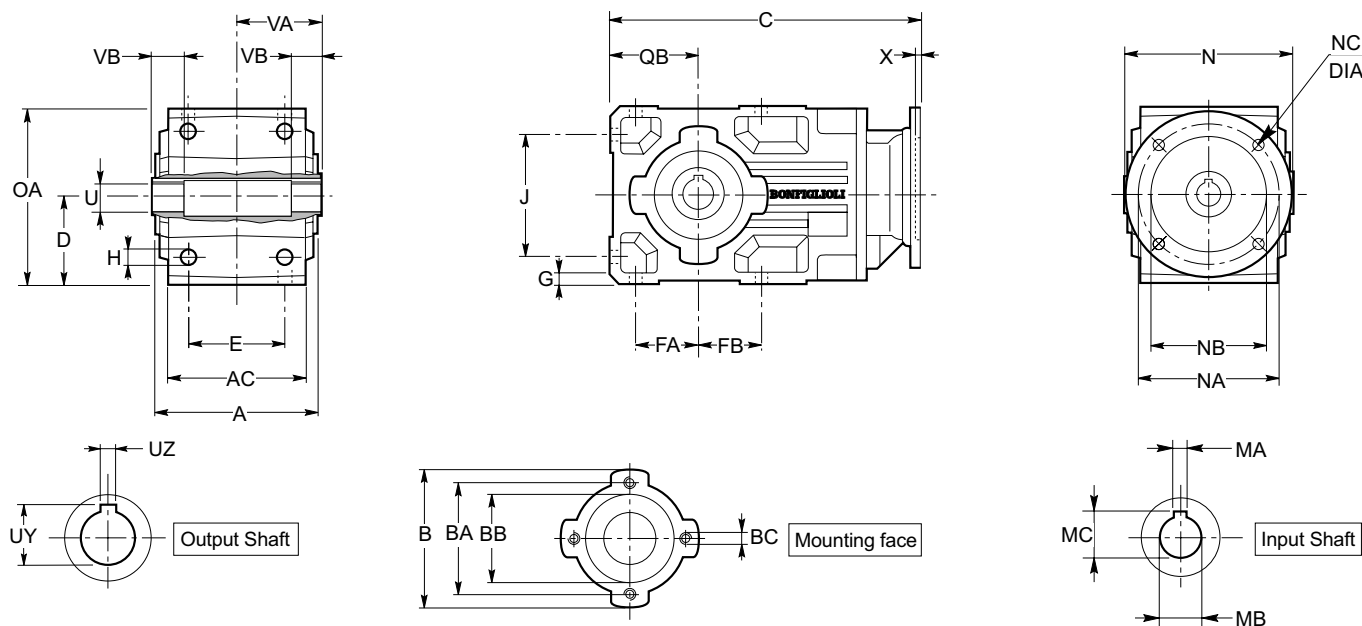
	U	UY	UZ	VA	VB
A 20 2, A 20 3 NUH	1.250 $\begin{matrix} +0.0013 \\ +0.0004 \end{matrix}$	1.367	0.250	2.76	0.87

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 20 2_S05 M05	3.74 95	17.01 432	19.61 498	4.76 121	40 / 18
A 20 2_S1 M1S	4.25 108	17.20 437	19.69 500	5.43 138	42 / 19
A 20 2_S1 M1L	4.25 108	18.15 461	20.55 522	5.43 138	46 / 21
A 20 2_S2 M2S	4.69 119	19.29 490	22.05 560	6.14 156	57 / 26
A 20 2_S3 M3S	5.59 142	20.98 533	24.76 629	7.68 195	75 / 34
A 20 2_S3 M3L	5.59 142	22.24 565	25.83 656	7.68 195	90 / 41
A 20 3_S05 M05	3.74 95	18.01 457.5	21.79 553.5	4.76 121	40 / 18
A 20 3_S1 M1S	4.25 108	18.21 462.5	21.87 555.5	5.43 138	44 / 20
A 20 3_S1 M1L	4.25 108	19.15 486.5	22.74 577.5	5.43 138	46 / 21
A 20 3_S2 M2S	4.69 119	21.48 545.5	24.23 615.5	6.14 156	57 / 26
A 20 3_S1 M3S	5.59 142	23.17 588.5	26.95 684.5	7.68 195	75 / 34
A 20 3_S1 M3L	5.59 142	24.43 620.5	28.01 711.5	7.68 195	90 / 41

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 20 2, A 20 3	5.35	4.33	5.51	4.53	3.740	M8x15 [mm]	3.15	3.54	2.36	2.36	0.35	0.37	4.72	6.30	3.15
	136	110	140	115	95		80	90	60	60	9	9.5	120	160	80

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 20 2, A 20 3 NUH	1.250 + 0.0013 + 0.0004	1.367	0.250	2.76	0.87

NEMA flange



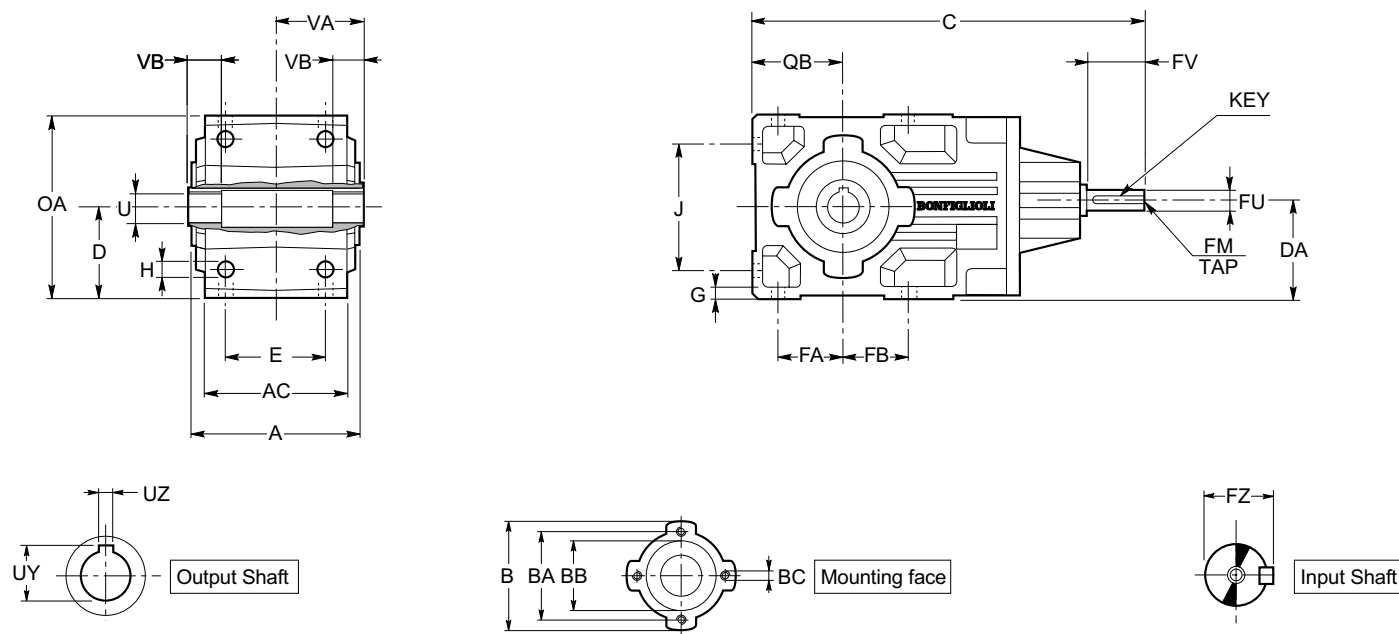
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	26 / 12
N140TC	6.496	5.875	4.500	0.394	0.196	29 / 13
N180TC	8.996	7.250	8.500	0.551	0.216	37 / 17

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241

	C		
	N56C	N140TC	N180TC
A 20 2	12.83	12.83	13.58
	326	326	345
A 20 3	15.00	15.00	15.77
	381	381	400.5

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 20 2, A 20 3	5.35 136	4.33 110	5.51 140	4.53 115	3.740 95	$\begin{matrix} -0.0014 \\ -0.0028 \end{matrix}$ $\begin{matrix} -0.036 \\ -0.071 \end{matrix}$ <i>M8x15 [mm]</i>	3.15 80	3.54 90	2.36 60	2.36 60	0.35 9	0.37 9.5	4.72 120	6.30 160	3.15 80

Output shaft (Inch series)

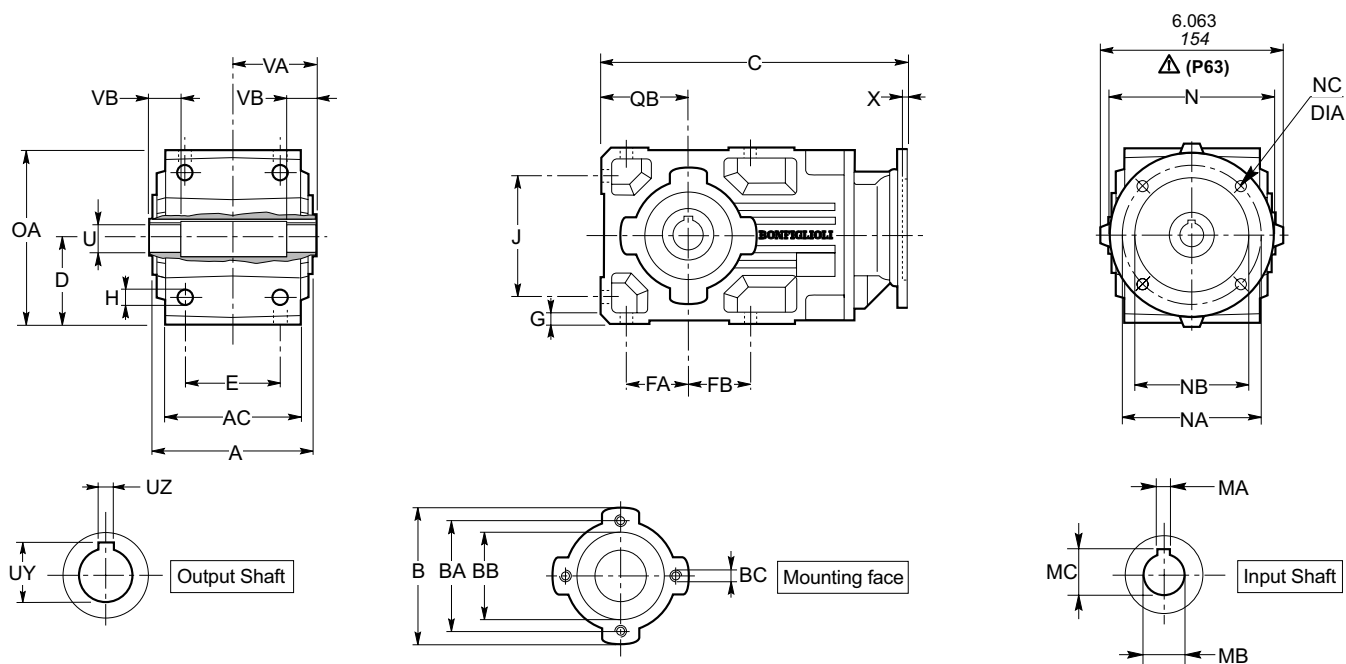
	U	UY	UZ	VA	VB
A 20 2, A 20 3 NUH	1.250 $\begin{matrix} +0.0013 \\ +0.0004 \end{matrix}$	1.367	0.250	2.76	0.87

Input shaft (Inch series)

	FU	FZ	FV	Key	FM
A 20 2 NHS	0.750 $\begin{matrix} +0 \\ -0.0005 \end{matrix}$	0.830	1.570	3/16 x 3/16 x 1 3/8	<i>M6x16 [mm]</i>
A 20 3 NHS	0.625 $\begin{matrix} +0 \\ -0.0004 \end{matrix}$	0.710	1.570	3/16 x 3/16 x 1 3/8	<i>M6x16 [mm]</i>



	C	Weight [lbs / kg]
A 20 2	14.02 356	27 / 12
A 20 3	14.51 368.5	27 / 12



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 20 2, A 20 3	5.35 136	4.33 110	5.51 140	4.53 115	3.740 95	^{-0.0014} _{-0.0028} ^{-0.036} _{-0.071} M8x15 [mm]	3.15 80	3.54 90	2.36 60	2.36 60	0.35 9	0.37 9.5	4.72 120	6.30 160	3.15 80

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 20 2, A 20 3 NUH	1.250 ^{+0.0013} ^{+0.0004}	1.367	0.250	2.76	0.87

IEC flange (mm)

	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	29 / 13
P71	160	130	110	M8x16	4.5	29 / 13
P80, P90	200	165	130	M10x12	4	31 / 14
P100, P112	250	215	180	M12x16	4.5	40 / 18

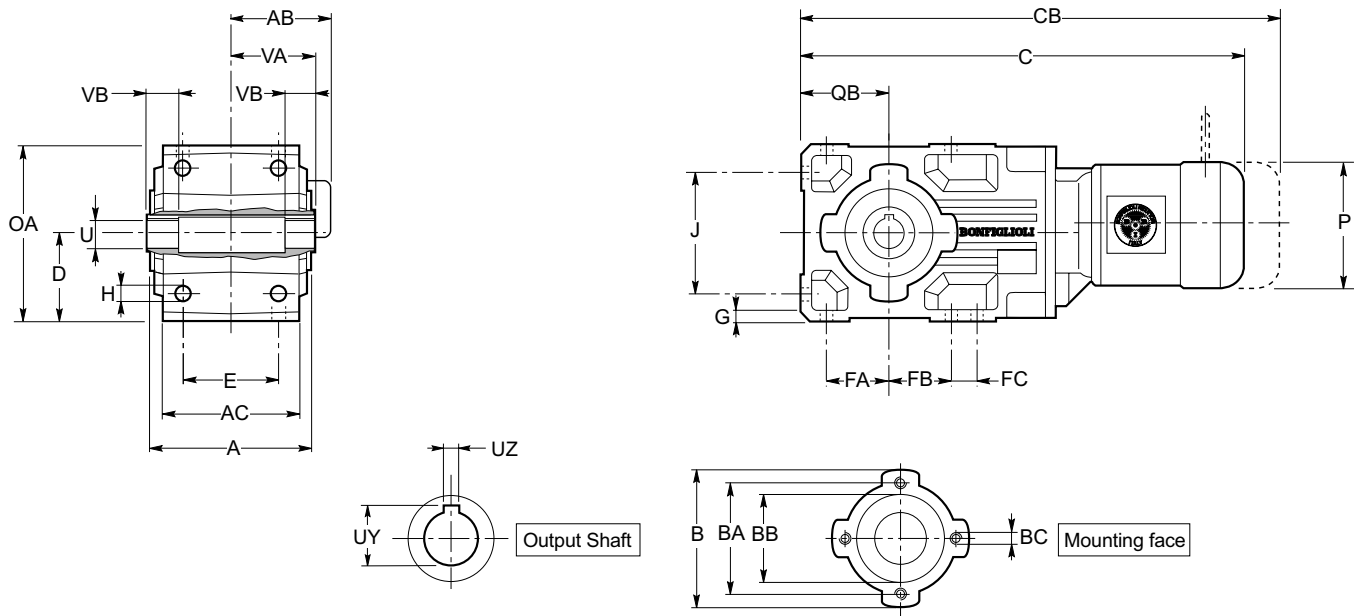


Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3

	C		
	P63 P71	P80 P90	P100 P112
A 20 2	12.05 306	12.81 325.5	13.21 335.5
A 20 3	14.23 361.5	15.00 381	15.39 391

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 30 2, A 30 3	6.14 156	5.12 130	5.51 140	4.53 115	3.740 95 -0.0014 -0.0028 -0.036 -0.071	M8x15 [mm]	3.54 90	3.74 95	2.48 63	2.48 63	0.87 22	0.43 11	0.47 12	4.96 126	7.09 180	3.54 90

Output shaft (Inch series)

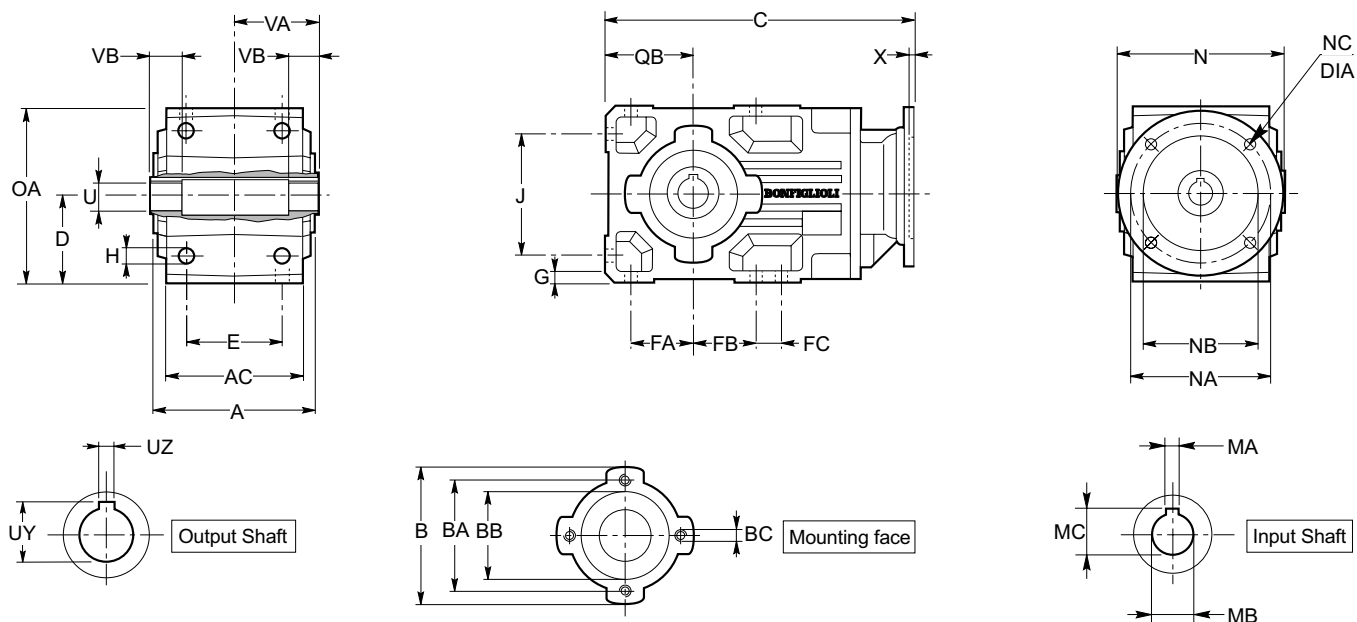
	U	UY	UZ	VA	VB
A 30 2, A 30 3 NUH	1.375 + 0.0013 + 0.0004	1.518	0.312	3.15	0.98

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 30 2_S1 M1S	4.25 108	18.27 464	20.75 527	5.43 138	51 / 23
A 30 2_S1 M1L	4.25 108	19.21 488	21.61 549	5.43 138	53 / 24
A 30 2_S2 M2S	4.69 119	20.35 517	23.11 587	6.14 156	64 / 29
A 30 2_S3 M3S	5.59 142	22.05 560	25.83 656	7.68 195	84 / 38
A 30 2_S3 M3L	5.59 142	23.31 592	26.89 683	7.68 195	99 / 45
A 30 3_S05 M05	3.74 95	20.33 516.5	22.93 582.5	4.76 121	49 / 22
A 30 3_S1 M1S	4.25 108	20.53 521.5	23.01 584.5	5.43 138	53 / 24
A 30 3_S1 M1L	4.25 108	21.48 545.5	23.88 606.5	5.43 138	57 / 26
A 30 3_S2 M2S	4.69 119	22.62 574.5	25.37 644.5	6.14 156	64 / 29
A 30 3_S3 M3S	5.59 142	24.31 617.5	28.09 713.5	7.68 195	84 / 38
A 30 3_S3 M3L	5.59 142	25.57 649.5	29.15 740.5	7.68 195	99 / 45

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB	
A 30 2, A 30 3	6.14	5.12	5.51	4.53	3.740	-0.0014 -0.0028	M8x15 [mm]	3.54	3.74	2.48	2.48	0.87	0.43	0.47	4.96	7.09	3.54
	156	130	140	115	95	-0.036 -0.071		90	95	63	63	22	11	12	126	180	90

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 30 2, A 30 3 NUH	1.375 $\begin{smallmatrix} +0.0013 \\ +0.0004 \end{smallmatrix}$	1.518	0.312	3.15	0.98

NEMA flange

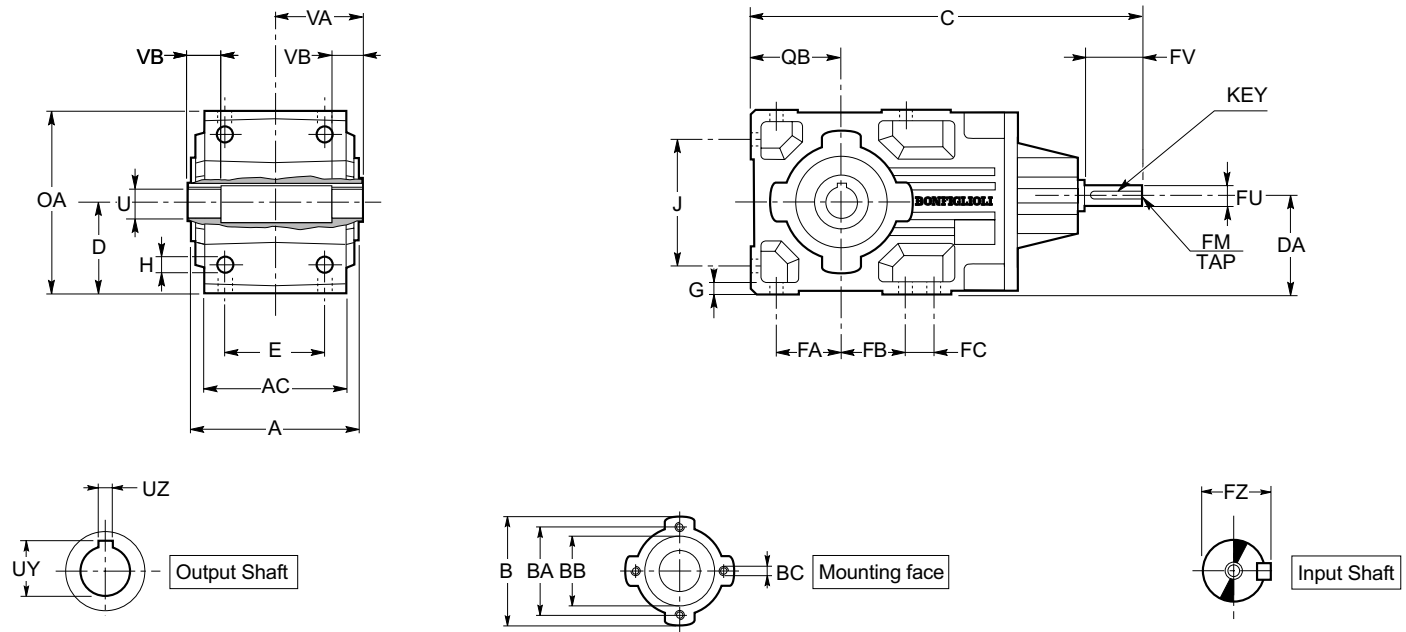


	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	35 / 16
N140TC	6.496	5.875	4.500	0.394	0.196	37 / 17
N180TC	8.996	7.250	8.500	0.551	0.216	44 / 20

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241

	C		
	N56C	N140TC	N180TC
A 30 2	13.90	13.90	14.65
	353	353	372
A 30 3	16.16	16.16	16.91
	410.5	410.5	429.5



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 30 2, A 30 3	6.14 156	5.12 130	5.51 140	4.53 115	3.740 95 ^{-0.0014} _{-0.0028} ^{-0.036} _{-0.071}	M8x15 [mm]	3.54 90	3.74 95	2.48 63	2.48 63	0.87 22	0.43 11	0.47 12	4.96 126	7.09 180	3.54 90

Output shaft (Inch series)

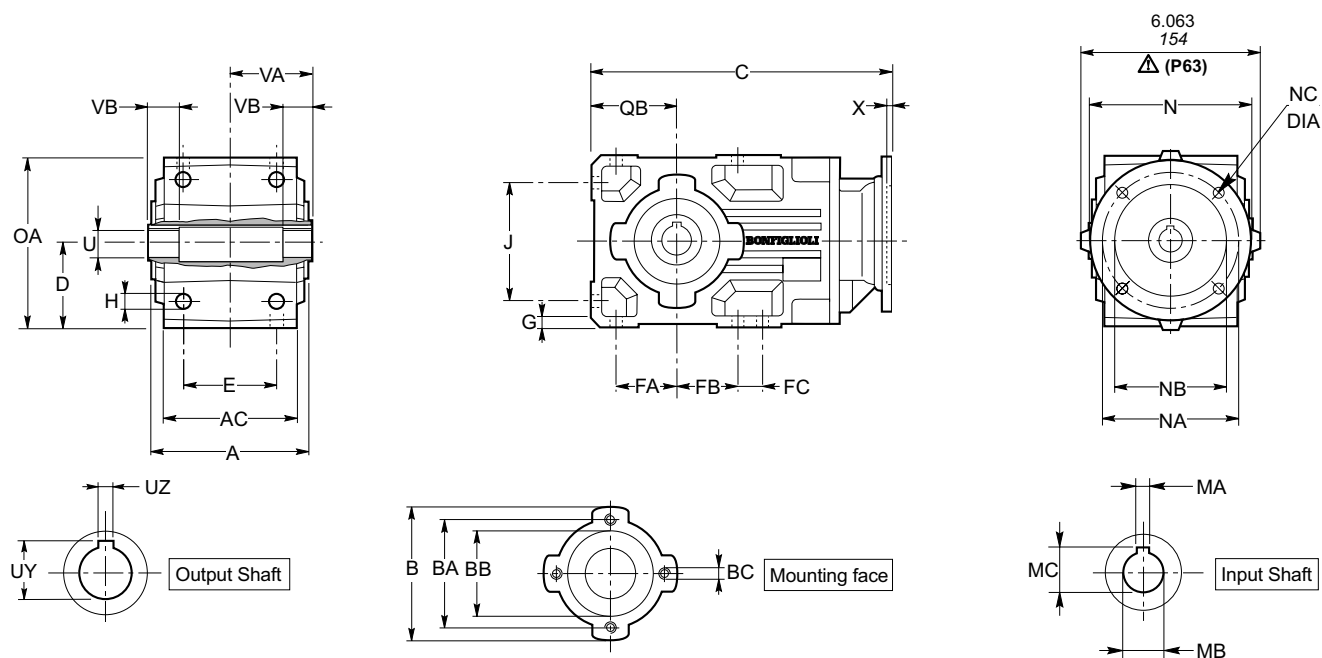
	U	UY	UZ	VA	VB
A 30 2, A 30 3 NUH	1.375 ^{+0.0013} _{+0.0004}	1.518	0.312	3.15	0.98

Input shaft (Inch series)

	FU	FZ	FV	Key	FM
A 30 2 NHS	0.750 ⁺⁰ _{-0.0005}	0.830	1.570	3/16 x 3/16 x 1 3/8	M6x16 [mm]
A 30 3 NHS	0.625 ⁺⁰ _{-0.0004}	0.710	1.570	3/16 x 3/16 x 1 3/8	M6x16 [mm]



	C	Weight [lbs / kg]
A 30 2	15.08 383	38 / 17
A 30 3	15.65 397.5	38 / 17



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 30 2, A 30 3	6.14	5.12	5.51	4.53	3.740	M8x15 [mm]	3.54	3.74	2.48	2.48	0.87	0.43	0.47	4.96	7.09	3.54
	156	130	140	115	95		90	95	63	63	22	11	12	126	180	90

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 30 2, A 30 3 NUH	1.375	$+0.0013$ $+0.0004$	1.518	3.15	0.98

IEC flange (mm)



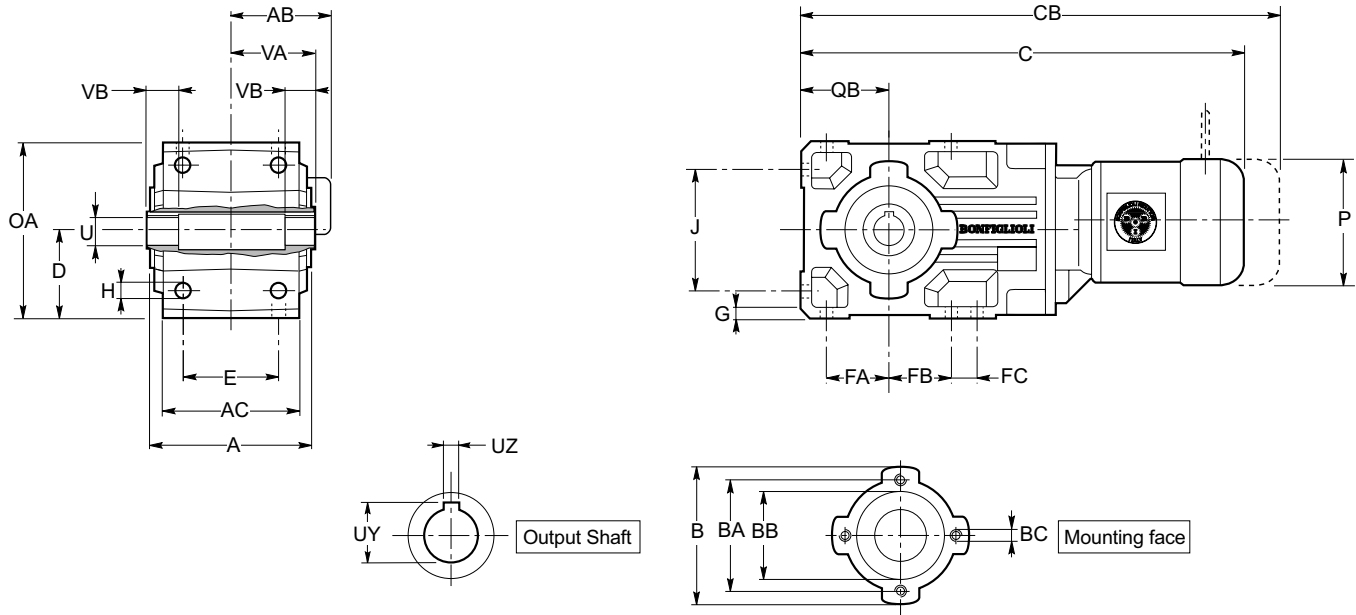
	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	38 / 17
P71	160	130	110	M8x16	4.5	38 / 17
P80, P90	200	165	130	M10x12	4	40 / 18
P100, P112	250	215	180	M12x16	4	49 / 22

Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3

	C		
	P63 P71	P80 P90	P100 P112
A 30 2	13.11	13.88	14.27
	333	352.5	362.5
A 30 3	15.37	16.14	16.54
	390.5	410	420

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 41 2, A 41 3	7.17	6.10	7.87	6.50	5.118	$\begin{smallmatrix} -0.0017 \\ -0.0033 \end{smallmatrix}$	M12x19 [mm]	4.41	4.72	3.15	3.15	0.79	0.51	0.55	6.30	8.82	4.41
	182	155	200	165	130	$\begin{smallmatrix} -0.043 \\ -0.083 \end{smallmatrix}$		112	120	80	80	20	13	14	160	224	112

Output shaft (Inch series)

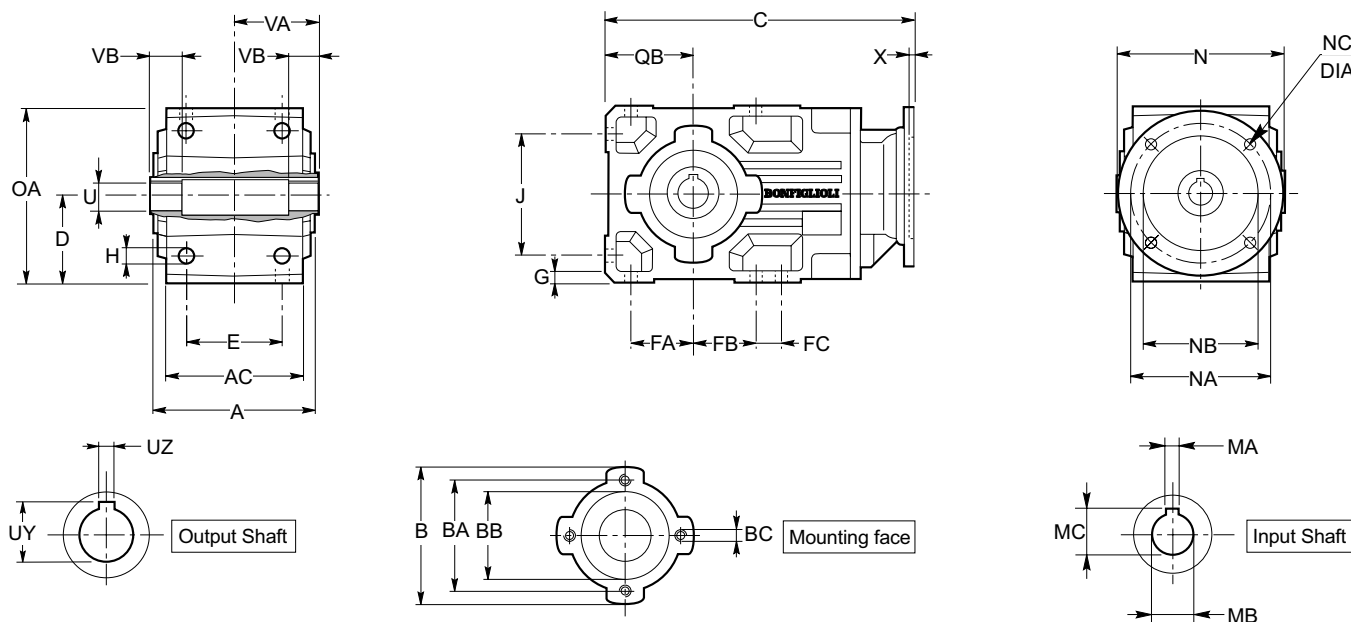
	U	UY	UZ	VA	VB
A 41 2, A 41 3 NUH	1.625	$\begin{smallmatrix} +0.0013 \\ +0.0004 \end{smallmatrix}$	1.796	3.66	1.18

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 41 2_S1 M1S	4.25	19.92	22.40	5.43	95 / 43
	108	506	569	138	
A 41 2_S1 M1L	4.25	20.87	23.27	5.43	97 / 44
	108	530	591	138	
A 41 2_S2 M2S	4.69	22.01	24.76	6.14	108 / 49
	119	559	629	156	
A 41 2_S3 M3S	5.59	23.70	27.48	7.68	128 / 58
	142	602	698	195	
A 41 2_S3 M3L	5.59	24.96	28.54	7.68	143 / 65
	142	634	725	195	
A 41 2_S4 M4S	7.60	29.21	33.50	10.16	201 / 91
	193	742	851	258	
A 41 2_S4 M4L	7.60	29.21	33.50	10.16	243 / 110
	193	742	851	258	
A 41 3_S05 M05	3.74	22.15	24.74	4.76	101 / 46
	95	562.5	628.5	121	
A 41 3_S1 M1S	4.25	22.34	24.82	5.43	106 / 48
	108	567.5	630.5	138	
A 41 3_S1 M1L	4.25	23.29	25.69	5.43	108 / 49
	108	591.5	652.5	138	
A 41 3_S2 M2S	4.69	24.43	27.19	6.14	128 / 58
	119	620.5	690.5	156	
A 41 3_S3 M3S	5.59	26.12	29.90	7.68	137 / 62
	142	663.5	759.5	195	
A 41 3_S3 M3L	5.59	27.38	30.96	7.68	150 / 68
	142	695.5	786.5	195	

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 41 2, A 41 3	7.17	6.10	7.87	6.50	5.118	M12x19 [mm]	4.41	4.72	3.15	3.15	0.79	0.51	0.55	6.30	8.82	4.41
	182	155	200	165	130		112	120	80	80	20	13	14	160	224	112

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 41 2, A 41 3 NUH	1.625	$\begin{smallmatrix} +0.0013 \\ +0.0004 \end{smallmatrix}$	1.796	0.375	1.18

NEMA flange



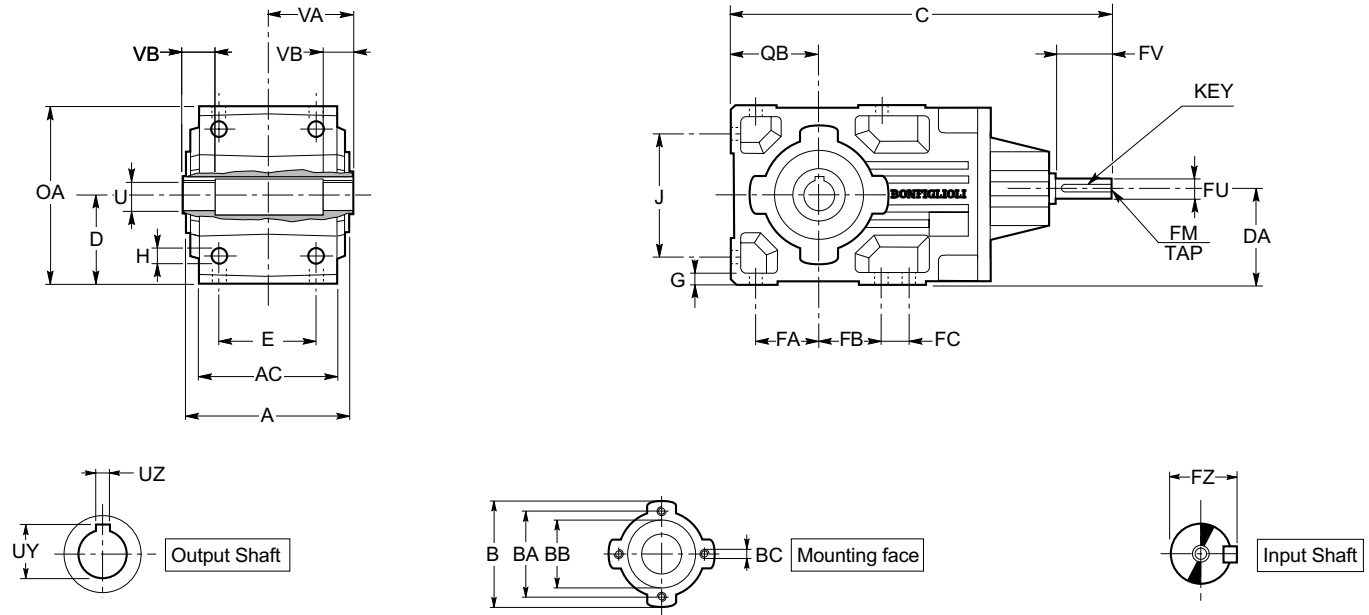
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	84 / 38
N140TC	6.496	5.875	4.500	0.394	0.196	86 / 39
N180TC	8.996	7.250	8.500	0.551	0.216	95 / 43
N210TC	8.996	7.250	8.500	0.551	0.216	101 / 46

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241
N210TC	0.312	1.375	1.518

	C			
	N56C	N140TC	N180TC	N210TC
A 41 2	15.55	15.55	16.30	17.54
	395	395	414	445.5
A 41 3	17.97	17.97	18.72	—
	456.5	456.5	475.5	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 41 2, A 41 3	7.17 182	6.10 155	7.87 200	6.50 165	5.118 130	$\begin{matrix} -0.0017 \\ -0.0033 \\ -0.043 \\ -0.083 \end{matrix}$ <i>M12x19 [mm]</i>	4.41 112	4.72 120	3.15 80	3.15 80	0.79 20	0.51 13	0.55 14	6.30 160	8.82 224	4.41 112

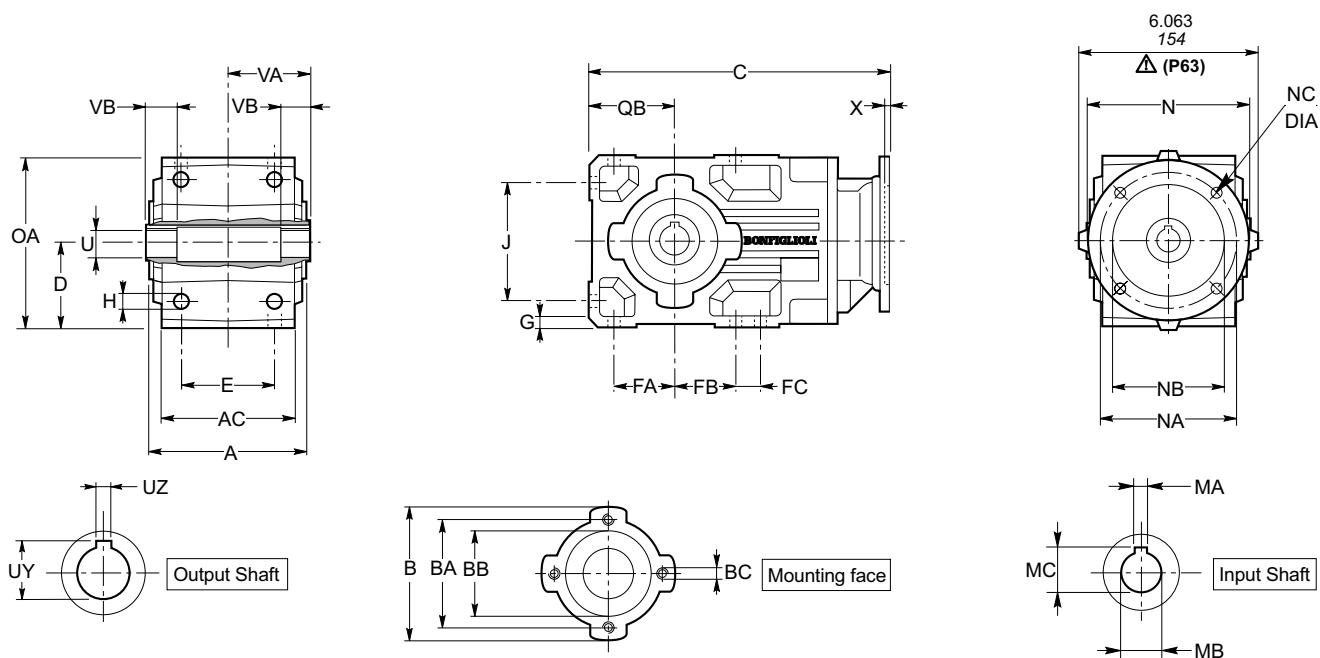
Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 41 2, A 41 3 NUH	1.625 $\begin{matrix} +0.0013 \\ +0.0004 \end{matrix}$	1.796	0.375	3.66	1.18

Input shaft (Inch series)

	FU	FZ	FV	Key	FM
A 41 2 NHS	1.000 $\begin{matrix} +0 \\ -0.0005 \end{matrix}$	1.110	1.970	1/4 x 1/4 x 1 3/4	M8x19 [mm]
A 41 3 NHS	0.750 $\begin{matrix} +0 \\ -0.0004 \end{matrix}$	0.830	1.570	3/16 x 3/16 x 1 3/8	M6x16 [mm]

	C	Weight [lbs / kg]
A 41 2	18.27 464	91 / 41
A 41 3	19.15 486.5	88 / 40



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	FC	G	H	J	OA	QB
A 41 2, A 41 3	7.17	6.10	7.87	6.50	5.118	$\begin{smallmatrix} -0.0017 \\ -0.0033 \end{smallmatrix}$	M12x19 [mm]	4.41	4.72	3.15	3.15	0.79	0.51	0.55	6.30	8.82
	182	155	200	165	130	$\begin{smallmatrix} -0.043 \\ -0.083 \end{smallmatrix}$		112	120	80	80	20	13	14	160	224

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 41 2, A 41 3 NUH	1.625 $\begin{smallmatrix} +0.0013 \\ +0.0004 \end{smallmatrix}$	1.796	0.375	3.66	1.18

IEC flange (mm)

	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	86 / 39
P71	160	130	110	M8x16	4.5	86 / 39
P80, P90	200	165	130	M10x12	4	88 / 44
P100, P112	250	215	180	M12x16	4.5	97 / 44
P132	300	265	230	14	5	101 / 46

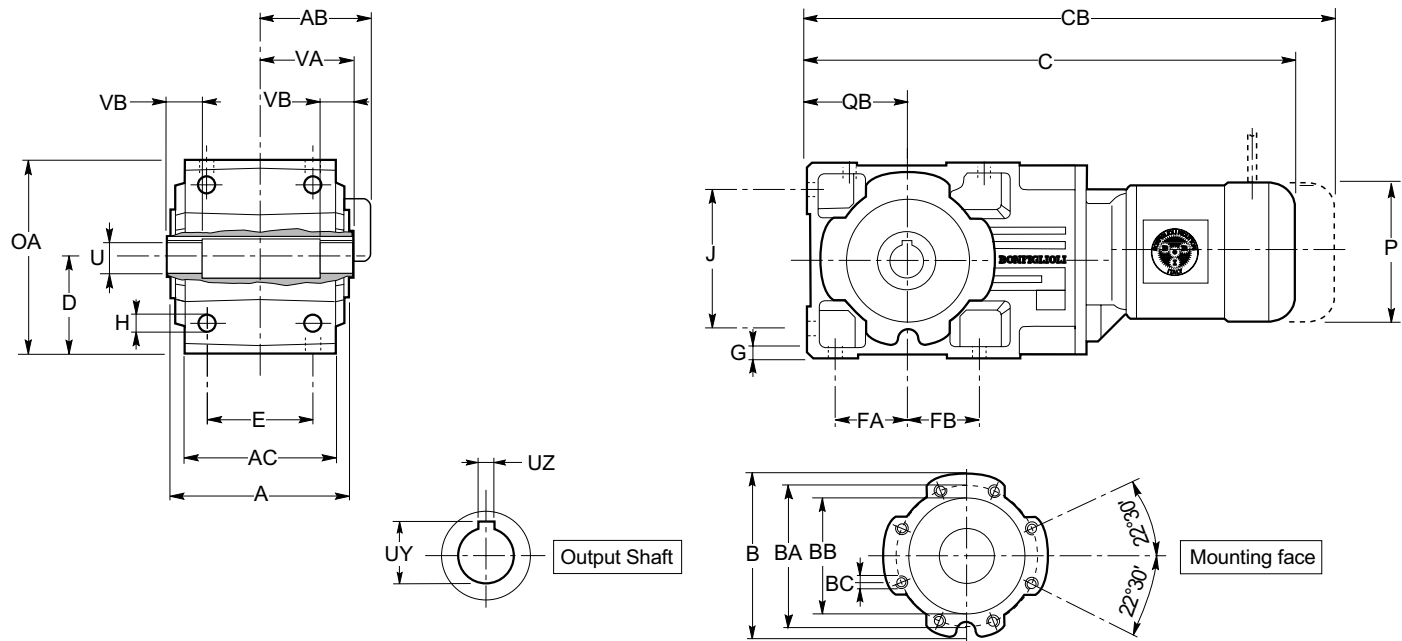


Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3

	C			
	P63 P71	P80 P90	P100 P112	P132
A 41 2	14.76 375	15.53 394.5	15.93 404.5	17.36 441
A 41 3	17.19 436.5	17.95 456	18.35 466	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 50 2, A 50 3, A 50 4	8.62	7.28	9.84	8.46	7.087	M12x19 [mm]	5.51	5.91	4.04	4.04	0.55	0.63	8.07	11.02	5.51
	219	185	250	215	180		140	150	103	103	14	16	205	280	140

Output shaft (Inch series)

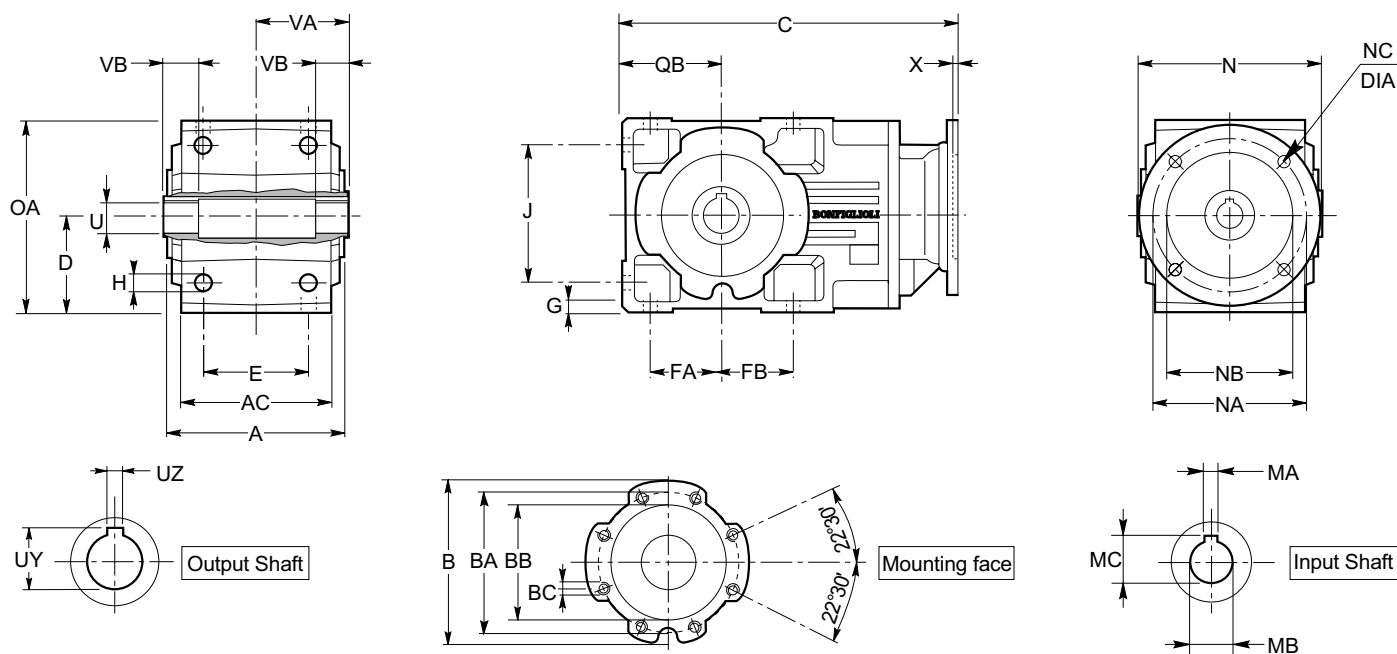
	U	UY	UZ	VA	VB
A 50 2, A 50 3, A 50 4 NUH	2.000	2.223	0.500	4.50	1.58

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 50 2_S1 M1S	4.25	23.05	25.53	5.43	148 / 67
A 50 3_S1 M1S	108	585.5	648.5	138	152 / 69
A 50 2_S1 M1L	4.25	24.00	26.40	5.43	172 / 78
A 50 3_S1 M1L	108	609.5	670.5	138	179 / 81
A 50 2_S2 M2S	4.69	25.14	27.89	6.14	194 / 88
A 50 3_S2 M2S	119	638.5	708.5	156	251 / 114
A 50 2_S3 M3S	5.59	26.83	30.61	7.68	293 / 133
A 50 3_S3 M3S	142	681.5	777.5	195	311 / 141
A 50 2_S3 M3L	5.59	28.09	31.67	7.68	194 / 88
A 50 3_S3 M3L	142	713.5	804.5	195	251 / 114
A 50 2_S4 M4S	7.60	32.34	36.63	10.16	293 / 133
A 50 3_S4 M4S	193	821.5	930.5	258	311 / 141
A 50 2_S4 M4L	7.60	32.34	36.63	10.16	293 / 133
A 50 3_S4 M4L	193	821.5	930.5	258	311 / 141
A 50 2_S4 M4LC	7.60	33.72	37.62	10.16	311 / 141
A 50 3_S4 M4LC	193	856.5	955.5	258	311 / 141
A 50 4_S1 M1S	4.25	25.87	28.35	5.43	150 / 68
A 50 4_S1 M1L	4.25	26.81	29.21	5.43	154 / 70
A 50 4_S2 M2S	4.69	27.95	30.71	6.14	165 / 75
A 50 4_S3 M3S	5.59	29.65	33.43	7.68	168 / 76
A 50 4_S3 M3L	5.59	30.91	34.49	7.68	172 / 78

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB	
A 50 2, A 50 3, A 50 4	8.62	7.28	9.84	8.46	7.087	-0.0017 -0.0033	M12x19 [mm]	5.51	5.91	4.04	4.04	0.55	0.63	8.07	11.02	5.51
	219	185	250	215	180	-0.043 -0.083		140	150	102.5	103	14	16	205	280	140

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 50 2, A 50 3, A 50 4 NUH	2.000	$+0.0016$ $+0.0004$	2.223	0.500	1.58

NEMA flange



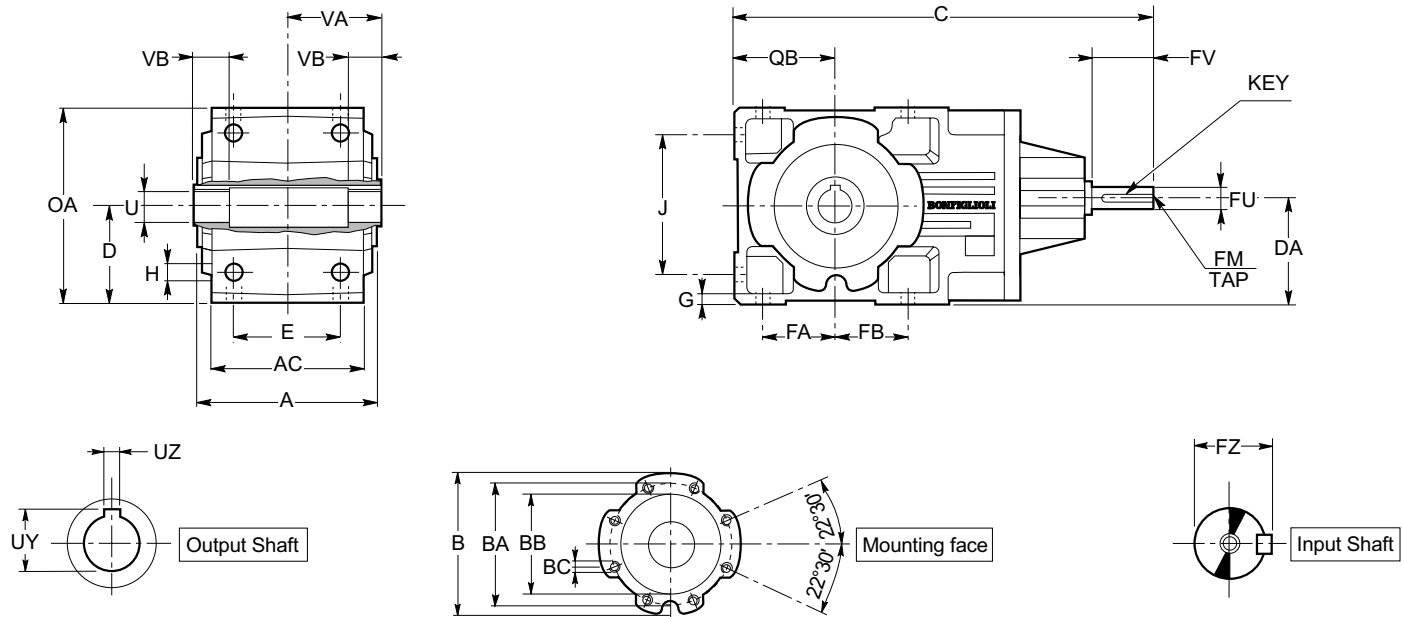
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	137 / 62
N140TC	6.496	5.875	4.500	0.394	0.196	139 / 63
N180TC	8.996	7.250	8.500	0.551	0.216	148 / 67
N210TC	8.996	7.250	8.500	0.551	0.216	150 / 68
N250TC	13.780	7.250	8.500	0.551	0.216	159 / 72
N280TC	13.780	9.000	10.500	0.551	0.216	159 / 72

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241
N210TC	0.312	1.375	1.518
N250TC	0.375	1.625	1.796
N280TC	0.500	1.875	2.102

	C					
	N56C	N140TC	N180TC	N210TC	N250TC	N280TC
A 50 2, A 50 3	18.68	18.68	19.43	20.67	23.46	23.66
	474.5	474.5	493.5	525	596	601
A 50 4	21.50	21.50	22.24	—	—	—
	546	546	565	—	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 50 2, A 50 3, A 50 4	8.62 219	7.28 185	9.84 250	8.46 215	7.087 180	^{-0.0017} _{-0.0033} ^{-0.043} _{-0.083} M12x19 [mm]	5.51 140	5.91 150	4.04 103	4.04 103	0.55 14	0.63 16	8.07 205	11.02 280	5.51 140

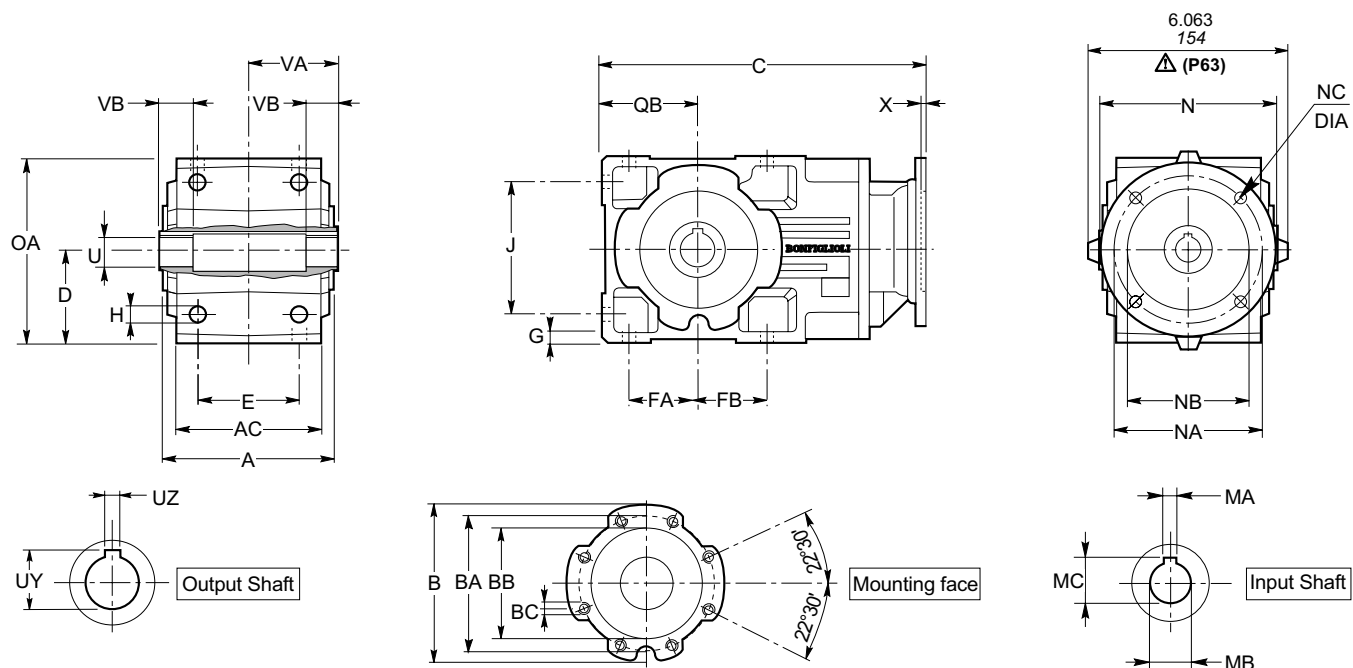
Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 50 2, A 50 3, A 50 4 NUH	2.000 ^{+0.0016} ^{+0.0004}	2.223	0.500	4.50	1.58

Input shaft (Inch series)

	FU	FZ	FV	Key	FM
A 50 2, A 50 3 NHS	1.000 ⁺⁰ ^{-0.0005}	1.110	1.970	1/4 x 1/4 x 1 3/4	M8x19 [mm]
A 50 4 NHS	0.750 ⁺⁰ ^{-0.0005}	0.830	1.570	3/16 x 3/16 x 1 3/8	M6x16 [mm]

	C	Weight [lbs / kg]
A 50 2, A 50 3	21.40 543.5	168 / 76
A 50 4	22.68 576	170 / 77



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB	
A 50 2, A 50 3, A 50 4	8.62	7.28	9.84	8.46	7.087	-0.0017 -0.0033	M12x19 [mm]	5.51	5.91	4.04	4.04	0.55	0.63	8.07	11.02	5.51
	219	185	250	215	180	-0.043 -0.083		140	150	102.5	103	14	16	205	280	140

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 50 2, A 50 3, A 50 4 NUH	2.000	$\begin{smallmatrix} +0.0016 \\ +0.0004 \end{smallmatrix}$	2.223	0.500	1.58

IEC flange (mm)

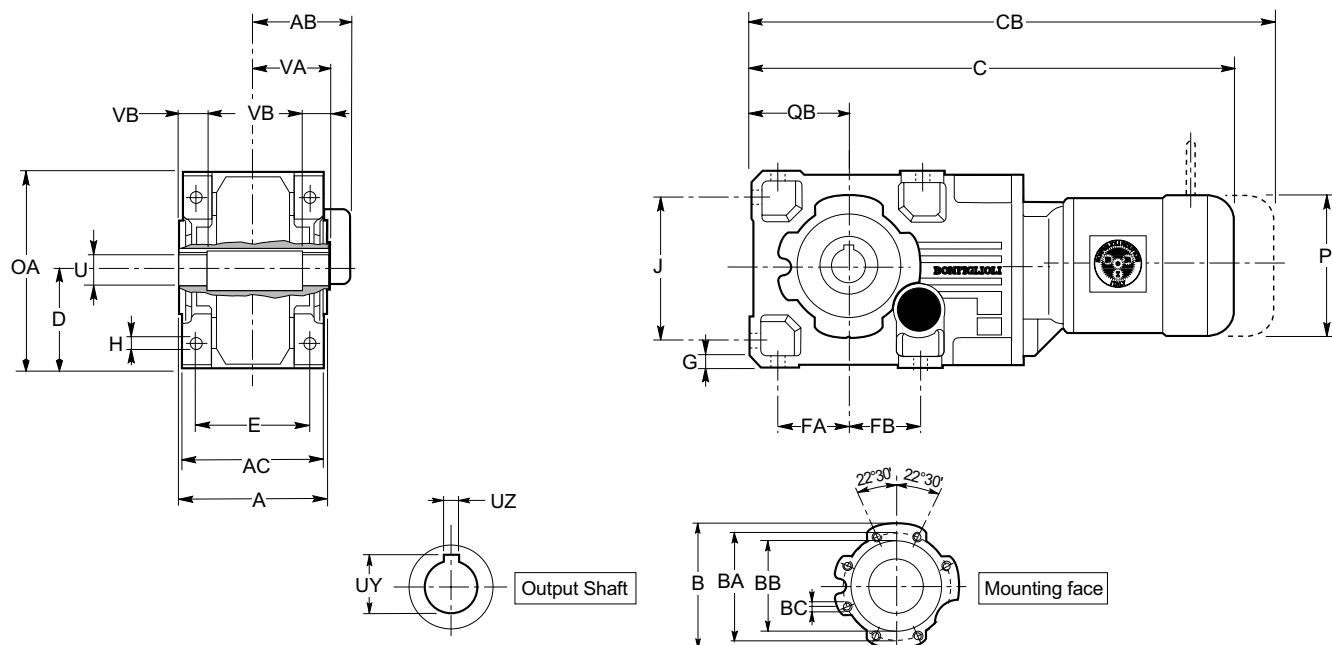
	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	137 / 62
P71	160	130	110	M8x16	4.5	137 / 62
P80, P90	200	165	130	M10x12	4	139 / 63
P100, P112	250	215	180	M12x16	4.5	148 / 67
P132	300	265	230	14	5	150 / 68
P160, P180	350	300	250	18	6	159 / 72

Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3
P132	10	38	41.3
P160	12	42	45.3
P180	14	48	51.8

	C				
	P63 P71	P80 P90	P100 P112	P132	P160 P180
A 50 2, A 50 3	17.89	18.66	19.06	20.49	22.48
	454.5	474	484	520.5	571
A 50 4	20.71	21.48	21.87	—	—
	526	545.5	555.5	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 60 2, A 60 3, A 60 4	9.41	9.25	9.84	8.46	7.087	<i>M12x19 [mm]</i>	6.50	7.68	4.82	4.82	0.63	0.73	9.65	12.99	6.50
	239	235	250	215	180		165	195	123	123	16	18.5	245	330	165

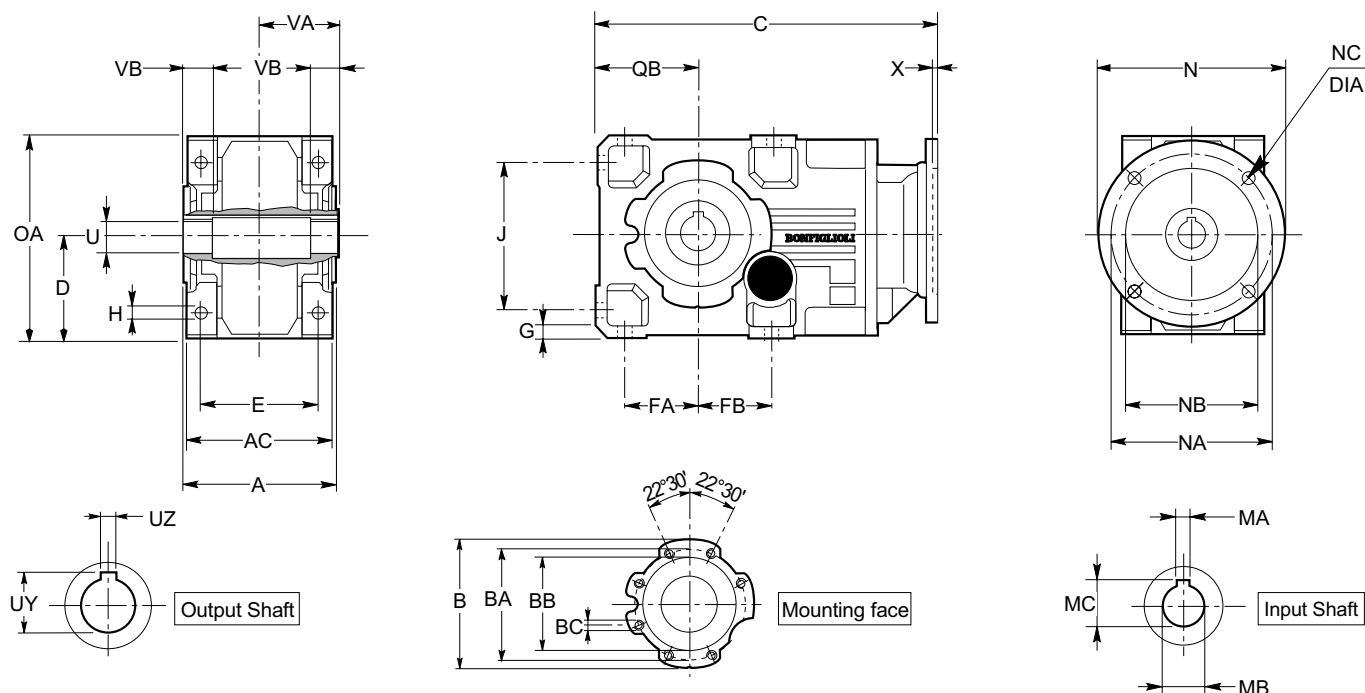
Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 60 2, A 60 3, A 60 4 NUH	2.625	2.905	0.625	4.92	1.97

Motor

	AB	C	CB	P	Weight [lbs / kg]
A 60 2_S2 M2S	4.69	27.58	30.33	6.14	218 / 99
A 60 3_S2 M2S	119	700.5	770.5	156	
A 60 2_S3 M3S	5.59	29.27	33.05	7.68	220 / 100
A 60 3_S3 M3S	142	743.5	839.5	195	
A 60 2_S3 M3L	5.59	30.53	34.11	7.68	236 / 107
A 60 3_S3 M3L	142	775.5	866.5	195	
A 60 2_S4 M4S	7.60	33.29	37.58	10.16	293 / 133
A 60 3_S4 M4S	193	845.5	954.5	258	
A 60 2_S4 M4L	7.60	36.12	40.02	10.16	335 / 152
A 60 3_S4 M4L	193	917.5	1016.5	258	
A 60 2_S4 M4LC	7.60	36.12	40.02	10.16	353 / 160
A 60 3_S4 M4LC	193	917.5	1016.5	258	
A 60 2_S5 M5S	9.65	38.19	43.70	12.20	423 / 192
A 60 3_S5 M5S	245	970	1110	310	
A 60 2_S5 M5L	9.65	39.92	45.43	12.20	459 / 208
A 60 3_S5 M5L	245	1014	1154	310	
A 60 4_S1 M1S	4.25	28.27	30.75	5.43	207 / 94
A 60 4_S1 M1L	108	718	781	138	
A 60 4_S1 M1L	4.25	29.21	31.61	5.43	209 / 95
A 60 4_S1 M1L	108	742	803	138	
A 60 4_S2 M2S	4.69	30.35	33.11	6.14	220 / 100
A 60 4_S2 M2S	119	771	841	156	
A 60 4_S3 M3S	5.59	32.05	35.83	7.68	240 / 109
A 60 4_S3 M3S	142	814	910	195	
A 60 4_S3 M3L	5.59	33.31	36.89	7.68	256 / 116
A 60 4_S3 M3L	142	846	937	195	

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB	
A 60 2, A 60 3, A 60 4	9.41	9.25	9.84	8.46	7.087	-0.0017 -0.0033	M12x19 [mm]	6.50	7.68	4.82	4.82	0.63	0.73	9.65	12.99	6.50
	239	235	250	215	180	-0.043 -0.083		165	195	122.5	123	16	18.5	245	330	165

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 60 2, A 60 3, A 60 4 NUH	2.625	$\begin{smallmatrix} +0.0016 \\ +0.0004 \end{smallmatrix}$	2.905	4.92	1.97

NEMA flange

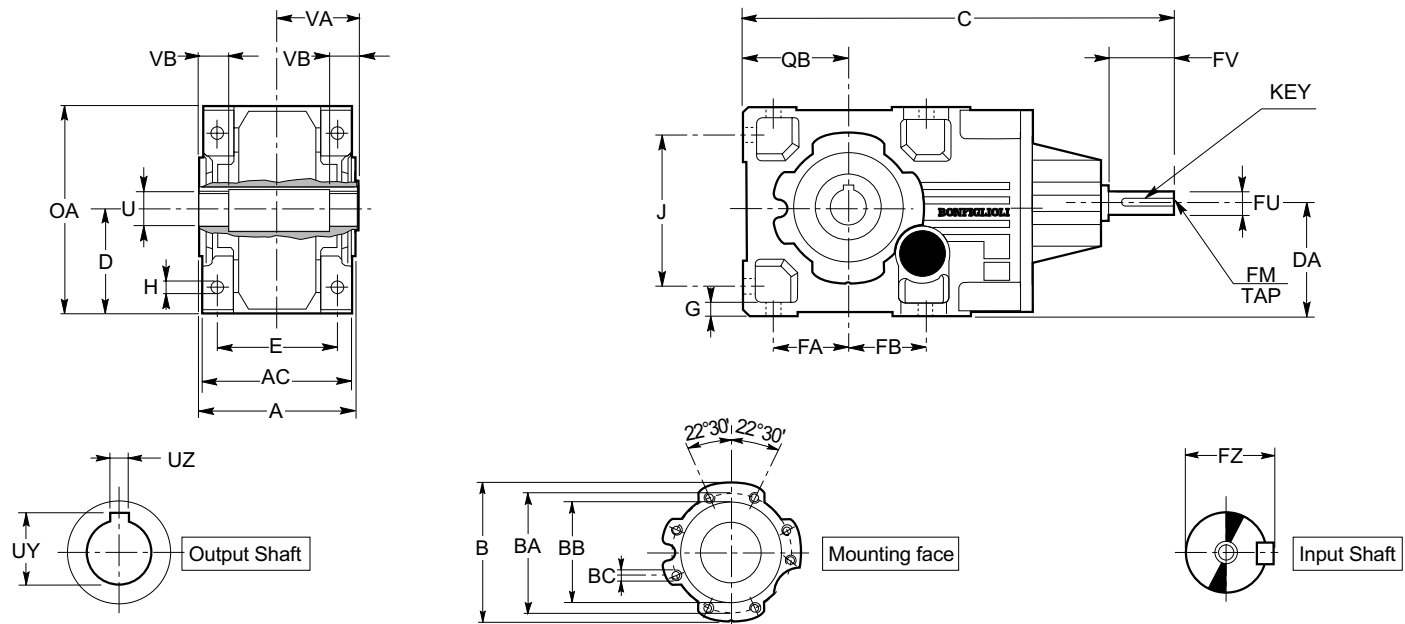
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	194 / 88
N140TC	6.496	5.875	4.500	0.394	0.196	198 / 90
N180TC	8.996	7.250	8.500	0.551	0.216	207 / 94
N210TC	8.996	7.250	8.500	0.551	0.216	201 / 91
N250TC	13.780	7.250	8.500	0.551	0.216	212 / 96
N280TC	13.780	9.000	10.500	0.551	0.216	212 / 96

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241
N210TC	0.312	1.375	1.518
N250TC	0.375	1.625	1.796
N280TC	0.500	1.875	2.102

	C					
	N56C	N140TC	N180TC	N210TC	N250TC	N280TC
A 60 2, A 60 3	21.12	21.12	24.87	23.11	25.91	26.10
	536.5	536.5	555.5	587	658	663
A 60 4	23.90	23.90	24.65	25.89	—	—
	607	607	626	657.5	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 60 2, A 60 3, A 60 4	9.41	9.25	9.84	8.46	7.087	$\begin{smallmatrix} -0.0017 \\ -0.0033 \end{smallmatrix}$	M12x19 [mm]	6.50	7.68	4.82	4.82	0.63	0.73	9.65	12.99	6.50
	239	235	250	215	180	$\begin{smallmatrix} -0.043 \\ -0.083 \end{smallmatrix}$		165	195	123	123	16	18.5	245	330	165

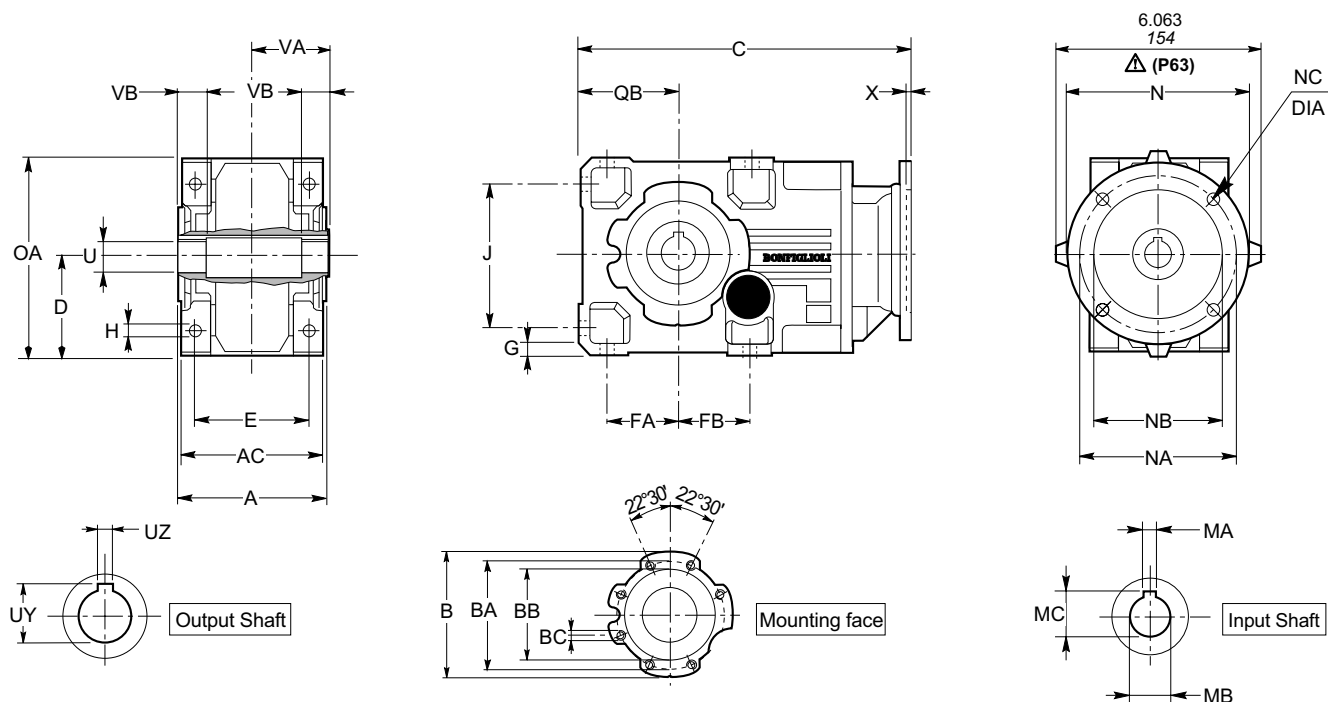
Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 60 2, A 60 3, A 60 4 NUH	2.625 $+0.0016$ $+0.0004$	2.905	0.625	4.92	1.97

Input shaft (Inch series)

	FU	FZ	FV	Key	FM
A 60 2, A 60 3 NHS	1.125 $+0$ -0.0005	1.230	2.360	1/4 x 1/4 x 2 5/32	<i>M10x22 [mm]</i>
A 60 4 NHS	1.000 $+0$ -0.0005	1.110	1.970	1/4 x 1/4 x 1 3/4	<i>M8x19 [mm]</i>

	C	Weight [lbs / kg]
A 60 2, A 60 3	24.92 633	292 / 119
A 60 4	26.61 676	231 / 105



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 60 2, A 60 3, A 60 4	9.41	9.25	9.84	8.46	7.087	M12x19 [mm]	6.50	7.68	4.82	4.82	0.63	0.73	9.65	12.99	6.50
	239	235	250	215	180		165	195	122.5	123	16	18.5	245	330	165

Output shaft (Inch series)

	U	UY	UZ	VA	VB
A 60 2, A 60 3, A 60 4 NUH	2.625 + 0.0016 + 0.0004	2.905	0.625	4.92	1.97

IEC flange (mm)

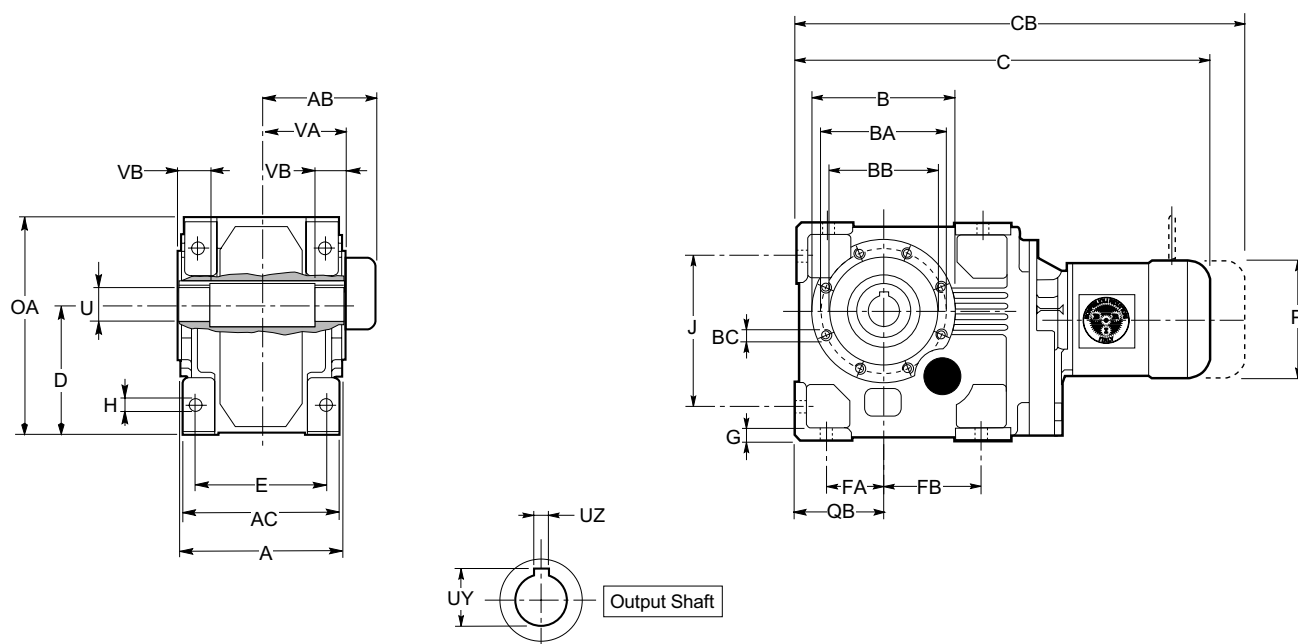
	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	194 / 88
P71	160	130	110	M8x16	4.5	194 / 88
P80, P90	200	165	130	M10x12	4	198 / 90
P100, P112	250	215	180	M12x16	4.5	207 / 94
P132	300	265	230	14	5	201 / 91
P160, P180	350	300	250	18	6	212 / 96

Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3
P132	10	38	41.3
P160	12	42	45.3
P180	14	48	51.8

	C				
	P63 P71	P80 P90	P100 P112	P132	P160 P180
A 60 2, A 60 3	—	21.10 536	21.50 546	22.89 581.5	24.92 633
A 60 4	23.11 587	23.88 606.5	24.27 616.5	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 70 3, A 70 4	11.22	11.02	10.63	9.25	8.071	-0.0020	M14x22 [mm]	9.02	9.06	4.33	7.24	0.71	0.87	11.57	15.12	6.10
	285	280	270	235	205	-0.0038		229	230	110	184	18	22	294	384	155
						-0.050										
						-0.096										

Output shaft

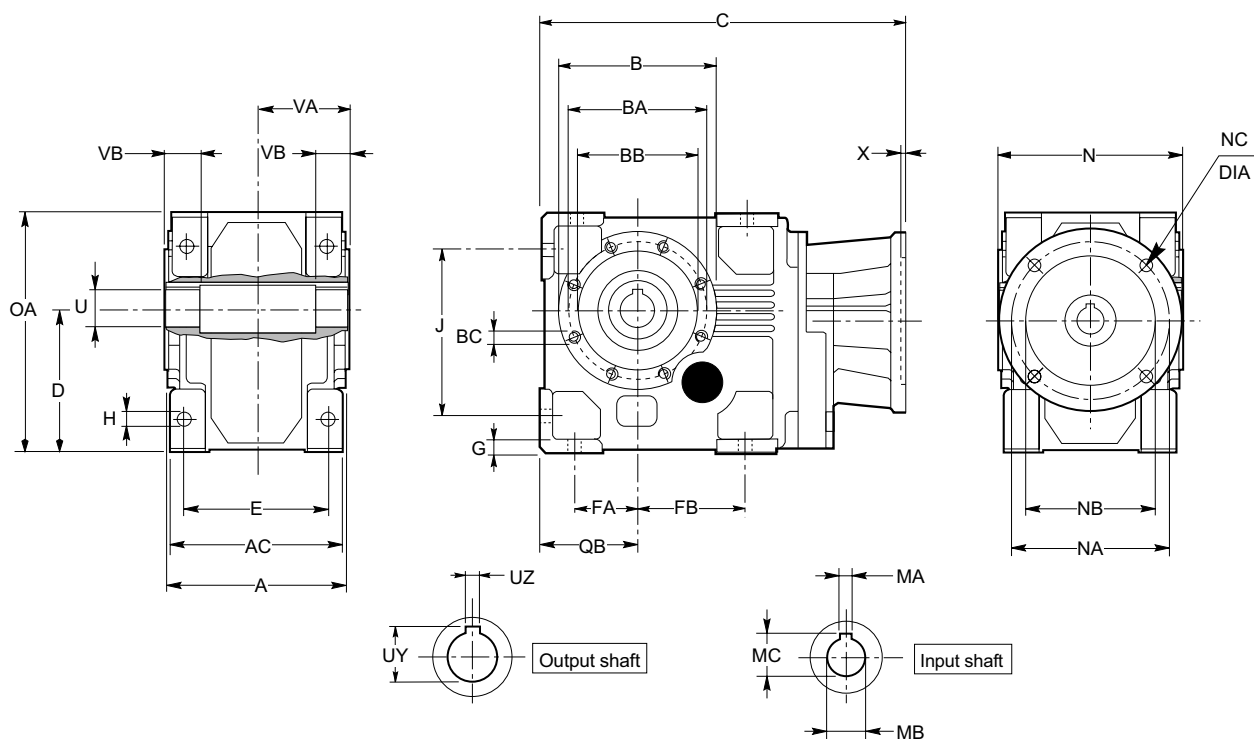
	U	UY	UZ	VA	VB
A 70 3, A 70 4	2.756	2.949	0.787	6.02	2.36
UH	70	74.9	20	153	60

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 70 3_S2 M2S	4.69 119	27.11 688.5	29.86 758.5	6.14 156	343 / 156
A 70 3_S3 M3S	5.59 142	28.80 731.5	32.58 827.5	7.68 195	362 / 164
A 70 3_S3 M3L	5.59 142	30.06 763.5	33.64 854.5	7.68 195	377 / 171
A 70 3_S4 M4S	7.60 193	34.35 872.5	38.64 981.5	10.16 258	434 / 197
A 70 3_S4 M4L	7.60 193	34.35 872.5	38.64 981.5	10.16 258	476 / 216
A 70 3_S4 M4LC	7.60 193	35.73 907.5	39.63 1006.5	10.16 258	494 / 224
A 70 3_S5 M5S	9.65 245	37.72 958	43.23 1098	12.20 310	565 / 256
A 70 3_S5 M5L	9.65 245	39.45 1002	44.96 1142	12.20 310	600 / 272
A 70 4_S1 M1S	4.25 108	27.03 686.5	29.51 749.5	5.43 138	339 / 154
A 70 4_S1 M1L	4.25 108	27.97 710.5	30.37 771.5	5.43 138	342 / 155
A 70 4_S2 M2S	4.69 119	29.11 739.5	31.87 809.5	6.14 156	352 / 160
A 70 4_S3 M3S	5.59 142	30.81 782.5	34.59 878.5	7.68 195	371 / 168
A 70 4_S3 M3L	5.59 142	32.07 814.5	35.65 905.5	7.68 195	387 / 175
A 70 4_S4 M4L	7.60 193	36.32 922.5	40.61 1031.5	10.16 258	444 / 201
A 70 4_S4 M4S	7.60 193	36.32 922.5	40.61 1031.5	10.16 258	486 / 220

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 70 3, A 70 4	11.22	11.02	10.63	9.25	8.071	-0.0020 -0.0038	M14x22 [mm]	9.02	9.06	4.33	7.24	0.71	0.87	11.57	15.12	6.10
	285	280	270	235	205	-0.050 -0.096		229	230	110	184	18	22	294	384	155

Output shaft

	U	UY	UZ	VA	VB
A 70 3, A 70 4	2.756	2.949	0.787	6.02	2.36
	70	74.9	20	153	60

NEMA flange

	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	322 / 146
N140TC	6.496	5.875	4.500	0.394	0.196	324 / 147
N180TC	8.996	7.250	8.500	0.551	0.216	326 / 148
N210TC	8.996	7.250	8.500	0.551	0.216	346 / 157
N250TC	13.780	7.250	8.500	0.551	0.216	373 / 169
N280TC	13.780	9.000	10.500	0.551	0.216	373 / 169

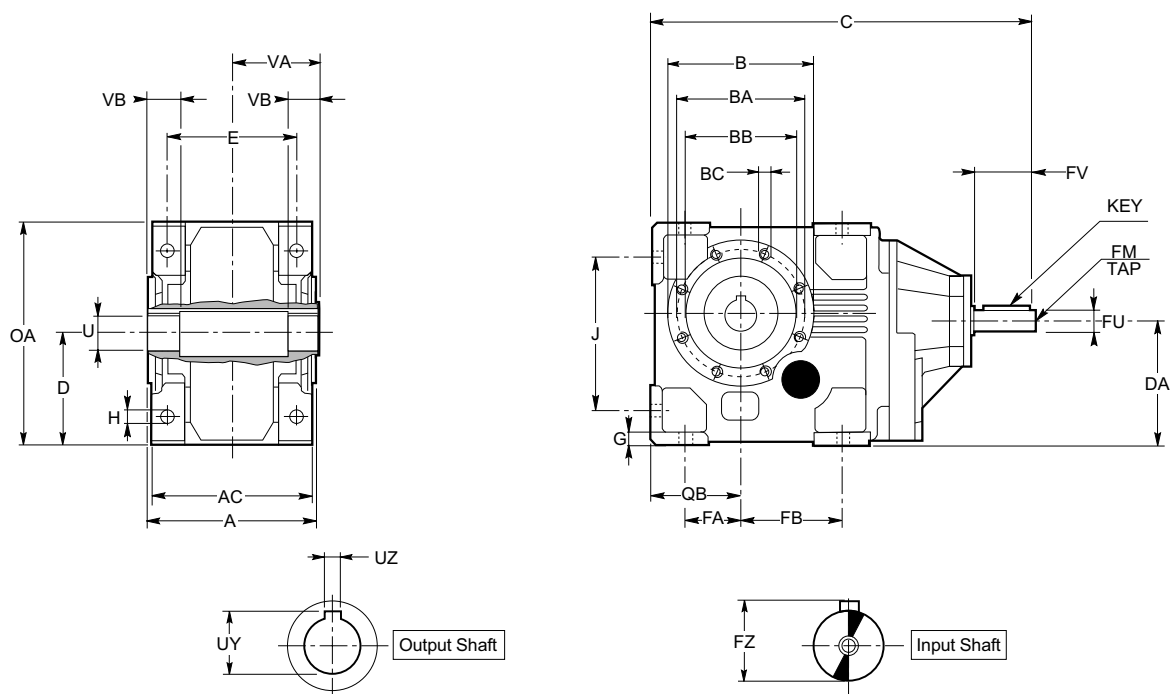


Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241
N210TC	0.312	1.375	1.518
N250TC	0.375	1.625	1.796
N280TC	0.500	1.875	2.102

	C					
	N56C	N140TC	N180TC	N210TC	N250TC	N280TC
A 70 3	—	20.65 524.5	21.40 543.5	22.64 575	25.63 651	25.83 656
A 70 4	22.66 575.5	22.66 575.5	23.41 594.5	24.65 626	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 70 3, A 70 4	11.22	11.02	10.63	9.25	8.071	<i>M14x22 [mm]</i>	9.02	9.06	4.33	7.24	0.71	0.87	11.57	15.12	6.10
	285	280	270	235	205		229	230	110	184	18	22	294	384	155

Output shaft

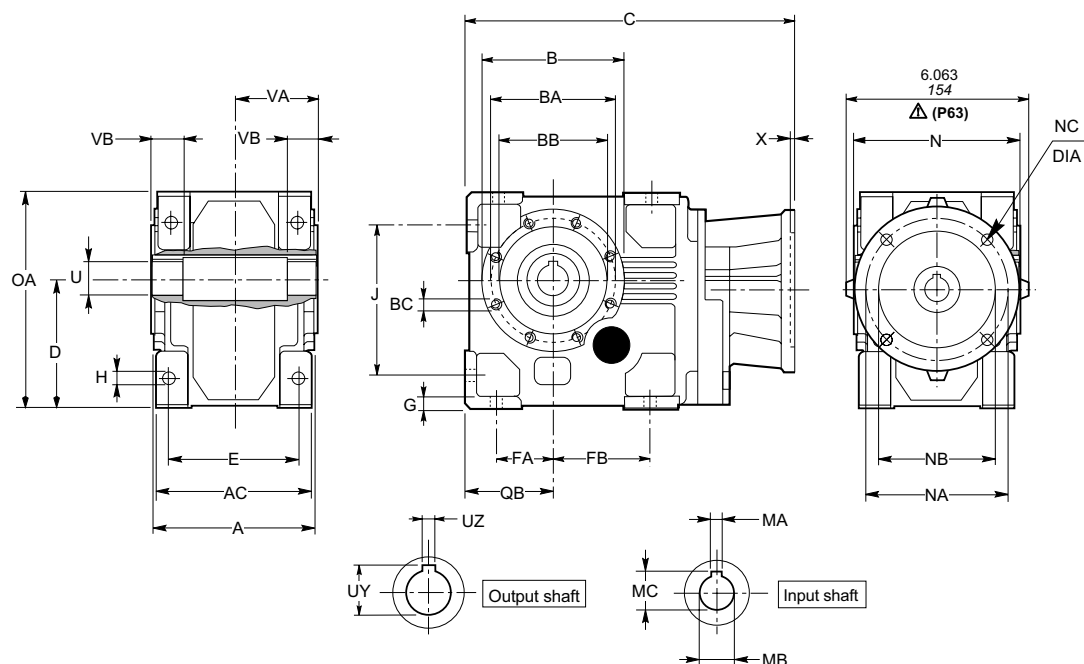
	U	UY	UZ	VA	VB
A 70 3, A 70 4 UH	2.756	2.949	0.787	6.02	2.36
	70	74.9	20	153	60

Input shaft

	FU	FZ	FV	Key	FM
A 70 3 HS	1.654	1.772	4.331	12 x 8 x 90	<i>M12x28 [mm]</i>
	42	45	110		
A 70 4 NHS	1.000	1.110	1.970	3/4 x 3/4 x 1 3/4	<i>M8x19 [mm]</i>



	C	Weight [lbs / kg]
A 70 3	27.89	364 / 165
	708.5	
A 70 4	25.37	328 / 149
	644.5	



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 70 3, A 70 4	11.22	11.02	10.63	9.25	8.071	-0.0020 -0.0038	M14x22 [mm]	9.02	9.06	4.33	7.24	0.71	0.87	11.57	15.12	6.10
	285	280	270	235	205	-0.050 -0.096		229	230	110	184	18	22	294	384	155

Output shaft

	U	UY	UZ	VA	VB
A 70 3, A 70 4 UH	2.756	$\begin{smallmatrix} +0.0016 \\ +0.00039 \end{smallmatrix}$	2.949	6.02	2.36
	70	$\begin{smallmatrix} +0.04 \\ +0.01 \end{smallmatrix}$	74.9	153	60

IEC flange (mm)



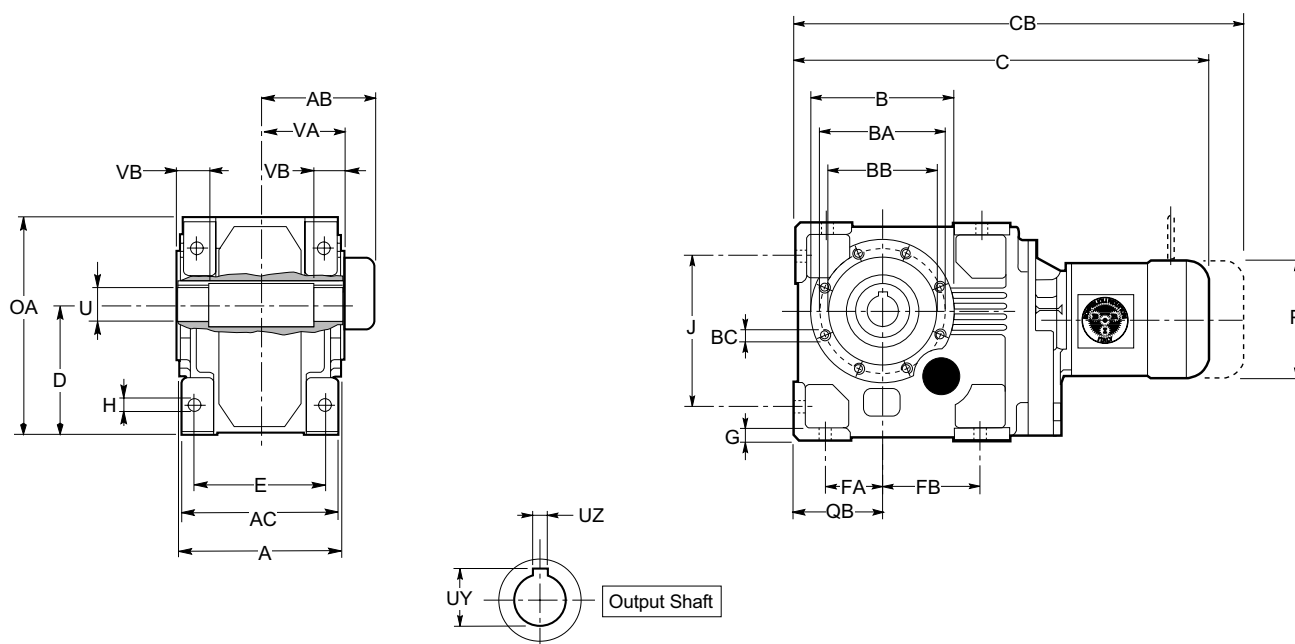
	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	322 / 146
P71	160	130	110	M8x16	4.5	322 / 146
P80, P90	200	165	130	M10x12	4	324 / 147
P100, P112	250	215	180	M12x16	4.5	326 / 148
P132	300	265	230	14	5	346 / 157
P160, P180	350	300	250	18	6	373 / 169
P200	400	350	300	M16x25	7	395 / 179

Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3
P132	10	38	41.3
P160	12	42	45.3
P180	14	48	51.8
P200	16	55	59.3

	C					
	P63 P71	P80 P90	P100 P112	P132	P160 P180	P200
A 70 3	—	20.63 524	21.02 534	22.46 570.5	24.65 626	25.63 651
A 70 4	21.87 555.5	22.64 575	23.03 585	24.35 618.5	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 80 3, A 80 4	13.39 340	12.99 330	11.81 300	10.43 265	9.055 230 -0.0020 -0.0038 -0.050 -0.096	M16x28 [mm]	10.71 272	10.83 275	4.80 122	8.23 209	0.91 23	1.02 26	13.03 331	17.99 457	7.28 185

Output shaft

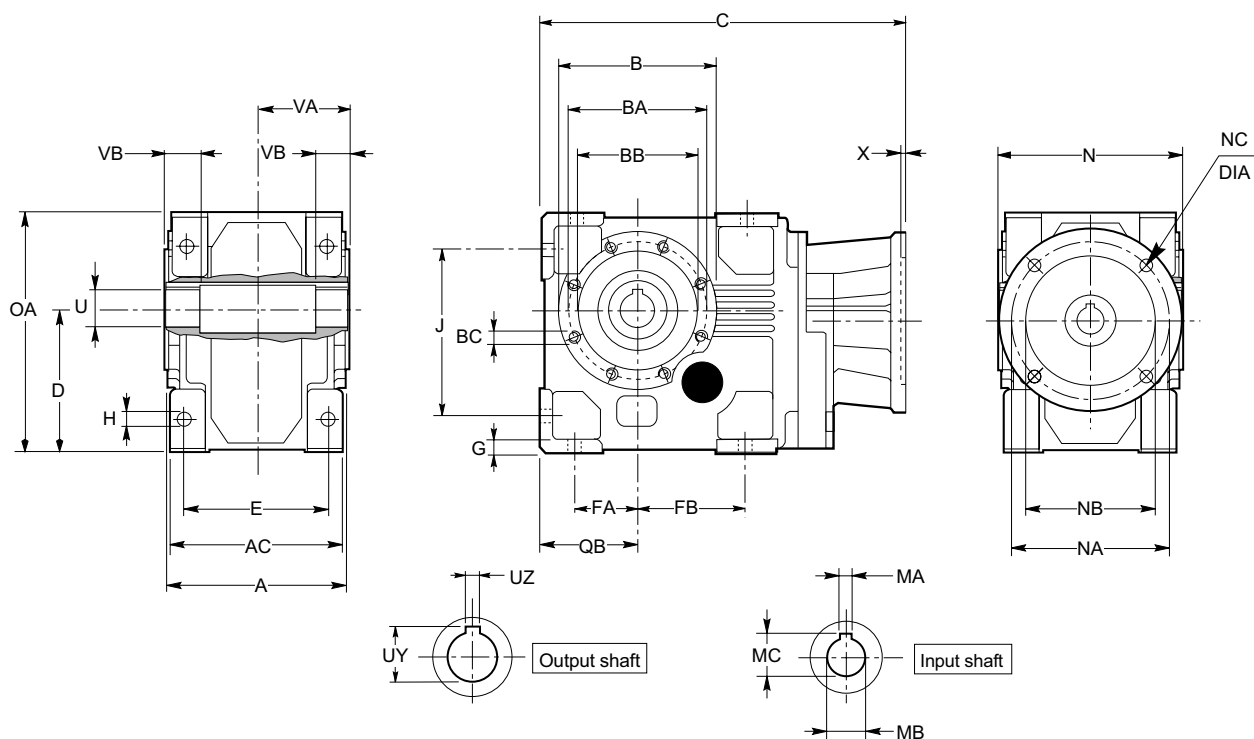
	U	UY	UZ	VA	VB
A 80 3, A 80 4 UH	3.150 80 +0.0016 +0.00039 +0.04 +0.01	3.362 85.4	0.866 22	7.09 180	3.15 80

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 80 3_S3 M3S	5.59 142	31.87 809.5	35.65 905.5	7.68 195	582 / 264
A 80 3_S3 M3L	5.59 142	33.13 841.5	36.71 932.5	7.68 195	597 / 271
A 80 3_S4 M4S	7.60 193	37.38 949.5	41.67 1058.5	10.16 258	655 / 297
A 80 3_S4 M4L	7.60 193	37.38 949.5	41.67 1058.5	10.16 258	697 / 316
A 80 3_S4 M4LC	7.60 193	38.76 984.5	42.66 1083.5	10.16 258	714 / 324
A 80 3_S5 M5S	9.65 245	40.79 1036	46.30 1176	12.20 310	785 / 356
A 80 3_S5 M5L	9.65 245	42.52 1080	48.03 1220	12.20 310	820 / 372
A 80 4_S1 M1S	4.25 108	30.57 776.5	33.05 839.5	5.43 138	545 / 247
A 80 4_S1 M1L	4.25 108	31.52 800.5	33.92 861.5	5.43 138	549 / 249
A 80 4_S2 M2S	4.69 119	32.66 829.5	35.41 899.5	6.14 156	560 / 254
A 80 4_S3 M3S	5.59 142	34.35 872.5	38.13 968.5	7.68 195	578 / 262
A 80 4_S3 M3L	5.59 142	35.61 904.5	39.19 995.5	7.68 195	593 / 269
A 80 4_S4 M4L	7.60 193	39.86 1012.5	44.15 1121.5	10.16 258	650 / 295
A 80 4_S4 M4S	7.60 193	39.86 1012.5	44.15 1121.5	10.16 258	692 / 314

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 80 3, A 80 4	13.39 340	12.99 330	11.81 300	10.43 265	9.055 230	$\begin{matrix} -0.0020 \\ -0.0038 \\ -0.050 \\ -0.096 \end{matrix}$ M16x28 [mm]	10.71 272	10.83 275	4.80 122	8.23 209	0.91 23	1.02 26	13.03 331	17.99 457	7.28 185

Output shaft

		U	UY	UZ	VA	VB
A 80 3, A 80 4	UH	3.150 80	$\begin{matrix} +0.0016 \\ +0.00039 \\ +0.04 \\ +0.01 \end{matrix}$	3.362 85.4	0.866 22	7.09 180

NEMA flange



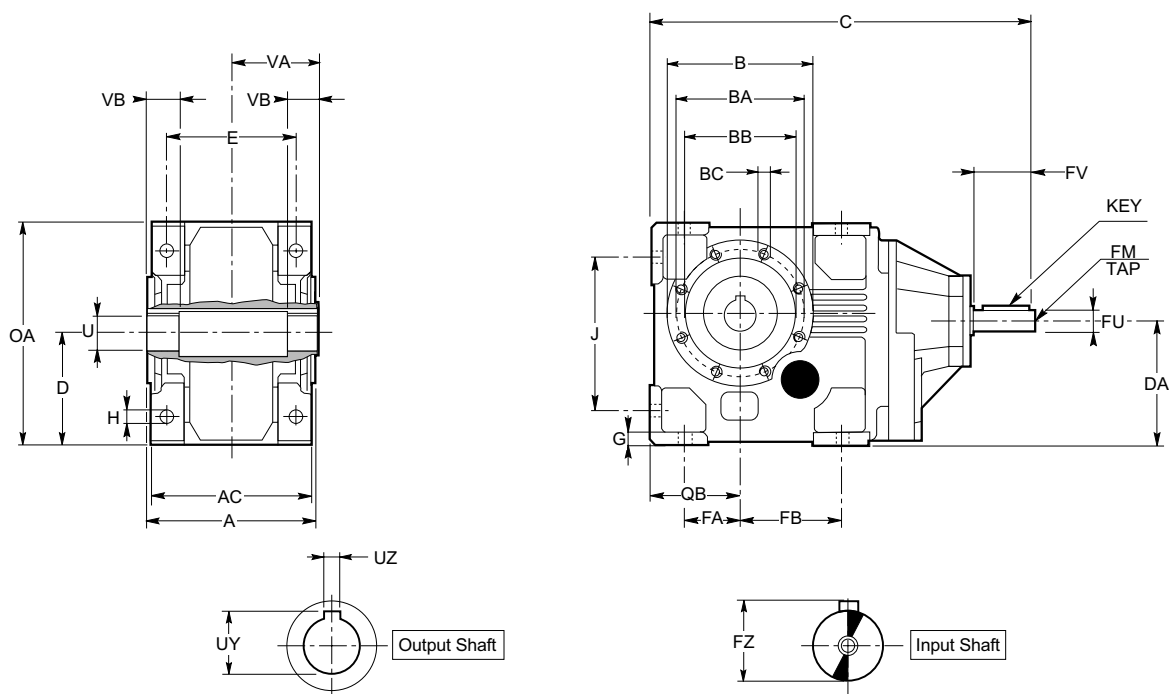
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	547 / 248
N140TC	6.496	5.875	4.500	0.394	0.196	549 / 249
N180TC	8.996	7.250	8.500	0.551	0.216	551 / 250
N210TC	8.996	7.250	8.500	0.551	0.216	571 / 259
N250TC	13.780	7.250	8.500	0.551	0.216	591 / 268
N280TC	13.780	9.000	10.500	0.551	0.216	592 / 268
N320TC	17.717	11.000	12.500	0.669	0.216	657 / 298

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241
N210TC	0.312	1.375	1.518
N250TC	0.375	1.625	1.796
N280TC	0.500	1.875	2.102
N320TC	0.500	2.125	2.350

	C						
	N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC
A 80 3	—	—	24.47 621.5	25.71 653	28.70 729	28.90 734	31.75 806.5
A 80 4	26.20 665.5	26.20 665.5	26.95 684.5	28.19 716	—	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 80 3, A 80 4	13.39	12.99	11.81	10.43	9.055	M16x28 [mm]	10.71	10.83	4.80	8.23	0.91	1.02	13.03	17.99	7.28
	340	330	300	265	230		272	275	122	209	23	26	331	457	185

Output shaft

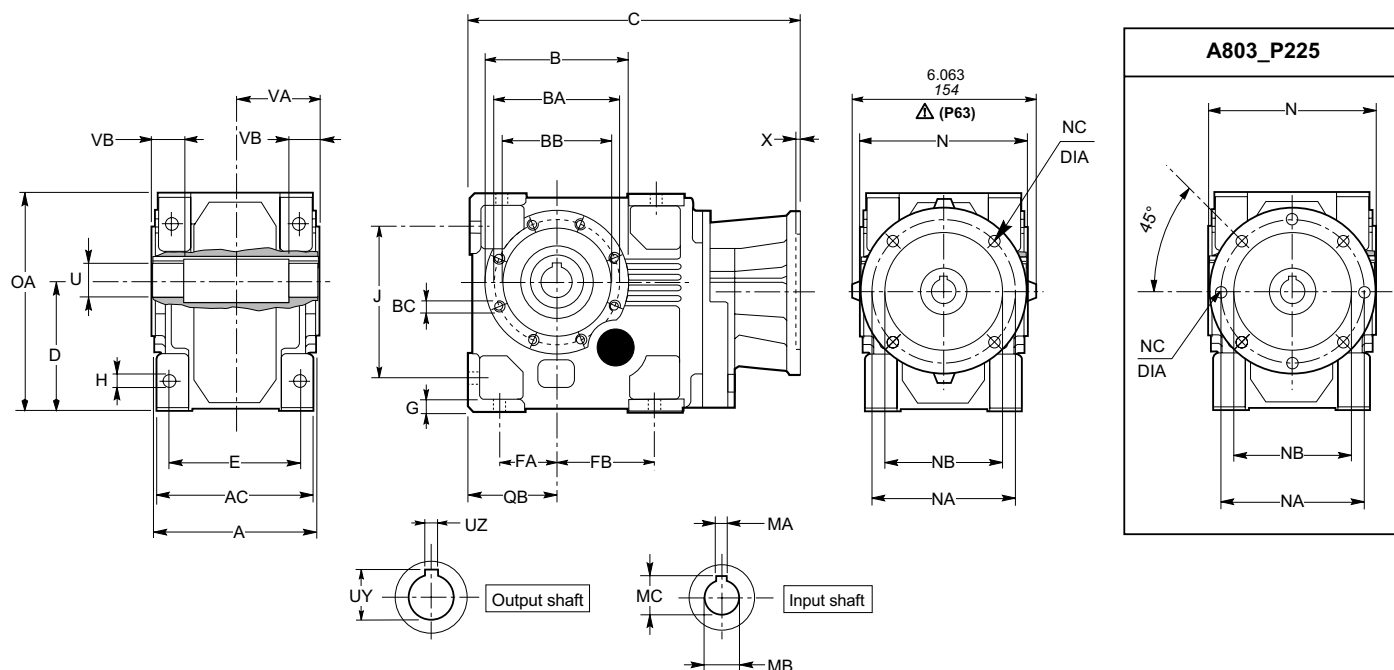
	U	UY	UZ	VA	VB
A 80 3, A 80 4 UH	3.150	3.362	0.866	7.09	3.15
	80	85.4	22	180	80

Input shaft

	FU	FZ	FV	Key	FM
A 80 3 HS	1.654	1.772	4.331	12 x 8 x 90	M12x28 [mm]
	42	45	110		
A 80 4 NHS	1.000	1.110	1.970	3/4 x 3/4 x 1 3/4	M8x19 [mm]



	C	Weight [lbs / kg]
A 80 3	30.96	584 / 265
	786.5	
A 80 4	28.94	551 / 250
	735	



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 80 3, A 80 4	13.39	12.99	11.81	10.43	9.055	-0.0020 -0.0038	M16x28 [mm]	10.71	10.83	4.80	8.23	0.91	1.02	13.03	17.99	7.28
	340	330	300	265	230	-0.050 -0.096		272	275	122	209	23	26	331	457	185

Output shaft

	U	UY	UZ	VA	VB
A 80 3, A 80 4	3.150	+0.0016 +0.00039	3.362	0.866	3.15
	80	+0.04 +0.01	85.4	22	80

IEC flange (mm)

	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	547 / 248
P71	160	130	110	M8x16	4.5	547 / 248
P80, P90	200	165	130	M10x12	4	549 / 249
P100, P112	250	215	180	M12x16	4.5	551 / 250
P132	300	265	230	14	5	571 / 259
P160, P180	350	300	250	18	6	591 / 268
P200	400	350	300	M16x25	7	615 / 279
P225	450	400	350	18	6	657 / 298

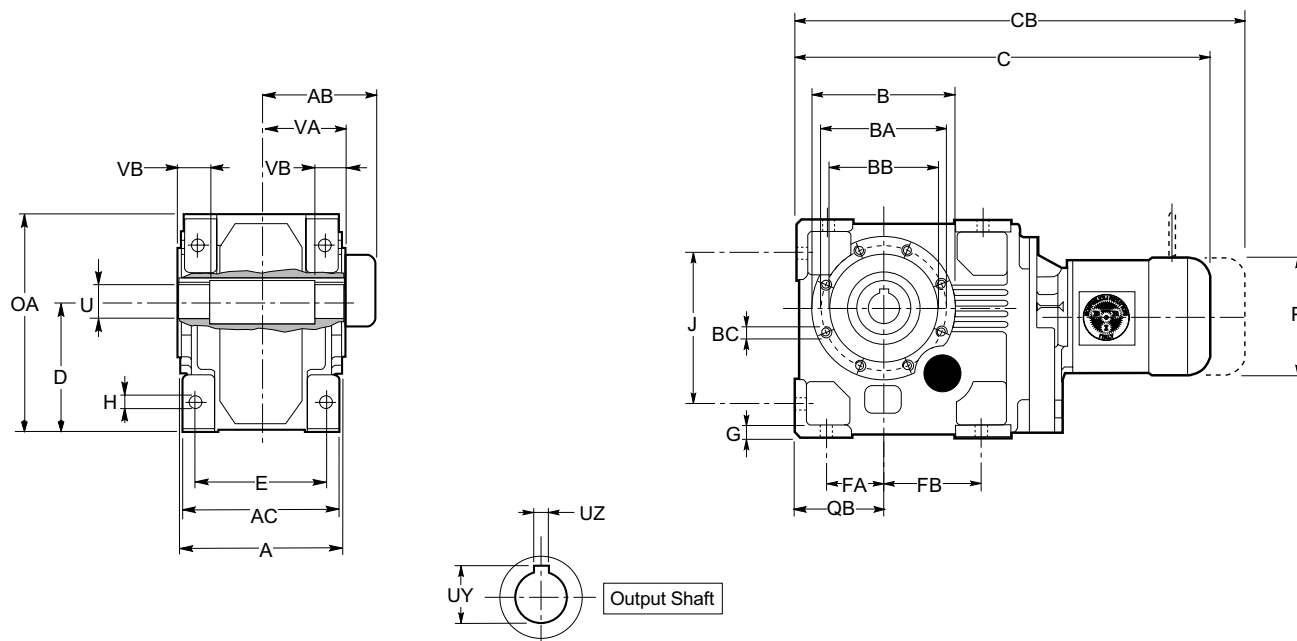


Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3
P132	10	38	41.3
P160	12	42	45.3
P180	14	48	51.8
P200	16	55	59.3
P225	18	60	64.4

	C						
	P63 P71	P80 P90	P100 P112	P132	P160 P180	P200	P225
A 80 3	—	23.70 602	24.09 612	25.53 648.5	27.72 704	28.70 729	30.49 774.5
A 80 4	25.41 645.5	26.18 665	26.57 675	28.01 711.5	—	—	—

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 90 3, A 90 4	15.35 390	14.76 375	13.78 350	11.81 300	9.843 250 -0.0020 -0.0038 -0.050 -0.096	M20x33 [mm]	12.80 325	12.40 315	6.10 155	10.04 255	1.18 30	1.02 26	16.14 410	21.65 550	8.86 225

Output shaft

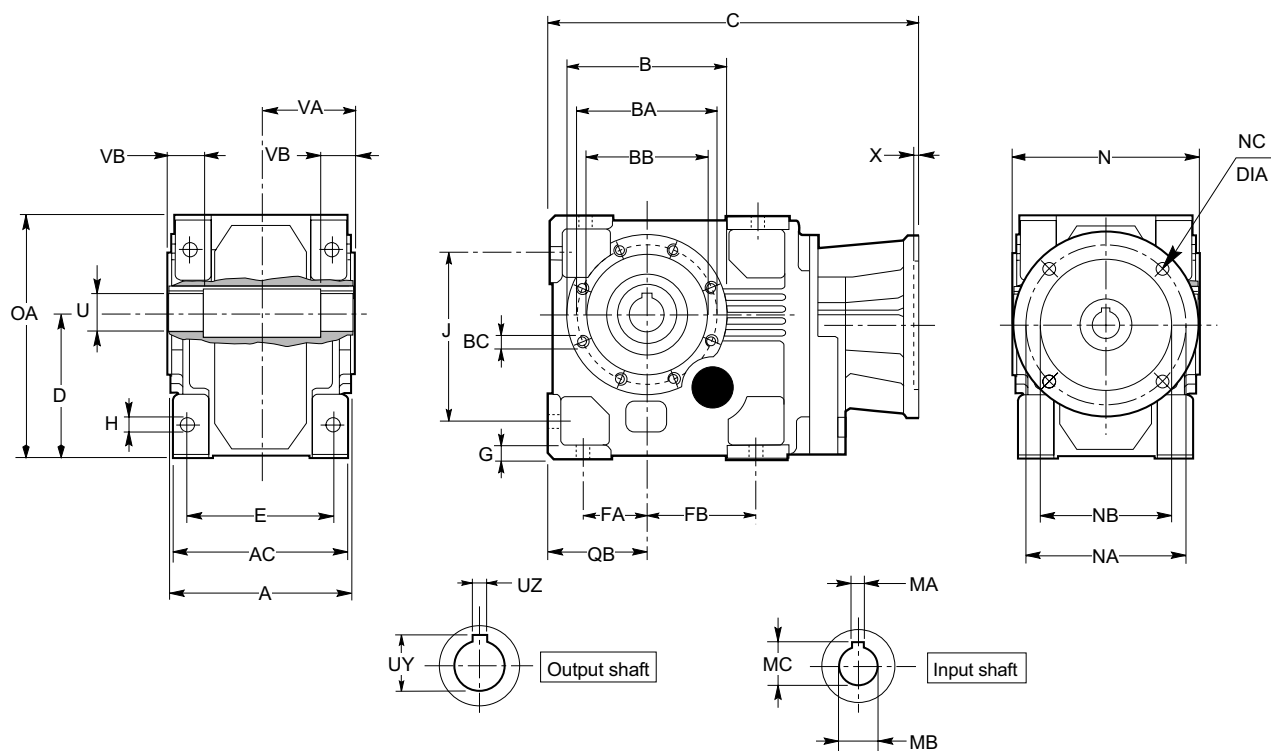
	U	UY	UZ	VA	VB
A 90 3, A 90 4 UH	3.543 90 + 0.0018 + 0.00047 + 0.047 + 0.012	3.756 95.4	0.984 25	8.07 205	3.15 80

Motor



	AB	C	CB	P	Weight [lbs / kg]
A 90 3_S3 M3S	5.59 142	36.63 930.5	40.41 1026.5	7.68 195	926 / 420
A 90 3_S3 M3L	5.59 142	37.89 962.5	41.48 1053.5	7.68 195	941 / 427
A 90 3_S4 M4S	7.60 193	42.15 1070.5	46.44 1179.5	10.16 258	999 / 453
A 90 3_S4 M4L	7.60 193	42.15 1070.5	46.44 1179.5	10.16 258	1041 / 472
A 90 3_S4 M4LC	7.60 193	43.52 1105.5	47.42 1204.5	10.16 258	1058 / 480
A 90 3_S5 M5S	9.65 245	45.55 1157	51.06 1297	12.20 310	1129 / 512
A 90 3_S5 M5L	9.65 245	47.28 1201	52.80 1341	12.20 310	1164 / 528
A 90 4_S1 M1S	4.25 108	36.12 917.5	38.60 980.5	5.43 138	906 / 411
A 90 4_S1 M1L	4.25 108	37.07 941.5	39.47 1002.5	5.43 138	908 / 412
A 90 4_S2 M2S	4.69 119	38.21 970.5	40.96 1040.5	6.14 156	939 / 426
A 90 4_S3 M3S	5.59 142	39.90 1013.5	43.68 1109.5	7.68 195	957 / 434
A 90 4_S3 M3L	5.59 142	41.16 1045.5	44.74 1136.5	7.68 195	972 / 441
A 90 4_S4 M4L	7.60 193	45.41 1153.5	49.70 1262.5	10.16 258	1030 / 467
A 90 4_S4 M4S	7.60 193	45.41 1153.5	49.70 1262.5	10.16 258	1071 / 486

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB		BC	D	E	FA	FB	G	H	J	OA	QB
A 90 3, A 90 4	15.35	14.76	13.78	11.81	9.843	$\begin{smallmatrix} -0.0020 \\ -0.0038 \end{smallmatrix}$	M20x33 [mm]	12.80	12.40	6.10	10.04	1.18	1.02	16.14	21.65	8.86
	390	375	350	300	250	$\begin{smallmatrix} -0.050 \\ -0.096 \end{smallmatrix}$		325	315	155	255	30	26	410	550	225

Output shaft

		U	UY	UZ	VA	VB
A 90 3, A 90 4	UH	3.543	+0.0018 +0.00047	3.756	0.984	3.15
		90	+0.047 +0.012	95.4	25	80

NEMA flange



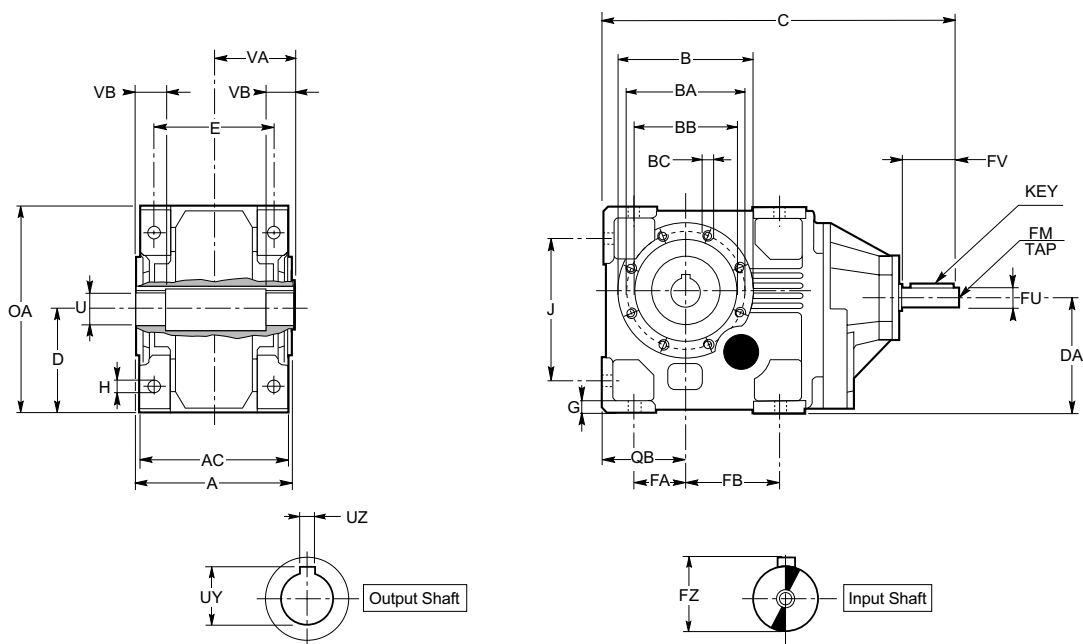
	N	NA	NB	NC	X	Weight [lbs / kg]
N56C	6.496	5.875	4.500	0.394	0.196	908 / 412
N140TC	6.496	5.875	4.500	0.394	0.196	910 / 413
N180TC	8.996	7.250	8.500	0.551	0.216	915 / 415
N210TC	8.996	7.250	8.500	0.551	0.216	933 / 423
N250TC	13.780	7.250	8.500	0.551	0.216	957 / 434
N280TC	13.780	9.000	10.500	0.551	0.216	957 / 434
N320TC	17.717	11.000	12.500	0.669	0.216	1041 / 472

Hollow input shaft

	MA	MB	MC
N56C	0.188	0.625	0.710
N140TC	0.188	0.875	0.964
N180TC	0.250	1.125	1.241
N210TC	0.312	1.375	1.518
N250TC	0.375	1.625	1.796
N280TC	0.500	1.875	2.102
N320TC	0.500	2.125	2.350

	C						
	N56C	N140TC	N180TC	N210TC	N250TC	N280TC	N320TC
A 90 3	—	—	29.23	30.47	33.46	33.66	36.52
			742.5	774	850	855	927.5
A 90 4	31.75	31.75	32.50	33.74	—	—	—
	806.5	806.5	825.5	857			

Dimensions are $\frac{\text{inch}}{\text{mm}}$



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 90 3, A 90 4	15.35 390	14.76 375	13.78 350	11.81 300	9.843 250 -0.0020 -0.0038 -0.050 -0.096	M20x33 [mm]	12.80 325	12.40 315	6.10 155	10.04 255	1.18 30	1.02 26	16.14 410	21.65 550	8.86 225

Output shaft

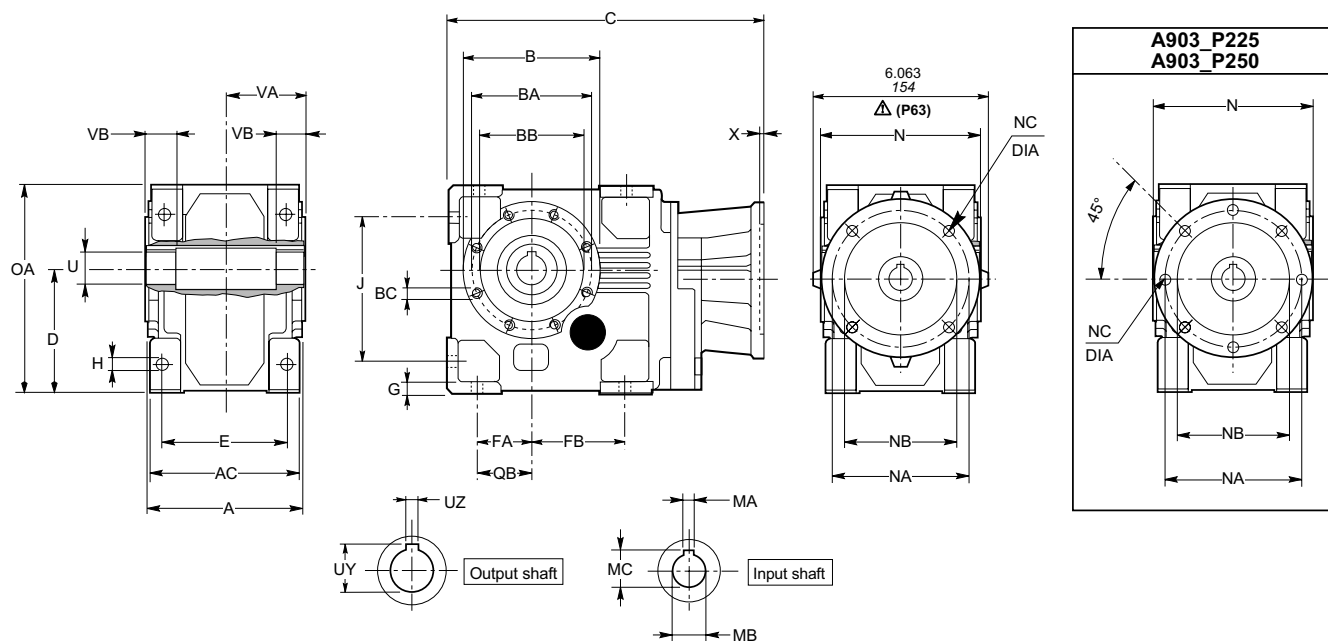
	U	UY	UZ	VA	VB
A 90 3, A 90 4 UH	3.543 90 +0.0018 +0.00047 +0.047 +0.012	3.756 95.4	0.984 25	8.07 205	3.15 80

Input shaft

	FU	FZ	FV	Key	FM
A 90 3 HS	2.362 60 +0 -0.0007 +0 -0.019	2.520 64	5.512 140	18 x 11 x 120	M16x36 [mm]
A 90 4 NHS	1.000 +0 -0.0005	1.110	1.970	1/4 x 1/4 x 1 3/4	M8x19 [mm]



	C	Weight [lbs / kg]
A 90 3	39.72 1009	1025 / 465
A 90 4	34.47 875.5	915 / 415



Outline dimensions

	A	AC	B	BA	BB	BC	D	E	FA	FB	G	H	J	OA	QB
A 90 3, A 90 4	15.35	14.76	13.78	11.81	9.843	M20x33 [mm]	12.80	12.40	6.10	10.04	1.18	1.02	16.14	21.65	8.86
	390	375	350	300	250		325	315	155	255	30	26	410	550	225

Output shaft

	U	UY	UZ	VA	VB
A 90 3, A 90 4	3.543	3.756	0.984	8.07	3.15
	90	95.4	25	205	80

IEC flange (mm)



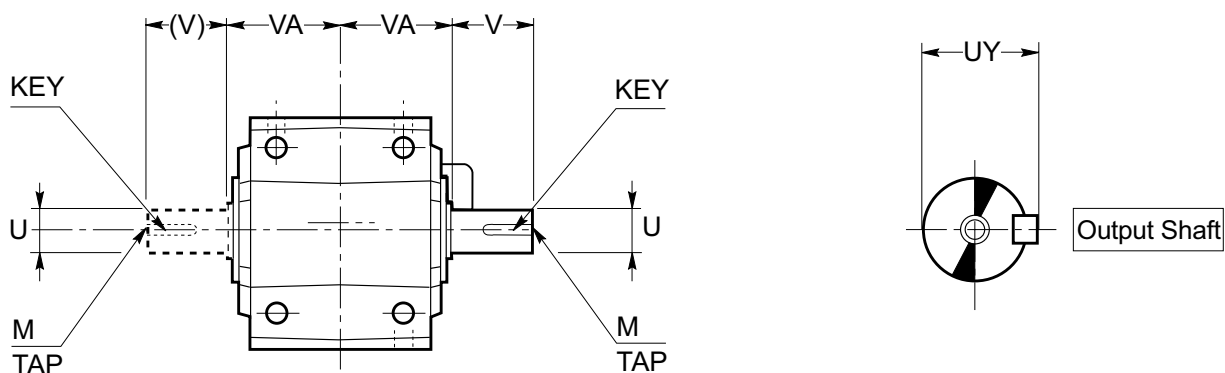
	N	NA	NB	NC	X	Weight [lbs / kg]
P63	140	115	95	M8x19	4	906 / 411
P71	160	130	110	M8x16	4.5	908 / 412
P80, P90	200	165	130	M10x12	4	910 / 413
P100, P112	250	215	180	M12x16	4.5	915 / 415
P132	300	265	230	14	5	933 / 423
P160, P180	350	300	250	18	6	957 / 434
P200	400	350	300	M16x25	7	961 / 436
P225	450	400	350	18	6	1041 / 472
P250	550	500	450	18	6	1047 / 475

Hollow input shaft

	MA	MB	MC
P63	4	11	12.8
P71	5	14	16.3
P80	6	19	21.8
P90	8	24	27.3
P100, P112	8	28	31.3
P132	10	38	41.3
P160	12	42	45.3
P180	14	48	51.8
P200	16	55	59.3
P225	18	60	64.4
P250	18	65	69.4

	C							
	P63 P71	P80 P90	P100 P112	P132	P160 P180	P200	P225	P250
A 90 3	—	28.46 723	28.86 733	30.30 769.5	32.48 825	33.46 850	35.26 895.5	36.44 925.5
A 90 4	30.96 786.5	31.73 806	32.13 816	33.56 852.5	35.55 903	—	—	—

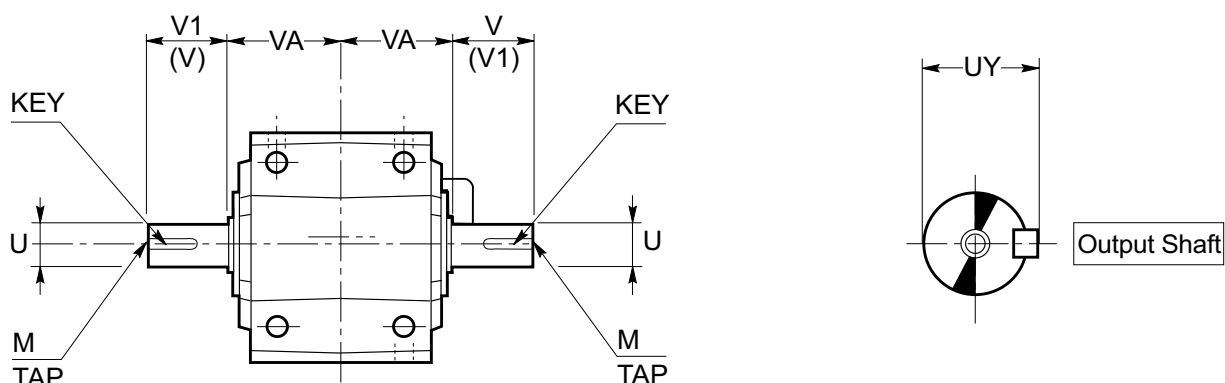
Dimensions are $\frac{\text{inch}}{\text{mm}}$



Output shaft (NUL, NUR inch series / UL, UR metric series)

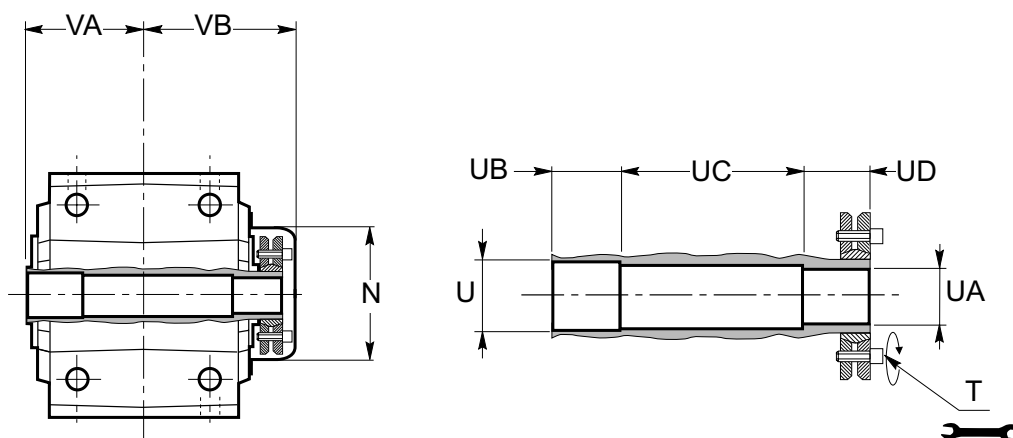
Model		U	UY	V	VA	Key	M
A 10	NUL	1.000	1.110	2.000	2.480	1/4 x 1/4 x 1 3/4	M8x19 [mm]
	NUR	⁺⁰ _{-0.0005}					
A 20	NUL	1.250	1.360	2.500	2.874	1/4 x 1/4 x 2 5/32	M10x22 [mm]
	NUR	⁺⁰ _{-0.0006}					
A 30	NUL	1.375	1.510	2.750	3.268	5/16 x 5/16 x 2 3/8	M10x22 [mm]
	NUR	⁺⁰ _{-0.0006}					
A 41	NUL	1.625	1.790	3.250	3.661	3/8 x 3/8 x 2 7/8	M12x228 [mm]
	NUR	⁺⁰ _{-0.0006}					
A 50	NUL	2.000	2.220	4.000	4.646	1/2 x 1/2 x 3 3/4	M16x36 [mm]
	NUR	⁺⁰ _{-0.0007}					
A 60	NUL	2.625	2.900	5.250	4.921	5/8 x 5/8 x 5	M20x42 [mm]
	NUR	⁺⁰ _{-0.0007}					
A 70	UL	3.150	3.346	5.118	6.024	22x14x110	M20x42 [mm]
	UR	⁺⁰ _{-0.0009}					
A 80	UL	80	85	130	153	25x14x160	M24x50 [mm]
	UR	⁺⁰ _{-0.022}					
A 80	UL	3.543	3.740	6.692	7.087	25x14x160	M24x50 [mm]
	UR	⁺⁰ _{-0.0009}					
A 90	UL	90	95	170	180	28x16x190	M24x50 [mm]
	UR	⁺⁰ _{-0.022}					
A 90	UL	3.937	4.173	8.267	8.070	28x16x190	M24x50 [mm]
	UR	⁺⁰ _{-0.0009}					
A 90	UL	100	106	210	205	28x16x190	M24x50 [mm]
	UR	⁺⁰ _{-0.022}					

Foot mount A 10...A 90 (double shaft extension)



Output shaft (NUD inch series / UD metric series)

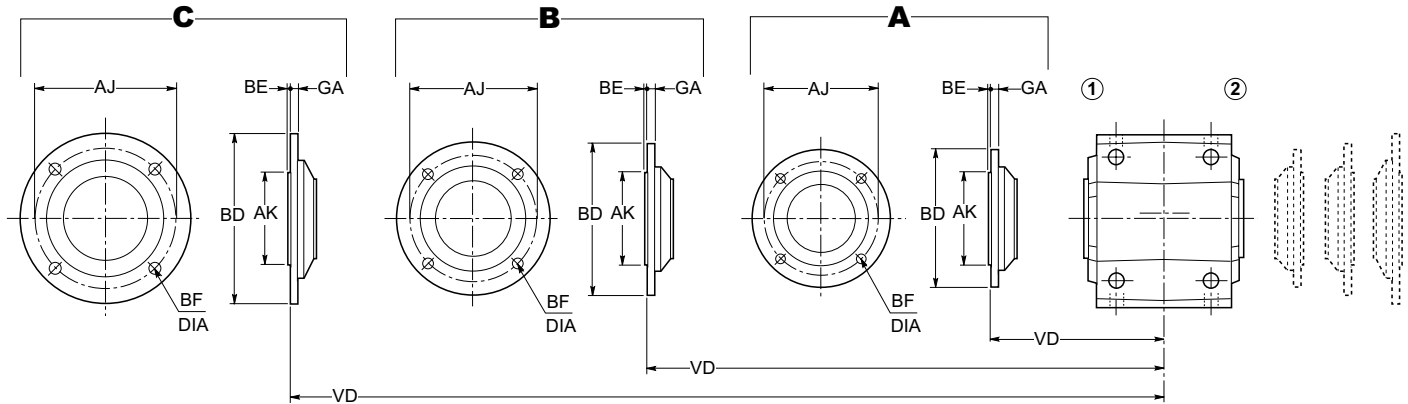
Model	U	UY	V	V1	VA	Key	M
A 10 NUD	1.000 ⁺⁰ / _{-0.0005}	1.110	2.080	2.000	2.480 63	1/4 x 1/4 x 1 3/4	M8x19 [mm]
A 20 NUD	1.250 ⁺⁰ / _{-0.0006}	1.360	2.550	2.500	2.874 73	1/4 x 1/4 x 2 5/32	M10x22 [mm]
A 30 NUD	1.375 ⁺⁰ / _{-0.0006}	1.510	2.800	2.750	3.268 83	5/16 x 5/16 x 2 3/8	M10x22 [mm]
A 41 NUD	1.625 ⁺⁰ / _{-0.0006}	1.790	3.330	3.250	3.661 93	3/8 x 3/8 x 2 7/8	M12x228 [mm]
A 50 NUD	2.000 ⁺⁰ / _{-0.0007}	2.220	4.060	4.000	4.646 118	1/2 x 1/2 x 3 3/4	M16x36 [mm]
A 60 NUD	2.625 ⁺⁰ / _{-0.0007}	2.900	5.290	5.250	4.921 125	5/8 x 5/8 x 5	M20x42 [mm]
A 70 UD	3.150 ⁺⁰ / _{-0.0009} 80 ⁺⁰ / _{-0.022}	3.346 85	5.118 130	5.118 130	6.024 153	22x14x110	M20x42 [mm]
A 80 UD	3.543 ⁺⁰ / _{-0.0009} 90 ⁺⁰ / _{-0.022}	3.740 95	6.692 170	6.692 170	7.087 180	25x14x160	M24x50 [mm]
A 90 UD	3.937 ⁺⁰ / _{-0.0009} 100 ⁺⁰ / _{-0.022}	4.173 106	8.267 210	8.267 210	8.070 205	28x16x190	M24x50 [mm]



Output shaft (Inch series / Optional metric series)

Model	T lb in Nm	U	UA	UB	UC	UD	VA	VB	N
A 10	128	1.260	1.181	1.417	3.051	1.417	2.362	4.055	3.346
	14.5	32	30	36	77.5	36	60	103	85
A 20	128	1.457	1.378	1.654	3.524	1.614	2.756	4.547	3.937
	14.5	37	35	42	89.5	41	70	115.5	100
A 30	128	1.654	1.575	1.969	3.760	1.890	3.150	4.941	3.937
	14.5	42	40	50	95.5	48	80	125.5	100
A 41	128	1.850	1.772	2.047	4.862	1.909	3.661	5.819	5.315
	14.5	47	45	52	123.5	48.5	93	147.8	195
A 50	310	2.244	2.165	1.890	6.142	2.441	4.488	7.051	7.283
	35	57	55	48	156	62	114	179.1	185
A 60	310	2.835	2.756	1.969	7.008	2.638	4.921	7.461	7.283
	35	72	70	50	178	67	125	189.5	185
A 70	310	3.228	3.150	3.622	6.811	3.543	6.024	8.366	8.268
	35	82	80	92	173	90	153	212.5	210
A 80	611	3.622	3.543	4.016	8.504	3.937	7.087	9.764	9.055
	69	92	90	102	216	100	180	248	230
A 90	611	4.016	3.937	3.150	12.638	2.756	8.071	11.063	9.843
	69	102	100	80	321	70	205	281	250

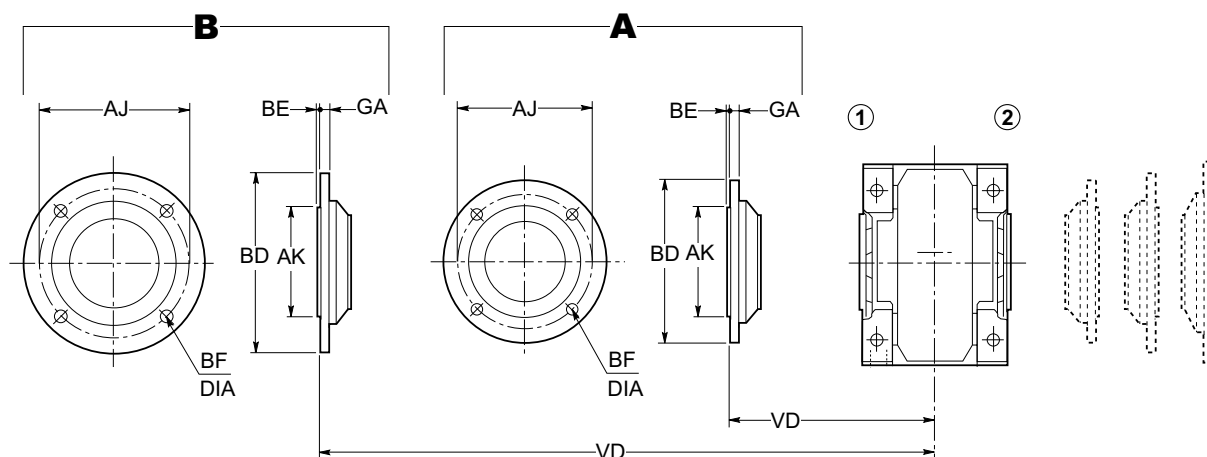
Flange options for A 10...A 60



Flange

		AJ	AK	BD	BE	BF	GA	VD
A	A 10	5.118 130	4.331 110 -0.0014 -0.0028 -0.036 -0.071	6.299 160	0.118 3	0.354 9	0.394 10	3.602 91.5
	A 20	5.118 130	4.331 110 -0.0014 -0.0028 -0.036 -0.071	6.299 160	0.118 3	0.354 9	0.394 10	3.602 106
	A 30	5.118 130	4.331 110 -0.0014 -0.0028 -0.036 -0.071	6.299 160	0.118 3	0.354 9	0.394 10	4.567 116
	A 41	8.465 215	7.087 180 -0.0017 -0.0033 -0.043 -0.083	9.843 250	0.157 4	0.433 14	0.512 13	5.020 127.5
	A 50	10.433 265	9.055 230 -0.0020 -0.0038 -0.050 -0.096	11.811 300	0.157 4	0.433 14	0.630 16	6.299 160
	A 60	10.433 265	9.055 230 -0.0020 -0.0038 -0.050 -0.096	11.811 300	0.157 4	0.433 14	0.630 16	6.692 170
B	A 10	6.496 165	5.118 130 -0.0017 -0.0033 -0.043 -0.083	7.874 200	0.138 3.5	0.433 11	0.433 11	3.602 91.5
	A 20	6.496 165	5.118 130 -0.0017 -0.0033 -0.043 -0.083	7.874 200	0.138 3.5	0.433 11	0.433 11	4.173 106
	A 30	6.496 165	5.118 130 -0.0017 -0.0033 -0.043 -0.083	7.874 200	0.138 3.5	0.433 11	0.433 11	4.567 116
	A 41	10.433 265	9.055 230 -0.0020 -0.0038 -0.050 -0.096	11.811 300	0.157 4	0.551 14	0.630 16	5.020 127.5
	A 50	11.811 300	9.843 250 -0.0020 -0.0039 -0.050 -0.098	13.780 350	0.197 5	0.709 18	0.709 18	6.299 160
	A 60	11.811 300	9.843 250 -0.0020 -0.0039 -0.050 -0.098	13.780 350	0.197 5	0.709 18	0.709 18	6.692 170
C	A 10	8.465 215	7.087 180 -0.0017 -0.0033 -0.043 -0.083	9.843 250	0.157 4	0.551 14	0.512 13	3.602 91.5
	A 20	8.465 215	7.087 180 -0.0017 -0.0033 -0.043 -0.083	9.843 250	0.157 4	0.551 14	0.512 13	4.173 106
	A 30	8.465 215	7.087 180 -0.0017 -0.0033 -0.043 -0.083	9.843 250	0.157 4	0.551 14	0.512 13	4.567 116
	A 41	11.811 300	9.843 250 -0.0020 -0.0038 -0.050 -0.096	13.780 350	0.197 5	0.709 18	0.709 18	5.020 127.5
	A 50	13.780 350	11.811 300 -0.0022 -0.0043 -0.056 -0.108	15.748 400	0.197 5	0.709 18	0.787 20	6.299 160
	A 60	13.780 350	11.811 300 -0.0022 -0.0043 -0.056 -0.108	15.748 400	0.197 5	0.709 18	0.787 20	6.692 170

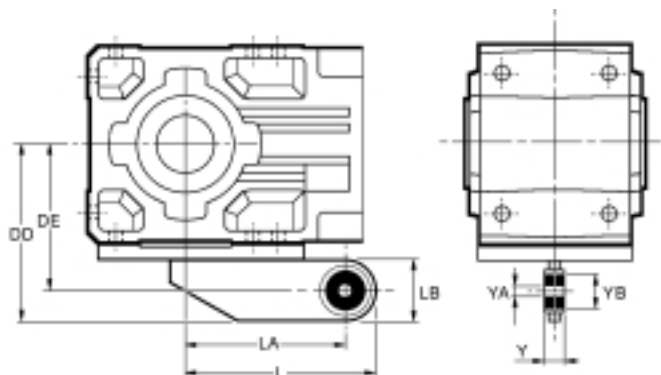
Dimensions are $\frac{\text{inch}}{\text{mm}}$



Flange

		AJ	AK	BD	BE	BF	GA	VD
A	A 70	15.748	13.780 -0.0024 -0.0047	17.717	0.197	0.709	0.866	8.661
		400	350 -0.062 -0.119	450	5	18	22	220
	A 80	15.748	13.780 -0.0024 -0.0047	17.717	0.197	0.709	0.866	9.843
		400	350 -0.062 -0.119	450	5	18	22	250
	A 90	19.685	17.717 -0.0027 -0.0052	21.654	0.197	0.709	0.945	11.024
		500	450 -0.068 -0.131	550	5	18	24	280
B	A 70	19.685	17.717 -0.0027 -0.0052	21.654	0.197	0.709	0.945	8.661
		500	450 -0.068 -0.131	550	5	18	24	220
	A 80	19.685	17.717 -0.0027 -0.0052	21.654	0.197	0.709	0.945	9.843
		500	450 -0.068 -0.131	550	5	18	24	250

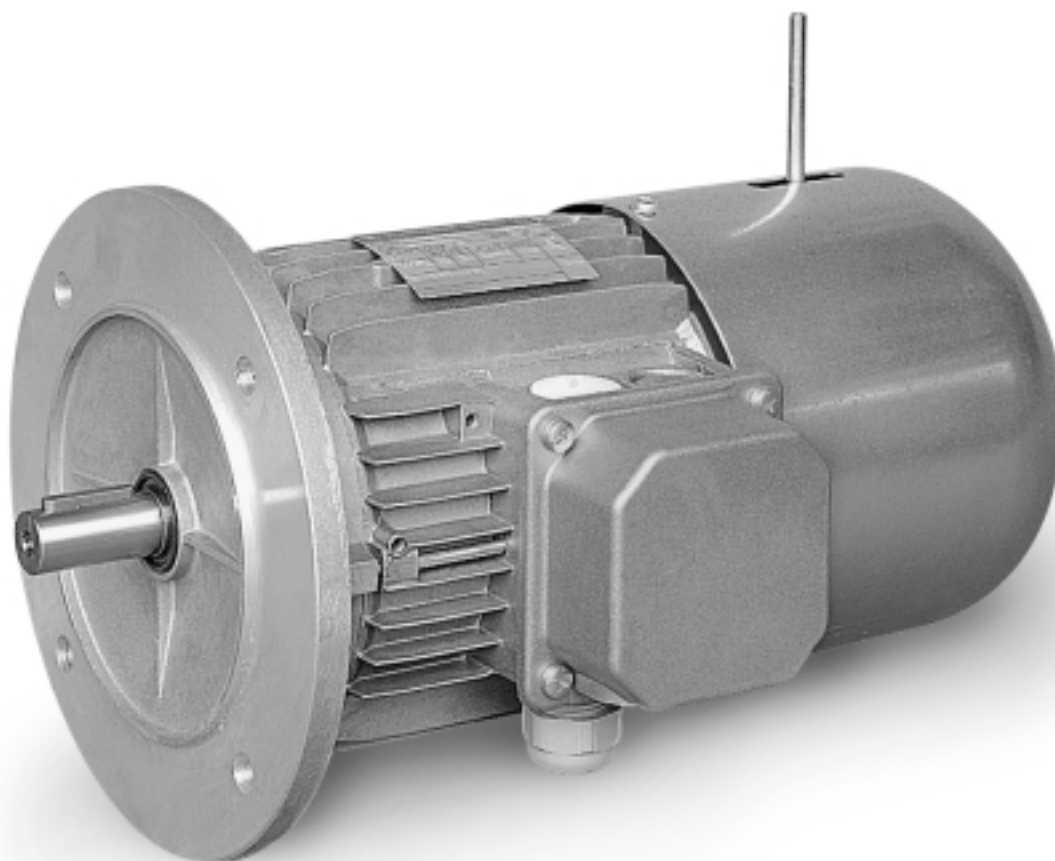
2.17 TORQUE ARM



	DD	DE	L	LA	LB	Y	YA	YB
A 10	5.433	4.252	5.827	4.646	2.362	0.787	0.394	1.181
	138	108	148	118	60	20	10	30
A 20	5.827	4.646	6.575	5.394	2.362	0.787	0.394	1.181
	148	118	167	137	60	20	10	30
A 30	6.693	5.315	7.283	5.906	2.756	0.984	0.787	1.575
	170	135	185	150	70	25	20	40
A 40	7.559	6.181	9.252	7.874	2.756	0.984	0.787	1.575
	192	157	235	200	70	25	20	40
A 50	9.646	7.874	11.614	9.843	3.543	1.575	1.260	2.205
	245	200	295	250	90	40	32	56
A 60	10.630	8.858	13.583	11.811	3.543	1.575	1.260	2.205
	270	225	345	300	90	40	32	56
A 70	13.150	11.380	11.614	9.843	3.543	1.575	1.260	2.205
	334	289	295	250	90	40	32	56
A 80	16.614	14.055	14.370	11.811	5.118	2.362	1.654	3.071
	422	357	365	300	130	60	42	78
A 90	18.700	16.142	16.338	13.780	5.118	2.362	1.654	3.071
	475	410	415	350	130	60	42	78

Torque arm comes complete with fasteners

3.0 **BONFIGLIOLI ELECTRIC MOTORS**



3.1 GENERAL INFORMATION

BONFIGLIOLI RIDUTTORI three-phase AC induction motors and brake motors are designed for continuous operation, IEC dimensional standard and comply electrically with all relevant standards including NEMA MG1.

They are supplied either integral (M type) to a BONFIGLIOLI gear unit or flanged design (BN type).

The motors also comply with national standards adapted to IEC 60034-1 as charted along side.

(C1)

Canada	CSA C22.2 N° 100
Great Britain	BS5000 / BS 4999
Germany	DIN VDE 0530
Australia	AS 1359
Belgium	NBNC 51 - 101
Norway	NEK – IEC 34
France	NF C 51
Austria	OEVE M 10
Switzerland	SEV 3009
Netherlands	NEN 3173
Sweden	SS 426 01 01

Abbreviations and units

Symb.	U.m.	Description
$\cos \varphi$	–	Power factor
η	–	Efficiency
f_m	–	Intermittence adjustment factor
f_t	–	Ambient temperature factor
I	–	Cyclic duration factor
I_n	[A]	Rated current
I_s	[A]	Locked rotor current
J_c	[lb·ft ²]	Load inertia
J_m	[lb·ft ²]	Motor inertia
n	[rpm]	Speed
K_c	–	Torque factor
K_d	–	Load factor
K_i	–	Inertia factor
T_b	[lb·in]	Brake torque
T_n	[lb·in]	Motor rated torque
T_a	[lb·in]	Mean starting torque
T_k	[lb·in]	Breakdown torque
T_L	[lb·in]	Load torque
T_s	[lb·in]	Locked rotor torque
P_b	[W]	Power absorbed by brake coil
P_n	[W]	Rated power output
t_1	[ms]	Brake release time
t_{1s}	[ms]	Shorter brake release time
t_2	[ms]	Brake reaction time
t_{2c}	[ms]	Faster reaction time
t_a	[°C/ °F]	Ambient temperature
t_f	[min]	Operating time at constant load
t_r	[min]	Rest time
W	[lb·ft]	Brake work between two successive adjustments
W_{max}	[lb·ft]	Max permissible brake work
Z	[1/h]	Permissible starts per hour
Z_0	[1/h]	Permissible starts per hour (un-loaded, I=50%)

Conversion table for commonly used metric – imperial units

Length

1 in	=	25.40 mm	= 0.0254 m
1 ft	=	304.8 mm	= 0.3048 m
1 yd	=	914.4 mm	= 0.9144 m

Area

1 in ²	=	645.16 mm ²	= 0.645×10 ⁻³ m ²
1 ft ²	=	92.9×10 ³ mm ²	= 92.9× 10 ³ m ²
1 yd ²	=	836×10 ³ mm ²	= 0.8361 m ²

Volume

1 in ³	=	16.4×10 ⁻³ dm ³	= 16.4×10 ⁻⁶ m ³
1 ft ³	=	28.32 dm ³	= 28.3×10 ⁻³ m ³

Force – Weight

1 lbm	=	2.2046 Kg
1 lbf	=	4.4482 N

Torque

1 lb in	=	0.1129 Nm
1 lb ft	=	1.3558 Nm

Power

1 hp	=	0.7457 kW
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Moment of inertia

1 lb ft ²	=	4.214×10 ⁻²	Kg m ²
1 lb in s ²	=	1.12985×10 ⁻¹	Kg m ²
1 lb ft s ²	=	1.35582	Kg m ²

Pressure – stress

1 lb/in ²	=	6.89×10 ⁻³	N/mm ²
1 lb/ft ²	=	47.88	N/m ²

Temperature

t [°F]	=	$\frac{5}{9} \times t - 32$	[°C]
T [°C]	=	$\frac{9}{5} \times T + 32$	[°F]

3.2 MOTOR ORDERING NUMBERS

MOTOR										BRAKE				
M	2SA	4	230/460-60	IP54	CLF		W	FD	15	R	SB	220	SA	
														OPTIONS
														BRAKE SUPPLY
														AC/DC RECTIFIER NB, NBR, SB, SBR
														BRAKE HAND RELEASE (optional) R, RM
														BRAKE TORQUE [specify Nm!] [1 ft • lb = 1.356 Nm]
														BRAKE TYPE FD (DC brake) FA (AC brake)
														TERMINAL BOX W (default), N, S, E
														MOUNTING blank for compact motor B5 for IEC motor
														INSULATION CLASS CL F default
														DEGREE OF PROTECTION IP 55 standard (IP 54 standard for brake motors)
														VOLTAGE - FREQUENCY
														NUMBER OF POLES
														MOTOR FRAME SIZE
														TYPE OF MOTOR

US power mains voltages and the corresponding rated voltages to be specified for the motor are indicated in the following table:

(C2)

Frequency	Mains voltage	V _{mot}
60 Hz	208 V	200 V
	240 V	230 V
	480 V	460 V
	600 V	575 V

Motors with YY/Y connection (e.g. 230/460-60; 220/440-60) feature, as standard, a 9-stud terminal board.

For DC brake motors type BN_FD, the rectifier is fed with 1-phase 230V a.c., factory pre-wired in the motor terminal box as standard.

Brake power supply for brake motors is as follows:

(C3)

BN_FD M_FD	
Wired to terminal box 1~230V a.c.	
BN_FA M_FA	
	Specify
Separate power supply 230V Δ - 60Hz	230SA
Separate power supply 460V Y - 60Hz	460SA

Tolerances

As per the IEC standards applicable the tolerances here after apply to the following quantities.

(C4) $15 (1 - h) P \leq 75 \text{ hp}$	Efficiency
$-(1 - \cos \phi)/6$ min 0.02 max 0.07	Power factor
$\pm 20\%$ *	Slip
+20%	Locked rotor current
-15% +25%	Locked rotor torque
-10%	Max. torque

* $\pm 30\%$ for motors with $P_n < 0.75 \text{ hp}$

CUS

Motors for USA and Canada

BN and M motors are available in NEMA Design C configuration (concerning electrical characteristics), certified to CSA (Canadian standard) C22.2 No. 100 and UL (Underwriters Laboratory) UL 1004. Name plate includes the cCSAus mark (voltage $\leq 600\text{V}$), in this case, please specify option CUS.

3.3 MECHANICAL CHARACTERISTICS

IP..

Enclosures

Motors are provided as totally enclosed fan-cooled (TEFC) according to NEMA MG1 1-26-2 1998 and they are designed for IP 55 (IP 54 for brake motors) degree of protection in accordance with NEMA MG1- 5 / IEC 60034-5 Standards.

Higher degree of protection (IP 56, or IP 55 for brake motors) is available on request.

The following table provides an overview of the available degree of protection.

Regardless of the protection class specified on order, motors to be installed outdoors require protection against direct sunlight and in addition – when they are to be installed with the shaft downwards – a drip cover to keep out water and solid matter (option **RC**).

(C5)

		IP 54	IP 55	IP 56
		n.a.	standard	at request
BN_FD BN_FA	M_FD M_FA	standard	at request	n.a.

Cooling

The motors are self ventilated (IEC 411 / NEMA MG1-6) and are equipped with a plastic fan working in both directions.

The motors must be installed allowing sufficient space between fan cowl and the nearest wall to ensure free air intake and allow access for maintenance purposes on motor and brake, if supplied.

Independent, forced air ventilation (IEC 416 / NEMA MG1-6) can be supplied on request (option U1).

This solution enables to increase the motor duty factor when driven by an inverter and operating at reduced speed.

Direction of rotation

Rotation is possible in both directions. If terminals U1, V1, and W1 are connected to line phases L1, L2 and L3, clockwise rotation (looking from drive end) is obtained. For counterclockwise rotation, switch two phases.

Noise

Noise levels, measured using the method prescribed by ISO 1680 Standards, are within the maximum levels specified by Standards CEI EN 60034-9.

Vibrations and balancing

Rotor shafts are balanced with half key fitted and fall within the vibration class N, as per Standard CEI EN 60034-14.

If a further reduced noise level is required improved balancing can be optionally requested (class R).

Table below shows the value for the vibration velocity for standard (N) and improved (R) balancing.

(C6)

Vibration class	Angular velocity n [rpm]	Limits of the vibration velocity [mm/s]	
		BN 56...BN 132 M05...M4	BN 160MR...BN 200 M5
N	$600 \leq n \leq 3600$	1.8	2.8
R	$600 \leq n \leq 1800$	0.71	1.12
	$1800 < n \leq 3600$	1.12	1.8

Values refer to measures with freely suspended motor in unloaded conditions.

Winding connection and motor terminal box

Standard terminal board has 9 studs for YY-Y dual-voltage winding and 6 studs for star/delta winding configuration (single-speed motors).

An earth terminal located in the terminal box is provided as standard on all motors.

For DC brake motors, the AC/DC rectifier is supplied in the terminal box and it is provided with adequately connected terminals.

All connections must be carried out according to the diagrams inside the terminal box or in the [instruction manual](#).

Cable entry

(C7)

		Cable entry (metric thread)	Max cable diam. [mm]
BN 63	M 05	2 x M20	13
BN 71	M 1	2 x M25	17
BN 80 - BN 90	M 2	2 x M25	17
BN 100	M 3	2 x M32	21
		2 x M25	17
BN 112	-	2 x M32	17
		2 x M25	
BN 132...BN 160MR	M 4	4 x M32	21
BN 160M...BN 200L	M 5	2 x M40	29

Bearings

Life lubricated preloaded radial ball bearings are used, types are shown in the chart here under.

Calculated endurance lifetime L_{10} , as per ISO 281, in unloaded condition, exceeds 40000 hrs.

DE = drive end

NDE = non drive end

(C8)

	DE	NDE	
	M, M_FD, M_FA	M	M_FD, M_FA
			
M05	6004 2Z C3	6201 2Z C3	6201 2RS C3
M1	6004 2Z C3	6202 2Z C3	6202 2RS C3
M2	6007 2Z C3	6204 2Z C3	6204 2RS C3
M3	6207 2Z C3	6206 2Z C3	6206 2RS C3
M4	6309 2Z C3	6208 2Z C3	6208 2RS C3
M5	6309 2Z C3	6209 2Z C3	6209 2RS C3

(C9)

	DE	NDE	
	BN, BN_FD, BN_FA	BN	BN_FD, BN_FA
			
BN 56	6201 2Z C3	6201 2Z C3	-
BN 63	6201 2Z C3	6201 2Z C3	6201 2Z C3
BN 71	6202 2Z C3	6202 2Z C3	6202 2Z C3
BN 80	6204 2Z C3	6204 2Z C3	6204 2Z C3
BN 90	6205 2Z C3	6205 2Z C3	6205 2Z C3
BN 100	6206 2Z C3	6206 2Z C3	6206 2Z C3
BN 112	6306 2Z C3	6306 2Z C3	6306 2Z C3
BN 132	6308 2Z C3	6308 2Z C3	6308 2Z C3
BN 160MR	6309 2Z C3	6308 2Z C3	6308 2Z C3
BN 160M/L	6309 2Z C3	6309 2Z C3	6309 2Z C3
BN 180M	6210 2Z C3	6309 2Z C3	6309 2Z C3
BN 180L	6310 2Z C3	6310 2Z C3	6310 2Z C3
BN 200L	6312 2Z C3	6310 2Z C3	6310 2Z C3

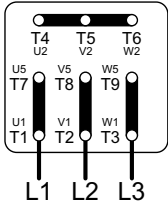
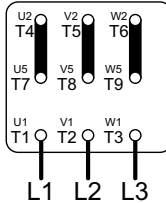
3.4 ELECTRICAL CHARACTERISTICS

Voltage

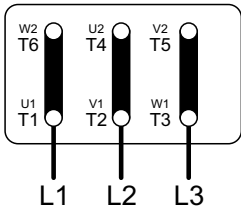
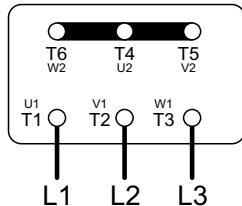
Motors can operate on any voltage within the range of 200 – 690 Volts. Voltage to be <600 V for CSA/UL motors. Voltage values available as standard are 230/460V-60 Hz and 575V-60Hz.

Other voltage values may be available on request.

(C10)

Low Voltage	High Voltage
230V - 60Hz	460V - 60Hz
200V - 50Hz	400V - 50Hz
Single-Speed / Dual-Voltage	
Low Voltage YY 	High Voltage Y 

(C11)

Low Voltage	High Voltage
200V - 50Hz	346V - 50Hz
208V - 60Hz	360V - 60Hz
220V - 50Hz	380V - 50Hz
230V - 50Hz	400V - 50Hz
240V - 50Hz	415V - 50Hz
330V - 60Hz	575V - 60Hz
Single-Speed / Dual-Voltage	
Low Voltage Δ 	High Voltage Y 

Rated horsepower

Motor outputs shown in this catalogue are based on continuous operation at 40 °C [100 °F] ambient temperature and maximum elevation not exceeding 3300 feet (1000 m) above the sea level.

Motors can operate at higher ambient temperatures with output adjusted in accordance with the chart (C12) here below.

(C12)

Ambient temperature [°F]	100	115	120	130	140
Power output as a % of rated power	100%	95%	90%	85%	80%

Should a derating factor higher than 15% apply, contact our Technical Service.

Insulation class

CL F

Bonfiglioli motors use class **F** insulating materials (enamelled wire, insulators, impregnation resins) as compared to the standard motor.

CL H

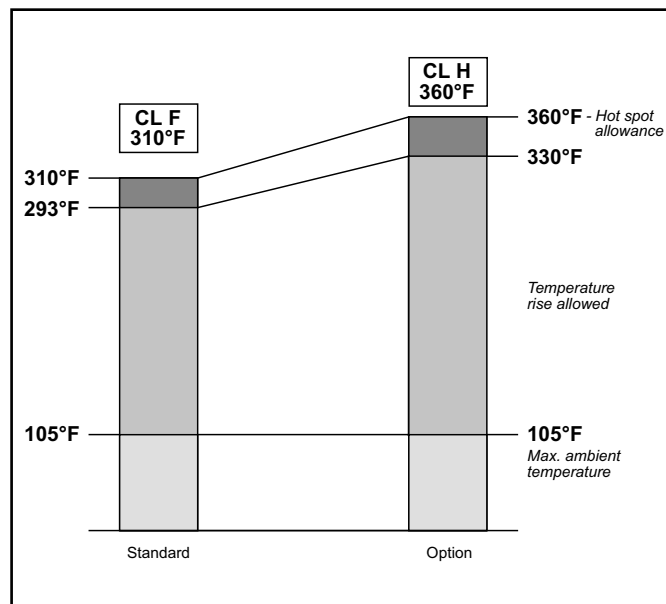
Motors manufactured in higher insulation class **H** are available at request.

In standard motors, the stator windings temperature rise normally stays below the 80 K limit corresponding to class B over temperature.

A careful selection of insulating components makes the motors compatible with tropical climates and normal vibration.

For applications involving the presence of aggressive chemicals or high humidity, contact Bonfiglioli Engineering for assistance with product selection.

(C13)



Types of duty

Unless otherwise indicated, the power rating of motors specified in the catalogue refers to continuous duty S1. For motors used under conditions other than S1, the type of duty required is defined with reference to CEI EN 60034-1 Standards.

In particular, for intermittent duties type S2 and S3, power can be adjusted with respect to continuous duty through multipliers listed in table (C14) applicable to single speed motors.

$$f_m = \frac{P(S2...S8)}{P(S1)}$$

(C14)

	Duty						Consult factory	
	S2			S3 *				S4 - S8
	Cycle duration (min)			Cyclic duration factor (I)				
	10	30	60	25%	40%	60%		
f _m	1.35	1.15	1.05	1.25	1.15	1.1		

* Cycle duration must, in any event, be equal to or less than 10 minutes; if this time is exceeded, please contact our Technical Service.

Cycle duration factor:

$$I = \frac{t_f}{t_f + t_r} \times 100$$

t_f = operating time at constant load

t_r = rest time

Limited duration duty S2

This type of duty is characterized by operation at constant load for a limited time, which is shorter than the time required to reach thermal equilibrium, followed by a rest period of sufficient duration to restore ambient temperature in the motor.

Periodical intermittent duty S3

This type of duty is characterized by a sequence of identical operation cycles, each including a constant load operation period and a rest period.

For this type of duty, the starting current does not significantly influence overtemperature.

Inverter-driven motors

The electric motors of series BN and M may be used in combination with PWM inverters with rated voltage at transformer input up to 500 V. Standard motors use a phase insulating system with separators, class 2 enamelled wire and class H impregnation resins (1600V peak-to-peak voltage pulse capacity and rise edge $t_s > 0.1\mu s$ at motor terminals). Table (C14) shows the typical torque/speed curves referred to S1 duty for motors with base frequency $f_b = 60$ Hz.

Because ventilation is somewhat impaired in operation at lower frequencies (approx. 30 Hz), standard motors with incorporated fan (IC411) require adequate torque derating or - alternately - the addition of a separate supply fan cooling.

Above base frequency, upon reaching the maximum output voltage of the inverter, the motor enters a steady-power field of operation, and shaft torque drops with ratio (f/f_b) .

As motor maximum torque decreases with $(f/f_b)^2$, the allowed overloading must be reduced progressively.

(C15)

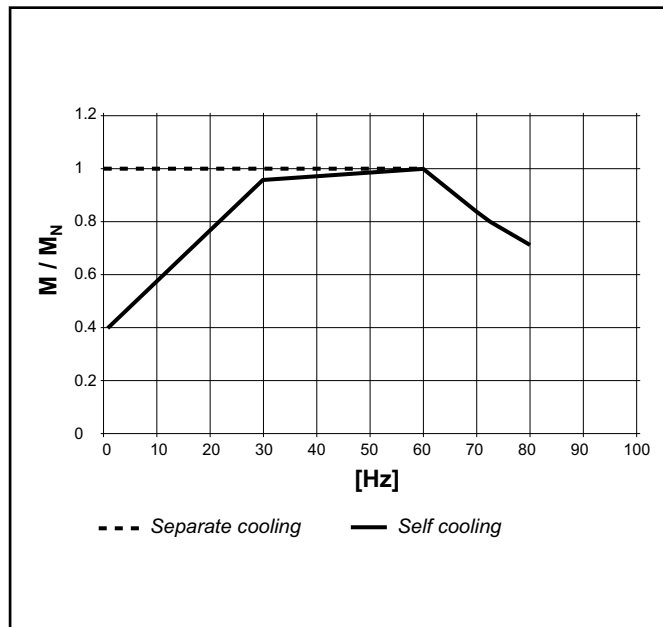


Table (C16) reports the mechanical limit speed for motor operation above rated frequency:

(C16)

		n [rpm]		
		2p	4p	6p
≤ BN 112	M05...M3	5200	4000	3000
BN 132...BN 200L	M4, M5	4500	4000	3000

Above rated speed, motors generate increased mechanical vibration and fan noise. Class R rotor balancing is highly recommended in these applications. Installing a separate supply fan cooling may also be advisable.

Independent fan cooling and brake (if fitted) must always be connected direct to mains power supply.

Permissible starts per hour

Z

The rating charts of brakemotors lend the permitted number of starts Z_0 , based on 50% intermittence and for unloaded operation.

The catalogue value represents the maximum number of starts per hour for the motor without exceeding the rated temperature for the insulation class F.

To give a practical example for an application characterized by inertia J_c , drawing power P_r and requiring mean torque at start-up T_L the actual number of starts per hour

for the motor can be calculated approximately through the following equation:

$$Z = \frac{Z_0 \times K_c \times K_d}{K_J}$$

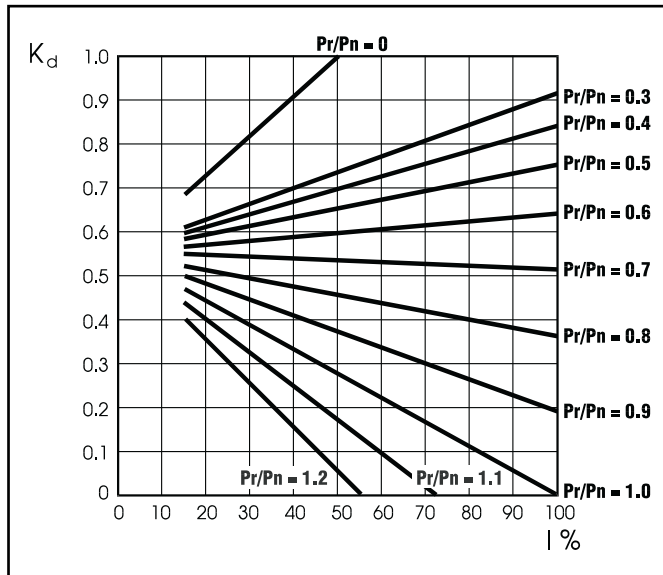
where:

$$K_J = \frac{J_m + J_c}{J_m} = \text{inertia factor}$$

$$K_c = \frac{T_a - T_L}{T_a} = \text{torque factor}$$

K_d = load factor (see table C17)

(C17)



If actual starts per hour is within permitted value (Z) it may be worth checking that braking work is compatible with brake (thermal) capacity W_{max} also given in table (C22) and dependent on the number of switches (s/h).

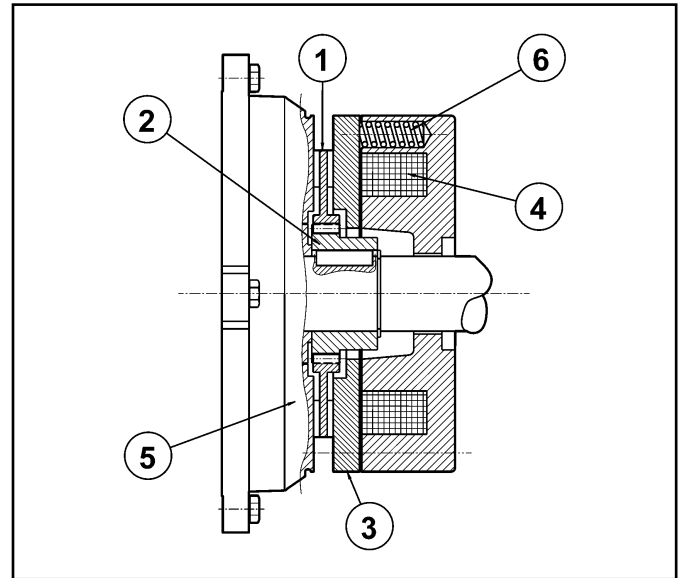
3.5 BRAKE MOTORS

Operation

Versions with incorporated brake use spring-applied DC (FD option) or AC (FA option) brakes. All brakes are designed to provide fail-safe operation,

meaning that they are applied by spring-action in the event of a power failure.

(C18)



Key:

- ① brake disc
- ② disc carrier
- ③ pressure plate
- ④ brake coil
- ⑤ motor rear shield
- ⑥ brake springs

When power is disconnected, the springs push the armature plate against the brake disc. The disc becomes trapped between the armature plate and motor shield and stops the shaft from rotating.

When the coil is energized, a magnetic field attracts the armature plate, so that the brake disc – which is integral with the motor shaft – is released.

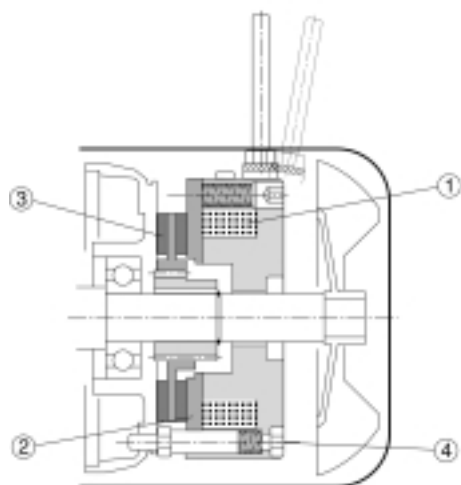
Most significant features

- Ηιγη βρακινγ τορθυεσ (νορμαλλψ T2 T_n), braking torque adjustment.
- Steel brake disc with double friction lining (low-wear, asbestos-free lining).
- Hexagonal socket head on motor shaft end (N.D.E.) for manual rotation (not compatible with options PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Manual release lever.
- Corrosion-proof treatment on all brake surfaces.
- Class F insulation

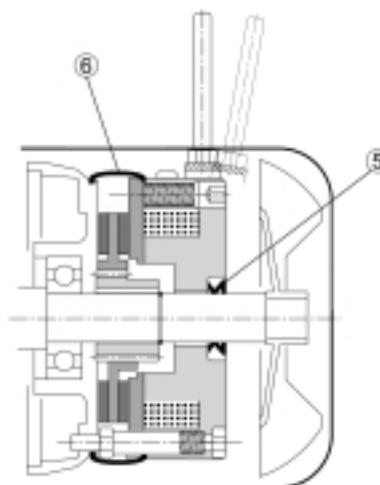
3.6 DC BRAKE MOTORS TYPE BN_FD

Frame sizes: BN 63 ... BN 200L

(C19)



IP 54 (DEFAULT FOR BRAKE MOTORS)



IP 55 (OPTIONAL ON BRAKE MOTORS)

Direct current electromagnetic brake bolted onto motor shield. Preloading springs provide axial positioning of magnet body.

Brake disc slides axially on steel hub fitted onto motor shaft with anti-vibration spring.

Brake torque factory setting is indicated in the corresponding motor rating charts.

Braking torque may be modified by changing the type and/or number of springs.

At request, motors may be equipped with manual release lever with automatic return (**R**) or system for holding brake in the released position (**RM**).

See table (C33) for available release lever locations.

FD brakes ensure excellent dynamic performance with low noise. DC brake operating characteristics may be optimized to meet application requirements by choosing from the various rectifier/power supply and wiring connection options available.

Protection class

Standard protection class is IP54.

Brake motor FD is also available in protection class **IP 55**, which incorporates the following variants:

- ① V-ring at N.D.E. of motor shaft
- ② dust and water-proof rubber boot
- ③ stainless steel shim placed between motor shield and brake disc
- ④ stainless steel hub
- ⑤ stainless steel brake disc

FD brake power supply

A rectifier housed into the terminal box feeds the DC brake coil. Wiring connection across rectifier and brake coil is performed at the factory.

On single-speed motors, rectifier is pre-wired to the motor terminal board.

Rectifier standard power supply voltage V_B is as indicated in the following table (C20), regardless of mains frequency:

(C20)

2, 4, 6 P				1 speed	
		BN_FD / M_FD		brake connected to terminal board power supply	separate power supply
		$V_{mot} \pm 10\%$ 3 ~	$V_B \pm 10\%$ 1 ~		
BN 63...BN 200	M05...M5	230/460 V – 60 Hz	230 V	standard	specify V_B SA or V_B SD

The diode half-wave rectifier ($V_{dc} \approx 0,45 \times V_{ac}$) is available in versions **NB**, **SB**, **NBR** e **SBR**, as detailed in the table (C21). Rectifier **SB** with electronic energizing control over-energizes the electromagnet upon power-up to cut brake release response time and then switches to normal half-wave operation once the brake has been released.

Use of the **SB** rectifier is mandatory in the event of:

- high number of operations per hour
- reduced brake release response time
- brake is exposed to extreme thermal stress

Rectifiers **NBR** or **SBR** are available for applications requiring quick brake release response.

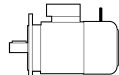
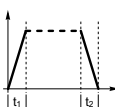
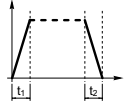
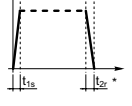
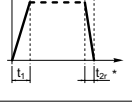
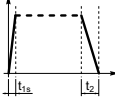
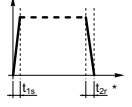
These rectifiers complement the **NB** and **SB** types as their electronic circuit incorporates a static switch that de-energizes the brake quickly in the event voltage is missing.

This arrangement ensures short brake release response time with no need for additional external wiring and contacts.

Optimum performance of rectifiers **NBR** and **SBR** is achieved with separate brake power supply.

Available voltages: 230V $\pm$ 10%.

(C21)

		Brake		
			Standard	At request
BN 63	M05	FD 02		SB,  SBR,  NBR 
BN 71	M1	FD 03		
		FD 53		
BN 80	M2	FD 04		
BN 90S	—	FD 14		
BN 90L	—	FD 05		
BN 100	M3	FD 15		SBR 
—		FD 55		
BN 112	—	FD 06S		
BN 132...160MR	M4	FD 56		
BN 160L - BN 180M	M5	FD 06		
BN 180L - NM 200L	—	FD 07		

(*) $t_{2c} < t_{2r} < t_2$

FD brake technical specifications

The table (C22) shows the technical specifications of DC brakes type FD.

(C22)

Brake	Brake torque T_b [lb-in]			Release		Braking		W_{max} per each brake operation			W	P
	Springs			t_1	t_{1s}	t_2	t_{2c}	[lb-ft]				
	6	4	2	[ms]	[ms]	[ms]	[ms]	10 c/h	100 c/h	1000 c/h	[lb-ftx10 ⁶]	[W]
FD02	—	31	15	30	15	80	9	3300	1050	130	11	17
FD03	44	31	15	50	20	100	12	5200	1400	170	18	24
FD53	66	44	22	60	30	100	12					
FD04	133	88	44	80	35	140	15	7400	2300	260	27	33
FD14												
FD05	354	230	115	130	65	170	20	13300	3300	370	37	45
FD15	354	230	115	130	65	170	20					
FD55	487	327	159	—	65	170	20					
FD06S	831	354	177	—	80	220	25	15000	3500	400	52	55
FD56	—	664	327	—	90	150	20	21500	5500	600	59	65
FD06		885	443		100	150	20					
FD07	1328	885	443	—	120	200	25	29500	6900	750	96	65
FD08*	2200	1770	1500	—	140	350	30	44500	10300	1100	170	100
FD09**	3540	2650	1770	—	200	450	40	51500	7600	1250	170	120

* brake torque values obtained with 9, 7 and 6 springs, respectively

** brake torque values obtained with 12, 9 and 6 springs, respectively

Key:

t_1 = brake release time with half-wave rectifier
 t_{1s} = brake release time with over-energizing rectifier
 t_2 = brake engagement time with AC line disconnect and separate power supply
 t_{2c} = brake engagement time with AC and DC line disconnect.
 Values for t_1 , t_{1s} , t_2 , t_{2c} indicated in the tab. (C22) are referred to brake set at maximum torque, medium air gap and rated voltage

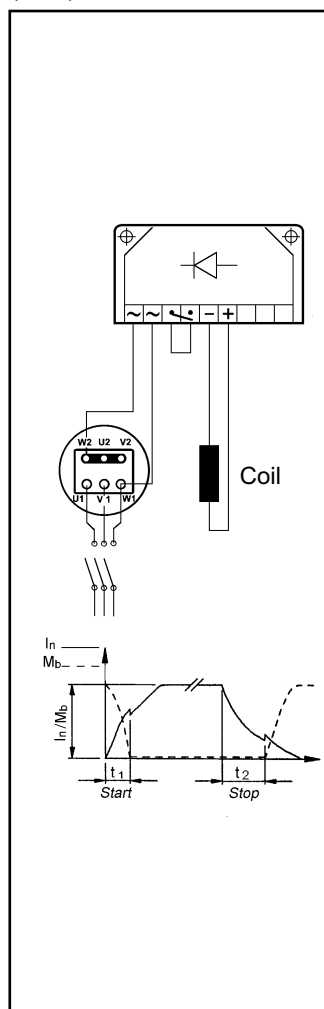
W_{max} = max energy per each brake operation
 W = braking energy between two successive air gap adjustments
 P_b = brake power absorption at normal ambient temperature
 T_b = static braking torque ($\pm 15\%$)
 $[s/h]$ = starts per hour

FD brake connections

On standard single-speed motors, the rectifier is connected to the motor terminal board at the factory.

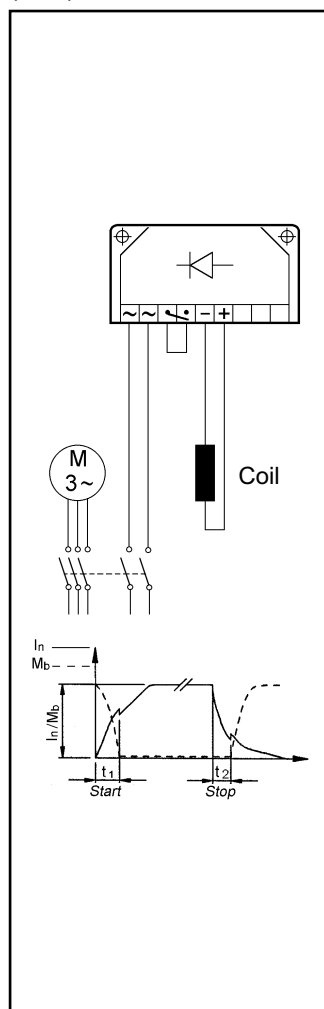
Because the load is of the inductive type, brake control and DC line switch must use contacts from the usage class AC-3 to IEC 60947-4-1.

(C23)



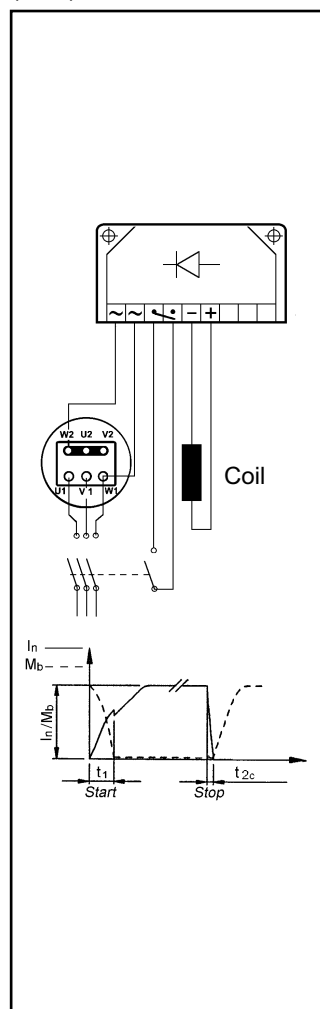
Brake supply from motor terminals and A.C. line disconnect. Longer stop time t_2 , dependent on motor time constants. Use when no particular braking performance is required.

(C24)



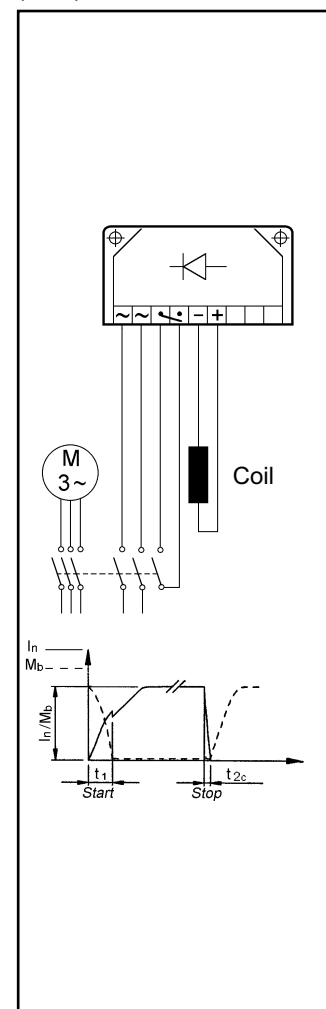
Separate power supply to brake coil and A.C. line disconnect. Stopping time is independent on motor. See table C22

(C25)



Brake coil energized from motor terminals, both A.C. and D.C. line switch off. Rapid stopping time, t_{2c} . See table C22

(C26)

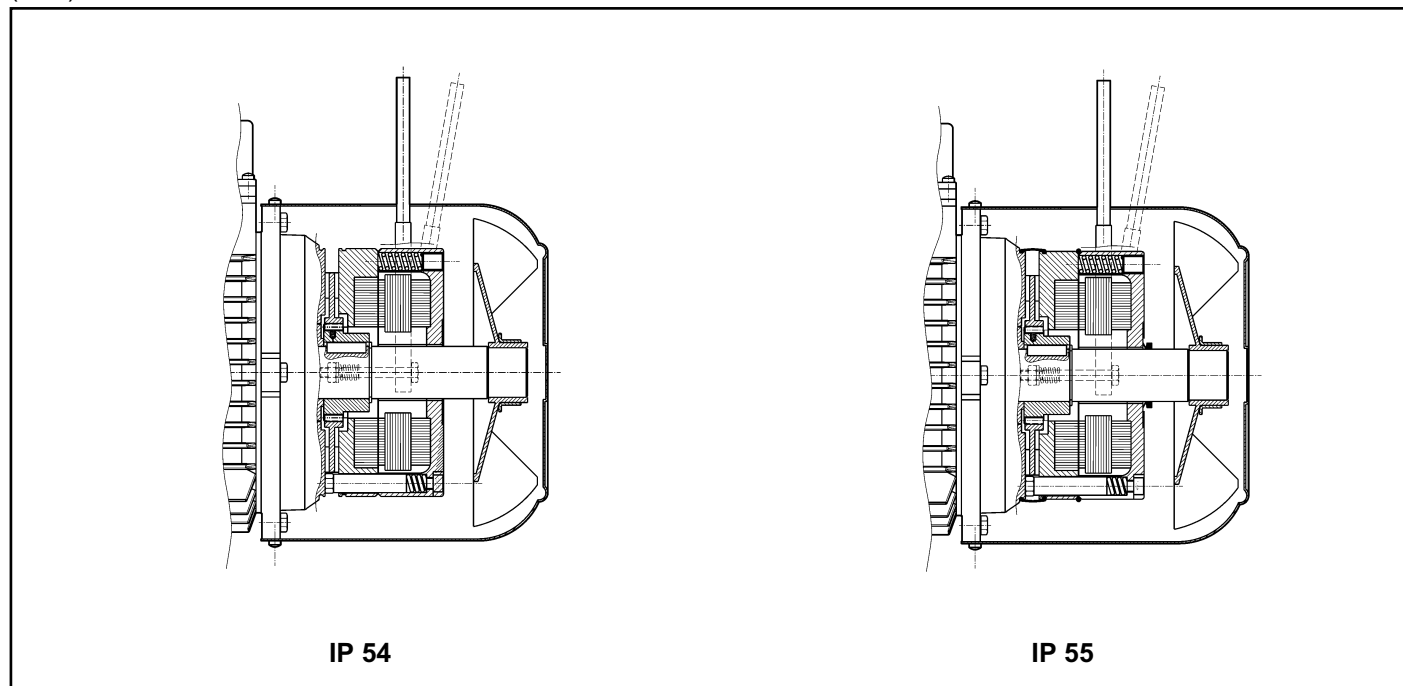


Separate power supply to brake coil. Both A.C. and D.C. line disconnect. Rapid stopping time to t_{2c} value, see table C22

3.7 AC BRAKE MOTORS TYPE BN_FA

Frame sizes: BN 63 ... BN 180M

(C27)



Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto motor rear shield. Preloaded springs provide axial positioning of the magnet body.

Steel brake disc slides axially on steel hub fitted onto motor shaft with anti-vibration spring.

Brake torque factory setting is indicated in the corresponding motor rating charts.

Spring preloading screws provide stepless braking torque adjustment.

Torque adjustment range is $30\% T_{bMAX} < T_b < T_{bMAX}$ (where T_{bMAX} is maximum braking torque as shown in tab. (C29).

Thanks to their high dynamic characteristics, FA brakes are ideal for heavy-duty applications as well as applications requiring frequent stop/starts and fast response time.

Motors may be equipped with manual release lever with automatic return (**R**) at request. See table (C33) for available lever locations.

Degree of protection

Standard degree of protection is IP54.

Brake motor BN_FA is also available with degree of protection **IP 55**, which incorporates the following variants:

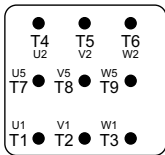
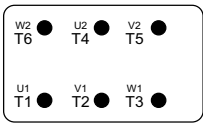
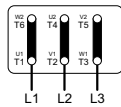
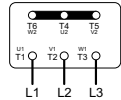
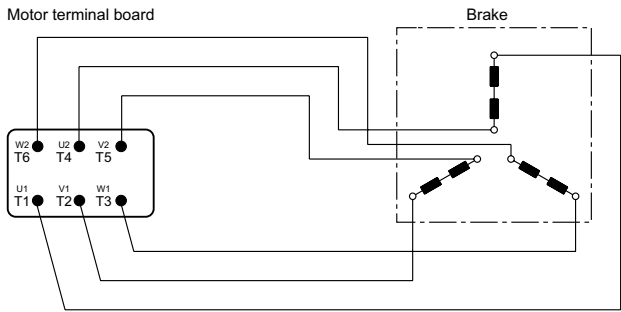
- V-ring at N.D.E. of motor shaft
- water-proof rubber grommet
- O-ring

FA brake power supply

Depending on motor voltage the brake may require the supply voltage to be specified, or not, as detailed in the

diagram below. Special voltages in the 24...690 V range may be available on request.

(C28)

Motor voltage - V_{mot}	Brake voltage - V_B	Specify	Brake wiring scherne		
230/460 V YY/Y 60 Hz	230 Δ - 60 Hz	230SA	Motor terminal board 	Auxiliary terminal board 	Δ Connected 
	460 Y - 60 Hz	460SA			Y Connected 
330/575 V Δ /Y 60 Hz	330/575 V Δ /Y 60 Hz	not required			

Technical specifications of FA brakes

(C29)

Brake	Brake torque T_b [lb·in]	Release t_1 [ms]	Braking t_2 [ms]	W_{max} [lb·ft]			W [lb·ftx10 ⁶]	P_b [VA]
				10 s/h	100 s/h	1000 s/h		
FA 02	31	4	20	4500	1400	180	15	60
FA 03	66	4	40	7000	1900	230	25	80
FA 04	133	6	60	10000	3100	350	30	110
FA 14								
FA 05	354	8	90	18000	4500	500	50	250
FA 15								
FA 06S	530	16	120	20000	4800	550	70	470
FA 06	663	16	140	29000	7400	800	80	550
FA 07	1328	16	180	40000	9300	1000	130	600
FA 08	2200	20	200	60000	14000	1500	230	1200

Key:

T_b = max static braking torque ($\pm 15\%$)

t_1 = brake release time

t_2 = brake engagement time

W_{max} = max energy per brake operation (brake thermal capacity)

W = braking energy between two successive air gap adjustments

P_b = power drawn by brake at 20° (50 Hz)

[s/h] = starts per hour

NOTE

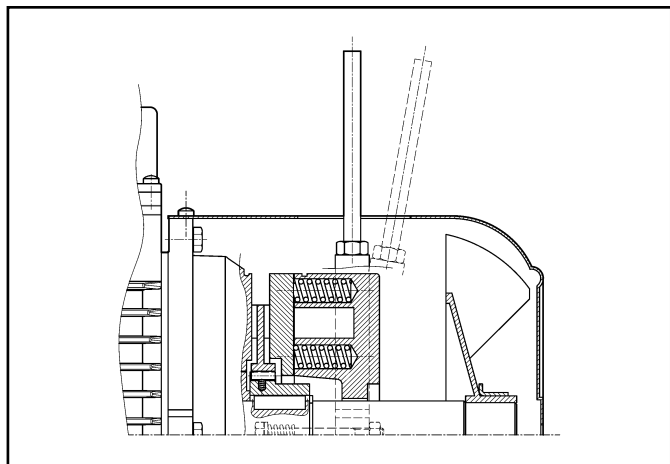
Values t_1 and t_2 in the table refer to a brake set at rated torque, medium air gap and rated voltage.

3.8 - BRAKE RELEASE SYSTEMS

Spring-applied brakes type **FD** and **FA** may be equipped with optional manual release devices. These are typically used for manually releasing the brake before servicing any machine or plant parts operated by the motor.

R

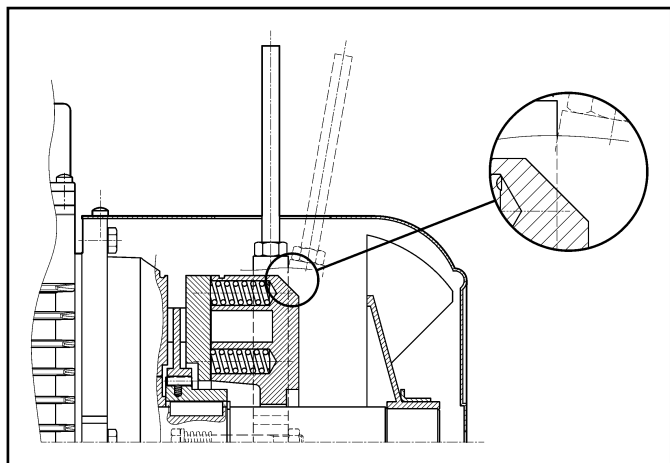
(C30)



A return spring brings the release lever back in the original position.

RM

(C31)



On motors type BN_FD, if the option RM is specified, the release lever may be locked in the "release" position by tightening the lever until lever end becomes engaged with a brake housing projection.

The availability for the two lever options is charted here below:

(C32)

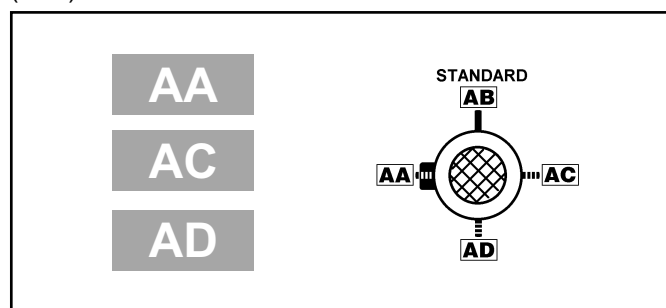
	R	RM
BN_FD	BN 63...BN 200	BN 63...BN 160MR
M_FD	M 05...M 5	M 05...M 4LC
BN_FA	BN 63...BN 180M	n.a.
M_FA	M 05...M 5	

Release lever arrangement

Unless otherwise specified, the release lever is located 90° away from the terminal box – identified by letters **[AB]** in the diagram below – in a clockwise direction on both options **R** and **RM**.

Alternative lever positions **[AA]**, **[AC]** and **[AD]** are also possible when the corresponding option is specified:

(C33)



Fly-wheel data (F1)

The table below shows values of weight and inertia of flywheel (option F1). Overall dimensions of motors remain unchanged. The option is available for DC brake-motors only.

(C34)

Main data for flywheel			
		Fly-wheel weight [lbs]	Fly-wheel inertia [lb • ft ²] x 10 ⁻⁵
BN 63	M05	0.31	2.7
BN 71	M1	0.51	5.7
BN 80	M2	0.76	11.4
BN 90 BN 90 L	—	1.14	22.3
BN 100	M3	1.58	35.4
BN 112	—	2.19	62.4
BN 132 S BN 132 M	M4	2.81	108.6

3.9 - SPECIAL EXECUTIONS

Thermal protective devices

In addition to the standard protection provided by the magneto-thermal device, motors can be supplied with built-in thermal probes to protect the winding against overheating caused, by insufficient ventilation or by an intermittent duty.

This additional protection should always be specified for servoventilated motors (IC416).

E3

Thermistors

These are semi-conductors having rapid resistance variation when they are close to the rated switch off temperature.

Variations of the $R = f(T)$ characteristic are specified under DIN 44081, IEC 34-11 Standards.

These elements feature several advantages: compact dimensions, rapid response time and, being contact-free, absolutely no wear.

Positive temperature coefficient thermistors are normally used (also known as PTC “cold conductor resistors”).

Unlike bimetallic thermostates, they cannot directly in-

tervene on currents of energizing coils, and must therefore be connected to a special control unit (triggering apparatus) to be interfaced with the external connections.

Thus protected, three PTCs connected in series are installed in the winding, the terminals of which are located on the auxiliary terminal-board.

Bimetallic thermostates

These types of protective devices house a bimetal disk. When the rated switch off temperature is reached, the disk switches the contacts from their initial rest position. As temperature falls, the disk and the contacts automatically return to rest position.

Three bimetallic thermostates connected in series are usually employed, with normally closed contacts. The terminals are located in an auxiliary terminal-board.

H1

Anti-condensation heaters

Where an application involves high humidity or extreme temperature fluctuation, motors may be equipped with an anti-condensate heater.

A single-phase power supply is available in the auxiliary terminal board inside the main terminal box. Values for the absorbed power are listed here below:

(C35)

		H1
		1~ 230V ± 10% P [W]
BN 56...BN 80	M0...M2	10
BN 90...BN 160MR	M3 - M4	25
BN 160M...BN 180M	M5	50
BN 180L...BN 200L	—	65

Warning!

Always disconnect power supply to the anti-condensate heater before operating the motor.

AL

AR

Backstop device

For applications where backdriving must be avoided, motors equipped with an anti run-back device can be used (available for the M series only).

While allowing rotation in the direction required, this device operates instantaneously in case of a power failure, preventing the shaft from running back.

The anti run-back device is life lubricated with special grease for this specific application.

When ordering, customers should indicate the required rotation direction, AL or AR.

Never use the anti run-back device to prevent reverse rotation caused by faulty electrical connection.

Table (C36) shows rated and maximum locking torques for the anti run-back devices.

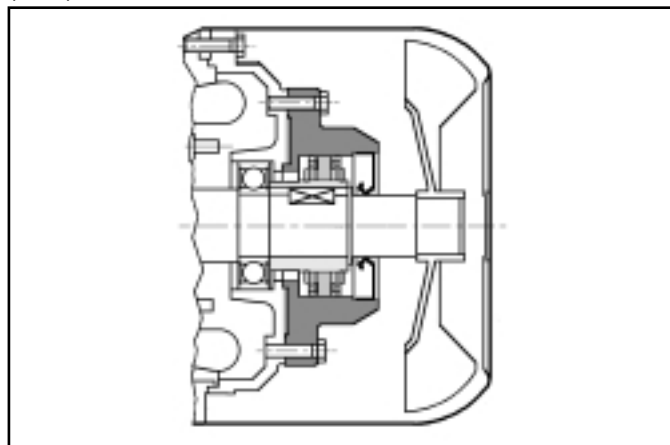
A diagram of the device can be seen in Table (C37).

Overall dimensions are same as the corresponding brake motor.

(C36)

	Rated locking torque [lb·in]	Max. locking torque [lb·in]	Release speed [rpm]
M1	53	90	750
M2	140	240	650
M3	480	815	520
M4	970	1815	430

(C37)



Ventilation

Motors are cooled through outer air blow (IC 411 according to CEI EN 60034-6) and are equipped with a plastic radial fan, which operates in both directions.

Ensure that fan cover is installed at a suitable distance from the closest wall so to allow air circulation and servicing of motor and brake, if fitted.

On request, motors can be supplied with independently power-supplied forced ventilation system starting from BN 71 or M1 size.

Motor is cooled by an axial fan with independent power supply and fitted on the fan cover (IC 416 cooling system).

This option comes handy for inverter driven motors so that constant torque operation is possible even at low speed or when high starting frequencies are needed.

Motors with rear shaft projection (PS option) are excluded.

(C38)

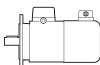
Power supply					
		V a.c. ± 10%	Hz	P [W]	I [A]
BN 71	M1	1~ 230	50 / 60	22	0.14
BN 80	M2			22	0.14
BN 90	—			40	0.25
BN 100 (*)	M3			50	0.25
BN 112	—	3~ 230 Δ / 400Y	50 / 60	50	0.26 / 0.15
BN 132S	M4S			110	0.38 / 0.22
BN 132M... BN160MR	M4L				
BN 160... BN 180M	M5	3~460	60	210	1.25 / 0.72



This variant features two options, designated **U1** and **U2**, having the same length overall.

Longer side of fan cover (ΔL) is specified for both models in the table below. Overall dimension can be reckoned from motor size table.

(C39)

Extra length for servoventilated motors [in]			
		ΔL_1 add for standard motor	ΔL_2 add for brakemotor
BN 71	M1	3.66	1.26
BN 80	M2	5.00	2.17
BN 90	–	5.16	1.89
BN 100	M3	4.69	1.10
BN 112	–	5.12	1.22
BN 132S	M4S	6.34	2.01
BN 132M	M4L	6.34	2.01

U1



Fan wiring terminals are housed in a separate terminal box.

In brake motors of size BN 71...BN 160MR, with **U1** model, the release lever cannot be positioned to AA.

U2



Fan terminals are wired in the motor terminal box.

The option does not apply to BN160M...BN200L motors.

(C40)

(*)			V a.c. $\pm 10\%$	Hz	P [W]	I [A]
	BN 100_U2	M3	3~ 230 Δ / 400Y	50 / 60	40	0.24 / 0.14

RC

Drip cover

The drip cover protects the motor from dripping and avoids the ingress of solid bodies. It is recommended when motor is installed in a vertical position with the shaft downwards.

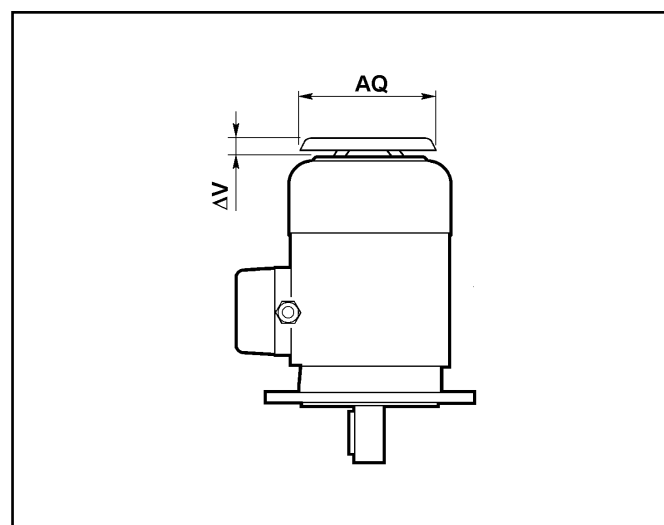
Relevant dimensions are indicated in the table (C41).

The drip cover is not compatible with variants PS, EN1, EN2, EN3 and will not fit motors equipped with a BA brake.

(C41)

		AQ [in]	ΔV [in]
BN 63	M05	118	24
BN 71	M1	134	27
BN 80	M2	134	25
BN 90	–	168	30
BN 100	M3	168	28
BN 112	–	211	32
BN 132...BN 160MR	M4	211	32
BN 160M...BN 180M	M5	270	36
BN 180L...BN 200L	–	310	36

(C42)



TC

Textile canopy

Option TC is a cover variant for textile industry environments, where lint may obstruct the fan grid and prevent a regular flow of cooling air.

This option is not compatible with variants EN1, EN2, EN3. Overall dimensions are the same as drip cover type RC.

Feedback units

Motors may be combined with three different types of encoders to achieve feedback circuits.

Configurations with double-extended shaft (PS) and rain canopy (RC, TC) are not compatible with the installation of the encoder.

EN1

Incremental encoder, $V_{IN}=5\text{ V}$, line-driver output RS 422.

EN2

Incremental encoder, $V_{IN}=10\text{-}30\text{ V}$, line-driver output RS 422.

EN3

Incremental encoder, $V_{IN}=12\text{-}30\text{ V}$, push-pull output 12-30 V.

(C43)

	EN1	EN2	EN3
Interface	RS 422	RS 422	push-pull
Power supply voltage [V]	4...6	10...30	12...30
Output voltage [V]	5	5	12...30
No-load operating current [mA]	120	100	100
No. of pulses per revolution	1024		
No. of signals	6 (A, B, C + inverted signals)		
Max. output frequency [kHz]	300	300	200
Max. speed [rpm]	600 (900 rpm x 10s)		
Temperature range [°C]	-20...+70		
Protection class	IP 65		

3.10 COMPACT MOTOR RATING CHARTS

2 POLE - 3600 rpm - S1

60 Hz

P _n			n	T _n	η	cosφ	I _n at 460V	I _s I _n	T _s T _n	T _k T _n	J _m lb-ft²		Weight lbs	Brake type	T _b	Z _o 1/h		Weight lbs	Brake type	T _b	Z _o 1/h	Weight lbs
HP	kW		rpm	lb-in	%		A	%	%	%	1)	2)	1)		lb-in	3)	4)	2)		lb-in	4)	2)
0.25	0.18	M 05A 2	3380	4.7	60	0.74	0.53	410	300	320	0.0048	0.0062	7.1	FD 02	15	2700	3300	10.8	FA 02	15	3300	10.4
0.33	0.25	M 05B 2	3400	6.1	65	0.75	0.63	490	320	330	0.0055	0.0071	7.9	FD 02	15	2700	3300	11.7	FA 02	15	3300	11.2
0.5	0.37	M 05C 2	3420	9.2	69	0.76	0.89	550	330	350	0.0062	0.0078	10.6	FD 02	30	2500	3000	14.3	FA 02	30	3000	13.9
0.75	0.55	M 1SD 2	3450	13.7	76	0.75	1.23	620	340	390	0.0097	0.0126	12.8	FD 03	44	2200	2700	18.7	FA 03	44	2700	18.1
1	0.75	M 1LA 2	3440	18.3	77	0.75	1.62	620	380	410	0.0119	0.0145	15.2	FD 03	44	1500	2100	21	FA 03	44	2100	21
1.5	1.1	M 2SA 2	3430	27.6	77	0.76	2.40	620	380	390	0.0214	0.0252	19.4	FD 04	88	1200	1600	28	FA 04	88	1600	28
2	1.5	M 2SB 2	3420	36.8	80	0.81	2.89	600	330	350	0.0271	0.0309	23	FD 04	133	1000	1300	32	FA 04	133	1300	32
3	2.2	M 3SA 2	3430	55	81	0.83	4.2	600	240	250	0.0570	0.0665	34	FD 15	230	800	1000	49	FA 15	230	1000	51
5	3.7	M 3LB 2	3490	92	84	0.83	6.7	670	290	320	0.0926	0.102	49	FD 15	354	360	500	62	FA 15	354	500	64
7.5	5.5	M 4SA 2	3490	135	83	0.86	9.8	640	270	300	0.240	0.266	72	FD 06	440		400	101	FA 06	440	400	104
10	7.5	M 4SB 2	3490	181	82	0.88	13.0	620	280	320	0.318	0.344	88	FD 06	440		350	117	FA 06	440	350	143
15	11	M 4LC 2	3510	271	87	0.88	18.3	690	270	300	0.499		132									
20	15	M 5SB 2	3510	359	86	0.90	24.2	600	250	270	0.808		154									
25	18.5	M 5SC 2	3520	449	88	0.91	29.2	690	280	300	0.998		183									
30	22	M 5LA 2	3520	537	88	0.91	35.1	690	280	310	1.164		209									

- 1) Inertia without brake
2) Inertia with brake

- 3) Permissible starts with NB rectifier (AC/DC)
4) Permissible starts with SB rectifier (AC/DC)

4 POLE - 1800 rpm - S1

60 Hz

P _n			n	T _n	η	cosφ	I _n at 460V	I _s I _n	T _s T _n	T _k T _n	J _m		Weight lbs	Brake type	T _b	Z _o		Weight lbs	Brake type	T _b	Z _o	Weight
HP	kW										1)	2)				3)	4)					
0.12	0.09	M 0B 4	1670	4.5	59	0.52	0.37	280	290	290	0.0356		6.4									
0.16	0.12	M 05A 4	1690	6.0	60	0.57	0.44	330	240	250	0.0048	0.0062	7.1	FD 02	15	7000	9000	10.8	FA 02	15	9000	10.4
0.25	0.18	M 05B 4	1670	9.4	58	0.60	0.65	320	280	290	0.0055	0.0071	7.9	FD 02	30	7000	9000	11.7	FA 02	30	9000	11.2
0.33	0.25	M 05C 4	1670	12.4	64	0.64	0.77	330	250	260	0.0078	0.0093	10.6	FD 02	30	6000	8000	14.3	FA 02	30	8000	13.9
0.50	0.37	M 1SD 4	1700	18.5	66	0.73	0.96	450	260	280	0.0164	0.0190	12.1	FD 03	44	4800	7500	18.1	FA 03	44	7500	17.4
0.75	0.55	M 1LA 4	1710	27.6	72	0.70	1.37	490	300	310	0.0216	0.0242	15.2	FD 53	66	3400	7000	21	FA 53	66	7000	21
1	0.75	M 2SA 4	1720	36.6	78	0.75	1.61	620	340	350	0.0482	0.0523	20	FD 04	133	3000	6000	29	FA 04	133	6000	29
1.5	1.1	M 2SB 4	1720	55	78	0.76	2.33	630	340	350	0.0594	0.0641	23	FD 04	133	2000	4200	32	FA 04	133	4200	32
2	1.5	M 3SA 4	1720	73	82	0.73	3.15	570	290	330	0.0808	0.0903	34	FD 15	230	1500	3000	49	FA 15	230	3000	51
3	2.2	M 3LA 4	1720	110	81	0.73	4.67	550	270	290	0.0960	0.105	37	FD 15	354	1000	2700	53	FA 15	354	2700	53
5	3.7	M 3LC 4	1730	182	84	0.74	7.5	560	280	310	0.145	0.154	51	FD 55	480		1200	64	FA 55	480	1200	66
7.5	5.5	M 4SA 4	1730	273	84	0.84	9.8	630	290	310	0.506	0.530	93	FD 56	664		850	121	FA 06	664	850	124
10	7.5	M 4LA 4	1740	362	85	0.84	13.2	610	290	300	0.641	0.665	112	FD 06	885		700	141	FA 06	885	700	143
15	11	M 4LC 4	1740	543	88	0.81	19.4	650	310	320	0.855	0.907	143	FD 07	1328		600	179	FA 07	1328	600	183
20	15	M 5SB 4	1750	720	90	0.84	24.9	580	230	270	1.544	1.781	187	FD 08	1770		400	254	FA 08	1770	400	251
25	18.5	M 5LA 4	1760	895	90	0.83	31.1	580	250	310	1.876	2.054	223	FD 08	2210		300	289	FA 08	2210	300	287

1) Inertia without brake

2) Inertia with brake

3) Permissible starts with NB rectifier (AC/DC)

4) Permissible starts with SB rectifier (AC/DC)

6 POLE - 1200 rpm - S1

60 Hz

P _n			n	T _n	η	cosφ	I _n at 460V	I _s I _n	T _s T _n	T _k T _n	J _m lb-ft²		Weight lbs	Brake type	T _b	Z _o 1/h		Weight lbs	Brake type	T _b	Z _o 1/h	Weight lbs
HP	kW		rpm	lb-in	%		A	%	%	%	1)	2)	1)		lb-in	3)	4)	1)		lb-in	4)	2)
0.12	0.09	M 05A 6	1100	6.9	47	0.46	0.52	240	290	290	0.0081	0.0095	9.5	FD 02	30	7000	10000	13.2	FA 02	30	10000	12.8
0.16	0.12	M 05B 6	1100	9.2	49	0.54	0.57	230	240	240	0.0088	0.0102	10.1	FD 02	30	7000	10000	13.9	FA 02	30	10000	13.4
0.25	0.18	M 1SC 6	1100	14.3	61	0.65	0.57	330	260	280	0.0200	0.0226	11.2	FD 03	44	6500	10000	17.2	FA 03	44	10000	16.5
0.33	0.25	M 1SD 6	1100	18.9	64	0.65	0.75	320	260	270	0.0259	0.0290	13.9	FD 03	44	6200	8000	19.8	FA 03	44	8000	19.2
0.50	0.37	M 1LA 6	1100	28.6	66	0.65	1.08	330	260	270	0.0306	0.0330	16.1	FD 53	66	4000	7000	22	FA 03	66	7000	21
0.75	0.55	M 2SA 6	1140	41.4	76	0.66	1.38	490	320	340	0.0594	0.0641	23	FD 04	133	3800	5000	32	FA 04	133	5000	32
1	0.75	M 2SB 6	1140	55	76	0.61	2.03	440	280	300	0.0665	0.0713	25	FD 04	133	2700	5000	34	FA 04	133	5000	34
1.5	1.1	M 3SA 6	1140	83	74	0.68	2.74	440	240	280	0.147	0.157	37	FD 15	230	2300	4500	51	FA 15	230	4500	53
2	1.5	M 3LA 6	1140	111	76	0.66	3.75	450	240	280	0.195	0.204	46	FD 15	354	1500	3000	60	FA 15	354	3000	62
3	2.2	M 3LC 6	1140	166	77	0.68	5.3	510	260	290	0.226	0.235	51	FD 55	480		1500	64	FA 15	480	1500	66
5	3.7	M 4LA 6	1150	274	80	0.79	7.3	610	250	310	0.701	0.724	95	FD 06	885		900	123	FA 06	885	900	126
7.5	5.5	M 4LB 6	1140	414	82	0.75	11.2	540	270	290	0.910	0.964	119	FD 07	1328		800	154	FA 07	1328	800	159
10	7.5	M 5SA 6	1160	543	85	0.82	13.5	580	230	280	1.758	1.936	152	FD 08	1500		550	216	FA 08	1500	550	216
15	11	M 5SB 6	1160	815	84	0.83	19.8	580	250	290	2.304	2.482	196	FD 08	1770		400	262	FA 08	1770	400	260

- 1) Inertia without brake
2) Inertia with brake

- 3) Permissible starts with NB rectifier (AC/DC)
4) Permissible starts with SB rectifier (AC/DC)

3.11 IEC MOTOR RATING CHARTS

2 POLE - 3600 rpm - S1

60 Hz

P _n			n	T _n	η	cosφ	I _n at 460V	$\frac{I_s}{I_n}$	$\frac{T_s}{T_n}$	$\frac{T_k}{T_n}$	J _m		Weight lbs	Brake type	T _b	Z _o		Weight lbs	Brake type	T _b	Z _o		Weight lbs
HP	kW										rpm	lb-in				%	A				%	%	
0.25	0.18	BN 63A	2	3360	4.7	58	0.74	0.55	370	290	300	0.0048	0.0062	7.7	FD 02	15	2700	3300	10.7	FA 02	15	3300	11.0
0.33	0.25	BN 63B	2	3370	6.2	61	0.73	0.69	420	290	300	0.0055	0.0071	8.6	FD 02	15	2700	3300	11.5	FA 02	15	3300	11.9
0.5	0.37	BN 71A	2	3420	9.2	71	0.77	0.86	580	330	380	0.0082	0.0109	11.9	FD 03	30	2400	3200	16.6	FA 03	30	3200	17.2
0.75	0.55	BN 71B	2	3450	13.7	76	0.75	1.23	620	340	390	0.0097	0.0126	13.7	FD 03	44	2200	2700	18.2	FA 03	44	2700	19.0
1	0.75	BN 80A	2	3440	18.3	76	0.76	1.62	590	310	370	0.0185	0.0223	19.0	FD 04	44	1400	1700	26	FA 04	44	1700	27
1.5	1.1	BN 80B	2	3430	27.6	77	0.76	2.40	620	380	390	0.0214	0.0252	21	FD 04	88	1200	1600	27	FA 04	88	1600	29
2	1.5	BN 90SA	2	3480	36.2	79	0.78	3.04	730	360	380	0.0297	0.0335	27	FD 14	133	750	1000	34	FA 14	133	1000	36
3	2.2	BN 90L	2	3490	54	81	0.79	4.4	730	380	390	0.0397	0.0435	31	FD 05	230	750	1000	41	FA 05	230	1000	46
5	3.7	BN 100LB	2	3490	90	84	0.83	6.7	670	290	320	0.0926	0.102	51	FD 15	354	360	500	59	FA 15	354	500	66
7.5	5.5	BN 132SA	2	3490	135	83	0.86	9.8	640	270	300	0.240	0.266	77	FD 06	440		400	98	FA 06	440	400	108
10	7.5	BN 132SB	2	3490	181	82	0.88	13.0	620	280	320	0.318	0.344	93	FD 06	440		350	113	FA 06	440	350	123
15	11	BN 160MR	2	3510	271	87	0.88	18.3	690	270	300	0.499		143									
20	15	BN 160MB	2	3510	359	86	0.90	24.2	600	250	270	0.808		185									
25	18.5	BN 160L	2	3520	449	88	0.91	29.2	690	280	300	0.998		214									
30	22	BN 180M	2	3520	537	88	0.91	35.1	690	280	310	1.164		240									
40	30	BN 200L	2	3530	716	89	0.91	46.2	690	260	300	1.829		309									

1) Inertia without brake

2) Inertia with brake

3) Permissible starts with NB rectifier (AC/DC)

4) Permissible starts with SB rectifier (AC/DC)

4 POLE - 1800 rpm - S1
60 Hz

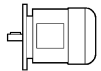
P _n			n	T _n	η	cosφ	I _n at 460V	I _s I _n	T _s T _n	T _k T _n	J _m		Weight lbs	Brake type	T _b	Z _o		Weight lbs	Brake type	T _b	Z _o	Weight	
HP	kW										1)	2)				1)	2)						3)
0.08	0.06	BN 56A	4	1670	3.0	53	0.55	0.26	290	310	310	0.0036		6.8									
0.12	0.09	BN 56B	4	1670	4.5	59	0.52	0.37	280	290	290	0.0036		6.8									
0.16	0.12	BN 63A	4	1650	6.1	55	0.64	0.43	310	240	250	0.0048	0.0062	7.7	FD 02	15	7000	9000	11.5	FA 02	15	9000	11.0
0.25	0.18	BN 63B	4	1670	9.4	58	0.59	0.68	310	280	290	0.0055	0.0071	8.6	FD 02	30	7000	9000	12.3	FA 02	30	9000	11.9
0.33	0.25	BN 71A	4	1700	12.2	64	0.74	0.65	430	260	270	0.0138	0.0164	11.2	FD 03	30	6000	8500	17.2	FA 03	30	8500	16.5
0.50	0.37	BN 71B	4	1700	18.5	66	0.73	0.97	450	260	280	0.0164	0.0190	13.0	FD 03	44	4800	7500	19.0	FA 03	44	7500	18.3
0.75	0.55	BN 80A	4	1710	27.6	73	0.75	1.28	490	300	300	0.0356	0.0394	18.1	FD 04	89	3400	7000	27	FA 04	89	7000	26
1	0.75	BN 80B	4	1720	36.6	78	0.75	1.60	620	340	350	0.0482	0.0523	22	FD 04	133	3000	6000	30	FA 04	133	6000	30
1.5	1.1	BN 90S	4	1720	55	78	0.74	2.43	570	310	340	0.0499	0.0546	27	FD 14	133	3000	7000	36	FA 14	133	7000	36
2	1.5	BN 90LA	4	1720	73	81	0.74	3.12	660	330	360	0.0665	0.0760	30	FD 05	230	2200	4700	43	FA 05	230	4700	45
3	2.2	BN 100LA	4	1720	110	81	0.73	4.8	550	270	290	0.0960	0.105	40	FD 15	354	1000	2700	55	FA 15	354	2700	55
5	3.7	BN 100LC	4	1730	182	84	0.74	7.5	560	280	310	0.145	0.154	55	FD 55	480		1200	66	FA 15	480	1200	64
5.5	4	BN 112M	4	1730	200	85	0.76	8.0	700	310	340	0.233	0.254	66	FD 06S	530		850	88	FA 06S	530	850	93
7.5	5.5	BN 132S	4	1730	273	84	0.84	10.0	630	290	310	0.506	0.530	97	FD 56	664		850	126	FA 06	664	850	128
10	7.5	BN 132MA	4	1740	362	85	0.84	13.1	610	290	300	0.641	0.665	117	FD 06	885		700	146	FA 07	885	700	157
15	11	BN 160MR	4	1740	543	88	0.81	19.4	650	310	320	0.855	0.907	154	FD 07	1328		600	190	FA 07	1328	600	194
20	15	BN 160L	4	1750	720	90	0.84	24.8	580	230	270	1.544	1.722	218	FD 08	1770		400	284	FA 08	1770	400	282
25	18.5	BN 180M	4	1760	895	90	0.83	31.3	580	250	310	1.876	2.054	254	FD 08	2210		300	320	FA 08	2210	300	317

- 1) Inertia without brake
2) Inertia with brake

- 3) Permissible starts with NB rectifier (AC/DC)
4) Permissible starts with SB rectifier (AC/DC)

6 POLE - 1200 rpm - S1

60 Hz

P _n			n	T _n	η	cosφ	I _n at 460V	$\frac{I_s}{I_n}$	$\frac{T_s}{T_n}$	$\frac{T_k}{T_n}$	J _m		Weight lbs	Brake type	T _b	Z _o		Weight lbs	Brake type	T _b	Z _o		Weight lbs
HP	kW										rpm	lb-in				%	A				%	%	
0.12	0.09	BN 63A	6	1100	6.9	47	0.50	0.48	280	290	290	0.0081	0.0095	10.1	FD 02	30	7000	10000	13.9	FA 02	30	10000	13.4
0.16	0.12	BN 63B	6	1100	9.2	50	0.55	0.55	240	240	270	0.0088	0.0102	10.8	FD 02	30	7000	10000	14.6	FA 02	30	10000	14.1
0.25	0.18	BN 71A	6	1100	14.3	61	0.65	0.57	330	260	280	0.0200	0.0226	12.1	FD 03	44	6500	10000	18.1	FA 03	44	10000	17.4
0.33	0.25	BN 71B	6	1100	18.9	64	0.65	0.75	320	260	270	0.0259	0.0285	14.8	FD 03	44	6200	8000	21	FA 03	44	8000	20
0.50	0.37	BN 80A	6	1130	27.9	67	0.65	1.07	390	260	280	0.0499	0.0546	22	FD 04	88	4100	5500	30	FA 04	88	5500	30
0.75	0.55	BN 80B	6	1140	41.4	76	0.66	1.38	490	320	340	0.0594	0.0641	25	FD 04	133	3800	5000	34	FA 04	133	5000	33
1	0.75	BN 90S	6	1140	55.3	73	0.63	2.05	450	290	310	0.0618	0.0665	29	FD 14	133	2700	4000	37	FA 14	133	4000	37
1.5	1.1	BN 90L	6	1140	83	75	0.65	2.83	430	280	290	0.0784	0.0879	33	FD 05	230	2000	3500	46	FA 05	230	3500	49
2	1.5	BN 100LA	6	1140	111	76	0.66	3.75	450	240	280	0.195	0.204	49	FD 15	354	1500	3000	62	FA 15	354	3000	64
3	2.2	BN 112M	6	1150	164	81	0.69	4.9	550	280	290	0.400	0.420	71	FD 06S	530		1250	93	FA 06S	530	1250	97
5.0	3.7	BN 132MA	6	1150	274	80	0.79	7.3	610	250	3.1	0.701	0.724	97	FD 06	885		900	128	FA 07	885	900	139
7.5	5.5	BN 132MB	6	1140	414	82	0.75	11.2	540	270	290	0.910	0.964	123	FD 07	1328		800	159	FA 07	1328	800	163
10	7.5	BN 160M	6	1160	543	85	0.82	13.5	580	230	280	1.758	1.936	183	FD 08	1500		550	247	FA 08	1500	550	249
15	11	BN 160L	6	1160	815	84	0.83	19.8	580	250	290	2.304	2.482	227	FD 08	1770		400	293	FA 08	1770	400	293

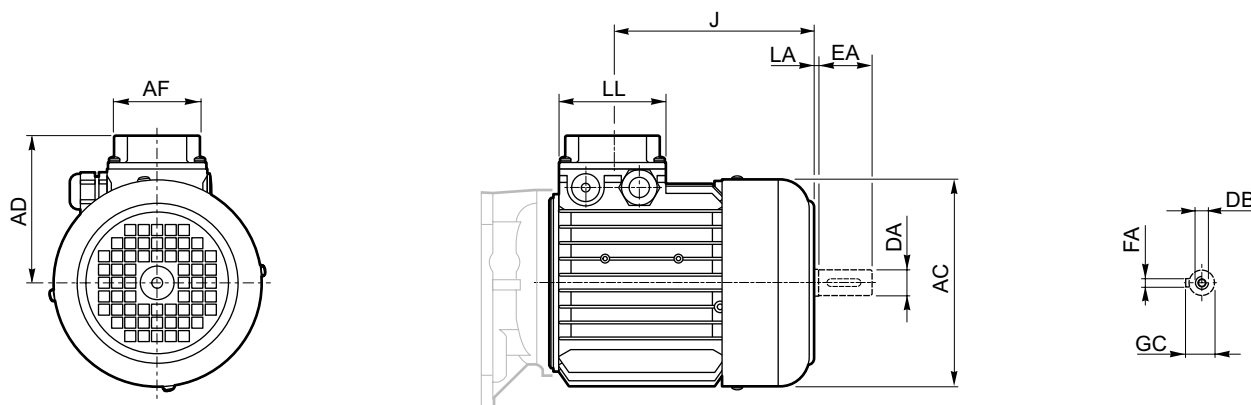
1) Inertia without brake

2) Inertia with brake

3) Permissible starts with NB rectifier (AC/DC)

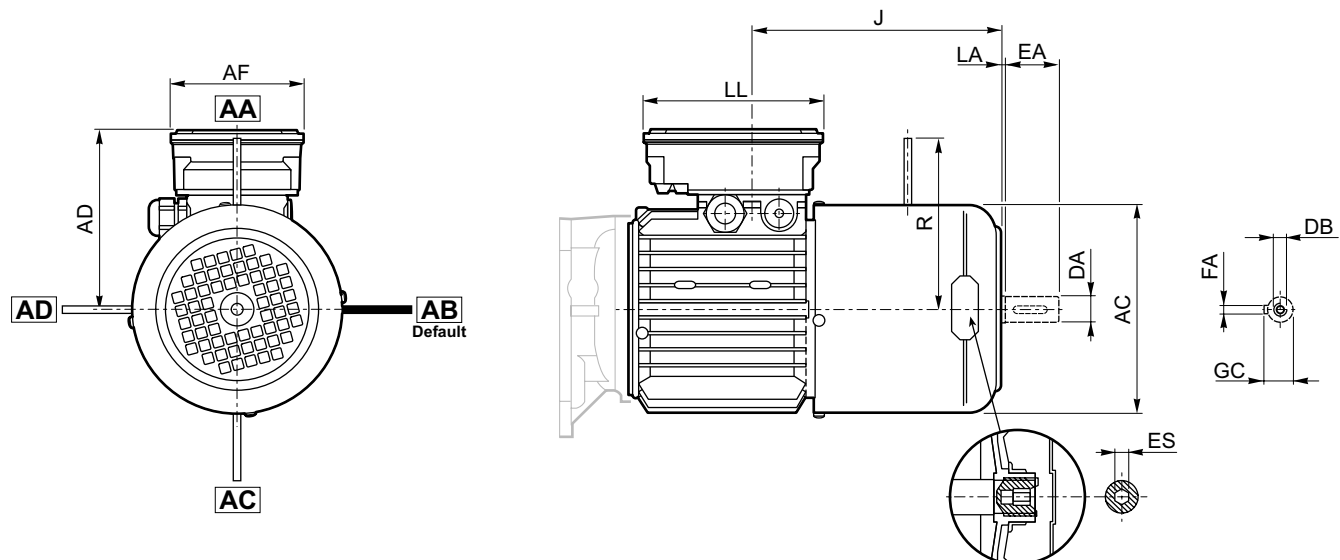
4) Permissible starts with SB rectifier (AC/DC)

3.12 DIMENSIONS



	AC	AD	AF	LL	J	DA	EA	LA	DB	GC	FA
M 0	4.33 110	3.58 91	2.91 74	3.15 80	3.58 91	0.35 9	0.79 20	0.08 2	M3	0.40 10.2	0.12 3
M 05	4.76 121	3.74 95	2.91 74	3.15 80	4.61 117	0.43 11	0.91 23	0.12 3	M4	0.49 12.5	0.16 4
M 1S	5.43 138	4.25 108	2.91 74	3.15 80	4.65 118	0.55 14	1.18 30	0.08 2	M5	0.63 16	0.20 5
M 1L	5.43 138	4.25 108	2.91 74	3.15 80	5.59 142	0.55 14	1.18 30	0.08 2	M5	0.63 16	0.20 5
M 2S	6.14 156	4.69 119	2.91 74	3.15 80	5.98 152	0.75 19	1.57 40	0.12 3	M6	0.85 21.5	0.24 6
M 3S	7.68 195	5.59 142	3.86 98	3.86 98	6.95 176.5	1.10 28	2.36 60	0.12 3	M10	1.22 31	0.31 8
M 3L	7.68 195	5.59 142	3.86 98	3.86 98	8.21 208.5	1.10 28	2.36 60	0.12 3	M10	1.22 31	0.31 8
M 4S	10.16 258	7.60 193	4.65 118	4.65 118	11.67 296.5	1.50 38	3.15 80	0.12 3	M12	1.61 41	0.39 10
M 4L	10.16 258	7.60 193	4.65 118	4.65 118	11.67 296.5	1.50 38	3.15 80	0.12 3	M12	1.61 41	0.39 10
M 4LC	10.16 258	7.60 193	4.65 118	4.65 118	13.05 331.5	1.50 38	3.15 80	0.12 3	M12	1.61 41	0.39 10
M 5S	12.20 310	9.65 245	7.36 187	7.36 187	13.44 341.5	1.50 38	3.15 80	0.16 4	M12	1.61 41	0.39 10
M 5L	12.20 310	9.65 245	7.36 187	7.36 187	15.16 385	1.50 38	3.15 80	0.16 4	M12	1.61 41	0.39 10

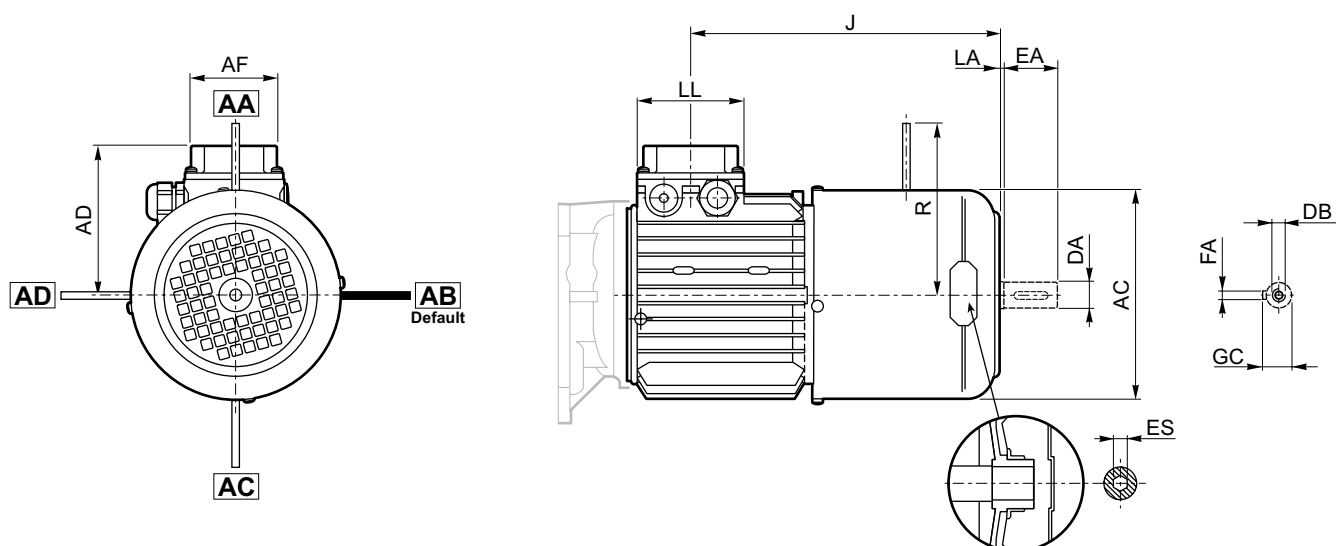
Dimensions are $\frac{\text{inch}}{\text{mm}}$



	AC	AD	AF	LL	J	R	DA	EA	LA	DB	GC	FA	ES
M 05	4.76 121	4.69 119	3.86 98	5.24 133	7.20 183	3.78 96	0.43 11	0.91 23	0.08 2	M4	0.49 12.5	0.16 4	0.20 5
M 1S	5.43 138	5.20 132	3.86 98	5.24 133	6.02 153	4.06 103	0.55 14	1.18 30	0.08 2	M5	0.63 16	0.20 5	0.20 5
M 1L	5.43 138	5.20 132	3.86 98	5.24 133	6.89 175	4.06 103	0.55 14	1.18 30	0.08 2	M5	0.63 16	0.20 5	0.20 5
M 2S	6.14 156	5.63 143	3.86 98	5.24 133	7.24 184	5.08 129	0.75 19	1.57 40	0.08 2	M6	0.85 21.5	0.24 6	0.20 5
M 3S	7.68 195	6.10 155	4.33 110	6.50 165	7.95 202	6.30 160	1.10 28	2.36 60	0.12 3	M10	1.22 31	0.31 8	0.24 6
M 3L	7.68 195	6.10 155	4.33 110	6.50 165	9.02 229	6.30 160	1.10 28	2.36 60	0.12 3	M10	1.22 31	0.31 8	0.24 6
M 4S	10.16 258	7.60 193	4.65 118	4.65 118	11.22 285	8.90 226	1.50 38	3.15 80	0.12 3	M12	1.61 41	0.39 10	0.24 6
M 4L	10.16 258	7.60 193	4.65 118	4.65 118	11.22 285	8.90 226	1.50 38	3.15 80	0.12 3	M12	1.61 41	0.39 10	0.24 6
M 4LC	10.16 258	7.60 193	4.65 118	4.65 118	16.97 431	8.90 226	1.50 38	3.15 80	0.12 3	M12	1.61 41	0.39 10	0.24 6
M 5S	12.20 310	9.65 245	7.36 187	7.36 187	18.94 481	10.47 266	1.50 38	3.15 80	0.16 4	M12	1.61 41	0.39 10	—
M 5L	12.20 310	9.65 245	7.36 187	7.36 187	20.67 525	10.47 266	1.50 38	3.15 80	0.16 4	M12	1.61 41	0.39 10	—

NOTE: The hexagonal socket "ES" is not available with the PS option.

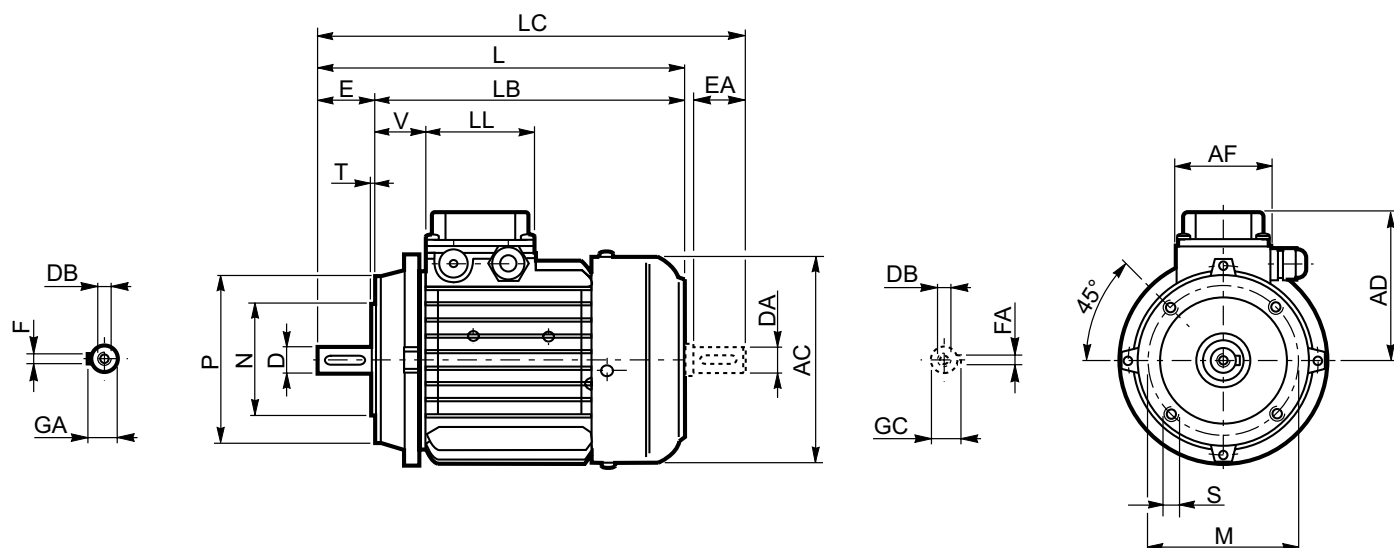
Dimensions are $\frac{\text{inch}}{\text{mm}}$



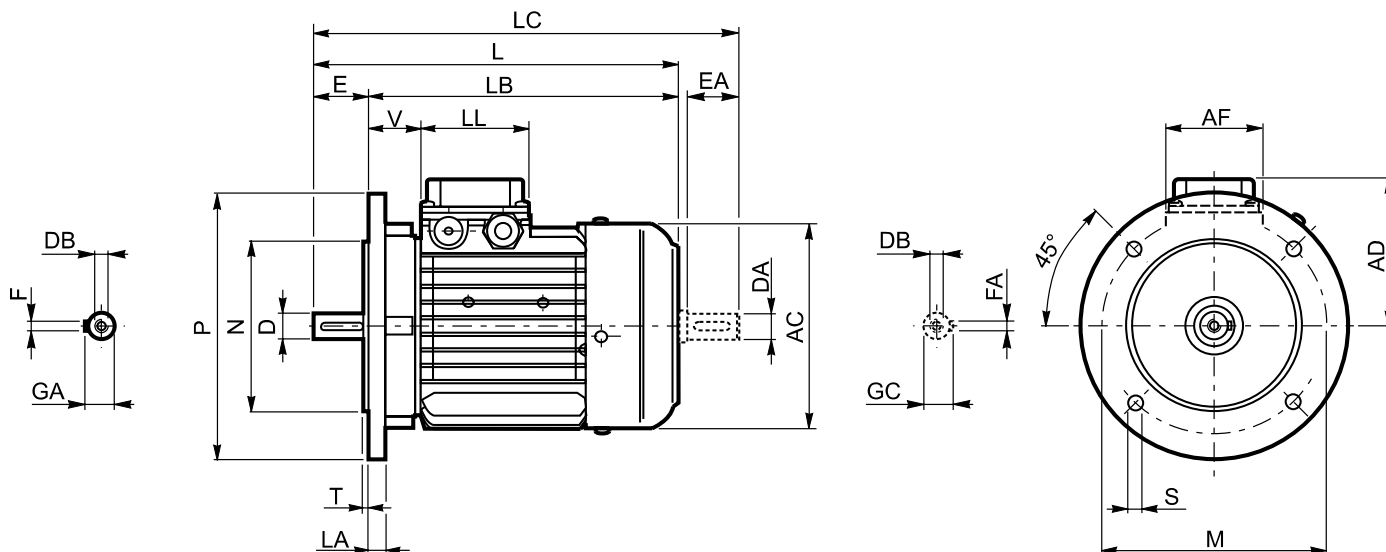
	AC	AD	AF	LL	J	R	DA	EA	LA	DB	GC	FA	ES
M 05	4.76 121	3.74 95	2.91 74	3.15 80	7.20 183	4.57 116	0.43 11	0.91 23	0.08 2	M4	0.49 12.5	0.16 4	0.20 5
M 1S	5.43 138	4.25 108	2.91 74	3.15 80	6.02 153	4.88 124	0.55 14	1.18 30	0.08 2	M5	0.63 16	0.20 5	0.20 5
M 1L	5.43 138	4.25 108	2.91 74	3.15 80	6.89 175	4.88 124	0.55 14	1.18 30	0.08 2	M5	0.63 16	0.20 5	0.20 5
M 2S	6.14 156	4.69 119	2.91 74	3.15 80	7.24 184	5.28 134	0.75 19	1.57 40	0.08 2	M6	0.85 21.5	0.24 6	0.20 5
M 3S	7.68 195	5.59 142	3.86 98	3.86 98	7.95 202	6.30 160	1.10 28	2.36 60	0.12 3	M10	1.22 31	0.31 8	0.24 6
M 3L	7.68 195	5.59 142	3.86 98	3.86 98	9.02 229	6.30 160	1.10 28	2.36 60	0.12 3	M10	1.22 31	0.31 8	0.24 6
M 4S	10.16 258	7.60 193	4.65 118	4.65 118	10.16 258	8.54 217	1.50 38	3.15 80	0.12 3	M14	1.61 41	0.39 10	0.24 6
M 4L	10.16 258	7.60 193	4.65 118	4.65 118	11.22 285	8.54 217	1.50 38	3.15 80	0.12 3	M14	1.61 41	0.39 10	0.24 6
M 4LC	10.16 258	7.60 193	4.65 118	4.65 118	16.97 431	8.54 217	1.50 38	3.15 80	0.12 3	M14	1.61 41	0.39 10	0.24 6
M 5S	12.20 310	9.21 234	6.73 171	7.36 187	18.94 481	9.72 247	1.50 38	3.15 80	0.16 4	M12	1.61 41	0.39 10	—
M 5L	12.20 310	9.21 234	6.73 171	7.36 187	20.67 525	9.72 247	1.50 38	3.15 80	0.16 4	M12	1.61 41	0.39 10	—

NOTE: The hexagonal socket "ES" is not available with the PS option.

Dimensions are $\frac{\text{inch}}{\text{mm}}$



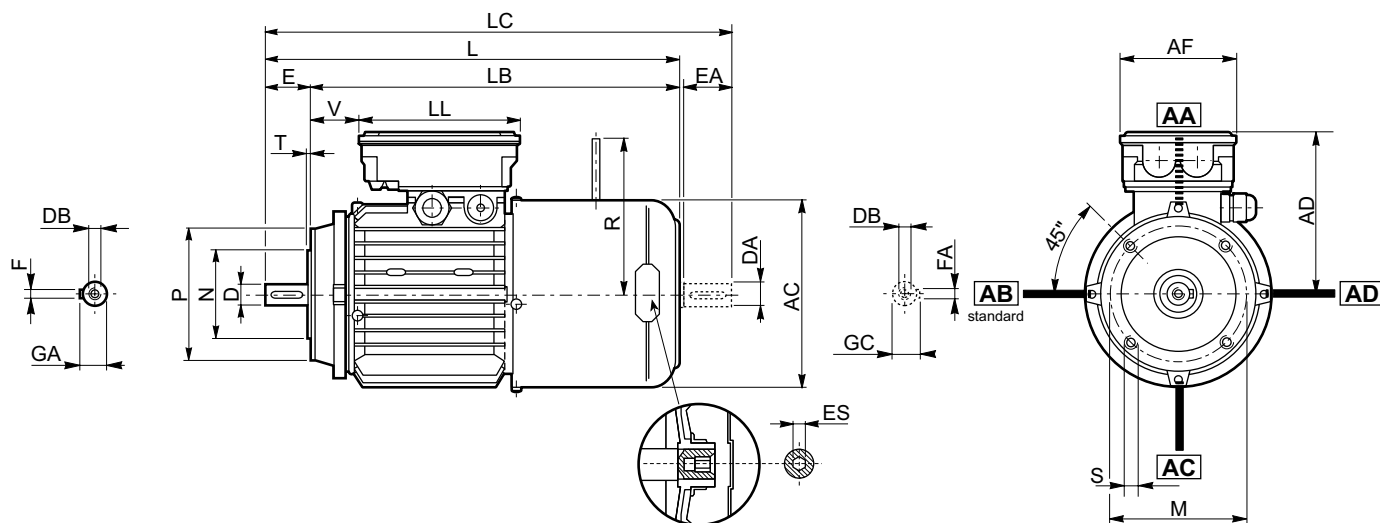
	Shaft					Flange					Motor							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V
BN 56	0.35 9	0.79 20	M3	0.40 10.2	0.12 3	2.56 65	1.97 50	3.15 80	M5	0.10 2.5	4.33 110	7.28 185	6.50 165	8.15 207	3.58 91	2.91 74	3.15 80	1.34 34
BN 63	0.43 11	0.91 23	M4	0.49 12.5	0.16 4	2.95 75	2.36 60	3.54 90	M5	0.10 2.5	4.76 121	8.15 207	7.24 184	9.13 232	3.74 95	2.91 74	3.15 80	1.02 26
BN 71	0.55 14	1.18 30	M5	0.63 16	0.20 5	3.35 85	2.76 70	4.13 105	M6	0.10 2.5	5.43 138	9.80 249	8.62 219	11.06 281	4.25 108	2.91 74	3.15 80	1.46 37
BN 80	0.75 19	1.57 40	M6	0.85 21.5	0.24 6	3.94 100	3.15 80	4.72 120	M6	0.12 3	6.14 156	10.79 274	9.21 234	12.40 315	4.69 119	2.91 74	3.15 80	1.50 38
BN 90 S	0.94 24	1.97 50	M8	1.06 27	0.31 8	4.53 115	3.74 95	5.51 140	M8	0.12 3	6.93 176	12.83 326	10.87 276	14.88 378	5.24 133	3.86 98	3.86 98	1.73 44
BN 90 L	0.94 24	1.97 50	M8	1.06 27	0.31 8	4.53 115	3.74 95	5.51 140	M8	0.12 3	6.93 176	12.83 326	10.87 276	14.88 378	5.24 133	3.86 98	3.86 98	1.73 44
BN 100	1.10 28	2.36 60	M10	1.22 31	0.31 8	5.12 130	4.33 110	6.30 160	M8	0.14 3.5	7.68 195	14.41 366	12.05 306	16.89 429	5.59 142	3.86 98	3.86 98	1.97 50
BN 112	1.10 28	2.36 60	M10	1.22 31	0.31 8	5.12 130	4.33 110	6.30 160	M8	0.14 3.5	8.62 219	15.16 385	12.80 325	17.64 448	6.18 157	3.86 98	3.86 98	2.05 52
BN 132 S	1.50 38	3.15 80	M12	1.61 41	0.39 10	6.50 165	5.12 130	7.87 200	M10	0.16 4	10.16 258	17.91 455	14.76 375	21.18 538	7.60 193	4.65 118	4.65 118	2.28 58
BN 132 M	1.50 38	3.15 80	M12	1.61 41	0.39 10	6.50 165	5.12 130	7.87 200	M10	0.16 4	10.16 258	19.41 493	16.26 413	22.68 576	7.60 193	4.65 118	4.65 118	2.28 58



	Shaft					Flange						Motor							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V
BN 63	0.43 11	0.91 23	M4	0.49 12.5	0.16 4	4.53 115	3.74 95	5.51 140	0.37 9.5	0.12 3	0.39 10	4.76 121	8.15 207	7.24 184	9.13 232	3.74 95	2.91 74	3.15 80	1.02 26
BN 71	0.55 14	1.18 30	M5	0.63 16	0.20 5	5.12 130	4.33 110	6.30 160	0.37 9.5	0.12 3	0.39 10	5.43 138	9.80 249	8.62 219	11.06 281	4.25 108	2.91 74	3.15 80	1.46 37
BN 80	0.75 19	1.57 40	M6	0.85 21.5	0.24 6	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.14 156	10.79 274	9.21 234	12.40 315	4.69 119	2.91 74	3.15 80	1.50 38
BN 90 S BN 90 L	0.94 24	1.97 50	M8	1.06 27	0.31 8	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.93 176	12.83 326	10.87 276	14.88 378	5.24 133	3.86 98	3.86 98	1.73 44
BN 100	1.10 28	2.36 60	M10	1.22 31	0.31 8	8.46 215	7.09 180	9.84 250	0.55 14	0.16 4	0.55 14	7.68 195	14.45 367	12.09 307	16.89 429	5.59 142	3.86 98	3.86 98	1.97 50
BN 112	1.10 28	2.36 60	M10	1.22 31	0.31 8	8.46 215	7.09 180	9.84 250	0.55 14	0.16 4	0.59 15	8.62 219	15.16 385	12.80 325	17.64 448	6.18 157	3.86 98	3.86 98	2.05 52
BN 132 S	1.49 38	3.14 80	M12	1.61 41	0.39 10	10.43 265	9.05 230	11.81 300	0.55 14	0.15 4	0.62 16	10.15 258	17.91 455	14.76 375	21.18 538	7.59 193	4.64 118	4.64 118	2.28 58
BN 132 M	1.49 38	3.14 80	M12	1.61 41	0.39 10	10.43 265	9.05 230	11.81 300	0.55 14	0.15 4	0.62 16	10.15 258	19.40 493	16.25 413	22.67 576	7.59 193	4.64 118	4.64 118	2.28 58
BN 160 MR	1.65 42	4.33 110	M16	1.77 45	0.47 12	11.81	9.84	13.77	0.72	0.19	0.59	10.15	22.12	17.79	25.39	7.59	4.64	4.64	8.58
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)	300	250	350	18.5	5	15	258	562	452	645	193	118	118	218
BN 160 M BN 160 L	1.65 42	4.33 110	M16	1.77 45	0.47 12	11.81	9.84	13.77	0.72	0.19	0.59	1.22	23.46	19.13	26.77	9.64	7.36	7.36	2.00
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)	300	250	350	18.5	5	15	310	596	486	680	245	187	187	51
BN 180 M	1.88 48	4.33 110	M16	2.02 51.5	0.55 14	11.81	9.84	13.77	0.72	0.19	0.59	1.22	25.19	20.86	28.50	9.64	7.36	7.36	2.00
	1.49 38 (1)	4.33 110 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)	300	250	350	18.5	5	15	310	640	530	724	245	187	187	51
BN 180 L	1.88 48	4.33 110	M16	2.02 51.5	0.55 14	11.81	9.84	13.77	0.72	0.19	0.70	13.70	27.87	23.54	32.40	10.27	7.36	7.36	2.04
	1.65 42 (1)	4.33 110 (1)	M16 (1)	1.77 45 (1)	0.47 12 (1)	300	250	350	18.5	5	18	348	708	598	823	261	187	187	52
BN 200 L	2.16 55	4.33 110	M20	2.32 59	0.62 16	13.77	11.81	15.74	0.72	0.19	0.70	13.70	28.42	24.09	32.95	10.27	7.36	7.36	2.59
	1.65 42 (1)	4.33 110 (1)	M16 (1)	1.77 45 (1)	0.47 12 (1)	350	300	400	18.5	5	18	348	722	612	837	261	187	187	66

1) These values refer to the rear shaft end.

Dimensions are $\frac{\text{inch}}{\text{mm}}$



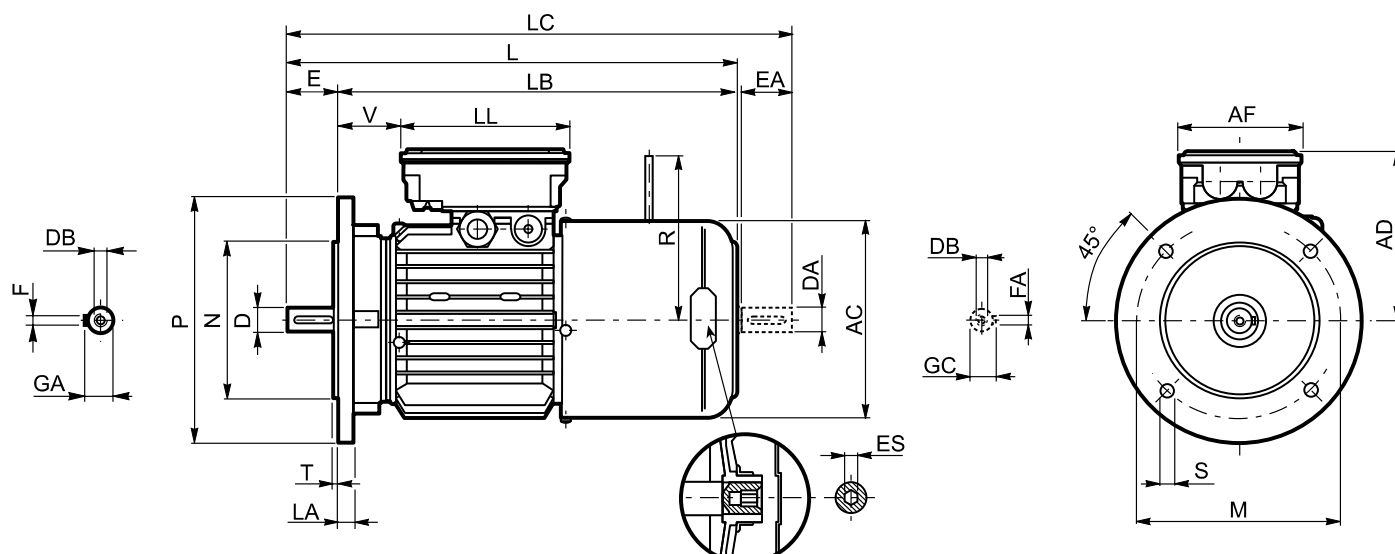
	Shaft					Flange					Motor									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V	R	ES
BN 63	0.43 11	0.91 23	M4	0.49 12.5	0.16 4	2.95 75	2.36 60	3.54 90	M5	0.10 2.5	4.76 121	10.71 272	9.80 249	11.69 297	4.69 119	3.86 98	5.24 133	0.55 14	3.78 96	0.20 5
BN 71	0.55 14	1.18 30	M5	0.63 16	0.20 5	3.35 85	2.76 70	4.13 105	M6	0.10 2.5	5.43 138	12.20 310	11.02 280	13.46 342	5.20 132	3.86 98	5.24 133	1.18 30	4.06 103	0.20 5
BN 80	0.75 19	1.57 40	M6	0.85 21.5	0.24 6	3.94 100	3.15 80	4.72 120	M6	0.12 3	6.14 156	13.62 346	12.05 306	15.28 388	5.63 143	3.86 98	5.24 133	1.61 41	5.08 129	0.20 5
BN 90 S	0.94 24	1.97 50	M8	1.06 27	0.31 8	4.53 115	3.74 95	5.51 140	M8	0.12 3	6.93 176	16.10 409	14.13 359	18.15 461	5.75 146	4.33 110	6.50 165	1.54 39	5.08 129	0.24 6
BN 90 L	0.94 24	1.97 50	M8	1.06 27	0.31 8	4.53 115	3.74 95	5.51 140	M8	0.12 3	6.93 176	16.10 409	14.13 359	18.15 461	5.75 146	4.33 110	6.50 165	1.54 39	6.30 160	0.24 6
BN 100	1.10 28	2.36 60	M10	1.22 31	0.31 8	5.12 130	4.33 110	6.30 160	M8	0.14 3.5	7.68 195	18.03 458	15.67 398	20.51 521	6.10 155	4.33 110	6.50 165	2.44 62	6.30 160	0.24 6
BN 112	1.10 28	2.36 60	M10	1.22 31	0.31 8	5.12 130	4.33 110	6.30 160	M8	0.14 3.5	8.62 219	19.06 484	16.69 424	21.54 547	6.69 170	4.33 110	6.50 165	2.87 73	7.83 199	0.24 6
BN 132 S	1.50 38	3.15 80	M12	1.61 41	0.39 10	6.50 165	5.12 130	7.87 200	M10	0.16 4	10.16 258	22.24 565	19.09 485	25.51 648	7.60 193	4.65 118	4.65 118	5.59 142	8.03 204 (2)	0.24 6
BN 132 M	1.50 38	3.15 80	M12	1.61 41	0.39 10	6.50 165	5.12 130	7.87 200	M10	0.16 4	10.16 258	23.74 603	20.59 523	27.01 686	7.60 193	4.65 118	4.65 118	7.09 180	8.03 204 (2)	0.24 6

1) These values refer to the rear shaft end.

2) For FD07 brake value R=226

ES hexagon is not supplied with PS option

Dimensions are $\frac{\text{inch}}{\text{mm}}$



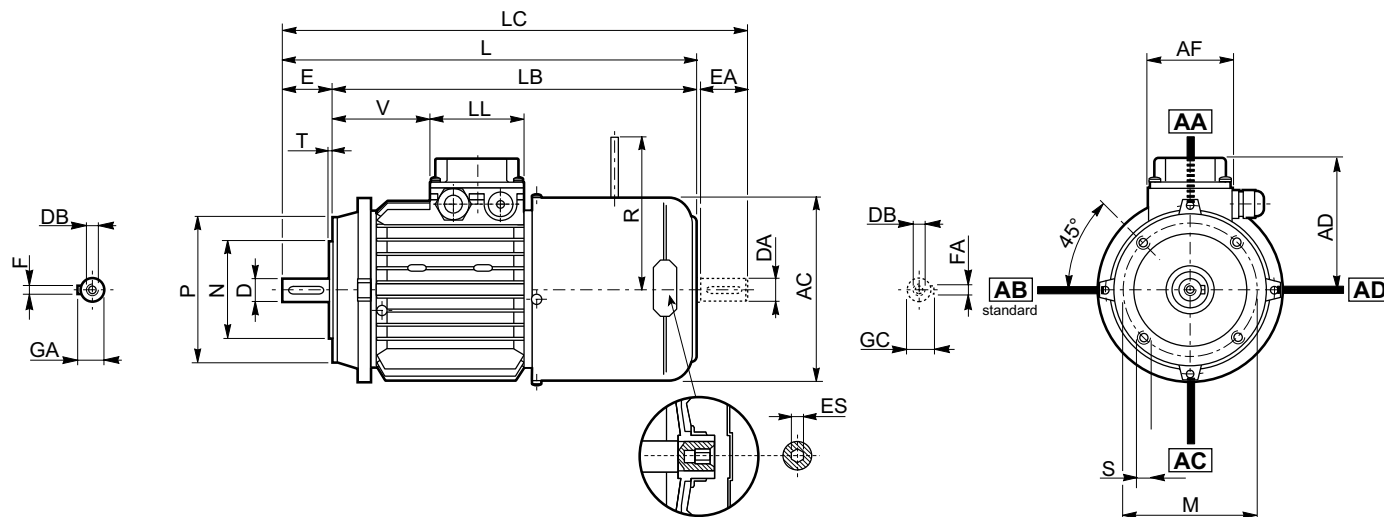
	Shaft					Flange						Motor									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R	ES
BN 63	0.43 11	0.91 23	M4	0.49 12.5	0.16 4	4.53 115	3.74 95	5.51 140	0.37 9.5	0.12 3	0.39 10	4.76 121	10.71 272	9.80 249	11.69 297	4.69 119	3.86 98	5.24 133	0.55 14	3.78 96	0.20 5
BN 71	0.55 14	1.18 30	M5	0.63 16	0.20 5	5.12 130	4.33 110	6.30 160	0.37 9.5	0.14 3.5	0.39 10	5.43 138	12.20 310	11.02 280	13.46 342	5.20 132	3.86 98	5.24 133	1.18 30	4.06 103	0.20 5
BN 80	0.75 19	1.57 40	M6	0.85 21.5	0.24 6	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.14 156	13.62 346	12.05 306	15.28 388	5.63 143	3.86 98	5.24 133	1.61 41	5.08 129	0.20 5
BN 90 S	0.94 24	1.97 50	M8	1.06 27	0.31 8	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.93 176	16.10 409	14.13 359	18.15 461	5.75 146	4.33 110	6.50 165	1.54 39	5.08 129	0.24 6
BN 90 L	0.94 24	1.97 50	M8	1.06 27	0.31 8	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.93 176	16.10 409	14.13 359	18.15 461	5.75 146	4.33 110	6.50 165	1.54 39	6.30 160	0.24 6
BN 100	1.10 28	2.36 60	M10	1.22 31	0.31 8	8.46 215	7.09 180	9.84 250	0.55 14	0.16 4	0.55 14	7.68 195	18.03 458	15.67 398	20.51 521	6.10 155	4.33 110	6.50 165	2.44 62	6.30 160	0.24 6
BN 112	1.10 28	2.36 60	M10	1.22 31	0.31 8	8.46 215	7.09 180	9.84 250	0.55 14	0.16 4	0.59 15	8.62 219	19.06 484	16.69 424	21.54 547	6.69 170	4.33 110	6.50 165	2.87 73	7.83 199	0.24 6
BN 132 S	1.49 38	3.14 80	M12	1.61 41	0.39 10	10.43 265	9.05 230	11.81 300	0.55 14	0.15 4	0.62 16	10.15 258	22.24 565	19.09 485	25.51 648	7.59 193	4.64 118	4.64 118	5.59 142	8.03 204 (2)	0.23 6
BN 132 M	1.49 38	3.14 80	M12	1.61 41	0.39 10	10.43 265	9.05 230	11.81 300	0.55 14	0.15 4	0.62 16	10.15 258	23.74 603	20.59 523	27.00 686	7.59 193	4.64 118	4.64 118	7.08 180	8.03 204 (1)	0.23 6
BN 160 MR	1.65 42	4.33 110	M16	1.77 45	0.47 12	11.81	9.84	13.77	0.72	0.19	0.59	10.15	26.45	22.12	29.72	7.59	4.64	4.64	8.58	8.89	0.23
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)																
BN 160 M BN 160 L	1.65 42	4.33 110	M16	1.77 45	0.47 12	11.81	9.84	13.77	0.72	0.19	0.59	1.22	28.97	24.64	32.28	9.64	7.36	7.36	2.00	8.89	
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)																
BN 180 M	1.88 48	4.33 110	M16	2.02 51.5	0.55 14	11.81	9.84	13.77	0.72	0.19	0.59	1.22	30.70	26.37	34.01	9.64	7.36	7.36	2.00	8.89	
	1.49 38 (1)	4.33 110 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)																
BN 180 L	1.88 48	4.33 110	M16	2.02 51.5	0.55 14	11.81	9.84	13.77	0.72	0.19	0.70	13.70	34.09	29.76	38.62	10.27	7.36	7.36	2.04	12.00	
	1.65 42 (1)	4.33 110 (1)	M16 (1)	1.77 45 (1)	0.47 12 (1)																
BN 200 L	2.16 55	4.33 110	M20	2.32 59	0.62 16	13.77	11.81	15.74	0.72	0.19	0.70	13.70	34.56	30.23	39.09	10.27	7.36	7.36	2.51	12.00	
	1.65 42 (1)	4.33 110 (1)	M16 (1)	1.77 45 (1)	0.47 12 (1)																

1) These values refer to the rear shaft end.

ES hexagon is not supplied with PS option

2) For FD07 brake value R=226

 Dimensions are $\frac{\text{inch}}{\text{mm}}$



	Shaft					Flange					Motor									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V	R	ES
BN 63	0.43 11	0.91 23	M4	0.49 12.5	0.16 4	2.95 75	2.36 60	3.54 90	M5	0.10 2.5	4.76 121	10.71 272	9.80 249	4.69 119	3.74 95	2.91 74	3.15 80	1.02 26	4.57 116	0.20 5
BN 71	0.55 14	1.18 30	M5	0.63 16	0.20 5	3.35 85	2.76 70	4.13 105	M6	0.10 2.5	5.43 138	12.20 310	11.02 280	13.46 342	4.25 108	2.91 74	3.15 80	2.68 68	4.88 124	0.20 5
BN 80	0.75 19	1.57 40	M6	0.85 21.5	0.24 6	3.94 100	3.15 80	4.72 120	M6	0.12 3	6.14 156	13.62 346	12.05 306	15.28 388	4.69 119	2.91 74	3.15 80	3.27 83	5.28 134	0.20 5
BN 90 S	0.94 24	1.97 50	M8	1.06 27	0.31 8	4.53 115	3.74 95	5.51 140	M8	0.12 3	6.93 176	16.10 409	14.13 359	18.15 461	5.24 133	3.86 98	3.86 98	3.74 95	5.28 134	0.24 6
BN 90 L	0.94 24	1.97 50	M8	1.06 27	0.31 8	4.53 115	3.74 95	5.51 140	M8	0.12 3	6.93 176	16.10 409	14.13 359	18.15 461	5.24 133	3.86 98	3.86 98	3.74 95	6.30 160	0.24 6
BN 100	1.10 28	2.36 60	M10	1.22 31	0.31 8	5.12 130	4.33 110	6.30 160	M8	0.14 3.5	7.68 195	18.03 458	15.67 398	20.51 521	5.59 142	3.86 98	3.86 98	4.69 119	6.30 160	0.24 6
BN 112	1.10 28	2.36 60	M10	1.22 31	0.31 8	5.12 130	4.33 110	6.30 160	M8	0.14 3.5	8.62 219	19.06 484	16.69 424	21.54 547	6.18 157	3.86 98	3.86 98	5.04 128	7.80 198	0.24 6
BN 132 S	1.50 38	3.15 80	M12	1.61 41	0.39 10	6.50 165	5.12 130	7.87 200	M10	0.16 4	10.16 258	22.24 565	19.09 485	25.51 648	7.60 193	4.65 118	4.65 118	5.59 142	7.87 200 (2)	0.24 6
BN 132 M	1.50 38	3.15 80	M12	1.61 41	0.39 10	6.50 165	5.12 130	7.87 200	M10	0.16 4	10.16 258	23.74 603	20.59 523	27.01 686	7.60 193	4.65 118	4.65 118	7.09 180	7.87 200 (2)	0.24 6

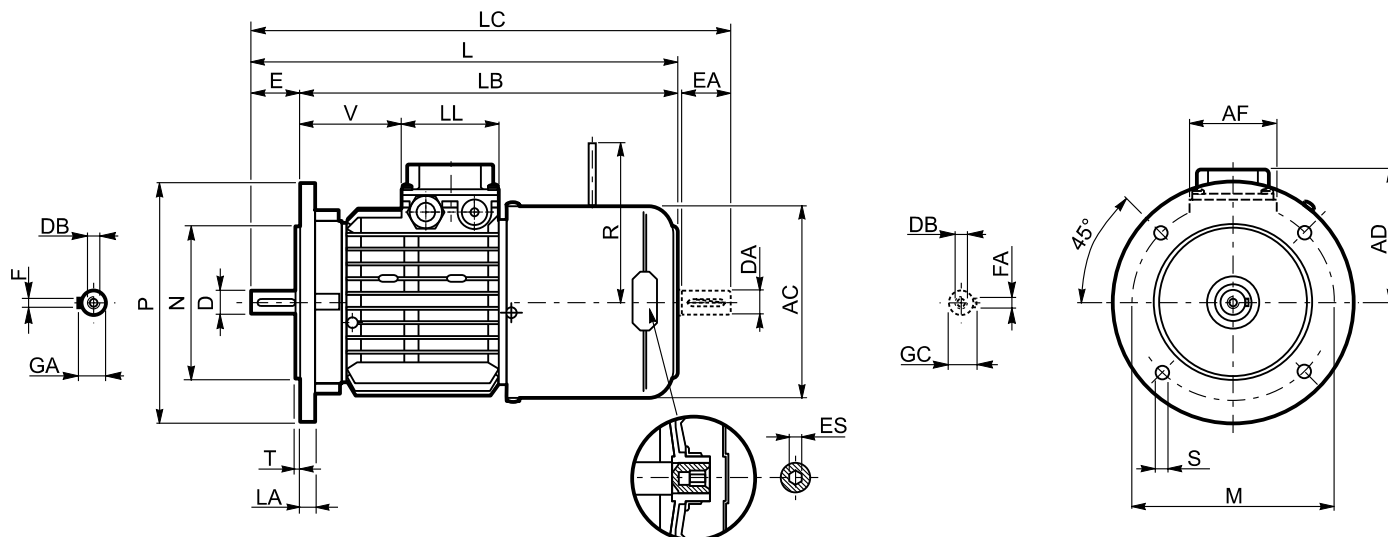
1) These values refer to the rear shaft end.

2) For FD07 brake value R=226

ES hexagon is not supplied with PS option.

For motors type BN..FA, the terminal box sizes AD, AF, LL, V are the same as for BN..FD.

Dimensions are $\frac{\text{inch}}{\text{mm}}$



	Shaft					Flange						Motor									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R	ES
BN 63	0.43 11	0.91 23	M4	0.49 12.5	0.16 4	4.53 115	3.74 95	5.51 140	0.37 9.5	0.12 3	0.39 10	4.76 121	10.71 272	9.80 249	11.69 297	3.74 95	2.91 74	3.15 80	1.02 26	4.57 116	0.20 5
BN 71	0.55 14	1.18 30	M5	0.63 16	0.20 5	5.12 130	4.33 110	6.30 160	0.37 9.5	0.14 3.5	0.39 10	5.43 138	12.20 310	11.02 280	13.46 342	4.25 108	2.91 74	3.15 80	2.68 68	4.88 124	0.20 5
BN 80	0.75 19	1.57 40	M6	0.85 21.5	0.24 6	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.14 156	13.62 346	12.05 306	15.28 388	4.69 119	2.91 74	3.15 80	3.27 83	5.28 134	0.20 5
BN 90 S	0.94 24	1.97 50	M8	1.06 27	0.31 8	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.93 176	16.10 409	14.13 359	18.15 461	5.24 133	3.86 98	3.86 98	3.74 95	5.28 134	0.24 6
BN 90 L	0.94 24	1.97 50	M8	1.06 27	0.31 8	6.50 165	5.12 130	7.87 200	0.45 11.5	0.14 3.5	0.45 11.5	6.93 176	16.10 409	14.13 359	18.15 461	5.24 133	3.86 98	3.86 98	3.74 95	6.30 160	0.24 6
BN 100	1.10 28	2.36 60	M10	1.22 31	0.31 8	8.46 215	7.09 180	9.84 250	0.55 14	0.16 4	0.55 14	7.68 195	18.03 458	15.67 398	20.51 521	5.59 142	3.86 98	3.86 98	4.69 119	6.30 160	0.24 6
BN 112	1.10 28	2.36 60	M10	1.22 31	0.31 8	8.46 215	7.09 180	9.84 250	0.55 14	0.16 4	0.59 15	8.62 219	19.06 484	16.69 424	21.54 547	6.18 157	3.86 98	3.86 98	5.04 128	7.80 198	0.24 6
BN 132 S	1.49 38	3.14 80	M12	1.61 41	0.39 10	10.43 265	9.05 230	11.81 300	0.55 14	0.15 4	0.62 16	10.15 258	22.24 565	19.09 485	25.51 648	7.59 193	4.64 118	4.64 118	5.59 142	7.87 200 (2)	0.23 6
BN 132 M	1.49 38	3.14 80	M12	1.61 41	0.39 10	10.43 265	9.05 230	11.81 300	0.55 14	0.15 4	0.62 16	10.15 258	23.74 603	20.59 523	27.00 686	7.59 193	4.64 118	4.64 118	7.08 180	7.87 200 (1)	0.23 6
BN 160 MR	1.65 42	4.33 110	M16	1.77 45	0.47 12	11.81 300	9.84 250	13.77 350	0.72 18.5	0.19 5	0.59 15	10.15 258	26.45 672	22.12 562	29.72 755	7.59 193	4.64 118	4.64 118	8.58 218	8.54 217	0.23 6
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)																
BN 160 M BN 160 L	1.65 42	4.33 110	M16	1.77 45	0.47 12	11.81 300	9.84 250	13.77 350	0.72 18.5	0.19 5	0.59 15	1.22 310	28.97 736	24.64 626	32.28 820	9.64 245	7.36 187	7.36 187	2.00 51	9.72 247	
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)																
BN 180 M	1.88 48	4.33 110	M16	2.02 51.5	0.55 14	11.81 300	9.84 250	13.77 350	0.72 18.5	0.19 5	0.59 15	1.22 310	30.70 780	26.37 670	34.01 864	9.64 245	7.36 187	7.36 187	2.00 51	9.72 247	
	1.49 38 (1)	3.14 80 (1)	M12 (1)	1.61 41 (1)	0.39 10 (1)																

1) These values refer to the rear shaft end.

2) For FD07 brake value R=226

ES hexagon is not supplied with PS option.

For motors type BN..FA, the terminal box sizes AD, AF, LL, V are the same as for BN..FD.

Dimensions are $\frac{\text{inch}}{\text{mm}}$

R3

High efficiency (η 0.95÷0.97) thanks to the high performance offered by the patented hypoid bevel gear pair at output

