iFit series

Rossi

Helical inline gearmotors

2

Contents

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1

Rossi for You

Innovation

Rossi S.p.A. offers a wide range of solutions for an evolving industry, flexible and innovative gear reducers and gearmotors for customer tailored solutions to maximize performances and minimize the Total Cost of Ownership (TCO).

High quality, 3 years warranty

Our drive is to innovate and boost operations by manufacturing performing, precise, reliable and high-quality products all over the world. We are always one step forward in offering and developing solutions that can satisfy an unlimited number of application needs, even in the most demanding conditions.

Reliability

We are a reliable company with high flexibility and know-how to respond to worldwide market requests, in all application fields, without leaving aside our commitment for the environment and value on human safety, to protect everyone's future.

Tools and processes

We continue to invest in new tools and processes, so our highly skilled specialist team in different fields are supporting you to find the best solution suitable for your demands, always by your side on every step of the project.

After-sale service

Highly trained technicians and support teams can ensure a fast and efficient after-sale service providing support worldwide.

Digital support

Alongside our 24/7 Rossi for You portal, you have digital support tools enabling real time access to order tracking, invoices, spare part tables and contact to our customer service resources.

60
YEARS

Experience

Shaped by more than 60 years of history Rossi meets your unique needs whether you need a standard design or a customized solution.


Rossi

1.1

Global presence local service

Local support
Sales, customer service,
technical support, spare parts

15 branches*

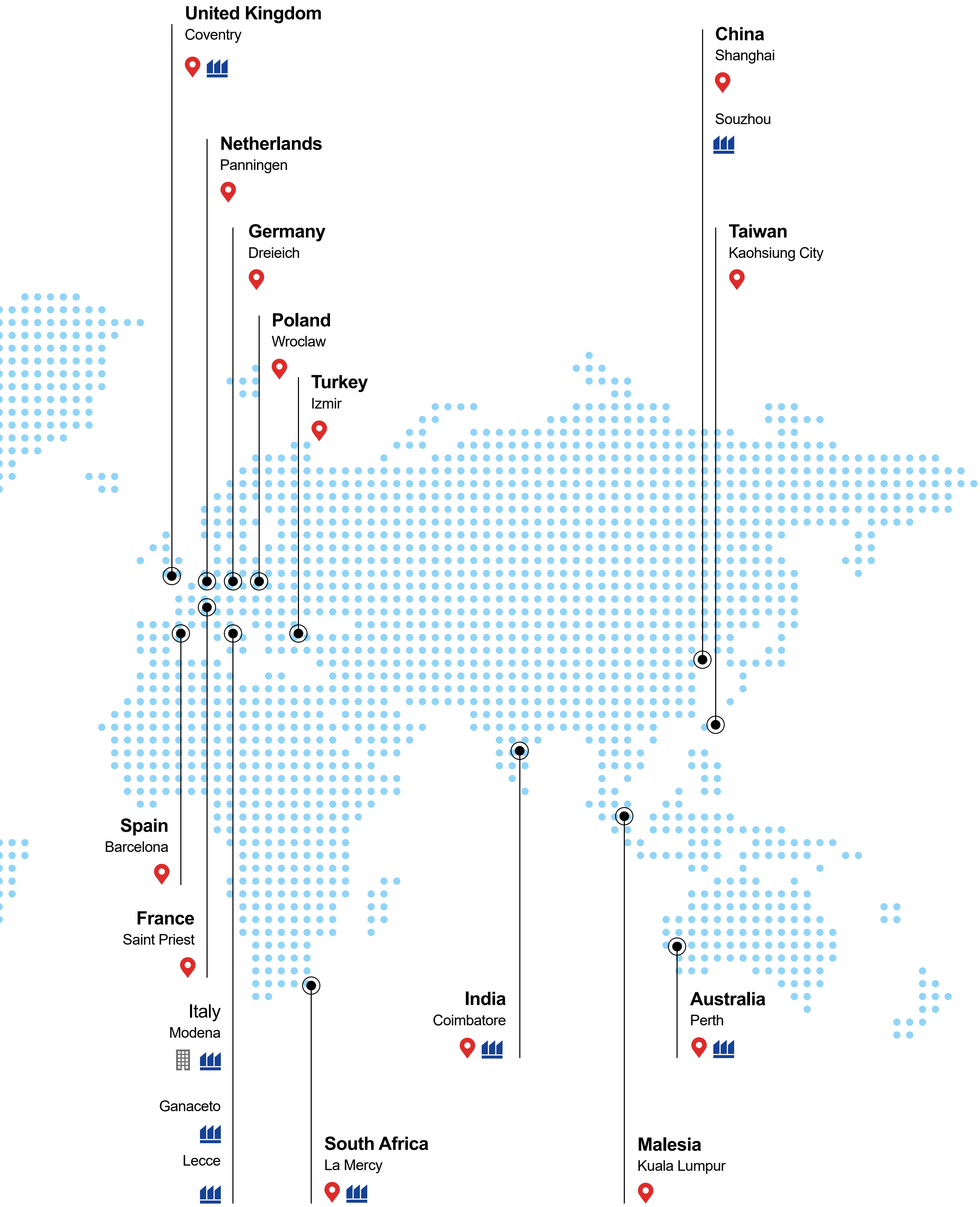
Worldwide distribution network *

A global network of subsidiaries and dealers.
From design and execution to after sales service.
Rossi S.p.A. is always close to you, a local reliable and flexible partner.

Alongside our 24/7 **Rossi for You** portal you have digital support tools enabling real time access to your order tracking, invoices, spare part tables and contact to our customer service resources.

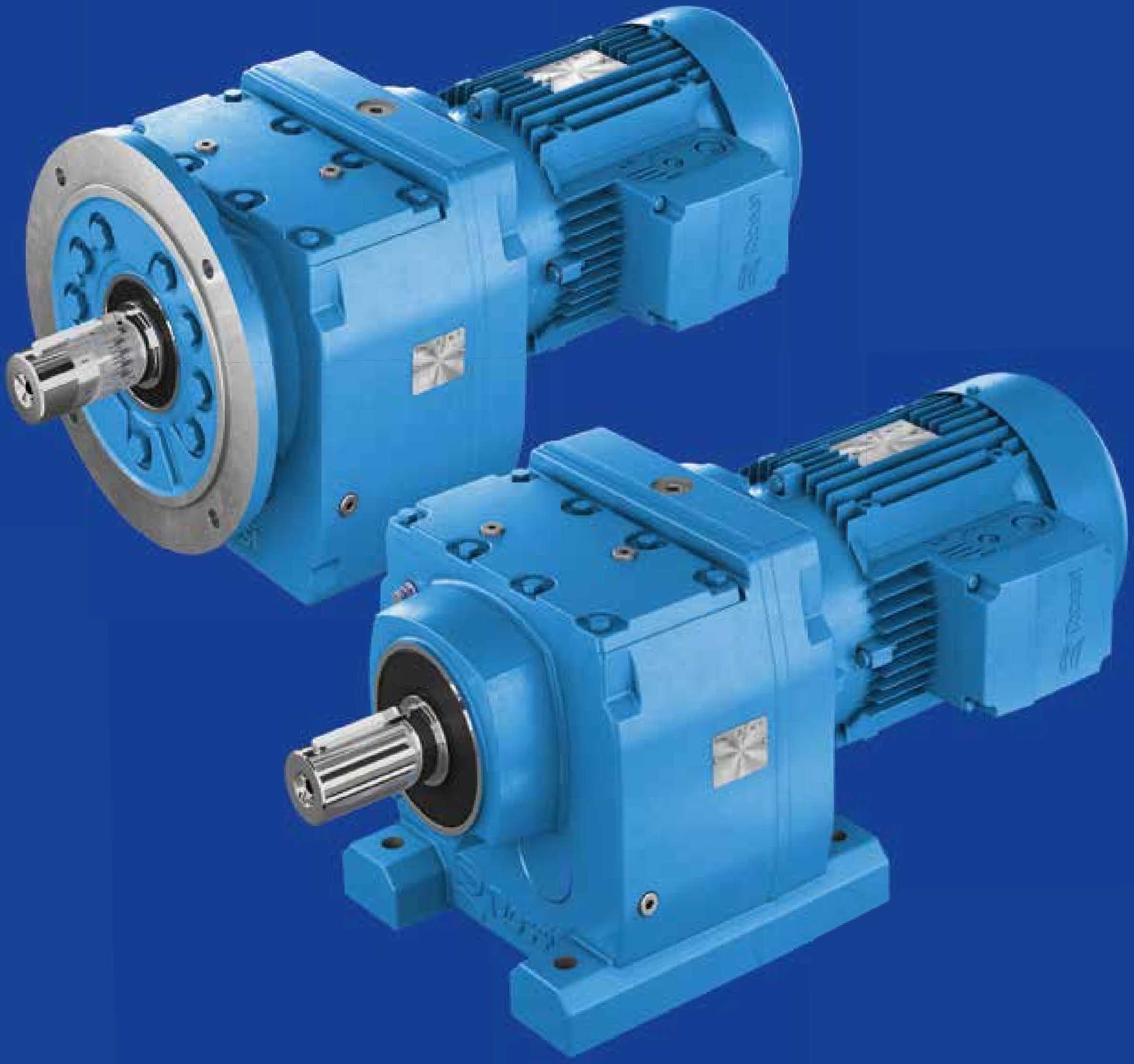
*All contacts available on **www.rossi.com**

▦ Headquarters 📍 Branches 🏭 Production facilities/Assembly plants



2

Product Overview



Section contents

2.1

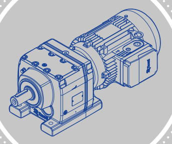
Features & Benefits

Fully interchangeable

Plug&Play.
No re-engineering costs.

100% made in EU

Superior quality,
minimum maintenance

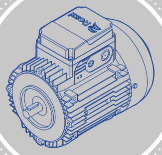


Cast iron housing

Maximum performance and
reliability

Gear precision DIN/ISO 6 - AGMA 12

Energy saving, low noise level,
reduced backlash



IE3 electric motors

Premium efficiency

High quality

Long life lubrication. Dedicated
motor side sealing system

Compact design

Wash down capability thanks to round
shaped, smooth housing surface

High performance

Up to 12% higher
than market standard

Additional benefits

- High Customer Value
- Short Lead Times for standard products
- 3 Years Warranty

2.2

Electric motors

- Standard and brake motors
- EISA Premium Efficiency (IE3) ⩾ 1 hp
- IE2 class of the international efficiency standard (IEC 60034-30) ⩽ 0.75 hp
- Supply voltage 230.460 V - 60 Hz; 9 terminals
- Service factor SF 1.15
- Aluminium frame sizes 63 ... 132
- Cable entry possible from two sides (at 180°)
- Motor insulation class F, rise temperature B

COMPLIANCE

- Test documents
- cURus motors certified to UL
- Machinery Directive 2006/42/EC
- Directive 2011/65/EC RoHS
- Directive «ErP» 2009/125/EC

PROTECTION/PAINTING

- Blue RAL 5010 paint with corrosivity class C3 as standard
- IP 55, IP 66 for the motor

OPTIONS

- Motor insulation class H
- Bi-metal type and thermistor type (PTC) thermal probes
- Motor with connectors
- Anti-condensation heater
- Forced fan cooling (IC 416)
- Drip-proof cover
- Double shaft extension
- Incremental encoder sin/cos
- Brake: manual release, manual release lever with different orientation, separate brake power supply
- Optional painting for extreme environments like Marine, Corrosive environments, food grade applications.

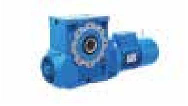
2.3

Inverter

- Max overloads: up to 200%
- Sensorless vector technology
- Flexibility in motor-mounted or wall-mounted installation
- Full "Plug & Play" capability
- Autotuning, software programming and updating included
- In compliance with IE2 class ECODESIGN EN 50598 IEC/EN 60034-30-1 and Ecodesign Directive in accordance with IEC 61800-9-2
- Remote commissioning, monitoring and diagnostics, Bluetooth, App and Safety (STO)
- Communication and connections to control several inverters
- A wide range of Field buss availability
- Comprehensive options range, components and design concept guarantee the best reliability and vibration resistance. Standard IP 65 rating

2.4 Product Range

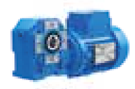
250	900	9000



A Series
Worm

lb in
14 sizes

lb in	355	630	1120	1900	2360	3750	4500	7500	11800
size	32	40	50	63	64	80	81	100	125



AS series
Worm Standardfit

lb in
6 sizes

lb in	315	530	1060	1900	3150	6000
size	118	225	325	430	535	742

E Series
Helical inline

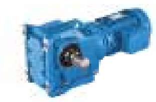
lb in
16 sizes

lb in	335	670	850	1400	2000	3000	4000	6000	8000	11800
size	32	40	41	50	51	63	64	80	81	100

iFIT Series
Helical inline New range

lb in
8 sizes

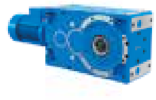
lb in	1283	1920	2965	4425	5930	8187	15490
size	27	37	47	57	67	77	87



iFIT Series
Bevel helical New range

lb in
7 sizes

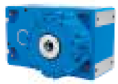
lb in	250	355	560	750	1000	1900
size	37	47	57	67	77	87



G Series
Helical and bevel helical

lb in
20 sizes

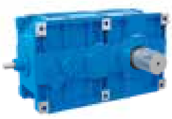
lb in	750	1800	3400	4300	7300	8600	15000
size	40	50	63	64	80	81	100



GX Series Extruder
Helical and bevel helical

lb in
16 sizes

lb in	15000
size	100



H series
Helical and bevel helical

lb in
12 sizes

EP Series
Planetary

lb in
24 sizes

lb in	14100
size	100

EPS Series
Planetary Slewing

lb in
10 sizes

SR series
Worm

lb in
10 sizes

lb in	375	710	1320	2240	2650	4250	5300	10600	14000
size	32	40	50	63	64	80	81	100	125

SR series
Helical inline

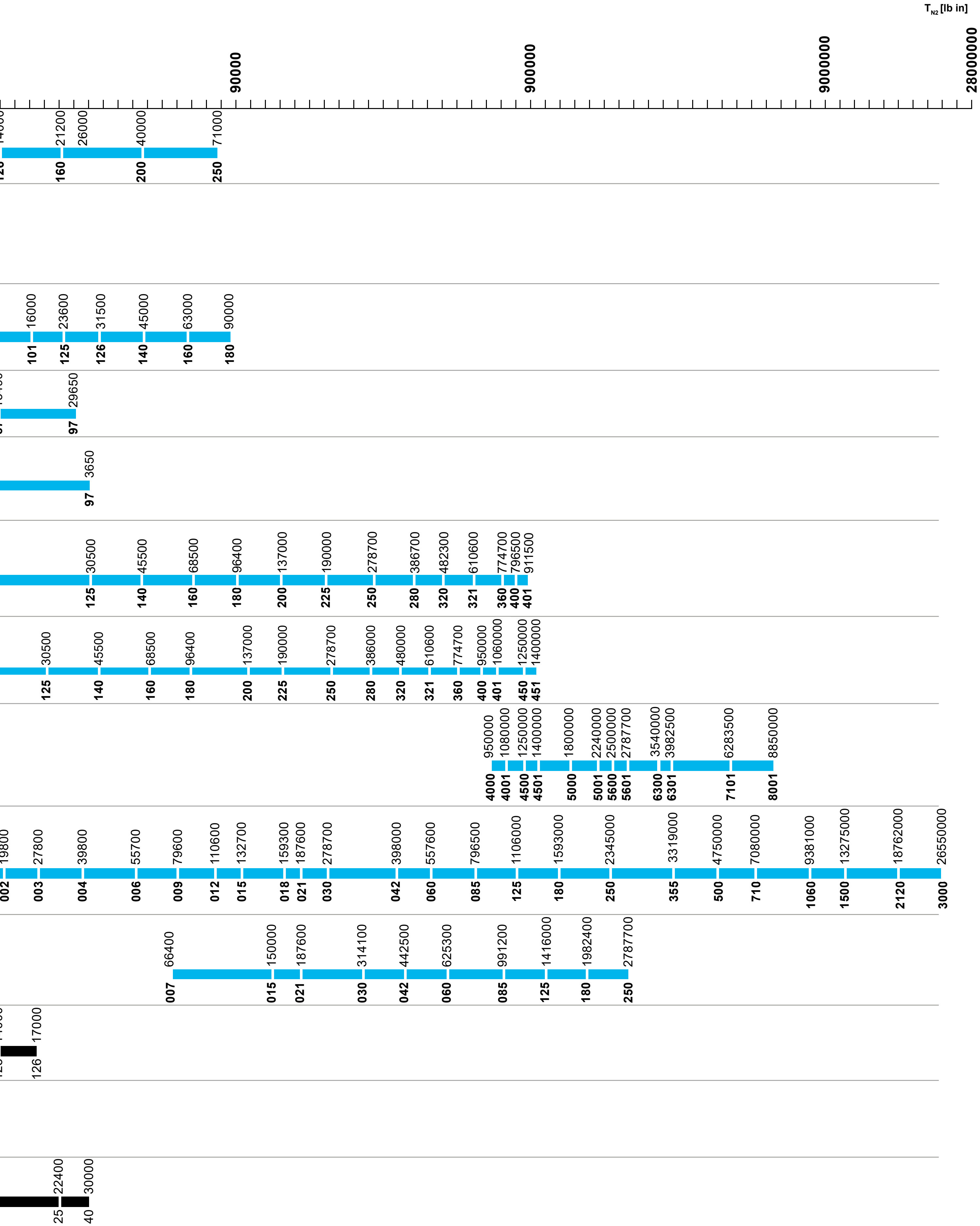
lb in
11 sizes

lb in	250	600	710	1250	1600	2650	3150	5300	6700	10000	13200
size	32	40	41	50	51	63	64	80	81	100	101

SR series
Helical and bevel helical

lb in
9 sizes

lb in	630	1,400	2800	3350	5600	6700	12500
size	40	50	63	64	80	81	100


T_N2 [lb in]
90000
900000
9000000
28000000
21200
26000
40000
71000
160
200
250
16000
23600
31500
45000
63000
90000
101
125
126
140
160
180
29650
97
3650
97
30500
45500
68500
96400
137000
190000
278700
386700
482300
610600
774700
796500
911500
125
140
160
180
200
225
250
280
320
321
360
400
401
30500
45500
68500
96400
137000
190000
278700
386000
480000
610600
774700
950000
1060000
1250000
1400000
125
140
160
180
200
225
250
280
320
321
360
400
401
450
451
950000
1080000
1250000
1400000
1800000
2240000
2500000
2787700
3540000
3982500
6283500
8850000
4000
4001
4500
4501
5000
5001
5600
5601
6300
6301
7101
8001
19800
27800
39800
55700
79600
110600
132700
159300
187600
278700
398000
557600
796500
1106000
1593000
2345000
3319000
4750000
7080000
9381000
13275000
18762000
26550000
002
003
004
006
009
012
015
018
021
030
042
060
085
125
180
250
355
500
710
1060
1500
2120
3000
66400
150000
187600
314100
442500
625300
991200
1416000
1982400
2787700
007
015
021
030
042
060
085
125
180
250
17000
126
22400
30000
125
140

3

Symbols and units of measure

Section contents

3.1

Symbols and units of measure

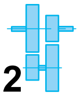
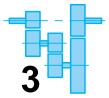
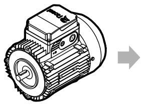
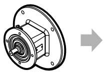
Symbols	Description	Unit of Measure IMPERIAL
SF	service factor	
f_T	thermal factor	
H	altitude	[ft]
$IP..$	protection degree	
WK^2	moment of inertia of mass	[lb ft^2]
T	torque	[lb in]
n	rotational speed	[rpm]
p	weight	[lb]
P	power	[hp]
$S1...S10$	duty cycle	
T	temperature	[°F]
t	time	[s]
v	linear speed	[ft/s]
z	number of starts per hour	[start/h]
	Gear reducer	
η	efficiency	
η_s	static efficiency	
F_{r1}	radial loads on high speed shaft	[lb]
F_{r2}	radial loads on low speed shaft	[lb]
F_{a1}	axial loads on high speed shaft	[lb]
F_{a2}	axial loads on low speed shaft	[lb]
i	transmission ratio	
L_h	bearing life	[h]
T_{N1}	nominal torque on high speed shaft	[lb in]
T_{N2}	nominal torque on low speed shaft	[lb in]
T_1	nominal torque on high speed shaft	[lb in]
T_2	nominal torque on low speed shaft	[lb in]
T_{2max}	maximum torque on low speed shaft	[lb in]
T_s	tightening torque for fastening bolts	[lb in]
n_1	rotation speed of high speed shaft	[rpm]
n_2	rotation speed of low speed shaft	[rpm]
P_{N1}	nominal power on high speed shaft	[hp]
P_{N2}	nominal power on low speed shaft	[hp]
P_T	thermal power	[hp]
P_{TN}	nominal thermal power	[hp]
P_1	power on high speed shaft	[hp]
P_2	power on low speed shaft	[hp]

Symbols	Description	Unit of Measure IMPERIAL
Motor		
$cos\varphi$	power factor	
C_{max}	maximum brake disk wear	[mm]
η_0	motor efficiency	
f	supply frequency	[Hz]
I_N	motor nominal current	[A]
I_S	starting current of the motor	[A]
WK_0^2	moment of inertia (of mass) of the motor	[lb ft^2]
T_S	starting torque, with direct on-line start	[lb in]
T_{max}	maximum torque, with direct on-line start	[lb in]
T_N	nominal torque of the motor	[lb in]
T_{bmax}	maximum braking torque	[lb in]
T_b	calibration braking torque	[lb in]
n_N	number of motor nominal rotations	[rpm]
P_N	motor nominal power	[hp]
t_a	starting time	[s]
t_b	braking time	[s]
t_1	delay of brake anchor release	[ms]
t_2	delay of braking	[ms]
t_{2cc}	braking delay with d.c. rectifier	[ms]
U	supply voltage	[V]
W_1	work of friction generating a brake disk wear of 1 mm	[MJ/mm]
W_{max}	maximum work due to friction for each braking	[10^6 lb in]

The dimensions are expressed in mm unless otherwise stated

3.2

Icons

Icons	Description	Icons	Description
p.	refer to page	lb	weight (without oil)
⚠	attention	US gal	oil quantity
▼	breather plug		2 reduction stages
●	level plug		3 reduction stages
■	drain plug		refer to motor section
▽	breather plug not in view (opposite side)		refer to section motor adapters
◍	level plug not in view (opposite side)	⚙ ➜	refer to section geometrical pairings
▨	drain plug not in view (opposite side)		

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4

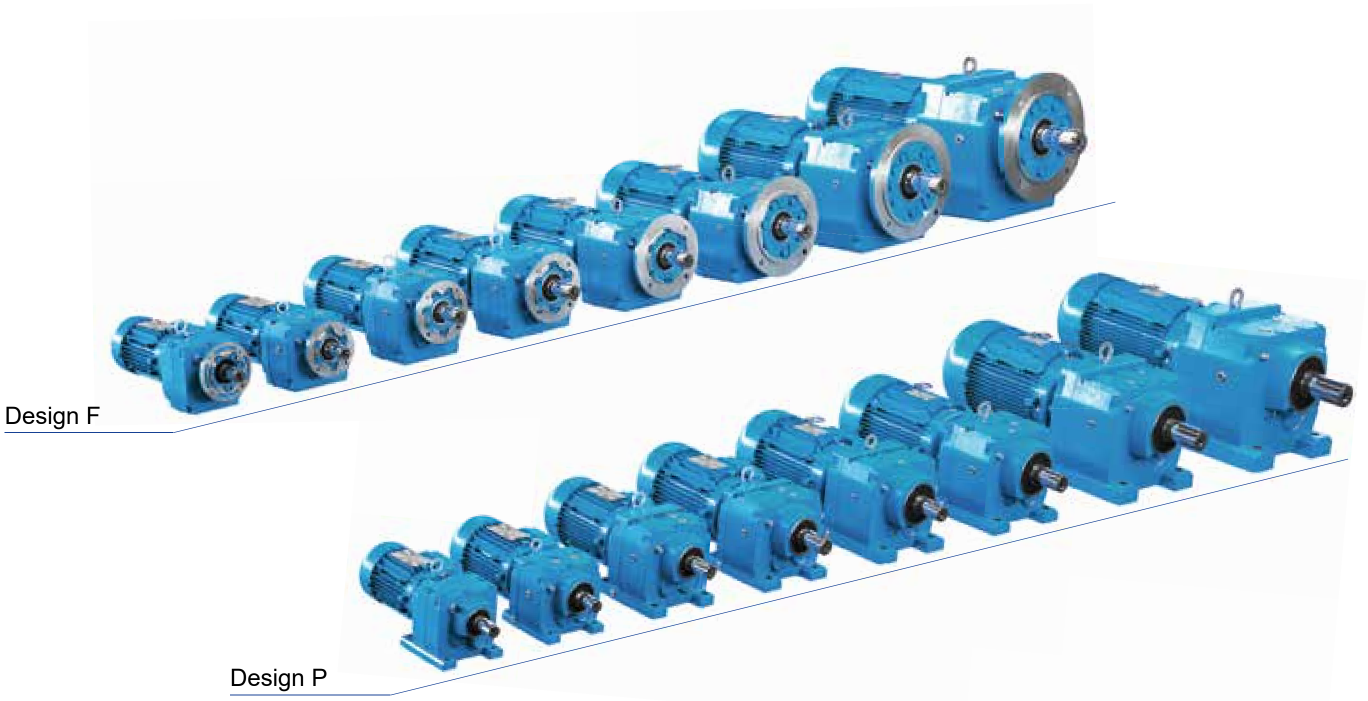
Product specifications

Section contents

4.1

General specifications

- **Maximum interchangeability** (shaft height, low speed shaft, foot and flange dimensions) and performance equal to, or higher than market standards;
- **EISA Premium efficiency motors (≥ 1hp)**;
- **foot mounting** (foot mounted gear reducer housing) or **flange mounting** (up to 4 flanges for each gear reducer size);
- **gear reducer cast iron single piece housing**, high stiffness and dimensional accuracy;
- **highly engineered low speed assembly** (shaft & bearings) that will withstand high axial and radial loading;
- **high manufacturing quality standard**
- **high, reliable and tested performances**
- **compact motors**, available with a high reliable integral DC brake (standard) and suitable for applications with inverters.



		iC 27	iC 37	iC 47	iC 57	iC 67	iC 77	iC 87	iC 97
Low speed shaft diameter	[in]	1	1	1.25	1.375	1.375	1.625	2.125	2.375
Shaft height (design P)	[mm]	90	90	115	115	130	140	180	225
B5 flange diameter (design F)	[mm]	120...160	120...200	140...200	160...250	200, 250	250, 300	300, 350	350, 450
Maximum nominal torque	[lb in]	1270	1890	2960	4430	5930	8190	15500	29600
Maximum nominal radial load	[lb]	950	1110	1220	1600	1700	2230	3800	4450

4.1.1 Gear reducer

Main structural features:

- cast iron single-piece housing 250 UNI ISO 185 with stiffening ribs and high lubricant capacity;
- ball bearings on highly engineered low speed assembly (shaft & bearings) that will withstand high axial and radial loading;
- pinion on final reduction with three bearings (sizes ≥ iC 57) in order to ensure the best meshing conditions (no overhung loading on low speed assembly, optimized for low noise level);
- first reduction stage pinion directly fitted with interference onto the motor shaft;
- cylindrical helical gear pairs with ground profile, for the maximum load capacity, smooth and low noise running;
- gear load capacity calculated to ISO 6336;
- oil-bath lubrication; all sizes are supplied filled with polyglycol synthetic oil (PAG), "for life" lubrication;

- includes metal plugs (filler plug with valve; drain plug; level plug);
- paint: external coating with two-component water-based acrylic enamel appropriate for resistance to normal industrial environments (corrosivity class C3 ISO 12944-2); color blue RAL 5010 DIN 1843; internal protection with paint providing resistance to synthetic oils.

4.1.2 Electric three-phase motor

Dimensions and masses of gearmotors described in present catalog are referred to standard motor and brake motors of catalog TX.

Main structural features:

- compact TEFC (Totally enclosed Fan Cooled)motor, 3 phase, 60HZ Standard);
- IP 55 protection, insulation class F, temperature rise class B;
- rated power delivered on continuous duty (S1) and referred to nominal voltage and frequency, ambient temperature 104 °F and maximum altitude 3281 ft.
- capacity to withstand one or more overloads up to 1,6 times the nominal load for a maximum total period of 2 min per hour;
- starting torque with direct on-line start at least 1,6 times the nominal one (it is usually higher);
- suitable for running with inverter (generous electromagnetic sizing, low-loss eletrical stamping, phase separators, etc.);
- design available for every application need: flywheel, independent cooling fan, independent cooling fan and encoder, etc.
- paint: external protection with two-component water-based acrylic enamel appropriate for resistance to normal industrial environments (corrosivity class C3 ISO 12944-2); color blue RAL 5010 DIN 1843.

Brake motor main structural features

- available with a high reliable integral DC brake (standard) and suitable for applications with inverters;
- very low noise level;
- brake can also be independently fed for quick braking action;
- braking torque proportioned to motor torque (usually $T_b \approx 2\ T_N$) and adjustable by adding or removing spring pairs;
- rapid, precise stopping;
- hand lever for manual release with automatic return; removable lever rod.

For other specifications and details see specific documentation of catalog TX.

Specific standards for electric motors:

- nominal powers and dimensions to CENELEC HD 231 (IEC 72-1, CNR-CEI UNEL 13117-71 and 13118-71, DIN 42677, NF C 51- 120, BS 5000-10 and BS 4999-141) for mounting positions IM B5, IM B14 and derivatives;
- nominal performances and running specifications to CENELEC EN 60034-1 (IEC 34-1, CEI EN 60034-1, DIN VDE 0530-1, NF C51-111, BS EN 60034-1);
- protection to CENELEC EN 60034-5 (IEC 34-5, CEI 2-16, DIN EN 60034-5, NF C51-115, BS 4999-105);
- mounting positions to CENELEC EN 60034-7 (IEC 34-7, CEI EN 60034-7, DIN IEC 34-7, NF C51-117, BS EN 60034-7);
- sound levels to CENELEC 60034-9 (IEC 34.9, DIN 57530 pt. 9);
- balancing and vibration velocity (vibration under standard rating N) to CENELEC HD 53.14 S1 (IEC 34-14, ISO 2373 CEI 2-23, BS 4999-142); motors are balanced with half key inserted into shaft extension;
- cooling to CENELEC EN 60034-6 (CEI 2-7, IEC 34-6): standard type IC 411; type IC 416 for non-standard design with axial independent cooling fan;
- TENV (Totally Enclosed Non-Ventilated) motor, 3 phase, 60hz optional.

4.2

Operational conditions

4.2.1 Operational ambient temperature

Gear reducers

Gear reducers are suitable for operation at ambient temperature 32 °F / +104 °F (with peaks down to -4 °F / +122 °F), with synthetic oil PAG ISO VG 220 cSt and standard seal rings.
The operation outside this range, with a minimum of -40 °F and a maximum of +140 °F, must be evaluated in relation to the specific operating conditions, duty cycle, type of lubricant, type of seals and cooling/heating system (where possible); please contact Rossi North America.
The catalog data are based on an operational ambient temperature of 77 °F (see pages 49 and 50).

Motors

Rossi HB series motors are suitable for operation in an ambient temperature range of -5 °F / +104 °F.
The operation outside this range is possible by adopting some precautions: contact Rossi North America.

In general, the nominal motor power should be derated according to the following table;

Ambient temperature °F	**86**	**104**	**113**	**122**	**131**	**140**
P / P_N [%]	106	100	96.5	93	90	86.5

For drives with inverters, it is necessary to take into account the higher thermal stresses to which the motor windings may be subjected.
If needed, contact Rossi North America.

4.2.2 Installation altitude

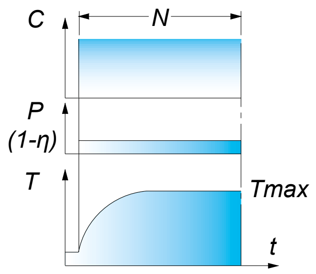
Installation altitude affects the effectiveness of convection heat dissipation; heat dissipation capacity decreases as installation altitude increases.
Catalog data are referred to a maximum altitude of 3281 ft.

Above this threshold, the nominal motor power must be downgraded according to the following table:

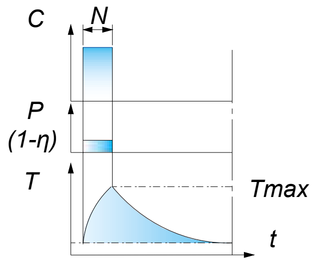
Altitude a.s.l. ft	**3300**	**4900**	**6600**	**8200**	**9800**	**11500**	**13100**
P / P_N [%]	100	96	92	88	84	80	76

for gear reducer part see pages 49 and 50.

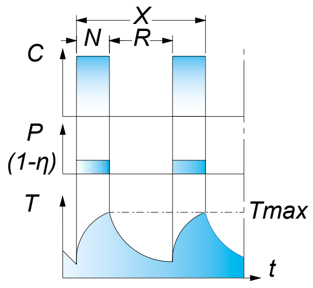
4.2.3 Duty cycles



Continuous duty (S1)
Operation at a constant load maintained for sufficient time to allow the motor to reach thermal stability.
Abbr. S1



Short time duty (S2)
Running at constant load for a given period of time less than that necessary to reach normal running temperature, followed by a rest period long enough for motor's return to ambient temperature.
Abbr. S2 + time N (minimum)



Intermittent periodic duty (S3)
Succession of identical work cycles consisting of a period of running at constant load and a rest period. Current peaks on starting are not to be of an order that will influence motor heat to any significant extent.
Abbr. S3 + cyclic duration factor

Cyclic duration factor = $N/(N+R) \cdot 100$ [%]

where

N = running time at constant load
R= rest time
For values of N+R > 10 min contact Rossi North America.

In case of a duty-requirement type S2 ... S10 the motor power can be increased as per the following table; starting torque keeps unchanged.

Duty cycle			Motor size		
			63 ... 90	100 ... 132	160 ... 315
S2	duration of running	**90 min**	1	1	1.06
		60 min	1	1.06	1.12
		30 min	1.25	1.18	1.25
		10 min	1.25	1.25	1.32
S3	cyclic duration factor	**60%**	1.12		
		40%	1.18		
		25%	1.25		
		15%	1.32		
S4 ... S10			Contact Rossi North America.		

4.2.4 Speed

Gearmotor low speed shaft rotation speeds indicated in the catalog are determined from the nominal HB motor speed under nominal operating conditions and gear reducer transmission ratio.
Actual speed may deviate from this value depending on load, actual operating conditions and power system.

4.2.5 Sound levels

The standard levels of sound power emission L_{WA} relevant to the gearmotors of this catalog, running at nominal load and speed, fulfill the limits settled by VDI 2159 for gear reducers and EN 60034 for motors.

4.2.6 Accessibility and heat dissipation

Position the gearmotor so as to allow a free passage of air for cooling both gear reducer and motor (especially at motor fan side).
Avoid any obstruction to the air-flow; heat sources near the gear reducer that might affect the temperature of cooling-air and of gear reducer for radiation; insufficient air recycle or any other factor hindering the steady dissipation of heat.
Also provide adequate spacing or shielding of heat-sensitive components (motor, brake, motor-inverter, electronic components, etc.) from hot surfaces of the driven machine, and provide adequate accessibility space for maintenance operations.

4.2.7 Weights

The weights shown in the catalog refer to gearmotors without lubricating oil.
Actual weights may vary depending on size, gearbox, transmission ratio, motor and whether there are accessories or special designs.

4.2.8 Reduced backlash

For sizes ≥ iC 37, the gearmotor can be supplied with reduced backlash.
The values are given in paragraph 9.2 in the "Geometric Coupling Tables" and refer to the low speed shaft with locked high speed shaft.
They are valid in the absence of applied loads (max. 0.01 of the nominal load of the gear reducer), with the gear reducer at ambient temperature (77 °F) and are subject to a tolerance of ± 2 arc min.

If the value is not specified, the reduced backlash option is not available.

4.2.9 Low speed shaft seals

For aggressive environmental conditions or particularly severe operating conditions, “Taconite” seals available (gear reducer and motor).
For gear units in flange-mounted design, the "Double low speed shaft seal" option is also available (except for size iC 27).

4.3

Surface protection

The gearmotors are protected externally with a water-based dual compound acrylic enamel paint suitable for withstanding normal industrial environments (corrosivity class C3 ISO 12944-2; color blue RAL 5010).
Other paints and protection degrees are available on request as per table below.

Field of use	Features	Corrosivity class ISO 12944-2	Durability class ISO 12944-2	Description treatment	Thickness treatment µm	Code
Applications in aggressive ambients	Good resistance to atmospheric and aggressive agents	C4	Low	1) Dual-compound epoxy primer 2) Water-soluble polyurethane dual-compound enamel with polyurethane acrylic resins	150	**1HRAL5010 (blue)**
			Medium	1) Dual-compound epoxy primer (2 layers) 2) Water-soluble polyurethane dual-compound enamel with polyurethane acrylic resins	200	**2HRAL5010 (blue)**
			High	1) Dual-compound epoxy primer (4 layers) 2) Water-soluble polyurethane dual-compound enamel with polyurethane acrylic resins	300	**3HRAL5010 (blue)**
Outdoor applications in saline environment	Excellent resistance to atmospheric and aggressive agents Outdoor applications in saline environment	C5 - M	Medium	1) Sanding 2) Dual-compound antirust primer with zinc phosphates 3) Dual-compound epoxy primer 4) Water-soluble polyurethane dual-compound enamel with polyurethane acrylic resins	300	**2IRAL5010 (blue)** 1)
			High	1) Sanding 2) Dual-compound antirust primer with zinc phosphates 3) Sealing with polyurethane sealant 4) Dual-compound epoxy primer 5) Polyurethane dual-compound enamel with polyurethane acrylic resins	400	**2KRAL5010 (blue)** 1)
Outdoor applications in chemically aggressive environment and high humidity industrial areas	Excellent resistance to atmospheric and aggressive agents Outdoor applications in chemically aggressive environment (fertilizers, etc.)	C5 - I	Medium	1) Sanding 2) Dual-compound antirust primer with zinc phosphates 3) Dual-compound epoxy primer 4) Water-soluble dual-compound enamel with epoxy resins	300	**2LRAL5010 (blue)** 1)
			High	1) Sanding 2) Dual-compound antirust primer with zinc phosphates 3) Sealing with polyurethane sealant 4) Dual-compound epoxy enamel 5) Water-soluble dual-compound enamel with epoxy resins	400	**2YRAL5010 (blue)** 1)

(1) Available for sizes **≥ 47.**

4.4

Storage and warehousing

Rossi gearmotors must be stored in a closed environment where they are protected from solar radiation and corrosive agents. The ambient must be sufficiently clean, dry (relative humidity < 50 %), free from excessive vibrations ($v_{eff} \leq 0.2$ mm/s) to avoid damage to bearings.

Ambient temperature 32 ÷ 104 °F; with peaks up to a ± 18 °F.

For different ambient conditions, contact Rossi North America.

The gear units and gearmotors must be positioned according to the mounting position stated in the order and on the nameplate. **Do not stack units.**

Do not, under any circumstances, loosen the closed plugs or activate the drain plug before commissioning.

For storage periods of 12 to 24 months, we recommend requesting the "Long term storage" option, which provides:

- supply of the gearbox without oil filling;
- protection of the internal volume of the gearbox by applying VCI lubricant;
- application of a layer of special anti-corrosive oil on all unpainted external parts (shafts, feet, flanges), including galvanized components (screws, nuts, washers, eyebolts, etc.);
- application of adhesive specific label;
- packing with sealed VCI bag.

For longer periods please contact Rossi North America.

5

Designation

Section contents

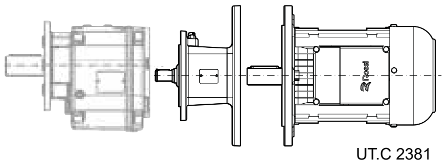
5.1

Coding

5.1.1 Gearmotor designation

gear reducer									motor
iC	**4**	**7**	**3**	**F**	**A**	**34.73**	**B3**	**F416**	**B16D** ***AB16BI063***
Series	Frame size gear reducer	Model	Train of gears	Gear reducer design	Low speed shaft design	Transmission ratio	Gear reducer mounting position	Output flange	Mounting position of compact motor *Motor adapter code*
iC iFIT coaxial gearmotors	**2** **3** **4** **5** **6** **7** **8** **9**	**7**	**2** Stages **3** Stages	**P** Foot mounted design **F** Design with flange **56**	**A** Imperial	**3.37** **4.00** **...** **...** **75**	**B3** **B6** **B7** **B8** **V5** **V6** **56**	**F212** **F214** **...** **...** **69**	**IEC**: **AB12BI063** **AB12BI071** **...** **AB30MI200** **66** **NEMA**: **AB12BN056** **AB12CN143** **...** **AB30MN324** **67** **B12B** **...** **B30M** **84**

configuration with adapter and standard IEC motor



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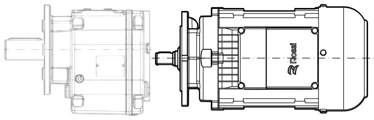
configuration with compact motor



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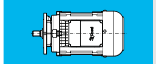
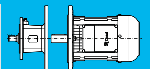
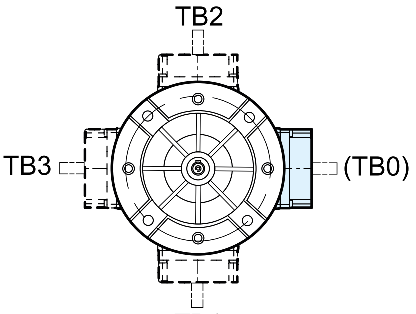
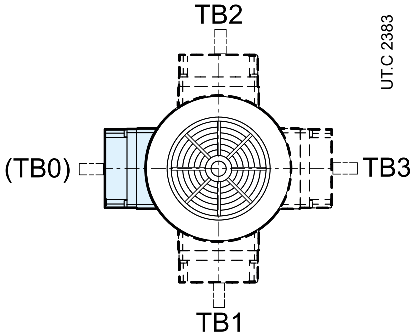
5.1.2 Motor designation

HB	3	Z	90S	-	4	230.460	60	-	B16D		-	TB2(1)
Series	**Energy class**	**Integrated brake**	**Motor size**	-	**N. poles**	**Supply voltage**	**Frequency**	-	**Motor mounting position**  **compact**	 **NEMA**	-	**Terminal box position**
HB	2 efficiency IE2 3 efficiency IE3	- Z	63A 63B 71B ...		2 4 6	230.460 ...	60		B12B ... B30C	B5		TB1 TB2 TB3
	144	147	144		144	144	144		84			

5.1.3 Motor terminal block



Drive end (D)



Non-drive end (N)

The designation is to be completed with the statement of motor terminal box position if differing from the standard one TB0 (see also pages 60 and 61).
The release lever (for brake motor) follows the position of the terminal box.

The cable entry is the responsibility of the Buyer: the terminal box is integral with housing with knockout cable openings on both sides (one for power cable and one for auxiliary equipment).

---

(1) For standard terminal box position TB0, no indication in motor designation is necessary.

5.1.4 Gear reducer options coding

Ref.	Description	Code	Gear reducer sizes
(1)	Strengthened low speed shaft bearings	SP2	≥ iC 67...
(2)	Low speed shaft double seal (only for design with flange)	DT2	≥ iC 37...F
(3)	Seal rings (gear reducer and motor) in fluoro rubber	TV2	all
(4)	Special painting cycle (gear reducer and motor)	see page 32	all
(5)	Reduced backlash	GR	see page 31
(6)	Universal mounting position	BX	all
(7)	Stainless steel nameplate (gear reducer and motor)	TI	all
(9)	Prearranged for "long-term storage"	LS	all
(10)	Terminal box position differing from TB0	TB1, TB2, TB3	all

5.1.5 Motor options coding

Ref.	Description	Code	HB	HBZ
(1)	Special motor supply	–	•	•
(3)	Motor insulation class H	,H	•	•
(8)	Condensate drain holes	,CD	•	•
(9)	Additional windings impregnation	,SP	•	•
(13)	Anti-condensation heater	,S	•	•
(16)	Second shaft end	,AA	•	•
(17)	Axial independent cooling fan	,V ...	•	•
(18)	Axial independent cooling fan and encoder	,V ... ,E...	•	•
(19)	Thermistor type thermal probes (PTC)	,T15 ,T17	•	•
(20)	Bi-metal thermal probes	,B15 ,B17	•	•
(21)	Drip-proof cover	,PP	•	•
(25)	Manual release lever position different from standard position (L)	,L1 ,L2 ,L3	–	•
(26)	D.c. brake separate supply	…	–	•
(35)	Light alloy fan	,VL	•	•
(36)	Encoder	,E1 ... ,E5	•	•
(42)	Motor certified to UL	,UL	•	•
(47)	Design for damp and corrosive environment,	,UC	–	•
	stainless steel bolts and screws of brake disk	,DB	–	•
(48)	IP 56 protection	,IP 56	–	•
(49)	IP 65 protection	,IP 65	–	•
(51)	Strengthened design for supply from inverter (sizes 160 ... 200)	,IR	•	•
(61)	Manual rotation	,MM	–	•
(62)	Prearranged for encoder	,PE	•	•
(63)	Axial independent cooling fan and prearranged for encoder	,V... ,PE	•	•
(64)	IP 66 protection	,IP 66	•	–

For a complete motor options description see cat. TX motors of series HB.

5.1.6 Designation examples

Example 1: compact gearmotor

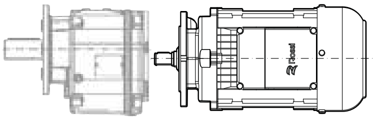
iC	4	7	3	F	A	-	34.73	-	B3	-	F416	-	B16D

- gearmotor size iC 47
- 3 reduction stages
- design with flange
- metric shaft
- transmission ratio 34.73
- gear reducer mounting position B3
- output flange F416
- compact motor with mounting position B16D

Compact motor designation compatible with above coded gear reducer follows

HB	3	Z	90S	-	4	230.460	60	-	B16D	-	TB2

- motor type HB, with efficiency IE3, brake type
- motor size 90S
- number of poles 4
- supply voltage 230-460 V at 60 Hz
- compact motor with mounting position B16D
- terminal box position TB2



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Example 2: gearmotor with NEMA adapter

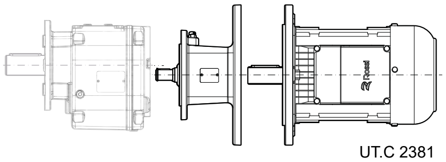
iC	4	7	3	F	A	-	34.73	-	B3	-	F416	-	AB16DN145

- gearmotor size iC 47
- 3 reduction stages
- design with flange
- metric shaft
- transmission ratio 34.73
- gear reducer mounting position B3
- output flange F416
- standard IEC motor with adapter AB16DN145

NEMA motor designation compatible with above coded gear reducer follows

HB	3	Z	90S	-	4	230.460	60	-	B5	-	TB2

- motor type HB, with efficiency IE3, brake type
- motor size 90S
- number of poles 4
- supply voltage 230-460 V at 60 Hz
- NEMA motor mounting position B5
- terminal box position TB2



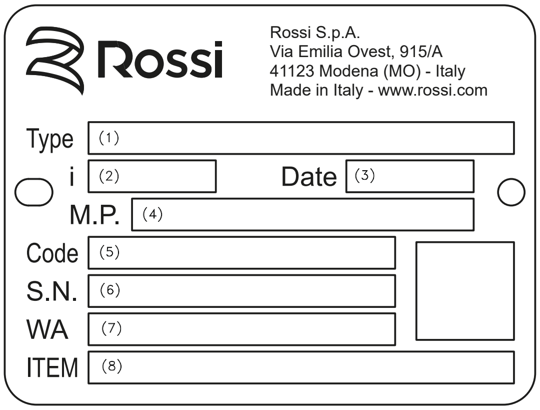
UT.C 2381

5.2

Nameplate data

5.2.1 Gear reducer nameplate

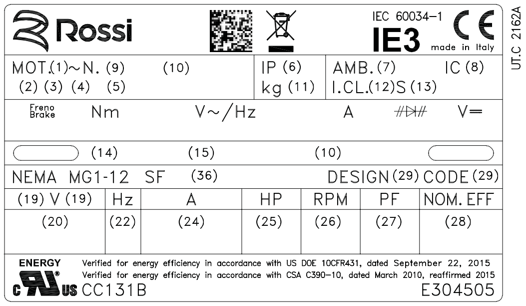
Every gear reducer is provided with a name plate in anodized aluminium containing main informations necessary for a correct identification of the product.
The name plate must not be removed and must be kept integral and readable.
All name plate data must be specified on eventual spare part orders.



(1)	Gear reducer type
(2)	Transmission ratio
(3)	Production date
(4)	Gear reducer mounting position
(5)	Product code
(6)	Serial number
(7)	Production batch
(8)	Customer code (1)

5.2.2 Motor nameplate

The motor is provided with a nameplate in anodized aluminium containing main information necessary for a correct identification of the project.
The name plate must not be removed and must be kept integral and readable.
All name plate data must be specified on eventual spare part orders.



HB

(1)	Number of phases
(2)	Motor type
(3)	Frame size
(4)	Number of poles
(5)	Mounting position designation position
(6)	Protection IP
(7)	Ambient temperature maximum
(8)	IC code
(9)	Production batch
(10)	Two months, year of manufacturing and serial number
(11)	Motor mass
(12)	Insulation class I.CL.
(13)	Duty cycle S...
(14)	Motor code
(15)	Customer code (1)
(16)	Bearings
(17)	Additional note
(18)	Additional note
(19)	Connection of the phases
(20)	Rated voltage
(21)	Voltage tolerance
(22)	Nominal frequency
(23)	Frequency tolerance
(24)	Nominal current
(25)	Nominal power
(26)	Rated speed
(27)	Nominal power factor
(28)	Nominal efficiency IEC 60034-2-1
(29)	Design - code
(36)	Service factor

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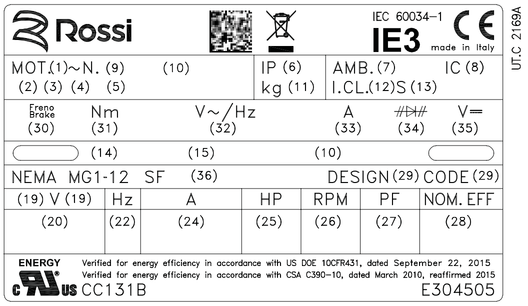
(1) On request



HBZ

(1) Number of phases
(2) Motor type
(3) Frame size
(4) Number of poles
(5) Mounting position designation position
(6) Protection IP
(7) Ambient temperature maximum
(8) IC code
(9) Production batch
(10) Two months, year of manufacturing and serial number
(11) Motor mass
(12) Insulation class I.CL.
(13) Duty cycle S...
(14) Motor code
(15) Customer code (1)
(16) Bearings
(17) Additional note
(18) Additional note
(19) Connection of the phases
(20) Rated voltage
(21) Voltage tolerance
(22) Nominal frequency
(23) Frequency tolerance
(24) Nominal current
(25) Nominal power
(26) Rated speed
(27) Nominal power factor
(28) Nominal efficiency IEC 60034-2-1
(29) Design - code
(30) Brake size
(31) Braking torque
(32) Supply of rectifier
(33) Current absorbed by brake
(34) Nominal d.c. voltage supply of brake
(35) Nominal d.c. voltage of brake supply
(36) Service factor

(1) On request

6

Project Planning

Section contents

6.1

Selection

6.1.1 Selection data

For a correct selection of gearmotor and drive, the following information about the application is required

Symbols	Description	Unit of Measure IMPERIAL
n_{2min}	minimum rotation speed required on low speed shaft	[rpm]
n_{2max}	maximum rotation speed required on low speed shaft	[rpm]
$P_{2-n2\ min}$	power required at low speed shaft at minimum speed	[hp]
$P_{2-n2\ max}$	power required at low speed shaft at maximum speed	[hp]
$T_{2-n2\ min}$	torque required at low speed shaft at minimum speed	[lb in]
$T_{2-n2\ max}$	torque required at low speed shaft at maximum speed	[lb in]
F_{a2}	axial loads on low speed shaft	[lb]
F_{r2}	radial loads on low speed shaft	[lb]
WK^2	external moment of inertia of mass (couplings, driven machine)	[lb ft²]
T_{amb}	(maximum and minimum) ambient temperature	[°F]
H	installation altitude	[ft]
$S1, S2,..$	duty cycle	[%]
z	number of starts per hour	[start/h]
f	supply frequency	[Hz]
U_{mot}	motor supply voltage	[V]
U_f	brake supply voltage	[V]
T_b	braking torque	[lb in]
$B3 \ldots V6$	gearmotor mounting position	

6.1.2 Selection of gearmotor size

In order to select the most suitable gearmotor size for the application, you must:

1 have the necessary data as indicated in the previous paragraph:
  - power P_2 required at gearmotor output;
  - angular speed n_2,
  - operating conditions (nature of the load, duration, frequency of starting z, other considerations).

2 determine service factor *SF* on the basis of running conditions (page 48).

3 select the gearmotor size on the basis of:
  - n_2
  - *SF*
  - power P_1 equal or greater than P_2

If power P_2 required is the result of a precise calculation, the gearmotor should be selected on the basis of a power P_1 equal or greater than P_2 / η , where $\eta = 0.97 \div 0.98$ is gear reducer efficiency (page 48).
When for reasons of motor standardization, power P_1 available in catalog is much greater than the power P_2 required, the gearmotor can be selected on the basis of a lower service factor provided it is certain that this excess power available will never be required and frequency of starting z is low enough not to affect service factor (page 47).
Calculations can also be made on the basis of torque instead of power; this method is even preferable for low n_2 values.

6.1.3 Verifications

- Verify possible radial load F_{r2} referring to directions given on pages 51 and 52.
- For the motor, verify frequency of starting z when higher than that normally permissible, referring to directions and values given in ch. 2 cat. TX; this will normally be required for brake motors only.
- When a load chart is available, and/or there are overloads – due to starting on full load (especially with high inertias and low transmission ratios), braking, shocks, gear reducers in which the low speed shaft becomes driving member due to driven machine inertia, applied power higher than strictly required, other static or dynamic causes - verify that the maximum torque peak is always smaller than $\boldsymbol{1.6 \cdot T_{N2}}$ (where $T_{N2} = T_2 \cdot SF$).
  If higher or if it cannot be evaluated in the above cases, install safety devices so that $\boldsymbol{1.6 \cdot T_{N2}}$ will never be exceeded.

6.1.4 Start and stop overloads

Starting torque

When starting on full load (especially for high inertias and low transmission ratios) verify that starting torque $T_{2\ starting}$ is:

$$T_{2\ start} = \left(\frac{T_{start}}{T_N} \cdot T_{2\ available} - T_{2\ required} \right) \cdot \frac{WK^2}{WK^2 + WK_0^2} + T_{2\ required} < 1.6 \cdot T_{N2}$$

where

• $T_{2\ required}$	is the torque absorbed by the machine through work and frictions;
• $T_{2\ available}$	is the output torque due to motor nominal power;
• WK_0^2	is the moment of inertia (of mass) of the motor;
• WK_1^2	is the external moment of inertia (of mass) in $lb_f\ ft^2$ (gear reducers, couplings, driven machine) referred to the motor shaft $WK_1^2 = WK^2/\ i^2$.

When seeking to verify that starting torque is sufficiently high for starting, take into account starting friction, if any, in evaluating T_2 required.

Braking torque

In case of **stopping machines with high kinetic energy** (high moments of inertia combined with high speeds) and **with brake motors**, verify braking stress by means of the formula

$$\left(\frac{T_b}{\eta} \cdot i + T_{2\ required} \right) \cdot \frac{WK^2}{WK^2 + WK_0^2} + T_{2\ required} < 1.6 \cdot T_{N2}$$

where

• T_b	is the braking torque setting (see table on page 148)
• η	is the efficiency
• i	is the transmission ratio
• WK_0^2	is the moment of inertia (of mass) of the motor;
• WK_1^2	is the external moment of inertia (of mass) in $lb_f\ ft^2$ (gear reducers, couplings, driven machine) referred to the motor shaft $WK_1^2 = WK^2/\ i^2$.

Attention:
Where no evaluation is possible, install safety devices which will keep values within $T_{2\ max} = 1.6 \cdot T_{N2}$

6.1.5 Operation with brake motor

Starting time t_a and revolutions of motor φ_{a1}

$$t_a = \frac{(WK_0^2 + WK_1^2) \cdot n_1}{25.603 \cdot \left(T_{starting} - \frac{T_{2\ required}}{i} \right)} \quad [s] \qquad \varphi_{a1} = \frac{t_a \cdot n_1}{19.1} \quad [rad]$$

Braking time t_b and revolutions of motor φ_{f1}

$$t_b = \frac{(WK_0^2 + WK_1^2) \cdot n_1}{25.603 \cdot \left(T_b + \frac{T_{2\ required}}{i} \right)} \quad [s] \qquad \varphi_{f1} = \frac{t_b \cdot n_1}{19.1} \quad [rad]$$

where:

- $T_{starting}$ is the motor starting torque in lb in $\left(\frac{63025 \cdot P_1}{n_1} \cdot \frac{T_{starting}}{T_N} \right)$
- T_b is the braking torque setting of the motor in lb in (see page 148)
- φ_{a1} is the revolution of motor during starting time t_a (see page 148)
- φ_{f1} is the revolution of motor during braking time t_b (see page 148)
- WK_0^2 is the moment of inertia (of mass) of the motor;
- WK_1^2 is the external moment of inertia (of mass) in lb ft^2 (gear reducers, couplings, driven machine) referred to the motor shaft.

For other symbols, see page 20 and table on page 44.

Assuming a regular air-gap and ambient humidity, and utilizing suitable electrical equipment, repetition of the braking action, as affected by variation in temperature of the brake and by the state of wear of friction surface, is approx $0.1 \cdot \varphi_{f1}$.

6.1.6 Considerations on motor power

Taking into account the efficiency of the gear reducer, and other drives – if any – **motor power** is to be as near as possible to the power rating required by the driven machine: accurate calculation is therefore recommended.

The power required by the machine can be calculated, taking into account its components:

- power due to the work to be done,
- power required to overcome friction (first detachment, sliding or rolling)
- power required to overcome inertia (especially when the mass and/or acceleration or deceleration is large);

or determined experimentally based on tests and comparisons with existing applications, amperometric and wattmetric readings.

Oversizing the motor involves:

- higher starting current and therefore larger fuse valves and conductor section;
- a higher operating cost as it worsens the power factor (cos φ) and also the efficiency;
- greater stress on the drive, causing danger of mechanical failure, drive being normally proportionate to the power rating required by the machine, not to motor power.

Only high values of ambient temperature, altitude, frequency of starting or other particular conditions require an increase in motor power.

6.2

Service factor SF

Service factor *SF* takes into account the different running conditions which the gearmotor must be referred to:

- nature of load;
- duration;
- frequency of starting;

and other consideration to be considered in the calculations of gear reducer selection and verification.
For a quick and rough selection, the following table gives the minimum service factor *SF* required according to the kind of the driven machine.

Load classification		Driven machine	*SF* ≥
I	**Uniform load** ($m_J \le 0.3$)	Fans (small diameters) Agitators (liquids at low and constant density) Mixers (low density and uniform materials) Belt conveyors (fine grade loose materials) Auxiliary commands Assembly lines Filling machines Compressors Centrifugal pumps (liquids with low and constant density) Elevators Escalations	**1**
II	**Moderate overloads** ($m_J \le 3$)	Fans (average diameters) Agitators (liquids, high or variable density) Mixers (variable density materials) Belt conveyors (coarse bulk materials) Translations Dosing pumps Gear pumps Multi-cylinder piston pumps Centrifugal Pumps (high or variable density liquids) Palletizers Slewing gears Palletizing equipments Bottling machines Hoists Sliding doors	**1.32**
III	**Heavy overloads** ($m_J \le 10$)	Bucket elevators Roller ways Heavy duty mixers (solid and heterogeneous materials) Bridge crane translations Mechanisms (cranks, eccentrics) Shears (sheet metal) Bending rolls Centrifuges Presses (crank, toggle, eccentric)	**1.6**

For a more accurate calculation of the required service factor (especially considering the running hours), proceed as stated below

1) Calculate the mass acceleration factor **m_J**:

$$m_J = \frac{WK_1^2}{WK_0^2}$$

where:

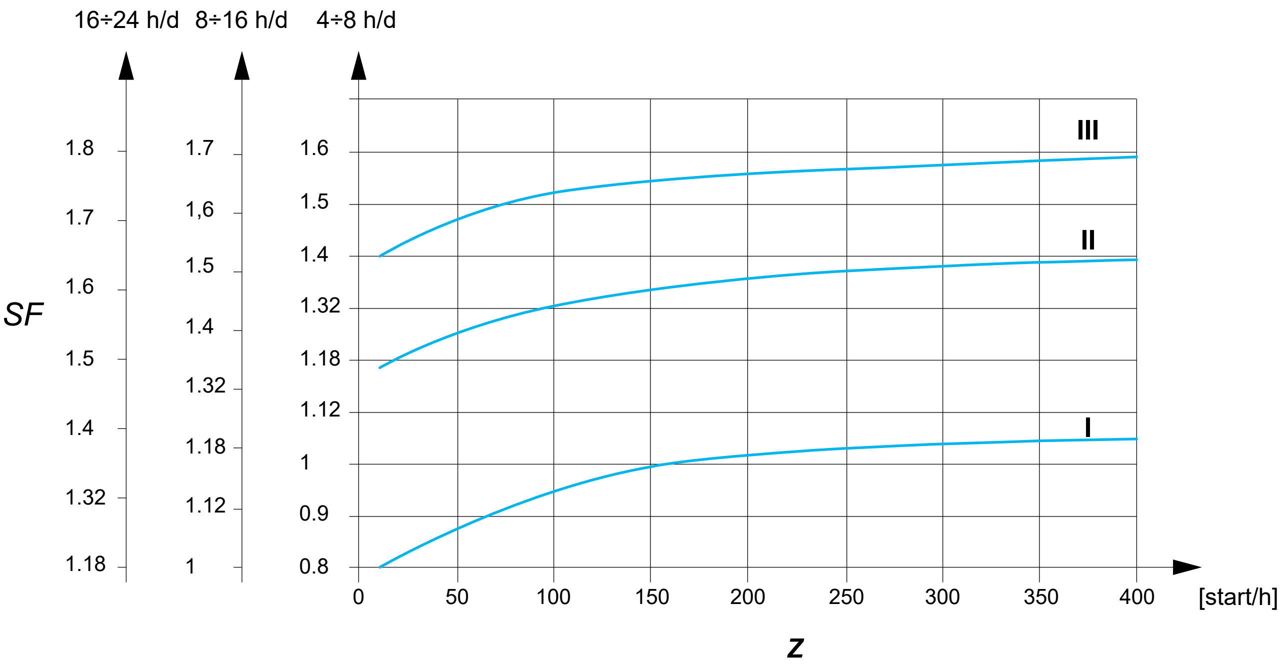
- WK_1^2 [lb ft²] is the external moment of inertia WK² (of mass; coupling, driven machine), referred to motor shaft $WK_1^2 = WK^2 / i^2$.
- WK_0^2 [lb ft²] is the moment of inertia (of mass) of motor (see. cat. TX) including brakes, flywheel, etc.
- i is the transmission ratio of selected gear reducer.

2) Select the proper overload class according to the acceleration mass factor m_J

$m_J \leq 0{,}3$ (uniform) **class I**
$m_J \leq 3$ (moderate overloads: ≈ 1,6 x normal) **class II**
$m_J \leq 10$ (heavy overloads: ≈ 2.5 x normal) **class III**

For m_J values higher than 10, in presence of high values of backlash for kinematic chain and/or high radial loads a specific evaluation has to be carried out: contact Rossi North America.

3) From the diagram below, according to the overload class, the running time and the starting frequency z, read off the service factor required.



6.3

Efficiency

Gear reducer efficiency is determined by the friction of the sliding and rolling surfaces (gears, bearings and seals) and by the oil splash leakage of the lubricating oil.
The value of efficiency is influenced by operating conditions (load and speed) and can reach a maximum value up to

- maximum efficiency 0.97 (for 3 stages gear reducer)
- maximum efficiency 0.98 (for 2 stages gear reducer).

The power loss due to efficiency is dissipated as heat flow through the outer surfaces of the gearmotor.

In order not to overheat the lubricant and seal material, **it must be ensured that the power applied does not exceed the heat dissipation capacity of the gearmotor.**

6.4

Thermal power Pt

The nominal thermal power $\boldsymbol{P_{TN}}$ [hp] is that which can be applied at the gear reducer input, without exceeding 203 °F approximately oil temperature when operating in following running conditions:

- input speed n_1 = 1800 min^{-1} (4 poles motor, 60 Hz);
- mounting position B3, B6, B7, B8;
- continuous duty *S1*;
- maximum ambient temperature 77 °F;
- maximum altitude 3300 ft a.s.l.
- air speed ≥ 4 ft/s (typical value in presence of a gearmotor with self-cooled motor)

The gearmotor combinations shown in chapter 9 are already thermally verified for all of the above conditions, including 2-pole combinations.

Otherwise it is necessary to verify that the applied power P_1 is less than or equal to the gearbox rated thermal power P_{TN} (indicated in the table) multiplied by the corrective coefficients f_{T1}, f_{T2}, f_{T3}, f_{T4}, f_{T5} (indicated in the tables) that take into account the different operating conditions:

$$P_1 \leq P_{TN} \cdot f_{T1} \cdot f_{T2} \cdot f_{T3} \cdot f_{T4} \cdot f_{T5}$$

If verification is not met, evaluate the use of special lubricants or heat exchanger cooling units, contact Rossi North America.

Thermal power needs not be taken into account when maximum duration of continuous running time is 1 ÷ 3 h, for all gear reducer sizes, followed by rest periods long enough to restore the gear reducer to near ambient temperature.
In case of maximum ambient temperature above 122 °F or below 32 °F, contact Rossi North America.

Nominal thermal power $\boldsymbol{P_{TN}}$ **[hp]:**

	$\boldsymbol{P_{TN}}$ [hp]							
	iC 27...	**iC 37...**	**iC 47...**	**iC 57...**	**iC 67...**	**iC 77...**	**iC 87...**	**iC 97...**
2	8.5	9	11.8	14	17	22.4	31.5	45
3	6.7	7.5	10.6	11.8	14	19	26.5	37.5

Thermal factor $\boldsymbol{f_{T1}}$ according to input speed $\boldsymbol{n_1}$:

	$\boldsymbol{f_{T1}}$ $\boldsymbol{n_1}$ [rpm]					
	710	**900**	**1120**	**1400**	**1800**	**2800**
2	1.4	1.32	1.25	1.18	**1**	0.71
3	1.12	1.12	1.09	1.06	**1**	0.9

Thermal factor f_{T2} **according to ambient temperature** and **service**

$T_{amb\ max}$ °F	f_{T2}				
	Continuous duty **S1**	Intermittent duty **S3 ... S6** Cyclic duration factor [%] for 60 min running			
		60	**40**	**25**	**15**
140	0.5	0.6	0.67	0.8	0.85
122	0.63	0.75	0.85	1	1.06
104	0.8	0.95	1.06	1.18	1.32
86	0.95	1.12	1.25	1.4	1.6
77	1	1.18	1.32	1.5	1.7
50	1.18	1.4	1.6	1.8	2

Thermal factor f_{T3} **according to mounting position:**

Mounting position	f_{T3}	
	iC 272 ... 972	**iC 273 ... 973**
V5	0.8	0.9
V6	0.71	0.8

Thermal factor f_{T4} **according to altitude:**

Altitude ft	f_{T4}
≤ 3300	**1**
3300 ÷ 6600	0.95
6600 ÷ 9800	0.9
9800 ÷ 13100	0.85
≥ 13100	0.8

Thermal factor f_{T5} **according to cooling air speed on housing:**

Air speed ft/s	**Installation environment**	f_{T5}
< 2	very small environment or without air movements or with protected gear reducer	(1)
2	very small environment and with limited air movements	0.71
3.15	wide environment without air movements	0.9
4	wide environment with light air movements (e.g. gearmotor with self-cooled motor)	**1**
8	open and cooled	1.18
12.5	with heavy air movements	1.32

(1) Contact Rossi North America.

6.5

Radial loads on low speed shaft end

6.5.1 General

Radial loads generated on the shaft end by a drive connecting gearmotor and machine must be less than or equal to those given at ch. 9 as bearing life and wear (which also affects gears unfavourably) and low speed shaft strength clearly impose limits on permissible radial load.

6.5.2 Determination of the applied radial load

For the most common drives, radial load F_{r2} can be determined using the following formula where *k* takes on different values in relation to transmission type

$$F_{r2} = k \cdot \frac{2 \cdot T_2}{d} \quad [\text{lb}]$$

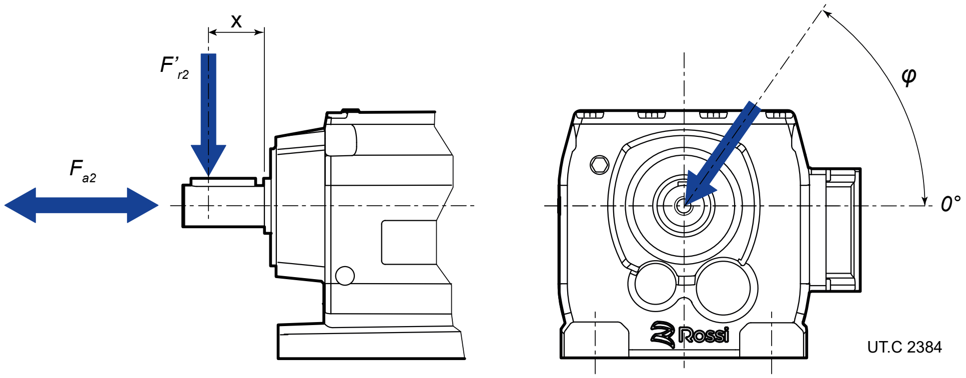
where:

- T_2 [lb in] is the torque required by the gearmotor low speed shaft;
- d [in] is the pitch diameter;
- k is a coefficient which assumes different values according to transmission type:
  k = 1 for chain drive (lifting in general);
  k = 1.5 for timing belt drive;
  k = 2.5 for V-belt drive;
  k = 1.1 for spur gear pair drive;
  k = 3.55 for friction wheel drive.

6.5.3 Permissible radial load

The values of permissible radial load F_{r2} are indicated in the tables of ch. 9 and are valid for foot mounted gearmotor design (P…).
These values are referred to gearmotor's output speed n_2 and torque T_2,considering overhung load acting on centre line of low speed shaft end, in the most unfavorable direction of rotation and angular position of load.

If the exact direction of rotation and angular position of load are known, an increase of permissible radial load may be achieved.
On request, the option with strengthened bearings on low speed shaft is available (see page 38).
For the verification of each specific case contact Rossi North America with the notation shown in the figure.



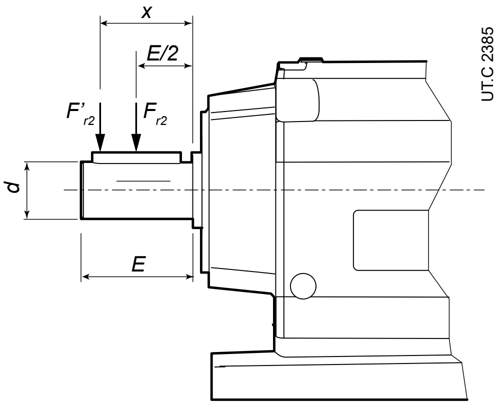
6.5.4 Permissible axial load

In absence of the radial load, an axial load may be acting on center line, not higher than 0.5 times the radial load stated in ch. 9. An **axial load** of up to 0.2 times the value in the table is permissible, simultaneously with the radial load, see ch. 9.

If exceeded and/or for **misaligned axial loads**, contact Rossi S.p.A.

6.5.5 Radial load not in center line

In the case of radial load acting in a position other than the centre line, i.e. at a distance from the shoulder other than 0.5 · E, you have to recalculate the permissible radial load value at distance x (F'_{r2x}) from the value given in chap. 9 using the minimum value given by the following formulae



$$F'_{r2b} = F_{r2} \cdot \frac{E/2 + y}{x + y} \quad [\text{lb}]$$

$$F'_{r2s} = \frac{m}{4.448 \cdot (x + q)} \quad [\text{lb}]$$

$$F'_{r2} = \min(F'_{r2b}; F'_{r2s}) \quad [\text{lb}]$$

where

• F'_{r2b} [lb]	is the permissible radial load, according to bearing life, acting at the distance x from shaft shoulder;
• F'_{r2s} [lb]	is the permissible radial load, according to shaft strength, acting at the distance x from shaft shoulder;
• F_{r2} [lb]	is the permissible radial load acting on center line of gearmotor low speed shaft end (see ch. 9);
• F'_{r2} [lb]	is the permissible radial load acting at the distance x from shaft shoulder;
• E [mm]	is the gearmotor low speed shaft end length;
• d [mm]	diameter of gearmotor low speed shaft end;
• x [mm]	is the distance between the gearmotor low speed shaft shoulder and the load application point;
• y [mm]	is a parameter that depends on the geometry of the gearmotor low speed shaft;
• m [N mm]	is a parameter that depends on the geometry of the gearmotor low speed shaft;
• q [mm]	is a parameter that depends on the geometry of the gearmotor low speed shaft.

Gearmotor size	*E/2 + y* mm	*y* mm	*m* N mm	*q* mm	*d* mm	*E* mm
iC 272 - iC 273	106.5	81.5	155700	11.8	25	50
iC 372 - iC 373	118	93	123500	0	25	50
iC 472 - iC 473	137	107	243900	15	30	60
iC 572 - iC 573	147.5	112.5	376300	18	35	70
iC 672 - iC 673	168.5	133.5	264600	0	35	70
iC 772 - iC 773	173.7	133.7	396800	0	40	80
iC 872 - iC 873	216.7	166.7	845000	0	50	100
iC 972 - iC 973	255.5	195.5	1060000	0	60	120

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7

Mounting positions

Section contents

7.1

Mounting positions

7.1.1 General

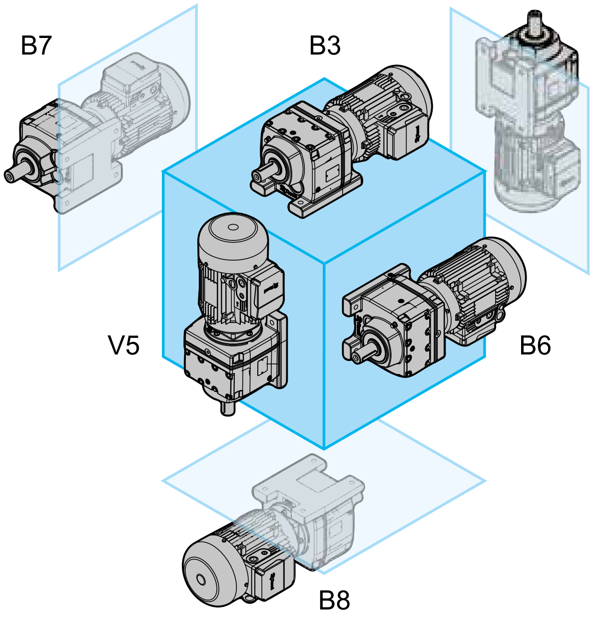
The mounting positions below show the possible mounting positions of the different gearmotor designs by Rossi North America.

Except specific needs, prefer mounting position B3 as it is the most advised from a technical and economic point of view:

- maximum simplification of lubrication system,
- less oil splash,
- less gear reducer heating;
- greater availability of stock products.

For inclined or oscillating mounting positions contact Rossi North America.

P



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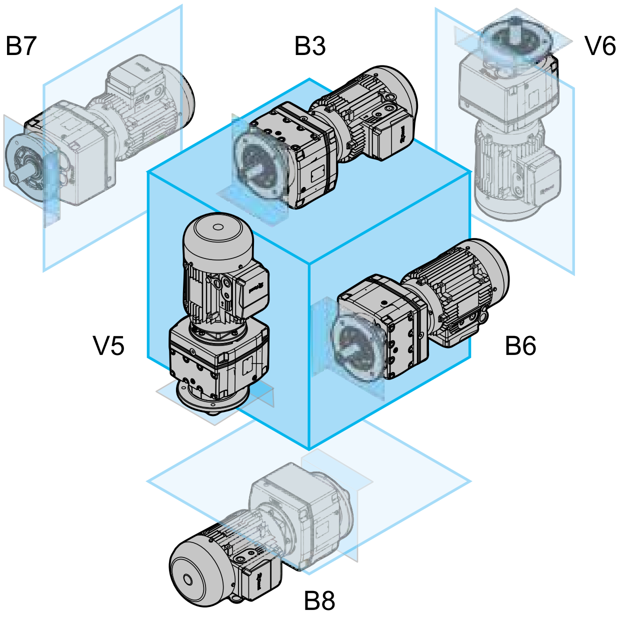


7.1.2 Change of mounting position

If gear reducer is installed in a mounting position differing from the one stated on name plate please follow these instructions:

- adjust the position of breather plug (see pages 60 and 61)
- adjust lubricant quantity (see page 64) up to the oil level foreseen, checking that there are no more gas pockets in the oil which is included in the gear reducer
- for the changeover to mounting position V6 contact Rossi North America.

7.1.3 Universal mounting position BX

In this mounting position the gearmotors are supplied completely full of lubricant with all closed plugs, and with a loose breather plug as standard.

Before commissioning, please follow these instructions:

- position the breather plug correctly in the position foreseen by the operation mounting position (see pages 60 and 61)
- adjust oil quantity according to operation mounting position (see page 64).

7.2

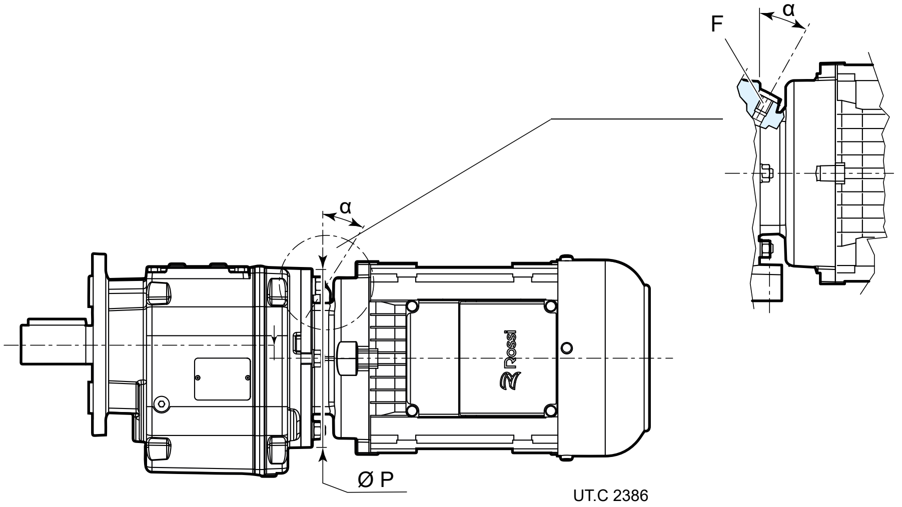
Plug position

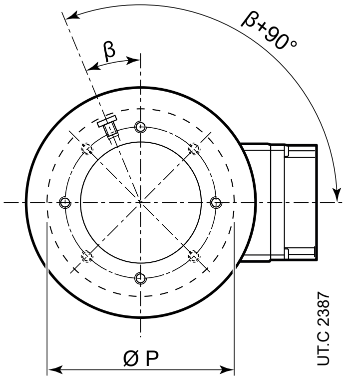
7.2.1 Positions of breather and drain plug

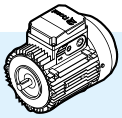
The position of breather and drain plug depend from gearmotor mounting position, see following pages.
Following table shows when the breather or drain plugs lay on motor flange, according to gearmotor mounting position.

Mounting position	Position of breather plug	Position of drain plug
B3, B6, B7, B8	in gear reducer housing	in gear reducer housing
V5	in motor flange	in gear reducer housing
V6	in gear reducer housing	in motor flange

When the breather plug or the drain plug are on motor flange, their angular position is determined on the basis of motor terminal box position.
All figures in this catalog represent breather and drain plugs with motor terminal box in standard TB0 position (see pages 37, 60 and 61).
The exact position of the breather and drain plugs according to the position of the motor terminal box is shown on the next page.





	P Ø	α °	β °	F
63	120	0	45	M10x1
	160	0	45	M10x1
	200	30	22.5	M12x1.5
71	120	0	45	M10x1
	160	0	45	M10x1
	200	30	22.5	M12x1.5
80	120	15	22.5	M10x1
	160	30	22.5	M12x1.5
	200	30	22.5	M12x1.5
	250	30	22.5	M12x1.5
	300	90	22.5	M22x1.5
90	120	30	22.5	M10x1
	160	30	22.5	M10x1
	200	30	22.5	M12x1.5
	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5
100 112MA	120	30	22.5	M10x1
	160	30	22.5	M10x1
	200	30	22.5	M12x1.5
	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5
112M	160	30	22.5	M10x1
	200	30	22.5	M12x1.5
	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5
132S 132M	160	30	22.5	M10x1
	200	15	22.5	M12x1.5
	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5
132L 160	200	30	22.5	M10x1
	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5
180	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5
200	250	30	22.5	M12x1.5
	300	30	22.5	M22x1.5

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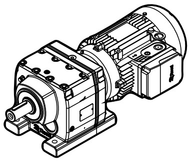
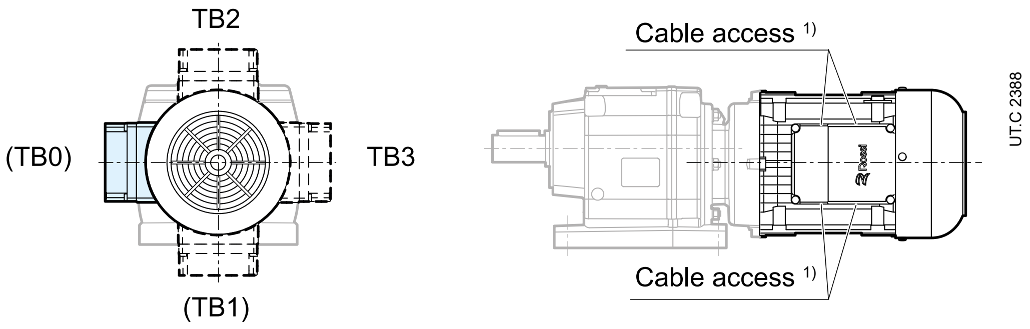
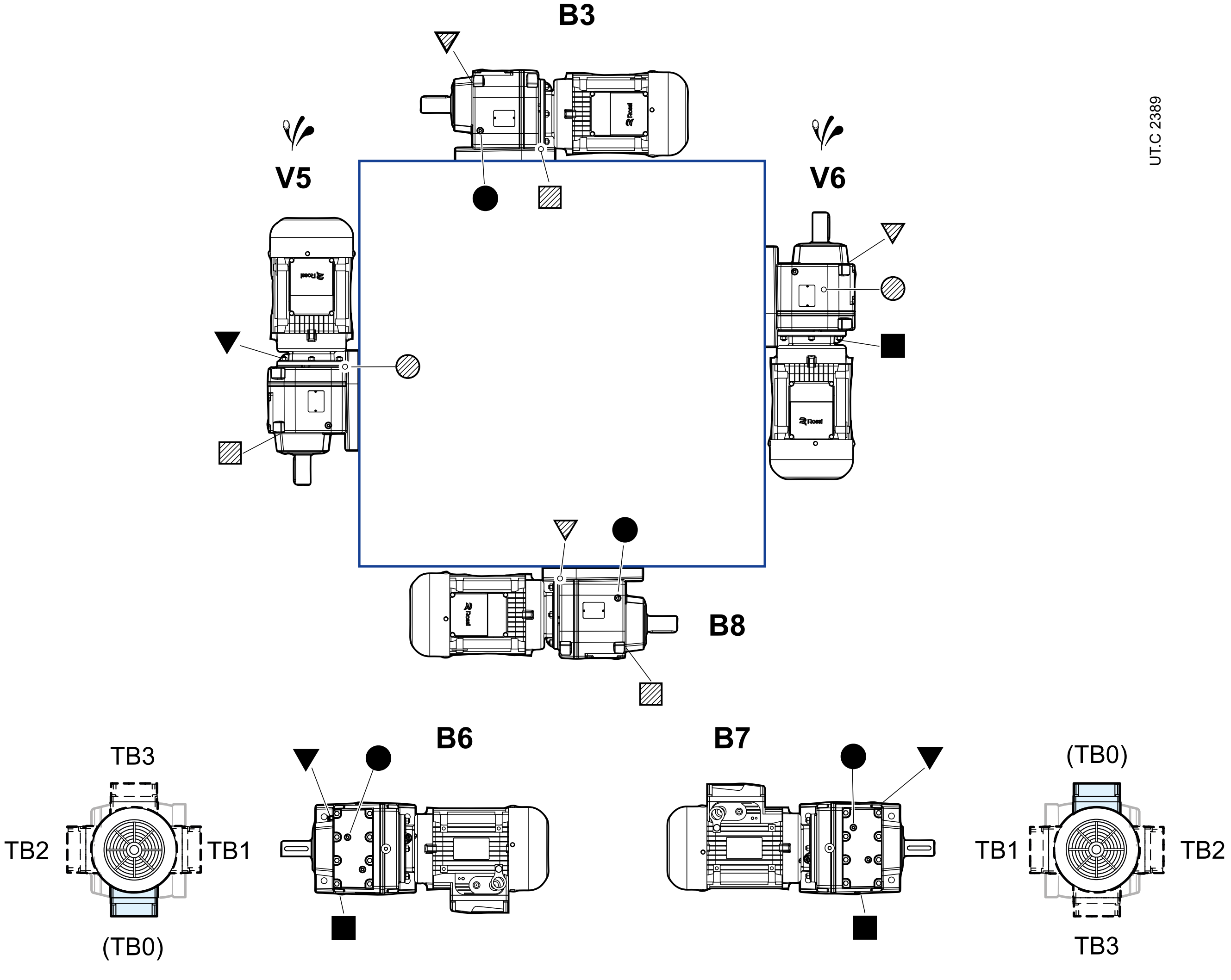
7.2.2 Position of breather and drain plug of foot mounted gearmotor

iC 272 / 273 PE ... iC 972 / 973 PE







iC 27... : breather plugs not present for B3, B8, B6, B7
iC 27... : oil level and drain plugs not present
iC 47..., **iC 57**... : level plug not present for B6

▼ breather plug
● oil level plug
■ oil drain plug

▽ breather plug on opposite side (not in view)
○ oil level plug on opposite side (not in view)
▨ oil drain plug on opposite side (not in view)

Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power P_{tN} see page 49.

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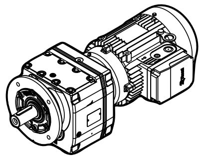
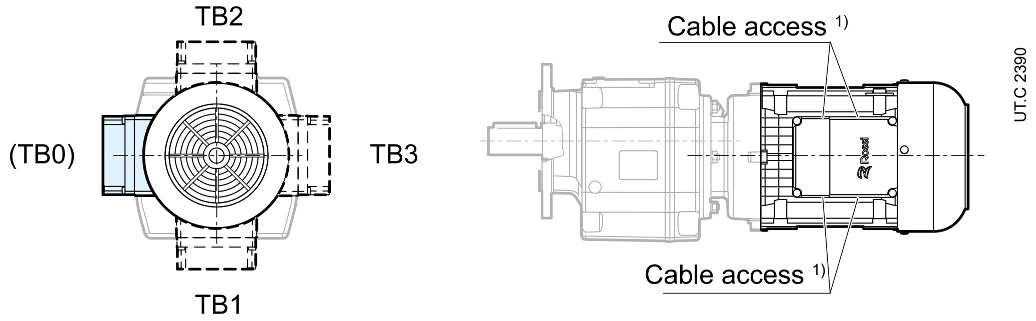
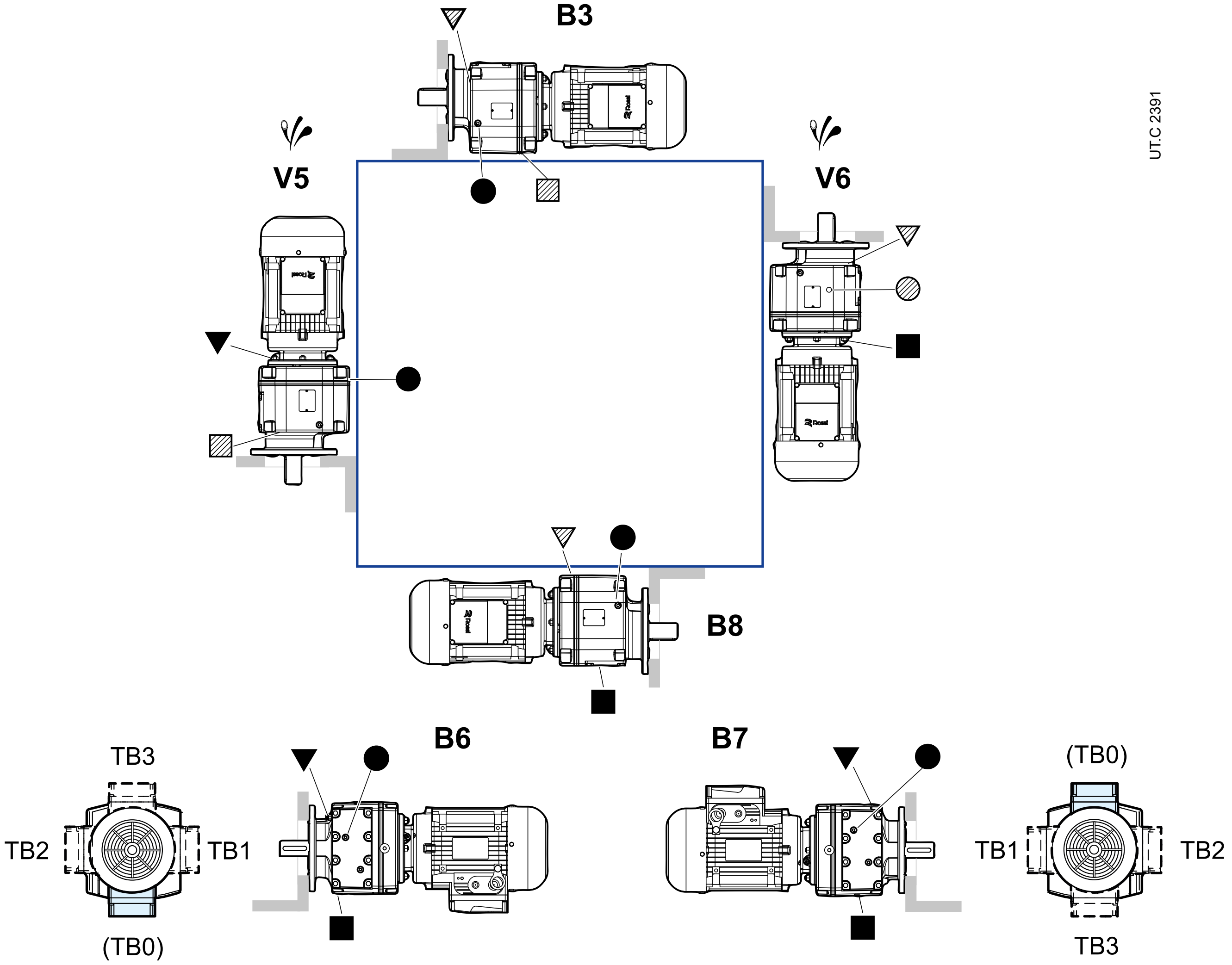
[1] Cable connection is by the customer: terminal box is integral with motor housing and equipped with knockout cable openings on both sides (one for power cable and one for auxiliary equipment).

7.2.3 Position of breather and drain plug of flange mounted gearmotor

iC 272 / 273 FE ... iC 972 / 973 FE







iC 27... : breather plugs not present for B3, B8, B6, B7

iC 27... : oil level and drain plugs not present

iC 47..., **iC 57**... level plug not present for B6

- ▼ breather plug
- ● oil level plug
- ■ oil drain plug
- ▽ breather plug on opposite side (not in view)
- ◍ oil level plug on opposite side (not in view)
- ▨ oil drain plug on opposite side (not in view)
- Possible high oil splash: for the corrective factor f_{t3} of nominal thermal power P_{tN} see page 49.

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[1] Cable connection is by the customer: terminal box is integral with motor housing and equipped with knockout cable openings on both sides (one for power cable and one for auxiliary equipment).

8

Structural and operational details

Section contents

8.1

Lubrication

8.1.1 General

The gear pairs and the bearings are oil bathed, splashed or lubricated “for life” with grease (with or without NILOS ring).
Unless otherwise stated, gearmotors are **supplied filled with synthetic oil** (KLÜBER Klünersynth GH 6-220, MOBIL Glygoyle 220, SHELL Omala S4 WE 220), providing lubrication – assuming pollution-free surroundings – “long life”.

Ambient temperature range 32 ÷ 104 °F with peaks of -4 °F and +122 °F.
Mounting position V6 foresees low speed shaft bearings grease lubricated (for life) with metal protection shield.

Important:
the order-specific mounting position determines the quantity of lubricant supplied to the gear unit at the time of delivery as well as whether there are bearings with independent lubrication.
Always be sure that the gearmotor is located as per the mounting position ordered, which appears on the name plate.
If the gearmotor is installed in a different mounting position verify, according to the values given in the table, that the oil quantity doesn't change; if so, adjust it consequently.
In addition, the vertical V6 mounting position requires the application of special grease in the upper bearing.
The mounting position can be changed only with previous authorization by Rossi S.p.A., otherwise the warranty is void.

8.1.2 Oil quantity

Stated lubricant quantities are approximate and indicative for provisioning. The exact quantity the gear reducer is to be filled with is definitely given by the level.

Gearmotor size	**Oil quantities [US gal]**					
	B3	B6	B7	B8	V5	V6
iC 272 - iC 273	0.12	0.16	0.16	0.15	0.24	0.21
iC 372 - iC 373	0.08	0.20	0.25	0.25	0.28	0.22
iC 472 - iC 473	0.19	0.40	0.40	0.40	0.44	0.42
iC 572 - iC 573	0.21	0.45	0.45	0.45	0.55	0.50
iC 672 - iC 673	0.29	0.48	0.53	0.74	0.77	0.63
iC 772 - iC 773	0.32	0.66	0.9	0.95	1.00	0.87
iC 872 - iC 873	0.61	1.66	1.71	1.90	1.90	1.69
iC 972 - iC 973	1.21	2.90	3.09	3.09	3.54	3.09

8.1.3 Lubricants table

Important:
Inappropriate lubricants can cause damage to the gear reducer.

The viscosity and type of lubricating oil used for filling **are indicated on the adhesive name plate on the gear reducer.**
Rossi S.p.A. declines any responsibility for damages deriving from the use of other lubricants or from the use outside the expected ambient temperature range. The indications on lubricants do not bind Rossi S.p.A. on the quality of the lubricant supplied by each respective manufacturer. Do not mix different lubricating oils; do not mix synthetic oils with mineral oils.

Brand	**Synthetic PAO oil**	**Synthetic PAG oil**	**Mineral oil**
AGIP	Blasia SX	Blasia S	Blasia
ARAL	Degol PAS	Degol GS	Degol BG
BP	Enersyn EPX	Enersyn SG-XP	Energol GR-XP
CASTROL	Alphasyn EP	Optiflex A	Alpha SP
FUCHS	Renolin Unisys	Renolin PG	Renolin CLP

Brand	**Synthetic PAO oil**	**Synthetic PAG oil**	**Mineral oil**
KLÜBER	Klübersynth GEM4	Klübersynth GH6	Klübersynth GEM1
MOBIL	Mobil SHC Gear	Mobil Glygoyle	Mobilgear 600 XP
SHELL	Omala S4 GX	Omala S4 WE	Omala S2 G
TEXACO	Pinnacle	Synlube CLP	Meropa
TOTAL	Carter SH	Carter SY	Carter EP

8.1.4 ISO viscosity grade

Unless otherwise specified, the gearmotors are **supplied complete with synthetic oil** of viscosity grade ISO VG 220 suitable for most applications in normal industrial environments. For different application conditions or specific needs, please contact Rossi North America.
The following table provides a general guideline for lubricant viscosity selection (average cSt value of kinematic viscosity at 104 °F).

Speed n_2 rpm	**Ambient temperature** T_{amb} $F°$		
	Mineral Oil		*Synthetic oil*
	32 ÷ 68	50 ÷ 104	32 ÷ 104
> 224	150	150	150
224 ÷ 22.4	150	220	220
22.4 ÷ 5.6	220	320	320
< 5.6	320	460	460

Ambient temperature peaks of ± 50 °F for mineral oils and ± 68 °F for synthetic oils are permissible with respect to the conditions given in the table.

8.1.5 Oil change intervals

An overall guide to oil-change interval is given in the table, and assumes pollution-free surroundings.
When heavy overloads are present, halve the values.

Oil temperature °F	**Oil change interval** [h]	
	Mineral Oil	*Synthetic oil*
≤ 149	8000	25000
149 ÷ 176	4000	18000
176 ÷ 203	2000	12500

Seal rings:
Duration depends on several factors such as dragging speed, temperature, ambient conditions, etc.; as a rough guide it can vary from 3150 to 25000 h.

8.1.6 Breather plugs

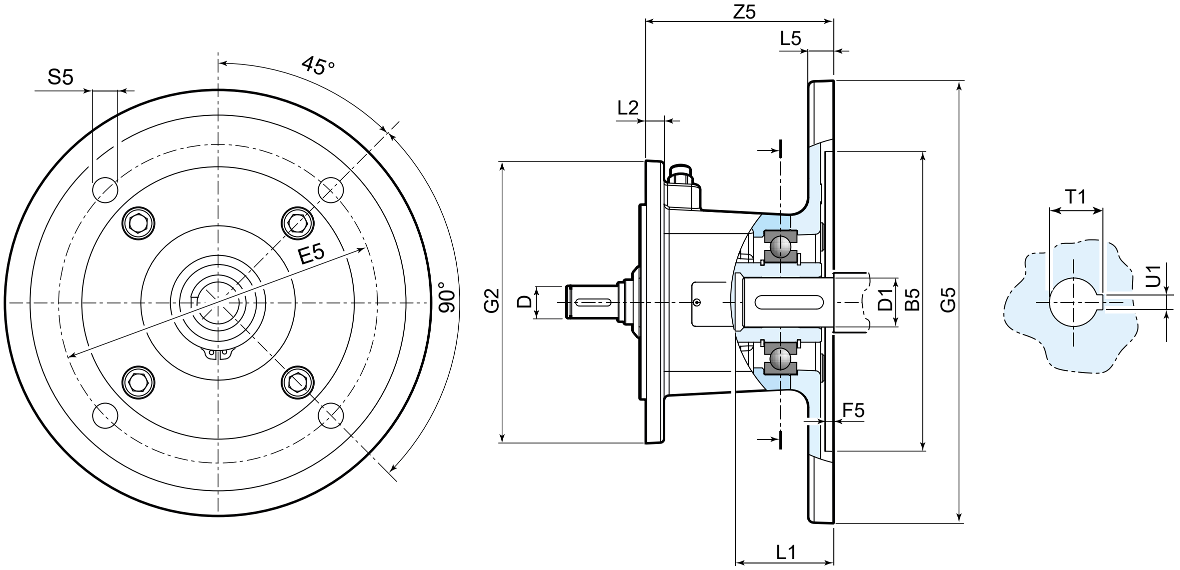
The gearmotors are supplied complete with a (metal) breather plug with valve mounted in the correct position according to the type of mounting position (except for type BX, see page 57).

Before commissioning it is necessary to activate the breather by tearing the closing tab on the plug.
It is necessary to keep the breather free from dirt that could compromise its functionality.
In case this is not possible, please contact Rossi North America to find a different solution.

8.2

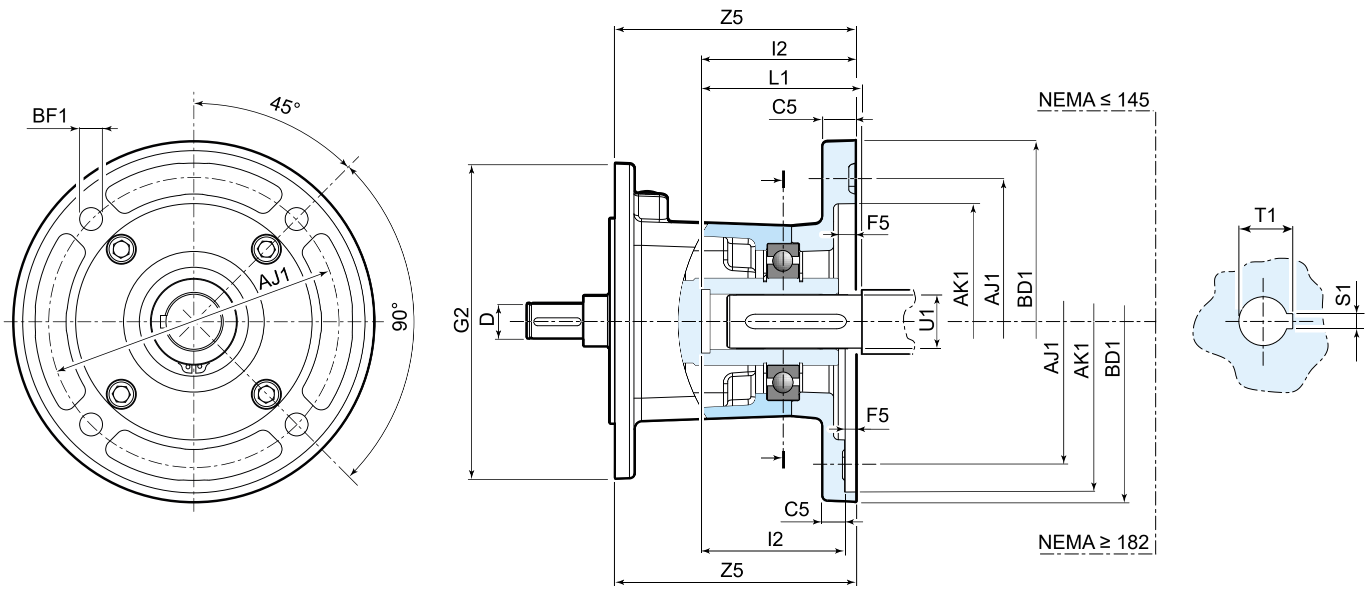
Adapters for motors

8.2.1 Adapters for the assembly of standard IEC motors



Gear reducer size	IEC motor size	Adapter code	B5 Ø H7	D Ø	D1 Ø F6	E5	F5	G2 Ø	G5 Ø	L1	L2	L5	S5 Ø	T1	U1 F9	Z5
iC 272, iC 273 iC 372, iC 373	63	AB12BI063	95	10	11	115	4	120	140	27	8	10	8.5	12.8	4	56.5
	71	AB12BI071	110	10	14	130	4.5	120	160	32	8	11	8.5	16.3	5	56.5
	80	AB12CI080	130	12	19	165	4.5	120	200	41.5	8	12	11	21.8	6	111
	90	AB12DI090	130	14	24	165	4.5	120	200	52	8	12	11	27.3	8	111
	100, 112MA	AB12EI100	180	16	28	215	5	120	250	62	8	14	13	31.3	8	113
iC 472, iC 473 iC 572, iC 573 iC 672, iC 673	63	AB16BI063	95	10	11	115	4	160	140	27	10	10	8.5	12.8	4	50.5
	71	AB16BI071	110	10	14	130	4.5	160	160	32	10	11	8.5	16.3	5	50.5
	80	AB16CI080	130	12	19	165	4.5	160	200	41.5	10	12	11	21.8	6	104
	90	AB16DI090	130	14	24	165	4.5	160	200	52	10	12	11	27.3	8	104
	100, 112MA	AB16EI100	180	16	28	215	5	160	250	62	10	14	13	31.3	8	106
	112M	AB16FI112	180	18	28	215	5	160	250	62	10	14	13	31.3	8	106
	132S, M	AB16GI13S	230	22	38	265	5	160	300	82	10	16.5	13	41.3	10	145
iC 772, iC 773	63	AB20BI063	95	10	11	115	4	200	140	27	12	10	8.5	12.8	4	44.5
	71	AB20BI071	110	10	14	130	4.5	200	160	32	12	11	8.5	16.3	5	44.5
	80	AB20CI080	130	12	19	165	4.5	200	200	41.5	12	12	11	21.8	6	98
	90	AB20DI090	130	14	24	165	4.5	200	200	52	12	12	11	27.3	8	98
	100, 112MA	AB20EI100	180	16	28	215	5	200	250	62	12	14	13	31.3	8	100
	112M	AB20FI112	180	18	28	215	5	200	250	62	12	14	13	31.3	8	100
	132S, M	AB20GI13S	230	22	38	265	5	200	300	82	12	16.5	13	41.3	10	139
	132MB	AB20HI13L	230	28	38	265	5	200	300	82	12	16.5	13	41.3	10	139
	160	AB20HI160	250	28	42	300	6	200	350	112	12	18	18	45.3	12	186
iC 872, iC 873	80	AB25CI080	130	12	19	165	4.5	250	200	41.5	14	12	11	21.8	6	94
	90	AB25DI090	130	14	24	165	4.5	250	200	52	14	12	11	27.3	8	94
	100, 112MA	AB25EI100	180	16	28	215	5	250	250	62	14	14	13	31.3	8	96
	112M	AB25FI112	180	18	28	215	5	250	250	62	14	14	13	31.3	8	96
	132S, M	AB25GI13S	230	22	38	265	5	250	300	82	14	16.5	13	41.3	10	134
	132MB	AB25HI13L	230	28	38	265	5	250	300	82	14	16.5	13	41.3	10	134
	160	AB25HI160	250	28	42	300	6	250	350	112	14	18	18	45.3	12	181
	180	AB25LI180	250	32	48	300	6	250	350	112	14	18	18	51.8	14	181
iC 972, iC 973	80	AB30CI080	130	12	19	165	4.5	300	200	41.5	14	12	11	21.8	6	86
	90	AB30DI090	130	14	24	165	4.5	300	200	52	14	12	11	27.3	8	86
	100, 112MA	AB30EI100	180	16	28	215	5	300	250	62	14	14	13	31.3	8	88
	112M	AB30FI112	180	18	28	215	5	300	250	62	14	14	13	31.3	8	88
	132S, M	AB30GI13S	230	22	38	265	5	300	300	82	14	16.5	13	41.3	10	129
	132MB	AB30HI13L	230	28	38	265	5	300	300	82	14	16.5	13	41.3	10	129
	160	AB30HI160	250	28	42	300	6	300	350	112	14	18	18	45.3	12	175
	180	AB30LI180	250	32	48	300	6	300	350	112	14	18	18	51.8	14	175
	200	AB30MI200	300	38	55 (E6)	350	6	300	400	113	14	18	18	59.3	16	205.5

8.2.2 Adapters for the assembly of standard NEMA C-Face motors



Gear reducer size	NEMA C-face motor size	Adapter code	AJ1 Ø inch	AK1 Ø inch	BD1 Ø inch	BF1 Ø	C5	D Ø	F5	G2 Ø	L1	I2	S1 inch	T1	U1 Ø inch	Z5
iC 272, iC 273 iC 372, iC 373	**56**	**AB12BN056**	5 7/8	4 1/2	6.5	10.5	10	10	5	120	54.7	59.5	3/16	18	5/8	81
	143	**AB12CN143**	5 7/8	4 1/2	6.5	10.5	12	12	5	120	64.2	61	3/16	24.5	7/8	113
	145	**AB12DN145**	5 7/8	4 1/2	6.5	10.5	12	14	5	120	64.2	61	3/16	24.5	7/8	113
	182	**AB12EN182**	5 7/8	4 1/2	9	14.5	14	16	5.5	120	79.2	76	1/4	31.5	1 1/8	124
iC 472, iC 473 iC 572, iC 573 iC 672, iC 673	**56**	**AB16BN056**	5 7/8	4 1/2	6.5	10.5	10	10	5	160	54.7	59.5	3/16	18	5/8	75
	143	**AB16CN143**	5 7/8	4 1/2	6.5	10.5	12	12	5	160	64.2	61	3/16	24.5	7/8	106
	145	**AB16DN145**	5 7/8	4 1/2	6.5	10.5	12	14	5	160	64.2	61	3/16	24.5	7/8	106
	182	**AB16EN182**	7 1/4	8 1/2	9	14.5	14	16	5.5	160	79.5	76	1/4	31.5	1 1/8	117
	184	**AB16FN184**	7 1/4	8 1/2	9	14.5	14	18	5.5	160	79.2	76	1/4	31.5	1 1/8	117
	213/215	**AB16GN213**	7 1/4	8 1/2	9	14.5	14	22	5.5	160	97.3	91	5/16	38.6	1 3/8	152
iC 772, iC 773	**56**	**AB20BN056**	5 7/8	4 1/2	6.5	10.5	10	10	5	200	54.7	59.5	3/16	18	5/8	69
	143	**AB20CN143**	5 7/8	4 1/2	6.5	10.5	12	12	5	200	64.2	61	3/16	24.5	7/8	100
	145	**AB20DN145**	5 7/8	4 1/2	6.5	10.5	12	14	5	200	64.2	61	3/16	24.5	7/8	100
	182	**AB20EN182**	7 1/4	8 1/2	9	14.5	14	16	5.5	200	79.2	76	1/4	31.5	1 1/8	111
	184	**AB20FN184**	7 1/4	8 1/2	9	14.5	14	18	5.5	200	79.2	76	1/4	31.5	1 1/8	111
	213/215	**AB20GN213**	7 1/4	8 1/2	9	14.5	14	22	5.5	200	97.3	91	5/16	38.6	1 3/8	146
	254/256	**AB20HN254**	7 1/4	8 1/2	10	14.5	14	28	5.5	200	115.3	109	3/8	45.6	1 5/8	232
iC 872, iC 873	**143**	**AB25CN143**	5 7/8	4 1/2	6.5	10.5	12	12	5	250	64.2	61	3/16	24.5	7/8	96
	145	**AB25DN145**	5 7/8	4 1/2	6.5	10.5	12	14	5	250	64.2	61	3/16	24.5	7/8	96
	182	**AB25EN182**	7 1/4	8 1/2	9	14.5	14	16	5.5	250	79.2	76	1/4	31.5	1 1/8	107
	184	**AB25FN184**	7 1/4	8 1/2	9	14.5	14	18	5.5	250	79.2	76	1/4	31.5	1 1/8	107
	213/215	**AB25GN213**	7 1/4	8 1/2	9	14.5	14	22	5.5	250	97.3	91	5/16	38.6	1 3/8	141
	254/256	**AB25HN254**	7 1/4	8 1/2	10	14.5	14	28	5.5	250	115.3	109	3/8	45.6	1 5/8	227
	284/286	**AB25LN284**	9	10 1/2	11.25	14.5	16	32	5.5	250	134.3	128	1/2	53.4	1 7/8	229
iC 972, iC 973	**143**	**AB30CN143**	5 7/8	4 1/2	6.5	10.5	12	12	5	300	64.2	61	3/16	24.5	7/8	88
	145	**AB30DN145**	5 7/8	4 1/2	6.5	10.5	12	14	5	300	64.2	61	3/16	24.5	7/8	88
	182	**AB30EN182**	7 1/4	8 1/2	9	14.5	14	16	5.5	300	79.2	76	1/4	31.5	1 1/8	99
	184	**AB30FN184**	7 1/4	8 1/2	9	14.5	14	18	5.5	300	79.2	76	1/4	31.5	1 1/8	99
	213/215	**AB30GN213**	7 1/4	8 1/2	9	14.5	14	22	5.5	300	97.3	91	5/16	38.6	1 3/8	136
	254/256	**AB30HN254**	7 1/4	8 1/2	10	14.5	14	28	5.5	300	115.3	109	3/8	45.6	1 5/8	221
	284/286	**AB30LN284**	9	10 1/2	11.25	14.5	16	32	5.5	300	134.3	128	1/2	53.4	1 7/8	223
	324/325	**AB30MN324**	11	12 1/2	14	18	20	38	5.5	300	150.3	144	1/2	59.7	2 1/8	208

8.3

Fastening bolts

Unless otherwise stated, usually it is sufficient to use bolts in class 8.8; The following cases are an exception, for which bolts with strength class 10.9 must be used:

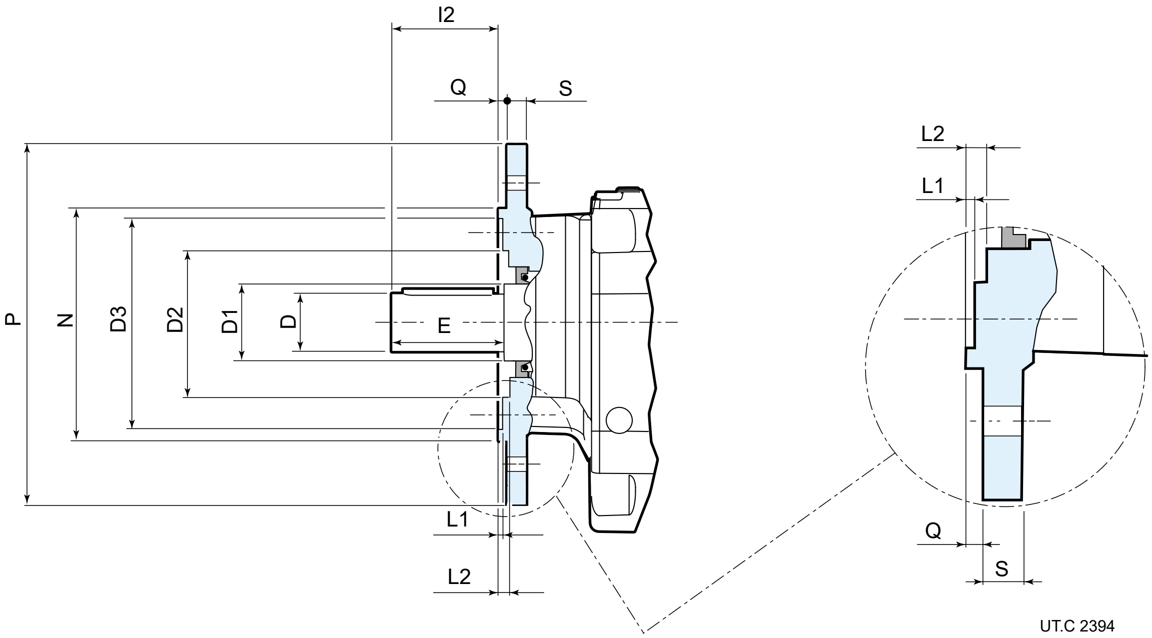
- iC 372 - iC 373 FE with flange F312
- iC 472 - iC 473 FE with flange F414
- iC 572 - iC 573 FE with flange F516

Thoroughly degrease the bolts before tightening. It is recommended to apply locking adhesives on the fastening bolts and on flange mating surfaces, in the event of heavy vibrations, heavy duties and/or frequent drive inversions.
Tighten the bolts to the tightening torque stated in the table.

Fastening bolts	**Tightening torque *Ts* for bolts for foot and flange fastening** lb in	
	cl. 8.8	cl. 10.9
M4	26	35
M5	53	75
M6	97	135
M8	220	310
M10	445	620
M12	750	1060
M14	1190	1680
M16	1810	2570
M18	2480	3540
M20	3540	4960
M22	4870	6820
M24	6280	8850

8.4

Details of gearmotor fastening flanges



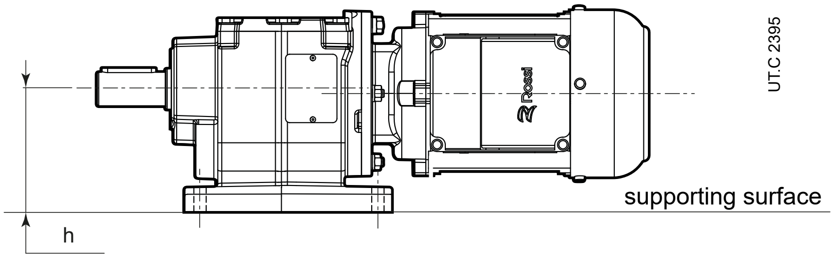
Gear reducer size	B5 flange code	P Ø	N Ø j6	S	D Ø k6	D1 Ø	D2 Ø	D3 Ø	Q	I2	E	L1	L2
iC 27...F	**F212**	120	80	8	25	30	56	66	3	50	50	2	6
	F214	140	95	9	25	30	56	80	3	50	50	2	6
	F216	160	110	10	25	30	56	94	3.5	50	50	2.6	6.5
iC 37...F	**F312**	120	80	8	25	35	63	68	3	50	50	5	7
	F314	140	95	10	25	35	11	83	3	50	50	5	7
	F316	160	110	10	25	35	61	96	3.5	50	50	2	7.5
	F320	200	130	12	25	35	61	118	3.5	50	50	1	7.5
iC 47...F	**F414**	140	95	10	30	35	77	82	3	60	60	4	6
	F416	160	110	10	30	35	75	96	3.5	60	60	1	6.5
	F420	200	130	12	30	35	75	116	3.5	60	60	1	6.5
iC 57...F	**F516**	160	110	10	35	40	82	97	3.5	70	70	4	6.5
	F520	200	130	12	35	40	78	116	3.5	70	70	-0.5	6.5
	F525	250	180	15	35	40	78	160	4	70	70	0	7
iC 67...F	**F620**	200	130	12	35	50	96	120	3.5	70	70	3.5	7
	F625	250	180	15	35	50	92	162	4	70	70	0.5	7.5
iC 77...F	**F725**	250	180	15	40	52	94	160	4	80	80	0.5	7
	F730	300	230	18.5	40	52	113	210	4	80	80	0.5	7
iC 87...F	**F830**	300	230	18.5	50	62	119	214	4	100	100	0	8
	F835	350	250 h6	18	50	62	138	225	5	100	100	0	8
iC 97...F	**F935**	350	250 h6	18	60 m6	72	146	234	5	120	120	1	9
	F945	450	350 h6	22	60 m6	72	156	320	5	120	120	1	9

8.5

Dimensional tolerances

Shaft height of foot mounted design iC...P...

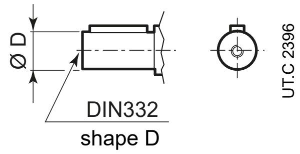
h ≤ 250 mm ⟶ tolerance - 0.5 ÷ 0 mm



Attention!
Always check that the motor does not protrude from the foot mounting surface.

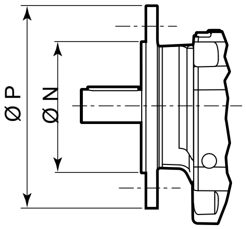
Low speed shaft end

Diameter:	Ø D ≤ 1.500 in ⟶ tolerance +0/-0.0005
	Ø D > 1.500 in ⟶ tolerance +0/-0.0010
Tapped butt-end hole:	Ø D ≤ 1.000 in ⟶ 3/8-16 UNCx14.5
	Ø D ≤ 1.375 in ⟶ 1/2-13 UNCx18.5
	Ø D ≤ 1.750 in ⟶ 5/8-11 UNCx23
	Ø D ≤ 2.875 in ⟶ 3/4-10 UNCx26
Key:	square key to ANSI B17.1 (form B)



Flange

Spigot:	Ø N ≤ 230 mm (Ø P 120 ÷ 300 mm) ⟶ tolerance ISO j6
	Ø N > 230 mm (Ø P 350 ÷ 450 mm) ⟶ tolerance ISO h6



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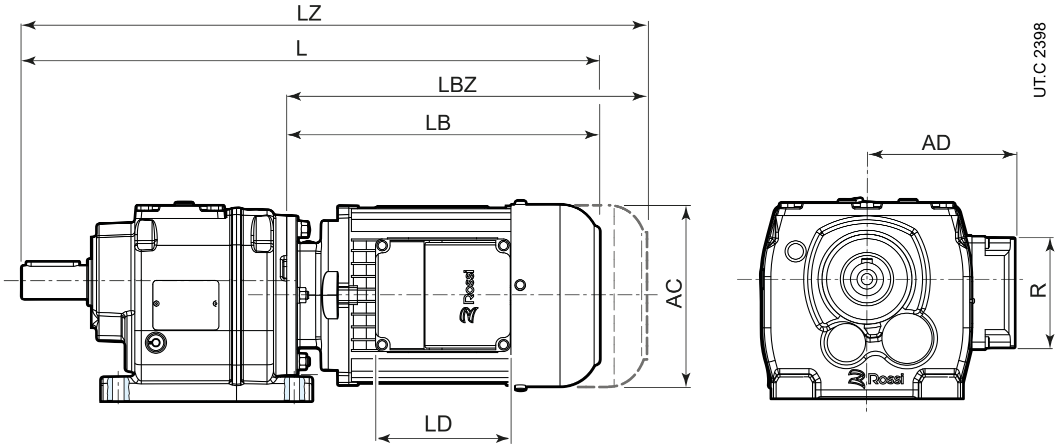
8.6

Overall dimensional remarks

8.6.1 Overall dimension details of HB and HBZ motors

The meaning of the total dimensions shown in the drawings in ch.10 is explained below:



where:

L	total length of gearmotor
LZ	total length of gearmotor with brake
LB	total length of motor
LBZ	total length of motor with brake
AC	diameter of motor fan cover
LD	length of motor terminal box
LBZ	radial dimensions of motor terminal box
R	width of motor terminal box

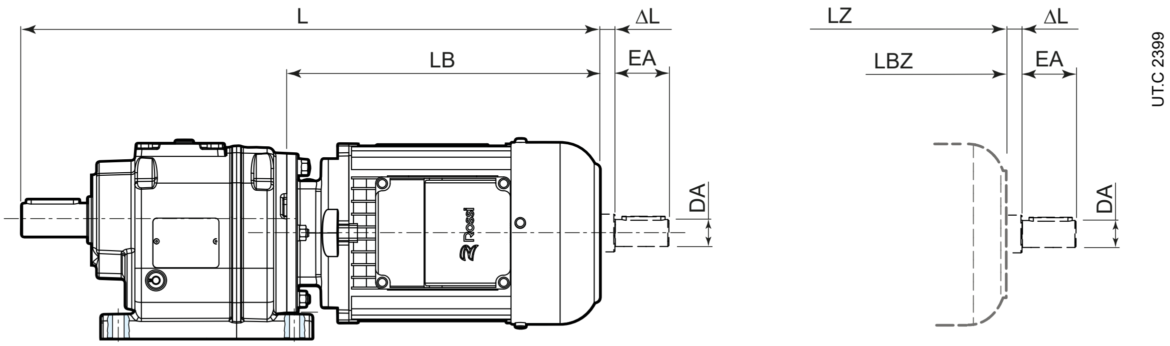
Motor length and terminal box dimension can slightly change according to specific motor options; if necessary, refer to cat. TX. or contact Rossi North America.

Eyelets and eyebolts for lifting

Sizes ≤ iC 57… are equipped with lifting eyelet for transport. Larger sizes are equipped with eyebolts.

Breather plugs:
Dimensional drawings indicated at ch. 10 do not indicate the dimensions of breather plug as its position depends on mounting position.
Total overall dimensions can slightly differ from the stated ones.

8.6.2 Dimension details of second motor shaft end



Motor size	DA Ø	EA	ΔL ≈
63	11	23	5
71	11	23	6
80	14	30	7
90	14	30	7
100	14	30	8
112MA	14	30	9
112M	19	40	9
132S, M	19	40	9
132MB	28	60	9

9

Selection tables

Section contents

9.1

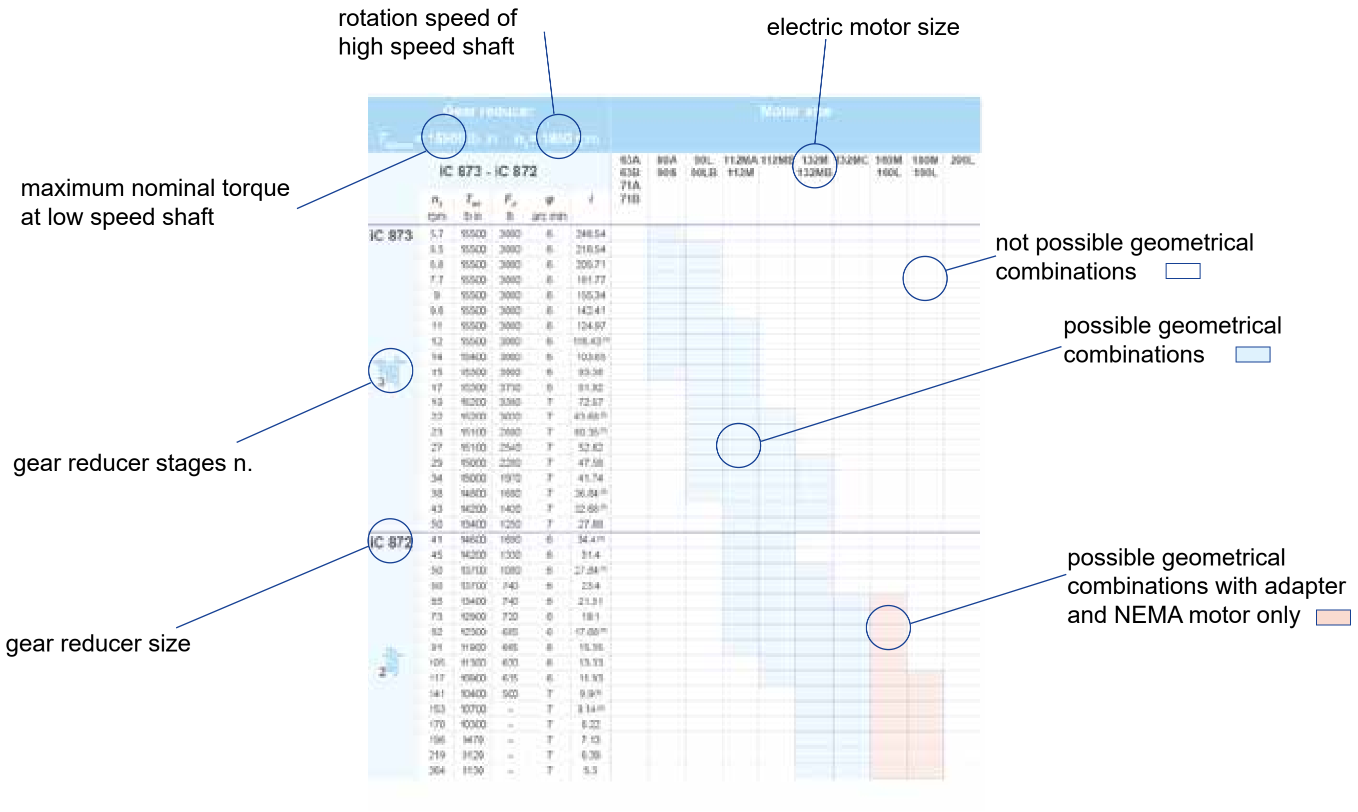
Possible geometrical combinations

9.1.1 General

The tables in the following pages show the geometrical coupling possibilities with HB 4 poles motors, according to train of gears (2 or 3 stages) and transmission ratio.
Also the low speed shaft rotation speed n_2, calculated according to a nominal input speed equal to n_1 = 1800 min^{-1}, are shown. The values of the nominal torque at the low speed shaft T_{N2} and of the permissible radial load F_{r2} acting on the center line are also referred to this speed.

At the time of selection, it is necessary to evaluate the actual operating conditions in relation to the actual power of the applied motor as indicated in ch. 6.

9.1.2 Key



where

- n_2 low speed shaft rotation speed
- T_{N2} nominal torque at low speed shaft
- F_{r2} permissible radial load acting on center line of low speed shaft (at speed n_2 and with torque T_{N2} indicated in the table - valid only for foot mounted gearmotor design)
- φ reduced backlash, referred to low speed shaft (tolerance ± 2 arc min - if value is not specified, the reduced backlash option is not available)
- i transmission ratio

Gear reducer						Motor size									
T_{N2max} = 1270 lb in			n_1 = 1800 rpm												
iC 273 - iC 272						63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i										
iC 273	10	1270	950	-	135.09	■									
	11	1270	950	-	123.91	■									
	13	1260	950	-	105.49	■	■ *								
	15	1260	950	-	90.96	■	■ *								
	17	1260	940	-	84.78	■	■ *								
	19	1250	890	-	74.11	■	■ *								
	20	1250	870	-	69.47	■	■ *								
	23	1240	830	-	61.3	■	■ *								
3	25	1240	800	-	55.87	■	■ *								
	29	1230	755	-	48.17	■	■ *								
	31	1230	735	-	44.9	■	■ *								
	36	1230	695	-	39.25	■	■								
	38	1220	680	-	36.79	■	■								
	43	1220	645	-	32.47	■	■								
	49	1210	615	-	28.78	■	■								
	57	1210	575	-	24.47	■	■								
iC 272	49	1210	610	-	28.37	■									
	54	1210	590	-	26.09	■									
	63	1200	550	-	22.32	■	■								
	72	1200	520	-	19.35	■	■	■							
	77	1200	505	-	18.08	■	■	■							
	90	1190	475	-	15.63	■	■	■	■						
	105	1180	410	-	13.28 (1)	■	■	■	■						
	118	1170	370	-	11.86	■	■	■	■						
	138	1100	355	-	10.13	■	■	■	■						
2	149	1080	133	-	9.41	■	■								
	172	1030	129	-	8.16	■	■	■							
	183	990	137	-	7.63 (1)	■	■	■							
	212	940	136	-	6.59	■	■	■	■						
	250	875	139	-	5.6 (1)	■	■	■	■						
	280	840	136	-	5 (1)	■	■	■	■						
	328	770	153	-	4.27	■	■	■	■						
	350	750	151	-	4 (1)	■	■	■	■						
	415	700	152	-	3.37	■	■	■	■						

* Only for motor size 80A 4.

(1) Finite transmission ratio i

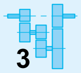
Gear reducer T_{N2max} = 1890 lb in n_1 = 1800 rpm						Motor size									
iC 373 - iC 372						63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i										
iC 373	10	1890	1110	8	134.82	▨									
	11	1880	1110	8	123.66	▨									
	13	1870	1110	8	105.28	▨	▨								
	15	1870	1110	8	90.77	▨	▨								
	17	1860	1110	8	84.61	▨	▨								
	19	1850	1110	8	73.96	▨	▨								
	20	1850	1110	8	69.33	▨	▨								
	23	1840	1110	9	61.18	▨	▨								
3	25	1840	1110	9	55.76	▨	▨								
	29	1830	1080	9	48.08	▨	▨	▨							
	31	1820	1020	9	44.81	▨	▨	▨							
	36	1820	920	9	39.17	▨	▨	▨							
	38	1810	880	9	36.72	▨	▨	▨							
	43	1810	790	9	32.4	▨	▨	▨							
	49	1800	705	9	28.73	▨	▨	▨							
	57	1770	605	9	24.42	▨	▨	▨							
iC 372	49	1800	700	8	28.32	▨									
	54	1790	740	8	26.03	▨									
	63	1780	545	8	22.27	▨	▨								
	73	1780	460	8	19.31	▨	▨	▨							
	78	1770	425	8	18.05	▨	▨	▨							
	90	1770	345	8	15.6	▨	▨	▨	▨						
	106	1680	320	8	13.25	▨	▨	▨	▨						
	118	1620	310	8	11.83	▨	▨	▨	▨						
	138	1500	315	9	10.11	▨	▨	▨	▨						
2	148	1480	305	9	9.47	▨	▨	▨	▨						
	176	1380	300	9	7.97	▨	▨	▨	▨						
	210	1290	144	13	6.67	▨	▨	▨	▨						
	247	1260	94	13	5.67	▨	▨	▨	▨						
	277	1210	104	13	5.06	▨	▨	▨	▨						
	324	1120	114	13	4.32	▨	▨	▨	▨						
	346	1080	121	14	4.05	▨	▨	▨	▨						
	411	1000	138	14	3.41	▨	▨	▨	▨						

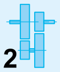
Gear reducer

T_{N2max} = 2960 lb in n_1 = 1800 rpm

iC 473 - iC 472

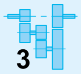
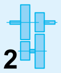
Motor size


3

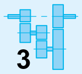
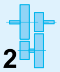

2

	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i	63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
iC 473	7.9	2960	1220	7	176.88	■									
	8.6	2960	1220	7	162.94	■									
	10	2960	1220	7	139.99	■	■								
	11	2960	1220	7	121.87	■	■								
	12	2960	1220	7	114.17	■	■								
	14	2960	1220	7	100.86	■	■								
	15	2960	1220	7	93.68	■	■								
	16	2960	1220	7	84.9	■	■								
	18	2960	1220	7	76.23	■	■								
	20	2960	1220	8	68.54	■	■	■							
	22	2960	1200	8	64.21	■	■	■							
	25	2960	1150	8	56.73	■	■	■							
	27	2960	1110	8	52.69	■	■	■							
	29	2960	1070	8	47.75	■	■	■							
	33	2960	1020	8	42.87	■	■	■							
	38	2960	960	8	36.93	■	■	■							
	40	2960	940	8	34.73	■	■	■							
	47	2960	880	8	29.88	■	■	■							
	52	2960	840	8	26.7		■	■							
	59	2960	775	8	23.59		■	■							
iC 472	41	2410	970	7	33.79	■									
	45	2150	960	7	31.12	■									
	52	2960	840	7	26.74	■	■								
	60	2830	760	7	23.28	■	■	■							
	64	2760	710	7	21.81	■	■	■							
	73	2640	640	7	19.27	■	■	■	■						
	78	2570	625	7	17.89	■	■	■							
	86	2470	615	7	16.22	■	■	■	■	■					
	96	2370	605	7	14.56	■	■	■	■	■					
	112	2240	590	8	12.54	■	■	■	■	■	■				
	119	2180	575	8	11.79	■	■	■	■	■	■				
	138	2050	565	8	10.15	■	■	■	■	■	■				
	154	1950	555	8	9.07		■	■	■	■	■				
	175	1850	545	8	8.01		■	■	■	■	■				
	180	1640	550	10	7.76 (1)	■	■	■	■	■					
	201	1590	540	10	6.96	■	■	■	■	■					
	233	1550	510	10	6	■	■	■	■	■	■				
	248	1550	500	10	5.64 (1)	■	■	■	■	■	■				
	289	1460	470	11	4.85	■	■	■	■	■	■				
	323	1380	455	12	4.34		■	■	■	■	■				
	366	1310	430	12	3.83		■	■	■	■	■				

(1) Finite transmission ratio *i*

Gear reducer T_{N2max} = 4430 lb in n_1 = 1800 rpm						Motor size									
iC 573 - iC 572						63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i										
iC 573	7.5	4430	1600	7	186.89	▨									
	8.1	4420	1600	7	172.17	▨									
	9.5	4340	1600	7	147.92	▨									
	11	4330	1600	7	128.77	▨	▨	▨							
	12	4320	1600	7	120.63	▨	▨	▨							
	13	4300	1600	7	106.58	▨	▨	▨							
	14	4290	1600	7	98.99	▨	▨	▨							
	16	4280	1600	7	89.71	▨	▨	▨							
	17	4260	1580	7	80.55	▨	▨	▨							
	20	4240	1490	8	69.23	▨	▨	▨							
	22	4230	1450	8	64.85	▨	▨	▨							
	24	4220	1370	8	57.29	▨	▨	▨	▨						
	26	4210	1330	8	53.22	▨	▨	▨							
	29	4190	1280	8	48.23	▨	▨	▨	▨	▨					
	32	4180	1220	8	43.3	▨	▨	▨	▨	▨					
	38	4160	1140	8	37.3 (1)	▨	▨	▨	▨	▨					
	40	4150	1110	8	35.07	▨	▨	▨	▨	▨					
	46	4130	1040	8	30.18	▨	▨	▨	▨	▨					
	52	4110	990	8	26.97		▨	▨	▨	▨					
iC 572	53	4110	980	7	26.31	▨	▨	▨							
	56	4110	950	7	24.99 (1)	▨	▨	▨							
	64	4090	900	7	21.93	▨	▨	▨	▨						
	75	4070	830	7	18.6 (1)	▨	▨	▨	▨	▨					
	83	4060	845	7	16.79	▨	▨	▨	▨	▨					
	95	4040	695	7	14.77 (1)	▨	▨	▨	▨	▨	▨				
	100	4030	670	7	13.95 (1)	▨	▨	▨	▨	▨	▨				
	118	3980	645	7	11.88	▨	▨	▨	▨	▨	▨				
	130	3870	635	8	10.79		▨	▨	▨	▨	▨				
	150	3650	615	8	9.35		▨	▨	▨	▨	▨				
	155	3320	305	9	9.06	▨	▨	▨	▨	▨					
	176	3140	315	9	7.97	▨	▨	▨	▨	▨	▨				
	186	3100	300	9	7.53	▨	▨	▨	▨	▨	▨				
	218	2960	270	9	6.41	▨	▨	▨	▨	▨	▨				
	241	2830	285	10	5.82		▨	▨	▨	▨	▨				
	277	2700	270	10	5.05		▨	▨	▨	▨	▨				
	319	2500	315	11	4.39			▨	▨	▨	▨				

(1) Finite transmission ratio *i*

Gear reducer T_{N2max} = 5930 lb in n_1 = 1800 rpm						Motor size									
iC 673 - iC 672						63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i										
iC 673	7	5930	1700	7	199.81	▨									
	7.6	5930	1700	7	184.07	▨									
	8.9	5930	1700	7	158.14	▨	▨								
	10	5930	1700	7	137.67	▨	▨	▨							
	11	5930	1700	7	128.97	▨	▨	▨							
	12	5930	1700	7	113.94	▨	▨	▨	▨						
	13	5930	1700	7	105.83	▨	▨	▨							
	15	5930	1700	7	95.91	▨	▨	▨	▨	▨					
	16	5930	1700	7	86.11	▨	▨	▨	▨	▨					
	19	5930	1700	7	74.17	▨	▨	▨	▨	▨					
	20	5850	1700	7	69.75	▨	▨	▨	▨	▨					
	23	5770	1700	7	61.26	▨	▨	▨	▨						
	25	5620	1700	7	56.89	▨	▨	▨							
	27	5440	1700	8	51.56	▨	▨	▨	▨	▨					
	30	5310	1700	8	46.29	▨	▨	▨	▨	▨					
	35	5130	1750	8	39.88 (1)	▨	▨	▨	▨	▨					
	37	5040	1780	8	37.5	▨	▨	▨	▨	▨					
	43	4830	1850	8	32.27	▨	▨	▨	▨	▨					
	49	4650	1890	8	28.83		▨	▨	▨	▨					
iC 672	50	4960	1850	6	28.13	▨	▨	▨							
	52	4820	1850	6	26.72	▨	▨	▨							
	60	5580	1760	7	23.44			▨	▨						
	70	5390	1470	7	19.89			▨	▨	▨					
	78	5270	1380	7	17.95			▨	▨	▨					
	89	4960	1350	7	15.79			▨	▨	▨	▨				
	94	4870	1320	7	14.91			▨	▨	▨	▨				
	110	4600	1260	7	12.7			▨	▨	▨	▨				
	121	4430	1230	7	11.54			▨	▨	▨	▨				
	140	4160	1200	7	10			▨	▨	▨	▨				
	161	3890	1190	7	8.7 (1)			▨	▨	▨	▨				
	180	3360	1110	9	7.79			▨	▨	▨	▨				
	190	3270	1100	9	7.36 (1)			▨	▨	▨	▨				
	223	2920	1150	9	6.27			▨	▨	▨	▨				
	246	2740	1130	10	5.7			▨	▨	▨	▨				
	284	2570	1080	10	4.93			▨	▨	▨	▨				
	326	2390	1040	10	4.29			▨	▨	▨	▨				

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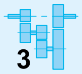
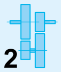
(1) Finite transmission ratio *i*

Gear reducer

T_{N2max} = 8190 lb in n_1 = 1800 rpm

Motor size

iC 773 - iC 772

	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i	63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
iC 773	7.2	8190	2230	7	195.24 (1)	🟦									
	8.4	8190	2230	7	166.59	🟦	🟦								
	9.6	8090	2230	7	145.67	🟦	🟦	🟦							
	10	8080	2230	7	138.39	🟦	🟦	🟦							
	12	8040	2230	7	121.42	🟦	🟦	🟦	🟦						
	14	8000	2230	7	102.99	🟦	🟦	🟦	🟦	🟦					
	15	7980	2230	7	92.97	🟦	🟦	🟦	🟦	🟦					
	17	7950	2230	7	81.8	🟦	🟦	🟦	🟦	🟦	🟦				
	18	7930	2230	7	77.24	🟦	🟦	🟦	🟦	🟦	🟦				
	21	7890	2230	7	65.77	🟦	🟦	🟦	🟦	🟦	🟦				
	24	7860	2230	8	57.68	🟦	🟦	🟦	🟦	🟦					
	27	7830	2230	8	52.07	🟦	🟦	🟦	🟦	🟦					
	31	7670	2230	8	45.81	🟦	🟦	🟦	🟦	🟦	🟦				
	32	7520	2230	8	43.26	🟦	🟦	🟦	🟦	🟦	🟦				
	38	7330	2230	8	36.83	🟦	🟦	🟦	🟦	🟦	🟦				
	42	7260	2230	8	33.47		🟦	🟦	🟦	🟦	🟦				
	48	7260	2030	8	29		🟦	🟦	🟦	🟦	🟦				
	55	6900	1950	8	25.23			🟦	🟦	🟦	🟦				
iC 772	60	7260	1690	7	23.37	🟦	🟦	🟦	🟦	🟦					
	65	7400	1560	7	21.43	🟦	🟦	🟦	🟦	🟦					
	74	7040	1510	7	18.8	🟦	🟦	🟦	🟦	🟦	🟦				
	79	6900	1430	7	17.82 (1)	🟦	🟦	🟦	🟦	🟦	🟦				
	90	6550	1390	7	15.6	🟦	🟦	🟦	🟦	🟦	🟦				
	100	6370	1330	7	14.05		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	114	6170	1270	7	12.33		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	129	5900	1220	7	10.88			🟦	🟦	🟦	🟦	🟦	🟥		
	145	5580	1190	7	9.64			🟦	🟦	🟦	🟦	🟦	🟥		
	163	5580	705	8	8.59	🟦	🟦	🟦	🟦	🟦	🟦				
	181	5450	675	8	7.74		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	206	5180	660	8	6.79		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	234	4830	700	8	5.99 (1)			🟦	🟦	🟦	🟦	🟦	🟥		
	264	4510	710	9	5.31			🟦	🟦	🟦	🟦	🟦	🟥		

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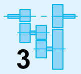
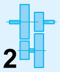
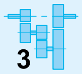
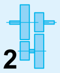
(1) Finite transmission ratio i

Gear reducer T_{N2max} = 15500 lb in n_1 = 1800 rpm						Motor size									
iC 873 - iC 872						**63A 63B 71A 71B**	**80A 90S**	**90L 90LB**	**112MA 112M**	**112MB**	**132M 132MB**	**132MC**	**160M 160L**	**180M 180L**	**200L**
	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	*i*										
iC 873	5.7	15500	3800	6	246.54		🟦								
	6.5	15500	3800	6	216.54		🟦	🟦							
	6.8	15500	3800	6	205.71		🟦	🟦							
	7.7	15500	3800	6	181.77		🟦	🟦	🟦						
	9	15500	3800	6	155.34		🟦	🟦	🟦	🟦					
	9.8	15500	3800	6	142.41		🟦	🟦	🟦	🟦					
	11	15500	3800	6	124.97		🟦	🟦	🟦	🟦	🟦				
	12	15500	3800	6	118.43 (1)		🟦	🟦	🟦	🟦	🟦				
	14	15400	3800	6	103.65		🟦	🟦	🟦	🟦	🟦				
	15	15300	3800	6	93.38		🟦	🟦	🟦	🟦	🟦				
	17	15300	3730	6	81.92		🟦	🟦	🟦	🟦	🟦				
	19	15200	3380	7	72.57		🟦	🟦	🟦	🟦					
	22	15200	3020	7	63.68 (1)		🟦	🟦	🟦	🟦	🟦				
	23	15100	2880	7	60.35 (1)		🟦	🟦	🟦	🟦	🟦				
	27	15100	2540	7	52.82		🟦	🟦	🟦	🟦	🟦				
	29	15000	2280	7	47.58		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	34	15000	1970	7	41.74		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	38	14800	1680	7	36.84 (1)			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	43	14200	1420	7	32.66 (1)			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	50	13400	1250	7	27.88			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
iC 872	41	14600	1690	6	34.4 (1)		🟦	🟦	🟦	🟦					
	45	14200	1330	6	31.4		🟦	🟦	🟦	🟦					
	50	13700	1080	6	27.84 (1)		🟦	🟦	🟦	🟦	🟦				
	60	13700	740	6	23.4		🟦	🟦	🟦	🟦	🟦				
	65	13400	740	6	21.51		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	73	12900	720	6	19.1		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	82	12300	685	6	17.08 (1)			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	91	11900	665	6	15.35			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	105	11300	630	6	13.33			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	117	10900	615	6	11.93				🟦	🟦	🟦	🟦	🟥	🟥	
	141	10400	500	7	9.9 (1)				🟦	🟦	🟦	🟦	🟥	🟥	
	153	10700	–	7	9.14 (1)			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	170	10300	–	7	8.22			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	196	9470	–	7	7.13			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	219	9120	–	7	6.39				🟦	🟦	🟦	🟦	🟥	🟥	
	264	8130	–	7	5.3				🟦	🟦	🟦	🟦	🟥	🟥	

(1) Finite transmission ratio *i*

Gear reducer T_{N2max} = 29600 lb in n_1 = 1800 rpm						Motor size									
iC 973 - iC 972						63A 63B 71A 71B	80A 90S	90L 90LB	112MA 112M	112MB	132M 132MB	132MC	160M 160L	180M 180L	200L
	n_2 rpm	T_{N2} lb in	F_{r2} lb	φ arc min	i										
iC 973	4.8	29600	4450	6	289.74		🟦								
	5.5	29600	4450	6	255.71		🟦	🟦							
	5.8	29600	4450	6	241.25		🟦	🟦							
	6.5	29600	4450	6	216.28		🟦	🟦	🟦						
	7.5	29600	4450	6	186.3		🟦	🟦	🟦	🟦					
	8.2	29500	4450	6	170.02		🟦	🟦	🟦	🟦					
	9.3	29000	4450	6	150.78		🟦	🟦	🟦	🟦	🟦				
	11	28800	4450	6	126.75		🟦	🟦	🟦	🟦	🟦				
 3	12	28700	4450	6	116.48		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	14	28600	4450	6	103.44		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	15	28500	4270	6	92.48			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	17	28400	3840	6	83.15			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	19	28300	3300	6	72.17			🟦	🟦	🟦	🟦	🟦	🟥	🟥	🟥
	21	28200	2930	7	65.21		🟦	🟦	🟦	🟦	🟦				
	23	28100	2620	7	59.92		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	26	28000	2210	7	53.21		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	29	27400	1840	7	47.58			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	33	26600	1500	7	42.78			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	38	26600	1060	7	37.13			🟦	🟦	🟦	🟦	🟦	🟥	🟥	🟥
	42	25800	1030	7	33.25				🟦	🟦	🟦	🟦	🟥	🟥	🟥
	51	23600	1090	7	27.58				🟦	🟦	🟦	🟦	🟥	🟥	🟥
iC 972	44	25700	1800	6	32.05		🟦	🟦	🟦	🟦	🟦				
	51	24500	1340	6	27.19		🟦	🟦	🟦	🟦	🟦				
	56	25000	400	6	25.03		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	63	24100	400	6	22.37		🟦	🟦	🟦	🟦	🟦	🟦	🟥		
	70	23300	430	6	20.14			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	77	22100	485	6	18.24			🟦	🟦	🟦	🟦	🟦	🟥	🟥	
	87	21200	470	6	16.17			🟦	🟦	🟦	🟦	🟦	🟥	🟥	🟥
 2	96	20400	510	6	14.62				🟦	🟦	🟦	🟦	🟥	🟥	🟥
	113	19400	445	6	12.39				🟦	🟦	🟦	🟦	🟥	🟥	🟥
	129	18500	435	6	10.83						🟦	🟦	🟥	🟥	🟥
	151	18000	–	6	9.29			🟦	🟦	🟦	🟦	🟦	🟥	🟥	🟥
	167	18000	–	6	8.39				🟦	🟦	🟦	🟦	🟥	🟥	🟥
	197	17700	–	6	7.12				🟦	🟦	🟦	🟦	🟥	🟥	🟥
	225	16700	–	6	6.21						🟦	🟦	🟥	🟥	🟥
	269	15800	–	7	5.2						🟦	🟦	🟥	🟥	🟥
	311	14400	–	7	4.5 (1)						🟦	🟦	🟥	🟥	🟥

(1) Finite transmission ratio *i*

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9.3

Selection tables [hp]

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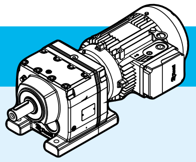
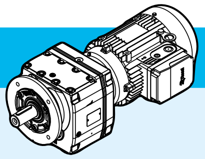
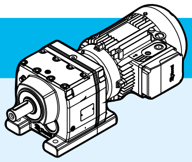
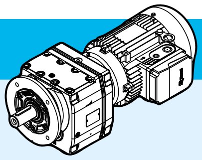




n_2	T_2	i	F_{r2}	SF			lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
5.7	1760	195.24 (1)	2920	4.7	**iC 773 – HB2 63 B 6 B20B**	3	100	105	115	120	132
6.7	1500	166.59	2920	5.5							
7.7	1310	145.67	2920	6.2							
5.6	1800	199.81	2300	3.3	**iC 673 – HB2 63 B 6 B16B**	3	80	84	86	90	130
6.1	1660	184.07	2310	3.6							
7.1	1420	158.14	2330	4.2							
8.1	1240	137.67	2340	4.8							
8.7	1160	128.97	2340	5.1							
9.8	1030	113.94	2350	5.8							
8.5	1190	199.81	2340	5	**iC 673 – HB2 63 A 4 B16B**	3	78	82	85	89	
9.2	1100	184.07	2340	5.4							
6	1680	186.89	1770	2.6	**iC 573 – HB2 63 B 6 B16B**	3	61	65	68	72	128
6.5	1550	172.17	1770	2.9							
7.6	1330	147.92	1780	3.3							
8.7	1160	128.77	1790	3.8							
9.3	1090	120.63	1790	4.1							
11	960	106.58	1790	4.6							
11	890	98.99	1790	4.9							
9	1120	186.89	1790	4	**iC 573 – HB2 63 A 4 B16B**	3	59	63	67	70	
9.8	1030	172.17	1790	4.3							
11	885	147.92	1790	4.9							
13	770	128.77	1800	5.6							
6.3	1590	176.88	1330	1.85	**iC 473 – HB2 63 B 6 B16B**	3	47	51	49	53	126
6.9	1470	162.94	1340	2							
8	1260	139.99	1350	2.4							
9.2	1100	121.87	1360	2.7							
9.6	1060	176.88	1360	2.8	**iC 473 – HB2 63 A 4 B16B**	3	45	49	48	52	
10	970	162.94	1370	3							
12	835	139.99	1370	3.5							
14	725	121.87	1380	4.1							
15	680	114.17	1380	4.4							
17	600	100.86	1380	4.9							
18	560	93.68	1380	5.3							
8.3	1210	134.82	1250	1.65	**iC 373 – HB2 63 B 6 B12B**	3	33	36	37	41	124
9.1	1110	123.66	1270	1.75							
11	950	105.28	1300	2							
12	815	90.77	1310	2.3							
13	760	84.61	1320	2.5							

(1) Finite transmission ratio *i*

P_1 = 0.16 hp

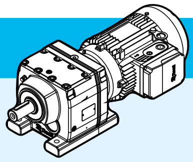
n_2	T_2	i	F_{r2}	SF	 		lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
15	665	73.96	1330	2.8	**iC 373 – HB2 63 A 4 B12B**	3	31	35	36	40	124
13	805	134.82	1320	2.3							
14	740	123.66	1320	2.6							
16	630	105.28	1340	3							
19	540	90.77	1340	3.4							
20	505	84.61	1350	3.7							
23	440	73.96	1350	4.2							
11	950	105.49	900	1.35	**iC 273 – HB2 63 B 6 B12B**	3	30	34	31	35	122
12	820	90.96	920	1.55							
13	765	84.78	920	1.65							
15	665	74.11	940	1.9							
13	805	135.09	920	1.6	**iC 273 – HB2 63 A 4 B12B**	3	29	33	30	33	
14	740	123.91	930	1.7							
16	630	105.49	940	2							
19	545	90.96	950	2.3							
20	505	84.78	960	2.5							
23	440	74.11	960	2.8							
24	415	69.47	970	3							
28	365	61.3	930	3.4							
30	335	55.87	910	3.7							
35	285	48.17	870	4.3							
38	270	44.9	850	4.6							

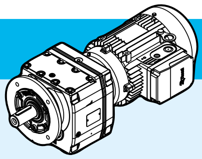
P_1 = 0.25 hp

5.7	2750	195.24 (1)	2860	3	**iC 773 – HB2 71 A 6 B20B**	3	99	105	115	120	132
6.7	2340	166.59	2890	3.5							
7.7	2050	145.67	2910	4							
8.1	1950	138.39	2910	4.2							
9.2	1710	121.42	2920	4.8							
8.6	1830	195.24 (1)	2920	4.5	**iC 773 – HB2 63 B 4 B20B**	3	100	105	115	120	
10	1560	166.59	2920	5.2							
12	1370	145.67	2920	5.9							
12	1300	138.39	2920	6.2							
5.6	2810	199.81	2190	2.1	**iC 673 – HB2 71 A 6 B16B**	3	83	89	89	95	130
6.1	2590	184.07	2210	2.3							
7.1	2220	158.14	2260	2.7							
8.1	1940	137.67	2280	3.1							
8.7	1810	128.97	2290	3.3							
9.8	1600	113.94	2310	3.7							
11	1490	105.83	2320	4							
12	1350	95.91	2330	4.4							
13	1210	86.11	2340	4.9							
15	1040	74.17	2340	5.7							
16	980	69.75	2350	6							

(1) Finite transmission ratio *i*

P_1 = 0.25 hp

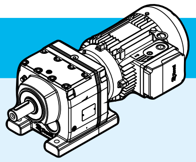


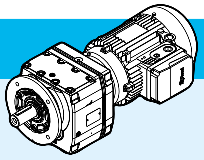


n_2	T_2	i	F_{r2}	SF			lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
8.4	1870	199.81	2300	3.2	**iC 673 – HB2 63 B 4 B16B**	3	80	84	86	90	130
9.1	1730	184.07	2310	3.4							
11	1480	158.14	2330	4							
12	1290	137.67	2340	4.6							
13	1210	128.97	2340	4.9							
15	1070	113.94	2350	5.5							
16	995	105.83	2350	6							
6	2630	186.89	1710	1.7	**iC 573 – HB2 71 A 6 B16B**	3	64	70	71	77	128
6.5	2420	172.17	1720	1.85							
7.6	2080	147.92	1740	2.1							
8.7	1810	128.77	1760	2.4							
9.3	1700	120.63	1760	2.6							
9	1750	186.89	1770	2.5	**iC 573 – HB2 63 B 4 B16B**	3	61	65	68	72	
9.8	1610	172.17	1770	2.7							
11	1390	147.92	1780	3.1							
13	1210	128.77	1790	3.6							
14	1130	120.63	1790	3.8							
16	1000	106.58	1790	4.3							
17	930	98.99	1790	4.6							
19	840	89.71	1790	5.1							
9.5	1660	176.88	1330	1.8	**iC 473 – HB2 63 B 4 B16B**	3	47	51	49	53	126
10	1530	162.94	1340	1.95							
12	1310	139.99	1350	2.3							
14	1140	121.87	1360	2.6							
15	1070	114.17	1360	2.8							
17	945	100.86	1370	3.1							
18	880	93.68	1370	3.4							
20	795	84.9	1370	3.7							
22	715	76.23	1380	4.1							
11	1480	105.28	1110	1.3	**iC 373 – HB2 71 A 6 B12B**	3	36	42	40	46	124
12	1280	90.77	1230	1.5							
13	1190	84.61	1250	1.6							
12	1260	134.82	1250	1.5	**iC 373 – HB2 63 B 4 B12B**	3	33	36	37	41	
14	1160	123.66	1270	1.6							
16	985	105.28	1290	1.9							
19	850	90.77	1310	2.2							
20	795	84.61	1320	2.3							
23	695	73.96	1330	2.7							
24	650	69.33	1340	2.8							
27	575	61.18	1330	3.2							
30	525	55.76	1300	3.5							
35	450	48.08	1240	4.1							

(1) Finite transmission ratio i

P_1 = 0.25 hp





n_2 rpm	T_2 lb in	i	F_{r2} lb	SF			lb foot		lb flange		p.
							HB	HBZ	HB	HBZ	
14	1160	123.91	795	1.1	**iC 273 – HB2 63 B 4 B12B**	3	30	34	31	35	122
16	990	105.49	900	1.3							
18	855	90.96	920	1.5							
20	795	84.78	920	1.6							
23	695	74.11	930	1.8							
24	650	69.47	930	1.9							
27	575	61.3	900	2.2							
30	525	55.87	880	2.4							
35	450	48.17	840	2.7							
37	420	44.9	830	2.9							
43	370	39.25	795	3.3							
46	345	36.79	780	3.5							
52	305	32.47	750	4							
58	270	28.78	725	4.5							
69	230	24.47	690	5.3							
59	265	28.37	720	4.6	**iC 272 – HB2 63 B 4 B12B**	2	30	34	31	35	
64	245	26.09	700	4.9							
75	210	22.32	670	5.8							
87	181	19.35	640	6.6							
93	170	18.08	625	7.1							
107	147	15.63	600	8.1							
127	125	13.28 (1)	570	9.5							

P_1 = 0.33 hp

5.7	3630	195.24 (1)	2790	2.3	**iC 773 – HB2 71 B 6 B20B**	3	100	105	115	120	132
6.7	3090	166.59	2840	2.6							
7.7	2710	145.67	2870	3							
8.8	2360	195.24 (1)	2890	3.5	**iC 773 – HB2 71 A 4 B20B**	3	98	105	115	120	
10	2010	166.59	2910	4.1							
12	1760	145.67	2920	4.6							
12	1670	138.39	2920	4.8							
14	1470	121.42	2920	5.5							
5.6	3710	199.81	2060	1.6	**iC 673 – HB2 71 B 6 B16B**	3	85	91	91	97	130
6.1	3420	184.07	2110	1.75							
7.1	2940	158.14	2180	2							
8.1	2560	137.67	2230	2.3							
8.7	2390	128.97	2240	2.5							
9.8	2120	113.94	2270	2.8							
11	1970	105.83	2290	3							
8.6	2420	199.81	2240	2.5	**iC 673 – HB2 71 A 4 B16B**	3	82	88	88	94	
9.3	2230	184.07	2260	2.7							
11	1910	158.14	2290	3.1							

(1) Finite transmission ratio *i*

Selection tables

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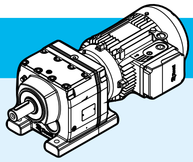
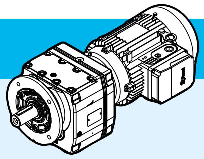
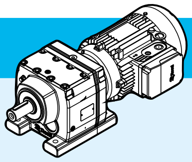
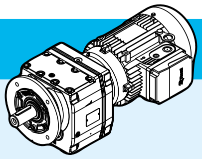




n_2	T_2	i	F_{r2}	SF			lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
12	1660	137.67	2310	3.6	**iC 673 – HB2 71 A 4 B16B**	3	82	88	88	94	130
13	1560	128.97	2320	3.8							
15	1380	113.94	2330	4.3							
16	1280	105.83	2330	4.6							
18	1160	95.91	2340	5.1							
20	1040	86.11	2350	5.7							
6	3470	186.89	1640	1.3	**iC 573 – HB2 71 B 6 B16B**	3	66	72	73	79	128
6.5	3200	172.17	1670	1.4							
7.6	2750	147.92	1700	1.6							
8.7	2390	128.77	1730	1.85							
9.3	2240	120.63	1740	2							
11	1980	106.58	1750	2.2							
11	1840	98.99	1760	2.4							
9.2	2260	186.89	1740	1.95	**iC 573 – HB2 71 A 4 B16B**	3	63	69	70	76	
10	2080	172.17	1750	2.1							
12	1790	147.92	1760	2.4							
13	1560	128.77	1770	2.8							
14	1460	120.63	1780	3							
16	1290	106.58	1780	3.3							
17	1200	98.99	1790	3.6							
19	1080	89.71	1790	3.9							
21	975	80.55	1790	4.4							
25	835	69.23	1770	5.1							
9.7	2140	176.88	1280	1.4	**iC 473 – HB2 71 A 4 B16B**	3	49	55	51	57	126
11	1970	162.94	1290	1.5							
12	1690	139.99	1320	1.75							
14	1470	121.87	1340	2							
15	1380	114.17	1340	2.1							
17	1220	100.86	1350	2.4							
18	1130	93.68	1360	2.6							
20	1030	84.9	1360	2.9							
23	920	76.23	1370	3.2							
25	830	68.54	1370	3.6							
27	775	64.21	1370	3.8							
30	685	56.73	1330	4.3							
33	635	52.69	1300	4.7							
36	575	47.75	1260	5.1							
13	1630	134.82	1040	1.15	**iC 373 – HB2 71 A 4 B12B**	3	35	41	39	45	124
14	1500	123.66	1140	1.25							
16	1270	105.28	1240	1.45							
19	1100	90.77	1270	1.7							
20	1020	84.61	1280	1.8							
23	895	73.96	1300	2.1							
25	840	69.33	1310	2.2							

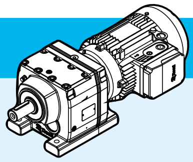
(1) Finite transmission ratio *i*

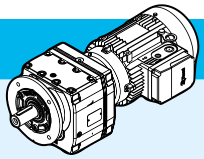
P_1 = 0.33 hp

n_2	T_2	i	F_{r2}	SF	 		lb foot		lb flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
28	740	61.18	1310	2.5	**iC 373 – HB2 71 A 4 B12B**	3	35	41	39	45	124
31	675	55.76	1280	2.7							
36	580	48.08	1220	3.1							
38	540	44.81	1200	3.4							
44	475	39.17	1150	3.8							
47	445	36.72	1130	4.1							
53	390	32.4	1090	4.6							
20	1030	84.78	870	1.25	**iC 273 – HB2 71 A 4 B12B**	3	32	38	33	39	122
23	895	74.11	910	1.4							
25	840	69.47	910	1.5							
28	740	61.3	880	1.7							
31	675	55.87	860	1.85							
36	585	48.17	820	2.1							
38	545	44.9	810	2.3							
44	475	39.25	780	2.6							
47	445	36.79	765	2.7							
53	395	32.47	740	3.1							
60	350	28.78	715	3.5							
70	295	24.47	680	4.1							
61	345	28.37	710	3.5	**iC 272 – HB2 71 A 4 B12B**	2	32	38	33	39	
66	315	26.09	695	3.8							
77	270	22.32	660	4.5							
89	235	19.35	635	5.1							
95	220	18.08	620	5.5							
110	189	15.63	595	6.3							
130	161	13.28 (1)	565	7.4							
145	143	11.86	545	8.2							
170	122	10.13	520	9							
183	114	9.41	505	9.5							
211	99	8.16	485	10							
226	92	7.63 (1)	475	11							
261	80	6.59	450	12							
307	68	5.6 (1)	430	13							
344	60	5 (1)	415	14							
403	52	4.27	395	15							
430	48	4 (1)	385	16							
510	41	3.37	365	17							

(1) Finite transmission ratio *i*

P_1 = 0.5 hp

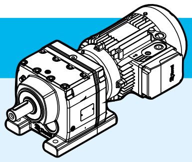


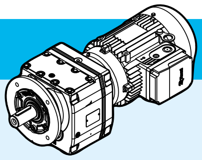


n_2	T_2	i	F_{r2}	SF			lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
3.9	8080	289.74	6350	3.7	**iC 973 – HB2 80 A 6 B30C**	3	295	305	330	340	136
4.4	7130	255.71	6370	4.2							
4.7	6730	241.25	6380	4.4							
5.2	6030	216.28	6390	4.9							
4.6	6880	246.54	4490	2.3	**iC 873 – HB2 80 A 6 B25C**	3	180	190	195	205	134
5.2	6040	216.54	4490	2.6							
5.5	5740	205.71	4490	2.7							
6.2	5070	181.77	4490	3.1							
7.3	4330	155.34	4490	3.6							
7.9	3970	142.41	4490	3.9							
6.8	4650	166.59	2670	1.75	**iC 773 – HB2 80 A 6 B20C**	3	105	110	115	125	132
7.8	4060	145.67	2740	2							
8.2	3860	138.39	2760	2.1							
8.8	3580	195.24 (1)	2800	2.3	**iC 773 – HB2 71 B 4 B20B**	3	100	105	115	120	
10	3050	166.59	2840	2.7							
12	2670	145.67	2870	3							
12	2540	138.39	2880	3.2							
14	2220	121.42	2900	3.6							
17	1890	102.99	2920	4.2							
18	1700	92.97	2920	4.7							
7.1	4410	158.14	1900	1.35	**iC 673 – HB2 80 A 6 B16C**	3	87	96	93	100	130
8.2	3840	137.67	2030	1.55							
8.8	3600	128.97	2070	1.65							
9.9	3180	113.94	2140	1.85							
8.6	3660	199.81	2070	1.6	**iC 673 – HB2 71 B 4 B16B**	3	84	90	90	96	
9.3	3370	184.07	2120	1.75							
11	2900	158.14	2190	2							
12	2520	137.67	2230	2.4							
13	2360	128.97	2250	2.5							
15	2090	113.94	2280	2.8							
16	1940	105.83	2290	3.1							
18	1760	95.91	2300	3.4							
20	1580	86.11	2320	3.8							
23	1360	74.17	2330	4.4							
25	1280	69.75	2340	4.6							
28	1120	61.26	2340	5.1							
30	1040	56.89	2350	5.4							
8.8	3590	128.77	1630	1.25	**iC 573 – HB2 80 A 6 B16C**	3	68	77	75	84	128
9.4	3360	120.63	1650	1.3							
11	2970	106.58	1680	1.5							
11	2760	98.99	1700	1.6							
9.2	3420	186.89	1650	1.3	**iC 573 – HB2 71 B 4 B16B**	3	65	71	72	78	
10	3150	172.17	1670	1.4							
12	2710	147.92	1710	1.6							

(1) Finite transmission ratio *i*

P_1 = 0.5 hp

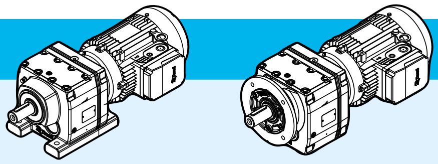




n_2	T_2	i	F_{r2}	SF			lb foot		lb flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
13	2360	128.77	1730	1.85	**iC 573 – HB2 71 B 4 B16B**	3	65	71	72	78	128
14	2210	120.63	1740	1.95							
16	1950	106.58	1750	2.2							
17	1810	98.99	1760	2.4							
19	1640	89.71	1770	2.6							
21	1480	80.55	1780	2.9							
25	1270	69.23	1730	3.3							
27	1190	64.85	1700	3.6							
30	1050	57.29	1640	4							
32	975	53.22	1600	4.3							
36	885	48.23	1560	4.7							
12	2560	139.99	1160	1.15	**iC 473 – HB2 71 B 4 B16B**	3	51	57	53	59	126
14	2230	121.87	1270	1.35							
15	2090	114.17	1280	1.4							
17	1850	100.86	1310	1.6							
18	1720	93.68	1320	1.75							
20	1560	84.9	1330	1.9							
23	1400	76.23	1340	2.1							
25	1260	68.54	1350	2.4							
27	1180	64.21	1340	2.5							
30	1040	56.73	1290	2.9							
33	965	52.69	1270	3.1							
36	875	47.75	1230	3.4							
40	785	42.87	1190	3.8							
47	675	36.93	1140	4.4							
50	635	34.73	1120	4.7							
51	620	33.79	1110	3.9	**iC 472 – HB2 71 B 4 B16B**	2	51	57	54	60	
55	570	31.12	1090	3.8							
64	490	26.74	1040	6.1							
74	425	23.28	990	6.6							
79	400	21.81	970	6.9							
19	1660	90.77	1010	1.1	**iC 373 – HB2 71 B 4 B12B**	3	37	43	41	47	124
20	1550	84.61	1100	1.2							
23	1360	73.96	1220	1.35							
25	1270	69.33	1240	1.45							
28	1120	61.18	1260	1.65							
31	1020	55.76	1230	1.8							
36	880	48.08	1190	2.1							
38	820	44.81	1160	2.2							
44	720	39.17	1120	2.5							
47	675	36.72	1100	2.7							
53	595	32.4	1060	3							
60	525	28.73	1020	3.4							
70	445	24.42	980	4							

(1) Finite transmission ratio *i*

P_1 = 0.5 hp



n_2	T_2	i	F_{r2}	SF			lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
61	520	28.32	1020	3.5	**iC 372 – HB2 71 B 4 B12B**	**2**	36	42	41	47	124
66	475	26.03	1000	3.8							
77	410	22.27	950	4.4							
89	355	19.31	910	5							
95	330	18.05	890	5.4							
110	285	15.6	850	6.2							
130	245	13.25	810	6.9							
145	215	11.83	785	7.5							
28	1120	61.3	800	1.1	**iC 273 – HB2 71 B 4 B12B**	**3**	34	40	35	41	122
31	1020	55.87	810	1.2							
36	885	48.17	785	1.4							
38	825	44.9	775	1.5							
44	720	39.25	750	1.7							
47	675	36.79	735	1.8							
53	595	32.47	715	2							
60	525	28.78	690	2.3							
70	450	24.47	660	2.7							
61	520	28.37	690	2.3	**iC 272 – HB2 71 B 4 B12B**	**2**	34	40	35	41	
66	480	26.09	670	2.5							
77	410	22.32	645	2.9							
89	355	19.35	620	3.4							
95	330	18.08	605	3.6							
110	285	15.63	580	4.2							
130	245	13.28 (1)	555	4.9							

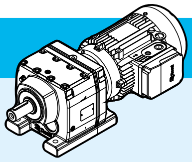
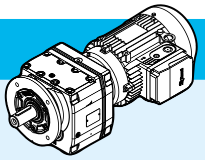
P_1 = 0.75 hp

n_2	T_2	i	F_{r2}	SF			lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
3.9	12000	289.74	6250	2.5	**iC 973 – HB2 80 B 6 B30C**	**3**	300	310	340	345	136
4.5	10600	255.71	6290	2.8							
4.7	10000	241.25	6310	3							
5.3	8970	216.28	6340	3.3							
6	7870	289.74	6360	3.8	**iC 973 – HB2 80 A 4 B30C**	**3**	300	305	335	340	
6.8	6950	255.71	6380	4.3							
7.2	6550	241.25	6380	4.5							
8	5880	216.28	6400	5							
4.6	10200	246.54	4030	1.5	**iC 873 – HB2 80 B 6 B25C**	**3**	185	195	205	210	134
5.3	8980	216.54	4430	1.75							
5.5	8530	205.71	4470	1.8							
6.3	7540	181.77	4490	2.1							
7.3	6440	155.34	4490	2.4							
7.1	6700	246.54	4490	2.3	**iC 873 – HB2 80 A 4 B25C**	**3**	180	190	200	210	
8	5880	216.54	4490	2.6							
8.5	5590	205.71	4490	2.8							
9.6	4940	181.77	4490	3.1							

(1) Finite transmission ratio *i*

Selection tables

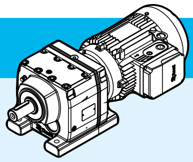
P_1 = 0.75 hp

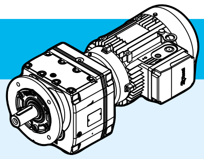



n_2	T_2	i	F_{r2}	SF			lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
11	4220	155.34	4490	3.7	**iC 873 – HB2 80 A 4 B25C**	3	180	190	200	210	134
12	3870	142.41	4490	4							
14	3390	124.97	4490	4.6							
15	3220	118.43 (1)	4490	4.8							
17	2820	103.65	4490	5.5							
10	4530	166.59	2680	1.8	**iC 773 – HB2 80 A 4 B20C**	3	105	115	120	130	132
12	3960	145.67	2750	2							
13	3760	138.39	2770	2.1							
14	3300	121.42	2820	2.4							
17	2800	102.99	2860	2.9							
19	2530	92.97	2880	3.2							
21	2220	81.8	2900	3.6							
23	2100	77.24	2910	3.8							
26	1790	65.77	2920	4.4							
11	4300	158.14	1930	1.4	**iC 673 – HB2 80 A 4 B16C**	3	90	98	96	105	130
13	3740	137.67	2040	1.6							
13	3500	128.97	2090	1.7							
15	3100	113.94	2150	1.9							
16	2870	105.83	2180	2.1							
18	2610	95.91	2220	2.3							
20	2340	86.11	2250	2.5							
23	2010	74.17	2280	2.9							
25	1890	69.75	2290	3.1							
28	1660	61.26	2310	3.5							
31	1550	56.89	2320	3.6							
14	3280	120.63	1660	1.3	**iC 573 – HB2 80 A 4 B16C**	3	71	79	78	86	128
16	2900	106.58	1690	1.5							
18	2690	98.99	1710	1.6							
19	2440	89.71	1720	1.75							
22	2190	80.55	1740	1.95							
25	1880	69.23	1680	2.3							
27	1760	64.85	1650	2.4							
30	1560	57.29	1590	2.7							
33	1450	53.22	1560	2.9							
36	1310	48.23	1520	3.2							
40	1180	43.3	1470	3.6							
47	1010	37.3 (1)	1410	4.1							
50	955	35.07	1390	4.4							
66	715	26.31	1280	5.8	**iC 572 – HB2 80 A 4 B16C**	2	68	77	76	84	
70	680	24.99 (1)	1260	6							
79	595	21.93	1210	6.9							
94	505	18.6 (1)	1150	8.1							
19	2540	93.68	1140	1.15	**iC 473 – HB2 80 A 4 B16C**	3	57	65	59	68	126
20	2310	84.9	1250	1.3							

(1) Finite transmission ratio *i*

P_1 = 0.75 hp

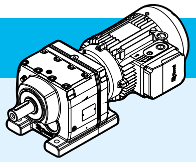


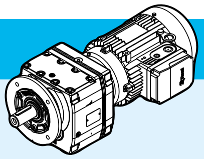


n_2 rpm	T_2 lb in	i	F_{r2} lb	SF			lb foot HB	lb foot HBZ	lb flange HB	lb flange HBZ	p.
23	2070	76.23	1280	1.45	**iC 473 – HB2 80 A 4 B16C**	3	57	65	59	68	126
25	1860	68.54	1300	1.6							
27	1740	64.21	1290	1.7							
31	1540	56.73	1250	1.9							
33	1430	52.69	1220	2.1							
36	1300	47.75	1190	2.3							
41	1160	42.87	1160	2.5							
47	1000	36.93	1110	3							
50	945	34.73	1090	3.1							
58	810	29.88	1050	3.7							
65	725	26.74	1020	4.1	**iC 472 – HB2 80 A 4 B16C**	2	57	66	59	68	
75	630	23.28	980	4.5							
80	590	21.81	960	4.7							
28	1660	61.18	990	1.1	**iC 373 – HB2 80 A 4 B12C**	3	42	51	47	55	124
31	1510	55.76	1100	1.2							
36	1310	48.08	1130	1.4							
39	1220	44.81	1110	1.5							
44	1060	39.17	1080	1.7							
47	1000	36.72	1060	1.8							
54	880	32.4	1030	2.1							
61	780	28.73	990	2.3							
71	665	24.42	950	2.7							
78	605	22.27	930	2.9	**iC 372 – HB2 80 A 4 B12C**	2	42	51	46	55	
90	525	19.31	890	3.4							
96	490	18.05	870	3.6							
112	425	15.6	840	4.2							
131	360	13.25	800	4.7							
147	320	11.83	770	5							
44	1070	39.25	705	1.15	**iC 273 – HB2 80 A 4 B12C**	3	40	48	41	49	122
47	1000	36.79	695	1.2							
54	880	32.47	675	1.4							
60	780	28.78	660	1.55							
71	665	24.47	635	1.8							
78	605	22.32	620	2	**iC 272 – HB2 80 A 4 B12C**	2	40	48	41	49	
90	525	19.35	595	2.3							
96	490	18.08	585	2.4							
111	425	15.63	565	2.8							
131	360	13.28 (1)	540	3.3							
147	320	11.86	525	3.6							
172	275	10.13	500	4							
185	255	9.41	485	4.2			39	48	40	49	
213	220	8.16	465	4.6							

(1) Finite transmission ratio *i*

P_1 = 0.75 hp





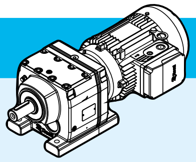
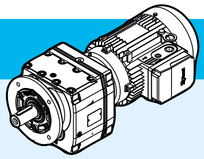
n_2 rpm	T_2 lb in	i	F_{r2} lb	SF			foot		flange		p.
							HB	HBZ	HB	HBZ	
228	205	7.63 (1)	455	4.8	**iC 272 – HB2 80 A 4 B12C**	2	39	48	40	49	122
264	179	6.59	435	5.2							
311	152	5.6 (1)	415	5.8							
348	136	5 (1)	405	6.2							
407	116	4.27	385	6.6							
435	109	4 (1)	375	6.9							
516	92	3.37	355	7.6							

P_1 = 1 hp

4.5	13900	255.71	6190	2.1	**iC 973 – HB3 100 LA 6 B30D**	3	335	350	370	385	136
4.8	13100	241.25	6220	2.3							
5.4	11800	216.28	6260	2.5							
6.2	10100	186.3	6310	2.9							
6.8	9240	170.02	6330	3.2							
6	10500	289.74	6300	2.8	**iC 973 – HB3 90 S 4 B30C**	3	310	320	350	355	
6.8	9260	255.71	6330	3.2							
7.2	8740	241.25	6350	3.4							
8	7830	216.28	6370	3.8							
9.3	6750	186.3	6390	4.4							
10	6160	170.02	6400	4.8							
5.4	11800	216.54	3550	1.3	**iC 873 – HB3 100 LA 6 B25D**	3	225	240	240	255	134
5.6	11200	205.71	3770	1.4							
6.4	9880	181.77	4240	1.55							
7.5	8440	155.34	4490	1.85							
8.1	7740	142.41	4490	2							
9.3	6790	124.97	4490	2.3							
9.8	6430	118.43 (1)	4490	2.4							
11	5630	103.65	4490	2.8							
12	5070	93.38	4490	3.1							
7.1	8930	246.54	4450	1.75	**iC 873 – HB3 90 S 4 B25C**	3	195	205	215	220	
8	7840	216.54	4490	1.95							
8.5	7450	205.71	4490	2.1							
9.6	6580	181.77	4490	2.4							
11	5630	155.34	4490	2.8							
12	5160	142.41	4490	3							
14	4530	124.97	4490	3.4							
15	4290	118.43 (1)	4490	3.6							
17	3750	103.65	4490	4.1							
19	3380	93.38	4490	4.5							
9.6	6600	121.42	2380	1.25	**iC 773 – HB3 100 LA 6 B20D**	3	150	160	165	175	132
11	5600	102.99	2560	1.45							
12	5050	92.97	2640	1.6							

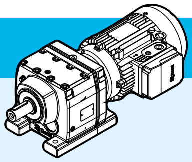
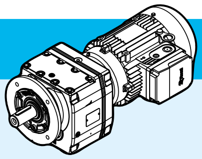
(1) Finite transmission ratio *i*

P_1 = 1 hp

n_2	T_2	i	F_{r2}	SF	 		lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
14	4440	81.8	2710	1.8	**iC 773 – HB3 100 LA 6 B20D**	3	150	160	165	175	132
15	4200	77.24	2740	1.9							
18	3570	65.77	2800	2.2							
20	3130	57.68	2840	2.5							
22	2830	52.07	2870	2.8							
25	2490	45.81	2890	3.2							
10	6030	166.59	2490	1.35	**iC 773 – HB3 90 S 4 B20C**	3	120	130	135	140	132
12	5280	145.67	2610	1.55							
13	5010	138.39	2640	1.6							
14	4400	121.42	2720	1.85							
17	3730	102.99	2790	2.1							
19	3370	92.97	2820	2.4							
21	2960	81.8	2860	2.7							
23	2800	77.24	2870	2.8							
26	2380	65.77	2890	3.3							
30	2090	57.68	2910	3.8							
33	1890	52.07	2920	4.2							
38	1660	45.81	2920	4.6							
40	1570	43.26	2920	4.8							
13	4680	86.11	1870	1.25	**iC 673 – HB3 100 LA 6 B16D**	3	130	145	140	150	130
16	4030	74.17	2010	1.45							
17	3790	69.75	2060	1.55							
19	3330	61.26	2130	1.8							
20	3090	56.89	2170	1.9							
22	2800	51.56	2200	2.1							
25	2520	46.29	2240	2.4							
29	2170	39.88 (1)	2270	2.7							
31	2040	37.5	2280	2.7							
36	1750	32.27	2310	3							
40	1570	28.83	2320	3.3							
13	4990	137.67	1800	1.2	**iC 673 – HB3 90 S 4 B16C**	3	105	115	110	120	
13	4670	128.97	1880	1.25							
15	4130	113.94	2000	1.45							
16	3830	105.83	2050	1.55							
18	3470	95.91	2110	1.7							
20	3120	86.11	2160	1.9							
23	2690	74.17	2220	2.2							
25	2530	69.75	2240	2.3							
28	2220	61.26	2270	2.6							
31	2060	56.89	2280	2.7							
34	1870	51.56	2300	2.9							
38	1680	46.29	2310	3.2							
17	3760	69.23	1620	1.15	**iC 573 – HB3 100 LA 6 B16D**	3	115	125	120	135	128
18	3520	64.85	1640	1.2							

(1) Finite transmission ratio *i*

P_1 = 1 hp

n_2	T_2	i	F_{r2}	SF	 		lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
20	3110	57.29	1680	1.35	**iC 573 – HB3 100 LA 6 B16D**	3	115	125	120	135	128
22	2890	53.22	1660	1.5							
24	2620	48.23	1620	1.6							
27	2350	43.3	1580	1.8							
31	2030	37.3 (1)	1520	2.1							
33	1910	35.07	1500	2.2							
38	1640	30.18	1440	2.6							
43	1470	26.97	1400	2.9							
16	3860	106.58	1610	1.1	**iC 573 – HB3 90 S 4 B16C**	3	85	94	92	100	128
18	3590	98.99	1640	1.2							
19	3250	89.71	1670	1.3							
22	2920	80.55	1660	1.45							
25	2510	69.23	1600	1.7							
27	2350	64.85	1580	1.8							
30	2080	57.29	1530	2							
33	1930	53.22	1500	2.2							
36	1750	48.23	1470	2.4							
40	1570	43.3	1420	2.7							
47	1350	37.3 (1)	1370	3.1							
50	1270	35.07	1350	3.3							
58	1090	30.18	1290	3.8							
65	975	26.97	1250	4.2							
66	955	26.31	1240	4.3	**iC 572 – HB3 90 S 4 B16C**	2	83	91	90	99	128
70	905	24.99 (1)	1220	4.5							
79	795	21.93	1180	5.1							
94	675	18.6 (1)	1120	6							
24	2590	47.75	1170	1.15	**iC 473 – HB3 100 LA 6 B16D**	3	99	115	100	115	126
27	2330	42.87	1220	1.25							
31	2010	36.93	1180	1.5							
33	1890	34.73	1170	1.55							
39	1620	29.88	1130	1.85							
43	1450	26.7	1090	2							
49	1280	23.59	1060	2.3							
25	2480	68.54	1240	1.2	**iC 473 – HB3 90 S 4 B16C**	3	71	79	73	82	
27	2330	64.21	1220	1.25							
31	2050	56.73	1190	1.45							
33	1910	52.69	1170	1.55							
36	1730	47.75	1140	1.7							
41	1550	42.87	1110	1.9							
47	1340	36.93	1070	2.2							

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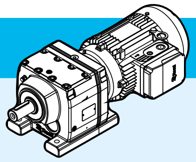
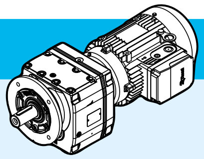
(1) Finite transmission ratio *i*

P_1 = 1 hp





n_2	T_2	i	F_{r2}	SF			lb foot		lb flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
50	1260	34.73	1050	2.4	**iC 473 – HB3 90 S 4 B16C**	3	71	79	73	82	126
58	1080	29.88	1010	2.7							
65	965	26.7	980	3.1							
74	855	23.59	950	3.5							
65	970	26.74	980	3.1	**iC 472 – HB3 90 S 4 B16C**	2	71	80	74	82	
75	845	23.28	950	3.4							
80	790	21.81	930	3.5							
90	700	19.27	900	3.8							
97	650	17.89	880	4							
107	585	16.22	850	4.2							
40	1560	28.73	1050	1.15	**iC 373 – HB3 100 LA 6 B12D**	3	83	96	88	100	124
48	1330	24.42	1010	1.35							
36	1740	48.08	980	1.05	**iC 373 – HB3 90 S 4 B12C**	3	56	65	61	69	
39	1620	44.81	1060	1.1							
44	1420	39.17	1030	1.3							
47	1330	36.72	1010	1.35							
54	1170	32.4	980	1.55							
61	1040	28.73	950	1.75							
71	885	24.42	920	2							
78	805	22.27	890	2.2	**iC 372 – HB3 90 S 4 B12C**	2	56	65	60	69	124
90	700	19.31	860	2.5							
96	655	18.05	850	2.7							
112	565	15.6	810	3.1							
131	480	13.25	775	3.5							
147	430	11.83	750	3.8							
172	365	10.11	715	4.1							
184	345	9.47	705	4.3							
60	1040	28.78	620	1.15	**iC 273 – HB3 90 S 4 B12C**	3	54	62	55	63	122
71	885	24.47	600	1.35							
78	810	22.32	590	1.5	**iC 272 – HB3 90 S 4 B12C**	2	54	62	55	63	
90	700	19.35	570	1.7							
96	655	18.08	560	1.85							
111	565	15.63	540	2.1							
131	480	13.28 (1)	520	2.5							
147	430	11.86	505	2.7							
172	365	10.13	485	3							
185	340	9.41	465	3.2			53	62	54	63	
213	295	8.16	450	3.5							
228	275	7.63 (1)	440	3.6							
264	240	6.59	425	4							
311	205	5.6 (1)	405	4.3							
348	181	5 (1)	390	4.7							

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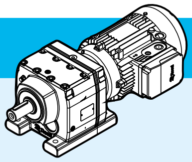
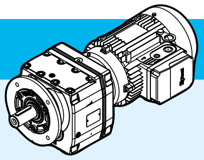
(1) Finite transmission ratio *i*

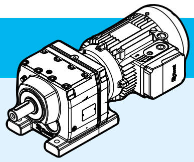
P_1 = 1.5 hp

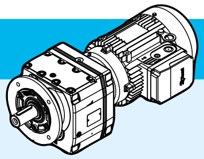



n_2	T_2	i	F_{r2}	SF			lb				p.
							foot		flange		
rpm	lb in		lb				HB	HBZ	HB	HBZ	
6.2	15200	186.3	6150	1.95	**iC 973 – HB3 112 M 6 B30D**	3	355	370	390	405	136
6.8	13900	255.71	6200	2.1	**iC 973 – HB3 90 L 4 B30D**	3	320	330	355	365	
7.2	13100	241.25	6220	2.3							
8	11800	216.28	6270	2.5							
9.3	10100	186.3	6310	2.9							
10	9240	170.02	6340	3.2							
12	8190	150.78	6360	3.5							
14	6890	126.75	6380	4.2							
15	6330	116.48	6390	4.5							
8	11800	216.54	3590	1.3	**iC 873 – HB3 90 L 4 B25D**	3	200	210	220	230	134
8.5	11200	205.71	3800	1.4							
9.6	9880	181.77	4270	1.55							
11	8440	155.34	4490	1.85							
12	7740	142.41	4490	2							
14	6790	124.97	4490	2.3							
15	6430	118.43 (1)	4490	2.4							
17	5630	103.65	4490	2.7							
19	5070	93.38	4490	3							
21	4450	81.92	4490	3.4							
24	3940	72.57	4490	3.9							
27	3460	63.68 (1)	4490	4.4							
29	3280	60.35 (1)	4490	4.6							
33	2870	52.82	4490	5.3							
14	6600	121.42	2390	1.2	**iC 773 – HB3 90 L 4 B20D**	3	125	135	140	150	132
17	5600	102.99	2560	1.45							
19	5050	92.97	2640	1.6							
21	4440	81.8	2720	1.8							
23	4200	77.24	2750	1.9							
26	3570	65.77	2810	2.2							
30	3130	57.68	2840	2.5							
33	2830	52.07	2870	2.8							
38	2490	45.81	2890	3.1							
40	2350	43.26	2900	3.2							
47	2000	36.83	2880	3.7							
52	1820	33.47	2800	4							
20	4680	86.11	1880	1.25	**iC 673 – HB3 90 L 4 B16D**	3	110	120	115	125	130
23	4030	74.17	2020	1.45							
25	3790	69.75	2060	1.55							
28	3330	61.26	2140	1.75							
31	3090	56.89	2170	1.8							
34	2800	51.56	2210	1.95							
38	2520	46.29	2240	2.1							
44	2170	39.88 (1)	2270	2.4							

(1) Finite transmission ratio *i*

P_1 = 1.5 hp

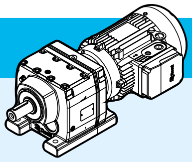


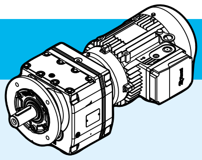


n_2	T_2	i	F_{r2}	SF			lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
46	2040	37.5	2290	2.5	**iC 673 – HB3 90 L 4 B16D**	3	110	120	115	125	130
54	1750	32.27	2240	2.8							
60	1570	28.83	2170	3							
62	1530	28.13	2150	3.2	**iC 672 – HB3 90 L 4 B16D**	2	110	115	115	125	
65	1450	26.72	2120	3.3							
74	1270	23.44	2040	4.4							
88	1080	19.89	1940	5							
25	3760	69.23	1490	1.15	**iC 573 – HB3 90 L 4 B16D**	3	92	100	99	105	128
27	3520	64.85	1470	1.2							
30	3110	57.29	1440	1.35							
33	2890	53.22	1410	1.45							
36	2620	48.23	1380	1.6							
40	2350	43.3	1350	1.8							
47	2030	37.3 (1)	1300	2.1							
50	1910	35.07	1290	2.2							
58	1640	30.18	1240	2.5							
65	1470	26.97	1200	2.8							
66	1430	26.31	1200	2.9	**iC 572 – HB3 90 L 4 B16D**	2	89	98	97	105	
70	1360	24.99 (1)	1180	3							
79	1190	21.93	1140	3.4							
94	1010	18.6 (1)	1090	4							
104	910	16.79	1060	4.4							
36	2590	47.75	1060	1.15	**iC 473 – HB3 90 L 4 B16D**	3	78	86	80	89	126
41	2330	42.87	1040	1.25							
47	2010	36.93	1010	1.5							
50	1890	34.73	1000	1.55							
58	1620	29.88	960	1.85							
65	1450	26.7	940	2							
74	1280	23.59	910	2.3							
75	1260	23.28	910	2.2	**iC 472 – HB3 90 L 4 B16D**	2	78	87	80	89	
80	1180	21.81	890	2.3							
90	1050	19.27	860	2.5							
97	970	17.89	850	2.7							
107	880	16.22	830	2.8							
119	790	14.56	800	3							
139	680	12.54	770	3.3							
148	640	11.79	755	3.4							
171	550	10.15	725	3.7							
192	495	9.07	700	4							
54	1760	32.4	785	1.05	**iC 373 – HB3 90 L 4 B12D**	3	63	72	67	76	124
61	1560	28.73	850	1.15							
71	1330	24.42	860	1.35							

(1) Finite transmission ratio *i*

P_1 = 1.5 hp





n_2	T_2	i		F_{r2}	SF			lb				p.
rpm	lb in			lb				foot		flange		
								HB	HBZ	HB	HBZ	
90	1050	19.31		820	1.7	**iC 372 – HB3 90 L 4 B12D**	2	63	71	67	76	124
96	980	18.05		810	1.85							
112	850	15.6		775	2.1							
131	720	13.25		745	2.4							
147	645	11.83		725	2.5							
172	550	10.11		695	2.8							
184	515	9.47		680	2.9							
218	435	7.97		650	3.2							
261	360	6.67		615	3.6			62	71	66	75	
307	310	5.67		585	4.1							
344	275	5.06		570	4.4							
90	1050	19.35		525	1.15	**iC 272 – HB3 90 L 4 B12D**	2	60	69	61	70	122
96	980	18.08		520	1.2							
111	850	15.63		505	1.4							
131	720	13.28	(1)	490	1.65							
147	645	11.86		475	1.8							
172	550	10.13		460	2							
213	445	8.16		430	2.4			60	69	61	69	
228	415	7.63	(1)	420	2.4							
264	360	6.59		405	2.6							
311	305	5.6	(1)	390	2.9							
348	270	5	(1)	380	3.1							
407	230	4.27		365	3.4							
435	215	4	(1)	355	3.5							
516	183	3.37		340	3.9							

P_1 = 2 hp

n_2	T_2	i		F_{r2}	SF			lb				p.
6.8	18500	255.71		5430	1.6	**iC 973 – HB3 90 LB 4 B30D**	3	320	330	355	370	136
7.2	17500	241.25		5740	1.7							
8	15700	216.28		6130	1.9							
9.3	13500	186.3		6210	2.2							
10	12300	170.02		6250	2.4							
12	10900	150.78		6290	2.7							
14	9180	126.75		6340	3.1							
15	8440	116.48		6350	3.4							
17	7490	103.44		6370	3.8							
19	6700	92.48		6390	4.3							
9.6	13200	181.77		3090	1.2	**iC 873 – HB3 90 LB 4 B25D**	3	200	215	220	235	134
11	11300	155.34		3780	1.4							
12	10300	142.41		4120	1.5							
14	9050	124.97		4450	1.7							
15	8580	118.43	(1)	4490	1.8							

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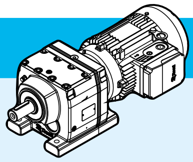
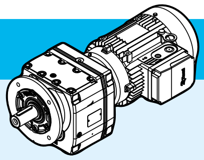
(1) Finite transmission ratio *i*

P_1 = 2 hp

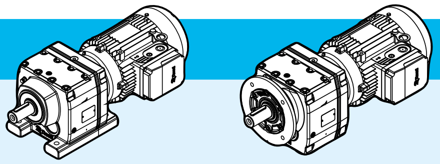




n_2 rpm	T_2 lb in	i		F_{r2} lb	SF			lb foot HB	 HBZ	 flange HB	 HBZ	p.
17	7510	103.65		4490	2	**iC 873 – HB3 90 LB 4 B25D**	3	200	215	220	235	134
19	6760	93.38		4490	2.3							
21	5930	81.92		4490	2.6							
24	5260	72.57		4490	2.9							
27	4610	63.68	(1)	4490	3.3							
29	4370	60.35	(1)	4490	3.5							
33	3830	52.82		4490	3.9							
37	3450	47.58		4450	4.4							
42	3020	41.74		4270	4.9							
47	2670	36.84	(1)	4110	5.5							
19	6740	92.97		2370	1.2	**iC 773 – HB3 90 LB 4 B20D**	3	125	140	140	155	132
21	5930	81.8		2510	1.35							
23	5600	77.24		2570	1.4							
26	4760	65.77		2680	1.65							
30	4180	57.68		2750	1.9							
33	3770	52.07		2790	2.1							
38	3320	45.81		2830	2.3							
40	3130	43.26		2840	2.4							
47	2670	36.83		2830	2.8							
52	2420	33.47		2750	3							
60	2100	29		2640	3.5							
69	1830	25.23		2530	3.8							
74	1690	23.37		2470	4.3	**iC 772 – HB3 90 LB 4 B20D**	2	125	135	140	150	
81	1550	21.43		2410	4.8							
93	1360	18.8		2320	5.2							
25	5050	69.75		1790	1.15	**iC 673 – HB3 90 LB 4 B16D**	3	110	125	115	130	130
28	4440	61.26		1940	1.3							
31	4120	56.89		2010	1.35							
34	3740	51.56		2070	1.45							
38	3350	46.29		2140	1.6							
44	2890	39.88	(1)	2200	1.8							
46	2720	37.5		2220	1.9							
54	2340	32.27		2190	2.1							
60	2090	28.83		2120	2.2							
62	2040	28.13		2110	2.4	**iC 672 – HB3 90 LB 4 B16D**	2	110	120	115	130	
65	1940	26.72		2080	2.5							
74	1700	23.44		2000	3.3							
88	1440	19.89		1910	3.7							
97	1300	17.95		1850	4.1							
33	3860	53.22		1330	1.1	**iC 573 – HB3 90 LB 4 B16D**	3	92	105	99	110	128
36	3490	48.23		1310	1.2							
40	3140	43.3		1280	1.35							
47	2700	37.3	(1)	1240	1.55							

(1) Finite transmission ratio *i*

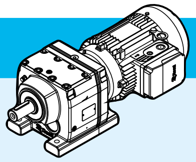
P_1 = 2 hp

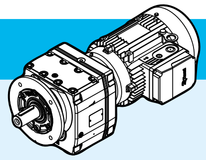


n_2	T_2	i	F_{r2}	SF			lb foot HB	HBZ	lb flange HB	HBZ	p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
50	2540	35.07	1230	1.65	**iC 573 – HB3 90 LB 4 B16D**	3	92	105	99	110	128
58	2190	30.18	1190	1.9							
65	1950	26.97	1160	2.1							
66	1910	26.31	1150	2.2	**iC 572 – HB3 90 LB 4 B16D**	2	89	105	97	110	
70	1810	24.99 (1)	1140	2.3							
79	1590	21.93	1100	2.6							
94	1350	18.6 (1)	1060	3							
104	1220	16.79	1030	3.3							
118	1070	14.77 (1)	1000	3.8							
125	1010	13.95 (1)	980	4							
146	860	11.88	940	4.6							
47	2680	36.93	950	1.1	**iC 473 – HB3 90 LB 4 B16D**	3	78	91	80	93	126
50	2520	34.73	940	1.2							
58	2160	29.88	910	1.35							
65	1930	26.7	890	1.55							
74	1710	23.59	870	1.75							
75	1690	23.28	870	1.7	**iC 472 – HB3 90 LB 4 B16D**	2	78	91	80	94	
80	1580	21.81	860	1.75							
90	1400	19.27	830	1.9							
97	1300	17.89	820	2							
107	1170	16.22	800	2.1							
119	1050	14.56	775	2.3							
139	910	12.54	750	2.5							
148	855	11.79	735	2.6							
171	735	10.15	705	2.8							
192	655	9.07	685	3							
217	580	8.01	665	3.2			76	89	79	92	
224	560	7.76 (1)	650	2.9							
250	505	6.96	630	3.2							
290	435	6	605	3.6							
309	410	5.64 (1)	595	3.8							
359	350	4.85	570	4.2							
401	315	4.34	550	4.4							
454	280	3.83	530	4.7							
71	1770	24.42	600	1	**iC 373 – HB3 90 LB 4 B12D**	3	63	76	67	81	124
90	1400	19.31	720	1.3	**iC 372 – HB3 90 LB 4 B12D**	2	63	76	67	80	
96	1310	18.05	750	1.4							
112	1130	15.6	745	1.6							
131	960	13.25	715	1.8							
147	855	11.83	700	1.9							
172	730	10.11	670	2.1							
184	685	9.47	660	2.2							
218	580	7.97	635	2.4							

(1) Finite transmission ratio *i*

P_1 = 2 hp





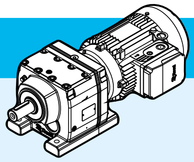
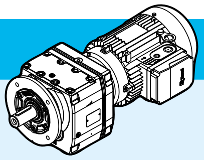
n_2 rpm	T_2 lb in	i		F_{r2} lb	SF			lb foot HB	 HBZ	flange HB	 HBZ	p.
261	485	6.67		600	2.7	**iC 372 – HB3 90 LB 4 B12D**	**2**	62	75	66	80	124
307	410	5.67		575	3.1							
344	365	5.06		555	3.3							
403	315	4.32		530	3.6							
430	295	4.05		520	3.7							
510	245	3.41		495	4.1							
111	1130	15.63		470	1.05	**iC 272 – HB3 90 LB 4 B12D**	**2**	60	74	61	75	122
131	960	13.28	(1)	460	1.25							
147	860	11.86		450	1.35							
172	735	10.13		435	1.5							
213	590	8.16		405	1.75			60	73	61	74	
228	550	7.63	(1)	400	1.8							
264	475	6.59		390	2							
311	405	5.6	(1)	375	2.2							
348	360	5	(1)	365	2.4							
407	310	4.27		350	2.5							
435	290	4	(1)	345	2.6							
516	245	3.37		330	2.9							

P_1 = 3 hp

8.1	23200	216.28		3940	1.3	**iC 973 – HB3 112 MA 4 B30E**	**3**	345	360	385	395	136
9.4	20000	186.3		4900	1.5							
10	18300	170.02		5430	1.6							
12	16200	150.78		6050	1.8							
14	13600	126.75		6200	2.1							
15	12500	116.48		6240	2.3							
17	11100	103.44		6280	2.6							
19	9940	92.48		6320	2.9							
21	8930	83.15		6250	3.2							
24	7750	72.17		6000	3.7							
27	7010	65.21		5830	4							
29	6440	59.92		5680	4.4							
33	5720	53.21		5490	4.9							
37	5110	47.58		5310	5.4							
14	13400	124.97		2930	1.15	**iC 873 – HB3 112 MA 4 B25E**	**3**	235	250	255	265	134
15	12700	118.43	(1)	3190	1.2							
17	11100	103.65		3770	1.4							
19	10000	93.38		4170	1.55							
21	8800	81.92		4460	1.75							
24	7800	72.57		4490	1.95							
28	6840	63.68	(1)	4490	2.2							
29	6480	60.35	(1)	4490	2.3							

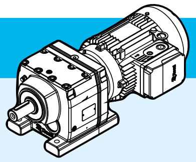
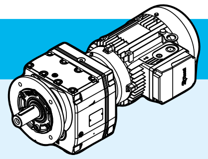
(1) Finite transmission ratio *i*

P_1 = 3 hp

n_2 rpm	T_2 lb in	i	F_{r2} lb	SF			lb foot HB	lb foot HBZ	lb flange HB	lb flange HBZ	p.
33	5670	52.82	4480	2.7	**iC 873 – HB3 112 MA 4 B25E**	3	235	250	255	265	134
37	5110	47.58	4350	2.9							
42	4480	41.74	4190	3.3							
48	3960	36.84 (1)	4040	3.7							
54	3510	32.66 (1)	3900	4							
51	3700	34.4 (1)	3960	4	**iC 872 – HB3 112 MA 4 B25E**	2	230	245	250	260	
56	3370	31.4	3850	4.2							
63	2990	27.84 (1)	3720	4.6							
75	2510	23.4	3520	5.5							
82	2310	21.51	3440	5.8							
27	7070	65.77	2280	1.1	**iC 773 – HB3 112 MA 4 B20E**	3	160	175	175	185	132
31	6200	57.68	2450	1.25							
34	5590	52.07	2550	1.4							
38	4920	45.81	2650	1.55							
41	4650	43.26	2690	1.6							
48	3960	36.83	2730	1.85							
53	3600	33.47	2660	2							
61	3120	29	2560	2.3							
70	2710	25.23	2470	2.5							
75	2510	23.37	2410	2.9	**iC 772 – HB3 112 MA 4 B20E**	2	155	170	170	185	
82	2300	21.43	2360	3.2							
94	2020	18.8	2270	3.4							
99	1910	17.82 (1)	2230	3.6							
113	1680	15.6	2150	3.9							
125	1510	14.05	2080	4.2							
44	4280	39.88 (1)	1960	1.2	**iC 673 – HB3 112 MA 4 B16E**	3	145	155	150	165	130
47	4030	37.5	2010	1.25							
55	3470	32.27	2100	1.4							
61	3100	28.83	2040	1.5							
75	2520	23.44	1940	2.2	**iC 672 – HB3 112 MA 4 B16E**	2	140	155	150	160	
89	2140	19.89	1850	2.5							
98	1930	17.95	1800	2.7							
111	1700	15.79	1740	2.9							
118	1600	14.91	1710	3							
139	1360	12.7	1640	3.4							
153	1240	11.54	1590	3.6							
176	1070	10	1530	3.9							
202	935	8.7 (1)	1460	4.2							
226	835	7.79	1420	4			135	150	145	155	
47	4010	37.3 (1)	1120	1.05	**iC 573 – HB3 112 MA 4 B16E**	3	125	140	130	145	128
50	3770	35.07	1110	1.1							
58	3240	30.18	1090	1.25							
65	2900	26.97	1070	1.4							

(1) Finite transmission ratio *i*

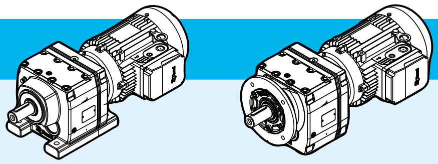
P_1 = 3 hp

n_2	T_2	i	F_{r2}	SF			lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
80	2360	21.93	1030	1.75	**iC 572 – HB3 112 MA 4 B16E**	**2**	120	135	130	145	128
95	2000	18.6 (1)	1000	2							
105	1800	16.79	980	2.2							
119	1590	14.77 (1)	950	2.5							
126	1500	13.95 (1)	940	2.7							
148	1280	11.88	900	3.1							
163	1160	10.79	880	3.3							
188	1000	9.35	850	3.6							
194	975	9.06	840	3.4			120	130	125	140	
221	855	7.97	810	3.7							
91	2070	19.27	770	1.3	**iC 472 – HB3 112 MA 4 B16E**	**2**	110	125	115	125	126
109	1740	16.22	745	1.4							
121	1560	14.56	730	1.5							
140	1350	12.54	705	1.65							
149	1270	11.79	700	1.7							
173	1090	10.15	675	1.9							
194	975	9.07	655	2							
220	860	8.01	635	2.2			110	120	110	125	
227	835	7.76 (1)	620	1.95							
253	750	6.96	605	2.1							
293	645	6	580	2.4							
312	605	5.64 (1)	575	2.6							
363	520	4.85	550	2.8							
406	465	4.34	535	3							
459	410	3.83	515	3.2							
113	1680	15.6	395	1.05	**iC 372 – HB3 112 MA 4 B12E**	**2**	94	105	98	110	124
133	1420	13.25	490	1.2							
149	1270	11.83	545	1.3							
174	1090	10.11	600	1.4							
186	1020	9.47	620	1.45							
221	855	7.97	600	1.6							
264	715	6.67	570	1.8			93	105	97	110	
311	610	5.67	545	2.1							
348	545	5.06	530	2.2							
407	465	4.32	510	2.4							
435	435	4.05	505	2.5							
516	365	3.41	480	2.7							
174	1090	10.13	335	1	**iC 272 – HB3 112 MA 4 B12E**	**2**	91	105	92	105	122
267	710	6.59	320	1.35							
314	600	5.6 (1)	345	1.45							
352	535	5 (1)	340	1.55							
412	460	4.27	330	1.7							
440	430	4 (1)	325	1.75							
522	360	3.37	315	1.95							

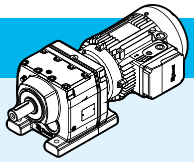
(1) Finite transmission ratio *i*

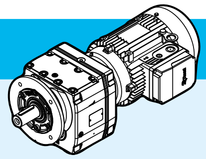
P_1 = 4 hp

n_2 rpm	T_2 lb in	i		F_{r2} lb	SF			lb foot		flange		p.
								HB	HBZ	HB	HBZ	
12	21700	150.78		4430	1.35	**iC 973 – HB3 112 M 4 B30E**	3	355	365	390	400	136
14	18300	126.75		5460	1.6							
15	16800	116.48		5900	1.7							
17	14900	103.44		6160	1.9							
19	13300	92.48		6210	2.1							
21	12000	83.15		6100	2.4							
24	10400	72.17		5870	2.7							
27	9390	65.21		5700	3							
29	8630	59.92		5570	3.3							
33	7670	53.21		5390	3.7							
37	6850	47.58		5220	4							
41	6160	42.78		5060	4.3							
47	5350	37.13		4850	5							
53	4790	33.25		4700	5.4							
19	13500	93.38		2950	1.15	**iC 873 – HB3 112 M 4 B25E**	3	240	255	260	275	134
21	11800	81.92		3550	1.3							
24	10500	72.57		4040	1.45							
27	9170	63.68	(1)	4430	1.65							
29	8690	60.35	(1)	4480	1.75							
33	7610	52.82		4360	2							
37	6850	47.58		4240	2.2							
42	6010	41.74		4090	2.5							
48	5310	36.84	(1)	3960	2.8							
54	4700	32.66	(1)	3820	3							
63	4020	27.88		3650	3.3							
51	4960	34.4	(1)	3880	3	**iC 872 – HB3 112 M 4 B25E**	2	240	250	255	270	
56	4520	31.4		3780	3.1							
63	4010	27.84	(1)	3650	3.5							
75	3370	23.4		3470	4.1							
81	3100	21.51		3390	4.3							
92	2750	19.1		3270	4.7							
102	2460	17.08	(1)	3160	5							
114	2210	15.35		3060	5.4							
38	6600	45.81		2380	1.15	**iC 773 – HB3 112 M 4 B20E**	3	170	180	185	195	132
40	6230	43.26		2450	1.2							
48	5310	36.83		2600	1.4							
52	4820	33.47		2570	1.5							
60	4180	29		2480	1.75							
69	3640	25.23		2400	1.9							
75	3370	23.37		2350	2.2	**iC 772 – HB3 112 M 4 B20E**	2	165	180	180	195	
82	3090	21.43		2300	2.4							
93	2710	18.8		2220	2.6							
98	2570	17.82	(1)	2190	2.7							
112	2250	15.6		2110	2.9							

(1) Finite transmission ratio *i*

P_1 = 4 hp

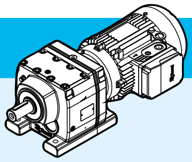


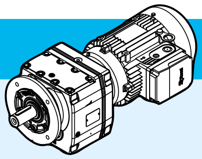


n_2	T_2	i	F_{r2}	SF			lb foot		lb flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
125	2020	14.05	2040	3.2	**iC 772 – HB3 112 M 4 B20E**	2	165	180	180	195	132
142	1780	12.33	1970	3.5							
161	1570	10.88	1900	3.8							
181	1390	9.64	1830	4			160	170	175	185	
204	1240	8.59	1780	4.5							
226	1120	7.74	1730	4.9							
258	980	6.79	1660	5.3							
75	3380	23.44	1870	1.65	**iC 672 – HB3 112 M 4 B16E**	2	145	160	155	165	130
88	2860	19.89	1790	1.85							
97	2590	17.95	1750	2							
111	2280	15.79	1690	2.2							
117	2150	14.91	1670	2.3							
138	1830	12.7	1600	2.5							
152	1660	11.54	1560	2.7							
175	1440	10	1500	2.9							
65	3880	26.97	980	1.05	**iC 573 – HB3 112 M 4 B16E**	3	130	145	135	150	128
80	3160	21.93	960	1.3	**iC 572 – HB3 112 M 4 B16E**	2	130	140	135	150	
94	2680	18.6 (1)	940	1.5							
104	2420	16.79	920	1.7							
118	2130	14.77 (1)	900	1.9							
125	2010	13.95 (1)	890	2							
147	1710	11.88	860	2.3							
162	1560	10.79	840	2.5							
187	1350	9.35	820	2.7							
193	1310	9.06	810	2.6			125	140	130	145	
220	1150	7.97	790	2.8							
232	1080	7.53	775	2.9							
273	925	6.41	745	3.2							
300	840	5.82	725	3.4							
347	725	5.05	700	3.7							
399	635	4.39	675	4							
108	2340	16.22	670	1.05	**iC 472 – HB3 112 M 4 B16E**	2	115	130	120	130	126
120	2100	14.56	680	1.15							
140	1810	12.54	665	1.25							
148	1700	11.79	660	1.3							
172	1460	10.15	640	1.4							
193	1310	9.07	625	1.5							
218	1150	8.01	610	1.6			115	130	115	130	
226	1120	7.76 (1)	590	1.45							
251	1000	6.96	575	1.6							
292	865	6	560	1.8							

(1) Finite transmission ratio *i*

P_1 = 4 hp





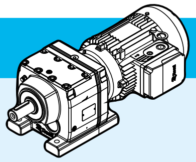
n_2	T_2	i	F_{r2}	SF			lb				p.
							foot		flange		
rpm	lb in		lb				HB	HBZ	HB	HBZ	
310	810	5.64 (1)	550	1.9	**iC 472 – HB3 112 M 4 B16E**	2	115	130	120	130	126
361	700	4.85	530	2.1							
404	625	4.34	515	2.2							
457	550	3.83	500	2.4							
173	1460	10.11	340	1.05	**iC 372 – HB3 112 M 4 B12E**	2	100	115	105	120	124
185	1360	9.47	380	1.1							
219	1150	7.97	455	1.2							
262	960	6.67	400	1.35							
309	815	5.67	455	1.55							
346	730	5.06	485	1.65							
405	620	4.32	490	1.8							
432	585	4.05	485	1.85							
513	490	3.41	465	2							
312	805	5.6 (1)	193	1.1	**iC 272 – HB3 112 M 4 B12E**	2	98	110	99	110	122
350	720	5 (1)	235	1.2							
410	615	4.27	280	1.25							
438	575	4 (1)	295	1.3							
519	485	3.37	295	1.45							

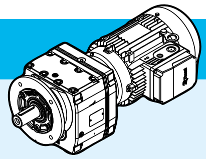
P_1 = 5.4 hp

15	22500	116.48	4180	1.3	**iC 973 – HB3 112 MB 4 B30F**	3	360	375	395	415	136
17	20000	103.44	4930	1.45							
19	17900	92.48	5560	1.6							
21	16100	83.15	5880	1.75							
24	14000	72.17	5680	2							
27	12600	65.21	5530	2.2							
29	11600	59.92	5410	2.4							
33	10300	53.21	5250	2.7							
37	9200	47.58	5090	3							
41	8270	42.78	4940	3.2							
47	7180	37.13	4750	3.7							
53	6430	33.25	4610	4							
55	6200	32.05	4560	4.1	**iC 972 – HB3 112 MB 4 B30F**	2	350	370	385	405	
65	5260	27.19	4350	4.7							
70	4840	25.03	4240	5.2							
79	4330	22.37	4100	5.6							
87	3890	20.14	3980	6							
28	12300	63.68 (1)	3360	1.25	**iC 873 – HB3 112 MB 4 B25F**	3	245	265	265	285	134
29	11700	60.35 (1)	3550	1.3							
33	10200	52.82	3740	1.5							
37	9200	47.58	3860	1.65							
42	8070	41.74	3960	1.85							

(1) Finite transmission ratio *i*

P_1 = 5.4 hp

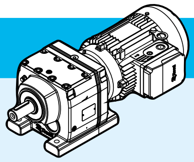
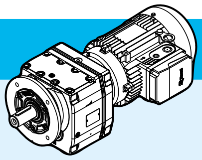




n_2	T_2	i	F_{r2}	SF			lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
48	7120	36.84 (1)	3840	2.1	**iC 873 – HB3 112 MB 4 B25F**	3	245	265	265	285	134
54	6310	32.66 (1)	3720	2.2							
63	5390	27.88	3570	2.5							
51	6650	34.4 (1)	3770	2.2	**iC 872 – HB3 112 MB 4 B25F**	2	245	260	260	280	
56	6070	31.4	3680	2.3							
63	5380	27.84 (1)	3560	2.6							
75	4530	23.4	3400	3							
82	4160	21.51	3320	3.2							
92	3690	19.1	3210	3.5							
103	3300	17.08 (1)	3110	3.7							
115	2970	15.35	3010	4							
132	2580	13.33	2890	4.4							
147	2310	11.93	2790	4.7							
48	7120	36.83	2270	1	**iC 773 – HB3 112 MB 4 B20F**	3	175	190	185	205	132
53	6470	33.47	2400	1.15							
61	5610	29	2370	1.3							
70	4880	25.23	2300	1.4							
75	4520	23.37	2260	1.6	**iC 772 – HB3 112 MB 4 B20F**	2	170	190	185	205	
82	4140	21.43	2210	1.75							
94	3640	18.8	2140	1.9							
99	3450	17.82 (1)	2120	2							
113	3020	15.6	2050	2.2							
125	2720	14.05	1990	2.4							
143	2380	12.33	1920	2.6							
162	2100	10.88	1860	2.8							
183	1860	9.64	1800	3			160	180	175	195	
205	1660	8.59	1750	3.4							
227	1500	7.74	1700	3.6							
259	1310	6.79	1640	3.9							
294	1160	5.99 (1)	1580	4.2							
331	1030	5.31 (1)	1520	4.4							
89	3850	19.89	1710	1.4	**iC 672 – HB3 112 MB 4 B16F**	2	150	170	155	175	130
98	3470	17.95	1670	1.5							
111	3050	15.79	1630	1.65							
118	2880	14.91	1600	1.7							
139	2460	12.7	1540	1.9							
153	2230	11.54	1510	2							
176	1930	10	1450	2.2							
202	1680	8.7 (1)	1400	2.3							
226	1510	7.79	1360	2.2			145	165	155	175	
239	1420	7.36 (1)	1340	2.3							
281	1210	6.27	1280	2.4							
309	1100	5.7	1250	2.5							

(1) Finite transmission ratio *i*

P_1 = 5.4 hp

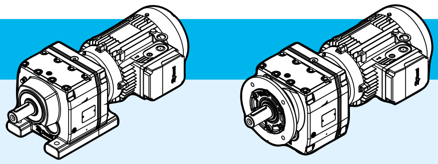
n_2 rpm	T_2 lb in	i	F_{r2} lb	SF	 		lb foot HB	foot HBZ	flange HB	flange HBZ	p.
357	955	4.93	1200	2.7	**iC 672 – HB3 112 MB 4 B16F**	2	145	170	155	175	130
410	830	4.29	1150	2.9							
95	3600	18.6 (1)	850	1.15	**iC 572 – HB3 112 MB 4 B16F**	2	130	150	140	160	128
105	3250	16.79	840	1.25							
119	2860	14.77 (1)	830	1.4							
126	2700	13.95 (1)	830	1.5							
148	2300	11.88	810	1.75							
163	2090	10.79	795	1.85							
188	1810	9.35	775	2							
194	1750	9.06	770	1.9			130	150	135	155	
221	1540	7.97	750	2							
234	1460	7.53	745	2.1							
275	1240	6.41	715	2.4							
302	1130	5.82	700	2.5							
349	975	5.05	675	2.8							
401	850	4.39	655	2.9							
173	1960	10.15	590	1.05	**iC 472 – HB3 112 MB 4 B16F**	2	120	140	125	145	126
194	1750	9.07	585	1.1							
220	1550	8.01	575	1.2			120	140	120	140	
253	1350	6.96	540	1.2							
293	1160	6	525	1.35							
312	1090	5.64 (1)	520	1.4							
363	940	4.85	505	1.55							
406	840	4.34	495	1.65							
459	740	3.83	480	1.75							

P_1 = 7.5 hp

21	22200	83.15	4230	1.3	**iC 973 – HB3 132 M 4 B30G**	3	410	435	445	470	136
25	19300	72.17	5110	1.45							
27	17400	65.21	5280	1.6							
30	16000	59.92	5190	1.75							
33	14200	53.21	5040	1.95							
37	12700	47.58	4910	2.2							
41	11400	42.78	4780	2.3							
48	9920	37.13	4610	2.7							
53	8880	33.25	4480	2.9							
64	7370	27.58	4260	3.2							
55	8560	32.05	4440	3	**iC 972 – HB3 132 M 4 B30G**	2	400	425	435	460	
65	7260	27.19	4240	3.4							
71	6680	25.03	4150	3.7							
79	5980	22.37	4020	4							
88	5380	20.14	3900	4.3							

(1) Finite transmission ratio *i*

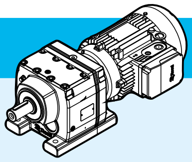
P_1 = 7.5 hp

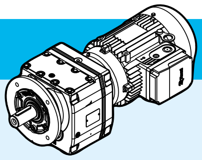


n_2	T_2	i		F_{r2}	SF			lb foot		lb flange		p.
rpm	lb in			lb				HB	HBZ	HB	HBZ	
97	4870	18.24		3790	4.5	**iC 972 – HB3 132 M 4 B30G**	2	400	425	435	460	136
109	4320	16.17		3660	4.9							
37	12700	47.58		3880	1.2	**iC 873 – HB3 132 M 4 B25G**	3	300	325	320	345	134
42	11100	41.74		3770	1.35							
48	9840	36.84	(1)	3670	1.5							
54	8720	32.66	(1)	3570	1.65							
63	7450	27.88		3440	1.8							
64	7440	27.84	(1)	3440	1.85	**iC 872 – HB3 132 M 4 B25G**	2	295	320	315	340	
76	6250	23.4		3290	2.2							
82	5740	21.51		3220	2.3							
93	5100	19.1		3120	2.5							
104	4560	17.08	(1)	3030	2.7							
115	4100	15.35		2940	2.9							
133	3560	13.33		2830	3.2							
148	3190	11.93		2740	3.4							
179	2640	9.9	(1)	2600	4							
194	2440	9.14	(1)	2560	4.4			280	305	300	320	
215	2200	8.22		2480	4.7							
248	1910	7.13		2380	5							
94	5020	18.8		2040	1.35	**iC 772 – HB3 132 M 4 B20G**	2	220	245	235	260	132
99	4760	17.82	(1)	2020	1.45							
113	4170	15.6		1960	1.55							
126	3750	14.05		1910	1.7							
144	3290	12.33		1850	1.85							
163	2900	10.88		1800	2							
184	2580	9.64		1740	2.2			210	235	225	250	
206	2290	8.59		1710	2.4							
229	2070	7.74		1660	2.6							
261	1810	6.79		1600	2.8							
295	1600	5.99	(1)	1550	3							
333	1420	5.31	(1)	1490	3.2							
112	4220	15.79		1530	1.2	**iC 672 – HB3 132 M 4 B16G**	2	205	230	210	235	130
119	3980	14.91		1510	1.2							
139	3390	12.7		1460	1.35							
153	3080	11.54		1440	1.45							
177	2670	10		1390	1.55							
203	2320	8.7	(1)	1350	1.7							
227	2080	7.79		1320	1.6			200	225	205	230	
240	1970	7.36	(1)	1300	1.65							
282	1670	6.27		1250	1.75							
311	1520	5.7		1210	1.8							
359	1320	4.93		1170	1.95							
412	1150	4.29		1120	2.1							

(1) Finite transmission ratio *i*

P_1 = 7.5 hp





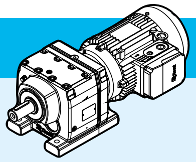
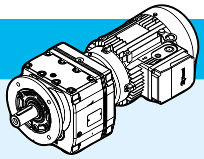
n_2 rpm	T_2 lb in	i	F_{r2} lb	SF			lb foot		flange		p.
							HB	HBZ	HB	HBZ	
127	3730	13.95 (1)	675	1.1	**iC 572 – HB3 132 M 4 B16G**	2	185	210	190	215	128
149	3170	11.88	725	1.25							
164	2880	10.79	720	1.35							
189	2500	9.35	710	1.45							
222	2130	7.97	700	1.5			180	205	190	210	
235	2010	7.53	695	1.55							
276	1710	6.41	675	1.75							
304	1560	5.82	660	1.8							
351	1350	5.05	645	2							
403	1170	4.39	625	2.1							
365	1300	4.85	465	1.15	**iC 472 – HB3 132 M 4 B16G**	2	170	195	175	200	
408	1160	4.34	460	1.2							126
462	1020	3.83	450	1.3							

P_1 = 10 hp

24	25800	72.17	3210	1.1	**iC 973 – HB3 132 MB 4 B30G**	3	435	455	470	495	136
27	23400	65.21	4980	1.2							
29	21500	59.92	4910	1.3							
33	19100	53.21	4800	1.45							
37	17000	47.58	4690	1.6							
41	15300	42.78	4580	1.75							
47	13300	37.13	4440	2							
53	11900	33.25	4320	2.2							
64	9880	27.58	4130	2.4							
55	11500	32.05	4290	2.2	**iC 972 – HB3 132 MB 4 B30G**	2	425	450	460	485	
65	9740	27.19	4110	2.5							
70	8960	25.03	4030	2.8							
79	8010	22.37	3910	3							
87	7210	20.14	3800	3.2							
96	6530	18.24	3700	3.4							
48	13200	36.84 (1)	3470	1.1	**iC 873 – HB3 132 MB 4 B25G**	3	325	350	340	365	134
54	11700	32.66 (1)	3390	1.2							
63	9990	27.88	3280	1.35							
63	9970	27.84 (1)	3280	1.4	**iC 872 – HB3 132 MB 4 B25G**	2	320	345	335	360	
75	8380	23.4	3160	1.65							
82	7700	21.51	3100	1.75							
92	6840	19.1	3010	1.9							
103	6120	17.08 (1)	2930	2							
115	5500	15.35	2860	2.2							
132	4770	13.33	2750	2.4							
147	4270	11.93	2670	2.6							
178	3550	9.9 (1)	2540	3							
193	3270	9.14 (1)	2520	3.3			305	330	320	345	
214	2940	8.22	2440	3.5							

(1) Finite transmission ratio *i*

P_1 = 10 hp

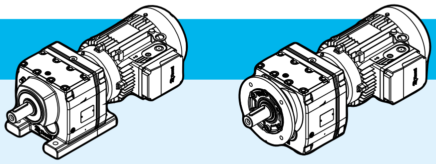
n_2	T_2	i	F_{r2}	SF	 		lb foot		flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
247	2550	7.13	2340	3.7	**iC 872 – HB3 132 MB 4 B25G**	2	305	345	335	360	134
275	2290	6.39	2270	4							
332	1900	5.3 (1)	2140	4.3							
94	6730	18.8	1540	1.05	**iC 772 – HB3 132 MB 4 B20G**	2	245	265	255	280	132
99	6380	17.82 (1)	1600	1.1							
113	5590	15.6	1740	1.2							
125	5030	14.05	1820	1.3							
143	4410	12.33	1770	1.4							
162	3900	10.88	1720	1.5							
183	3450	9.64	1680	1.65			235	260	250	275	
205	3080	8.59	1660	1.85							
227	2770	7.74	1620	1.95							
259	2430	6.79	1560	2.1							
294	2150	5.99 (1)	1510	2.2							
331	1900	5.31 (1)	1460	2.4							
139	4550	12.7	1250	1	**iC 672 – HB3 132 MB 4 B16G**	2	225	250	235	255	130
153	4130	11.54	1350	1.1							
176	3580	10	1320	1.15							
202	3120	8.7 (1)	1280	1.25							
226	2790	7.79	1260	1.2			220	245	230	255	
239	2640	7.36 (1)	1240	1.25							
281	2240	6.27	1200	1.3							
309	2040	5.7	1170	1.35							
357	1770	4.93	1130	1.45							
410	1540	4.29	1090	1.55							
221	2850	7.97	460	1.1	**iC 572 – HB3 132 MB 4 B16G**	2	205	230	210	235	128
234	2700	7.53	510	1.15							
275	2300	6.41	625	1.3							
302	2090	5.82	615	1.35							
349	1810	5.05	605	1.5							
401	1570	4.39	590	1.6							

P_1 = 12.3 hp

33	23400	53.21	4580	1.2	**iC 973 – HB3 132 MC 4 B30H**	3	435	455	470	495	136
37	20900	47.58	4490	1.3							
41	18800	42.78	4400	1.4							
48	16300	37.13	4280	1.65							
53	14600	33.25	4180	1.75							
64	12100	27.58	4010	1.95							
71	11000	25.03	3920	2.3	**iC 972 – HB3 132 MC 4 B30H**	2	425	450	460	485	
79	9830	22.37	3820	2.5							
88	8850	20.14	3720	2.6							
97	8010	18.24	3630	2.8							

(1) Finite transmission ratio *i*

P_1 = 12.3 hp



n_2	T_2	i		F_{r2}	SF			lb foot		flange		p.
rpm	lb in			lb				HB	HBZ	HB	HBZ	
109	7100	16.17		3510	3	**iC 972 – HB3 132 MC 4 B30H**	**2**	425	450	460	485	136
121	6420	14.62		3420	3.2							
142	5440	12.39		3270	3.6							
82	9450	21.51		2990	1.4	**iC 872 – HB3 132 MC 4 B25H**	**2**	320	345	335	360	134
92	8390	19.1		2920	1.55							
103	7500	17.08	(1)	2850	1.65							
115	6740	15.35		2780	1.75							
132	5850	13.33		2690	1.95							
148	5240	11.93		2610	2.1							
178	4350	9.9	(1)	2490	2.4							
193	4020	9.14	(1)	2480	2.7			305	330	320	345	
215	3610	8.22		2410	2.9							
247	3130	7.13		2310	3							
276	2810	6.39		2240	3.2							
126	6170	14.05		1370	1.05	**iC 772 – HB3 132 MC 4 B20H**	**2**	245	265	255	280	132
143	5410	12.33		1500	1.15							
162	4780	10.88		1600	1.25							
183	4240	9.64		1620	1.3			235	260	250	275	
228	3400	7.74		1560	1.6							
260	2980	6.79		1520	1.75							
295	2630	5.99	(1)	1480	1.85							
332	2330	5.31	(1)	1430	1.95							

P_1 = 15 hp

37	25300	47.58		4260	1.1	**iC 973 – HB3 160 M 4 B30H**	**3**	315	–	355	–	136
41	22800	42.78		4190	1.15							
48	19800	37.13		4100	1.35							
53	17700	33.25		4020	1.45							
64	14700	27.58		3880	1.6							
71	13300	25.03		3800	1.9	**iC 972 – HB3 160 M 4 B30H**	**2**	310	–	345	–	
79	11900	22.37		3710	2							
88	10700	20.14		3620	2.2							
97	9710	18.24		3540	2.3							
110	8610	16.17		3430	2.5							
121	7790	14.62		3350	2.6							
143	6600	12.39		3210	2.9							
164	5770	10.83		3090	3.2							
191	4950	9.29		3010	3.6			285	–	320	–	
211	4470	8.39		2930	4							
249	3790	7.12		2790	4.7							
286	3310	6.21		2680	5.1							
83	11500	21.51		2870	1.15	**iC 872 – HB3 160 M 4 B25H**	**2**	200	–	220	–	134
93	10200	19.1		2810	1.25							

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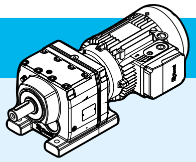
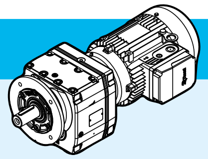
(1) Finite transmission ratio *i*

P_1 = 15 hp





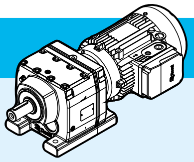
n_2 rpm	T_2 lb in	i	F_{r2} lb	SF			lb foot		flange		p.
							HB	HBZ	HB	HBZ	
104	9100	17.08 (1)	2750	1.35	**iC 872 – HB3 160 M 4 B25H**	3	200	–	220	–	134
116	8180	15.35	2690	1.45							
133	7100	13.33	2610	1.6							
149	6360	11.93	2540	1.7							
179	5270	9.9 (1)	2430	2							
194	4870	9.14 (1)	2440	2.2			185	–	200	–	
216	4380	8.22	2370	2.4							
249	3800	7.13	2280	2.5							
278	3400	6.39	2210	2.7							
335	2820	5.3 (1)	2100	2.9							
163	5790	10.88	1190	1	**iC 772 – HB3 160 M 4 B20H**	2	120	–	135	–	132
184	5140	9.64	1310	1.1			110	–	125	–	
229	4120	7.74	1220	1.3							
261	3620	6.79	1320	1.4							
296	3190	5.99 (1)	1390	1.5							
334	2830	5.31 (1)	1400	1.6							

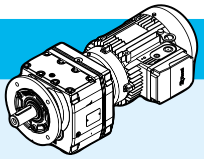
P_1 = 20 hp

48	26400	37.13	3760	1	**iC 973 – HB3 160 L 4 B30H**	3	315	–	355	–	136
53	23600	33.25	3720	1.1			315	–	355	–	
64	19600	27.58	3630	1.2			315	–	355	–	
71	17800	25.03	3570	1.4	**iC 972 – HB3 160 L 4 B30H**	2	310	–	345	–	
79	15900	22.37	3500	1.5							
88	14300	20.14	3440	1.6							
97	13000	18.24	3370	1.7							
110	11500	16.17	3290	1.85							
121	10400	14.62	3220	1.95							
143	8800	12.39	3100	2.2							
164	7690	10.83	3000	2.4							
191	6590	9.29	2940	2.7			285	–	320	–	
211	5960	8.39	2860	3							
249	5050	7.12	2730	3.5							
286	4410	6.21	2630	3.8							
104	12100	17.08 (1)	2560	1	**iC 872 – HB3 160 L 4 B25H**	2	200	–	220	–	134
116	10900	15.35	2520	1.1							
133	9460	13.33	2460	1.2							
149	8470	11.93	2410	1.3							
179	7030	9.9 (1)	2320	1.5							
194	6490	9.14 (1)	2360	1.65			185	–	200	–	
216	5840	8.22	2300	1.75							
249	5070	7.13	2220	1.85							
278	4540	6.39	2150	2							
335	3760	5.3 (1)	2050	2.1							

(1) Finite transmission ratio *i*

P_1 = 25 hp





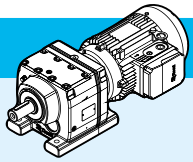
n_2	T_2	i	F_{r2}	SF			lb				p.
rpm	lb in		lb				foot		flange		
							HB	HBZ	HB	HBZ	
88	17800	20.14	3250	1.3	**iC 972 – HB3 180 M 4 B30L**	**2**	310	–	345	–	136
98	16100	18.24	3200	1.35							
110	14300	16.17	3140	1.5							
122	12900	14.62	3080	1.55							
144	11000	12.39	2980	1.75							
164	9580	10.83	2900	1.95							
192	8220	9.29	2870	2.2			285	–	320	–	
212	7430	8.39	2800	2.4							
250	6300	7.12	2680	2.8							
286	5500	6.21	2580	3							
342	4600	5.2	2460	3.4							
396	3980	4.5 (1)	2360	3.6							
149	10600	11.93	2280	1.05	**iC 872 – HB3 180 M 4 B25L**	**2**	200	–	220	–	134
180	8760	9.9 (1)	2210	1.2							
195	8090	9.14 (1)	2270	1.3			185	–	200	–	
217	7280	8.22	2220	1.4							
249	6320	7.13	2150	1.5							
279	5650	6.39	2090	1.6							
336	4690	5.3 (1)	2000	1.7							

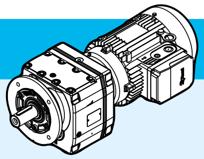
P_1 = 30 hp

88	21400	20.14	3070	1.1	**iC 972 – HB3 180 L 4 B30L**	**2**	310	–	345	–	136
98	19400	18.24	3040	1.15							
110	17200	16.17	2990	1.25							
122	15500	14.62	2950	1.3							
144	13200	12.39	2870	1.45							
164	11500	10.83	2800	1.6							
192	9860	9.29	2800	1.8							
212	8920	8.39	2740	2							
250	7560	7.12	2630	2.3							
286	6600	6.21	2540	2.5							
342	5520	5.2	2420	2.9							
396	4780	4.5 (1)	2330	3							
180	10500	9.9 (1)	2110	1	**iC 872 – HB3 180 L 4 B25L**	**2**	200	–	220	–	134
195	9710	9.14 (1)	2190	1.1			185	–	200	–	
217	8730	8.22	2150	1.2							
249	7580	7.13	2090	1.25							
279	6790	6.39	2040	1.35							
336	5630	5.3 (1)	1950	1.45							

(1) Finite transmission ratio *i*

P_1 = 40 hp





n_2	T_2	i	F_{r2}	SF			lb foot		lb flange		p.
rpm	lb in		lb				HB	HBZ	HB	HBZ	
122	20700	14.62	2680	1	**iC 972 – HB3 200 L 4 B30M**	2	320	–	355	–	136
144	17500	12.39	2640	1.1							
165	15300	10.83	2600	1.2							
192	13100	9.29	2670	1.35			295	–	330	–	
213	11900	8.39	2610	1.5							
251	10000	7.12	2520	1.75							
287	8780	6.21	2450	1.9							
343	7340	5.2	2340	2.1							
397	6360	4.5 (1)	2260	2.3							

(1) Finite transmission ratio *i*

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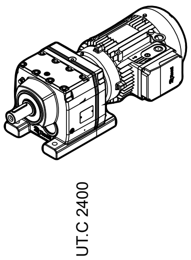
10

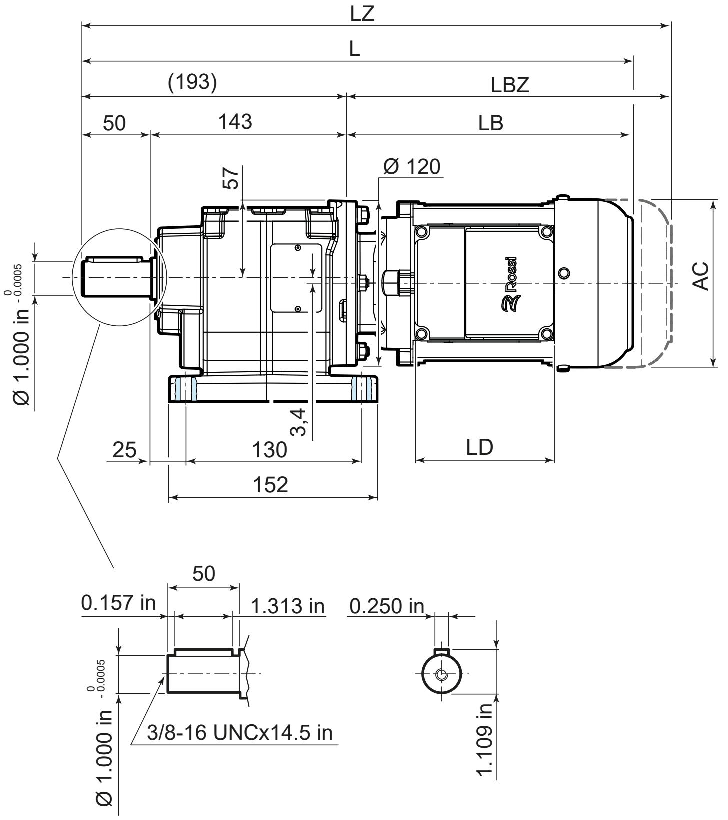
Dimensional drawings

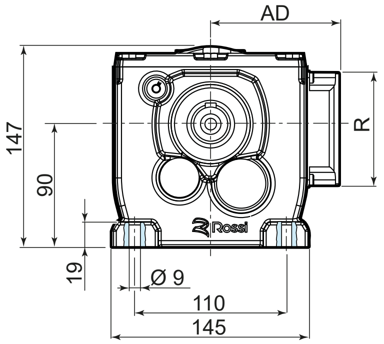
Section contents

10.1

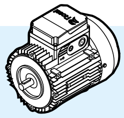
iC 272 / iC 273 PE



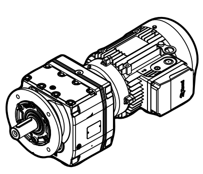


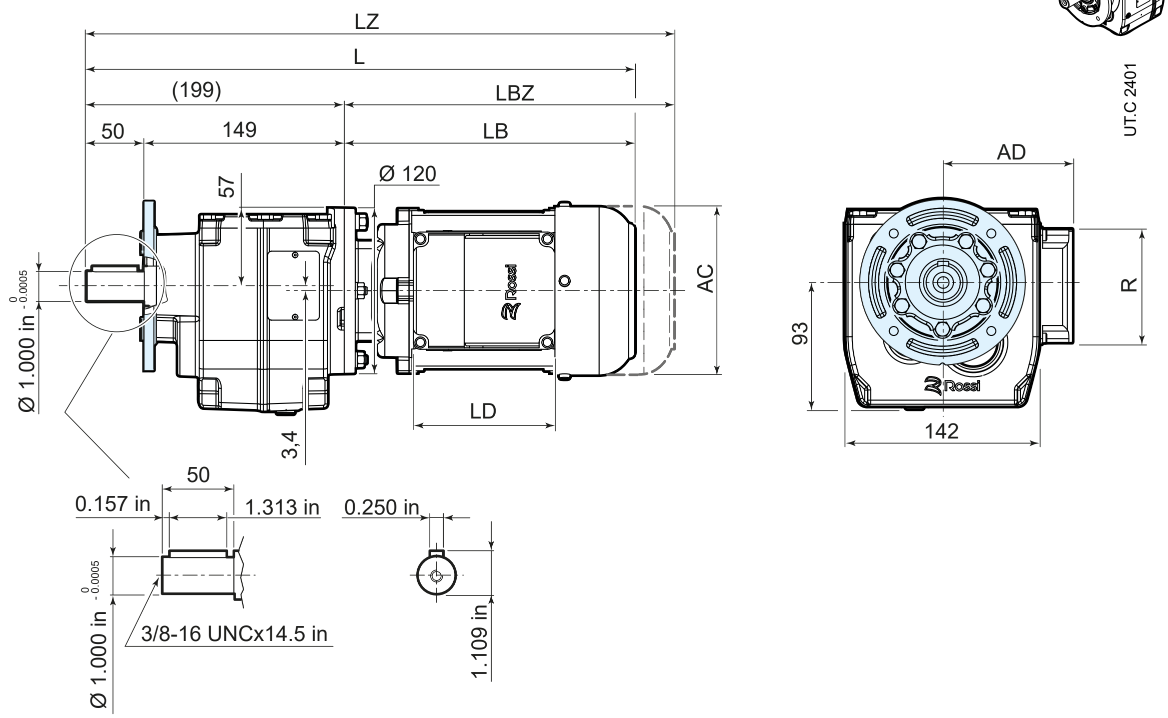


75
66
138

	63	71	80	90S	90L	100	112MA
AC	123	138	156	176	176	194	218
AD	95	112	121	141	141	151	163
LB	211	237	266	290	320	351	389
LBZ	266	299	335	369	399	446	488
L	404	430	459	483	513	544	582
LZ	459	492	528	562	592	639	681
LD	103	103	103	136	136	136	136
R	86	86	86	106	106	106	106

iC 272 / iC 273 FE





F212
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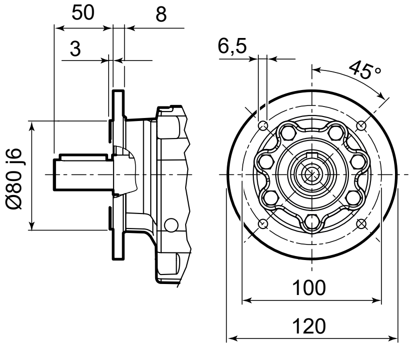
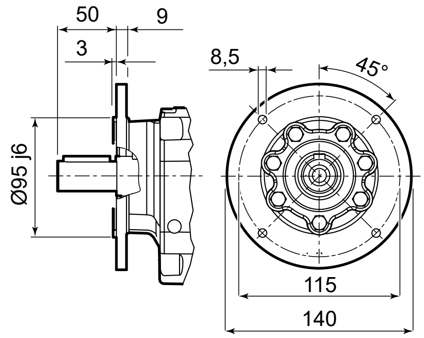
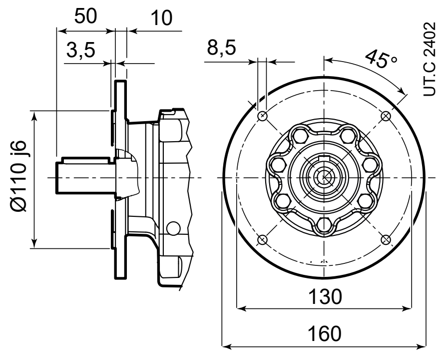


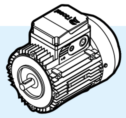
F214
Ø 140



F216
Ø 160

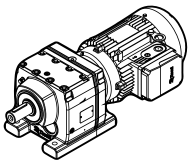


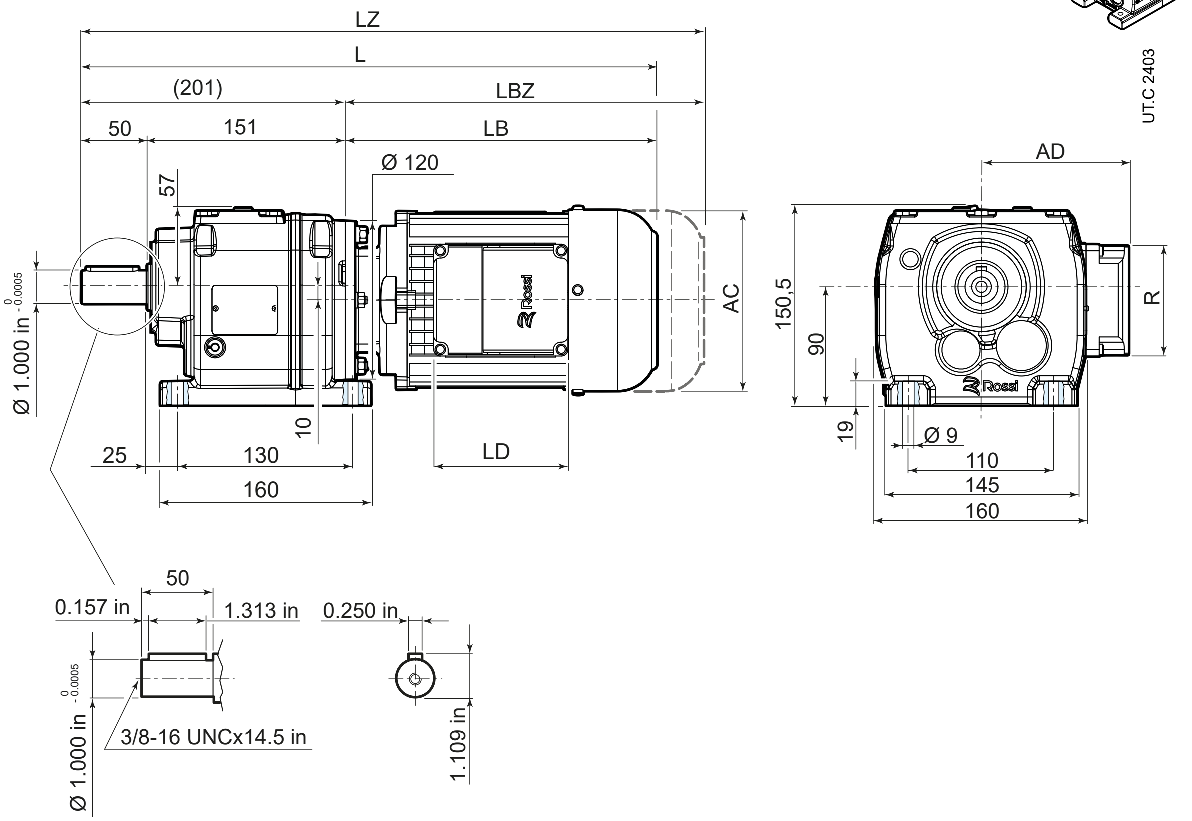
75 66 138

	63	71	80	90S	90L	100	112MA
AC	123	138	156	176	176	194	218
AD	95	112	121	141	141	151	163
LB	211	237	266	290	320	351	389
LBZ	266	299	335	369	399	446	488
L	410	436	465	489	519	550	588
LZ	465	498	534	568	598	645	687
LD	103	103	103	136	136	136	136
R	86	86	86	106	106	106	106

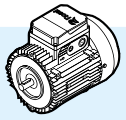
10.2

iC 372 / iC 373 PE

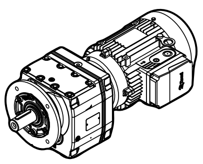


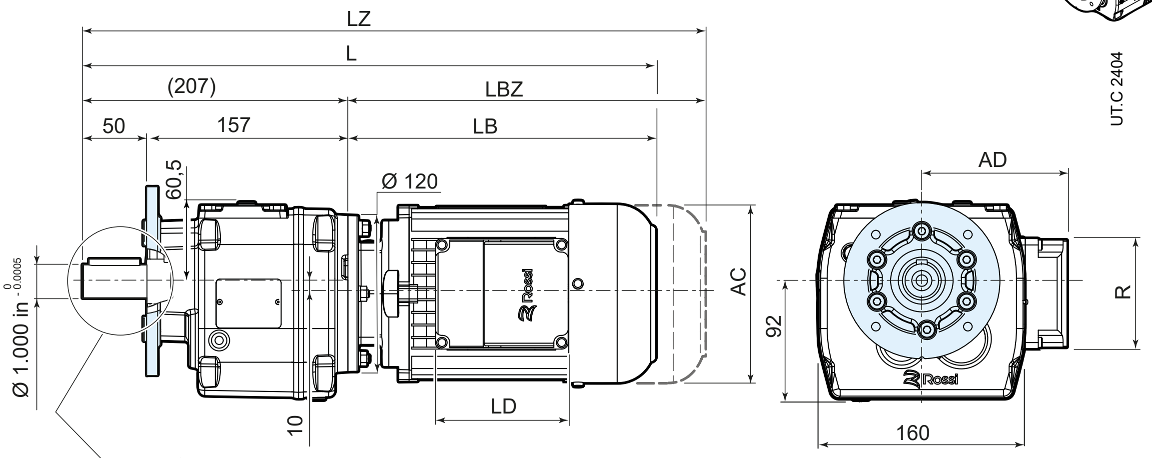


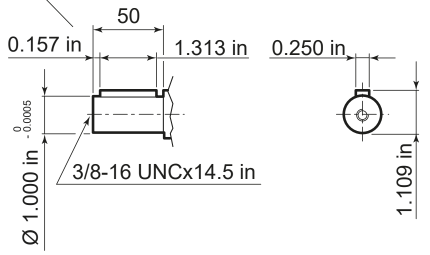
76
66
138

	63	71	80	90S	90L	100	112MA
AC	123	138	156	176	176	194	218
AD	95	112	121	141	141	151	163
LB	211	237	266	290	320	351	389
LBZ	266	299	335	369	399	446	488
L	412	438	467	491	521	552	590
LZ	467	500	536	570	600	647	689
LD	103	103	103	136	136	136	136
R	86	86	86	106	106	106	106

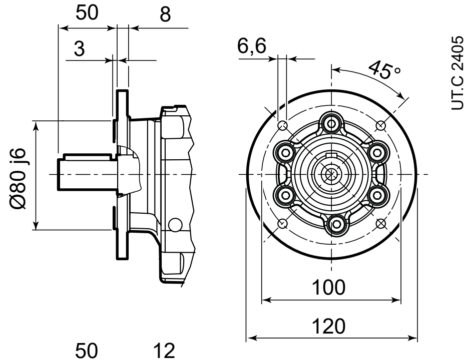
iC 372 / iC 373 FE

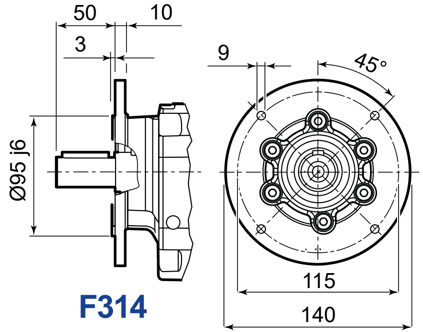




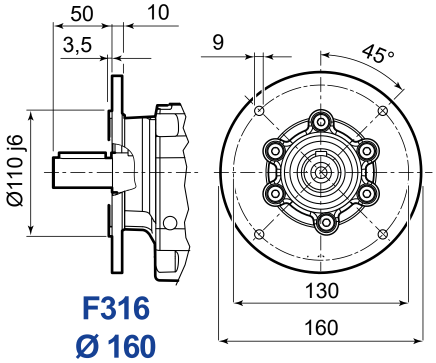


F312
Ø 120





F314
Ø 140



F316
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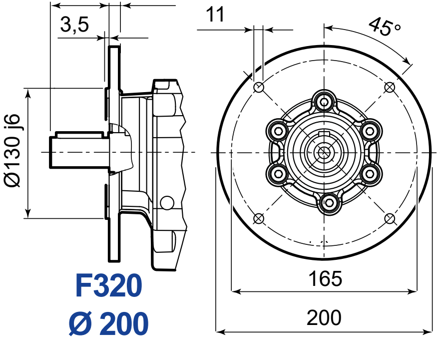
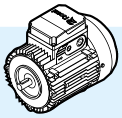


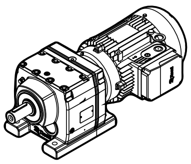
F320
Ø 200

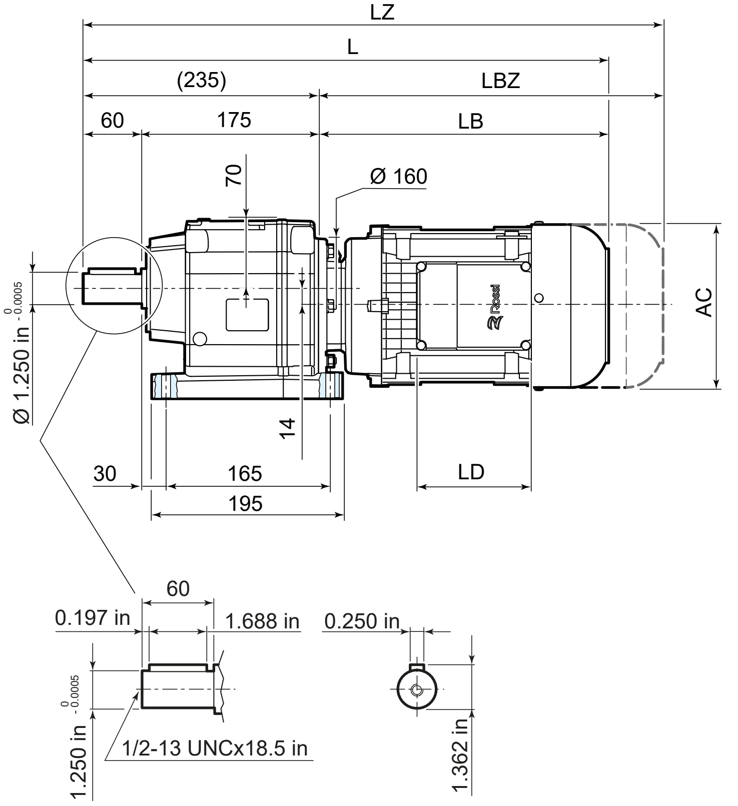
76 66 138

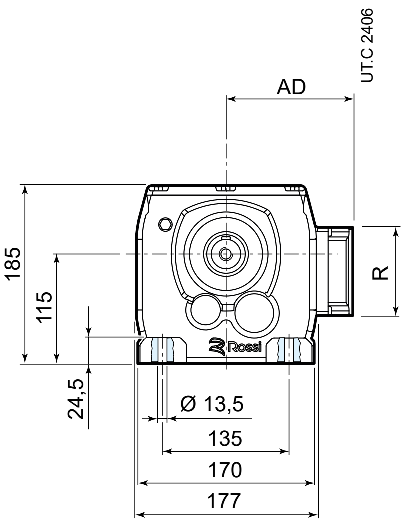
	63	71	80	90S	90L	100	112MA
AC	123	138	156	176	176	194	218
AD	95	112	121	141	141	151	163
LB	211	237	266	290	320	351	389
LBZ	266	299	335	369	399	446	488
L	418	444	473	497	527	558	596
LZ	473	506	542	576	606	653	695
LD	103	103	103	136	136	136	136
R	86	86	86	106	106	106	106

10.3

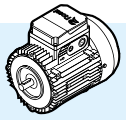
iC 472 / iC 473 PE



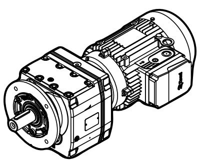


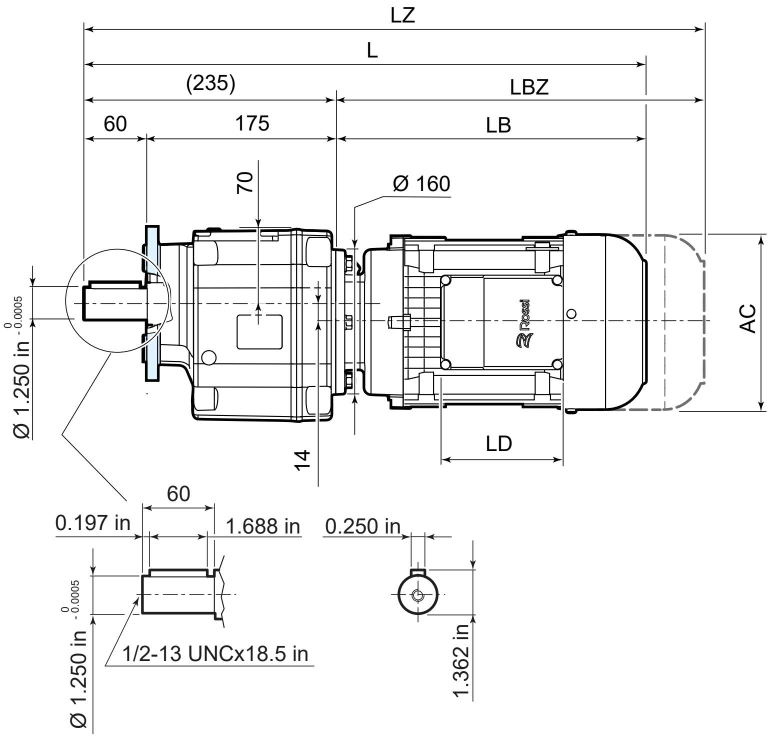


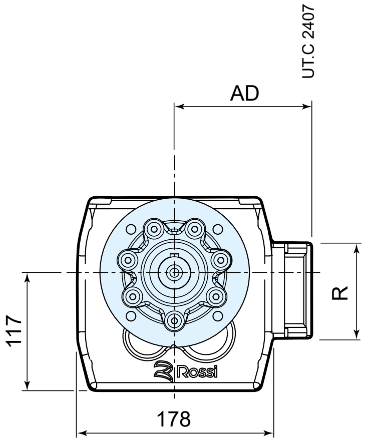
77 66 138

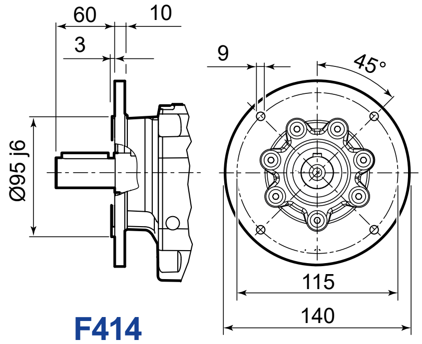
	63	71	80	90S	90L	100	112MA	112M	132S,M
AC	123	138	156	176	176	194	218	218	257
AD	95	112	121	141	141	151	163	163	194
LB	205	231	260	283	313	345	383	383	439
LBZ	260	293	329	362	392	440	482	482	547
L	440	466	495	518	548	580	618	618	674
LZ	495	528	564	597	627	675	717	717	782
LD	103	103	103	136	136	136	136	136	190
R	86	86	86	106	106	106	106	106	148

iC 472 / iC 473 FE









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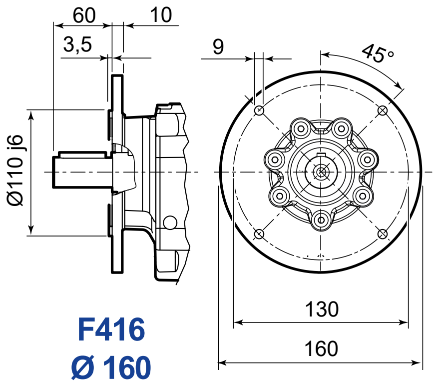

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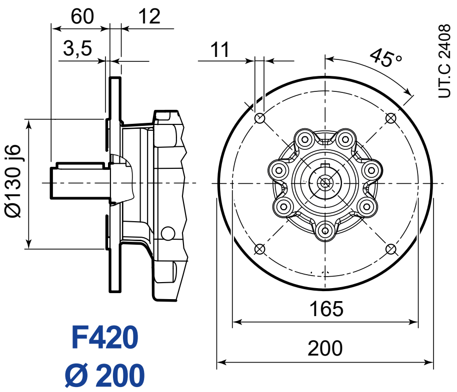

F420
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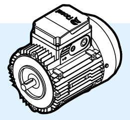
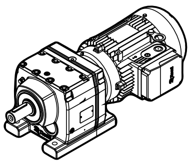
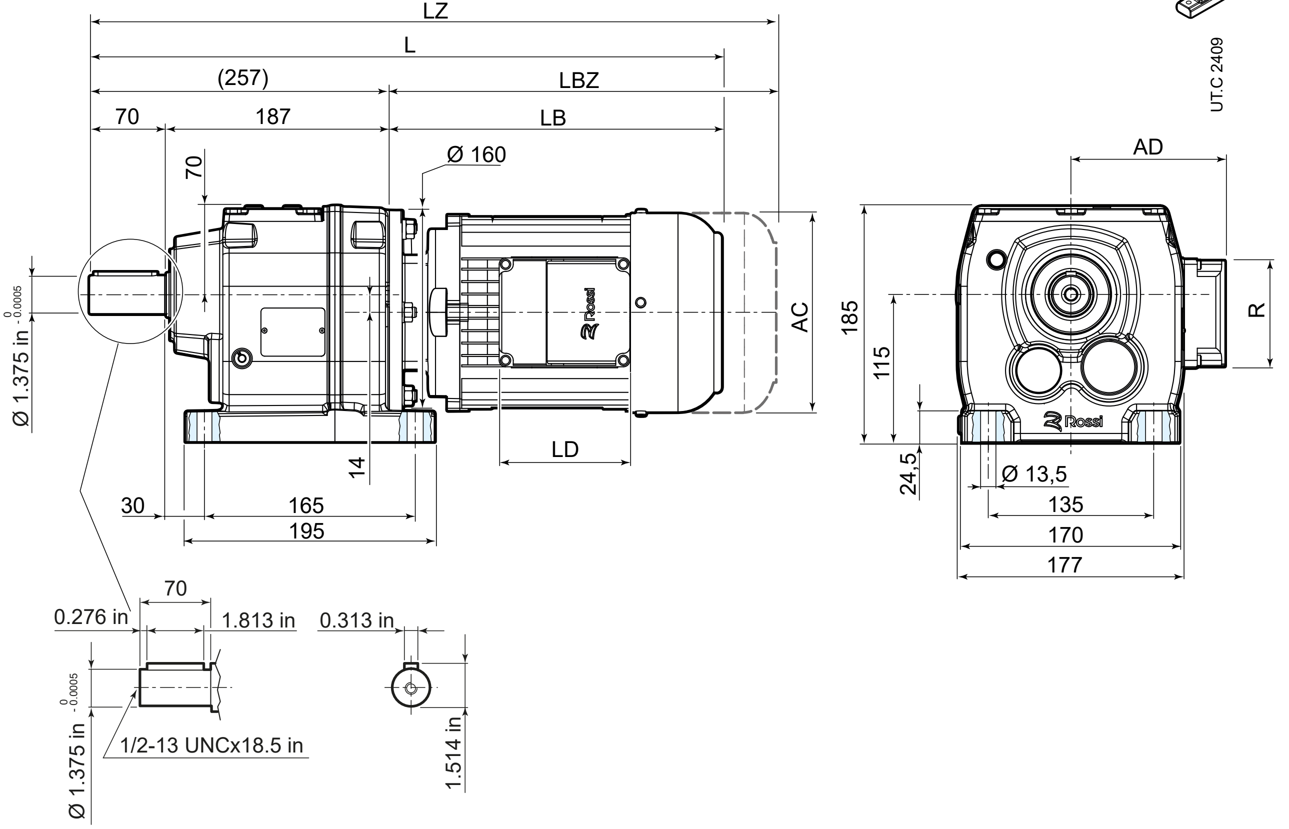
77 66 138

	63	71	80	90S	90L	100	112MA	112M	132S,M
AC	123	138	156	176	176	194	218	218	257
AD	95	112	121	141	141	151	163	163	194
LB	205	231	260	283	313	345	383	383	439
LBZ	260	293	329	362	392	440	482	482	547
L	440	466	495	518	548	580	618	618	674
LZ	495	528	564	597	627	675	717	717	782
LD	103	103	103	136	136	136	136	136	190
R	86	86	86	106	106	106	106	106	148

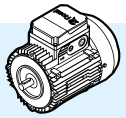
10.4

iC 572 / iC 573 PE

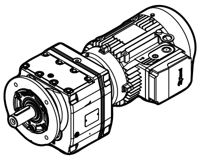


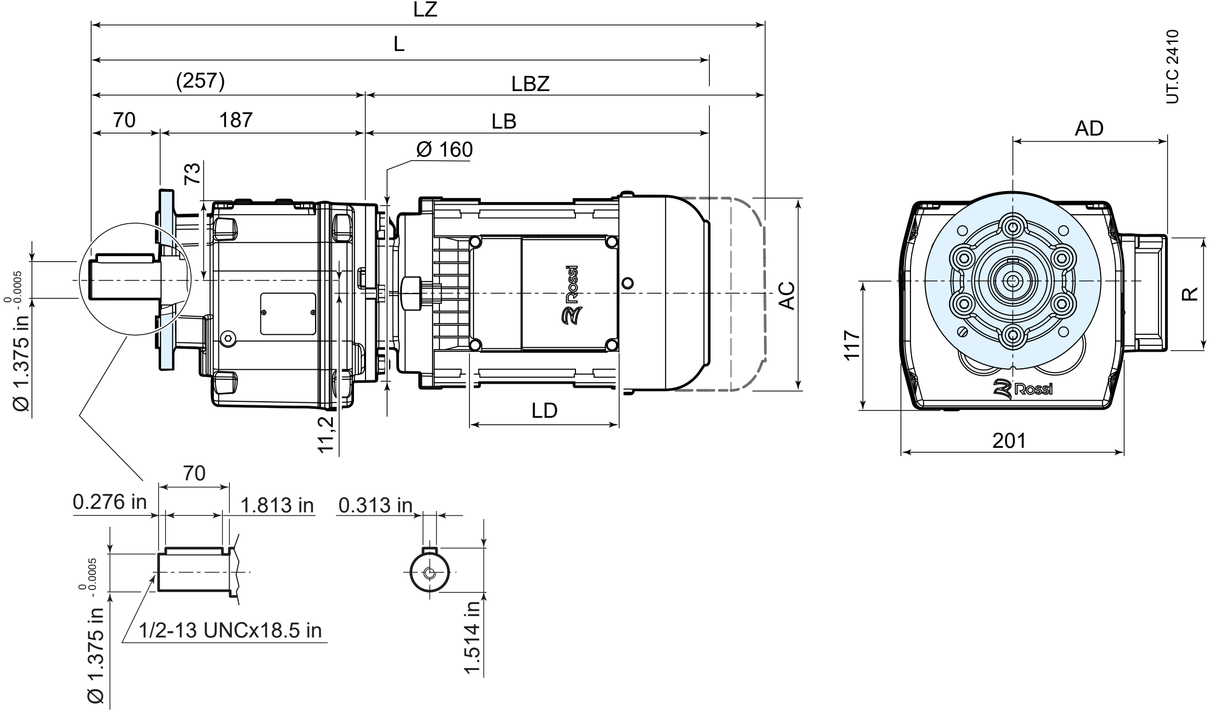


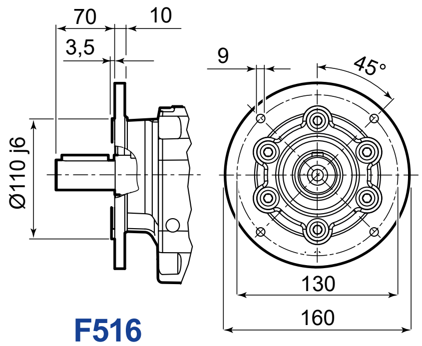
→ 78 → 66 → 138

	63	71	80	90S	90L	100	112MA	112M	132S,M
AC	123	138	156	176	176	194	218	218	257
AD	95	112	121	141	141	151	163	163	194
LB	205	231	260	283	313	345	383	383	439
LBZ	260	293	329	362	392	440	482	482	547
L	462	488	517	540	570	602	640	640	696
LZ	517	550	586	619	649	697	739	739	804
LD	103	103	103	136	136	136	136	136	190
R	86	86	86	106	106	106	106	106	148

iC 572 / iC 573 FE







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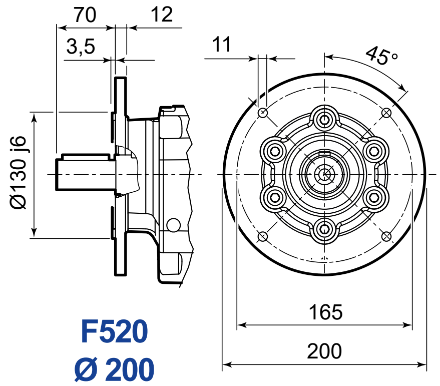

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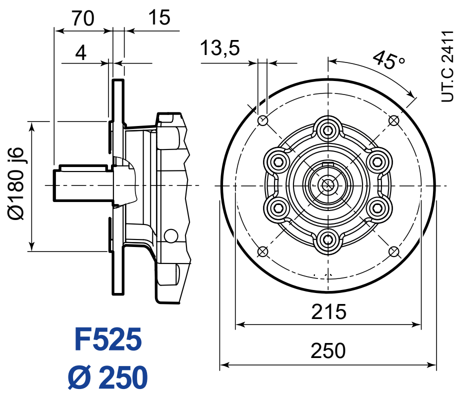
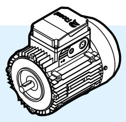


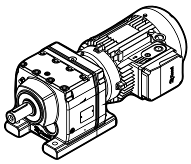
F525
Ø 250

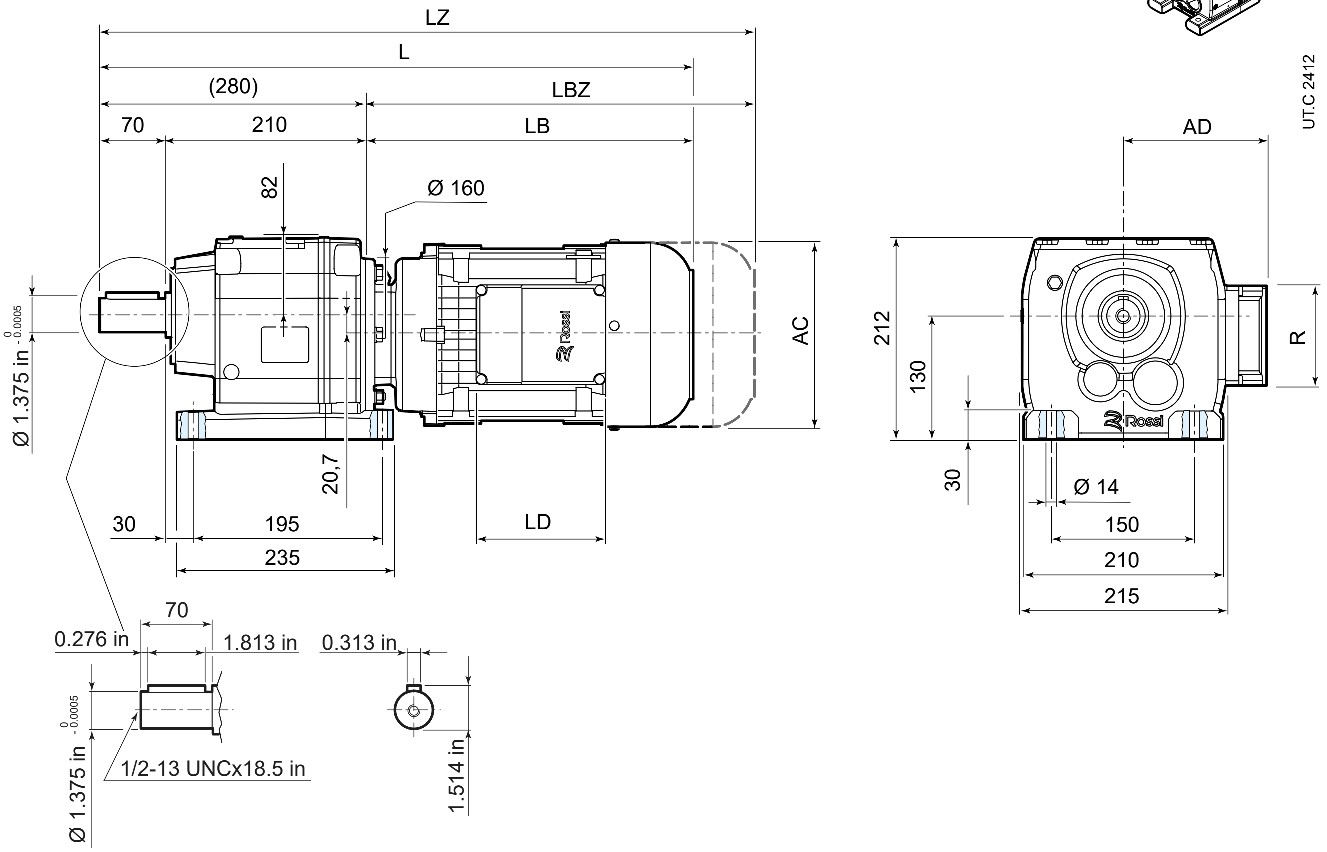
78 66 138

	63	71	80	90S	90L	100	112MA	112M	132S,M
AC	123	138	156	176	176	194	218	218	257
AD	95	112	121	141	141	151	163	163	194
LB	205	231	260	283	313	345	383	383	439
LBZ	260	293	329	362	392	440	482	482	547
L	462	488	517	540	570	602	640	640	696
LZ	517	550	586	619	649	697	739	739	804
LD	103	103	103	136	136	136	136	136	190
R	86	86	86	106	106	106	106	106	148

10.5

iC 672 / iC 673 PE





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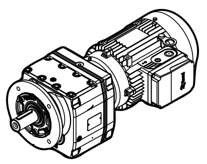
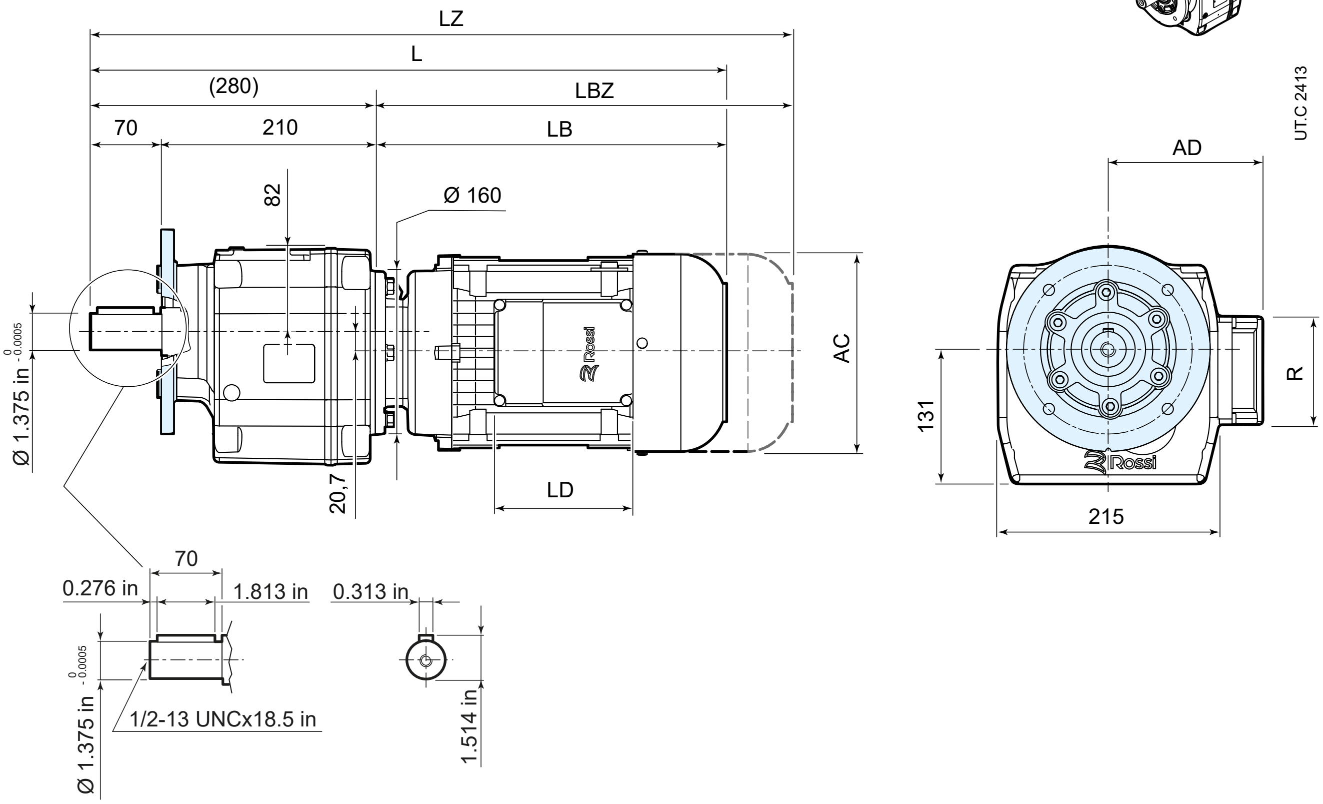
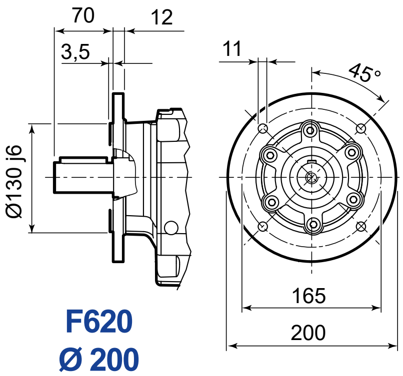
	63	71	80	90S	90L	100	112MA	112M	132S,M
AC	123	138	156	176	176	194	218	218	257
AD	95	112	121	141	141	151	163	163	194
LB	205	231	260	283	313	345	383	383	439
LBZ	260	293	329	362	392	440	482	482	547
L	485	511	540	563	593	625	663	663	719
LZ	540	573	609	642	672	720	762	762	827
LD	103	103	103	136	136	136	136	136	190
R	86	86	86	106	106	106	106	106	148



iC 672 / iC 673 FE





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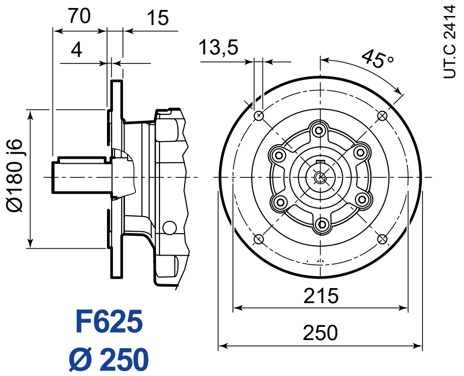

F625
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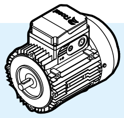
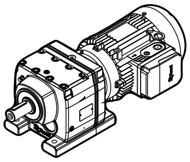
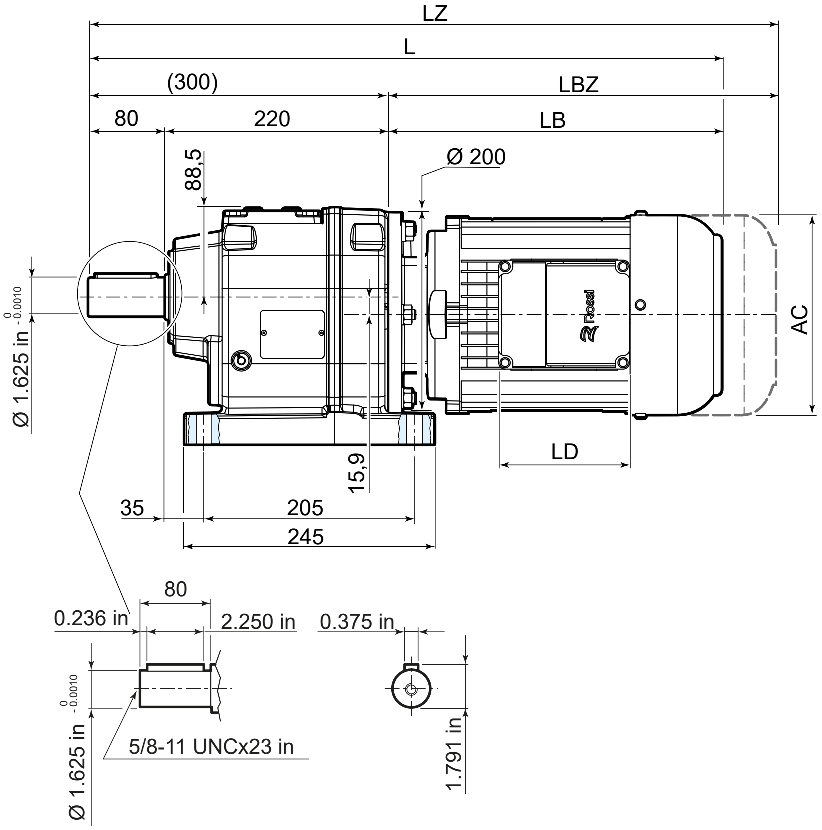
79 66 138

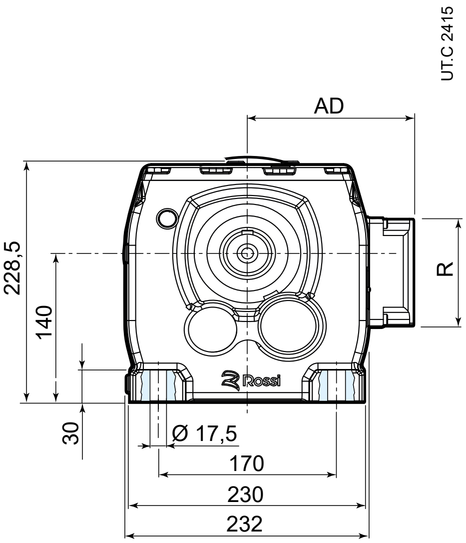
	63	71	80	90S	90L	100	112MA	112M	132S,M
AC	123	138	156	176	176	194	218	218	257
AD	95	112	121	141	141	151	163	163	194
LB	205	231	260	283	313	345	383	383	439
LBZ	260	293	329	362	392	440	482	482	547
L	485	511	540	563	593	625	663	663	719
LZ	540	573	609	642	672	720	762	762	827
LD	103	103	103	136	136	136	136	136	190
R	86	86	86	106	106	106	106	106	148

10.6

iC 772 / iC 773 PE







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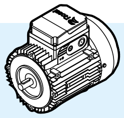
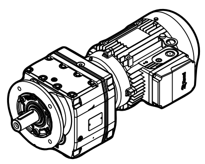
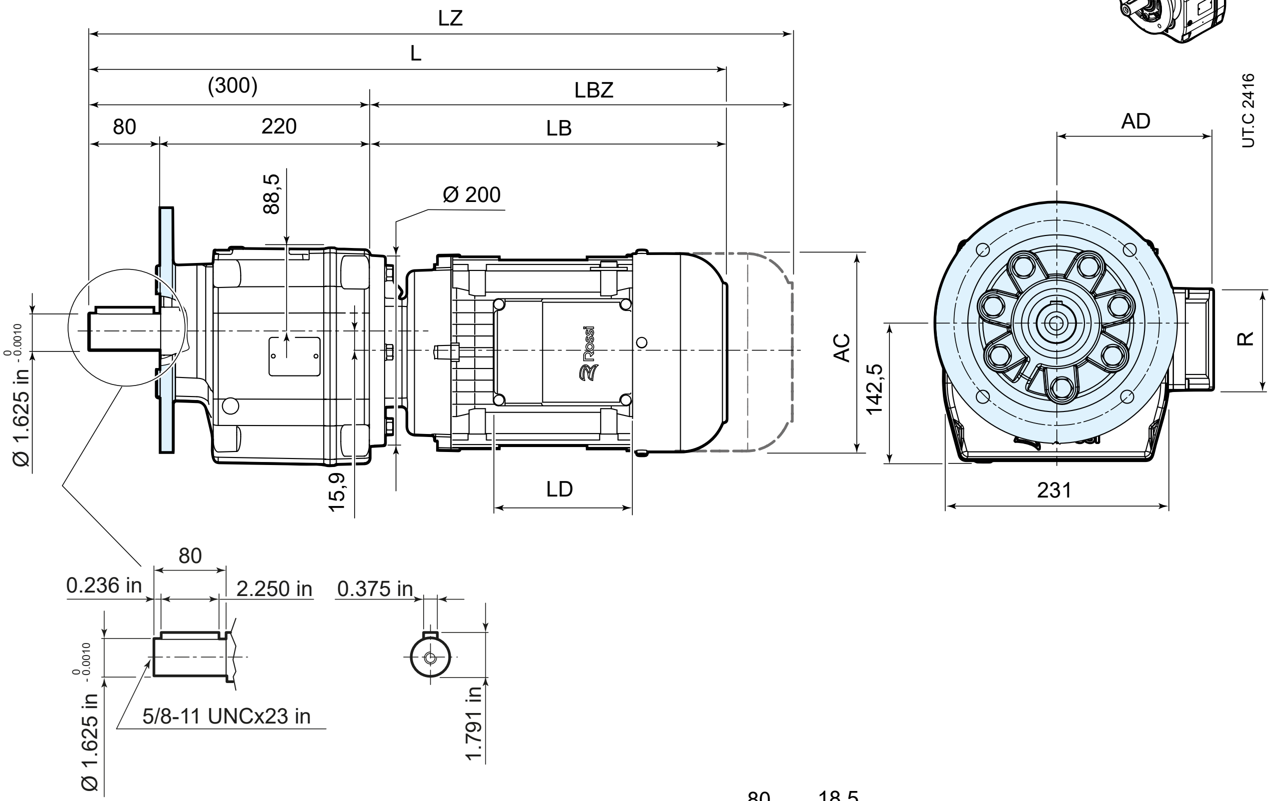
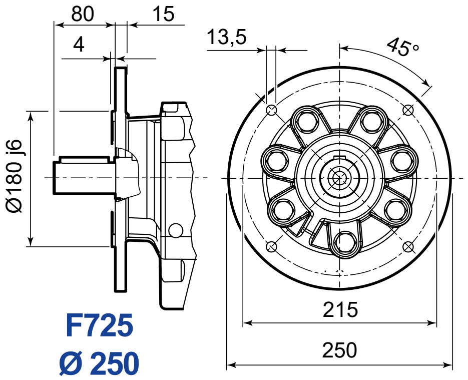
	63	71	80	90S	90L	100	112MA	112M	132S,M	132MB
AC	123	138	156	176	176	194	218	218	257	257
AD	95	112	121	141	141	151	163	163	194	194
LB	199	225	254	276	306	339	377	377	433	493
LBZ	254	287	323	355	385	434	476	476	541	601
L	499	525	554	576	606	639	677	677	733	793
LZ	554	587	623	655	685	734	776	776	841	901
LD	103	103	103	136	136	136	136	136	190	190
R	86	86	86	106	106	106	106	106	148	148

iC 772 / iC 773 FE







F725
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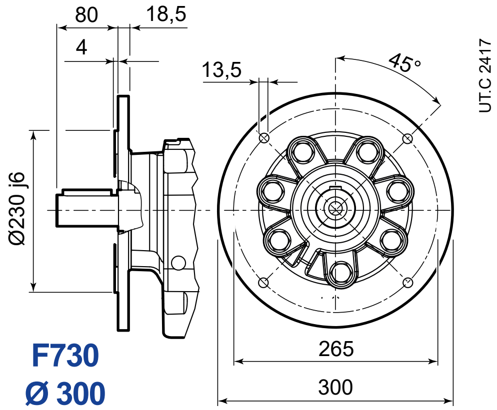

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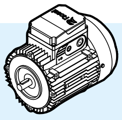
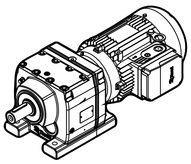
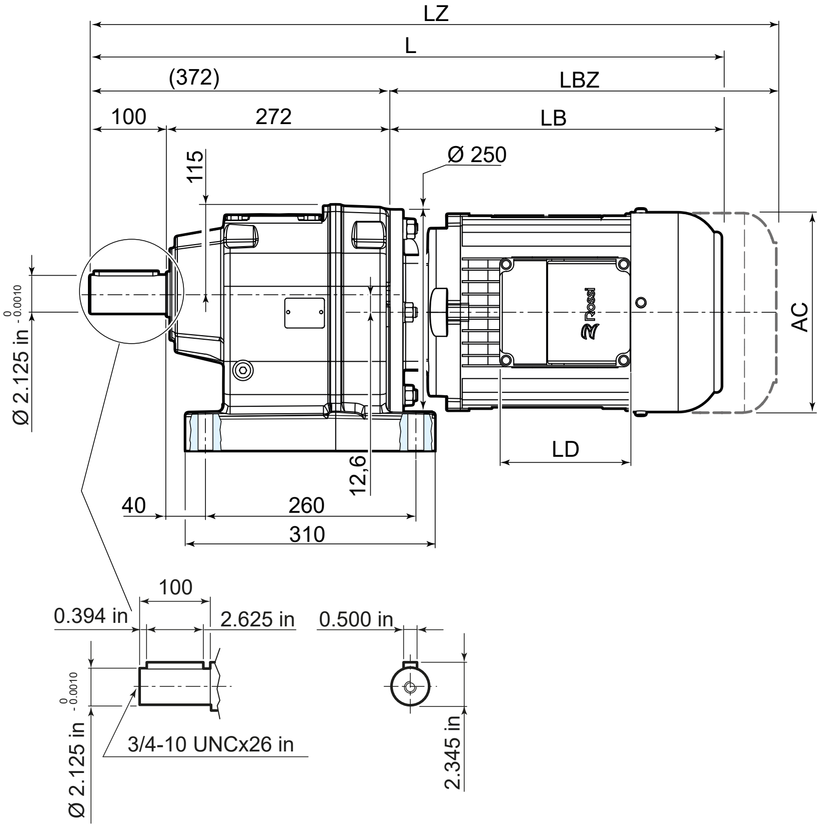
	63	71	80	90S	90L	100	112MA	112M	132S,M	132MB
AC	123	138	156	176	176	194	218	218	257	257
AD	95	112	121	141	141	151	163	163	194	194
LB	199	225	254	276	306	339	377	377	433	493
LBZ	254	287	323	355	385	434	476	476	541	601
L	499	525	554	576	606	639	677	677	733	793
LZ	554	587	623	655	685	734	776	776	841	901
LD	103	103	103	136	136	136	136	136	190	190
R	86	86	86	106	106	106	106	106	148	148

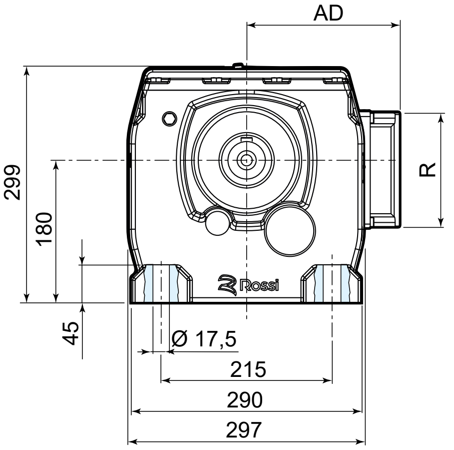
10.7

iC 872 / iC 873 PE



UT.C 2418





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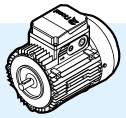
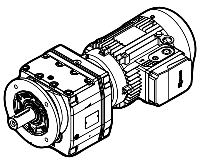
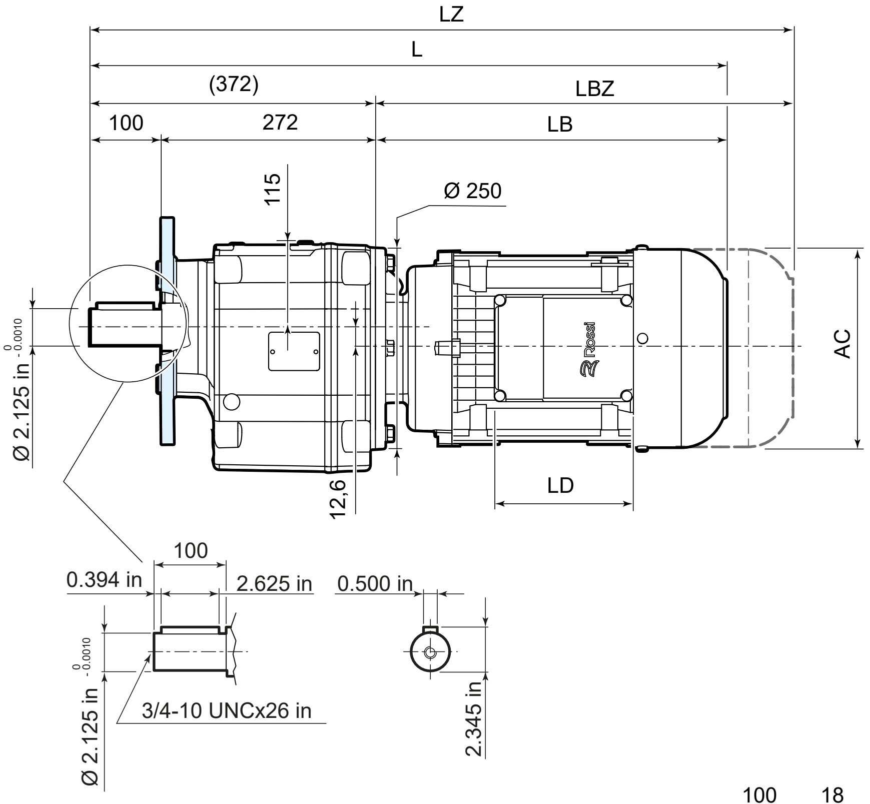
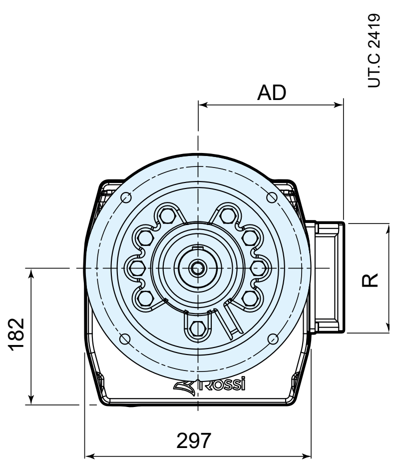
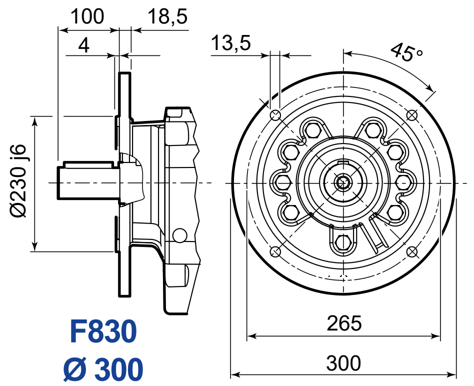
	80	90S	90L	100	112MA	112M	132S,M	132MB
AC	156	176	176	194	218	218	257	257
AD	121	141	141	151	163	163	194	194
LB	249	272	302	334	372	372	428	488
LBZ	318	351	381	429	471	471	536	596
L	621	644	674	706	744	744	800	860
LZ	690	723	753	801	843	843	908	968
LD	103	136	136	136	136	136	190	190
R	86	106	106	106	106	106	148	148

iC 872 / iC 873 FE









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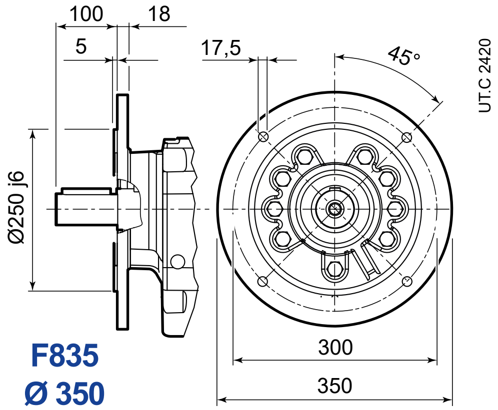

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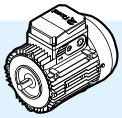
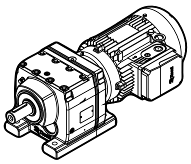
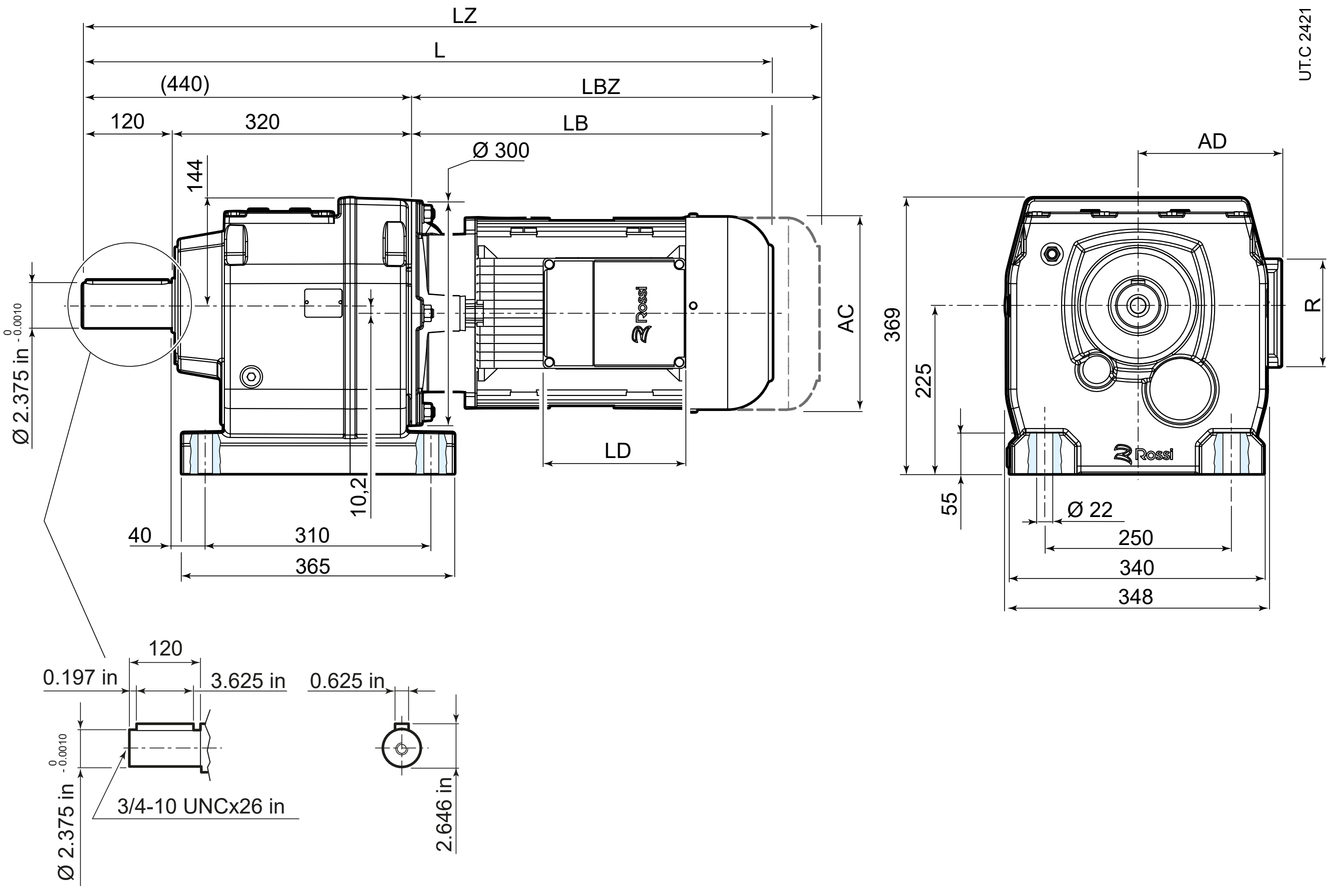
	80	90S	90L	100	112MA	112M	132S,M	132MB
AC	156	176	176	194	218	218	257	257
AD	121	141	141	151	163	163	194	194
LB	249	272	302	334	372	372	428	488
LBZ	318	351	381	429	471	471	536	596
L	621	644	674	706	744	744	800	860
LZ	690	723	753	801	843	843	908	968
LD	103	136	136	136	136	136	190	190
R	86	106	106	106	106	106	148	148

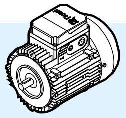
10.8

iC 972 / iC 973 PE

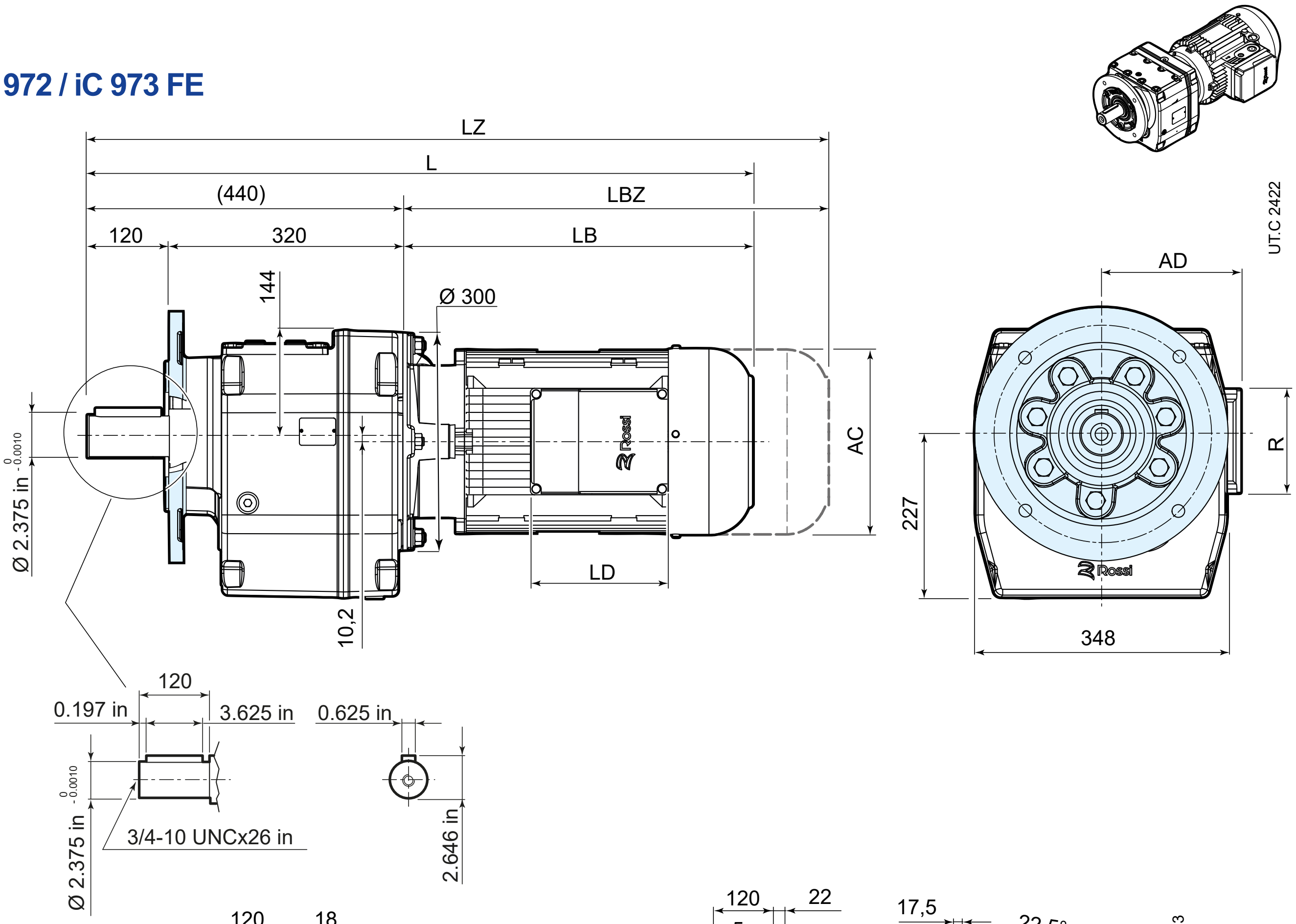


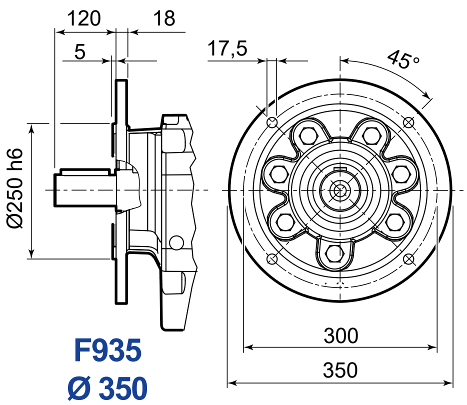


82 66 138

	80	90S	90L	100	112MA	112M	132S,M	132MB
AC	156	176	176	194	218	218	257	257
AD	121	141	141	151	163	163	194	194
LB	242	264	294	327	364	364	423	483
LBZ	311	343	373	422	463	463	531	591
L	682	704	734	767	804	804	863	923
LZ	751	783	813	862	903	903	971	1031
LD	103	136	136	136	136	136	190	190
R	86	106	106	106	106	106	148	148

iC 972 / iC 973 FE





F935
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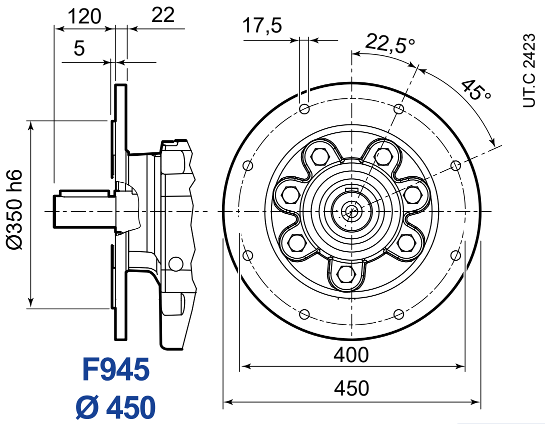

F945
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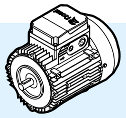
	80	90S	90L	100	112MA	112M	132S,M	132MB
AC	156	176	176	194	218	218	257	257
AD	121	141	141	151	163	163	194	194
LB	242	264	294	327	364	364	423	483
LBZ	311	343	373	422	463	463	531	591
L	682	704	734	767	804	804	863	923
LZ	751	783	813	862	903	903	971	1031
LD	103	136	136	136	136	136	190	190
R	86	106	106	106	106	106	148	148

11

Compact three-phase motor HB and brake motor HBZ

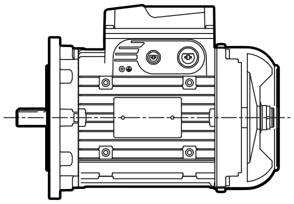
Section contents

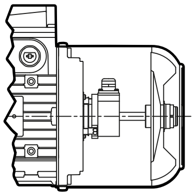
11.1

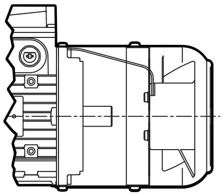
Compact asynchronous three-phase motor HB

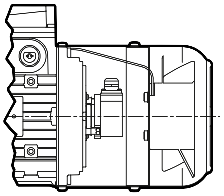
11.1.1 General specifications

- **insulation class F**, rise temperature B;
- **mating tolerances under «accuracy» rating;**
- **IP55 protection;**
- **suitable for operation with inverter;**
- asynchronous three-phase **electric motor** with rotor cage, total enclosed, externally ventilated (cooling system IC 411 with cooling fan keyed on motor shaft);
- **single-speed** 4 or 6 poles **motors**;
- particularly strong **construction** (both electrical and mechanical); duly proportioned bearings;
- **«generous» electromagnetic sizing** having margins of safety, good acceleration capacity (high frequency of starting) and uniform starting (slightly «sagged» characteristic curves);
- **metallic terminal box;**
- **designs available** for every application need (independent cooling fan, independent cooling fan and encoder, protections higher than IP 55, etc.)


Standard


Encoder


Independent cooling fan


Independent cooling fan and encoder

UT.C 1374

Rated power delivered on continuous duty (S1) and referred to nominal voltage and frequency, ambient temperature 5 ÷ 104 °F and maximum altitude 3300 ft.
Motor housing in pressure diecast light alloy.
Drive end and non-drive end end-shield in cast iron or light alloy.
«Supported» tightening attachments of **endshields and flanges** fitted on housing with «tight» coupling.
Ball bearings lubricated «for life» assuming pollution-free surroundings; preload spring.
Motor shaft axially fastened on drive end.
Rear threaded extraction hole as standard for sizes ≥ 90 ... 132.
Steel **fan cover**.
Thermoplastic **cooling fan** with radial vanes.
Terminal box made of light alloy (integral with housing with knockout cable openings on both sides, two holes, one for power cable and one for auxiliary equipment).
Left side position non drive end (pos. TB0 see page 37); on request other positions.
Pressure diecast light alloy **terminal box cover**.
Terminal block with 9 terminals for supply voltage YY230 Y460 60 Hz.
Earth terminal located inside terminal box; prearranged for the installation of further two external earth terminals on housing.

Rotor: pressure diecast cage rotor in aluminium.
Stator winding with class H copper conductor insulation, insulated with double coat, type of impregnation with resin of class H; other materials are of classes F and H for a class F insulation system.
Materials and type of impregnation allow use in tropical climates without further treatments.
Rotor dynamic balancing: vibration velocity under standard rating A. Motors are balanced with half key inserted into shaft extension.
Painting with bi-component water-based acrylic enamel, color blue RAL 5010 DIN 1843, suitable to resist to normal industrial environments (corrosivity class C3 ISO 12944-2).

For non-standard designs and accessories see page 38.

11.2

Technical data of compact asynchronous three-phase motor HB

4 poles - 1800 rpm
IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

IE2
230.460 V - 60Hz

ErP CE cULus
NEMA MG1-12

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²	start/h	
0.16	0.12	**HB2 63 A 4**	1690	6.0	0.84	0.42	58	64	J	3.1	3.1	3.6	0.0047	10000	8.6
0.25	0.18	**HB2 63 B 4**	1680	9.0	1.18	0.59	60	69	J	3.3	3.1	3.8	0.0071	10000	9.9
0.33	0.25	**HB2 71 A 4**	1720	12.3	1.4	0.7	65	70.9	K	2.8	3.3	4.8	0.0166	8000	12.6
0.5	0.37	**HB2 71 B 4**	1720	18.2	1.9	0.95	65	76	K	3.1	3.8	5.3	0.0214	8000	14.6
0.75	0.55	**HB2 80 A 4**	1740	26.6	2.4	1.2	74	78.4	L	3.3	3.7	7.2	0.0500	6300	20

4 poles - 1800 rpm
IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

Premium Efficiency (IE3)
230.460 V - 60Hz
EISA

ENERGY cULus CC131B

In according with US DOE
10 CFR 431 and CSA C390 EISA ACT
December 19, 2017

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²	start/h	
1	0.75 (2)	**HB3 90 S 4**	1740	36.3	3	1.5	73	85.5	K	3.4	4.3	7.2	0.0759	3150	34.2
1.5	1.1 (2)	**HB3 90 L 4**	1740	54	4.2	2.1	75	86.5	K	3.4	4.1	7.7	0.1020	2500	40.8
2	1.5	**HB3 90 LB 4**	1740	73	5.8	2.9	75	86.5	L	3.4	4.4	7.9	0.1020	2500	40.8
3	2.2 (2)	**HB3 112MA 4**	1760	106	8	4	78	89.5	M	3.9	5.1	9.6	0.2847	2000	68.3
4	3 (2)	**HB3 112M 4**	1750	144	10.6	5.3	79	89.5	M	4.1	5.4	9.4	0.3085	1600	72.8
5.4	4	**HB3 112MB 4**	1760	193	15	7.5	75	89.5	N	4.0	5.5	10.3	0.3322	1400	77.2
7.5	5.5 (2)	**HB3 132M 4**	1770	263	19	9.5	79	91.7	L	4.1	4.4	9.7	0.8471	710	127.9
10	7.5	**HB3 132MB 4**	1760	359	25.8	12.9	79	91.7	L	3.7	4.4	9.1	1.0631	710	151
12.3	9.2 (2)	**HB3 132MC 4**	1760	441	33.6	16.8	79	91.7	L	3.7	4.4	9.1	1.0631	710	151

(1) The nameplate contains data expressed in: hp, rpm, PF (power factor) in %.
(2) Power or motor power-to-size correspondence not according to standard.

6 poles - 1200 rpm

IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

IE2
230.460 V - 60Hz

ErP CE cULus
NEMA MG1-12

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²	start/h	
0.16	0.12	**HB2 63 B 6**	1120	9.0	1.04	0.52	53	55.8	J	3.1	3.2	2.9	0.0119	10000	9.9
0.25	0.18	**HB2 71 A 6**	1120	13.5	1.22	0.61	60	62.6	H	3	3.1	3.6	0.0214	10000	13.2
0.33	0.25	**HB2 71 B 6**	1120	18.6	1.62	0.81	60	64.9	J	3.1	3.1	3.9	0.0285	9000	15
0.5	0.37	**HB2 80 A 6**	1130	27.6	2.2	1.1	61	68.4	J	3.3	3.5	4.3	0.0451	7500	17.6
0.75	0.55	**HB2 80 B 6**	1140	40.7	3	1.5	62	75.7	K	3.6	3.7	5.3	0.0760	7100	24.3

6 poles - 1200 rpm

IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

Premium Efficiency (IE3)
230.460 V - 60Hz
EISA

ENERGY cULus CC131B

In according with US DOE
10 CFR 431 and CSA C390 EISA ACT
December 19, 2017

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²	start/h	
1	0.75 (2)	**HB3 100 LA 6**	1160	54	3.2	1.6	71	82.5	M	2.9	4.4	7.9	0.0759	3150	34.2
1.5	1.1 (2)	**HB3 112 M 6**	1160	81	4.4	2.2	73	87.5	J	2.5	3.4	6.3	0.1020	2500	40.8

(1) The nameplate contains data expressed in: hp, rpm, PF (power factor) in %.
(2) Power or motor power-to-size correspondence not according to standard.

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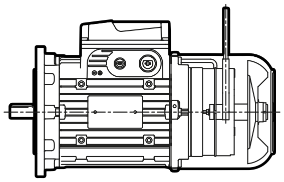
11.3

Compact asynchronous three-phase brake motor HBZ

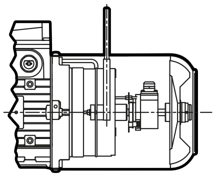
11.3.1 General specifications

- **Insulation class F**, rise temperature B;
- **mating tolerances under «accuracy» rating;**
- **IP55 protection;**
- **suitable for operation with inverter;**
- **electric asynchronous three-phase brake motor with d.c. brake** (braking in case of supply failure) with **double braking surface with braking torque proportioned to motor torque** (usually $T_b \approx 2\ T_N$);
- **single-speed** 4 or 6, poles **motors**;
- **particularly strong construction** (both electrical and mechanical) to withstand alternating torsional and thermic stresses of starting and braking; duly proportioned bearings;
- **electromagnetic sizing especially studied** to allow high acceleration capacity (high frequency of starting) and uniform starting;
- **large metal terminal box**, multivoltage rectifier, one brake coil, for **voltage always coordinated** with the motor one (both Y.Y and Y);
- **maximum reduced noise level and operation progressivity** (both at starting and braking) thanks to a lower rapidity (typical of d.c. brake) of the anchor (which is lighter and less quick in the impact): motor starts slightly braked i.e. with greater progressivity; good release and braking rapidity; possibility to increase rapidity in braking, with supply opening on d.c. side;
- **high braking capacity;**
- **designs available** for every application need (independent cooling fan, independent cooling fan and encoder, protections higher than IP 55, etc.);
- **particularly suitable** for applications requiring **regular and low-noise starting and braking** and, at the same time, braking with good rapidity and precision and high number of starts.

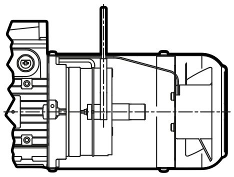
Standard



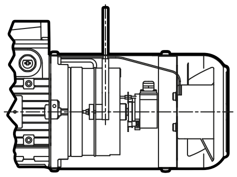
Encoder



Independent cooling units



Independent cooling fan and encoder



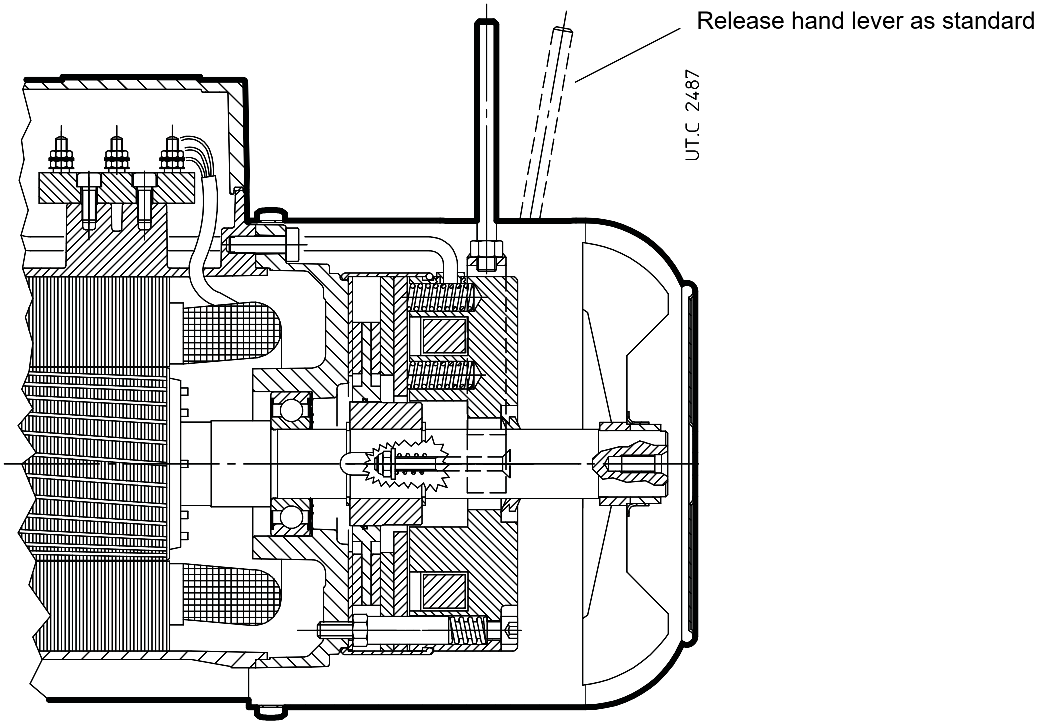
UT.C 1383

«Torque-speed» **characteristic curves** duly optimized for handling (horizontal and vertical traverse movements, rotation), slightly «sagged», without peaks in the hipersynchronous area and with carefully proportioned mean value.
Rated power delivered on continuous duty (S1) and referred to nominal voltage and frequency, ambient temperature 5 ÷ 104 °F and maximum altitude 3300 ft.
Housing in pressure diecast light alloy.
Drive end flange and non-drive end endshield in cast iron or light alloy.
«Supported» tightening attachments of **endshields and flanges** fitted on housing with «tight» coupling.
Ball bearings lubricated «for life» assuming pollution-free surroundings; preload spring.
Motor shaft in steel axially fastened on drive end endshield.
Rear threaded extraction **hole.**
Steel **fan cover**.
Thermoplastic **cooling fan** with radial vanes.

Terminal box made of light alloy (integral with housing with knockout cable openings on both sides, two holes, one for power cable and one for auxiliary equipment). Left side position non drive end (pos. TB0 see page 37); on request other positions.
Pressure diecast light alloy **terminal box cover**.
Terminal block with 9 terminals for supply voltage YY230 Y460 60 Hz.
Earth terminal located inside terminal box; prearranged for the installation of further two external earth terminals on housing.
Brake supply: with rectifier laying in terminal box having 2 terminals for cable connection for rectifier supply, 2 for rapid braking external contact; possible brake supply **directly from motor terminal block** or **separately** (to use for: motors supplied by inverter, separate drive needs of motor and brake, etc.). Brake can be supplied, also at motor standstill, with no time limitations.
Rotor: pressure diecast cage rotor in aluminium.
Stator winding with class H copper conductor insulation, insulated with double coat, type of impregnation with resin of class H; other materials are of classes F and H for a class F insulation system.
Rotor **dynamic balancing**: vibration velocity under standard rating A. Motors are balanced with half key inserted into shaft extension.
Painting with two-component water based acrylic enamel, color blue RAL 5010 DIN 1843, suitable for normal industrial environments (corrosivity class C3 ISO 12944-2)

For **non-standard designs** and accessories see page 38.

11.3.2 Brake specifications



Electromagnetic spring loaded brake (braking occurs automatically when it is not supplied), with **d.c.** toroidal coil and double braking surface, braking torque proportioned to motor torque (usually $T_b \approx 2\ T_N$).
Maximum reduced noise level and operation progressivity (both at starting and braking thanks to a lower rapidity, typical of d.c. brake, of the anchor, which is lighter and less quick in the impact: motor starts slightly braked i.e. with greater progressivity); **good release and braking rapidity**; possibility to increase rapidity, both in releasing (with rapid rectifier) and braking, with supply opening on d.c. side; high braking capacity.
Designs available for every application (encoder, independent cooling fan, independent cooling fan and encoder, second shaft end, etc.).

Particularly suitable for applications requiring regular and low-noise starting and braking and, at the same time, braking with good rapidity and precision and high number of starts.
When electromagnet is not supplied, the brake anchor pushed by springs, presses the brake disk on rear end-shield generating the braking torque on the same brake disk and consequentely on motor shaft it is keyed onto; by supplying the brake the electromagnet draws the brake anchor and releases brake disk and driving shaft.

Key features:

- **multivoltage rectifier** (as standard), specifically designed for the management of a **brake coil only** with supply voltage always coordinated with standard voltage of HBZ motor;
- **rectifier supply directly from motor terminal block** or indifferently from a separate line;
- **braking torque** adjustable by changing number of springs;
- **insulation class F**, temperature rise class B;
- **brake disk**, sliding on moving hub: with single steel coat and double friction surface with average friction coefficient for low wear;
- **brake anchor in two pieces** for greater rapidity of starting and reduced noise;
- **water-proof and dust-proof gaiter and V-ring** both to prevent polluting infiltrations from surroundings towards brake, and to avoid that wear dust of friction surface will be dispersed in the surroundings;
- **lever for manual release with automatic return (as standard)** and removable level rod; position of release lever corresponding to terminal box; on request, other possible positions. Contact Rossi North America;
- **for other running specifications** see following table.

For **non-standard designs** and accessories see page 38.

Motor is always **equipped with a high reliable rectifier** fixed on terminal box providing adequate connecting terminal (2 for rectifier supply directly from motor terminal block or separate; 2 for external contact of rapid braking).

The rectifier is supplied as standard connected to the motor terminal block for direct power supply Y460 V - 60 Hz.
In case of YY230 V - 60 Hz motor power supply, the connection must be changed (see cat. TX).

Multivoltage rectifiers **RM1**(1) (supplied as standard for brakes 12 ... 14) and **RM2**(1) (supplied as standard for brakes 05 ... 07) are a.c./d.c. supply voltage devices with full-wave controlled bridge able to **supply output voltage value independently from input voltage.**

The brake rectifier is suitable for power supply

range 110 ÷ 440 V a.c. (for brake sizes 12 ÷ 15)
range 200 ÷ 440 V a.c. (for brake sizes 06S ... 07)

without having to change the coil and therefore is also always coordinated with motor supply.
In the supply range 200 ÷ 440 V a.c., the rectifier also has an integrated speed-up function (a higher voltage than the nominal voltage is supplied to the brake coil for approx. 400 ms at the start, allowing the brake to be released more quickly).
In addition, compared to a conventional rectifier, multi-voltage also offers the following advantages:

- greater constancy of the brake performance (the output voltage being at a constant predefined value independent of fluctuations in the supply voltage);
- lower brake holding voltage (75 V d.c.) in the released state (lower power consumption, less coil heating and shorter braking delay).

Both models of rectifiers (RM1, RM2) can be switched on and off either on the a.c. side (for maximum quiet operation), or on the a.c. and d.c. sides. (for faster braking), as they are equipped with varistors to protect the diodes, the electromagnet and the d.c. side opening contact.

Main functional brake specifications

Actual values may deviate slightly depending on the ambient temperature and humidity, the brake temperature and the wear condition of the friction linings.

Brake size		Motor size	T_b			Absorption			Delay of			Air-gap		W_1 (6)	C_{max} (7)	W_{max} (8)		
									release	braking								
	(2)		2 springs lb in	4 springs lb in	6 springs lb in	V a.c.	A a.c. max	W	t_1 (4) ms	t_2 ms	t_2 (5) (d.c.) ms	mm min	max	MJ/mm	mm	brakings/h 10	100	1000
BZ 12	RM1	63 71	15.5	31.0	-	110 ÷ 440	0.09	9	20	100	10	0.25	0.40	70	5	4500	1120	160
BZ 53.13	RM1	71 80	22.1	44.2	66	110 ÷ 440	0.14	12	32	120	10	0.25	0.40	90	5	5600	1400	200
BZ 04.14	RM1	80 90	44.3	97	142	110 ÷ 440	0.20	16	45	150	10	0.30	0.45	125	5	7500	1900	265
BZ 05.15	RM2	90 100 112	115	239	354	110 ÷ 440	0.26	24	63	220	15	0.30	0.45	160	5	10000	2500	355
BZ 06 S	RM2	112	221	443	664	200 ÷ 440	0.28	30	90	300	30	0.35	0.55	220	5	14000	3550	500
BZ 56	RM2	132	327	664	-	200 ÷ 440	0.28	50	90	224	20	0.35	0.55	224	4.5	14000	3550	500
BZ 06	RM2	132	443	885	-	200 ÷ 440	0.28	50	90	224	20	0.35	0.55	224	4.5	14000	3550	500
BZ 07	RM2	132	443	885	1328	200 ÷ 440	0.34	65	125	280	25	0.40	0.60	315	4.5	20000	5000	710

(1) The multivoltage rectifiers RM1 and RM2 are patented devices.
(2) Standard rectifier, supplied as standard; the rest time must be between 2.5 s ÷ 3.5 s. If necessary, please contact Rossi North America.
(3) Values valid with T_{bmax}, mean air-gap, nominal value of supply voltage.
(4) Brake release time obtained with standard rectifier and, for RM1, with supply voltage 200 V c.a.
(5) Braking delay obtained with separate brake supply and disconnection on a.c. side of rectifier (t_2) or on a.c. and d.c. side. (t_2 d.c).
With direct supply from motor terminal block, the values of t_2 increase by approx. 2.5 times the ones stated in the table.
(6) Work of friction generating a brake disk wear of 1 mm. (minimum value for heavy application, real value is usually greater).
(7) Maximum brake disk wear.
(8) Maximum friction work for each braking.

Technical data of compact asynchronous three-phase brake motor HBZ

4 poles - 1800 rpm
IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

IE2
230.460 V - 60Hz

ErP
NEMA MG1-12

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	Brake	T_b	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²		lb in	start/h	
0.16	0.12	**HB2Z 63 A 4**	1690	6.0	0.84	0.42	58	64	J	3.1	3.1	3.6	0.0071	BZ 12	15.5	10000	12.6
0.25	0.18	**HB2Z 63 B 4**	1680	9.0	1.18	0.59	60	69	J	3.3	3.1	3.8	0.0095	BZ 12	31.0	10000	13.9
0.33	0.25	**HB2Z 71 A 4**	1720	12.3	1.4	0.7	65	70.9	K	2.8	3.3	4.8	0.0190	BZ 53	44.3	8000	18.5
0.5	0.37	**HB2Z 71 B 4**	1720	18.2	1.9	0.95	65	76	K	3.1	3.8	5.3	0.0237	BZ 53	44.3	8000	20.5
0.75	0.55	**HB2Z 80 A 4**	1740	26.6	2.4	1.2	74	78.4	L	3.3	3.7	7.2	0.0593	BZ 04	97	6300	28.7

4 poles - 1800 rpm
IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

Premium Efficiency (IE3)
230.460 V - 60Hz
EISA

CC131B

In according with US DOE
10 CFR 431 and CSA C390 EISA ACT
December 19, 2017

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	Brake	T_b	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²		lb in	start/h	
1	0.75 (2)	**HB3Z 90S 4**	1740	36.2	3	1.5	73	85.5	K	3.4	4.3	7.2	0.0806	BZ 14	97	3150	42.7
1.5	1.1 (2)	**HB3Z 90L 4**	1740	54	4.2	2.1	75	86.5	K	3.4	4.1	7.7	0.1067	BZ 14	142	2500	49.3
2	1.5	**HB3Z 90LB 4**	1740	73	5.8	2.9	75	86.5	L	3.4	4.4	7.9	0.1115	BZ 05	239	2500	53.9
3	2.2	**HB3Z 112MA 4**	1760	106	8	4	78	89.5	M	3.9	5.1	9.6	0.2918	BZ 15	354	2000	81.4
4	3 (2)	**HB3Z 112M 4**	1750	144	10.6	5.3	79	89.5	M	4.1	5.4	9.4	0.3156	BZ 15	354	1600	85.8
5.4	4 (2)	**HB3Z 112MB 4**	1760	193	15	7.5	75	89.5	N	4.0	5.5	10.3	0.3535	BZ 06S	664	1400	96.8
7.5	5.5 (2)	**HB3Z 132M 4**	1770	263	19	9.5	79	91.7	L	4.1	4.4	9.7	0.8709	BZ 56	664	710	151.8
10	7.5	**HB3Z 132MB 4**	1760	359	25.8	12.9	79	91.7	L	3.7	4.4	9.1	1.0868	BZ 06	885	710	174.9
12.3	9.2 (2)	**HB3Z 132MC 4**	1760	441	33.6	16.8	79	91.7	L	3.7	4.4	9.1	1.0868	BZ 07	1328	710	174.9

(1) The nameplate contains data expressed in: hp, rpm, PF (power factor) in %.
(2) Power or motor power-to-size correspondence not according to standard.

6 poles - 1200 rpm

IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

IE2
230.460 V - 60Hz

ErP
NEMA MG1-12

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	Brake	T_b	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²		lb in	start/h	
0.16	0.12	**HB2Z 63 B 6**	1120	9.0	1.04	0.52	53	55.8	J	3.1	3.2	2.9	0.0119	BZ 12	31	10000	13.9
0.25	0.18	**HB2Z 71 A 6**	1120	13.5	1.22	0.61	60	62.6	H	3	3.1	3.6	0.0237	BZ 53	44.3	9000	19.1
0.33	0.25	**HB2Z 71 B 6**	1120	18.6	1.62	0.81	60	64.9	J	3.1	3.1	3.9	0.0308	BZ 53	44.3	9000	20.9
0.5	0.37	**HB2Z 80 A 6**	1130	27.6	2.2	1.1	61	68.4	J	3.3	3.5	4.3	0.0498	BZ 04	97	7500	26.4
0.75	0.55	**HB2Z 80 B 6**	1140	40.7	3	1.5	62	75.7	K	3.6	3.7	5.3	0.0783	BZ 04	142	7100	33.0

6 poles - 1200 rpm

IP 55
IC 411
Insulation class F
Temperature rise class B
Service factor SF1.15
9 terminals

Premium Efficiency (IE3)
230.460 V - 60Hz
EISA

ENERGY
CC131B

In according with US DOE
10 CFR 431 and CSA C390 EISA ACT
December 19, 2017

P_N (1)		Motor	n_N (1)	T_N	I_N A		PF (1)	η Nom. Eff. MG 1-12	NEMA Code	T_S / T_N	T_{max} / T_N	I_S / I_N	WK_0^2	Brake	T_b	z_0	lb
hp	kW		rpm	lb in	230 V	460 V	%	%					lb ft²		lb in	start/h	
1	**0.75** (2)	**HB3Z 100LA 6**	1160	53.98	3.2	1.6	71	82.5	M	2.9	4.4	7.9	0.3179	BZ 15	115	3200	70.4
1.5	**1.1** (2)	**HB3Z 112M 6**	1160	80.54	4.4	2.2	73	87.5	J	2.5	3.4	6.3	0.5197	BZ 15	239	2500	88.0

(1) The nameplate contains data expressed in: hp, rpm, PF (power factor) in %.
(2) Power or motor power-to-size correspondence not according to standard.

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12

Installation and maintenance

Section contents

Installation and maintenance

12

12.1

Safety

Important:
The gearmotors supplied by Rossi North America must be incorporated into machinery and **should not be commissioned before the machinery or system in which the components have been incorporated conforms to:**

- **Machinery directive 2006/42/EC and subsequent updatings; in particular, possible safety guards for shaft ends not being used and for eventually accessible fan cover passages (or other) are the Buyer's responsibility;**
- **«Electromagnetic compatibility (EMC)» 2004/108/EC and subsequent updatings.**

Attention!
It is recommended to pay attention to all instructions of present handbook, all existing safety laws and standards concerning correct installation. Whenever personal injury or property damage may occur, due to falling or projecting parts of gear reducer or of its parts, foresee adequate supplementary protection devices against loosening or breaking of the fastening screws.
If deviations from normal operation occur (temperature increase, vibrations, unusual noise, etc.) immediately switch off the machine.

Safety during installation
An incorrect installation, an improper use, the removing or disconnection of protection devices, the lack of inspections and maintenance, improper connections may cause severe personal injury or property damage.
Therefore the component must be moved, installed, commissioned, handled, controlled, serviced and re-paired **exclusively by responsible qualified personnel specifically instructed** and have the necessary experience to recognize any risks connected with present products avoiding any possible emergencies.

Gear reducers and gearmotors of present catalog are normally suitable for installations in industrial areas: additional protection measures, if necessary, must be adopted and assured by the personnel responsible for the installation.

Attention!
Motors in non-standard design or with constructive **variations** may differ in the details from the ones described here following and may require additional information.

Attention!
For the installation, use and maintenance of the electric motor of the possible motor-variator and/or the electric supply device (frequency converter, soft-start, etc.), and/or any optional electric devices (e.g.: independent cooling fan, etc.), consult the specific attached documentation. If necessary, require it.

Safety during maintenance
When operating on gear reducer or on components connected to it, the **machine must be at rest, disconnected from power supply and cold**: disconnect motor (including auxiliary equipments) from power supply, gear reducer from load, be sure that safety systems are on against any accidental starting and, if necessary, pre-arrange mechanical locking devices (to be removed before commissioning).

Attention!
During the running the gear reducers could have **hot surfaces**; Always wait that the gear reducer or the gearmotor to cool before carrying out any operations. Further technical documentation (e.g. catalogs) can be downloaded from our website **www.rossi.com**.

12.2

Installation and maintenance

Be sure that the structure on which gearmotor is fitted is plane, levelled and sufficiently dimensioned in order to assure fitting stability and vibration absence, keeping in mind all transmitted forces due to the masses, to the torque, to the radial and axial loads.

Position the gearmotor so as to allow a free passage of air for cooling both gear reducer and motor (especially at motor fan side).

Avoid: any obstruction to the air-flow; heat sources near the gearmotor that might affect the temperature of cooling-air and of gearmotor for radiation; insufficient air recycle or any other factor hindering the steady dissipation of heat.
Mount the gearmotor so as not to receive vibrations.

When external loads are present use pins or locking blocks, if necessary.

When fitting gear reducer and machine and/or gear reducer and eventual flange B5 it is recommended to use **locking adhesives** such as LOCTITE on the fastening screws (also on flange mating surfaces).
For outdoor installation or in a hostile environment protect the gearmotor with anticorrosion paint. Added protection may be afforded by water-repellent grease (especially around the rotary seating of seal rings and the accessible zones of shaft end).

Gearmotors should be protected wherever possible, and by whatever appropriate means, from solar radiation and extremes of weather; weather protection **becomes essential** for **V5 and V6** mounting positions.

For ambient temperatures higher than 104 °F or lower than 32 °F, contact Rossi North America.

Before wiring-up the gearmotor, make sure that motor voltage corresponds to input voltage.
If direction of rotation is not as desired, invert two phases at the terminals.

If overloads are imposed for long periods or if shocks or danger of jamming are envisaged, then motor-protection, electronic torque limiters, fluid couplings, safety couplings, control units or other similar devices should be fitted.
Where duty cycles involve a high number of starts on-load, it is advisable to utilize **thermal probes** (fitted on the wiring) for motor protection; a thermal overload relay is unsuitable since its threshold must be set higher than the motor's nominal current rating.

Use varistors to limit voltage peaks due to contactors.

⚠

Attention!
Bearing life and good shaft and coupling running depend on alignment precision between the shafts.
Carefully align the gearmotor with the driven machine (with the aid of shims if need be), interposing flexible couplings whenever possible.
Whenever a leakage of lubricant could cause heavy damages, increase the frequency of inspections and/or envisage appropriate control devices (e.g.: remote oil level gauge, lubricant for food industry, etc.).

In polluting surroundings, take suitable precautions against lubricant contamination through seal rings or other.

For brake or non-standard motors, consult us for specific information.

Fitting of components to low speed shaft ends
It is recommended that the bore of parts keyed to low speed shaft ends is machined to K7 tolerance (H7 when load is uniform and light).
Before mounting, thoroughly clean mating surfaces and lubricate against seizure and fretting corrosion. Installing and removal operations should be carried out with pullers and jacking screws using the tapped hole at the shaft butt-end.

Gear selection data sheet

1 Application conditions

Application / Industry sector

Type of machine to be driven

☐ new machine
☐ existing machine, running gear reducer currently applied

Ambient temperature [°T]
min standard max

Altitude [ft above sea level]

Environment:
☐ normal (industrial) indoor
☐ normal (industrial) outdoor
☐ dusty
☐ corrosive / humid

Gear reducer position:
☐ small environment with limited air movement (v_{air} < 2 ft/s)
☐ wide environment with free air movement (v_{air} > 4 ft/s)
☐ open space, protected against extremes of weather and solar radiance

2 Load data

Required output speed [rpm]
min nominal max

Torque required at low speed shaft [lb in]
min nominal max

Required output power [hp]
min nominal max

Input speed (gear reducers) [rpm]
min nominal max

Nature of load:
☐ uniform
☐ moderate overloads
☐ heavy overloads

Frequency of starting [starts/h]

Machine moment of inertia [lb ft²]
min standard max

Running time [h/d]

Total duration [h]

Duty cycle (S1 ... S10)

Load cycle attached
☐ yes
☐ no

3 Motor

Motor type:
☐ asynchronous three-phase (a.c.)
☐ asynchronous three-phase with inverter
☐ d.c. motor with relevant converter
☐ internal combustion motor (single-cylinder)
☐ internal combustion motor (multi-cylinder)

Power P_1 [hp]
min nominal max

Nominal speed n_1 [rpm]
min nominal max

a.c. motor supply:
voltage [V] frequency [Hz]

IEC motor size (a.c. motor)

Type of a.c. motor starting:
☐ direct
☐ Y / Δ
☐ soft starter / inverter

Electromagnetic motor
☐ parking brake
☐ work
☐ safety

Braking torque [lb in]

Starting torque [lb in]

Moment of inertia [lb ft²]

Electric motor design (a.c. and d.c.):
☐ with independent cooling fan
☐ with encoder:
☐ with tacho-generator

System of motor-gear reducer mounting:
☐ with coupling
☐ with trapezoidal belts
section No. d_m [in] d_1 [in]
☐ with toothed belt drive
section No. d_m [in]

Eventual limit to drive dimensions

4 Gear reducer

Mounting position

Direction of rotation of output shaft
☐ white arrow
☐ black arrow
☐ white and black arrow

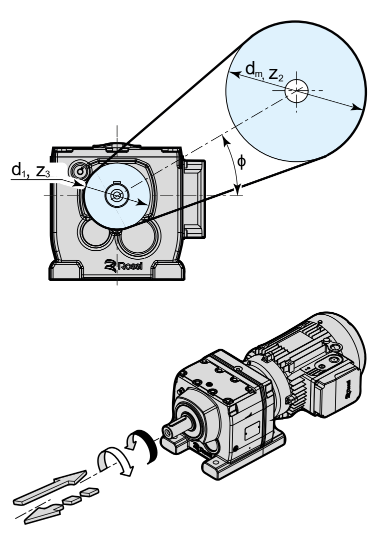
Backstop device (if present)
☐ free rotation, white arrow
☐ free rotation, black arrow

Type of admitted cooling
☐ with fan
☐ with coil
☐ with internal exchanger
☐ with UR O/A unit
☐ with UR O/W unit

Type of machine coupling
☐ shaft mounting
☐ with fluid / flexible coupling
☐ with cardan joint
☐ with toothed belt drive
pitch d_m d_1 ϕ
☐ with chain
pitch No. z_2 z_3 overhang [in] ϕ
☐ straight tooth cylindrical gear
pitch No. z_2 z_3 overhang [in] ϕ

Eventual axial load F_a [lb]
⇠ ⇒

Eventual limit to drive dimensions



Frame size	With Technical System units	With SI units
starting or stopping **time** as a function of an acceleration or deceleration, of a starting or braking torque	$t = \frac{v}{a}$ [s] $t = \frac{Gd^2 \cdot n}{375 \cdot M}$ [s]	$t = \frac{J \cdot \omega}{M}$ [s]
velocity in rotary motion	$v = \frac{\pi \cdot d \cdot n}{60} = \frac{d \cdot n}{19,1}$ [m/s]	$v = \omega \cdot r$ [m/s]
angular velocity	$n = \frac{60 \cdot v}{\pi \cdot d} = \frac{19,1 \cdot v}{d}$ [min^{-1}]	$\omega = \frac{v}{r}$ [rad/s]
acceleration or deceleration as a function of starting or stopping time	$a = \frac{v}{t}$ [m/s^2]	
angular **acceleration** or **deceleration** as a function of a starting or stopping time, of a starting or braking torque	$\alpha = \frac{n}{9,55 \cdot t}$ [rad/s^2] $\alpha = \frac{39,2 \cdot M}{Gd^2}$ [rad/s^2]	$\alpha = \frac{\omega}{t}$ [rad/s^2] $\alpha = \frac{M}{J}$ [rad/s^2]
starting or stopping distance as a function of an **acceleration** or deceleration, of a final or initial velocity	$s = \frac{a \cdot t^2}{2}$ [m] $s = \frac{v \cdot t}{2}$ [m] $w = \frac{\alpha \cdot t^2}{2}$ [rad]	
starting or stopping **angle** as a function of an angular acceleration or deceleration, of a final or initial angular velocity	$\varphi = \frac{n \cdot t}{19,1}$ [rad]	$\varphi = \frac{\omega \cdot t}{2}$ [rad]
mass	$m = \frac{G}{g}$ [$\frac{\text{kgf s}^2}{\text{m}}$]	m è l'unità di massa [kg]
weight (weight force)	G è l'unità di peso (forza peso) [kgf]	$G = m \cdot g$ [N]
force in vertical (lifting), horizontal, inclined motion of translation (μ = coefficient of friction; φ = angle of inclination)	$F = G$ [kgf] $F = \mu \cdot G$ [kgf] $F = G\,(\mu \cdot \cos\varphi + \text{sen}\,\varphi)$ [kgf]	$F = m \cdot g$ [N] $F = \mu \cdot m \cdot g$ [N] $F = m \cdot g\,(\mu \cdot \cos\varphi + \text{sen}\,\varphi)$ [N]
dynamic moment Gd², moment of inertia J due to a motion of translation (numerically $J = \frac{Gd^2}{4}$)	$Gd^2 = \frac{365 \cdot G \cdot v^2}{n^2}$ [kgf m^2]	$J = \frac{m \cdot v^2}{\omega^2}$ [kg m^2]
torque as a function of a force, of a dynamic moment or of a moment of inertia, of a power	$M = \frac{F \cdot d}{2}$ [kgf m] $M = \frac{Gd^2 \cdot n}{375 \cdot t}$ [kgf m] $M = \frac{716 \cdot P}{n}$ [kgf m]	$M = F \cdot r$ [N m] $M = \frac{J \cdot \omega}{t}$ [N m] $M = \frac{P}{\omega}$ [N m]
work, energy in motion of translation, in rotary motion	$W = \frac{G \cdot v^2}{19,6}$ [kgf m] $W = \frac{Gd^2 \cdot n^2}{7160}$ [kgf m]	$W = \frac{m \cdot v^2}{2}$ [J] $W = \frac{J \cdot \omega^2}{2}$ [J]
power in motion of translation, in rotary motion	$P = \frac{F \cdot v}{75}$ [CV] $P = \frac{M \cdot n}{716}$ [CV]	$P = F \cdot v$ [W] $P = M \cdot \omega$ [W]
power available at the shaft of a single-phase motor ($\cos\varphi$ = power factor)	$P = \frac{U \cdot I \cdot \eta \cdot \cos\varphi}{736}$ [CV]	$P = U \cdot I \cdot \eta \cdot \cos\varphi$ [W]
power available at the shaft of a three-phase motor	$P = \frac{U \cdot I \cdot \eta \cdot \cos\varphi}{425}$ [CV]	$P = 1,73 \cdot U \cdot I \cdot \eta \cdot \cos\varphi$ [W]

Note. Acceleration or deceleration are understood constant; motion of translation and rotary motion are understood rectilinear and circular respectively.

Notes

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an evolving
industry

Rossi S.p.A.
Via Emilia Ovest 915/A
41123 Modena - Italy

Phone +39 059 33 02 88

info@rossi.com
www.rossi.com

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