AS series

IMPERIAL UNITS

Worm gearmotors

Edition February 2013

Contents

ROSSI MOTORIDUTTORI

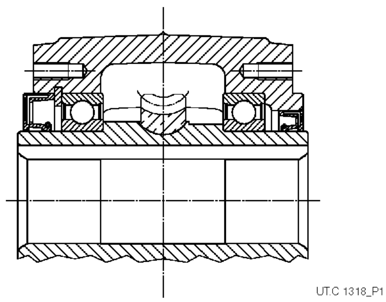
All gearmotors components in this catalog are manufactured by Rossi Motoriduttori.

For further technical information please visit our website www.rossi-group.com or contact the headquarters

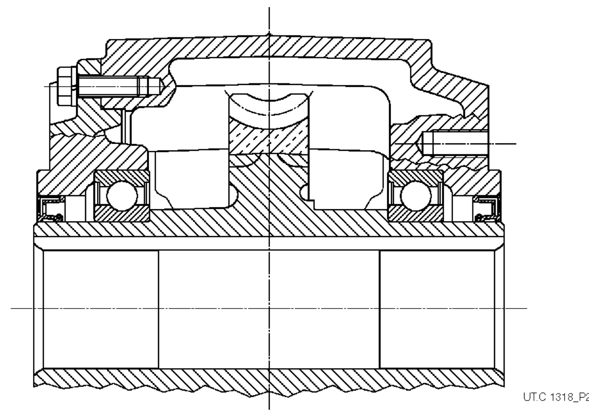
Worm-wheel

Sizes 118, 225 / 325 ... 742

118, 225



325 ... 742

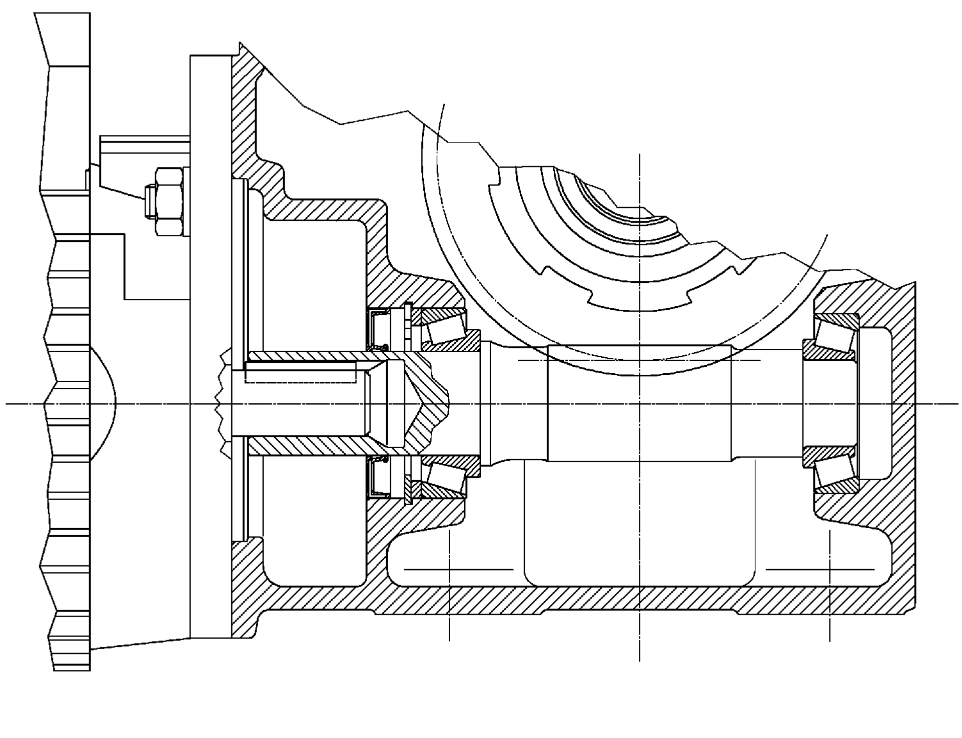


Worm

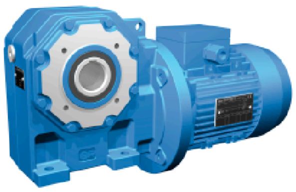
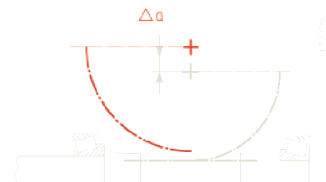
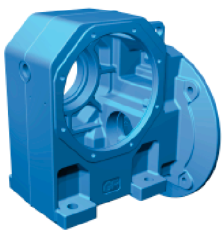
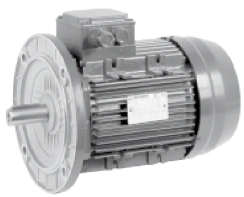
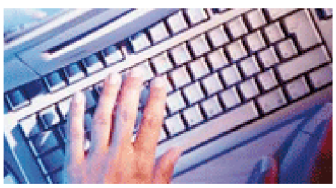
Sizes

430 ... 742

118 ... 325

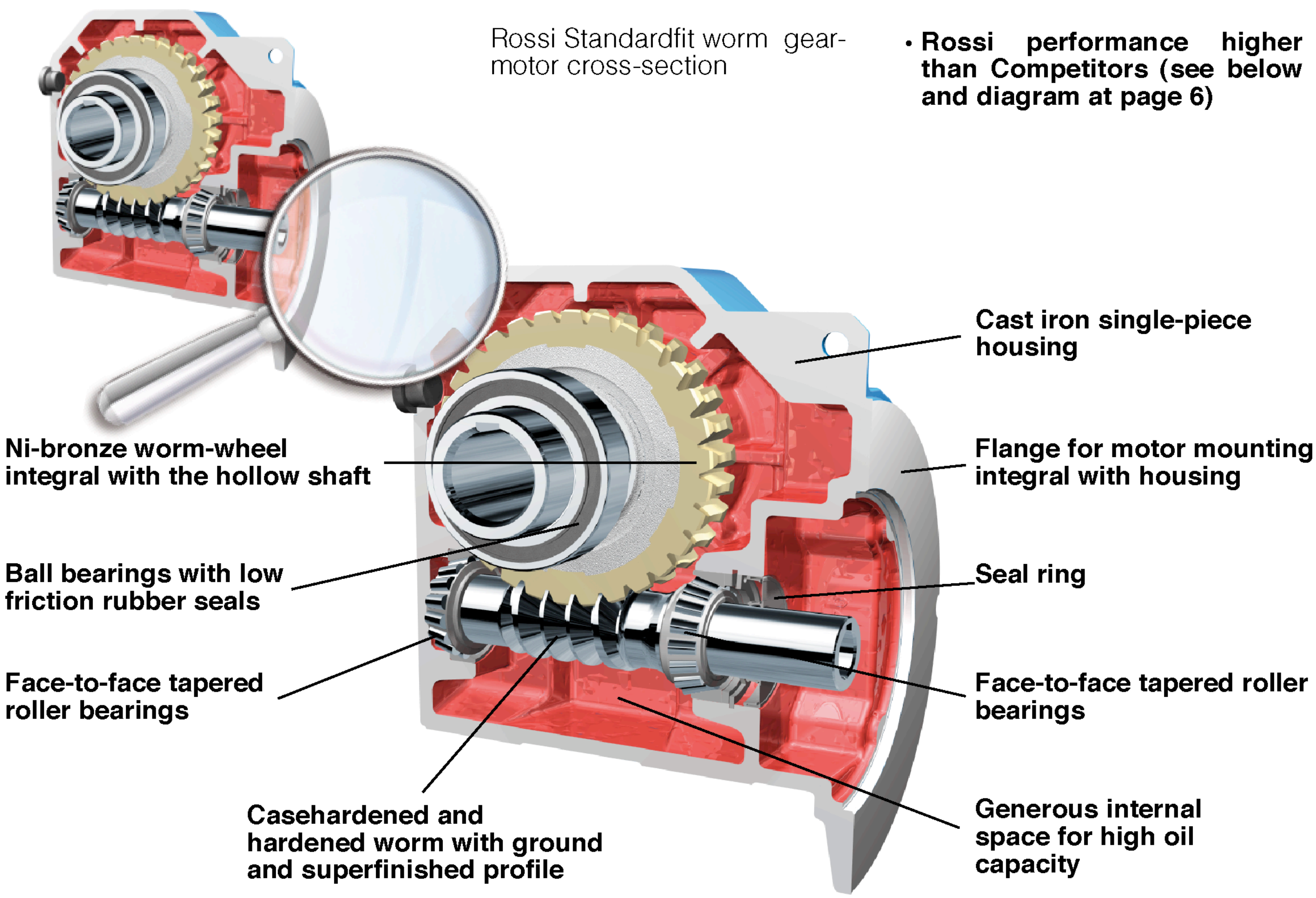


Features and benefits

	Features	Benefits
	Standardfit	• **Hollow low speed shaft interchangeability with market leader gearmotors** • **No additional costs for drawing updating and no machine changes are needed**
	Performance	• **Outstanding efficiency, life, and reliability** • **Excellent low noise running** • **«Long-life» lubrication for zero maintenance costs**
 UT.C 1345	Cast iron single-piece housing with integral motor flange	• **Oustanding torsional stiffness for higher overload withstanding** • **Excellent low noise running**
	NEMA MG1-12 electric motor Mating dimensions to IEC 72-1	• **Ready to use in NEMA enviroment** • **Universal availability thanks to IEC stock flexibility**
	Competent assistance	• **Worldwide Customer Service** • **E-catalog on Rossi website for an easy and quick self-made selection**

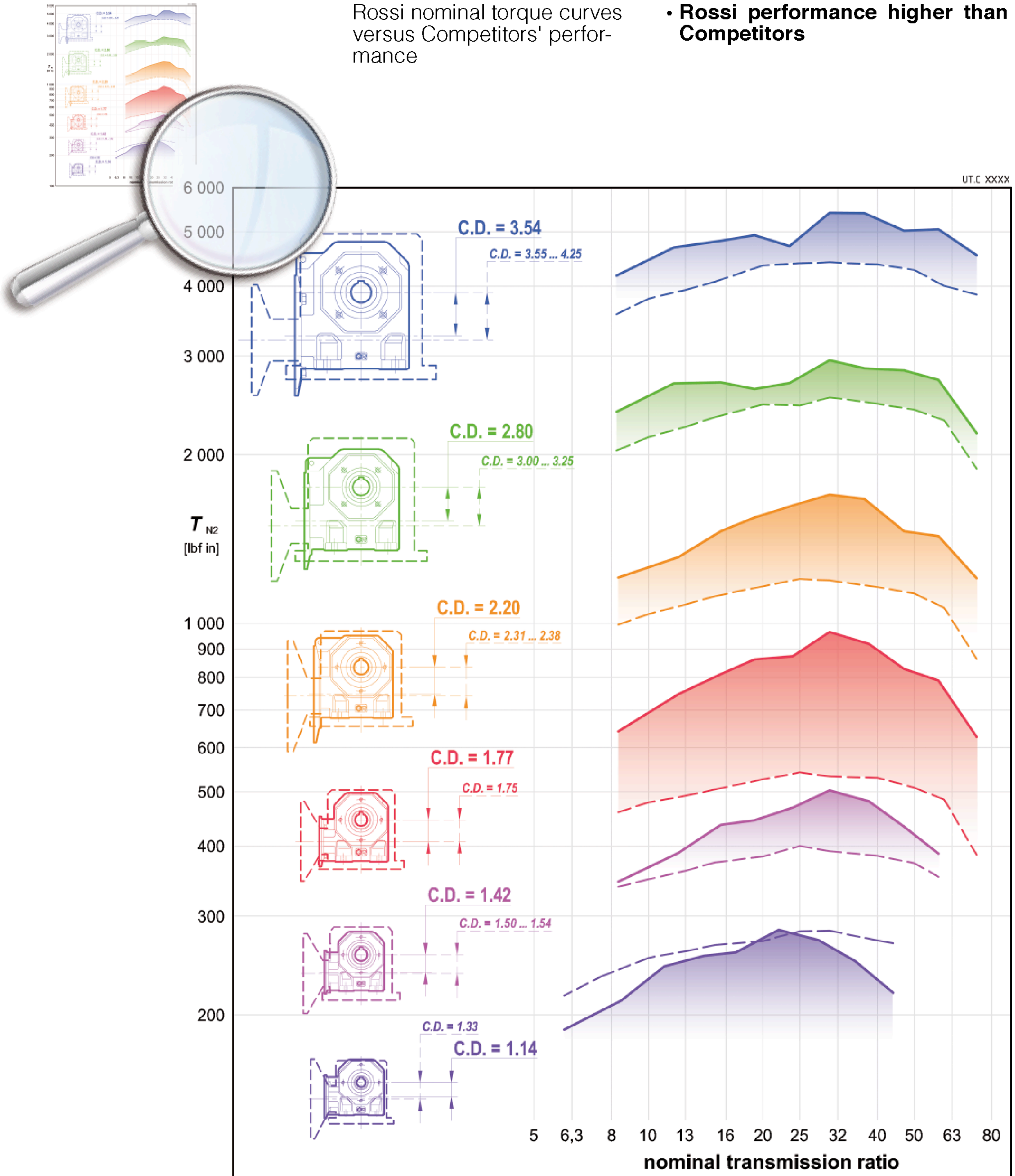
Features and benefits

	Features	Benefits
	Global service	• Direct worldwide Sale and Service Network • Affiliated companies and distributors with on hand inventories • Deliveries in 24 hours
	3 year warranty	• 3 year trouble-free running • Applicable to direct Customers and Customers of authorized ISO 9000 certified distributors
	Rossi Standardfit worm gearmotor cross-section	• Rossi performance higher than Competitors (see below and diagram at page 6)



Features and benefits

Features	Benefits
Rossi nominal torque curves versus Competitors' performance	• **Rossi performance higher than Competitors**



The figure above illustrates the nominal torque curves of the new gearmotor AS07 *STANDARDFIT* compared to the mean nominal torque curves of the main North American competitors (dashed curves) with equal or higher center distance «C.D.».
It shows as well – in proportion – the reduced overall dimensions of the gear reducer AS07 *STANDARDFIT* compared to competitor typical dimensions.

1 - Symbols, units of measurement and conversion table

Symbols and units of measurement

F_{r2}	[lbf]	radial load on low speed shaft end (OHL)
F_{a2}	[lbf]	axial load on low speed shaft end
i		transmission ratio
i_N		nominal transmission ratio
L_{WA}	[dB(A)]	sound power level
n_N	[rpm]	nominal speed of the motor
n_1	[rpm]	input speed of the gearmotor
n_2	[rpm]	output speed of the geamotor
P_N	[hp]	rated motor power
P_1	[hp]	input power of the gearmotor
P_2	[hp]	output power of the gearmotor
P_{N2}	[hp]	nominal output power of the gearmotor
Pt_N	[hp]	nominal thermal power of gear reducer
ta	[s]	starting time
tb	[s]	braking time
T_N	[lbf in]	nominal torque of the motor
T_{start}	[lbf in]	starting torque of the motor
T_{max}	[lbf in]	max torque of the motor, with direct on-line start
T_{brake}	[lbf in]	braking torque setting of the motor
T_{N2}	[lbf in]	nominal output torque of the gearmotor at speed n_2
T_2	[lbf in]	output torque of the gearmotor at speed n_2
I_N	[A]	rated current of the motor
I_S	[A]	starting current of the motor
WK_L^2	[lb ft^2]	external moment of inertia (of mass; couplings, driven machine)
WK_0^2	[lb ft^2]	moment of inertia (of mass) of the motor
z	[start/h]	starting frequency
z_0	[start/h]	no-load starting frequency
φa_1	[rad]	revolution of motor shaft during acceleration
φb_1	[rad]	revolution of motor shaft during deceleration
η		gear reducer efficiency
max		max value
min		min value
1		relating to high speed shaft (input)
2		relating to low speed shaft (output)
$\div$		from … to
$\approx$		approximately equal to
$\geqslant$		greater than or equal to
$\leqslant$		less than or equal to

Conversion table

Distance					
inch	[in]	=	0.0254	meter	[m]
feet	[ft]	=	0.3048	meter	[m]
Mass					
pound	[lb]	=	0.4536	kilogram	[kg]
ounce	[oz]	=	0.0283	kilogram	[kg]
Volume					
US liquid gallon	[gal]	=	3.7854	liter	[l]
Temperature					
fahrenheit degree	[°F]	=	1.8 · °C + 32	celsius degree	[°C]
Force					
pound-force	[lbf]	=	4.4482	newton	[N]
pound-force	[lbf]	=	0.4536	kilogram force	[kgf]
Power					
horse power	[hp]	=	0.7457	kilowatt	[kW]
Torque, Work					
pound-force inch	[lbf in]	=	0.1130	newton meter, joule	[N m], [J]
pound-force inch	[lbf in]	=	0.0115	kilogram-force meter	[kgf m]
pound-force foot	[lbf ft]	=	1.3560	newton meter, joule	[N m], [J]
pound-force foot	[lbf ft]	=	0.1383	kilogram-force meter	[kgf m]
Moment of inertia					
WK^2	[lb ft^2]	=	0.0421	kilogram square-meter	[kg m^2]

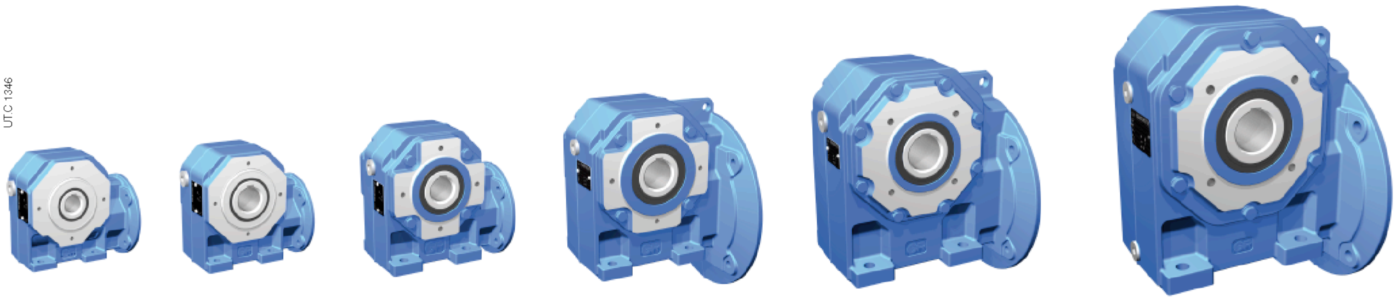
2 - Specifications

Interchangeability (low speed shaft diameters)
Universal mounting with lower feet, integral with housing, and **B14 flange** on 2 faces
Basic design; **compactness** and **economy**
Motors with mating dimensions standardized to **IEC** and electrical design according to **NEMA MG1-12**
High, **reliable**, and **tested performances** (Ni-bronze); optimization of worm gear pair performance (**ZI** involute profile and adequately matched wormwheel profile)
Rigid and precise cast iron single-piece housing with **motor mounting integral flange**

Generous internal space between gear stage and housing allowing:
- high oil capacity;
- lower oil contamination;
- greater duration of worm-wheel and worm bearings;
- lower running temperature.

Improved and up-graded modular construction both for components and assembled product which ensures great flexibility in manufacturing and product management
High manufacturing quality standard
Reduced maintenance

UTC 1346



118	225	325	430	535	742	1)
0.75	1	1.125	1.25	1.375	1.625	U
280	**500**	**950**	**1 700**	**3 000**	**5 400**	T_{N2}
450	600	900	1 250	1 450	1 700	$F_{r2\,max}$

1) U low speed shaft end Ø [in]
T_{N2} max nominal torque (n_1 = 1 750 rpm) [lbf in]
F_{r2max} max radial load (OHL) [lbf]

a - Gear reducer

Structural features

Main specifications are:
- **universal mounting** having lower **feet integral with housing** and **B14 flange** (integral with housing for sizes 118, 225) on the 2 output faces of hollow low speed shaft. **B5 flange** with spigot «recess» which can be mounted onto B14 flanges (see ch.13);
- **flange for motor coupling integral** with the housing;
- nodular cast iron hollow low speed shaft integral with worm-wheel, with keyway;
- standard (left or right extension) or double extension low speed shaft (see ch. 13);
- **motor directly keyed** into the worm;
- bearings on worm: face-to-face tapered roller bearings;
- bearings on worm-wheel: ball bearings with low friction rubber seals;
- 200 UNI ISO 185 **cast iron single-piece housing** with transverse stiffening ribs, and high oil capacity;
- oil bath lubrication with **synthetic oil** (ch. 4) for «**long-life**» lubrication: gear reducers with one plug (two plugs for size 742) supplied **filled with oil**; sealed;
- paint: external coating in epoxy powder paint appropriate for resistance to normal industrial environments and suitable for the application of further coats of synthetic paint; color blue RAL 5010 DIN 1843; internal protection in epoxy powder paint appropriate for resistance to synthetic oils.

Gear stage:

- worm gear pair;
- **6 sizes** with center distance to R 10 series;
- nominal transmission ratios to R 10 series (6 … 75);
- casehardened/hardened worm made of 16MnCr5 EN 10084-98 steel with ground and **superfinished involute** profile (**ZI**);
- worm-wheel with profile especially conjugate to the worm through hob optimization, with hub in nodular cast iron and **Ni-bronze** CuSn12Ni2-B (EN1982-98) gear rim with high pureness and controlled phosphor contents;
- load capacity calculated for breakage and wear; thermal capacity verified.

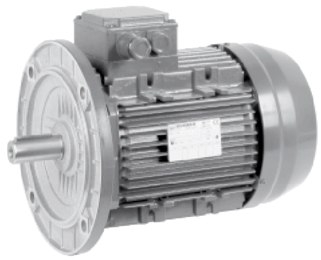
Specific standards:

- nominal transmission ratios and principal dimensions according to UNI 2016 standard numbers (DIN 323-74, NF X 01.001, BS 2045-65, ISO 3-73);
- basic rack to BS 721-83; involute profile (ZI) to UNI 4760/4-77 (DIN 3975-76), ISO/R 1122/2-69);
- fixing flanges B14 and B5 (the latter with spigot «recess») taken from UNEL 13501-69 (DIN 42948-65, IEC 72.2);
- parallel keys to UNI 6604-69 (DIN 6885 Bl. 1-68, NF E 27.656 and 22.175, BS 4235.1-72, ISO/R 773-69) except for specific cases of motor-to-gear reducer coupling where key height is reduced;
- mounting positions taken from UNEL 05513-67 (DIN 42950-64, IEC 34;7);
- worm gear pair load capacity and efficiency to **BS 721-83** integrated with ISO/CD 14521.

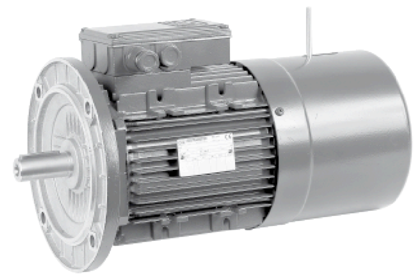
Sound levels

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

b - Electric motor



HF 63 ... 132



F0 63 ... 132

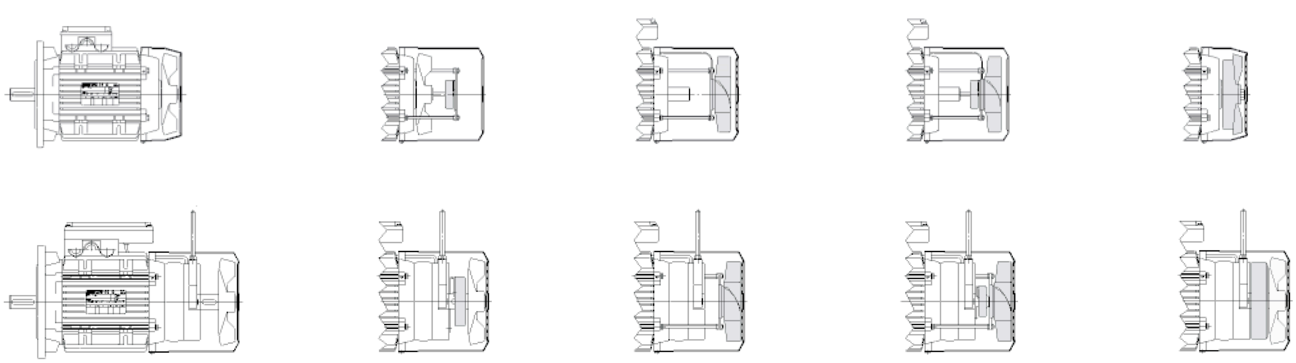
Asynchronous three-phase motor type HF:

- mating dimensions standardized to IEC 72-1 and electric design according to NEMA MG1-12 (see table below);
- standard efficiency, **1.15** service factor ;
- torque values according to **NEMA MG1-12** suitable for application involving high torque requirements;
- cULus compliance available on request;
- totally enclosed fan cooled (TEFC) single-speed induction motors;
- three phase, Y460 V - 60 Hz supply (230 V / 460 V - 60 Hz on request);
- IP 55 protection, class F insulation, class B temperature rise;
- continuous duty rated power; maximum ambient temperature 104 °F (40 °C) up to 3 300 ft elevation: consult us if higher;
- inverter duty (generous electromagnetic sizing, low-loss electrical stamping, phase separator, etc.);
- designs available for every application need: flywheel, independent cooling fan, independent cooling fan and encoder, etc.

Asynchronous three-phase brake motor type F0

- same mechanical and electric specifications as HF motor;
- particularly strong construction to withstand braking stresses; maximum reduction of noise level;
- **electromagnetic** spring loaded **brake** (braking occurs automatically when it is not supplied), with **d.c.** toroidal coil and an a.c. diodes rectifier: feeding from motor terminal block; brake can also be fed independently from the line (see UT.D 162; consult us);
- braking torque proportioned to motor torque (normally $T_{brake} \approx 2\ T_N$) step adjustable;
- high starting frequency enabled;
- rapid, precise stopping;
- hand lever for manual release with automatic return; removable lever rod.

For the full designation, technical specifications, **non-standard designs**, and further details see specific literature UT.D 162; consult us.



Main IEC motor mating dimensions [mm]: shaft end ∅ D x E - flange ∅ P

Motor size	Motor mounting position 1)			
	B14	B14R	**B5**	B5R
63	**11 x 23 - 90**	–	–	–
71	**14 x 30 - 105**	11 x 23 - 90	–	–
80	–	14 x 30 - 105	**19 x 40 - 200**	–
90	–	–	**24 x 50 - 200**	19 x 40 - 200
100, 112	–	–	**28 x 60 - 250**	24 x 50 - 200
132	–	–	–	28 x 60 - 250

1) Stated in designation (see ch. 3) and in motor name plate.

Electric motor technical data (HF and F0)

1 750 rpm - 60 Hz

P_N 1) hp	P_N 1) kW	Motor	n_N 2) rpm	T_N 2) lbf in	I_N 2) A Y460 V	cos φ 2)	η 2) % 100 %	η 2) % 75 %	$\frac{T_{start}}{T_N}$ 2)	$\frac{T_{max}}{T_N}$ 2)	$\frac{I_S}{I_N}$ 2)	Code Letter 2)	WK_0^2 2) lb ft² HF	WK_0^2 lb ft² F0	z_0 2) starts/h HF	z_0 starts/h F0	T_{brake} lbf in	Weight 2) lb HF	Weight lb F0
0.12	0.09	**56 B 4**	1 640	4.64	0.41	0.55	54.1	49.5	3.5	3.5	2.8	J	0.004	–	12 000	–	–	8	–
0.16	0.12	**63 A 4**	1 640	6.2	0.52	0.56	55,3	51.4	3.4	3.5	2.8	H	0.0060	0.0048	10 600	10 600	15	9.5	12.5
0.25	0.18	**63 B 4**	1 650	9.2	0.68	0.60	58,5	55.6	3	3.4	3.1	H	0.0075	0.0071	10 600	10 600	31	10	13
0.33	0.25	**63 C 4**	1 660	12.7	1.03	0.53	60.3	56.3	3.6	3.6	3.1	J	0.0093	0.0071	8 500	8 500	31	11.5	13
0.33	0.25	**71 A 4**	1 680	12.6	0.77	0.67	65.5	63.7	3.1	3.1	3.8	J	0.0123	0.0119	8 500	8 500	51	12.5	17.5
0.5	0.37	**71 B 4**	1 680	18.6	0.99	0.72	67.6	66.9	2.8	2.8	4.1	H	0.0160	0.0166	8 500	8 500	51	14.5	19.5
0.75	0.55	**71 C 4**	1 680	27.7	1.53	0.68	68.1	66.5	3.1	3.5	4.2	H	0.0209	0.019	6 700	6 700	67	16.5	21
1	0.75	**71 D 4**	1 680	37.7	2.05	0.68	68.1	66.5	3.2	3.4	4.5	J	0.0285	–	6 000	–	–	16	–
0.75	0.55	**80 A 4**	1 680	27.7	1.35	0.72	72.8	73.7	2.8	2.9	4.5	H	0.0255	0.0356	6 700	6 700	104	20	26
1	0.75	**80 B 4**	1 680	37.7	1.71	0.78	73.5	74.9	2.7	2.7	4.4	G	0.0348	0.0451	6 000	6 000	104	23	29
1.5	1.1	**80 C 4**	1 680	55	2.6	0.76	75.7	77	3.4	3.4	5.4	J	0.0487	0.0594	4 250	4 250	148	28	33
1.5	1.1	**90 S 4**	1 700	55	2.6	0.71	78.9	79.1	3.1	3.5	4.9	H	0.0473	0.0594	4 250	4 250	148	28	33
2	1.5	**90 L 4**	1 720	74	3.7	0.67	80.3	79.4	4	4.2	5.7	K	0.0662	0.0974	3 350	3 350	246	34	44
2.5	1.85	**90 LB 4**	1 690	93	3.95	0.77	80.5	81.5	3.6	3.6	5.8	J	0.0789	0.1045	3 350	3 350	246	37	46
3	2.2	**90 LC 4**	1 680	111	4.7	0.78	80.2	81.6	3.5	3.5	5.4	H	0.0883	0.114	2 650	2 650	246	41	51
3	2.2	**100 LA 4**	1 720	108	4.95	0.73	81	80.4	3.1	3.6	5.7	J	0.1525	0.1211	2 650	2 650	361	47	57
5	3.7	**100 LB 4**	1 740	180	8	0.7	82.6	81.1	3.6	4.1	6.6	K	0.2468	0.1639	2 650	2 650	361	67	66
5.4	4	**112 M 4**	1 730	195	8.3	0.75	84.2	84	3.3	3.8	6.4	J	0.2468	0.2304	2 120	2 120	670	67	84
7.5	5.5	**112 MC 4**	1 730	269	10.3	0.8	86.4	87.2	2.9	3.6	6.7	J	0.3433	0.2732	1 500	1 500	670	79	99
7.5	5.5	**132 S 4**	1 760	264	11.2	0.73	87.9	87.5	2.8	3.9	6.8	K	0.5766	0.5131	1 500	1 500	670	95	132
10	7.5	**132 M 4**	1 760	360	14.1	0.77	90.4	90.3	3.3	4.2	8.2	L	0.8524	0.7672	1 060	1 060	892	127	159
12.5	9.2	**132 MB 4**	1 760	442	16.9	0.79	90.3	90.6	3.2	4.1	8.2	L	0.9276	0.9287	900	900	1 334	134	168
15	11	**132 MC 4**	1 760	528	19.8	0.85	87.3	88.8	2.6	2.6	6.8	J	1.0530	1.0071	750	750	1 334	140	174

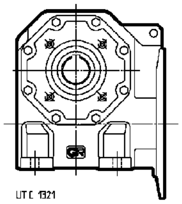
1 150 rpm - 60 Hz

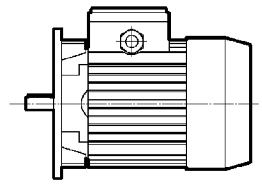
P_N 1) hp	P_N 1) kW	Motor	n_N rpm	T_N lbf in	I_N A Y460 V	cos φ	η % 100 %	η % 75 %	$\frac{T_{start}}{T_N}$	$\frac{T_{max}}{T_N}$	$\frac{I_S}{I_N}$	Code Letter	WK_0^2 lb ft² HF	WK_0^2 lb ft² F0	z_0 starts/h HF	z_0 starts/h F0	T_{brake} lbf in	Weight lb HF	Weight lb F0
0.12	0.09	**63 A 6**	1 090	7	0.65	0.55	41	38.7	3	3	1.9	J	0.0095	0.0095	11 200	10 600	31	9	13
0.16	0.12	**63 B 6**	1 070	9.5	0.7	0.56	43.7	39.9	3.1	3.1	1.9	H	0.0095	0.0095	10 600	10 600	31	9	13
0.25	0.18	**71 A 6**	1 105	13.8	0.7	0.64	61.2	59.6	2.7	2.7	3.2	H	0.0214	0.0285	10 600	9 500	44	13	20
0.33	0.25	**71 B 6**	1 090	19.4	0.8	0.63	63.1	62.9	2.4	2.4	2.7	F	0.0261	0.0285	9 500	9 500	44	14.5	20
0.5	0.37	**71 C 6**	1 075	29.1	1.4	0.67	59.8	57.4	2.4	2.4	2.7	F	0.0285	0.0309	8 500	8 500	66	15	21
0.5	0.37	**80 A 6**	1 130	27.7	1.2	0.66	65.6	64.1	2.3	2.7	3.5	H	0.0428	0.0451	8 000	8 000	97	18	26
0.75	0.55	**80 B 6**	1 120	41.5	1.7	0.69	65.3	63.7	2.4	2.6	3.4	G	0.0546	0.057	7 500	7 500	142	20	29
1	0.75	**80 C 6**	1 120	57	2	0.73	70.9	68.5	2.4	2.6	3.8	G	0.076	0.0784	6 000	6 000	142	25	33
1	0.75	**90 S 6**	1 120	57	2	0.73	70.9	68.5	2.4	2.6	3.8	G	0.076	0.0784	6 000	6 000	142	25	33
1.5	1.1	**90 L 6**	1 115	83	2.8	0.74	72.3	71.9	2.6	2.6	4.2	G	0.1116	0.1188	4 500	4 500	239	35	49
2	1.5	**90 LC 6**	1 105	115	4.4	0.70	70.2	69.8	2.8	3.8	3.8	G	0.1211	0.1306	4 250	4 250	239	37	51
2	1.5	**100 LA 6**	1 150	110	3.5	0.70	78.1	77.4	2.9	3.2	5.3	J	0.2399	0.2470	3 000	3 000	354	51	66
2.5	1.85	**100 LB 6**	1 150	136	4.3	0.75	77.8	76.4	2.8	2.9	5.4	J	0.2732	0.2803	2 650	2 650	354	57	71
3	2.2	**112 M 6**	1 155	161	5.4	0.70	78.7	77.1	3.2	3.3	5.8	K	0.3040	0.3373	2 360	2 360	443	66	84
5.4	4	**132 M 6**	1 160	291	9	0.72	83.7	82.8	3.2	3.7	6.6	K	0.6841	0.7672	1 180	1 180	885	132	159
7.5	5.5	**132 MB 6**	1 150	401	12.5	0.76	83.1	82.6	2.9	3.2	6.1	J	0.8432	0.9287	1 060	1 060	885	141	168

1) **Continuous duty** power rating with **1.15** service factor and three-phase supply **460 V - 60 Hz**.
2) Values **valid for** 4 poles **standard motors**, without brake, in mounting positions B5, B5R, B14, B14R; in any other case see specific literature (UT.D 162) or consult us.

For the full designation, technical specifications, **non-standard designs**, and further details see specific literature (UT.D 162): consult us.

3 - Designation





UT.C 1321

MR V 742 U O 4 A - F0 112M 4 265.460 B5 / 148

GEARMOTOR OUTPUT SPEED [rpm]		
MOTOR MOUNTING POSITION (ch. 2b and 9):	**...**	
VOLTAGE [V]:	**265.460**	Y460 V - 60 Hz
NUMBER OF POLES:	**4, 6**	
MOTOR SIZE:	**63A ... 132MB**	
MOTOR:	(HF)	asynchronous three-phase (**omitted from designation**)
	F0	with d.c. brake
	...	(see UT.D 162)
DESIGN:	**A**	
MODEL:	**4**	
SHAFT POSITION:	**O**	right angle
MOUNTING:	**U**	universal
SIZE:	**118 ... 742**	
GEAR STAGE:	**V**	worm gear pair
MACHINE:	**MR**	gearmotor

In case of:

mounting position[1] **differing from B3** (B3 and B8 for sizes ⩽ 535; see ch. 4):
complete designation stating «**mounting position ...** »
MR V 430 UO4A – 80A 4 265.460 B5/36,5
mounting position V5;

terminal box position differing from 0 (see ch. 4):
complete designation stating «**terminal box position ...**»
MR V 430 UO4A – 80A 4 265.460 B5/36,5
terminal box position 2;

brake motor:
insert the letters **F0** before motor size
MR V 430 UO4A – **F0** 80A 4 265.460 B5/36,5.

motor supplied by the Buyer [2]:
omit voltage, and add «**motor supplied by us**»
MR V 430 UO4A – 80A 4 … B5/36,5
motor supplied by us.

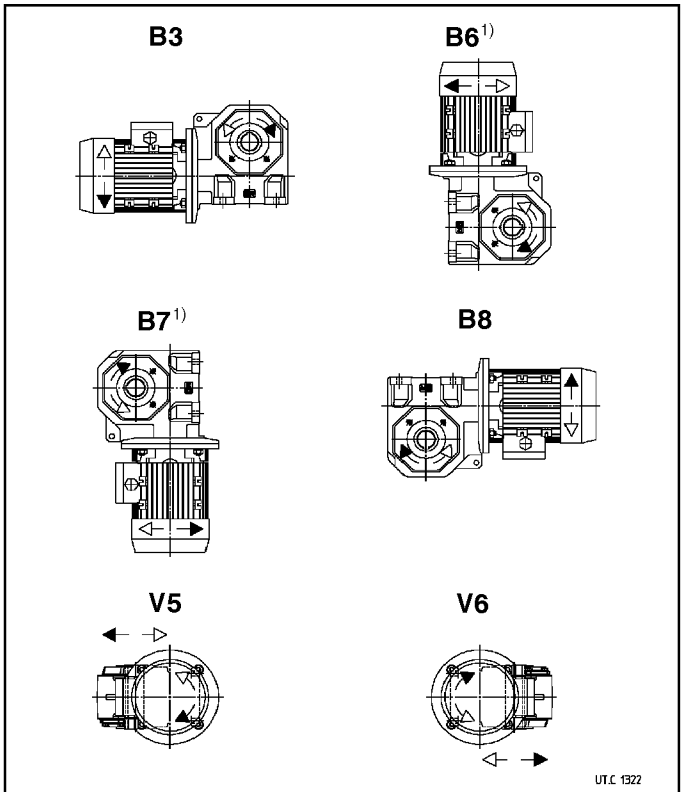
gearmotor without motor:
omit voltage, and add «**without motor**»
MR V 430 UO4A – 80A 4 … B5/36,5
without motor.

1) To simplify, the designation of mounting position (see ch. 4) is referred to foot mounting only, even if gearmotors are in universal mounting (e.g.: B14 flange mounting and derivatives; B5 flange mounting and derivatives, see ch. 13).
2) The motor supplied by the Buyer must be with mating surfaces machined under «standard» rating (IEC 72-1) at least and is to be sent carriage and expenses paid to our factory for fitting to the gear reducer.

4 - Mounting positions and lubrication

Mounting positions (and direction of rotation)

Unless otherwise stated, gearmotors are supplied in mounting position **B3** (**B3** and **B8** for sizes ⩽ 535) which, being standard, is **omitted** from the designation.

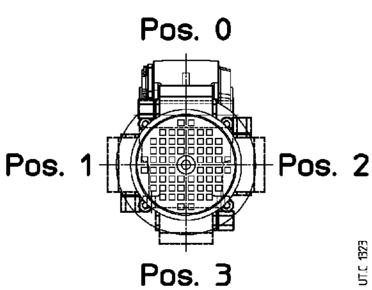


1) For mounting position **B6** or **B7** multiply Pt_N by **0,9** (ch. 5).

Terminal box position

Unless otherwise stated, gearmotors are supplied with motor terminal box in position 0, as stated in the figure below. On request, positions 1 ... 3 are available: complete the designation stating «**terminal box position 1**, **2** or **3**» (according to figure below).

Cable gland can be fitted in a position different from the one given in the figure (at Buyer's care).
In position 3 the terminal box projects below the foot mounting surface.



Lubrication

Worm gear pairs and bearings are oil-bath lubricated; worm-wheel bearings are lubricated with grease – assuming pollution-free surroundings – «**for life**» (bearings with low-friction rubber seals).

All sizes are envisaged with synthetic oil lubrication (synthetic oils can withstand operating temperatures up to **203 ÷ 230 °F** (95 ÷ 110 °C).

Gearmotors are supplied **filled with synthetic oil** (AGIP Blasia S 320, KLÜBER Klübersynth GH 6-320, MOBIL Glygoyle HE 320, SHELL Tivela S 320), providing «**long life**» lubrication, assuming pollution-free surroundings. Ambient temperature 32 ÷ 104 °F (0 ÷ 40 °C) with peaks of -4 °F (-20 °C) and +122 °F (+50 °C).

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

Oil temperature [°F]	Oil-change interval [h] - Synthetic oil
⩽ 149	18 000
149 ÷ 176	12 500
176 ÷ 203	9 000
203 ÷ 230	6 300

Never mix different makes of synthetic oil; if oil-change involves switching to a type different from that used hitherto, then give the gear reducer a thorough clean-out.

Important: be sure that the gearmotor is installed as per mounting position ordered and stated on the name plate: if the gearmotor is installed in a **different mounting position** verify, according to the values given in the table and/or on the lubrication plate, that the **oil quantity** doesn't **change**; if so, **adjust** it accordingly.

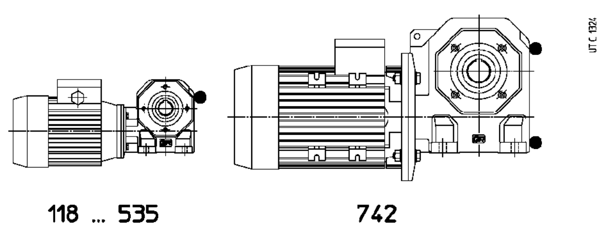
Size	Oil quantities [gal]		
	B3, V5, V6	**B8**	**B6, B7**
118	0.04		0.07
225	0.05		0.08
325	0.08		0.12
430	0.16		0.24
535	0.29		0.42
742	0.42	0.58	0.77

Running-in: a period of about 200 ÷ 800 h is advisable, by which time the gear pair will have reached maximum efficiency (ch. 11); oil temperature during this period is likely to reach higher levels than would normally be the case.

Seal rings: duration depends on several factors such as dragging speed, temperature, ambient conditions, etc.; as a rough guide it can vary from 3 150 to 12 500 h.

Plug position

Gearmotors are provided with 1 plug (2 plugs for size 742) positioned as in figure below. No level plug is foreseen.



5 - Thermal power *Pt* [hp]

The nominal thermal power Pt_N is that **power which can be applied at the input side of the gear reducer**, on continuous duty, at a max ambient temperature of 104 °F (40 °C) and air velocity ⩾ 4.1 ft/s without exceeding a 203 °F (95 °C) approximate oil temperature.

The following tables give the nominal thermal power values Pt_N according to **transmission ratio *i*** and **motor nominal speed n_1**. Consider: for **4** poles n_1 = 1 800 rpm and for **6** poles 1 120 rpm.

Size **118**

n_1 rpm	Pt_N [hp] *i*										
	6	**8.5**	**11**	**14**	**17**	**22**	**28**	**35**	**44**	**–**	**–**
1 750	1.37	1.12	1.03	0.94	0.74	0.67	0.6	0.55	0.49	–	–
1 150	1.09	0.89	0.8	0.74	0.58	0.53	0.47	0.43	0.39	–	–

Size **225**

n_1 rpm	Pt_N [hp] *i*										
	–	**8.33**	**12**	**15.5**	**19**	**24**	**30**	**38**	**47**	**58**	**–**
1 750	–	1.53	1.24	1.14	1.04	0.82	0.75	0.67	0.61	0.54	–
1 150	–	1.22	0.98	0.89	0.82	0.65	0.59	0.53	0.48	0.43	–

Size **325**

n_1 rpm	Pt_N [hp] *i*										
	–	**8.33**	**12**	**15.5**	**19**	**24**	**30**	**38**	**47**	**58**	**73**
1 750	–	2.1	1.72	1.57	1.43	1.13	1.04	0.92	0.83	0.75	0.66
1 150	–	1.68	1.36	1.24	1.13	0.82	0.82	0.73	0.66	0.6	0.53

Size **430**

n_1 rpm	Pt_N [hp] *i*										
	–	**8,33**	**12**	**15,5**	**19**	**24**	**30**	**37**	**47**	**58**	**73**
1 750	–	3.09	2.53	2.35	2.13	1.68	1.54	1.37	1.23	1.1	0.98
1 150	–	2.49	2.02	1.83	1.68	1.31	1.2	1.08	0.98	0.88	0.78

Size **535**

n_1 rpm	Pt_N [hp] *i*										
	–	**8.25**	**11.7**	**15.5**	**19**	**23,5**	**30**	**37**	**47**	**58**	**73**
1 750	–	5	4.26	3.64	3.36	3.1	2.41	2.18	2	1.8	1.6
1 150	–	4.01	3.42	2.87	2.64	2.47	1.89	1.7	1.59	1.42	1.27

Size **742**

n_1 rpm	Pt_N [hp] *i*										
	–	**8.25**	**11.7**	**15.5**	**19**	**23.5**	**30**	**37**	**47**	**58**	**73**
1 750	–	7.9	6.85	5.9	5.38	5.03	3.94	3.5	3.25	2.91	2.58
1 150	–	6.41	5.51	4.65	4.29	3.94	3.07	2.77	2.54	2.29	2.03

Thermal power *Pt* can be higher than the nominal Pt_N, described above, as per the following formula $Pt = Pt_N \cdot ft$ where *ft* is the thermal factor depending on ambient temperature and type of duty as indicated in the table.

Maximum ambient temperature °F	Duty continuous S1	on intermittent load S3 ... S6 Cyclic duration factor [%] for 60 min running [1]			
		60	**40**	**25**	**15**
104	1	1.18	1.32	1.5	1.7
86	1.18	1.4	1.6	1.8	2
68	1.32	1.6	1.8	2	2.24
50	1.5	1.8	2	2.24	2.5

1) $\frac{\text{Duration of running on load [min]}}{60} \cdot 100$

In general, the combinations foreseen in ch. 9 **do not require thermal power verification**, i.e. the verification that applied power P_1 is less than or equal to thermal power *Pt* ($P_1 \leqslant Pt = Pt_N \cdot ft$), exception made for those cases indicated by * or ** for which:

* thermal power verification is necessary if, for continuous duty, **the ambient temperature is > 86 °F** (30 °C) or running is in **full power;**

** thermal power is **always** to be verified.

For **B6** or **B7** mounting position multiply Pt_N by **0.9**.

Thermal power needs not be taken into account when maximum duration of continuous running time is 0,5 ÷ 2 h (from small to large gear reducer sizes) followed by rest periods long enough to restore the gear reducer to near ambient temperature (likewise 0,5 ÷ 2 h).

In case of maximum ambient temperature above 104 °F (40 °C) or below 32° F (0 °C) consult us.

6 - Service factor *f*s

Service factor *f*s takes into account the different running conditions (nature of load, running time, frequency of starting, other considerations) to which the gearmotor can be subjected and which must be referred to when performing calculations of gearmotor selection and verification.

Two equivalent methods are here proposed to determine the minimum service factor required by applications:

- **mass acceleration method**: considering the overloads deriving from the system inertia and running conditions (starts per hour, hours per day, expected life);
- **AGMA service factor**: according to AGMA standards (although the gearmotors of the present catalog are not strictly AGMA rated)

Mass acceleration method

For an analitical determination of the required service factor (especially considering the running hours), proceed as stated below and/or consult us

– Calculate the **mass acceleration factor** m_J:

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

where:

WK_R^2 [lb ft²] is the external moment of inertia (of mass; couplings, driven machine)

WK_L^2 reflected to the motor shaft:

$$WK_R^2 = WK_L^2 \cdot \left(\frac{n_2}{n_N}\right)^2$$

WK_0^2 [lb ft²] is the moment of inertia (of mass) of motor (see ch. 2b);

n_2 [rpm] is output speed of the gearmotor;

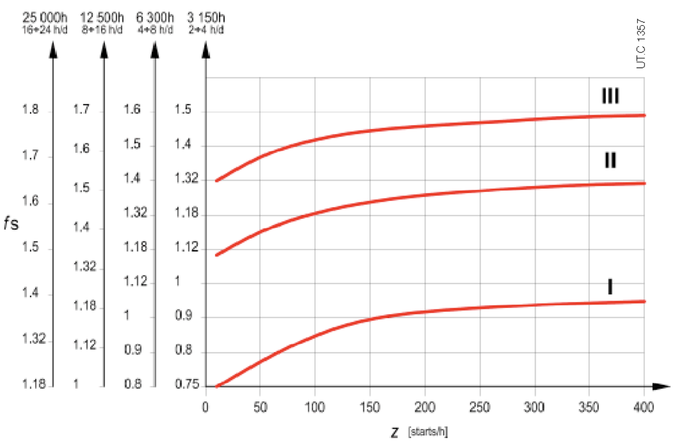
n_N [rpm] is nominal speed of the motor (see ch. 2b). As a guideline consider: n_N = 1 750 rpm for 4 poles and n_N = 1 150 rpm for 6 poles;

– Select the proper **overload class** according to the acceleration mass factor m_J:

$m_J \leq 0.3$	(uniform load)	load classification **I**
$m_J \leq 3$	(moderate overloads)	load classification **II**
$m_J \leq 10$	(heavy overloads)	load classification **III**

For m_J values larger than **10**, in presence of high values of backlash for kinematic chain, a specific evalutation has to be carried out: consult us.

– From the **diagram**, according to the overload class, the running time and the starting frequency z, read off the minimum service factor required.



– Whenever a **higher degree of reliability** is required (particularly difficult maintenance conditions, key importance of gearmotor to production, personnel safety, etc.) multiply *f*s by **1.25 ÷ 1.4**.

AGMA Service factor

Service factor

For a proper selection of gearmotor service factor, the magnitude and duration of shock loads, the duration of service per hour, per day, and per week, as well as the required reliability must be determined.

Although the gearmotors of the present catalog are not strictly AGMA rated, nevertheless the following table (gear reducer driven by an electric motor) can be used to select a proper service factor as well.

It is recommended that service factor for unique applications be agreed upon by the end user and the manufacturer.

The following discussion of shock loads and duration of service are provided as a guide to proper classification of applications.

Load classification

Since the gearmotor rating applies to applications involving uniform loads, the magnitude of any recurrent shock loads should be estimated or determined through test by the system designer. The loading conditions may be classified as follows:

- **uniform load**. Recurrent shock loads do not exceed the **nominal** specified input power;
- **moderate shock load**. Recurrent shock loads do not exceed **125** percent of the nominal specified input power;
- **heavy shock load**. Recurrent shock loads do not exceed **150** percent of the nominal specified input power;
- **extreme shock load**. Recurrent shock loads do not exceed **175** percent of the nominal specified input power.

Duration [hours per day]	**Service factor**			
	Uniform load	**Moderate shock**	**Heavy shock**	**Extreme shock**
Occasional 1/2 hour	(0.75)[1)]	(0.90)[1)]	1.00	1.25
≤ 3	1.00	1.00	1.25	1.50
3 ÷ 10	1.00	1.25	1.50	1.75
> 10	1.25	1.50	1.75	2.00

1) These service factors should be 1.00 or as agreed by the user and the manufacturer

Caution: in case of high reliability degree requirements (eg.: application involving risks for personnel safety) or in presence of high inertia loads or high starts/stops frequency, consult us.

7 - Selection

Determining the gearmotor size

– Make available all necessary data: required output power P_2 of gearmotor, speed n_2, running conditions (nature of load, running time, frequency of starting z, other considerations) with reference to ch. 6.
– Determine service factor fs on the basis of running conditions (ch. 6).
– Select the gearmotor size on the basis of n_2, fs, P_2 (ch. 9).

When for reasons of motor standardization, power P_2 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,

$\left(fs \cdot \dfrac{P_2 \text{ required}}{P_2 \text{ available}} \right)$ 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 (ch. 6).

Calculations can also be made on the basis of torque instead of power; this method is even preferable for low n_2 values.

Verifications

– Verify possible radial load F_{r2} referring to directions and values given in ch. 8 and 9.
– 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 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, irreversible or with low reversibility gear reducers in which the worm-wheel becomes driving member due to the driven machine inertia, other static or dynamic causes – verify that the maximum torque peak (ch. 11) is always less than T_{2max} (indicated in ch. 9); if it is higher or cannot be evaluated– in the above instances – install suitable safety devices so that T_{2max} will never be exceeded.
– In general, thermal power verification (ch. 5) is not required for the combinations foreseen in ch.9, exception made for those cases inticated by * or ** for which:
  * thermal power verification is necessary if, for continuous duty, the **ambient temperature is > 86 °F** (30 °C) or running is in **full power**;
  ** thermal power is **always** to be verified.

Considerations on selection

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, seeing that it is related directly to the power-requirement of the work to be carried out, to friction (starting, sliding or rolling friction) and inertia (particularly when mass and/or acceleration or deceleration are considerable). It can also be determined experimentally on the basis of tests, comparisons with existing applications, or readings taken with amperometers or wattmeters.

An oversized motor would involve: a greater starting current and consequently larger fuses and heavier cable; a higher running cost as power factor (cos φ) and efficiency would suffer; 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.

Driving machines with high kinetic energy

In presence of driving machines with high inertias and/or speeds, avoid the use of irreversible gearmotors as stopping and braking can cause very high overloads (ch. 11).

8 - Radial loads (overhung loads OHL) F_{r2} [lbf] on low speed shaft end

Radial loads generated on the shaft end by a drive connecting gearmotor and machine must be less than or equal to those given in ch. 9.

Normally, radial loads on low speed shaft end are considerable: in fact there is a tendency to connect the gear reducer to the machine by means of a transmission with high transmission ratio (economizing on the gear reducer) and with small diameters (economizing on the drive, and for requirements dictated by overall dimensions).

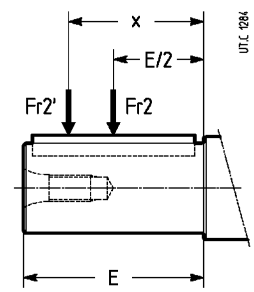
Bearing life and wear (which also affects gears unfavorably) and low speed shaft strength, clearly impose limits on permissible radial load.

Permissible radial loads are given in the tables of ch. 9 and are referred to gearmotor's output speed n_2 and torque T_2, considering overhung load acting on center line of standard low speed shaft end (see ch. 13), 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. If necessary, consult us for the verification of specific instance.

In case of radial load acting in position different from center line of low speed shaft end, i.e. operating at a distance different from 0.5 · E, the permissible radial load must be recalculated according to the following formula, verifying not to exceed F_{r2max} max value stated in the table:

$$F_{r2}' = F_{r2} \cdot \frac{E/2 + k}{x + k} \quad \text{[lbf]}$$



Where:

F_{r2}' [lbf] is the permissible radial load acting at the distance x from shaft shoulder;
F_{r2} [lbf] is the permissible radial load acting on center line of low speed shaft end (see ch.9);
E [in] is shaft end length (see following table and ch. 13);
k [in] is given in the table;
x [in] is the distance between the shaft shoulder and the load application point.

	Gear reducer size					
	118	**225**	**325**	**430**	**535**	**742**
E [in]	1.1	1.6	1.6	2.2	2.2	3.2
k [in]	2.05	2.58	3.05	3.68	4.35	5.24
F_{r2max} [lbf]	450	600	900	1 250	1 450	1 700

An **axial load** of up 0.2 times the value in the tables of ch. 9 is permissible, simultaneously with the radial load.

In case of no radial loads an axial load (not misaligned) of up 0.5 times the value in the tables of ch. 9, is permissible.

For higher values and/or **misaligned** axial loads, consult us.

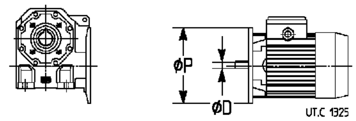
Radial load F_{r2} for most common drives has the following value:

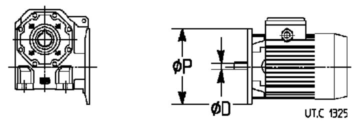
$$F_{r2} = k \cdot \frac{2 \cdot T_2}{d} \quad \text{[lbf]}$$

where:

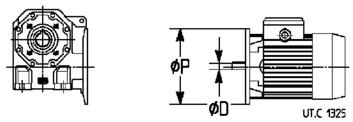
T_2 [lbf in] is the torque required by the gearmotor low speed shaft;
d [in] is the pitch diameter;
k is a coefficient which assumes different values according to transmission type:
k = 1 for chain drive (lifting in general);
k = 1.5 for timing belt drive;
k = 2.5 for V-belt drive;
k = 1.1 for spur gear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

9 - Selection tables

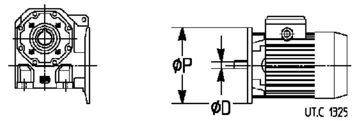
Motor power P_1 hp	Output speed n_2 rpm	Output power P_2 hp	Output torque T_2 lbf in	Max output torque T_{2max} lbf in	OHL F_{r2} lbf	Ratio i	Service factor fs		ØD mm	ØP mm	Weight ≈ HF lb	Weight ≈ F0 lb
0.12	**18.8**	0.08	259	618	600	58	1.5	**MR V 225 - 63 A 6 B14**	**11 ×**	**90**	18	22
	23.2	0.08	221	773	530	47	2.12					
	28.7	0.09	187	866	530	38	2.8					
	24.8	0.08	196	424	450	44	1.18	**MR V 118 - 63 A 6 B14**	**11 ×**	**90**	16	20
	31.1	0.08	165	454	425	35	1.7					
	38.9	0.09	138	497	375	28	2.24					
	49.5	0.09	113	528	375	22	3					
	64.1	0.09	90	477	355	17	3.35					
	77.9	0.1	79	466	335	14	3.75					
	99.1	0.1	63	485	300	11	4.5					
	128	0.1	49.8	416	250	8.5	5					
	182	0.1	36.4	388	224	6	6.3					
0.16	**18.6**	0.1	348	618	600	58	1.12	**MR V 225 - 63 B 6 B14**	**11 ×**	**90**	18	22
	23	0.11	298	773	600	47	1.6					
	28.4	0.11	252	866	530	38	2.12					
	29	0.11	238	606	560	58	1.6	**MR V 225 - 63 A 4 B14**	**11 ×**	**90**	17	21
	35.7	0.11	202	685	475	47	2.12					
	44.2	0.12	170	763	475	38	2.8					
	24.5	0.1	264	424	450	44	0.9	**MR V 118 - 63 B 6 B14**	**11 ×**	**90**	16	20
	30.9	0.11	222	454	450	35	1.25					
	38.6	0.11	185	497	400	28	1.7					
	49.1	0.12	152	528	375	22	2.12					
	38.2	0.11	181	371	450	44	1.18	**MR V 118 - 63 A 4 B14**	**11 ×**	**90**	15	19
	48	0.11	151	400	375	35	1.7					
	60	0.12	125	434	335	28	2.12					
	76.4	0.12	102	464	335	22	2.8					
	98.8	0.13	81	421	315	17	3.15					
	120	0.13	70	403	280	14	3.55					
	153	0.14	56	422	250	11	4.25					
	198	0.14	44	371	212	8.5	4.75					
	280	0.14	32	334	190	6	6					
0.25	**15.2**	0.16	645	865	900	73	1	**MR V 325 - 71 A 6 B14**	**14 ×**	**105**	27	34
	19.1	0.17	546	1 199	900	58	1.5					
	23.6	0.17	463	1 470	800	47	2					
	29.2	0.18	391	1 669	710	38	2.65					
	37	0.19	321	1 735	670	30	3.35					
	46.3	0.19	264	1 618	630	24	3.75					
	23.6	0.17	453	773	600	47	1	**MR V 225 - 71 A 6** B14R	11 ×	90	22	29
	29.2	0.18	383	866	600	38	1.4					
	37	0.18	314	944	530	30	1.8					
	29	0.17	372	606	560	58	1.06	**MR V 225 - 63 B 4 B14**	**11 ×**	**90**	17	21
	35.7	0.18	316	685	530	47	1.4					
	44.2	0.19	265	763	475	38	1.8					
	56	0.19	217	821	425	30	2.36					
	70	0.2	178	762	400	24	2.65					
	88.4	0.21	149	714	375	19	3					
	31.7	0.17	337	454	450	35	0.85	**MR V 118 - 71 A 6** B14R	11 ×	90	20	27
	39.6	0.18	282	497	450	28	1.12					
	50.5	0.18	230	528	400	22	1.4					
	65.3	0.19	184	477	375	17	1.6					
	38.2	0.17	282	371	400	44	0.8	**MR V 118 - 63 B 4 B14**	**11 ×**	**90**	16	20
	48	0.18	235	400	425	35	1.06					
	60	0.19	195	434	375	28	1.4					
	76.4	0.19	159	464	335	22	1.8					
	98.8	0.2	126	421	315	17	2					
	120	0.21	110	403	265	14	2.36					
	153	0.21	88	422	236	11	2.8					
	198	0.22	69	371	212	8.5	3.15					
	280	0.22	49.9	334	180	6	3.75					
0.33	**18.8**	0.22	733	1 199	900	58	1.12	**MR V 325 - 71 B 6 B14**	**14 ×**	**105**	28	34
	23.2	0.23	622	1 470	800	47	1.5					
	28.7	0.24	526	1 669	750	38	2					
	36.3	0.25	432	1 735	630	30	2.5					

Motor power P_1 hp	**Output speed** n_2 rpm	Output power P_2 hp	Output torque T_2 lbf in	Max output torque T_{2max} lbf in	OHL F_{r2} lbf	Ratio i	Service factor fs		ØD mm	ØP mm	Weight ≈ HF lb	F0 lb
0,33	**23.4**	0.22	587	851	850	73	1.06	**MR V 325 - 71 A 4 B14**	**14 ×**	**105**	25	31
	29.5	0.23	493	1 176	800	58	1.6					
	36.4	0.24	416	1 314	670	47	2					
	45	0.25	350	1 490	600	38	2.65					
	57	0.26	286	1 564	560	30	3.35					
	71.3	0.26	234	1 433	560	24	3.75					
	90	0.28	195	1 409	500	19	4.5					
	28.7	0.23	514	866	600	38	1.06	**MR V 225 - 71 B 6** B14R	11 ×	90	23	29
	36.3	0.24	422	944	530	30	1.4					
	45.4	0.25	349	855	530	24	1.6					
	35.5	0.24	419	685	560	47	1.06	**MR V 225 - 63 C 4** B14*	11 ×	90	18	22
	43.9	0.25	352	763	500	38	1.4					
	55.7	0.25	288	821	450	30	1.7					
	69.6	0.26	236	762	425	24	2					
	87.9	0.28	198	714	355	19	2.24					
	36.4	0.24	410	685	530	47	1.06	**MR V 225 - 71 A 4** B14R	11 ×	90	20	26
	45	0.25	344	763	500	38	1.4					
	57	0.25	281	821	450	30	1.8					
	71.3	0.26	231	762	425	24	2					
	90	0.28	193	714	355	19	2.36					
	110	0.28	160	756	335	15.5	2.8					
	143	0.28	126	666	300	12	3.15					
	38.9	0.23	379	497	425	28	0.8	**MR V 118 - 71 B 6** B14R	11 ×	90	21	27
	49.5	0.24	310	528	425	22	1.06					
	64.1	0.25	247	477	400	17	1.18					
	77.9	0.27	217	466	335	14	1.4					
	47.7	0.24	312	400	375	35	0.8	**MR V 118 - 63 C 4** B14*	11 ×	90	16	20
	59.6	0.25	259	434	375	28	1.06					
	75.9	0.25	211	464	375	22	1.32					
	98.2	0.26	167	421	335	17	1.5					
	119	0.28	146	403	280	14	1.7					
	152	0.28	116	422	224	11	2.12					
	48.9	0.24	305	400	375	35	0.8	**MR V 118 - 71 A 4** B14R	11 ×	90	18	24
	61.1	0.25	253	434	375	28	1.06					
	77.7	0.25	206	464	355	22	1.4					
	101	0.26	163	421	335	17	1.6					
	122	0.28	142	403	280	14	1.8					
	155	0.28	114	422	224	11	2.12					
	201	0.28	89	371	200	8.5	2.36					
	285	0.29	65	334	180	6	3					
0.5	**15.5**	0.34	1 388	3 443	1 450	73	1.7	**MR V 535 - 80 A 6 B5**	**19 ×**	**200**	63	71
	19.5	0.36	1 159	4 817	1 450	58	2.5					
	24	0.37	978	5 166	1 450	47	3.15					
	15.5	0.32	1 309	1 698	1 250	73	0.95	**MR V 430 - 80 A 6 B5**	**19 ×**	**200**	42	51
	19.5	0.34	1 102	2 343	1 250	58	1.32					
	24	0.36	935	2 656	1 060	47	1.8					
	30.5	0.37	765	3 018	950	37	2.5					
	37.7	0.38	642	3 171	900	30	3.15					
	47.1	0.39	527	3 058	850	24	3.55					
	23	0.35	951	1 470	800	47	0.95	**MR V 325 - 71 C 6** B14*	14 ×	105	29	35
	28.4	0.36	804	1 669	800	38	1.32					
	36	0.38	661	1 735	630	30	1.7					
	45	0.39	543	1 618	630	24	1.9					
	29.4	0.35	750	1 176	800	58	1.06	**MR V 325 - 71 B 4 B14**	**14 ×**	**105**	27	33
	36.3	0.36	632	1 314	750	47	1.32					
	44.9	0.38	531	1 490	630	38	1.7					
	56.8	0.39	434	1 564	530	30	2.24					
	71	0.4	355	1 433	500	24	2.5					
	89.7	0.42	296	1 409	475	19	3					
	110	0.43	245	1 398	450	15.5	3.35					
	142	0.43	193	1 277	400	12	4					
	36	0.37	646	944	530	30	0.9	**MR V 225 - 71 C 6** B14R	11 ×	90	23	29
	45	0.38	534	855	530	24	1					

* Power or motor power-to-size correspondence not according to standard.

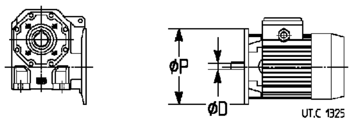
Motor power P_1 hp	Output speed n_2 rpm	Output power P_2 hp	Output torque T_2 lbf in	Max output torque T_{2max} lbf in	OHL F_{r2} lbf	Ratio i	Service factor fs		ØD mm	ØP mm	Weight ≈ HF lb	Weight ≈ F0 lb
0.5	**44.9**	0.37	523	763	500	38	0.9	**MR V 225 - 71 B 4** B14R	11 ×	90	22	28
	56.8	0.39	427	821	500	30	1.18					
	71	0.4	350	762	475	24	1.32					
	89.7	0.42	293	714	400	19	1.5					
	110	0.42	243	756	355	15.5	1.8					
	142	0.43	191	666	315	12	2					
	205	0.44	137	624	250	8.33	2.5					
	63.5	0.38	378	477	355	17	0.8	**MR V 118 - 71 C 6** B14R	11 ×	90	22	28
	77.5	0.39	313	464	355	22	0.9	**MR V 118 - 71 B 4** B14R	11 ×	90	20	26
	100	0.4	248	421	335	17	1.06					
	122	0.42	216	403	300	14	1.18					
	155	0.42	173	422	250	11	1.4					
	201	0.43	135	371	212	8.5	1.6					
	284	0.44	98	334	180	6	1.9					
0.75	**15.5**	0.51	2 082	3 443	1 450	73	1.12	**MR V 535 - 80 B 6 B5**	**19 ×**	**200**	65	73
	19.5	0.54	1 739	4 817	1 450	58	1.7					
	24	0.56	1 466	5 166	1 320	47	2.12					
	23.5	0.54	1 444	3 386	1 320	73	1.5	**MR V 535 - 80 A 4 B5**	**19 ×**	**200**	63	71
	29.6	0.56	1 197	4 164	1 250	58	2.24					
	36.5	0.58	1 003	4 476	1 250	47	2.8					
	46.4	0.59	808	5 133	1 180	37	3.55					
	19.5	0.51	1 653	2 343	1 250	58	0.9	**MR V 430 - 80 B 6 B5**	**19 ×**	**200**	45	53
	24	0.54	1 403	2 656	1 180	47	1.18					
	30.5	0.56	1 148	3 018	1 060	37	1.6					
	37.7	0.58	963	3 171	850	30	2.12					
	47.1	0.59	790	3 058	800	24	2.36					
	23.5	0.51	1 371	1 670	1 180	73	0.9	**MR V 430 - 80 A 4 B5**	**19 ×**	**200**	43	51
	29.6	0.54	1 146	2 250	1 180	58	1.25					
	36.5	0.56	967	2 395	1 000	47	1.5					
	46.4	0.58	787	2 705	800	37	2.12					
	57.2	0.6	659	2 778	750	30	2.65					
	71.5	0.61	539	2 672	750	24	3					
	90.3	0.64	447	2 540	670	19	3.55					
	111	0.65	370	2 519	630	15.5	4					
	29.7	0.54	1 153	1 669	710	38	0.9	**MR V 325 - 80 B 6** B14R	14 ×	105	34	42
	37.7	0.57	947	1 735	710	30	1.18					
	47.1	0.58	778	1 618	670	24	1.32					
	35.7	0.55	963	1 314	670	47	0.85	**MR V 325 - 71 C 4 B14**	**14 ×**	**105**	29	35
	44.2	0.57	809	1 490	670	38	1.12					
	56	0.59	661	1 564	600	30	1.5					
	70	0.6	541	1 433	560	24	1.6					
	88.4	0.63	451	1 409	500	19	1.9					
	108	0.64	374	1 398	400	15.5	2.12					
	36.5	0.55	943	1 314	670	47	0.9	**MR V 325 - 80 A 4** B14R	14 ×	105	32	40
	45.1	0.57	793	1 490	670	38	1.18					
	57.2	0.59	648	1 564	600	30	1.5					
	71.5	0.6	530	1 433	560	24	1.6					
	90.3	0.63	441	1 409	500	19	2					
	111	0.64	366	1 398	400	15.5	2.24					
	143	0.65	288	1 277	375	12	2.65					
	206	0.67	205	1 169	335	8.33	3.15					
	56	0.58	651	821	425	30	0.75	**MR V 225 - 71 C 4** B14R	11 ×	90	23	29
	70	0.59	533	762	425	24	0.9					
	88.4	0.63	447	714	400	19	1					
	108	0.64	371	756	375	15.5	1.18					
	140	0.65	291	666	335	12	1.32					
	202	0.67	208	624	250	8.33	1.7					
	120	0.63	329	403	265	14	0.75	**MR V 118 - 71 C 4** B14R	11 ×	90	22	28
	153	0.64	263	422	236	11	0.95					
	198	0.65	206	371	212	8.5	1					
	280	0.67	150	334	190	6	1.25					
1	**15.3**	0.7	2 880	7 053	1 700	73	1.7	**MR V 742 - 90 S 6 B5**	**24 ×**	**200**	91	99
	19.3	0.73	2 398	9 269	1 700	58	2.36					
	23.8	0.76	2 013	9 390	1 700	47	2.8					
	30.3	0.78	1 627	11 028	1 700	37	4					

* Power or motor power-to-size correspondence not according to standard.

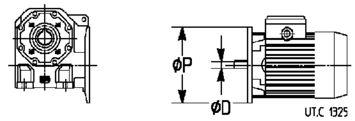


Motor power P_1 hp	Output speed n_2 rpm	Output power P_2 hp	Output torque T_2 lbf in	Max output torque T_{2max} lbf in	OHL F_{r2} lbf	Ratio i	Service factor fs		ØD × ØP mm	Weight ≈ HF lb	F0 lb
1	15.3	0.68	2 801	3 443	1 450	73	0.85	MR V 535 - 80 C 6 B5*	19 × 200	70	78
	19.3	0.72	2 339	4 817	1 450	58	1.25				
	23.8	0.75	1 973	5 166	1 450	47	1.6				
	30.3	0.76	1 589	5 933	1 250	37	2.12				
	37.3	0.79	1 328	5 795	1 180	30	2.65				
	15.3	0.68	2 801	3 443	1 450	73	0.85	**MR V 535 - 90 S 6 B5**	**24 × 200**	70	78
	19.3	0.72	2 339	4 817	1 450	58	1.25				
	23.8	0.75	1 973	5 166	1 450	47	1.6				
	30.3	0.76	1 589	5 933	1 250	37	2.12				
	37.3	0.79	1 328	5 795	1 180	30	2.65				
	23.6	0.72	1 919	3 386	1 400	73	1.12	**MR V 535 - 80 B 4 B5**	**19 × 200**	65	73
	29.7	0.75	1 592	4 164	1 320	58	1.7				
	36.6	0.77	1 334	4 476	1 180	47	2.12				
	46.5	0.79	1 075	5 133	1 180	37	2.65				
	57.3	0.81	894	5 012	1 120	30	3.35				
	73.2	0.85	736	4 318	1 000	23.5	3.55				
	23.8	0.71	1 888	2 656	1 120	47	0.9	MR V 430 - 80 C 6 B5*	19 × 200	50	58
	30.3	0.74	1 544	3 018	1 060	37	1.25				
	37.3	0.77	1 296	3 171	950	30	1.5				
	46.7	0.79	1 063	3 058	850	24	1.8				
	29.7	0.72	1 524	2 250	1 120	58	0.95	**MR V 430 - 80 B 4 B5**	**19 × 200**	45	53
	36.6	0.75	1 285	2 395	1 000	47	1.12				
	46.5	0.77	1 046	2 705	900	37	1.6				
	57.3	0.8	877	2 778	800	30	1.9				
	71.7	0.81	716	2 672	710	24	2.24				
	90.5	0.85	594	2 540	670	19	2.65				
	111	0.87	492	2 519	600	15.5	3				
	143	0.88	385	2 339	530	12	3.35				
*	37.3	0.75	1 274	1 735	630	30	0.85	MR V 325 - 80 C 6 B14R	14 × 105	39	47
	44.9	0.76	1 063	1 490	630	38	0.85	**MR V 325 - 71 D 4 B14**	**14 × 105**	30	-
	56.8	0.78	869	1 564	600	30	1.12				
	71	0.8	711	1 433	600	24	1.25				
	89.7	0.84	592	1 409	500	19	1.5				
	110	0.86	491	1 398	425	15.5	1.7				
	142	0.87	386	1 277	375	12	1.9				
	45.3	0.76	1 054	1 490	630	38	0.85	MR V 325 - 80 B 4 B14R	14 × 105	34	42
	57.3	0.78	861	1 564	600	30	1.12				
	71.7	0.8	705	1 433	600	24	1.25				
	90.5	0.84	587	1 409	500	19	1.5				
	111	0.86	487	1 398	425	15.5	1.7				
	143	0.87	382	1 277	375	12	2				
	206	0.89	273	1 169	315	8.33	2.36				
	110	0.85	487	756	335	15.5	0.9	MR V 225 - 71 D 4 B14R	11 × 90	24	-
	142	0.86	382	666	315	12	1				
	205	0.89	273	624	280	8.33	1.25				
	284	0.89	197	334	160	6	0.95	MR V 118 - 71 D 4 B14R	11 × 90	23	-
1.5	15.3	1.05	4 319	7 053	1 700	73	1.18	**MR V 742 - 90 L 6 B5**	**24 × 200**	101	114
	19.3	1.1	3 598	9 269	1 700	58	1.6				
	23.8	1.14	3 020	9 390	1 700	47	1.9				
	30.3	1.17	2 441	11 028	1 700	37	2.65				
	23.4	1.11	2 974	6 936	1 700	73	1.5	**MR V 742 - 90 S 4 B5**	**24 × 200**	91	99
	29.5	1.15	2 460	7 792	1 600	58	2				
	36.4	1.19	2 056	8 139	1 500	47	2.5				
	46.2	1.21	1 649	9 719	1 700	37	3.35				
	19.3	1.08	3 509	4 817	1 450	58	0.85	**MR V 535 - 90 L 6 B5**	**24 × 200**	80	93
	23.8	1.12	2 959	5 166	1 450	47	1.06				
	30.3	1.14	2 384	5 933	1 400	37	1.4				
	37.3	1.18	1 992	5 795	1 250	30	1.7				
	47.7	1.25	1 660	4 998	1 120	23.5	1.9				
	29.5	1.12	2 402	4 164	1 400	58	1.12	MR V 535 - 80 C 4 B5*	19 × 200	70	78
	36.4	1.16	2 012	4 476	1 320	47	1.4				
	46.2	1.19	1 622	5 133	1 180	37	1.8				

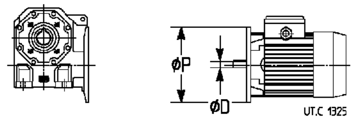
* On continuous duty, with an ambient temperature > 86 °F (30 °C) or with full load running, thermal power verification is necessary.
* Power or motor power-to-size correspondence not according to standard.

Motor power P_1 hp	Output speed n_2 rpm	Output power P_2 hp	Output torque T_2 lbf in	Max output torque T_{2max} lbf in	OHL F_{r2} lbf	Ratio i	Service factor fs		ØD mm	ØP mm	Weight ≈ HF lb	Weight ≈ FO lb
1.5	**29.5**	1.12	2 402	4 164	1 400	58	1.12	**MR V 535 - 90 S 4 B5**	**24 ×**	**200**	70	78
	36.4	1.16	2 012	4 476	1 320	47	1.4					
	46.2	1.19	1 622	5 133	1 180	37	1.8					
	57	1.22	1 349	5 012	1 000	30	2.24					
	72.8	1.28	1 111	4 318	950	23.5	2.36					
	90	1.3	909	4 835	900	19	2.8					
	110	1.31	751	4 487	900	15.5	3.55					
	* **30.3**	1.11	2 316	3 018	950	37	0.8	**MR V 430 - 90 L 6** B5R	19 ×	200	60	73
	* **37.3**	1.15	1 944	3 171	900	30	1					
	46.7	1.18	1 595	3 058	900	24	1.18					
	58.9	1.25	1 337	2 871	750	19	1.4					
	* **36.4**	1.12	1 939	2 395	900	47	0.75	**MR V 430 - 80 C 4** B5*	19 ×	200	50	58
	46.2	1.16	1 578	2 705	900	37	1.06					
	57	1.2	1 323	2 778	900	30	1.32					
	71.3	1.22	1 080	2 672	750	24	1.5					
	90	1.28	896	2 540	670	19	1.7					
	110	1.3	743	2 519	600	15.5	2					
	* **71.3**	1.2	1 063	1 433	500	24	0.8	**MR V 325 - 80 C 4** B14R	14 ×	105	39	47
	90	1.26	885	1 409	475	19	0.95					
	110	1.29	734	1 398	450	15.5	1.12					
	143	1.3	577	1 277	425	12	1.32					
	205	1.34	412	1 169	335	8.33	1.6					
2	**15.3**	1.4	5 759	7 053	1 700	73	0.85	**MR V 742 - 90 LC 6** B5*	24 ×	200	103	116
	19.3	1.47	4 797	9 269	1 700	58	1.18					
	23.8	1.52	4 026	9 390	1 700	47	1.4					
	30.3	1.56	3 255	11 028	1 700	37	2					
	37.3	1.61	2 710	10 384	1 700	30	2.36					
	15.6	1.4	5 658	7 053	1 700	73	0.9	**MR V 742 - 100 LA 6 B5**	**28 ×**	**250**	118	134
	19.7	1.47	4 713	9 269	1 700	58	1.18					
	24.3	1.52	3 956	9 390	1 700	47	1.5					
	30.8	1.56	3 198	11 028	1 700	37	2					
	38	1.61	2 662	10 384	1 700	30	2.5					
	23.4	1.47	3 966	6 936	1 700	73	1.12	**MR V 742 - 90 L 4 B5**	**24 ×**	**200**	97	110
	29.5	1.53	3 280	7 792	1 700	58	1.5					
	36.4	1.58	2 741	8 139	1 600	47	1.8					
	46.2	1.61	2 199	9 719	1 600	37	2.5					
	57	1.66	1 830	8 902	1 500	30	3					
	72.8	1.73	1 499	7 813	1 400	23.5	3.15					
	30.3	1.53	3 179	5 933	1 400	37	1.06	**MR V 535 - 90 LC 6** B5*	24 ×	200	82	95
	37.3	1.57	2 656	5 795	1 320	30	1.32					
	47.7	1.67	2 213	4 998	1 180	23.5	1.4					
	58.9	1.69	1 812	5 666	1 000	19	1.8					
	72.3	1.72	1 500	5 412	900	15.5	2.12					
	29.5	1.5	3 202	4 164	1 320	58	0.85	**MR V 535 - 90 L 4 B5**	**24 ×**	**200**	77	89
	36.4	1.55	2 683	4 476	1 320	47	1.06					
	46.2	1.59	2 162	5 133	1 320	37	1.32					
	57.0	1.63	1 798	5 012	1 180	30	1.6					
	72.8	1.71	1 481	4 318	1 000	23.5	1.8					
	90	1.73	1 213	4 835	900	19	2.12					
	110	1.75	1 001	4 487	850	15.5	2.65					
	147	1.79	769	4 714	750	11.7	3.55					
	207	1.82	553	3 983	710	8.25	4.25					
	** **46.7**	1.57	2 127	3 058	800	24	0.9	**MR V 430 - 90 LC 6** B5R	19 ×	200	62	75
	* **46.2**	1.54	2 105	2 705	800	37	0.8	**MR V 430 - 90 L 4** B5R	19 ×	200	57	69
	* **57**	1.6	1 764	2 778	800	30	0.95					
	* **71.3**	1.63	1 440	2 672	750	24	1.12					
	90	1.71	1 195	2 540	750	19	1.32					
	110	1.73	990	2 519	600	15.5	1.5					
	143	1.75	775	2 339	475	12	1.7					
	205	1.8	552	2 131	400	8.33	2.24					
2.5	**19.7**	1.84	5 891	9 269	1 700	58	0.95	**MR V 742 - 100 LB 6 B5**	**28 ×**	**250**	125	138
	24.3	1.9	4 945	9 390	1 700	47	1.18					
	30.8	1.95	3 997	11 028	1 700	37	1.6					
	38	2.01	3 328	10 384	1 700	30	1.9					

* On continuous duty, with an ambient temperature > 86 °F (30 °C) or with full load running, thermal power verification is necessary.
** Thermal power is to be verified.
* Power or motor power-to-size correspondence not according to standard.

Motor power	Output speed	Output power	Output torque	Max output torque	OHL	Ratio	Service factor				Weight ≈	
P_1 hp	n_2 rpm	P_2 hp	T_2 lbf in	T_{2max} lbf in	F_{r2} lbf	i	fs		ØD mm	ØP mm	HF lb	F0 lb
2.5	**23**	1.84	5 046	6 936	1 600	73	0.9	**MR V 742 - 90 LB 4 B5**	**24 ×**	**200**	100	112
	29	1.92	4 173	7 792	1 700	58	1.18					
	35.7	1.98	3 488	8 139	1 700	47	1.4					
	45.4	2.02	2 798	9 719	1 700	37	1.9					
	56	2.07	2 329	8 902	1 400	30	2.36					
	71.5	2.16	1 907	7 813	1 320	23.5	2.5					
	88.4	2.18	1 557	9 011	1 320	19	3.15					
	* **30.8**	1.91	3 904	5 933	1 320	37	0.85	**MR V 535 - 100 LB 6** B5R	24 ×	200	102	115
	* **38**	1.97	3 262	5 795	1 250	30	1.06					
	48.5	2.09	2 717	4 998	1 180	23.5	1.18					
	60	2.12	2 225	5 666	1 060	19	1.4					
	73.5	2.15	1 842	5 412	900	15.5	1.8					
	97.7	2.21	1 423	5 616	800	11.7	2.24					
	138	2.25	1 026	4 743	710	8.25	2.8					
	* **35.7**	1.94	3 413	4 476	1 250	47	0.85	**MR V 535 - 90 LB 4 B5**	**24 ×**	**200**	79	91
	45.4	1.98	2 751	5 133	1 250	37	1.06					
	56	2.03	2 288	5 012	1 180	30	1.32					
	71.5	2.14	1 884	4 318	1 060	23.5	1.4					
	88.4	2.16	1 543	4 835	900	19	1.7					
	108	2.19	1 274	4 487	800	15.5	2.12					
	144	2.24	978	4 714	750	11.7	2.8					
	204	2.27	704	3 983	670	8.25	3.35					
	** **56**	1.99	2 244	2 778	670	30	0.75	**MR V 430 - 90 LB 4** B5R	19 ×	200	59	71
	* **70**	2.04	1 833	2 672	710	24	0.9					
	88.4	2.13	1 520	2 540	670	19	1					
	108	2.17	1 260	2 519	630	15.5	1.18					
	140	2.19	986	2 339	560	12	1.32					
	202	2.25	703	2 131	400	8.33	1.7					
3	* **19.8**	2.2	7 008	9 269	1 700	58	0.8	**MR V 742 - 112 M 6 B5**	**28 ×**	**250**	134	151
	* **24.5**	2.28	5 882	9 390	1 700	47	1					
	31.1	2.34	4 755	11 028	1 700	37	1.32					
	38.3	2.41	3 959	10 384	1 700	30	1.6					
	23.3	2.21	5 984	6 936	1 400	73	0.75	**MR V 742 - 90 LC 4** B5*	24 ×	200	103	116
	29.3	2.3	4 949	7 792	1 600	58	1					
	36.2	2.37	4 136	8 139	1 700	47	1.18					
	45.9	2.42	3 318	9 719	1 700	37	1.6					
	56.7	2.48	2 762	8 902	1 500	30	2					
	23.6	2.21	5 914	6 936	1 400	73	0.75	**MR V 742 - 100 LA 4 B5**	**28 ×**	**250**	112	125
	29.7	2.3	4 891	7 792	1 600	58	1.06					
	36.6	2.37	4 088	8 139	1 700	47	1.25					
	46.5	2.42	3 279	9 719	1 700	37	1.6					
	57.3	2.48	2 730	8 902	1 500	30	2					
	73.2	2.6	2 235	7 813	1 320	23.5	2.12					
	90.5	2.62	1 825	9 011	1 250	19	2.65					
	111	2.66	1 508	7 977	1 180	15.5	3.15					
	** **38.3**	2.36	3 880	5 795	1 180	30	0.9	**MR V 535 - 112 M 6** B5R	24 ×	200	111	128
	* **48.9**	2.51	3 233	4 998	1 120	23.5	0.95					
	60.5	2.54	2 647	5 666	1 060	19	1.18					
	74.2	2.58	2 191	5 412	950	15.5	1.5					
	98.6	2.65	1 692	5 616	800	11.7	1.9					
	139	2.7	1 220	4 743	670	8.25	2.36					
	* **45.9**	2.38	3 263	5 133	1 180	37	0.85	**MR V 535 - 90 LC 4** B5*	24 ×	200	82	95
	* **56.7**	2.44	2 713	5 012	1 120	30	1.06					
	72.3	2.56	2 234	4 318	1 060	23.5	1.18					
	89.5	2.6	1 830	4 835	950	19	1.4					
	110	2.63	1 511	4 487	800	15.5	1.8					
	* **46.5**	2.38	3 225	5 133	1 180	37	0.9	**MR V 535 - 100 LA 4** B5R	24 ×	200	89	102
	* **57.3**	2.44	2 681	5 012	1 120	30	1.12					
	73.2	2.56	2 208	4 318	1 060	23.5	1.18					
	90.5	2.6	1 808	4 835	950	19	1.4					
	111	2.63	1 493	4 487	800	15.5	1.8					
	147	2.68	1 147	4 714	710	11.7	2.36					
	208	2.73	825	3 983	630	8.25	2.8					
	** **70.8**	2.44	2 173	2 672	630	24	0.75	**MR V 430 - 90 LC 4** B5R	19 ×	200	62	75
	* **89.5**	2.56	1 802	2 540	600	19	0.85					
	* **110**	2.6	1 494	2 519	560	15.5	1					
	* **142**	2.63	1 169	2 339	500	12	1.12					
	204	2.7	833	2 131	425	8.33	1.4					

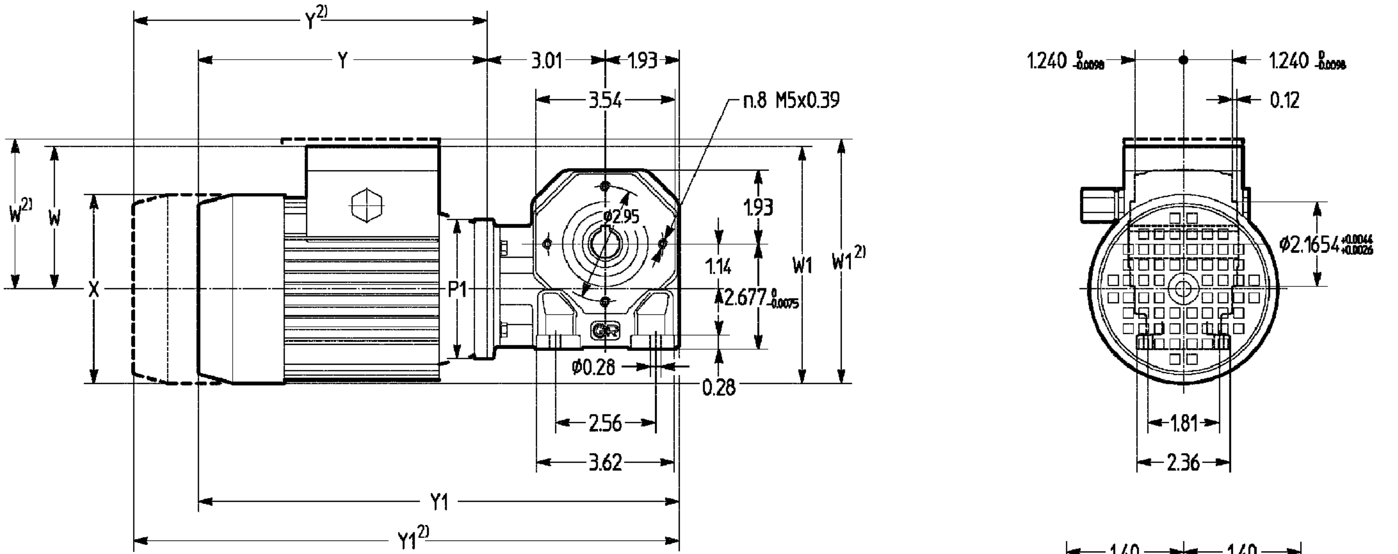
* On continuous duty, with an ambient temperature > 86 °F (30 °C) or with full load running, thermal power verification is necessary.
** Thermal power is to be verified.
* Power or motor power-to-size correspondence not according to standard.

Motor power P_1 hp		Output speed n_2 rpm	Output power P_2 hp	Output torque T_2 lbf in	Max output torque T_{2max} lbf in	OHL F_{r2} lbf	Ratio i	Service factor fs		ØD mm × ØP mm	Weight ≈ HF lb	Weight ≈ F0 lb
5	**	**36.6**	3.96	6 813	8 139	1 400	47	0.75	**MR V 742 - 100 LB 4 B5**	**28 × 250**	121	134
	*	**46.5**	4.03	5 466	9 719	1 700	37	1				
	*	**57.3**	4.14	4 549	8 902	1 600	30	1.18				
		73.2	4.33	3 725	7 813	1 500	23.5	1.25				
		90.5	4.37	3 042	9 011	1 320	19	1.6				
		111	4.43	2 513	7 977	1 120	15.5	1.9				
		147	4.5	1 926	8 505	950	11.7	2.5				
		208	4.57	1 382	7 027	900	8.25	3				
	**	**73.2**	4.27	3 680	4 318	850	23.5	0.71	**MR V 535 - 100 LB 4** B5R	24 × 200	98	111
	*	**90.5**	4.33	3 014	4 835	850	19	0.85				
	*	**111**	4.38	2 488	4 487	850	15.5	1.06				
		147	4.47	1 911	4 714	710	11.7	1.4				
		208	4.55	1 375	3 983	560	8.25	1.7				
5.4	*	**61.1**	4.64	4 787	10 600	1 500	19	1.25	**MR V 742 - 132 M 6** B5R	28 × 250	200	226
		74.8	4.7	3 954	9 704	1 320	15.5	1.5				
		99.4	4.81	3 046	10 087	1 120	11.7	1.9				
		141	4.89	2 192	8 423	900	8.25	2.36				
	*	**57.7**	4.47	4 885	8 902	1 600	30	1.12	**MR V 742 - 112 M 4 B5**	**28 × 250**	134	151
		73.6	4.67	3 999	7 813	1 500	23.5	1.18				
		91.1	4.72	3 267	9 011	1 320	19	1.5				
		112	4.78	2 699	7 977	1 120	15.5	1.8				
		148	4.87	2 068	8 505	950	11.7	2.24				
		210	4.94	1 484	7 027	900	8.25	2.8				
	*	**112**	4.73	2 672	4 487	800	15.5	1	**MR V 535 - 112 M 4** B5R	24 × 200	111	128
	*	**148**	4.83	2 052	4 714	750	11.7	1.32				
		210	4.91	1 477	3 983	630	8.25	1.6				
7.5	**	**61.1**	6.44	6 649	10 600	1 250	19	0.9	**MR V 742 - 132 MB 6** B5R	28 × 250	209	235
	**	**74.8**	6.52	5 492	9 704	1 250	15.5	1.06				
	*	**99.4**	6.68	4 231	10 087	1 180	11.7	1.32				
		141	6.79	3 044	8 423	850	8.25	1.7				
	*	**89.5**	6.55	4 617	9 011	1 250	19	1.06	**MR V 742 - 112 MC 4** B5*	28 × 250	145	167
	*	**110**	6.64	3 814	7 977	1 250	15.5	1.25				
		146	6.76	2 923	8 505	1 060	11.7	1.6				
		206	6.9	2 097	7 027	850	8.25	2				
	*	**91.6**	6.55	4 511	9 011	1 250	19	1.12	**MR V 742 - 132 S 4** B5R	28 × 250	182	200
	*	**112**	6.64	3 727	7 977	1 250	15.5	1.32				
		149	6.76	2 856	8 505	1 060	11.7	1.6				
		211	6.9	2 049	7 027	850	8.25	2				
	**	**146**	6.71	2 900	4 714	600	11.7	0.9	**MR V 535 - 112 MC 4** B5R	24 × 200	122	144
	**	**206**	6.82	2 087	3 983	530	8.25	1.12				

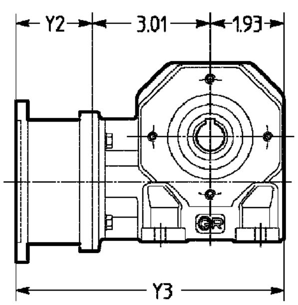
* On continuous duty, with an ambient temperature > 86°F (30 °C) or with full load running, thermal power verification is necessary.
** Thermal power is to be verified.
* Power or motor power-to-size correspondence not according to standard.

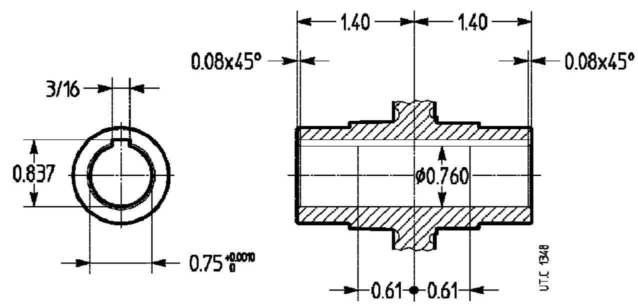
10 - Dimensions

Size **118**



C-Face3)

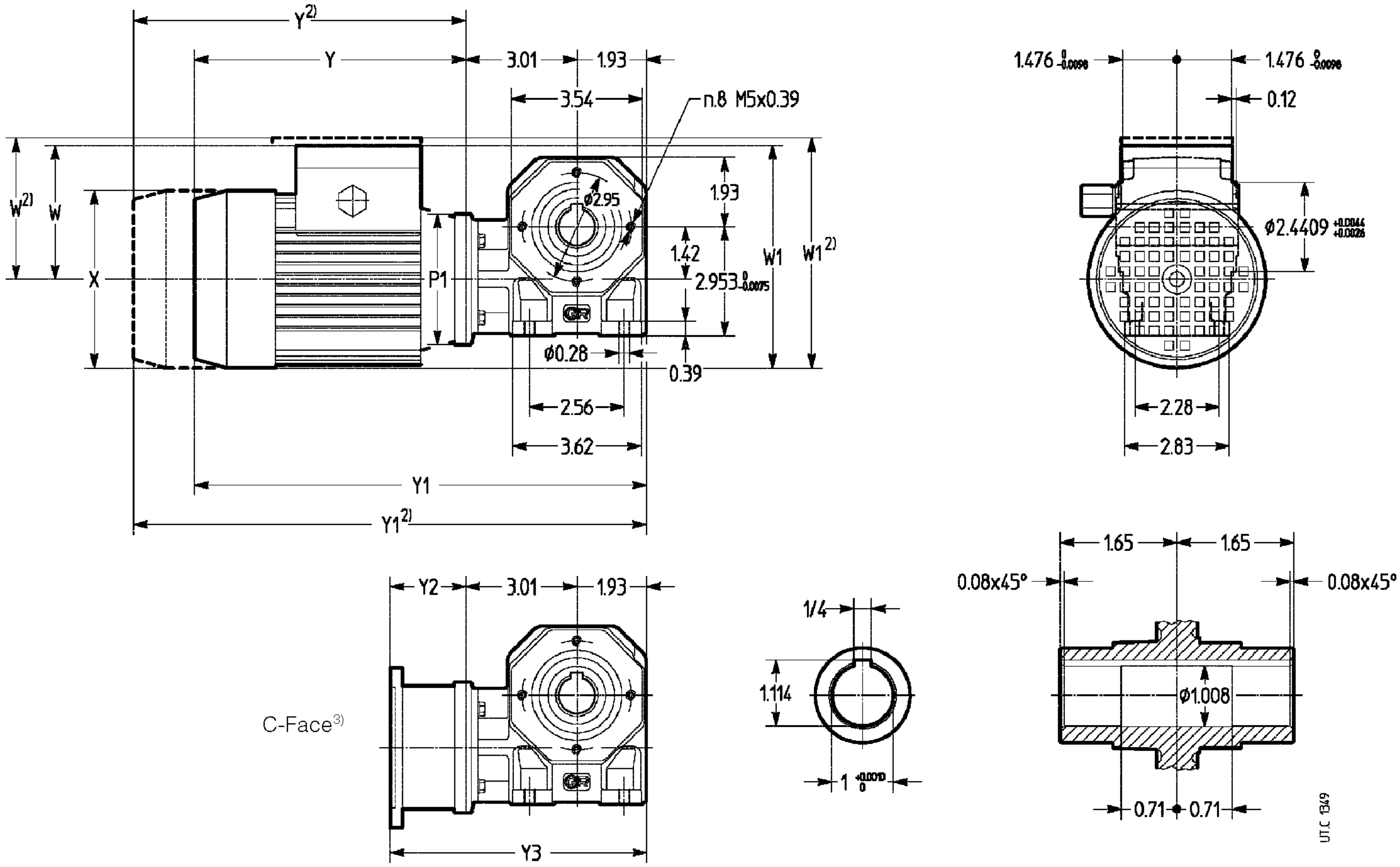




Motor size		1)	P1 Ø	X Ø ≈	2)	Y ≈	2)	Y1 ≈	2)	W ≈	2)	W1 ≈	2)	NEMA C - Face adapter3)	Y2	Y3 ≈
63	**A**	**B14**	3.54	4.84	4.80	7.80	9.02	12.74	14.00	4.33	4.09	6.75	6.50	–	2.70	7.64
	B	**B14**												MPN 63 B14 - 56 C4)		
	C	**B14**												MPN 63 B14 - 56 C		
71		**B14R**		5.51	5.51	9.06	10.80	14.00	15.80	4.65	4.49	7.40	7.24	MPN 63 B14 - 56 C	2.70	7.64

1) Motor mounting position (see ch. 2b).
2) Values valid for F0 brake motor.
3) Available on request: for further dimensions and details see ch. 13
4) Not available for 63B 6 motor.

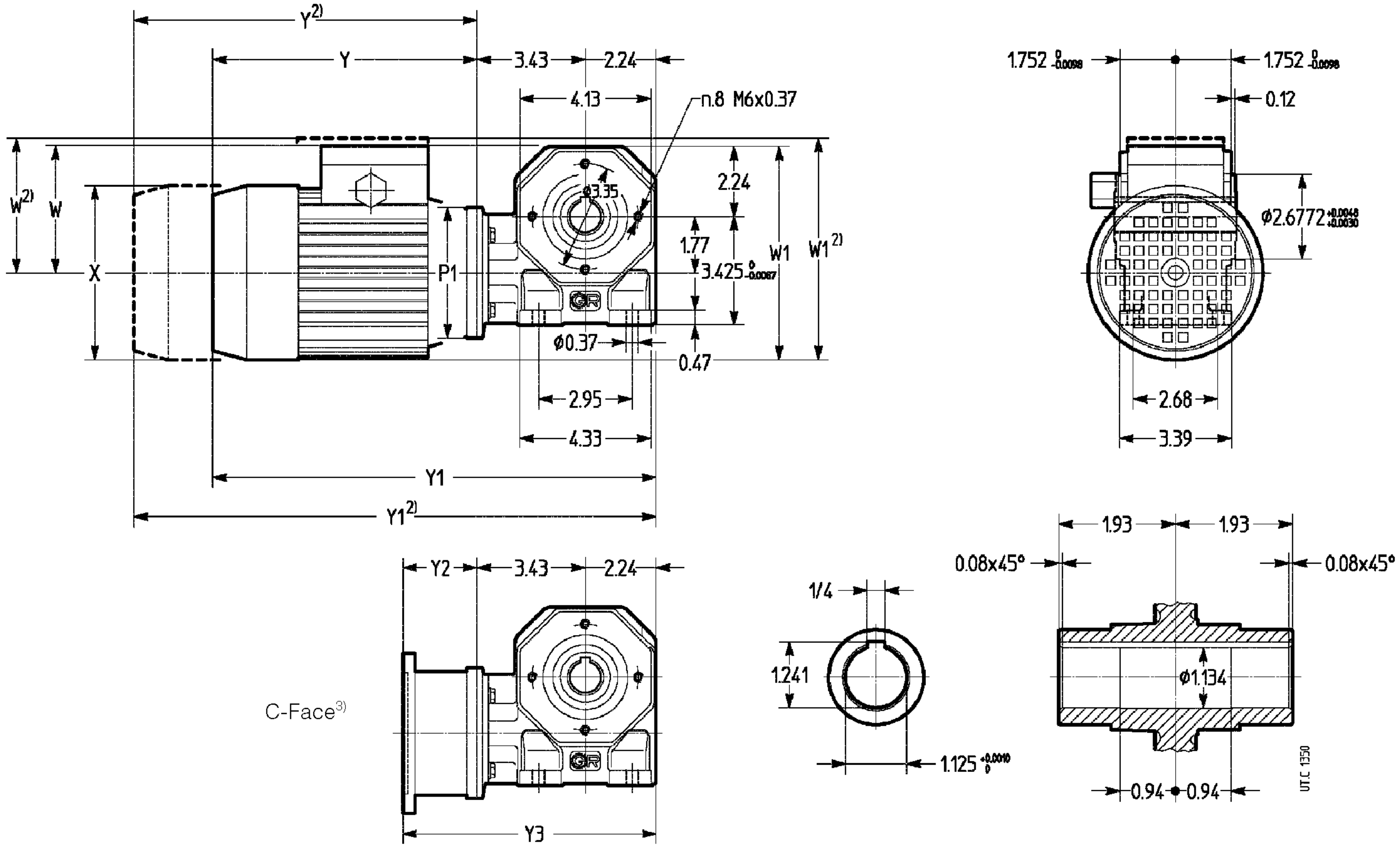
Size **225**



Motor size 1)	P1 ⌀	X ⌀ ≈	X 2)	Y ≈	Y 2)	Y1 ≈	Y1 2)	W ≈	W 2)	W1 ≈	W1 2)	NEMA C - Face adapter[3]	Y2	Y3 ≈
63 A B14	3.54	4.84	4.80	7.80	9.02	12.74	14.00	4.33	4.09	6.75	6.50	–	2.70	7.64
B B14												MPN 63 B14 - 56 C[4]		
C B14												MPN 63 B14 - 56 C		
71 B14R		5.51	5.51	9.06	10.8	14.00	15.80	4.65	4.49	7.40	7.24	MPN 63 B14 - 56 C	2.70	7.64

1) Motor mounting position (see ch. 2b).
2) Values valid for F0 brake motor.
3) Available on request: for further dimensions and details see ch. 13
4) Not available for 63B 6 motor.

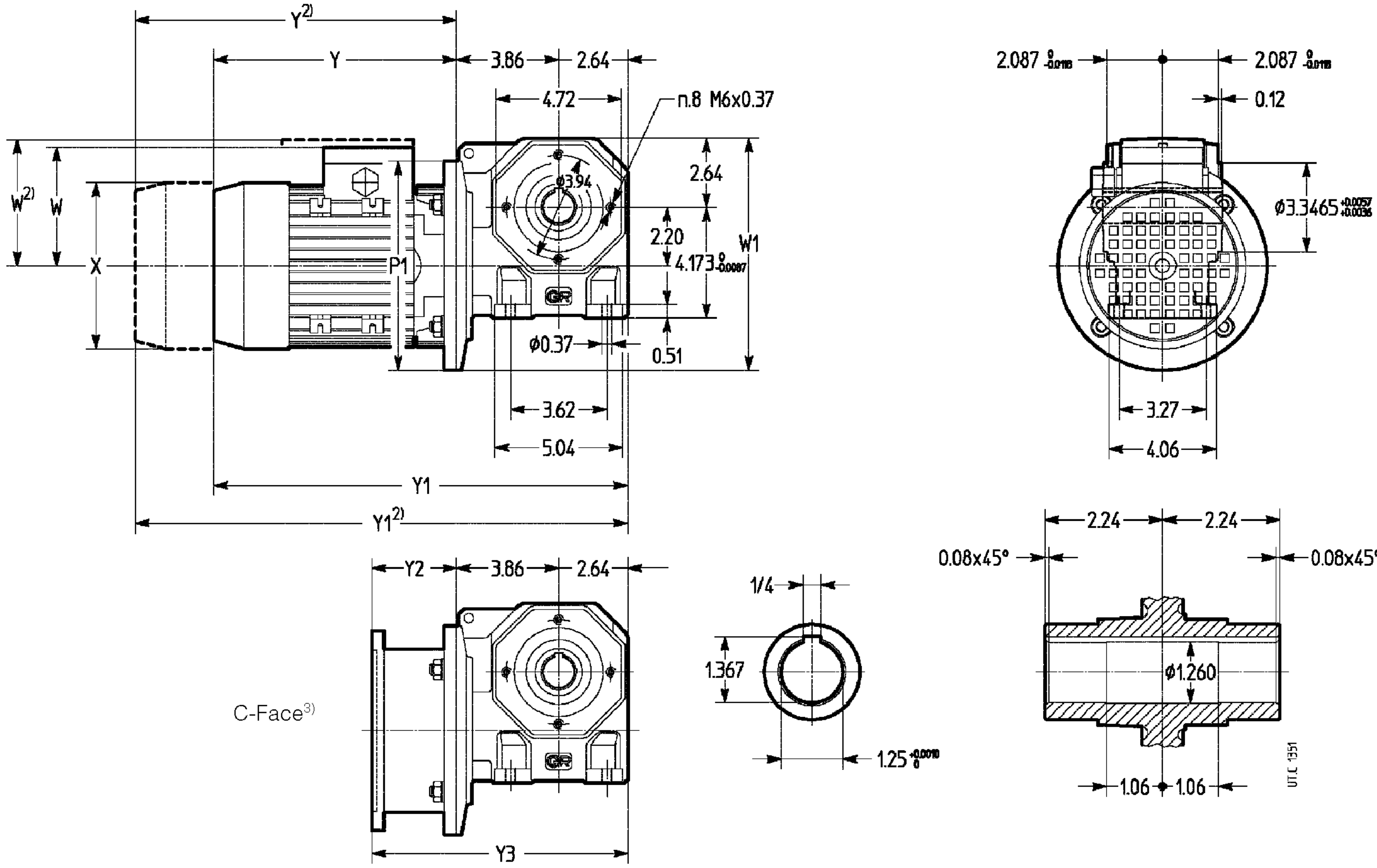
Size **325**



Motor size		P1 Ø	X Ø ≈		Y ≈		Y1 ≈		W ≈		W1		NEMA C - Face adapter[3)]	Y2	Y3 ≈
	1)			2)		2)		2)		2)		2)			
71	**B14**	4.13	5.51	5.51	9.06	10.80	14.72	16.50	4.65	4.49	7.40	7.24	MPN 71 B14 - 56 C	2.7	8.37
80	**B14R**		6.26	6.26	9.92	12.10	15.59	17.80	5.39	5.08	8.52	8.23	MPN 63 B14 - 56 C	2.7	8.37

1) Motor mounting position (see ch. 2b).
2) Values valid for F0 brake motor.
3) Available on request: for further dimensions and details see ch. 13

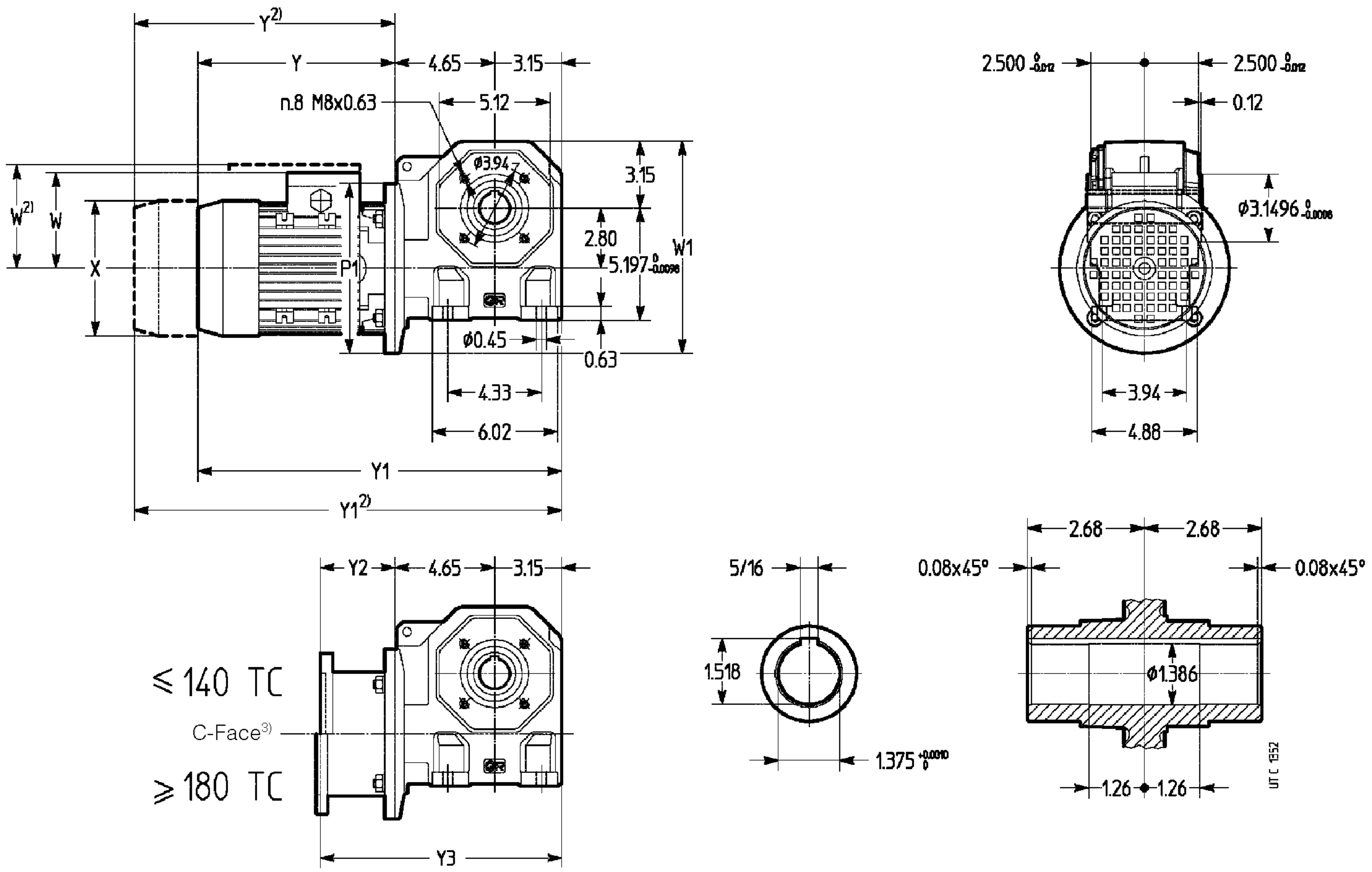
Size **430**



Motor size		P1 Ø	X Ø ≈		Y ≈		Y1 ≈		W ≈		W1 ≈		NEMA C - Face adapter[3)]	Y2	Y3 ≈
1)				2)		2)		2)		2)		2)			
80	**B5**	7.88	6.26	6.26	9.92	12.10	16.42	18.60	5.39	5.08	9.33	9.02	MPN 80 B5 - 56 C	2.7	9.2
90 L	**B5R**		6.97	6.97	11.34	14.00	17.83	20.50	5.67	5.67	9.61	9.61	MPN 90 B5R - 140 TC	2.7	9.2
LB	**B5R**				12.52		19.02						–		
LC	**B5R**				12.52		19.02						MPN 90 B5R - 140 TC		

1) Motor mounting position (see ch. 2b).
2) Values valid for F0 brake motor.
3) Available on request: for further dimensions and details see ch. 13

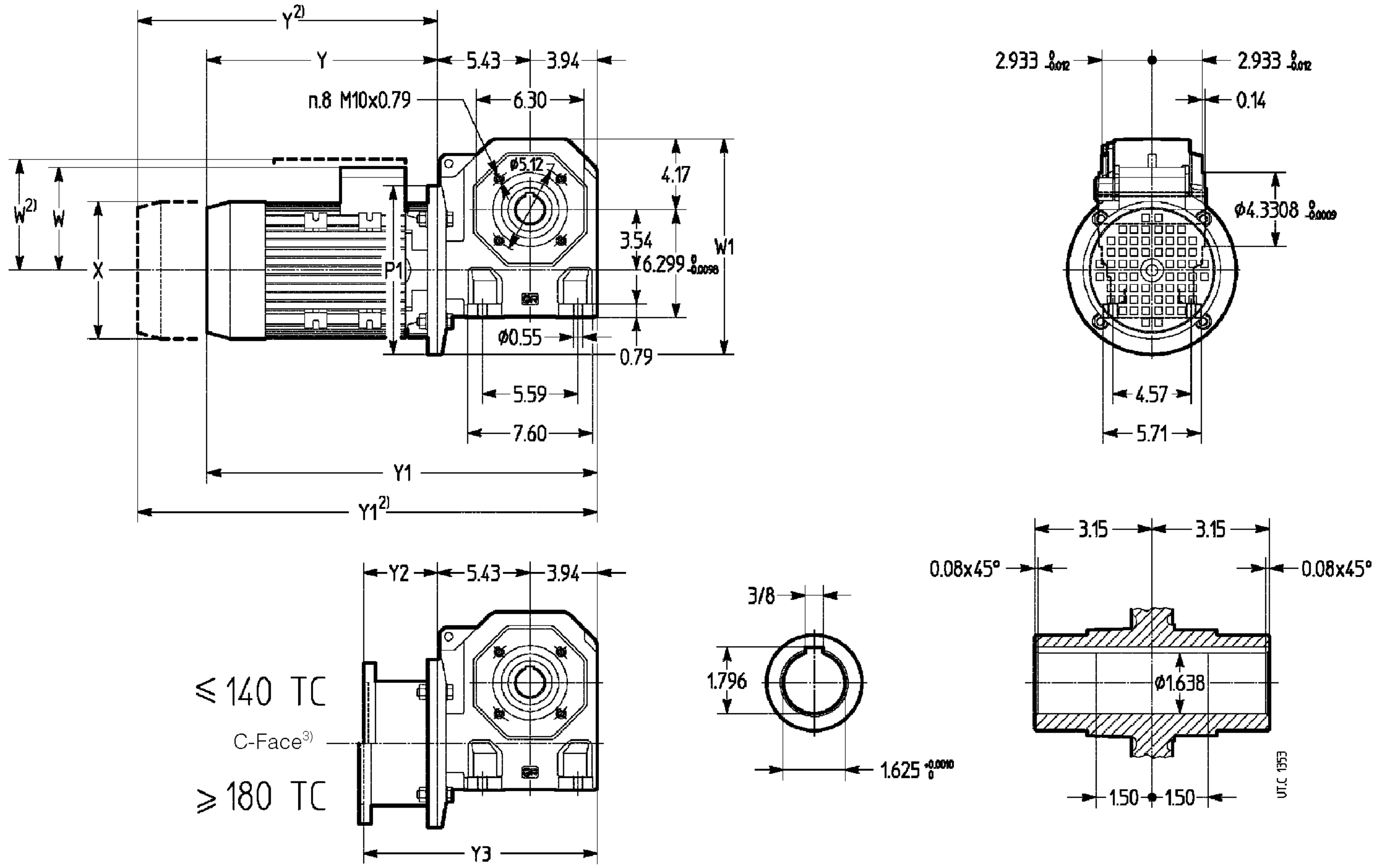
Size **535**



Motor size		1)	P1 Ø	X Ø ≈	2)	Y ≈	2)	Y1 ≈	2)	W ≈	2)	W1 ≈	2)	NEMA C - Face adapter[3)]	Y2	Y3 ≈
80		**B5**	7.87	6.26	6.26	9.92	12.10	17.72	19.90	5.39	5.08	9.88	9.88	MPN 80 B5 - 56 C	2.7	10.5
90	**S**	**B5**		6.89		10.31		18.11		5.67				MPN 90 B5 - 56 C	2.7	10.5
	L	**B5**		6.97	6.97	11.34	14.00	13.13	21.80	5.67	5.67			MPN 90 B5 - 140 TC		
	LB	**B5**												–		
	LC	**B5**				12.52		20.31						MPN 90 B5 - 180 TC	3.35	11.1
100	**LA**	**B5R**		8.74	8.03	14.02	17.40	21.81	25.20	6.81	5.98	11.18	10.00	MPN 90 B5 - 180 TC		
	LB	**B5R**				15.00		22.80						MPN 90 B5 - 180 TC[4)]		
112	**M**	**B5R**				14.21		22.01						MPN 100 B5R - 210 TC[5)]	4.04	11.8
	MC	**B5R**				15.59	18.40	23.39	26.20					MPN 100 B5R - 210 TC		

1) Motor mounting position (see ch. 2b).
2) Values valid for F0 brake motor.
3) Available on request: for further dimensions and details see ch. 13.
4) Not available for 100LB 6 motor.
5) Not available for 112M 4 motor.

Size **742**



Motor size 1)			P1 Ø	X Ø ≈	X 2)	Y ≈	Y 2)	Y1 ≈	Y1 2)	W ≈	W 2)	W1 ≈	W1 2)	NEMA C - Face adapter[3]	Y2	Y3 ≈
90	**S**	**B5**	7.87	6.89	6.26	10.31	12.10	19.62	21.50	5.67	5.08	11.65	11.65	MPN 90 B5 - 56 C	2.7	12.1
	L	**B5**	7.87	6.97	6.97	11.34	14.00	20.71	23.30	5.67	5.67			MPN 90 B5 - 140 C	2.7	12.1
	LB	**B5**												–	–	–
	LC	**B5**				12.52		21.89						MPN 90 B5 - 180 C	3.35	12.7
100	**LA**	**B5**	9.84	8.74	8.03	13.19	16.50	22.56	25.90	6.81	6.00	12.64	12.64	MPN 100 B5 - 180 TC	3.35	12.7
	LB	**B5**												MPN 100 B5 - 180 TC[4]		
112	**M**	**B5**	9.84	8.74	8.03	13.35	16.50	22.72	25.90	6.81	6.00	12.64	12.64	MPN 100 B5 - 210 TC[5]	4.04	13.4
	MC	**B5**				13.98	17.50	23.35	26.90					MPN 100 B5 - 210 TC[6]	4.04	13.4
132	**S**	**B5R**	9.84	10.16	10.20	16.30	20.80	25.67	30.20	7.76	7.68	12.83	12.83	MPN 100 B5 - 210 TC	4.04	13.4
	M	**B5R**				16.34		25.71						MPN 100 B5 - 210 TC		
	MB	**B5R**				17.80	22.30	27.17	31.70					–	–	–

1) Motor mounting position (see ch. 2b).
2) Values valid for F0 brake motor.
3) Available on request: for further dimensions and details see ch. 13.
4) Not available for 100LB 6 motor.
5) Not available for 112M 4 motor.
6) Not available for 112MC 6 motor.

11 - Structural and operational details

Worm gear pair

Number of teeth – wormwheel z_2 and worm z_1 – axial module m_x [mm], reference lead angle γ_m, static efficiency η_s of the worm gear pair.

i_N		Gear reducer size 118	225	325	430	535	742
6	z_2/z_1	18/3	–	–	–	–	–
	m_x	2.2					
	γ_m	22° 29’					
	η_s	0.71					
8.5	z_2/z_1	17/2	25/3	25/3	25/3	33/4	33/4
	m_x	2.3	2.2	2.8	3.4	3.5	4.5
	γ_m	15° 10’	22° 29’	22° 29’	22° 37’	28° 37’	28° 33’
	η_s	0.65	0.71	0.71	0.71	0.74	0.74
11.8	z_2/z_1	22/2	24/2	24/2	24/2	35/3	35/3
	m_x	1.8	2.3	2.8	3.5	3.3	4.2
	γ_m	13° 29’	15° 10’	15° 10’	15° 07’	19° 52’	20° 28’
	η_s	0.62	0.65	0.65	0.65	0.69	0.7
16	z_2/z_1	28/2	31/2	31/2	31/2	31/2	31/2
	m_x	1.5	1.8	2.3	2.9	3.7	4.7
	γ_m	11° 58’	13° 29’	13° 14’	13° 36’	14° 23’	14° 48’
	η_s	0.6	0.62	0.62	0.63	0.64	0.64
19	z_2/z_1	17/1	38/2	38/2	38/2	38/2	38/2
	m_x	2.3	1.5	1.9	2.4	3.1	3.9
	γ_m	7° 43’	11° 58’	11° 53’	12° 04’	12° 47’	13° 14’
	η_s	0.5	0.6	0.6	0.6	0.61	0.62
23.6	z_2/z_1	22/1	24/1	24/1	24/1	47/2	47/2
	m_x	1.9	2.3	2.8	3.5	2.5	3.2
	γ_m	6° 55’	7° 43’	7° 40’	7° 46’	11° 46’	12° 01’
	η_s	0.48	0.5	0.5	0.5	0.6	0.6
30	z_2/z_1	28/1	30/1	30/1	30/1	30/1	30/1
	m_x	1.5	1.9	2.4	3	3.8	4.8
	γ_m	6° 00’	6° 55’	6° 52’	6° 58’	7° 21’	7° 34’
	η_s	0.45	0.48	0.48	0.48	0.5	0.5
37.5	z_2/z_1	35/1	38/1	38/1	37/1	37/1	37/1
	m_x	1.3	1.5	1.9	2.4	3.06	3.9
	γ_m	5° 14’	6° 00’	6° 00’	6° 03’	6° 25’	6° 38’
	η_s	0.42	0.45	0.45	0.45	0.46	0.47
47.5	z_2/z_1	44/1	47/1	47/1	47/1	47/1	47/1
	m_x	1	1.3	1.6	2	2.5	3.2
	γ_m	4° 30’	5° 14’	5° 10’	5° 16’	5° 54’	6° 02’
	η_s	0.38	0.42	0.42	0.42	0.44	0.45
60	z_2/z_1	–	58/1	58/1	58/1	58/1	58/1
	m_x		1	1.3	1.6	2.1	2.7
	γ_m		4° 30’	4° 25’	4° 32’	5° 07’	5° 15’
	η_s		0.38	0.38	0.38	0.41	0.42
75	z_2/z_1	–	–	73/1	73/1	73/1	73/1
	m_x			1	1.3	1.7	2.1
	γ_m			3° 43’	3° 50’	4° 21’	4° 27’
	η_s			0.34	0.35	0.38	0.38

Low speed shaft angular backlash

A rough guide for low speed shaft angular backlash is given in the table (the worm being held stationary). Values vary according to design and temperature.

Gear reducer size	Angular backlash [rad][1) min]	max
118	0.0034	0.0132
225	0.0028	0.0112
325	0.0023	0.0090
430	0.0019	0.0075
535	0.0017	0.0067
742	0.0015	0.0056

1) 1 rad = 3438’.

Efficiency η

Gear reducer efficiency η is given by P_2 / P_1 ratio (see ch. 9). The values obtained will be valid assuming normal working conditions, worm operating as driving member, proper lubrication, adequate running-in (see ch. 12), and a load near to the nominal value.

During the **initial working period** (about 50 hours) and generally at every cold start, efficiency will be lower (by about 12% for worms with $z_1 = 1$; 6% for worms with $z_1 = 2$ and 3% for worms with $z_1 = 3$).

«Static» efficiency η_s on starting (see table in the preceding section) is much lower than η (since «starting friction» must be overcome at speed 0); as speed picks up gradually, efficiency will rise correspondingly until the catalog value is reached.

Inverse efficiency η_{inv}, – produced by the wormwheel as driver – is always less than η. It can be calculated approximately as follows:

$$\eta_{inv} \approx 2 - 1 / \eta; \qquad \text{likewise:} \qquad \eta_{s\ inv} \approx 2 - 1 / \eta_s$$

Irreversibility

The worm gearmotor is **dynamically irreversible** (that is, it ceases to turn the instant the wormshaft receives no further stimulus that would keep the worm itself in rotation e.g. motor torque, inertia from the worm, motor, flywheels, couplings, etc.) when η < **0.5** as η_{inv} then drops below 0.

This state becomes necessary wherever there is a **need for stopping and holding** the load, even without the aid of a brake. Where continuous vibration occurs, dynamic irreversibility may not be obtainable.

The gearmotor is **statically irreversible** (that is, rotation cannot be imparted by way of the low speed shaft) when η_s< **0.5**.

This is a state **necessary to keep the load at standstill**; taking into account, however, that efficiency can increase with time spent in operation, it would be advisable to assume $\eta_s \leqslant$ **0.4** ($\gamma_m < 5°$).
Where continuous vibration occurs, static irreversibility may not be obtainable.

The gearmotor has **low static reversibility** (i.e. rotation may be imparted by way of the low speed shaft with high torque and/or vibration) when **0.5** < $\eta_s \leqslant$ **0.6** (7° 30' < $\gamma_m \leqslant$ 12°).

The gearmotor has **complete static reversibility** (i.e. rotation may be imparted by way of the low speed shaft) when η_s > **0,6** (γ_m > 12°).

This state is advisable where there is a **need for easy start-up of the gearmotor by way of the low speed shaft**.

Overloads

Since worm gear pairs are often subject to high static and dynamic overloads by nature of the fact that they are especially suited to bear them, the need arises – more so than with other gear pairs – to verify that such overloads will always remain lower than $\boldsymbol{T}_{2\,max}$ (ch. 9).

Overloads are normally generated when one has:
- starting on full load (especially for high inertias and low transmission ratios), braking, shocks;
- irreversible gearmotors or gearmotors with low reversibility in which the worm-wheel becomes driver due to driven machine inertia;
- applied power higher than that required; other static or dynamic causes.

The following general observations on overloads are accompanied by some formula for carrying out evaluations in certain typical instances.

Where no evaluation is possible, install safety devices which will keep values within $\boldsymbol{T}_{2\,max}$.

Starting torque

When starting on full load (especially for high inertias and low transmission ratios) verify that $\boldsymbol{T}_{2\,max}$ is equal to or greater than starting torque, by using the following formula:

$$T_2 \text{ start} = \left(\frac{T \text{ start}}{T_N} \cdot T_2 \text{ available} - T_2 \text{ required}\right) \frac{WK^2_R}{WK^2_R + WK^2_0 \cdot \eta} + T_2 \text{ required}$$

where:
- T start is the motor starting torque (see Electric motor technical data ch. 2b);
- T_N is the motor nominal torque;
- T_2 available is output torque derived from the motor's nominal power rating;
- T_2 required is torque absorbed by the machine through work and friction;
- WK^2_0 is the moment of inertia (of mass) of the motor (see ch. 2b);
- WK^2_R is the external moment of inertia of mass: (couplings, driven machine) referred to the motor shaft.

NOTE: When seeking to verify that starting torque is sufficiently high for starting, take into account efficiency η_s when evaluating T_2 available, and starting friction, if any, in evaluating T_2 required.

Stopping machines with high kinetic energy (high moments of inertia combined with high speeds) with or without braking (braking applied to wormshaft, or use of brake motor)

Select a gear reducer with static reversibility (η_s > 0.5); if using a brake motor, verify braking stress with the following formula:

$$\left(\frac{T \text{ brake} \,.\, i + T_2 \text{ required}}{\eta_{s\,inv}}\right) \frac{WK^2_R}{WK^2_R + WK^2_0/\eta_{s\,inv}} - T_2 \text{required} \leqslant T_{2\,max}$$

where:

T brake is the braking torque setting of the motor (see Electric motor technical data ch. 2b);
$\eta_{s\,inv}$ is static inverse efficiency (see previous heading);
for other symbols see above and ch.1.

Where selection of a statically reversible gearmotor is not possible (i.e. $\eta_s \leqslant$ 0.5) slowing-down should be sufficiently gradual (avoiding application of excessive stress to the unit itself) as to ensure that:

$$0.373 \cdot WK^2_L \cdot \alpha_2 - T_2 \leqslant T_{2\,max}$$

where:
WK^2_L [lb ft²] is the moment of inertia (of mass) of the driven machine referred to the gearmotor low speed shaft;
T_2 [lbf in] is torque absorbed by the machine through work and friction;
α_2 [rad/s²] is the low speed shaft's angular deceleration; this may be reduced by electric deceleration ramps, lowering of braking torque when braking systems are in use, etc.

α_2 may be arrived at theorically (within broadly safe limits) or experimentally (by testing against stopping time and distance etc.).
If a brake motor is in use, the following formula may be used for a safe evaluation of α_2:

$$\alpha_2 = \frac{T \text{ brake}}{0.373 \cdot WK^2_L \cdot i}$$

in which the motor is presumed without load and subject to its braking torque setting T_{brake} [lbf in] (see cat. TX).

Operation with brake motor

Starting time ta and revolutions of motor φa_1

$$ta = \frac{(WK^2_0 + WK^2_R/\eta) \cdot n_1}{25.603 \cdot \left(T \text{ start} - \dfrac{T_2 \text{required}}{i \cdot \eta}\right)} \text{ [s]}; \qquad \varphi a_1 = \frac{ta \cdot n_1}{19.1} \text{ [rad]}$$

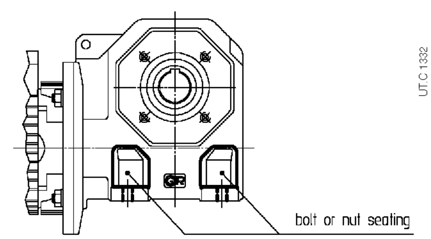
Braking time tb and revolutions of motor φb_1

$$tb = \frac{(WK^2_0 + WK^2_R/\eta_{inv}) \cdot n_1}{25.603 \cdot \left(T \text{ brake} + \dfrac{T_2 \text{required} \,.\, \eta_{inv}}{i}\right)} \text{ [s]}; \qquad \varphi b_1 = \frac{tf \cdot n_1}{19.1} \text{ [rad]}$$

for symbols see above.

With the gear reducer run-in and operating at normal running temperature — 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 · φb_1.
During warm-up (0.5 ÷ 2 h, small through to large sizes), braking times and distances tend to increase to the point of stabilizing at or around values corresponding to rated catalog efficiency.

Fixing bolt dimensions for gear reducer feet



Gear reducer size	Bolt	
	ANSI B18.2.1 class 5	UNI 5737-88 UNI 5739-88 class 8.8
118	1/4 - 20 × 3/4	M 6 x 18
225	1/4 - 20 × 1	M 6 x 25
325	5/16 - 18 × 1¼	M 8 x 35
430	5/16 - 18 × 1½	M 8 x 40
535	3/8 - 16 × 2	M10 x 50
742	7/16 - 14 × 2	M12 x 60

12 - Installation and maintenance

General

Be sure that the structure on which the gearmotor is fitted is flat, levelled and sufficiently dimensioned in order to assure fitting stability and absence of vibrations, 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 gear reducer that might affect the temperature of cooling-air and of gear motor 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 **B5** flange 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 **B6**, **V5** and **V6** mounting positions.

For ambient temperatures greater than 104 °F (40 °C) or less than 32 °F (0 °C), consult us.

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

If overloads are imposed for long periods of time, or if shocks or danger of jamming are envisaged, then motor-protections, electronic torque limiters, safety couplings, control units or other suitable 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.

Warning! Bearing life, 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 documentation.

Machine shaft

For the **machine shaft**, where the hollow shaft of the gear reducer is to be keyed, the following **tolerances** are **recommended** (according to load classification):

Gear reducer size	Hollow low speed shaft diameter ØU		**Shaft** recommended tolerances Load cl. **I**	Load cl. **II, III**
118	0.75	+0.0010 / +0	+0.0003 / +0.0002	+0.0005 / - 0.0003
225	1	+0.0010 / +0	+0.0004 / +0	+0.0006 / - 0.0003
325	1.125	+0.0010 / +0	+0.0004 / +0	+0.0006 / - 0.0003
430	1.25	+0.0010 / +0	+0.0004 / +0	+0.0006 / - 0.0003
535	1.375	+0.0010 / +0	+0.0004 / +0.0002	+0.0007 / - 0.0001
742	1.625	+0.0010 / +0	+0.0004 / +0.0002	+0.0007 / - 0.0001

For complete hollow low speed shaft dimensions see ch. 10.

Important: the shoulder diameter of the machine shaft end abutting with the gear reducer must be at least (1.18 ÷ 1.25) · U.

Before mounting, clean mating surfaces thoroughly and lubricate against seizure and fretting corrosion. Installing and removal operations should be carried out with **pullers** and **jacking screws**.

Fitting of components to low speed shaft ends

For the **bore** of **parts** keyed to the low speed shaft end the following **tolerances** are **recommended** (according to load classification):

Gear reducer size	Low speed shaft diameter ØU		**Bore** recommended tolerances Load cl. **I**	Load cl. **II, III**
118	0.75	+0 / - 0.0005	+0.0006 / +0	+0.0008 / - 0.0005
225	1	+0 / - 0.0005	+0.0016 / +0	+0.0010 / - 0.0006
325	1.125	+0 / - 0.0005	+0.0016 / +0	+0.0010 / - 0.0006
430	1.25	+0 / - 0.0005	+0.0016 / +0	+0.0010 / - 0.0006
535	1.375	+0 / - 0.0005	+0.0020 / +0	+0.0013 / - 0.0007
742	1.625	+0 / - 0.0005	+0.0020 / +0	+0.0013 / - 0.0007

Shaft-mounting arrangements

IMPORTANT. When shaft mounted, the gearmotor must be supported both axially and radially by the shaft end of the driven machine, as well as anchored against rotation only, by means of a reaction having **freedom of axial movement** and sufficient **clearance in its couplings** to permit minor oscillations – always in evidence – without provoking dangerous overloads on the actual gearmotor. Pivots and components subject to sliding have to be properly lubricated; we recommend the use of a locking adhesive such as LOCTITE 601 when fitting the bolts.

IEC frame motor mounting or replacement

For IEC frame motor mounting simply observe the following instructions:

– ensure that the mating surfaces are machined under «standard» rating (IEC 72.1; UNEL 13501-69; DIN 42955) at least;
– clean surfaces to be fitted, thoroughly;
– check and, if necessary, lower the parallel key so as to leave a clearance of 0.004 ÷ 0.008 in (0.1 ÷ 0.2 mm) between its tip and the bottom of the keyway; if shaft keyway is without end, lock the key with a pin;
– lubricate surfaces to be fitted against fretting corrosion.

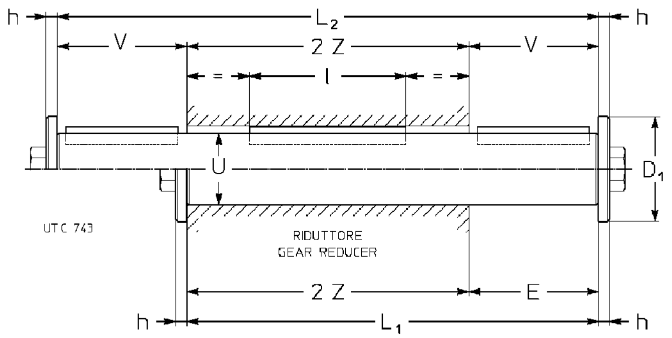
For other details regarding motor mounting, see specific information and/or consult us.

The replacement of a motor supplied by us with an IEC frame motor[1)] **of the same power** supplied by the Customer **is possible only** for motors stated in ch. 9, in **mounting positions B5 or B14**.
However, if need be and accepting a reduced machine duty cycle, it is possible to replace the motors in mounting position **B5***, **B14*** (i.e. with power of motor power-to-size correspondence not according to standard), **B5R** and **B14R** with motors standardized to IEC of smaller power and size, if possible, having mating dimensions as stated in ch. 9.

1) NEMA C-Face motors may be fitted in combination with an adapter device supplied as accessory (see ch. 13 for dimensions and possible combination).

13 - Accessories and non-standard designs

Low speed shaft ends



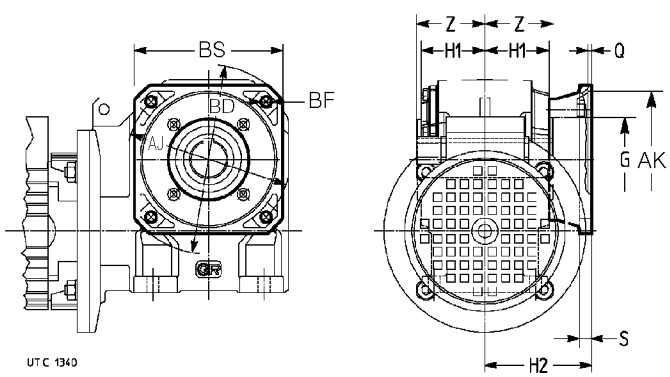
The accessory is supplied fitted onto the gear reducer. If not differently stated, the standard mounting position for the low speed shaft end is on gear reducer right hand side – B3 mounting position – seen from motor side. For reverse mounting, specify in designation «**mounted on opposite side**».

The shoulder outer diameter of the part, or of spacer abutting with the gear reducer must be (1.25 ÷ 1.4) · U.

Supplementary description when ordering by **designation: standard**, or **double extension low speed shaft**.

Gear reducer size	U Ø	**V**	External key b × h × l	D_1	h	L_1	L_2	**l**	**2 Z**	Bolt ANSI B18.2.1	Weight Stand. lb	Double extens. lb
118	0.75 +0 -0.0005	1.19	3/16 × 3/16 × 1	1.1	0.16	3.98	5.17	1.5	2.8	1/4 - 20 × 3/4	0.46	0.62
225	1 +0 -0.0005	1.625	1/4 × 1/4 × 1¼	1.38	0.2	4.93	6.56	2.44	3.31	3/8 - 16 × 1	1.01	1.34
325	1.125 +0 -0.0005	1.625	1/4 × 1/4 × 1¼	1.38	0.2	5.48	7.11	2.44	3.86	3/8 - 16 × 1	1.46	1.9
430	1.25 +0 -0.0005	2.25	1/4 × 1/4 × 1 7/8	1.85	0.2	6.74	8.99	2.25	4.49	1/2 - 13 × 1 1/4	2.12	2.91
535	1.375 +0 -0.0005	2.25	3/16 × 3/16 × 1 13/16	1.85	0.2	7.6	9.85	2.37	5.35	1/2 - 13 × 1 1/4	2.98	3.9
742	1.625 +0 -0.0005	3.25	3/8 × 3/8 × 2 5/8	2.24	0.24	9.55	12.8	3.5	6.3	5/8 - 11 × 1 1/2	5.2	7

Flange

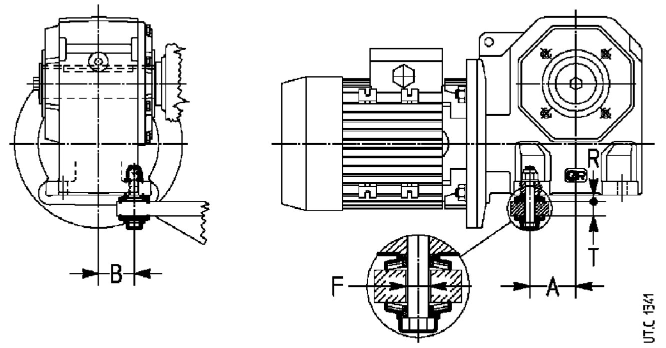


B5 flange having clearance holes and spigot «recess», is supplied fitted onto the gear reducer. If not differently stated, the standard mounting position is on gear reducer right hand side – B3 mounting position – seen from motor side. For reverse mounting, specify in designation «**mounted on opposite side**».
Locking adhesives such as LOCTITE are recommended both around threads and on mating surfaces.

Supplementary description when ordering by **designation: B5 flange**.

Gear reducer size	**BF** Ø	**G** Ø	**H1**	**H2**	**AJ** Ø	**AK** Ø	**BD** Ø	**Q**	**S**	**BS**	**Z**	Weight lb
118	0.28	2.17	1.240 +0.0098 +0	2.677 +0.0118 +0	3.94	3.150 +0.0012 +0	4.72	0.16	0.39	3.74	1.4	1.1
225	0.28	2.44	1.476 +0.0098 +0	2.913 +0.0118 +0	3.94	3.150 +0.0012 +0	4.72	0.16	0.39	3.74	1.65	1.1
325	0.37	2.68	1.752 +0.0098 +0	3.268 +0.0138 +0	4.53	3.740 +0.0014 +0	5.51	0.16	0.43	4.33	1.93	1.8
430	0.37	3.35	2.087 +0.0118 +0	3.307 +0.0138 +0	5.12	4.331 +0.0014 +0	6.3	0.18	0.47	4.92	2.24	2.2
535	0.45	3.15	2.5 +0.0118 +0	4.134 +0.0138 +0	6.50	5.118 +0.0016 +0	7.87	0.18	0.55	5.98	2.68	4
742	0.55	4.33	2.933 +0.0118 +0	4.606 +0.0138 +0	8.47	7.087 +0.0016 +0	9.84	0.2	0.63	7.72	3.15	7

Shaft-mounting arrangements



Reaction bolt using disc springs

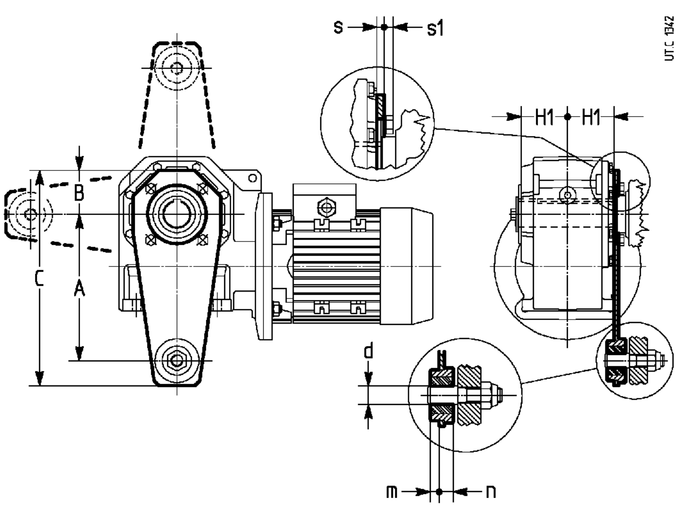
Semi-flexible and economical reaction arrangement, with bolt using disc springs.

IMPORTANT: Comply with recommendations at ch.12 for shaft mounting.

Supplementary description when ordering by **designation**: **reaction bolt using disc springs.**

Gear reducer size	A	B	Bolt UNI 5737-88	Disc spring DIN 2093	T	F Ø	R +0 - 0.0394	$T_2 \leqslant$ 1) lbf in
118	1.28	0.91	M 6 × 40	A 18 n.2	0.31 ÷ 0.39	0.31	0.19	–
225	1.28	1.14	M 6 × 40	A 18 n.2	0.31 ÷ 0.39	0.31	0.19	–
325	1.48	1.34	M 8 × 55	A 25 n.2	0.39 ÷ 0.55	0.43	0.26	–
430	1.81	1.63	M 8 × 55	A 25 n.2	0.39 ÷ 0.55	0.43	0.26	–
535	2.17	1.97	M12 × 70*	A 35,5 n.2	0.55 ÷ 0.67	0.79	0.35	2 800
742	2.8	2.28	M12 × 90	A 35,5 n.3	0.71 ÷ 0.98	0.79	0.43	5 300

1) For higher T_2 values, utilize 2 reaction bolts or the torque arm (see below).
* Modified bolt.



Torque arm

Reaction arrangement using torque arm, fitted onto B14 flange, with plastic damping bush (not present for sizes 118, 225). The accessory, including fixing screws, is supplied not assembled. Fitting towards motor is not possible.

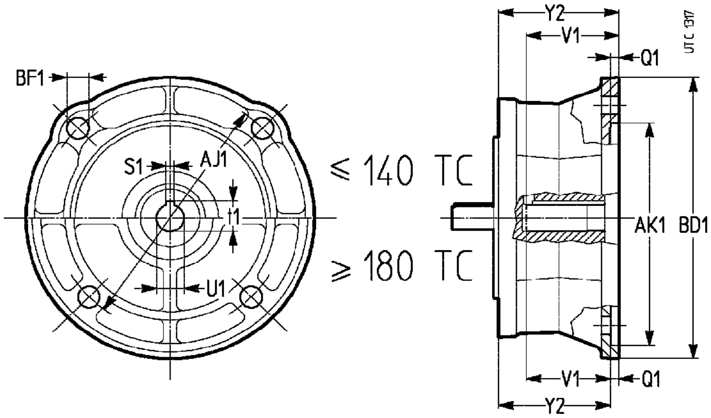
IMPORTANT: comply with recommendations at ch. 12 for shaft mounting.

Supplementary description when ordering by **designation: torque arm.**

Gear reducer size	A	B	C	d Ø	H1	m	n Ø	s	s1 ≈
118	3.94	1.77	6.18	0.315 +0.0035 +0 1)	1.24 +0 - 0.0098	0.2	0.35	0.16	0.19
225	3.94	1.77	6.18	0.315 +0.0035 +0 1)	1.476 +0 - 0.0098	0.2	0.35	0.16	0.19
325	5.91	2.07	9.06	0.394 +0.0035 +0	1.752 +0 - 0.0098	0.28	0.51	0.24	0.22
430	7.87	2.36	11.57	0.787 +0.0051 +0	2.087 +0 - 0.0118	0.37	0.61	0.24	0.22
535	7.87	2.36	11.57	0.787 +0.0051 +0	2.5 +0 - 0.0118	0.37	0.61	0.24	0.3
742	9.84	3.15	14.33	0.787 +0.0051 +0	2.933 +0 - 0.0118	0.37	0.61	0.24	0.36

1) Plastic damping bush not present.

NEMA C-Face adapter



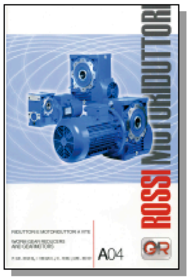
Cast iron casing device transforming gearmotor IEC input side into NEMA C-Face mating dimensions (see ch. 10 for possible combinations)

Designation code for **ordering** and dimensions as per table below.

Designation code	NEMA C-Face input side	U1 Ø +0.0010 0	V1	S1 +0.0020 0	t1	BF1 Ø	AJ1 Ø	AK1 Ø +0.0010 - 0.0007	BD1 Ø	Q1	Y2	Weight lb
MPN 63 B14 - 56 C	56 C	0.625	2.06	0.188	0.709	0.43	5.875	4.5	6.5	0.2	2.7	5.6
MPN 71 B14 - 56 C												5.9
MPN 80 B5 - 56 C												9.6
MPN 90 B5 - 56 C												9.8
MPN 90 B5 - 140 TC	140 TC	0.875	2.12	0.188	0.964	0.43	5.875	4.5	6.5	0.2	2.7	9.6
MPN 90 B5R - 140 TC												9.4
MPN 90 B5 - 180 TC	180 TC	1.125	2.62	0.25	1.241	0.56	7.25	8.5	9	0.22	3.35	17.1
MPN 90 B5R - 180 TC												16.9
MPN 100 B5 - 180 TC												20.5
MPN 100 B5 - 210 TC	210 TC	1.375	3.12	0.312	1.518	0.56	7.25	8.5	9	0.22	4.04	23.9
MPN 100 B5R - 210 TC												20.3

Catalogs

Gear reducers

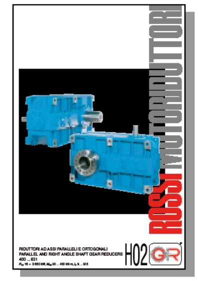


Cat. **A**
Worm gear reducers and gearmotors

Cat. **E**
Universal coaxial gear reducers and gearmotors

Cat. **EP**
Planetary gear reducers and gearmotors

Cat. **G**
Parallel and right angle shaft gear reducers and gearmotors



Cat. **H**
Parallel and right angle shaft gear reducers

Cat. **L**
Right angle shaft gear reducers

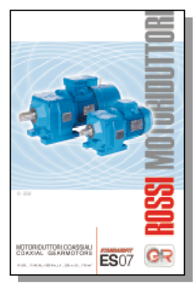
Cat. **P**
Shaft mounted gear reducers

Gearmotors

Cat. **A**
Worm gear reducers and gearmotors

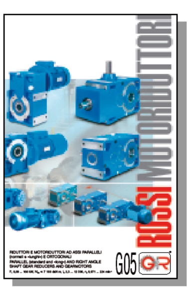
Cat. **AS**
STANDARDFIT
Worm gearmotors

Cat. **E**
Universal coaxial gear reducers and gearmotors

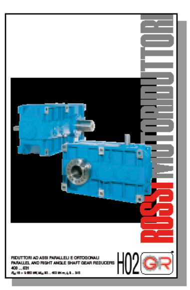


Cat. **ES**
STANDARDFIT
Coaxial gearmotors

Cat. **EP**
Planetary gear reducers and gearmotors



Cat. **G**
Parallel and right angle shaft gear reducers and gearmotors



Cat. **H**
Parallel and right angle shaft gear reducers

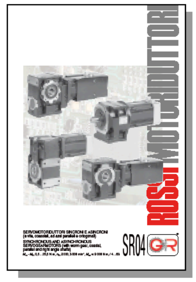
Cat. **L**
Right angle shaft gear reducers

Cat. **P**
Shaft mounted gear reducers

Automation

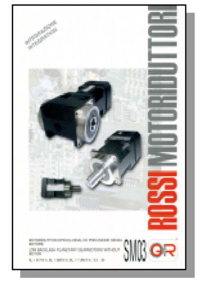
Cat. **I**
Inverter

Cat. **TI**
Integrated motor-inverter



Cat. **SR**
Synchronous and asynchronous servogearmotors

Cat. **SM**
Integrated low backlash planetary servogearmotors
Synchronous and asynchronous servomotors



Cat. **SM integration**
Low backlash planetary gearmotors without motor

Motor

Cat. **TX**
Asynchronous three-phase, brake motors and for roller ways

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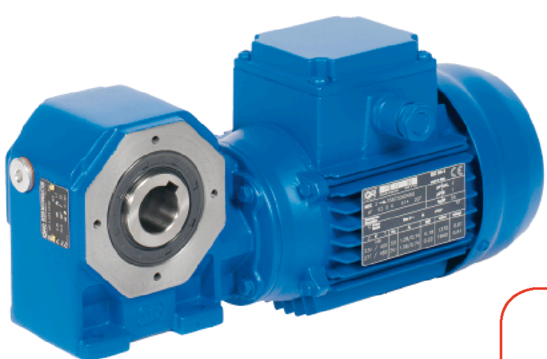
Notes



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Solutions for an evolving industry

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