

R02-CATALOGUE

TS TECH
DRIVE & MOTION

(주)티에스테크솔루션

 **VARVEL**[®]
KNOW-HOW TO DO IT



L'esperienza al servizio dell'innovazione

IT

Dal 1955 il Gruppo Varvel progetta e realizza sistemi di trasmissione di potenza impiegati in numerosi settori dell'industria. "Know-how to do it": Varvel ha le competenze per soddisfare al meglio le richieste dei clienti. Grazie alla grande esperienza maturata in oltre sessant'anni, Varvel offre alla clientela un'ampia gamma di soluzioni standard e prodotti personalizzati per esigenze specifiche. L'intera gamma di prodotti Varvel è progettata e realizzata in Italia, ma il Gruppo è presente in tutto il mondo con due filiali (una in USA e l'altra in India) e una rete globale con oltre 100 partner commerciali.

Experience at the service of innovation

EN

The Varvel Group has been designing and producing power transmission systems for numerous areas of industry since 1955. "Know-how to do it": Varvel has the know-how needed to satisfy customers' requests in the best way possible. Thanks to over sixty years of accumulated experience, Varvel can offer customers a vast range of standard solutions and customise products for specific needs. The entire product range is designed and made in Italy and sold worldwide through two subsidiaries (in the USA and India) and a global network of over 100 commercial partners.

Erfahrung im Dienste der Innovation

DE

Die Varvel-Gruppe entwickelt und produziert seit 1955 Kraftübertragungssysteme für viele Industriezweige. "Know-how to do it": Varvel verfügt über das Know-how, um die Anforderungen der Kunden bestmöglich zu erfüllen. Dank der in über sechzig Jahren Firmenaktivität gesammelten Erfahrung kann Varvel seinen Kunden eine breite Palette von Standardlösungen und maßgeschneiderten Produkten für alle spezifischen Anforderungen bieten. Die gesamte Varvel-Produktpalette wird in Italien entwickelt und hergestellt; darüber hinaus ist die Gruppe aber auch weltweit mit zwei Tochtergesellschaften (die eine in den USA und die andere in Indien) und einem globalen Netzwerk mit über 100 Geschäftspartnern präsent.

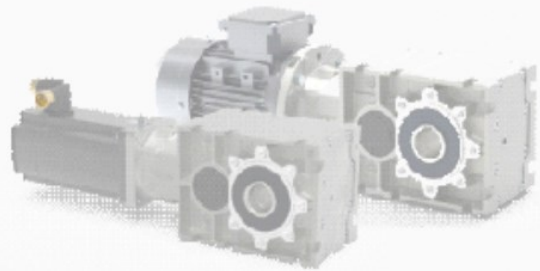
UNI EN ISO 9001:2015
UNI EN ISO 14001:2015
BS OHSAS 180001:2007



EC DIRECTIVE 2014/34/EC (ATEX)



RO-2



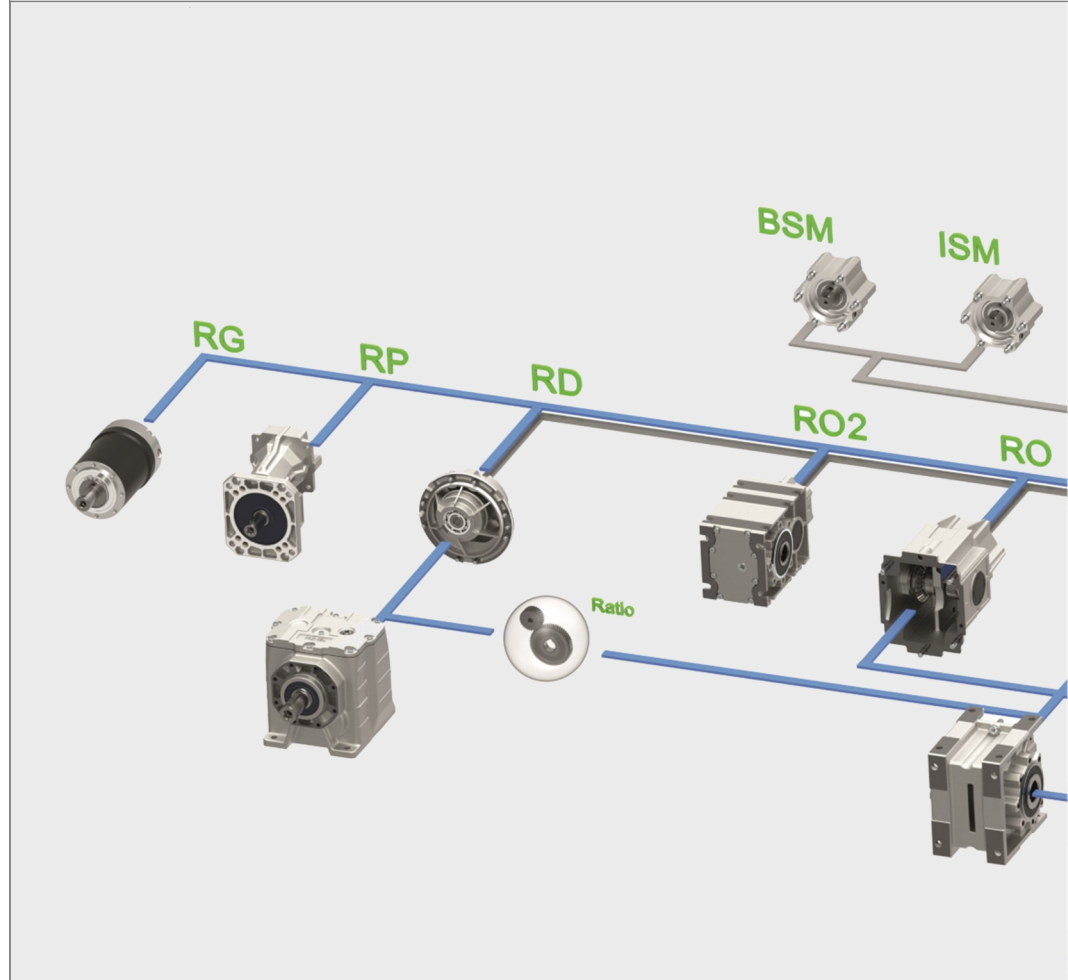
Bevel helical gearboxes

- one-piece housing
- two gear trains
- in-line version
- IEC and NEMA motors

CONTENTS

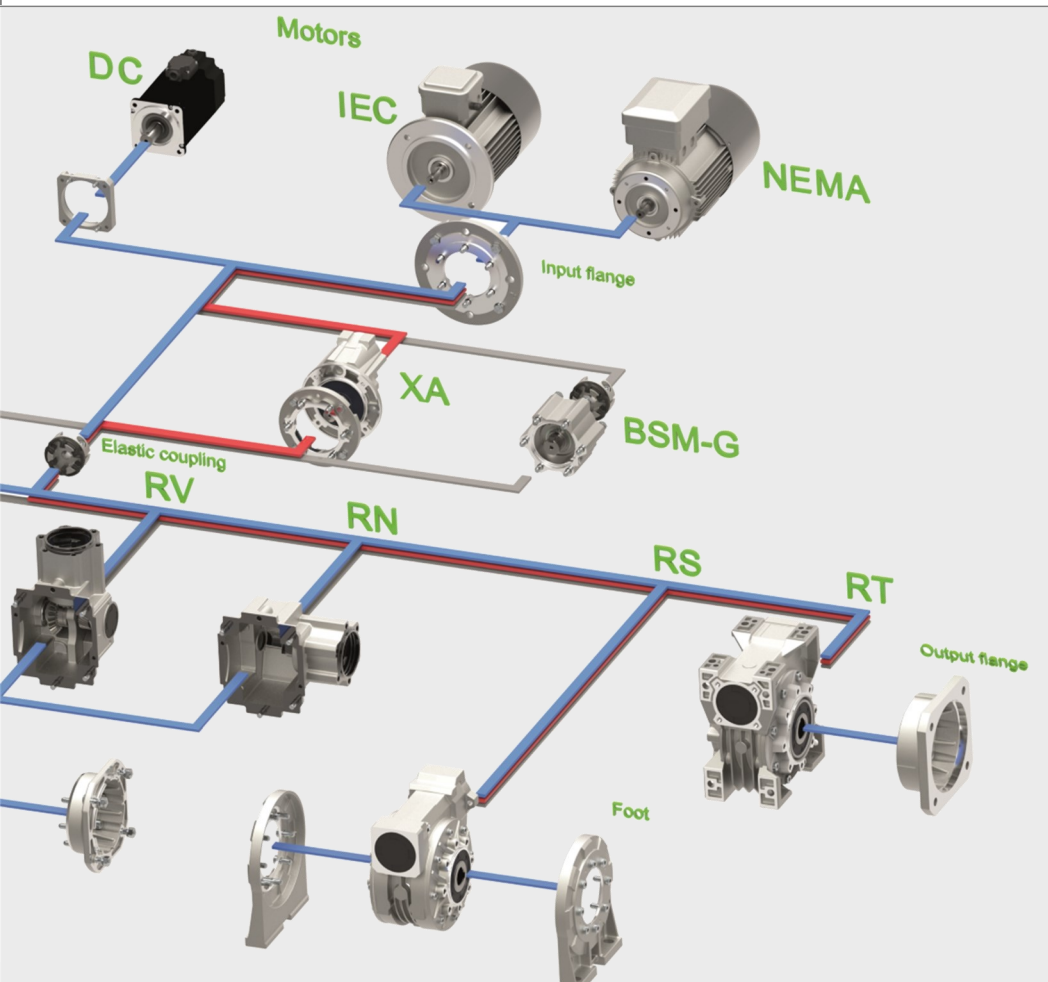


Modular System	2
Electronic catalogue	3
Technical information	
Description	4-5
Coupling	6
Flanges & coupling	7
Designation	8
Weights, Oil quantity	9
Mounting positions	9
Lubrication	10
Apparent oil leakages	10
Service factors	11-12
External loads	13
Versions	14
Thermal power	15
Selection tables	
Gearboxes FRO - SRO - RO	18-19
Geared motors MRO	20-35
Dimensions	
MRO - FRO - SRO - RO	36-51
Output shafts	52-54
Accessory position	55
General information	
Component parts	56
Rotation	56
IEC Motors	57
ATEX	58-59
Operation and Maintenance	60



Modularity

Since the 2000s, the VARVEL product design has focused on modularity and flexibility, allowing the sales network to assemble kit gearboxes in minutes with standard equipment. Kit mounting provides VARVEL distributors and resellers with great flexibility, allowing them to configure the required product as soon as possible.



Electronic catalogue



VARsize[®] selection program, available from our site www.varvel.com allows a friendly sizing of VARVEL product range.

2D/3D Drawings

A guided selection lets 2D/3D models downloaded for the most popular CAD systems.

Guided selection

VARsize returns

- the gearboxes matching the required operation parameters (power, output torque, rpm, service factor etc.),
- a data sheet featuring performance data of the selected gearbox;
- the 2D dimensional drawings,
- the 3D model.

Description

Integral casing, input bevel and output cylindrical gears to afford significant external loads are the features of the RO-2 Series two-stage orthogonal gearboxes .

The RO-2 Series is designed according to ISO design standards using structural analysis to verify the deformation and stress of the housing.

Operating torque and external loads do not cause the robust monolithic structure to deform, leading to positive results on the sealing surfaces.

By simply applying one of the different output flanges available, the shaft mount version can be converted to B5 flange form.

Output shafts of different sizes and types (hollow with keyway in standard version, and on request with shrink-disk clamping, throughout splined, and with one or two solid extensions) are available for a wide range of applications.

Four sizes, 17 ratios, and a torque range of 120 to 500 Nm are available for the RO-2 series.

Thermal power

The rated power is the power that can be applied to the input of the gearbox, on continuous service, max. room temperature of 40 °C, max. altitude 1000 m, without exceeding an oil temperature of about 85 °C.

The thermal power can limit the rated power depending on the cooling system, the input speed, the ambient temperature and the service factor.

Oil seals

- NBR - fitted on input and output shafts as standard.
- Viton - for operation with 2-pole AC, DC and servo motors, on demand.
- Silicone - for low temperature operation, on demand.

Lubricant

Gearboxes are delivered filled with synthetic long-life oil (ISO VG 320 Grade) for temperature -15/+35 °C as standard. Oil quantities are valid for any working positions. Lubrication-for-life is factory packed.

Oil, drain or vent plugs on demand.

Service factor

Selection data are intended for service factor SF1.0. i.e.

- 8 running hours per day,
- uniform load,
- max. 6 start/stops per hour and
- room temperature from 15 to 35 °C.

More detailed information on page 13.

Directive ATEX

The gearboxes VARVEL-ATEX, supplied on demand, are manufactured according to the European Directive 2014/34/UE-ATEX and therefore, they are qualified for installation in potentially explosive atmospheres.

Detailed information at pages 58-59.

Surface protection

- liquid painting: two-component epoxy paint primer and two-component polyurethane enamel finish.
- white paint RAL 9010 for food environments without direct contact with food: a primer with two-component epoxy paint and two-component acrylic finish based on hydroxylated acrylic resins and aliphatic isocyanic adduct.
- black anodising according to ISO 10681
- fluorination (Cr-free conversion)

Dimensions

Dimensions and units of measurement are referred to metric system, or imperial where applicable



General specifications



Range	2 gear stages 4 sizes 17 reduction ratios 500 Nm max. output torque
Sizing	according to ISO6336/DIN3990
Housing	pressure die cast aluminium, monoblock cast
Coupling	pressure die cast aluminium - steel, on demand
Toothed parts	tooth profile ground/shaved - run-in bevel gears
Bearings	ball- or roller-types , according to sizes
Oil seals	NBR - standard VI - Viton on demand SI - Silicone on demand
Lubricant	synthetic long-life oil - grade ISO VG 320
External surfaces	natural aluminium, unpainted
Protection grade	IP66 - gearbox body only IP20 - gearbox with flanges increased grades on demand
ATEX	on demand

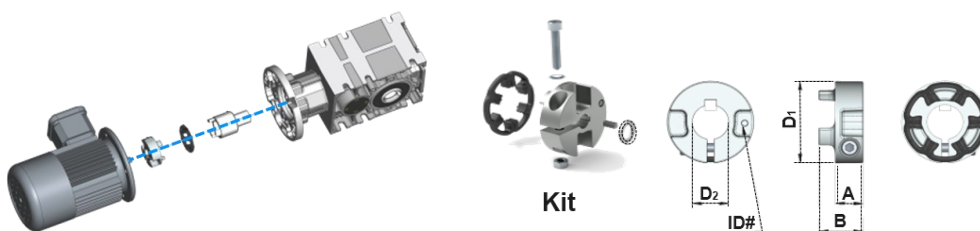
Symbols

Fr_1, Fr_2, Fr	[N]	radial load (input, output, application)
Fa_2	[N]	axial load (output)
SF SF ₁ SF ₂		service factor SF by load type SF by starts per hour
i, i_r		reduction ratio (nominal, real)
J_1, J_2, J_m	[kgm ²]	moment of inertia of the gearbox (input, output) and of motor
k_a, k_L, k_T, k_{S3}		factor (acceleration, length, type, S3 intermittence)
H, V		mounting (horizontal, vertical)
Lub	[litri]	lubricant
$M_2, M_{(app)}$	[Nm]	maximum output torque (gearbox, application)
η		efficiency

Useful formulae

Input power [kW]	Output torque [Nm]	Duty factor [FU]
$P_1 = \frac{M_2 * n_2}{9550 * \eta}$	$M_2 = \frac{9550 * P_1 * \eta}{n_2}$	$FU = \frac{M_2}{M_{(app)}}$

Coupling



Jaw-coupling clamped on the motor shaft

- IEC, NEMA, Brushless, DC adapters and couplings to fit on already assembled gearbox
- Elimination of fretting corrosion between bore and key
- Zero backlash in gearbox/motor connection
- High torsional rigidity



Type	Kit Part No.	RO	Mt [Nm]	Mt ₁ [Nm]	Mt ₂ [Nm]	A [mm]	B [mm]	D ₁ [mm]	D ₂ [mm]	ID#
G5	KG5.009	02	8.9 - 10	14	8 - 10	14.5	23	45	9	509
	KG5.011			15	8 - 10			45	11	511
	KG5.014			30	12 - 17			45	14	514
	KG5.019			40	20 - 25			45	19	519
	KG5.024			70	30 - 40			52	24	524
G6	KG6.014	12 - 22 - 32	15.3 - 18	60	30 - 40	19.5	31.5	58	14	614
	KG6.019			90	50 - 65			19	619	
	KG6.024			130	85 - 100			24	624	
	KG6.028			180	100 - 120			28	628	
	KGS6.038			500	---			38	---	



Type	Kit Part No.	RO - RV	Mt [in-lb]	Mt ₁ [in-lb]	Mt ₂ [in-lb]	A [in]	B [in]	D ₁ [in]	D ₂ [in]	ID#
G5	KG5.N56	02	80 - 90	400	265 - 310	0.57	0.91	1.77	1/2"	5N48
	KG5.N140			530	355 - 400			2.05	5/8"	5N56
G6	KG6.N56	12 - 22 - 32	135 - 160	440	---	0.77	1.24	2.28	5/8"	6N56
	KG6.N140			750	---			7/8"	6N140	
	KG6.N180			1770	---			1-1/8"	6N180	



Mt - screw locking torque
 Mt₁ - transmissible torque with key
 Mt₂ - transmissible torque without key

Type	Flange				Coupling		Flanges & Coupling
	Type	IEC	Kit Part No. .		Type	Kit Part No.	
			B5	B14			
RO02	FM 50	IEC56 IEC63 IEC71 IEC80 IEC90	K532.206.120 K532.206.140 K532.206.160 K532.206.200 K532.206.200	--- K532.206.090 K532.206.105 K532.206.120 K532.206.140	G5 ø9 G5 ø11 G5 ø14 G5 ø19 G5 ø24	KG5.009 KG5.011 KG5.014 KG5.019 KG5.024	 
RO12	FM 70	IEC63 IEC71 IEC80 IEC90 IEC100/112	K533.206.140 K533.206.160 K533.206.200 K533.206.200 K533.206.250	--- K533.206.105 K533.206.120 K533.206.140 K533.206.160	○ ø11 G6 ø14 G6 ø19 G6 ø24 G6 ø28	○ ø11 KG6.014 KG6.019 KG6.024 KG6.028	
RO22	FM 85	IEC63 IEC71 IEC80 IEC90 IEC100/112	K534.206.140 K534.206.160 K534.206.200 K534.206.200 K534.206.250	--- --- K534.206.120 K534.206.140 K534.206.160	○ ø11 G6 ø14 G6 ø19 G6 ø24 G6 ø28	○ ø11 KG6.014 KG6.019 KG6.024 KG6.028	
RO32	FM 110	IEC71 IEC80 IEC90 IEC100/112 IEC132	K535.206.160 K535.206.200 K535.206.200 K535.206.250 K535.206.300	--- --- --- K535.206.160 K535.206.200	G6 ø14 G6 ø19 G6 ø24 G6 ø28 ○ ø38	KG6.014 KG6.019 KG6.024 KG6.028 ---	

○ ø.. - bore with keyway (no coupling)

Type	Flange		Coupling		
	Type	NEMA	Kit Part No.	Type	Kit Part No.
RO02	FM 50	56 C 140 TC	K532.227.N56	G5 ø5/8" G5 ø7/8"	KG5.N56/X KG5.N140/X
RO12	FM 70	56 C 140 TC	K533.227.N56	G6 ø5/8" G6 ø7/8"	KG6.N56/X KG6.N140/X
RO22	FM 85	56 C 140 TC	K534.227.N56	G6 ø5/8" G6 ø7/8"	KG6.N56/X KG6.N140/X
RO32	FM 110	56 C 140 TC 180 TC	K535.227.N56 K535.227.N56 K535.227.N180	G6 ø5/8" G6 ø7/8" G6 ø1-1/8"	KG6.N56/X KG6.N140/X KG6.N180/X





Designation

Gearbox

F	RO	-G ---	12	/B3	H	18	IEC71	B14	AU30	DFU200
										Output flange
										Output shaft
										Motor form
										Electric motor frame
										Reduction ratio
										H, V = Mounting position
										Gearbox form
										Size and stages
										-G = Input with G-type coupling --- = Input with bore and keyway

Gearbox type

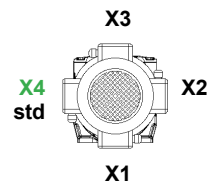
M = Geared motor
 F = Gearbox with input flange
 S = Gearbox without input flange
 ... = Gearbox with input free shaft

Motor

MT	0.37 kW	71 B	4	B14	230/400/50	IP55	F	X4
								Terminal box position
								F (std) = Insulation class IP55 (std) = Protection class
								Voltage / Frequency
								B5, B14 = Mounting form
								Number of poles
								Motor frame (IEC)

Motor power

MT = Three-phase motor
 MM = Single-phase motor
 MA = Brake motor



Weights
Mounting position

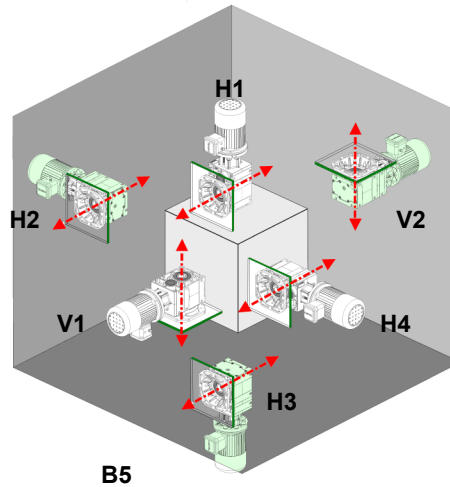
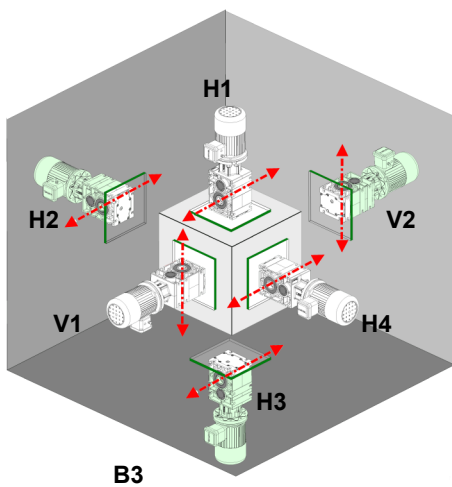
Weights and oil quantity

FRO SRO RO	Weight kg	ISO VG320 Oil [litres]					
		H1	H2	H3	H4	V1	V2
02	4.4	0.4	0.2	0.3	0.2	0.4	0.3
12	7.0	0.7	0.4	0.6	0.4	0.7	0.5
22	11	1.0	0.7	0.9	0.7	1.1	0.8
32	15	1.5	1.0	1.3	1.0	1.5	0.9



RO-2



Mounting position



Attention !
Mounting position (H or V) is referred to the output shaft position and not to B3-foot or B5-flange fixing position.

Lubrication

Lubricants

										
VG320	*	Degol GS 320	Enersyn SG-XP320	Alphasyn PG 320	Glycolube 320	Klübersynth GH-6-320	Glygoyle HE 320	Synlube CLP 320	Carter SY 320	Omala S4 WE 320
	**	Eural Gear 320	---	Vitalube GS 320	Gear Oil FM 320	Klübersynth UH1-6-320	Mobil DTE FM 320	---	Nevastane EP 320	---

All the units are delivered already filled with synthetic long-life oil.

ISO VG 320 grade allows correct operation in the ambient temperature range between -15 and +35 °C (+60 and +95 °F).

Lower or higher temperatures require environmental considerations to submit to Customer Service.

* - synthetic base oil

** - Food Industry Approved synthetic oil

Apparent oil leakages

The oil seal lip is protected with a special grease to prevent the shaft rotation without any lubricant interposed at start-up and to protect oxidation of the oil seal lip track.

The oil seal lip temperature increases during operation; the grease placed outside fluidizes and its oily part can be incorrectly recognized as oil coming from inside.

This oiliness, like the lubricating film that is always present between the oil seal and the shaft, can be wrongly judged as a loss of lubricant.

Breather plugs

The vent cap installation is recommended when the internal pressure exceeds the values of 0.25-0.3 bar to avoid possible leakage of lubricant from the oil seals.

The increase in internal pressure is caused by the variation in lubricant volume caused by the temperature increase under external conditions (inclined working position, environment greater than 35 Celsius), or internal (input speed greater than 2000 rpm, frequent starts, continuous service over 8 hours a day)..

Service factors

Duty factor

The ratio between the gearbox's maximum output torque M_2 and the M_{app} application's torque requirement defines the Duty factor.

The ratio shall be greater than or equal to the SF or $k_{(a)}$ factors described here.

FU - duty factor
 M_2 - max. torque of the gearbox
 M_{app} - torque of the application

$$FU = \frac{M_2}{M_{app}}$$

$$FU \geq SF$$

$$FU \geq k_{(a)}$$

Service factor

The Service factor [SF1.0] is intended to be representative of an operation of 8 hours per day, with a uniform load, starts of less than 6 per hour and ambient temperature between 15 and 35 Celsius.

For other service conditions, select SF according to tables SF₁ and SF₂.

$$SF = SF_1 \times SF_2$$

SF - service factor
 SF₁ - SF by load type
 SF₂ - SF by starts per hour
 h - hours
 A, B, C - type of load (uniform, variable with shocks)
 n - number

SF ₂		SF ₁			
n	RS - RT	h	A	B	C
6	1.0	8	1.0	1.2	1.4
60	1.1	16	1.2	1.4	1.6
120	1.2	24	1.4	1.6	1.8

Acceleration factor

The Mass Acceleration factor [$k_{(a)} \leq 0.2$] is used to represent an operation of 8 hours per day for Load class A.

For other working conditions, select $k_{(a)}$ according to the charts on pages 3 and 4 of the Catalogue FS - Service factors.

k_a - acceleration factor
 A, B, C - load class (uniform, moderate shocks, heavy shocks)
 J_1, J_2 - moment of inertia of the gearbox (input, output)
 J_m - moment of inertia of the motor
 i_r - real reduction ratio

$$k_a = \frac{J_2 + J_1}{i_r^2 J_m}$$

	$k_{(a)}$
A	$k_{(a)} \leq 0.2$
B	$0.2 < k_{(a)} \leq 3$
C	$3 < k_{(a)} \leq 10$

Duty type

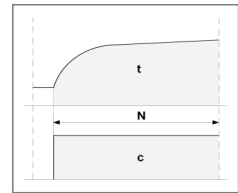
Duty types are defined by CEI EN 60034-1/ IEC34-1 Standard.

S1 - Continuous duty

Operation

- steady load (c)
- indefinite period of time (N)
- period long enough to achieve thermal balancing (t)

On continuous duty, select the gearbox with service factor SF1.0 or higher



S3 - Periodic intermittent duty

Operation

- steady load (c)
- according to a cycle (C)
- including a steady load time (N)
- and a rest time (R)

Starts/stops do not affect temperature (t).

Reference cycle (C) is 10 minutes overall.

On periodic intermittent duty, select the gearbox with the appropriate multiplier k_{S3} or higher.

Intermittence ratio is calculated according the following formula.

$$\frac{N}{(N+R)} * 100 = \begin{cases} 60\% & k_{S3} 0.9 \\ 40\% & k_{S3} 0.85 \\ 25\% & k_{S3} 0.75 \\ 15\% & k_{S3} 0.7 \end{cases}$$

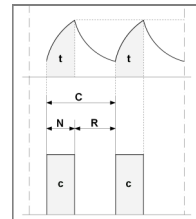
c - load

C - duty cycle

N - operation time

R - rest time

t - temperature



External loads

Radial (overhung) load

The radial (OHL) load of the Catalogue should be checked according to

- output speed,
- mounting position,
- the transmission element fitted on the output shaft of the gearbox,
- and then rectified by the appropriate k_L and k_T rating factors.

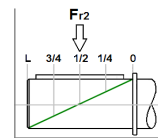
Gearbox radial load F_{r2} must be greater than or equal to application radial load F_r .

- Application point

The radial load is considered as applied at the output shaft mid-point.

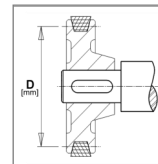
Other positions origin loads to be adjusted by the appropriate factor k_L :

k_L	L [mm]
1.1	$1/4 * L$
1.0	$1/2 * L$
0.9	$3/4 * L$
0.8	L



- Transmission element

k_T	Element type
1,15	Gear tooth No. < 17
1,40	Chain sprocket tooth No. < 13
1,25	tooth No. < 20
1,00	tooth No. > 20
1,75	Pulley for V-belt
2.50	flat belts
2.25	toothed-belt



Axial load

The axial load is included in the catalogue radial load as

- 20% of F_{r2} value
- and it is valid for both tensile and compressive axial stress.

Radial load	Axial load
$F_{r2} = (2000 \times M_2) : D \times k_L \times k_T$ $F_{r2} \geq F_r$	$F_{a2} = F_{r2} \times 0.2$

F_{a2} - permissible axial load
 F_r - radial load of application
 F_{r2} - radial load of gearbox
 D - transmission element diameter

k_L - application point factor
 k_T - transmission element factor
 M_2 - output torque of gearbox

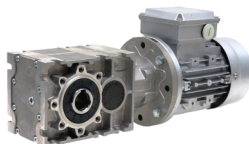


Versions

MRO-2

Gearbox motors

- output hollow shaft
- two gear sets
- foot-, flange- and shaft-mounting



FRO-2

Gearboxes with input motor flange

- hollow output shaft and input coupling
- two gear sets
- foot-, flange- and shaft-mounting



SRO-2

Gearboxes without input motor flange

- hollow output shaft and input coupling
- two gear sets
- foot-, flange- and shaft-mounting



RO-2

Gearboxes with input solid shaft

- hollow output shaft
- two gear sets
- foot-, flange- and shaft-mounting



Thermal power

i_n	RO02			RO12			RO22			RO32		
	i_r	P_1 [kW]	Pt_1 [kW]	i_r	P_1 [kW]	Pt_1 [kW]	i_r	P_1 [kW]	Pt_1 [kW]	i_r	P_1 [kW]	Pt_1 [kW]
5	5,18	3,2	5,9	5,03	4,2	8,2	5,18	5,4	12	5,18	8,1	15
7,1	7,19	2,4	4,8	7,09	3,8	6,5	7,28	5,5	9,2	7,28	6,0	13
8	8,58	2,0	4,5	8,74	3,2	6,9	8,36	4,8	9,6	8,54	5,5	13
10	10,88	1,7	4,2	10,57	2,9	5,9	10,88	3,9	8,3	10,88	5,3	11
11,2	-	-	-	12,34	1,9	5,1	11,71	3,6	7,3	11,6	5,4	8,4
14	15,1	1,1	3,7	14,9	2,1	5,0	15,31	3,4	7,0	15,31	4,9	10
16	16,36	1,0	3,4	15,91	1,7	4,9	16,36	3,1	6,9	16,36	4,6	9,5
18	18,03	1,0	3,4	18,37	1,7	5,3	17,56	2,9	7,4	17,95	4,3	10
20	21,75	0,8	3,1	21,75	1,2	4,7	22,35	2,3	6,7	21,35	3,6	9,1
22,4	22,73	0,8	3,1	22,42	1,4	4,3	23,03	2,2	5,7	23,03	3,4	8,6
25	24,41	0,6	2,8	25,92	0,9	4,2	24,61	1,9	6,0	24,39	3,2	7,2
28	27,13	0,6	2,9	27,64	1,1	4,4	26,42	1,9	6,2	27,01	2,9	8,7
31,5	31,88	0,5	2,6	31,45	1,0	3,7	32,3	1,6	5,0	32,3	2,4	7,2
	32,73	0,5	2,7	32,73	0,8	4,0	33,64	1,5	5,7	-	-	-
35,5	36,73	0,4	2,5	38,76	0,8	3,8	37,06	1,4	5,2	36,69	2,1	6,4
	38,05	0,5	2,5	-	-	-	-	-	-	37,89	2,1	7,3
45	45,9	0,3	2,3	45,9	0,6	3,5	47,18	1,1	4,8	45,05	1,7	6,6
50	51,51	0,3	2,2	54,71	0,4	3,2	51,93	1,0	4,5	51,46	1,5	5,5

The rated power is the power that can be applied to the input of the gearbox, on continuous service, max. room temperature of 40 °C, max. altitude 1000 m, without exceeding an oil temperature of about 85 °C.

The thermal power can limit the rated power depending on the cooling system, the input speed, the ambient temperature and the service factor.

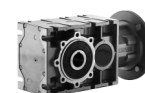
i_n - nominal reduction ratio
 i_r - actual reduction ratio

P_1 - nominal power
 Pt_1 - thermal power

FRO/RO 02 - 120 Nm

Gearbox

1400 rpm	i_n	i_r	n_2 [rpm]	M_2 [Nm]	P_1 [kW]	F_{r1} [N]	F_{r2} [N]	$J_1 \times 10^{-4}$ [kgm ²]	56 B5	63 B*	71 B*	80 B*	90 B*
FRO 02 RO 02	5	5.180	271	105	3.2	1200	1700	1.21	⊙	⊙	⊙	⊙	⊙
	7,1	7.190	195	110	2.4	1250	2000	1.01	⊙	⊙	⊙	⊙	⊙
	8	8.580	163	110	2.0	1250	2200	0.94	⊙	⊙	⊙	⊙	⊙
	10	10.880	129	120	1.7	1250	2300	0.64	⊙	⊙	⊙	⊙	⊙
	14	15.100	93	110	1.1	1280	2850	0.59	⊙	⊙	⊙	⊙	⊙
	16	16.360	86	100	1.0	1280	3000	0.55	⊙	⊙	⊙	⊙	⊙
	18	18.030	78	110	1.0	1300	3100	0.58	⊙	⊙	⊙	⊙	⊙
	20	21.750	64	110	0.8	1300	3400	0.56	⊙	⊙	⊙	⊙	
	22,4	22.730	62	110	0.8	1300	3400	0.53	⊙	⊙	⊙	⊙	
	25	24.410	57	100	0.6	1300	3700	0.56	⊙	⊙	⊙	⊙	
	28	27.130	52	110	0.6	1300	3700	0.52	⊙	⊙	⊙	⊙	
	31,5	31.880	44	100	0.5	1300	3950	0.50	⊙	⊙	⊙	⊙	
	31,5	32.730	43	100	0.5	1300	4150	0.51	⊙	⊙	⊙	⊙	
	35,5	36.730	38	100	0.4	1300	4350	0.51	⊙	⊙	⊙	⊙	
	35,5	38.050	37	100	0.4	1300	4200	0.49	⊙	⊙	⊙		
	45	45.900	31	100	0.3	1300	4900	0.49	⊙	⊙	⊙		
50	51.510	27	100	0.3	1300	4900	0.49	⊙	⊙	⊙			



B* - B5 & B14

FRO/RO 12 - 200 Nm

Gearbox

1400 rpm	i_n	i_r	n_2 [rpm]	M_2 [Nm]	P_1 [kW]	F_{r1} [N]	F_{r2} [N]	$J_1 \times 10^{-4}$ [kgm ²]	63 B5	71 B*	80 B*	90 B*	100 B*	112 B*
FRO 12 RO 12	5	5.030	278	135	4.2	1500	2300	3.20	⊙	⊙	⊙	⊙	⊙	⊙
	7,1	7.090	197	175	3.8	1550	2450	2.70	⊙	⊙	⊙	⊙	⊙	⊙
	8	8.740	160	180	3.2	1580	2700	2.50	⊙	⊙	⊙	⊙	⊙	⊙
	10	10.570	132	200	2.9	1580	2700	2.03	⊙	⊙	⊙	⊙	⊙	
	11,2	12.340	114	150	1.9	1600	3550	2.27	⊙	⊙	⊙	⊙	⊙	
	14	14.900	94	200	2.1	1600	3350	1.92	⊙	⊙	⊙	⊙	⊙	
	16	15.910	88	170	1.7	1610	3650	1.84	⊙	⊙	⊙	⊙	⊙	
	18	18.370	76	200	1.7	1610	3750	1.87	⊙	⊙	⊙	⊙	⊙	
	20	21.750	64	170	1.2	1610	4350	1.85	⊙	⊙	⊙	⊙		
	22,4	22.420	62	200	1.4	1610	4100	1.79	⊙	⊙	⊙	⊙		
	25	25.920	54	150	0.9	1610	4850	1.82	⊙	⊙	⊙	⊙		
	28	27.640	51	200	1.1	1610	4550	1.77	⊙	⊙	⊙	⊙		
	31,5	31.450	45	200	1.0	1610	4800	1.74	⊙	⊙	⊙	⊙		
	31,5	32.730	43	170	0.8	1610	5200	1.76	⊙	⊙	⊙			
	35,5	38.760	36	200	0.8	1610	5300	1.73	⊙	⊙	⊙			
	45	45.900	31	170	0.6	1610	5700	1.73	⊙	⊙	⊙			
50	54.710	26	150	0.4	1610	5750	1.72	⊙	⊙	⊙				

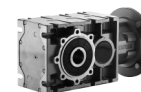


B* - B5 & B14

FRO/RO 22 - 330 Nm

Gearbox

1400 rpm	i_n	i_r	n_2 [rpm]	M_2 [Nm]	P_1 [kW]	F_{r1} [N]	F_{r2} [N]	$J_1 \times 10^{-4}$ [kgm ²]	63 B5	71 B5	80 B*	90 B*	100 B*	112 B*
FRO 22 RO 22	5	5.180	271	180	5.4	2900	3150	5.89	⊙	⊙	⊙	⊙	⊙	⊙
	7,1	7.280	192	255	5.5	2900	3200	4.79	⊙	⊙	⊙	⊙	⊙	⊙
	8	8.360	168	260	4.8	2900	3450	4.50	⊙	⊙	⊙	⊙	⊙	⊙
	10	10.880	129	270	3.9	2900	3700	3.55	⊙	⊙	⊙	⊙	⊙	⊙
	11,2	11.710	120	270	3.6	3000	4050	3.95	⊙	⊙	⊙	⊙	⊙	⊙
	14	15.310	92	330	3.4	3000	4100	3.30	⊙	⊙	⊙	⊙	⊙	⊙
	16	16.360	86	330	3.1	3000	4100	3.16	⊙	⊙	⊙	⊙	⊙	⊙
	18	17.560	80	330	2.9	3000	4450	3.23	⊙	⊙	⊙	⊙	⊙	⊙
	20	22.350	63	330	2.3	3000	5000	3.14	⊙	⊙	⊙	⊙	⊙	⊙
	22,4	23.030	61	330	2.2	3000	5000	3.05	⊙	⊙	⊙	⊙	⊙	⊙
	25	24.610	57	300	1.9	3000	5500	3.11	⊙	⊙	⊙	⊙	⊙	⊙
	28	26.420	53	330	1.9	3000	5450	3.02	⊙	⊙	⊙	⊙	⊙	⊙
	31,5	32.300	43	330	1.6	3000	5900	2.96	⊙	⊙	⊙	⊙	⊙	⊙
	31,5	33.640	42	330	1.5	3000	6100	2.98	⊙	⊙	⊙	⊙	⊙	⊙
	35,5	37.060	38	330	1.4	3000	6350	2.94	⊙	⊙	⊙	⊙	⊙	⊙
	45	47.180	30	330	1.1	3000	6400	2.92	⊙	⊙	⊙	⊙	⊙	⊙
50	51.930	27	300	1.0	3000	6450	2.91	⊙	⊙	⊙	⊙	⊙	⊙	



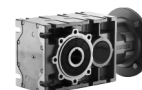
B* - B5 & B14

⊙ - bore with keyway

FRO/RO 32 - 500 Nm

Gearbox

1400 rpm	i_n	i_r	n_2 [rpm]	M_2 [Nm]	P_1 [kW]	F_{r1} [N]	F_{r2} [N]	$J_1 \times 10^{-4}$ [kgm ²]	71 B5	80 B5	90 B5	100 B*	112 B*	132 B*
FRO 32 RO 32	5	5.180	271	270	8.1	4500	4800	9.07	⊙	⊙	⊙	⊙	⊙	⊙
	7,1	7.280	192	280	6.0	4550	5650	6.77	⊙	⊙	⊙	⊙	⊙	⊙
	8	8.540	164	300	5.5	5540	6000	6.07	⊙	⊙	⊙	⊙	⊙	⊙
	10	10.880	129	370	5.3	5630	6000	4.27	⊙	⊙	⊙	⊙	⊙	⊙
	11,2	11.600	121	400	5.4	5710	6400	4.99	⊙	⊙	⊙	⊙	⊙	⊙
	14	15.310	92	480	4.9	5710	6450	3.75	⊙	⊙	⊙	⊙	⊙	⊙
	16	16.360	86	480	4.6	5730	6500	3.48	⊙	⊙	⊙	⊙	⊙	⊙
	18	17.950	78	500	4.3	5730	6900	3.59	⊙	⊙	⊙	⊙	⊙	⊙
	20	21.350	66	500	3.6	5680	7550	3.43	⊙	⊙	⊙	⊙	⊙	⊙
	22,4	23.030	61	500	3.4	5730	7700	3.25	⊙	⊙	⊙	⊙	⊙	⊙
	25	24.390	57	500	3.2	5740	8300	3.34	⊙	⊙	⊙	⊙	⊙	⊙
	28	27.010	52	500	2.9	5730	8400	3.18	⊙	⊙	⊙	⊙	⊙	⊙
	31,5	32.300	43	500	2.4	5740	9050	3.06	⊙	⊙	⊙	⊙	⊙	⊙
	35,5	36.690	38	500	2.1	5740	9950	3.07	⊙	⊙	⊙	⊙	⊙	⊙
	35,5	37.890	37	500	2.1	5740	9800	3.02	⊙	⊙	⊙	⊙	⊙	⊙
	45	45.050	31	500	1.7	5740	9800	2.99	⊙	⊙	⊙	⊙	⊙	⊙
50	51.460	27	500	1.5	5740	9800	2.97	⊙	⊙	⊙	⊙	⊙	⊙	



B* - B5 & B14

MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Tipo	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,06	270	MRO 02 - 56A4	5,18	2	>3	7,3	4,4	1700	1,5	1,214
	195	MRO 02 - 56A4	7,19	2,8	>3	7,3	4,4	2000	1,5	1,015
	163	MRO 02 - 56A4	8,58	3,4	>3	7,3	4,4	2200	1,5	0,944
	129	MRO 02 - 56A4	10,88	4,3	>3	7,3	4,4	2300	1,5	0,639
	93	MRO 02 - 56A4	15,1	5,9	>3	7,3	4,4	2850	1,5	0,593
	86	MRO 02 - 56A4	16,36	6,4	>3	7,3	4,4	3000	1,5	0,545
	78	MRO 02 - 56A4	18,03	7,1	>3	7,3	4,4	3100	1,5	0,578
	64	MRO 02 - 56A4	21,75	8,5	>3	7,3	4,4	3400	1,5	0,564
	62	MRO 02 - 56A4	22,73	8,9	>3	7,3	4,4	3400	1,5	0,525
	57	MRO 02 - 56A4	24,41	9,6	>3	7,3	4,4	3700	1,5	0,557
	52	MRO 02 - 56A4	27,13	11	>3	7,3	4,4	3700	1,5	0,518
	44	MRO 02 - 56A4	31,88	13	>3	7,3	4,4	3950	1,5	0,498
	43	MRO 02 - 56A4	32,73	13	>3	7,3	4,4	4150	1,5	0,512
	38	MRO 02 - 56A4	36,73	14	>3	7,3	4,4	4350	1,5	0,509
	37	MRO 02 - 56A4	38,05	15	>3	7,3	4,4	4200	1,5	0,494
	31	MRO 02 - 56A4	45,9	18	>3	7,3	4,4	4900	1,5	0,491
	27	MRO 02 - 56A4	51,51	20	>3	7,3	4,4	4900	1,5	0,49
0,09	270	MRO 02 - 56B4	5,18	3,1	>3	7,6	4,4	1700	2	1,214
	195	MRO 02 - 56B4	7,19	4,2	>3	7,6	4,4	2000	2	1,015
	163	MRO 02 - 56B4	8,58	5,1	>3	7,6	4,4	2200	2	0,944
	129	MRO 02 - 56B4	10,88	6,4	>3	7,6	4,4	2300	2	0,639
	93	MRO 02 - 56B4	15,1	8,9	>3	7,6	4,4	2850	2	0,593
	86	MRO 02 - 56B4	16,36	9,6	>3	7,6	4,4	3000	2	0,545
	78	MRO 02 - 56B4	18,03	11	>3	7,6	4,4	3100	2	0,578
	64	MRO 02 - 56B4	21,75	13	>3	7,6	4,4	3400	2	0,564
	62	MRO 02 - 56B4	22,73	13	>3	7,6	4,4	3400	2	0,525
	57	MRO 02 - 56B4	24,41	14	>3	7,6	4,4	3700	2	0,557
	52	MRO 02 - 56B4	27,13	16	>3	7,6	4,4	3700	2	0,518
	44	MRO 02 - 56B4	31,88	19	>3	7,6	4,4	3950	2	0,498
	43	MRO 02 - 56B4	32,73	19	>3	7,6	4,4	4150	2	0,512
	38	MRO 02 - 56B4	36,73	22	>3	7,6	4,4	4350	2	0,509
	37	MRO 02 - 56B4	38,05	22	>3	7,6	4,4	4200	2	0,494
	31	MRO 02 - 56B4	45,9	27	>3	7,6	4,4	4900	2	0,491
	27	MRO 02 - 56B4	51,51	30	>3	7,6	4,4	4900	2	0,49
0,12	278	MRO 12 - 63A4	5,03	4	>3	10,7	7	2300	2,8	3,2008
	270	MRO 22 - 63A4	5,18	4,1	>3	14,7	11	3150	2,8	5,8944
	270	MRO 02 - 63A4	5,18	4,1	>3	8,1	4,4	1700	2,8	1,214
	197	MRO 12 - 63A4	7,09	5,6	>3	10,7	7	2450	2,8	2,6978
	195	MRO 02 - 63A4	7,19	5,7	>3	8,1	4,4	2000	2,8	1,015
	192	MRO 22 - 63A4	7,28	5,7	>3	14,7	11	3200	2,8	4,792
	167	MRO 22 - 63A4	8,36	6,6	>3	14,7	11	3450	2,8	4,5033
	163	MRO 02 - 63A4	8,58	6,7	>3	8,1	4,4	2200	2,8	0,944
	160	MRO 12 - 63A4	8,74	6,9	>3	10,7	7	2700	2,8	2,5046
	132	MRO 12 - 63A4	10,57	8,3	>3	10,7	7	2700	2,8	2,0326
	129	MRO 22 - 63A4	10,88	8,6	>3	14,7	11	3700	2,8	3,5463
	129	MRO 02 - 63A4	10,88	8,6	>3	8,1	4,4	2300	2,8	0,639
	120	MRO 22 - 63A4	11,71	9,2	>3	14,7	11	4050	2,8	3,9507
	113	MRO 12 - 63A4	12,34	9,7	>3	10,7	7	3550	2,8	2,2731
	94	MRO 12 - 63A4	14,9	12	>3	10,7	7	3350	2,8	1,9187
	93	MRO 02 - 63A4	15,1	12	>3	8,1	4,4	2850	2,8	0,593



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Tipo	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,12	91	MRO 22 - 63A4	15,31	12	>3	14,7	11	4100	2,8	3,2966
	88	MRO 12 - 63A4	15,91	13	>3	10,7	7	3650	2,8	1,8416
	86	MRO 22 - 63A4	16,36	13	>3	14,7	11	4100	2,8	3,1625
	86	MRO 02 - 63A4	16,36	13	>3	8,1	4,4	3000	2,8	0,545
	80	MRO 22 - 63A4	17,56	14	>3	14,7	11	4450	2,8	3,2313
	78	MRO 02 - 63A4	18,03	14	>3	8,1	4,4	3100	2,8	0,578
	76	MRO 12 - 63A4	18,37	14	>3	10,7	7	3750	2,8	1,8749
	64	MRO 12 - 63A4	21,75	17	>3	10,7	7	4350	2,8	1,8457
	64	MRO 02 - 63A4	21,75	17	>3	8,1	4,4	3400	2,8	0,564
	63	MRO 22 - 63A4	22,35	18	>3	14,7	11	5000	2,8	3,1366
	62	MRO 12 - 63A4	22,42	18	>3	10,7	7	4100	2,8	1,7913
	62	MRO 02 - 63A4	22,73	18	>3	8,1	4,4	3400	2,8	0,525
	61	MRO 22 - 63A4	23,03	18	>3	14,7	11	5000	2,8	3,0523
	57	MRO 22 - 63A4	24,61	19	>3	14,7	11	5500	2,8	3,1062
	57	MRO 02 - 63A4	24,41	19	>3	8,1	4,4	3700	2,8	0,557
	54	MRO 12 - 63A4	25,92	20	>3	10,7	7	4850	2,8	1,8225
	53	MRO 22 - 63A4	26,42	21	>3	14,7	11	5450	2,8	3,0234
	52	MRO 02 - 63A4	27,13	21	>3	8,1	4,4	3700	2,8	0,518
	51	MRO 12 - 63A4	27,64	22	>3	10,7	7	4550	2,8	1,772
	45	MRO 12 - 63A4	31,45	25	>3	10,7	7	4800	2,8	1,7418
	44	MRO 02 - 63A4	31,88	25	>3	8,1	4,4	3950	2,8	0,498
	43	MRO 22 - 63A4	32,3	25	>3	14,7	11	5900	2,8	2,9572
	43	MRO 12 - 63A4	32,73	26	>3	10,7	7	5200	2,8	1,7591
	43	MRO 02 - 63A4	32,73	26	>3	8,1	4,4	4150	2,8	0,512
	42	MRO 22 - 63A4	33,64	26	>3	14,7	11	6100	2,8	2,9816
	38	MRO 22 - 63A4	37,06	29	>3	14,7	11	6350	2,8	2,9425
	38	MRO 02 - 63A4	36,73	29	>3	8,1	4,4	4350	2,8	0,509
	37	MRO 12 - 63A4	38,05	30	>3	8,1	4,4	4200	2,8	0,494
	36	MRO 22 - 63A4	38,76	30	>3	10,7	7	5300	2,8	1,732
	31	MRO 12 - 63A4	45,9	36	>3	10,7	7	5700	2,8	1,7254
	31	MRO 02 - 63A4	45,9	36	2,8	8,1	4,4	4900	2,8	0,491
	30	MRO 22 - 63A4	47,18	37	>3	14,7	11	6400	2,8	2,9213
	27	MRO 22 - 63A4	51,93	41	>3	14,7	11	6450	2,8	2,9144
	27	MRO 02 - 63A4	51,51	40	2,5	8,1	4,4	4900	2,8	0,49
	26	MRO 12 - 63A4	54,71	43	>3	10,7	7	5750	2,8	1,7202
0,18	278	MRO 12 - 63B4	5,03	5,9	>3	11,2	7	2300	4	3,2008
	270	MRO 22 - 63B4	5,18	6,1	>3	15,2	11	3150	4	5,8944
	270	MRO 02 - 63B4	5,18	6,1	>3	8,6	4,4	1700	4	1,214
	197	MRO 12 - 63B4	7,09	8,4	>3	11,2	7	2450	4	2,6978
	195	MRO 02 - 63B4	7,19	8,5	>3	8,6	4,4	2000	4	1,015
	192	MRO 22 - 63B4	7,28	8,6	>3	15,2	11	3200	4	4,792
	167	MRO 22 - 63B4	8,36	9,9	>3	15,2	11	3450	4	4,5033
	163	MRO 02 - 63B4	8,58	10	>3	8,6	4,4	2200	4	0,944
	160	MRO 12 - 63B4	8,74	10	>3	11,2	7	2700	4	2,5046
	132	MRO 12 - 63B4	10,57	12	>3	11,2	7	2700	4	2,0326
	129	MRO 22 - 63B4	10,88	13	>3	15,2	11	3700	4	3,5463
	129	MRO 02 - 63B4	10,88	13	>3	8,6	4,4	2300	4	0,639
	120	MRO 22 - 63B4	11,71	14	>3	15,2	11	4050	4	3,9507
	113	MRO 12 - 63B4	12,34	15	>3	11,2	7	3550	4	2,2731
	94	MRO 12 - 63B4	14,9	18	>3	11,2	7	3350	4	1,9187



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Tipo	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,18	93	MRO 02 - 63B4	15,1	18	>3	8,6	4,4	2850	4	0,593
	91	MRO 22 - 63B4	15,31	18	>3	15,2	11	4100	4	3,2966
	88	MRO 12 - 63B4	15,91	19	>3	11,2	7	3650	4	1,8416
	86	MRO 22 - 63B4	16,36	19	>3	15,2	11	4100	4	3,1625
	80	MRO 02 - 63B4	16,36	19	>3	8,6	4,4	3000	4	0,545
	80	MRO 22 - 63B4	17,56	21	>3	15,2	11	4450	4	3,2313
	78	MRO 02 - 63B4	18,03	21	>3	8,6	4,4	3100	4	0,578
	76	MRO 12 - 63B4	18,37	22	>3	11,2	7	3750	4	1,8749
	64	MRO 12 - 63B4	21,75	26	>3	11,2	7	4350	4	1,8457
	64	MRO 02 - 63B4	21,75	26	>3	8,6	4,4	3400	4	0,564
	63	MRO 22 - 63B4	22,35	26	>3	15,2	11	5000	4	3,1366
	62	MRO 12 - 63B4	22,42	26	>3	11,2	7	4100	4	1,7913
	62	MRO 02 - 63B4	22,73	27	>3	8,6	4,4	3400	4	0,525
	61	MRO 22 - 63B4	23,03	27	>3	15,2	11	5000	4	3,0523
	57	MRO 22 - 63B4	24,61	29	>3	15,2	11	5500	4	3,1062
	57	MRO 02 - 63B4	24,41	29	>3	8,6	4,4	3700	4	0,557
	54	MRO 12 - 63B4	25,92	31	>3	11,2	7	4850	4	1,8225
	53	MRO 22 - 63B4	26,42	31	>3	15,2	11	5450	4	3,0234
	52	MRO 02 - 63B4	27,13	32	>3	8,6	4,4	3700	4	0,518
	51	MRO 12 - 63B4	27,64	33	>3	11,2	7	4550	4	1,772
	45	MRO 12 - 63B4	31,45	37	>3	11,2	7	4800	4	1,7418
	44	MRO 02 - 63B4	31,88	38	2,7	8,6	4,4	3950	4	0,498
	43	MRO 22 - 63B4	32,3	38	>3	15,2	11	5900	4	2,9572
	43	MRO 12 - 63B4	32,73	39	>3	11,2	7	5200	4	1,7591
	43	MRO 02 - 63B4	32,73	39	2,6	8,6	4,4	4150	4	0,512
	42	MRO 22 - 63B4	33,64	40	>3	15,2	11	6100	4	2,9816
	38	MRO 22 - 63B4	37,06	44	>3	15,2	11	6350	4	2,9425
	38	MRO 02 - 63B4	36,73	43	2,3	8,6	4,4	4350	4	0,509
	37	MRO 02 - 63B4	38,05	45	2,2	8,6	4,4	4200	4	0,494
	36	MRO 12 - 63B4	38,76	46	>3	11,2	7	5300	4	1,732
	31	MRO 12 - 63B4	45,9	54	>3	11,2	7	5700	4	1,7254
	31	MRO 02 - 63B4	45,9	54	1,8	8,6	4,4	4900	4	0,491
	30	MRO 22 - 63B4	47,18	56	>3	15,2	11	6400	4	2,9213
	27	MRO 22 - 63B4	51,93	61	>3	15,2	11	6450	4	2,9144
	27	MRO 02 - 63B4	51,51	61	1,6	8,6	4,4	4900	4	0,49
	26	MRO 12 - 63B4	54,71	65	2,3	11,2	7	5750	4	1,7202
0,25	278	MRO 12 - 63C4	5,03	8,2	>3	12	7	2300	4	3,2008
	278	MRO 12 - 71A4	5,03	8,2	>3	12	7	2300	5	3,2008
	270	MRO 32 - 71A4	5,18	8,5	>3	20	15	4800	5	9,0749
	270	MRO 22 - 63C4	5,18	8,5	>3	16	11	3150	4	5,8944
	270	MRO 22 - 71A4	5,18	8,5	>3	16	11	3150	5	5,8944
	270	MRO 02 - 63C4	5,18	8,5	>3	9,4	4,4	1700	4	1,214
	270	MRO 02 - 71A4	5,18	8,5	>3	9,4	4,4	1700	5	1,214
	197	MRO 12 - 63C4	7,09	12	>3	12	7	2450	4	2,6978
	197	MRO 12 - 71A4	7,09	12	>3	12	7	2450	5	2,6978
	195	MRO 02 - 63C4	7,19	12	>3	9,4	4,4	2000	4	1,015
	195	MRO 02 - 71A4	7,19	12	>3	9,4	4,4	2000	5	1,015
	192	MRO 32 - 71A4	7,28	12	>3	20	15	5650	5	6,7749
	192	MRO 22 - 63C4	7,28	12	>3	16	11	3200	4	4,792
	192	MRO 22 - 71A4	7,28	12	>3	16	11	3200	5	4,792



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Tipo	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,25	167	MRO 22 - 63C4	8,36	14	>3	16	11	3450	4	4,5033
	167	MRO 22 - 71A4	8,36	14	>3	16	11	3450	5	4,5033
	164	MRO 32 - 71A4	8,54	14	>3	20	15	6000	5	6,07
	163	MRO 02 - 63C4	8,58	14	>3	9,4	4,4	2200	4	0,944
	163	MRO 02 - 71A4	8,58	14	>3	9,4	4,4	2200	5	0,944
	160	MRO 12 - 63C4	8,74	14	>3	12	7	2700	4	2,5046
	160	MRO 12 - 71A4	8,74	14	>3	12	7	2700	5	2,5046
	132	MRO 12 - 63C4	10,57	17	>3	12	7	2700	4	2,0326
	132	MRO 12 - 71A4	10,57	17	>3	12	7	2700	5	2,0326
	129	MRO 32 - 71A4	10,88	18	>3	20	15	6000	5	4,2665
	129	MRO 22 - 63C4	10,88	18	>3	16	11	3700	4	3,5463
	129	MRO 22 - 71A4	10,88	18	>3	16	11	3700	5	3,5463
	129	MRO 02 - 63C4	10,88	18	>3	9,4	4,4	2300	4	0,639
	129	MRO 02 - 71A4	10,88	18	>3	9,4	4,4	2300	5	0,639
	121	MRO 32 - 71A4	11,6	19	>3	20	15	6400	5	4,9874
	120	MRO 22 - 63C4	11,71	19	>3	16	11	4050	4	3,9507
	120	MRO 22 - 71A4	11,71	19	>3	16	11	4050	5	3,9507
	113	MRO 12 - 63C4	12,34	20	>3	12	7	3550	4	2,2731
	113	MRO 12 - 71A4	12,34	20	>3	12	7	3550	5	2,2731
	94	MRO 12 - 63C4	14,9	24	>3	12	7	3350	4	1,9187
	94	MRO 12 - 71A4	14,9	24	>3	12	7	3350	5	1,9187
	93	MRO 02 - 63C4	15,1	25	>3	9,4	4,4	2850	4	0,593
	93	MRO 02 - 71A4	15,1	25	>3	9,4	4,4	2850	5	0,593
	91	MRO 32 - 71A4	15,31	25	>3	20	15	6450	5	3,7457
	91	MRO 22 - 63C4	15,31	25	>3	16	11	4100	4	3,2966
	91	MRO 22 - 71A4	15,31	25	>3	16	11	4100	5	3,2966
	88	MRO 12 - 63C4	15,91	26	>3	12	7	3650	4	1,8416
	88	MRO 12 - 71A4	15,91	26	>3	12	7	3650	5	1,8416
	86	MRO 32 - 71A4	16,36	27	>3	20	15	6500	5	3,4806
	86	MRO 22 - 63C4	16,36	27	>3	16	11	4100	4	3,1625
	86	MRO 22 - 71A4	16,36	27	>3	16	11	4100	5	3,1625
	86	MRO 02 - 63C4	16,36	27	>3	9,4	4,4	3000	4	0,545
	86	MRO 02 - 71A4	16,36	27	>3	9,4	4,4	3000	5	0,545
	80	MRO 22 - 63C4	17,56	29	>3	16	11	4450	4	3,2313
	80	MRO 22 - 71A4	17,56	29	>3	16	11	4450	5	3,2313
	78	MRO 32 - 71A4	17,95	29	>3	20	15	6900	5	3,586
	78	MRO 02 - 63C4	18,03	30	>3	9,4	4,4	3100	4	0,578
	78	MRO 02 - 71A4	18,03	30	>3	9,4	4,4	3100	5	0,578
	76	MRO 12 - 63C4	18,37	30	>3	12	7	3750	4	1,8749
	76	MRO 12 - 71A4	18,37	30	>3	12	7	3750	5	1,8749
	66	MRO 32 - 71A4	21,35	35	>3	20	15	7550	5	3,4347
	64	MRO 12 - 63C4	21,75	36	>3	12	7	4350	4	1,8457
	64	MRO 12 - 71A4	21,75	36	>3	12	7	4350	5	1,8457
	64	MRO 02 - 63C4	21,75	36	>3	9,4	4,4	3400	4	0,564
	64	MRO 02 - 71A4	21,75	36	>3	9,4	4,4	3400	5	0,564
	63	MRO 22 - 63C4	22,35	37	>3	16	11	5000	4	3,1366
	63	MRO 22 - 71A4	22,35	37	>3	16	11	5000	5	3,1366
	62	MRO 12 - 63C4	22,42	37	>3	12	7	4100	4	1,7913
	62	MRO 12 - 71A4	22,42	37	>3	12	7	4100	5	1,7913
	62	MRO 02 - 63C4	22,73	37	3	9,4	4,4	3400	4	0,525



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,25	62	MRO 02 - 71A4	22,73	37	3	9,4	4,4	3400	5	0,525
	61	MRO 32 - 71A4	23,03	38	>3	20	15	7700	5	3,2506
	61	MRO 22 - 63C4	23,03	38	>3	16	11	5000	4	3,0523
	61	MRO 22 - 71A4	23,03	38	>3	16	11	5000	5	3,0523
	57	MRO 32 - 71A4	24,39	40	>3	20	15	8300	5	3,3409
	57	MRO 22 - 63C4	24,61	40	>3	16	11	5500	4	3,1062
	57	MRO 22 - 71A4	24,61	40	>3	16	11	5500	5	3,1062
	57	MRO 02 - 63C4	24,41	40	2,5	9,4	4,4	3700	4	0,557
	57	MRO 02 - 71A4	24,41	40	2,5	9,4	4,4	3700	5	0,557
	54	MRO 12 - 63C4	25,92	42	>3	12	7	4850	4	1,8225
	54	MRO 12 - 71A4	25,92	42	>3	12	7	4850	5	1,8225
	53	MRO 22 - 63C4	26,42	43	>3	16	11	5450	4	3,0234
	53	MRO 22 - 71A4	26,42	43	>3	16	11	5450	5	3,0234
	52	MRO 32 - 71A4	27,01	44	>3	20	15	8400	5	3,1801
	52	MRO 02 - 63C4	27,13	44	2,5	9,4	4,4	3700	4	0,518
	52	MRO 02 - 71A4	27,13	44	2,5	9,4	4,4	3700	5	0,518
	51	MRO 12 - 63C4	27,64	45	>3	12	7	4550	4	1,772
	51	MRO 12 - 71A4	27,64	45	>3	12	7	4550	5	1,772
	45	MRO 12 - 63C4	31,45	52	>3	12	7	4800	4	1,7418
	45	MRO 12 - 71A4	31,45	52	>3	12	7	4800	5	1,7418
	44	MRO 02 - 63C4	31,88	52	1,9	9,4	4,4	3950	4	0,498
	44	MRO 02 - 71A4	31,88	52	1,9	9,4	4,4	3950	5	0,498
	43	MRO 32 - 71A4	32,3	53	>3	20	15	9050	5	3,058
	43	MRO 22 - 63C4	32,3	53	>3	16	11	5900	4	2,9572
	43	MRO 22 - 71A4	32,3	53	>3	16	11	5900	5	2,9572
	43	MRO 12 - 63C4	32,73	54	>3	12	7	5200	4	1,7591
	43	MRO 12 - 71A4	32,73	54	>3	12	7	5200	5	1,7591
	43	MRO 02 - 63C4	32,73	54	1,9	9,4	4,4	4150	4	0,512
	43	MRO 02 - 71A4	32,73	54	1,9	9,4	4,4	4150	5	0,512
	42	MRO 22 - 63C4	33,64	55	>3	16	11	6100	4	2,9816
	42	MRO 22 - 71A4	33,64	55	>3	16	11	6100	5	2,9816
	38	MRO 32 - 71A4	36,69	60	>3	20	15	9950	5	3,0718
	38	MRO 22 - 63C4	37,06	61	>3	16	11	6350	4	2,9425
	38	MRO 22 - 71A4	37,06	61	>3	16	11	6350	5	2,9425
	38	MRO 02 - 63C4	36,73	60	1,7	9,4	4,4	4350	4	0,509
	38	MRO 02 - 71A4	36,73	60	1,7	9,4	4,4	4350	5	0,509
	37	MRO 32 - 71A4	37,89	62	>3	20	15	9800	5	3,0222
	37	MRO 02 - 63C4	38,05	62	1,6	9,4	4,4	4200	4	0,494
	37	MRO 02 - 71A4	38,05	62	1,6	9,4	4,4	4200	5	0,494
	36	MRO 12 - 63C4	38,76	63	>3	12	7	5300	4	1,732
	36	MRO 12 - 71A4	38,76	63	>3	12	7	5300	5	1,732
	31	MRO 32 - 71A4	45,05	74	>3	20	15	9800	5	2,9882
	31	MRO 12 - 63C4	45,9	75	2,3	12	7	5700	4	1,7254
	31	MRO 12 - 71A4	45,9	75	2,3	12	7	5700	5	1,7254
	31	MRO 02 - 63C4	45,9	75	1,3	9,4	4,4	4900	4	0,491
	31	MRO 02 - 71A4	45,9	75	1,3	9,4	4,4	4900	5	0,491
	30	MRO 22 - 63C4	47,18	77	>3	16	11	6400	4	2,9213
	30	MRO 22 - 71A4	47,18	77	>3	16	11	6400	5	2,9213
	27	MRO 32 - 71A4	51,46	84	>3	20	15	9800	5	2,9671
	27	MRO 22 - 63C4	51,93	85	>3	16	11	6450	4	2,9144



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,25	27	MRO 22 - 71A4	51,93	85	>3	16	11	6450	5	2,9144
	27	MRO 02 - 63C4	51,51	84	1,2	9,4	4,4	4900	4	0,49
	27	MRO 02 - 71A4	51,51	84	1,2	9,4	4,4	4900	5	0,49
	26	MRO 12 - 63C4	54,71	90	1,7	12	7	5750	4	1,7202
	26	MRO 12 - 71A4	54,71	90	1,7	12	7	5750	5	1,7202
0,37	278	MRO 12 - 71B4	5,03	12	>3	12,8	7	2300	8	3,2008
	270	MRO 32 - 71B4	5,18	13	>3	20,8	15	4800	8	9,0749
	270	MRO 22 - 71B4	5,18	13	>3	16,8	11	3150	8	5,8944
	270	MRO 02 - 71B4	5,18	13	>3	10,2	4,4	1700	8	1,214
	197	MRO 12 - 71B4	7,09	17	>3	12,8	7	2450	8	2,6978
	195	MRO 02 - 71B4	7,19	17	>3	10,2	4,4	2000	8	1,015
	192	MRO 32 - 71B4	7,28	18	>3	20,8	15	5650	8	6,7749
	192	MRO 22 - 71B4	7,28	18	>3	16,8	11	3200	8	4,792
	167	MRO 22 - 71B4	8,36	20	>3	16,8	11	3450	8	4,5033
	164	MRO 32 - 71B4	8,54	21	>3	20,8	15	6000	8	6,07
	163	MRO 02 - 71B4	8,58	21	>3	10,2	4,4	2200	8	0,944
	160	MRO 12 - 71B4	8,74	21	>3	12,8	7	2700	8	2,5046
	132	MRO 12 - 71B4	10,57	26	>3	12,8	7	2700	8	2,0326
	129	MRO 32 - 71B4	10,88	26	>3	20,8	15	6000	8	4,2665
	129	MRO 22 - 71B4	10,88	26	>3	16,8	11	3700	8	3,5463
	129	MRO 02 - 71B4	10,88	26	>3	10,2	4,4	2300	8	0,639
	121	MRO 32 - 71B4	11,6	28	>3	20,8	15	6400	8	4,9874
	120	MRO 22 - 71B4	11,71	28	>3	16,8	11	4050	8	3,9507
	113	MRO 12 - 71B4	12,34	30	>3	12,8	7	3550	8	2,2731
	94	MRO 12 - 71B4	14,9	36	>3	12,8	7	3350	8	1,9187
	93	MRO 02 - 71B4	15,1	37	>3	10,2	4,4	2850	8	0,593
	91	MRO 32 - 71B4	15,31	37	>3	20,8	15	6450	8	3,7457
	91	MRO 22 - 71B4	15,31	37	>3	16,8	11	4100	8	3,2966
	88	MRO 12 - 71B4	15,91	39	>3	12,8	7	3650	8	1,8416
	86	MRO 32 - 71B4	16,36	40	>3	20,8	15	6500	8	3,4806
	86	MRO 22 - 71B4	16,36	40	>3	16,8	11	4100	8	3,1625
	86	MRO 02 - 71B4	16,36	40	2,5	10,2	4,4	3000	8	0,545
	80	MRO 22 - 71B4	17,56	43	>3	16,8	11	4450	8	3,2313
	78	MRO 32 - 71B4	17,95	44	>3	20,8	15	6900	8	3,586
	78	MRO 02 - 71B4	18,03	44	2,5	10,2	4,4	3100	8	0,578
	76	MRO 12 - 71B4	18,37	45	>3	12,8	7	3750	8	1,8749
	66	MRO 32 - 71B4	21,35	52	>3	20,8	15	7550	8	3,4347
	64	MRO 12 - 71B4	21,75	53	>3	12,8	7	4350	8	1,8457
	64	MRO 02 - 71B4	21,75	53	2,1	10,2	4,4	3400	8	0,564
	63	MRO 22 - 71B4	22,35	54	>3	16,8	11	5000	8	3,1366
	62	MRO 12 - 71B4	22,42	54	>3	12,8	7	4100	8	1,7913
	62	MRO 02 - 71B4	22,73	55	2	10,2	4,4	3400	8	0,525
	61	MRO 32 - 71B4	23,03	56	>3	20,8	15	7700	8	3,2506
	61	MRO 22 - 71B4	23,03	56	>3	16,8	11	5000	8	3,0523
	57	MRO 32 - 71B4	24,39	59	>3	20,8	15	8300	8	3,3409
	57	MRO 22 - 71B4	24,61	60	>3	16,8	11	5500	8	3,1062
	57	MRO 02 - 71B4	24,41	59	1,7	10,2	4,4	3700	8	0,557
54	MRO 12 - 71B4	25,92	63	2,4	12,8	7	4850	8	1,8225	
53	MRO 22 - 71B4	26,42	64	>3	16,8	11	5450	8	3,0234	
52	MRO 32 - 71B4	27,01	65	>3	20,8	15	8400	8	3,1801	





MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴	
0,37	52	MRO 02 - 71B4	27,13	66	1,7	10,2	4,4	3700	8	0,518	
	51	MRO 12 - 71B4	27,64	67	3	12,8	7	4550	8	1,772	
	45	MRO 12 - 71B4	31,45	76	2,6	12,8	7	4800	8	1,7418	
	44	MRO 02 - 71B4	31,88	77	1,3	10,2	4,4	3950	8	0,498	
	43	MRO 32 - 71B4	32,3	78	>3	20,8	15	9050	8	3,058	
	43	MRO 22 - 71B4	32,3	78	>3	16,8	11	5900	8	2,9572	
	43	MRO 12 - 71B4	32,73	79	2,1	12,8	7	5200	8	1,7591	
	43	MRO 02 - 71B4	32,73	79	1,3	10,2	4,4	4150	8	0,512	
	42	MRO 22 - 71B4	33,64	82	>3	16,8	11	6100	8	2,9816	
	38	MRO 32 - 71B4	36,69	89	>3	20,8	15	9950	8	3,0718	
	38	MRO 22 - 71B4	37,06	90	>3	16,8	11	6350	8	2,9425	
	38	MRO 02 - 71B4	36,73	89	1,1	10,2	4,4	4350	8	0,509	
	37	MRO 32 - 71B4	37,89	92	>3	20,8	15	9800	8	3,0222	
	37	MRO 02 - 71B4	38,05	92	1,1	10,2	4,4	4200	8	0,494	
	36	MRO 12 - 71B4	38,76	94	2,1	12,8	7	5300	8	1,732	
	31	MRO 32 - 71B4	45,05	109	>3	20,8	15	9800	8	2,9882	
	31	MRO 12 - 71B4	45,9	111	1,5	12,8	7	5700	8	1,7254	
	31	MRO 02 - 71B4	45,9	111	0,9	10,2	4,4	4900	8	0,491	
	30	MRO 22 - 71B4	47,18	114	2,9	16,8	11	6400	8	2,9213	
	27	MRO 32 - 71B4	51,46	125	>3	20,8	15	9800	8	2,9671	
	27	MRO 22 - 71B4	51,93	126	2,4	16,8	11	6450	8	2,9144	
	27	MRO 02 - 71B4	51,51	125	0,8	10,2	4,4	4900	8	0,49	
	26	MRO 12 - 71B4	54,71	133	1,1	12,8	7	5750	8	1,7202	
	0,55	278	MRO 12 - 71C4	5,03	18	>3	13,5	7	2300	9	3,2008
		278	MRO 12 - 80A4	5,03	18	>3	15,1	7	2300	14	3,2008
		270	MRO 32 - 71C4	5,18	19	>3	21,5	15	4800	9	9,0749
270		MRO 32 - 80A4	5,18	19	>3	23,1	15	4800	14	9,0749	
270		MRO 22 - 71C4	5,18	19	>3	17,5	11	3150	9	5,8944	
270		MRO 22 - 80A4	5,18	19	>3	19,1	11	3150	14	5,8944	
270		MRO 02 - 71C4	5,18	19	>3	10,9	4,4	1700	8	1,214	
270		MRO 02 - 80A4	5,18	19	>3	12,5	4,4	1700	14	1,214	
197		MRO 12 - 71C4	7,09	26	>3	13,5	7	2450	9	2,6978	
197		MRO 12 - 80A4	7,09	26	>3	15,1	7	2450	14	2,6978	
195		MRO 02 - 71C4	7,19	26	>3	10,9	4,4	2000	9	1,015	
196		MRO 02 - 80A4	7,19	26	>3	12,5	4,4	2000	14	1,015	
192		MRO 32 - 71C4	7,28	26	>3	21,5	15	5650	9	6,7749	
192		MRO 32 - 80A4	7,28	26	>3	23,1	15	5650	14	6,7749	
192		MRO 22 - 71C4	7,28	26	>3	17,5	11	3200	9	4,792	
192		MRO 22 - 80A4	7,28	26	>3	19,1	11	3200	14	4,792	
167		MRO 22 - 71C4	8,36	30	>3	17,5	11	3450	9	4,5033	
167		MRO 22 - 80A4	8,36	30	>3	19,1	11	3450	14	4,5033	
164		MRO 32 - 71C4	8,54	31	>3	21,5	15	6000	9	6,07	
164		MRO 32 - 80A4	8,54	31	>3	23,1	15	6000	14	6,07	
163		MRO 02 - 71C4	8,58	31	>3	10,9	4,4	2200	9	0,944	
163		MRO 02 - 80A4	8,58	31	>3	12,5	4,4	2200	14	0,944	
160		MRO 12 - 71C4	8,74	31	>3	13,5	7	2700	9	2,5046	
160		MRO 12 - 80A4	8,74	31	>3	15,1	7	2700	14	2,5046	
132		MRO 12 - 71C4	10,57	38	>3	13,5	7	2700	9	2,0326	
132		MRO 12 - 80A4	10,57	38	>3	15,1	7	2700	14	2,0326	
129		MRO 32 - 71C4	10,88	39	>3	21,5	15	6000	9	4,2665	



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻⁴	J ₁ × 10 ⁻⁴
0,55	129	MRO 32 - 80A4	10,88	39	>3	23,1	15	6000	14	4,2665
	129	MRO 22 - 71C4	10,88	39	>3	17,5	11	3700	9	3,5463
	129	MRO 22 - 80A4	10,88	39	>3	19,1	11	3700	14	3,5463
	129	MRO 02 - 71C4	10,88	39	>3	10,9	4,4	2300	9	0,639
	129	MRO 02 - 80A4	10,88	39	>3	12,5	4,4	2300	14	0,639
	121	MRO 32 - 71C4	11,6	42	>3	21,5	15	6400	9	4,9874
	121	MRO 32 - 80A4	11,6	42	>3	23,1	15	6400	14	4,9874
	120	MRO 22 - 71C4	11,71	42	>3	17,5	11	4050	9	3,9507
	120	MRO 22 - 80A4	11,71	42	>3	19,1	11	4050	14	3,9507
	113	MRO 12 - 71C4	12,34	44	>3	13,5	7	3550	9	2,2731
	113	MRO 12 - 80A4	12,34	44	>3	15,1	7	3550	14	2,2731
	94	MRO 12 - 71C4	14,9	54	>3	13,5	7	3350	9	1,9187
	94	MRO 12 - 80A4	14,9	54	>3	15,1	7	3350	14	1,9187
	93	MRO 02 - 71C4	15,1	54	2	10,9	4,4	2850	9	0,593
	93	MRO 02 - 80A4	15,1	54	2	12,5	4,4	2850	14	0,593
	91	MRO 32 - 71C4	15,31	55	>3	21,5	15	6450	9	3,7457
	91	MRO 32 - 80A4	15,31	55	>3	23,1	15	6450	14	3,7457
	91	MRO 22 - 71C4	15,31	55	>3	17,5	11	4100	9	3,2966
	91	MRO 22 - 80A4	15,31	55	>3	19,1	11	4100	14	3,2966
	88	MRO 12 - 71C4	15,91	57	3	13,5	7	3650	9	1,8416
	88	MRO 12 - 80A4	15,91	57	3	15,1	7	3650	14	1,8416
	86	MRO 32 - 71C4	16,36	59	>3	21,5	15	6500	9	3,4806
	86	MRO 32 - 80A4	16,36	59	>3	23,1	15	6500	14	3,4806
	86	MRO 22 - 71C4	16,36	59	>3	17,5	11	4100	9	3,1625
	86	MRO 22 - 80A4	16,36	59	>3	19,1	11	4100	14	3,1625
	86	MRO 02 - 71C4	16,36	59	1,7	10,9	4,4	3000	9	0,545
	86	MRO 02 - 80A4	16,36	59	1,7	12,5	4,4	3000	14	0,545
	80	MRO 22 - 71C4	17,56	63	>3	17,5	11	4450	9	3,2313
	80	MRO 22 - 80A4	17,56	63	>3	19,1	11	4450	14	3,2313
	78	MRO 32 - 71C4	17,95	65	>3	21,5	15	6900	9	3,586
	78	MRO 32 - 80A4	17,95	65	>3	23,1	15	6900	14	3,586
	78	MRO 02 - 71C4	18,03	65	1,7	10,9	4,4	3100	9	0,578
	78	MRO 02 - 80A4	18,03	65	1,7	12,5	4,4	3100	14	0,578
	76	MRO 12 - 71C4	18,37	66	>3	13,5	7	3750	9	1,8749
	76	MRO 12 - 80A4	18,37	66	>3	15,1	7	3750	14	1,8749
	66	MRO 32 - 71C4	21,35	77	>3	21,5	15	7550	9	3,4347
	66	MRO 32 - 80A4	21,35	77	>3	23,1	15	7550	14	3,4347
	64	MRO 12 - 71C4	21,75	78	2,2	13,5	7	4350	9	1,8457
	64	MRO 12 - 80A4	21,75	78	2,2	15,1	7	4350	14	1,8457
	64	MRO 02 - 71C4	21,75	78	1,4	10,9	4,4	3400	9	0,564
	64	MRO 02 - 80A4	21,75	78	1,4	12,5	4,4	3400	14	0,564
	63	MRO 22 - 71C4	22,35	81	>3	17,5	11	5000	9	3,1366
	63	MRO 22 - 80A4	22,35	81	>3	19,1	11	5000	14	3,1366
	62	MRO 12 - 71C4	22,42	81	2,5	13,5	7	4100	9	1,7913
	62	MRO 12 - 80A4	22,42	81	2,5	15,1	7	4100	14	1,7913
	62	MRO 02 - 71C4	22,73	82	1,3	10,9	4,4	3400	9	0,525
	62	MRO 02 - 80A4	22,73	82	1,3	12,5	4,4	3400	14	0,525
	61	MRO 32 - 71C4	23,03	83	>3	21,5	15	7700	9	3,2506
	61	MRO 32 - 80A4	23,03	83	>3	23,1	15	7700	14	3,2506
	61	MRO 22 - 71C4	23,03	83	>3	17,5	11	5000	9	3,0523





MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,55	61	MRO 22 - 80A4	23,03	83	>3	19,1	11	5000	14	3,0523
	57	MRO 32 - 71C4	24,39	88	>3	21,5	15	8300	9	3,3409
	57	MRO 32 - 80A4	24,39	88	>3	23,1	15	8300	14	3,3409
	57	MRO 22 - 71C4	24,61	89	>3	17,5	11	5500	9	3,1062
	57	MRO 22 - 80A4	24,61	89	>3	19,1	11	5500	14	3,1062
	57	MRO 02 - 71C4	24,41	88	1,1	10,9	4,4	3700	9	0,557
	57	MRO 02 - 80A4	24,41	88	1,1	12,5	4,4	3700	14	0,557
	54	MRO 12 - 71C4	25,92	93	1,6	13,5	7	4850	9	1,8225
	54	MRO 12 - 80A4	25,92	93	1,6	15,1	7	4850	14	1,8225
	53	MRO 22 - 71C4	26,42	95	>3	17,5	11	5450	9	3,0234
	53	MRO 22 - 80A4	26,42	95	>3	19,1	11	5450	14	3,0234
	52	MRO 32 - 71C4	27,01	97	>3	21,5	15	8400	9	3,1801
	52	MRO 32 - 80A4	27,01	97	>3	23,1	15	8400	14	3,1801
	52	MRO 02 - 71C4	27,13	98	1,1	10,9	4,4	3700	9	0,518
	52	MRO 02 - 80A4	27,13	98	1,1	12,5	4,4	3700	14	0,518
	51	MRO 12 - 71C4	27,64	100	2	13,5	7	4550	9	1,772
	51	MRO 12 - 80A4	27,64	100	2	15,1	7	4550	14	1,772
	45	MRO 12 - 71C4	31,45	113	1,8	13,5	7	4800	9	1,7418
	45	MRO 12 - 80A4	31,45	113	1,8	15,1	7	4800	14	1,7418
	44	MRO 02 - 71C4	31,88	115	0,9	10,9	4,4	3950	9	0,498
	44	MRO 02 - 80A4	31,88	115	0,9	12,5	4,4	3950	14	0,498
	43	MRO 32 - 71C4	32,3	116	>3	21,5	15	9050	9	3,058
	43	MRO 32 - 80A4	32,3	116	>3	23,1	15	9050	14	3,058
	43	MRO 22 - 71C4	32,3	116	2,8	17,5	11	5900	9	2,9572
	43	MRO 22 - 80A4	32,3	116	2,8	19,1	11	5900	14	2,9572
	43	MRO 12 - 71C4	32,73	118	1,4	13,5	7	5200	9	1,7591
	43	MRO 12 - 80A4	32,73	118	1,4	15,1	7	5200	14	1,7591
	43	MRO 02 - 71C4	32,73	118	0,8	10,9	4,4	4150	9	0,512
	43	MRO 02 - 80A4	32,73	118	0,8	12,5	4,4	4150	14	0,512
	42	MRO 22 - 71C4	33,64	121	2,7	17,5	11	6100	9	2,9816
	42	MRO 22 - 80A4	33,64	121	2,7	19,1	11	6100	14	2,9816
	38	MRO 32 - 71C4	36,69	132	>3	21,5	15	9950	9	3,0718
	38	MRO 32 - 80A4	36,69	132	>3	23,1	15	9950	14	3,0718
	38	MRO 22 - 71C4	37,06	134	2,5	17,5	11	6350	9	2,9425
	38	MRO 22 - 80A4	37,06	134	2,5	19,1	11	6350	14	2,9425
	37	MRO 32 - 71C4	37,89	137	>3	21,5	15	9800	9	3,0222
	37	MRO 32 - 80A4	37,89	137	>3	23,1	15	9800	14	3,0222
	36	MRO 12 - 71C4	38,76	140	1,4	13,5	7	5300	9	1,732
	36	MRO 12 - 80A4	38,76	140	1,4	15,1	7	5300	14	1,732
	31	MRO 32 - 71C4	45,05	162	>3	21,5	15	9800	9	2,9882
	31	MRO 32 - 80A4	45,05	162	>3	23,1	15	9800	14	2,9882
	31	MRO 12 - 71C4	45,9	165	1	13,5	7	5700	9	1,7254
	31	MRO 12 - 80A4	45,9	165	1	15,1	7	5700	14	1,7254
	30	MRO 22 - 71C4	47,18	170	1,9	17,5	11	6400	9	2,9213
	30	MRO 22 - 80A4	47,18	170	1,9	19,1	11	6400	14	2,9213
	27	MRO 32 - 71C4	51,46	185	2,7	21,5	15	9800	9	2,9671
	27	MRO 32 - 80A4	51,46	185	2,7	23,1	15	9800	14	2,9671
	27	MRO 22 - 71C4	51,93	187	1,6	17,5	11	6450	9	2,9144
	27	MRO 22 - 80A4	51,93	187	1,6	19,1	11	6450	14	2,9144
0,75	278	MRO 12 - 80B4	5,03	25	>3	16,1	7	2300	17	3,2008



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,75	270	MRO 32 - 80B4	5,18	25	>3	24,1	15	4800	17	9,0749
	270	MRO 22 - 80B4	5,18	25	>3	20,1	11	3150	17	5,8944
	270	MRO 02 - 80B4	5,18	25	>3	13,5	4,4	1700	17	1,214
	197	MRO 12 - 80B4	7,09	35	>3	16,1	7	2450	17	2,6978
	195	MRO 02 - 80B4	7,19	35	>3	13,5	4,4	2000	17	1,015
	192	MRO 32 - 80B4	7,28	36	>3	24,1	15	5650	17	6,7749
	192	MRO 22 - 80B4	7,28	36	>3	20,1	11	3200	17	4,792
	167	MRO 22 - 80B4	8,36	41	>3	20,1	11	3450	17	4,5033
	164	MRO 32 - 80B4	8,54	42	>3	24,1	15	6000	17	6,07
	163	MRO 02 - 80B4	8,58	42	2,6	13,5	4,4	2200	17	0,944
	160	MRO 12 - 80B4	8,74	43	>3	16,1	7	2700	17	2,5046
	132	MRO 12 - 80B4	10,57	52	>3	16,1	7	2700	17	2,0326
	129	MRO 32 - 80B4	10,88	53	>3	24,1	15	6000	17	4,2665
	129	MRO 22 - 80B4	10,88	53	>3	20,1	11	3700	17	3,5463
	129	MRO 02 - 80B4	10,88	53	2,2	13,5	4,4	2300	17	0,639
	121	MRO 32 - 80B4	11,6	57	>3	24,1	15	6400	17	4,9874
	120	MRO 22 - 80B4	11,71	58	>3	20,1	11	4050	17	3,9507
	113	MRO 12 - 80B4	12,34	61	2,5	16,1	7	3550	17	2,2731
	94	MRO 12 - 80B4	14,9	73	2,7	16,1	7	3350	17	1,9187
	93	MRO 02 - 80B4	15,1	74	1,5	13,5	4,4	2850	17	0,593
	91	MRO 32 - 80B4	15,31	75	>3	24,1	15	6450	17	3,7457
	91	MRO 22 - 80B4	15,31	75	>3	20,1	11	4100	17	3,2966
	88	MRO 12 - 80B4	15,91	78	2,2	16,1	7	3650	17	1,8416
	86	MRO 32 - 80B4	16,36	80	>3	24,1	15	6500	17	3,4806
	86	MRO 22 - 80B4	16,36	80	>3	20,1	11	4100	17	3,1625
	86	MRO 02 - 80B4	16,36	80	1,2	13,5	4,4	3000	17	0,545
	80	MRO 22 - 80B4	17,56	86	>3	20,1	11	4450	17	3,2313
	78	MRO 32 - 80B4	17,95	88	>3	24,1	15	6900	17	3,586
	78	MRO 02 - 80B4	18,03	89	1,2	13,5	4,4	3100	17	0,578
	76	MRO 12 - 80B4	18,37	90	2,2	16,1	7	3750	17	1,8749
	66	MRO 32 - 80B4	21,35	105	>3	24,1	15	7550	17	3,4347
	64	MRO 12 - 80B4	21,75	107	1,6	16,1	7	4350	17	1,8457
	64	MRO 02 - 80B4	21,75	107	1	13,5	4,4	3400	17	0,564
	63	MRO 22 - 80B4	22,35	110	>3	20,1	11	5000	17	3,1366
	62	MRO 12 - 80B4	22,42	110	1,8	16,1	7	4100	17	1,7913
	61	MRO 02 - 80B4	22,73	112	1	13,5	4,4	3400	17	0,525
	61	MRO 32 - 80B4	23,03	113	>3	24,1	15	7700	17	3,2506
	61	MRO 22 - 80B4	23,03	113	2,9	20,1	11	5000	17	3,0523
	57	MRO 32 - 80B4	24,39	120	>3	24,1	15	8300	17	3,3409
	57	MRO 22 - 80B4	24,61	121	2,5	20,1	11	5500	17	3,1062
	57	MRO 02 - 80B4	24,41	120	0,8	13,5	4,4	3700	17	0,557
	54	MRO 12 - 80B4	25,92	127	1,2	16,1	7	4850	17	1,8225
	53	MRO 22 - 80B4	26,42	130	2,5	20,1	11	5450	17	3,0234
	52	MRO 32 - 80B4	27,01	133	>3	24,1	15	8400	17	3,1801
	52	MRO 02 - 80B4	27,13	133	0,8	13,5	4,4	3700	17	0,518
	51	MRO 12 - 80B4	27,64	136	1,5	16,1	7	4550	17	1,772
	45	MRO 12 - 80B4	31,45	155	1,3	16,1	7	4800	17	1,7418
	43	MRO 32 - 80B4	32,3	159	>3	24,1	15	9050	17	3,058
	43	MRO 22 - 80B4	32,3	159	2,1	20,1	11	5900	17	2,9572
	43	MRO 12 - 80B4	32,73	161	1,1	16,1	7	5200	17	1,7591





MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
0,75	42	MRO 22 - 80B4	33,64	165	2	20,1	11	6100	17	2,9816
	38	MRO 32 - 80B4	36,69	180	2,8	24,1	15	9950	17	3,0718
	38	MRO 22 - 80B4	37,06	182	1,8	20,1	11	6350	17	2,9425
	37	MRO 32 - 80B4	37,89	186	2,7	24,1	15	9800	17	3,0222
	36	MRO 12 - 80B4	38,76	190	1,1	16,1	7	5300	17	1,732
	31	MRO 32 - 80B4	45,05	221	2,3	24,1	15	9800	17	2,9882
	30	MRO 22 - 80B4	47,18	232	1,4	20,1	11	6400	17	2,9213
	27	MRO 32 - 80B4	51,46	253	2	24,1	15	9800	17	2,9671
	27	MRO 22 - 80B4	51,93	255	1,2	20,1	11	6450	17	2,9144
1,1	278	MRO 12 - 80C4	5,03	36	>3	18	7	2300	23	3,2008
	278	MRO 12 - 90S4	5,03	36	>3	18,7	7	2300	33	3,2008
	270	MRO 32 - 80C4	5,18	37	>3	26	15	4800	23	9,0749
	270	MRO 32 - 90S4	5,18	37	>3	26,7	15	4800	33	9,0749
	270	MRO 22 - 80C4	5,18	37	>3	22	11	3150	23	5,8944
	270	MRO 22 - 90S4	5,18	37	>3	22,7	11	3150	33	5,8944
	270	MRO 02 - 80C4	5,18	37	2,8	15,4	4,4	1700	23	1,214
	270	MRO 02 - 90S4	5,18	37	2,8	16,1	4,4	1700	33	1,214
	197	MRO 12 - 80C4	7,09	51	>3	18	7	2450	23	2,6978
	197	MRO 12 - 90S4	7,09	51	>3	18,7	7	2450	33	2,6978
	195	MRO 02 - 80C4	7,19	52	2,1	15,4	4,4	2000	23	1,015
	195	MRO 02 - 90S4	7,19	52	2,1	16,1	4,4	2000	33	1,015
	192	MRO 32 - 80C4	7,28	52	>3	26	15	5650	23	6,7749
	192	MRO 32 - 90S4	7,28	52	>3	26,7	15	5650	33	6,7749
	192	MRO 22 - 80C4	7,28	52	>3	22	11	3200	23	4,792
	192	MRO 22 - 90S4	7,28	52	>3	22,7	11	3200	33	4,792
	167	MRO 22 - 80C4	8,36	60	>3	22	11	3450	23	4,5033
	167	MRO 22 - 90S4	8,36	60	>3	22,7	11	3450	33	4,5033
	164	MRO 32 - 80C4	8,54	62	>3	26	15	6000	23	6,07
	164	MRO 32 - 90S4	8,54	62	>3	26,7	15	6000	33	6,07
	163	MRO 02 - 80C4	8,58	62	1,8	15,4	4,4	2200	23	0,944
	163	MRO 02 - 90S4	8,58	62	1,8	16,1	4,4	2200	33	0,944
	160	MRO 12 - 80C4	8,74	63	2,9	18	7	2700	23	2,5046
	160	MRO 12 - 90S4	8,74	63	2,9	18,7	7	2700	33	2,5046
	132	MRO 12 - 80C4	10,57	76	2,6	18	7	2700	23	2,0326
	132	MRO 12 - 90S4	10,57	76	2,6	18,7	7	2700	33	2,0326
	129	MRO 32 - 80C4	10,88	78	>3	26	15	6000	23	4,2665
	129	MRO 32 - 90S4	10,88	78	>3	26,7	15	6000	33	4,2665
	129	MRO 22 - 80C4	10,88	78	>3	22	11	3700	23	3,5463
	129	MRO 22 - 90S4	10,88	78	>3	22,7	11	3700	33	3,5463
	129	MRO 02 - 80C4	10,88	78	1,5	15,4	4,4	2300	23	0,639
	129	MRO 02 - 90S4	10,88	78	1,5	16,1	4,4	2300	33	0,639
	121	MRO 32 - 80C4	11,6	84	>3	26	15	6400	23	4,9874
121	MRO 32 - 90S4	11,6	84	>3	26,7	15	6400	33	4,9874	
120	MRO 22 - 80C4	11,71	84	>3	22	11	4050	23	3,9507	
120	MRO 22 - 90S4	11,71	84	>3	22,7	11	4050	33	3,9507	
113	MRO 12 - 80C4	12,34	89	1,7	18	7	3550	23	2,2731	
113	MRO 12 - 90S4	12,34	89	1,7	18,7	7	3550	33	2,2731	
94	MRO 12 - 80C4	14,9	107	1,9	18	7	3350	23	1,9187	
94	MRO 12 - 90S4	14,9	107	1,9	18,7	7	3350	33	1,9187	
93	MRO 02 - 80C4	15,1	109	1	15,4	4,4	2850	23	0,593	



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
1,1	93	MRO 02 - 90S4	15,1	109	1	16,1	4,4	2850	33	0,593
	91	MRO 32 - 80C4	15,31	110	>3	26	15	6450	23	3,7457
	91	MRO 32 - 90S4	15,31	110	>3	26,7	15	6450	33	3,7457
	91	MRO 22 - 80C4	15,31	110	3	22	11	4100	23	3,2966
	91	MRO 22 - 90S4	15,31	110	3	22,7	11	4100	33	3,2966
	88	MRO 12 - 80C4	15,91	115	1,5	18	7	3650	23	1,8416
	88	MRO 12 - 90S4	15,91	115	1,5	18,7	7	3650	33	1,8416
	86	MRO 32 - 80C4	16,36	118	>3	26	15	6500	23	3,4806
	86	MRO 32 - 90S4	16,36	118	>3	26,7	15	6500	33	3,4806
	86	MRO 22 - 80C4	16,36	118	2,8	22	11	4100	23	3,1625
	86	MRO 22 - 90S4	16,36	118	2,8	22,7	11	4100	33	3,1625
	86	MRO 02 - 80C4	16,36	118	0,8	15,4	4,4	3000	23	0,545
	86	MRO 02 - 90S4	16,36	118	0,8	16,1	4,4	3000	33	0,545
	80	MRO 22 - 80C4	17,56	127	2,6	22	11	4450	23	3,2313
	80	MRO 22 - 90S4	17,56	127	2,6	22,7	11	4450	33	3,2313
	78	MRO 32 - 80C4	17,95	129	>3	26	15	6900	23	3,586
	78	MRO 32 - 90S4	17,95	129	>3	26,7	15	6900	33	3,586
	78	MRO 02 - 80C4	18,03	130	0,8	15,4	4,4	3100	23	0,578
	78	MRO 02 - 90S4	18,03	130	0,8	16,1	4,4	3100	33	0,578
	76	MRO 12 - 80C4	18,37	132	1,5	18	7	3750	23	1,8749
	76	MRO 12 - 90S4	18,37	132	1,5	18,7	7	3750	33	1,8749
	66	MRO 32 - 80C4	21,35	154	>3	26	15	7550	23	3,4347
	66	MRO 32 - 90S4	21,35	154	>3	26,7	15	7550	33	3,4347
	64	MRO 12 - 80C4	21,75	157	1,1	18	7	4350	23	1,8457
	64	MRO 12 - 90S4	21,75	157	1,1	18,7	7	4350	33	1,8457
	63	MRO 22 - 80C4	22,35	161	2	22	11	5000	23	3,1366
	63	MRO 22 - 90S4	22,35	161	2	22,7	11	5000	33	3,1366
	62	MRO 12 - 80C4	22,42	162	1,2	18	7	4100	23	1,7913
	62	MRO 12 - 90S4	22,42	162	1,2	18,7	7	4100	33	1,7913
	61	MRO 32 - 80C4	23,03	166	>3	26	15	7700	23	3,2506
	61	MRO 32 - 90S4	23,03	166	>3	26,7	15	7700	33	3,2506
	61	MRO 22 - 80C4	23,03	166	2	22	11	5000	23	3,0523
	61	MRO 22 - 90S4	23,03	166	2	22,7	11	5000	33	3,0523
	57	MRO 32 - 80C4	24,39	176	2,8	26	15	8300	23	3,3409
	57	MRO 32 - 90S4	24,39	176	2,8	26,7	15	8300	33	3,3409
	57	MRO 22 - 80C4	24,61	177	1,7	22	11	5500	23	3,1062
	57	MRO 22 - 90S4	24,61	177	1,7	22,7	11	5500	33	3,1062
	54	MRO 12 - 80C4	25,92	187	0,8	18	7	4850	23	1,8225
	54	MRO 12 - 90S4	25,92	187	0,8	18,7	7	4850	33	1,8225
	53	MRO 22 - 80C4	26,42	190	1,7	22	11	5450	23	3,0234
	53	MRO 22 - 90S4	26,42	190	1,7	22,7	11	5450	33	3,0234
	52	MRO 32 - 80C4	27,01	195	2,6	26	15	8400	23	3,1801
	52	MRO 32 - 90S4	27,01	195	2,6	26,7	15	8400	33	3,1801
	51	MRO 12 - 80C4	27,64	199	1	18	7	4550	23	1,772
	51	MRO 12 - 90S4	27,64	199	1	18,7	7	4550	33	1,772
	45	MRO 12 - 80C4	31,45	227	0,9	18	7	4800	23	1,7418
	45	MRO 12 - 90S4	31,45	227	0,9	18,7	7	4800	33	1,7418
	43	MRO 32 - 80C4	32,3	233	2,1	26	15	9050	23	3,058
	43	MRO 32 - 90S4	32,3	233	2,1	26,7	15	9050	33	3,058
	43	MRO 22 - 80C4	32,3	233	1,4	22	11	5900	23	2,9572



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
1,1	43	MRO 22 - 90S4	32,3	233	1,4	22,7	11	5900	33	2,9572
	42	MRO 22 - 80C4	33,64	242	1,4	22	11	6100	23	2,9816
	42	MRO 22 - 90S4	33,64	242	1,4	22,7	11	6100	33	2,9816
	38	MRO 32 - 80C4	36,69	264	1,9	26	15	9950	23	3,0718
	38	MRO 32 - 90S4	36,69	264	1,9	26,7	15	9950	33	3,0718
	38	MRO 22 - 80C4	37,06	267	1,2	22	11	6350	23	2,9425
	38	MRO 22 - 90S4	37,06	267	1,2	22,7	11	6350	33	2,9425
	37	MRO 32 - 80C4	37,89	273	1,8	26	15	9800	23	3,0222
	37	MRO 32 - 90S4	37,89	273	1,8	26,7	15	9800	33	3,0222
	31	MRO 32 - 80C4	45,05	325	1,5	26	15	9800	23	2,9882
	31	MRO 32 - 90S4	45,05	325	1,5	26,7	15	9800	33	2,9882
	30	MRO 22 - 80C4	47,18	340	1	22	11	6400	23	2,9213
	30	MRO 22 - 90S4	47,18	340	1	22,7	11	6400	33	2,9213
	27	MRO 32 - 80C4	51,46	371	1,3	26	15	9800	23	2,9671
	27	MRO 32 - 90S4	51,46	371	1,3	26,7	15	9800	33	2,9671
	27	MRO 22 - 80C4	51,93	374	0,8	22	11	6450	23	2,9144
	27	MRO 22 - 90S4	51,93	374	0,8	22,7	11	6450	33	2,9144
1,5	278	MRO 12 - 90L4	5,03	49	2,7	21,4	7	2300	40	3,2008
	270	MRO 32 - 90L4	5,18	51	>3	29,4	15	4800	40	9,0749
	270	MRO 22 - 90L4	5,18	51	>3	25,4	11	3150	40	5,8944
	270	MRO 02 - 90L4	5,18	51	2,1	18,8	4,4	1700	40	1,214
	197	MRO 12 - 90L4	7,09	70	2,5	21,4	7	2450	40	2,6978
	195	MRO 02 - 90L4	7,19	71	1,6	18,8	4,4	2000	40	1,015
	192	MRO 32 - 90L4	7,28	72	>3	29,4	15	5650	40	6,7749
	192	MRO 22 - 90L4	7,28	72	>3	25,4	11	3200	40	4,792
	167	MRO 22 - 90L4	8,36	82	>3	25,4	11	3450	40	4,5033
	164	MRO 32 - 90L4	8,54	84	>3	29,4	15	6000	40	6,07
	163	MRO 02 - 90L4	8,58	84	1,3	18,8	4,4	2200	40	0,944
	160	MRO 12 - 90L4	8,74	86	2,1	21,4	7	2700	40	2,5046
	132	MRO 12 - 90L4	10,57	104	1,9	21,4	7	2700	40	2,0326
	129	MRO 32 - 90L4	10,88	107	>3	29,4	15	6000	40	4,2665
	129	MRO 22 - 90L4	10,88	107	2,5	25,4	11	3700	40	3,5463
	129	MRO 02 - 90L4	10,88	107	1,1	18,8	4,4	2300	40	0,639
	121	MRO 32 - 90L4	11,6	114	>3	29,4	15	6400	40	4,9874
	120	MRO 22 - 90L4	11,71	115	2,3	25,4	11	4050	40	3,9507
	113	MRO 12 - 90L4	12,34	121	1,2	21,4	7	3550	40	2,2731
	94	MRO 12 - 90L4	14,9	146	1,4	21,4	7	3350	40	1,9187
	91	MRO 32 - 90L4	15,31	150	>3	29,4	15	6450	40	3,7457
	91	MRO 22 - 90L4	15,31	150	2,2	25,4	11	4100	40	3,2966
	88	MRO 12 - 90L4	15,91	156	1,1	21,4	7	3650	40	1,8416
	86	MRO 32 - 90L4	16,36	161	3	29,4	15	6500	40	3,4806
	86	MRO 22 - 90L4	16,36	161	2,1	25,4	11	4100	40	3,1625
	80	MRO 22 - 90L4	17,56	173	1,9	25,4	11	4450	40	3,2313
	78	MRO 32 - 90L4	17,95	176	2,8	29,4	15	6900	40	3,586
	76	MRO 12 - 90L4	18,37	181	1,1	21,4	7	3750	40	1,8749
	66	MRO 32 - 90L4	21,35	210	2,4	29,4	15	7550	40	3,4347
	64	MRO 22 - 90L4	21,75	214	0,8	21,4	7	4350	40	1,8457
	63	MRO 12 - 90L4	22,35	220	1,5	25,4	11	5000	40	3,1366
	62	MRO 12 - 90L4	22,42	220	0,9	21,4	7	4100	40	1,7913
	61	MRO 32 - 90L4	23,03	226	2,2	29,4	15	7700	40	3,2506



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻⁴	J ₁ × 10 ⁻⁴
1,5	61	MRO 22 - 90L4	23,03	226	1,5	25,4	11	5000	40	3,0523
	57	MRO 32 - 90L4	24,39	240	2,1	29,4	15	8300	40	3,3409
	57	MRO 22 - 90L4	24,61	242	1,2	25,4	11	5500	40	3,1062
	53	MRO 22 - 90L4	26,42	260	1,3	25,4	11	5450	40	3,0234
	52	MRO 32 - 90L4	27,01	265	1,9	29,4	15	8400	40	3,1801
	43	MRO 32 - 90L4	32,3	317	1,6	29,4	15	9050	40	3,058
	43	MRO 22 - 90L4	32,3	317	1	25,4	11	5900	40	2,9572
	42	MRO 22 - 90L4	33,64	331	1	25,4	11	6100	40	2,9816
	38	MRO 32 - 90L4	36,69	361	1,4	29,4	15	9950	40	3,0718
	38	MRO 22 - 90L4	37,06	364	0,9	25,4	11	6350	40	2,9425
	37	MRO 32 - 90L4	37,89	372	1,3	29,4	15	9800	40	3,0222
	31	MRO 32 - 90L4	45,05	443	1,1	29,4	15	9800	40	2,9882
	27	MRO 32 - 90L4	51,46	506	1	29,4	15	9800	40	2,9671
2,2	278	MRO 12 - 90LC4	5,03	72	1,9	24,6	7	2300	60	3,2008
	278	MRO 12 - 100A4	5,03	72	1,9	26,2	7	2300	75	3,2008
	270	MRO 32 - 90LC4	5,18	75	>3	32,6	15	4800	60	9,0749
	270	MRO 32 - 100A4	5,18	75	>3	34,2	15	4800	75	9,0749
	270	MRO 22 - 90LC4	5,18	75	2,4	28,6	11	3150	60	5,8944
	270	MRO 22 - 100A4	5,18	75	2,4	30,2	11	3150	75	5,8944
	270	MRO 02 - 90LC4	5,18	75	1,4	22	4,4	1700	60	1,214
	197	MRO 12 - 90LC4	7,09	102	1,7	24,6	7	2450	60	2,6978
	197	MRO 12 - 100A4	7,09	102	1,7	26,2	7	2450	75	2,6978
	195	MRO 02 - 90LC4	7,19	104	1,1	22	4,4	2000	60	1,015
	192	MRO 32 - 90LC4	7,28	105	2,7	32,6	15	5650	60	6,7749
	192	MRO 32 - 100A4	7,28	105	2,7	34,2	15	5650	75	6,7749
	192	MRO 22 - 90LC4	7,28	105	2,4	28,6	11	3200	60	4,792
	192	MRO 22 - 100A4	7,28	105	2,4	30,2	11	3200	75	4,792
	167	MRO 22 - 90LC4	8,36	120	2,2	28,6	11	3450	60	4,5033
	167	MRO 22 - 100A4	8,36	120	2,2	30,2	11	3450	75	4,5033
	164	MRO 32 - 90LC4	8,54	123	2,4	32,6	15	6000	60	6,07
	164	MRO 32 - 100A4	8,54	123	2,4	34,2	15	6000	75	6,07
	163	MRO 02 - 90LC4	8,58	124	0,9	22	4,4	2200	60	0,944
	160	MRO 12 - 90LC4	8,74	126	1,4	24,6	7	2700	60	2,5046
	160	MRO 12 - 100A4	8,74	126	1,4	26,2	7	2700	75	2,5046
	132	MRO 12 - 90LC4	10,57	152	1,3	24,6	7	2700	60	2,0326
	132	MRO 12 - 100A4	10,57	152	1,3	26,2	7	2700	75	2,0326
	129	MRO 32 - 90LC4	10,88	157	2,4	32,6	15	6000	60	4,2665
	129	MRO 32 - 100A4	10,88	157	2,4	34,2	15	6000	75	4,2665
	129	MRO 22 - 90LC4	10,88	157	1,7	28,6	11	3700	60	3,5463
	129	MRO 22 - 100A4	10,88	157	1,7	30,2	11	3700	75	3,5463
	121	MRO 32 - 90LC4	11,6	167	2,4	32,6	15	6400	60	4,9874
	121	MRO 32 - 100A4	11,6	167	2,4	34,2	15	6400	75	4,9874
	120	MRO 22 - 90LC4	11,71	169	1,6	28,6	11	4050	60	3,9507
	120	MRO 22 - 100A4	11,71	169	1,6	30,2	11	4050	75	3,9507
	113	MRO 12 - 90LC4	12,34	178	0,8	24,6	7	3550	60	2,2731
	113	MRO 12 - 100A4	12,34	178	0,8	26,2	7	3550	75	2,2731
	94	MRO 12 - 90LC4	14,9	215	0,9	24,6	7	3350	60	1,9187
	94	MRO 12 - 100A4	14,9	215	0,9	26,2	7	3350	75	1,9187
	91	MRO 32 - 90LC4	15,31	221	2,2	32,6	15	6450	60	3,7457
	91	MRO 32 - 100A4	15,31	221	2,2	34,2	15	6450	75	3,7457



MRO-2 - 1400 rpm
Geared motor

P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻³	J ₁ × 10 ⁻⁴
2,2	91	MRO 22 - 90LC4	15,31	221	1,5	28,6	11	4100	60	3,2966
	91	MRO 22 - 100A4	15,31	221	1,5	30,2	11	4100	75	3,2966
	86	MRO 32 - 90LC4	16,36	236	2	32,6	15	6500	60	3,4806
	86	MRO 32 - 100A4	16,36	236	2	34,2	15	6500	75	3,4806
	86	MRO 22 - 90LC4	16,36	236	1,4	28,6	11	4100	60	3,1625
	86	MRO 22 - 100A4	16,36	236	1,4	30,2	11	4100	75	3,1625
	80	MRO 22 - 90LC4	17,56	253	1,3	28,6	11	4450	60	3,2313
	80	MRO 22 - 100A4	17,56	253	1,3	30,2	11	4450	75	3,2313
	78	MRO 32 - 90LC4	17,95	259	1,9	32,6	15	6900	60	3,586
	78	MRO 32 - 100A4	17,95	259	1,9	34,2	15	6900	75	3,586
	66	MRO 32 - 90LC4	21,35	308	1,6	32,6	15	7550	60	3,4347
	68	MRO 32 - 100A4	21,35	308	1,6	34,2	15	7550	75	3,4347
	63	MRO 22 - 90LC4	22,35	322	1	28,6	11	5000	60	3,1366
	63	MRO 22 - 100A4	22,35	322	1	30,2	11	5000	75	3,1366
	61	MRO 32 - 90LC4	23,03	332	1,5	32,6	15	7700	60	3,2506
	61	MRO 32 - 100A4	23,03	332	1,5	34,2	15	7700	75	3,2506
	61	MRO 22 - 90LC4	23,03	332	1	28,6	11	5000	60	3,0523
	61	MRO 22 - 100A4	23,03	332	1	30,2	11	5000	75	3,0523
	57	MRO 32 - 90LC4	24,39	352	1,4	32,6	15	8300	60	3,3409
	57	MRO 32 - 100A4	24,39	352	1,4	34,2	15	8300	75	3,3409
	57	MRO 22 - 90LC4	24,61	355	0,8	28,6	11	5500	60	3,1062
	57	MRO 22 - 100A4	24,61	355	0,8	30,2	11	5500	75	3,1062
	53	MRO 22 - 90LC4	26,42	381	0,9	28,6	11	5450	60	3,0234
	53	MRO 22 - 100A4	26,42	381	0,9	30,2	11	5450	75	3,0234
	52	MRO 32 - 90LC4	27,01	389	1,3	32,6	15	8400	60	3,1801
	52	MRO 32 - 100A4	27,01	389	1,3	34,2	15	8400	75	3,1801
	43	MRO 32 - 90LC4	32,3	466	1,1	32,6	15	9050	60	3,058
	43	MRO 32 - 100A4	32,3	466	1,1	34,2	15	9050	75	3,058
	38	MRO 32 - 90LC4	36,69	529	0,9	32,6	15	9950	60	3,0718
	38	MRO 32 - 100A4	36,69	529	0,9	34,2	15	9950	75	3,0718
37	MRO 32 - 90LC4	37,89	546	0,9	32,6	15	9800	60	3,0222	
37	MRO 32 - 100A4	37,89	546	0,9	34,2	15	9800	75	3,0222	
3	278	MRO 12 - 100B4	5,03	99	1,4	29,9	7	2300	85	3,2008
	270	MRO 32 - 100B4	5,18	102	2,7	37,9	15	4800	85	9,0749
	270	MRO 22 - 100B4	5,18	102	1,8	33,9	11	3150	85	5,8944
	197	MRO 12 - 100B4	7,09	139	1,3	29,9	7	2450	85	2,6978
	192	MRO 32 - 100B4	7,28	143	2	37,9	15	5650	85	6,7749
	192	MRO 22 - 100B4	7,28	143	1,8	33,9	11	3200	85	4,792
	167	MRO 22 - 100B4	8,36	164	1,6	33,9	11	3450	85	4,5033
	164	MRO 32 - 100B4	8,54	168	1,8	37,9	15	6000	85	6,07
	160	MRO 12 - 100B4	8,74	172	1	29,9	7	2700	85	2,5046
	132	MRO 12 - 100B4	10,57	208	1	29,9	7	2700	85	2,0326
	129	MRO 32 - 100B4	10,88	214	1,7	37,9	15	6000	85	4,2665
	129	MRO 22 - 100B4	10,88	214	1,3	33,9	11	3700	85	3,5463
	121	MRO 32 - 100B4	11,6	228	1,8	37,9	15	6400	85	4,9874
	120	MRO 22 - 100B4	11,71	230	1,2	33,9	11	4050	85	3,9507
	91	MRO 32 - 100B4	15,31	301	1,6	37,9	15	6450	85	3,7457
	91	MRO 22 - 100B4	15,31	301	1,1	33,9	11	4100	85	3,2966
	86	MRO 32 - 100B4	16,36	322	1,5	37,9	15	6500	85	3,4806
	86	MRO 22 - 100B4	16,36	322	1	33,9	11	4100	85	3,1625

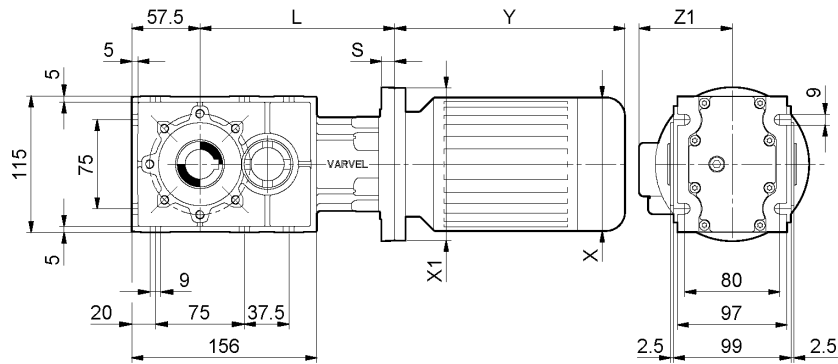


MRO-2 - 1400 rpm
Geared motor

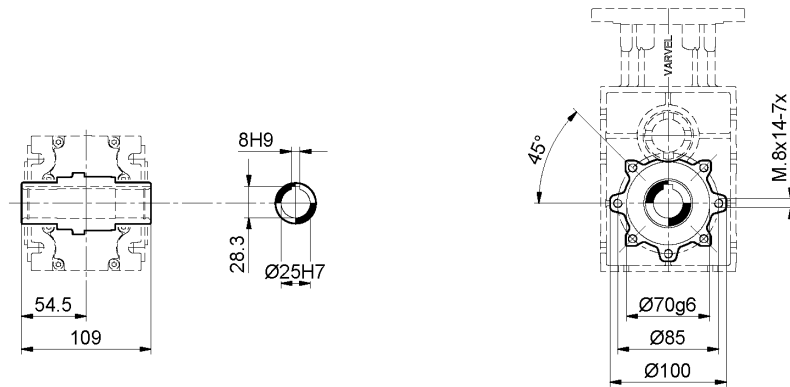
P ₁ [kW]	n ₂ [rpm]	Size	i _r	M ₂ [Nm]	FS	MRO [kg]	FRO [kg]	F _{r2} [N]	J _m × 10 ⁻⁴	J ₁ × 10 ⁻⁴
3	80	MRO 22 - 100B4	17,56	345	1	33,9	11	4450	85	3,2313
	78	MRO 32 - 100B4	17,95	353	1,4	37,9	15	6900	85	3,586
	66	MRO 32 - 100B4	21,35	420	1,2	37,9	15	7550	85	3,4347
	61	MRO 32 - 100B4	23,03	453	1,1	37,9	15	7700	85	3,2506
	57	MRO 32 - 100B4	24,39	479	1	37,9	15	8300	85	3,3409
	52	MRO 32 - 100B4	27,01	531	0,9	37,9	15	8400	85	3,1801
	43	MRO 32 - 100B4	32,3	635	0,8	37,9	15	9050	85	3,058
4	278	MRO 12 - 112A4	5,03	132	1	36	7	2300	130	3,2008
	270	MRO 32 - 112A4	5,18	136	2	44	15	4800	130	9,0749
	270	MRO 22 - 112A4	5,18	136	1,3	40	11	3150	130	5,8944
	197	MRO 12 - 112A4	7,09	186	0,9	36	7	2450	130	2,6978
	192	MRO 32 - 112A4	7,28	191	1,5	44	15	5650	130	6,7749
	192	MRO 22 - 112A4	7,28	191	1,3	40	11	3200	130	4,792
	167	MRO 22 - 112A4	8,36	219	1,2	40	11	3450	130	4,5033
	164	MRO 32 - 112A4	8,54	224	1,3	44	15	6000	130	6,07
	160	MRO 12 - 112A4	8,74	229	0,8	36	7	2700	130	2,5046
	129	MRO 32 - 112A4	10,88	285	1,3	44	15	6000	130	4,2665
	129	MRO 22 - 112A4	10,88	285	0,9	40	11	3700	130	3,5463
	121	MRO 32 - 112A4	11,6	304	1,3	44	15	6400	130	4,9874
	120	MRO 22 - 112A4	11,71	307	0,9	40	11	4050	130	3,9507
	91	MRO 32 - 112A4	15,31	401	1,2	44	15	6450	130	3,7457
	91	MRO 22 - 112A4	15,31	401	0,8	40	11	4100	130	3,2966
	86	MRO 32 - 112A4	16,36	429	1,1	44	15	6500	130	3,4806
	78	MRO 32 - 112A4	17,95	470	1,1	44	15	6900	130	3,586
66	MRO 32 - 112A4	21,35	559	0,9	44	15	7550	130	3,4347	
61	MRO 32 - 112A4	23,03	603	0,8	44	15	7700	130	3,2506	
57	MRO 32 - 112A4	24,39	639	0,8	44	15	8300	130	3,3409	
5,5	270	MRO 32 - 112MC4	5,18	187	1,4	50,7	15	4800	160	9,0749
	270	MRO 32 - 132S4	5,18	187	1,4	54	15	4800	240	9,0749
	270	MRO 22 - 112MC4	5,18	187	1	46,7	11	3150	160	5,8944
	192	MRO 32 - 112MC4	7,28	262	1,1	50,7	15	5650	160	6,7749
	192	MRO 32 - 132S4	7,28	262	1,1	54	15	5650	240	6,7749
	192	MRO 22 - 112MC4	7,28	262	1	46,7	11	3200	160	4,792
	167	MRO 22 - 112MC4	8,36	301	0,9	46,7	11	3450	160	4,5033
	164	MRO 32 - 112MC4	8,54	308	1	50,7	15	6000	160	6,07
	164	MRO 32 - 132S4	8,54	308	1	54	15	6000	240	6,07
	129	MRO 32 - 112MC4	10,88	392	0,9	50,7	15	6000	160	4,2665
	129	MRO 32 - 132S4	10,88	392	0,9	54	15	6000	240	4,2665
	121	MRO 32 - 112MC4	11,6	418	1	50,7	15	6400	160	4,9874
	121	MRO 32 - 132S4	11,6	418	1	54	15	6400	240	4,9874
	91	MRO 32 - 112MC4	15,31	552	0,9	50,7	15	6450	160	3,7457
	91	MRO 32 - 132S4	15,31	552	0,9	54	15	6450	240	3,7457
	86	MRO 32 - 112MC4	16,36	589	0,8	50,7	15	6500	160	3,4806
	86	MRO 32 - 132S4	16,36	589	0,8	54	15	6500	240	3,4806
7,5	270	MRO 32 - 132M4	5,18	254	1,1	63,5	15	4800	330	9,0749
	192	MRO 32 - 132M4	7,28	358	0,8	63,5	15	5650	330	6,7749
9,2	270	MRO 32 - 132ML4	5,18	312	0,9	71,5	15	4800	340	9,0749



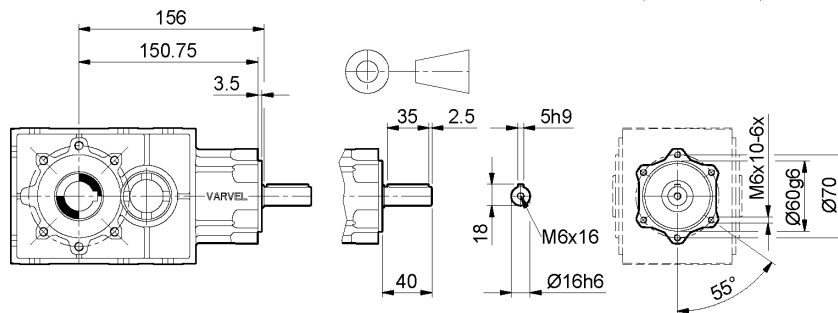
MRO 02
FRO 02
RO 02



MRO02
FRO02



AC25



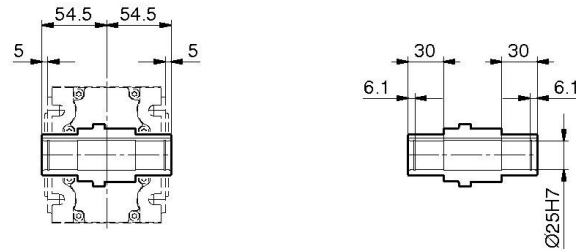
RO02

IEC	63	71	80	90 S	90 L	100	112
X / Y / Z1	123/185/11	140/215/12	159/238/13	176/255/149	176/280/14	195/309/16	219/328/17
X1 (B5) / S	140/17.5	160/15.5	200/15.5	200/15.5	200/15.5	250/16.7	250/16.7
X1 (B14) /	---	105/15.5	120/15.5	140/17.5	140/17.5	160/15.5	160/15.5
L (B5)	200.5	198.5	198.5	198.5	198.5	199.7	199.7
L (B14)	---	198.5	200.5	200.5	200.5	198.5	198.5

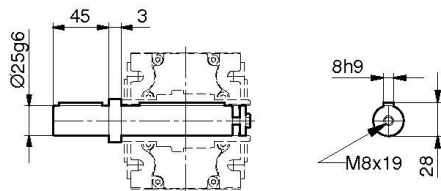
Not binding dimensions and weights

MRO/FRO/RO 02
Output shafts

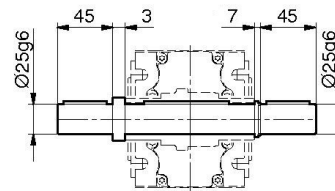
AC



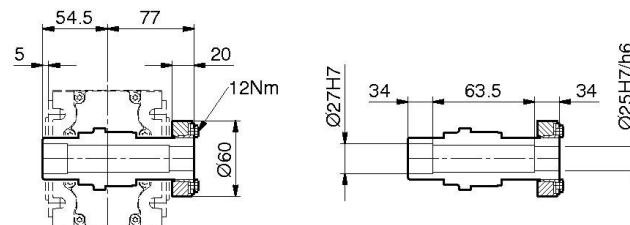
AS



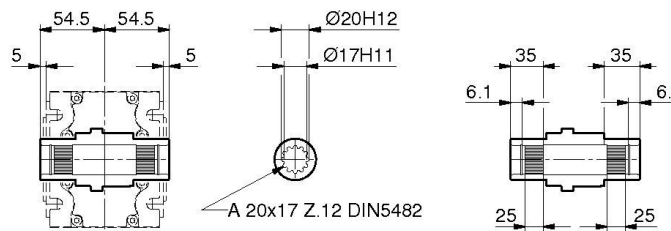
AD



***ACC**



***ACS**

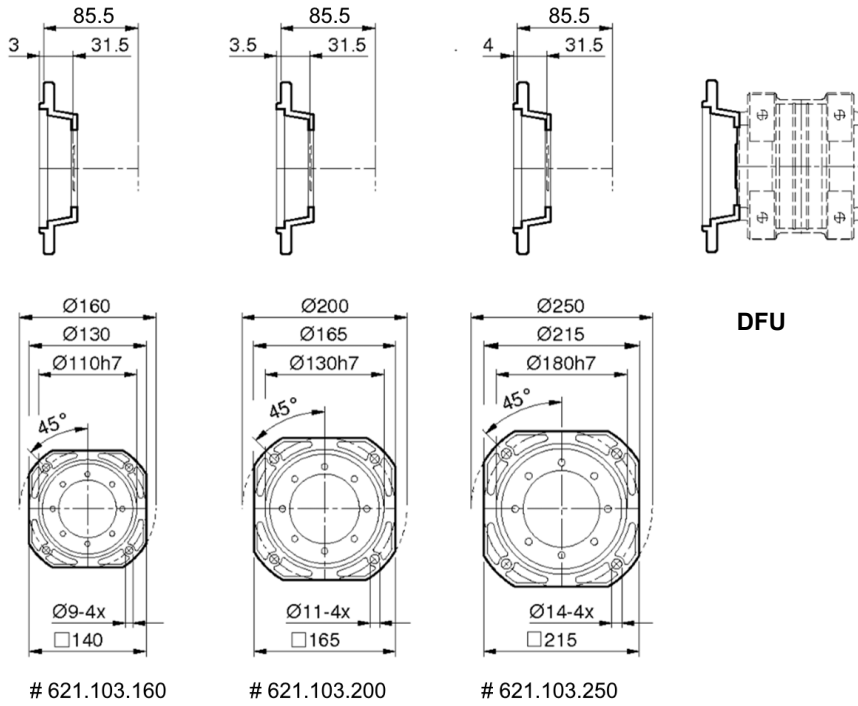


* - ACC and ACS versions on demand
Machine shaft dimensions: pages 52-54

Not binding dimensions and weights

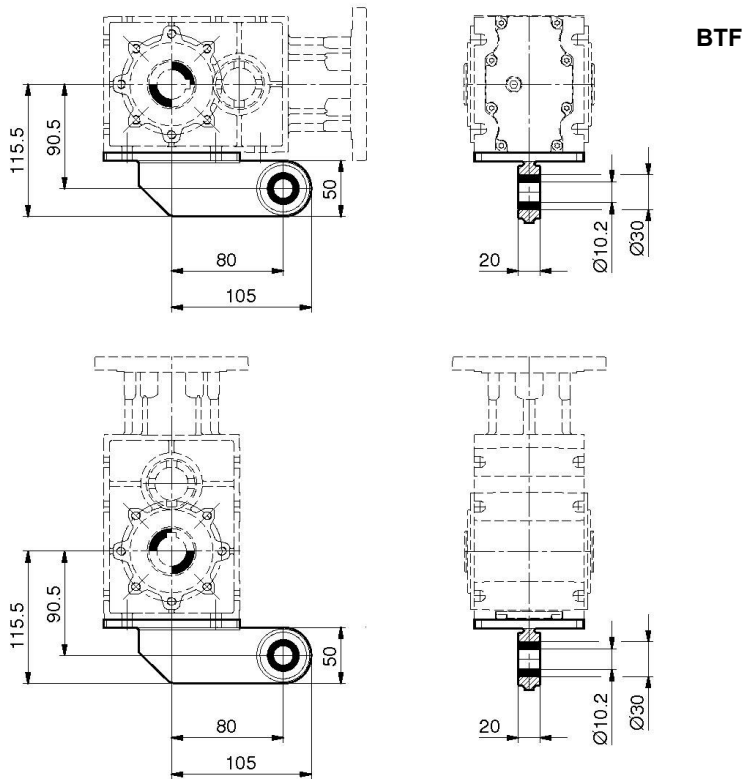
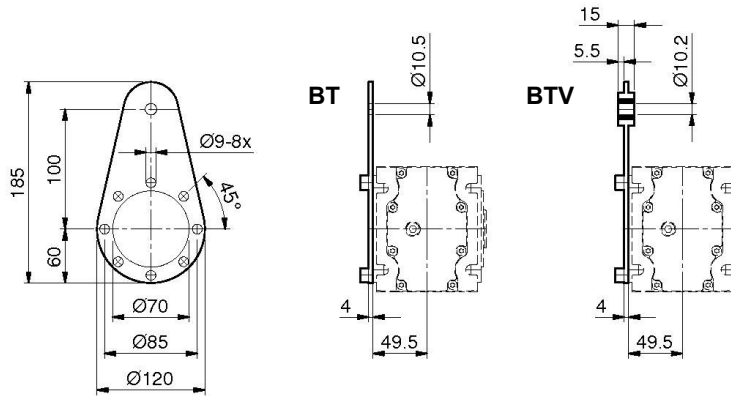


MRO/FRO/RO 02
Output flanges



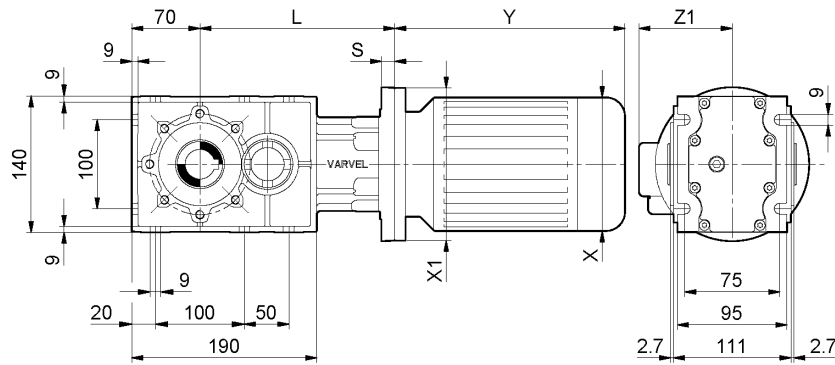
- Flange Part No.
Not binding dimensions and weights

MRO/FRO/RO 02
Torque arms

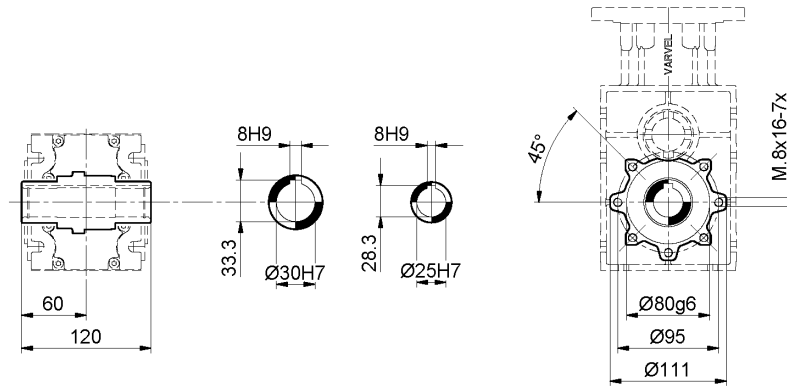


Not binding dimensions and weights

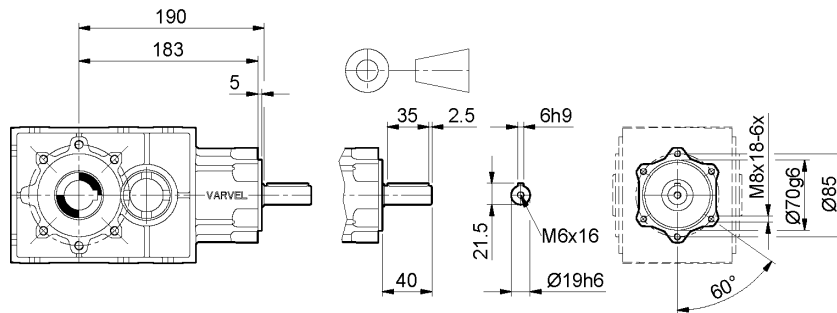
MRO 12
FRO 12
RO 12



MRO12



AC30
AC25

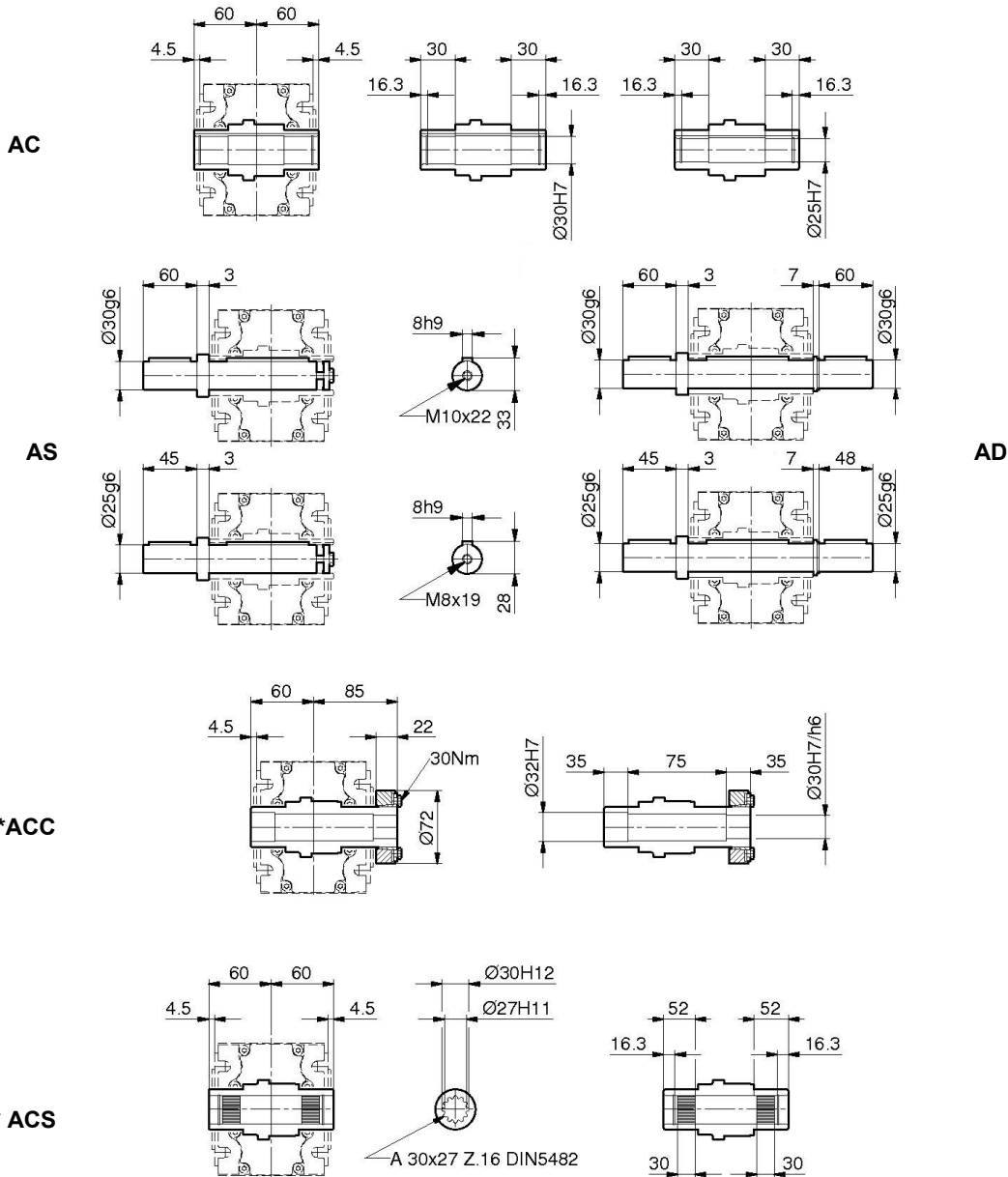


RO12

IEC	63	71	80	90 S	90 L	100	112
X / Y / Z1	123/185/11	140/215/12	159/238/13	176/255/149	176/280/14	195/309/16	219/328/17
X1 (B5) / S	140/17.5	160/15.5	200/15.5	200/15.5	200/15.5	250/16.7	250/16.7
X1 (B14) /	---	105/15.5	120/15.5	140/17.5	140/17.5	160/15.5	160/15.5
L (B5)	200.5	198.5	198.5	198.5	198.5	199.7	199.7
L (B14)	---	198.5	200.5	200.5	200.5	198.5	198.5

Not binding dimensions and weights

MRO/FRO/RO 12
Output shafts

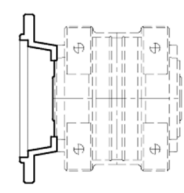
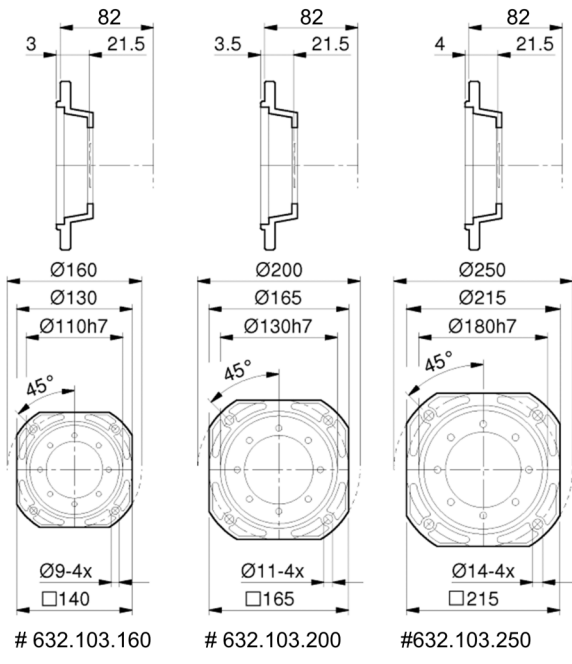


* - ACC and ACS versions on demand
Machine shaft dimensions: pages 52-54

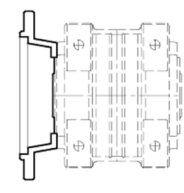
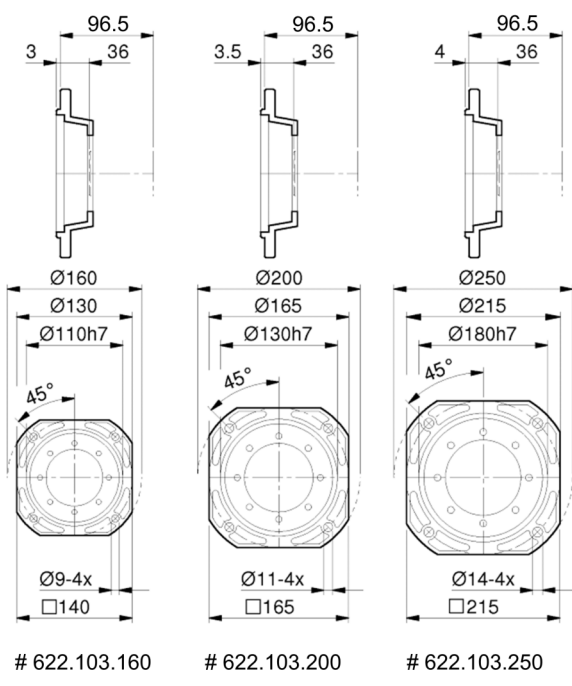
Not binding dimensions and weights



MRO/FRO/RO 12
Output flanges



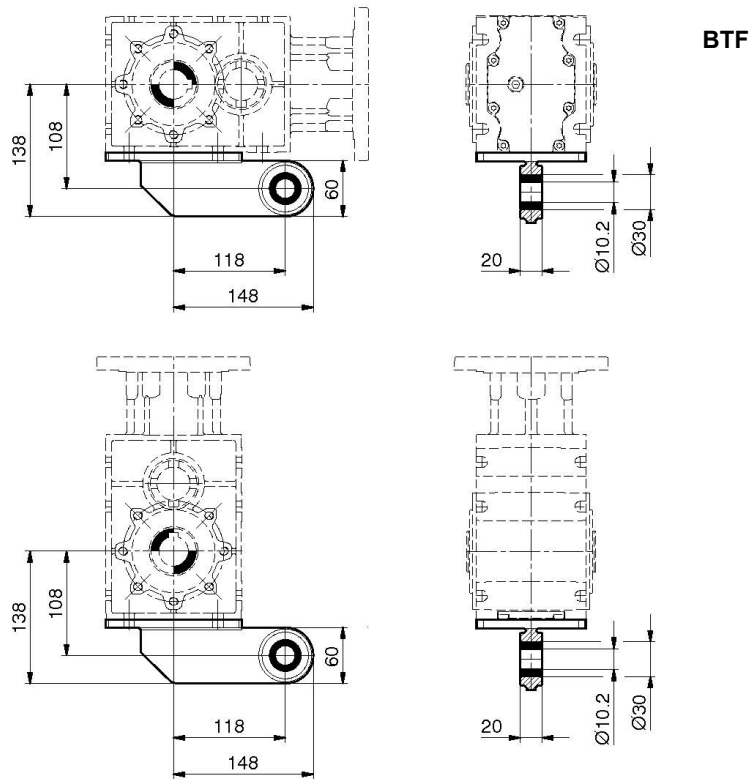
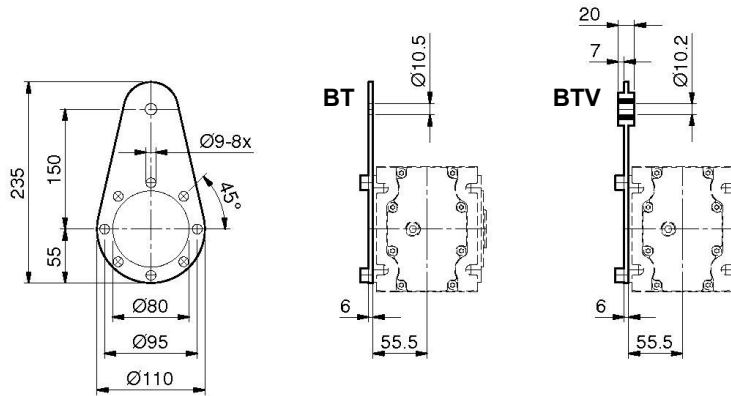
DFU-A



DFU-F

- Flange Part No.
Not binding dimensions and weights

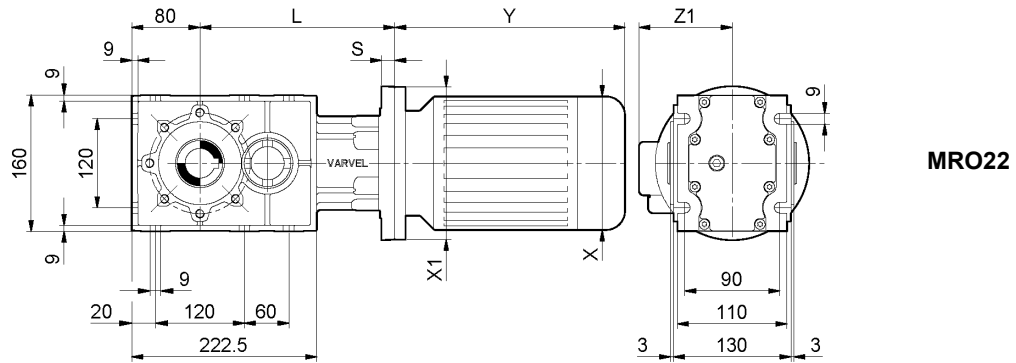
MRO/FRO/RO 12
Torque arms



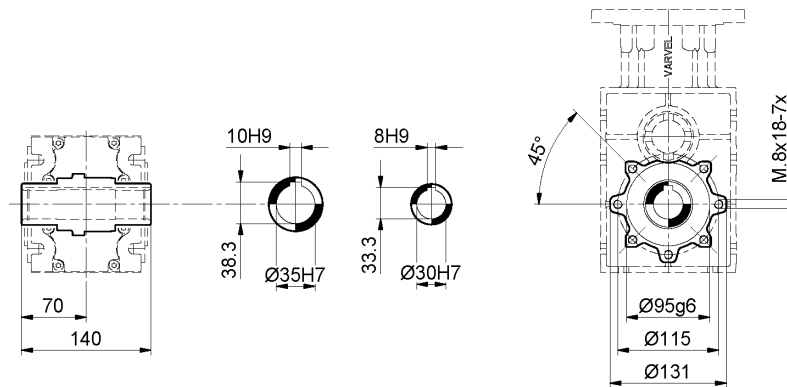
Not binding dimensions and weights



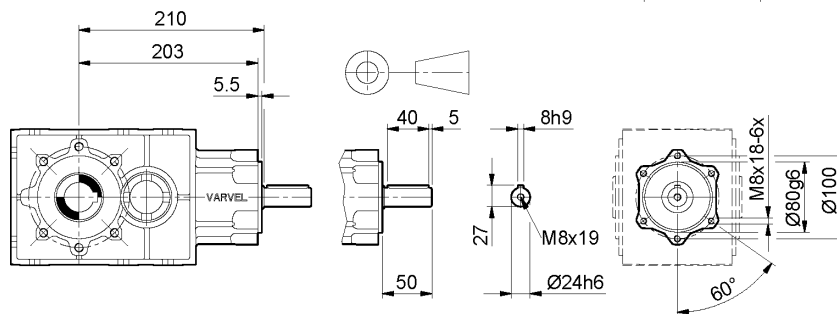
MRO 22
FRO 22
RO 22



MRO22



AC35
AC30

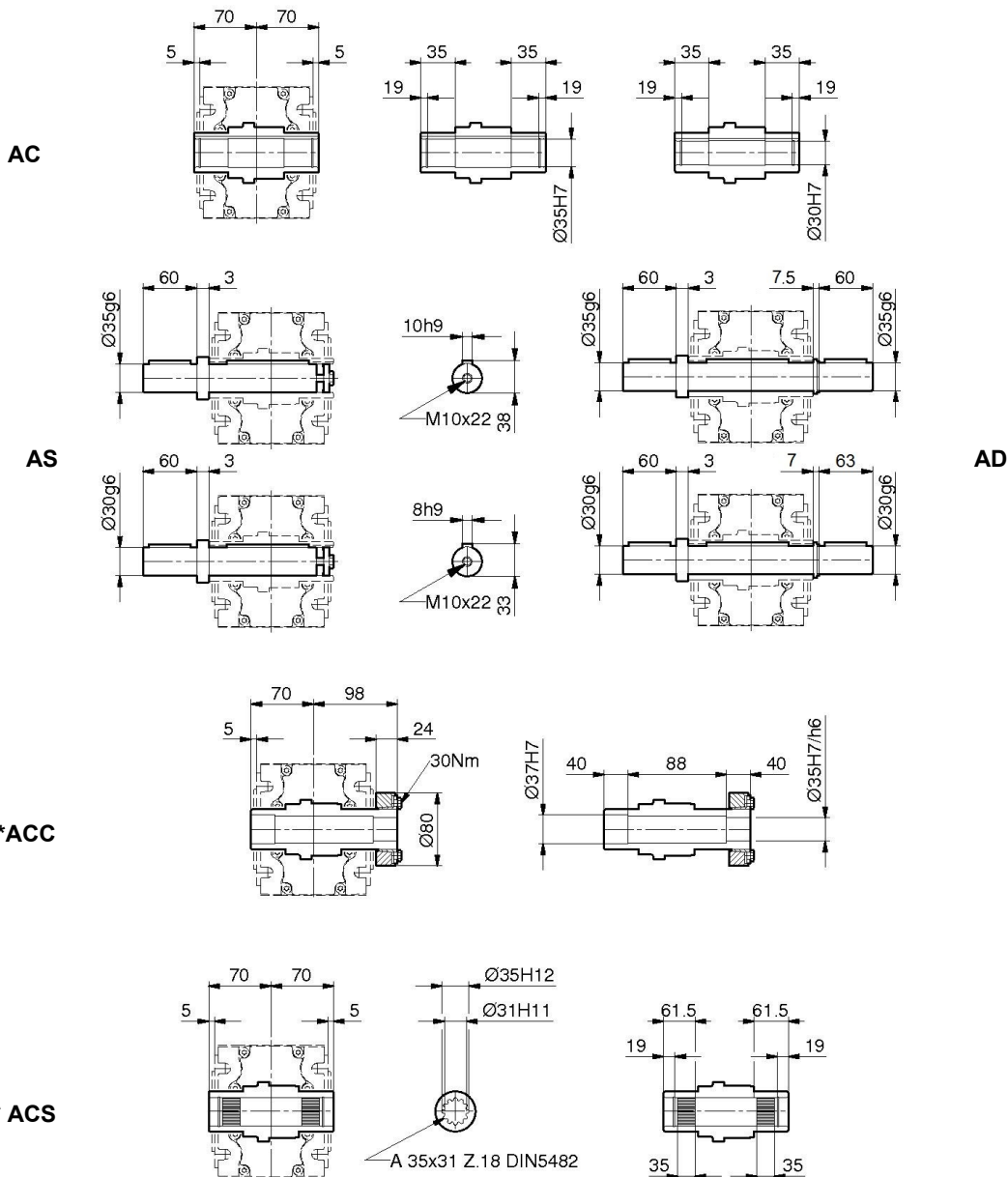


RO22

IEC	63	71	80	90 S	90 L	100	112
X / Y / Z1	123/185/11	140/215/12	159/238/13	176/255/149	176/280/14	195/309/16	219/328/17
X1 (B5) / S	140/18.5	160/15.5	200/15.5	200/15.5	200/15.5	250/16.7	250/16.7
X1 (B14) /	---	---	120/15.5	140/18.5	140/18.5	160/15.5	160/15.5
L (B5)	221.5	218.5	218.5	218.5	218.5	219.7	219.7
L (B14)	---	---	218.5	221.5	221.5	218.5	218.5

Not binding dimensions and weights

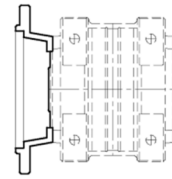
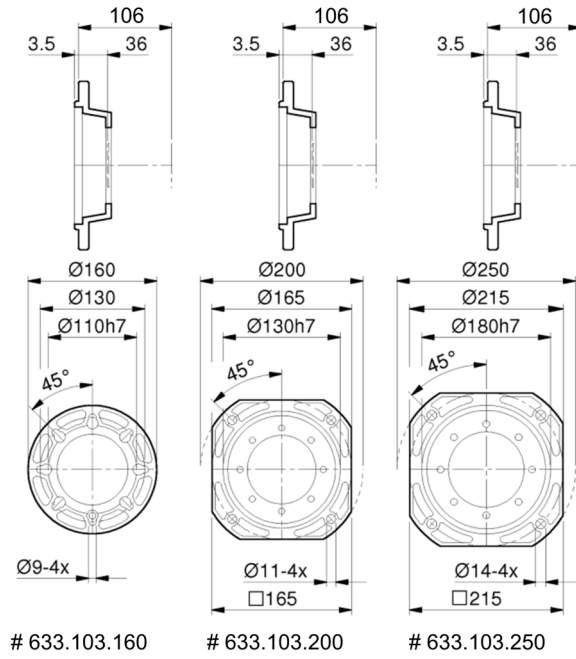
MRO/FRO/RO 22
Output shafts



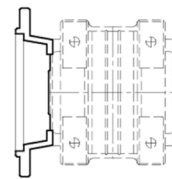
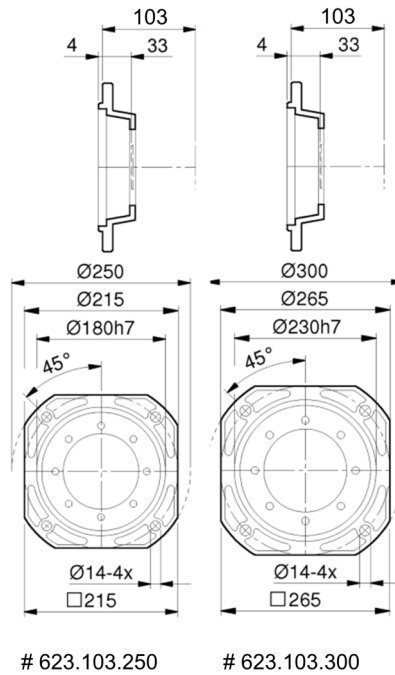
* - ACC and ACS versions on demand
Machine shaft dimensions: pages 52-54

Not binding dimensions and weights

MRO/FRO/RO 22
Output flanges



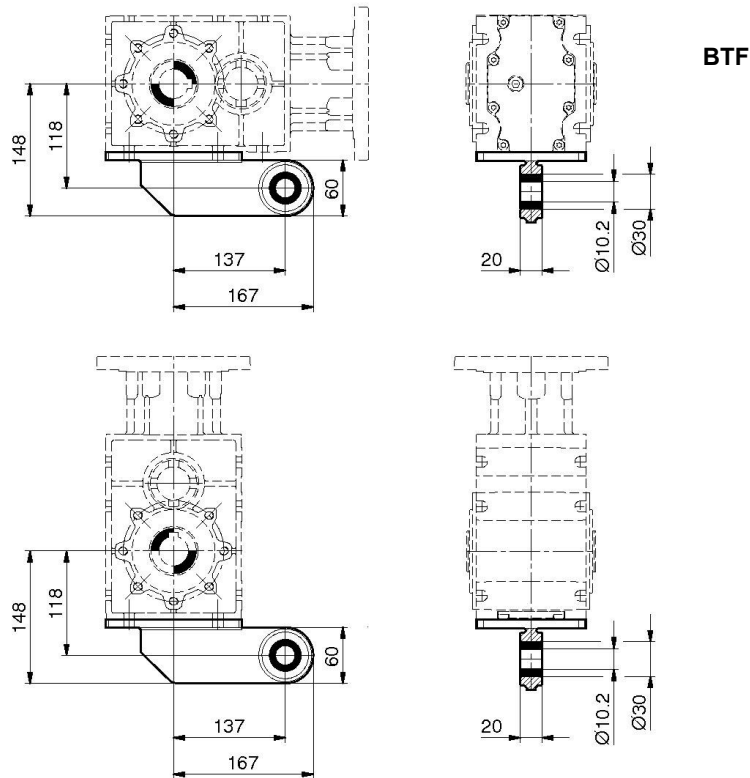
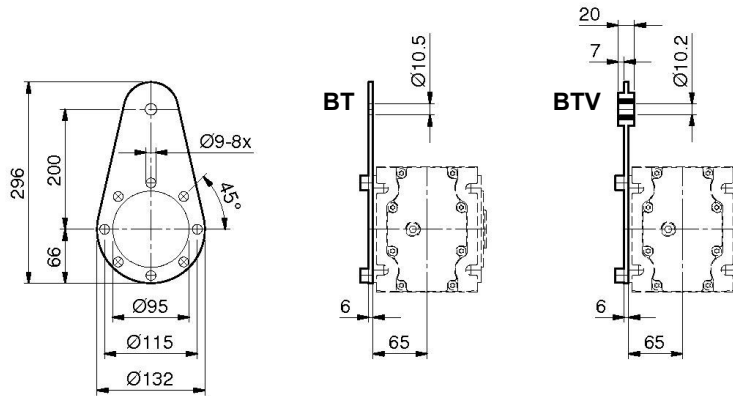
DFU-A



DFU-F

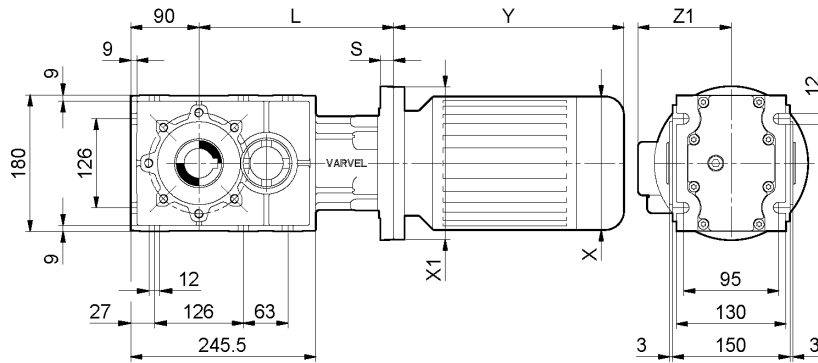
- Flange Part No.
Not binding dimensions and weights

MRO/FRO/RO 22
Torque arms

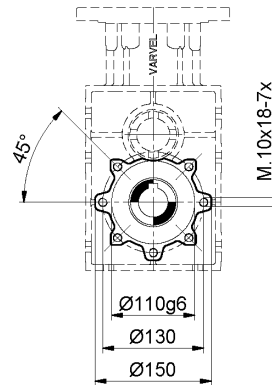
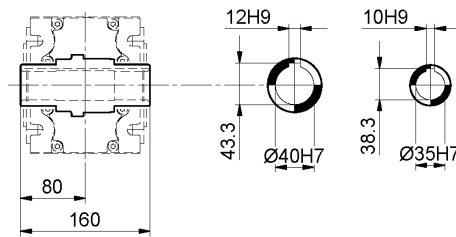


Not binding dimensions and weights

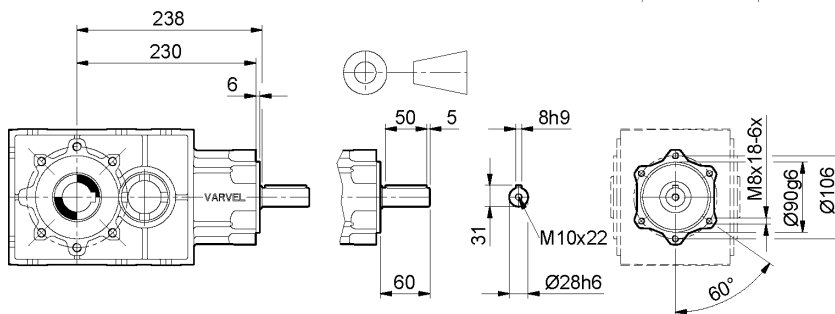
MRO 32
FRO 32
RO 32



MRO32



AC40
AC35

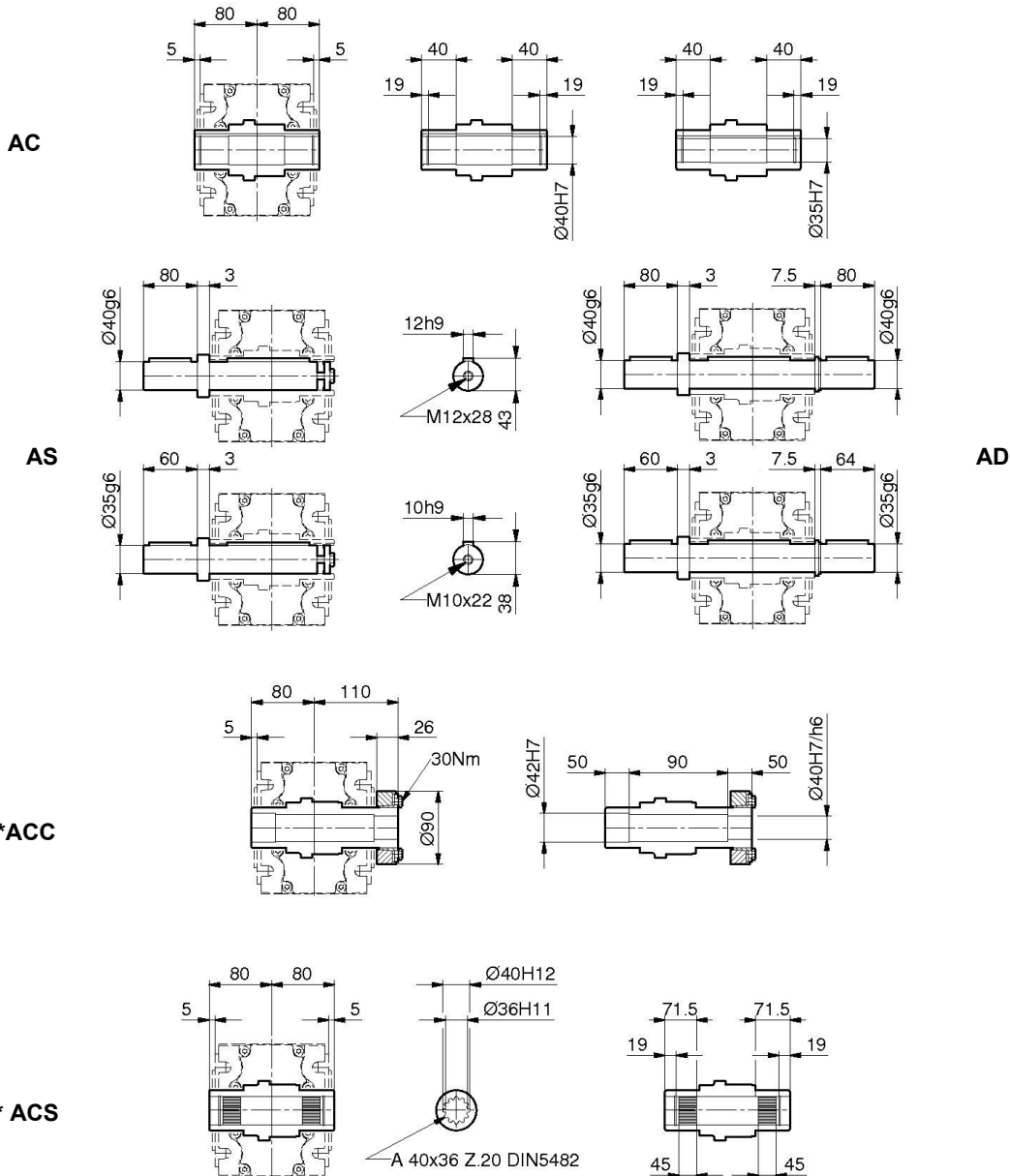


RO32

IEC	71	80	90 S	90 L	100	112	132 S (*)
X / Y / Z1	140/215/12	159/238/13	176/255/14	176/280/149	195/309/16	219/328/17	258/368/19
X1 (B5) / S	160/20	200/18	200/18	200/18	250/18.7	250/18.7	300/18
X1 (B14) /	---	---	---	---	160/20	160/20	200/18
L (B5)	250	248	248	248	248.7	248.7	298.5
L (B14)	---	---	---	---	250	250	298.5

Not binding dimensions and weights

MRO/FRO/RO 32
Output shafts

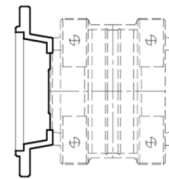
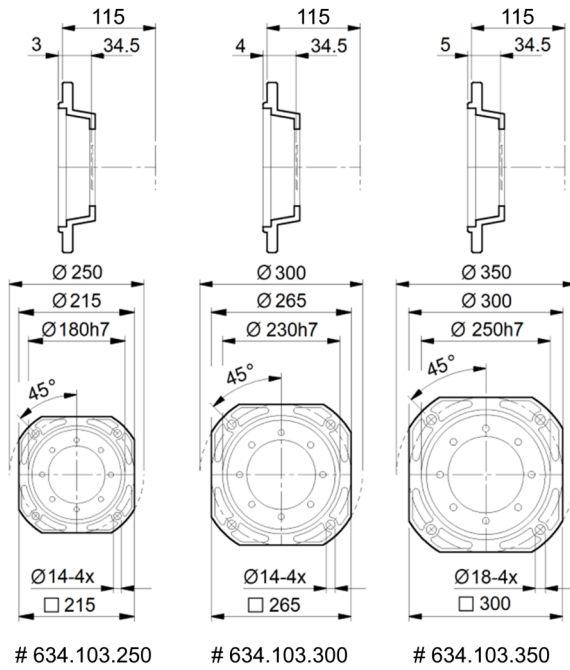


* - ACC and ACS versions on demand
Machine shaft dimensions: pages 52-54

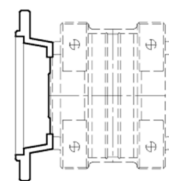
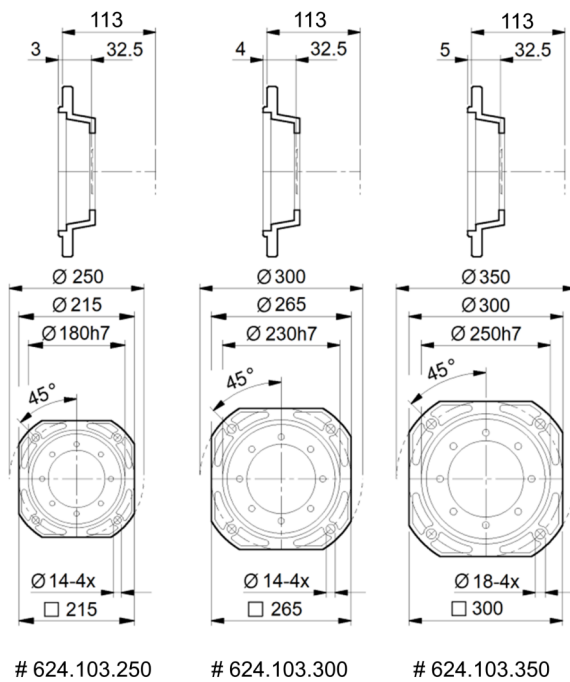
Not binding dimensions and weights



MRO/FRO/RO 32
Output flanges



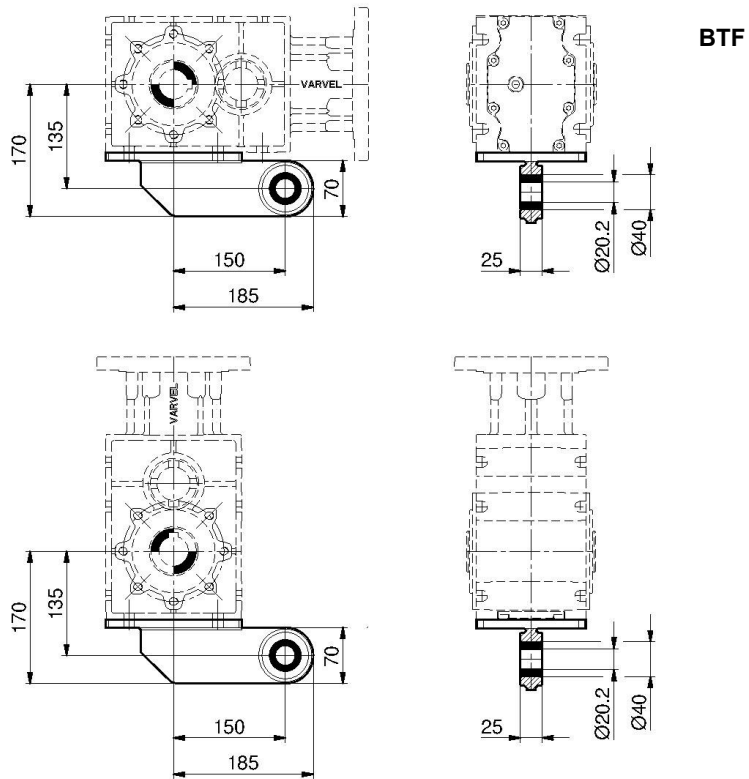
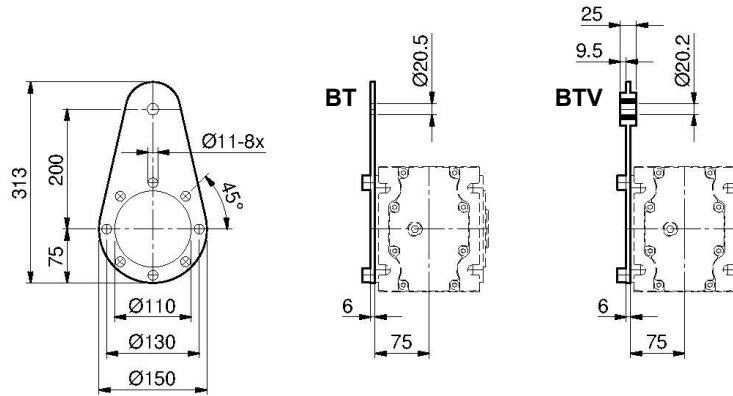
DFU-A



DFU-F

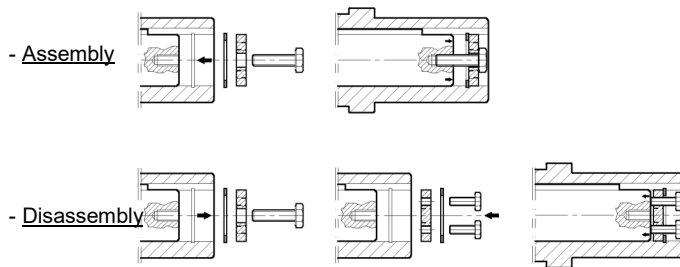
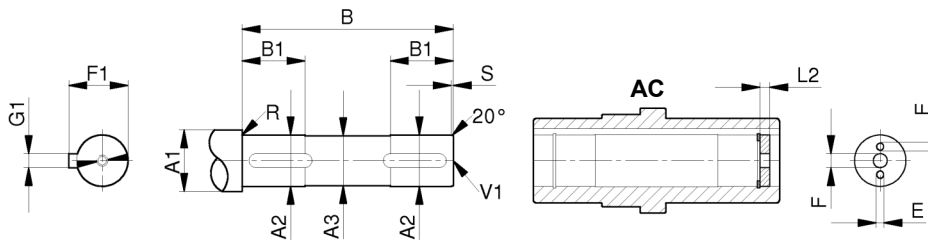
- Flange Part No.
Not binding dimensions and weights

MRO/FRO/RO 32
Torque arms



Not binding dimensions and weights

AC
Hollow output shaft
(standard)

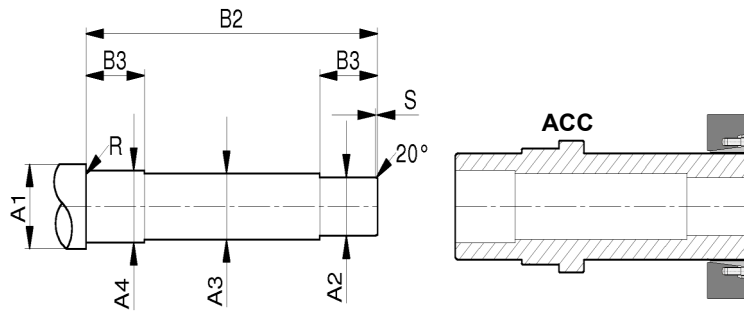


Size	A1	A2	A3	B	B1	E	F	F1	G1	L2	R	S	V1
RO02	35	25	24	98	35	M5	9	28	8	4.5	1	2	M8x19
RO12	40	30	29	98	35	M6	11	33	8	5.5	1	2	M10x22
	35	25	24	98	35	M5	9	28	8	4.5	1	2	M8x19
RO22	45	35	34	113.5	40	M8	11	38	10	7	1	2	M10x22
	40	30	29	113.5	40	M6	11	33	8	7	1	2	M10x22
RO32	50	40	38	133.5	45	M8	13	43	12	7	1	2	M12x28
	35	35	34	133.5	45	M8	11	38	10	7	1	2	M10x22

Not binding dimensions and weights

ACC

Hollow output shaft with shrink-disk
(on demand)



Size	A1	A2	A3	A4	B2	B3	R	S
RO02	35	25	25	27	130.5	33	1	2
RO12	40	30	29	32	144	34	1	2
RO22	45	35	34	37	167	39	1	2
RO32	50	40	39	42	189	49	1	2

The keying device is based on the wedge principle to create a mechanical coupling for interference without the need of a key. Stable shrinkage occurs due to the conversion of axial tightening of the screws into radial contact pressure between the shaft and the hub.

Assembly

Ensure that the contact surfaces of the shaft and hub are cleaned carefully and apply a light layer of oil. Gradually and evenly tighten the screws until the required tightness torque is reached. Avoid using oils that contain molybdenum disulfide, as it causes a significant drop in the coefficient of friction. The hub does not move axially with respect to the shaft during screw tightening.

Disassembly

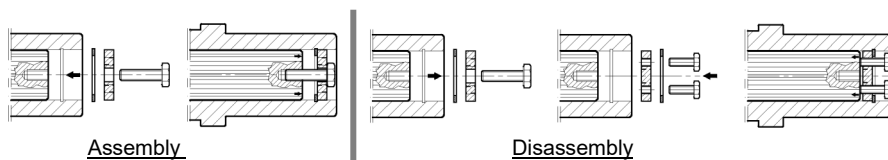
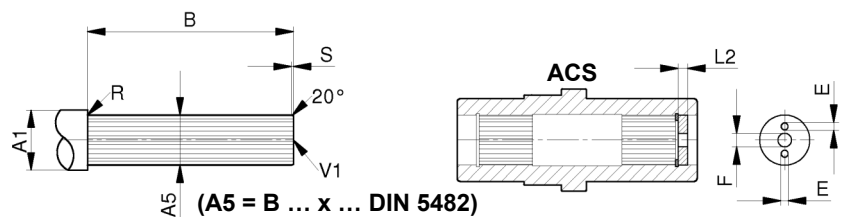
Slowly loosen the screws without removing them from the threads.

To ensure a coefficient of friction of 0.04, apply a lubricant paste to the screws and conical surfaces when reusing them.

Tightening torques, tolerances, and roughness in accordance with manufacturer's specifications.

ACS

Splined hollow output shaft
(on demand)



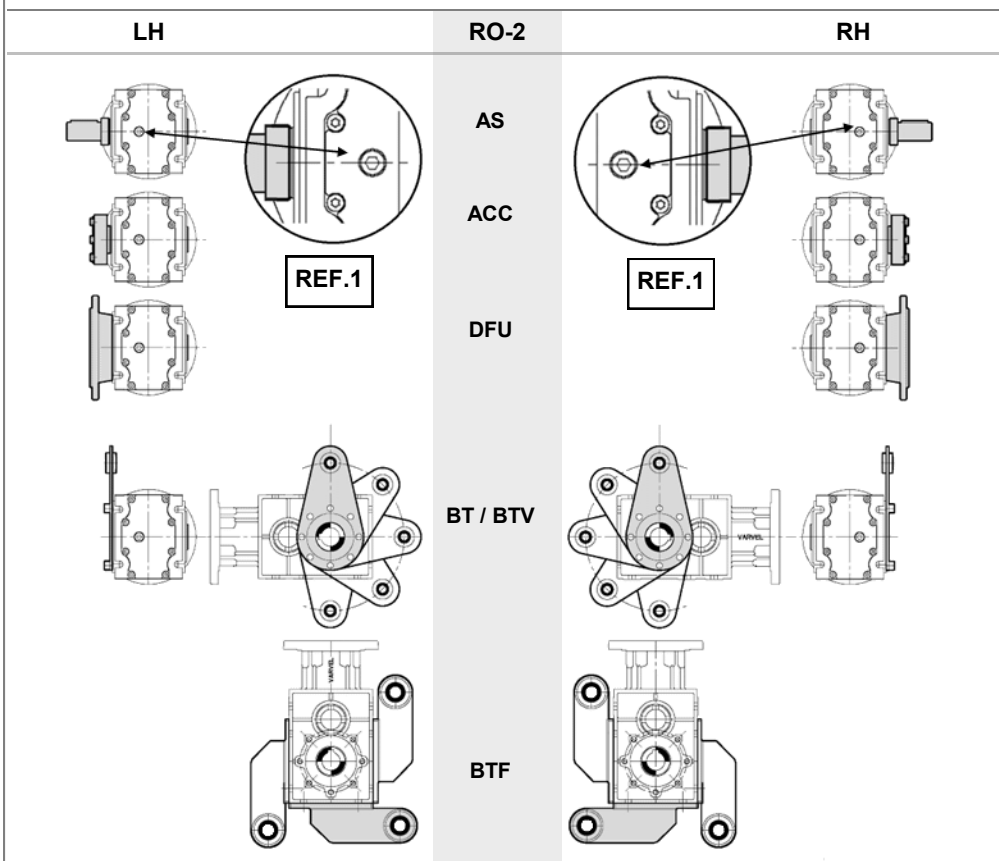
Size	A1	A5	B	E	F	L2	R	S	V1
RO02	35	20x17	98	M4	9	4.5	1	2	M8x19
RO12	40	30x27	98	M6	11	5.5	1	2	M8x19
RO22	45	35x31	113.5	M8	11	7	1	2	M10x22
RO32	50	40x36	133.5	M8	13	7	1	2	M10x22

The spined shafts have teeth that mesh with the corresponding grooves of a coupler piece and transfer the torque, while maintaining the angular correspondence between them.

The grooves can offer greater torque and a longer fatigue life as an alternative to the hollow/key connection.

Not binding dimensions and weights

AS - ACC - F - BT - BTV - BTF
Accessory position



The accessories in the working positions RH and LH refer to the mounting position H1 on p. 12 and are seen from the cover of the lower side of the reducer.

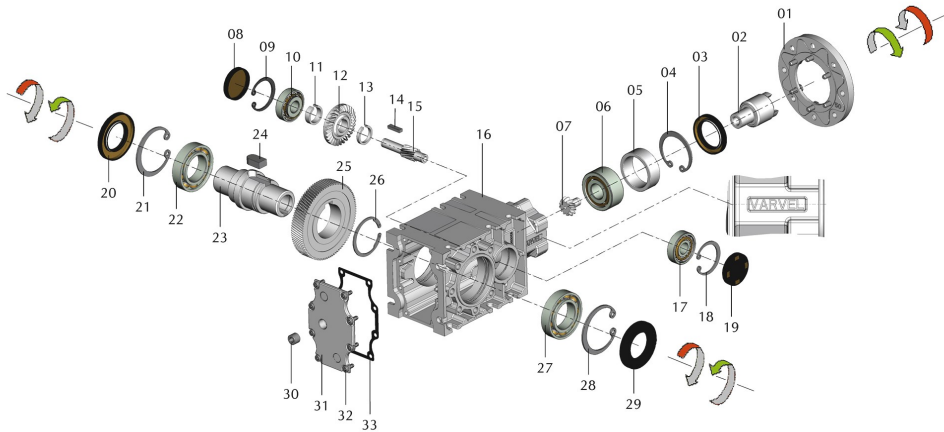
The side of the casing with the oil plug (REF.1) is the exact identification of the reference side of the cover.

The order remains pending until the RH or LH side is determined if the accessory must be factory-mounted.

For BT-BTV-BTF accessories and other mounting positions, please refer to Customer Service.

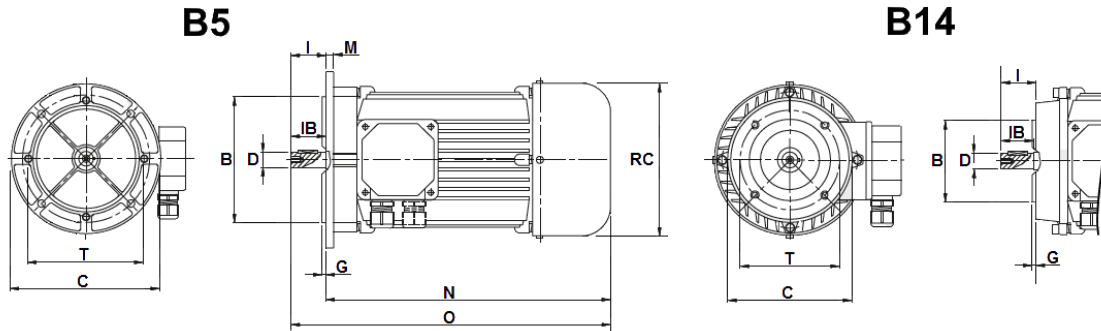
The standard accessory positions are indicated with grey highlights.

Component parts Rotation



Item	Description	Item	Description
01	Motor flange	18	Snap ring
02	Input shaft	19	Oil seal
03	Oil seal	20	Oil seal
04	Snap ring	21	Snap ring
05	Spacer	22	Bearing
06	Bearing	23	Output shaft
07	Conical pinion	24	Key
08	Oil seal	25	Gear
09	Snap ring	26	Snap ring
10	Bearing	27	Bearing
11	Spacer	28	Snap ring
12	Conical gear	29	Oil seal
13	Spacer	30	Plug
14	Key	31	Cover
15	Pinion	32	Screw
16	Housing	33	Gasket
17	Bearing		

Motors



Size	2 - poles 2800 rpm		4 - poles 1400 rpm		6 - poles 900 rpm		Flange B / C / T	Shaft D x l	G	IB	N	O
	kW	kg	kW	kg	kW	kg						
T56A T56B	0.09 0,12	2.6 3.0	0.06 0.09	2.9 3.2	---	---	B5 - 120 / 100 / 80 B14- 80 / 65 / 50	9 x 20	3.0 2.5	20	176	196
T63A T63B T63C	0.18 0.25 0.37	4.0 4.2 4.7	0.12 0.18 0.25	3.7 4.2 4.7	0.09 0.12 ---	4.2 4.5 ---	B5 - 140 / 115 / 95 B14- 90 / 75 / 60	11 x 23	3.0 2.5	23	197	220
T71A T71B T71C	0.37 0.55 0.75	5.2 6.0 7.0	0.25 0.37 0.55	5.0 5.8 6.5	0.18 0.25 0.37	5.6 6.0 6.5	B5 - 160 / 130 / 110 B14- 105 / 85 / 70	14 x 30	3.5 2.5	30	211	241
T80A T80B T80C	0.75 1.1 1.5	8.7 10 11.2	0.55 0.75 1.1	8.1 9.1 11	0.37 0.55 0.75	6.8 9.6 10	B5 - 200 / 165 / 130 B14- 120 / 100 / 80	19 x 40	3.5 3.0	40	250	290
T90S T90L T90LB	1.5 2.2 3	12 14.5 15	1.1 1.5 2.2	11.7 14.4 17.6	0.75 1.1 1.5	11.3 14.4 15.5	B5 - 200 / 165 / 130 B14- 140 / 115 / 95	24 x 50	3.5 3.0	50	262 287	312 337
T100A T100B	3 4	20 24	2.2 3	17.6 22.5	1.5 2.2	18.8 19.8	B5 - 250 / 215 / 180 B14- 160 / 130 / 110	28 x 60	4.0 3.5	60	309	369
T112A T112MC	5.5 7.5	29.3 34	4 5.5	29 35.7	3 ---	30 ---	B5 - 250 / 215 / 180 B14- 160 / 130 / 110	28 x 60	4.0 3.5	60	335	395
T132S T132M T132ML T132MC	7.5 9.2 11 ---	38.4 48.2 52.5 ---	5.5 7.5 9.2 11	39 48.5 56.5 64	4.5 5 7.5 ---	47.6 50.7 47 ---	B5 - 300 / 265 / 230 B14- 200 / 165 / 130	38 x 80	4.0 4.0 ---	80	357 395 421	437 475 501
T160M T160L T160MC	15 18.5 22	77.5 92 107	11 15 18.5	73 88.5 97.5	7.5 11 15	70.0 87.0 124	B5 - 350 / 300 / 250 B14- 250 / 215 / 180	42 x 110	5.0 4.0	110	530	640
T180M T180L	22 ---	121 ---	18.5 22	118 128	15 ---	124 ---	B5 - 350 / 300 / 250	48 x 110	5.0	110	620	730

Not binding dimensions and weights

ATEX

Directive 2014/34/UE
Regulation 2016/1107/UK

The European Directive 2014/34/EC-ATEX relates not only to electric devices but to all the machines and driving units destined, alone or combined, to operate in potentially explosive environments within European Community territory.

The gearboxes are identified as «components» in the Directive and therefore, deprived of their autonomous function but essential for the operation of equipment and protective systems intended for production, transport, storage, measurement, adjustment and conversion of energy and transformation of materials that, due to their own flammability potential, are likely to trigger an explosion.

The gearboxes VARVEL-ATEX are manufactured

- with metallic housings and covers, containing the driving gears fitted on ball or roller bearings;
- FKM-Fluor-elastomer (Viton) oil seals on input and output shafts;
- the needed oil quantity to ensure the unit operation;
- sealed thread screws with sealing paste.

VARVEL RO-2 Series conforms to design directions required for

- Group II
- Category 2 and 3
 - zones 1 and 2 for operation in zones with risk of explosion in presence of gas
 - zones 21 and 22 for operation in zones with risk of explosion in presence of combustible dust

The VARVEL-ATEX products are marked for the
- key/keyway input version

   II 2 G Ex h IIC T4 Gb IP66 T_{amb} -20 /+55°C
II 2 D Ex h IIIC T135°C Db IP66 T_{amb} -20 /+55°C

key to ATEX Code

- II - group II (surface industries)
- 2, 3 - category (2, 3)
- G, D - explosive environment (gas, dust)
- Ex h - mode of protection
- IIC, IIIC - group of explosion (gas, dust)
- T4 - class of temperature (gas)
- T 135°C - max. temperature of surface (dust)
- Gb, Db - EPL - Explosion Protection Level (gas, dust)
- IP66 - protection of gearbox
- T_{amb} - ambient temperature -20 /+55°C

Attention !

VARVEL-ATEX gearboxes
are not certified for operation in hatched areas.

Substances	Zones	Categories	EPL	Key code	
Gas, Vapours, Cloud	0	1G	Ga	Zona	0 Continuous occurrence of explosive gas
	1	2G	Gb		1 Occasional occurrence of explosive gas
	2	3G	Gc		2 Unlikely occurrence of explosive gas
Dusti	20	1D	Da		20 Continuous occurrence of explosive dust
	21	2D	Db		21 Occasional occurrence of explosive dust
	22	3D	Dc		22 Unlikely occurrence of explosive
EPL - Equipment Protection Level				1G, 1D	Equipment with very high protection level
				2G, 2D	Equipment with high protection level
				3G, 3D	Equipment with normal protection level
				Ga, Da	Very high level of protection
				Gb, Db	High level of protection
				Gc, Dc	Normal level of protection

Note - Gases with ignition temperature higher than or equal to Class T4=135 °C are listed on the following table.

Temperature / Group	T1 450 °C	T2 300 °C	T3 200 °C	T4 135 °C	T5 100 °C	T6 85 °C
I	*Natural gas (Firedamp)					
II A	Ethyl acetate Methyl acetate Acetone Acetic acid Methyl acid Ammonia Benzene Benzol Chlorine methylene Chlorine ethylene Ethane Methane Methanol Carbon monoxide Naphthalene Propane Toluene Xylene	Butyl acetate Propyl acetate Amyl alcohol Ethyl alcohol Isobutyl alcohol Methyl alcohol n-butyl alcohol Acetic anhydride Cyclohexanone Liquefied petroleum gas Natural gas Isopropanol Mono amyl acetate n-Butane	Cyclohexane Cyclohexane Decane Heptane Hexane Gasoil Kerosene Naphtha Pentane Oil **	Acetaldehyde Ethylic ether		
II B	Coke gas Water gas	1.3-butadiene Ethyl benzene Ethylene Ethylene oxide	Hydrogen sulphide Isoprene Oil **	Ethylic ether		
II C	Hydrogen	Acetylene				Ethyl nitrate Carbon sulphide

** - In funzione della composizione chimica

INSTRUCTIONS FOR USE AND MAINTENANCE

(complete manual on www.varvel.com)

According to the Machinery Directive 2014/34/EC and its Guideline, gearboxes and speed variators are considered "separate elements of machines that do not have a specific application and are intended to be incorporated into the machine. The complete machine equipped with these components must meet the relevant essential health and safety requirements" of the Directive.

Installation

Ensure that the unit to be installed has the characteristics required to perform the required function and that the mounting position is consistent with the order. These characteristics can be deduced from the identification plate on the gearbox. Verify the mounting stability so that no vibration or overload occurs during operation.

Operation

The reducer can be connected by clockwise or counterclockwise rotation. Stop the gearbox immediately in the event of faulty operation or abnormal noise, remove the defect or return the unit to the factory for proper overhaul. If the defective part is not replaced, other components can also be damaged, resulting in further damage and less chance of tracing the causes.

Maintenance

Although the assemblies are tested without loading before shipment, it is advisable not to use them at maximum load during the first 20-30 hours of operation so that the internal parts can adapt to each other. The gearboxes are shipped already filled with long-life synthetic oil and, if it is necessary to replace or top up the lubricant, do not mix synthetic-based oils with mineral-based oils.

Handling

In the case of lifting with a hoist, use the hooking positions on the structure of the body, where they exist, holes in the feet or on the flanges, avoiding all moving parts.

Painting

If the units have to be subjected to a painting process, the sealing rings, the coupling planes and the protruding shafts must be carefully protected.

Prolonged storage in stock

For stays longer than three months, the application of antioxidants on external shafts and machined surfaces, and of protective grease on the lips of oil seals is considered.

Environmental Management of the product

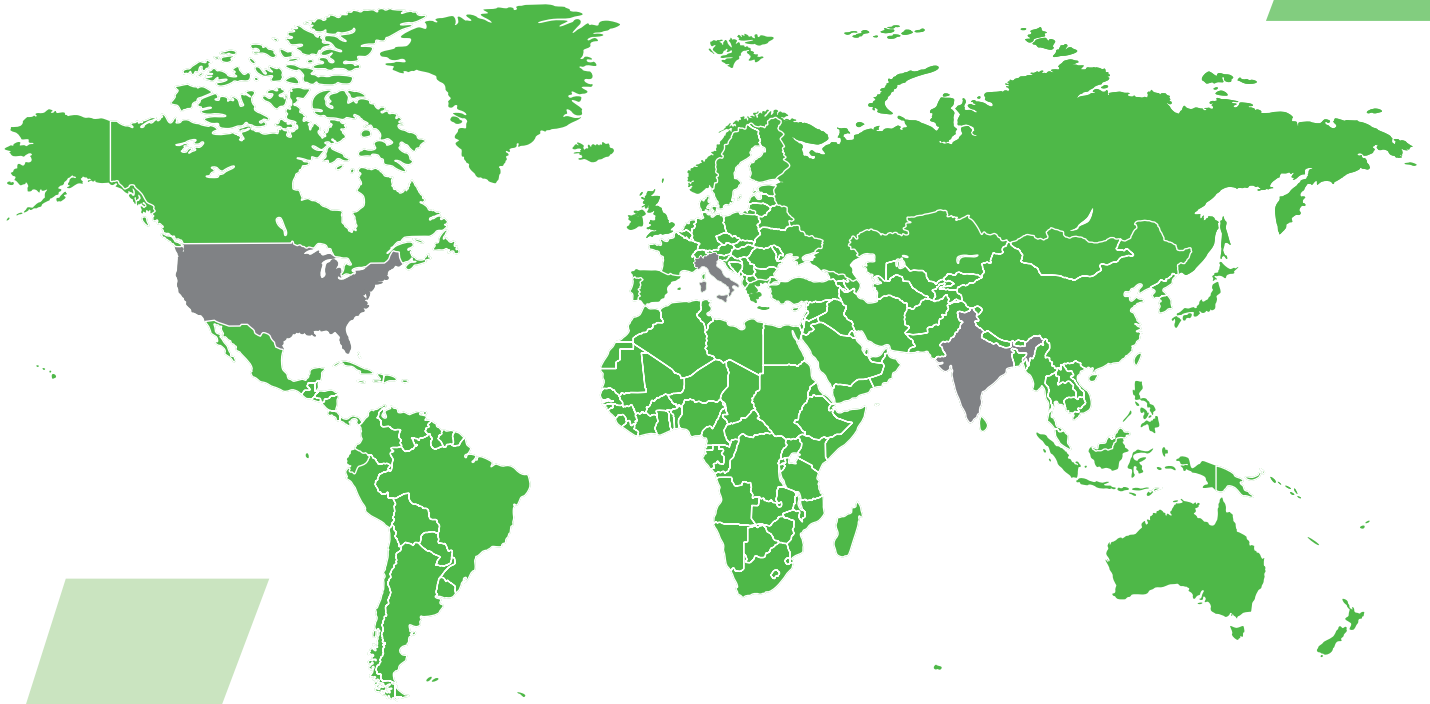
In accordance with the ISO 14001 Environmental Certification, the following indications are suggested for the disposal of our product:

- the metal components of the unit being scrapped to be delivered to authorised collection centres for metallic materials;
- the oils and lubricants collected by the unit to be disposed of and delivered to the Consortia Waste Oils;
- the packaging of the units (pallets, cardboard, paper, plastic, etc.) to be sent as far as possible to recovery/ recycling, delivering them to authorized companies for the individual waste classes.

Disclaimer

This catalogue cancels and replaces the previous ones.
Dimensions and weights are not binding.
VARVEL reserves the right to make changes without notice.
Reproduction, even partial, is prohibited without prior authorization.

D00-RO2-STD-en-ED04-REV00



2 Filiali estere in India e USA

Foreign subsidiaries, one in India, one in the USA
Auslandsfilialen: in Indien und in den USA



60 Oltre 60 anni di storia e successi internazionali

Over 60 years of history and international success
Über 60 Jahre Unternehmensgeschichte und internationale



100 Rete globale con oltre 100 partner commerciali

A global network with over 100 commercial partners
Globales Vertriebsnetz mit mehr als 100 Handelspartnern

India subsidiary:

MGM-VARVEL Power Transimission Pvt Ltd

Warehouse N. G3 and G4 | Ground Floor

Indus Valley's Logistic Park | Unit 3

Mel Ayanambakkam Vellala Street

Chennai - 600 095 | Tamil Nadu | INDIA

info@mgmvarvelindia.com

www.mgmvarvelindia.com

USA subsidiary:

VARVEL USA LLC

2815 Colonnades Court

Peachtree Corners, GA 30071 | USA

T 770-217-4567 | F 770-255-1978

info@varvelusa.com

www.varvelusa.com



VARVEL SpA | Via 2 Agosto 1980, 9 | Loc. Crespellano | 40053 Valsamoggia (BO)
Italy | T+39 051 6721811 | F +39 051 6721825 | varvel@varvel.com

www.varvel.com

