RS-RT

WORM GEAR BOXES
- single-stage worm
- helical / worm
- two-stage worm

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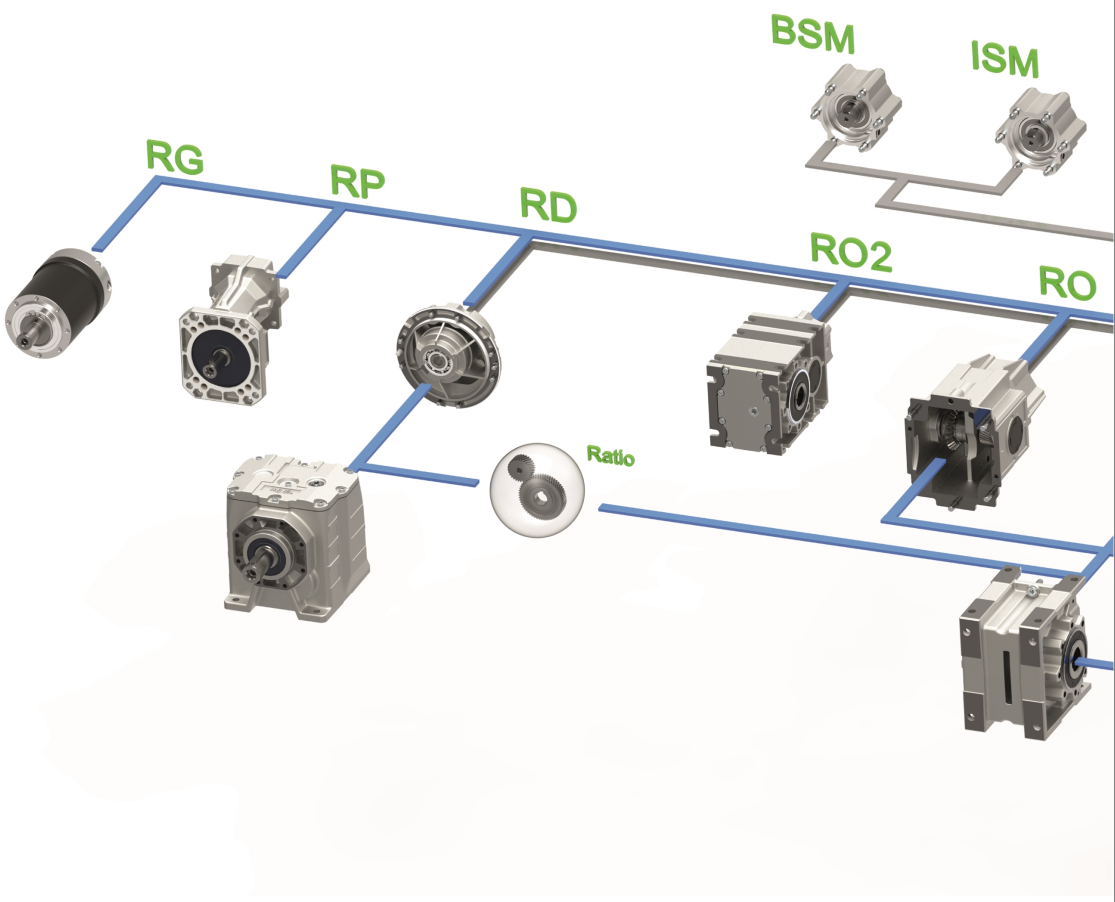
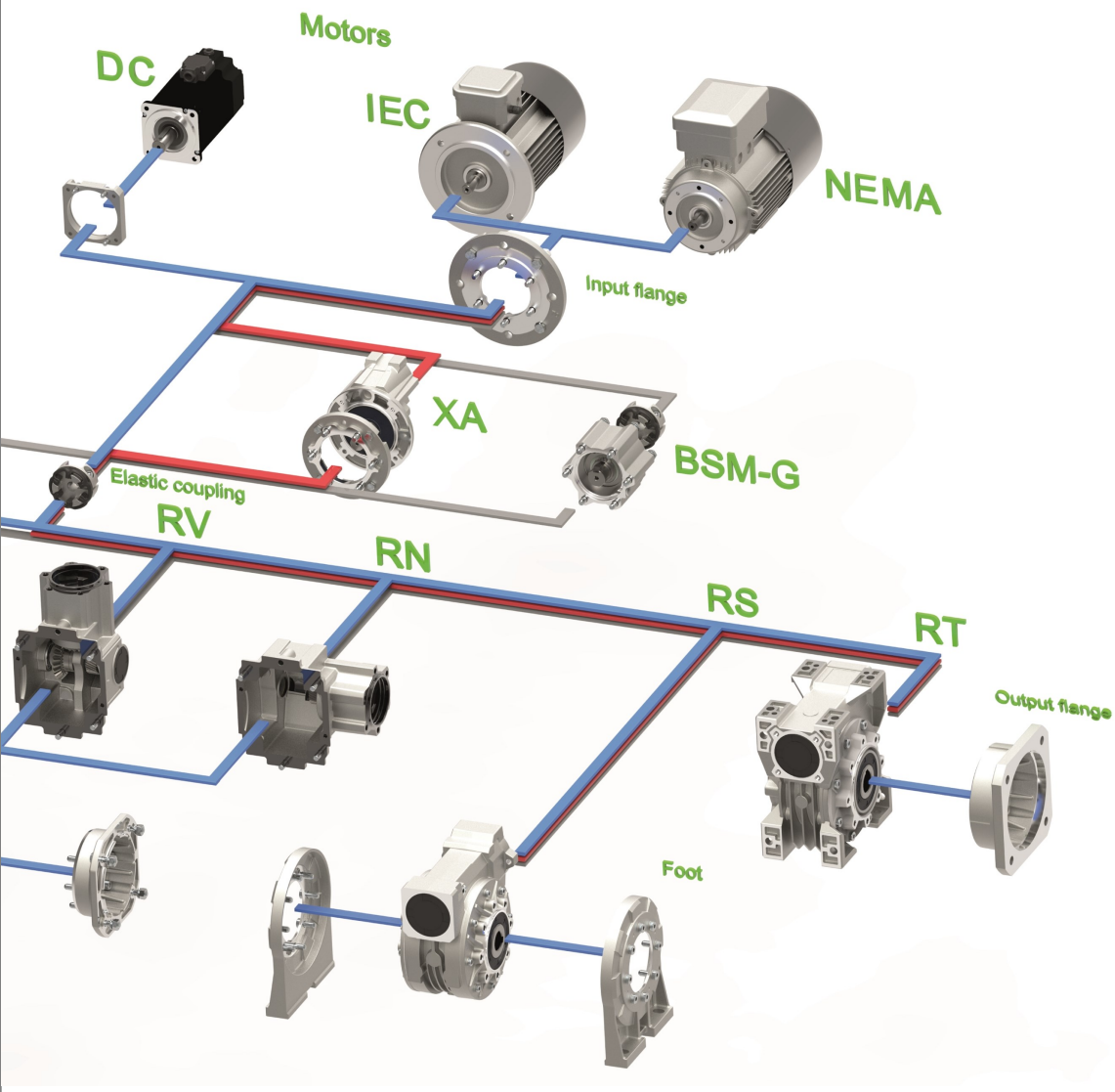
Modular System



Modularity
Modularity and flexibility have been leading the design of VARVEL products since the years 2000 thus allowing the availability of gearboxes in kit form with assembly in a few minutes using normal equipment. This feature provides the highest flexibility to VARVEL's distributors and resellers who, thanks to a limited kit selection, are able to immediately configure the required product.



Selection wizard

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

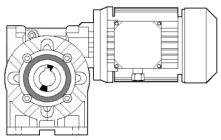
2D/3D Drawings
A guided selection lets 2D/3D models downloaded for the most popular CAD systems.

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

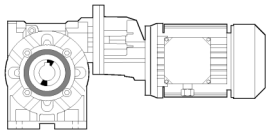
Single-stage worm gearboxes
RS and RT gearboxes have same performance data and reduction ratios but allow different spatial layout and fittings suitable to most applications
The gearboxes are made as standard for the mounting of various motor adapters and couplings, and either sides allow feet, output flanges and torque arm easy fitting.

RS
RT



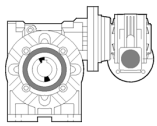
Helical/worm gearboxes
RA and TA gearboxes are made of an independent single-stage helical gearbox FXA fitted on a standard FRS or FRT gearbox input, allowing greater output torques and higher efficiency than the single-stage FRS or FRT gearbox with equivalent ratio.

RA
TA



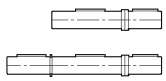
Two-stage worm gearboxes
RS/RS and RT/RT gearboxes are made of two standard gearboxes RS or RT combination and offer a full selection of high reduction ratios to get even lower output speeds.
Both gearboxes are independently lubricated with synthetic long-life oil.

RS/RS
RT/RT



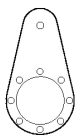
Output shafts
All gearboxes are manufactured with hollow output shaft as standard.
Steel single AS or double AD solid output shafts can be supplied on demand. An ASC safety shield fitted on the opposite side of the AS extension. is available on demand.

AS
AD



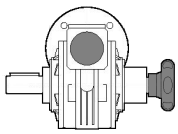
Torque arms
Gearbox basic versions work as shaft mounted units.
The torque arm - BR and BT plain version, or BRV and BTV with Vulkollan vibration-damping bushing - is made of white galvanized extra thick plate.

BR-BRV
BT-BTV

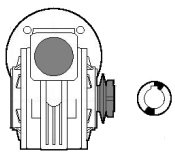


Torque limiters
The torque limiter and safeguard device - TLI built-in type and TLE kit-pack to fit on a regular gearbox - allows easy torque adjustments, full gearbox safeguard against unexpected overload conditions, simple hand release and manual operation in case of power supply failure.
The factory preset maximum slipping torque can be adjusted down to zero.
Shaft rotation restarts automatically as soon as torque value is lower than the preset value.
TLI oil quantity are listed at pages 48 and 56.

TLE

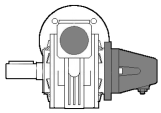


TLI



RS   RT

Travel limiters
SL travel limiter halts, by the means of internal limit switches, the gearbox operation after a preset period of time. As standard, 40 turns of output shaft are performed. Limit switch travel can be adjusted and gearbox working time ranges from 12 to 170 seconds according to reduction ratios

SL 

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 (see page 12).

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.

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 70-71.

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

Description, Useful formula

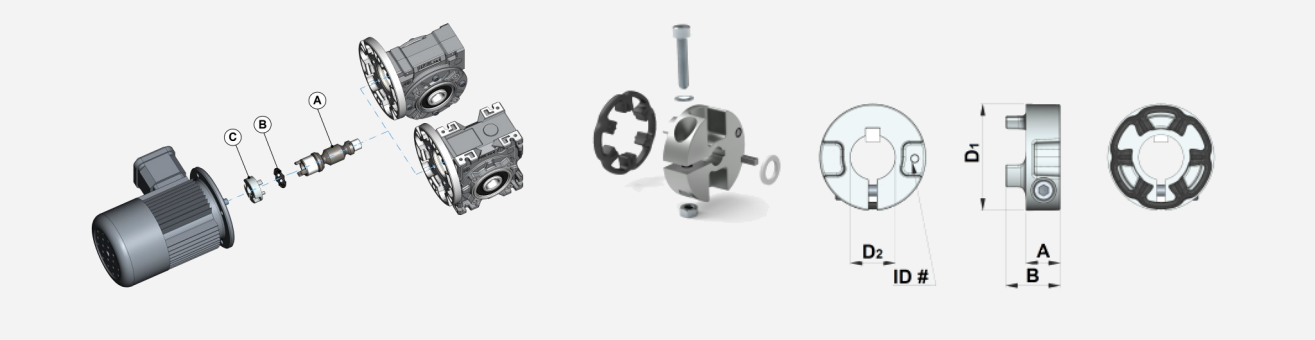
General specifications	
Range	Sizes: RS (9) - RT (7) 55 ratios 3020 Nm max. output torque
Sizing	According to BS721.
Housing, Covers	Pressure die cast aluminium up to size 85 Cast iron from size 110
GCoupling	Pressure die cast aluminium Steel, on demand
Toothed parts	Worms of CH steel with ground tooth profile. Wheels of bronze on cast iron hub.
Bearings	Ball- or roller-types according to sizes and technical requirements
Oil seals	NBR - Nitril-Butadiene Rubber VI - Viton on demand SI - Silicone on demand
Lubricant	Synthetic long-life oil Grade ISO VG 320
Painting	Raw aluminium until size 85 Epoxy powder paint Standard colour RAL 7012 from size 110
Protection grade	IP66 - Gearbox body only IP20 - Gearbox body with flanges and adapters: Increased grades on demand
ATEX	On demand

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

Types, Symbols

Types	
AC	Hollow output shaft
AD, AS	Solid output shaft (double, single)
ASC	Safety cap for not projecting side of AS shaft
BR, BRV	RS - Torque arm (standard, with Vulkollan bush)
BT, BTV	RT - Torque arm (standard, with Vulkollan bush)
D, DA	RS - Footed version, vertical wormshaft
FL, FA, FB, FO, FR	RS - Flanged version
F, FL, FV	RT - Flanged version
I, IA	RS - Footed version, wormshaft down
PC, PA, PB	RS - Shaft mount version
RA	Helical/worm reducer, round housing
RS	Basic gearbox, round housing
RS/RS	Basic two-stage gearbox, round housing
RT	Basic gearbox, square housing
RT/RT	Basic two-stage gearbox, square housing
S, SA	RS - Footed version, wormshaft up
SL	Travel limiter
TA	Helical/worm reducer, square housing
TLE, TLI	Torque limiter (external, built-in)
VB	Wormshaft with 2nd shaft end
XA	Single stage helical attachment

Symbols		
F_{r1}, F_{r2}, F_r	[N]	Catalogue radial load (input, output)
FS		Service factor
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)
Lub	[l]	Lubricant (litres) Mounting (horizontal, vertical)
M_2, $M_{(app)}$	[Nm]	Maximum output torque (gearbox, application)
η		Efficiency



Advantages

- Friction clamped coupling on motor shaft
- IEC, NEMA, Brushless, DC adapters and couplings fitted on already assembled gearbox
- Elimination of fretting corrosion between bore and key
- Zero backlash in gearbox/motor connection
- Angular allowed misalignment lower than 1°
- High torsional rigidity

Type	Kit Part No.	RS - RT	Mt [Nm]	Mt_1 [Nm]	Mt_2 [Nm]	A [mm]	B [mm]	D_1 [mm]	D_2 [mm]	ID#
G3	KG3.009 KG3.011 KG3.014	28-40 28-40 40	4.5 - 6 4.5 - 6 6.5 - 7.5	15 15 28	8-10 10-12 15-20	11	19	30 30 36	9 11 14	309 311 314
G5	KG5.009 KG5.011 KG5.014 KG5.019 KG5.024	50-60 50-60 50-60 50-60 60	9 - 10	15 20 25 40 50	8-10 10-12 15-20 25-30 30-40	14.5	23	45 45 45 45 52	9 11 14 19 24	509 511 514 519 524
G6	KG6.014 KG6.019 KG6.024 KG6.028	70 70-85-110 70-85-110 70-85-110	15 - 18	60 80 120 150	40-50 60-70 80-100 100-120	19.5	31.5	58	14 19 24 28	614 619 624 628

Type	Kit Part No.	RS - RT	Mt [in-lb]	Mt_1 [in-lb]	Mt_2 [in-lb]	A [in]	B [in]	D_1 [in]	D_2 [in]	ID#
G3	KG3.N42 KG3.N48	28-40 40	40 - 53	133 177	71-89 89-106	0.43	0.74	1.17 1.40	3/8" 1/2"	3N42 3N48
G5	KG5.N56 KG5.N140	50-60 60	80 - 89	354 443	221-266 266-354	0.57	0.91	1.76 2.03	5/8" 7/8"	5N56 5N140
G6	KG6.N56 KG6.N140 KG6.N180	70-85-110 70-85-110 70-85-110	133 - 159	885 1062 1328	531-620 708-885 885-1062	0.76	1.23	2.268	5/8" 7/8" 1-1/8"	6N56 6N140 6N180

Mt - Screw locking torque
Mt_1 - Transmissible torque with key
Mt_2 - Transmissible torque without key

Flanges & Coupling [mm]

Type	Flange	IEC	Flange		Coupling	
			Kit Part No. (B5)	Kit Part No. (B14)	Type	Kit Part No.
RS-RT 28	FM 28	IEC56 IEC63	K530.206.120 K530.206.140	K530.206.080 K530.206.090	G3 ø9 G3 ø11	KG3.009 KG3.011
RS-RT 40	FM 40	IEC56 IEC63 IEC71	K531.206.120 K531.206.140 K531.206.160	K531.206.080 K531.206.090 K531.206.105	G3 ø9 G3 ø11 G3 ø14	KG3.009 KG3.011 KG3.014
RS-RT 50	FM 50	IEC63 IEC71 IEC80	K532.206.140 K532.206.160 K532.206.200	K532.206.090 K532.206.105 K532.206.120	G5 ø11 G5 ø14 G5 ø19	KG5.011 KG5.014 KG5.019
RS-RT 60	FM 60	IEC71 IEC80 IEC90	K539.206.160 K539.206.200 K539.206.200	K539.206.105 K539.206.120 K539.206.140	G5 ø14 G5 ø19 G5 ø24	KG5.014 KG5.019 KG5.024
RS-RT 70	FM 70	IEC71 IEC80 IEC90 IEC100	K533.206.160 K533.206.200 K533.206.200 K533.206.250	K533.206.105 K533.206.120 K533.206.140 K533.206.160	G6 ø14 G6 ø19 G6 ø24 G6 ø28	KG6.014 KG6.019 KG6.024 KG6.028
RS-RT 85	FM 85	IEC80 IEC90 IEC100/112	K534.206.200 K534.206.200 K534.206.250	K534.206.120 K534.206.140 K534.206.160	G6 ø19 G6 ø24 G6 ø28	KG6.019 KG6.024 KG6.028
RS-RT 110	FM 110	IEC90 IEC100/112 IEC132	K535.206.200 K535.206.250 K535.206.300	NA K535.206.160 K535.206.200	G6 ø24 G6 ø28 ø38 (#)	KG6.024 KG6.028 NA
RS 130	FM 130	IEC100/112 IEC 132	K536.206.250 K537.206.300	NA K536.206.200	ø28 (#) ø38 (#)	NA
RS 150	FM 150	IEC100/112 IEC 132 IEC 160	K536.206.250 K537.206.300 K537.206.350	K536.206.200 K536.206.250 NA	ø28 (#) ø38 (#) ø42 (#)	NA
XA 63	FM 40	IEC56 IEC63	K531.206.120 K531.206.140	K531.206.080 K531.206.090	ø9 (#) ø11 (#)	NA
XA 71	FM 50	IEC71	K532.206.160	K532.206.105	ø14 (#)	NA
XA 80	FM 70	IEC80 IEC90	K533.206.200 K533.206.200	K533.206.120 K533.206.140	ø19 (#) ø24 (#)	NA
XA 100	FM 85	IEC80 IEC90 IEC100/112	K534.206.200 K534.206.200 K534.206.250	K534.206.120 K534.206.140 K534.206.160	G6 ø19 G6 ø24 G6 ø28	KG6.019 KG6.024 KG6.028

- Bored and keyed wormshaft
NA - Not available

Flanges & Coupling [inches]

Type	Flange Type	NEMA	Flange Kit Part No.	Coupling	
				Type	Kit Part No.
RS-RT 28	FM 28	42 C 48C	K530.207.N48 K530.207.N48	G3 ø3/8” G3 ø1/2“	KG3.N042 KG3.N048
RS-RT 40	FM 40	42 C 48 C 56 C	K531.227.N48 K531.227.N48 K531.227.N56	G3 ø3/8” G3 ø1/2” G3 ø5/8”	KG3.N042 KG3.N048 KG3.N056
RS-RT 50	FM 50	56 C	K532.227.N56	G5 ø5/8“	KG5.N056
RS-RT 60	FM 60	56 C 140 TC	K539.227.N56 K539.227.N56	G5 ø5/8” G5 ø7/8”	KG5.N056 KG5.N140
RS-RT 70	FM 70	56 C 140 TC 180 TC	K533.227.N56 K533.227.N56 K533.227.N180	G6 ø5/8” G6 ø7/8” G6 ø1-1/8”	KG6.N056 KG6.N140 KG6.N180
RS-RT 85	FM 85	56 C 140 TC 180 TC	K534.227.N56 K534.227.N56 K534.227.N180	G6 ø5/8” G6 ø7/8” G6 ø1-1/8”	KG6.N056 KG6.N140 KG6.N180
RS-RT 110	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.N056 KG6.N140 KG6.N180
RS 130	FM 130	56 C 140 TC 180 TC	K536.227.N56 K536.227.N56 K536.227.N180	ø28 (#) [mm] ø38 (#) [mm]	NA
RS 150	FM 130	56 C 140 TC 180 TC 210 TC	K537.227.N56 K537.227.N56 K537.227.N180 K537.227.N180	ø28 (#) [mm] ø38 (#) [mm] ø42 (#) [mm]	NA
XA 63	FM 40	IEC56 (*) IEC63 (*)	K531.206.120 K531.206.140	ø9 (#) [mm] ø11 (#) [mm]	NA
XA 71	FM 50	IEC71 (*)	K532.206.160	ø14 (#) [mm]	NA
XA 80	FM 70	IEC80 (*) IEC90 (*)	K533.206.200 K533.206.200	ø19 (#) [mm] ø24 (#) [mm]	NA
XA 100	FM 85	56 C 140 TC 180 TC	K334.227.N056 K334.227.N056 K334.227.N180	G6 ø5/8” G6 ø7/8” G6 ø1-1/8”	KG6.N056 KG6.N140 KG6.N180

- IEC bred and keyed wormshaft
* - IEC input only
NA - Not available

Designation

Designation of the gearbox

F	RT	-G - - -	[../]	40	B3	28	IEC71	B14	(OPS, OPP)

OPS = Standard options at pages 48 and 56
OPP = Options at the foot of the page

Motor form

Electric motor frame

Reduction ratio

Gearbox form

Gearbox size

63/, 71/, 80/ (FXA) = Helical stage size

G = Input with G coupling

RS, RT, RA, TA, RS/RS, RT/RT = Gearbox type

M = Geared motor
F = Gearbox with input flange
S = Gearbox without input flange

Designation of the motor

MT	0.37 kW	71 B	4	B14	230/400/50	IP55	F	X4

Terminal box position

Insulation class

Protection class

Voltage/frequency

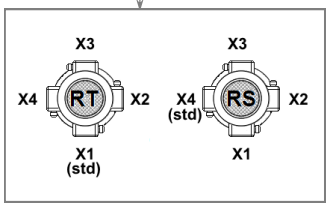
Mounting form

Number of poles

IEC motor frame

Motor power

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



OPP Options

Standard fitting side is the right side of the gearbox when seen from the input side, unless otherwise requested.

ACø - Non-standard hollow shaft ø..
CS - Heavy duty output bearings
F, FL - Additional output flange
GRM - Reduced end play
LNS - Non- standard lubrication
VB - NDE wormshaft extension

Lubrication

All the units are delivered already filled with synthetic long-life oil.
The safe operation of the units with ISO VG 320 grade lubricant is recommended in the ambient temperature range -15 and +35 °C (+60 and +95 °F)
Ask the Customer Service for lower or higher temperatures.

ISO	ARAL	bp	Castrol	EXXON	KLÜBER LUBRICATION	Mobil	TEXACO	TOTAL	Shell
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
VG320**	Eural Gear 320	- - -	Vitalube GS 320	Gear Oil FM 320	Klübersynth UH1-6-320	Mobil DTE FM 320	---	Nevastane EP 320	---

* - Synthetic oil
** - Food Industry Approved Synthetic Oil

Apparent oil leakages

Oil seal lips are safeguarded at gearbox assembly with an adequate grease amount against oil seal dry running-in and shaft oxidation.

Oil seal lip-temperature increases during operation; the grease laid on the outer side of the oil seal becomes then more and more fluid and the grease oily component may be misread as oil coming from inside the gearbox.

Apparently, this oiliness and also the lubricant film, that must always exist between oil seal lip and shaft seat, might be wrongly considered as a lubricant leakage.

Breather plugs

Vent plug installation is recommended to avoid possible leakage of lubricant from the oil sea when internal pressure exceeds 0.25-0.3 bar .

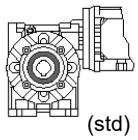
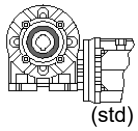
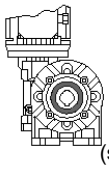
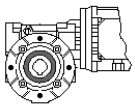
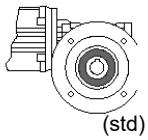
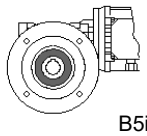
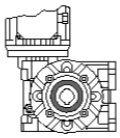
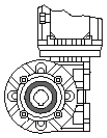
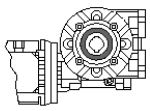
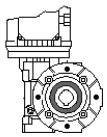
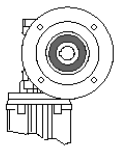
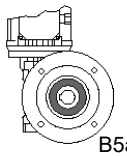
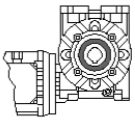
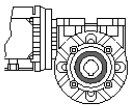
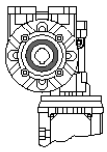
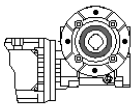
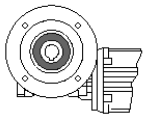
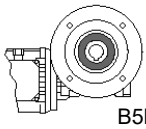
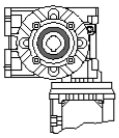
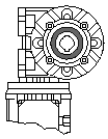
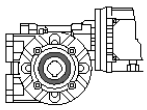
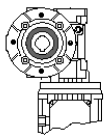
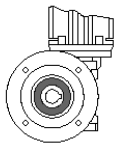
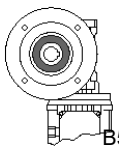
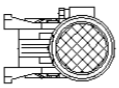
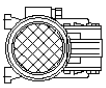
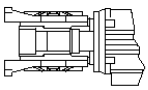
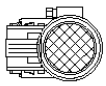
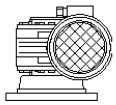
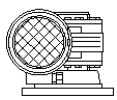
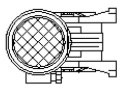
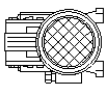
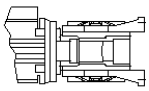
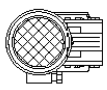
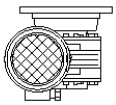
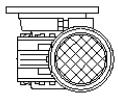
Internal pressure increase is caused by the lubricant volume variation due to temperature increase by
- external conditions (sloped working position, environment over 35°C), or
- internal conditions (input speed over 2000 rpm; frequent start/stops, continuous service over 8 hours a day).

Vent plug standard calibration is 0.25-0.3 bar.
Other calibrations on demand.

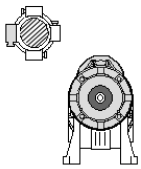
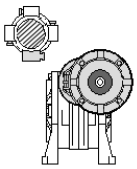
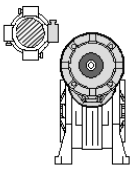
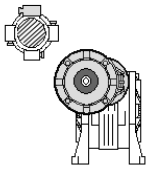
Ask for vent plug installation feasibility as not all the sizes allow it.

Mounting positions

RS - RA - RS/RS
Gearbox fixing

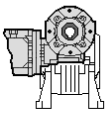
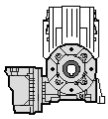
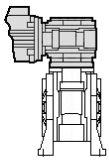
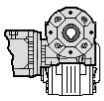
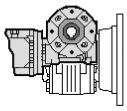
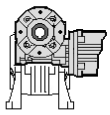
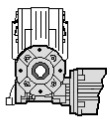
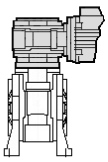
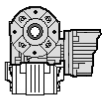
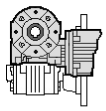
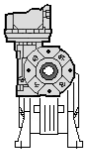
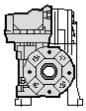
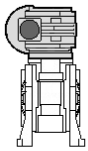
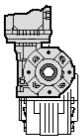
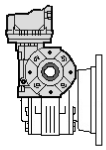
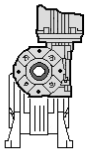
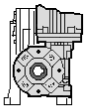
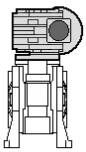
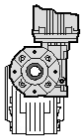
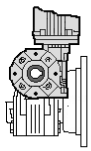
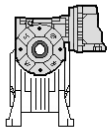
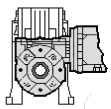
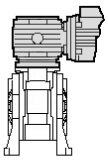
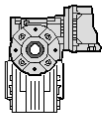
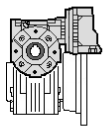
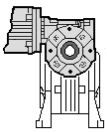
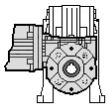
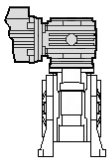
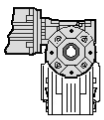
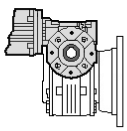
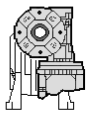
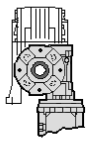
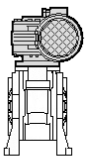
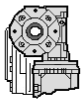
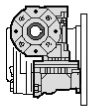
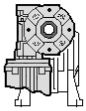
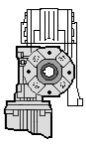
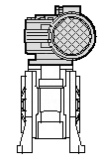
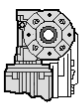
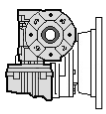
	S - SA	**I** - IA	**D** - DA		**PC** - PA - PB	**FL** - FA - FB - FR	
B3	 (std)	 (std)	 (std)	**B5**	 (std)	 (std)	 B5i
V5				**B5a**			 B5ai
B8				**B5b**			 B5bi
V6				**B5c**			 B5ci
B6				**V1**			 V1i
B7				**V3**			 V3i

RA
Helical stage position

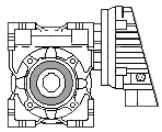
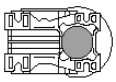
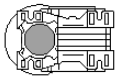
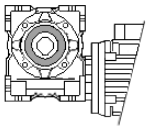
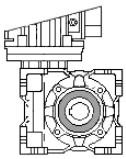
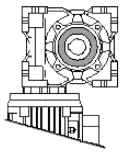
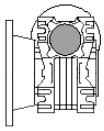
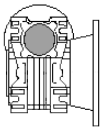
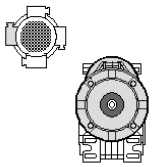
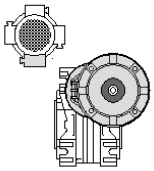
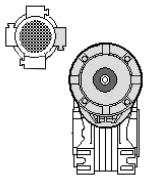
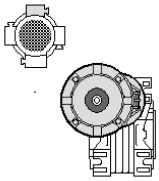
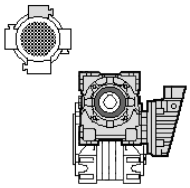
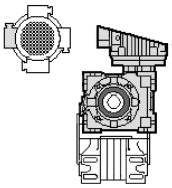
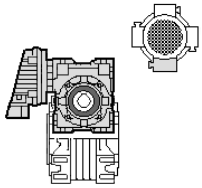
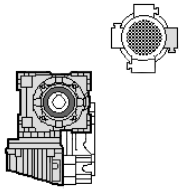
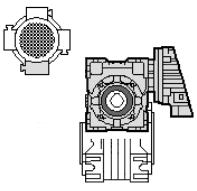
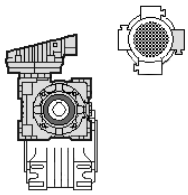
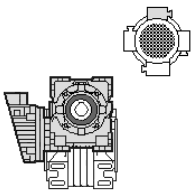
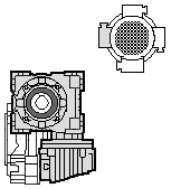
10	**11**	**12**	**13**
 (std)			

Mounting positions

RS/RS
First gearbox position

	S - SA	**I** - IA	**D** - DA	**PC** - PA - PB	**FL** - FA - FB - FR
11					
12					
13					
14					
15					
16					
17					
18					

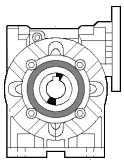
Mounting positions

RT - TA - RT/RT Gearbox fixing				
B3	**B6**	**B7**	**B8**	
 (std)				
V5	**V6**	**F**	**Fi**	
	 (std)	 (std)		
TA Helical stage position				
10	**11**	**12**	**13**	
 (std)				
RT/RT First gearbox position				
2	**21**	**22**	**23**	
 (std)				
24	**25**	**26**	**27**	
				

Weights [kg] **- Lubricants** [litri]

RS - RT
single stage worm

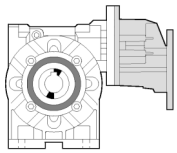
Type	FRS - FRT kg	FRS - FRT l
28	1.1	0.03
40	2.5	0.08
50	3.8	0.13
60	6.5	0.25
70	9.0	0.35
85	13.5	0.60
110	39.0	1.50
RS130	50.0	2.75
RS150	80.0	4.40



l - gearbox ISO VG 320 long-life oil [litres]

RA - TA
helical worm

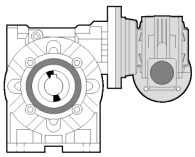
Type	FRA - FTA kg	FXA l_1	FRS - FRT l_2
63 / 40	4.0	0.04	0.08
63 / 50	5.3	0.04	0.13
63 / 60	8.0	0.04	0.25
71 / 50	6.6	0.05	0.13
71 / 60	9.3	0.05	0.25
71 / 70	11.8	0.05	0.35
71 / 85	16.3	0.05	0.60
80 / 60	10.5	0.10	0.25
80 / 70	13.0	0.10	0.35
80 / 85	17.5	0.10	0 .60
80 / 110	43.0	0.10	1.50
100 /110	46.0	0.20	1.50
RA100 / 130	64.0	0.20	2.75
RS100 / 150	94.0	0.20	4.40



FXA
l_1 - 1st gearbox ISO VG 320 long-life oil [litres]
FRS-FRT
l_2 - 2nd gearbox ISO VG 320 long-life oil [litres]

RS/RS - RT/RT
Two stage worm

Type	FRS/RS FRT/RT kg	FRS FRT l_1	RS RT l_2
28 / 28	2.5	0.03	0.03
28 / 40	3.9	0.03	0.08
28 / 50	5.2	0.03	0.13
28 / 60	7.9	0.03	0.25
40 / 70	12.0	0.08	0.35
40 / 85	16.5	0.08	0.60
50 / 110	45.0	0.13	1.50
RS60 / 130	57.0	0.23	2.75
RS70 / 150	90.0	0.35	4.40



FRS/RS - FRT/RT
l_1 - 1st gearbox ISO VG 320 long-life oil [litres]
l_2 - 2nd gearbox ISO VG 320 long-life oil [litres]

Service factors

Duty Factor
of the gearbox

Duty factor is defined as the ratio between gearbox maximum output torque M_2 and application torque $M_{(app)}$ ratio.
The ratio must be bigger than or equal to SF or k_a factor here defined.

Service factor [SF1.0] is meant as typical operation of 8 hours/day, with uniform load, starts/ stops lower than 6 per hour and ambient temperature between 15 and 35 Celsius.
For other operation conditions, select SF according to tables SF_1 and SF_2 below.

Mass acceleration factor [$k_a \leq 0.2$] is meant as 8 hours/day typical operation for Load class A.
For other working conditions, select k_a from the graphs below as appropriate.

For max. ambient temperature exceeding 35°C or below 0°C, please ask Customer Service.

Service factor
SF

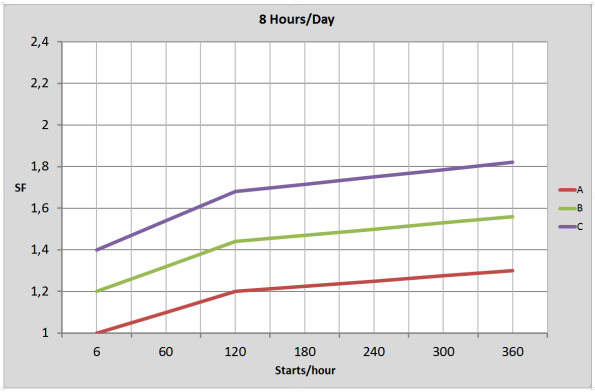
Charge type **SF_1**				Start-Stops per hour **SF_2**		
hours	uniform	variable	with shocks	start-stop number	Factor	**$SF = SF_1 \times SF_2$**
8	1.0	1.2	1.4	6	1.0	
16	1.2	1.4	1.6	60	1.1	
24	1.4	1.6	1.8	120	1.2	

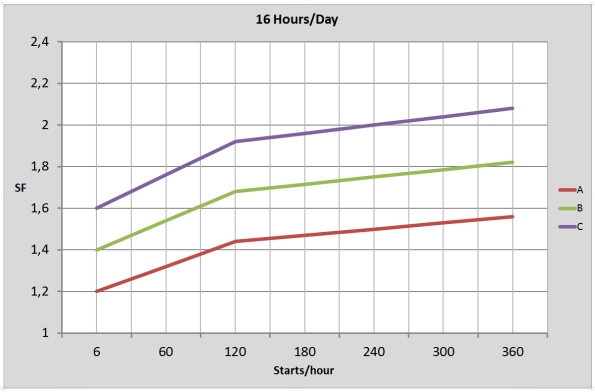
Acceleration factor of masses
k_a

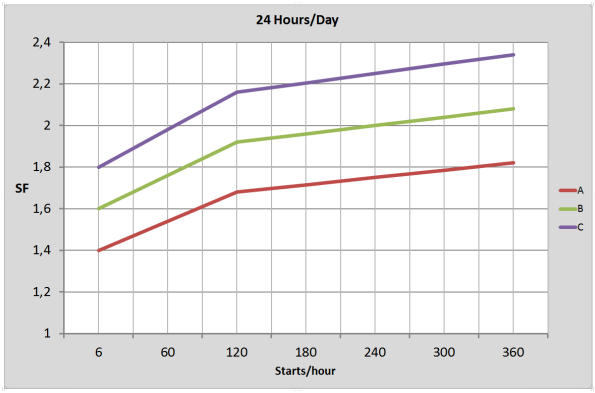
$$k_a = \frac{\frac{J_2}{i_r^2} + J_1}{J_m}$$

	k_a	Load type
A	$k_a \leq 0.2$	uniform
B	$0.2 < k_a \leq 3$	Moderate shocks
C	$3 < k_a \leq 10$	severe shocks

A, B, C - Load class







Service types

Duty type
of the motor

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

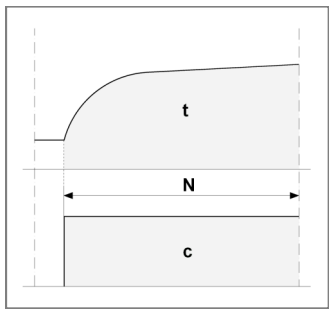
S1 - Continuous duty

Operation
- on steady load (c)
- for an indefinite period (N),

but long enough to achieve thermal balancing (t).

On continuous duty, the gearboxes with service factor of selection tables SF1.0 or higher can be accordingly used.

c = Load
N = Operation time
t = Temperature



S3 - Periodic intermittent duty

Operation
- on a cycle (C) including
- a steady load time (N)
- and a rest time (R).

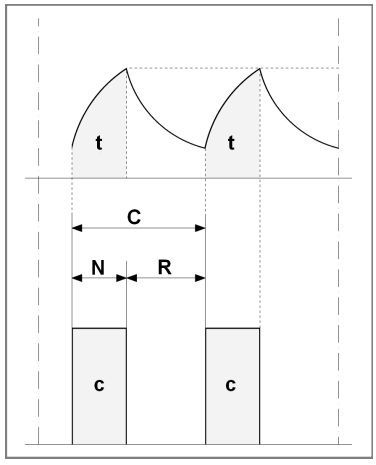
Starts/stops do not affect temperature (t).
Reference cycle (C) is 10 minutes overall.

On periodic intermittent duty, the gearboxes with service factor of selection tables SF matching the intermittence ratio service factor (k_{S3}) or higher can be accordingly used.

Intermittence ratio is calculated according the following formula.

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

c = Load
C = Duty cycle
N = Operation time
R = Rest time
t = Temperature



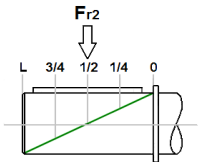
Output Radial loads (OHL)

The radial (overhung) load shown in the tables, should be checked according to
- output speed,
- mounting position (A),
- type of the transmission element (B) fitted on the gearbox output shaft
- and rectified by the appropriate k_L and k_T rating factors.

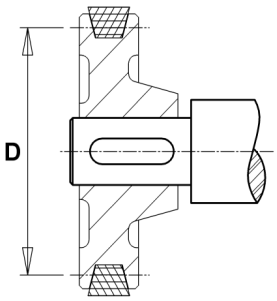
Gearbox radial load F_{r2} must be equal or greater than application radial load F_r.

(A) - Application point of radial load - k_L

OHL is considered as applied at the output shaft mid-point.
Other positions origin loads to be adjusted by the appropriate factor k_L.
Examples of the distance from the shaft shoulder:
:

k_L	L	
1.1	1/4 * L	
1.0	1/2 * L	
0.9	3/4 * L	
0.8	L	

(B) - Transmission element - k_T

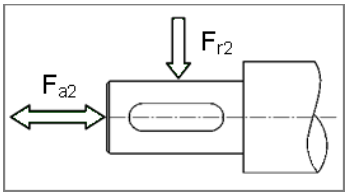
k_T	Element type	
1,15	Gear tooth No. < 17	
	Chain sprocket	
1,40	tooth No. < 13	
1,25	tooth No. < 20	
1,00	tooth No. > 20	
	Pulley for	
2,50	V-belt	
1,25	toothed-belt	

Radial (overhung) load

$F_{r2} = (2000 \times M_2) : D \times k_L \times k_T$
F_{r2} must be equal or greater than F_r
where
F_r = Radial load of application
F_{r2} = Radial load of gearbox
M_2 = Output torque of gearbox

Output Axial loads

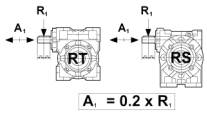
Axial load
$F_{a2} = F_{r2} \times 0.2$
is included within the catalogue radial load figure
and is valid on both tensile and compressive stress.



External loads [daN]

Input radial loads

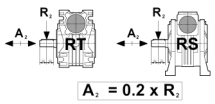
rpm	2800	1400	900	700	500	300
RS-RT 28	5	7	8	9	10	12
RS-RT 40	11	15	16	17	18	20
RS-RT 50	15	20	22	25	28	30
RS-RT 60	23	30	33	35	37	40
RS-RT 70	26	35	40	44	47	50
RS-RT 85	34	45	52	58	62	70
RS-RT 110	57	75	80	85	92	100
RS 130	70	100	105	110	115	120
RS 150	90	120	125	130	140	150



Output radial loads

Standard bearings

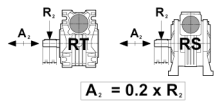
i rpm	5 280	7 200	10 140	15 93	20 70	28 50	40 35	49 29	56 25	70 20	80 18	100 14	Brg No.
RS-RT 28	80	80	80	90	100	100	110	120	120	130	130	130	6005
RS-RT 40	100	100	110	120	135	150	160	170	180	190	200	230	16006
RS-RT 50	145	125	145	170	190	200	230	240	260	280	290	320	16008
RS-RT 60	225	240	250	290	330	360	390	430	460	500	530	560	6208*
RS-RT 70	260	270	290	360	390	420	450	520	550	590	630	670	6209
RS-RT 85	330	330	370	440	470	540	550	630	660	710	750	830	6210
RS-RT 110	- - -	390	415	520	540	590	570	750	780	800	880	980	6212
RS 130	- - -	500	585	615	650	660	780	880	950	970	1050	1150	6015
RS 150	- - -	650	770	830	880	900	1100	1200	1250	1300	1400	1500	6216



* 6008 - for RS60

Heavy duty bearings

i rpm	5 280	7 200	10 140	15 93	20 70	28 50	40 35	49 29	56 25	70 20	80 18	100 14	Brg No.
RS-RT 28	see standard eversion												
RS-RT 40	140	150	155	165	190	210	225	240	250	260	260	260	32006
RS-RT 50	200	175	200	240	260	300	340	360	390	420	420	420	32008
RS-RT 60	290	300	320	370	420	480	510	570	610	660	660	660	30208
RS-RT 70	335	330	370	450	516	560	610	690	730	790	790	790	30209
RS-RT 85	410	420	460	550	630	720	730	840	870	940	940	940	30210
RS-RT110	- - -	500	540	670	750	800	930	1050	1110	1110	1110	1110	30212
RS 130	- - -	700	790	860	970	990	1170	1290	1420	1450	1450	1450	32015
RS 150	- - -	900	1080	1160	1320	1350	1650	1800	1870	1950	1950	1950	30216



Notes

Versions

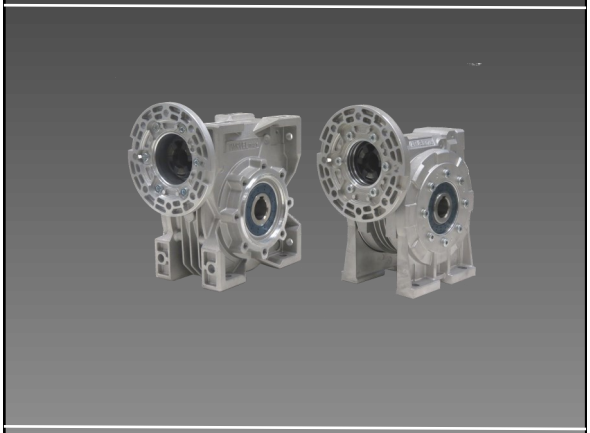
MRS, MRT
Geared motors
- w/single stage worm,
- helical/worm,
- double stage worm

Powers: 0.06 kW to 15 kW, 4 poles
Output speed: 650 rpm to 0.14 rpm

FRS, FRT
Gearboxes with motor flange,
- single stage worm,
- helical/worm,
- double stage worm,
- quill input (coupling or key/keyway).

Motor flanges:
- IEC 56 to IEC 160 and
- NEMA 56C to NEMA 210TC

Output torque: 7 Nm to 3020 Nm
Reduction ratios: 5:1 to 10000:1



SRS, SRT
Gearboxes without input flange,
- single stage worm,
- helical/worm,
- double stage worm,
- quill input (coupling or key/keyway)

Output torque: 7 Nm to 3020 Nm
Reduction ratios: 5:1 to 10000:1

RS, RT
Gearboxes w/single stage worm,
- helical/worm,
- double stage worm
- with input solid shaft

Output torque: 7 Nm to 3020 Nm
Reduction ratios: 5:1 to 10000:1

Coupling selection

“ G ”

IEC motors

FRS FRT	28	40	50	60	70	85	110	FRS 130	FRS 150
IEC 56	G3	G3	- - -	- - -	- - -	- - -	- - -	- - -	- - -
IEC 63	G3	G3	G5	- - -	- - -	- - -	- - -	- - -	- - -
IEC 71	- - -	G3	G5	G5	G6	- - -	- - -	- - -	- - -
IEC 80	- - -	- - -	G5	G5	G6	G6	- - -	- - -	- - -
IEC 90	- - -	- - -	- - -	G5	G6	G6	G6	- - -	- - -
IEC 100	- - -	- - -	- - -	- - -	G6	G6	G6	■	■
IEC 112	- - -	- - -	- - -	- - -	- - -	G6	G6	■	■
IEC 132	- - -	- - -	- - -	- - -	- - -	- - -	■	■	■
IEC 160	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	■

FXA	63	71	80	100
IEC 56	■	- - -	- - -	- - -
IEC 63	■	- - -	- - -	- - -
IEC 71	- - -	■	- - -	- - -
IEC 80	- - -	- - -	■	G6
IEC 90	- - -	- - -	■	G6
IEC 100	- - -	- - -	- - -	G6
IEC 112	- - -	- - -	- - -	G6

NEMA motors

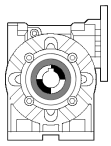
FRS FRT	28	40	50	60	70	85	110	FRS 130	FRS 150
NEMA 42	G3	G3	- - -	- - -	- - -	- - -	- - -	- - -	- - -
NEMA 48	- - -	G3	- - -	- - -	- - -	- - -	- - -	- - -	- - -
NEMA 56	- - -	G3	G5	G5	G6	G6	G6	- - -	- - -
NEMA 140	- - -	- - -	- - -	G5	G6	G6	G6	■	■
NEMA 180	- - -	- - -	- - -	- - -	G6	G6	G6	■	■
NEMA 210	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	■

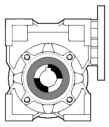
FXA	63	71	80	100
NEMA 56	- - -	- - -	- - -	G6
NEMA 140	- - -	- - -	- - -	G6
NEMA 180	- - -	- - -	- - -	G6

■ - Bore and key fitting (metric only)

FRS-FRT - Input flanges

FRS - FRT



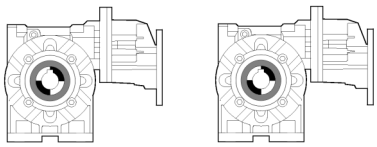


	i & rpm	i = 5	7	10	15	20	28	40	49	56	70	80	100
	IEC	280	200	140	93	70	50	35	29	25	20	18	14
28	56	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	63	①②	①②	①②	①②	①②	①②	①②	①②	①	①	①	①
40	56	①	①	①	①	①	①	①	①	①	①	①	①
	63	①	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	71	①②	①②	①②	①②	①②	①②	①②	①②	①	①	①	①
50	63	①	①	①	①	①	①	①	①	①	①②	①②	①②
	71	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	80	①②	①②	①②	①②	①②	①②	①②	①②	①	①	①	①
60	71	①	①	①	①	①	①②	①②	①②	①②	①②	①②	①②
	80	①	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	90	①	①②	①②	①②	①②	①②	①②	①	①	①	①	①
70	71	①	①	①	①	①	①②	①②	①②	①②	①②	①②	①②
	80	①	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	90	①	①②	①②	①②	①②	①②	①②	①②	①	①	①	①
	100	①②	①②	①②	①②	①	①	①	①	①	①	①	①
85	80	①	①	①	①	①	①	①②	①②	①②	①②	①②	①②
	90	①	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	100/112	①②	①②	①②	①②	①②	①②	①②	①	①	①	①	①
110	90	- - -	③	③	③	③	③	③④	③④	③④	③④	○④	○④
	100/112	- - -	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②	①②
	132	- - -	②	②	②	②	- - -	- - -	- - -	- - -	- - -	- - -	- - -
130	100/112	- - -	④	④	④	④	④	④	④	④	④	④	④
	132	- - -	④	④	④	④	④	④	- - -	- - -	- - -	- - -	- - -
150	100/112	- - -	④	④	④	④	④	④	④	④	④	④	④
	132	- - -	④	④	④	④	④	④	④	④	④	- - -	- - -
	160	- - -	④	④	④	④	④	④	④	- - -	- - -	- - -	- - -

IEC flange form	Gearbox driving with
① - B5&B14 ③ - B5	coupling
② - B5&B14 ④ - B5	bore and key / keyway

FRA-FTA - Input flanges

FRA - FTA

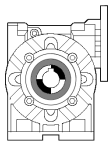


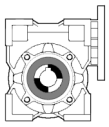
	IEC	i = 5	7	10	15	20	28	40	49	56	70	80	100
63/40	56 B5 & B14	①	①	①	①	①	①	①	①	①	①	①	①
63/50		①	①	①	①	①	①	①	①	①	①	①	①
63/60		- - -	- - -	- - -	- - -	- - -	①	①	①	①	①	①	①
63/40	63 B5 & B14	①	①	①	①	①	①	①	①	①	①	①	①
63/50		①	①	①	①	①	①	①	①	①	①	①	①
63/60		- - -	- - -	- - -	- - -	- - -	①	①	①	①	①	①	①
71/50	71 B5 & B14	②	②	②	②	②	②	②	②	⑦	⑦	⑦	⑦
71/60		②	②	②	②	②	②	②	②	②	②	②	②
71/70		②	②	②	②	②	②	②	②	②	②	②	②
71/85		- - -	- - -	- - -	- - -	- - -	- - -	②	②	②	②	②	②
80/60	80 B5 & B14	③	③	③	③	③	③	③	③	③	③	③	③
80/70		③	③	③	③	③	③	③	③	③	③	③	③
80/85		③	③	③	③	③	③	③	③	③	③	③	③
80/110		- - -	④	④	④	④	③	③	③	③	③	③	③
88/60	90 B5 & B14	③	③	③	③	③	③	③	③	③	③	③	③
80/70		③	③	③	③	③	③	③	③	③	③	③	③
80/85		③	③	③	③	③	③	③	③	③	③	③	③
80/110		- - -	④	④	④	④	③	③	③	③	③	③	③
100/110		- - -	④	④	④	④	③	③	③	③	③	③	③
100/130 (✶)	90 B5 & B14	- - -	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
	100 B5 & B14	- - -	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
100/150 (✶)	90 B5&B14	- - -	⑥	⑥	⑥	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
	100 B5 & B14	- - -	⑥	⑥	⑥	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤

Helical stage output and worm box input
(ø flange x ø FXA-shaft & FRS/FRT-bore)

① - ø105 x 14
② - ø120 x 19
③ - ø140 x 24
④ - ø140 x 28
⑤ - ø200 x 28
⑥ - ø200 x 28 Wormshaft bore ø38mm + Bush ø28/38mm
✶ - FRA only

RS-RT - 2800 rpm



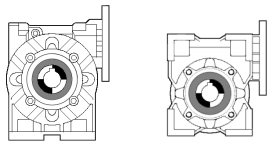


	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	560	400	280	187	140	100	70	57	50	40	35	28
RS - RT 28	kW	0.84	0.63	0.49	0.35	0.25	0.23	0.16	0.13	0.12	0.09	0.08	0.04
	Nm	13	13	14	14	13	15	14	13	12	11	10	7
	eff.	0.86	0.86	0.83	0.79	0.77	0.69	0.64	0.61	0.54	0.49	0.49	0.46
	J_1x10^{-6}	6,2300	6,0100	5,5500	5,3000	5,2100	5,1600	5,1300	5,1200	5,1200	5,1100	5,1100	5,1100
RS - RT 40	kW	2.1	1,5	1,2	0,82	0,56	0,49	0,36	0,30	0,26	0,21	0,19	0,15
	Nm	32	31	34	34	30	34	32	31	30	29	28	26
	eff.	0.89	0,87	0,85	0,81	0,78	0,72	0,66	0,62	0,6	0,57	0,54	0,51
	J_1x10^{-5}	2,2750	2,2130	2,0040	1,8920	1,8530	1,8280	1,8150	1,8110	1,8090	1,8060	1,8050	1,8040
RS - RT 50	kW	3.8	3,0	2,0	1,5	0,95	0,92	0,63	0,51	0,43	0,33	0,31	0,23
	Nm	58	62	59	61	52	66	59	56	53	46	49	40
	eff.	0.90	0,88	0,86	0,82	0,8	0,75	0,69	0,66	0,64	0,58	0,58	0,52
	J_1x10^{-5}	7,1680	6,0680	5,3610	4,9830	4,8510	4,7680	4,7240	4,7100	4,7030	4,6950	4,6920	4,6880
RS - RT 60	kW	5.8	4,4	3,5	2,6	1,9	1,6	1,1	0,72	0,73	0,60	0,52	0,34
	Nm	90	93	104	110	108	116	105	85	92	92	85	68
	eff.	0.90	0,88	0,87	0,84	0,82	0,76	0,73	0,71	0,66	0,64	0,6	0,58
	J_1x10^{-4}	1,3740	1,3443	1,1860	1,1016	1,0720	1,0534	1,0435	1,0403	1,0388	1,0371	1,0364	1,0355
RS - RT 70	kW	8.1	5,7	4,3	3,2	2,4	2,2	1,5	1,2	1,0	0,80	0,69	0,54
	Nm	126	122	130	139	136	161	155	142	130	120	115	107
	eff.	0.91	0,89	0,88	0,85	0,83	0,78	0,74	0,7	0,68	0,63	0,61	0,58
	J_1x10^{-4}	3,3190	3,0626	2,7418	2,5706	2,5107	2,4729	2,4529	2,4464	2,4434	2,4399	2,4384	2,4367
RS - RT 85	kW	13.0	9,6	7,5	5,3	4,3	3,1	2,4	2,0	1,7	1,3	1,1	0,93
	Nm	202	205	225	234	237	235	250	242	229	210	200	190
	eff.	0.91	0,89	0,88	0,86	0,8	0,8	0,76	0,72	0,71	0,67	0,64	0,6
	J_1x10^{-4}	5,0250	4,8911	4,1250	3,7160	3,5729	3,4828	3,4349	3,4196	3,4124	3,4039	3,4004	3,3963
RS - RT 110	kW	- - -	17,5	14,8	10,7	8,6	7,0	5,0	4,5	3,6	3,1	3,0	2,1
	Nm	- - -	375	445	470	490	530	520	545	490	525	540	450
	eff.	- - -	0,9	0,88	0,86	0,84	0,79	0,76	0,73	0,71	0,7	0,67	0,62
	J_1x10^{-3}	- - -	2,2160	1,9420	1,7960	1,7450	1,7130	1,6960	1,6910	1,6880	1,6850	1,6840	1,6820
RS 130	kW	- - -	26,3	21,6	15,8	12,2	9,4	7,7	6,0	5,3	3,9	3,3	2,4
	Nm	- - -	565	655	705	715	715	815	740	780	670	620	560
	eff.	- - -	0,9	0,89	0,87	0,86	0,8	0,78	0,74	0,77	0,72	0,68	0,68
	J_1x10^{-3}	- - -	3,9443	3,2820	2,9284	2,8047	2,7268	2,6854	2,6721	2,6659	2,6586	2,6555	2,6520
RS 150	kW	- - -	37,0	29,6	22,8	17,1	13,6	10,7	8,5	6,6	5,5	4,9	3,6
	Nm	- - -	795	900	1015	1005	1065	1170	1090	970	950	915	845
	eff.	- - -	0,9	0,89	0,87	0,86	0,82	0,8	0,77	0,77	0,72	0,68	0,68
	J_1x10^{-3}	- - -	8,1739	6,9606	6,3130	6,0863	5,9436	5,8678	5,8435	5,8321	5,8187	5,8131	5,8066

Gearbox selection

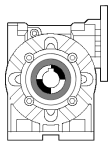
RS-RT

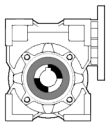
RS-RT - 1400 rpm



	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	560	400	280	187	140	100	70	57	50	40	35	28
RS - RT 28	kW	0,68	0,45	0,33	0,23	0,16	0,16	0,10	0,09	0,08	0,06	0,05	0,03
	Nm	20	18	18	18	16	20	17	17	15	12	12	8
	eff.	0.88	0.84	0.81	0.77	0.74	0.66	0.62	0.57	0.51	0.45	0.45	0.43
	J_1x10^{-6}	6,2300	6,0100	5,5500	5,3000	5,2100	5,1600	5,1300	5,1200	5,1200	5,1100	5,1100	5,1100
RS - RT 40	kW	1.5	1,1	0,81	0,55	0,38	0,37	0,25	0,21	0,18	0,14	0,12	0,09
	Nm	45	45	46	44	39	48	42	41	38	36	32	29
	eff.	0.87	0.85	0.83	0.78	0.75	0.68	0.61	0.58	0.56	0.52	0.50	0.46
	J_1x10^{-5}	2,2750	2,2130	2,0040	1,8920	1,8530	1,8280	1,8150	1,8110	1,8090	1,8060	1,8050	1,8040
RS - RT 50	kW	2.7	1,8	1,3	0,93	0,63	0,63	0,41	0,37	0,31	0,25	0,20	0,13
	Nm	81	75	75	74	65	85	72	76	71	63	58	43
	eff.	0.88	0.86	0.84	0.78	0.76	0.71	0.64	0.62	0.60	0.53	0.52	0.47
	J_1x10^{-5}	7,1680	6,0680	5,3610	4,9830	4,8510	4,7680	4,7240	4,7100	4,7030	4,6950	4,6920	4,6880
RS - RT 60	kW	4.1	2,8	2,3	1,6	1,2	1,0	0,75	0,62	0,54	0,46	0,37	0,25
	Nm	125	113	133	130	122	139	135	128	123	122	106	83
	eff.	0.89	0.86	0.84	0.81	0.77	0.71	0.66	0.62	0.60	0.55	0.53	0.49
	J_1x10^{-4}	1,3740	1,3443	1,1860	1,1016	1,0720	1,0534	1,0435	1,0403	1,0388	1,0371	1,0364	1,0355
RS - RT 70	kW	5.7	4,0	3,1	2,2	1,8	1,5	1,2	0,84	0,74	0,58	0,50	0,37
	Nm	176	166	180	188	194	216	208	189	180	163	154	130
	eff.	0.89	0.88	0.86	0.83	0.81	0.75	0.71	0.67	0.64	0.59	0.56	0.52
	J_1x10^{-4}	3,3190	3,0626	2,7418	2,5706	2,5107	2,4729	2,4529	2,4464	2,4434	2,4399	2,4384	2,4367
RS - RT 85	kW	9.1	6,2	4,6	3,4	2,9	2,2	1.6	1,4	1,2	0,96	0,86	0,55
	Nm	279	259	268	289	322	319	325	316	305	290	280	210
	eff.	0.90	0.88	0.86	0.83	0.82	0.76	0.72	0.67	0.68	0.63	0.60	0.56
	J_1x10^{-4}	5,0250	4,8911	4,1250	3,7160	3,5729	3,4828	3,4349	3,4196	3,4124	3,4039	3,4004	3,3963
RS - RT 110	kW	- - -	12,5	9,0	6,5	5,7	4,4	3,5	2,7	2,2	2,0	1,5	1,1
	Nm	- - -	525	532	560	647	642	691	631	595	635	525	469
	eff.	- - -	0.88	0.87	0.84	0.83	0.76	0.73	0.71	0.70	0.67	0.66	0.61
	J_1x10^{-3}	- - -	2,2160	1,9420	1,7960	1,7450	1,7130	1,6960	1,6910	1,6880	1,6850	1,6840	1,6820
RS 130	kW	- - -	19,0	15,0	11,0	8,5	7,5	5,5	3,9	3,7	2,7	2,4	1,8
	Nm	- - -	807	890	960	975	1100	1140	950	1005	865	810	750
	eff.	- - -	0.89	0.87	0.85	0.84	0.77	0.76	0.72	0.71	0.67	0.63	0.61
	J_1x10^{-3}	- - -	3,9443	3,2820	2,9284	2,8047	2,7268	2,6854	2,6721	2,6659	2,6586	2,6555	2,6520
RS 150	kW	- - -	24,9	21,0	16,0	12,5	9,5	8,0	5,9	5,1	3,8	3,3	2,6
	Nm	- - -	1060	1260	1410	1430	1435	1680	1440	1420	1230	1170	1120
	eff.	- - -	0.89	0.88	0.86	0.84	0.79	0.77	0.73	0.73	0.68	0.65	0.63
	J_1x10^{-3}	- - -	8,1739	6,9606	6,3130	6,0863	5,9436	5,8678	5,8435	5,8321	5,8187	5,8131	5,8066

RS-RT - 900 rpm

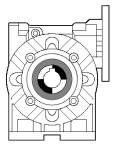


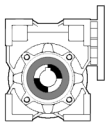


	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	560	400	280	187	140	100	70	57	50	40	35	28
RS - RT 28	kW	0,49	0,36	0,24	0,18	0,13	0,12	0,08	0,07	0,06	0,04	0,03	0,02
	Nm	22	22	20	21	19	22	20	19	16	13	11	8
	eff.	0.84	0.82	0.78	0.72	0.70	0.61	0.56	0.52	0.45	0.43	0.40	0.37
	J_1x10^{-6}	6,2300	6,0100	5,5500	5,3000	5,2100	5,1600	5,1300	5,1200	5,1200	5,1100	5,1100	5,1100
RS - RT 40	kW	1.2	0,84	0,64	0,44	0,30	0,28	0,19	0,16	0,14	0,12	0,10	0,08
	Nm	54	52	54	52	45	52	46	43	41	40	39	36
	eff.	0.86	0.83	0.80	0.74	0.70	0.63	0.56	0.52	0.49	0.46	0.44	0.42
	J_1x10^{-5}	2,2750	2,2130	2,0040	1,8920	1,8530	1,8280	1,8150	1,8110	1,8090	1,8060	1,8050	1,8040
RS - RT 50	kW	2.1	1,5	1,1	0,75	0,52	0,51	0,35	0,28	0,25	0,19	0,17	0,12
	Nm	96	95	95	91	79	99	85	81	80	67	67	55
	eff.	0.86	0.85	0.81	0.76	0.72	0.65	0.58	056	0.54	0.47	0.46	042
	J_1x10^{-5}	7,1680	6,0680	5,3610	4,9830	4,8510	4,7680	4,7240	4,7100	4,7030	4,6950	4,6920	4,6880
RS - RT 60	kW	3.2	2,4	1,9	1,4	1,0	0,87	0,56	0,43	0,40	0,32	0,28	0,19
	Nm	150	150	163	166	161	175	152	135	130	125	115	94
	eff.	0.87	0.85	0.83	0.75	0.76	0.68	0.64	0.61	0.55	0.53	0.480	0.47
	J_1x10^{-4}	1,3740	1,3443	1,1860	1,1016	1,0720	1,0534	1,0435	1,0403	1,0388	1,0371	1,0364	1,0355
RS - RT 70	kW	4.5	3,2	2,4	1,7	1,3	1,2	0,87	0,64	0,53	0,42	0,38	0,30
	Nm	212	202	211	218	207	242	240	205	187	170	160	147
	eff.	0.88	0.86	0.83	0.79	0.77	0.70	0.654	0.62	0.59	0.54	0.50	0.46
	J_1x10^{-4}	3,3190	3,0626	2,7418	2,5706	2,5107	2,4729	2,4529	2,4464	2,4434	2,4399	2,4384	2,4367
RS - RT 85	kW	7.2	5,0	3,9	3,0	2,1	1,8	1,5	1,0	0,83	0,73	0,64	0,51
	Nm	338	320	350	378	355	373	410	350	332	300	290	260
	eff.	0.88	0.86	0.84	0.80	0.78	0.71	0.66	0.672	0.671	0.55	0.53	0.48
	J_1x10^{-4}	5,0250	4,8911	4,1250	3,7160	3,5729	3,4828	3,4349	3,4196	3,4124	3,4039	3,4004	3,3963
RS - RT 110	kW	- - -	9,8	8,0	5,7	4,4	3,7	2,7	2,3	1,9	1,7	1,5	0,94
	Nm	- - -	635	720	745	745	795	780	780	690	765	715	500
	eff.	- - -	0.87	0.85	0.82	0.79	0.73	0.68	0.64	0.62	0.59	0.57	0.50
	J_1x10^{-3}	- - -	2,2160	1,9420	1,7960	1,7450	1,7130	1,6960	1,6910	1,6880	1,6850	1,6840	1,6820
RS 130	kW	- - -	14,9	11,7	8,4	6,5	5,1	4,1	3,1	2,8	2,1	1,8	1,3
	Nm	- - -	975	1070	1115	1115	1145	1215	1095	1145	960	890	805
	eff.	- - -	0.88	0.86	0.83	0.81	0.75	0.70	0.67	0.68	0.63	0.58	0.57
	J_1x10^{-3}	- - -	3,9443	3,2820	2,9284	2,8047	2,7268	2,6854	2,6721	2,6659	2,6586	2,6555	2,6520
RS 150	kW	- - -	20,8	15,9	12,2	9,3	7,3	5,6	4,5	3,3	2,9	2,5	2,0
	Nm	- - -	1360	1470	1635	1625	1660	1740	1600	1370	1390	1290	1230
	eff.	- - -	0.88	0.87	0.84	0.82	0.77	0.73	0.69	0.69	0.64	0.61	0.58
	J_1x10^{-3}	- - -	8,1739	6,9606	6,3130	6,0863	5,9436	5,8678	5,8435	5,8321	5,8187	5,8131	5,8066

Gearbox selection

RS-RT - 700 rpm

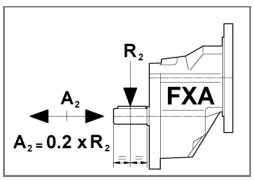




	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	560	400	280	187	140	100	70	57	50	40	35	28
RS - RT 28	kW	0,41	0,29	0,21	0,14	0,10	0,10	0,06	0,05	0,04	0,03	0,02	0,01
	Nm	23	23	23	22	21	24	21	20	17	13	11	8
	eff.	0.82	0.81	0.77	0.71	0.69	0.60	0.55	0.51	0.44	0.40	0.39	0.36
	J_1x10^{-6}	6,2300	6,0100	5,5500	5,3000	5,2100	5,1600	5,1300	5,1200	5,1200	5,1100	5,1100	5,1100
RS - RT 40	kW	1.00	0,74	0,54	0,39	0,26	0,24	0,17	0,14	0,12	0,10	0,09	0,07
	Nm	59	58	58	58	49	55	49	46	45	43	41	38
	eff.	0.85	0.82	0.79	0.73	0.68	0.59	0.53	0.50	0.48	0.44	0.42	0.39
	J_1x10^{-5}	2,2750	2,2130	2,0040	1,8920	1,8530	1,8280	1,8150	1,8110	1,8090	1,8060	1,8050	1,8040
RS - RT 50	kW	1.8	1,4	0,92	0,65	0,44	0,43	0,29	0,24	0,21	0,16	0,15	0,12
	Nm	106	110	100	99	86	106	91	87	83	70	72	62
	eff.	0.86	0.83	0.80	0.75	0.71	0.64	0.57	0.542	0.52	0.45	0.44	0.39
	J_1x10^{-5}	7,1680	6,0680	5,3610	4,9830	4,8510	4,7680	4,7240	4,7100	4,7030	4,6950	4,6920	4,6880
RS - RT 60	kW	2.8	2,0	1,6	1,1	0,87	0,73	0,49	0,35	0,34	0,26	0,24	0,17
	Nm	165	164	177	178	175	187	165	140	139	128	120	100
	eff.	0.87	0.84	0.81	0.77	0.74	0.67	0.62	0.59	0.54	0.51	0.46	0.44
	J_1x10^{-4}	1,3740	1,3443	1,1860	1,1016	1,0720	1,0534	1,0435	1,0403	1,0388	1,0371	1,0364	1,0355
RS - RT 70	kW	3.9	2,7	2,1	1,4	1,1	1,0	0,71	0,55	0,46	0,36	0,32	0,24
	Nm	234	216	233	231	225	256	245	220	197	176	167	150
	eff.	0.87	0.85	0.82	0.78	0.75	0.68	0.63	0.60	0.56	0.51	0.48	0.45
	J_1x10^{-4}	3,3190	3,0626	2,7418	2,5706	2,5107	2,4729	2,4529	2,4464	2,4434	2,4399	2,4384	2,4367
RS - RT 85	kW	6.2	4,6	3,5	2,5	1,9	1,5	1,2	0,93	0,78	0,59	0,56	0,44
	Nm	372	370	400	408	388	400	420	379	353	310	305	275
	eff.	0.87	0.85	0.83	0.79	0.76	0.69	0.65	0.61	0.59	0.55	0.50	0.46
	J_1x10^{-4}	5,0250	4,8911	4,1250	3,7160	3,5729	3,4828	3,4349	3,4196	3,4124	3,4039	3,4004	3,3963
RS - RT 110	kW	- - -	8,5	6,8	4,9	3,9	3,3	2,3	2,0	1,7	1,5	1,2	0,79
	Nm	- - -	700	780	795	815	890	820	840	770	815	720	515
	eff.	- - -	0.86	0.84	0.80	0.77	0.71	0.66	0.62	0.60	0.57	0.55	0.48
	J_1x10^{-3}	- - -	2,2160	1,9420	1,7960	1,7450	1,7130	1,6960	1,6910	1,6880	1,6850	1,6840	1,6820
RS 130	kW	- - -	12,8	10,3	7,4	5,6	4,4	3,6	2,7	2,4	1,8	1,6	1,1
	Nm	- - -	1060	1200	1230	1215	1200	1320	1185	1215	1030	955	855
	eff.	- - -	0.87	0.85	0.81	0.80	0.72	0.68	0.65	0.66	0.61	0.56	0.55
	J_1x10^{-3}	- - -	3,9443	3,2820	2,9284	2,8047	2,7268	2,6854	2,6721	2,6659	2,6586	2,6555	2,6520
RS 150	kW	- - -	18,0	13,7	10,6	8,1	6,2	4,9	3,8	3,0	2,6	2,3	1,7
	Nm	- - -	1475	1610	1805	1780	1790	1890	1710	1535	1500	1425	1275
	eff.	- - -	0.87	0.86	0.83	0.81	0.75	0.71	0.68	0.67	0.61	0.58	0.56
	J_1x10^{-3}	- - -	8,1739	6,9606	6,3130	6,0863	5,9436	5,8678	5,8435	5,8321	5,8187	5,8131	5,8066

Gearbox selection

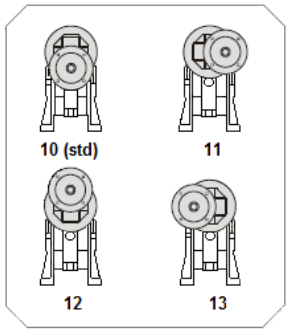
FXA - Helical gear single-stage attachment



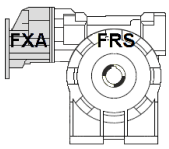
FXA 1400 rpm	i_n =	3.5	6.3	8
	rpm	400	225	175
FXA63	i_r =	3.5	6.2	7.8
	kW	0.50	0.23	0.18
	Nm	12	10	9
	R_2 [N]	390	450	450
FXA71	i_r =	3.5	6.4	8.0
	kW	1.1	0.52	0.37
	Nm	26	22	20
	R_2 [N]	490	560	560
FXA80	i_r =	3.4	6.4	8.3
	kW	3.1	1.5	1.1
	Nm	68	65	60
	R_2 [N]	610	700	700
FXA100	i_r =	3.9	6.2	7.5
	kW	8.7	4.0	2.2
	Nm	235	163	136
	R_2 [N]	1500	2500	2500

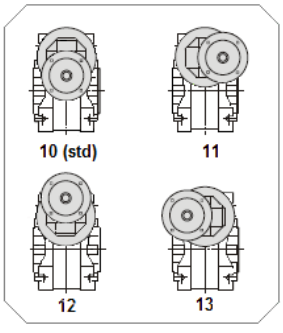
Dimensions: page 58

Attachment position

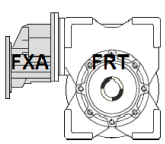


FRA



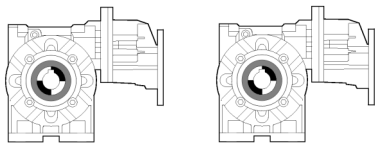


FTA



Gearbox selection

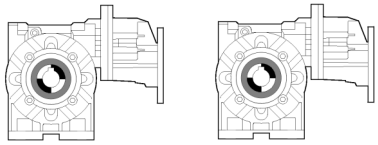
RA-TA - 1400 rpm [FXA i=3.5]



	$i = i_n \times i_2$	17.5	25	35	53	70	98	140	172	196	245	280	350
$i_n = 3.5$	rpm	80	57	40	27	20	14	10	8	7	6	5	4
	i_2	5	7	10	15	20	28	40	49	56	70	80	100
RA-TA 63/40	kW	0.73	0.55	0.40	0.28	0.20	0.19	0.13	0.11	0.10	0.06	0.05	0.03
	Nm	70	72	72	70	60	70	64	58	56	42	35	25
	eff.	0.80	0.78	0.75	0.70	0.63	0.56	0.50	0.46	0.44	0.41	0.40	0.35
RA-TA 63/50 RA-TA 71/50	kW	1.34	1.02	0.70	0.50	0.33	0.32	0.21	0.20	0.16	0.11	0.09	0.06
	Nm	130	135	127	125	105	125	105	115	100	80	70	50
	eff.	0.81	0.79	0.76	0.70	0.66	0.59	0.52	0.50	0.46	0.42	0.40	0.35
RA-TA 63/60 RA-TA 71/60 RA-TA 80/60	kW	1.94	1.53	1.18	0.83	0.57	0.53	0.33	0.27	0.23	0.19	0.15	0.10
	Nm	190	205	217	215	192	217	177	170	152	145	110	85
	eff.	0.82	0.80	0.77	0.72	0.70	0.61	0.57	0.54	0.49	0.45	0.38	0.36
RA-TA 71/70 RA-TA 80/70	kW	2.57	1.96	1.48	1.08	0.77	0.72	0.50	0.43	0.36	0.30	0.26	0.19
	Nm	255	265	275	285	260	310	270	270	235	225	200	180
	eff.	0.83	0.81	0.78	0.74	0.71	0.64	0.57	0.54	0.49	0.45	0.41	0.39
RA-TA 71/85 RA-TA 80/85	kW	4.09	3.14	2.39	1.77	1.37	1.11	0.80	0.65	0.58	0.49	0.40	0.26
	Nm	415	430	450	475	470	475	445	420	410	390	340	250
	eff.	0.85	0.82	0.79	0.75	0.72	0.64	0.58	0.55	0.53	0.48	0.44	0.40
RA-TA 80/110 RA-TA 100/110	kW	- - -	6.02	4.63	3.58	2.61	2.18	1.60	1.27	1.12	0.86	0.86	0.54
	Nm	- - -	835	895	950	910	960	950	850	820	750	740	540
	eff.	- - -	0.83	0.81	0.74	0.73	0.66	0.62	0.57	0.55	0.52	0.45	0.42
RA 100/130	kW	- - -	7.0	6.8	5.5	3.8	3.1	2.3	1.7	1.5	1.3	1.1	0.8
	Nm	- - -	975	1320	1495	1350	1430	1380	1300	1250	1200	1080	880
	eff.	- - -	0.83	0.81	0.77	0.75	0.67	0.63	0.64	0.62	0.60	0.50	0.48
RA 100/150	kW	- - -	7.9	7.8	7.5	5.7	4.5	3.3	2.7	2.4	1.8	1.6	1.0
	Nm	- - -	1115	1535	2090	2060	2130	2050	2040	2025	1700	1459	1200
	eff.	- - -	0.84	0.82	0.79	0.76	0.69	0.66	0.64	0.62	0.60	0.52	0.50

Gearbox selection

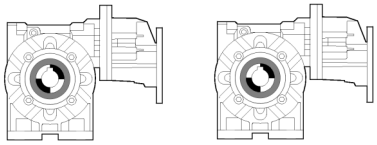
RA-TA - 1400 rpm [FXA i=6.3]



	$i = i_n \times i_2$	31.5	44	63	95	126	176	252	309	353	441	504	630
$i_n = 6.3$	rpm	44	32	22	15	11	8	5.5	4.6	4	3.2	2.8	2.2
	i_2	5	7	10	15	20	28	40	49	56	70	80	100
RA-TA 63/40	kW	0.45	0.35	0.25	0.17	0.12	0.11	0.08	0.06	0.06	0.05	0.04	0.03
	Nm	76	79	78	74	63	69	63	57	55	53	51	46
	eff.	0.78	0.76	0.72	0.67	0.60	0.52	0.45	0.43	0.39	0.35	0.34	0.31
RA-TA 63/50 RA-TA 71/50	kW	0.81	0.62	0.42	0.30	0.20	0.20	0.14	0.11	0.10	0.09	0.07	0.05
	Nm	140	145	133	130	113	138	115	108	100	92	89	72
	eff.	0.80	0.78	0.74	0.67	0.63	0.55	0.48	0.45	0.42	0.36	0.36	0.31
RA-TA 63/60 RA-TA 71/60 RA-TA 80/60	kW	1.23	0.92	0.74	0.52	0.40	0.35	0.23	0.16	0.16	0.11	0.10	0.08
	Nm	215	218	237	235	230	238	210	160	175	141	130	122
	eff.	0.81	0.79	0.75	0.70	0.67	0.57	0.53	0.49	0.45	0.42	0.37	0.35
RA-TA 71/70 RA-TA 80/70	kW	1.59	1.2	0.95	0.68	0.50	0.44	0.32	0.26	0.23	0.18	0.17	0.12
	Nm	280	289	310	310	292	320	259	272	254	221	210	190
	eff.	0.82	0.80	0.76	0.71	0.68	0.60	0.54	0.50	0.46	0.42	0.37	0.36
RA-TA 71/85 RA-TA 80/85	kW	2.66	2.0	1.6	1.1	0.84	0.69	0.53	0.43	0.37	0.28	0.26	0.22
	Nm	490	490	526	516	495	501	500	466	449	391	380	345
	eff.	0.80	0.80	0.77	0.72	0.69	0.60	0.55	0.51	0.50	0.46	0.42	0.36
RA-TA 80/110 RA-TA 100/110	kW	- - -	4.3	3.2	2.4	1.8	1.6	1.1	1.0	0.80	0.66	0.51	0.32
	Nm	- - -	1030	1100	1150	1100	1170	1110	1100	995	950	780	550
	eff.	- - -	0.81	0.79	0.74	0.71	0.63	0.57	0.53	0.52	0.48	0.45	0.39
RA100/130	kW	- - -	6.41	4.94	3.72	2.71	2.37	1.65	1.47	1.25	1.02	0.82	0.47
	Nm	- - -	1600	1700	1800	1700	1800	1700	1700	1600	1600	1300	900
	eff.	- - -	0.83	0.80	0.75	0.73	0.63	0.60	0.55	0.53	0.52	0.46	0.45
RA100/150	kW	- - -	8.41	6.61	5.04	3.77	3.02	2.31	1.82	1.41	1.24	1.09	0.84
	Nm	- - -	2100	2300	2500	2400	2400	2500	2300	2000	1800	1800	1700
	eff.	- - -	0.83	0.81	0.77	0.74	0.66	0.63	0.60	0.59	0.81	0.48	0.47

Gearbox selection

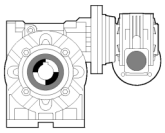
RA-TA - 1400 rpm [FXA i=8]

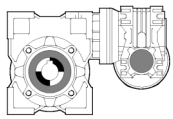


	$i = i_n \times i_2$	40	56	80	120	160	224	320	392	448	560	640	800
$i_n = 8$	rpm	35	25	18	12	9	6	4	3.5	3	2.5	2.2	1.75
	i_2	5	7	10	15	20	28	40	49	56	70	80	100
RA-TA 63/40	kW	0.43	0.32	0.23	0.16	0.11	0.11	0.08	0.06	0.05	0.03	0.03	0.02
	Nm	90	93	89	84	72	85	75	69	59	45	38	27
	eff.	0.76	0.75	0.72	0.65	0.59	0.50	0.44	0.41	0.38	0.36	0.34	0.31
RA-TA 63/50 RA-TA 71/50	kW	0.76	0.58	0.41	0.28	0.20	0.18	0.13	0.10	0.09	0.06	0.05	0.03
	Nm	165	170	165	154	130	150	130	120	115	86	73	53
	eff.	0.79	0.77	0.73	0.67	0.61	0.55	0.47	0.45	0.41	0.36	0.37	0.31
RA-TA 63/60 RA-TA 71/60 RA-TA 80/60	kW	1.15	0.87	0.68	0.49	0.34	0.31	0.21	0.16	0.15	0.10	0.08	0.05
	Nm	252	260	280	275	240	270	235	220	200	155	125	92
	eff.	0.80	0.78	0.75	0.69	0.65	0.57	0.51	0.50	0.43	0.41	0.37	0.35
RA-TA 71/70 RA-TA 80/70	kW	1.67	1.26	0.88	0.63	0.44	0.48	0.28	0.24	0.20	0.16	0.12	0.05
	Nm	370	380	365	360	325	440	320	320	275	245	200	145
	eff.	0.81	0.79	0.76	0.70	0.67	0.60	0.53	0.50	0.45	0.41	0.38	0.35
RA-TA 71/85 RA-TA 80/85	kW	2.30	1.76	1.42	1.07	0.85	0.65	0.48	0.40	0.33	0.26	0.20	0.13
	Nm	510	530	595	620	620	600	560	550	510	450	360	260
	eff.	0.81	0.79	0.77	0.71	0.67	0.60	0.54	0.52	0.50	0.45	0.41	0.37
RA-TA 80/110 RA-TA 100/110	kW	- - -	3.42	2.75	1.97	1.52	1.29	0.97	0.73	0.64	0.52	0.43	0.27
	Nm	- - -	1045	1170	1180	1160	1200	1180	1020	980	920	850	550
	eff.	- - -	0.80	0.78	0.73	0.70	0.61	0.56	0.52	0.50	0.46	0.45	0.38
RA100/130	kW	- - -	3.3	3.0	3.2	2.3	1.8	1.2	1.1	0.9	0.7	0.7	0.5
	Nm	- - -	1000	1240	1840	1765	1760	1700	1660	1600	1435	1330	1160
	eff.	- - -	0.80	0.78	0.73	0.72	0.62	0.58	0.56	0.54	0.51	0.45	0.43
RA100/150	kW	- - -	3.7	3.4	3.6	3.4	2.7	2.0	1.7	1.4	1.1	1.0	0.8
	Nm	- - -	1130	1425	2150	2580	2675	2860	2550	2490	2110	1970	1855
	eff.	- - -	0.81	0.79	0.75	0.72	0.63	0.61	0.56	0.57	0.49	0.46	0.45

Gearbox selection

RS/RS - RT/RT - 1400 rpm

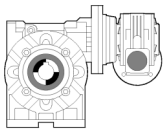


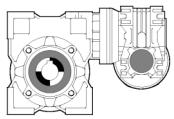


	$i_1 \times i_2$	150	200	280	420	560	784	1120	1568	2240	2800	4000	5600	8000	10000
	rpm	9.3	7.0	5.0		3.3	1.8	1.3	0.9	1.0	0.6	0.4	0.3	0.2	0.1
	i_1	10	10	10	15	20	28	40	56	56	70	100	100	100	100
	i_2	15	20	28	28	28	28	28	28	40	40	40	56	80	100
	kW	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
28/28	Nm	31	30	35	35	36	36	36	35	30	30	30	16	12	11
	eff.	0.51	0.49	0.40	0.38	0.37	0.32	0.300	0.25	0.21	0.20	0.18	0.14	0.13	0.12
	kW	0.12	0.12	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
28/40	Nm	64	77	71	68	85	80	80	80	73	76	70	62	41	25
	eff.	0.52	0.49	0.41	0.39	0.37	0.33	0.31	0.25	0.21	0.18	0.18	0.15	0.14	0.12
	kW	0.18	0.18	0.18	0.12	0.09	0.09	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
28/50	Nm	93	120	141	136	127	158	157	159	125	131	147	125	78	49
	eff.	0.52	0.49	0.41	0.39	0.37	0.33	0.31	0.25	0.22	0.19	0.19	0.16	0.14	0.12
	kW	0.18	0.18	0.18	0.18	0.12	0.12	0.09	0.09	0.006	0.06	0.06	0.06	0.6	0.06
28/60	Nm	100	128	151	219	183	223	227	258	220	217	164	195	128	91
	eff.	0.54	0.52	0.44	0.42	0.40	0.35	0.33	0.27	0.23	0.21	0.20	0.16	0.14	0.13
	kW	0.12	0.12	0.12	0.12	0.12	0.12	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
40/40	Nm	65	78	73	81	85	80	80	80	74	74	74	63	38	27
	eff.	0.53	0.48	0.43	0.39	0.37	0.34	0.30	0.27	0.23	0.21	0.19	0.06	0.15	0.13
	kW	0.25	0.18	0.18	0.12	0.12	0.12	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
40/50	Nm	136	126	153	136	127	1362	157	171	130	128	128	124	75	52
	eff.	0.53	0.50	0.43	0.39	0.37	0.34	0.31	0.27	0.24	0.21	0.19	0.17	0.15	0.13
	kW	0.37	0.37	0.25	0.18	0.18	0.12	0.09	0.09	0.06	0.06	0.06	0.06	0.06	0.06
40/60	Nm	210	252	222	219	270	229	227	277	246	241	246	203	137	93
	eff.	0.55	0.53	0.46	0.42	0.40	0.36	0.33	0.29	0.26	0.24	0.21	0.18	0.15	0.14
	kW	0.37	0.37	0.37	0.25	0.25	0.18	0.12	0.12	0.09	0.06	0.06	0.06	0.06	0.06
40/70	Nm	217	278	332	318	400	363	303	382	371	287	360	321	201	154
	eff.	0.57	0.55	0.47	0.44	0.42	0.38	0.33	0.30	0.27	0.25	0.22	0.20	0.15	0.14
	kW	0.37	0.37	0.37	0.37	0.37	0.25	0.18	0.18	0.12	0.12	0.09	0.06	0.06	0.06
40/85	Nm	220	278	346	493	622	531	481	611	513	596	565	458	373	264
	eff.	0.58	0.55	0.49	0.46	0.44	0.40	0.35	0.32	0.28	0.26	0.23	0.20	0.17	0.15
	kW	0.25	0.25	0.25	0.25	0.25	0.25	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
50/50	Nm	138	126	152	136	145	152	152	152	130	128	128	124	75	52
	eff.	0.54	0.50	0.43	0.39	0.38	0.35	0.32	0.29	0.25	0.22	0.20	0.17	0.15	0.13
	kW	0.37	0.37	0.25	0.25	0.25	0.25	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
50/60	Nm	213	252	222	224	275	262	233	280	246	246	246	203	135	93
	eff.	0.56	0.53	0.46	0.43	0.41	0.38	0.34	0.31	0.28	0.24	0.22	0.17	0.15	0.14
	kW	0.55	0.37	0.37	0.25	0.25	0.25	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
50/70	Nm	330	278	340	320	400	400	347	378	346	346	346	310	206	150
	eff.	0.58	0.55	0.48	0.44	0.42	0.39	0.35	0.32	0.29	0.25	0.23	0.20	0.16	0.15

Gearbox selection

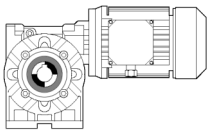
RS/RS - RT/RT - 1400 rpm

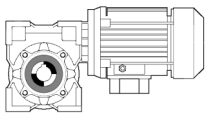




	$i_1 \times i_2$	150	200	280	420	560	784	1120	1568	2240	2800	4000	5600	8000	10000
	rpm	9.3	7.0	5.0	5.2	3.3	1.8	1.3	0.9	1.0	0.6	0.4	0.3	0.2	0.1
	i_1	10	10	10	15	20	28	40	56	56	70	100	100	100	100
	i_2	15	20	28	28	28	28	28	28	40	40	40	56	80	100
50/85	kW	0.75	0.75	0.55	0.37	0.37	0.25	0.18	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	Nm	455	573	514	482	620	544	509	469	600	607	607	540	375	268
	eff.	0.59	0.56	0.49	0.45	0.44	0.41	0.37	0.34	0.30	0.26	0.24	0.21	0.17	0.15
50/110	kW	0.75	0.75	0.75	0.75	0.55	0.55	0.37	0.25	0.25	0.18	0.12	0.12	0.12	0.12
	Nm	162	583	716	998	945	1196	1046	902	1184	928	786	963	821	550
	eff.	0.60	0.57	0.50	0.46	0.45	0.41	0.37	0.34	0.31	0.27	0.24	0.21	0.19	0.16
	kW	0.55	0.55	0.55	0.55	0.55	0.55	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
60/70	Nm	330	278	340	333	410	406	400	378	346	346	346	310	206	150
	eff.	0.58	0.55	0.48	0.46	0.43	0.39	0.36	0.30	0.29	0.26	0.23	0.21	0.16	0.15
	kW	0.75	0.75	0.55	0.55	0.55	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
60/85	Nm	455	573	525	503	620	530	607	607	607	607	607	540	375	268
	eff.	0.59	0.56	0.50	0.47	0.44	0.40	0.38	0.33	0.30	0.27	0.24	0.22	0.18	0.15
	kW	1.8	1.5	1.1	0.75	0.75	0.55	0.37	0.29	0.29	0.29	0.29	0.29	0.29	0.29
60/110	Nm	1110	1166	1050	1042	1285	1196	1074	902	1185	1210	1210	1065	825	580
	eff.	0.60	0.57	0.50	0.48	0.45	0.41	0.38	0.34	0.31	0.28	0.25	0.22	0.20	0.17
	kW	1.8	1.8	1.8	1.5	1.1	0.75	0.55	0.55	0.37	0.25	0.25	0.25	0.25	0.25
60/130	Nm	1110	1450	1750	2010	1930	1670	1530	2015	1830	1410	1770	1850	1420	1255
	eff.	0.60	0.59	0.52	0.50	0.46	0.43	0.40	0.35	0.33	0.30	0.27	0.25	0.21	0.20
	kW	0.75	0.75	0.55	0.55	0.55	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
70/85	Nm	462	583	536	514	620	570	607	607	607	607	607	540	375	268
	eff.	0.60	0.57	0.51	0.48	0.47	0.43	0.41	0.36	0.32	0.29	0.26	0.33	0.19	0.17
	kW	1.8	1.5	1.1	0.75	0.75	0.55	0.37	0.25	0.25	0.25	0.25	0.25	0.25	0.25
70/110	Nm	1127	1187	1093	1063	1300	1270	1159	955	1210	1210	1210	1065	825	580
	eff.	0.62	0.58	0.52	0.49	0.48	0.44	0.41	0.36	0.33	0.30	0.26	0.23	0.21	0.18
	kW	2.2	1.8	1.8	1.5	1.1	0.75	0.55	0.55	0.37	0.25	0.25	0.25	0.25	0.25
70/130	Nm	1400	1498	1780	2200	2055	1747	1644	2187	1940	1528	1615	1615	1550	1370
	eff.	0.62	0.61	0.53	0.51	0.49	0.45	0.43	0.38	0.35	0.32	0.28	0.26	0.23	0.21
	kW	3	3	2.2	1.8	105	1.1	0.75	0.75	0.55	0.37	0.37	0.25	0.25	0.25
70/150	Nm	1970	2520	2230	2570	2830	2570	2460	2850	3020	2325	2875	2670	2135	1995
	eff.	0.63	0.60	0.57	0.52	0.50	0.46	0.43	0.38	0.36	0.33	0.31	0.27	0.23	0.22
	kW	4	3	2.2	1.8	1.5	1.1	0.75	0.75	0.55	0.55	0.55	0.55	0.55	0.55
85/150	Nm	2580	2550	2230	2570	2830	2570	2520	3075	2835	2710	2710	2650	2180	1980
	eff.	0.63	0.61	0.57	0.52	0.50	0.46	0.44	.041	0.38	0.35	0.31	0.29	0.25	0.23

MRS-MRT - 1400 rpm





0.06 kW	rpm	i =	Nm	SF	kg
MRS-MRT 28	280	5	1,8	>3	3.6
MRS-MRT 28	200	7	2,4	>3	3,6
MRS-MRT 28	140	10	3,3	>3	3,6
MRS-MRT 28	93	15	4,7	>3	3,6
MRS-MRT 28	70	20	6,1	2,6	3,6
MRS-MRT 28	50	28	7,6	2,6	3,6
MRS-MRT 28	35	40	10	1,7	3,6
MRA-MTA 63 / 40	32	44	14	>3	6,5
MRS-MRT 28	29	49	11	1,5	3,6
MRS-MRT 28	25	56	12	1,3	3,6
MRA-MTA 63 / 40	22	63	19	>3	6,5
MRS-MRT 28	20	70	13	0,9	3,6
MRS-MRT 40	18	80	16	2,0	5,0
MRA-MTA 63 / 40	15	95	26	2,8	6,5
MRS-MRT 40	14	100	19	1,5	5,0
MRA-MTA 63 / 40	11	126	31	2,0	6,5
MRS-MRT 28 / 28	9,3	150	31	1,1	5,0
MRA-MTA 63 / 40	8,0	176	37	1,8	6,5
MRS-MRT 28 / 28	7,0	200	30	0,8	5,0
MRA-MTA 63 / 40	5,5	252	46	1,4	6,5
MRS-MRT 28 / 28	5,0	280	35	0,8	5,0
MRA-MTA 63 / 40	4,6	309	54	1,0	6,5
MRA-MTA 63 / 40	4,0	353	56	1,0	6,5
MRS-MRT 28 / 40	3,3	420	67	1,3	6,4
MRA-MTA 63 / 50	3,2	441	65	1,4	7,8
MRA-MTA 63 / 50	2,8	504	74	1,2	7,8
MRS-MRT 28 / 40	2,5	560	85	1,0	6,4
MRA-MTA 63 / 50	2,2	630	80	0,9	7,8
MRS-MRT 28 / 50	1,8	784	106	1,5	7,7
MRS-MRT 28 / 50	1,3	1120	142	1,2	7,7
MRS-MRT 28 / 50	0,9	1560	160	1,0	7,7
MRS-MRT 28 / 60	0,6	2240	211	1,2	10
MRS-MRT 28 / 60	0,5	2800	241	0,9	10
MRS-MRT 40 / 70	0,4	4000	360	1,0	15
MRS-MRT 40 / 70	0,3	5600	458	0,7	15
MRS-MRT 40 / 85	0,2	8000	557	0,7	19
MRS-MRT 40 / 85	0,1	10000	614	0,4	19

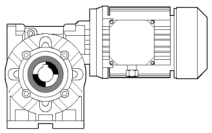
0,09 kW	rpm	i =	Nm	SF	kg
MRS-MRT 28	280	5	2,7	>3	3.7
MRS-MRT 28	200	7	3,6	>3	3,7
MRS-MRT 28	140	10	5,0	>3	3,7
MRS-MRT 28	93	15	7,1	2,5	3,7
MRS-MRT 28	70	20	9,1	1,8	3,7
MRS-MRT 28	50	28	11	1,8	3,7
MRS-MRT 28	35	40	15	1,1	3,7
MRA-MTA 63 / 40	32	44	21	>3	6,6
MRS-MRT 28	29	49	17	1,0	3,7

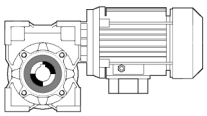
0.09 kW	rpm	i =	Nm	SF	kg
MRS-MRT 40	25	56	20	2,1	5,1
MRA-MTA 63 / 40	22	63	28	2,8	6,6
MRS-MRT 40	20	70	22	1,6	5,1
MRS-MRT 40	18	80	25	1,3	5,1
MRA-MTA 63 / 40	15	95	39	1,9	6,6
MRS-MRT 40	14	100	28	1,0	5,1
MRA-MTA 63 / 40	11	126	46	1,4	6,6
MRS-MRT 28 / 40	9,3	150	48	1,3	6,5
MRA-MTA 63 / 40	8,0	176	56	1,2	6,6
MRS-MRT 28 / 40	7,0	200	60	1,3	6,5
MRA-MTA 63 / 40	5,5	252	70	0,9	6,6
MRS-MRT 28 / 40	5,0	280	70	1,0	6,5
MRA-MTA 63 / 50	4,6	309	86	1,3	7,9
MRA-MTA 63 / 50	4,0	353	91	1,1	7,9
MRS-MRT 28 / 50	3,3	420	101	1,5	7,8
MRA-MTA 63 / 50	3,2	441	97	0,9	7,9
MRS-MRT 28 / 50	2,5	560	127	1,2	7,8
MRS-MRT 28 / 50	1,8	784	159	1,0	7,8
MRS-MRT 28 / 50	1,3	1120	213	0,8	7,8
MRS-MRT 28 / 60	0,9	1568	260	1,0	11
MRS-MRT 40 / 70	0,6	2240	371	1,0	15
MRS-MRT 40 / 85	0,5	2800	447	1,3	19
MRS-MRT 40 / 85	0,4	4000	565	1,0	19
MRS-MRT 40 / 85	0,3	5600	688	0,8	19

0,12 kW	rpm	i =	Nm	SF	kg
MRS-MRT 28	280	5	3,6	>3	4.8
MRS-MRT 28	200	7	4,8	>3	4,8
MRS-MRT 28	140	10	6,6	2,7	4,8
MRS-MRT 28	93	15	9,5	1,9	4,8
MRS-MRT 28	70	20	12	1,3	4,8
MRS-MRT 28	50	28	15	1,3	4,8
MRS-MRT 40	35	40	20	2,1	6,2
MRA-MTA 63 / 40	32	44	27	2,9	7,7
MRS-MRT 40	29	49	23	1,8	6,2
MRS-MRT 40	25	56	26	1,5	6,2
MRA-MTA 63 / 40	22	63	37	2,1	7,7
MRS-MRT 40	20	70	30	1,2	6,2
MRS-MRT 40	18	80	33	1,0	6,2
MRA-MTA 63 / 40	15	95	52	1,4	7,7
MRS-MRT 50	14	100	38	1,1	7,5
MRA-MTA 63 / 40	11	126	62	1,0	7,7
MRS-MRT 28 / 40	9,3	150	64	1,4	7,6
MRA-MTA 63 / 40	8,0	176	75	0,9	7,7
MRS-MRT 28 / 40	7,0	200	77	1,0	7,6
MRA-MTA 63 / /50	5,5	252	99	1,2	9,0
MRS-MRT 28 / 40	5,0	280	94	0,8	7,6
MRA-MTA 63 / /50	4,6	309	114	0,9	9,0

Geared Motor Selection

MRS-MRT - 1400 rpm





0.12 kW	rpm	i =	Nm	SF	kg
MRS-MRT 28 / 50	3,3	420	134	1,2	8,9
MRS-MRT 28 / 50	2,5	560	170	0,9	8,9
MRS-MRT 28 / 60	1,8	784	225	1,1	12
MRS-MRT 28 / 60	1,3	1120	303	0,8	12
MRS-MRT 40 / 70	0,9	1568	385	1,0	16
MRS-MRT 40 / 85	0,6	2240	513	1,2	20
MRS-MRT 40 / 85	0,5	2800	596	1,0	20
MRS-MRT 40 / 85	0,4	4000	753	0,8	20

0,18 kW	rpm	i =	Nm	SF	kg
MRS-MRT 28	280	5	5,4	>3	5.4
MRS-MRT 28	200	7	7,2	2,5	5,4
MRS-MRT 28	140	10	9,9	1,8	5,4
MRS-MRT 28	93	15	14	1,3	5,4
MRS-MRT 28	70	20	18	0,8	5,4
MRS-MRT 40	50	28	23	2,1	6,8
MRS-MRT 40	35	40	30	1,4	6,8
MRA-MTA 63 / 40	32	44	41	1,9	8,3
MRS-MRT 40	29	49	35	1,2	6,8
MRS-MRT 40	25	56	39	1,0	6,2
MRA-MTA 63 / 40	22	63	56	1,4	8,3
MRS-MRT 50	20	70	46	1,4	8,1
MRS-MRT 50	18	80	51	1,1	8,1
MRA-MTA 63 / 40	15	95	78	0,9	8,3
MRS-MRT 50	14	100	43	0,8	8,1
MRA-MTA 63 / 50	11	126	97	1,2	9,6
MRS-MRT 28 / 50	9,3	150	93	1,6	9,5
MRA-MTA 63 / 50	8,0	176	119	1,2	9,6
MRS-MRT 28 / 50	7,0	200	120	1,1	9,5
MRS-MRT 28 / 50	5,0	280	141	1,1	9,5
MRS-MRT 28 / 60	3,3	420	217	1,1	12
MRS-MRT 40 / 70	2,5	560	289	1,4	16
MRS-MRT 40 / 70	1,8	784	366	1,1	16
MRS-MRT 40 / 85	1,3	1120	481	1,3	21
MRS-MRT 40 / 85	0,9	1568	616	1,0	21
MRS-MRT 40 / 85	0,6	2240	770	0,8	21

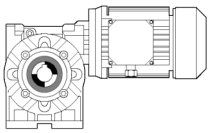
0,25 kW	rpm	i =	Nm	SF	kg
MRS-MRT 40	280	5	7,5	>3	8,3
MRS-MRT 40	200	7	10	>3	8,3
MRS-MRT 40	140	10	14	>3	8,3
MRS-MRT 40	93	15	20	2,2	8,3
MRS-MRT 40	70	20	26	1,5	8,3
MRS-MRT 40	50	28	32	1,5	8,3
MRS-MRT 40	35	40	42	1,0	8,3
MRA-MTA 71 / 50	32	44	59	2,5	12
MRS-MRT 50	29	49	52	1,5	9,6
MRS-MRT 50	25	56	57	1,3	9,6
MRA-MTA 71 / 50	22	63	80	1,7	12
MRS-MRT 50	20	70	63	1,0	9,6
MRS-MRT 60	18	80	72	1,5	12

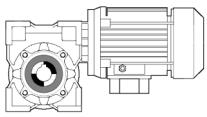
0.25 kW	rpm	i =	Nm	SF	kg
MRA-MTA 71 / 50	95	95	109	1,2	12
MRS-MRT 60	14	100	88	1,0	12
MRA-MTA 71 / 60	11	126	144	1,6	15
MRS-MRT 40 / 70	9,3	150	146	1,5	18
MRA-MTA 71 / 60	8,0	176	171	1,4	15
MRS-MRT 40 / 70	7,0	200	188	1,5	18
MRA-MTA 71 / 70	5,5	252	232	1,3	18
MRS-MRT 40 / 70	5,0	280	224	1,5	18
MRA-MTA 71 / 70	4,6	309	263	1,0	18
MRA-MTA 71 / 70	4,0	353	277	0,9	18
MRS-MRT 40 / 70	3,3	420	315	1,2	18
MRS-MRT 40 / 70	2,5	560	401	1,0	18
MRS-MRT 40 / 85	1,8	784	535	1,1	22
MRS-MRT 50 / 110	1,3	1120	707	1,8	46
MRS-MRT 50 / 110	0,9	1568	882	1,5	46
MRS-MRT 50 / 110	0,6	2240	1146	1,2	46
MRS-MRT 50 / 110	0,5	2800	1289	0,9	46

0,37 kW	rpm	i =	Nm	SF	kg
MRS-MRT 40	280	5	11	>3	8,7
MRS-MRT 40	200	7	15	3,0	8,7
MRS-MRT 40	140	10	21	2,2	8,7
MRS-MRT 40	93	15	30	1,5	8,7
MRS-MRT 40	70	20	38	1,0	8,7
MRS-MRT 40	50	28	48	1,0	8,7
MRS-MRT 50	35	40	65	1,1	10
MRA-MTA 71 / 50	32	44	87	1,7	13
MRS-MRT 50	29	49	77	1,0	10
MRS-MRT 60	25	56	85	1,5	13
MRA-MTA 71 / 50	22	63	118	1,1	13
MRS-MRT 60	20	70	97	1,3	13
MRS-MRT 60	18	80	107	1,0	13
MRA-MTA 71 / 60	15	95	168	1,4	16
MRS-MRT 70	14	100	130	1,0	15
MRA-MTA 71 / 60	11	126	213	1,1	15
MRS-MRT 40 / 70	9,3	150	217	2,1	18
MRA-MTA 71 / 60	8,0	176	253	0,9	15
MRS-MRT 40 / 70	7,0	200	278	1,3	18
MRA-MTA 71 / 70	5,5	252	343	0,9	18
MRS-MRT 40 / 70	5,0	280	332	1,1	18
MRS-MRT 40 / 85	3,3	420	488	1,2	23
MRS-MRT 40 / 85	2,5	560	622	1,0	23
MRS-MRT 50 / 110	1,3	1120	1046	1,2	47
MRS-MRT 50 / 110	0,9	1568	1306	1,1	47

0,55 kW	rpm	i =	Nm	SF	kg
MRS-MRT 40	280	5	16	2,8	10,7
MRS-MRT 50	200	7	23	>3	12
MRS-MRT 50	140	10	32	2,4	12
MRS-MRT 50	70	20	57	1,1	12
MRS-MRT 50	50	28	75	1,1	12

MRS-MRT - 1400 rpm





0.55 kW	rpm	i =	Nm	SF	kg
MRS-MRT 60	35	40	99	1,4	15
MRA-MTA 80 / 60	32	44	130	1,7	19
MRS-MRT 60	29	49	114	1,1	15
MRS-MRT 60	25	56	126	1,0	15
MRA-MTA 80 / 60	22	63	177	1,2	19
MRS-MRT 70	20	70	155	1,1	18
MRS-MRT 70	18	80	168	1,0	18
MRA-MTA 80/60	15	95	249	1,0	19
MRS-MRT 85	14	100	210	1,0	22
MRA-MTA 80 / 70	11	126	321	1,1	22
MRA-MTA 80 / 85	8,0	176	396	1,3	26
MRA-MTA 80 / 85	5,5	252	520	1,0	26
MRA-MTA 80 / 110	4,6	309	614	1,8	49
MRA-MTA 80 / 110	4,0	353	689	1,4	49
MRS-MRT 50 / 110	3,3	420	756	1,1	49
MRA-MTA 80 / 110	3,2	441	794	1,2	49
MRA-MTA 80 / 110	2,8	504	851	0,9	49
MRS-MRT 50 / 110	2,5	570	962	1,3	49
MRS-MRT 50 / 110	1,8	784	1235	1,5	49

0,75 kW	rpm	i =	Nm	SF	kg
MRS-MRT 50	200	5	23	>3	14
MRS-MRT 50	200	7	31	2,4	14
MRS-MRT 50	140	10	43	1,7	14
MRS-MRT 50	93	15	60	1,2	14
MRS-MRT 60	70	20	79	1,5	17
MRS-MRT 60	50	28	102	1,4	17
MRS-MRT 60	35	40	135	1,0	17
MRA-MTA 80 / 60	32	44	178	1,2	20
MRS-MRT 70	29	49	168	1,1	19
MRS-MRT 70	25	56	183	1,0	19
MRA-MTA 80 / 60	22	63	242	1,0	20
MRS-MRT 85	20	70	226	1,3	23
MRS-MRT 85	18	80	246	1,1	23
MRA-MTA 80 / 70	11	126	341	0,9	23
MRA-MTA 80 / 85	8,0	176	540	0,9	27
MRA-MTA 80 / 110	5,5	252	735	1,5	50
MRA-MTA 80 / 110	4,6	309	838	1,3	50
MRA-MTA 80 / 110	4,0	353	939	1,1	50
MRS-MRT 50 / 110	3,3	420	1031	1,2	50
MRA-MTA 80 / 110	3,2	441	1083	0,9	50
MRS-MRT 50 / 110	2,5	570	1289	1,0	50

1.1 kW	rpm	i =	Nm	SF	kg
MRS-MRT 60	200	5	34	>3	19
MRS-MRT 60	140	10	63	2,1	19
MRS-MRT 60	93	15	91	1,4	19
MRS-MRT 60	70	20	116	1,1	19
MRS-MRT 70	50	28	158	1,4	21
MRS-MRT 70	35	40	213	1,1	21

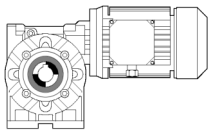
1.1 kW	rpm	i =	Nm	SF	kg
MRA-MTA 80 / 70	32	44	264	1,1	25
MRS-MRT 85	29	49	246	1,3	26
MRS-MRT 85	25	56	286	1,1	26
MRA-MTA 80 / 85	22	63	364	1,4	30
MRS-MRT 110	20	70	352	1,8	48
MRS-MRT 110	18	80	396	1,3	48
MRA-MTA 80 / 85	15	95	513	1,0	30
MRS-MRT 110	14	100	458	1,0	48
MRA-MTA 80 / 110	11	126	671	1,6	52
MRA-MTA 80 / 110	8,0	176	832	1,4	52
MRA-MTA 80 / 110	5,5	252	1078	1,0	52
MRA-MTA 80 / 110	4,6	309	1229	0,9	52
MRA 110 / 130	3,5	400	1681	1,0	94
MRS-MRT 60 / 130	3,3	420	1576	1,3	69
MRA 110/150	3,0	448	1916	1,3	99
MRA 110/150	2,5	560	2059	1,0	99
MRA 110/150	2,2	640	2209	0,9	99
MRS-MRT 70 / 150	1,8	784	2706	0,9	102

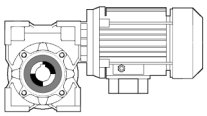
1,5 kW	rpm	i =	Nm	SF	kg
MRS-MRT 60	280	5	46	2,7	20
MRS-MRT 60	200	7	62	1,8	20
MRS-MRT 60	140	10	86	1,5	20
MRS-MRT 60	93	15	124	1,0	20
MRS-MRT 70	70	20	166	1,2	23
MRS-MRT 70	50	28	215	1,0	23
MRS-MRT 85	35	40	295	1,4	27
MRA-MTA 80 / 85	32	44	360	1,4	31
MRS-MRT 85	29	49	336	0,9	27
MRS-MRT 110	29	49	356	1,8	50
MRS-MRT 110	25	56	401	1,5	50
MRA-MTA 80 / 85	22	63	496	1,1	31
MRS-MRT 110	20	70	480	1,3	50
MRS-MRT 110	18	80	540	1,0	50
MRA-MTA 80 / 110	15	95	719	1,6	54
MRS130	14	100	624	1,2	64
MRA-MTA 80 / 110	11	126	915	1,2	54
MRA-MTA 80 / 110	8,0	176	1135	1,0	54
MRA100/130	7,0	200	1269	1,0	71
MRA100/130	6,3	224	1421	1,2	71
MRA100/150	5,0	280	1490	1,1	101
MRA100/150	3,5	400	2292	1,1	101

2.2 kW	rpm	i =	Nm	SF	kg
MRS-MRT 70	280	5	92	1,9	28
MRS-MRT 70	200	7	92	1,8	28
MRS-MRT 70	140	10	129	1,4	28
MRS-MRT 70	93	15	187	1,0	28
MRS-MRT 85	70	20	246	1,3	33
MRS-MRT 85	50	28	319	1,0	33

Geared Motor Selection

MRS-MRT - 1400 rpm





2.2 kW	rpm	i =	Nm	SF	kg
MRS-MRT 110	35	40	438	1,6	55
MRS-MRT 110	29	49	522	1,2	55
MRS-MRT 110	25	56	588	1,0	55
MRS-MRT 110	20	70	704	0,9	55
MRS130	18	80	756	1,1	69
MRS150	14	100	945	1,2	99
MRA100/130	14	98	985	1,5	78
MRA100/130	12	125	1369	1,3	78
MRA100/130	10	140	1324	1,0	78
MRA100/130	8,9	160	1729	1,0	78
MRA100/150	7,0	200	1861	1,1	108
MRA100/150	6,3	230	2175	1,2	108

3 kW	rpm	i =	Nm	SF	kg
MRS-MRT 70	280	5	91	1,9	30
MRS-MRT 70	200	7	126	1,3	30
MRS-MRT 70	140	10	176	1,0	30
MRS-MRT 85	93	15	255	1,1	35
MRS-MRT 85	70	20	336	1,1	35
MRS-MRT 110	50	28	435	1,5	57
MRS-MRT 110	35	40	598	1,2	57
MRS-MRT 110	29	49	712	0,9	57
MRS130	29	49	722	1,3	71
MRS130	25	56	814	1,2	71
MRS150	20	70	974	1,3	101
MRA100/130	20	70	1074	1,3	78
MRS150	18	80	1064	1,1	101
MRA100/130	18	80	1277	1,0	78
MRA100/130	14	98	1344	1,1	78
MRS150	14	100	1289	0,9	101
MRA100/130	12	120	1793	1,0	78
MRA100/150	10	140	1891	1,1	108
MRA100/150	8,9	160	2357	1,1	108

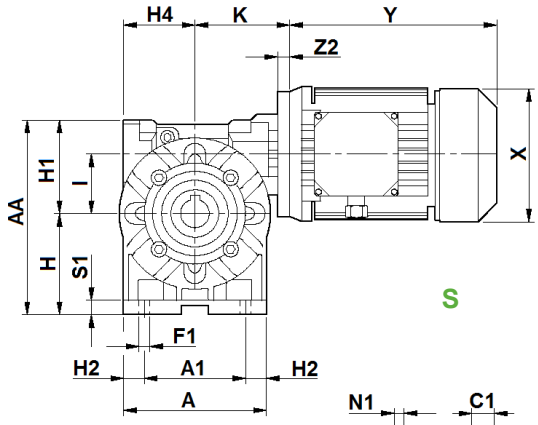
4 kW	rpm	i =	Nm	SF	kg
MRS-MRT 85	280	5	122	2.3	43
MRS-MRT 85	200	7	168	1,5	43
MRS-MRT 85	140	10	235	1,1	43
MRS-MRT 110	93	15	344	1,6	65
MRS-MRT 110	50	28	581	1,1	65
MRS130	35	40	829	1,4	79
MRS130	29	49	963	1,0	79
MRS130	25	56	1085	0,9	79
MRS150	25	56	1115	1,3	109
MRS150	20	70	1299	0,9	109
MRA100/130	20	70	1433	0,9	86
MRA100/150	18	80	1724	0,9	116
MRA100/150	14	98	1845	1,2	116
MRA100/150	12	120	2456	0,9	116

5.5 kW	rpm	i =	Nm	SF	kg
MRS-MRT 110	200	7	231	2,3	79
MRS-MRT 110	140	10	326	1,6	79
MRS-MRT 110	93	15	473	1,2	79
MRS-MRT 110	70	20	623	1,0	79
MRS130	50	28	809	1,4	93
MRS130	35	40	1141	1,0	93
MRS150	29	49	1342	1,1	123
MRS150	25	56	1534	0,9	123

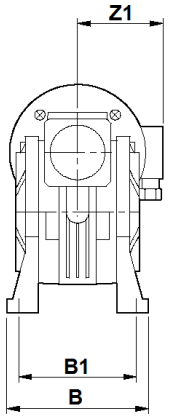
7,5 kW	rpm	i =	Nm	SF	kg
MRS-MRT 110	200	7	315	1,7	88
MRS-MRT 110	140	10	445	1,2	88
MRS-MRT 110	93	15	645	0,9	88
MRS130	93	15	652	1,5	102
MRS 130	70	20	860	1,1	102
MRS130	50	28	1103	1,0	102
MRS150	35	40	1576	1,1	132

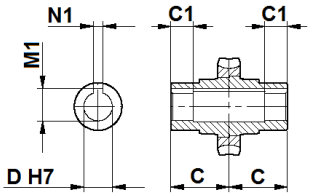
11 kW	rpm	i =	Nm	SF	kg
MRS150	200	7	467	2,3	148
MRS150	140	10	660	1,9	148
MRS150	93	15	968	1,5	148
MRS150	70	20	1261	1,1	148

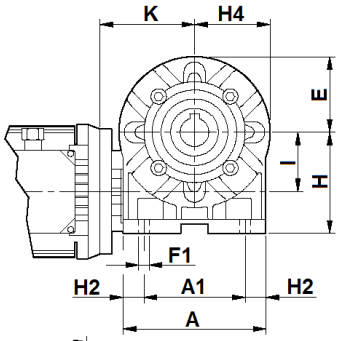
15 kW	rpm	i =	Nm	SF	kg
MRS150	200	7	637	1,7	158
MRS150	140	10	900	1,4	158
MRS150	93	15	1320	1,1	158


H4
K
Y
Z2
X
AA
H1
I
H
S1
F1
H2
A1
H2
A

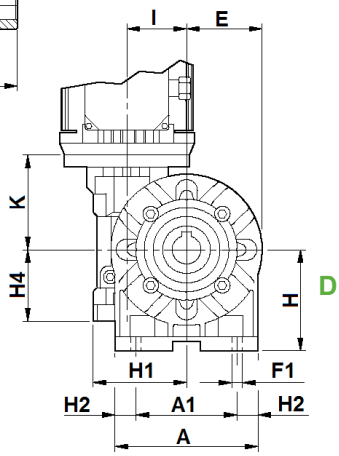
S


Z1
B1
B

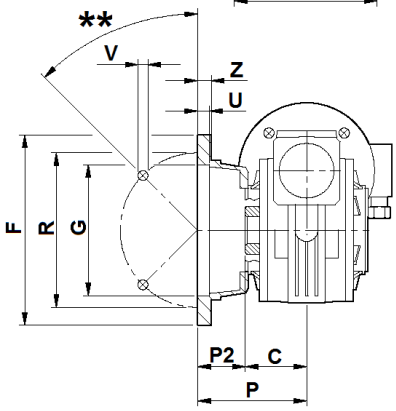

N1
C1
C1
M1
D H7
C
C


K
H4
E
I
H
F1
H2
A1
H2
A

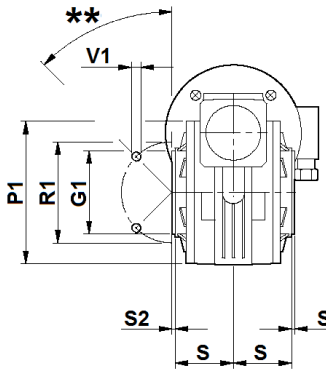
I


I
E
K
H4
H
H1
F1
H2
A1
H2
A

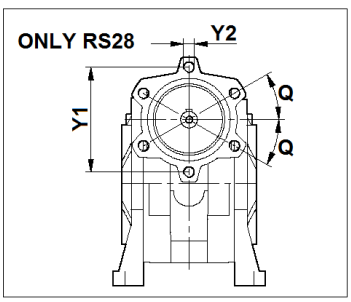
D

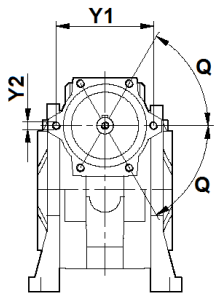

**
V
Z
U
F
R
G
P2
C
P

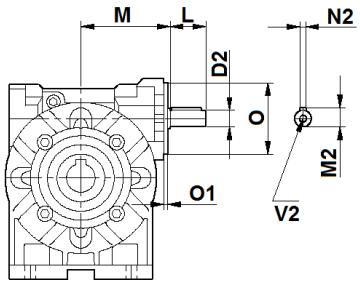
FL


**
V1
P1
R1
G1
S2
S2
S
S

PC


ONLY RS28
Y2
Y1
Q
Q


Y1
Y2
Q
Q


M
L
N2
D2
O
M2
O1
V2

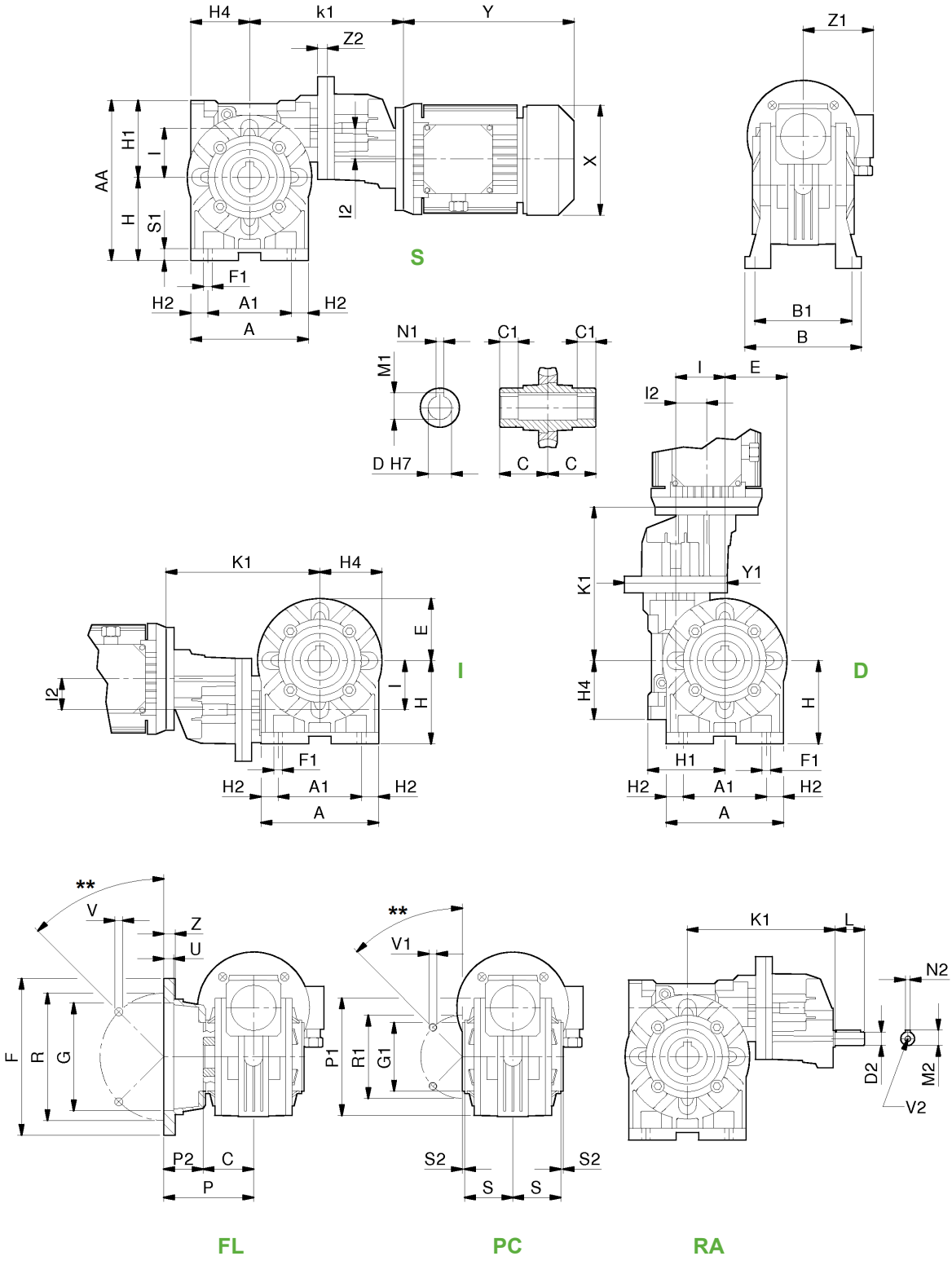
RS

RS-RT

Dimensions [mm]

RS	28	40	50	60	70	85	110	130	150
A	70	100	120	138	158	193	250	286	336
A_1	52	70	85	95	120	140	200	235	260
AA	99	138	163	192	221	252	333	400	454
B	78	102	119	136	#	168	200	230	250
B_1	66	84	99	111	116	140	162	190	210
C	30	41	49	60	60	61	77,5	90	105
C_1	26.5	26	30.5	39	37.5	38.5	52.5	85	100
D_{H7}	14	18-19-20	24-25	25	25-28-30	32-35	42	48	55
$D_{2\ h6}$	9	11	14	19	19	24	28	38	42
E	34	50	61	70	80	98	125	143	168
F	70	140	160	180	200	200	250	300	350
F_1	5,5	7	9	11	11	13	14	15	19
G_{H8}	40	95	110	115	130	130	180	230	250
$G_{1\ f8}$	42	60	70	70	80	110	130	180	180
H	52	71	85	100	115	135	172	200	230
H_1	47	67	78	92	106	117	161	200	224
H_2	9	15	17,5	21,5	19	26,5	25	25,5	38
H_4	40	50	60	72	86	103	139	159	183
I	28	40	50	60	70	85	110	130	150
K	57,5	70,5	83-88*	93-94*	117-118*	134-137*	151-153*	173	191-211*
L	20	23	30	40	40	50	60	80	100
M	50	65	75	87	110	123,5	146	166	195
M_1	16,3	20.8-21,8-22.8	27,3-28.3	28,3	28.3-31,3-33.3	35,3-38.3	45,3	51,8	59,3
M_2	10,2	12,5	16	22,5	22,5	27	31	41	45
N_1	5	6	8	8	8	10	12	14	16
N_2	3	4	5	6	6	8	8	10	12
O	37	52	60	70	70	80	90	120	120
O_1	2,5	3,5	3,5	4,75	4,75	5	6	9	9
P	49	82	91,5	116	111	100	150	150	160
P_1	67	94	100	102	118	150	200	234	250
P_2	19	41	42,5	56	51	39	72,5	60	55
Q	30°	60°	55°	60°	60°	60°	60°	60°	60°
R	56	115	130	150	165	165	215	265	300
R_1	56	83	85	85	100	130	165	215	215
S	32	38	49	57,5	57	56.5	75	87	102
S_1	6	9	12	12	14	15	17	19	20
S_2	-3	2	2,5	2,5	3	3	2,5	5	5
U	4	6	10	10	12	6	5	5	6
V	6,5 (4)	9 (4)	9 (4)	11 (4)	13 (4)	13 (4)	15 (8)	15 (8)	19 (8)
V_1	M6x6 (4)	M6x9 (4)	M8x12 (4)	M8x15 (8)	M8x18 (8)	M10x20 (8)	M12x21 (8)	M12x24 (8)	M14x30 (8)
V_2	M4x10	M4x10	M6x15	M8x20	M8x20	M8x20	M8x20	M10x22	M12x25
Y_1	47	61	70	80	85	100	106	140	140
Y_2	M5x8.5 (6)	M5x10 (6)	M6x10 (6)	M6x12 (6)	M8x16 (6)	M8x15 (6)	M8x15,5 (6)	M10x20 (6)	M10x20 (6)
Z	6	10	10	11	14	14	16	22	20

* - IEC71-B14(FRS50), IEC71-B14(FRS60), IEC80-B14(FRS70), IEC90-B14(FRS85), IEC100/112-B14(FRS110), IEC160-B5(FRS150)
** - 90° for RS28 / 45° for other sizes
# - 137 - Cover with bolted feet (std)
- 142 - Cover with integral feet
S, I, D - Integral/bolted feet RS28-110
- Integral feet RS130-150
Motor dimensions: see page 59
Not binding dimensions


H4
k1
Y
Z2
H1
I
AA
H
S1
I2
X
F1
H2
A1
H2
A
S
Z1
B1
B
N1
C1
C1
M1
D H7
C
C
I
E
I2
K1
Y1
H4
H
H1
F1
H2
A1
H2
A
D
K1
H4
E
I2
I
H
F1
H2
A1
H2
A
I
**
V
Z
U
F
R
G
P2
C
P
FL
**
V1
P1
R1
G1
S2
S
S
S2
PC
K1
L
N2
D2
M2
V2
RA

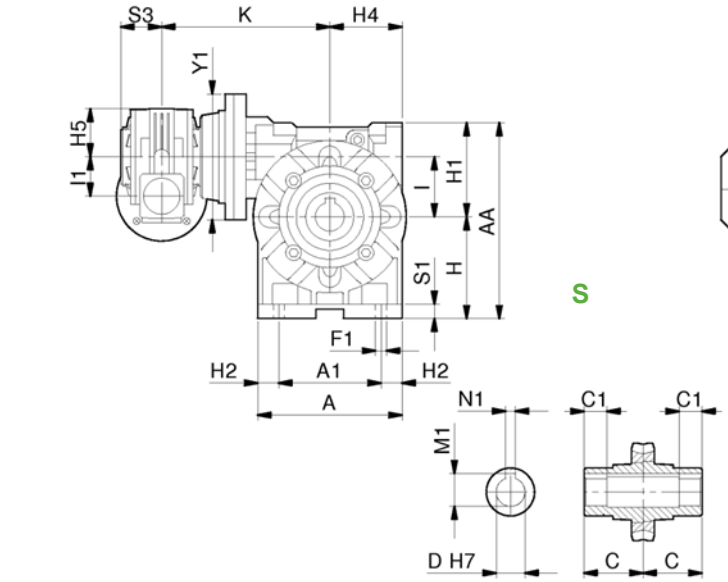
RS-RT

Dimensions [mm]

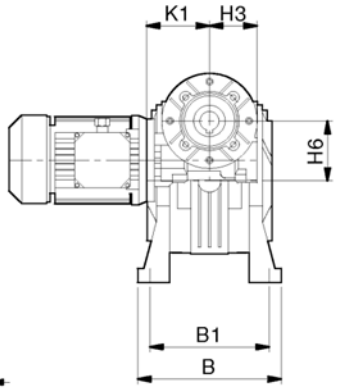
RA	63/40	63/50	63/60	71/50	71/60	71/70	71/85	80/60	80/70	80/85	80/110	100/110	100/130	100/150
A	100	120	138	120	138	158	193	138	158	193	250	250	286	336
A_1	70	85	95	85	95	120	140	95	120	140	200	200	235	260
AA	138	163	192	163	192	221	252	192	221	252	333	333	400	454
B	102	119	136	119	136	#	168	136	#	168	200	200	230	250
B_1	84	99	111	99	111	116	140	111	116	140	162	162	190	210
C	41	49	60	49	60	60	61	60	60	61	77,5	77,5	90	105
C_1	26	30.5	39	30.5	39	37.5	38.5	39	37.5	38.5	52.5	52.5	85	100
D_{H7}	18-19-20	24-25	25	24-25	25	25-28-30	32	25	25-28-30	32-35	42	42	48	55
$D_{2\ h6}$	11	11	11	14	14	14	14	19	19	19	19	24	24	24
E	50	61	70	61	70	80	98	70	80	98	125	125	143	168
F	140	160	180	160	180	200	200	180	200	200	250	250	300	350
F_1	7	9	11	9	11	11	13	11	11	13	14	14	15	19
G_{H8}	95	110	115	110	115	130	130	115	130	130	180	180	230	250
$G_{1\ f8}$	60	70	70	70	70	80	110	70	80	110	130	130	180	180
H	71	85	100	85	100	115	135	100	115	135	172	172	200	230
H_1	67	78	92	78	92	106	117	92	106	117	161	161	200	224
H_2	15	17,5	21,5	17,5	21,5	19	26,5	21,5	19	26,5	25	25	25,5	38
H_4	50	60	72	60	72	86	103	72	86	103	139	139	159	189
I	40	50	60	50	60	70	85	60	70	85	110	110	130	150
I_2	32	32	32	40	40	40	40	50	50	50	50	63	63	63
K_1	153,5	171	177	173	183	209	224	207	232,5	250,5	264,5	328	342	368
	- - -	- - -	- - -	178*	188*	214*	229*	- - -	- - -	- - -	- - -	- - -	- - -	- - -
L	23	23	23	30	30	30	30	40	40	40	40	50	50	50
M_1	20.8-21,8-22.8	27,3-28.3	28,3	27,3-28.3	28,3	28.3-31,3-33.3	35,3	28,3	28.3-31,3-33.3	35,3-38.3	45,3	45,3	51,8	59,3
M_2	12,5	12,5	12,5	16	16	16	16	22,5	22,5	22,5	22,5	27	27	27
N_1	6	8	8	8	8	8	10	8	8	10	12	12	14	16
N_2	4	4	4	5	5	5	5	6	6	6	6	8	8	8
P	82	91,5	116	91,5	116	111	100	116	111	100	150	150	150	160
P_1	94	100	102	100	102	118	150	102	118	150	200	200	234	250
P_2	41	42,5	56	42,5	56	51	39	56	51	39	72,5	72,5	60	55
R	115	130	150	130	150	165	165	150	165	165	215	215	265	300
R_1	83	85	85	85	85	100	130	85	100	130	165	165	215	215
S	38	49	57,5	49	57,5	57	56,5	57,5	57	56,5	75	75	87	102
S_1	9	12	12	12	12	14	15	12	14	15	17	17	19	20
S_2	2	2,5	2,5	2,5	2,5	3	3	2,5	3	3	2,5	2,5	5	5
U	6	10	10	10	10	12	6	10	12	6	5	5	5	6
V	9 (4)	9 (4)	11 (4)	9 (4)	11 (4)	13 (4) (4)	13 (4)	11 (4)	13 (4)	13 (4)	15 (8)	15 (8)	15 (8)	19 (8)
V_1	M6x9 (4)	M8x12 (4)	M8x15 (8)	M8x12 (4)	M8x15 (8)	M8x18 (8)	M10x20 (8)	M8x15 (8)	M8x18 (8)	M10x20 (8)	M12x21 (8)	M12x21 (8)	M12x24 (8	M14x30 (8)
V_2	M4x10	M4x10	M4x10	M6x15	M6x15	M6x15	M6x15	M8x20	M8x20	M8x20	M8x20	M8x20	M8x20	M8x20
Y_1	105	105	105	120	120	120	120	140	140	140	140	140	200	200
Z	10	10	11	10	11	14	14	11	14	14	16	16	22	20

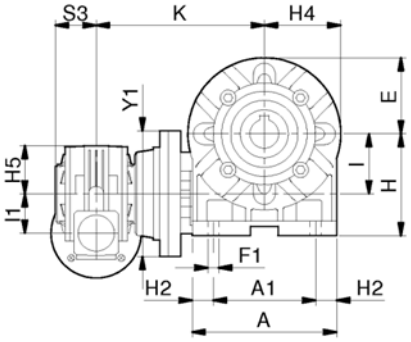
* - IEC71-B14 (**FRA 71/50, FRA 71/60, FRA 71/70, FRA 71/85**) - IEC100-B5 (**FRA 100/130**) - IEC100-B5 (**FRA 100/150**)
** - 90° for RS28 / 45° for other sizes
\# - 137 - Bolted feet version (std)
- 142 - Integral feet version
S, I, D - Integral/bolted feet RS28-110
- Integral feet RS130-150
Motor dimensions: see page 59
Not binding dimensions

RS/RS - Two-stage worm box

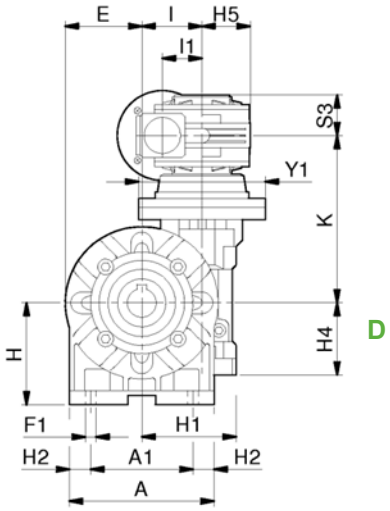


S

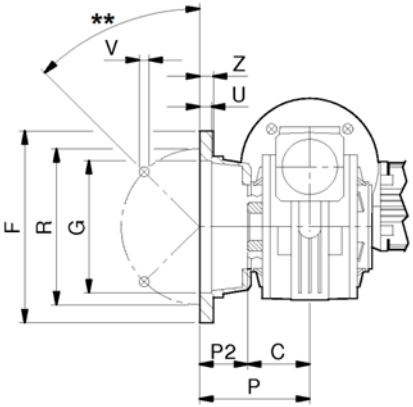




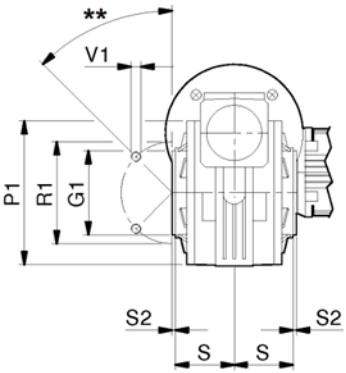
I



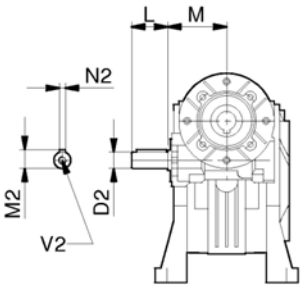
D



FL



PC



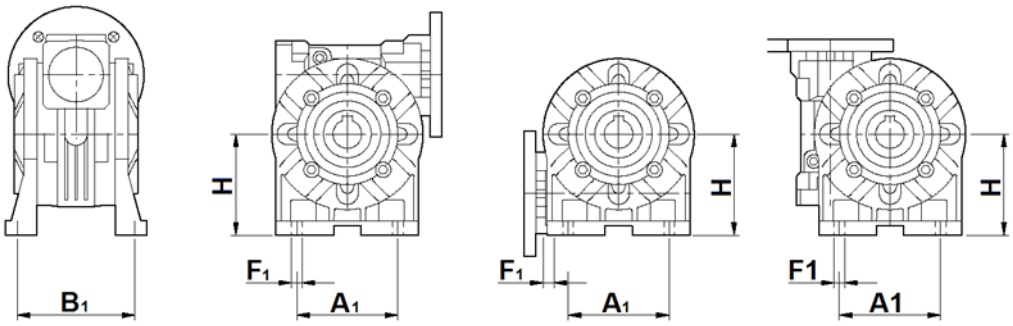
RS/RS

RS-RT

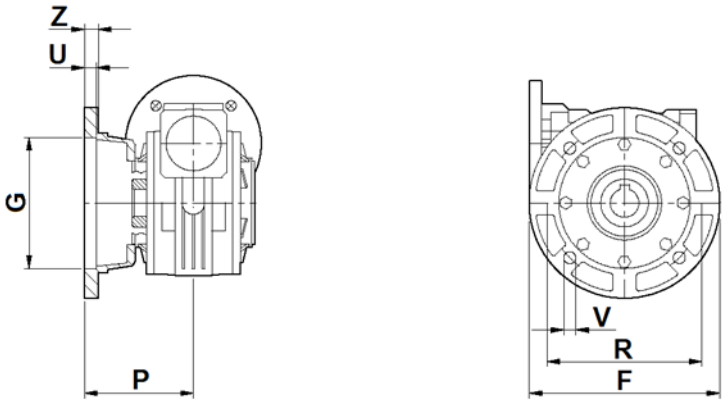
Dimensions [mm]

RS/RS	28/28	28/40	28/50	28/60	40/70	40/85	50/110	60/130	70/150
A	70	100	120	138	158	193	250	286	336
A_1	52	70	85	95	120	140	200	235	260
AA	99	138	163	192	221	252	333	400	454
B	78	102	119	136	#	168	200	230	250
B_1	66	84	99	111	116	140	162	190	210
C	30	41	49	60	60	61	77,5	90	105
C_1	26.5	26	30.5	39	37.5	38.5	52.5	85	100
D $_{H7}$	14	18-19-20	24-25	25	25-28-30	32-35	42	48	55
$D_{2\ h6}$	9	9	9	9	11	11	14	38	42
E	34	50	61	70	80	98	125	143	168
F	70	140	160	180	200	200	250	300	350
F_1	5,5	7	9	11	11	13	14	15	19
G $_{H8}$	40	95	110	115	130	130	180	230	250
$G_{1\ f8}$	42	60	70	70	80	110	130	180	180
H	52	71	85	100	115	135	172	200	230
H_1	47	67	78	92	106	117	161	200	224
H_2	9	15	17,5	21,5	19	26,5	25	25,5	38
H_3	40	40	40	40	50	50	60	72	86
H_4	40	50	60	72	86	103	139	159	189
H_5	34	34	34	34	50	50	61	70	80
H_6	47	47	47	47	67	67	78	92	106
I	28	40	50	60	70	85	110	130	150
I_1	28	28	28	28	40	40	50	60	70
K	99,5	123	138,5	146	182	199	246	246	300
K_1	57,5	57,5	57,5	57,5	70,5	70,5	83 - 88*	93 – 94*	117-118*
L	20	20	20	20	23	23	30	40	40
M	50	50	50	50	65	65	75	87	110
M_1	16,3	20.8-21,8-22.8	27,3-28.3	28,3	28.3-31,3-33.3	35,3-38.3	45,3	51,8	59,3
M_2	10,2	10,2	10,2	10,2	12,5	12,5	16	22,5	22,5
N_1	5	6	8	8	8	10	12	14	16
N_2	3	3	3	3	4	4	5	6	6
P	49	82	91,5	116	111	100	150	150	160
P_1	67	94	100	102	118	150	200	234	250
P_2	19	41	42,5	56	51	39	72,5	60	55
R	56	115	130	150	165	165	215	265	300
R_1	56	83	85	85	100	130	165	215	215
S	32	38	49	57,5	57	56,5	75	87	102
S_1	6	9	12	12	14	15	17	19	20
S_2	-3	2	2,5	2,5	3	3	2,5	5	5
S_3	30	30	30	30	41	41	49	60	60
U	4	6	10	10	12	6	5	5	6
V	6,5 (4)	9 (4)	9 (4)	11 (4)	13 (4)	13 (4)	15 (8)	15 (8)	19 (8)
V_1	M6x6 (4)	M6x9 (4)	M8x12 (4)	M8x15 (8)	M8x18 (8)	M10x20 (8)	M12x21 (8)	M12x24 (8)	M14x30 (8)
V_2	M4x10	M4x10	M4x10	M4x10	M4x10	M4x10	M6x15	M8x20	M8x20
Y_1	80	80	80	90	115	115	110	180	200
Z	6	10	10	11	14	14	16	22	20

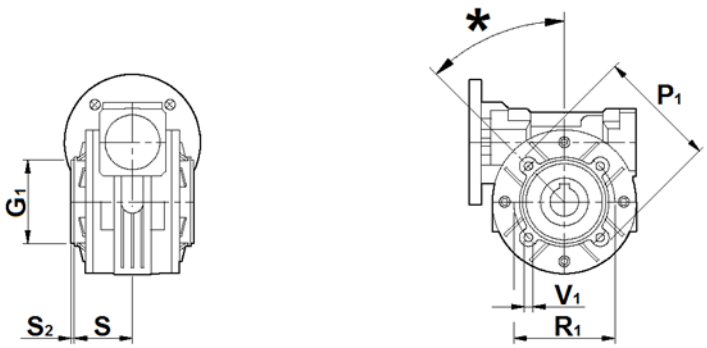
* - IEC71-B14 (**FRS50**) - IEC71-B14 (**FRS60**) - IEC 80-B14 (**FRS70**)
** - 90° for RS28 / 45° for other sizes
# - 137 - Bolted feet (std)
- 142 - Integral feet
S, I, D - Integral/bolted feet RS28-110
- Integral feet RS130-150
Motor dimensions: see page 59
Not binding dimensions



SA IA DA



FA - FB - FR



PA - PB

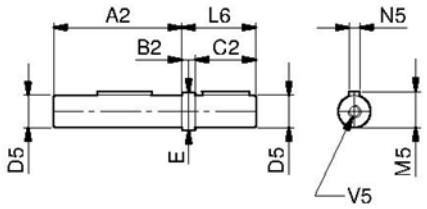
RS-RT

Dimensions [mm]

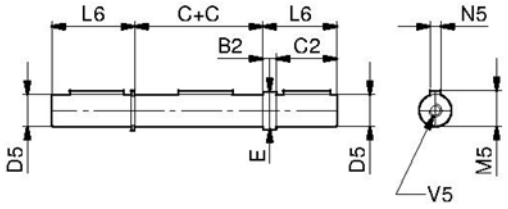
RS	28	40	50	60	70	85	110	130	150
SA – IA - DA									
A_1	- - -	52	63	- - -	- - -	140	- - -	- - -	- - -
B_1	- - -	81	98,5	- - -	- - -	146	- - -	- - -	- - -
F_1	- - -	8,5	9	- - -	- - -	11	- - -	- - -	- - -
H	- - -	72	82	- - -	- - -	142	- - -	- - -	- - -
FA									
F	80	114	125	165	165	- - -	- - -	- - -	- - -
G_{H8}	50	60	70	110	115	- - -	- - -	- - -	- - -
P	50,5	69	93	90	116	- - -	- - -	- - -	- - -
R	68	87	90	130	150	- - -	- - -	- - -	- - -
U	3,5	5	5	10	4,5	- - -	- - -	- - -	- - -
V	6,5 (4)	9 (4)	11 (4)	10,5 (4)	11 (4)	- - -	- - -	- - -	- - -
Z	7	8	10	15	10	- - -	- - -	- - -	- - -
FB									
F	- - -	120	- - -	180	- - -	210	270	- - -	- - -
G_{H8}	- - -	80	- - -	115	- - -	152	170	- - -	- - -
P	- - -	62	- - -	86	- - -	119,5	131,5	- - -	- - -
R	- - -	100	- - -	150	- - -	176	230	- - -	- - -
U	- - -	4	- - -	3,5	- - -	5	5	- - -	- - -
V	- - -	9 (4)	- - -	11 (4)	- - -	11 (4)	13 (4)	- - -	- - -
Z	- - -	9	- - -	12	- - -	14	18	- - -	- - -
FR									
F	- - -	- - -	- - -	- - -	160	- - -	- - -	- - -	- - -
G_{H8}	- - -	- - -	- - -	- - -	110	- - -	- - -	- - -	- - -
P	- - -	- - -	- - -	- - -	84,5	- - -	- - -	- - -	- - -
R	- - -	- - -	- - -	- - -	130	- - -	- - -	- - -	- - -
U	- - -	- - -	- - -	- - -	4,5	- - -	- - -	- - -	- - -
V	- - -	- - -	- - -	- - -	11 (4)	- - -	- - -	- - -	- - -
Z	- - -	- - -	- - -	- - -	14	- - -	- - -	- - -	- - -
PA									
$G_{1\ h8}$	- - -	50	68	75	90	- - -	- - -	- - -	- - -
P_1	- - -	95	110	104	125	- - -	- - -	- - -	- - -
R_1	- - -	65	94	90	110	- - -	- - -	- - -	- - -
S	- - -	38	49	57,5	57	- - -	- - -	- - -	- - -
S_2	- - -	2	2,5	5,5	3	- - -	- - -	- - -	- - -
V_1	- - -	M6x8 (4)	M6x12,5(4)	M8x14 (4)	M8x14 (4)	- - -	- - -	- - -	- - -
PB									
$G_{1\ h8}$	- - -	- - -	60	- - -	70	- - -	- - -	- - -	- - -
P_1	- - -	- - -	110	- - -	116	- - -	- - -	- - -	- - -
R_1	- - -	- - -	75	- - -	85	- - -	- - -	- - -	- - -
S	- - -	- - -	49	- - -	67	- - -	- - -	- - -	- - -
S_2	- - -	- - -	2,5	- - -	4	- - -	- - -	- - -	- - -
V_1	- - -	- - -	M6x12,5(4)	- - -	M8x14 (4)	- - -	- - -	- - -	- - -

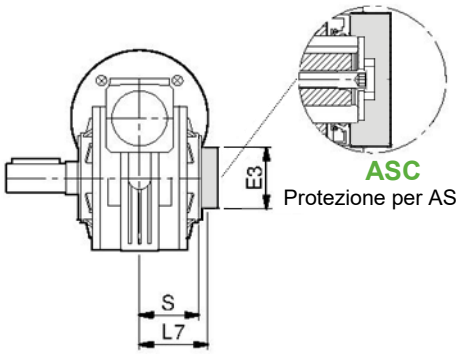
* - 45° std / 90° on demand
FA, FB - Integral/bolted flanges RS28-85
FB - Bolted flange, only RS110
FR - Bolted flange RS70
Motor dimensions: see page 59
Not binding dimensions

AS



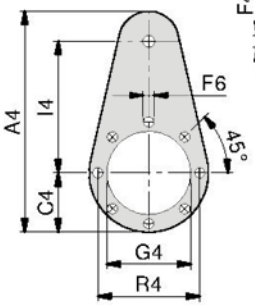
AD



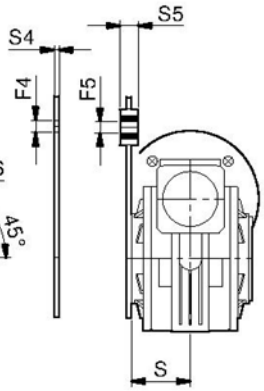


ASC
Protezione per AS

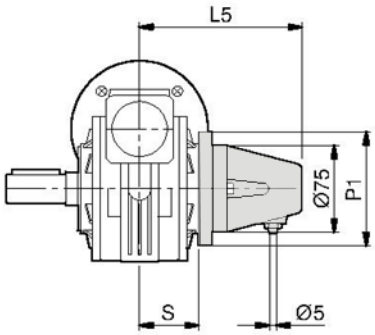
BR



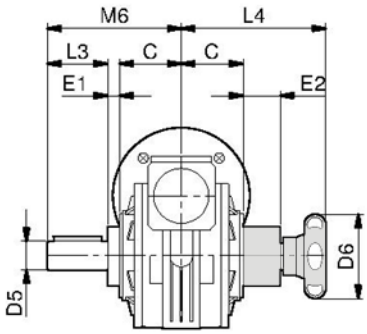
BRV



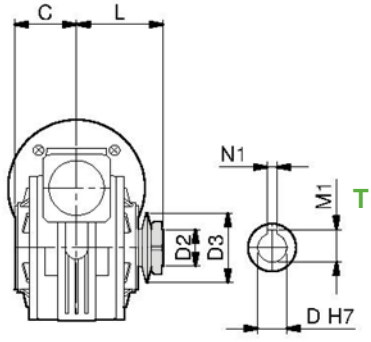
SL



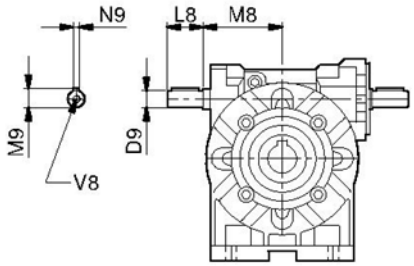
TLE



TLI



VB



TLI
Oil

Litres

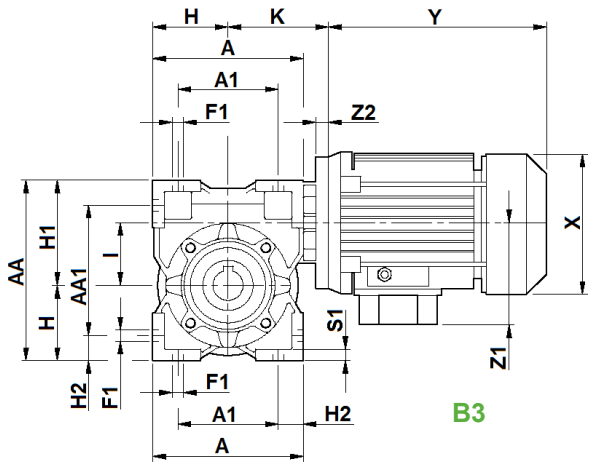
RS 28	0.04
RS 40	0.10
RS 50	0.13
RS 60	0.30
RS 70	0.45
RS 85	0.75
RS 110	2.25

RS-RT

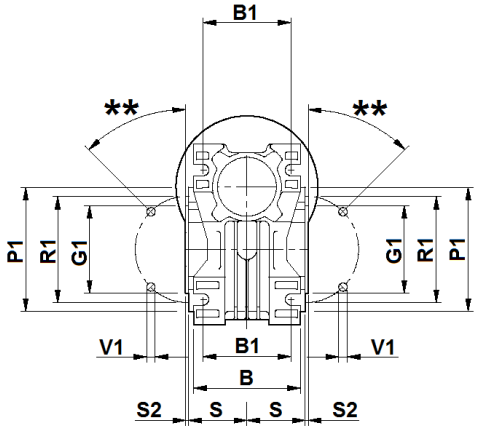
Dimensions [mm]

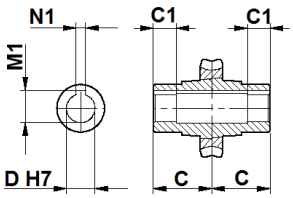
RS		28	40	50	60	70	85	110	130	150
AS &	A_2	58	80	95	117	117	119	153	177	207
AD	B_2	1	10	10	10	10	10	10	20	20
	C	30	41	49	60	60	61	77,5	90	105
	C_2	30	40	45	50	60	70	100	110	110
	$D_{5\ g6}$	14	19 (18)	24 (25)	25	28	32 (35)	42	48	55
	E	14	22	28	30	34	38	50	58	63
	L_6	31	50	55	60	70	80	110	130	130
	M_5	16	21,5	27	28	31	35	45	51,5	59
	$N_{5\ (h9)}$	5	6	8	8	8	10	12	14	16
	V_5	M5x10	M8x20	M8x20	M8x20	M8x20	M10x25	M10x25	- - -	- - -
ASC	E_3	42	55	62	62	72	90	120	- - -	- - -
	L_7	36	48,5	55,5	68,5	67	77	85	- - -	- - -
	S	32	38	49	57.5	57	56.5	75	- - -	- - -
BR &	A_4	133,5	168	185	230	240	313	388	465	525
BRV	C_4	33,5	43	60	50	60	75	100	120	125
	F_4	10,5	10,5	10,5	10,5	10,5	20,5	20,5	26	26
	$F_{5\ 0/+0.4}$	10	10	10	10	10	20	20	25	25.2
	F_6	7	7	9	9	9	11	13	13	15
	G_4	42	60	70	70	80	110	130	180	180
	I_4	80	90	100	150	150	200	250	300	350
	R_4	56	83	85	85	100	130	165	215	215
	S_4	4	4	4	6	6	6	6	6	6
	S_5	15	15	15	20	20	25	25	30	30
SL	L_5	97	114	129	137	133	133	151	- - -	- - -
	P_1	67	100	110	102	120	150	200	- - -	- - -
	S	32	38	49	57,5	57	56.5	75	- - -	- - -
TLE	D_6	52	70	70	70	80	100	100	- - -	- - -
	E_1	10	12	12	15	14	19	24	- - -	- - -
	E_2	28	37	31	40	46	57	71	- - -	- - -
	L_3	30	40	50	50	60	70	80	- - -	- - -
	L_4	94	116	118	128	146	168	201	- - -	- - -
	M_6	70	93	111	125	134	150	181	- - -	- - -
TLI	D_{H7}	14	18-19	24/25	25	28	32/35	42	- - -	- - -
	D_2	14,2 x 20	19,5 x 20,5	24,5 x 28	25,5 x 26	28,5 x 22	32,5 x 27	42,5 x 38,5	- - -	- - -
	D_3	40	56	71	71	80	90	125	- - -	- - -
	L	45	61,5	77	86,5	89	94	112.5	- - -	- - -
	M_1	15,4*	21,8	27,3	27,3*	31,3	35,3	45,3	- - -	- - -
	$N_{1\ h9}$	5	6	8	8	8	10	12	- - -	- - -
VB	D_9	9	11	14	19	19	24	28	38	42
	L_8	20	23	30	40	40	50	60	80	100
	M_8	43	55	65	77	84	106,5	145	166	195
	M_9	10,2	12,5	16	22,5	22,5	27	31	41	45
	$N_{9\ h9}$	3	4	5	6	6	8	8	10	12
	V_8	M4x10	M4x10	M6x15	M8x20	M8x20	M8x20	M8x20	M10x22	M12x25

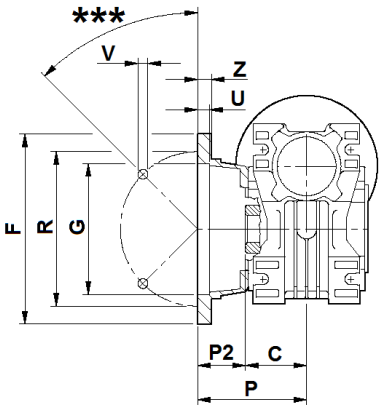
* = Undersized key
D_5(..) = Diameter on demand
Not binding dimensions


H
K
Y
A
A1
F1
Z2
AA
H1
H
AA1
I
S1
X
Z1
H2
F1
F1
A1
H2
A

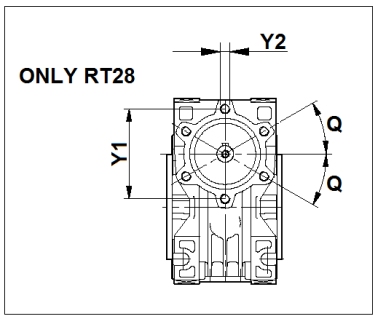
B3

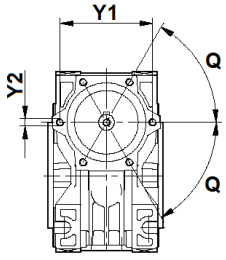

B1
**
**
P1
R1
G1
G1
R1
P1
V1
B1
V1
B
S2
S
S
S2

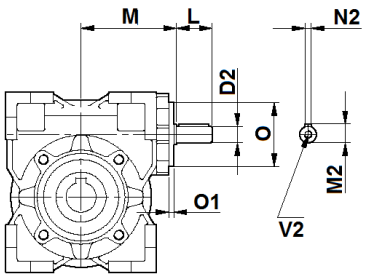

N1
C1
C1
M1
D H7
C
C


***
V
Z
U
F
R
G
P2
C
P

F, [FV], {FL}


ONLY RT28
Y2
Y1
Q
Q


Y1
Y2
Q
Q


M
L
N2
D2
O
M2
O1
V2

RT

Dimensions [mm]

RT	28	40	50	60	70	85	110
A	80	100	120	144	172	206	255
A_1	54	70	80	100	120	140	170
AA	97	121,5	144	174	205	238	295
AA_1	71	91,5	104	130	153	172	210
B	53	71	85	100	112	130	144
B_1	44	60	70	85	90	100	115
C	30	41	49	60	60	61	77,5
C_1	26.5	26	30.5	39	37.5	38.5	52.5
D_{H7}	14	18-19-20	24-25	25	25-28-30	32-35	42
$D_{2\ h6}$	9	11	14	19	19	24	28
F	80	110 {110}	125 [160] 125}	180 {180}	200	210	270
F_1	7	7	9	9	11	13	15
G_{H8}	50	60 {60}	70 [110] {70}	115 {115}	130	152	170
$G_{1\ h8}$	55	60	70	80	95	110	130
H	40	50	60	72	86	103	127,5
H_1	57	71,5	84	102	119	135	167,5
H_2	13	15	20	22	26	33	42,5
I	28	40	50	60	70	85	110
K	57,5	70,5	83-88*	93-94*	117-118*	134-137*	151-153*
L	20	23	30	40	40	50	60
M	50	65	75	87	110	123,5	146
M_1	16,3	20.8-21,8-22.8	27,3-28.3	28,3	28.3-31,3-33.3	35,3-38.3	45,3
M_2	10,2	12,5	16	22,5	22,5	27	31
N_1	5	6	8	8	8	10	12
N_2	3	4	5	6	6	8	8
O	37	52	60	70	70	80	90
O_1	2,5	3,5	3,5	4,75	4,75	5	6
P	53	69 {99}	93 [90,5] {123}	86 {116}	111	111	131
P_1	75	86	100	110	130	160	200
P_2	23	28 {58}	44 [41,5] {74}	25 {56}	51	50	53,5
Q	30°	60°	55°	60°	60°	60°	60°
R	68	87 {87}	90 [130] {90}	150,5 {150,5}	165	175	230
R_1	65	75	85	95	115	130	165
S	27,5	38,5	46,5	57	57	67	74
S_1	6	7	8	10	11	14	13
S_2	2,5	2,5	3	3	3	3	3,5
U	10	4 {4}	5 [11] {5}	6,5 {6,5}	12	6	5
V	7	9 {9}	11 [9] {9}	11 {11}	13	13	14
V_1	M6x10 (4)	M6x8,5 (4)	M8x10 (4)	M8x16 (8)	M8x16 (8)	M10x18 (8)	M10x21 (8)
V_2	M4x10	M4x10	M6x15	M8x20	M8x20	M8x20	M8x20
Y_1	47	61	70	80	85	100	106
Y_2	M5x8,5 (6)	M5x10 (6)	M6x10 (6)	M6x10 (6)	M8x16 (6)	M8x15 (6)	M8x15,5 (6)
Z	7	6 {8}	10 [13] {10}	10 {10}	14	16	18
Z_2	13	13	13 - 18,5	14 - 15	15,5 - 17,5	15,5 - 18,5	18-20

* - IEC71-B14 (**FRT50**) - IEC71-B14 (**FRT60**) - IEC 80-B14 (**FRT70**) - IEC 90-B14 (**FRT85**) - IEC100/112-B14 (**FRT110**)

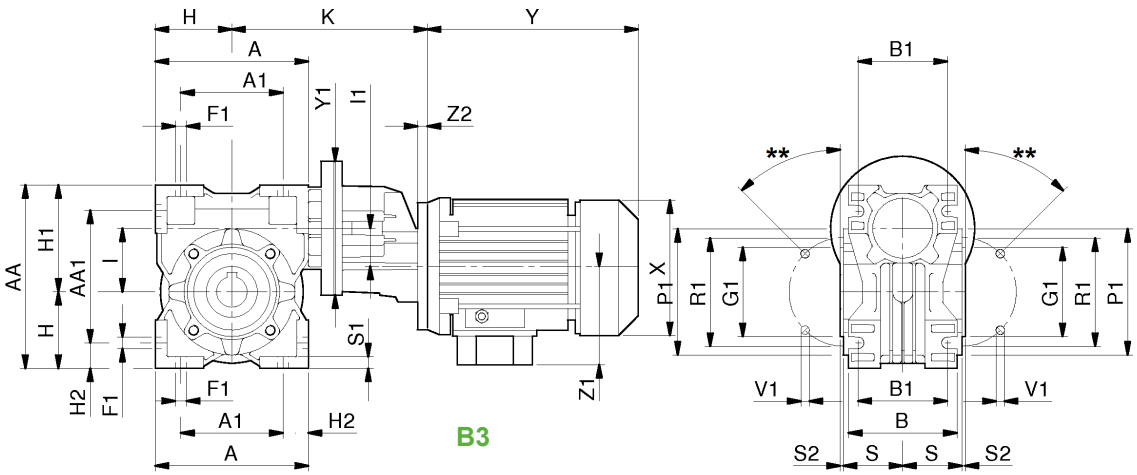
** - 90° for RT28 / 45° for other sizes

*** - 45° standard / 90° on demand

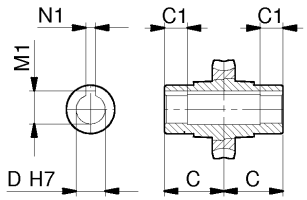
Motor dimensions: see page 59

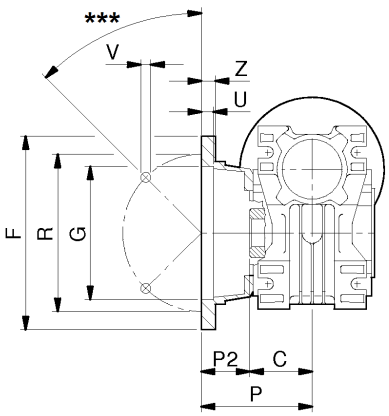
Not binding dimensions

Note: dimensions L, M, O, O_1, Y_1, Y_2 also apply to SRT input

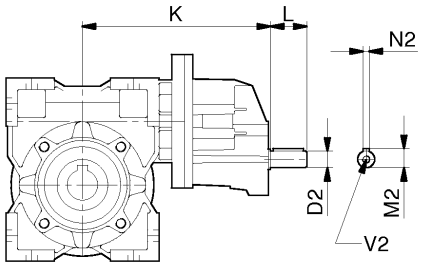

H
K
Y
A
A1
F1
Y1
I1
Z2
B1
**
**
AA
H1
H
AA1
I
S1
Z1
P1
X
R1
G1
G1
R1
P1
H2
F1
F1
A1
H2
A
V1
B1
V1
B
S2
S
S
S2

B3


N1
C1
C1
M1
D H7
C
C


***
V
Z
U
F
R
G
P2
C
P

F, [FV], {FL}


K
L
N2
D2
M2
V2

TA

RS-RT

Dimensions [mm]

TA	63/40	63/50	63/60	71/50	71/60	71/70	71/85	80/60	80/70	80/85	80/110	100/110
A	100	120	144	120	144	172	206	144	172	206	255	255
A_1	70	80	100	80	100	120	140	100	120	140	170	170
AA	121,5	144	174	144	174	205	238	174	205	238	295	295
AA_1	91,5	104	130	104	130	153	172	130	153	172	210	210
B	71	85	100	85	100	112	130	100	112	130	144	144
B_1	60	70	85	70	85	90	100	85	90	100	115	115
C	41	49	60	49	60	60	61	60	60	61	77,5	77,5
C_1	26	30.5	39	30.5	39	37.5	38.5	39	37.5	38.5	52.5	52.5
D_{H7}	18-19-20	24-25	25	24-25	25	25-28-30	32-35	25	25-28-30	32-35	42	42
$D_{2\ h6}$	11	11	11	14	14	14	14	19	19	19	19	24
F	110 {110}	125 [160]	180 {180}	125 [160]	180 {180}	200	210	180 {180}	200	210	270	270
	- - -	{125}	- - -	{125}	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
F_1	7	9	9	9	9	11	13	9	11	13	15	15
G_{H8}	60 {60}	70 [110]	115 {115}	70 [110]	115 {115}	130	152	115 {115}	130	152	170	170
	- - -	{70}	- - -	{70}	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
$G_{1\ h8}$	60	70	80	70	80	95	110	80	95	110	130	130
H	50	60	72	60	72	86	103	72	86	103	127,5	127,5
H_1	71,5	84	102	84	102	119	135	102	119	135	167,5	167,5
H_2	15	20	22	20	22	26	33	22	26	33	42,5	42,5
I	40	50	60	50	60	70	85	60	70	85	110	110
I_1	32	32	32	40	40	40	40	50	50	50	50	50
K	153,5	171	177	173-178*	183 188*	209-214*	224 229*	207	232,5	250,5	264,5	328
L	23	23	23	30	30	30	30	40	40	40	40	50
M_1	20.8-21,8-22.8	27,3-28.3	28,3	27,3-28.3	28,3	28.3-31,3-33.3	35,3-38.3	28,3	28.3-31,3-33.3	35,3-38.3	45,3	45,3
M_2	12,5	12,5	12,5	16	16	16	16	22,5	22,5	22,5	22,5	27
N_1	6	8	8	8	8	8	10	8	8	10	12	12
N_2	4	4	4	5	5	5	5	6	6	6	6	8
P	69 {99}	93 [90,5]	86 {116}	93 [90,5]	86 {116}	111	111	86 {116}	111	111	131	131
	- - -	{123}	- - -	{123}	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
P_1	86	100	110	100	110	130	160	110	130	160	200	200
P_2	28 {58}	44 [41,5]	25 {56}	44 [41,5]	25 {56}	51	50	25 {56}	51	50	53,5	53,5
	- - -	{74}	- - -	{74}	- - -	- - -	- - -	{56}	- - -	- - -	- - -	- - -
R	87 {87}	90 [130] {90}	150,5 {150,5}	90 [130] {90}	150,5 {150,5}	165	175	150,5 {150,5}	165	175	230	230
R_1	75	85	95	85	95	115	130	95	115	130	165	165
S	38,5	46,5	57	46,5	57	57	67	57	57	67	74	74
S_1	7	8	10	8	10	11	14	10	11	14	13	13
S_2	2,5	3	3	3	3	3	3	3	3	3	3,5	3,5
U	4 {4}	5 [11] {5}	6,5 {6,5}	5 [11] {5}	6,5 {6,5}	12	6	6,5 {6,5}	12	6	5	5
V	9 {9}	11 [9] {9}	11 {11}	11 [9] {9}	11 {11}	13	13	11 {11}	13	13	14	14
V_1	M6x8 (4)	M8x10 (4)	M8x16 (8)	M8x10 (4)	M8x16 (8)	M8x16 (8)	M10x18 (8)	M8x16 (8)	M8x16 (8)	M10x18 (8)	M10x21 (8)	M10x21 (8)
V_2	M4 x 10	M4 x 10	M4 x 10	M6 x 15	M6 x 15	M6 x 15	M6 x 15	M8 x 20	M8 x 20	M8 x 20	M8 x 20	M8 x 20
Y_1	105	105	105	120	120	120	120	140	140	140	140	140
Z	6 {8}	10 [13] {10}	10 {10}	10 [13] {10}	10 {10}	14	16	10 {10}	14	16	18	18
Z_2	13	13	13	13 - 18,5	13 - 18,5	13 - 18,5	13 - 18,5	14 - 15	14 - 15	14 - 15	14 - 15	14 - 15

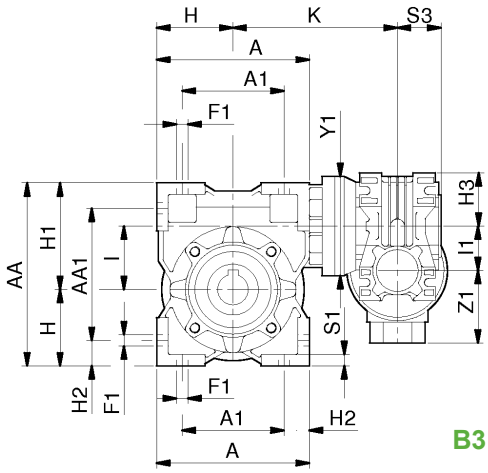
* - IEC71-B14 (**FTA 71/50**, **FTA71/60**, **FTA71/70**. **FTA71/85**)

** - 90° for RT28 / 45° for other sizes

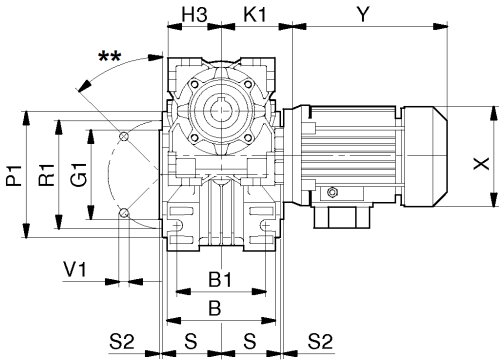
*** - 45° standard / 90° on demand

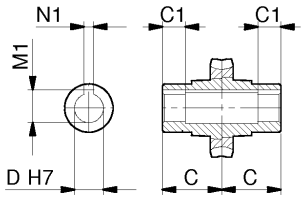
Motor dimensions: see page 59

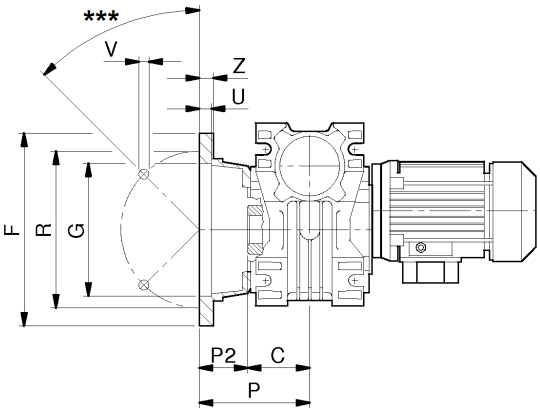
Not binding dimensions



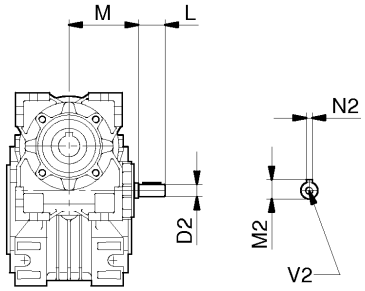
B3







F, [FV], {FL}



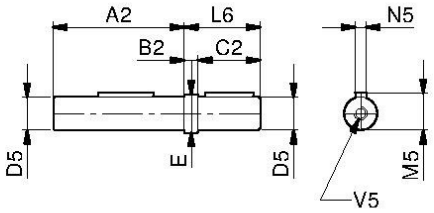
RT/RT

Dimensions [mm]

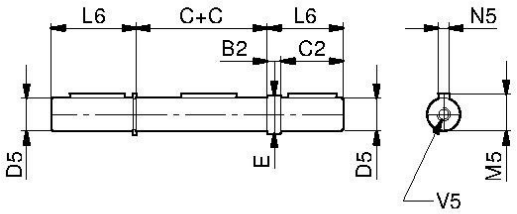
RT/RT	28/28	28/40	28/50	28/60	40/70	40/85	50/110
A	80	100	120	144	172	206	255
A_1	54	70	80	100	120	140	170
AA	97	121,5	144	174	205	238	295
AA_1	71	91,5	104	130	153	172	210
B	53	71	85	100	112	130	144
B_1	44	60	70	85	90	100	115
C	30	41	49	60	60	61	77,5
C_1	26.5	26	30.5	39	37.5	38.5	52.5
D H7	14	18-19-20	24-25	25	25-28-30	32-35	42
D_2 h6	9	9	9	9	11	11	14
F	80	110 {110}	125 [160] {125}	180 {180}	200	210	270
F_1	7	7	9	9	11	13	15
G H8	50	60 {60}	70 [110] {70}	115 {115}	130	152	170
G_1 h8	55	60	70	80	95	110	130
H	40	50	60	72	86	103	127,5
H_1	57	71,5	84	102	119	135	167,5
H_2	13	15	20	22	26	33	42,5
H_3	40	40	40	40	50	50	60
I	28	40	50	60	70	85	110
I_1	28	28	28	28	40	40	50
K	79,5	115,5	134	145,5	182	199	203
K_1	57,5	57,5	57,5	57,5	70,5	70,5	83 - 88*
L	20	20	20	20	23	23	30
M	50	50	50	50	65	65	75
M_1	16,3	20.8-21,8-22.8	27,3-28.3	28,3	28.3-31,3-33.3	35,3-38.3	45,3
M_2	10,2	10,2	10,2	10,2	12,5	12,5	16
N_1	5	6	8	8	8	10	12
N_2	3	3	3	3	4	4	5
P	53	69 {99}	93 [90,5] {123}	86 {116}	111	111	131
P_1	75	86	100	110	130	160	200
P_2	23	28 {58}	44 [41,5] {74}	25 {56}	51	50	53,5
R	68	87 {87}	90 [130] {90}	150,5 {150,5}	165	175	230
R_1	65	75	85	95	115	130	165
S	27,5	38,5	46,5	57	57	67	74
S_1	6	7	8	10	11	14	13
S_2	2,5	2,5	3	3	3	3	3,5
S_3	30	30	30	30	41	41	49
U	10	4 {4}	5 [11] {5}	6,5 {6,5}	12	6	5
V	7	9 {9}	11 [9] {9}	11 {11}	13	13	14
V_1	M6x10 (4)	M6x8,5 (4)	M8x10 (4)	M8x16 (8)	M8x16 (8)	M10x18 (8)	M10x21 (8)
V_2	M4x10	M4x10	M4x10	M4x10	M4x10	M4x10	M6x15
Y_1	80	90	90	90	120	120	120
Z	7	6 {8}	10 [13] {10}	10 {10}	14	16	18

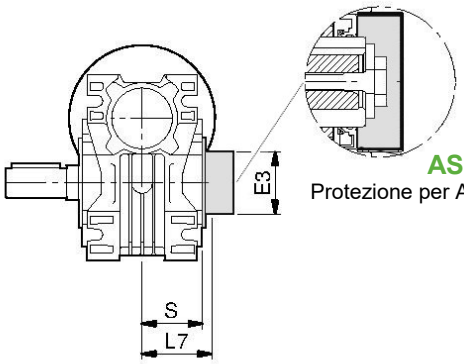
** - 90° for RT28 / 45° for other sizes
*** - 45° standard / 90° on demand
Motor dimensions: see page 59
Not binding dimensions
Dimensioni non impegnative

AS



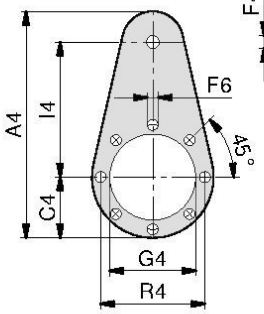
AD



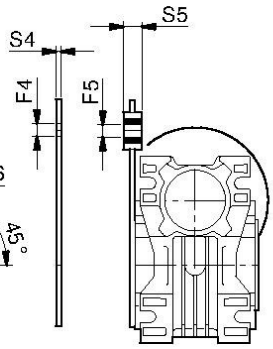


ASC
Protezione per AS

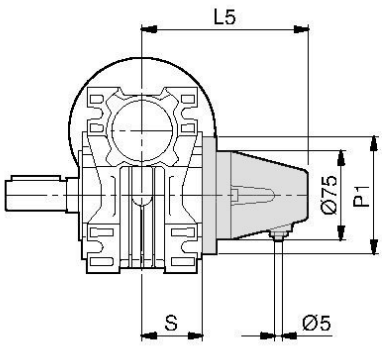
BT



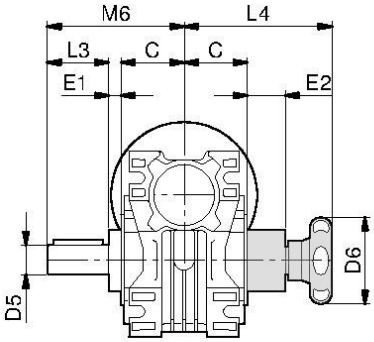
BTV



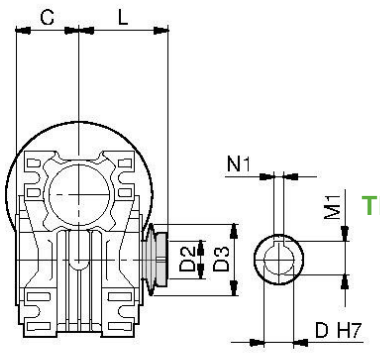
SL



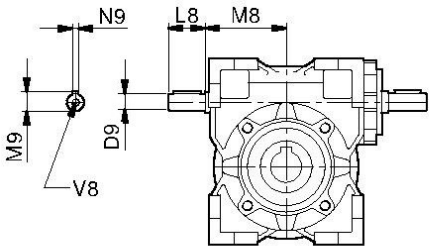
TLE



TLI



VB



TLI
Oil
Litres

RT 28	0.04
RT 40	0.10
RT 50	0.13
RT 60	0.30
RT 70	0.45
RT 85	0.75
RT 110	2.25

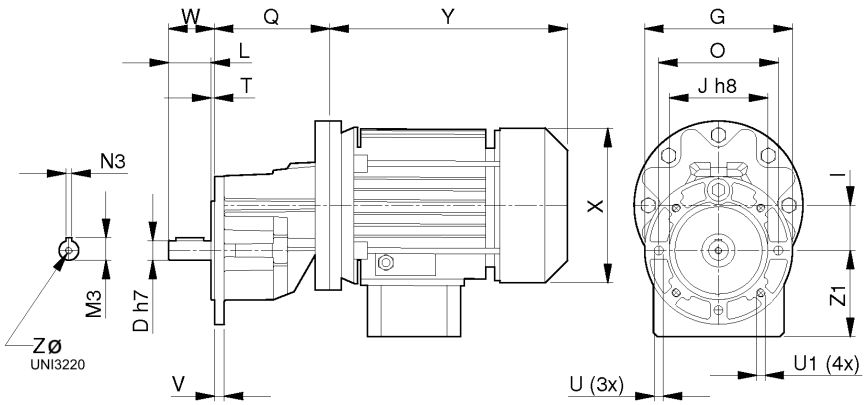
RS-RT

Dimensions [mm]

RT		28	40	50	60	70	85	110
AS &	A_2	58	80	95	117	117	119	153
AD	B_2	1	10	10	10	10	10	10
	C	30	41	49	60	60	61	77,5
	C_2	30	40	45	50	60	70	110
	$D_{5\ g6}$	14	19 (18)	24 (25)	25	28	32 (35)	42
	E	14	22	28	30	34	38	50
	L_6	31	50	55	60	70	80	110
	M_5	16	21,5	27	28	31	35	45
	$N_{5\ h9}$	5	6	8	8	8	10	12
	V_5	M5x10	M8x20	M8x20	M8x20	M8x20	M10x25	M10x25
ASC	E_3	50	52	62	75	90	100	120
	L_7	36	48,5	55,5	68,5	67	77	85
	S	27,5	38,5	46,5	57	57	67	74
BT &	A_4	138	168	185	235	295	313	388
BTV	C_4	38	43	60	55	65	75	100
	F_4	10,5	10,5	10,5	10,5	10,5	20,5	20,5
	$F_{5\ 0/+0.4}$	10	10	10	10	10	20	20
	F_6	7	7	9	9	9	12	13
	G_4	55	60	70	80	95	110	130
	I_4	80	100	100	150	200	200	250
	R_4	65	75	85	95	115	130	165
	S_4	4	4	4	6	6	6	6
	S_5	15	15	15	20	20	25	25
SL	L_5	96	113	123	133	133	139	150
	P_1	78	90	100	110	130	160	200
	S	27,5	38,5	46,5	57	57	67	74
TLE	D_6	52	70	70	70	80	100	100
	E_1	10	12	12	15	14	19	24
	E_2	28	37	31	40	46	57	71
	L_3	30	40	50	50	60	70	80
	L_4	94	116	118	128	146	168	201
	M_6	70	93	111	125	134	150	181
TLI	D_{H7}	14	18/19	24/25	25	28	32/35	42
	D_2	14,2 x 20	19,5 x 20,5	24,5 x 28	25,5 x 26	28,5 x 22	32,5 x 27	42,5 x 38,5
	D_3	40	56	71	71	80	90	125
	L	45	61,5	77	86,5	89	94	112.5
	M_1	15,4*	21,8	27,3	27,3*	31,3	35,3	45,3
	$N_{1\ h9}$	5	6	8	8	8	10	12
VB	D_9	9	11	14	19	19	24	28
	L_8	20	23	30	40	40	50	60
	M_8	43	55	65	77	89	106,5	145
	M_9	10,2	12,5	16	22,5	22,5	27	31
	$N_{9\ h9}$	3	4	5	6	6	8	8
	V_8	M4x10	M4x10	M6x15	M8x20	M8x20	M8x20	M8x20

D_5 (,,) = Diameter on demand
Not binding dimensions

XA - Dimensions [mm] and Weights



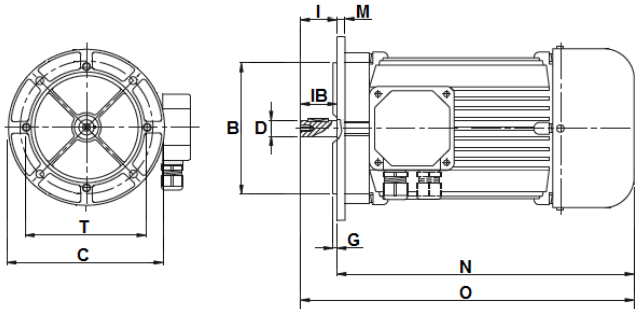
XA	D	G	I	J_{h8}	L	M_3	$N_{3\ h9}$	O	Q	U	U1	T	V	W	Zø	Weight kg	Oil Litri
63	14_{h8}	105	32	70	30	16	5	85	83	6,5	M6	2,5	7	32,5	R3.15	1.5	0.04
71	19_{h8}	120	40	80	40	22.5	6	100	90	5,5	M6	2,5	7,5	42,5	R4	2.2	0.06
80	24_{h8}	140	50	95	49,5	27	8	115	114	9	M8	2,5	10,5	52	R4	3.0	0.10
100	28_{h7}	200	63	130	57,5	31	8	165	177	10,5	10,5	2,5	12	60	R5	7.0	0.20

IEC B5	56	63	71	80	90 S	90 L	100	112
X	110	123	137	156	176	176	194	218
Y	168	190.5	218	242	255	280	312	330
Z_1 + I	95	100	109	123	128	128	140	148

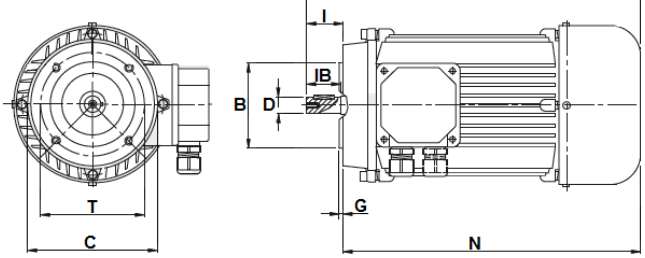
Z - Output shaft centring hole
Not binding dimensions and weights

IEC - Motors [mm]

IEC - B5



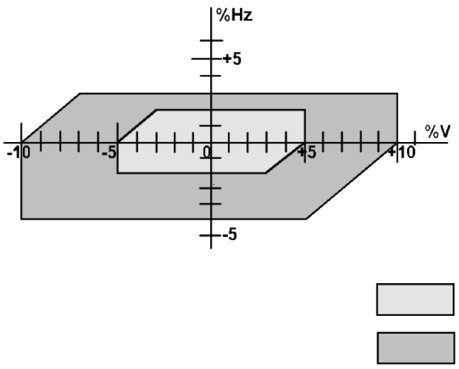
IEC - B14



Size	2 - poles			4 - poles			6 - poles			Flange	Shaft	G	IB	N	O
	kW	rpm	kg	kW	rpm	kg	kW	rpm	kg	C / T / B	D x l				
T56A T56B	0.09 0,12	2710 2700	2.6 3.0	0.06 0.09	1360 1360	2.9 3.2	--- ---	--- ---	--- ---	B5 - 120 / 100 / 80 B14 - 80 / 65 / 50	9 x 20	3.0 2.5	20	176	196
T63A T63B	0.18 0.25	2710 2710	4.0 4.2	0.12 0.18	1360 1310	3.7 4.2	0.09 0.12	840 850	4.2 4.5	B5 - 140 / 115 / 95 B14 - 90 / 75 / 60	11 x 23	3.0 2.5	23	197	220
T71A T71B	0.37 0.55	2730 2780	5.2 6.0	0.25 0.37	1350 1370	5.0 5.8	0.18 0.25	880 900	5.6 6.0	B5 - 160 / 130 / 110 B14 - 105 / 85/ 70	14 x 30	3.5 2.5	30	211	241
T80A T80B	0.75 1.1	2770 2770	8.7 10	0.55 0.75	1370 1380	8.1 9.1	0.37 0.55	890 900	6.8 9.6	B5 - 200 / 165 / 130 B14 - 120 / 100 / 80	19 x 40	3.5 3.0	40	250	290
T90S T90L	1.5 2.2	2840 2840	12 14.5	1.1 1.5	1400 1400	11.7 14.4	0.75 1.1	920 925	11.3 14.4	B5 - 200 / 165 / 130 B14 - 140 / 115 / 95	24 x 50	3.5 3.0	50	262 287	312 337
T100A T100B	3 4	2840 2850	20 24	2.2 3	1400 1420	17.6 22.5	1.5 2.2	945 950	18.8 19.8	B5 - 250 / 215 / 180 B14 - 160 / 130 / 110	28 x 60	4.0 3.5	60	309	369
T112A	5.5	2880	29.3	4	1430	29.0	3	950	30.0	B5 - 250 / 215 / 180 B14 - 160 / 130 / 110	28 x 60	4.0 3.5	60	335	395
T132S T132M T132ML	7.5 11 ---	2900 2930 ---	38.4 52.5 --	5.5 7.5 9.2	1450 1450 1460	39.0 48.5 56.5	4 5. 5 7.5	960 60 960	47.6 50.7 47.6	B5 - 300 / 265 / 230 B14 - 200 / 165 / 130	38 x 80	4.0 4.0 ---	80	357 395 421	437 475 501
T160M T160L	15 18.5	2940 2940	77.5 92	11 15	1460 1445	73 100	7.5 11	960 960	70.0 87.0	B5 - 350 / 300 / 250 B14 - 250 / 215 / 180	42 x 110	5.0 4.0	110	530	640

Not binding dimensions and weights

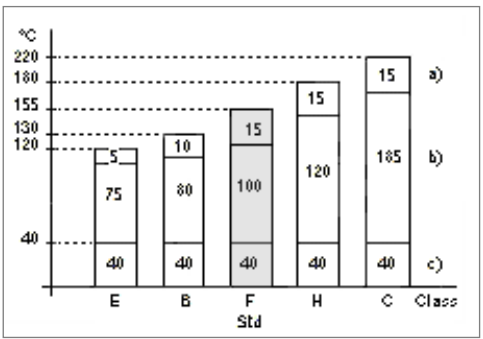
Voltage and frequency



Rated values	Usable values
230/400V 50Hz	240/415V 50Hz 220/380V 50Hz
277/480V 60 Hz	265/460V 60Hz 260/440V 60Hz

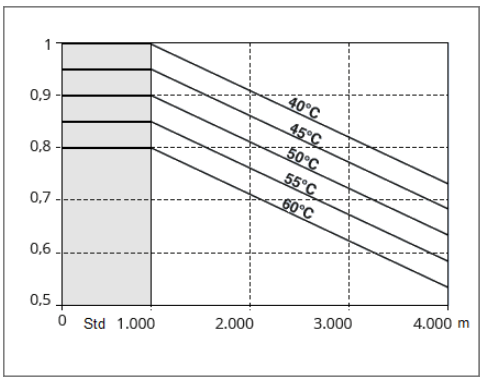
Duty
normal
heavy but limited

Insulation class



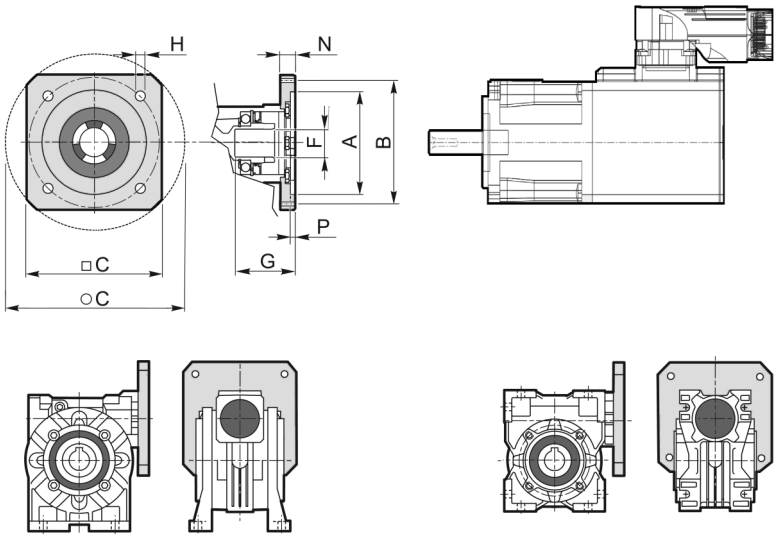
Temperatures
a) safety margin
b) admissible temperature
c) conventional ambient temperature

Altitude and Temperature Factors



Conventional environment
1000 m - altitude above sea level
40 °C - ambient temperature
-15 °C - min. ambient air temperature
≤ 60% - relative humidity

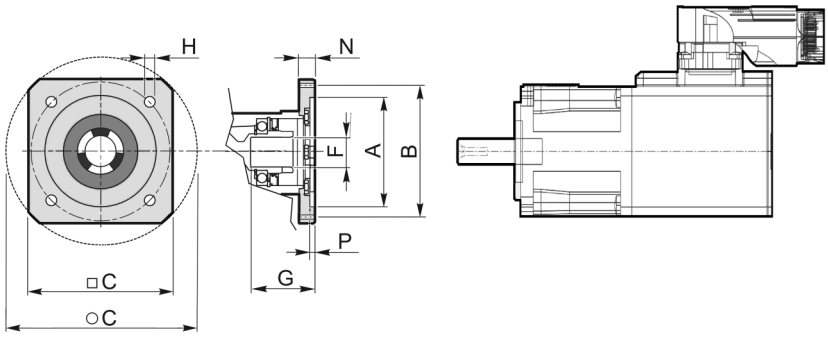
Servomotor flanges [mm]



Flange Code	FRS-FRT Size	A	B	C □ / ○	F	G	H	N	P	Notes
APP050004	28	22	43,8	56	13	34	Ø5x4	7	4,5	Nema 17
A180043A	28	30	45	50	13	36	M3x4	9	3	
APP050009	28	36	70,7	60	13	36	M4x4	9	4,5	
A180003A	28	36	70,7	60	13	40	M4x4	13	4,5	
APP050006	28	38,1	66,6	56	13	36	M4x4	9	4,5	Nema 23
A180001A	28	38,1	66,6	56	13	41	M4x4	14,5	4,5	Nema 23
A180085A	40	38,1	66,6	65	15	44	M4x4	15	4,5	
APP050003	28	40	63	56	13	36	M5x4	9	4,5	
A180002A	28	40	63	56	13	40	M5x4	13	4,5	
A180083A	28	40	63	56	13	44	M5x4	17	4,5	
APP2258	40	40	63	65	15	44	M5x4	15	3,5	
A180076A	40	40	73,5	65	15	43	M4x4	13,5	4,5	
A180102A	28	50	66,6	57	13	40	M4x4	13	2,5	
A180107A	28	50	66,6	60	13	40	M5x4	13	4,5	
APP050013	28	50	70	60	13	36	M5x4	9	4,5	
APP050022	28	50	70	60	13	48	M4x4	21	4,5	
APP050027	28	50	70	60	13	48	M5x4	21	4,5	
A180005A	28	50	70	60	13	40	M5x4	13	4,5	
A180108A	40	50	66,6	60	15	43	M5x4	13,5	3,5	
A180055A	40	50	70	60	15	43	M5x4	13,5	3,5	
A180008A	40	50	95	80	15	43	M6x4	13,5	4	
A180070A	50	50	70	Ø80	21	59	M4x4	20	3	
A180075A	50	50	70	Ø80	21	59	M5x4	20	3	
A180071A	60	50	70	Ø90	24	58	M4x4	20	3	
APP1987	50	56	130	115	21	64	Ø9x4	25	3,5	

- Table sorted by Centring diameter (A) in ascending order
- Not binding dimensions and weights

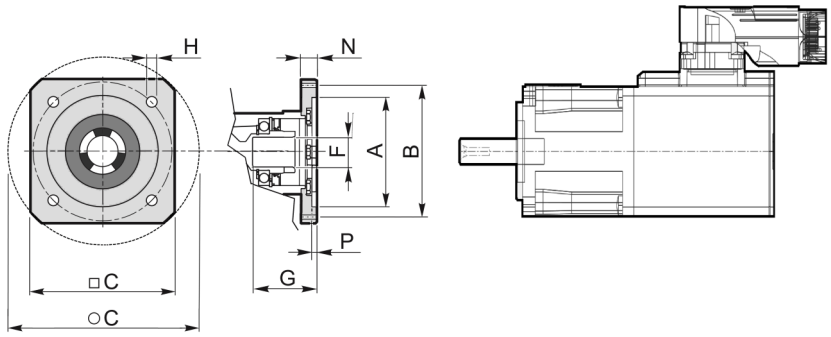
Servomotor flanges [mm]



Flange Code	FRS-FRT Size	A	B	C □ / ○	F	G	H	N	P	Notes
APP050035	28	60	75	65	13	39	M5x4	12	4,5	
APP070006	40	60	75	72	15	43	M5x4	13,5	3	
A180090B	50	60	82	70	21	55	M5x4	16	5	
APP070003	40	70	90	80	15	43	M6x4	13,5	4,5	
A180066A	40	70	90	80	15	49	M6x4	19,5	4,5	
A180056A	50	70	90	80	21	52	M6x4	13,5	7	
APP2144	50	70	90	80	21	55	M6x4	16	9	
A180019A	60	70	90	80	24	53	M6x4	14,5	7	
A180077A	70	70	90	90	28	64	M6x4	14,5	4,5	
A180077A	70	70	90	90x80	28	64	M6x4	14,5	4,5	
APP1829	28	73	98,4	83	13	49	M5x4	22,3	3	Nema 34
APP070011	40	73	98,4	86	15	43	M5x4	13,5	4,5	Nema 34
APP1897	40	73	98,4	83	15	49	M5x5	19,8	3	Nema 34
A180054A	40	73	98,4	87	15	44	M6x4	15	4,5	Nema 34
APP1976	50	73	98,4	83	21	58	M5x5	19,8	3	Nema 34
A180094B	50	73	98,4	87	21	54	M5x4	15	4,5	Nema 34
A180064A	60	73	98,4	86	24	53	M5x4	14,5	4,5	Nema 34
APP070002	40	80	100	85	15	43	M6x4	13,5	4,5	
APP070008	40	80	100	85	15	43	M8x4	13,5	4,5	
A180051A	40	80	100	90	15	43	M6x4	13,5	5,5	
A180035A	50	80	100	85	21	56	M6x4	17,5	6	
APP090009	60	80	100	85	24	53	M6x4	14,5	4,5	
A180037A	60	80	100	90	24	56	M6x4	18	6	
A180088A	70	80	100	82	28	85	M6x4	35	5	
A180086A	70	80	100	105	28	65	M6x4	15,5	10,5	
A180101A	28	83	104	90	13	40	Ø6,5x4	13,5	3,5	
A180089A	85	90	127	125x110	28	65	Ø9x4	15,5	5	
APP070007	40	95	115	98	15	43	M8x4	13,5	4	
A180007A	40	95	115	98	15	54	M8x4	25	4	
APP2259	50	95	115	100	21	52	Ø9x4	13	4	

- Table sorted by Centring diameter (A) in ascending order
- Not binding dimensions and weights

Servomotor flanges [mm]



Flange Code	FRS-FRT Size	A	B	C □ / ○	F	G	H	N	P	Notes
A180096A	50	95	115	100	21	59	Ø9x4	20	4	
APP090013	60	95	115	100	24	53	M8x4	14,5	4,5	
APP090014	60	95	115	100	24	57	M6x4	19	4,5	
APP090041	60	95	135	120	24	53	M8x4	14,5	6,5	
APP2132	70	95	115	100	28	72	M6x4	22	9	
A180013A	70	95	130	116	28	65	M8x4	15,5	3,5	
A180078A	85	95	115	110	28	65	M8x4	15,5	5	
A180095A	85	95	115	110	28	65	Ø9x4	15,5	5	
A180098A	85	95	130	120	28	68	M8x4	18,5	5	
APP120001	110	95	115	110	28	65	M8x4	18	5	
APP2134	50	110	145	120	21	55	M8x4	16	5	
A180036A	60	110	130	125	24	63	Ø8,5x4	25	8,5	
APP090012	60	110	145	120	24	53	M8x4	14,5	6,5	
APP090040	60	110	145	120	24	58	M8x4	19,5	6,5	
A180045A	60	110	145	120	24	66	M8x4	28	10	
A180059A	60	110	145	120	24	53	M8x4	14,5	3.5	
A180041A	60	110	145	130	24	57	M8x4	19	11	
A180061A	60	110	145	130	24	53	M8x4	14,5	6,5	
APP2133	70	110	145	130	28	75	M8x4	25	7	
A180040A	110	110	130	126	28	65	M8x4	18	5	
A180011B	70	130	165	140	28	65	M10x4	15,5	4,5	
A180097A	85	130	165	140	28	65	M10x4	15,5	5	
A180053A	85	130	165	155	28	105	M10x4	58	5	
APP120006	110	130	165	140	28	65	M8x4	18	5	
APP120033	110	130	165	140	28	65	M10x4	18	5	
A18.0072A	130	130	165	140	38	83	M10x4	18	5	
A18.0072A	150	130	165	140	42	94	M10x4	18	5	

- Table sorted by Centring diameter (A) in ascending order
- Not binding dimensions and weights

Self-locking

When back-driving a worm gear set using the worm wheel as driver, the efficiency is lower than wormshaft-driving. Back-drive efficiency can be reduced to zero obtaining a self-locking, or irreversible, gear set.

When back-driving the worm gear, internal friction tends to lock the mesh, and the bigger the applied torque the mesh friction rises proportionally and increases the lockage accordingly.

The most obvious example is braking or slowing down the load by inertia, where external torque will back-drive the worm shaft.

A worm gear is intended as a self-locking unit when the lead angle is less than the friction angle (arc tangent of friction coefficient).

Tooth contact is dynamic even when mesh velocity is zero, as vibrations in a non-rotating gear can induce motion in the tooth contact area.

According to lead angle and self-locking table, a safety factor of 3° lead angle is recommended for full self-locking condition and 10° lead angle for poor self-locking.

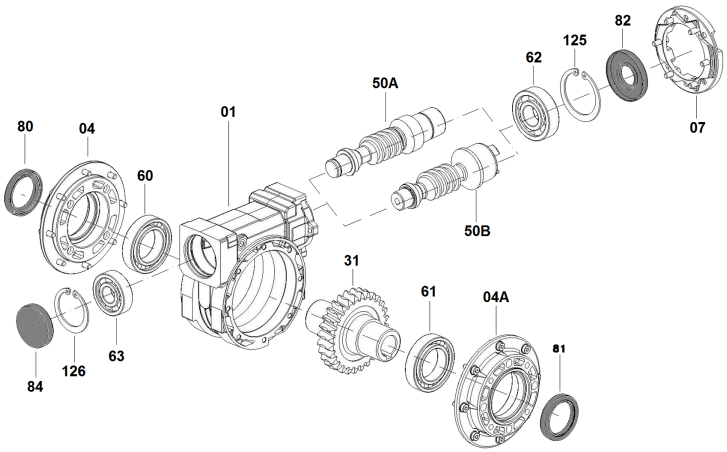
Lead angle	Static self-locking
$\beta > 20°$	Full back-driving
$10° < \beta < 20°$	High back-driving
$5° < \beta < 10°$	Good back-driving Poor self-locking
$3° < \beta < 5°$	Poor back-driving Good self-locking
$1° < \beta < 3°$	Full self-locking

Gearing data

	i =	5	7	10	15	20	28	40	49	56	70	80	100
RS / RT 28	m_x β z_1	1.38 29°33' 6	1,50 23°11' 4	1,40 16°41' 3	1,40 11°18' 2	1,10 10°23' 2	1,50 6°06' 1	1,10 5°14' 1	0,90 4°19' 1	0,75 3°03' 1	0,60 2°27' 1	0,55 2°37' 1	0,45 2°20' 1
RS / RT 40	m_x β z_1	2,00 30°57' 6	2,10 21°36' 4	2,00 16°41' 3	2,00 11°18' 2	1,50 8°31' 2	2,10 5°39' 1	1,50 4°17' 1	1,25 3°48' 1	1,10 3°25' 1	0,90 3°01' 1	0,80 2°51' 1	0,65 2°38' 1
RS / RT 50	m_x β z_1	2,50 30°57' 6	2,70 23°52' 4	2,50 16°41' 3	2,50 11°18' 2	1,90 8°59' 2	2,70 6°19' 1	1,90 4°31' 1	1,60 4°14' 1	1,40 3°42' 1	1,10 2°44' 1	1,00 2°51' 1	0,80 2°17' 1
RS / RT 60	m_x β z_1	3,15 36°32' 6	3,30 25°33' 4	3,10 19°0' 3	3,10 12°55' 2	2,40 11°18' 2	3,30 6°49' 1	2,40 5°42' 1	2,00 5°11' 1	1,70 3°55' 1	1,40 3°38' 1	1,20 2°51' 1	1,00 2°51' 1
RS / RT 70	m_x β z_1	3,60 34°01' 6	3,90 26°51' 4	3,60 18°38' 3	3,60 12°40' 2	2,80 11°18' 2	3,90 7°12' 1	2,80 5°42' 1	2,30 4°48' 1	2,00 4°05' 1	1,60 3°16' 1	1,40 2°51' 1	1,15 2°38' 1
RS / RT 85	m_x β z_1	4,40 34°47' 6	4,70 26°05' 4	4,40 19°09' 3	4,40 13°02' 2	3,40 11°18' 2	4,70 6°58' 1	3,40 5°52' 1	2,80 4°52' 1	2,50 4°45' 1	2,00 3°48' 1	1,74 3°14' 1	1,40 2°40' 1
RS / RT 110	m_x β z_1	- - -	6,10 26°22' 4	5,80 20°43' 3	5,80 14°09' 2	4,40 11°18' 2	6,10 7°04' 1	4,40 5°42' 1	3,60 4°43' 1	3,20 4°29' 1	2,60 3°54' 1	2,30 3°39' 1	1,80 2°34' 1
RS 130	m_x β z_1	- - -	7.25 26°57' 4	6.90 21°20' 3	6.85 14°06' 2	5.35 13°05' 2	7.25 7°14' 1	5.30 6°18' 1	4.35 5°18' 1	4.00 6°20' 1	3.15 4°33' 1	2.70 3°30' 1	2.25 3°40' 1
RS 150	m_x β z_1	- - -	8.25 25°33' 4	8.00 21°48' 3	8.15 16°22' 2	6.20 13°24' 2	8.45 7°35' 1	6.25 7°07' 1	5.10 5°48' 1	4.60 6°11' 1	3.60 4°17' 1	3.15 3°45' 1	2.60 3°43' 1

m_x = Axial module
z_1 = Number of starts
β = Lead angle (r.h.)
20° = Pressure angle

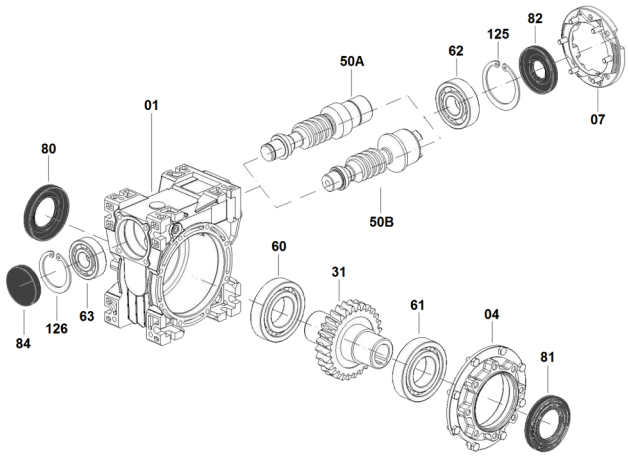
Parti componenti



FRS

Item	Description
01	Housing
04A	Side cover
07	Motor flange
31	Worm wheel
50A	Worm shaft IEC
50B	Worm shaft “G”
60	Bearing
61	Bearing
62	Bearing
63	Bearing
80	Oil seal
81	Oil seal
82	Oil seal
84	Oil seal RCA
125	Snap ring
126	Snap ring

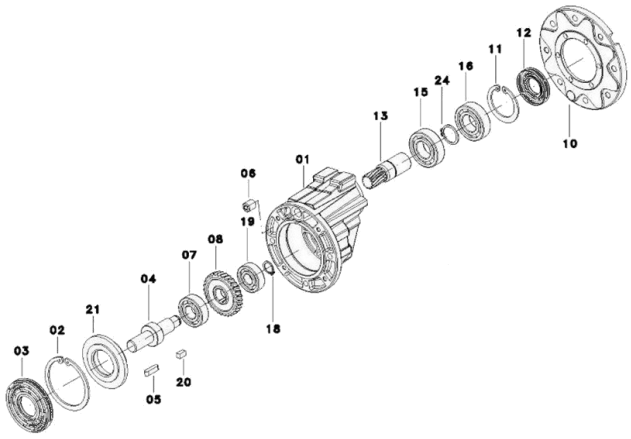
Parti componenti



FRT

Item	Description
01	Housing
04	Side cover
07	Motor flange
31	Worm wheel
50A	Worm shaft IEC
50B	Worm shaft “G”
60	Bearing
61	Bearing
62	Bearing
63	Bearing
80	Oil seal
81	Oil seal
82	Oil seal
84	Oil seal RCA
125	Snap ring
126	Snap ring

Parti componenti

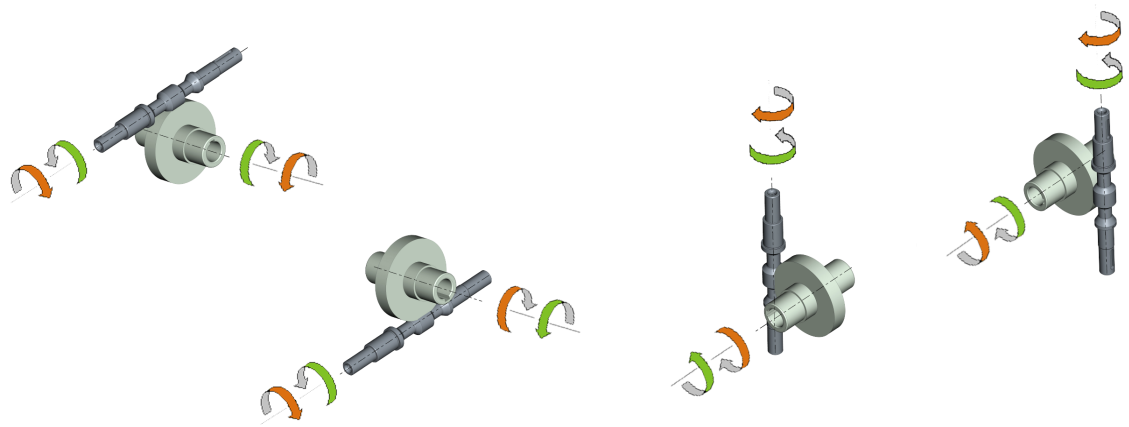


FXA

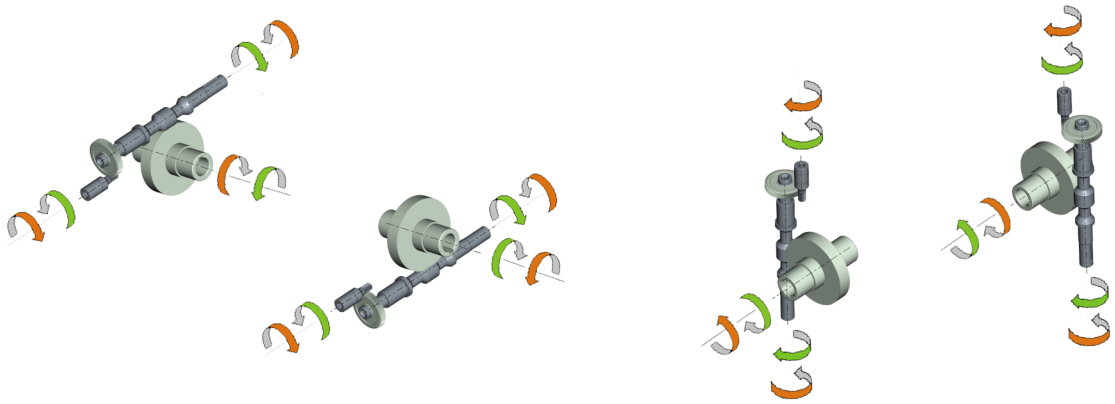
Item	Description
01	Housing
02	Snap ring
03	Oil seal
04	Output shaft
05	Key
06	Screw
07	Bearing
08	Gear
10	Motor flange
11	Snap ring
12	Oil seal
13	Pinion
15	Bearing
16	Bearing
18	Snap ring
19	Bearing
20	Key
21	Adapter
24	Snap ring

Direction of rotation

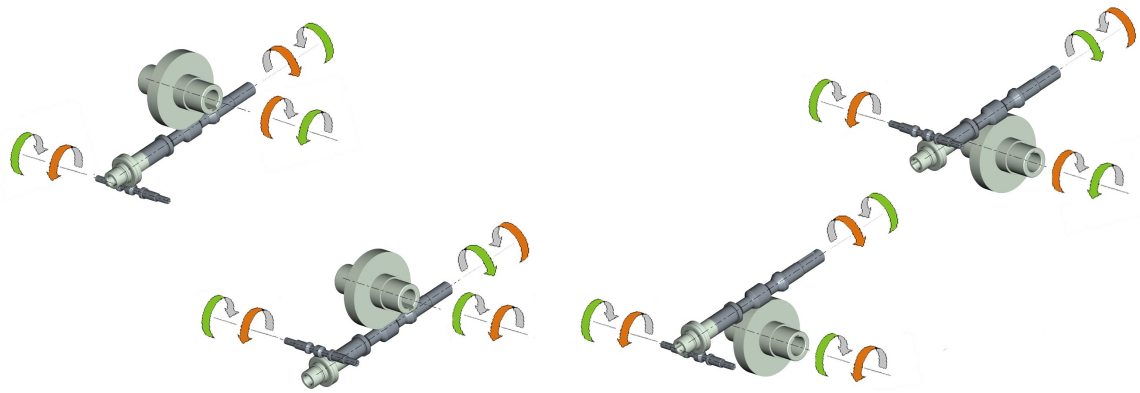
RS - RT



RA - TA



RS/RS - RT/RT



ATEX- 2014/34/EC - European Directive

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 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.

The gearboxes are identified in the Directive as «components», therefore stripped away any autonomous function, but fundamental to operation of units and protection systems destined to production, transport, storage, measuring, adjusting and conversion of energy and material transformation that because of their own inflammable potentiality, risk to induce an explosion trigger.

VARVEL RS, RT and XA Series conform 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

- key/keyway input version

CE Ex **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

- steel coupling input version

CE Ex **II 3 G Ex h IIC T5 Gc IP66 T_{amb}** -10 /+35°C
II 3 D Ex h IIIC T100°C Dc IP66 T_{amb} -10 /+35°C

Key to ATEX Code

II	- Group II (surface industries)
2, 3	- Category (2, 3)
G, D	- Explosive environment (presence of gas-vapours-cloud, 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) - key/keyway (-10 /+35°C) - steel coupling

Warning !

VARVEL-ATEX gearboxes

are not certified for operation in **hatched areas**.

ATEX-2006/42/EC - European Directive

Substances, Zones, Categories, EPL

Substances	Zones	Categories			EPL (Equipment Protection Level)		
Gas, Vapours, Cloud	0	1G			Ga		
	1		2G			Gb	
	2			3G			Gc
Dust	20	1D			Da		
	21		2D			Db	
	22			3D			Dc

Key code		
Zone	0	Continuous occurrence of explosive gas
	1	Occasional occurrence of explosive gas
	2	Unlikely occurrence of explosive gas
	20	Continuous occurrence of explosive dust
	21	Occasional occurrence of explosive dust
	22	Unlikely occurrence of explosive
Category	1	Equipment with very high protection level (1G, 1D)
	2	Equipment with high protection level (2G, 2D)
	3	Equipment with normal protection level (3G, 3D)
EPL	a	Very high level of protection (Ga, Da)
	b	High level of protection (Gb, Db)
	c	Normal level of protection (Gc, Dc)

Gas Groups and Temperature

Group Temperature	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 meth-ylene 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

** - According to chemical composition

Under the terms of the Machine Directive 2014/34/EC and relevant Guidelines, the speed gearboxes and variators are considered as “machines’ separate elements not having a specific application and meant for being incorporated onto the machine. The complete machine and equipped with such components must comply with the essential and relevant requisites for safety and health preservation” of the mentioned Directive.

Installation
Check if the unit to be installed, is properly selected to perform the required function and that its mounting position complies with the order.
The nameplate reports such information.
Check mounting stability to ensure the unit runs without vibrations or overloads.

Running
The unit may be connected for clockwise or counter-clockwise rotation.
The unit must be stopped as soon as defective running or unexpected noise occur, remove the faulty part or return the unit to the factory for checking.
If the faulty part is not replaced, other parts can also be affected, causing more severe damage and making the identification of initial cause more difficult.

Maintenance
Although the units are no-load run tested in the factory before despatch, it is recommended not to run them at maximum load for the first 20-30 running hours to allow the proper running in.
The gearboxes are delivered already filled with long-life synthetic oil and, in case of replacement or topping, do not mix with mineral lubricants.

Handling
When hoisting, use relevant housing locations or eyebolts if provided, or foot or flange holes
Never hoist on any moving part.

Painting
Carefully protect oil seals, coupling faces and shafts when units are re-painted.

Long-term storage
For storages longer than three months, apply anti-oxidants onto shafts and machined surfaces, and protective grease on oil seal lips.

Product’s Environmental Management
In conformity with Environmental Certification ISO 14001, we recommend the following to dispose of our products:
- scraped components of the units to be delivered to authorized centres for metal object collection;
- oils and lubricants drained from the units to be delivered to Exhausted Oil Unions;
- packages (pallets, carton boxes, paper, plastic, etc.) to lead into regeneration/recycling circuits as far as possible, by delivering separate waste classes to authorized companies.

Disclaimer
This catalogue cancels and replaces the previous ones.
Dimensions and weights are not binding.
VARVEL reserves the right to make changes without notice.