RS-RT

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

CONTENTS

RS-RT

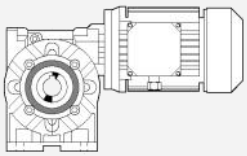
Description

RSRS, RT - Single-stage worm gear boxes
The worm gearboxes, RS and RT series, specifically designed for universal mounting, are manufactured with aluminium die cast housings and covers up to size 85 and cast iron from the 110.

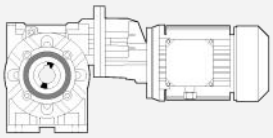
On request, input Viton oil seals allow trouble-free operation with 2-pole standard AC, brushless or 3000 rpm DC motors and Silicone oil seals are recommended for low temperatures.

Gearboxes are delivered filled with synthetic long-life oil (without plugs), see filling quantities at page 17, and valid for all mounting positions.

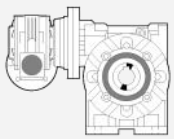
Selection table data are intended for service factor SF1.0, i.e. 8-10 running hours per day, uniform load, less than 6 start/ stops per hour, and room temperature ranging from 15 to 35 °C.



RA, TA - Helical/worm gear boxes
The helical/worm gearboxes, RA and TA series, made of an independent single stage helical gearbox FXA fitted to a standard FRS or FTR gearbox, allow greater output torques and higher efficiency than the FRS and FRT gearbox with equivalent ratios.



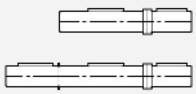
RS/RS, RT/RT - Two-stage worm gear boxes
The gearboxes, RS/RS and RT/RT series, are made of two gearboxes RS or RT and offer a full selection of high reduction ratios to obtain low output speeds and high output torques.



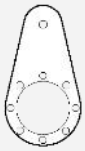
RS

RT

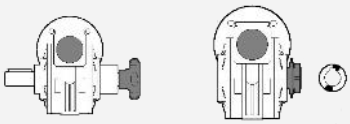
AS, AD - Output shafts
All gearboxes are manufactured with hollow output shaft as standard. Optionally, a single AS or double AD solid output shaft - made of steel C43 - can be supplied.
An ASC safety shield for the opposite side of a single output shaft AS, is available on demand.



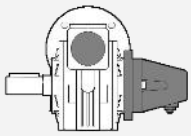
BR, BT - Torque arms
Standard gearboxes are normally supplied with covers on each side to allow the torque arm fixing when gearboxes have to operate as shaft mounted units.
The torque arm, standard or with Vulkollan vibration damping, is made of extra thick plate and white galvanized.



TLI/TLE - Torque limiters
The torque limiter and safeguard device - TLI built-in inside the gearbox and TLE fitted outside - allows easy torque adjustments, full gearbox safeguard against un-expected overload conditions, simple hand release, and manual operation in case of power supply failure.
The factory preset slipping torque can be adjusted from the maximum preset torque down to zero. Shaft rotation restarts automatically as soon as torque value is lower than the preset value.
Oil quantity of torque limiters TLI are listed on page 48 and 56



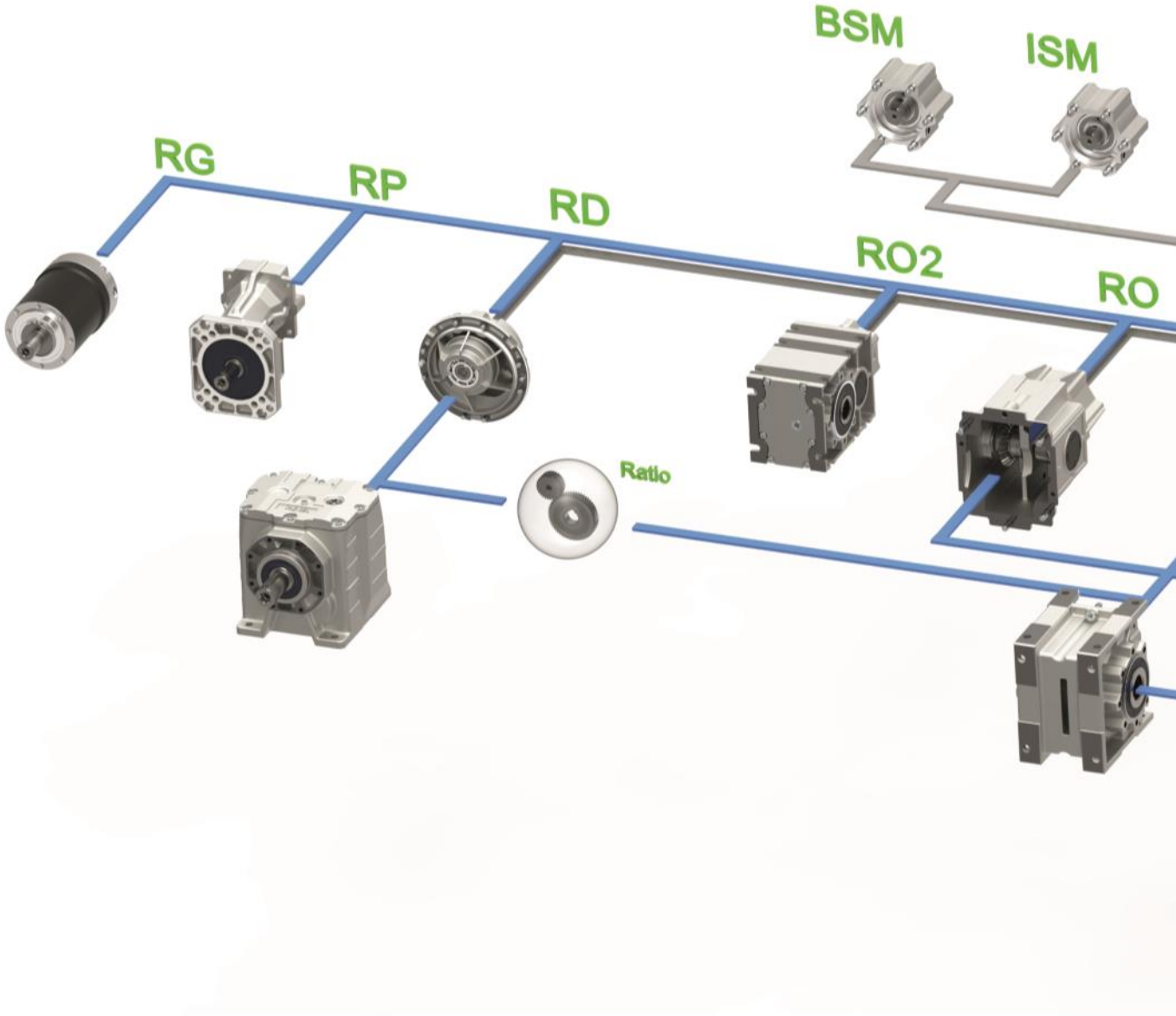
SL - Travel limiters
The SL travel limiter device stops - by means of built-in limit switches - the gearbox after a given operation time.
Standard thread allows approx. 40 turns of the output shaft. Limit switch travel is adjustable and operation time varies upon the used reduction ratio from min. 12 to max. 170 seconds.

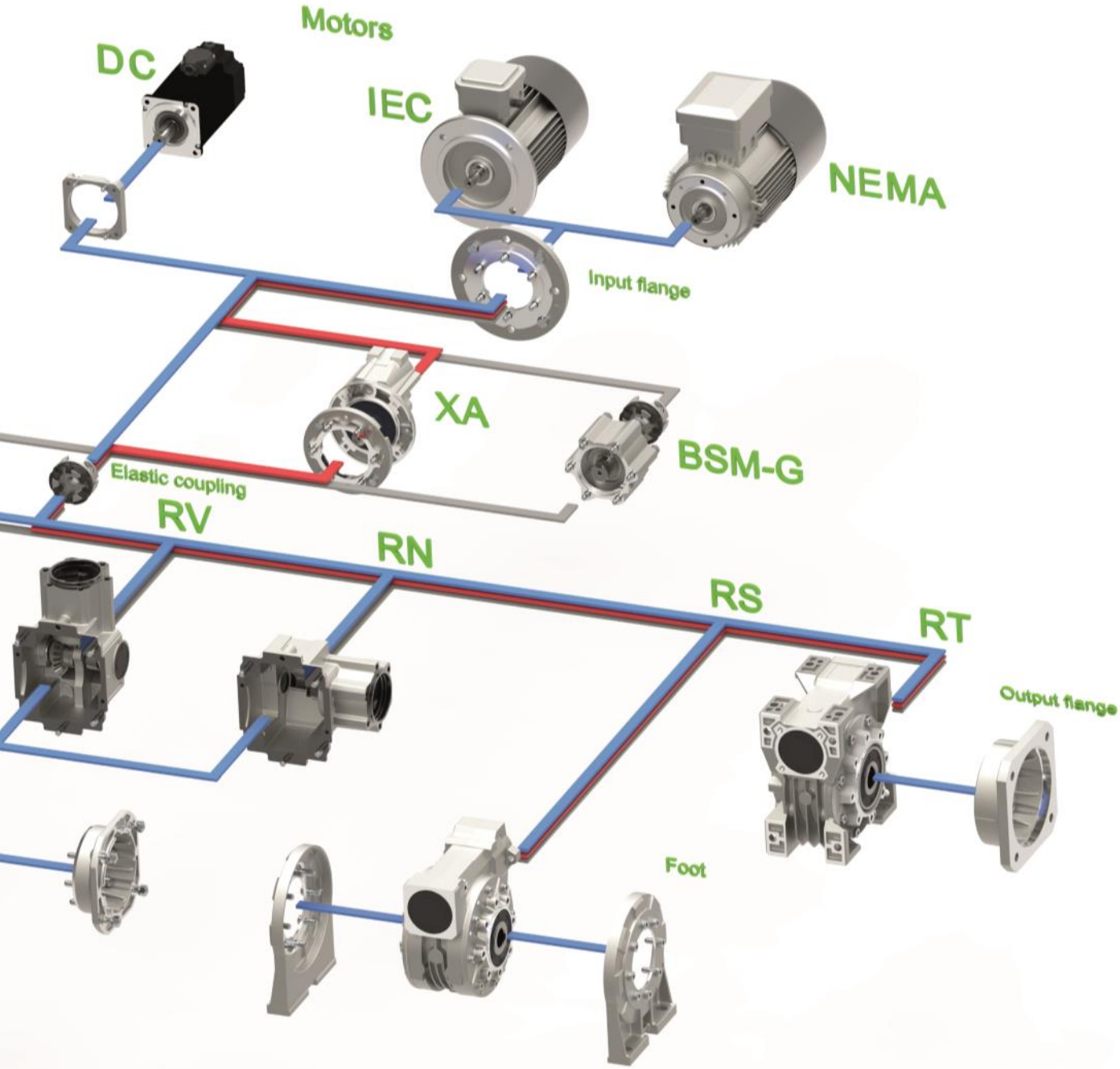


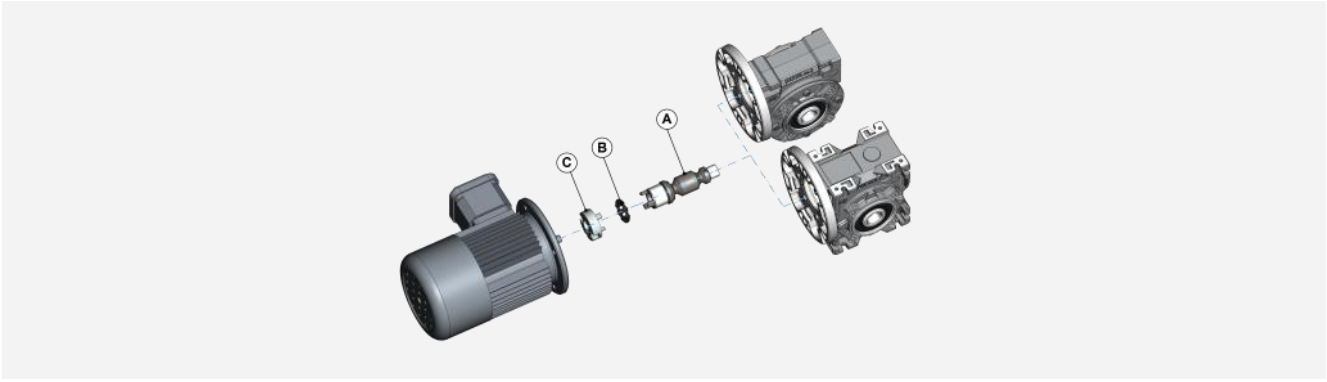
GENERAL SPECIFICATIONS	
Range	Sizes: RS (9) - RT (7) 55 ratios 3020 Nm max. output torque
Sizing	According to BS721. 10,000 hrs average lifetime with service factor SF1
Housing, Covers	Pressure die cast aluminium up to size 85 Cast iron from size 110
Coupling G input	Pressure die cast aluminium for sizes G3, G5, G6. Alloyed steel for size GS8
Toothed parts	Worms of CH steel with ground tooth profile. Wheels of bronze on cast iron hub.
Shafts Keys	Steel Tolerances: Shafts h6, Bores E8 Keys according to DIN6885 B1
Hollow output shaft	Steel, grey or GS400 ferritic cast iron
Bearings	Ball- or roller-types according to sizes and technical requirements
Oil seals	Type NBR - Nitril-Butadiene Rubber with additional anti-dust lip according to DIN 3760 Type FKM - Fluor elastomer Viton on demand
Lubricant	Synthetic long-life oil Grade ISO VG 320
Painting	Aluminium until size 85 Epoxy powder paint Standard colour RAL 7012 from size 110
Protection grade	Gearbox body: IP66 Motor flanges and adapters: IP20; increased grade on demand
ATEX	On demand

Symbols

Symbol	Description
F_r [N]	Application radial load
F_{r1} [N]	Catalogue radial load (input)
F_{r2} [N]	Catalogue radial load (output)
FS	Service factor $FS = \frac{M2}{M(app)}$
i_n	Nominal reduction ratio
i_r	Actual reduction ratio
J_1 [kgm^2]	Moment of inertia of the gearbox at gearbox input shaft
Lub [l]	Lubricant (litres) H - Horizontal mounting V - Vertical mounting
M_2 [Nm]	Gearbox maximum output torque $M2 = \frac{9550 * P1 * \eta}{n2}$
$M_{(app)}$[Nm]	Application torque
n_1 [min^{-1}]	Input speed
n_2 [min^{-1}]	Output speed
P_1 [kW]	Input power $P1 = \frac{M2 * n2}{9550 * \eta}$
$P_{(kg)}$ [kg]	Weight:
η	Efficiency


BSM
ISM
RG
RP
RD
RO2
RO
Ratio


Motors
DC
IEC
NEMA
Input flange
XA
BSM-G
Elastic coupling
RV
RN
RS
RT
Output flange
Foot



A)

Reducer-side coupling hub

- Material: steel
- One piece machined on input shaft
- Two bearing setting
- Unchanged casing dimensions

B)

Spider

- External tooth connection
- Material: Thermoplastic Elastomer: IXEF® - Polyarylamide
- Hardness
  90 Shore D
- Temperature
  -30/+135°C
  (-22/+275°F)

C)

Motor-side coupling hub

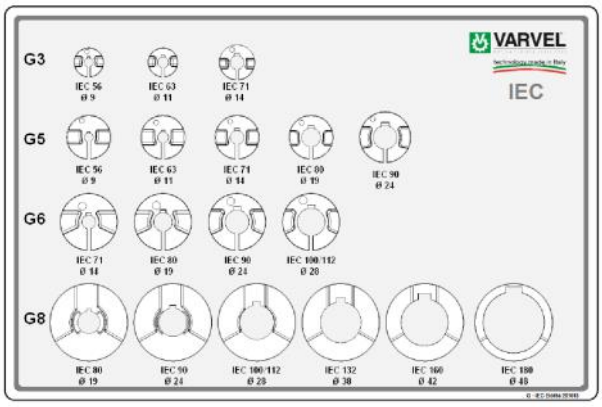
- Material:
  Pressure die cast aluminium (G3, G5, G6)
  Steel (GS3, GS5, GS6, GS8)
- Dynamic balancing
- Fitting:
  Clamp (G3, G5, G6)
  Key (GS3, GS5, GS6, GS8)
- Bores, available according to:
  IEC 72 / DIN42948
  NEMA C and TC

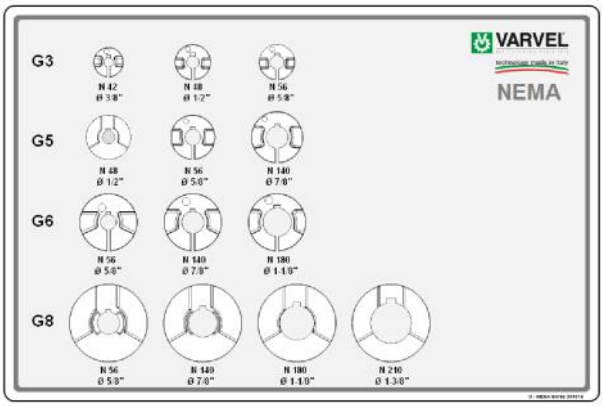
Advantages:

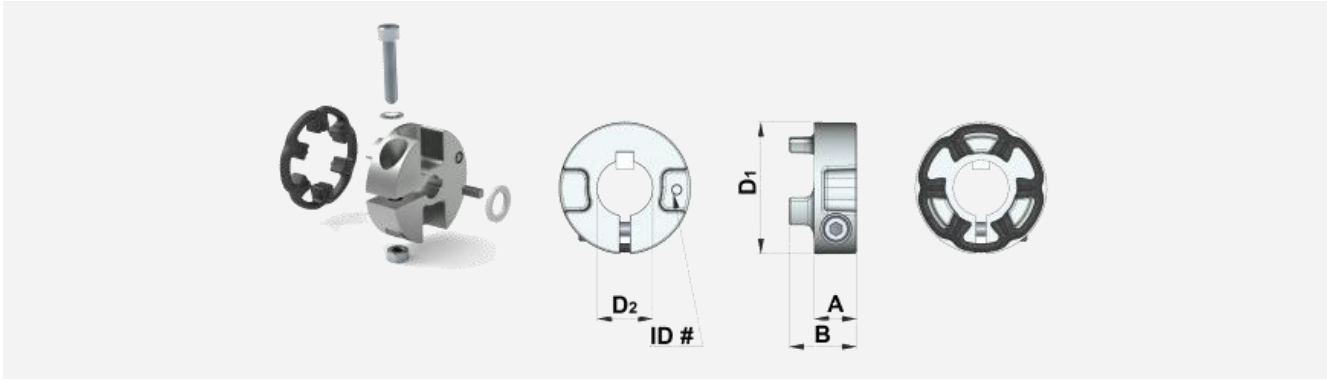
- One gearbox only for each reduction ratio
- Greater flexibility
- Increased stock rotation
- Elimination of fretting corrosion between key and keyway
- Gearbox / motor connection with zero backlash
- Allowed angular misalignment 1° max.
- High torsional rigidity
- High vibration damping

Input flanges:

- Material:
  Aluminium up to IEC112 & NEMA TC180
  Cast iron from IEC 132 & NEMA TC200







Type	IEC NEMA	Kit Part No.	RS - RT	Mt [Nm]	Mt_1 [Nm]	Mt_2 [Nm]	A [mm]	B [mm]	D_1 [mm/ inch]	D_2 [mm/ inch]	ID#
G3	IEC	KG3.009/X KG3.011/X KG3.014/X	28-40 28-40 40	4.5 - 6 4.5 - 6 7 - 8.5	15 15 28	8-10 8-10 18-22	11	19	30 30 36	9 11 14	309 311 314
	NEMA	KG3.N42/X KG3.N48/X KG3.N56/X	28-40 40 40	4.5 - 6 4.5 - 6 7 - 8.5	16 18 30	8-10 10-12 20-24			30 36 36	3/8" 1/2"	3N42 3N48
G5	IEC	KG5.011/X KG5.014/X KG5.019/X KG5.024/X	50-60 50-60 50-60 60	8.9 - 10	15 30 40 70	8-10 12-17 20-25 30-40	19.5	31.5	45 45 45 52	11 14 19 24	511 514 519 524
	NEMA	KG5.N56/X KG5.N140/X	50-60 60		45 60	30-35 40-45			45 52	1/2" 5/8" 7/8"	5N48 5N56 5N140
G6	IEC	KG6.014/X KG6.019/X KG6.024/X KG6.028/X	70 70-85-110 70-85-110 70-85-110	15.3 - 18	60 90 130 180	30-40 50-65 85-100 100-120	19.5	31.5	58	14 19 24 28	614 619 624 628
	NEMA	KG6.N56/X KG6.N140/X KG6.N180/X	70-85-110 70-85-110 70-85-110		50 85 200	- - - - - - - - -				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
* - Coupling GS8: steel, key fit and grub screw
../X - Code of coupling with IXEF black-spider

Gearbox Type	Flange Type	IEC	Flange		Coupling	
			B5 Kit Part No.	B14 Kit Part No.	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/X KG3.011/X
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/X KG3.011/X KG3.014/X
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/X KG5.014/X KG5.019/X
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/X KG5.019/X KG5.024/X
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/X KG6.019/X KG6.024/X KG6.028/X
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/X KG6.024/X KG6.028/X
RS-RT 110	FM 110	IEC90 IEC100/112 IEC132	K535.206.200 K535.206.250 K535.206.300	- - - K535.206.160 K535.206.200	G6 ø24 G6 ø28 # ø38	KG6.024/X KG6.028/X - - -
RS 130	FM 130	IEC100/112 IEC 132	K536.206.250 K537.206.300	- - - K536.206.200	# ø28 # ø38	- - - - - -
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 - - -	# ø28 # ø38 # ø42	- - - - - - - - -
XA 63	FM 40	IEC56 IEC63	K531.206.120 K531.206.140	K531.206.080 K531.206.090	# ø9 # ø11	- - - - - -
XA 71	FM 50	IEC71	K532.206.160	K532.206.105	# ø14	- - -
XA 80	FM 70	IEC80 IEC90	K533.206.200 K533.206.200	K533.206.120 K533.206.140	# ø19 # ø24	- - - - - -
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/X KG6.024/X KG6.028/X

- Key / keyway motor fitting
../X - Code of coupling with IXEF black-spider

Gearbox Type	Flange Type	NEMA	Flange Kit Part No.	Coupling	
				Type	Kit Part No.
RS-RT 28	FM 28	42 C	K530.207.N048	G3 ø 3/8”	KG3.N042/X
RS-RT 40	FM 40	42 C 48 C 56 C	K531.227.N048 K531.227.N048 K531.227.N056	G3 ø 3/8” G3 ø 1/2” G3 ø 5/8”	KG3.N042/X KG3.N048/X KG3.N056/X
RS-RT 50	FM 50	56 C	K532.227.N056	G5 ø 5/8	KG5.N056/X
RS-RT 60	FM 60	56 C 140 TC	K539.227.N056 K539.227.N056	G5 ø 5/8” G5 ø 7/8”	KG5.N056/X KG5.N140/X
RS-RT 70	FM 70	56 C 140 TC 180 TC	K533.227.N056 K533.227.N056 K533.227.N180	G6 ø 5/8” G6 ø 7/8” G6 ø 1-1/8”	KG6.N056/X KG6.N140/X KG6.N180/X
RS-RT 85	FM 85	56 C 140 TC 180 TC	K534.227.N056 K534.227.N056 K534.227.N180	G6 ø 5/8” G6 ø 7/8” G6 ø 1-1/8”	KG6.N056/X KG6.N140/X KG6.N180/X
RS-RT 110	FM 110	56 C 140 TC 180 TC	K535.227.N056 K535.227.N056 K535.227.N180	G6 ø 5/8” G6 ø 7/8” G6 ø 1-1/8”	KG6.N056/X KG6.N140/X KG6.N180/X
RS 130	FM 130	56 C 140 TC 180 TC	K536.227.N056 K536.227.N056 K536.227.N180	# ø 5/8” # ø 7/8” # ø 1-1/8”	- - - - - - - - -
RS 150	FM 130	56 C 140 TC 180 TC 210 TC	K537.227.N056 K537.227.N056 K537.227.N180 K537.227.N180	# ø 5/8” # ø 7/8” # ø 1-1/8” # ø 1-1/8”	- - - - - - - - - - - -
XA 63	FM 40	* IEC56 * IEC63	K531.206.120 K531.206.140	# ø9 mm # ø11 mm	- - - - - -
XA 71	FM 50	* IEC71	K532.206.160	# ø14 mm	- - -
XA 80	FM 70	* IEC80 * IEC90	K533.206.200 K533.206.200	# ø19 mm # ø24 mm	- - - - - -
XA 100	FM 85	56 C 140 TC 180 TC	K334.227.N056 K334.227.N056 K334.227.N180	G6 ø 5/8” G6 ø 7/8” G6 ø 1-1/8”	KG6.N056/X KG6.N140/X KG6.N180/X

\# - Key / keyway motor fitting
* - IEC input only
../X - Code of coupling with IXEF black-spider

GEARBOX DESIGNATION

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

OPS = Standard options pages 56 and 64
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 of helical/worm unit
28/, 40/, 50/ (FRS / FRT) = 1st gearbox size of two-stage unit

-G = input with Coupling G
- - - = Keyway & key

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

M = Geared motor
F = Gearbox with input flange
S = Gearbox without input flange
… = (nothing) Gearbox with input free shaft

MOTOR DESIGNATION

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

Terminal box position

Insulation class

Protection class

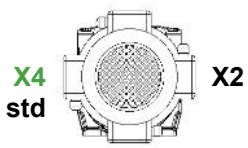
Voltage/frequency

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, unless otherwise re-quested, is the right side of the gearbox when seen from the input side.

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

VARsize by VARVEL

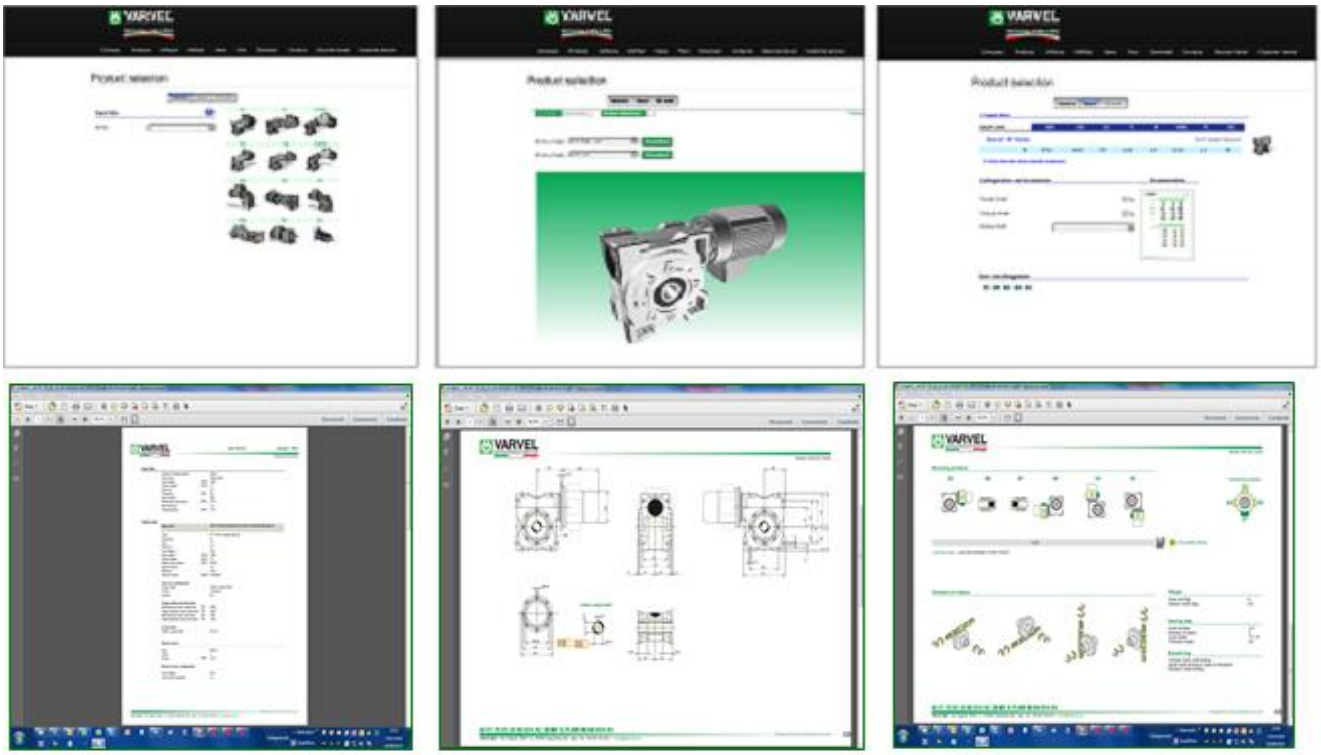
Modularity and flexibility
have been leading the design of VARVEL products since the years 2000: this way, the gearbox-kit concept was carried out allowing anyone to assemble the unit in few minutes with standard tooling.

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.

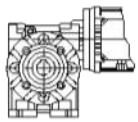
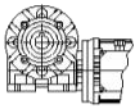
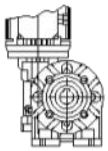
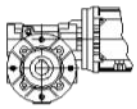
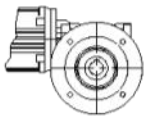
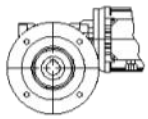
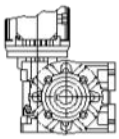
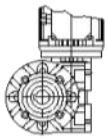
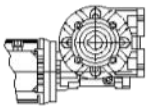
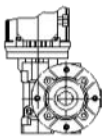
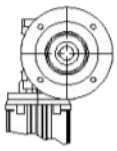
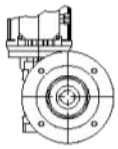
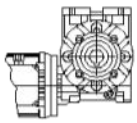
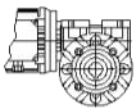
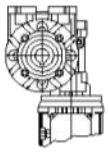
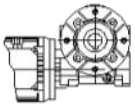
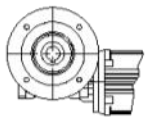
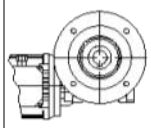
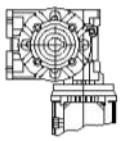
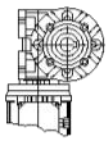
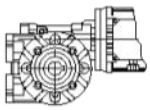
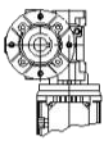
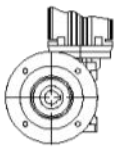
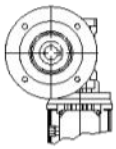
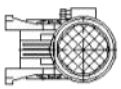
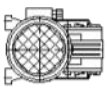
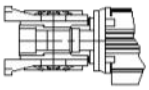
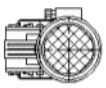
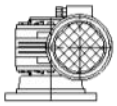
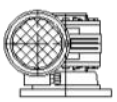
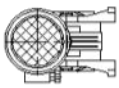
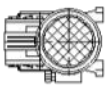
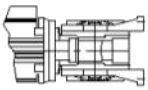
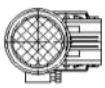
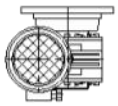
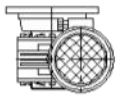
VARsize® selection program, available from our web-site
www.varvel.com
allows a friendly sizing of VARVEL product range.

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

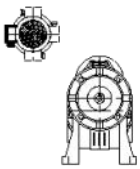
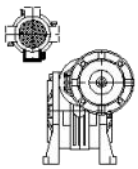
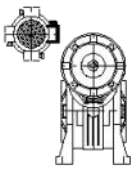
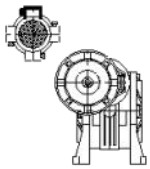
Guided selection
This option returns a list of applicable product configurations upon a given sequence of application parameters (power, output torque, rpm, service factor etc.); a PDF data sheet featuring performance data and dimensional drawings is generated for each configuration, as well as the 3D model and 2D drawings.



RS, RA, RS/RS
Gearbox fixing

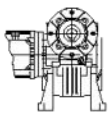
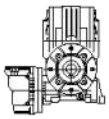
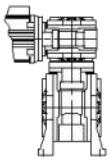
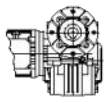
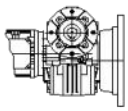
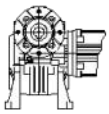
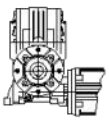
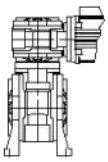
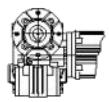
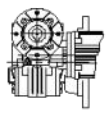
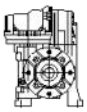
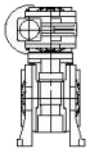
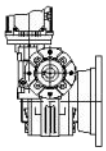
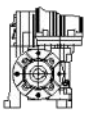
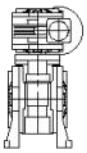
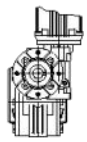
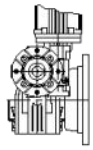
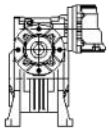
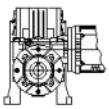
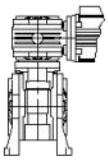
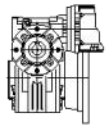
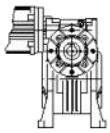
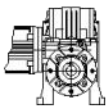
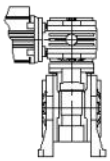
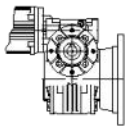
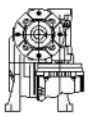
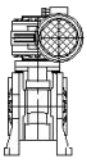
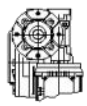
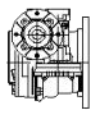
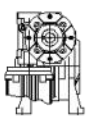
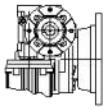
S (SA)	**I** (IA)	**D** (DA)	**PC** (PA, PB)	FL (FA, FB, FR)	
 B3 (std)	 B3 (std)	 B3 (std)	 B5 (std)	 B5 (std)	 B5i
 V5	 V5	 V5	 B5a	 B5a	 B5ai
 B8	 B8	 B8	 B5b	 B5b	 B5bi
 V6	 V6	 V6	 B5c	 B5c	 B5ci
 B6	 B6	 B6	 V1	 V1	 V1i
 B7	 B7	 B7	 V3	 V3	 V3i

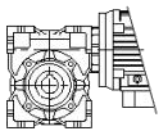
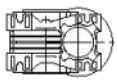
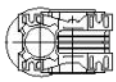
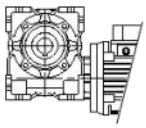
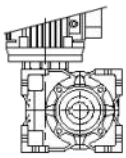
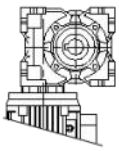
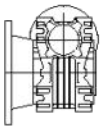
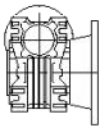
RA
Helical stage position

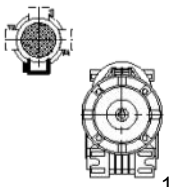
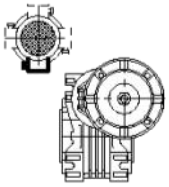
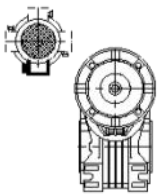
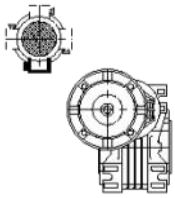
10 (std)	**11**	**12**	**13**	
				

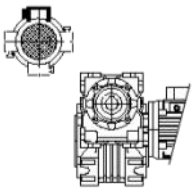
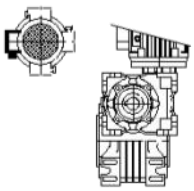
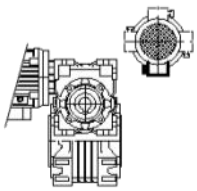
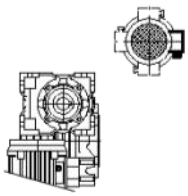
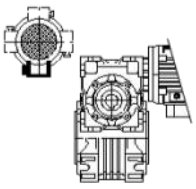
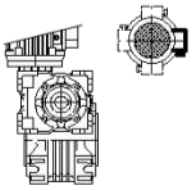
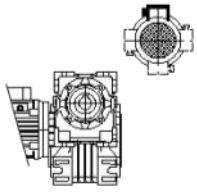
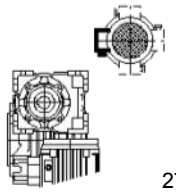
Mounting positions

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					

RT, TA, RT/RT - Gearbox fixing	 B3 (std)	 B6	 B7	 B8
	 V5	 V6	 F (std)	 Fi

TA - Helical stage position	 10 (std)	 11	 12	 13

RT/RT - First gearbox position	 20 (std)	 21	 22	 23
	 24	 25	 26	 27

WEIGHTS					
RS RT	kg	**RA TA**	kg	**RS / RS RT /RT**	kg
28	1.1	63 / 40	4.0	28 / 28	2.5
40	2.5	63 / 50	5.3	28 / 40	3.9
50	3.8	63 / 60	8.0	28 / 50	5.2
60	6.5	71 / 50	6.6	28 / 60	7.9
70	9.0	71 / 60	9.3	40 / 70	12.0
85	13.5	71 / 70	11.8	40 / 85	16.5
110	39.0	71 / 85	16.3	50 / 110	45.0
RS 130	50.0	80 / 60	10.5	RS60 / 130	57.0
RS 150	80.0	80 / 70	13.0	RS70 / 150	90.0
		80 / 85	17.5		
		80 / 110	43.0		
		100 /110	46.0		
		RS100 / 130	64.0		
		RS 100 / 150	94.0		

LUBRICANTS [l, l_1, l_2 = litres]					
RS RT	l	**RA TA**	l_1/l_2	**RS / RS RT / RT**	l_1/l_2
28	0.03	63 / 40	0.04 / 0.08	28 / 28	0.03 / 0.03
40	0.08	63 / 50	0.04 / 0.13	28 / 40	0.03 / 0.08
50	0.13	63 / 60	0.04 / 0.25	28 / 50	0.03 / 0.13
60	0.25	71 / 50	0.05 / 0.13	28 / 60	0.03 / 0.25
70	0.35	71 / 60	0.05 / 0.25	40 / 70	0.08 / 0.35
85	0.60	71 / 70	0.05 / 0.35	40 / 85	0.08 / 0.60
110	1.50	71 / 85	0.05 / 0.60	50 / 110	0.13 / 1.50
RS 130	2.75	80 / 60	0.10 / 0.25	RS60 / 130	0.23 / 2.75
RS 150	4.40	80 / 70	0.10 / 0.35	RS70 / 150	0.35 / 4.40
		80 / 85	0.10 / 0 .60		
		80 / 110	0.10 / 1.50		
		100 /110	0.20 / 1.50		
		RS100 / 130	0.20 / 2.75		
		RS 100 /150	0.20 / 4.40		

SERVICE FACTOR of the gearbox

Service factor FS1.0 is meant as typical of 8-10 hours/day operation, with uniform load and starts/ stops lower than 6 per hour and ambient temperature between 15 and 35 Celsius.

The ratio between the drive's maximum output torque M_2 and application torque $M_{(app)}$ defines the drive's Duty Factor that must be equal or bigger than the Service Factor SF.

Pease ask our Pre-sales Service for max. ambient temperature over 40 °C or below 0 °C.

Should other operation conditions occur, the service factors of the two tables have to be multiplied.

Service Factor SF

Type of Charge				Start-Stops per Hour		
hours	uniform **SF_1**	variable **SF_1**	with shocks **SF_1**	number	**SF_2**	**$SF = SF_1 \times SF_2$**
8	0.8	1.1	1.4	6	1.0	
16	1.0	1.3	1.5	60	1.2	
24	1.2	1.4	1.6	120	1.3	

Mass acceleration factor

Load class

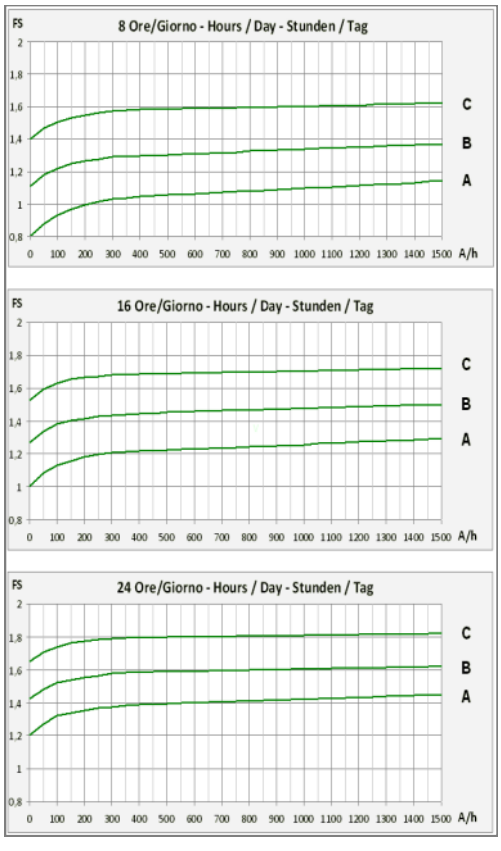
$$k_{(a)} = \frac{\frac{J_2}{ir^2} + J_1}{J_m}$$

A - Uniform load $k_{(a)} \leq 0.2$

B - Moderate shock load $0.2 < k_{(a)} \leq 3$

C - Severe shock load $3 < k_{(a)} \leq 10$

A/h - Number of starts/stops per hour



DUTY TYPE
of the motor

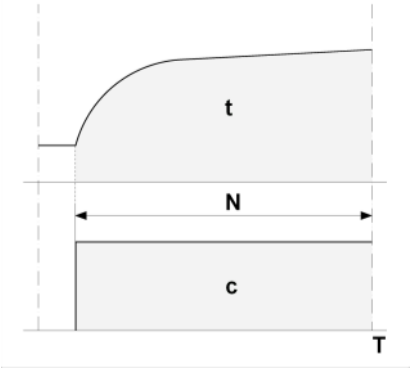
Duty types are defined by CEI EN 60034-1 / IEC34-1 Standard.

S1 - Continuous duty

Steady load operation for an indefinite period (N), but long enough to achieve thermal balancing.

FS = 1.0

c = load
N = operation time
t = temperature
T = time



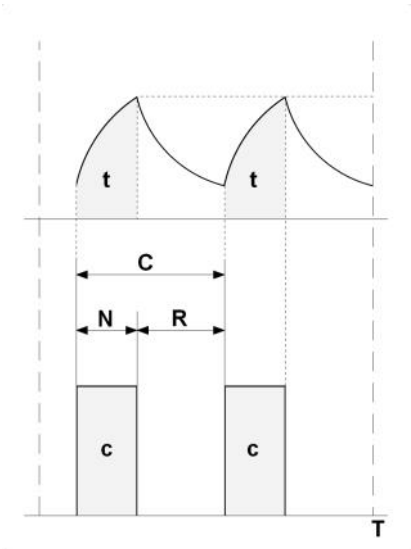
S3 - Periodic intermittent duty

Operation according to cycle (C) including steady load time (N) and rest time (R).
Starts/stops do not affect temperature.
The reference cycle (C) to count as a total of 10 minutes.
Intermittence ratio is calculated according the following formula.

$$\frac{N}{(N+R)} * 100 =$$

60% **FS 1.1**
40% **FS 1.2**
25% **FS 1.3**
15% **FS 1.4**

C = duty cycle
c = load
N = operation time
R = rest time
t = temperature
T = time



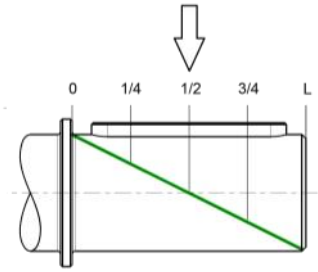
OUTPUT RADIAL LOADS (OHL)

Radial (overhung) loads - as shown in the following tables - should be checked according to output speed, mounting position and type of the transmission element fitted on the gearbox output shaft by the appropriate $k_{(t)}$. rating factor.

Application point of radial load

OHL (F_{r2}) is considered as applied at the output shaft mid-point.
Other positions origin loads to be adjusted with the appropriate factor k_L.
Examples of the distance from the shaft shoulder:

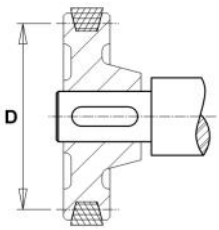
k_L	L
1.1	1/4 * L
1.0	1/2 * L
0.9	3/4 * L
0.8	L



Transmission element

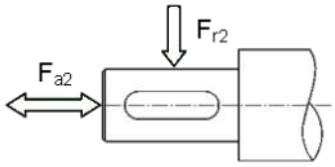
k_T	Type
1.15	Gear tooth No. < 17
1.40 1.25 1.00	Chain sprocket tooth No. < 13 tooth No. < 20 tooth No. > 20
2.50 1.25	Pulley for V-belt toothed-belt

$$Fr = \frac{2000 * M2}{D} * k_T$$

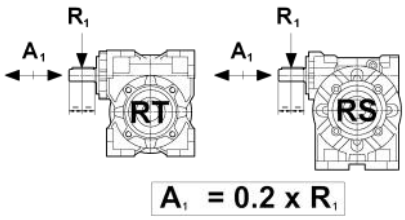


OUTPUT AXIAL LOADS

Axial load value
$F_{a2} = F_{r2} \times 0.2$
both on tensile and compressive stress. and with radial load.

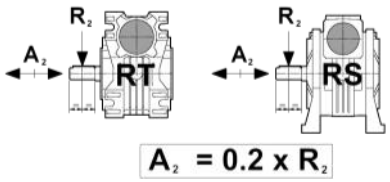


INPUT RADIAL LOADS
R_1 [daN]



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

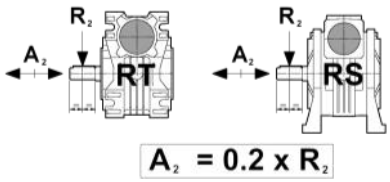
OUTPUT RADIAL LOADS
with standard bearings
R_2 [daN]



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 Type
RS-RT 28	50	45	50	55	60	62	70	75	80	90	95	100	16005
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	①
RS-RT 70	260	270	290	360	390	420	450	520	550	590	630	670	②
RS-RT 85	330	330	370	440	470	540	550	630	660	710	750	830	③
RS-RT 110	- - -	390	415	520	540	590	570	750	780	800	880	980	④
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

Bearing type	RS	RT
① ② ③ ④	6008 6009 6010 6012	6208 6209 6210 6212

OUTPUT RADIAL LOADS
with heavy duty bearings
R_2 [daN]



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 Type
RS-RT 28	75	65	75	82	90	93	105	112	120	130	130	130	6005
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	①
RS-RT 85	410	420	460	550	630	720	730	840	870	940	940	940	②
RS-RT 110	- - -	500	540	670	750	800	930	1050	1110	1110	1110	1110	③
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

Bearing type	RS	RT
① ② ③	32009 32010 32012	30209 30210 30212

FRS FRT	rpm / IEC	i = 5	7	10	15	20	28	40	49	56	70	80	100
		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	- - -	- - -	- - -	- - -

		Input flange with
①	B5&B14	flexible coupling
③	B5	
②	B5&B14	bore and key / keyway
④	B5	

FRA FTA	i =	5	7	10	15	20	28	40	49	56	70	80	100
	IEC (✶)	(✶✶✶)											
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	⑧	⑧	⑧	⑧	⑧	⑧
80/70		③	③	③	③	③	③	③	③	⑧	⑧	⑧	⑧
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	⑧	⑧	⑧	⑧	⑧	⑧
80/70		③	③	③	③	③	③	③	③	⑧	⑧	⑧	⑧
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

(✶)	FRA, FTA - IEC input frame
(✶✶)	FRA only
(✶✶✶)	Helical stage output and FRS/FRT input
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 ø38 mm + Bore adapter ø28/38 mm)

RS-RT

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 w/single stage worm, helical/worm, double stage worm and with input motor flange, input quill and flexible coupling
  Motor flanges: IEC 56 to IEC 160 and NEMA 56C to NEMA 210TC
  Output torque: 7 Nm [62 in-lb] to 26730 Nm [20350 in-lb]
  Reduction ratios: 5:1 to 10000:1

SRS, SRT

- Gearboxes w/single stage worm, helical/worm, double stage worm without input motor flange, but with input hollow shaft and flexible coupling
  Output torque: 7 Nm [62 in-lb] to 26730 Nm [20350 in-lb]
  Reduction ratios: 5:1 to 10000:1

RS, RT

- Gearboxes w/single stage worm, helical/worm, double stage worm and input solid shaft
  Output torque: 7 Nm [62 in-lb] to 26730 Nm [20350 in-lb]
  Reduction ratios: 5:1 to 10000:1

RS-RT - 2800 rpm

RS RT	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

RS-RT- 1400 rpm

RS RT	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	280	200	140	93	70	50	35	29	25	20	18	14
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	238	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

RS RT	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	180	128	90	60	45	32	23	19	16	13	11	9
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

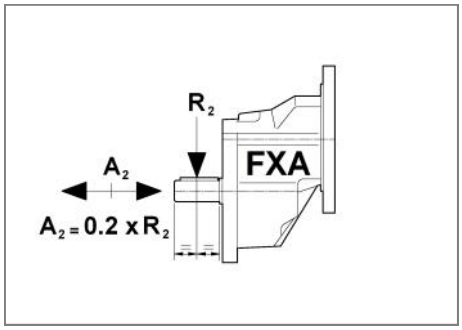
RS-RT- 700 rpm

RS RT	i =	5	7	10	15	20	28	40	49	56	70	80	100
	rpm	140	100	70	47	35	25	18	15	13	10	8.7	7
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

XA - 1400 rpm

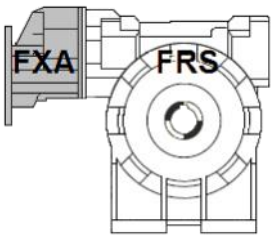
FXA Attachment

FXA				
	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

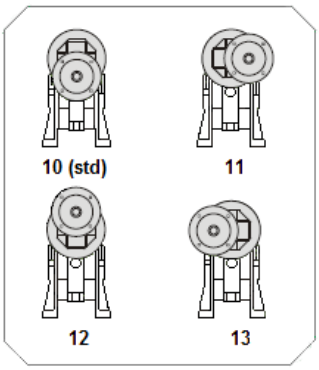


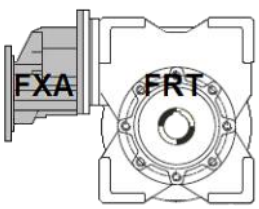
Dimensions: page 58

Attachment positions



FRA





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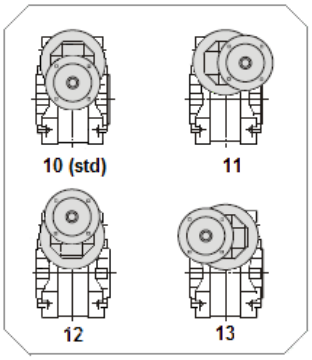


RA-TA - 1400 rpm [XA ratio i=3.5]

RA TA i_n = 3.5	$i = i_n \times i_2$	17.5	25	35	53	70	98	140	172	196	245	280	350
	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

RA-TA - 1400 rpm [XA ratio i=6.3]

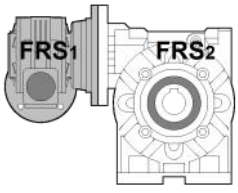
RA TA i_n = 6.3	$i = i_n \times i_2$	31.5	44	63	95	126	176	252	309	353	441	504	630
	rpm	44	32	22	15	11	8	5.5	4.6	4	3.2	2.8	2.2
	i_2	5	7	10	15	20	28	40	49	56	70	80	100
RA-TA 63/40	kW	0.45	0.35	0.25	0.17	0.12	0.11	0.08	0.06	0.06	0.05	0.04	0.03
	Nm	76	79	78	74	63	69	63	57	55	53	51	46
	eff.	0.78	0.76	0.72	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

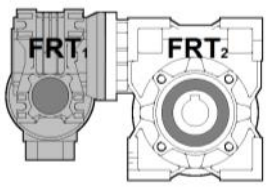
RA-TA - 1400 rpm [XA ratio i=8]

RA TA $i_n = 8$	$i = i_n \times i_2$	40	56	80	120	160	224	320	392	448	560	640	800
	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

RS/RS-RT/RT - 1400 rpm

RS RT	$i = i_1 \times i_2$	280	420	560	784	1120	1568	2240	2800	4000	5600	8000	10000
	rpm	5	3.3	2.5	1.8	1.25	0.9	0.6	0.5	0.35	0.25	0.17	0.14
	i_1 =	10	15	20	28	40	56	56	70	100	100	100	100
	i_2 =	28	28	28	28	28	28	40	40	40	56	80	100
RS-RT 28/28	W	45	32	25	21	16	13	9	8	6	3	1.8	1.3
	Nm	36	36	36	36	36	35	30	30	30	16	12	11
	eff.	0.40	0.38	0.37	0.32	0.30	0.25	0.21	0.20	0.18	0.14	0.12	0.13
RS-RT 28/40	W	108	75	60	46	34	30	22	22	14	11	5	3
	Nm	85	85	85	80	80	80	73	76	70	62	41	25
	eff.	0.41	0.39	0.37	0.33	0.31	0.25	0.21	0.18	0.18	0.15	0.14	0.12
RS-RT 28/50	W	187	133	106	91	74	60	36	36	28	20	10	6
	Nm	150	150	150	160	175	160	125	131	147	125	78	49
	eff.	0.30. 42	0.39	0.37	0.33	0.31	0.25	0.22	0.19	0.19	0.16	0.14	0.12
RS-RT 28/60	W	279	197	157	132	91	91	67	54	30	32	16	10
	Nm	240	240	240	245	230	260	245	217	164	195	128	91
	eff.	0.45	0.42	0.40	0.35	0.33	0.27	0.23	0.21	0.20	0.16	0.14	0.13
RS-RT 40/70	W	423	298	249	198	157	119	86	72	60	42	24	16
	Nm	380	380	400	400	395	380	370	345	360	321	201	154
	eff.	0.47	0.44	0.42	0.38	0.33	0.30	0.27	0.25	0.22	0.20	0.15	0.14
RS-RT 40/85	W	635	447	372	276	224	180	138	120	90	72	39	26
	Nm	595	595	625	585	625	610	615	595	565	550	373	264
	eff.	0.49	0.46	0.44	0.40	0.35	0.32	0.28	0.26	0.23	0.20	0.17	0.15
RS-RT 50/110	W	- - -	865	756	579	453	382	292	235	163	128	82	51
	Nm	- - -	1190	1300	1300	1280	1350	1340	1210	1070	980	810	560
	eff.	- - -	0.48	0.45	0.42	0.37	0.33	0.30	0.27	0.24	0.20	0.18	0.16
RS 60/130	kW	- - -	1.5	1.1	0.75	0.55	0.55	0.37	0.25	0.25	0.25	0.25	0.25
	Nm	- - -	2015	1930	1670	1530	2015	1830	1410	1770	1850	1420	1225
	eff.	- - -	0.50	0.46	0.43	0.40	0.35	0.33	0.30	0.27	0.25	0.21	0.20
RS 70/150	kW	- - -	1.8	1.5	1.1	0.75	0.75	0.55	0.37	0.37	0.25	0.25	0.25
	Nm	- - -	2570	2830	2570	2460	2850	3020	2325	2875	2670	2135	1995
	eff.	- - -	0.52	0.50	0.46	0.43	0.39	0.36	0.33	0.31	0.27	0.23	0.22





Other reduction ratios and gearbox size combinations are available on demand.

MRS-MRT - 1400 rpm

0.06 kW	rpm	i =	Nm	SF	kg
MRS-MRT28	280	5	1,8	>3	3.6
MRS-MRT28	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

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

0,25 kW	rpm	i =	Nm	SF	kg
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
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

MRS-MRT - 1400 rpm

0,55 kW	rpm	i =	Nm	SF	kg	1.1 kW	rpm	i =	Nm	SF	kg
MRS-MRT 40	280	5	16	2,8	10,7	MRS-MRT 60	200	5	34	>3	19
MRS-MRT 50	200	7	23	>3	12	MRS-MRT 60	140	10	63	2,1	19
MRS-MRT 50	140	10	32	2,4	12	MRS-MRT 60	93	15	91	1,4	19
MRS-MRT 50	70	20	57	1,1	12	MRS-MRT 60	70	20	116	1,1	19
MRS-MRT 50	50	28	75	1,1	12	MRS-MRT 70	50	28	158	1,4	21
MRS-MRT 60	35	40	99	1,4	15	MRS-MRT 70	35	40	213	1,1	21
MRA-MTA 80/60	32	44	130	1,7	19	MRA-MTA 80/70	32	44	264	1,1	25
MRS-MRT 60	29	49	114	1,1	15	MRS-MRT 85	29	49	246	1,3	26
MRS-MRT 60	25	56	126	1,0	15	MRS-MRT 85	25	56	286	1,1	26
MRA-MTA 80/60	22	63	177	1,2	19	MRA-MTA 80/85	22	63	364	1,4	30
MRS-MRT 70	20	70	155	1,1	18	MRS-MRT 110	20	70	352	1,8	48
MRS-MRT 70	18	80	168	1,0	18	MRS-MRT 110	18	80	396	1,3	48
MRA-MTA 80/60	15	95	249	1,0	19	MRA-MTA 80/85	15	95	513	1,0	30
MRS-MRT 85	14	100	210	1,0	22	MRS-MRT 110	14	100	458	1,0	48
MRA-MTA 80/70	11	126	321	1,1	22	MRA-MTA 80/110	11	126	671	1,6	52
MRA-MTA 80/85	8,0	176	396	1,3	26	MRA-MTA 80/110	8,0	176	832	1,4	52
MRA-MTA 80/85	5,5	252	520	1,0	26	MRA-MTA 80/110	5,5	252	1078	1,0	52
MRA-MTA 8 0/110	4,6	309	614	1,8	49	MRA-MTA 80/110	4,6	309	1229	0,9	52
MRA-MTA 80/110	4,0	353	689	1,4	49	MRA 110/130	3,5	400	1681	1,0	94
MRS-MRT 50 / 110	3,3	420	756	1,1	49	MRS-MRT 60 / 130	3,3	420	1576	1,3	69
MRA-MTA 80/110	3,2	441	794	1,2	49	MRA 110/150	3,0	448	1916	1,3	99
MRA-MTA 80/110	2,8	504	851	0,9	49	MRA 110/150	2,5	560	2059	1,0	99
MRS-MRT 50 / 110	2,5	570	962	1,3	49	MRA 110/150	2,2	640	2209	0,9	99
MRS-MRT 50 / 110	1,8	784	1235	1,5	49	MRS-MRT 70 / 150	1,8	784	2706	0,9	102
0,75 kW	rpm	i =	Nm	SF	kg	**1,5 kW**	rpm	i =	Nm	SF	kg
MRS-MRT 50	200	5	23	>3	14	MRS-MRT 60	280	5	46	2,7	20
MRS-MRT 50	200	7	31	2,4	14	MRS-MRT 60	200	7	62	1,8	20
MRS-MRT 50	140	10	43	1,7	14	MRS-MRT 60	140	10	86	1,5	20
MRS-MRT 50	93	15	60	1,2	14	MRS-MRT 60	93	15	124	1,0	20
MRS-MRT 60	70	20	79	1,5	17	MRS-MRT 70	70	20	166	1,2	23
MRS-MRT 60	50	28	102	1,4	17	MRS-MRT 70	50	28	215	1,0	23
MRS-MRT 60	35	40	135	1,0	17	MRS-MRT 85	35	40	295	1,4	27
MRA-MTA 80/60	32	44	178	1,2	20	MRA-MTA 80 / 85	32	44	360	1,4	31
MRS-MRT 70	29	49	168	1,1	19	MRS-MRT 85	29	49	336	0,9	27
MRS-MRT 70	25	56	183	1,0	19	MRS-MRT 110	29	49	356	1,8	50
MRA-MTA 80/60	22	63	242	1,0	20	MRS-MRT 110	25	56	401	1,5	50
MRS-MRT 85	20	70	226	1,3	23	MRA-MTA 80 / 85	22	63	496	1,1	31
MRS-MRT 85	18	80	246	1,1	23	MRS-MRT 110	20	70	480	1,3	50
MRA-MTA 8 70	11	126	341	0,9	23	MRS-MRT 110	18	80	540	1,0	50
MRA-MTA 80/85	8,0	176	540	0,9	27	MRA-MTA 80/110	15	95	719	1,6	54
MRA-MTA 80/110	5,5	252	735	1,5	50	MRS130	14	100	624	1,2	64
MRA-MTA 80/110	4,6	309	838	1,3	50	MRA-MTA 80/110	11	126	915	1,2	54
MRA-MTA 80/110	4,0	353	939	1,1	50	MRA-MTA 80/110	8,0	176	1135	1,0	54
MRS-MRT 50 / 110	3,3	420	1031	1,2	50	MRA100/130	7,0	200	1269	1,0	71
MRA-MTA 80/110	3,2	441	1083	0,9	50	MRA100/130	6,3	224	1421	1,2	71
MRS-MRT 50 / 110	2,5	570	1289	1,0	50	MRA100/150	5,0	280	1490	1,1	101
						MRA100/150	3,5	400	2292	1,1	101

MRS-MRT - 1400 rpm

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
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

4kW	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

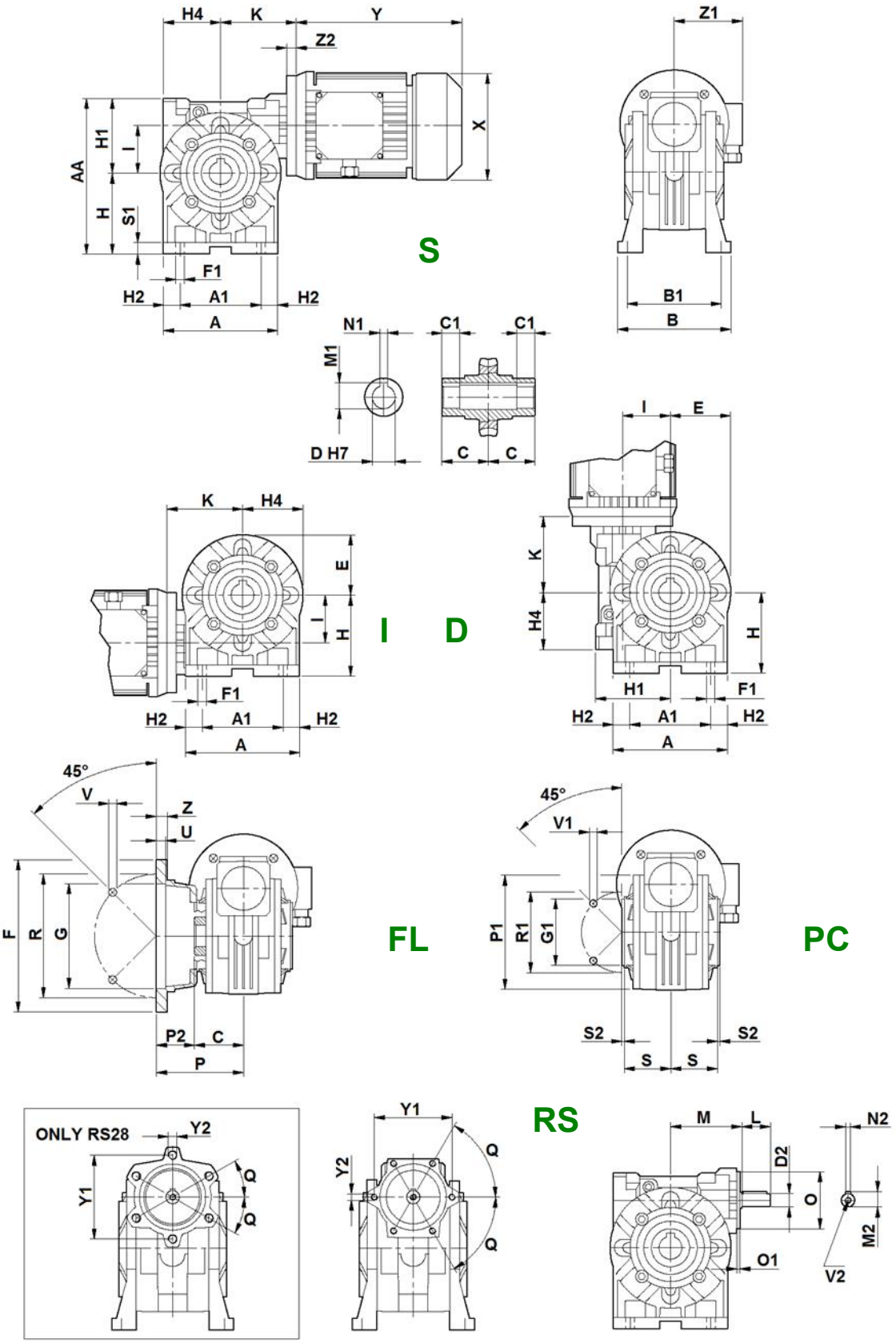
4 kW	rpm	i =	Nm	SF	kg
MRS130	25	56	1085	0,9	79
MRS150	25	56	1115	1,3	109
MRS150	20	70	1299	0,9	109
MRA100/130	20	70	1433	0,9	86
MRA100/150	18	80	1724	0,9	116
MRA100/150	14	98	1845	1,2	116
MRA100/150	12	120	2456	0,9	116

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
Z1
X
AA
H1
I
H
S1
F1
H2
A1
H2
A
B1
B
S
N1
C1
C1
M1
D H7
C
C
I
E
K
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D
K
H4
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F1
H1
F1
H2
A1
H2
A
H2
A1
H2
A
45°
V
Z
U
F
R
G
45°
V1
P1
R1
G1
FL
PC
P2
C
P
S2
S2
S
S
ONLY RS28
Y2
Y1
Q
Q
Y1
Y2
Q
Q
RS
M
L
N2
D2
O
M2
O1
V2

Dimensions

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	47,5	57,5	56,5	71	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

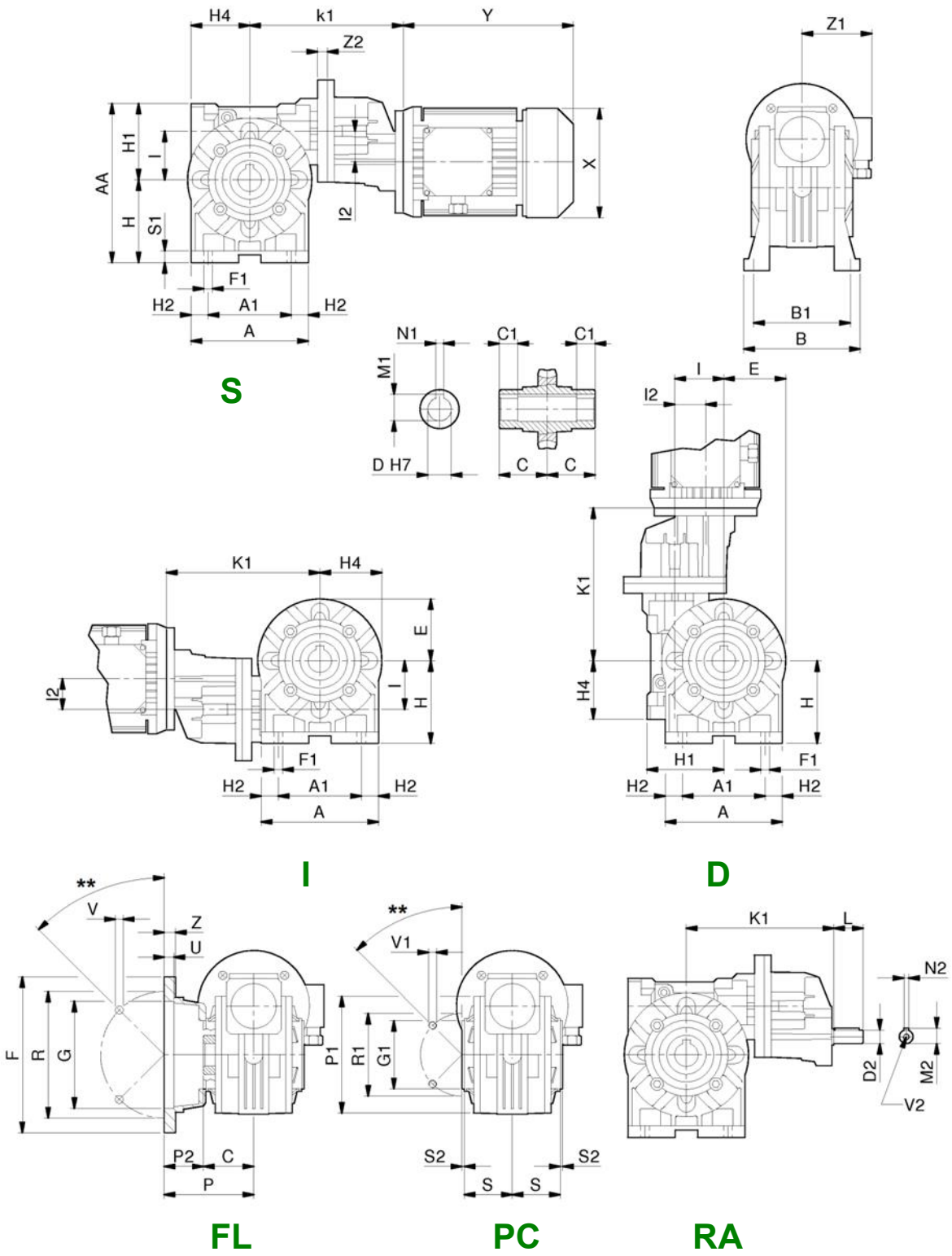
* - IEC71-B14 (**FRS50**) - IEC71-B14 (**FRS60**) - IEC 80-B14 (**FRS70**)

** - 90° for RS28 / 45° for other sizes

- 137 - Cover with bolted feet (std)
- 142 - Cover with integral feet

Motor dimensions: see page 67

Not binding dimensions


H4
k1
Y
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Z1
H1
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S1
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D H7
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K1
H4
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I2
F1
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A1
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A
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H4
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H1
F1
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A1
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V
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R
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P2
C
P
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V1
P1
R1
G1
S2
S
S
S2
K1
L
N2
D2
M2
V2
FL
PC
RA

Dimensions

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	74,5	74,5	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

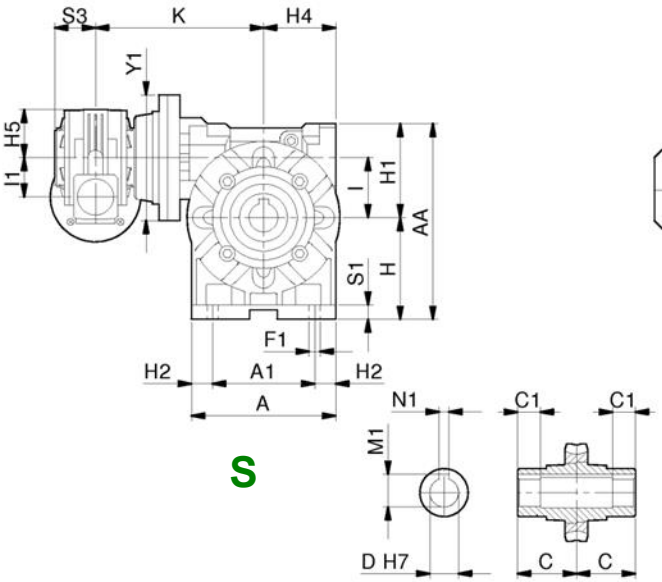
* - IEC71-B14 (**FRA 71/50, FRA 71/60, FRA 71/70, FRA 71/85)** - IEC100-B5 (**FRA 100/130**) - IEC100-B5 (**FRA 100/150**)

** - 90° for RS28 / 45° for other sizes

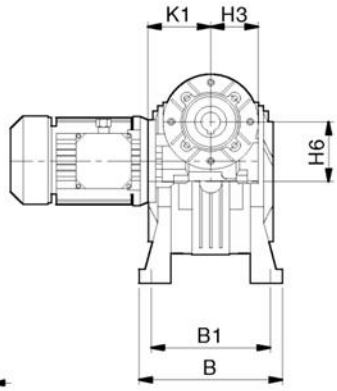
\# - 137 - Bolted feet version (std)
- 142 - Integral feet version

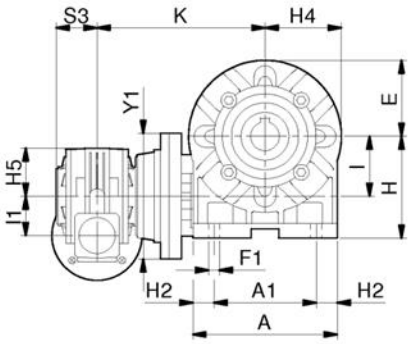
Motor dimensions: see page 67

Not binding dimensions



S





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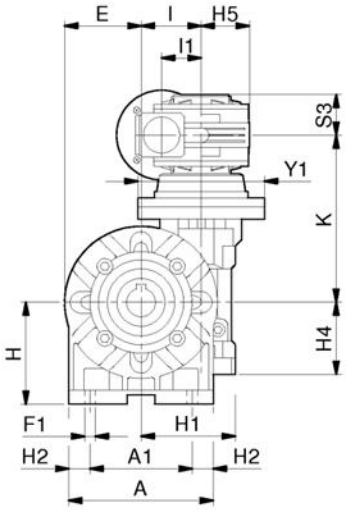
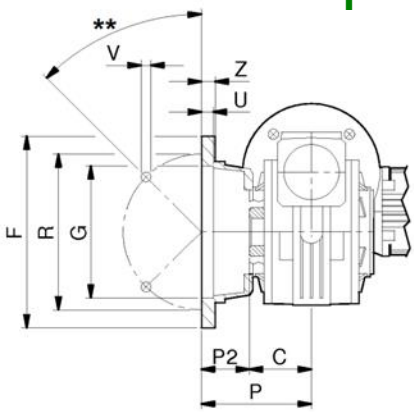
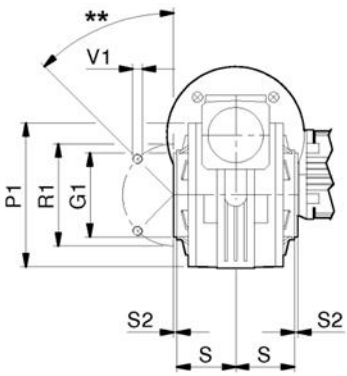


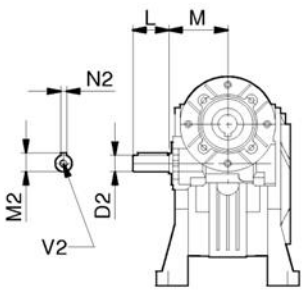
D



FL



PC



RS/RS

Dimensions

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_2	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	74,5	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

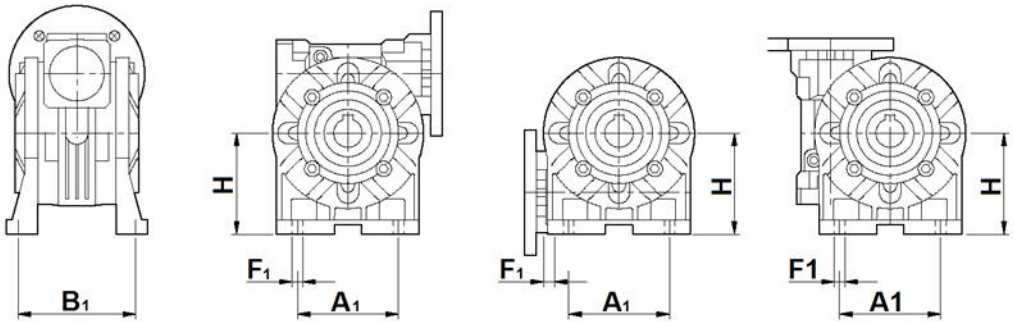
* - IEC71-B14 (**FRS50**) - IEC71-B14 (**FRS60**) - IEC 80-B14 (**FRS70**)

** - 90° for RS28 / 45° for other sizes

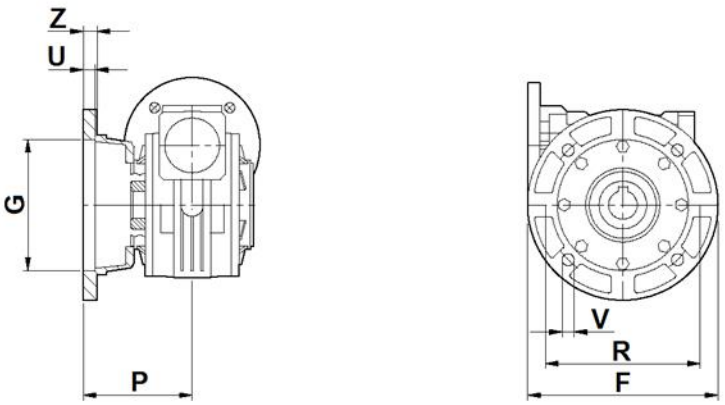
- 137 - Bolted feet (std)
- 142 - Integral feet

Motor dimensions: see page 67

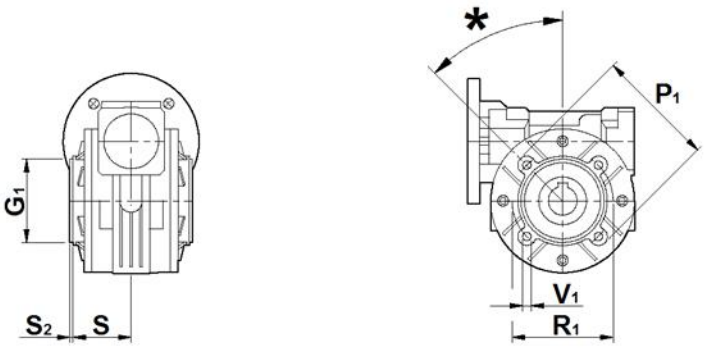
Not binding dimensions



SA **IA** **DA**



FA - FB - FR



PA - PB

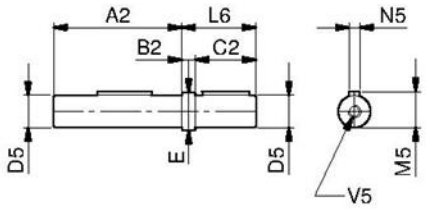
Dimensions

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	47,5	55	- - -	- - -	- - -	- - -
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)	- - -	- - -	- - -	- - -

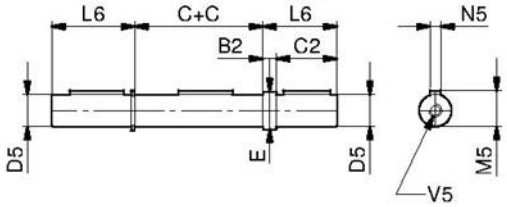
* - 45° std / 90° on demand

Not binding dimensions

AS

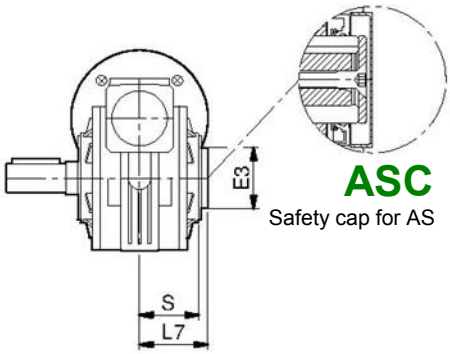


AD

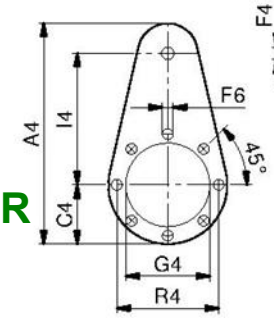


ASC

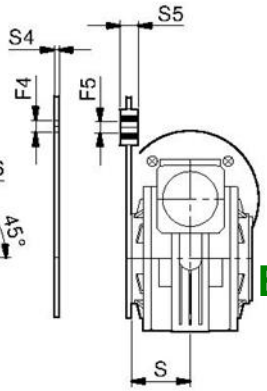
Safety cap for AS



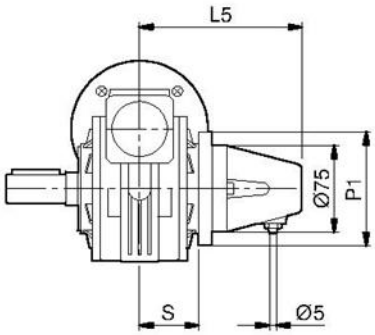
BR



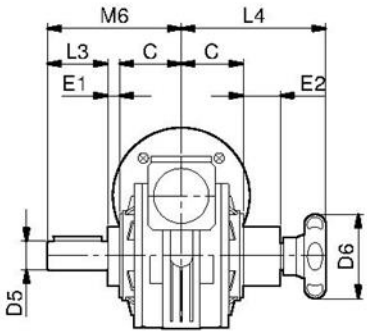
BRV



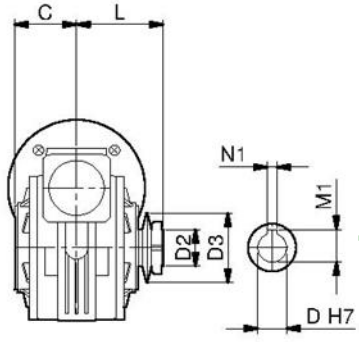
SL



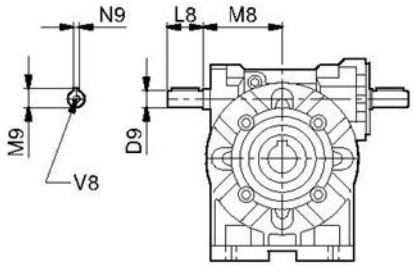
TLE



TLI



VB



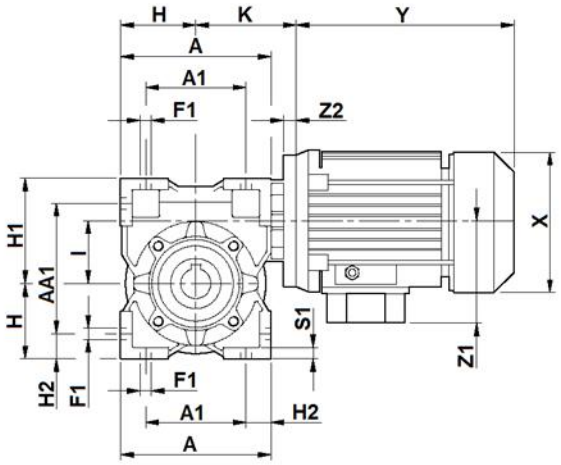
TLI
Oil
Litres

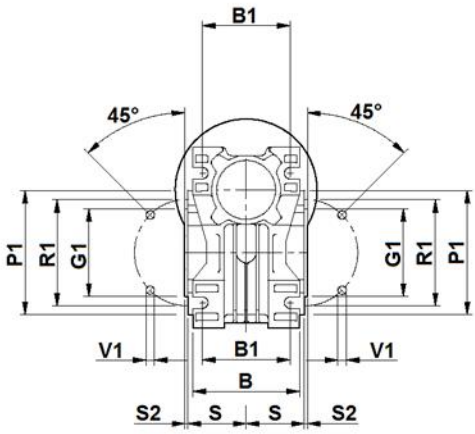
RS 28	0.04
RS 40	0.10
RS 50	0.13
RS 60	0.30
RS 70	0.45
RS 85	0.75
RS 110	2.25

Dimensions

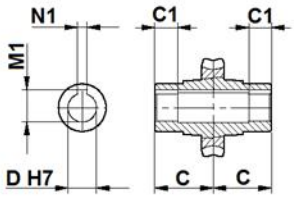
RS		28	40	50	60	70	85	110	130	150
AS & AD	A_2	58	80	95	117	117	119	153	177	207
	B_2	1	10	10	10	10	10	10	20	20
	C	30	41	49	60	60	61	77,5	90	105
	C_2	30	40	45	50	60	70	100	110	110
	$D_{5\ (g6)}$	14	19 (18)	24 (25)	25	28	32 (35)	42	48	55
	E	14	22	28	30	34	38	50	58	63
	L_6	31	50	55	60	70	80	110	130	130
	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	47,5	57.5	56,5	71	75	- - -	- - -
BR & BRV	A_4	133,5	168	185	230	240	313	388	465	525
	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	47,5	57,5	56,5	71	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

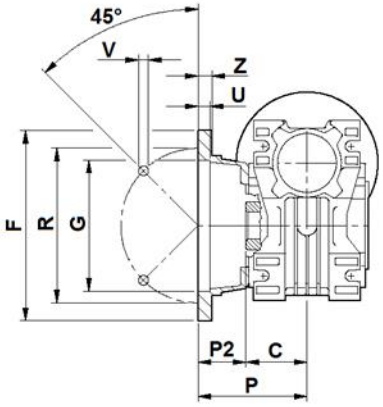

H
K
Y
A
A1
F1
Z2
H1
AA1
I
H
H2
F1
S1
X
Z1
F1
A1
H2
A


B1
45°
45°
P1
R1
G1
G1
R1
P1
V1
B1
V1
B
S2
S
S
S2

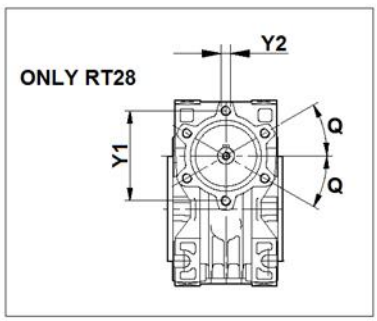
B3

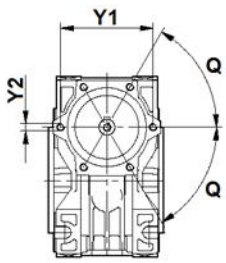

N1
C1
C1
M1
D H7
C
C

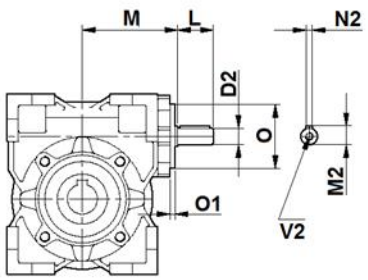
F, [FV], {FL}


45°
V
Z
U
F
R
G
P2
C
P

RT


ONLY RT28
Y2
Y1
Q
Q


Y1
Y2
Q
Q


M
L
N2
D2
O
M2
O1
V2

Dimensions

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

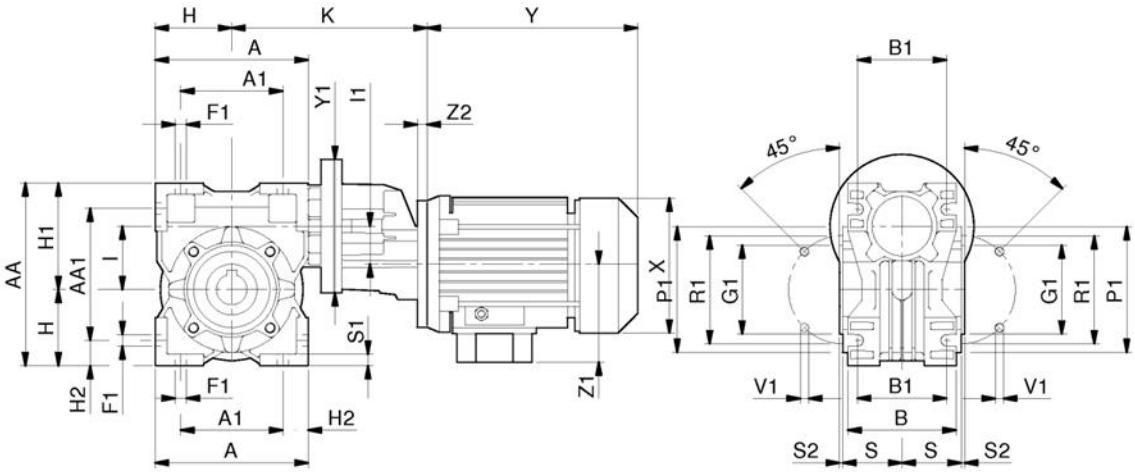
* - IEC71-B14 (**FRT50**) - IEC71-B14 (**FRT60**) - IEC 80-B14 (**FRT70**) - IEC 90-B14 (**FRT85**) - IEC100/112-B14 (**FRT110**)

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

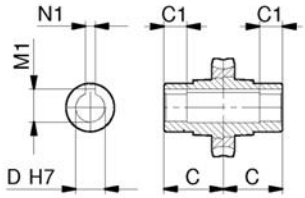
- Motor dimensions: see page 67

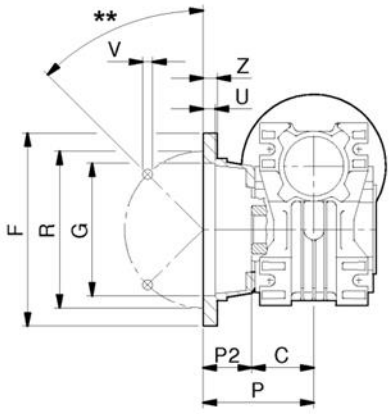
- Not binding dimensions

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

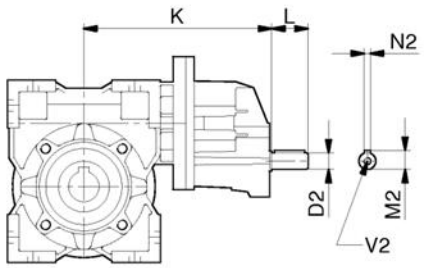

H
K
Y
A
A1
F1
Y1
I1
Z2
B1
45°
45°
AA
H1
AA1
I
H
S1
P1
X
R1
G1
G1
R1
P1
V1
B1
V1
B
S2
S
S
S2
H2
F1
F1
A1
H2
A
Z1

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

Dimensions

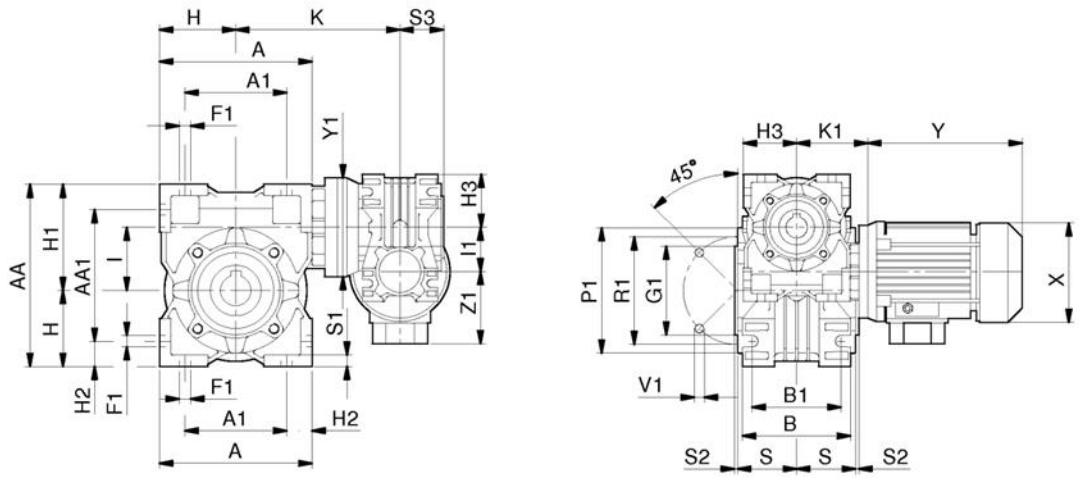
TA	63/40	63/50	63/60	71/50	71/60	71/70	71/85	80/60	80/70	80/85	80/110	100/110
A	100	120	144	120	144	172	206	144	172	206	255	255
A_1	70	80	100	80	100	120	140	100	120	140	170	170
AA	121,5	144	174	144	174	205	238	174	205	238	295	295
AA_1	91,5	104	130	104	130	153	172	130	153	172	210	210
B	71	85	100	85	100	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_3	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**)

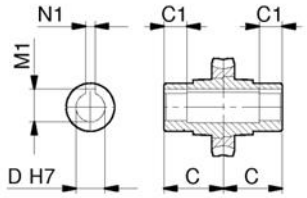
** - 90° for RT28 / 45° for other sizes

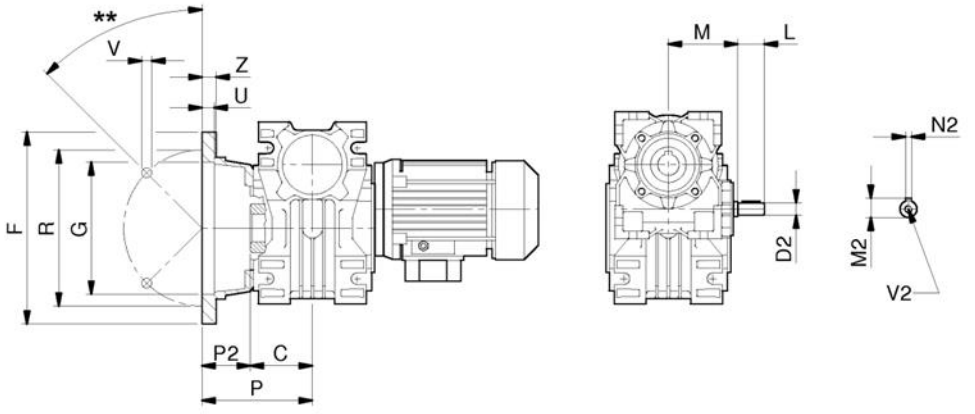
Motor dimensions: see page 67

Not binding dimensions



B3





F, [FV], {FL} **RT/RT**

Dimensions

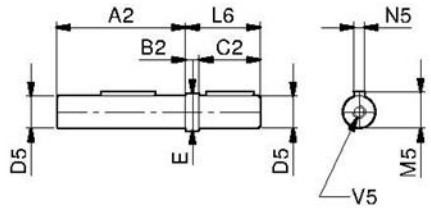
RT/RT	28/28	28/40	28/50	28/60	40/70	40/85	50/110
A	80	100	120	144	172	206	255
A_1	54	70	80	100	120	140	170
AA	97	121,5	144	174	205	238	295
AA_1	71	91,5	104	130	153	172	210
B	53	71	85	100	112	130	144
B_1	44	60	70	85	90	100	115
C	30	41	49	60	60	61	77,5
C_1	26.5	26	30.5	39	37.5	38.5	52.5
D (H7)	14	18-19-20	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

* - IEC71-B14 (FRT50)

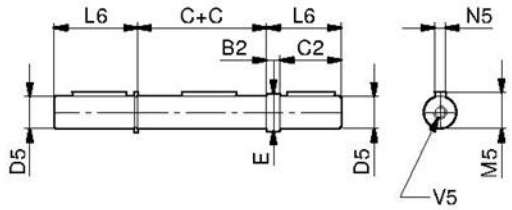
** - 90° for RT28 / 45° for other sizes

- Motor dimensions: see page 67
- Not binding dimensions

AS

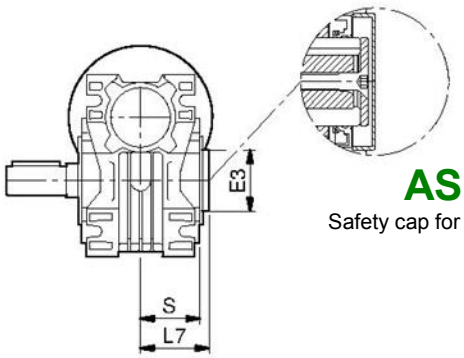


AD

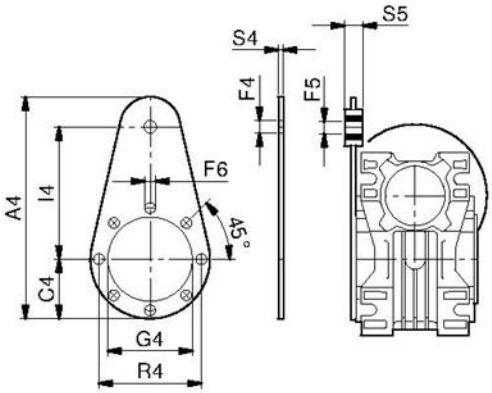


ASC

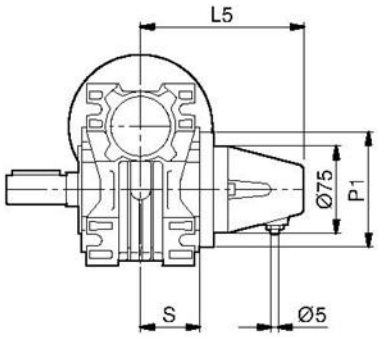
Safety cap for AS



BT

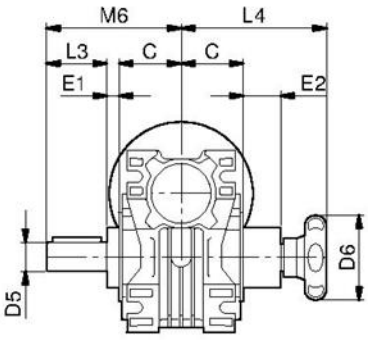


BTV

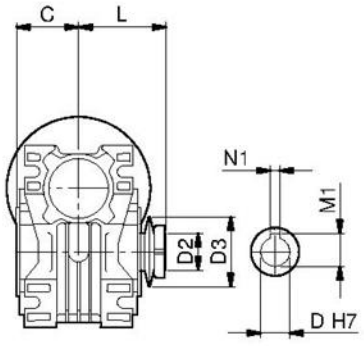


SL

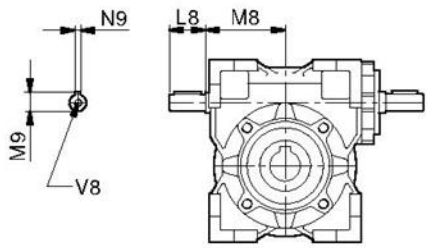
TLE



TLI



VB



TLI

Oil

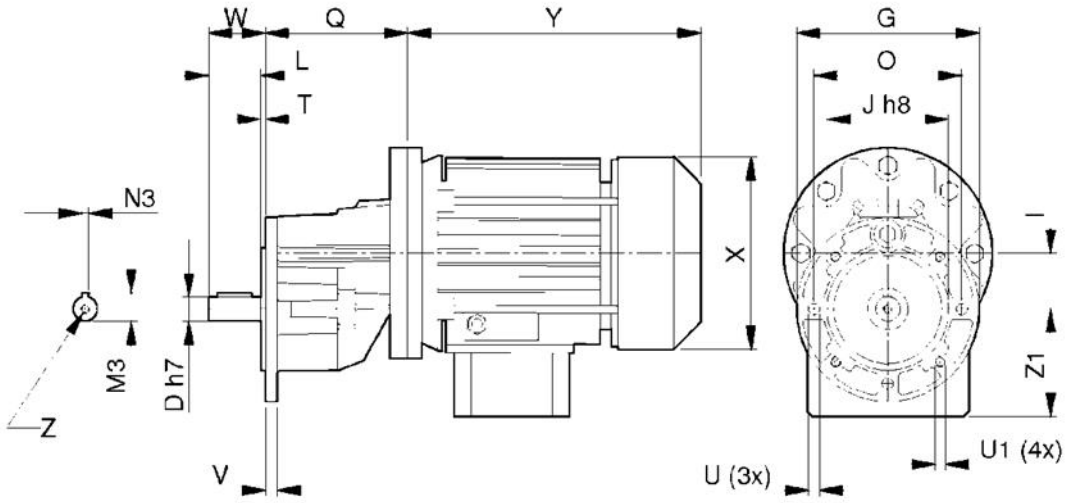
Litres

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

Dimensions

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

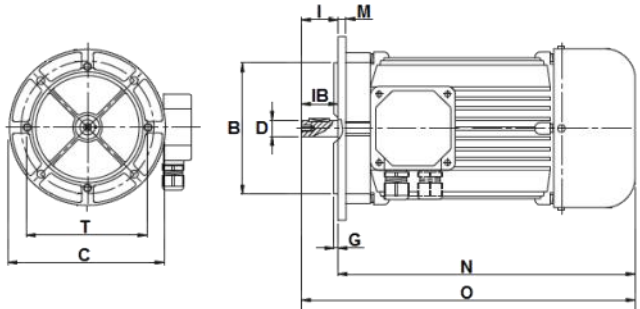


XA	D_{H7}	G	I	J_{h8}	L	M_3	$N_{3\ h9}$	O	Q	U	U1	T	V	W	Z
63	14	105	32	70	30	16	5	85	83	6,5	M6	2,5	7	32,5	M5x10
71	19	120	40	80	40	22.5	6	100	90	5,5	M6	2,5	7,5	42,5	M8x20
80	24	140	50	95	49,5	27	8	115	114	9	M8	2,5	10,5	52	M8x20
100	28	200	63	130	57,5	31	8	165	177	10,5	10,5	2,5	12	60	M10 x 22

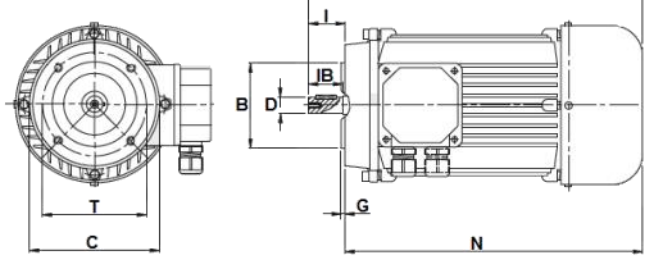
IEC B5	56	63	71	80	90 S	90 L	100	112
X	110	123	137	156	176	176	194	218
Y	168	190.5	218	242	255	280	312	330
Z_1 + I	95	100	109	123	128	128	140	148

XA	Weight kg	Oil litres
63	1.5	0.04
71	2.2	0.06
80	3.0	0.10
100	7.0	0.20

IEC - B5



IEC - B14



Frame	4 poles			2 poles			Flange	Shaft	G	IB	M	N	O
	kW	rpm	kg (B3)	kW	rpm	kg (B3)	C / T / B	D x I					
T56A	0.06	1410	2.5	0.09	2730	2.6	B5 - 120 / 100 / 80	9 x 20	2.5	20	8.5	168	188
T56B	0.09	1340	2.6	0.14	2750	3.2	B14 - 80 / 65 / 50					125	145
T63A	0.13	1340	3.7	0.18	2770	3.7	B5 - 140 / 115 / 95	11 x 23	2.5	23	10	190.5	213.5
T63B	0.18	1360	4.3	0.25	2820	4.3	B14 - 90 / 75 / 60					140	161
T71A	0.25	1410	5.8	0.37	2860	5.8	B5 - 160 / 130 / 110	14 x 30	3.0	30	10	218	248
T71B	0.37	1370	6.2	0.55	2860	6.2	B14 - 105 / 85/ 70					168	188
T80A	0.55	1430	8.5	0.75	2860	8.5	B5 - 200 / 165 / 130	19 x 40	3.0	40	11	248	282
T80B	0.75	1430	9.8	1.1	2850	9.8	B14 - 120 / 100 / 80						
T90S	1.1	1430	12.0	1.5	2880	12.0	B5 - 200 / 165 / 130	24 x 50	3.5	50	10	255	305
T90L	1.5	1430	13.5	2.2	2850	13.5	B14 - 140 / 115 / 95					280	330
T100A	2.2	1430	19.0	3	2910	18.5	B5 - 250 / 215 / 180	28 x 60	4.0	60	14	312	372
T100B	3	1430	21.0	4	2920	21.0	B14 - 160 / 130 / 110						
T112A	4	1440	29.0	5.5	2920	32.0	B5 - 250 / 215 / 180	28 x 60	4.0	60	14	330	390
							B14 - 160 / 130 / 110						
T132S	5.5	1460	43	7.5	2920	48	B5 - 300 / 265 / 230	38 x 80	4.0	80	20	380.5	460.5
T132M	7.5	1460	52	11	2940	54	B14 - 200 / 165 / 130					418.5	498.5
T132ML	9.2	1460	54	15	2940	58							
T160M	11	1470	90	- - -	- - -	- - -	B5 - 350 / 300 / 250	42 x 110	5.0	110	20	491	601
T160L	15	1480	100	18.5	2960	99	B14 - 250 / 215 / 180					535	645

Not binding dimensions and weights

When back-driving a worm gear set using the worm wheel as input, the efficiency is lower than forward-driving and, by varying the design data, 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 is, the more mesh friction increases proportionally aug-menting the lockage at the same time.

The most obvious example is during braking or slowing-down where the inertial load will try to 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 coeffi-cient).

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

To provide a safety factor, a 3° lead angle is recommended for full self-locking condition, and 10° lead angle for poor self-lock-ing condition, according to the table of relations between lead angles and 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

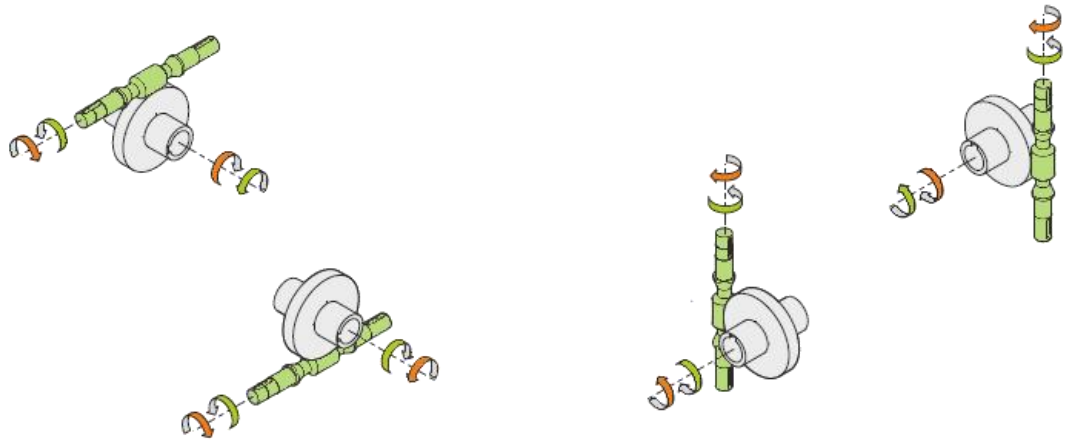
	i =	5	7	10	15	20	28	40	49	56	70	80	100
RS/RT 28	m_x β z_1	1.38 29°33' 6	1,50 23°11' 4	1,40 16°41' 3	1,40 11°18' 2	1,10 10°23' 2	1,50 6°06' 1	1,10 5°14' 1	0,90 4°19' 1	0,75 3°03' 1	0,60 2°27' 1	0,55 2°37' 1	0,45 2°20' 1
RS/RT 40	m_x β z_1	2,00 30°57' 6	2,10 21°36' 4	2,00 16°41' 3	2,00 11°18' 2	1,50 8°31' 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

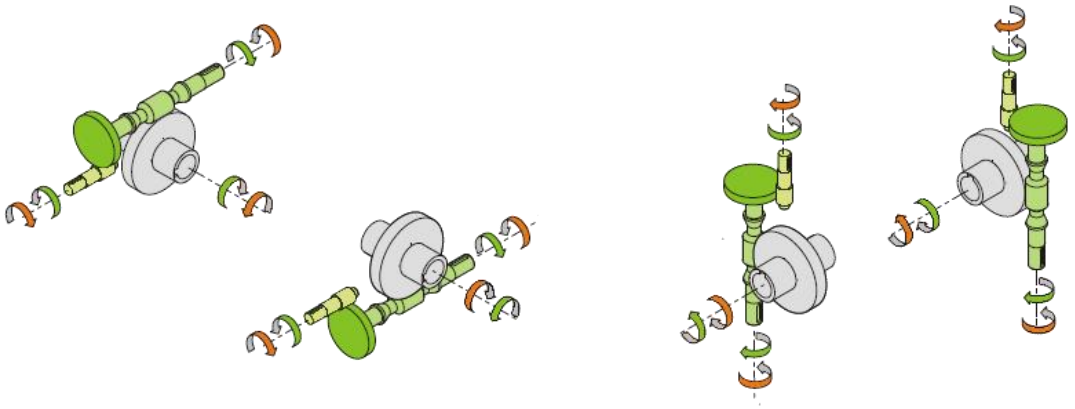
RS-RT

Direction of rotation

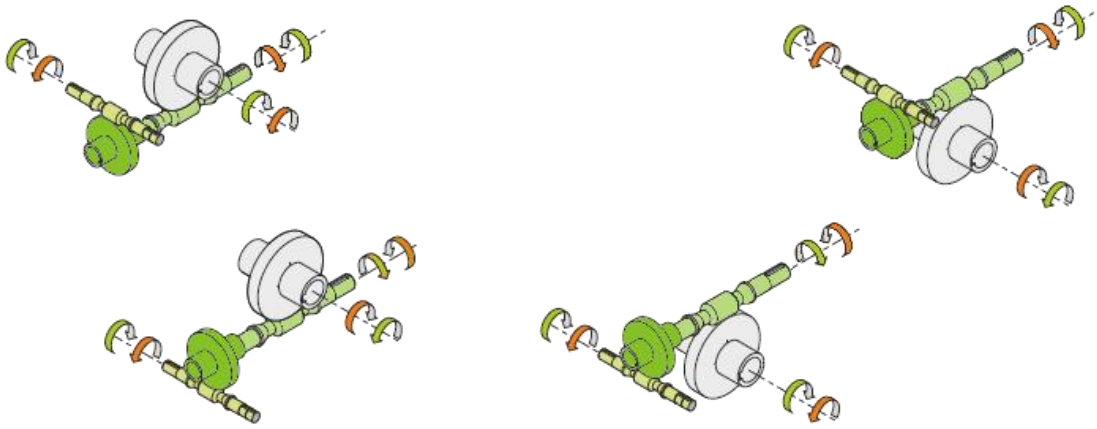
RS - RT

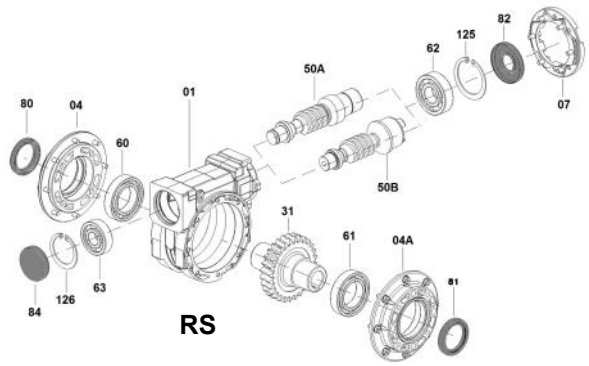


RA - TA

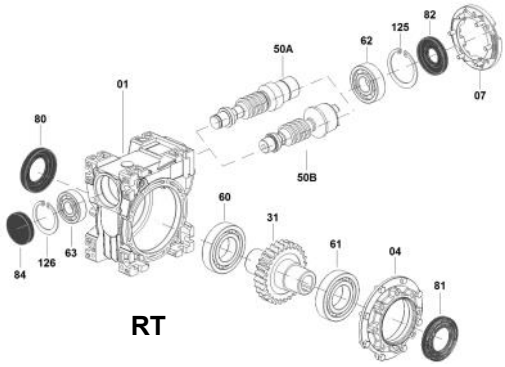


RS/RS - RT/RT



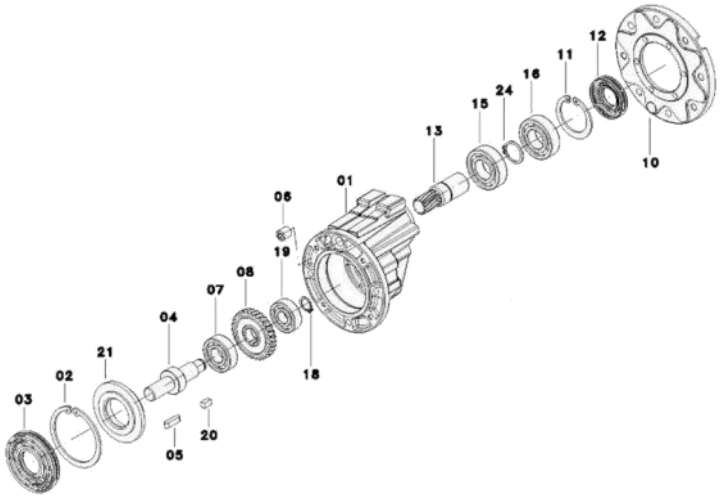


RS



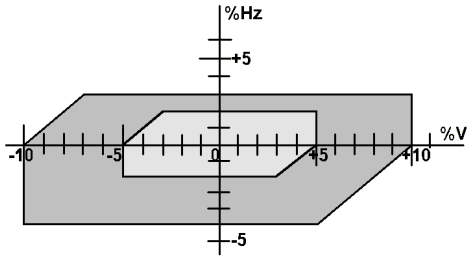
RT

Item	Description
01	Body
04	Side cover RT
04A	Side cover RS
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



Item	Description
01	Body
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

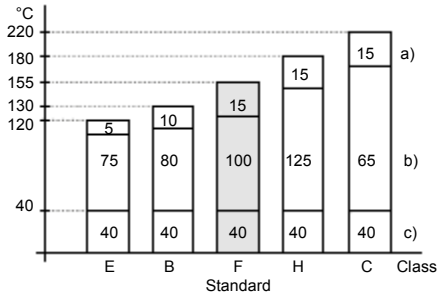
Voltage and frequency



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

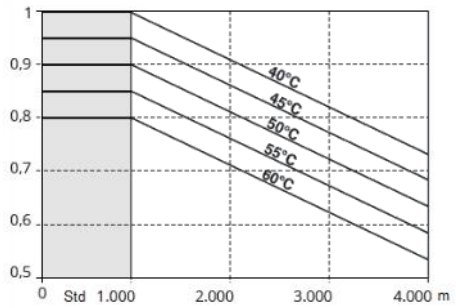
- Normal duty
- Heavy duty but limited

Insulation class



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

Altitude and Temperature Factors



- Conventional conditions

1000 m [3285 ft]	- altitude above sea level
40 °C [104 °F]	- ambient temperature
-15 °C [5 °F]	- min. ambient air temperature
≤ 60%	- relative humidity

The European Directive 2006/42/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 VARVEL-ATEX 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.

ATEX-Directive Code Breakdown

Group

I - mining operation
II - surface industry operation

- **Category**

  1- continuous exposure in possibly explosive environment for more than 1000 hrs/year or with frequent malfunctioning
  2- occasional exposure in possibly explosive environment for 10 to 1000 hrs/year or with sporadic malfunctioning
  3- not very likely exposure in possibly explosive environment and if happened, not longer than 10 hours/year

- **Letters “G” and “D”**

  G - gas presence
  D - dust presence

- **Letters “c” and “k”**

  c - safety indication of construction
  k - safety indication of immersion in liquid

- **IP66 (IP4X Nema)**

  IP- International Protection
  1st digit (6) - dust tight protection
  2nd digit (6)- against powerful water-jet protection

- **T_{max} and T_{amb}**

  T_{max} - surface max. temperature
  T_{amb} - ambient max. temperature

VARVEL RD, RS, RT, RN, RO, RV, RP680 and XA100 series are conforming with design requirements asked by

- Group II,
- Category 2 or 3,
- Operation in possible hazardous Zones G(1) and G(2) in presence of gas,
- Operation in possible hazardous Zones G(21) and G(22) in presence of combustible dust.

The VARVEL-ATEX products are marked

Ex II 2 GD ck IP66 CE
T_{max}=135°C

Group	Category	Gas Vapours Cloud ⇦ Zone ⇨	Dust
I (a)	M1 (c) M2 (d)		
II (b)	1 (c)	G (0)	D (20)
	2 (d)	G (1)	D (21)
	3 (e)	G (2)	D (22)

Warning
The VARVEL-ATEX gearboxes **are not certified** for operation in **shaded areas**.

(a) - Mines
(b) - Surface industries

(c) - Protection level: very high
(d) - Protection level: high
(e) - Protection level: normal

(0) - Continuous presence of gas
(1) - Discontinuous presence of gas
(2) - Occasional presence of gas

(20) - Continuous presence of dust
(21) - Discontinuous presence of dust
(22) - Occasional presence of dust

RS-RT

Abstract of
OPERATION & MAINTENANCE INSTRUCTIONS
(complete manual on **www.varvel.com**)

Under the terms of the Machine Directive 2006/42/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.