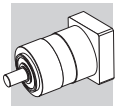
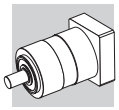


SUMMARY

Chapter **Contents**

Revisions
Refer to page 36 for the catalogue revision index.
Visit www.tecnoingranaggi.it to search for catalogues with up-to-date revisions.



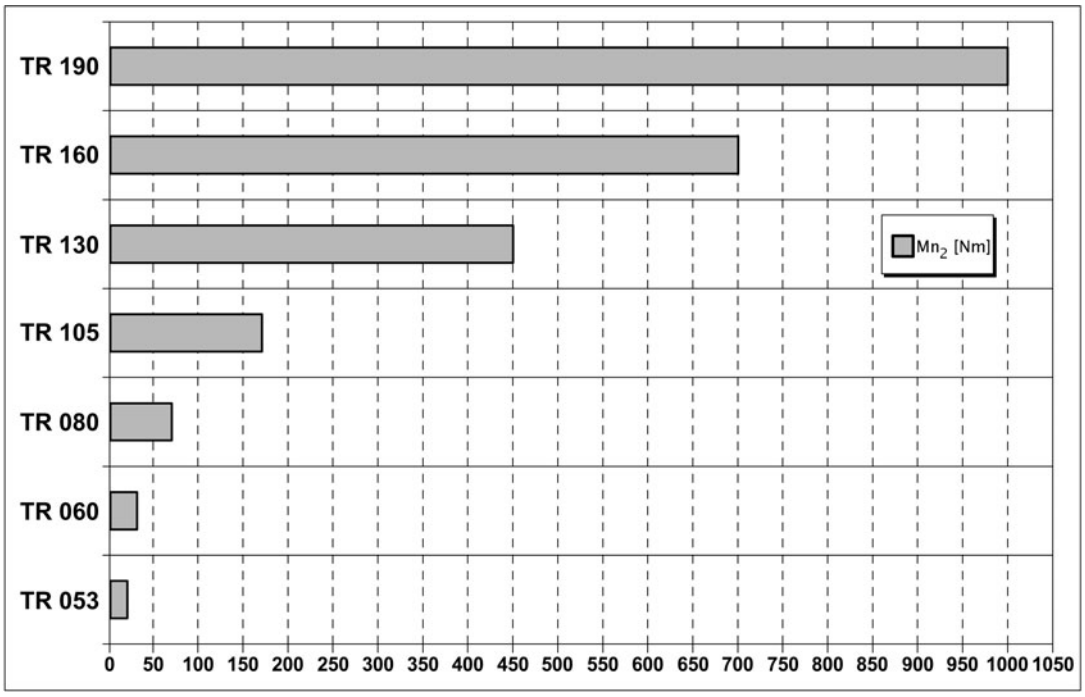
1 GENERAL INFORMATION

1.1 SYMBOLS AND UNITS OF MEASUREMENT

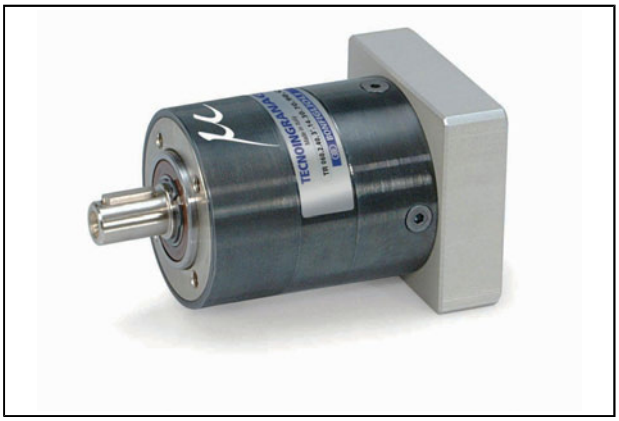
A_n	[N]	The **admissible thrust force** can be applied axially to the shaft under study along with the admissible radial force. The catalogue value is calculated for an output speed n_2 = 100 min^{-1}
C_t	[Nm/arcmin]	**Torsional stiffness**
i	-	**Gear ratio** is expressed as the relationship of the input speed to the output speed: $i = \frac{n_1}{n_2}$
I	-	**Intermittence** is defined as the relationship of the operating time to the cycle time
f_c	-	**Cycle factor**. An adjusting factor that is to be accounted for when selecting gear unit operating under continuous duty S1
f_Z	-	**Service factor**
M_{a2}	[Nm]	**Maximum acceleration torque** acceptable for a duty with **I** < 60%
M_{n2}	[Nm]	**Nominal output torque**
M_{p2}	[Nm]	**Emergency stop torque**. The value cannot apply more than 1000 times over the entire life of the gear unit and should not recur in normal operating conditions
M_r	[Nm]	**Reversibility torque**. Minimum torque that is to be applied to output shaft to drive the unit back
J	[$Kgcm^2$]	**Mass moment of inertia** of the gear unit
L_{10}	[h]	**Average service life of bearings**
n_1	[min^{-1}]	**Nominal input speed** (continuous duty S1). It is the reference speed for duties with intermittence I $\geqslant$ 60% and/or operating time $\geqslant$ 20 min
n_{1max}	[min^{-1}]	**Maximum momentary input speed.** The speed the unit can be driven at occasionally and in non-repetitive conditions. For cyclic duty, type S5, it cannot be applied continuously for more than 30 seconds
R_n	[N]	The **admissible radial force** must be equal to, or greater than, the radial force actually applying onto the shaft. Catalogue value is based on output speed n_2 = 100 min^{-1}
T_c	[°C]	**Housing temperature**. Under no circumstances it should exceed 90 °C
φ_S	[arcmin]	**Standard backlash** is calculated in static conditions and with the application of a torque equal to 2% of the nominal torque for the gear unit
φ_R	[arcmin]	**Reduced backlash** is calculated in static conditions and with the application of a torque equal to 2% of the nominal torque for the gear unit
η	[%]	**Dynamic efficiency** is calculated through the relationship of output torque to torque applied to input shaft under nominal conditions: $\eta_d = \frac{M_2}{M_1 \times i} \times 100$
Z	-	**Number** of accelerations/switches per hour

1.2 FEATURES OF TR SERIES

- Their limited backlash, up to 5' in the **standard** execution, can be optionally further **reduced** to 3', for applications where maximum precision and repeatability are mandatory.
- Bearings are rated for an average service life of 20,000 hours under nominal operating conditions. As standard, frame sizes 053, 060 feature rigid ball bearings while sizes 080, 105 ,130 ,160 and 190 feature taper roller bearings.
- Units are factory charged with synthetic lubricant of viscosity ISO VG220 suitable for operation in any mounting position and at ambient temperature in the 0°C…+40°C range. In the absence of contamination lubricant does not require periodical oil changes.
- Degree of protection IP65
- Noise level $L_P \leqslant$ 70 dB(A) – n_1= 3000 min^{-1}
- Numerous input options
- Ratio i = 10 available for single-reduction units (i=9 for frame size 053 alone)



1.3 VERSIONS



-

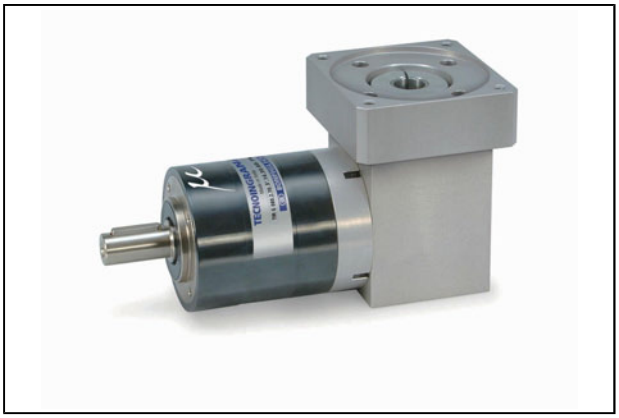
Coaxial gear unit

053...190

IS

Gear unit with solid input shaft

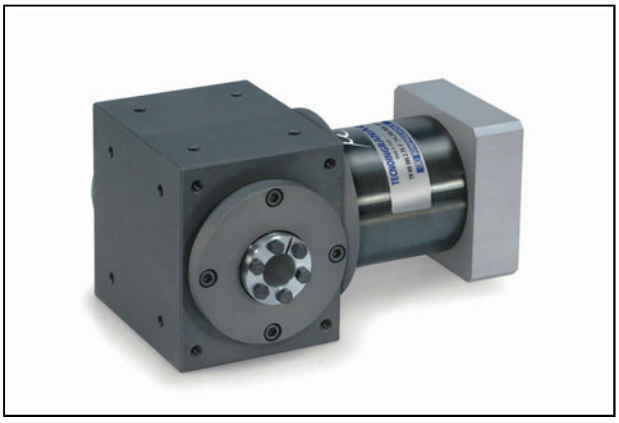
053...160



G

Right-angle gear unit

053...160



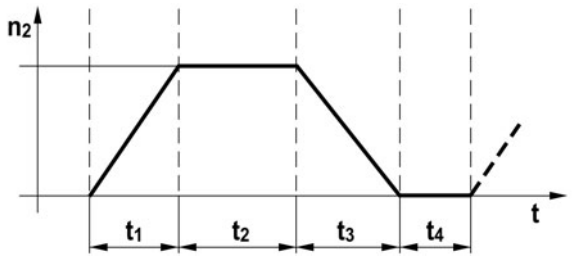
MB

Right angle gear unit with through hollow shaft

080...160

1.4 SELECTING THE GEAR UNIT

- Determine intermittence **I** :



$$I\,[\%] = \frac{t_1 + t_2 + t_3}{t_1 + t_2 + t_3 + t_4}$$

$\mathbf{t_1}$ = starting time
$\mathbf{t_2}$ = operating time at constant speed
$\mathbf{t_3}$ = stopping time
$\mathbf{t_4}$ = rest time

1) Determine the applicable duty for the application:

	Z $\leqslant$ 1000	**Z** > 1000
I < 60%	S5	S1
I $\geqslant$ 60%	S1	S1

S5 **cyclic duty**

2) Search the gear unit for which the condition is verified:

$$M_{a2} \geq M_{1max} \times i \times \eta$$

S1 **continuous duty**

2) Determine service factor $\mathbf{f_z}$:

Z	$\mathbf{f_Z}$
Z $\leqslant$ 1000	1.00
1000 < Z $\leqslant$ 1500	1.25
1500 < Z $\leqslant$ 2000	1.50
2000 < Z $\leqslant$ 2500	1.75
2500 < Z $\leqslant$ 3000	2.00
Z > 3000	Contact us

3) Determine cycle factor $\mathbf{f_c}$:

I	20%...60%	80%	100%
$\mathbf{f_c}$	1.0	1.20	1.40

4) Search the gear unit for which the condition is verified:

$$M_{n2} \geq M_{1max} \times i \times \eta \times f_z \times f_c$$

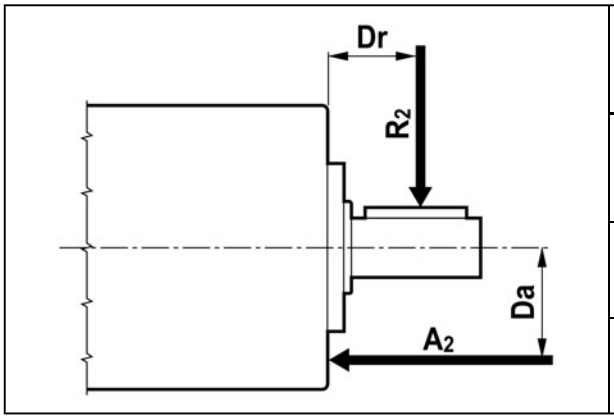
$\mathbf{M_{1max}}$ = Maximum acceleration torque of motor

⚠ If, under particular operating conditions, a housing temperature higher than usual is to be expected, it is recommended that Viton® seals are specified at the time of order through option **S1**.
Under no circumstances the maximum speed [n_{1max}] permitted for the gear unit should be exceeded.
Should the surface temperature exceed 90°C it is recommended that speed is reduced, or an auxiliary cooling system is provided.

1.5 SERVICE LIFE OF BEARINGS

Whether bearings are ball type (**CS**) or taper roller type (**CR**), their service life can be calculated through the equations where actual radial and axial forces are accounted for.

TR 053	TR 060	TR 080	TR 105	TR 130	TR 160	TR 190
CS	CS	CR	CR	CR	CR	CR

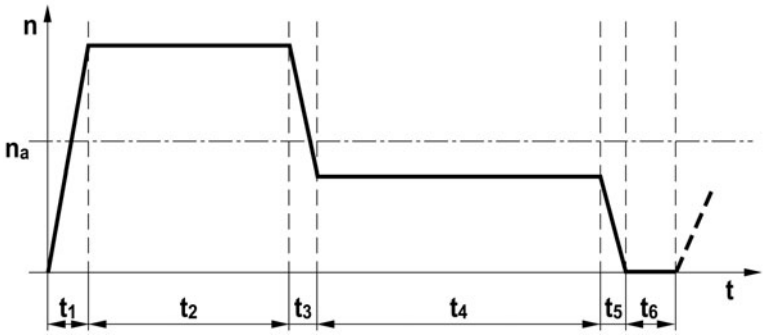


A_2 [N]	Offset axial force
R_2 [N]	Radial force
Da [mm]	Distance of axial force from shaft centre
Dr [mm]	Distance of radial force from mounting flange

SERVICE LIFE CALCULATION FOR RIGID BALL BEARINGS (CS)

$$F_{eq} = \frac{A_2 \times D_a + R_2 \times (D_r + b)}{a}$$

$$n_a = \frac{n_1 \times t_1 + n_2 \times t_2 + \ldots + n_5 \times t_5}{t_1 + t_2 + t_3 + t_4 + t_5 + t_6}$$



$$L_{10}(h) = \frac{16666}{n_a} \times \left(\frac{c}{F_{eq}}\right)^3$$

Load location factor	TR 053	TR 060
a	15.5	14.4
b	17	17.4
c	5600	9550

F_{eq} [N] = equivalent force resulting from radial and axial forces applying simultaneously

n_a [min^{-1}] = mean output speed

$L_{10}(h)$ = theoretical service life of bearings

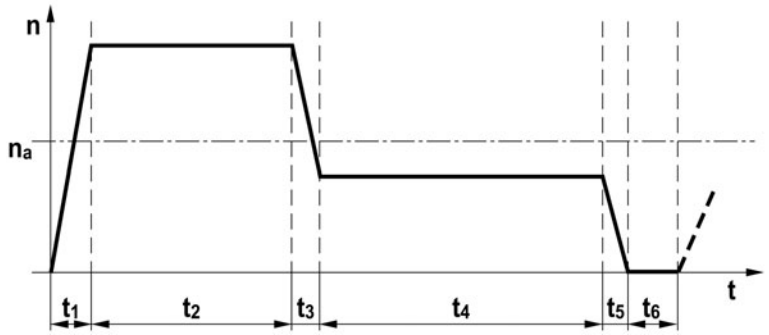
Calculate **$e = A_2/F_{eq}$**, and check that condition **$e \leqslant 0.19$** is verified.

If **$e > 0.19$** contact our Technical Service.

SERVICE LIFE CALCULATION FOR TAPER ROLLER BEARING (CR)

$$F_{eq} = \frac{A_2 \times D_a + R_2 \times (D_r + b)}{a}$$

$$n_a = \frac{n_1 \times t_1 + n_2 \times t_2 + \ldots + n_5 \times t_5}{t_1 + t_2 + t_3 + t_4 + t_5 + t_6}$$



$$L_{10}(h) = \frac{16666}{n_a} \times \left(\frac{c}{F_{eq}}\right)^{10/3}$$

Load location factor	TR 080	TR 105	TR 130	TR 160	TR 190
a	28	35	45	52	62
b	35.55	41.25	51.75	56.75	64.25
c	30800	51200	76500	99000	14000

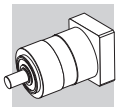
F_{eq} [N] = equivalent force resulting from radial and axial forces applying simultaneously

n_a [min^{-1}] = mean output speed

$L_{10}(h)$ = theoretical service life of bearings

Calculate **$e = A_2/F_{eq}$**, and check that condition **$e \leqslant 0.4$** is verified.

If **$e > 0.4$** contact our Technical Service.



1.6 ORDERING CODE

TR G 080 2 70 10' 14 30 60 75 S1 O TH

TH: MOTOR WITH THREADED HOLES

Mounting position:
O (horizontal)
VS (vertical - motor up)
VI (vertical - motor down)

S1: continuous duty setting

PCD OF MOTOR ADAPTER HOLES

PILOT DIAMETRE OF MOTOR ADAPTER

MOTOR SHAFT LENGTH

MOTOR SHAFT DIAMETER

	TR 053	TR 060	TR 080	TR 105	TR 130	TR 160	TR 190
D	6 - 6.35 7 - 8 9 - 9.52 10 - 11 12 - 12.7 14	6 - 6.35 7 - 8 9 - 9.52 10 - 11 12 - 12.7 14	8 - 9 9.52 - 11 12 - 12.7 14 - 15.875 16 - 17 19 - 19.05	11 - 12 12.7 - 14 15 - 15.875 16 - 19 22 - 24 28 - 32	14 - 15.875 16 - 19 22 - 24 28 - 32 35 - 38	14 - 15.875 16 - 19 22 - 24 28 - 32 35 - 38	14 - 16 19 - 22 24 - 28 32 - 35 38 - 42 45 - 48

BACKLASH

	1-stage	2-stage	3-stage
Standard (TR053...TR190)	**5'**	**5'**	**7'**
Reduced (TR060...TR190)	**3'**	**3'**	**5'**

GEAR RATIO

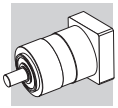
REDUCTIONS
1, **2**, **3**

FRAME SIZE
053, **060**, **080**, **105**, **130**, **160**, **190**

VERSIONS
— = coaxial
IS = solid input shaft
G = right angle gear unit
MB = right angle gear unit with through hollow shaft

SERIES
TR

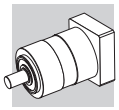
Optional variant



2 GEARBOX RATING CHART

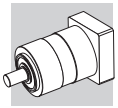
2.1 TR 053

TR 053													
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n1} [N]	R_{n2} [N]	A_{n2} [N]	η %
TR 053 1_ 3	12	22	40	0.3	3300	4000	5'	-	1	200	500	600	97
TR 053 1_ 4	15	28	45	0.3	3500	5000	5'	-	1	200	500	600	97
TR 053 1_ 5	15	28	45	0.3	3500	5000	5'	-	1	200	500	600	97
TR 053 1_ 6	15	28	45	0.3	3500	5000	5'	-	1	200	500	600	97
TR 053 1_ 7	15	28	45	0.3	4000	6000	5'	-	1	200	500	600	97
TR 053 1_ 9	12	22	40	0.3	4000	6000	5'	-	1	200	500	600	97
TR 053 2_ 12	20	30	60	0.5	3300	4000	5'	-	0.9	200	500	600	94
TR 053 2_ 15	20	30	60	0.5	3300	4000	5'	-	0.9	200	500	600	94
TR 053 2_ 16	20	30	60	0.5	3500	5000	5'	-	0.9	200	500	600	94
TR 053 2_ 20	20	30	60	0.5	3500	5000	5'	-	0.9	200	500	600	94
TR 053 2_ 25	20	30	60	0.5	3500	5000	5'	-	0.9	200	500	600	94
TR 053 2_ 28	20	30	60	0.5	4000	6000	5'	-	0.9	200	500	600	94
TR 053 2_ 35	20	30	60	0.5	4000	6000	5'	-	0.9	200	500	600	94
TR 053 2_ 36	15	28	45	0.5	4000	6000	5'	-	0.9	200	500	600	94
TR 053 2_ 45	20	30	60	0.5	4000	6000	5'	-	0.9	200	500	600	94
TR 053 3_ 60	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 2_ 81	12	22	40	0.5	4000	6000	5'	-	0.9	200	500	600	94
TR 053 3_ 48	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 64	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 75	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 80	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 84	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 100	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 112	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 125	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 140	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 144	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 175	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 180	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 216	20	30	60	3	3500	5000	7'	-	0.7	200	500	600	90
TR 053 3_ 225	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 245	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 252	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 324	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 405	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 567	20	30	60	3	4000	6000	7'	-	0.7	200	500	600	90
TR 053 3_ 729	12	22	40	3	4000	6000	7'	-	0.7	200	500	600	90



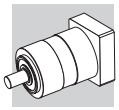
2.2 TR 060

TR 060													
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n1} [N]	R_{n2} [N]	A_{n2} [N]	η %
TR 060 1_ 3	18	35	70	0.4	3300	4000	5'	3'	3.0	200	600	700	97
TR 060 1_ 4	25	40	90	0.4	3500	5000	5'	3'	3.0	200	600	700	97
TR 060 1_ 5	25	40	90	0.4	3500	5000	5'	3'	3.0	200	600	700	97
TR 060 1_ 6	25	40	90	0.4	3500	5000	5'	3'	3.0	200	600	700	97
TR 060 1_ 7	25	40	90	0.4	4000	6000	5'	3'	3.0	200	600	700	97
TR 060 1_ 10	18	35	70	0.4	4000	6000	5'	3'	3.0	200	600	700	97
TR 060 2_ 9	18	35	70	0.6	3300	4000	5'	3'	2.5	200	600	700	94
TR 060 2_ 12	30	45	100	0.6	3300	4000	5'	3'	2.5	200	600	700	94
TR 060 2_ 15	30	45	100	0.6	3300	4000	5'	3'	2.5	200	600	700	94
TR 060 2_ 16	30	45	100	0.6	3500	5000	5'	3'	2.5	200	600	700	94
TR 060 2_ 20	30	45	100	0.6	3500	5000	5'	3'	2.5	200	600	700	94
TR 060 2_ 25	30	45	100	0.6	3500	5000	5'	3'	2.5	200	600	700	94
TR 060 2_ 28	30	45	100	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 2_ 30	18	35	70	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 2_ 35	30	45	100	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 2_ 36	25	40	90	0.6	3500	5000	5'	3'	2.5	200	600	700	94
TR 060 2_ 40	30	45	100	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 2_ 50	30	45	100	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 2_ 70	30	45	100	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 2_ 100	18	35	70	0.6	4000	6000	5'	3'	2.5	200	600	700	94
TR 060 3_ 48	30	45	100	3.5	3500	5000	7'	5'	2.0	200	600	700	90
TR 060 3_ 64	30	45	100	3.5	3500	5000	7'	5'	2.0	200	600	700	90
TR 060 3_ 75	30	45	100	3.5	3500	5000	7'	5'	2.0	200	600	700	90
TR 060 3_ 80	30	45	100	3.5	3500	5000	7'	5'	2.0	200	600	700	90
TR 060 3_ 84	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 90	18	35	70	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 120	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 125	30	45	100	3.5	3500	5000	7'	5'	2.0	200	600	700	90
TR 060 3_ 140	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 150	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 160	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 175	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 200	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 210	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 216	30	45	100	3.5	3500	5000	7'	5'	2.0	200	600	700	90
TR 060 3_ 250	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 280	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 350	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 400	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 500	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 700	30	45	100	3.5	4000	6000	7'	5'	2.0	200	600	700	90
TR 060 3_ 1000	18	35	70	3.5	4000	6000	7'	5'	2.0	200	600	700	90



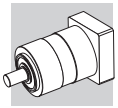
2.3 TR 080

TR 080													
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n1} [N]	R_{n2} [N]	A_{n2} [N]	η %
TR 080 1_ 3	40	80	180	0.5	2900	3500	5'	3'	8.0	400	2500	3000	97
TR 080 1_ 4	50	80	200	0.5	3100	4500	5'	3'	8.0	400	2500	3000	97
TR 080 1_ 5	50	80	200	0.5	3200	4500	5'	3'	8.0	400	2500	3000	97
TR 080 1_ 6	50	80	200	0.5	3200	4500	5'	3'	8.0	400	2500	3000	97
TR 080 1_ 7	50	80	200	0.5	4000	6000	5'	3'	8.0	400	2500	3000	97
TR 080 1_ 10	40	80	180	0.5	4000	6000	5'	3'	8.0	400	2500	3000	97
TR 080 2_ 9	40	80	180	0.8	2900	3500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 12	70	100	250	0.8	2900	3500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 15	70	100	250	0.8	2900	3500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 16	70	100	250	0.8	3100	4500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 20	70	100	250	0.8	3200	4500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 25	70	100	250	0.8	3200	4500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 28	70	100	250	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 30	40	80	180	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 35	70	100	250	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 36	50	80	200	0.8	3200	4500	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 40	70	100	250	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 50	70	100	250	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 70	70	100	250	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 2_ 100	40	80	180	0.8	4000	6000	5'	3'	6.5	400	2500	3000	94
TR 080 3_ 48	70	100	250	5	3100	4500	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 64	70	100	250	5	3100	4500	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 75	70	100	250	5	3200	4500	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 80	70	100	250	5	3100	4500	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 84	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 90	40	80	180	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 120	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 125	70	100	250	5	3200	4500	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 140	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 150	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 160	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 175	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 200	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 210	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 216	70	100	250	5	3200	4500	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 250	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 280	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 350	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 400	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 500	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 700	70	100	250	5	4000	6000	7'	5'	5.5	400	2500	3000	90
TR 080 3_ 1000	40	80	180	5	4000	6000	7'	5'	5.5	400	2500	3000	90



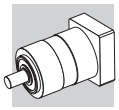
2.4 TR 105

TR 105													
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n1} [N]	R_{n2} [N]	A_{n2} [N]	η %
TR 105 1_ 3	100	180	360	0.90	2500	3500	5'	3'	24	600	3800	4000	97
TR 105 1_ 4	140	210	450	0.90	2800	4500	5'	3'	24	600	3800	4000	97
TR 105 1_ 5	140	210	450	0.90	3000	4500	5'	3'	24	600	3800	4000	97
TR 105 1_ 6	140	210	450	0.90	3000	4500	5'	3'	24	600	3800	4000	97
TR 105 1_ 7	140	210	450	0.90	3500	5000	5'	3'	24	600	3800	4000	97
TR 105 1_ 10	100	180	360	0.90	3500	5000	5'	3'	24	600	3800	4000	97
TR 105 2_ 9	100	180	360	2.5	2500	3500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 12	170	250	600	2.5	2500	3500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 15	170	250	600	2.5	2500	3500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 16	170	250	600	2.5	2800	4500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 20	170	250	600	2.5	3000	4500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 25	170	250	600	2.5	3000	4500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 28	170	250	600	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 30	100	180	360	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 35	170	250	600	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 36	140	210	450	2.5	3000	4500	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 40	170	250	600	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 50	170	250	600	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 70	170	250	600	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 2_ 100	100	180	360	2.5	3500	5000	5'	3'	21.5	600	3800	4000	94
TR 105 3_ 48	170	250	600	10	2800	4500	7'	5'	18	600	3800	4000	90
TR 105 3_ 64	170	250	600	10	2800	4500	7'	5'	18	600	3800	4000	90
TR 105 3_ 75	170	250	600	10	3000	4500	7'	5'	18	600	3800	4000	90
TR 105 3_ 80	170	250	600	10	2800	4500	7'	5'	18	600	3800	4000	90
TR 105 3_ 84	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 90	100	180	360	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 120	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 125	170	250	600	10	3000	4500	7'	5'	18	600	3800	4000	90
TR 105 3_ 140	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 150	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 160	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 175	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 200	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 210	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 216	170	250	600	10	3000	4500	7'	5'	18	600	3800	4000	90
TR 105 3_ 250	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 280	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 350	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 400	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 500	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 700	170	250	600	10	3500	5000	7'	5'	18	600	3800	4000	90
TR 105 3_ 1000	100	180	360	10	3500	5000	7'	5'	18	600	3800	4000	90



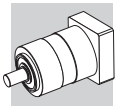
2.5 TR 130

TR 130													
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n1} [N]	R_{n2} [N]	A_{n2} [N]	η %
TR 130 1_ 3	215	400	800	1.2	2100	3000	5'	3'	45	800	5500	6500	97
TR 130 1_ 4	380	600	1100	1.2	2400	3500	5'	3'	45	800	5500	6500	97
TR 130 1_ 5	380	600	1100	1.2	2900	3500	5'	3'	45	800	5500	6500	97
TR 130 1_ 6	380	600	1100	1.2	2900	3500	5'	3'	45	800	5500	6500	97
TR 130 1_ 7	380	600	1100	1.2	3200	4000	5'	3'	45	800	5500	6500	97
TR 130 1_ 10	215	400	800	1.2	3200	4000	5'	3'	45	800	5500	6500	97
TR 130 2_ 9	215	400	800	5	2100	3000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 12	450	700	1300	5	2100	3000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 15	450	700	1300	5	2100	3000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 16	450	700	1300	5	2400	3500	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 20	450	700	1300	5	2900	3500	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 25	450	700	1300	5	2900	3500	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 28	450	700	1300	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 30	215	400	800	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 35	450	700	1300	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 36	380	600	1100	5	2900	3500	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 40	450	700	1300	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 50	450	700	1300	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 70	450	700	1300	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 2_ 100	215	400	800	5	3200	4000	5'	3'	38.5	800	5500	6500	94
TR 130 3_ 48	450	700	1300	20	2400	3500	7'	5'	30	800	5500	6500	90
TR 130 3_ 64	450	700	1300	20	2400	3500	7'	5'	30	800	5500	6500	90
TR 130 3_ 75	450	700	1300	20	2900	3500	7'	5'	30	800	5500	6500	90
TR 130 3_ 80	450	700	1300	20	2400	3500	7'	5'	30	800	5500	6500	90
TR 130 3_ 84	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 90	215	400	800	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 120	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 125	450	700	1300	20	2900	3500	7'	5'	30	800	5500	6500	90
TR 130 3_ 140	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 150	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 160	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 175	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 200	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 210	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 216	450	700	1300	20	2900	3500	7'	5'	30	800	5500	6500	90
TR 130 3_ 250	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 280	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 350	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 400	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 500	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 700	450	700	1300	20	3200	4000	7'	5'	30	800	5500	6500	90
TR 130 3_ 1000	215	400	800	20	3200	4000	7'	5'	30	800	5500	6500	90



2.6 TR 160

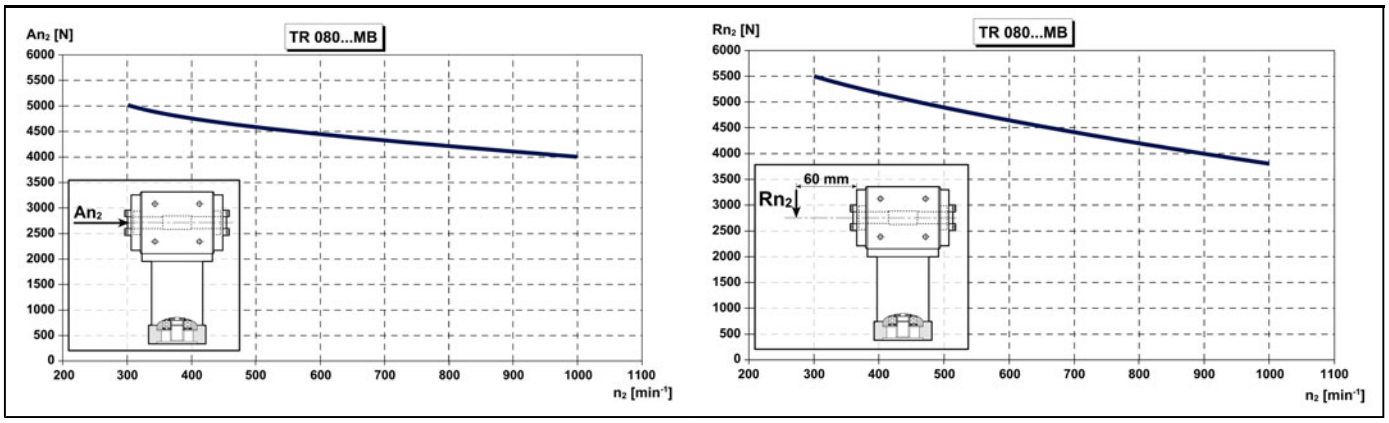
TR 160													
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n1} [N]	R_{n2} [N]	A_n [N]	η %
TR 160 1_ 3	350	660	1200	1.3	1900	3000	5'	3'	90	1200	6500	7500	97
TR 160 1_ 4	500	750	1400	1.3	2200	3500	5'	3'	90	1200	6500	7500	97
TR 160 1_ 5	500	750	1400	1.3	2500	3500	5'	3'	90	1200	6500	7500	97
TR 160 1_ 6	500	750	1400	1.3	2500	3500	5'	3'	90	1200	6500	7500	97
TR 160 1_ 7	500	750	1400	1.3	3000	4000	5'	3'	90	1200	6500	7500	97
TR 160 1_ 10	350	660	1200	1.3	3000	4000	5'	3'	90	1200	6500	7500	97
TR 160 2_ 9	350	660	1200	6	1900	3000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 12	700	950	1800	6	1900	3000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 15	700	950	1800	6	1900	3000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 16	700	950	1800	6	2200	3500	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 20	700	950	1800	6	2500	3500	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 25	700	950	1800	6	2500	3500	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 28	700	950	1800	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 30	350	660	1200	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 35	700	950	1800	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 36	500	750	1400	6	2500	3500	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 40	700	950	1800	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 50	700	950	1800	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 70	700	950	1800	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 2_ 100	350	660	1200	6	3000	4000	5'	3'	83.5	1200	6500	7500	94
TR 160 3_ 48	700	950	1800	23	2200	3500	7'	5'	60	1200	6500	7500	90
TR 160 3_ 64	700	950	1800	23	2200	3500	7'	5'	60	1200	6500	7500	90
TR 160 3_ 75	700	950	1800	23	2500	3500	7'	5'	60	1200	6500	7500	90
TR 160 3_ 80	700	950	1800	23	2200	3500	7'	5'	60	1200	6500	7500	90
TR 160 3_ 84	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 90	350	660	1200	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 120	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 125	700	950	1800	23	2500	3500	7'	5'	60	1200	6500	7500	90
TR 160 3_ 140	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 150	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 160	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 175	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 200	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 210	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 216	700	950	1800	23	2500	3500	7'	5'	60	1200	6500	7500	90
TR 160 3_ 250	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 280	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 350	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 400	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 500	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 700	700	950	1800	23	3000	4000	7'	5'	60	1200	6500	7500	90
TR 160 3_ 1000	350	660	1200	23	3000	4000	7'	5'	60	1200	6500	7500	90

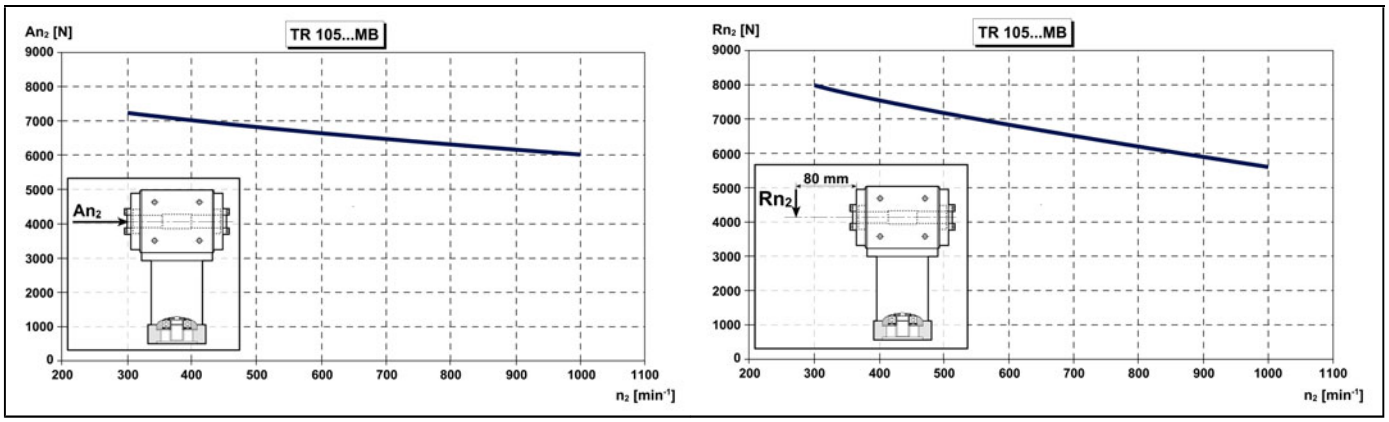


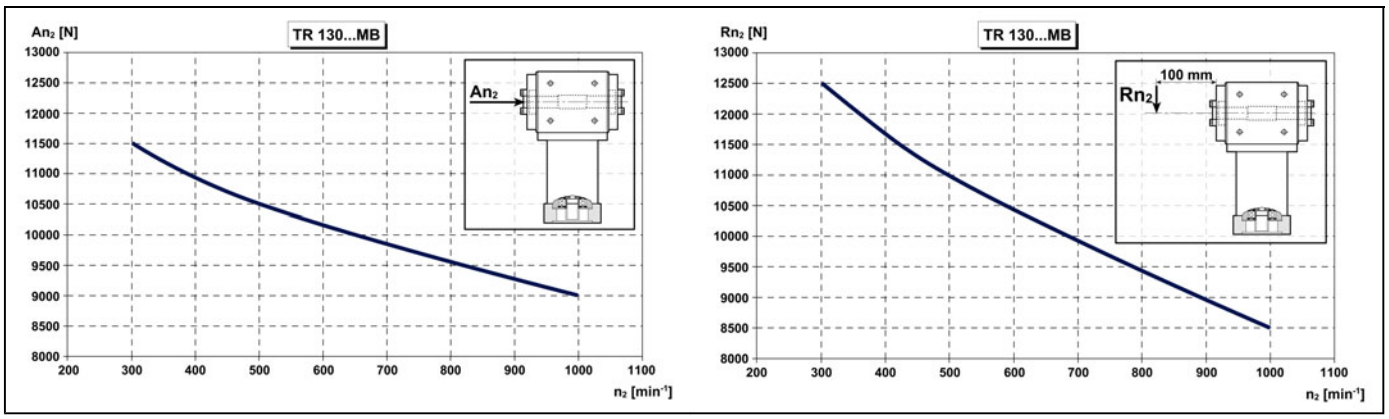
2.7 TR 190

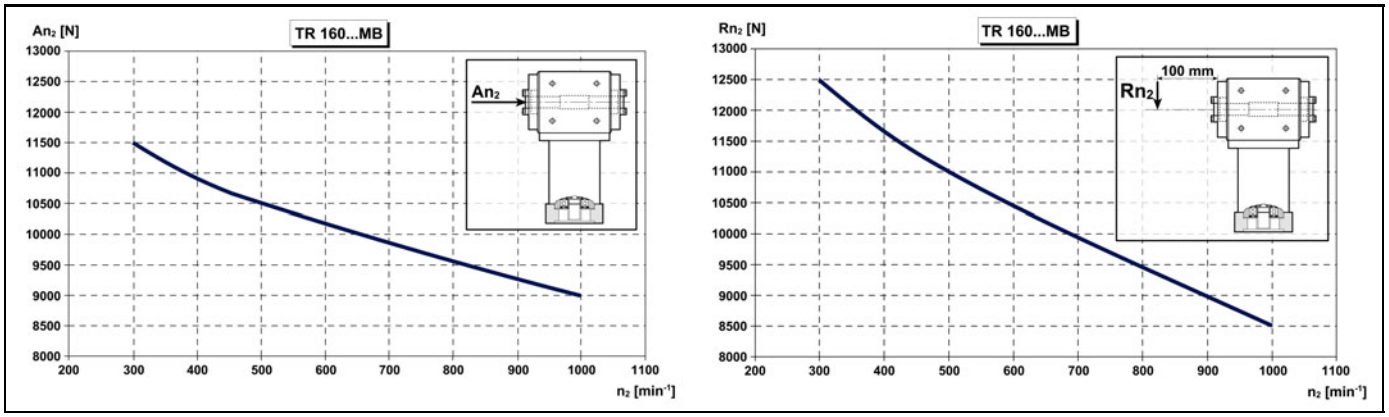
TR 190												
i	M_{n2} [Nm]	M_{a2} [Nm]	M_{p2} [Nm]	M_r [Nm]	n_1 [min^{-1}]	n_{1max} [min^{-1}]	φ_S [arcmin]	φ_R [arcmin]	C_t [Nm/arcmin]	R_{n2} [N]	A_{n2} [N]	η %
TR 190 1_ 3	500	800	1400	3	1500	2500	5'	3'	130	14000	15000	97
TR 190 1_ 4	700	950	1800	3	2100	3000	5'	3'	130	14000	15000	97
TR 190 1_ 5	700	950	1800	3	2300	3000	5'	3'	130	14000	15000	97
TR 190 1_ 6	700	950	1800	3	2300	3000	5'	3'	130	14000	15000	97
TR 190 1_ 7	700	950	1800	3	2900	3500	5'	3'	130	14000	15000	97
TR 190 1_ 10	500	800	1400	3	2900	3500	5'	3'	130	14000	15000	97
TR 190 2_ 9	500	800	1400	7.5	1500	2500	5'	3'	100	14000	15000	94
TR 190 2_ 12	1000	1200	2200	7.5	1500	2500	5'	3'	100	14000	15000	94
TR 190 2_ 15	1000	1200	2200	7.5	1500	2500	5'	3'	100	14000	15000	94
TR 190 2_ 16	1000	1200	2200	7.5	2100	3000	5'	3'	100	14000	15000	94
TR 190 2_ 20	1000	1200	2200	7.5	2300	3000	5'	3'	100	14000	15000	94
TR 190 2_ 25	1000	1200	2200	7.5	2300	3000	5'	3'	100	14000	15000	94
TR 190 2_ 28	1000	1200	2200	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 2_ 30	500	800	1400	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 2_ 35	1000	1200	2200	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 2_ 36	700	950	1800	7.5	2300	3000	5'	3'	100	14000	15000	94
TR 190 2_ 40	1000	1200	2200	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 2_ 50	1000	1200	2200	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 2_ 70	1000	1200	2200	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 2_ 100	500	800	1400	7.5	2900	3500	5'	3'	100	14000	15000	94
TR 190 3_ 48	1000	1200	2200	28	2100	3000	7'	5'	90	14000	15000	90
TR 190 3_ 64	1000	1200	2200	28	2100	3000	7'	5'	90	14000	15000	90
TR 190 3_ 75	1000	1200	2200	28	2300	3000	7'	5'	90	14000	15000	90
TR 190 3_ 80	1000	1200	2200	28	2100	3000	7'	5'	90	14000	15000	90
TR 190 3_ 84	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 90	500	800	1400	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 120	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 125	1000	1200	2200	28	2300	3000	7'	5'	90	14000	15000	90
TR 190 3_ 140	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 150	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 160	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 175	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 200	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 210	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 216	1000	1200	2200	28	2300	3000	7'	5'	90	14000	15000	90
TR 190 3_ 250	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 280	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 350	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 400	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 500	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 700	1000	1200	2200	28	2900	3500	7'	5'	90	14000	15000	90
TR 190 3_ 1000	500	800	1400	28	2900	3500	7'	5'	90	14000	15000	90

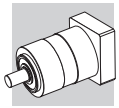
2.8 PERMITTED AXIAL AND RADIAL FORCES FOR VERSION TR … MB







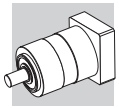




2.9 MASS MOMENT OF INERTIA

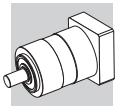
2.9.1 TR 053

TR 053		
	J [kgcm^2]	
i	D = Ø6...Ø9.52	D = Ø11...Ø14
TR 053 1_ 3	0.06	0.08
TR 053 1_ 4	0.05	0.06
TR 053 1_ 5	0.04	0.06
TR 053 1_ 6	0.03	0.05
TR 053 1_ 7	0.03	0.05
TR 053 1_ 9	0.03	0.05
TR 053 2_ 12	0.06	0.08
TR 053 2_ 15	0.06	0.08
TR 053 2_ 16	0.05	0.06
TR 053 2_ 20	0.04	0.06
TR 053 2_ 25	0.04	0.06
TR 053 2_ 28	0.03	0.05
TR 053 2_ 35	0.03	0.05
TR 053 2_ 36	0.03	0.05
TR 053 2_ 45	0.03	0.05
TR 053 2_ 81	0.03	0.05
TR 053 3_ 48	0.05	0.07
TR 053 3_ 60	0.05	0.07
TR 053 3_ 64	0.05	0.06
TR 053 3_ 75	0.04	0.06
TR 053 3_ 80	0.05	0.06
TR 053 3_ 84	0.03	0.05
TR 053 3_ 100	0.04	0.06
TR 053 3_ 112	0.03	0.05
TR 053 3_ 125	0.04	0.06
TR 053 3_ 140	0.03	0.05
TR 053 3_ 144	0.03	0.05
TR 053 3_ 175	0.03	0.05
TR 053 3_ 180	0.03	0.05
TR 053 3_ 216	0.03	0.05
TR 053 3_ 225	0.03	0.05
TR 053 3_ 245	0.03	0.05
TR 053 3_ 252	0.05	0.06
TR 053 3_ 324	0.03	0.05
TR 053 3_ 405	0.03	0.05
TR 053 3_ 567	0.03	0.05
TR 053 3_ 729	0.03	0.05



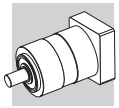
2.9.2 TR 060

TR 060		
	J [kgcm^2]	
i	D = Ø6...Ø9.52	D= Ø11...Ø14
TR 060 1_ 3	0.10	0.11
TR 060 1_ 4	0.06	0.08
TR 060 1_ 5	0.05	0.07
TR 060 1_ 6	0.04	0.06
TR 060 1_ 7	0.04	0.06
TR 060 1_ 10	0.03	0.05
TR 060 2_ 9	0.10	0.12
TR 060 2_ 12	0.10	0.11
TR 060 2_ 15	0.09	0.11
TR 060 2_ 16	0.06	0.08
TR 060 2_ 20	0.05	0.07
TR 060 2_ 25	0.05	0.06
TR 060 2_ 28	0.04	0.06
TR 060 2_ 30	0.03	0.05
TR 060 2_ 35	0.04	0.06
TR 060 2_ 36	0.04	0.06
TR 060 2_ 40	0.03	0.05
TR 060 2_ 50	0.03	0.05
TR 060 2_ 70	0.03	0.05
TR 060 2_ 100	0.03	0.05
TR 060 3_ 48	0.06	0.08
TR 060 3_ 64	0.06	0.08
TR 060 3_ 75	0.05	0.07
TR 060 3_ 80	0.06	0.08
TR 060 3_ 84	0.04	0.06
TR 060 3_ 90	0.03	0.05
TR 060 3_ 120	0.03	0.05
TR 060 3_ 125	0.05	0.07
TR 060 3_ 140	0.04	0.06
TR 060 3_ 150	0.03	0.05
TR 060 3_ 160	0.03	0.05
TR 060 3_ 175	0.04	0.06
TR 060 3_ 200	0.03	0.05
TR 060 3_ 210	0.03	0.05
TR 060 3_ 216	0.04	0.06
TR 060 3_ 250	0.03	0.05
TR 060 3_ 280	0.03	0.05
TR 060 3_ 350	0.03	0.05
TR 060 3_ 400	0.03	0.05
TR 060 3_ 500	0.03	0.05
TR 060 3_ 700	0.03	0.05
TR 060 3_ 1000	0.03	0.05



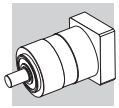
2.9.3 TR 080

TR 080		
	J [kgcm^2]	
i	D = Ø8...Ø12.7	D = Ø14...Ø19
TR 080 1_ 3	0.50	0.59
TR 080 1_ 4	0.34	0.43
TR 080 1_ 5	0.28	0.37
TR 080 1_ 6	0.21	0.30
TR 080 1_ 7	0.23	0.32
TR 080 1_ 10	0.20	0.29
TR 080 2_ 9	0.49	0.58
TR 080 2_ 12	0.47	0.56
TR 080 2_ 15	0.46	0.55
TR 080 2_ 16	0.32	0.41
TR 080 2_ 20	0.27	0.36
TR 080 2_ 25	0.27	0.36
TR 080 2_ 28	0.22	0.31
TR 080 2_ 30	0.20	0.29
TR 080 2_ 35	0.22	0.31
TR 080 2_ 36	0.20	0.29
TR 080 2_ 40	0.20	0.29
TR 080 2_ 50	0.19	0.28
TR 080 2_ 70	0.19	0.28
TR 080 2_ 100	0.19	0.28
TR 080 3_ 48	0.33	0.42
TR 080 3_ 64	0.32	0.41
TR 080 3_ 75	0.27	0.36
TR 080 3_ 80	0.32	0.41
TR 080 3_ 84	0.23	0.32
TR 080 3_ 90	0.20	0.29
TR 080 3_ 120	0.20	0.29
TR 080 3_ 125	0.27	0.36
TR 080 3_ 140	0.22	0.31
TR 080 3_ 150	0.20	0.29
TR 080 3_ 160	0.20	0.29
TR 080 3_ 175	0.22	0.31
TR 080 3_ 200	0.20	0.29
TR 080 3_ 210	0.20	0.29
TR 080 3_ 216	0.20	0.29
TR 080 3_ 250	0.19	0.28
TR 080 3_ 280	0.19	0.28
TR 080 3_ 350	0.19	0.28
TR 080 3_ 400	0.19	0.28
TR 080 3_ 500	0.19	0.28
TR 080 3_ 700	0.19	0.28
TR 080 3_ 1000	0.19	0.28



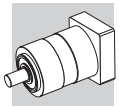
2.9.4 TR 105

TR 105				
	J [kgcm^2]			
i	D = Ø11...Ø12.7	D = Ø14...Ø19	D = Ø22...Ø24	D = Ø28...Ø32
TR 105 1_ 3	1.7	1.8	2.2	2.6
TR 105 1_ 4	0.99	1.1	1.5	1.9
TR 105 1_ 5	0.72	0.79	1.23	1.6
TR 105 1_ 6	0.36	0.43	0.88	1.2
TR 105 1_ 7	0.47	0.55	0.99	1.4
TR 105 1_ 10	0.33	0.41	0.85	1.2
TR 105 2_ 9	1.6	1.6	2.1	2.4
TR 105 2_ 12	1.5	1.6	2.0	2.4
TR 105 2_ 15	1.5	1.5	2.0	2.4
TR 105 2_ 16	0.87	0.95	1.4	1.8
TR 105 2_ 20	0.86	0.93	1.4	1.7
TR 105 2_ 25	0.63	0.71	1.1	1.5
TR 105 2_ 28	0.43	0.51	0.95	1.3
TR 105 2_ 30	0.32	0.40	0.84	1.2
TR 105 2_ 35	0.43	0.50	0.95	1.3
TR 105 2_ 36	0.32	0.39	0.84	1.2
TR 105 2_ 40	0.31	0.39	0.83	1.2
TR 105 2_ 50	0.31	0.39	0.83	1.2
TR 105 2_ 70	0.31	0.38	0.83	1.2
TR 105 2_ 100	0.31	0.38	0.83	1.2
TR 105 3_ 48	0.91	0.98	1.4	1.8
TR 105 3_ 64	0.87	0.94	1.4	1.7
TR 105 3_ 75	0.66	0.74	1.2	1.5
TR 105 3_ 80	0.86	0.94	1.4	1.7
TR 105 3_ 84	0.44	0.52	0.96	1.3
TR 105 3_ 90	0.32	0.39	0.84	1.2
TR 105 3_ 120	0.32	0.39	0.84	1.2
TR 105 3_ 125	0.63	0.70	1.1	1.5
TR 105 3_ 140	0.43	0.51	0.95	1.3
TR 105 3_ 150	0.32	0.39	0.84	1.2
TR 105 3_ 160	0.31	0.39	0.83	1.2
TR 105 3_ 175	0.43	0.50	0.95	1.3
TR 105 3_ 200	0.31	0.39	0.83	1.2
TR 105 3_ 210	0.32	0.39	0.84	1.2
TR 105 3_ 216	0.31	0.39	0.83	1.2
TR 105 3_ 250	0.31	0.39	0.83	1.2
TR 105 3_ 280	0.31	0.38	0.83	1.2
TR 105 3_ 350	0.31	0.38	0.83	1.2
TR 105 3_ 400	0.31	0.38	0.83	1.2
TR 105 3_ 500	0.31	0.38	0.83	1.2
TR 105 3_ 700	0.31	0.38	0.83	1.2
TR 105 3_ 1000	0.31	0.38	0.83	1.2



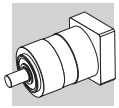
2.9.5 TR 130

TR 130				
	J [kgcm^2]			
i	D = Ø14...Ø19	D = Ø22...Ø24	D = Ø28...Ø32	D = Ø35...Ø38
TR 130 1_ 3	5.3	5.5	5.8	7.2
TR 130 1_ 4	3.1	3.3	3.6	5.0
TR 130 1_ 5	2.2	2.4	2.8	4.1
TR 130 1_ 6	1.2	1.4	1.7	3.1
TR 130 1_ 7	1.5	1.7	2.0	3.4
TR 130 1_ 10	1.0	1.2	1.6	3.0
TR 130 2_ 9	4.8	5.0	5.4	6.7
TR 130 2_ 12	4.6	4.8	5.1	6.5
TR 130 2_ 15	4.5	4.7	5.0	6.4
TR 130 2_ 16	2.7	2.9	3.2	4.6
TR 130 2_ 20	2.0	2.2	2.5	3.9
TR 130 2_ 25	1.9	2.1	2.5	3.8
TR 130 2_ 28	1.3	1.6	1.9	3.3
TR 130 2_ 30	1.0	1.2	1.6	2.9
TR 130 2_ 35	1.3	1.5	1.9	3.2
TR 130 2_ 36	1.1	1.3	1.6	3.0
TR 130 2_ 40	0.98	1.2	1.5	2.9
TR 130 2_ 50	0.97	1.2	1.5	2.9
TR 130 2_ 70	0.96	1.2	1.5	2.9
TR 130 2_ 100	0.96	1.2	1.5	2.9
TR 130 3_ 48	2.8	3.0	3.3	4.7
TR 130 3_ 64	2.6	2.9	3.2	4.6
TR 130 3_ 75	2.0	2.2	2.6	3.9
TR 130 3_ 80	2.6	2.9	3.2	4.6
TR 130 3_ 84	1.4	1.6	1.9	3.3
TR 130 3_ 90	1.0	1.2	1.6	2.9
TR 130 3_ 120	0.99	1.20	1.55	2.90
TR 130 3_ 125	1.9	2.1	2.5	3.8
TR 130 3_ 140	1.3	1.5	1.9	3.2
TR 130 3_ 150	0.99	1.2	1.6	2.9
TR 130 3_ 160	0.98	1.2	1.5	2.9
TR 130 3_ 175	1.3	1.5	1.9	3.2
TR 130 3_ 200	0.97	1.2	1.5	2.9
TR 130 3_ 210	0.99	1.2	1.6	2.9
TR 130 3_ 216	1.0	1.3	1.6	3.0
TR 130 3_ 250	0.97	1.2	1.5	2.9
TR 130 3_ 280	0.96	1.2	1.5	2.9
TR 130 3_ 350	0.96	1.2	1.5	2.9
TR 130 3_ 400	0.96	1.2	1.5	2.9
TR 130 3_ 500	0.96	1.2	1.5	2.9
TR 130 3_ 700	0.96	1.2	1.5	2.9
TR 130 3_ 1000	0.96	1.2	1.5	2.9



2.9.6 TR 160

TR 160				
	J [kgcm^2]			
i	D = Ø14...Ø19	D = Ø22...Ø24	D = Ø28...Ø32	D = Ø35...Ø38
TR 160 1_ 3	8.4	8.6	8.9	10.3
TR 160 1_ 4	4.7	4.9	5.2	6.6
TR 160 1_ 5	3.3	3.5	3.8	5.2
TR 160 1_ 6	1.3	1.5	1.9	3.2
TR 160 1_ 7	2.0	2.2	2.6	3.9
TR 160 1_ 10	1.3	1.5	1.9	3.2
TR 160 2_ 9	7.5	7.7	8.1	9.4
TR 160 2_ 12	7.1	7.3	7.7	9.0
TR 160 2_ 15	6.9	7.1	7.5	8.9
TR 160 2_ 16	4.0	4.2	4.5	5.9
TR 160 2_ 20	2.8	3.0	3.4	4.7
TR 160 2_ 25	2.8	3.0	3.3	4.7
TR 160 2_ 28	1.8	2.0	2.4	3.7
TR 160 2_ 30	1.2	1.5	1.8	3.2
TR 160 2_ 35	1.8	2.0	2.3	3.7
TR 160 2_ 36	1.1	1.3	1.6	3.0
TR 160 2_ 40	1.2	1.4	1.8	3.1
TR 160 2_ 50	1.2	1.4	1.8	3.1
TR 160 2_ 70	1.2	1.4	1.7	3.1
TR 160 2_ 100	1.2	1.4	1.7	3.1
TR 160 3_ 48	4.1	4.3	4.7	6.0
TR 160 3_ 64	3.9	4.1	4.5	5.8
TR 160 3_ 75	2.9	3.1	3.5	4.8
TR 160 3_ 80	3.9	4.1	4.5	5.8
TR 160 3_ 84	1.8	2.1	2.4	3.8
TR 160 3_ 90	1.2	1.4	1.8	3.1
TR 160 3_ 120	1.2	1.4	1.8	3.1
TR 160 3_ 125	2.7	2.9	3.3	4.6
TR 160 3_ 140	1.8	2.0	2.3	3.7
TR 160 3_ 150	1.2	1.4	1.8	3.1
TR 160 3_ 160	1.2	1.4	1.8	3.1
TR 160 3_ 175	1.8	2.0	2.3	3.7
TR 160 3_ 200	1.2	1.4	1.8	3.1
TR 160 3_ 210	1.2	1.4	1.8	3.1
TR 160 3_ 216	1.1	1.3	1.6	3.0
TR 160 3_ 250	1.2	1.4	1.7	3.1
TR 160 3_ 280	1.2	1.4	1.7	3.1
TR 160 3_ 350	1.2	1.4	1.7	3.1
TR 160 3_ 400	1.2	1.4	1.7	3.1
TR 160 3_ 500	1.2	1.4	1.7	3.1
TR 160 3_ 700	1.2	1.4	1.7	3.1
TR 160 3_ 1000	1.2	1.4	1.7	3.1

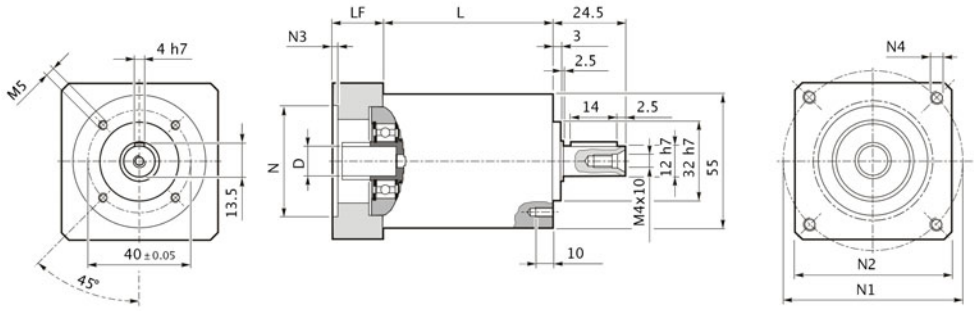


2.9.7 TR 190

TR 190					
	J [kgcm^2]				
i	D = Ø14...Ø24	D = Ø28...Ø32	D = Ø35...Ø38	D = Ø42	D = Ø45...Ø48
TR 190 1_ 3	24.2	24.9	25.6	29.3	29.9
TR 190 1_ 4	13.4	14.1	14.9	18.5	19.1
TR 190 1_ 5	9.3	10.0	10.8	14.4	15.0
TR 190 1_ 6	2.9	3.6	4.3	8.0	8.6
TR 190 1_ 7	5.7	6.4	7.1	10.8	11.4
TR 190 1_ 10	3.6	4.2	5.0	8.7	9.3
TR 190 2_ 9	23.2	23.9	24.7	28.3	28.9
TR 190 2_ 12	22.0	22.7	23.5	27.1	27.7
TR 190 2_ 15	21.6	22.3	23.0	26.7	27.3
TR 190 2_ 16	12.2	12.9	13.6	17.3	17.9
TR 190 2_ 20	8.5	9.2	10.0	13.6	14.2
TR 190 2_ 25	8.4	9.1	9.8	13.5	14.1
TR 190 2_ 28	5.3	6.0	6.7	10.4	11.0
TR 190 2_ 30	3.5	4.2	4.9	8.6	9.2
TR 190 2_ 35	5.2	5.9	6.6	10.3	10.9
TR 190 2_ 36	2.2	2.9	3.6	7.3	7.9
TR 190 2_ 40	3.4	4.1	4.8	8.5	9.1
TR 190 2_ 50	3.3	4.0	4.8	8.4	9.0
TR 190 2_ 70	3.3	4.0	4.7	8.4	9.0
TR 190 2_ 100	3.3	4.0	4.7	8.4	9.0
TR 190 3_ 48	12.7	13.4	14.2	17.8	18.4
TR 190 3_ 64	12.1	12.8	13.5	17.2	17.8
TR 190 3_ 75	8.9	9.5	10.3	14.0	14.6
TR 190 3_ 80	12.1	12.8	13.5	17.2	17.8
TR 190 3_ 84	5.5	6.1	6.9	10.6	11.2
TR 190 3_ 90	3.5	4.1	4.9	8.6	9.2
TR 190 3_ 120	3.5	4.1	4.9	8.6	9.2
TR 190 3_ 125	8.3	9.0	9.8	13.4	14.0
TR 190 3_ 140	5.2	5.9	6.7	10.3	10.9
TR 190 3_ 150	3.5	4.1	4.9	8.6	9.2
TR 190 3_ 160	3.4	4.0	4.8	8.5	9.1
TR 190 3_ 175	5.2	5.9	6.6	10.3	10.9
TR 190 3_ 200	3.4	4.0	4.8	8.5	9.1
TR 190 3_ 210	3.5	4.1	4.9	8.6	9.2
TR 190 3_ 216	2.2	2.8	3.6	7.3	7.9
TR 190 3_ 250	3.3	4.0	4.8	8.4	9.0
TR 190 3_ 280	3.3	4.0	4.7	8.4	9.0
TR 190 3_ 350	3.3	4.0	4.7	8.4	9.0
TR 190 3_ 400	3.3	4.0	4.7	8.4	9.0
TR 190 3_ 500	3.3	4.0	4.7	8.4	9.0
TR 190 3_ 700	3.3	4.0	4.7	8.4	9.0
TR 190 3_ 1000	3.3	4.0	4.7	8.4	9.0

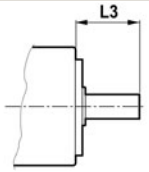
3 DIMENSIONS

3.1 TR 053

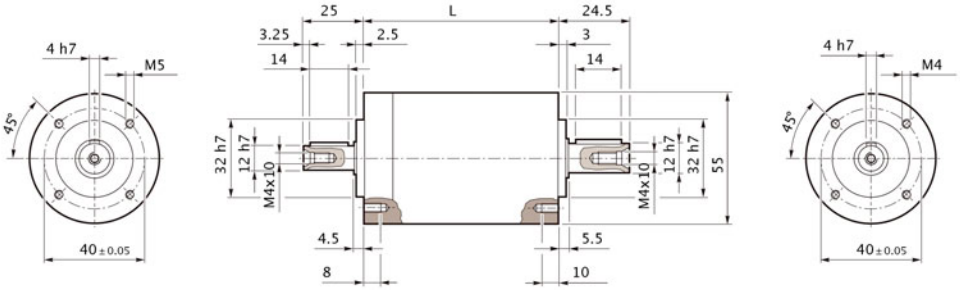


	L	Kg
TR 053 1	53	0.8
TR 053 2	66.8	1.0
TR 053 3	80.6	1.3

MOTOR

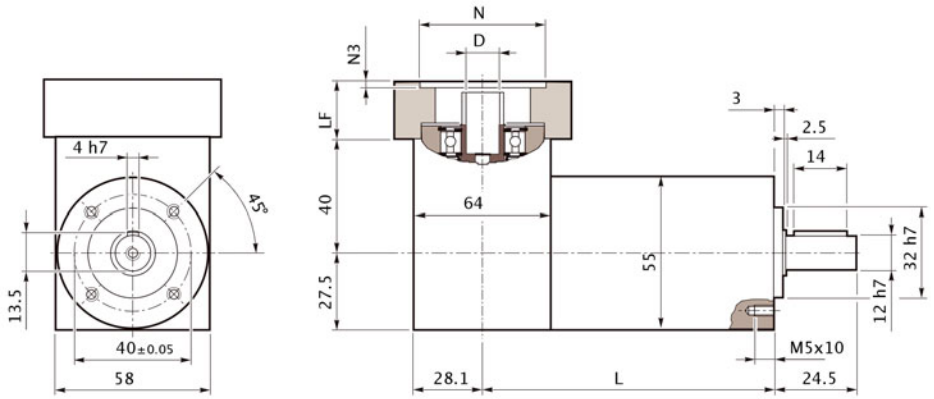


IS



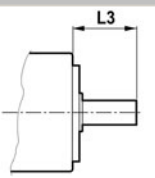
	L	Kg
TR 053 1	58.2	0.8
TR 053 2	72	1.0
TR 053 3	85.8	1.3

G



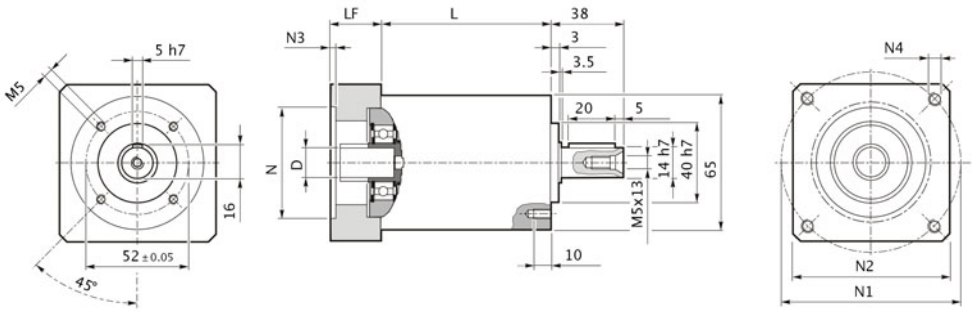
	L	Kg
TR 053 1	88.9	1.3
TR 053 2	102.7	1.5
TR 053 3	116.5	1.8

MOTOR



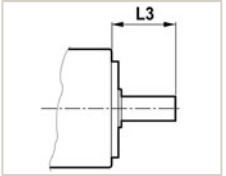
	D	N	N1	N2	N3	N4	LF	L3
TR 053_ 6...9 25 25...36 36...48	⩽ 9 mm	25...36	36...48	55	4	4.5	25	25
TR 053_ 6...12 25 38.1 66.6	⩽ 12 mm	38.1	66.6	60	3	M4x10	18	25
TR 053_ 6...12 25 40 63		40	63	60	3	M4x10	18	25
TR 053_ 6...12 25 50 60		50	60	60	3	M4x10	18	25
TR 053_ 6...12 25 60 75		60	75	63	3	M5x12	18	25
TR 053_ 6...14 30 50 65	⩽ 14 mm	50	65	60	3	M5x12	23	30
TR 053_ 6...14 30 50 70		50	70	60	3	M4x10	23	30
TR 053_ 6...14 30 60 75		60	75	63	3	M5x12	23	30
TR 053_ 6...14 30 60 90		60	90	75	3	M5x12	23	30
TR 053_ 6...14 30 70 85		70	85	75	3	M6x15	23	30
TR 053_ 6...14 30 70 90		70	90	75	3	M5x12	23	30
TR 053_ 6...14 32 73 98.4		73	98.4	85	3	M5x12	25	32
TR 053_ 6...14 30 80 100		80	100	85	3	M6x15	23	30

3.2 TR 060

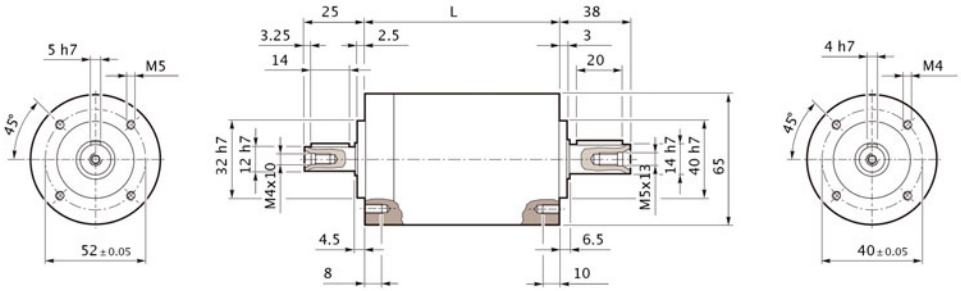


	L	Kg
TR 060 1	57.55	1.2
TR 060 2	74.25	1.7
TR 060 3	90.95	2.0

MOTOR

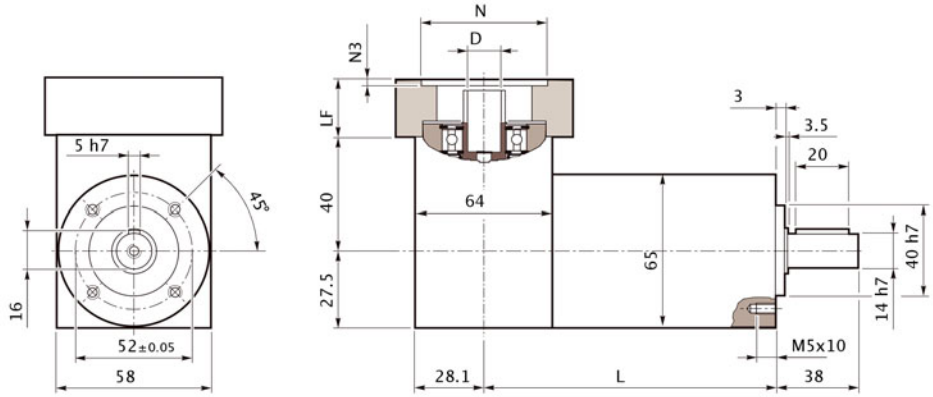


IS



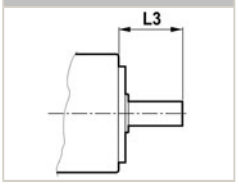
	L	Kg
TR 060 1	62.75	1.2
TR 060 2	79.45	1.7
TR 060 3	96.15	2.0

G



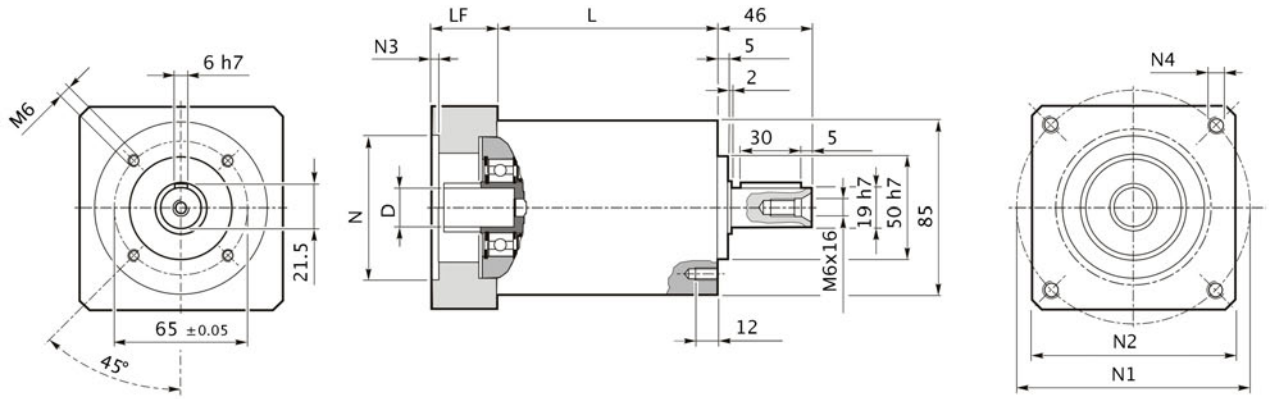
	L	Kg
TR 060 1	93.45	1.7
TR 060 2	110.15	2.2
TR 060 3	126.85	2.5

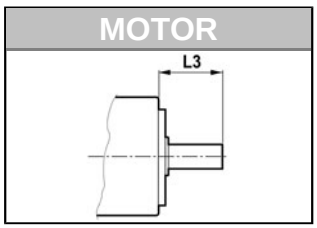
MOTOR



	D	N	N1	N2	N3	N4	LF	L3
TR 060_ 6...9 25 25...30 39...56	⩽ 9 mm	25...30	39...56	65	4	4.5	25	25
TR 060_ 6...12 25 38.1 66.6	⩽ 12 mm	38.1	66.6	60	3	M4x10	18	25
TR 060_ 6...12 25 40 63		40	63	60	3	M4x10	18	25
TR 060_ 6...12 25 50 60		50	60	60	3	M4x10	18	25
TR 060_ 6...12 25 60 75		60	75	63	3	M5x12	18	25
TR 060_ 6...14 30 50 65	⩽ 14 mm	50	65	60	3	M5x12	23	30
TR 060_ 6...14 30 50 65 TH		50	65	60	3	5	25	30
TR 060_ 6...14 30 50 70		50	70	60	3	M4x10	23	30
TR 060_ 6...14 30 60 75		60	75	63	3	M5x12	23	30
TR 060_ 6...14 30 60 90		60	90	75	3	M5x12	23	30
TR 060_ 6...14 30 70 85		70	85	75	3	M5x12	23	30
TR 060_ 6...14 30 70 90		70	90	75	3	M5x12	23	30
TR 060_ 6...14 32 73 98.4		73	98.4	85	3	M5x12	25	32
TR 060_ 6...14 30 80 100		80	100	85	3	M6x15	23	30

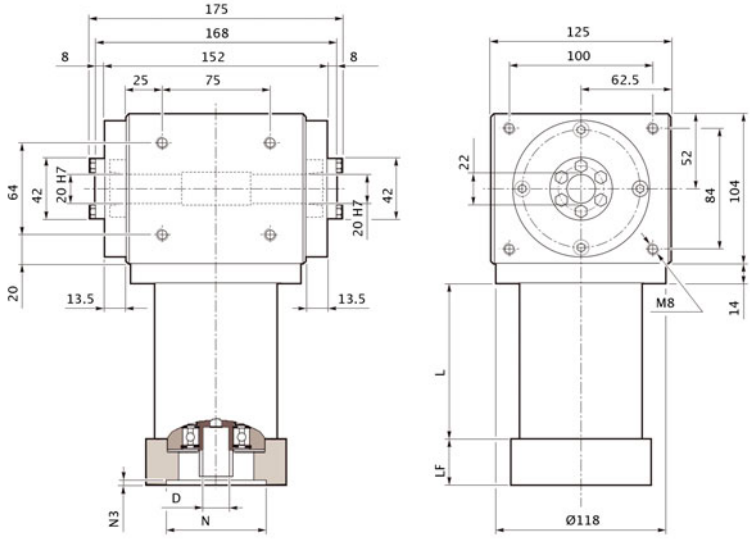
3.3 TR 080

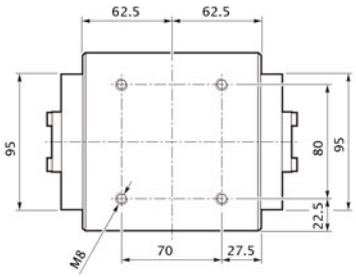


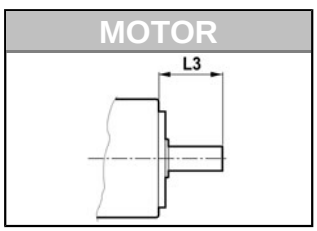


	L	Kg
TR 080 1	83.5	4.0
TR 080 2	108	4.6
TR 080 3	132.5	5.2

MB

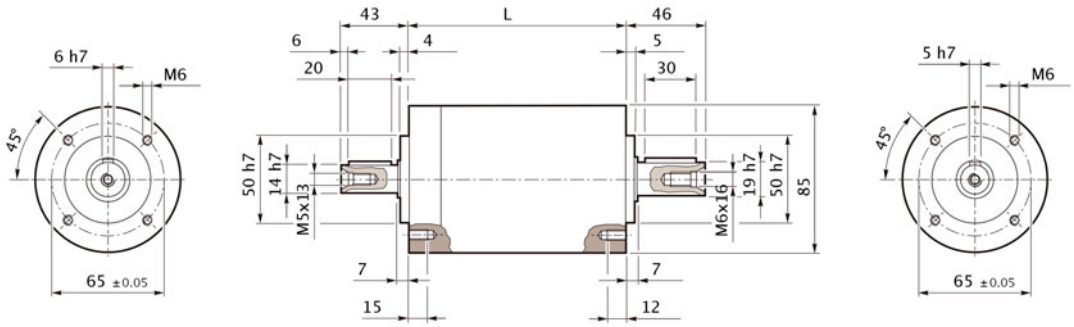






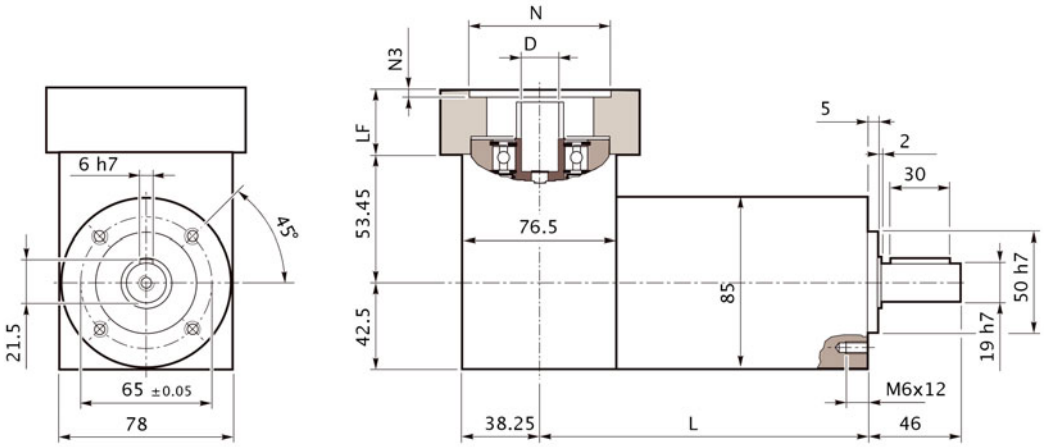
	L	Kg
TR 080 1	83.5	14
TR 080 2	108	15
TR 080 3	132.5	16

IS

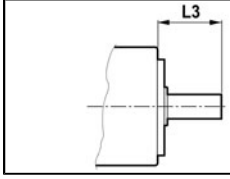


	L	Kg
TR 080 1	105.3	4
TR 080 2	129.8	4.6
TR 080 3	154.3	5.2

G



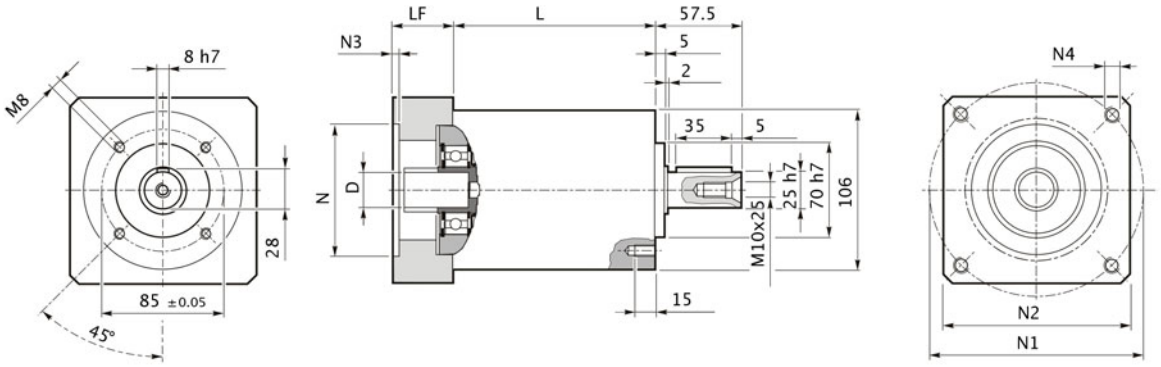
MOTOR



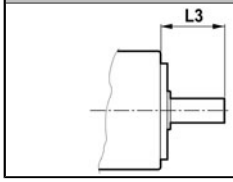
	L	Kg
TR 080 1	143.55	5.2
TR 080 2	168.05	5.8
TR 080 3	192.55	6.4

	D	N	N1	N2	N3	N4	LF	L3
TR 080_ 8...14 40 50 65	⩽ 14 mm	50	65	80	4	M5x16	34	40
TR 080_ 8...14 40 50 65 TH		50	65	80	4	5	34	40
TR 080_ 8...14 40 50 70		50	70	80	4	M4x10	34	40
TR 080_ 9...14 40 50 95		50	95	80	4	M6x10	34	40
TR 080_ 8...14 40 60 75		60	75	65	4	M5x16	34	40
TR 080_ 8...14 40 60 75 TH		60	75	65	4	5	34	40
TR 080_ 8...14 40 73 98.4		73	98.4	85	4	M5x16	34	40
TR 080_ 8...14 40 78 63.5		78	63.5	90	4	Ø6.5	34	40
TR 080_ 8...16 40 60 90	⩽ 16 mm	60	90	80	4	M5x16	34	40
TR 080_ 8...19 40 55.5 125.7	⩽ 19 mm	55.5	125.7	105	4	M6x16	34	40
TR 080_ 8...19 40 70 85		70	85	80	4	M6x20	34	40
TR 080_ 8...19 40 70 85 TH		70	85	80	4	6	34	40
TR 080_ 8...19 40 70 90		70	90	80	4	M5x16	34	40
TR 080_ 8...19 40 80 100		80	100	90	4	M6x16	34	40
TR 080_ 8...19 40 95 115		95	115	100	4	M8x20	34	40
TR 080_ 8...19 40 95 130		95	130	115	4	M8x20	34	40
TR 080_ 8...19 40 110 130		110	130	115	4	M8x20	34	40
TR 080_ 8...19 50 110 145		110	145	120	6.5	M8x20	44	50
TR 080_ 8...19 60 110 145		110	145	120	6.5	M8x20	54	60

3.4 TR 105

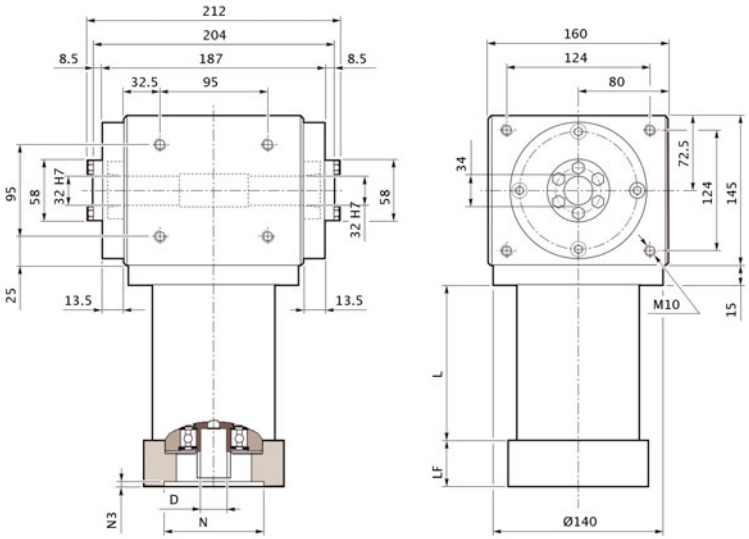


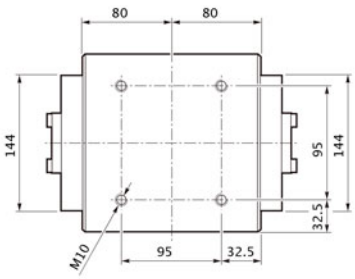
MOTOR



	L	Kg
TR 105 1	107.5	6.5
TR 105 2	140	8.5
TR 105 3	172.5	10.5

MB





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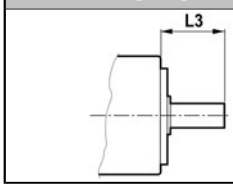
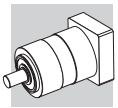
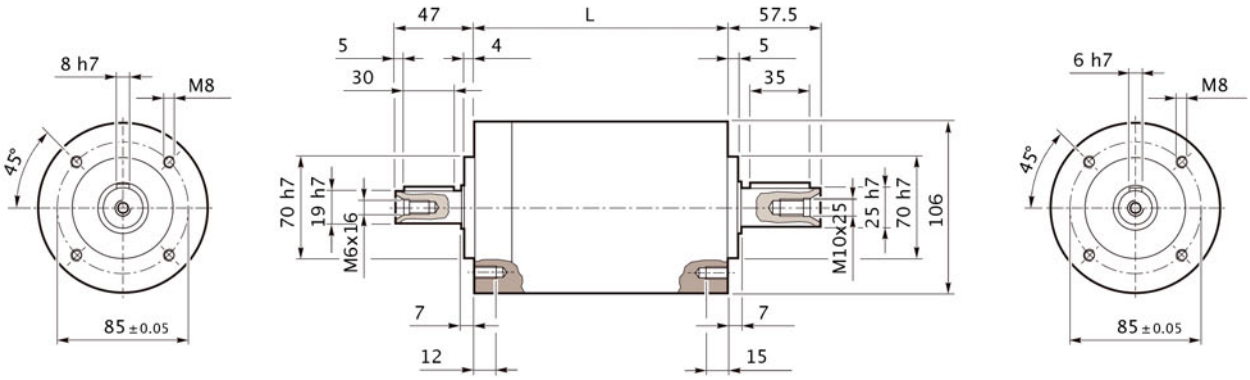


	L	Kg
TR 105 1	107.5	32
TR 105 2	140	34
TR 105 3	172.5	36

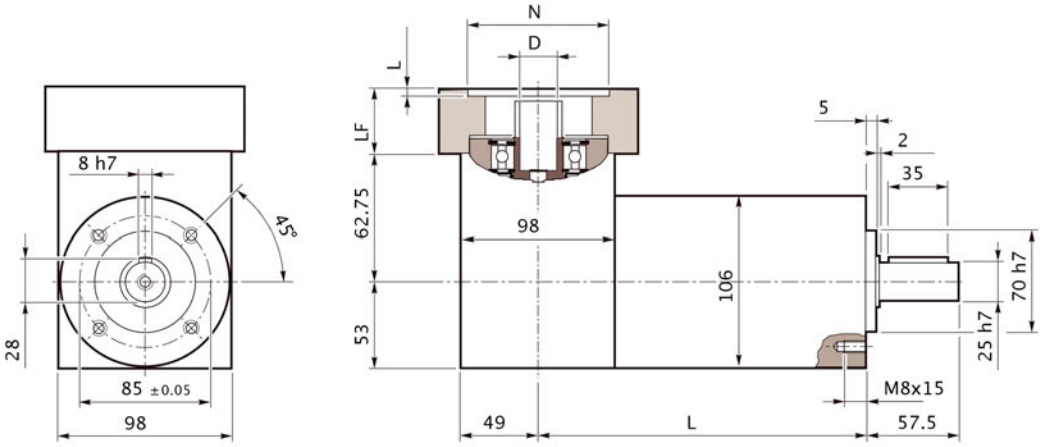


IS

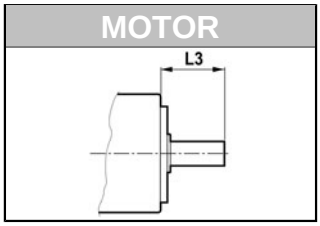


	L	Kg
TR 105 1	121.3	6.5
TR 105 2	153.8	8.5
TR 105 3	186.3	10.5

G



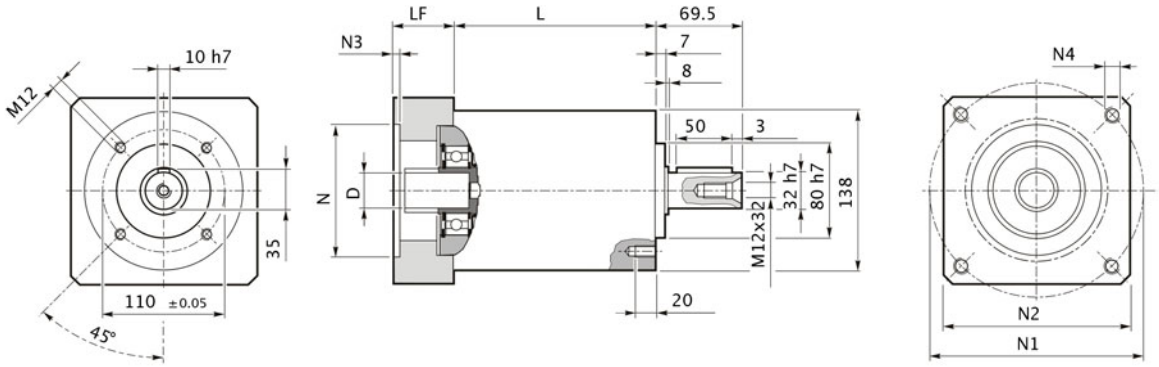
MOTOR



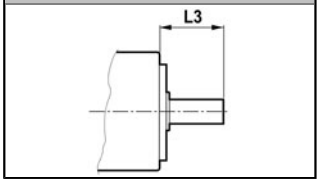
	L	Kg
TR 105 1	170.3	8.5
TR 105 2	202.8	10.5
TR 105 3	235.3	12.5

	D	N	N1	N2	N3	N4	LF	L3
TR 105_ 11...19 40 50 95		50	95	100	5	M6x14	28	40
TR 105_ 11...19 40 55.5 125.7		55.5	125.7	105	5	M6x16	28	40
TR 105_ 11...19 40 60 75		60	75	100	5	M5x14	28	40
TR 105_ 11...19 40 60 75 TH		60	75	100	5	5	33	40
TR 105_ 11...19 40 70 85		70	85	100	5	M6x14	28	40
TR 105_ 11...19 40 70 85 TH	⩽ 19 mm	70	85	100	5	6	33	40
TR 105_ 11...19 40 70 90		70	90	100	5	M5x12	28	40
TR 105_ 11...19 40 80 100		80	100	100	5	M6x16	28	40
TR 105_ 11...19 40 95 115		95	115	100	5	M8x18	28	40
TR 105_ 11...19 40 95 130		95	130	115	5	M8x18	28	40
TR 105_ 11...19 40 110 130		110	130	115	5	M8x18	28	40
TR 105_ 11...24 50 95 115		95	115	100	5	M8x18	38	50
TR 105_ 11...24 50 110 130		110	130	115	6.5	M8x20	38	50
TR 105_ 11...24 50 110 145	⩽ 24 mm	110	145	120	6.5	M8x20	38	50
TR 105_ 11...24 60 110 145		110	145	120	6.5	M8x20	48	60
TR 105_ 11...24 50 130 165		130	165	140	6.5	M10x20	38	50
TR 105_ 11...32 60 130 165	⩽ 32 mm	130	165	140	6.5	M10x25	48	60

3.5 TR 130

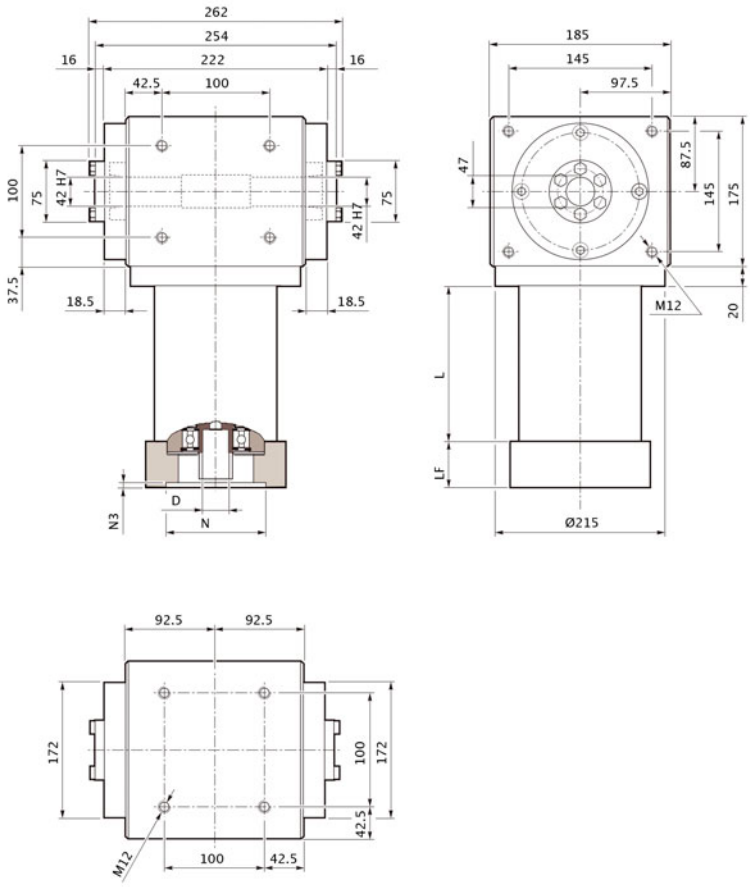


MOTOR

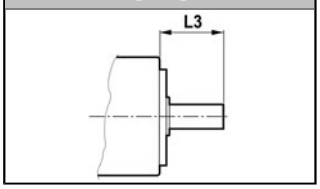


	L	Kg
TR 130 1	126	12
TR 130 2	165.5	15.5
TR 130 3	205	18.5

MB

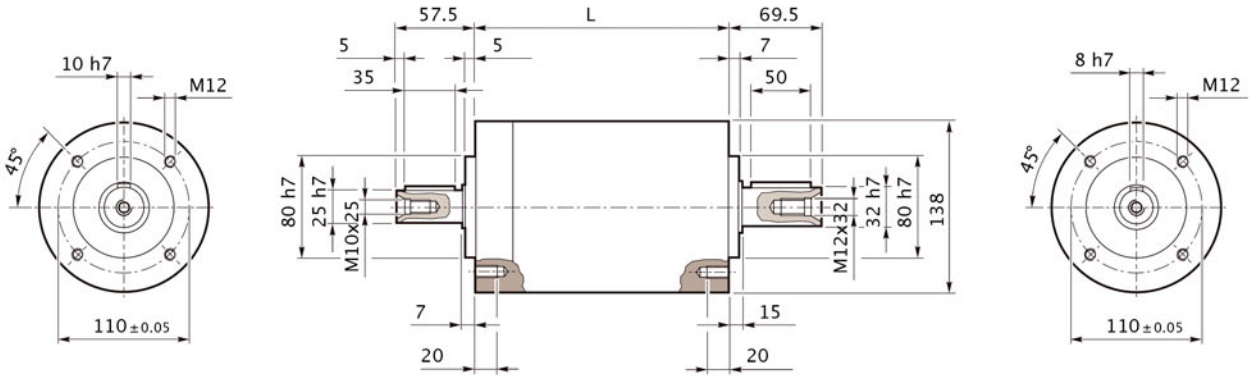


MOTOR



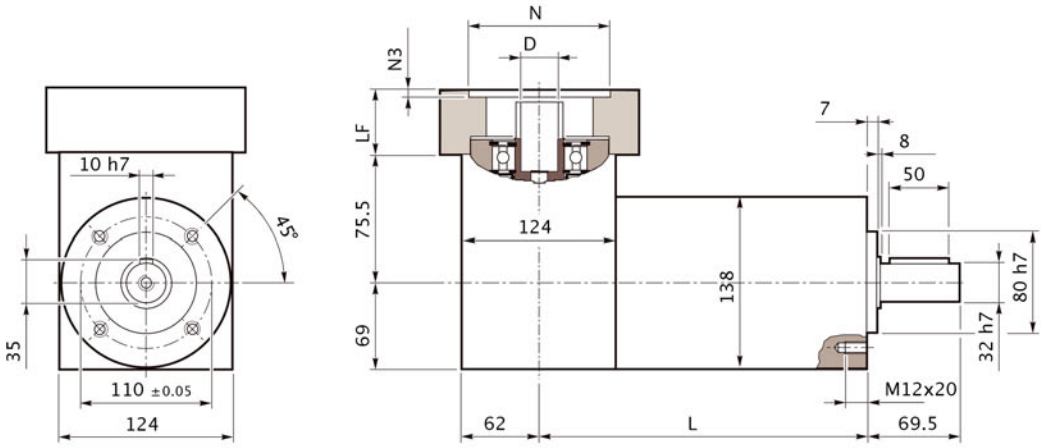
	L	Kg
TR 130 1	126	54
TR 130 2	165.5	58
TR 130 3	205	61

IS

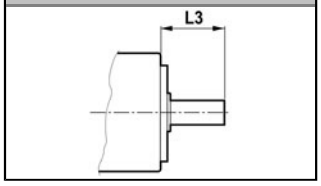


	L	Kg
TR 130 1	151.2	12
TR 130 2	190.7	15.5
TR 130 3	230.2	18.5

G



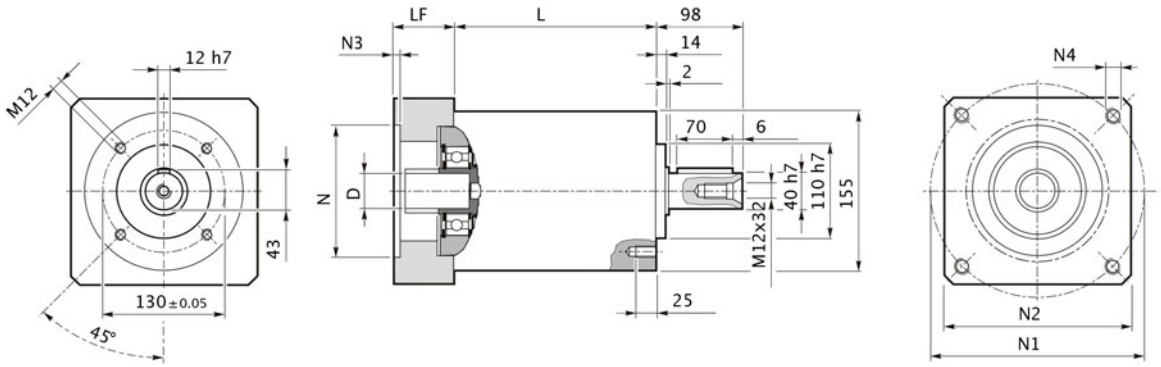
MOTOR

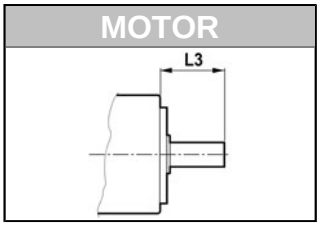


	L	Kg
TR 130 1	213.2	16
TR 130 2	252.7	19.5
TR 130 3	292.2	22.5

	D	N	N1	N2	N3	N4	LF	L3
TR 130_ 14...19 50 55.5 125.7	⩽ 19 mm	55.5	125.7	130	4	M6x15	39.5	50
TR 130_ 14...19 50 80 100		80	100	130	4	M6x15	39.5	50
TR 130_ 14...24 50 95 115	⩽ 24 mm	95	115	130	4	M8x20	39.5	50
TR 130_ 14...24 50 110 130		110	130	130	4	M8x20	39.5	50
TR 130_ 14...24 60 110 145		110	145	130	6.5	M8x20	49.5	60
TR 130_ 14...24 50 130 165		130	165	140	4	M10x20	39.5	50
TR 130_ 14...32 60 130 165	⩽ 32 mm	130	165	140	4	M10x20	49.5	60
TR 130_ 14...32 60 180 215		180	215	190	5.5	M14x25	49.5	60
TR 130_ 14...38 80 114.3 200	⩽ 38 mm	114.3	200	170	5.5	M12x25	69.5	80
TR 130_ 14...38 80 180 215		180	215	190	5.5	M14x25	69.5	80

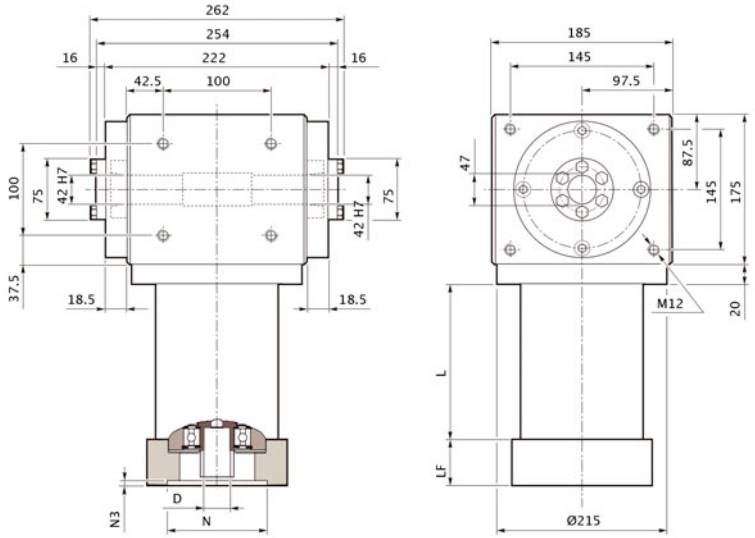
3.6 TR 160

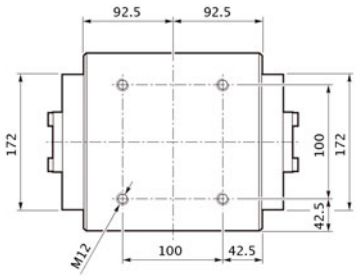


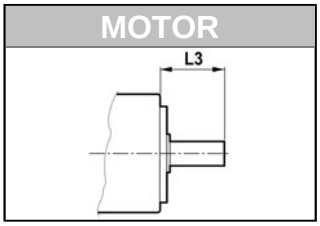


	L	Kg
TR 160 1	130	17
TR 160 2	169.5	21
TR 160 3	209	28

MB

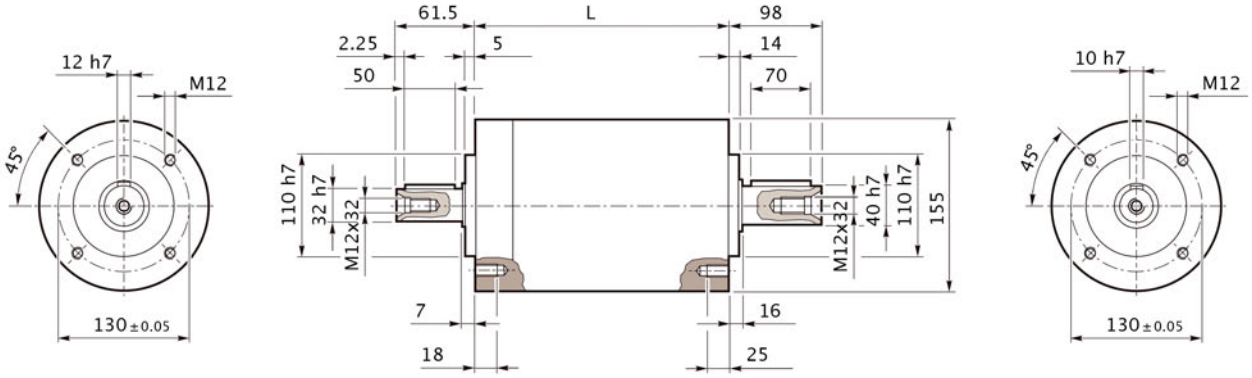






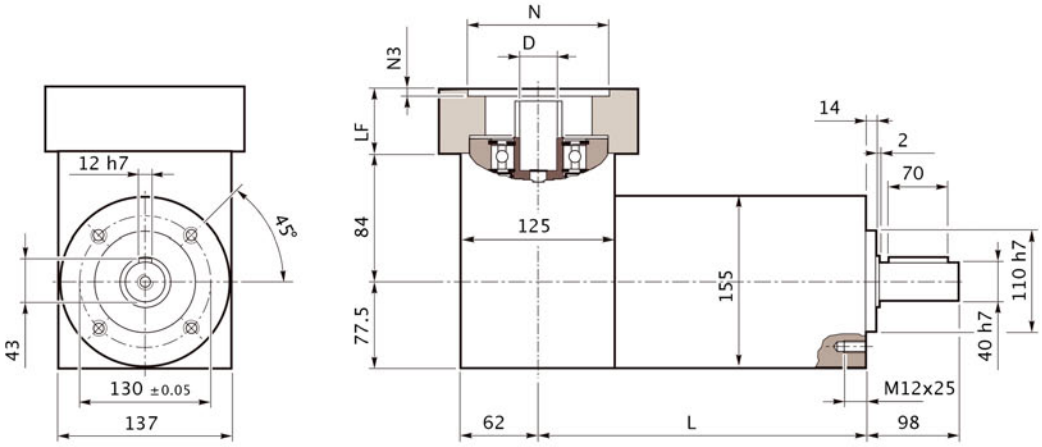
	L	Kg
TR 160 1	130	54
TR 160 2	169.5	58
TR 160 3	209	61

IS

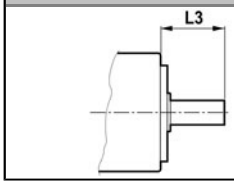


	L	Kg
TR 160 1	155.2	17
TR 160 2	194.7	21
TR 160 3	234.2	28

G



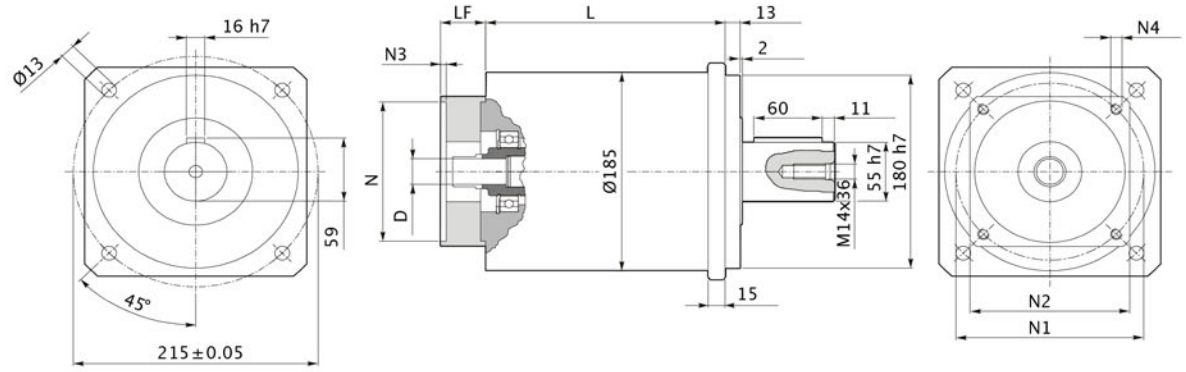
MOTOR

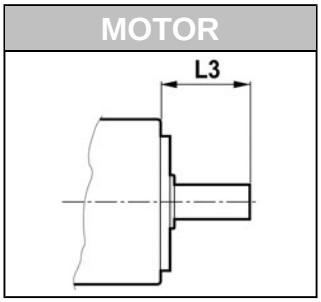


	L	Kg
TR 160 1	218.2	24
TR 160 2	257.7	28
TR 160 3	297.2	34

	D	N	N1	N2	N3	N4	LF	L3
TR 160_ 14...19 50 55.5 125.7	⩽ 19	55.5	125.7	140	5	M6x15	39.5	50
TR 160_ 14...19 50 80 100		80	100	140	5	M6x15	39.5	50
TR 160_ 14...24 50 95 115	⩽ 24	95	115	140	5	M8x20	39.5	50
TR 160_ 14...24 50 110 130		110	130	140	5	M8x20	39.5	50
TR 160_ 14...24 60 110 145		110	145	140	6.5	M8x20	49.5	60
TR 160_ 14...24 50 130 165		130	165	140	5	M10x20	39.5	50
TR 160_ 14...32 60 130 165	⩽ 32	130	165	140	5	M10x20	49.5	60
TR 160_ 14...32 60 180 215		180	215	190	5.5	M14x25	49.5	60
TR 160_ 14...38 80 114.3 200	⩽ 38	114.3	200	170	6.5	M12x25	69.5	80
TR 160_ 14...38 80 180 215		180	215	190	6.5	M14x25	69.5	80

3.7 TR 190

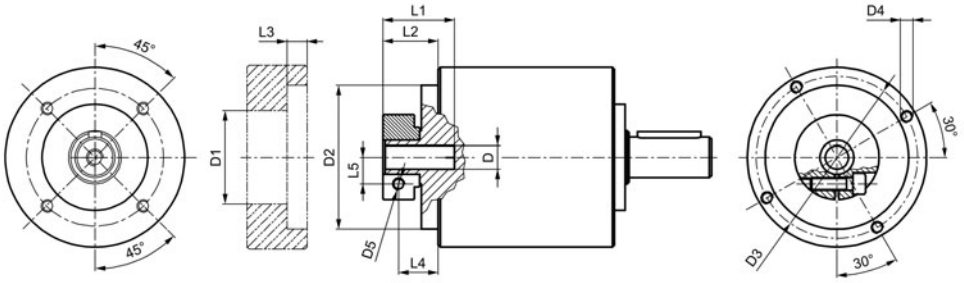




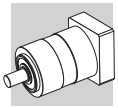
	L	Kg
TR 190 1	158.7	25
TR 190 2	210.4	29
TR 190 3	262.1	34

	D	N	N1	N2	N3	N4	LF	L3
TR 190_ 14...19 50 55.5 125.7	⩽ 19	55.5	125.7	140	5	M6x15	39.5	50
TR 190_ 14...19 50 80 100		80	100	140	5	M6x15	39.5	50
TR 190_ 14...24 50 95 115	⩽ 24	95	115	140	5	M8x20	39.5	50
TR 190_ 14...24 50 110 130		110	130	140	5	M8x20	39.5	50
TR 190_ 14...24 60 110 145		110	145	140	6.5	M8x20	49.5	60
TR 190_ 14...24 50 130 165		130	165	140	5	M10x20	39.5	50
TR 190_ 14...32 60 130 165	⩽ 32	130	165	140	5	M10x20	49.5	60
TR 190_ 14...32 60 180 215		180	215	190	5.5	M14x25	49.5	60
TR 190_ 14...38 80 114.3 200	⩽ 38	114.3	200	170	6.5	M12x25	69.5	80
TR 190_ 14...38 80 180 215		180	215	190	6.5	M14x25	69.5	80

3.8 GEARBOX WITHOUT MOTOR ADAPTER



	D (F7)	D1	D2 (h7)	D3	D4	D5	L1	L2	L3 +0.1 +0.2	L4	L5
TR 053	6 - 6.35 - 7	32.5	50	42.5	M4x8	M4	21.7	13.2	3	8.2	8
	8 - 9 - 9.52 - 10	32.5	50	42.5	M4x8	M4	21.7	13.2	3	8.2	9
	11 - 12 - 12.7	35.5	50	42.5	M4x8	M4	22	13.5	3	8.5	11
	14	35.5	50	42.5	M4x8	M4	26.5	18	3	13	11.5
TR 060	6 - 6.35 - 7	32.5	50	42.5	M4x8	M4	21.7	13.2	3	8.2	8
	8 - 9 - 9.52 - 10	32.5	50	42.5	M4x8	M4	21.7	13.2	3	8.2	9
	11 - 12 - 12.7	35.5	50	42.5	M4x8	M4	22	13.5	3	8.5	11
	14	35.5	50	42.5	M4x8	M4	26.5	18	3	13	11.5
TR 080	8 - 9 - 9.52	38	68	76.5	M6x10	M6	34	26.3	9.5	18.8	10.5
	11 - 12 - 12.7	43	68	76.5	M6x10	M6	34	26.3	9.5	18.8	12.5
	14 - 15.875 - 16 - 17	48	68	76.5	M6x10	M6	34	26.3	9.5	18.8	14.5
	19 - 19.05	51	68	76.5	M6x10	M6	34	26.3	9.5	18.8	16.5
TR 105	11 - 12 - 12.7	43	90	98	M6x15	M6	33.5	20	7.6	12.5	12.5
	14 - 15 - 15.875 - 16	48	90	98	M6x15	M6	33.5	20	7.6	12.5	14.5
	19	51	90	98	M6x15	M6	33.5	20	7.6	12.5	16.5
	22 - 24	56.5	90	98	M6x15	M6	36.5	23	7.6	14	19
	28	67	90	98	M6x15	M8	36.5	23	7.6	14	22.5
	32	71	90	98	M6x15	M8	38	24.5	7.6	15.5	24.5
TR 130	14 - 15.875 - 16	48	113	125.5	M8x15	M6	40	27.5	6	20	14.5
	19	51	113	125.5	M8x15	M6	40	27.5	6	20	16.5
	22 - 24	56.5	113	125.5	M8x15	M6	41	28.5	6	19.5	19
	28	67	113	125.5	M8x15	M8	41	28.5	6	19.5	22.5
	32	71	113	125.5	M8x15	M8	40	27.5	6	18.5	24.5
	35	73	113	125.5	M8x15	M8	50	37.5	11.25	26	26
	38	77.5	113	125.5	M8x15	M8	50	37.5	11.25	26	28
TR 160	14 - 15.875 - 16	48	130	142.5	M8x16	M6	40	27.5	6	20	14.5
	19	51	130	142.5	M8x16	M6	40	27.5	6	20	16.5
	22 - 24	56.5	130	142.5	M8x16	M6	41	28.5	6	19.5	19
	28	67	130	142.5	M8x16	M8	41	28.5	6	19.5	22.5
	32	71	130	142.5	M8x16	M8	40	27.5	6	18.5	24.5
	35	73	130	142.5	M8x16	M8	50	37.5	11.25	26	26
	38	77.5	130	142.5	M8x16	M8	50	37.5	11.25	26	28
TR 190	14 - 16	48	130	142.5	M8x14	M6	45.5	27.5	6	20	14.5
	19	51	130	142.5	M8x14	M6	45.5	27.5	6	20	16.5
	22 - 24	56.5	130	142.5	M8x14	M6	47	29	6	20	19
	28	67	130	142.5	M8x14	M8	47	29	6	20	22.5
	32	71	130	142.5	M8x14	M8	47	29	6	20	24.5
	35	73	130	142.5	M8x14	M8	54.5	36.5	6	25	26
	38	77.5	130	142.5	M8x14	M8	54.5	36.5	6	25	28
	42	92	130	142.5	M8x14	M10	60.5	40	6	25	33
	45	95	130	142.5	M8x14	M10	60.5	40	6	25	33
	48	97	130	142.5	M8x14	M10	60.5	40	6	25	33



INDEX OF REVISIONS R0

DOCUMENT	SECTION	DESCRIPTION