

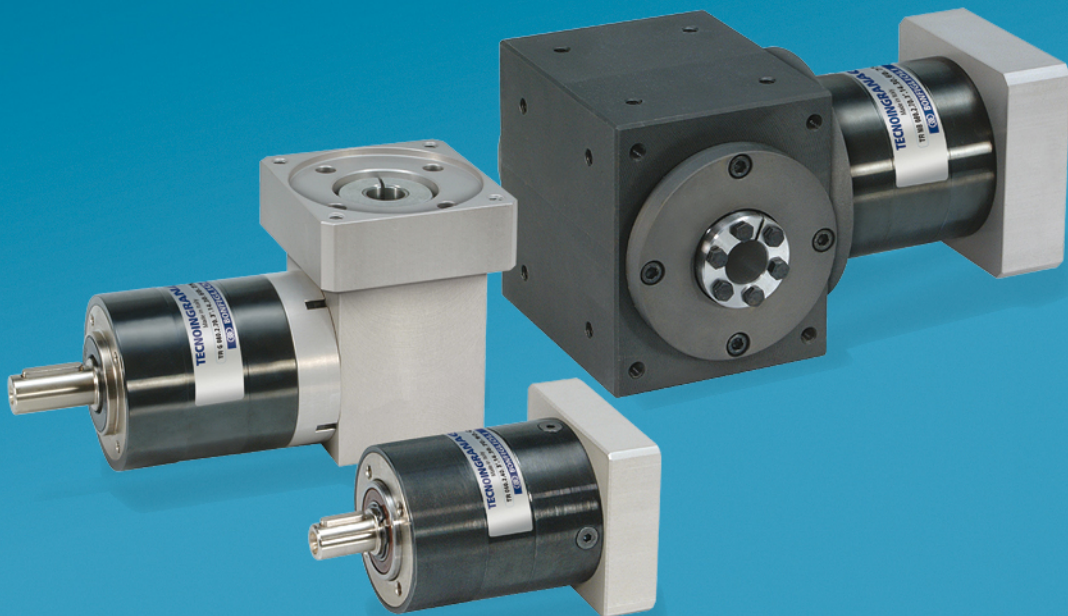


**Bonfiglioli**  
Tecnoingranaggi

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## TR series

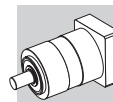
Low-backlash gearboxes



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power, control and green solutions





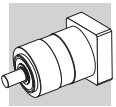
## SUMMARY

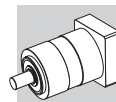
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### Revisions

Refer to page 46 for the catalogue revision index.

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## 1 GENERAL INFORMATION

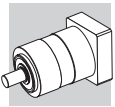
### 1.1 SYMBOLS, UNITS AND DEFINITIONS

#### Values depending on the **APPLICATION**

term	u.m.	definition
<b>A<sub>2</sub></b>	[N]	Thrust force on output shaft
<b>A<sub>2</sub> EQU</b>	[N]	Equivalent thrust force applying on output shaft
<b>A<sub>2</sub> MAX</b>	[N]	Maximum thrust force applying on output shaft
<b>R<sub>2</sub></b>	[N]	Radial force on output shaft
<b>R<sub>2</sub> EQU</b>	[N]	Equivalent radial force applying on output shaft
<b>R<sub>2</sub> MAX</b>	[N]	Maximum radial force applying on output shaft
<b>ED</b>	[min]	Loading time
<b>ED%</b>	[%]	Loading time %
<b>L<sub>10h</sub> TARGET</b>	[h]	Output shaft bearings' desired basic rating life
<b>M<sub>1</sub> PEAK</b>	[Nm]	Maximum input torque (usually motor)
<b>M<sub>2(1) ... M<sub>2(n)</sub></sub></b>	[Nm]	Output torque at each of the time periods t <sub>1</sub> ... t <sub>n</sub>
<b>M<sub>2</sub> EQU</b>	[Nm]	Equivalent output torque
<b>M<sub>2</sub> MAX</b>	[Nm]	Maximum output torque in case of emergency
<b>M<sub>T2</sub> EQU</b>	[Nm]	Equivalent tilting moment applying on output shaft
<b>M<sub>T2</sub> MAX</b>	[Nm]	Maximum tilting moment applying on output shaft
<b>n<sub>2</sub></b>	[min <sup>-1</sup> ]	Output speed
<b>n<sub>2(1) ... n<sub>2(n)</sub></sub></b>	[min <sup>-1</sup> ]	Output speed based on the time periods t <sub>1</sub> ... t <sub>n</sub>
<b>n<sub>2</sub> EQU</b>	[min <sup>-1</sup> ]	Equivalent output speed
<b>n<sub>2</sub> MAX</b>	[min <sup>-1</sup> ]	Maximum output speed
<b>T</b>	[C°]	Ambient temperature
<b>t<sub>1</sub> ... t<sub>n</sub></b>	[s]	Time periods of motion
<b>t<sub>Σ</sub></b>	[s]	Cycle duration including pause
<b>Z</b>	[1/h]	Cycle number per hour

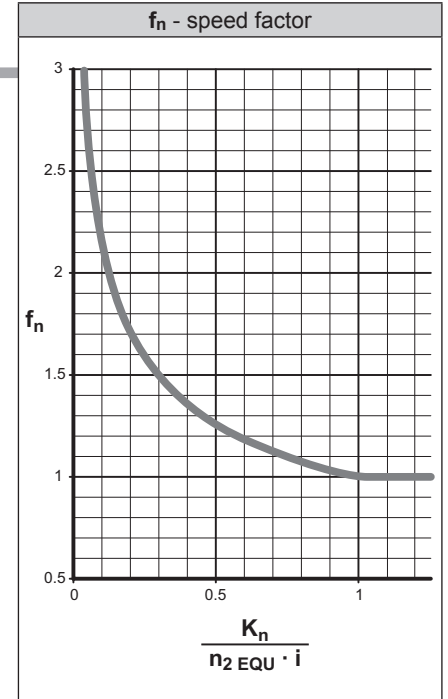
#### Values depending on the **GEAR DRIVE SELECTION**

term	u.m.	definition
<b>A<sub>2 3</sub> max</b>	[N]	Admissible thrust force on output shaft
<b>A<sub>2'</sub> max</b>	[N]	Thrust force acting simultaneously with the rated radial force
<b>R<sub>1</sub> max</b>	[N]	Admissible radial force at midpoint of input shaft
<b>R<sub>2 3</sub> max</b>	[N]	Admissible radial force at midpoint of output shaft
<b>C<sub>B</sub></b>	[Nm]	Constant for bearing's lifetime calculation
<b>C<sub>t</sub></b>	$\left[ \frac{\text{Nm}}{\text{arcmin}} \right]$	Torsional stiffness
<b>f<sub>n</sub></b>	—	Speed factor
<b>f<sub>z</sub></b>	—	Cycle factor
<b>f<sub>T</sub></b>	—	Temperature adjusting factor
<b>i</b>	—	Gearbox ratio
<b>J<sub>G</sub></b>	[kgcm <sup>2</sup> ]	Mass moment of inertia of the gearhead
<b>K<sub>n</sub></b>	—	Speed constant
<b>L<sub>10h</sub></b>	[h]	Bearings' basic rating life
<b>L<sub>Z</sub></b>	[mm]	Factor for bearing's lifetime calculation
<b>M<sub>a 2</sub></b>	[Nm]	Maximum acceleration output torque
<b>M<sub>n 2</sub></b>	[Nm]	Rated output torque
<b>M<sub>p 2</sub></b>	[Nm]	Emergency stop output torque
<b>M<sub>T2</sub> max</b>	[Nm]	Maximum tilting moment applying on output shaft
<b>n<sub>1</sub> max</b>	[min <sup>-1</sup> ]	Maximum momentary input speed. The speed the unit can be driven at occasionally and in non-repetitive conditions For cycle duty type S5, it cannot be applied continuously for more than 30 seconds
<b>p</b>	—	Bearing lifetime exponent
<b>η</b>	[%]	Gear efficiency
<b>φ<sub>R</sub></b>	[arcmin]	Reduced backlash is calculated in static conditions and with the application of a torque equal to 2% of the gear unit rated torque
<b>φ<sub>S</sub></b>	[arcmin]	Standard backlash is calculated in static conditions and with the application of a torque equal to 2% of the gear unit rated torque



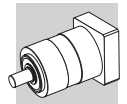
## 1.2 SELECTING THE GEAR UNIT

(a)	Ratio	$i$	—	$i = \frac{n_1}{n_2}$														
(b)	Equivalent output torque	$M_{2\text{ EQU}}$	[Nm]	$M_{2\text{ EQU}} = \sqrt[3]{\frac{n_{2(1)} \cdot t_1 \cdot  M_{2(1)} ^3 + \dots + n_{2(n)} \cdot t_n \cdot  M_{2(n)} ^3}{n_{2(1)} \cdot t_1 + \dots + n_{2(n)} \cdot t_n}}$														
(c)	Equivalent output speed	$n_{2\text{ EQU}}$	[min <sup>-1</sup> ]	$n_{2\text{ EQU}} = \frac{n_{2(1)} \cdot t_1 + n_{2(2)} \cdot t_2 + \dots + n_{2(n)} \cdot t_n}{t_\Sigma}$														
(d)	Speed factor	$f_n$	—	If $\frac{K_n}{n_{2\text{ EQU}} \cdot i} \geq 1 \Rightarrow f_n = 1$ If $\frac{K_n}{n_{2\text{ EQU}} \cdot i} < 1 \Rightarrow f_n = \text{Obtain from diagram}$														
(e)	Loading time %	ED%	[%]	$ED\% = \frac{t_1 + t_2 + \dots + t_n}{t_\Sigma} \cdot 100$														
	Loading time	ED	[min]	$ED = t_1 + t_2 + \dots + t_n$														
(f)	Cycle number per hour	$Z$	[1/h]	$Z = \frac{3600}{t_\Sigma}$														
(g)	Cycle factor	$f_z$	—	<table border="1"> <thead> <tr> <th>Z</th> <th><math>f_z</math></th> </tr> </thead> <tbody> <tr> <td><math>Z \leq 1000</math></td> <td>1.00</td> </tr> <tr> <td><math>1000 &lt; Z \leq 1500</math></td> <td>1.25</td> </tr> <tr> <td><math>1500 &lt; Z \leq 2500</math></td> <td>1.50</td> </tr> <tr> <td><math>2500 &lt; Z \leq 4000</math></td> <td>1.75</td> </tr> <tr> <td><math>4000 &lt; Z \leq 6000</math></td> <td>2.00</td> </tr> <tr> <td><math>Z &gt; 6000</math></td> <td>contact us</td> </tr> </tbody> </table>	Z	$f_z$	$Z \leq 1000$	1.00	$1000 < Z \leq 1500$	1.25	$1500 < Z \leq 2500$	1.50	$2500 < Z \leq 4000$	1.75	$4000 < Z \leq 6000$	2.00	$Z > 6000$	contact us
Z	$f_z$																	
$Z \leq 1000$	1.00																	
$1000 < Z \leq 1500$	1.25																	
$1500 < Z \leq 2500$	1.50																	
$2500 < Z \leq 4000$	1.75																	
$4000 < Z \leq 6000$	2.00																	
$Z > 6000$	contact us																	
(h)	Temperature adjusting factor	$f_T$	—	If $T \leq 30^\circ\text{C} \Rightarrow f_T = 1$ If $T > 30^\circ\text{C} \Rightarrow f_T = 1 + \frac{T - 30\text{ C}}{100\text{ }^\circ\text{C}}$														
(i)	Maximum input torque	$M_{1\text{ PEAK}}$	[Nm]	a) maximum possible application torque b) limited motor torque by inverter c) maximum motor torque														



<b><math>K_n</math> - speed constant</b>															
i	TR 053	TR 060	TR 080	TR 105	TR 130	TR 160	TR 190	i	TR 053	TR 060	TR 080	TR 105	TR 130	TR 160	TR 190
3	1392	1392	2675	2500	1696	540	1500	100	4000	4000	4000	3500	3200	3000	2900
4	1980	1584	1513	1615*	504*	326*	1158	112	3500						
5	2320	2047	1726	1843*	574*	372*	1321	120		4000	4000	3500	3200	2143	2900
6	2297	2523	2522	1032*	153*	132*	1125*	125	4000	3500	3200	3000	2900	1819	2300
7	3790	3032	2117	1353	423	319*	1619	140	4000	4000	4000	3500	3200	2037	2900
9	4000	3300	2900	2500	2100	1620	1500	144	4000						
10		4000	4000	3500	3200	1172	2900	150		4000	4000	3500	3200	2183	2900
12	3300	3300	1478	1522	516	319*	1058	160		4000	4000	3500	3200	2551	2900
15	3300	3300	1687	1737	588	364*	1207	175	4000	4000	4000	3500	3200	2547	2900
16	3500	3500	1971	2030	688	425*	1410	180	4000						
20	3500	3500	2464	2537	860	319	1763	200		4000	4000	3500	3200	2911	2900
25	3500	3500	2812	2895	980	364	2011	210		4000	4000	3500	3200	2677	2900
28	4000	4000	3449	3500	1204	446	2468	216	3500	3500	3200	3000	1881	976	2300
30		4000	4000	3500	3200	3000	1930	225	4000						
35	4000	4000	3937	3500	1372	509	2815	245	4000						
36	4000	3500	3200	1945	551	500	2300	250		4000	4000	3500	3200	3000	2900
40		4000	4000	3500	1720	638	2900	252	4000						
45	4000							280		4000	4000	3500	3200	3000	2900
48	4000	3500	3100	2800	2314	857	2100	324	4000						
50		4000	4000	3500	1959	728	2900	350		4000	4000	3500	3200	3000	2900
60	3500							400		4000	4000	3500	3200	3000	2900
64	3500	3500	3100	2800	2752	1020	2100	405	4000						
70		4000	4000	3500	2408	892	2900	500		4000	4000	3500	3200	3000	2900
75	3500	3500	3200	3000	3200	1339	2300	567	4000						
80	4000	3500	3100	2800	2400	1275	2100	700		4000	4000	3500	3200	3000	2900
81	4000							729	4000						
84	4000	4000	4000	3500	2889	1071	2900	1000		4000	4000	3500	3200	3000	2900
90		4000	4000	3500	2826	3000	2900								

In case of S1 duty the values marked with \* reduce the average service life of bearings.

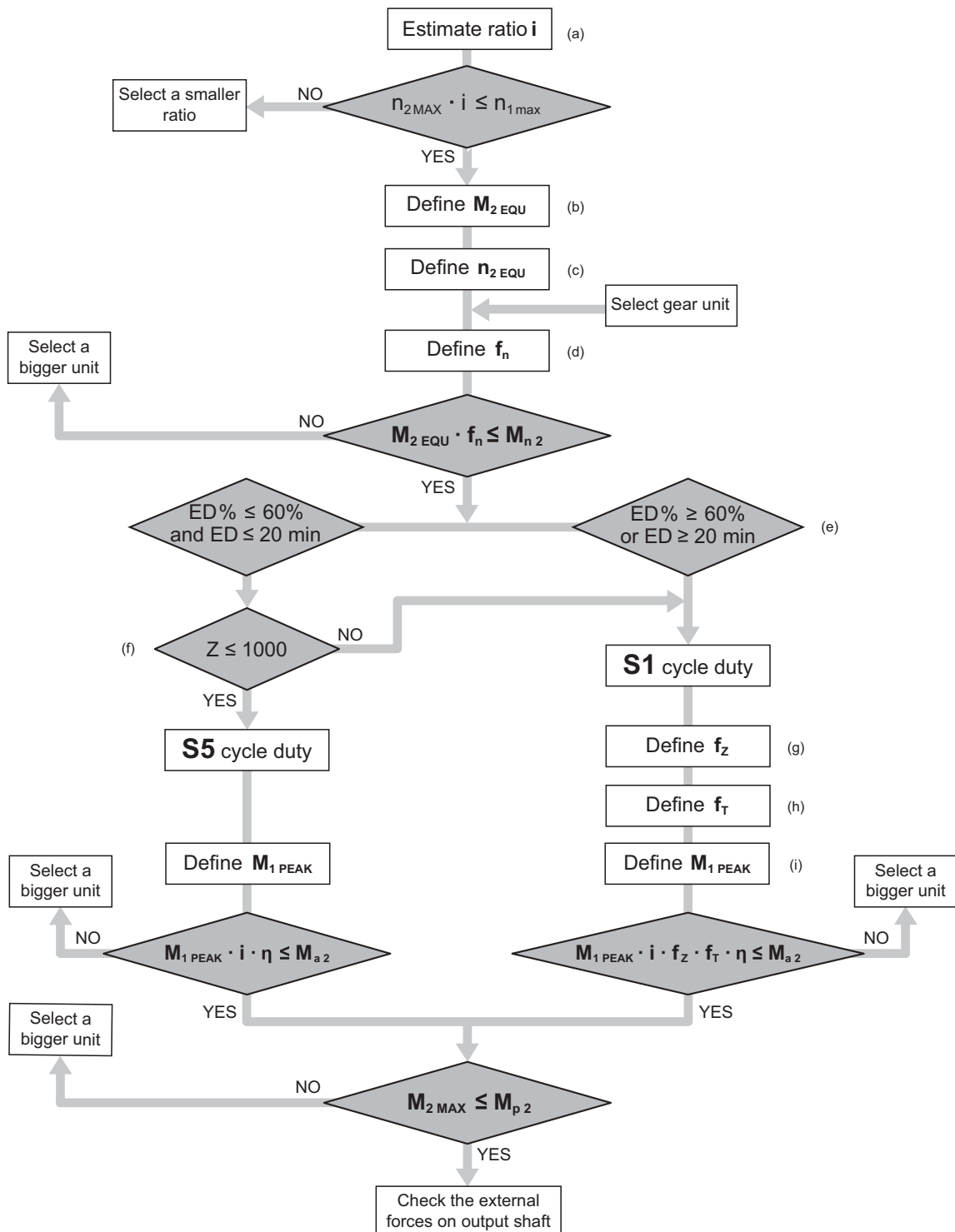
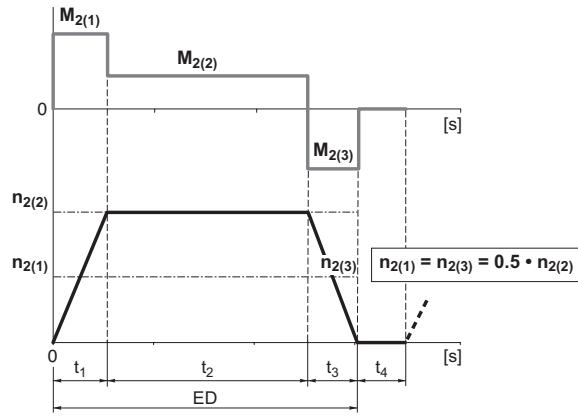


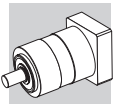
**Load diagram**

—  $M_2$ : Output torque

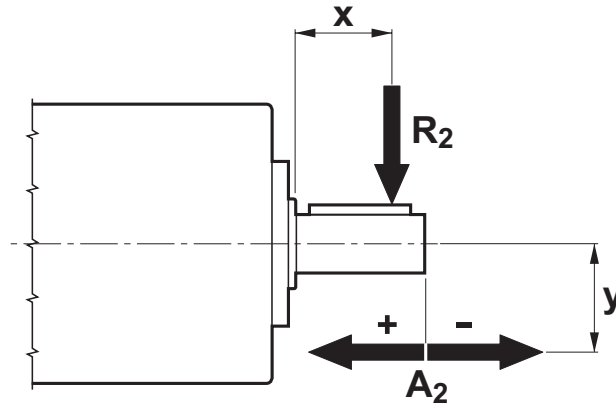
**Speed diagram**

—  $n_2$ : Output speed





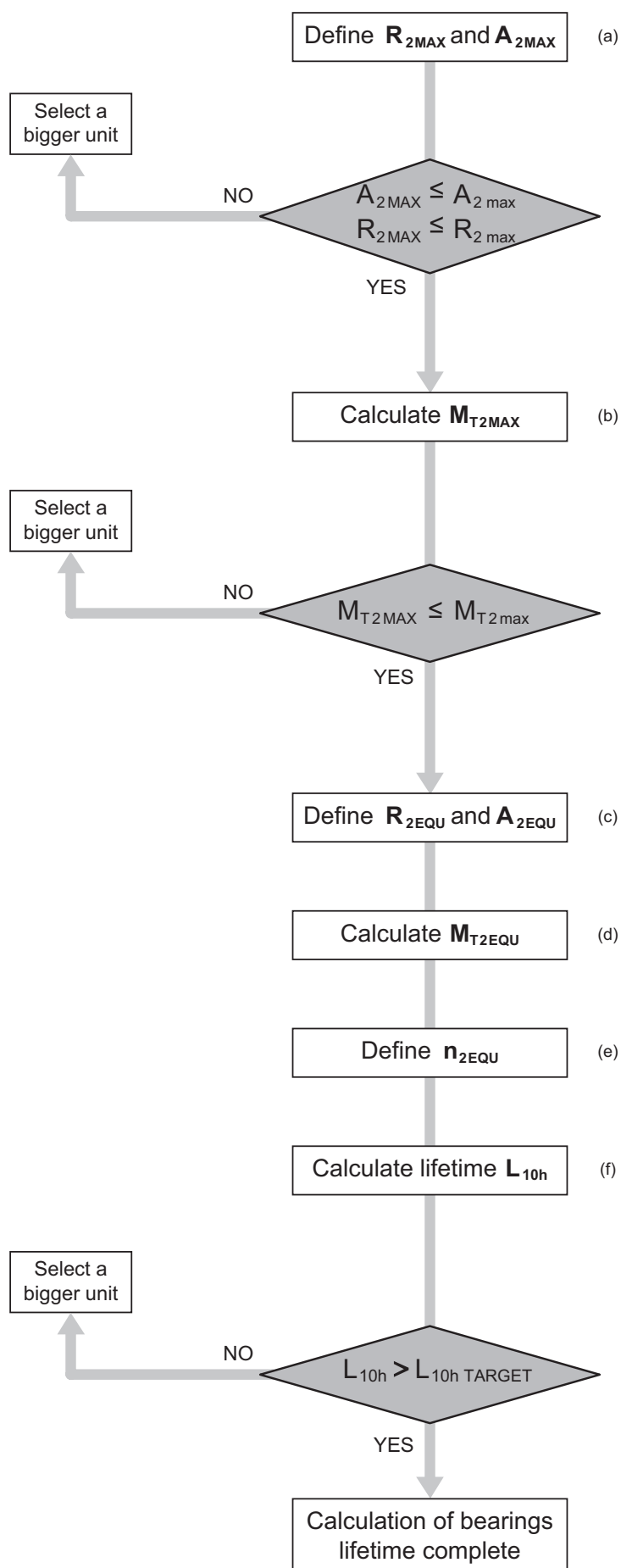
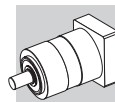
### 1.3 SERVICE LIFE OF BEARINGS

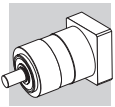


(a)	Maximum radial force applying on output shaft	$R_{2 \text{ MAX}}$	[N]	Please consider the specific conditions (e.g. belt drives under acceleration torque)
	Maximum axial force applying on output shaft	$A_{2 \text{ MAX}}$	[N]	
(b)	Maximum tilting moment applying on output shaft	$M_{T2 \text{ MAX}}$	[Nm]	$M_{T2 \text{ MAX}} = \frac{R_{2 \text{ MAX}} \cdot (x + L_z) \pm A_{2 \text{ MAX}} \cdot y}{1000}$
(c)	Equivalent forces applying on output shaft	$R_{2 \text{ EQU}}$	[N]	$R_{2 \text{ EQU}} = \sqrt[3]{\frac{n_{2(1)} \cdot t_1 \cdot  R_{2(1)} ^3 + \dots + n_{2(n)} \cdot t_n \cdot  R_{2(n)} ^3}{n_{2(1)} \cdot t_1 + \dots + n_{2(n)} \cdot t_n}}$
		$A_{2 \text{ EQU}}$	[N]	$A_{2 \text{ EQU}} = \sqrt[3]{\frac{n_{2(1)} \cdot t_1 \cdot  A_{2(1)} ^3 + \dots + n_{2(n)} \cdot t_n \cdot  A_{2(n)} ^3}{n_{2(1)} \cdot t_1 + \dots + n_{2(n)} \cdot t_n}}$
(d)	Equivalent tilting moment applying on output shaft	$M_{T2 \text{ EQU}}$	[Nm]	$M_{T2 \text{ EQU}} = \frac{R_{2 \text{ EQU}} \cdot (x + L_z) + A_{2 \text{ EQU}} \cdot y}{1000}$
(e)	Equivalent output speed	$n_{2 \text{ EQU}}$	[min <sup>-1</sup> ]	$n_{2 \text{ EQU}} = \frac{n_{2(1)} \cdot t_1 + n_{2(2)} \cdot t_2 + \dots + n_{2(n)} \cdot t_n}{t_1 + t_2 + \dots + t_n}$
(f)	Bearings' basic rating life	$L_{10h}$	[h]	$L_{10h} = \frac{16666}{n_{2 \text{ EQU}}} \cdot \left( \frac{C_B}{M_{T2 \text{ EQU}}} \right)^p$

	TR 053	TR 060	TR 080	TR 105	TR 130	TR 160	TR 190
<b>Lz</b> [mm]	22	23	42	53	74	94	100
<b>MT2 max</b> [Nm]	16	23	155	278	515	739	1683
<b>CB</b> [Nm]	91	143	994	2048	3893	5824	8680
<b>p</b> —	3	3	3.33	3.33	3.33	3.33	3.33







## 2 FEATURES OF MP SERIES

Planetary gear units of the MP series belong to a range of low backlash drives very broad and complete as far as transmissible torque, gear ratios and circumferential backlash.

All units are generously proportioned to run quietly and provide a long service life without maintenance requirements.

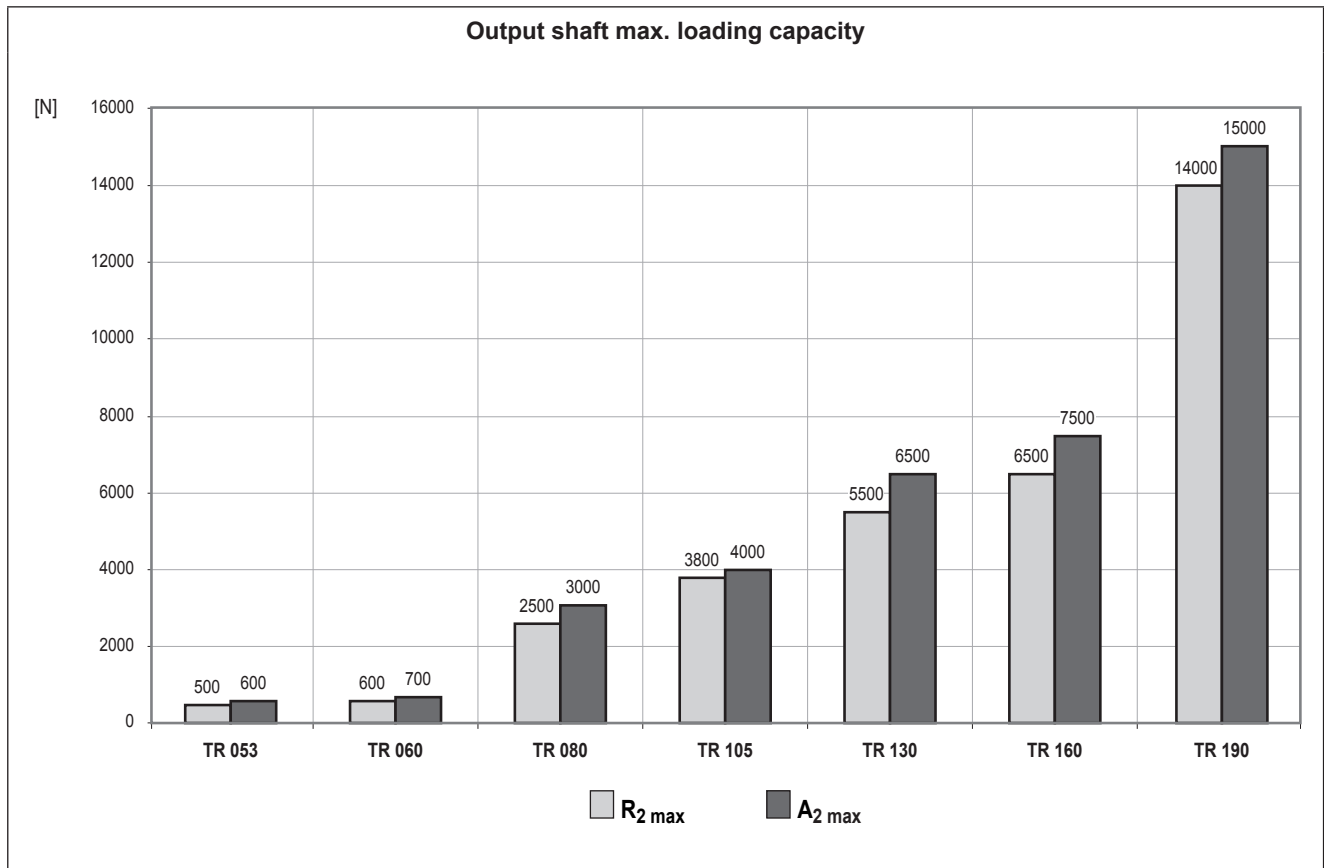
Motor mounting is an operation that can be easily conducted without the need of any particular tooling, other than that usually available in a normally equipped workshop.

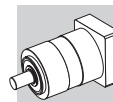
- Available with either standard (STD) or reduced (LOW) backlash.

1 reduction gearhead	$\varphi_S = 5'$	$\varphi_R = 3'$
2 reduction gearheads	$\varphi_S = 5'$	$\varphi_R = 3'$
3 reduction gearheads (G and MB only)	$\varphi_S = 5'$	$\varphi_R = 3'$
3 reduction gearheads	$\varphi_S = 7'$	$\varphi_R = 5'$
4 reduction gearheads (G and MB only)	$\varphi_S = 7'$	$\varphi_R = 5'$

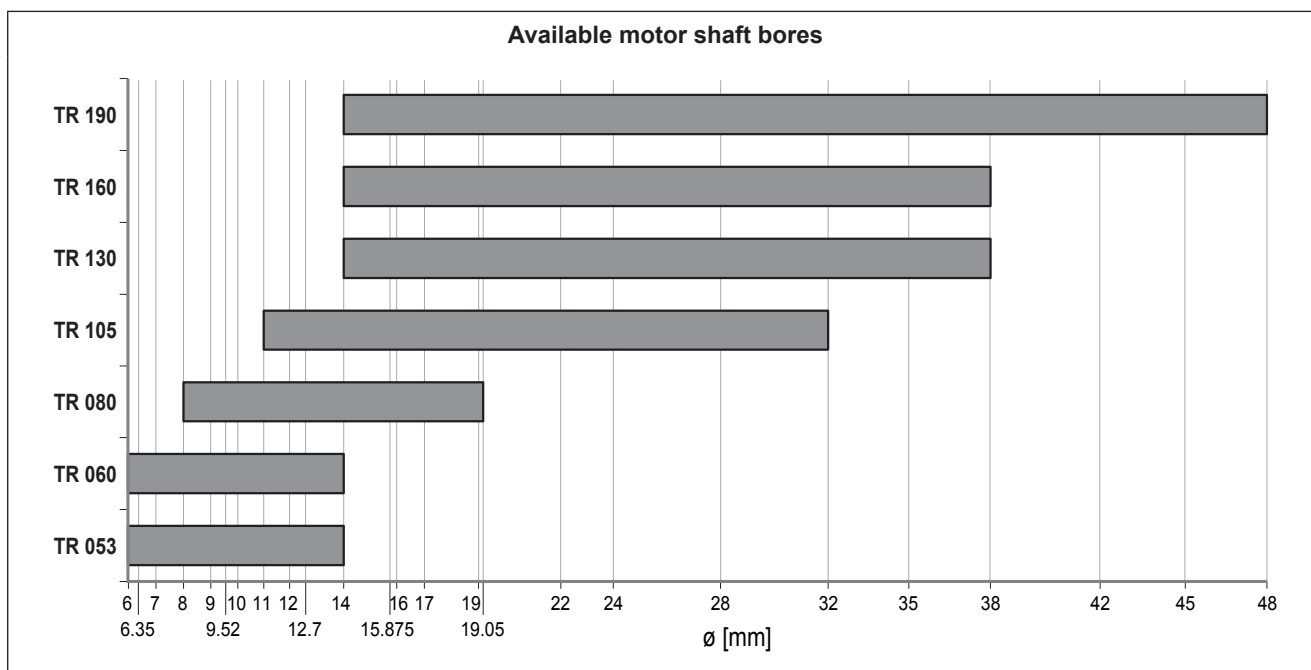
- Ratio  $i = 10$  available for single-reduction units ( $i = 9$  for frame size TR 053 alone).
- Degree of protection IP65.
- Max. noise level  $L_P \leq 70$  dB(A) @  $n_1 = 3000$  min<sup>-1</sup>.
- Bearings suitably rated for an average service life of 20,000 hours under nominal operating conditions. The following chart shows the types of bearings for the output shaft.

	TR 053	TR 060	TR 080	TR 105	TR 130	TR 160	TR 190
SB							





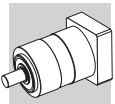
- Wide range of adapter flanges matching the most popular brands of motors.



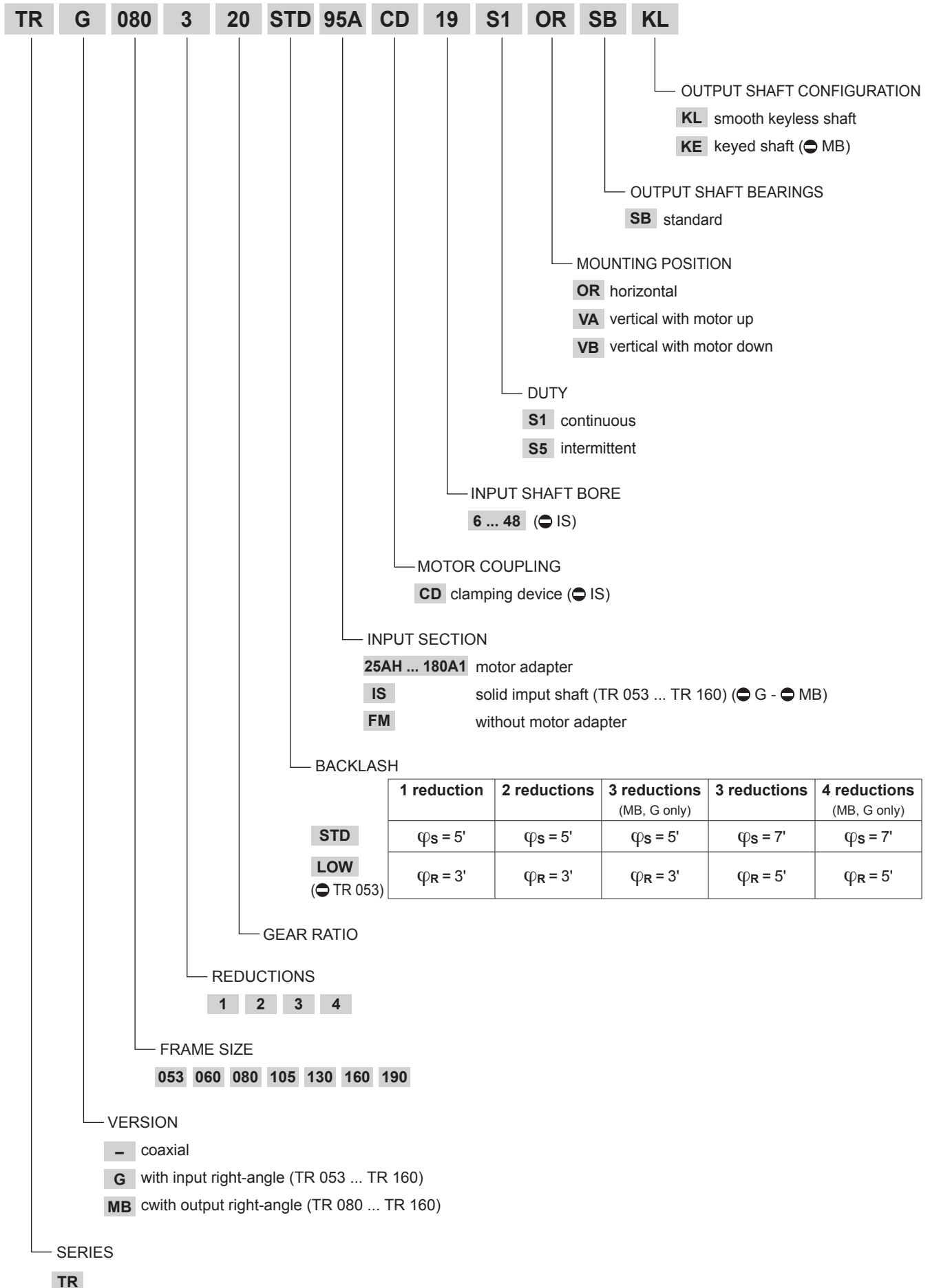
- Units are factory filled with lubricant suitable for installation at ambient temperature within the range 0°C...40°C. Because the quantity of lubricant required depends on the mounting position, this must be specified in the order. In the absence of contamination the lubricant does not require periodical changes. The type of lubricant and the material used for the seals also vary according to duty rating and gearbox size. The chart below illustrates the various combinations:

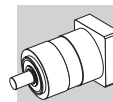
duty	TR 053 - TR 060	TR 080 ... TR 190	oil seals
<b>S1</b> (continuous)	NLGI grease consistency 00	Synthetic oil viscosity ISO VG 220	Viton®
<b>S5</b> (intermittent)	NLGI grease consistency 00	NLGI grease consistency 00	NBR

		Distribution of nominal torque $M_{n2}$ [Nm]																											
	[I]	3	4	5	6	7	9	10	12	15	16	20	25	28	30	35	36	40	45	48	50	60	64	70	75	80	81	84	90
TR 053		12	15	15	15	15	12	-	20	20	20	20	20	20	-	20	15	-	20	20	-	20	20	-	20	20	12	20	-
TR 060		18	25	25	25	25	18	18	30	30	30	30	30	30	18	30	25	30	-	30	30	-	30	30	30	30	-	30	18
TR 080		40	50	50	50	50	40	40	70	70	70	70	70	70	40	70	50	70	-	70	70	-	70	70	70	70	-	70	40
TR 105		100	140	140	140	140	100	100	170	170	170	170	170	170	100	170	140	170	-	170	170	-	170	170	170	170	-	170	100
TR 130		215	380	380	380	380	215	215	450	450	450	450	450	450	215	450	380	450	-	450	450	-	450	450	450	450	-	450	215
TR 160		350	500	500	500	500	350	350	700	700	700	700	700	700	350	700	500	700	-	700	700	-	700	700	700	700	-	700	350
TR 190		500	700	700	700	700	500	500	1000	1000	1000	1000	1000	1000	500	1000	700	1000	-	1000	1000	-	1000	1000	1000	1000	-	1000	500
	[I]	100	112	120	125	140	144	150	160	175	180	200	210	216	225	245	250	252	280	324	350	400	405	500	567	700	729	1000	
TR 053		20	20	-	20	20	20	-	-	20	20	-	-	20	20	20	-	20	-	20	-	-	20	-	20	-	12	-	
TR 060		18	-	30	30	30	-	30	30	30	-	30	30	30	-	-	30	-	30	-	30	30	-	30	-	30	-	18	
TR 080		40	-	70	70	70	-	70	70	70	-	70	70	70	-	-	70	-	70	-	70	70	-	70	-	70	-	40	
TR 105		100	-	170	170	170	-	170	170	170	-	170	170	170	-	-	170	-	170	-	170	170	-	170	-	170	-	100	
TR 130		215	-	450	450	450	-	450	450	450	-	450	450	450	-	-	450	-	450	-	450	450	-	450	-	450	-	215	
TR 160		700	-	350	700	700	-	700	700	700	-	700	700	-	-	700	-	700	-	700	-	700	700	-	700	-	700	-	350
TR 190		1000	-	500	1000	1000	-	1000	1000	1000	-	1000	1000	-	-	1000	-	1000	-	1000	-	1000	1000	-	1000	-	1000	-	500



### 3 ORDERING CODE





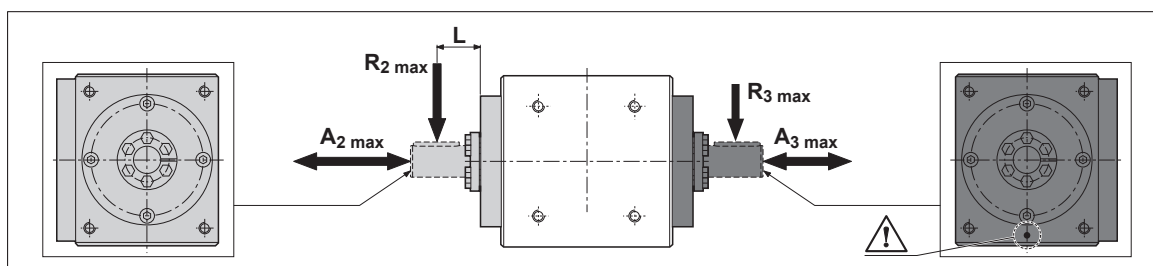
### 3.1 VERSION AND INPUT SECTION

		VERSION		
		coaxial (—)	with input right-angle (G)	with output right-angle (MB)
INPUT SECTION	25AH ... 180A1			
	IS		—	—
	FM			

### 3.2 MOUNTING POSITIONS

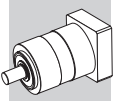
	OR	VA	VB
—			
G			
MB			

### 4 ADMISSIBLE RADIAL AND THRUST FORCES FOR MB VERSION



	R <sub>2</sub> max [N]	A <sub>2</sub> max [N]	L [mm]	R <sub>3</sub> max [N]	A <sub>3</sub> max [N]
TR MB 080	6000	5000	60	5500	5000
TR MB 105	9000	7500	80	7500	7500
TR MB 130	13500	11500	100	11000	11500
TR MB 160*	15000	11500	100	12500	11500

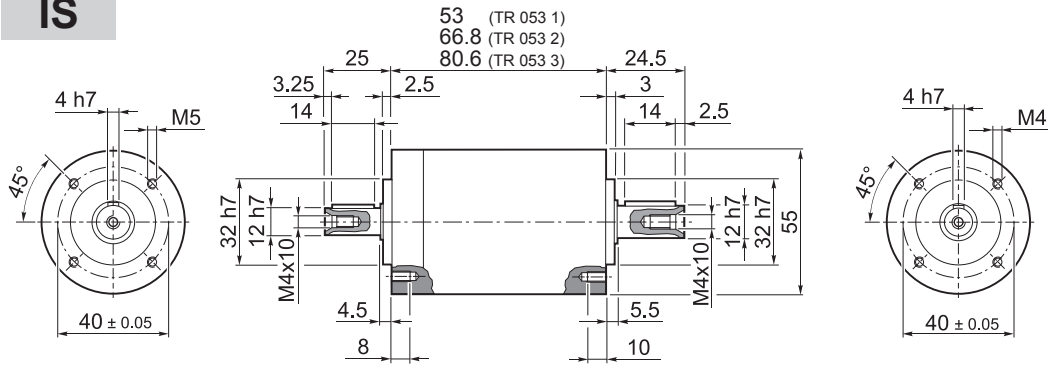
\* Bearings suitably rated for an average service life of 10,000 hours under nominal operating conditions.



# TR 053

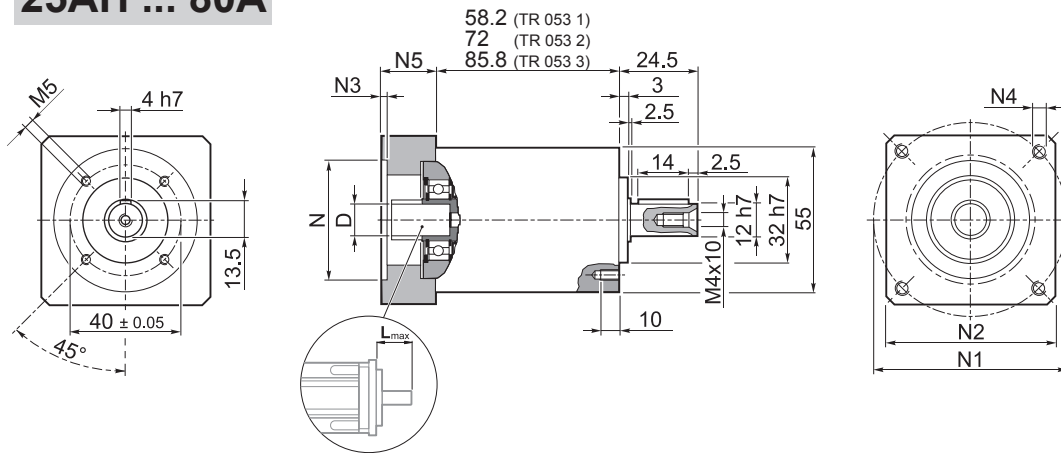
## 5 DIMENSIONS AND TECHNICAL SPECIFICATIONS

### IS



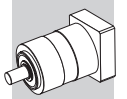
TR 053 1	0.8
TR 053 2	1.0
TR 053 3	1.3

### 25AH ... 80A

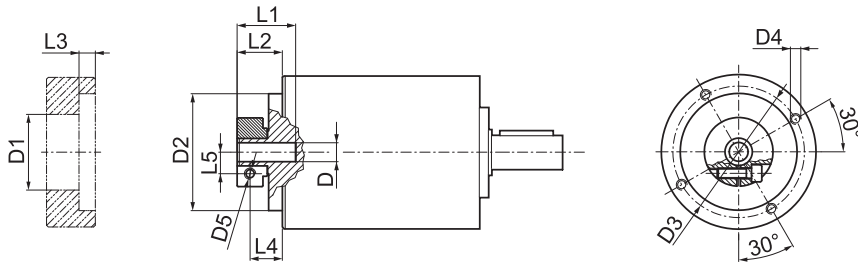


TR 053 1	0.8
TR 053 2	1.0
TR 053 3	1.3

												N	N1		N2	N3	N4	N5	L <sub>max</sub>
	6	6.35	7	8	9	9.52	-	-	-	-	-		min	max					
25AH	6	6.35	7	8	9	9.52	-	-	-	-	-	25	36	48					
26AH	6	6.35	7	8	9	9.52	-	-	-	-	-	26	36	48					
28AH	6	6.35	7	8	9	9.52	-	-	-	-	-	28	36	48					
30AH	6	6.35	7	8	9	9.52	-	-	-	-	-	30	36	48					
32AH	6	6.35	7	8	9	9.52	-	-	-	-	-	32	38	48	55	3.5	4.5	25	25
34AH	6	6.35	7	8	9	9.52	-	-	-	-	-	34	40	48					
36AH	6	6.35	7	8	9	9.52	-	-	-	-	-	36	42	48					
38AH	6	6.35	7	8	9	9.52	-	-	-	-	-	38	44	48					
40AH	6	6.35	7	8	9	9.52	-	-	-	-	-	40	46	48					
38B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	38.1	66.6		60	3	M4x10	18	25
40B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	40	63		60	3	M4x10	18	25
50A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	50	60		60	3	M4x10	18	25
50B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65		60	3	M5x12	23	30
50BH	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65		60	4	5.5	23	30
50C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	70		60	3	M4x10	23	30
50MH	6	6.35	7	8	9	9.52	10	11	12	12.7	-	50	65		55	2	5.5	16	23
60A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	60	75		63	3	M5x12	18	25
60AH	6	6.35	7	8	9	9.52	10	11	12	12.7	-	60	75		65	3	5.5	18	25
60A1	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	75		63	3	M5x12	23	30
60AH1	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	75		65	3	5.5	23	30
60B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	85		75	3	M5x12	23	30
60C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	90		75	3	M5x12	23	30
70A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	85		75	3	M6x15	23	30
70B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	90		75	3	M5x12	23	30
73A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	73	98.4		85	3	M5x12	25	32
80A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	80	100		85	3	M6x15	23	30

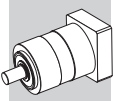


## FM



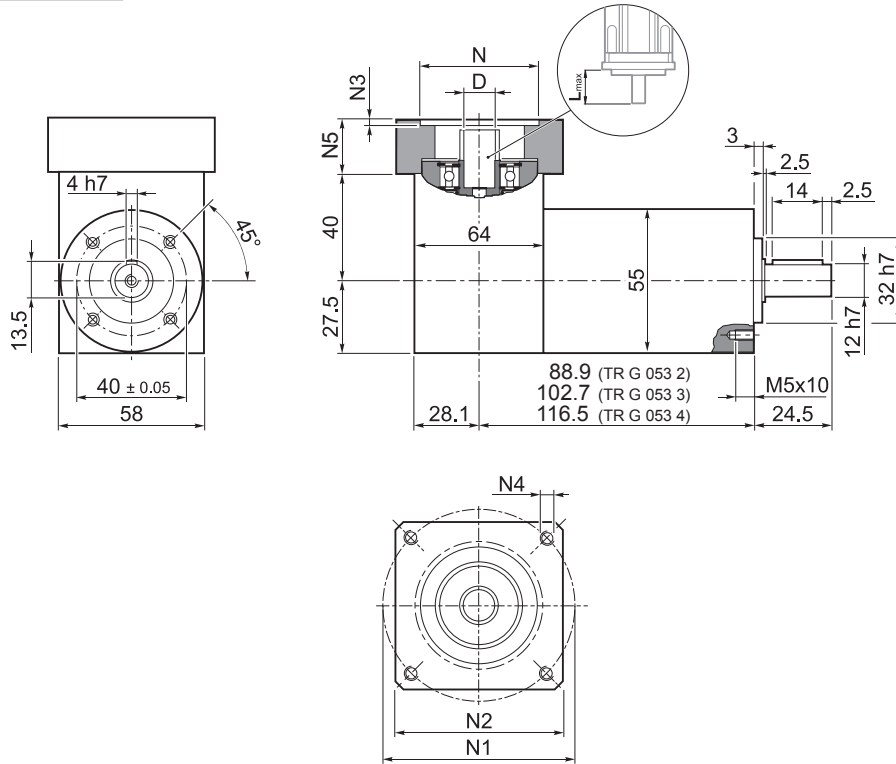
D		D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
6	6.35 7	32.5	50	42.5	M4x8	M4	20.2	13.2	3	8.7	8
8	9 9.52 10	32.5	50	42.5	M4x8	M4	20.2	13.2	3	7.8	9
11	12 12.7	35.5	50	42.5	M4x8	M4	20.5	13.5	3	8.5	11
14		35.5	50	42.5	M4x8	M4	24	17	3	10.2	11.5

i	$M_{n2}$ [Nm]	$M_{a2}$ [Nm]	$M_{p2}$ [Nm]	$n_{1max}$ [min <sup>-1</sup> ]	$\varphi_S$ [arcmin]	$C_t$ [Nm/arcmin]	$R_{1max}$ [N]	$R_{2max}$ [N]	$A_{2max}$ [N]	$\eta$ %	$J_G$ [kgm <sup>2</sup> ]	
											D	6 ... 9.52
TR 053 1_3	12	22	40	4000	5'	1.0	200	500	600	97	0.06	0.08
TR 053 1_4	15	28	45	5000	5'	1.0	200	500	600	97	0.05	0.06
TR 053 1_5	15	28	45	5000	5'	1.0	200	500	600	97	0.04	0.06
TR 053 1_6	15	28	45	5000	5'	1.0	200	500	600	97	0.03	0.05
TR 053 1_7	15	28	45	6000	5'	1.0	200	500	600	97	0.03	0.05
TR 053 1_9	12	22	40	6000	5'	1.0	200	500	600	97	0.03	0.05
TR 053 2_12	20	30	60	4000	5'	0.9	200	500	600	94	0.06	0.08
TR 053 2_15	20	30	60	4000	5'	0.9	200	500	600	94	0.06	0.08
TR 053 2_16	20	30	60	5000	5'	0.9	200	500	600	94	0.05	0.06
TR 053 2_20	20	30	60	5000	5'	0.9	200	500	600	94	0.04	0.06
TR 053 2_25	20	30	60	5000	5'	0.9	200	500	600	94	0.04	0.06
TR 053 2_28	20	30	60	6000	5'	0.9	200	500	600	94	0.03	0.05
TR 053 2_35	20	30	60	6000	5'	0.9	200	500	600	94	0.03	0.05
TR 053 2_36	15	28	45	6000	5'	0.9	200	500	600	94	0.03	0.05
TR 053 2_45	20	30	60	6000	5'	0.9	200	500	600	94	0.03	0.05
TR 053 2_81	12	22	40	6000	5'	0.9	200	500	600	94	0.03	0.05
TR 053 3_48	20	30	60	5000	7'	0.7	200	500	600	91	0.05	0.07
TR 053 3_60	20	30	60	5000	7'	0.7	200	500	600	91	0.05	0.07
TR 053 3_64	20	30	60	5000	7'	0.7	200	500	600	91	0.05	0.06
TR 053 3_75	20	30	60	5000	7'	0.7	200	500	600	91	0.04	0.06
TR 053 3_80	20	30	60	5000	7'	0.7	200	500	600	91	0.05	0.06
TR 053 3_84	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_100	20	30	60	5000	7'	0.7	200	500	600	91	0.04	0.06
TR 053 3_112	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_125	20	30	60	5000	7'	0.7	200	500	600	91	0.04	0.06
TR 053 3_140	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_144	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_175	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_180	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_216	20	30	60	5000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_225	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_245	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_252	20	30	60	6000	7'	0.7	200	500	600	91	0.05	0.06
TR 053 3_324	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_405	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_567	20	30	60	6000	7'	0.7	200	500	600	91	0.03	0.05
TR 053 3_729	12	22	40	6000	7'	0.7	200	500	600	91	0.03	0.05



# TR G 053

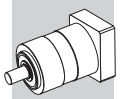
## 25AH ... 80A



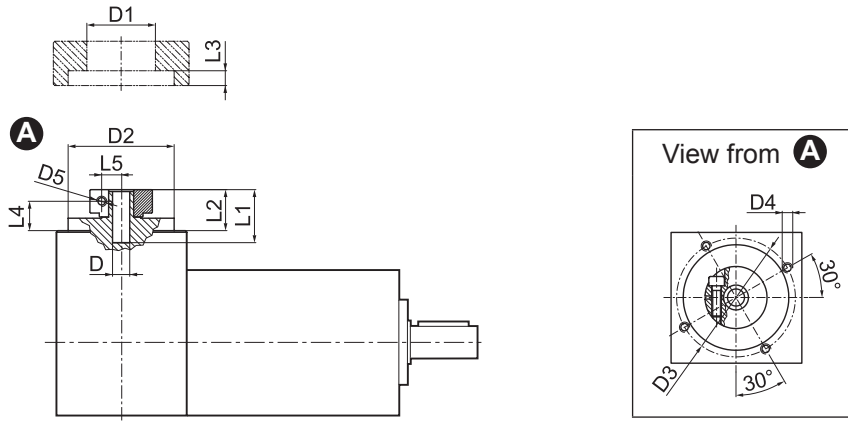
TR G 053 2	1.3
TR G 053 3	1.5
TR G 053 4	1.8

												N	N1		N2	N3	N4	N5	L <sub>max</sub>
	min	max																	
25AH	6	6.35	7	8	9	9.52	-	-	-	-	-	25	36	48	55	3.5	4.5	25	25
26AH	6	6.35	7	8	9	9.52	-	-	-	-	-	26	36	48					
28AH	6	6.35	7	8	9	9.52	-	-	-	-	-	28	36	48					
30AH	6	6.35	7	8	9	9.52	-	-	-	-	-	30	36	48					
32AH	6	6.35	7	8	9	9.52	-	-	-	-	-	32	38	48					
34AH	6	6.35	7	8	9	9.52	-	-	-	-	-	34	40	48					
36AH	6	6.35	7	8	9	9.52	-	-	-	-	-	36	42	48					
38AH	6	6.35	7	8	9	9.52	-	-	-	-	-	38	44	48					
40AH	6	6.35	7	8	9	9.52	-	-	-	-	-	40	46	48					
38B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	38.1	66.6	60	3	M4x10	18	25	
40B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	40	63	60	3	M4x10	18	25	
50A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	50	60	60	3	M4x10	18	25	
50B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65	60	3	M5x12	23	30	
50BH	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65	60	4	5.5	23	30	
50C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	70	60	3	M4x10	23	30	
50MH	6	6.35	7	8	9	9.52	10	11	12	12.7	-	50	65	55	2	5.5	16	23	
60A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	60	75	63	3	M5x12	18	25	
60A1	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	75	63	3	M5x12	23	30	
60B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	85	75	3	M5x12	23	30	
60C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	90	75	3	M5x12	23	30	
70A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	85	75	3	M6x15	23	30	
70B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	90	75	3	M5x12	23	30	
73A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	73	98.4	85	3	M5x12	25	32	
80A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	80	100	85	3	M6x15	23	30	

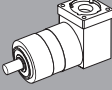


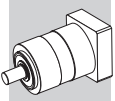


## FM



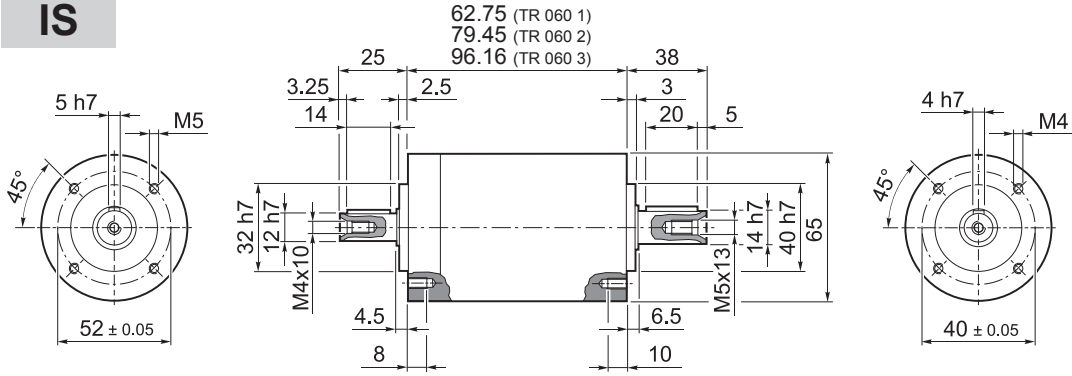
D		D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
6	6.35 7	32.5	50	42.5	M4x8	M4	20.2	13.2	3	8.7	8
8	9 9.52 10	32.5	50	42.5	M4x8	M4	20.2	13.2	3	7.8	9
11	12 12.7	35.5	50	42.5	M4x8	M4	20.5	13.5	3	8.5	11
14		35.5	50	42.5	M4x8	M4	24	17	3	10.2	11.5

 i	$M_{n2}$	$M_{a2}$	$M_{p2}$	$n_{1 \max}$	$\varphi_s$	$C_t$	$R_{2 \max}$	$A_{2 \max}$	$\eta$	$J_G$ [kgcm <sup>2</sup> ]	
	[Nm]	[Nm]	[Nm]	[min <sup>-1</sup> ]	[arcmin]	$\left[ \frac{Nm}{arcmin} \right]$	[N]	[N]	%	6 ... 9.52	10 ... 14
TR G 053 2_3	12	22	40	4000	5'	1.0	500	600	94	0.18	0.20
TR G 053 2_4	15	28	45	5000	5'	1.0	500	600	94	0.18	0.19
TR G 053 2_5	15	28	45	5000	5'	1.0	500	600	94	0.17	0.19
TR G 053 2_6	15	28	45	5000	5'	1.0	500	600	94	0.17	0.18
TR G 053 2_7	15	28	45	6000	5'	1.0	500	600	94	0.17	0.19
TR G 053 2_9	12	22	40	6000	5'	1.0	500	600	94	0.17	0.18
TR G 053 3_12	20	30	60	4000	5'	0.9	500	600	91	0.18	0.20
TR G 053 3_15	20	30	60	4000	5'	0.9	500	600	91	0.18	0.20
TR G 053 3_16	20	30	60	5000	5'	0.9	500	600	91	0.17	0.19
TR G 053 3_20	20	30	60	5000	5'	0.9	500	600	91	0.17	0.19
TR G 053 3_25	20	30	60	5000	5'	0.9	500	600	91	0.17	0.19
TR G 053 3_28	20	30	60	6000	5'	0.9	500	600	91	0.17	0.19
TR G 053 3_35	20	30	60	6000	5'	0.9	500	600	91	0.17	0.19
TR G 053 3_36	15	28	45	6000	5'	0.9	500	600	91	0.17	0.18
TR G 053 3_45	20	30	60	6000	5'	0.9	500	600	91	0.17	0.19
TR G 053 3_81	12	22	40	6000	5'	0.9	500	600	91	0.17	0.18
TR G 053 4_48	20	30	60	5000	7'	0.7	500	600	89	0.18	0.19
TR G 053 4_60	20	30	60	5000	7'	0.7	500	600	89	0.18	0.19
TR G 053 4_64	20	30	60	5000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_75	20	30	60	5000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_80	20	30	60	5000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_84	20	30	60	6000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_100	20	30	60	5000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_112	20	30	60	6000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_125	20	30	60	5000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_140	20	30	60	6000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_144	20	30	60	6000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_175	20	30	60	6000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_180	20	30	60	6000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_216	20	30	60	5000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_225	20	30	60	6000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_245	20	30	60	6000	7'	0.7	500	600	89	0.17	0.19
TR G 053 4_252	20	30	60	6000	7'	0.7	500	600	89	0.18	0.20
TR G 053 4_324	20	30	60	6000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_405	20	30	60	6000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_567	20	30	60	6000	7'	0.7	500	600	89	0.17	0.18
TR G 053 4_729	12	22	40	6000	7'	0.7	500	600	89	0.17	0.18



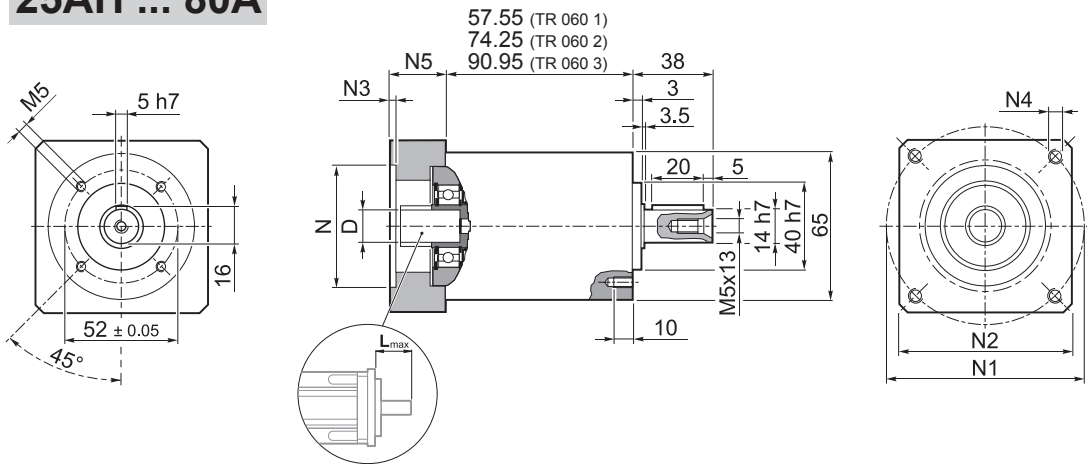
# TR 060

## IS



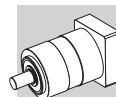
TR 060 1	1.2
TR 060 2	1.7
TR 060 3	2.0

## 25AH ... 80A

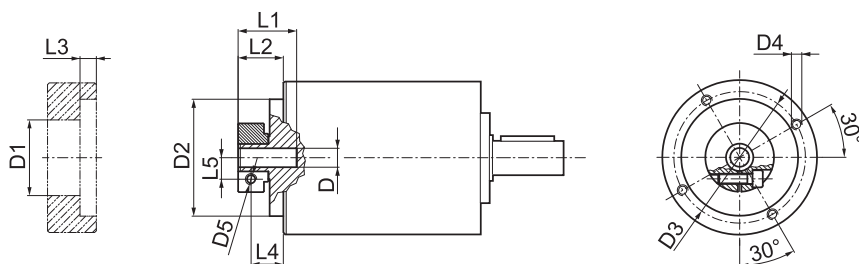


TR 060 1	1.2
TR 060 2	1.7
TR 060 3	2.0

	D											N	N1		N2	N3	N4	N5	L <sub>max</sub>
													min	max					
25AH	6	6.35	7	8	9	9.52	-	-	-	-	-	25	39	56					
26AH	6	6.35	7	8	9	9.52	-	-	-	-	-	26	39	56					
28AH	6	6.35	7	8	9	9.52	-	-	-	-	-	28	39	56					
30AH	6	6.35	7	8	9	9.52	-	-	-	-	-	30	39	56					
32AH	6	6.35	7	8	9	9.52	-	-	-	-	-	32	39	56	65	3.5	4.5	25	25
34AH	6	6.35	7	8	9	9.52	-	-	-	-	-	34	40	56					
36AH	6	6.35	7	8	9	9.52	-	-	-	-	-	36	42	56					
39AH	6	6.35	7	8	9	9.52	-	-	-	-	-	39	45	56					
40AH	6	6.35	7	8	9	9.52	-	-	-	-	-	40	46	56					
38B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	38.1	66.6		60	3	M4x10	18	25
40B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	40	63		60	3	M4x10	18	25
50A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	50	60		60	3	M4x10	18	25
50B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65		60	3	M5x12	23	30
50BH	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65		65	3	5.5	25	32
50C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	70		60	3	M4x10	23	30
55MH	6	6.35	7	8	9	9.52	10	11	12	12.7	-	55	80		65	2	5.5	16	23
60A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	60	75		63	3	M5x12	18	25
60AH	6	6.35	7	8	9	9.52	10	11	12	12.7	-	60	75		65	3	5.5	18	25
60A1	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	75		63	3	M5x12	23	30
60AH1	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	75		65	3	5.5	23	30
60B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	85		75	3	M5x12	23	30
60C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	90		75	3	M5x12	23	30
70A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	85		75	3	M6x15	23	30
70B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	90		75	3	M5x12	23	30
73A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	73	98.4		85	3	M5x12	25	32
80A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	80	100		85	3	M6x15	23	30

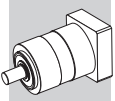


## FM



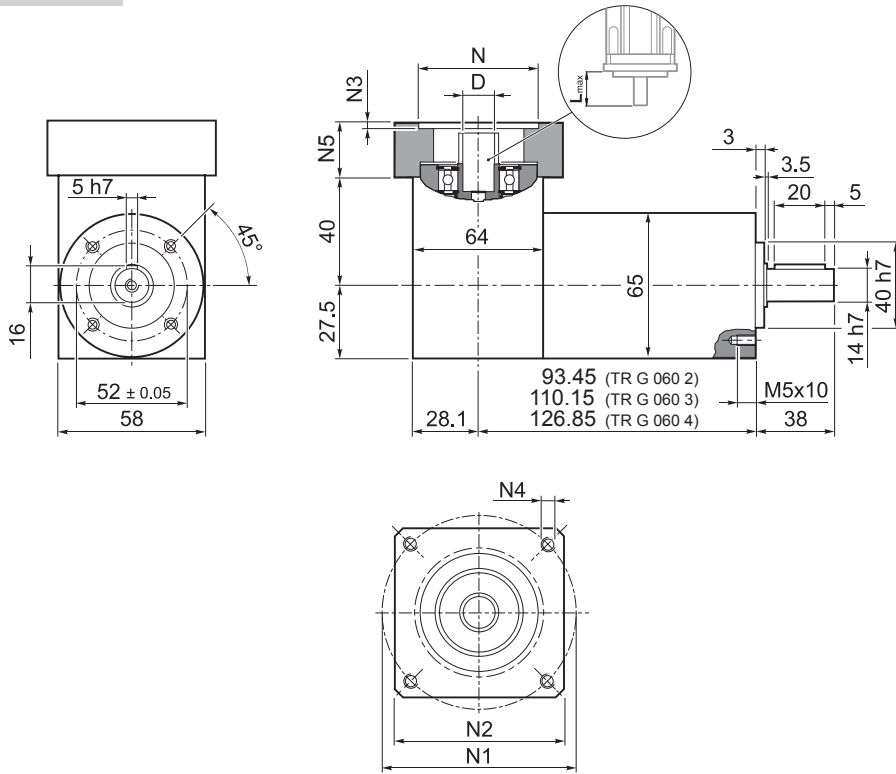
D		D1	D2	D3	D4	D5	L1	L2	L3	L4	L5		
6	6.35	7	32.5	50	42.5	M4x8	M4	20.2	13.2	3	8.7	8	
8	9	9.52	10	32.5	50	42.5	M4x8	M4	20.2	13.2	3	7.8	9
11	12	12.7		35.5	50	42.5	M4x8	M4	20.5	13.5	3	8.5	11
14				35.5	50	42.5	M4x8	M4	24	17	3	10.2	11.5



i	M <sub>n 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	Φ <sub>S</sub> [arcmin]	Φ <sub>R</sub> [arcmin]	C <sub>t</sub> [Nm/arcmin]	R <sub>1 max</sub> [N]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>e</sub> [kgcm <sup>2</sup> ]	
												6 ... 9.52	10 ... 14
TR 060 1_3	18	35	70	4000	5'	3'	3.0	200	600	700	97	0.10	0.11
TR 060 1_4	25	40	90	5000	5'	3'	3.0	200	600	700	97	0.06	0.08
TR 060 1_5	25	40	90	5000	5'	3'	3.0	200	600	700	97	0.05	0.07
TR 060 1_6	25	40	90	5000	5'	3'	3.0	200	600	700	97	0.04	0.06
TR 060 1_7	25	40	90	6000	5'	3'	3.0	200	600	700	97	0.04	0.06
TR 060 1_10	18	35	70	6000	5'	3'	3.0	200	600	700	97	0.03	0.05
TR 060 2_9	18	35	70	4000	5'	3'	2.5	200	600	700	94	0.10	0.12
TR 060 2_12	30	45	100	4000	5'	3'	2.5	200	600	700	94	0.10	0.11
TR 060 2_15	30	45	100	4000	5'	3'	2.5	200	600	700	94	0.09	0.11
TR 060 2_16	30	45	100	5000	5'	3'	2.5	200	600	700	94	0.06	0.08
TR 060 2_20	30	45	100	5000	5'	3'	2.5	200	600	700	94	0.05	0.07
TR 060 2_25	30	45	100	5000	5'	3'	2.5	200	600	700	94	0.05	0.06
TR 060 2_28	30	45	100	6000	5'	3'	2.5	200	600	700	94	0.04	0.06
TR 060 2_30	18	35	70	6000	5'	3'	2.5	200	600	700	94	0.03	0.05
TR 060 2_35	30	45	100	6000	5'	3'	2.5	200	600	700	94	0.04	0.06
TR 060 2_36	25	40	90	5000	5'	3'	2.5	200	600	700	94	0.04	0.06
TR 060 2_40	30	45	100	6000	5'	3'	2.5	200	600	700	94	0.03	0.05
TR 060 2_50	30	45	100	6000	5'	3'	2.5	200	600	700	94	0.03	0.05
TR 060 2_70	30	45	100	6000	5'	3'	2.5	200	600	700	94	0.03	0.05
TR 060 2_100	18	35	70	6000	5'	3'	2.5	200	600	700	94	0.03	0.05
TR 060 3_48	30	45	100	5000	7'	5'	2.0	200	600	700	91	0.06	0.08
TR 060 3_64	30	45	100	5000	7'	5'	2.0	200	600	700	91	0.06	0.08
TR 060 3_75	30	45	100	5000	7'	5'	2.0	200	600	700	91	0.05	0.07
TR 060 3_80	30	45	100	5000	7'	5'	2.0	200	600	700	91	0.06	0.08
TR 060 3_84	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.04	0.06
TR 060 3_90	18	35	70	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_120	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_125	30	45	100	5000	7'	5'	2.0	200	600	700	91	0.05	0.07
TR 060 3_140	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.04	0.06
TR 060 3_150	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_160	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_175	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.04	0.06
TR 060 3_200	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_210	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_216	30	45	100	5000	7'	5'	2.0	200	600	700	91	0.04	0.06
TR 060 3_250	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_280	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_350	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_400	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_500	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_700	30	45	100	6000	7'	5'	2.0	200	600	700	91	0.03	0.05
TR 060 3_1000	18	35	70	6000	7'	5'	2.0	200	600	700	91	0.03	0.05

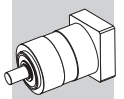


# TR G 060

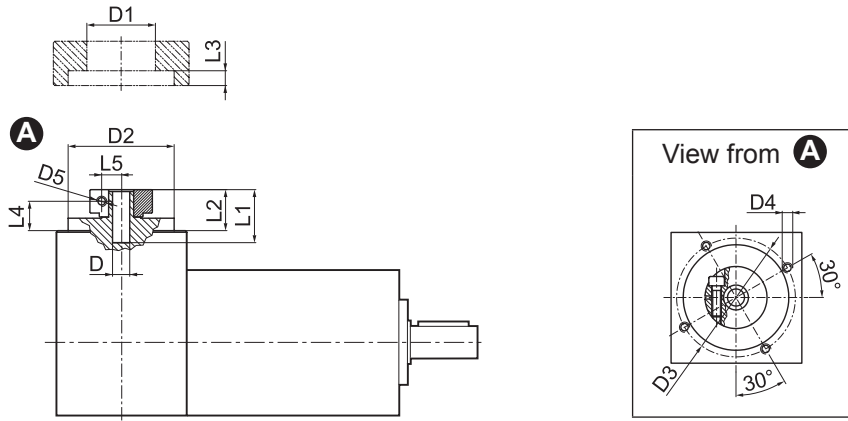
## 25AH ... 80A



												N	N1		N2	N3	N4	N5	Lmax
	min	max																	
25AH	6	6.35	7	8	9	9.52	-	-	-	-	-	25	39	56					
26AH	6	6.35	7	8	9	9.52	-	-	-	-	-	26	39	56					
28AH	6	6.35	7	8	9	9.52	-	-	-	-	-	28	39	56					
30AH	6	6.35	7	8	9	9.52	-	-	-	-	-	30	39	56					
32AH	6	6.35	7	8	9	9.52	-	-	-	-	-	32	39	56	65	3.5	4.5	25	25
34AH	6	6.35	7	8	9	9.52	-	-	-	-	-	34	40	56					
36AH	6	6.35	7	8	9	9.52	-	-	-	-	-	36	42	56					
39AH	6	6.35	7	8	9	9.52	-	-	-	-	-	39	45	56					
40AH	6	6.35	7	8	9	9.52	-	-	-	-	-	40	46	56					
38B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	38.1	66.6	60	3	M4x10	18	25	
40B	6	6.35	7	8	9	9.52	10	11	12	12.7	-	40	63	60	3	M4x10	18	25	
50A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	50	60	60	3	M4x10	18	25	
50B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65	60	3	M5x12	23	30	
50BH	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	65	65	3	5.5	25	32	
50C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	50	70	60	3	M4x10	23	30	
55MH	6	6.35	7	8	9	9.52	10	11	12	12.7	-	55	80	65	2	5.5	16	23	
60A	6	6.35	7	8	9	9.52	10	11	12	12.7	-	60	75	63	3	M5x12	18	25	
60A1	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	75	63	3	M5x12	23	30	
60B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	85	75	3	M5x12	23	30	
60C	6	6.35	7	8	9	9.52	10	11	12	12.7	14	60	90	75	3	M5x12	23	30	
70A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	85	75	3	M6x15	23	30	
70B	6	6.35	7	8	9	9.52	10	11	12	12.7	14	70	90	75	3	M5x12	23	30	
73A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	73	98.4	85	3	M5x12	25	32	
80A	6	6.35	7	8	9	9.52	10	11	12	12.7	14	80	100	85	3	M6x15	23	30	

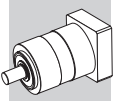


## FM



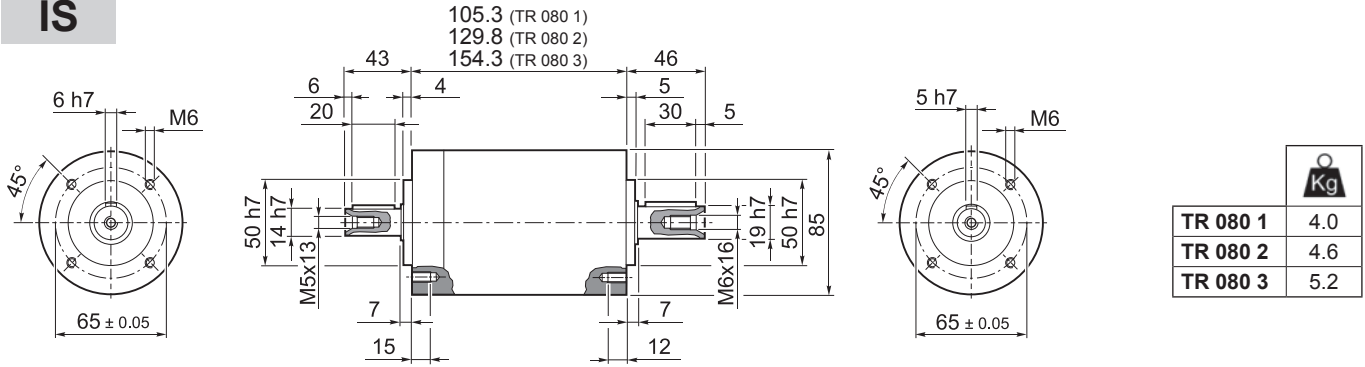
D		D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
6	6.35 7	32.5	50	42.5	M4x8	M4	20.2	13.2	3	8.7	8
8	9 9.52 10	32.5	50	42.5	M4x8	M4	20.2	13.2	3	7.8	9
11	12 12.7	35.5	50	42.5	M4x8	M4	20.5	13.5	3	8.5	11
14		35.5	50	42.5	M4x8	M4	24	17	3	10.2	11.5

i	M <sub>n 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub> [arcmin]	C <sub>t</sub> [ Nm / arcmin ]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]	
											D	6 ... 9.52
TR G 060 2_3	18	35	70	4000	5'	3'	3.0	600	700	94	0.20	0.20
TR G 060 2_4	25	40	90	5000	5'	3'	3.0	600	700	94	0.18	0.20
TR G 060 2_5	25	40	90	5000	5'	3'	3.0	600	700	94	0.17	0.19
TR G 060 2_6	25	40	90	5000	5'	3'	3.0	600	700	94	0.17	0.19
TR G 060 2_7	25	40	90	6000	5'	3'	3.0	600	700	94	0.17	0.19
TR G 060 2_10	18	35	70	6000	5'	3'	3.0	600	700	94	0.17	0.18
TR G 060 3_9	18	35	70	4000	5'	3'	2.5	600	700	91	0.20	0.21
TR G 060 3_12	30	45	100	4000	5'	3'	2.5	600	700	91	0.20	0.21
TR G 060 3_15	30	45	100	4000	5'	3'	2.5	600	700	91	0.19	0.21
TR G 060 3_16	30	45	100	5000	5'	3'	2.5	600	700	91	0.18	0.20
TR G 060 3_20	30	45	100	5000	5'	3'	2.5	600	700	91	0.17	0.19
TR G 060 3_25	30	45	100	5000	5'	3'	2.5	600	700	91	0.17	0.18
TR G 060 3_28	30	45	100	6000	5'	3'	2.5	600	700	91	0.17	0.19
TR G 060 3_30	18	35	70	6000	5'	3'	2.5	600	700	91	0.17	0.18
TR G 060 3_35	30	45	100	6000	5'	3'	2.5	600	700	91	0.18	0.19
TR G 060 3_36	25	40	90	5000	5'	3'	2.5	600	700	91	0.18	0.19
TR G 060 3_40	30	45	100	6000	5'	3'	2.5	600	700	91	0.17	0.18
TR G 060 3_50	30	45	100	6000	5'	3'	2.5	600	700	91	0.17	0.18
TR G 060 3_70	30	45	100	6000	5'	3'	2.5	600	700	91	0.17	0.18
TR G 060 3_100	18	35	70	6000	5'	3'	2.5	600	700	91	0.17	0.18
TR G 060 4_48	30	45	100	5000	7'	5'	2.0	600	700	89	0.18	0.20
TR G 060 4_64	30	45	100	5000	7'	5'	2.0	600	700	89	0.18	0.20
TR G 060 4_75	30	45	100	5000	7'	5'	2.0	600	700	89	0.17	0.19
TR G 060 4_80	30	45	100	5000	7'	5'	2.0	600	700	89	0.18	0.20
TR G 060 4_84	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.19
TR G 060 4_90	18	35	70	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_120	30	45	100	6000	7'	5'	2.0	600	700	89	0.15	0.17
TR G 060 4_125	30	45	100	5000	7'	5'	2.0	600	700	89	0.17	0.19
TR G 060 4_140	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.19
TR G 060 4_150	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_160	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_175	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.19
TR G 060 4_200	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_210	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_216	30	45	100	5000	7'	5'	2.0	600	700	89	0.17	0.19
TR G 060 4_250	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_280	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_350	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_400	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_500	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_700	30	45	100	6000	7'	5'	2.0	600	700	89	0.17	0.18
TR G 060 4_1000	18	35	70	6000	7'	5'	2.0	600	700	89	0.17	0.18



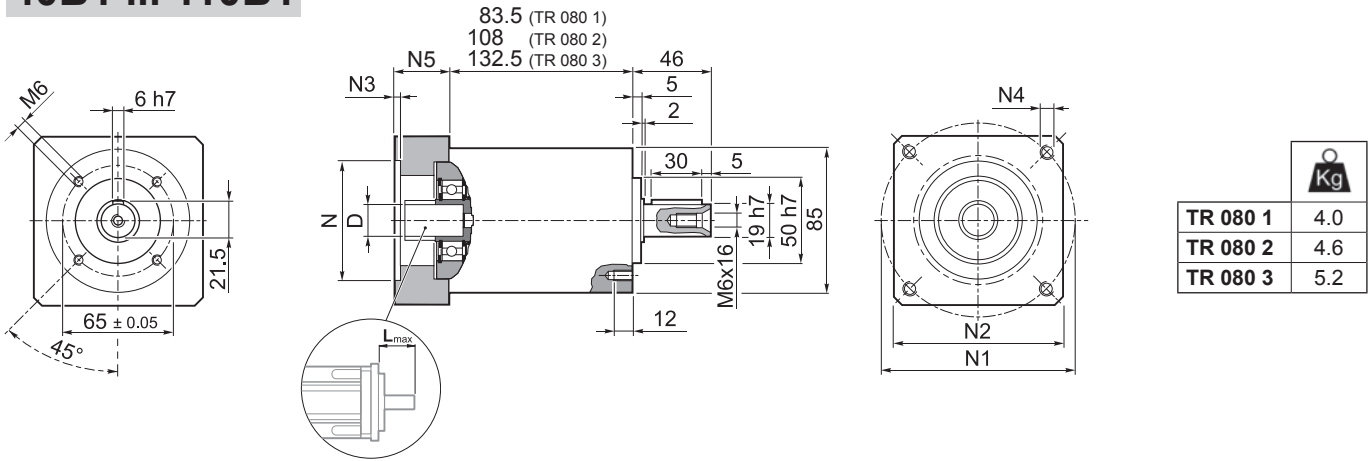
# TR 080

## IS



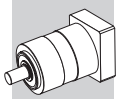
TR 080 1	4.0
TR 080 2	4.6
TR 080 3	5.2

## 40B1 ... 110B1

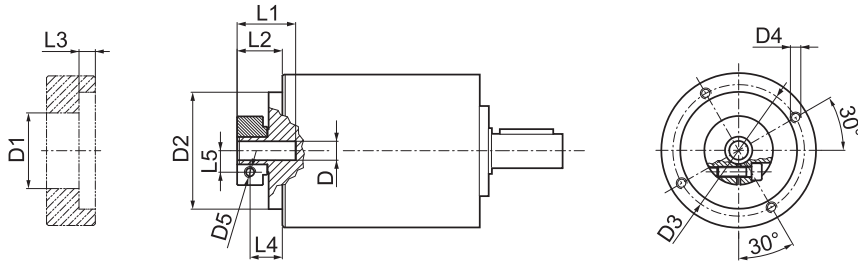


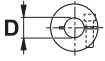
TR 080 1	4.0
TR 080 2	4.6
TR 080 3	5.2

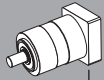

												N	N1	N2	N3	N4	N5	L <sub>max</sub>	
40B1	8	9	9.52	11	12	12.7	14	-	-	-	-	-	40	63	80	4	M4x12	34	40
45A	8	9	9.52	11	12	12.7	-	-	-	-	-	-	45	63	80	4	M4x12	34	40
50B1	8	9	9.52	11	12	12.7	14	-	-	-	-	-	50	65	80	4	M5x16	34	40
50BH1	8	9	9.52	11	12	12.7	14	-	-	-	-	-	50	65	80	4	5.5	34	40
50C1	8	9	9.52	11	12	12.7	14	-	-	-	-	-	50	70	80	4	M4x10	34	40
50D	8	9	9.52	11	12	12.7	14	-	-	-	-	-	50	95	80	4	M6x20	34	40
55A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	55.5	125.7	105	4	M6x20	34	40
60A2	8	9	9.52	11	12	12.7	14	-	-	-	-	-	60	75	80	4	M5x16	34	40
60AH2	8	9	9.52	11	12	12.7	14	-	-	-	-	-	60	75	90	4	6.5	34	40
60B1	8	9	9.52	11	12	12.7	14	15.875	16	-	-	-	60	85	80	4	M5x16	34	40
60C1	8	9	9.52	11	12	12.7	14	15.875	16	-	-	-	60	90	80	4	M5x16	34	40
70A1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	85	80	4	M6x20	34	40
70AH1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	85	90	4	6.5	34	40
70B1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	90	80	4	M5x16	34	40
73A1	8	9	9.52	11	12	12.7	14	-	-	-	-	-	73	98.4	85	4	M5x16	34	40
80A1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	80	100	90	4	M6x16	34	40
95A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	95	115	100	4	M8x20	34	40
95B	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	95	130	115	4	M8x20	34	40
110A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	130	115	4	M8x20	34	40
110B	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	145	120	6.5	M8x20	44	50
110B1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	145	120	6.5	M8x20	54	60

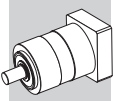


## FM



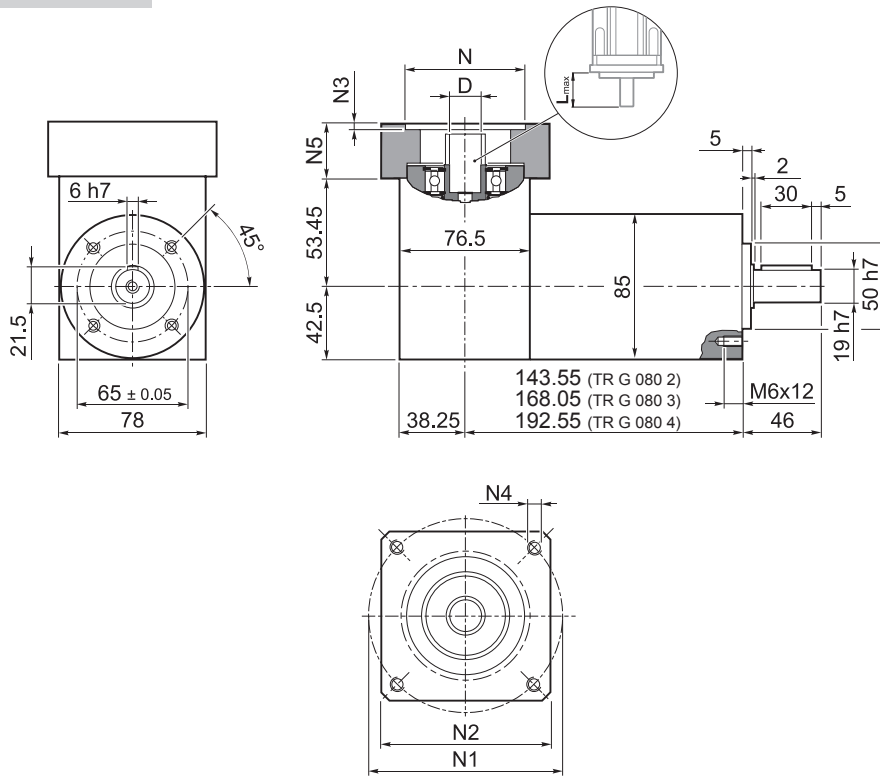
				D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
8	9	9.52		38	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	10.5
11	12	12.7		43	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	12.5
14	15.875	16	17	48	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	14.5
19	19.05			51	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	16.5

	M <sub>n 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub> [arcmin]	C <sub>t</sub> [ $\frac{Nm}{arcmin}$ ]	R <sub>1 max</sub> [N]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>e</sub> [kgcm <sup>2</sup> ]	
													8 ... 12.7
TR 080 1_3	40	80	180	3500	5'	3'	8.0	400	2500	3000	97	0.50	0.59
TR 080 1_4	50	80	200	4500	5'	3'	8.0	400	2500	3000	97	0.34	0.43
TR 080 1_5	50	80	200	4500	5'	3'	8.0	400	2500	3000	97	0.28	0.37
TR 080 1_6	50	80	200	4500	5'	3'	8.0	400	2500	3000	97	0.21	0.30
TR 080 1_7	50	80	200	6000	5'	3'	8.0	400	2500	3000	97	0.23	0.32
TR 080 1_10	40	80	180	6000	5'	3'	8.0	400	2500	3000	97	0.20	0.29
TR 080 2_9	40	80	180	3500	5'	3'	6.5	400	2500	3000	94	0.49	0.58
TR 080 2_12	70	100	250	3500	5'	3'	6.5	400	2500	3000	94	0.47	0.56
TR 080 2_15	70	100	250	3500	5'	3'	6.5	400	2500	3000	94	0.46	0.55
TR 080 2_16	70	100	250	4500	5'	3'	6.5	400	2500	3000	94	0.32	0.41
TR 080 2_20	70	100	250	4500	5'	3'	6.5	400	2500	3000	94	0.27	0.36
TR 080 2_25	70	100	250	4500	5'	3'	6.5	400	2500	3000	94	0.27	0.36
TR 080 2_28	70	100	250	6000	5'	3'	6.5	400	2500	3000	94	0.22	0.31
TR 080 2_30	40	80	180	6000	5'	3'	6.5	400	2500	3000	94	0.20	0.29
TR 080 2_35	70	100	250	6000	5'	3'	6.5	400	2500	3000	94	0.22	0.31
TR 080 2_36	50	80	200	4500	5'	3'	6.5	400	2500	3000	94	0.20	0.29
TR 080 2_40	70	100	250	6000	5'	3'	6.5	400	2500	3000	94	0.20	0.29
TR 080 2_50	70	100	250	6000	5'	3'	6.5	400	2500	3000	94	0.19	0.28
TR 080 2_70	70	100	250	6000	5'	3'	6.5	400	2500	3000	94	0.19	0.28
TR 080 2_100	40	80	180	6000	5'	3'	6.5	400	2500	3000	94	0.19	0.28
TR 080 3_48	70	100	250	4500	7'	5'	5.5	400	2500	3000	91	0.33	0.42
TR 080 3_64	70	100	250	4500	7'	5'	5.5	400	2500	3000	91	0.32	0.41
TR 080 3_75	70	100	250	4500	7'	5'	5.5	400	2500	3000	91	0.27	0.36
TR 080 3_80	70	100	250	4500	7'	5'	5.5	400	2500	3000	91	0.32	0.41
TR 080 3_84	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.23	0.32
TR 080 3_90	40	80	180	6000	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_120	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_125	70	100	250	4500	7'	5'	5.5	400	2500	3000	91	0.27	0.36
TR 080 3_140	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.22	0.31
TR 080 3_150	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_160	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_175	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.22	0.31
TR 080 3_200	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_210	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_216	70	100	250	4500	7'	5'	5.5	400	2500	3000	91	0.20	0.29
TR 080 3_250	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28
TR 080 3_280	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28
TR 080 3_350	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28
TR 080 3_400	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28
TR 080 3_500	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28
TR 080 3_700	70	100	250	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28
TR 080 3_1000	40	80	180	6000	7'	5'	5.5	400	2500	3000	91	0.19	0.28



# TR G 080

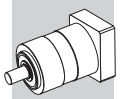
## 40B1 ... 110B1



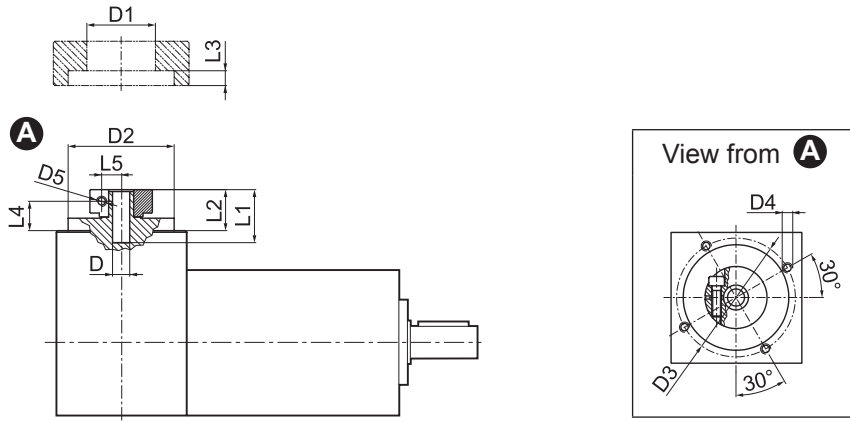
	Kg
TR G 080 2	5.2
TR G 080 3	5.8
TR G 080 4	6.4

												N	N1	N2	N3	N4	N5	L <sub>max</sub>	
	8	9	9.52	11	12	12.7	14	-	-	-	-								
40B1	8	9	9.52	11	12	12.7	14	-	-	-	-	40	63	80	4	M4x12	34	40	
45A	8	9	9.52	11	12	12.7	-	-	-	-	-	45	63	80	4	M4x12	34	40	
50B1	8	9	9.52	11	12	12.7	14	-	-	-	-	50	65	80	4	M5x16	34	40	
50BH1	8	9	9.52	11	12	12.7	14	-	-	-	-	50	65	80	4	5.5	34	40	
50C1	8	9	9.52	11	12	12.7	14	-	-	-	-	50	70	80	4	M4x10	34	40	
50D	8	9	9.52	11	12	12.7	14	-	-	-	-	50	95	80	4	M6x20	34	40	
55A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	55.5	125.7	105	4	M6x20	34	40
60A2	8	9	9.52	11	12	12.7	14	-	-	-	-	60	75	80	4	M5x16	34	40	
60AH2	8	9	9.52	11	12	12.7	14	-	-	-	-	60	75	90	4	6.5	34	40	
60B1	8	9	9.52	11	12	12.7	14	15.875	16	-	-	60	85	80	4	M5x16	34	40	
60C1	8	9	9.52	11	12	12.7	14	15.875	16	-	-	60	90	80	4	M5x16	34	40	
70A1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	85	80	4	M6x20	34	40
70AH1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	85	90	4	6.5	34	40
70B1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	90	80	4	M5x16	34	40
73A1	8	9	9.52	11	12	12.7	14	-	-	-	-	73	98.4	85	4	M5x16	34	40	
80A1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	80	100	90	4	M6x16	34	40
95A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	95	115	100	4	M8x20	34	40
95B	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	95	130	115	4	M8x20	34	40
110A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	130	115	4	M8x20	34	40
110B	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	145	120	6.5	M8x20	44	50
110B1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	145	120	6.5	M8x20	54	60

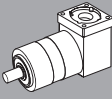



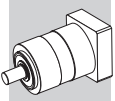


## FM



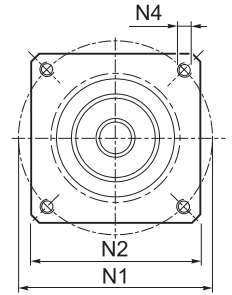
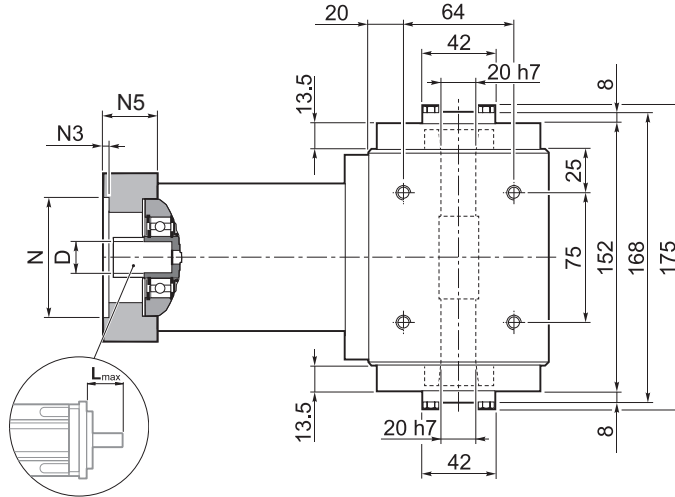
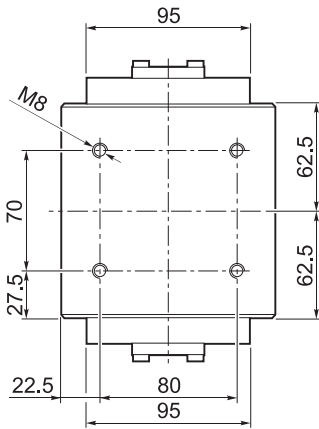
D			D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
8	9	9.52	38	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	10.5
11	12	12.7	43	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	12.5
14	15.875	16	48	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	14.5
19	19.05		51	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	16.5

 i	M <sub>n 2</sub>	M <sub>a 2</sub>	M <sub>p 2</sub>	n <sub>1 max</sub>	φ <sub>S</sub>	φ <sub>R</sub>	C <sub>t</sub>	R <sub>2 max</sub>	A <sub>2 max</sub>	η	J <sub>G</sub> [kgcm <sup>2</sup> ]	
	[Nm]	[Nm]	[Nm]	[min <sup>-1</sup> ]	[arcmin]	[arcmin]	[ $\frac{Nm}{arcmin}$ ]	[N]	[N]	%		
											8 ... 12.7	14 ... 19.05
TR G 080 2_3	40	80	180	3500	5'	3'	8.0	2500	3000	94	0.67	0.79
TR G 080 2_4	50	80	200	4500	5'	3'	8.0	2500	3000	94	0.62	0.75
TR G 080 2_5	50	80	200	4500	5'	3'	8.0	2500	3000	94	0.61	0.74
TR G 080 2_6	50	80	200	4500	5'	3'	8.0	2500	3000	94	0.58	0.71
TR G 080 2_7	50	80	200	6000	5'	3'	8.0	2500	3000	94	0.60	0.73
TR G 080 2_10	40	80	180	6000	5'	3'	8.0	2500	3000	94	0.60	0.72
TR G 080 3_9	40	80	180	3500	5'	3'	6.5	2500	3000	91	0.66	0.78
TR G 080 3_12	70	100	250	3500	5'	3'	6.5	2500	3000	91	0.75	0.87
TR G 080 3_15	70	100	250	3500	5'	3'	6.5	2500	3000	91	0.74	0.87
TR G 080 3_16	70	100	250	4500	5'	3'	6.5	2500	3000	91	0.60	0.73
TR G 080 3_20	70	100	250	4500	5'	3'	6.5	2500	3000	91	0.60	0.73
TR G 080 3_25	70	100	250	4500	5'	3'	6.5	2500	3000	91	0.64	0.76
TR G 080 3_28	70	100	250	6000	5'	3'	6.5	2500	3000	91	0.59	0.72
TR G 080 3_30	40	80	180	6000	5'	3'	6.5	2500	3000	91	0.60	0.72
TR G 080 3_35	70	100	250	6000	5'	3'	6.5	2500	3000	91	0.61	0.74
TR G 080 3_36	50	80	200	4500	5'	3'	6.5	2500	3000	91	0.57	0.70
TR G 080 3_40	70	100	250	6000	5'	3'	6.5	2500	3000	91	0.60	0.72
TR G 080 3_50	70	100	250	6000	5'	3'	6.5	2500	3000	91	0.59	0.71
TR G 080 3_70	70	100	250	6000	5'	3'	6.5	2500	3000	91	0.59	0.71
TR G 080 3_100	40	80	180	6000	5'	3'	6.5	2500	3000	91	0.59	0.71
TR G 080 4_48	70	100	250	4500	7'	5'	5.5	2500	3000	89	0.61	0.75
TR G 080 4_64	70	100	250	4500	7'	5'	5.5	2500	3000	89	0.60	0.73
TR G 080 4_75	70	100	250	4500	7'	5'	5.5	2500	3000	89	0.60	0.73
TR G 080 4_80	70	100	250	4500	7'	5'	5.5	2500	3000	89	0.60	0.73
TR G 080 4_84	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.60	0.73
TR G 080 4_90	40	80	180	6000	7'	5'	5.5	2500	3000	89	0.60	0.72
TR G 080 4_120	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.60	0.72
TR G 080 4_125	70	100	250	4500	7'	5'	5.5	2500	3000	89	0.60	0.73
TR G 080 4_140	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.72
TR G 080 4_150	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.60	0.72
TR G 080 4_160	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.60	0.72
TR G 080 4_175	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.72
TR G 080 4_200	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.60	0.72
TR G 080 4_210	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.60	0.72
TR G 080 4_216	70	100	250	4500	7'	5'	5.5	2500	3000	89	0.57	0.70
TR G 080 4_250	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.71
TR G 080 4_280	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.71
TR G 080 4_350	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.71
TR G 080 4_400	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.71
TR G 080 4_500	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.71
TR G 080 4_700	70	100	250	6000	7'	5'	5.5	2500	3000	89	0.59	0.71
TR G 080 4_1000	40	80	180	6000	7'	5'	5.5	2500	3000	89	0.59	0.71

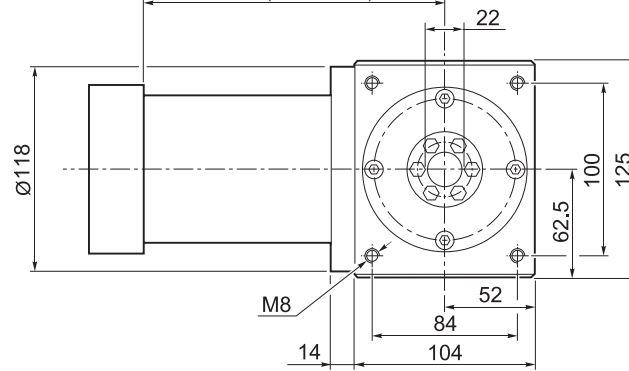


# TR MB 080

## 40B1 ... 110B1

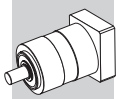


149.5 (TR MB 080 2)  
174 (TR MB 080 3)  
198.5 (TR MB 080 4)

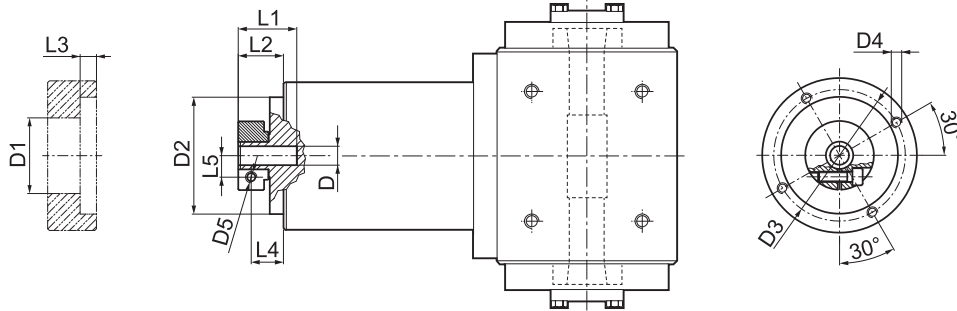


TR MB 080 2	14.0
TR MB 080 3	15.0
TR MB 080 4	16.0

												N	N1	N2	N3	N4	N5	L <sub>max</sub>	
	8	9	9.52	11	12	12.7	14	-	-	-	-								
40B1	8	9	9.52	11	12	12.7	14	-	-	-	-	40	63	80	4	M4x12	34	40	
45A	8	9	9.52	11	12	12.7	-	-	-	-	-	45	63	80	4	M4x12	34	40	
50B1	8	9	9.52	11	12	12.7	14	-	-	-	-	50	65	80	4	M5x16	34	40	
50BH1	8	9	9.52	11	12	12.7	14	-	-	-	-	50	65	80	4	5.5	34	40	
50C1	8	9	9.52	11	12	12.7	14	-	-	-	-	50	70	80	4	M4x10	34	40	
50D	8	9	9.52	11	12	12.7	14	-	-	-	-	50	95	80	4	M6x20	34	40	
55A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	55.5	125.7	105	4	M6x20	34	40
60A2	8	9	9.52	11	12	12.7	14	-	-	-	-	60	75	80	4	M5x16	34	40	
60AH2	8	9	9.52	11	12	12.7	14	-	-	-	-	60	75	90	4	6.5	34	40	
60B1	8	9	9.52	11	12	12.7	14	15.875	16	-	-	60	85	80	4	M5x16	34	40	
60C1	8	9	9.52	11	12	12.7	14	15.875	16	-	-	60	90	80	4	M5x16	34	40	
70A1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	85	80	4	M6x20	34	40
70AH1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	85	90	4	6.5	34	40
70B1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	70	90	80	4	M5x16	34	40
73A1	8	9	9.52	11	12	12.7	14	-	-	-	-	73	98.4	85	4	M5x16	34	40	
80A1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	80	100	90	4	M6x16	34	40
95A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	95	115	100	4	M8x20	34	40
95B	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	95	130	115	4	M8x20	34	40
110A	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	130	115	4	M8x20	34	40
110B	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	145	120	6.5	M8x20	44	50
110B1	8	9	9.52	11	12	12.7	14	15.875	16	17	19	19.05	110	145	120	6.5	M8x20	54	60

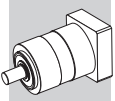


## FM



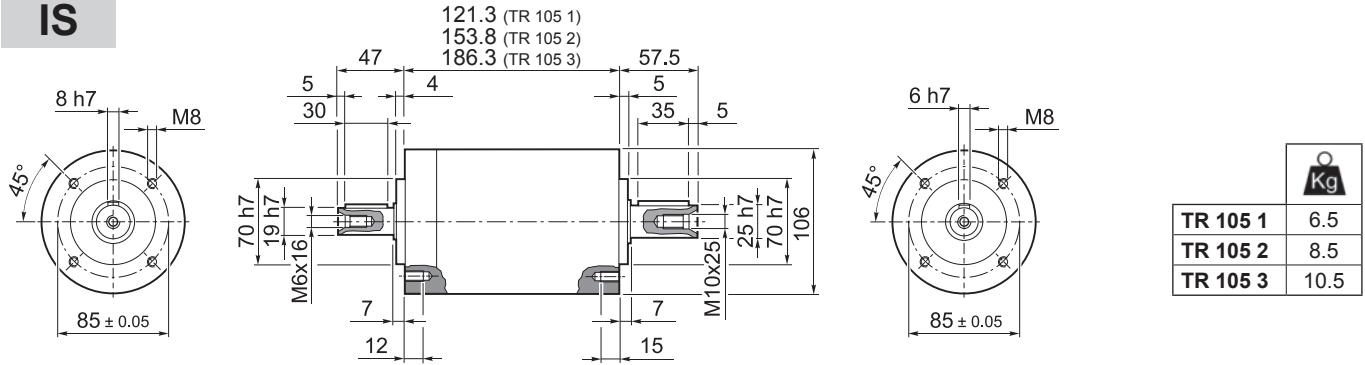
				D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
8	9	9.52		38	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	10.5
11	12	12.7		43	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	12.5
14	15.875	16	17	48	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	14.5
19	19.05			51	68	76.5	M6x12	M6	32.2	26.3	9.5	19.3	16.5

	i	M <sub>n 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub>	φ <sub>R</sub>	C <sub>t</sub> [Nm/arcmin]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]	
											8 ... 12.7
TR MB 080 2_3		40	80	180	3500	5'	3'	8.0	94	0.50	0.59
TR MB 080 2_4		50	80	200	4500	5'	3'	8.0	94	0.34	0.43
TR MB 080 2_5		50	80	200	4500	5'	3'	8.0	94	0.28	0.37
TR MB 080 2_6		50	80	200	4500	5'	3'	8.0	94	0.21	0.30
TR MB 080 2_7		50	80	200	6000	5'	3'	8.0	94	0.23	0.32
TR MB 080 2_10		40	80	180	6000	5'	3'	8.0	94	0.20	0.29
TR MB 080 3_9		40	80	180	3500	5'	3'	6.5	91	0.49	0.58
TR MB 080 3_12		70	100	250	3500	5'	3'	6.5	91	0.47	0.56
TR MB 080 3_15		70	100	250	3500	5'	3'	6.5	91	0.46	0.55
TR MB 080 3_16		70	100	250	4500	5'	3'	6.5	91	0.32	0.41
TR MB 080 3_20		70	100	250	4500	5'	3'	6.5	91	0.27	0.36
TR MB 080 3_25		70	100	250	4500	5'	3'	6.5	91	0.27	0.36
TR MB 080 3_28		70	100	250	6000	5'	3'	6.5	91	0.22	0.31
TR MB 080 3_30		40	80	180	6000	5'	3'	6.5	91	0.20	0.29
TR MB 080 3_35		70	100	250	6000	5'	3'	6.5	91	0.22	0.31
TR MB 080 3_36		50	80	200	4500	5'	3'	6.5	91	0.20	0.29
TR MB 080 3_40		70	100	250	6000	5'	3'	6.5	91	0.20	0.29
TR MB 080 3_50		70	100	250	6000	5'	3'	6.5	91	0.19	0.28
TR MB 080 3_70		70	100	250	6000	5'	3'	6.5	91	0.19	0.28
TR MB 080 3_100		40	80	180	6000	5'	3'	6.5	91	0.19	0.28
TR MB 080 4_48		70	100	250	4500	7'	5'	5.5	89	0.33	0.42
TR MB 080 4_64		70	100	250	4500	7'	5'	5.5	89	0.32	0.41
TR MB 080 4_75		70	100	250	4500	7'	5'	5.5	89	0.27	0.36
TR MB 080 4_80		70	100	250	4500	7'	5'	5.5	89	0.32	0.41
TR MB 080 4_84		70	100	250	6000	7'	5'	5.5	89	0.23	0.32
TR MB 080 4_90		40	80	180	6000	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_120		70	100	250	6000	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_125		70	100	250	4500	7'	5'	5.5	89	0.27	0.36
TR MB 080 4_140		70	100	250	6000	7'	5'	5.5	89	0.22	0.31
TR MB 080 4_150		70	100	250	6000	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_160		70	100	250	6000	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_175		70	100	250	6000	7'	5'	5.5	89	0.22	0.31
TR MB 080 4_200		70	100	250	6000	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_210		70	100	250	6000	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_216		70	100	250	4500	7'	5'	5.5	89	0.20	0.29
TR MB 080 4_250		70	100	250	6000	7'	5'	5.5	89	0.19	0.28
TR MB 080 4_280		70	100	250	6000	7'	5'	5.5	89	0.19	0.28
TR MB 080 4_350		70	100	250	6000	7'	5'	5.5	89	0.19	0.28
TR MB 080 4_400		70	100	250	6000	7'	5'	5.5	89	0.19	0.28
TR MB 080 4_500		70	100	250	6000	7'	5'	5.5	89	0.19	0.28
TR MB 080 4_700		70	100	250	6000	7'	5'	5.5	89	0.19	0.28
TR MB 080 4_1000		40	80	180	6000	7'	5'	5.5	89	0.19	0.28



# TR 105

## IS



## 50D ... 130A1

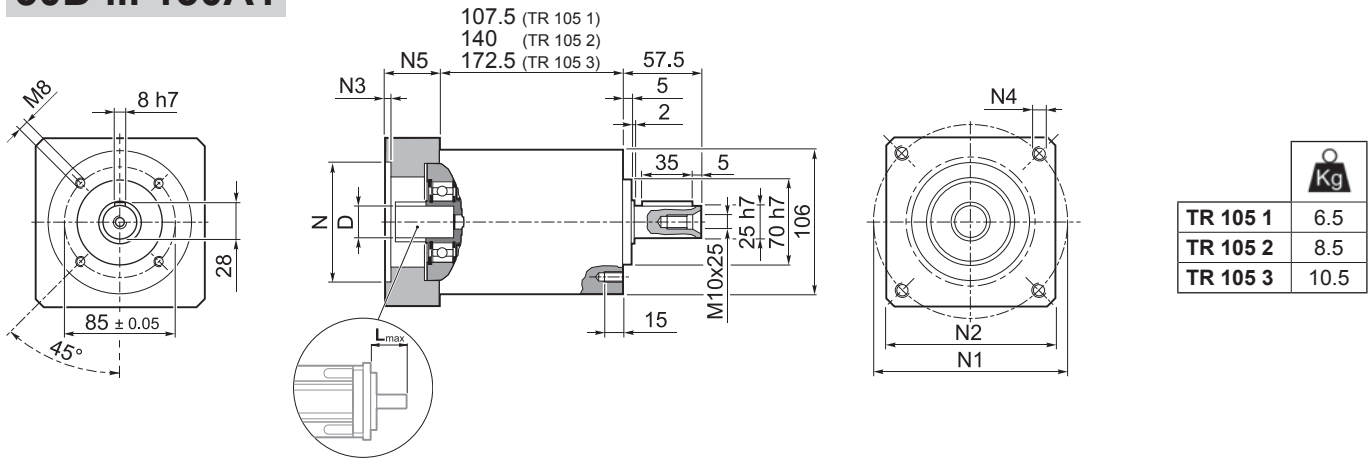
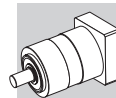
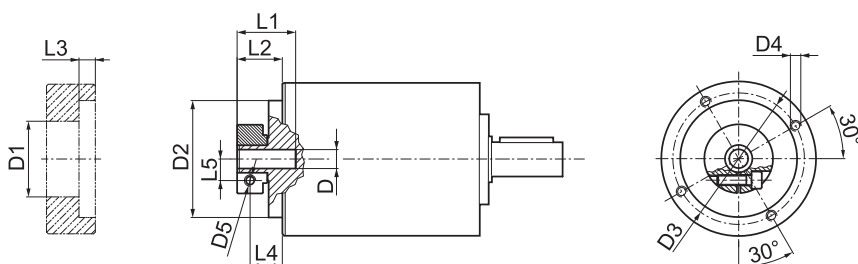


Image	D											N	N1	N2	N3	N4	N5	L <sub>max</sub>
	11	12	12.7	14	15	15.875	16	19	-	-	-							
50D	11	12	12.7	14	15	15.875	16	19	-	-	-	50	95	100	5	M6x14	28	40
55A	11	12	12.7	14	15	15.875	16	19	-	-	-	55	125.7	105	5	M6x16	28	40
60A2	11	12	12.7	14	15	15.875	16	19	-	-	-	60	75	100	6.5	M5x14	28	40
60AH2	11	12	12.7	14	15	15.875	16	19	-	-	-	60	75	100	4	6.5	33	40
60B1	11	12	12.7	14	15	15.875	16	19	-	-	-	60	85	100	6.5	M5x14	28	40
70A1	11	12	12.7	14	15	15.875	16	19	-	-	-	70	85	100	6.5	M6x14	28	40
70AH1	11	12	12.7	14	15	15.875	16	19	-	-	-	70	85	100	4	6.5	33	40
70B1	11	12	12.7	14	15	15.875	16	19	-	-	-	70	90	100	6.5	M5x12	28	40
80A1	11	12	12.7	14	15	15.875	16	19	-	-	-	80	100	100	6.5	M6x16	28	40
80AH1	11	12	12.7	14	15	15.875	16	19	-	-	-	80	100	100	4	6.5	33	40
95A	11	12	12.7	14	15	15.875	16	19	-	-	-	95	115	100	6.5	M8x18	28	40
95A1	11	12	12.7	14	15	15.875	16	19	22	24	-	95	115	100	6.5	M8x18	38	50
95B	11	12	12.7	14	15	15.875	16	19	-	-	-	95	130	115	6.5	M8x18	28	40
110A	11	12	12.7	14	15	15.875	16	19	-	-	-	110	130	115	6.5	M8x18	28	40
110A1	11	12	12.7	14	15	15.875	16	19	22	24	-	110	130	115	6.5	M8x20	38	50
110B	11	12	12.7	14	15	15.875	16	19	22	24	-	110	145	120	6.5	M8x20	38	50
110B1	11	12	12.7	14	15	15.875	16	19	22	24	28	110	145	120	6.5	M8x20	48	60
130A	11	12	12.7	14	15	15.875	16	19	22	24	-	130	165	140	6.5	M10x20	38	50
130A1	11	12	12.7	14	15	15.875	16	19	22	24	28	130	165	140	6.5	M10x25	48	60

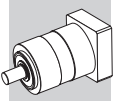


## FM



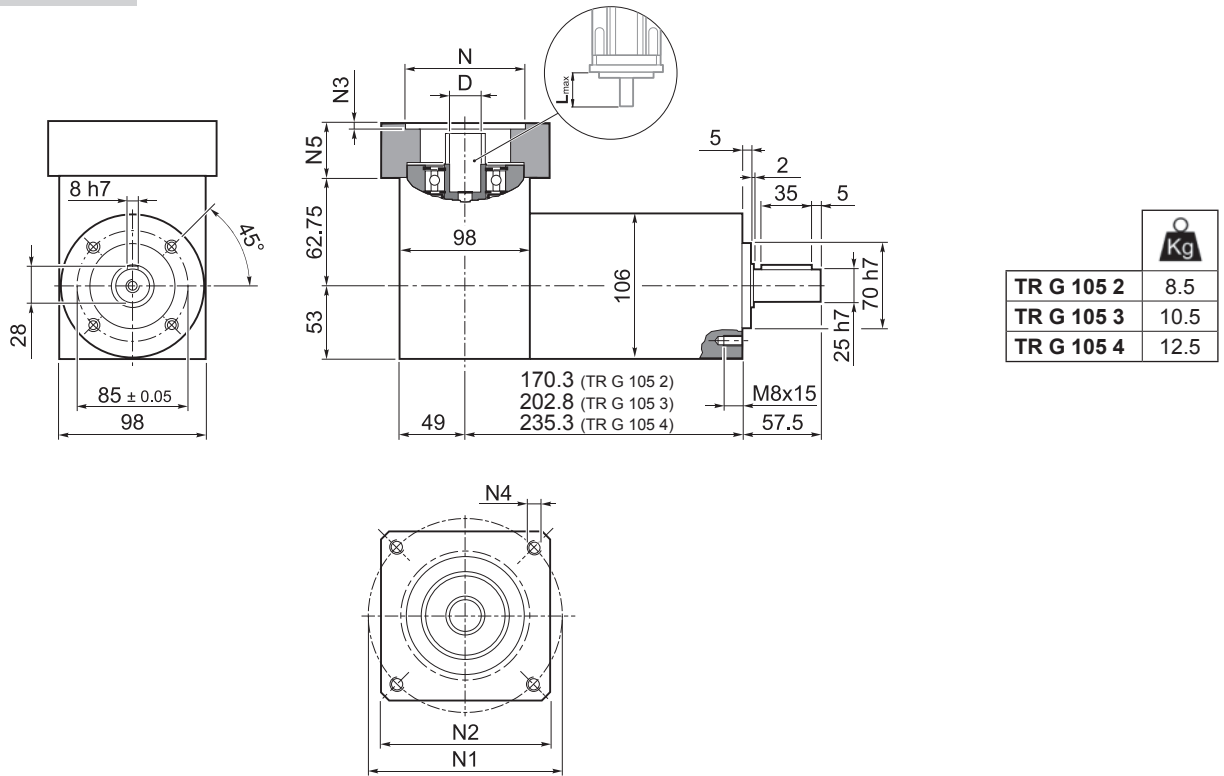
D				D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
11	12	12.7		43	90	98	M6x15	M6	31.5	19.5	7.6	12	12.5
14	15	15.875	16	48	90	98	M6x15	M6	31.5	19.5	7.6	12	14.5
19				51	90	98	M6x15	M6	31.5	19.5	7.6	12	16.5
22	24			56.5	90	98	M6x15	M6	35	23	7.6	12	19
28				67	90	98	M6x15	M8	35	23	7.6	14	22.5
32				71	90	98	M6x15	M8	37	25	7.6	16	24.5

i	M <sub>n2</sub> [Nm]	M <sub>a2</sub> [Nm]	M <sub>p2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub> [arcmin]	C <sub>t</sub> [Nm/arcmin]	R <sub>1 max</sub> [N]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
												D			
												11 ... 12.7	14 ... 19	22 - 24	28 - 32
TR 105 1_3	100	180	360	3500	5'	3'	24.0	600	3800	4000	97	1.70	1.78	2.22	2.59
TR 105 1_4	140	210	450	4500	5'	3'	24.0	600	3800	4000	97	0.99	1.06	1.51	1.87
TR 105 1_5	140	210	450	4500	5'	3'	24.0	600	3800	4000	97	0.72	0.79	1.23	1.60
TR 105 1_6	140	210	450	4500	5'	3'	24.0	600	3800	4000	97	0.36	0.43	0.88	1.24
TR 105 1_7	140	210	450	5000	5'	3'	24.0	600	3800	4000	97	0.47	0.55	0.99	1.35
TR 105 1_10	100	180	360	5000	5'	3'	24.0	600	3800	4000	97	0.33	0.41	0.85	1.21
TR 105 2_9	100	180	360	3500	5'	3'	21.5	600	3800	4000	94	1.58	1.63	2.07	2.44
TR 105 2_12	170	250	600	3500	5'	3'	21.5	600	3800	4000	94	1.52	1.59	2.03	2.40
TR 105 2_15	170	250	600	3500	5'	3'	21.5	600	3800	4000	94	1.47	1.55	1.99	2.36
TR 105 2_16	170	250	600	4500	5'	3'	21.5	600	3800	4000	94	0.87	0.95	1.39	1.76
TR 105 2_20	170	250	600	4500	5'	3'	21.5	600	3800	4000	94	0.86	0.93	1.37	1.74
TR 105 2_25	170	250	600	4500	5'	3'	21.5	600	3800	4000	94	0.63	0.71	1.15	1.51
TR 105 2_28	170	250	600	5000	5'	3'	21.5	600	3800	4000	94	0.43	0.51	0.95	1.32
TR 105 2_30	100	180	360	5000	5'	3'	21.5	600	3800	4000	94	0.32	0.40	0.84	1.20
TR 105 2_35	170	250	600	5000	5'	3'	21.5	600	3800	4000	94	0.43	0.50	0.95	1.31
TR 105 2_36	140	210	450	4500	5'	3'	21.5	600	3800	4000	94	0.32	0.39	0.84	1.20
TR 105 2_40	170	250	600	5000	5'	3'	21.5	600	3800	4000	94	0.31	0.39	0.83	1.20
TR 105 2_50	170	250	600	5000	5'	3'	21.5	600	3800	4000	94	0.31	0.39	0.83	1.19
TR 105 2_70	170	250	600	5000	5'	3'	21.5	600	3800	4000	94	0.31	0.38	0.83	1.19
TR 105 2_100	100	180	360	5000	5'	3'	21.5	600	3800	4000	94	0.31	0.38	0.83	1.19
TR 105 3_48	170	250	600	4500	7'	5'	18.0	600	3800	4000	91	0.91	0.98	1.42	1.79
TR 105 3_64	170	250	600	4500	7'	5'	18.0	600	3800	4000	91	0.87	0.94	1.38	1.75
TR 105 3_75	170	250	600	4500	7'	5'	18.0	600	3800	4000	91	0.66	0.74	1.18	1.55
TR 105 3_80	170	250	600	4500	7'	5'	18.0	600	3800	4000	91	0.86	0.94	1.38	1.75
TR 105 3_84	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.44	0.52	0.96	1.33
TR 105 3_90	100	180	360	5000	7'	5'	18.0	600	3800	4000	91	0.32	0.39	0.84	1.20
TR 105 3_120	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.32	0.39	0.84	1.20
TR 105 3_125	170	250	600	4500	7'	5'	18.0	600	3800	4000	91	0.63	0.70	1.15	1.51
TR 105 3_140	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.43	0.51	0.95	1.32
TR 105 3_150	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.32	0.39	0.84	1.20
TR 105 3_160	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.39	0.83	1.21
TR 105 3_175	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.43	0.50	0.95	1.31
TR 105 3_200	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.39	0.83	1.20
TR 105 3_210	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.32	0.39	0.84	1.20
TR 105 3_216	170	250	600	4500	7'	5'	18.0	600	3800	4000	91	0.31	0.39	0.83	1.20
TR 105 3_250	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.39	0.83	1.19
TR 105 3_280	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.38	0.83	1.19
TR 105 3_350	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.38	0.83	1.19
TR 105 3_400	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.38	0.83	1.19
TR 105 3_500	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.38	0.83	1.19
TR 105 3_700	170	250	600	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.38	0.83	1.19
TR 105 3_1000	100	180	360	5000	7'	5'	18.0	600	3800	4000	91	0.31	0.38	0.83	1.19



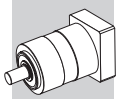
# TR G 105

## 50D ... 130A1

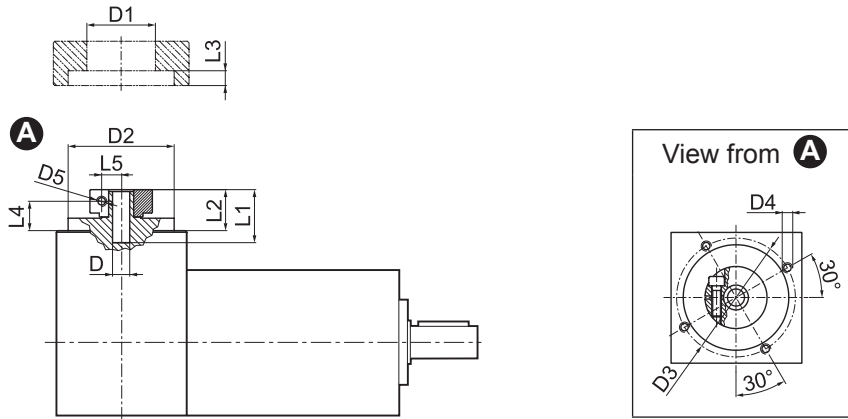


TR G 105 2	8.5
TR G 105 3	10.5
TR G 105 4	12.5

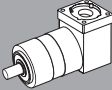
												N	N1	N2	N3	N4	N5	L <sub>max</sub>	
<b>50D</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	50	95	100	5	M6x14	28	40
<b>55A</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	55	125.7	105	5	M6x16	28	40
<b>60A2</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	60	75	100	6.5	M5x14	28	40
<b>60AH2</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	60	75	100	4	6.5	33	40
<b>60B1</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	60	85	100	6.5	M5x14	28	40
<b>70A1</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	70	85	100	6.5	M6x14	28	40
<b>70AH1</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	70	85	100	4	6.5	33	40
<b>70B1</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	70	90	100	6.5	M5x12	28	40
<b>80A1</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	80	100	100	6.5	M6x16	28	40
<b>80AH1</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	80	100	100	4	6.5	33	40
<b>95A</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	95	115	100	6.5	M8x18	28	40
<b>95A1</b>	11	12	12.7	14	15	15.875	16	19	22	24	-	-	95	115	100	6.5	M8x18	38	50
<b>95B</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	95	130	115	6.5	M8x18	28	40
<b>110A</b>	11	12	12.7	14	15	15.875	16	19	-	-	-	-	110	130	115	6.5	M8x18	28	40
<b>110A1</b>	11	12	12.7	14	15	15.875	16	19	22	24	-	-	110	130	115	6.5	M8x20	38	50
<b>110B</b>	11	12	12.7	14	15	15.875	16	19	22	24	-	-	110	145	120	6.5	M8x20	38	50
<b>110B1</b>	11	12	12.7	14	15	15.875	16	19	22	24	28	-	110	145	120	6.5	M8x20	48	60
<b>130A</b>	11	12	12.7	14	15	15.875	16	19	22	24	-	-	130	165	140	6.5	M10x20	38	50
<b>130A1</b>	11	12	12.7	14	15	15.875	16	19	22	24	28	32	130	165	140	6.5	M10x25	48	60

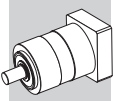


## FM



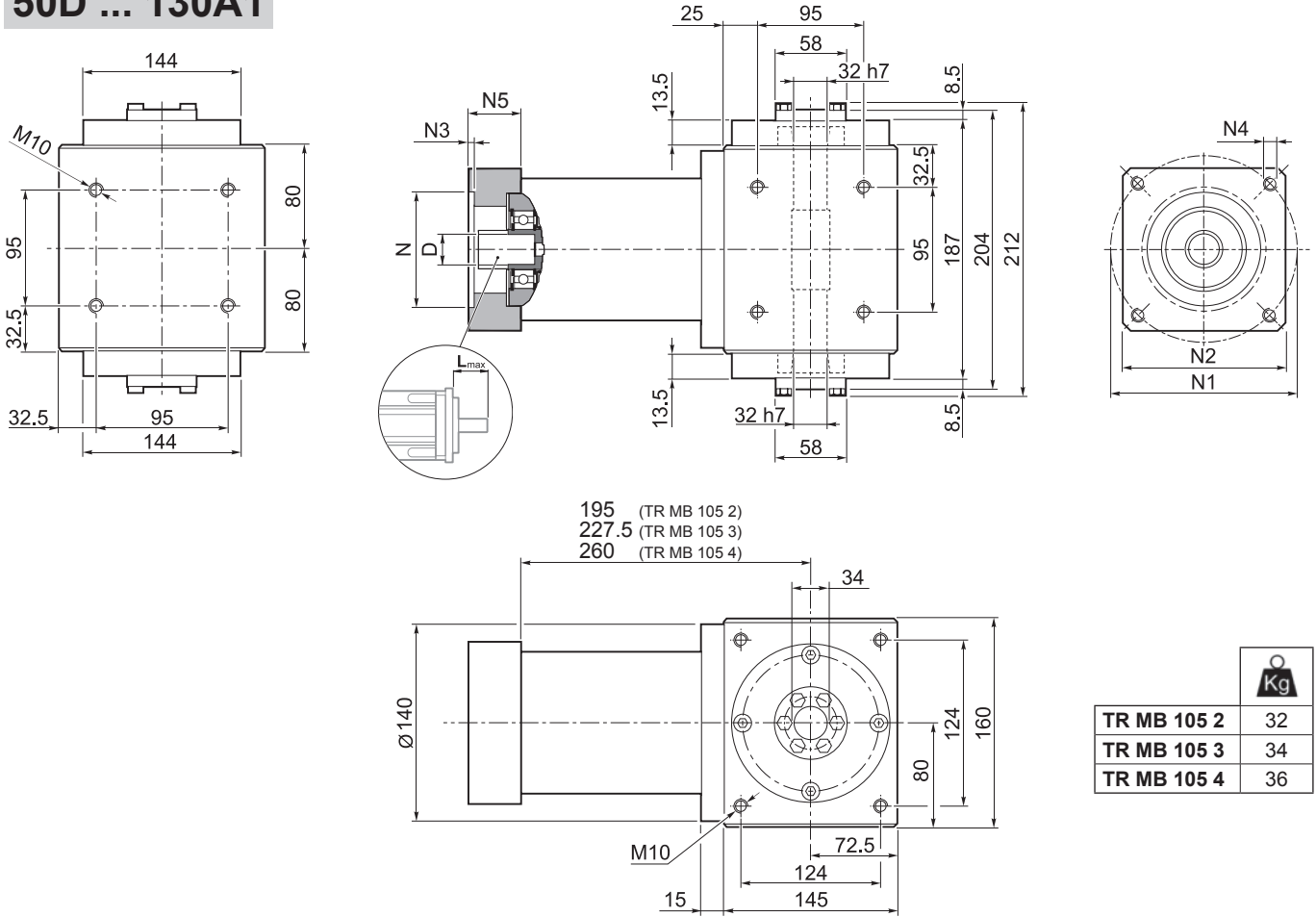
D				D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
11	12	12.7		43	90	98	M6x15	M6	31.5	19.5	7.6	12	12.5
14	15	15.875	16	48	90	98	M6x15	M6	31.5	19.5	7.6	12	14.5
19				51	90	98	M6x15	M6	31.5	19.5	7.6	12	16.5
22	24			56.5	90	98	M6x15	M6	35	23	7.6	12	19
28				67	90	98	M6x15	M8	35	23	7.6	14	22.5
32				71	90	98	M6x15	M8	37	25	7.6	16	24.5

	i	M <sub>n2</sub> [Nm]	M <sub>a2</sub> [Nm]	M <sub>p2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	Ψ <sub>S</sub> [arcmin]	Ψ <sub>R</sub> [arcmin]	C <sub>t</sub> [Nm/arcmin]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
												D			
												11 ... 12.7	14 ... 19	22 - 24	28 - 32
TR G 105 2_3		100	180	360	3500	5'	3'	24.0	3800	4000	94	1.85	2.01	2.33	3.07
TR G 105 2_4		140	210	450	4500	5'	3'	24.0	3800	4000	94	1.14	1.29	1.62	2.35
TR G 105 2_5		140	210	450	4500	5'	3'	24.0	3800	4000	94	1.07	1.21	1.34	2.08
TR G 105 2_6		140	210	450	4500	5'	3'	24.0	3800	4000	94	0.87	1.02	1.16	1.89
TR G 105 2_7		140	210	450	5000	5'	3'	24.0	3800	4000	94	0.98	1.14	1.27	2.00
TR G 105 2_10		100	180	360	5000	5'	3'	24.0	3800	4000	94	0.94	1.09	1.23	1.95
TR G 105 3_9		100	180	360	3500	5'	3'	21.5	3800	4000	91	1.76	1.86	2.18	2.92
TR G 105 3_12		170	250	600	3500	5'	3'	21.5	3800	4000	91	1.60	1.75	2.14	2.88
TR G 105 3_15		170	250	600	3500	5'	3'	21.5	3800	4000	91	1.57	1.73	2.10	2.84
TR G 105 3_16		170	250	600	4500	5'	3'	21.5	3800	4000	91	1.02	1.18	1.50	2.24
TR G 105 3_20		170	250	600	4500	5'	3'	21.5	3800	4000	91	1.20	1.35	1.48	2.22
TR G 105 3_25		170	250	600	4500	5'	3'	21.5	3800	4000	91	1.13	1.29	1.42	2.15
TR G 105 3_28		170	250	600	5000	5'	3'	21.5	3800	4000	91	0.94	1.10	1.23	1.97
TR G 105 3_30		100	180	360	5000	5'	3'	21.5	3800	4000	91	0.93	1.08	1.22	1.94
TR G 105 3_35		170	250	600	5000	5'	3'	21.5	3800	4000	91	1.02	1.17	1.31	2.04
TR G 105 3_36		140	210	450	4500	5'	3'	21.5	3800	4000	91	0.83	0.98	1.12	1.85
TR G 105 3_40		170	250	600	5000	5'	3'	21.5	3800	4000	91	0.96	1.11	1.25	1.98
TR G 105 3_50		170	250	600	5000	5'	3'	21.5	3800	4000	91	0.96	1.11	1.25	1.98
TR G 105 3_70		170	250	600	5000	5'	3'	21.5	3800	4000	91	0.92	1.06	1.21	1.93
TR G 105 3_100		100	180	360	5000	5'	3'	21.5	3800	4000	91	0.92	1.06	1.21	1.93
TR G 105 4_48		170	250	600	4500	7'	5'	18.0	3800	4000	89	1.06	1.21	1.53	2.27
TR G 105 4_64		170	250	600	4500	7'	5'	18.0	3800	4000	89	1.02	1.17	1.49	2.23
TR G 105 4_75		170	250	600	4500	7'	5'	18.0	3800	4000	89	1.00	1.16	1.29	2.03
TR G 105 4_80		170	250	600	4500	7'	5'	18.0	3800	4000	89	1.01	1.17	1.49	2.23
TR G 105 4_84		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.95	1.11	1.24	1.98
TR G 105 4_90		100	180	360	5000	7'	5'	18.0	3800	4000	89	0.93	1.07	1.22	1.94
TR G 105 4_120		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.93	1.07	1.22	1.94
TR G 105 4_125		170	250	600	4500	7'	5'	18.0	3800	4000	89	0.97	1.12	1.26	1.99
TR G 105 4_140		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.94	1.10	1.23	1.97
TR G 105 4_150		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.93	1.07	1.22	1.94
TR G 105 4_160		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.07	1.21	1.96
TR G 105 4_175		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.94	1.09	1.23	1.96
TR G 105 4_200		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.07	1.21	1.94
TR G 105 4_210		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.93	1.07	1.22	1.94
TR G 105 4_216		170	250	600	4500	7'	5'	18.0	3800	4000	89	0.83	0.98	1.11	1.85
TR G 105 4_250		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.07	1.21	1.93
TR G 105 4_280		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.06	1.21	1.93
TR G 105 4_350		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.06	1.21	1.93
TR G 105 4_400		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.06	1.21	1.93
TR G 105 4_500		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.06	1.21	1.93
TR G 105 4_700		170	250	600	5000	7'	5'	18.0	3800	4000	89	0.92	1.06	1.21	1.93
TR G 105 4_1000		100	180	360	5000	7'	5'	18.0	3800	4000	89	0.92	1.06	1.21	1.93


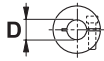


# TR MB 105

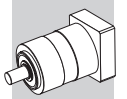
## 50D ... 130A1



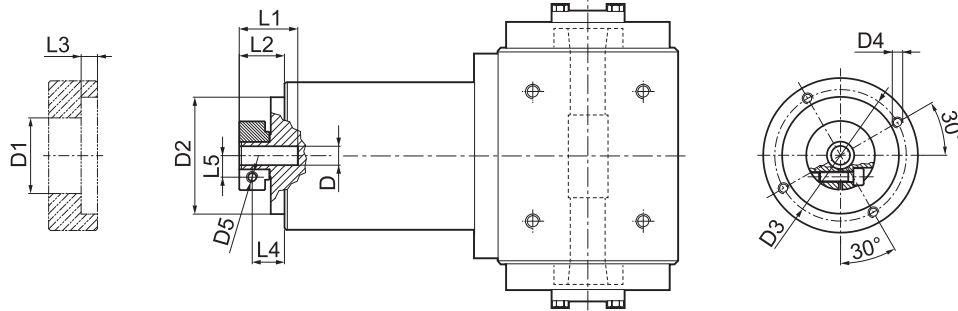
	Kg
TR MB 105 2	32
TR MB 105 3	34
TR MB 105 4	36


													N	N1	N2	N3	N4	N5	L <sub>max</sub>
	11	12	12.7	14	15	15.875	16	19	-	-	-	-							
50D	11	12	12.7	14	15	15.875	16	19	-	-	-	-	50	95	100	5	M6x14	28	40
55A	11	12	12.7	14	15	15.875	16	19	-	-	-	-	55	125.7	105	5	M6x16	28	40
60A2	11	12	12.7	14	15	15.875	16	19	-	-	-	-	60	75	100	6.5	M5x14	28	40
60AH2	11	12	12.7	14	15	15.875	16	19	-	-	-	-	60	75	100	4	6.5	33	40
60B1	11	12	12.7	14	15	15.875	16	19	-	-	-	-	60	85	100	6.5	M5x14	28	40
70A1	11	12	12.7	14	15	15.875	16	19	-	-	-	-	70	85	100	6.5	M6x14	28	40
70AH1	11	12	12.7	14	15	15.875	16	19	-	-	-	-	70	85	100	4	6.5	33	40
70B1	11	12	12.7	14	15	15.875	16	19	-	-	-	-	70	90	100	6.5	M5x12	28	40
80A1	11	12	12.7	14	15	15.875	16	19	-	-	-	-	80	100	100	6.5	M6x16	28	40
80AH1	11	12	12.7	14	15	15.875	16	19	-	-	-	-	80	100	100	4	6.5	33	40
95A	11	12	12.7	14	15	15.875	16	19	-	-	-	-	95	115	100	6.5	M8x18	28	40
95A1	11	12	12.7	14	15	15.875	16	19	22	24	-	-	95	115	100	6.5	M8x18	38	50
95B	11	12	12.7	14	15	15.875	16	19	-	-	-	-	95	130	115	6.5	M8x18	28	40
110A	11	12	12.7	14	15	15.875	16	19	-	-	-	-	110	130	115	6.5	M8x18	28	40
110A1	11	12	12.7	14	15	15.875	16	19	22	24	-	-	110	130	115	6.5	M8x20	38	50
110B	11	12	12.7	14	15	15.875	16	19	22	24	-	-	110	145	120	6.5	M8x20	38	50
110B1	11	12	12.7	14	15	15.875	16	19	22	24	28	-	110	145	120	6.5	M8x20	48	60
130A	11	12	12.7	14	15	15.875	16	19	22	24	-	-	130	165	140	6.5	M10x20	38	50
130A1	11	12	12.7	14	15	15.875	16	19	22	24	28	32	130	165	140	6.5	M10x25	48	60

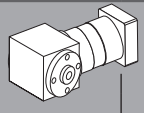



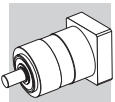


## FM



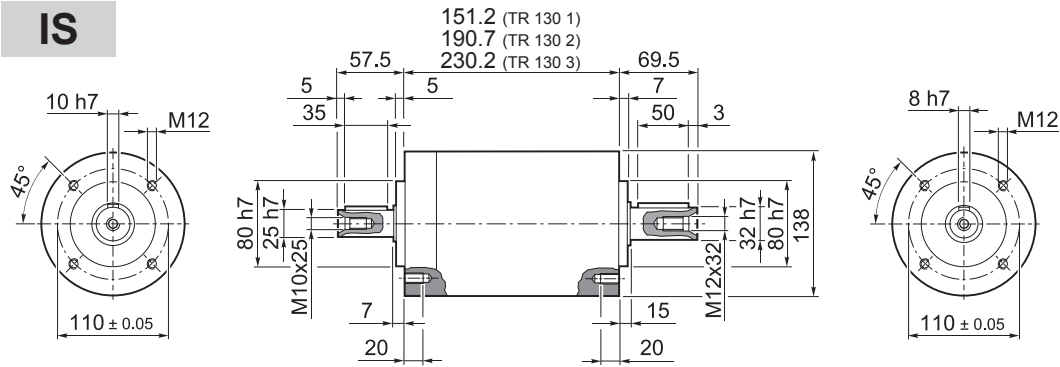
				D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
11	12	12.7		43	90	98	M6x15	M6	31.5	19.5	7.6	12	12.5
14	15	15.875	16	48	90	98	M6x15	M6	31.5	19.5	7.6	12	14.5
19				51	90	98	M6x15	M6	31.5	19.5	7.6	12	16.5
22	24			56.5	90	98	M6x15	M6	35	23	7.6	12	19
28				67	90	98	M6x15	M8	35	23	7.6	14	22.5
32				71	90	98	M6x15	M8	37	25	7.6	16	24.5

	i	M <sub>n2</sub> [Nm]	M <sub>a2</sub> [Nm]	M <sub>p2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub> [arcmin]	C <sub>t</sub> [ Nm / arcmin ]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
													
										11 ... 12.7	14 ... 19	22 - 24	28 - 32
TR MB 105 2_3		100	180	360	3500	5'	3'	24.0	94	1.70	1.78	2.22	2.59
TR MB 105 2_4		140	210	450	4500	5'	3'	24.0	94	0.99	1.06	1.51	1.87
TR MB 105 2_5		140	210	450	4500	5'	3'	24.0	94	0.72	0.79	1.23	1.60
TR MB 105 2_6		140	210	450	4500	5'	3'	24.0	94	0.36	0.43	0.88	1.24
TR MB 105 2_7		140	210	450	5000	5'	3'	24.0	94	0.47	0.55	0.99	1.35
TR MB 105 2_10		100	180	360	5000	5'	3'	24.0	94	0.33	0.41	0.85	1.21
TR MB 105 3_9		100	180	360	3500	5'	3'	21.5	91	1.58	1.63	2.07	2.44
TR MB 105 3_12		170	250	600	3500	5'	3'	21.5	91	1.52	1.59	2.03	2.40
TR MB 105 3_15		170	250	600	3500	5'	3'	21.5	91	1.47	1.55	1.99	2.36
TR MB 105 3_16		170	250	600	4500	5'	3'	21.5	91	0.87	0.95	1.39	1.76
TR MB 105 3_20		170	250	600	4500	5'	3'	21.5	91	0.86	0.93	1.37	1.74
TR MB 105 3_25		170	250	600	4500	5'	3'	21.5	91	0.63	0.71	1.15	1.51
TR MB 105 3_28		170	250	600	5000	5'	3'	21.5	91	0.43	0.51	0.95	1.32
TR MB 105 3_30		100	180	360	5000	5'	3'	21.5	91	0.32	0.40	0.84	1.20
TR MB 105 3_35		170	250	600	5000	5'	3'	21.5	91	0.43	0.50	0.95	1.31
TR MB 105 3_36		140	210	450	4500	5'	3'	21.5	91	0.32	0.39	0.84	1.20
TR MB 105 3_40		170	250	600	5000	5'	3'	21.5	91	0.31	0.39	0.83	1.20
TR MB 105 3_50		170	250	600	5000	5'	3'	21.5	91	0.31	0.39	0.83	1.19
TR MB 105 3_70		170	250	600	5000	5'	3'	21.5	91	0.31	0.38	0.83	1.19
TR MB 105 3_100		100	180	360	5000	5'	3'	21.5	91	0.31	0.38	0.83	1.19
TR MB 105 4_48		170	250	600	4500	7'	5'	18.0	89	0.91	0.98	1.42	1.79
TR MB 105 4_64		170	250	600	4500	7'	5'	18.0	89	0.87	0.94	1.38	1.75
TR MB 105 4_75		170	250	600	4500	7'	5'	18.0	89	0.66	0.74	1.18	1.55
TR MB 105 4_80		170	250	600	4500	7'	5'	18.0	89	0.86	0.94	1.38	1.75
TR MB 105 4_84		170	250	600	5000	7'	5'	18.0	89	0.44	0.52	0.96	1.33
TR MB 105 4_90		100	180	360	5000	7'	5'	18.0	89	0.32	0.39	0.84	1.20
TR MB 105 4_120		170	250	600	5000	7'	5'	18.0	89	0.32	0.39	0.84	1.20
TR MB 105 4_125		170	250	600	4500	7'	5'	18.0	89	0.63	0.70	1.15	1.51
TR MB 105 4_140		170	250	600	5000	7'	5'	18.0	89	0.43	0.51	0.95	1.32
TR MB 105 4_150		170	250	600	5000	7'	5'	18.0	89	0.32	0.39	0.84	1.20
TR MB 105 4_160		170	250	600	5000	7'	5'	18.0	89	0.31	0.39	0.83	1.21
TR MB 105 4_175		170	250	600	5000	7'	5'	18.0	89	0.43	0.50	0.95	1.31
TR MB 105 4_200		170	250	600	5000	7'	5'	18.0	89	0.31	0.39	0.83	1.20
TR MB 105 4_210		170	250	600	5000	7'	5'	18.0	89	0.32	0.39	0.84	1.20
TR MB 105 4_216		170	250	600	4500	7'	5'	18.0	89	0.31	0.39	0.83	1.20
TR MB 105 4_250		170	250	600	5000	7'	5'	18.0	89	0.31	0.39	0.83	1.19
TR MB 105 4_280		170	250	600	5000	7'	5'	18.0	89	0.31	0.38	0.83	1.19
TR MB 105 4_350		170	250	600	5000	7'	5'	18.0	89	0.31	0.38	0.83	1.19
TR MB 105 4_400		170	250	600	5000	7'	5'	18.0	89	0.31	0.38	0.83	1.19
TR MB 105 4_500		170	250	600	5000	7'	5'	18.0	89	0.31	0.38	0.83	1.19
TR MB 105 4_700		170	250	600	5000	7'	5'	18.0	89	0.31	0.38	0.83	1.19
TR MB 105 4_1000		100	180	360	5000	7'	5'	18.0	89	0.31	0.38	0.83	1.19



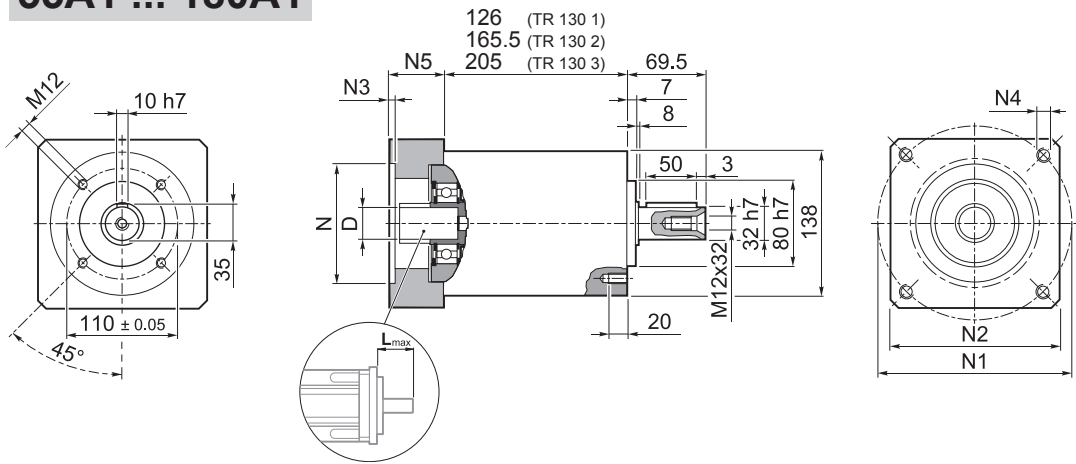
# TR 130

## IS



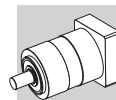
	Kg
TR 130 1	12.0
TR 130 2	15.5
TR 130 3	18.5

## 55A1 ... 180A1

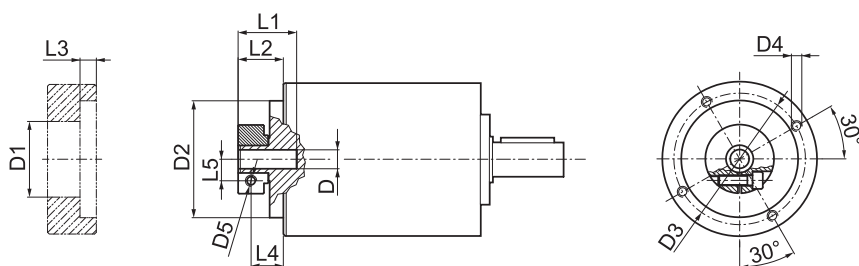


	Kg
TR 130 1	12.0
TR 130 2	15.5
TR 130 3	18.5

											N	N1	N2	N3	N4	N5	L <sub>max</sub>
<b>55A1</b>	14	15.875	16	19	-	-	-	-	-	-	55.5	125.7	130	4	M6x15	39.5	50
<b>80A2</b>	14	15.875	16	19	-	-	-	-	-	-	80	100	130	4	M6x15	39.5	50
<b>95A1</b>	14	15.875	16	19	22	24	-	-	-	-	95	115	130	4	M8x20	39.5	50
<b>110A1</b>	14	15.875	16	19	22	24	-	-	-	-	110	130	130	4	M8x20	39.5	50
<b>110B1</b>	14	15.875	16	19	22	24	-	-	-	-	110	145	130	6.5	M8x20	49.5	60
<b>114A0</b>	14	15.875	16	19	22	24	-	-	-	-	114.3	200	170	5.5	M12x25	39.5	50
<b>114A</b>	14	15.875	16	19	22	24	28	32	35	38	114.3	200	170	5.5	M12x25	69.5	80
<b>130A</b>	14	15.875	16	19	22	24	-	-	-	-	130	165	140	4	M10x20	39.5	50
<b>130A1</b>	14	15.875	16	19	22	24	28	32	-	-	130	165	140	4	M10x20	49.5	60
<b>180A</b>	14	15.875	16	19	22	24	28	32	-	-	180	215	190	5.5	M14x25	49.5	60
<b>180A1</b>	14	15.875	16	19	22	24	28	32	35	38	180	215	190	5.5	M14x25	69.5	80

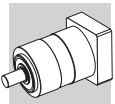


## FM



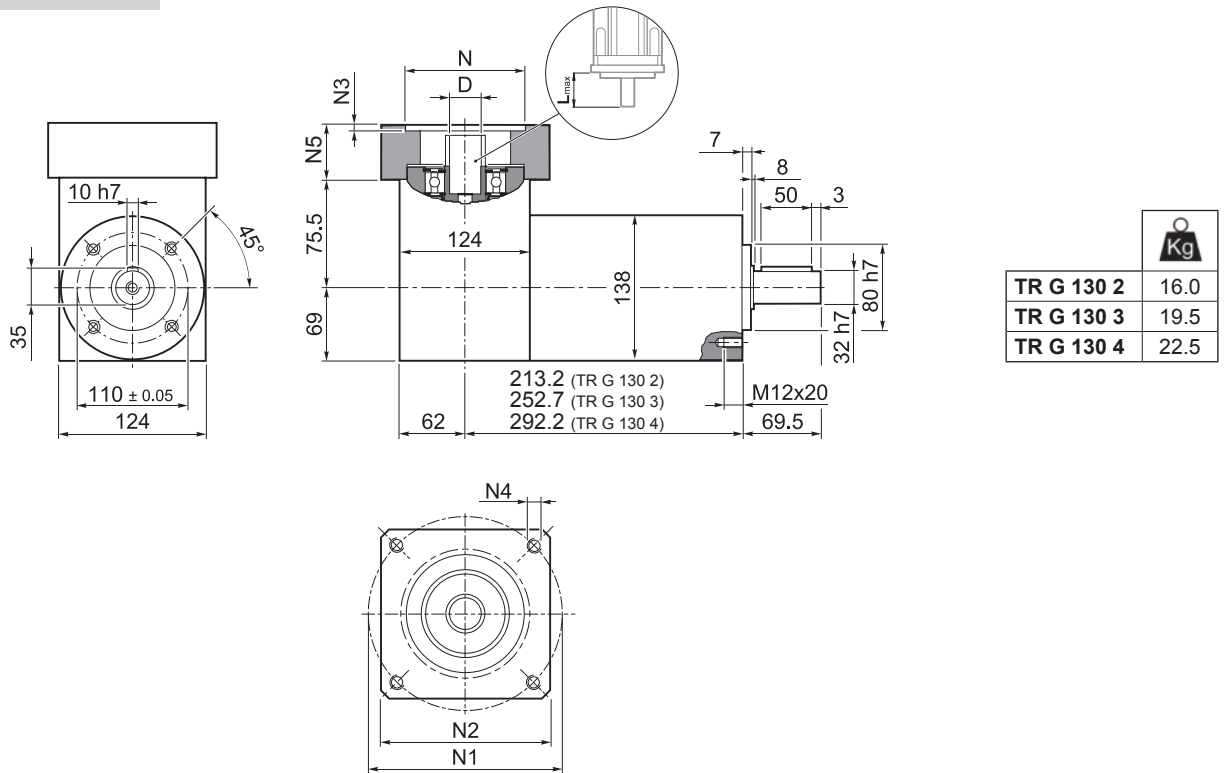
	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
14 15.875 16	48	113	125.5	M8x15	M6	40	27.5	6	20	14.5
19	51	113	125.5	M8x15	M6	40	27.5	6	20	16.5
22 24	56.5	113	125.5	M8x15	M6	41	28.5	6	19.5	19
28	67	113	125.5	M8x15	M8	41	28.5	6	19.5	22.5
32	71	113	125.5	M8x15	M8	41	28.5	6	19.5	24.5
35	73	113	125.5	M8x15	M8	50	37.5	11.25	26	26
38	77.5	113	125.5	M8x15	M8	50	37.5	11.25	26	28

	M <sub>n2</sub>	M <sub>a2</sub>	M <sub>p2</sub>	n <sub>1 max</sub>	φ <sub>S</sub>	φ <sub>R</sub>	C <sub>t</sub>	R <sub>1 max</sub>	R <sub>2 max</sub>	A <sub>2 max</sub>	η	J <sub>G</sub> [kgcm <sup>2</sup> ]			
												D	14 ... 19	22 - 24	28 - 32
i	[Nm]	[Nm]	[Nm]	[min <sup>-1</sup> ]	[arcmin]	[arcmin]	$\frac{Nm}{arcmin}$	[N]	[N]	[N]	%				
TR 130 1_3	215	400	800	3000	5'	3'	45.0	800	5500	6500	97	5.25	5.46	5.81	7.16
TR 130 1_4	380	600	1100	3500	5'	3'	45.0	800	5500	6500	97	3.06	3.26	3.61	4.97
TR 130 1_5	380	600	1100	3500	5'	3'	45.0	800	5500	6500	97	2.22	2.42	2.77	4.13
TR 130 1_6	380	600	1100	3500	5'	3'	45.0	800	5500	6500	97	1.19	1.40	1.75	3.10
TR 130 1_7	380	600	1100	4000	5'	3'	45.0	800	5500	6500	97	1.47	1.68	2.03	3.38
TR 130 1_10	215	400	800	4000	5'	3'	45.0	800	5500	6500	97	1.04	1.25	1.60	2.95
TR 130 2_9	215	400	800	3000	5'	3'	38.5	800	5500	6500	94	4.82	5.02	5.37	6.72
TR 130 2_12	450	700	1300	3000	5'	3'	38.5	800	5500	6500	94	4.57	4.78	5.13	6.48
TR 130 2_15	450	700	1300	3000	5'	3'	38.5	800	5500	6500	94	4.48	4.69	5.04	6.39
TR 130 2_16	450	700	1300	3500	5'	3'	38.5	800	5500	6500	94	2.67	2.88	3.23	4.58
TR 130 2_20	450	700	1300	3500	5'	3'	38.5	800	5500	6500	94	1.97	2.18	2.53	3.88
TR 130 2_25	450	700	1300	3500	5'	3'	38.5	800	5500	6500	94	1.94	2.15	2.50	3.85
TR 130 2_28	450	700	1300	4000	5'	3'	38.5	800	5500	6500	94	1.34	1.55	1.90	3.25
TR 130 2_30	215	400	800	4000	5'	3'	38.5	800	5500	6500	94	1.00	1.21	1.56	2.91
TR 130 2_35	450	700	1300	4000	5'	3'	38.5	800	5500	6500	94	1.33	1.53	1.88	3.24
TR 130 2_36	380	600	1100	3500	5'	3'	38.5	800	5500	6500	94	1.05	1.26	1.61	2.96
TR 130 2_40	450	700	1300	4000	5'	3'	38.5	800	5500	6500	94	0.98	1.19	1.54	2.89
TR 130 2_50	450	700	1300	4000	5'	3'	38.5	800	5500	6500	94	0.97	1.18	1.53	2.88
TR 130 2_70	450	700	1300	4000	5'	3'	38.5	800	5500	6500	94	0.96	1.17	1.52	2.87
TR 130 2_100	215	400	800	4000	5'	3'	38.5	800	5500	6500	94	0.96	1.17	1.52	2.87
TR 130 3_48	450	700	1300	3500	7'	5'	30.0	800	5500	6500	91	2.77	2.98	3.33	4.68
TR 130 3_64	450	700	1300	3500	7'	5'	30.0	800	5500	6500	91	2.65	2.86	3.21	4.56
TR 130 3_75	450	700	1300	3500	7'	5'	30.0	800	5500	6500	91	2.03	2.24	2.59	3.94
TR 130 3_80	450	700	1300	3500	7'	5'	30.0	800	5500	6500	91	2.65	2.85	3.20	4.56
TR 130 3_84	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	1.37	1.58	1.93	3.28
TR 130 3_90	215	400	800	4000	7'	5'	30.0	800	5500	6500	91	1.00	1.20	1.55	2.91
TR 130 3_120	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.99	1.20	1.55	2.90
TR 130 3_125	450	700	1300	3500	7'	5'	30.0	800	5500	6500	91	1.93	2.13	2.48	3.84
TR 130 3_140	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	1.34	1.54	1.89	3.25
TR 130 3_150	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.99	1.20	1.55	2.90
TR 130 3_160	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.98	1.18	1.53	2.89
TR 130 3_175	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	1.32	1.53	1.88	3.23
TR 130 3_200	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.97	1.18	1.53	2.88
TR 130 3_210	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.99	1.20	1.55	2.90
TR 130 3_216	450	700	1300	3500	7'	5'	30.0	800	5500	6500	91	1.05	1.26	1.61	2.96
TR 130 3_250	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.97	1.18	1.53	2.88
TR 130 3_280	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.96	1.17	1.52	2.87
TR 130 3_350	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.96	1.17	1.52	2.87
TR 130 3_400	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.96	1.17	1.52	2.87
TR 130 3_500	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.96	1.17	1.52	2.87
TR 130 3_700	450	700	1300	4000	7'	5'	30.0	800	5500	6500	91	0.96	1.17	1.52	2.87
TR 130 3_1000	215	400	800	4000	7'	5'	30.0	800	5500	6500	91	0.96	1.17	1.52	2.87



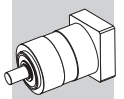
# TR G 130

## 55A1 ... 180A1

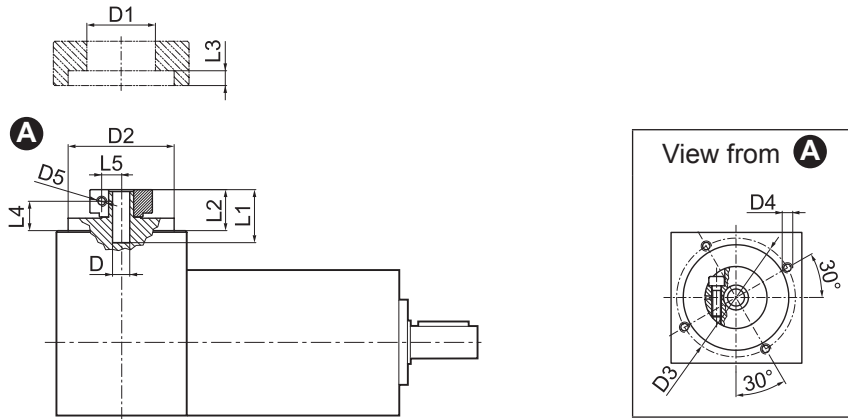



	Kg
TR G 130 2	16.0
TR G 130 3	19.5
TR G 130 4	22.5

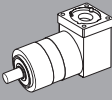

											N	N1	N2	N3	N4	N5	L <sub>max</sub>
	D																
<b>55A1</b>	14	15.875	16	19	-	-	-	-	-	-	55.5	125.7	130	4	M6x15	39.5	50
<b>80A2</b>	14	15.875	16	19	-	-	-	-	-	-	80	100	130	4	M6x15	39.5	50
<b>95A1</b>	14	15.875	16	19	22	24	-	-	-	-	95	115	130	4	M8x20	39.5	50
<b>110A1</b>	14	15.875	16	19	22	24	-	-	-	-	110	130	130	4	M8x20	39.5	50
<b>110B1</b>	14	15.875	16	19	22	24	-	-	-	-	110	145	130	6.5	M8x20	49.5	60
<b>114A0</b>	14	15.875	16	19	22	24	-	-	-	-	114.3	200	170	5.5	M12x25	39.5	50
<b>114A</b>	14	15.875	16	19	22	24	28	32	35	38	114.3	200	170	5.5	M12x25	69.5	80
<b>130A</b>	14	15.875	16	19	22	24	-	-	-	-	130	165	140	4	M10x20	39.5	50
<b>130A1</b>	14	15.875	16	19	22	24	28	32	-	-	130	165	140	4	M10x20	49.5	60
<b>180A</b>	14	15.875	16	19	22	24	28	32	-	-	180	215	190	5.5	M14x25	49.5	60
<b>180A1</b>	14	15.875	16	19	22	24	28	32	35	38	180	215	190	5.5	M14x25	69.5	80

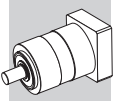


## FM



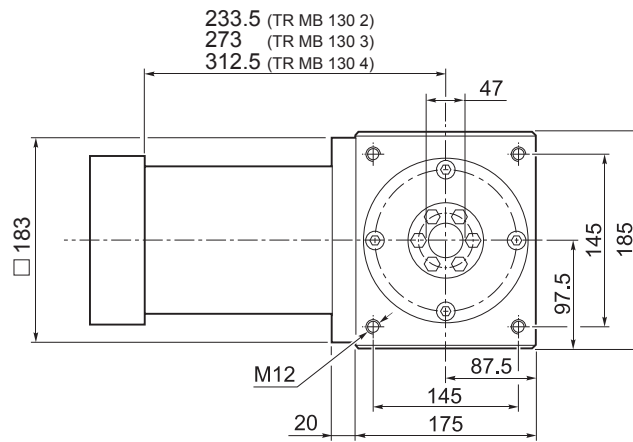
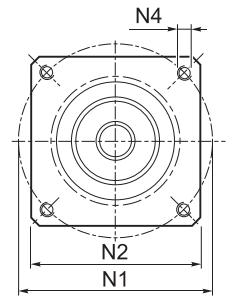
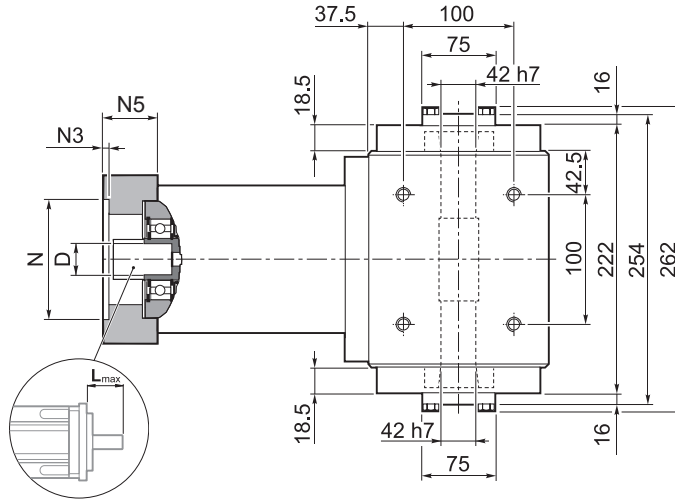
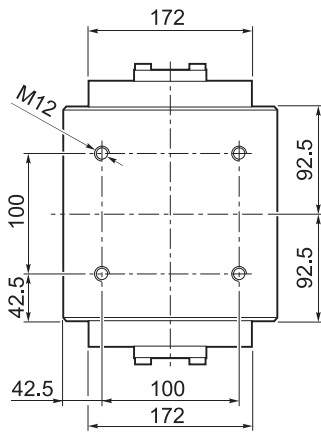
	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
14 15.875 16	48	113	125.5	M8x15	M6	40	27.5	6	20	14.5
19	51	113	125.5	M8x15	M6	40	27.5	6	20	16.5
22 24	56.5	113	125.5	M8x15	M6	41	28.5	6	19.5	19
28	67	113	125.5	M8x15	M8	41	28.5	6	19.5	22.5
32	71	113	125.5	M8x15	M8	41	28.5	6	19.5	24.5
35	73	113	125.5	M8x15	M8	50	37.5	11.25	26	26
38	77.5	113	125.5	M8x15	M8	50	37.5	11.25	26	28

	M <sub>n 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	Φ <sub>S</sub> [arcmin]	Φ <sub>R</sub> [arcmin]	C <sub>t</sub> [Nm/arcmin]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
														
i											14 ... 19	22 - 24	28 - 32	35 - 38
TR G 130 2_3	215	400	800	3000	5'	3'	45.0	5500	6500	94	7.09	7.28	7.66	10.37
TR G 130 2_4	380	600	1100	3500	5'	3'	45.0	5500	6500	94	4.90	5.08	5.46	8.18
TR G 130 2_5	380	600	1100	3500	5'	3'	45.0	5500	6500	94	4.81	4.99	5.38	8.10
TR G 130 2_6	380	600	1100	3500	5'	3'	45.0	5500	6500	94	4.45	4.64	5.03	7.73
TR G 130 2_7	380	600	1100	4000	5'	3'	45.0	5500	6500	94	4.73	4.92	5.31	8.01
TR G 130 2_10	215	400	800	4000	5'	3'	45.0	5500	6500	94	4.68	4.88	5.26	7.97
TR G 130 3_9	215	400	800	3000	5'	3'	38.5	5500	6500	91	6.66	6.84	7.22	9.93
TR G 130 3_12	450	700	1300	3000	5'	3'	38.5	5500	6500	91	6.25	6.45	6.84	9.54
TR G 130 3_15	450	700	1300	3000	5'	3'	38.5	5500	6500	91	6.25	6.44	6.83	9.53
TR G 130 3_16	450	700	1300	3500	5'	3'	38.5	5500	6500	91	4.51	4.70	5.08	7.79
TR G 130 3_20	450	700	1300	3500	5'	3'	38.5	5500	6500	91	4.56	5.36	5.75	8.45
TR G 130 3_25	450	700	1300	3500	5'	3'	38.5	5500	6500	91	5.13	4.72	5.11	7.82
TR G 130 3_28	450	700	1300	4000	5'	3'	38.5	5500	6500	91	4.60	4.79	5.18	7.88
TR G 130 3_30	215	400	800	4000	5'	3'	38.5	5500	6500	91	4.64	4.84	5.22	7.93
TR G 130 3_35	450	700	1300	4000	5'	3'	38.5	5500	6500	91	4.92	5.10	5.49	8.20
TR G 130 3_36	380	600	1100	3500	5'	3'	38.5	5500	6500	91	4.31	4.50	4.89	7.59
TR G 130 3_40	450	700	1300	4000	5'	3'	38.5	5500	6500	91	4.77	4.96	5.35	8.05
TR G 130 3_50	450	700	1300	4000	5'	3'	38.5	5500	6500	91	4.76	4.96	5.34	8.05
TR G 130 3_70	450	700	1300	4000	5'	3'	38.5	5500	6500	91	4.60	4.80	5.18	7.89
TR G 130 3_100	215	400	800	4000	5'	3'	38.5	5500	6500	91	4.60	4.80	5.18	7.89
TR G 130 4_48	450	700	1300	3500	7'	5'	30.0	5500	6500	89	4.61	4.81	5.18	7.89
TR G 130 4_64	450	700	1300	3500	7'	5'	30.0	5500	6500	89	4.49	4.68	5.06	7.77
TR G 130 4_75	450	700	1300	3500	7'	5'	30.0	5500	6500	89	4.62	4.81	5.20	7.91
TR G 130 4_80	450	700	1300	3500	7'	5'	30.0	5500	6500	89	4.49	4.67	5.05	7.77
TR G 130 4_84	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.63	4.82	5.21	7.91
TR G 130 4_90	215	400	800	4000	7'	5'	30.0	5500	6500	89	4.64	4.83	5.21	7.93
TR G 130 4_120	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.63	4.83	5.21	7.92
TR G 130 4_125	450	700	1300	3500	7'	5'	30.0	5500	6500	89	4.52	4.70	5.09	7.81
TR G 130 4_140	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.60	4.78	5.17	7.88
TR G 130 4_150	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.63	4.83	5.21	7.92
TR G 130 4_160	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.62	4.81	5.19	7.91
TR G 130 4_175	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.58	4.77	5.16	7.86
TR G 130 4_200	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.61	4.81	5.19	7.90
TR G 130 4_210	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.63	4.83	5.21	7.92
TR G 130 4_216	450	700	1300	3500	7'	5'	30.0	5500	6500	89	4.31	4.50	4.89	7.59
TR G 130 4_250	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.61	4.81	5.19	7.90
TR G 130 4_280	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.60	4.80	5.18	7.89
TR G 130 4_350	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.60	4.80	5.18	7.89
TR G 130 4_400	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.60	4.80	5.18	7.89
TR G 130 4_500	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.60	4.80	5.18	7.89
TR G 130 4_700	450	700	1300	4000	7'	5'	30.0	5500	6500	89	4.60	4.80	5.18	7.89
TR G 130 4_1000	215	400	800	4000	7'	5'	30.0	5500	6500	89	4.60	4.80	5.18	7.89



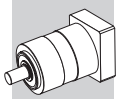
# TR MB 130

## 55A1 ... 180A1

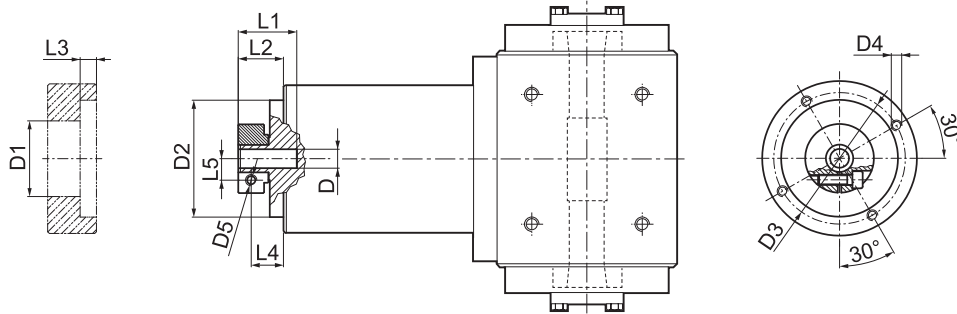



TR MB 130 2	54
TR MB 130 3	58
TR MB 130 4	61

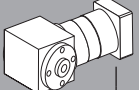

											N	N1	N2	N3	N4	N5	L <sub>max</sub>
55A1	14	15.875	16	19	-	-	-	-	-	-	55.5	125.7	130	4	M6x15	39.5	50
80A2	14	15.875	16	19	-	-	-	-	-	-	80	100	130	4	M6x15	39.5	50
95A1	14	15.875	16	19	22	24	-	-	-	-	95	115	130	4	M8x20	39.5	50
110A1	14	15.875	16	19	22	24	-	-	-	-	110	130	130	4	M8x20	39.5	50
110B1	14	15.875	16	19	22	24	-	-	-	-	110	145	130	6.5	M8x20	49.5	60
114A0	14	15.875	16	19	22	24	-	-	-	-	114.3	200	170	5.5	M12x25	39.5	50
114A	14	15.875	16	19	22	24	28	32	35	38	114.3	200	170	5.5	M12x25	69.5	80
130A	14	15.875	16	19	22	24	-	-	-	-	130	165	140	4	M10x20	39.5	50
130A1	14	15.875	16	19	22	24	28	32	-	-	130	165	140	4	M10x20	49.5	60
180A	14	15.875	16	19	22	24	28	32	-	-	180	215	190	5.5	M14x25	49.5	60
180A1	14	15.875	16	19	22	24	28	32	35	38	180	215	190	5.5	M14x25	69.5	80

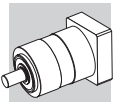


## FM



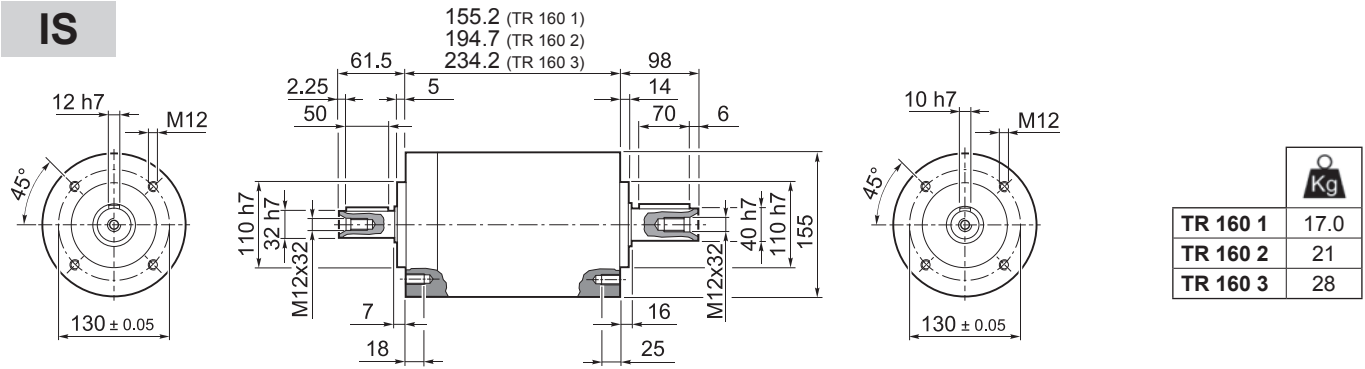
	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
14	48	113	125.5	M8x15	M6	40	27.5	6	20	14.5
19	51	113	125.5	M8x15	M6	40	27.5	6	20	16.5
22	56.5	113	125.5	M8x15	M6	41	28.5	6	19.5	19
28	67	113	125.5	M8x15	M8	41	28.5	6	19.5	22.5
32	71	113	125.5	M8x15	M8	41	28.5	6	19.5	24.5
35	73	113	125.5	M8x15	M8	50	37.5	11.25	26	26
38	77.5	113	125.5	M8x15	M8	50	37.5	11.25	26	28

	i	M <sub>n2</sub> [Nm]	M <sub>a2</sub> [Nm]	M <sub>p2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub> [arcmin]	C <sub>t</sub> [ Nm / arcmin ]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
											14 ... 19	22 - 24	28 - 32
TR MB 130 2_3		215	400	800	3000	5'	3'	45.0	94	5.25	5.46	5.81	7.16
TR MB 130 2_4		380	600	1100	3500	5'	3'	45.0	94	3.06	3.26	3.61	4.97
TR MB 130 2_5		380	600	1100	3500	5'	3'	45.0	94	2.22	2.42	2.77	4.13
TR MB 130 2_6		380	600	1100	3500	5'	3'	45.0	94	1.19	1.40	1.75	3.10
TR MB 130 2_7		380	600	1100	4000	5'	3'	45.0	94	1.47	1.68	2.03	3.38
TR MB 130 2_10		215	400	800	4000	5'	3'	45.0	94	1.04	1.25	1.60	2.95
TR MB 130 3_9		215	400	800	3000	5'	3'	38.5	91	4.82	5.02	5.37	6.72
TR MB 130 3_12		450	700	1300	3000	5'	3'	38.5	91	4.57	4.78	5.13	6.48
TR MB 130 3_15		450	700	1300	3000	5'	3'	38.5	91	4.48	4.69	5.04	6.39
TR MB 130 3_16		450	700	1300	3500	5'	3'	38.5	91	2.67	2.88	3.23	4.58
TR MB 130 3_20		450	700	1300	3500	5'	3'	38.5	91	1.97	2.18	2.53	3.88
TR MB 130 3_25		450	700	1300	3500	5'	3'	38.5	91	1.94	2.15	2.50	3.85
TR MB 130 3_28		450	700	1300	4000	5'	3'	38.5	91	1.34	1.55	1.90	3.25
TR MB 130 3_30		215	400	800	4000	5'	3'	38.5	91	1.00	1.21	1.56	2.91
TR MB 130 3_35		450	700	1300	4000	5'	3'	38.5	91	1.33	1.53	1.88	3.24
TR MB 130 3_36		380	600	1100	3500	5'	3'	38.5	91	1.05	1.26	1.61	2.96
TR MB 130 3_40		450	700	1300	4000	5'	3'	38.5	91	0.98	1.19	1.54	2.89
TR MB 130 3_50		450	700	1300	4000	5'	3'	38.5	91	0.97	1.18	1.53	2.88
TR MB 130 3_70		450	700	1300	4000	5'	3'	38.5	91	0.96	1.17	1.52	2.87
TR MB 130 3_100		215	400	800	4000	5'	3'	38.5	91	0.96	1.17	1.52	2.87
TR MB 130 4_48		450	700	1300	3500	7'	5'	30.0	89	2.77	2.98	3.33	4.68
TR MB 130 4_64		450	700	1300	3500	7'	5'	30.0	89	2.65	2.86	3.21	4.56
TR MB 130 4_75		450	700	1300	3500	7'	5'	30.0	89	2.03	2.24	2.59	3.94
TR MB 130 4_80		450	700	1300	3500	7'	5'	30.0	89	2.65	2.85	3.20	4.56
TR MB 130 4_84		450	700	1300	4000	7'	5'	30.0	89	1.37	1.58	1.93	3.28
TR MB 130 4_90		215	400	800	4000	7'	5'	30.0	89	1.00	1.20	1.55	2.91
TR MB 130 4_120		450	700	1300	4000	7'	5'	30.0	89	0.99	1.20	1.55	2.90
TR MB 130 4_125		450	700	1300	3500	7'	5'	30.0	89	1.93	2.13	2.48	3.84
TR MB 130 4_140		450	700	1300	4000	7'	5'	30.0	89	1.34	1.54	1.89	3.25
TR MB 130 4_150		450	700	1300	4000	7'	5'	30.0	89	0.99	1.20	1.55	2.90
TR MB 130 4_160		450	700	1300	4000	7'	5'	30.0	89	0.98	1.18	1.53	2.89
TR MB 130 4_175		450	700	1300	4000	7'	5'	30.0	89	1.32	1.53	1.88	3.23
TR MB 130 4_200		450	700	1300	4000	7'	5'	30.0	89	0.97	1.18	1.53	2.88
TR MB 130 4_210		450	700	1300	4000	7'	5'	30.0	89	0.99	1.20	1.55	2.90
TR MB 130 4_216		450	700	1300	3500	7'	5'	30.0	89	1.05	1.26	1.61	2.96
TR MB 130 4_250		450	700	1300	4000	7'	5'	30.0	89	0.97	1.18	1.53	2.88
TR MB 130 4_280		450	700	1300	4000	7'	5'	30.0	89	0.96	1.17	1.52	2.87
TR MB 130 4_350		450	700	1300	4000	7'	5'	30.0	89	0.96	1.17	1.52	2.87
TR MB 130 4_400		450	700	1300	4000	7'	5'	30.0	89	0.96	1.17	1.52	2.87
TR MB 130 4_500		450	700	1300	4000	7'	5'	30.0	89	0.96	1.17	1.52	2.87
TR MB 130 4_700		450	700	1300	4000	7'	5'	30.0	89	0.96	1.17	1.52	2.87
TR MB 130 4_1000		215	400	800	4000	7'	5'	30.0	89	0.96	1.17	1.52	2.87

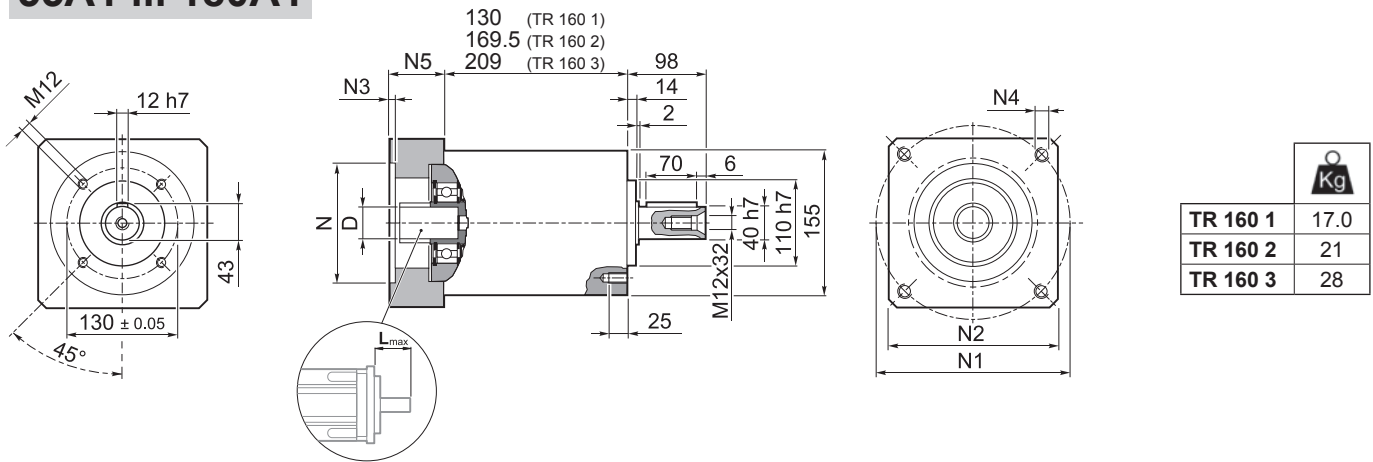



# TR 160

## IS

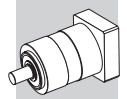


## 55A1 ... 180A1

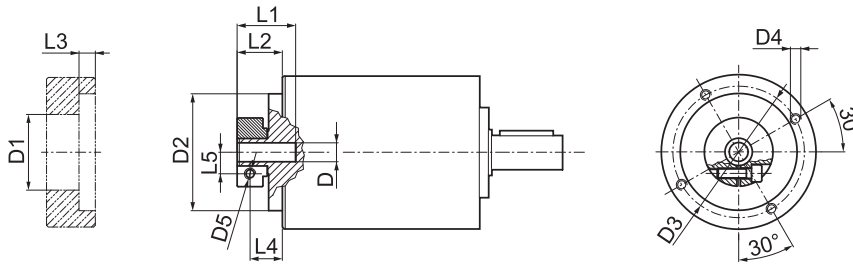


	D										N	N1	N2	N3	N4	N5	L <sub>max</sub>	
	55A1	14	15.875	16	19	-	-	-	-	-	55.5	125.7	140	5	M6x15	39.5	50	
	80A2	14	15.875	16	19	-	-	-	-	-	80	100	140	5	M6x15	39.5	50	
	95A1	14	15.875	16	19	22	24	-	-	-	95	115	140	5	M8x20	39.5	50	
	110A1	14	15.875	16	19	22	24	-	-	-	110	130	140	5	M8x20	39.5	50	
	110B1	14	15.875	16	19	22	24	-	-	-	110	145	140	6.5	M8x20	49.5	60	
	114A	14	15.875	16	19	22	24	28	32	35	38	114.3	200	170	6.5	M12x25	69.5	80
	130A	14	15.875	16	19	22	24	-	-	-	130	165	140	5	M10x20	39.5	50	
	130A1	14	15.875	16	19	22	24	28	32	-	130	165	140	5	M10x20	49.5	60	
	180A	14	15.875	16	19	22	24	28	32	-	180	215	190	6.5	M14x25	49.5	60	
	180A1	14	15.875	16	19	22	24	28	32	35	38	180	215	190	6.5	M14x25	69.5	80



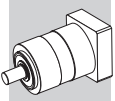


## FM



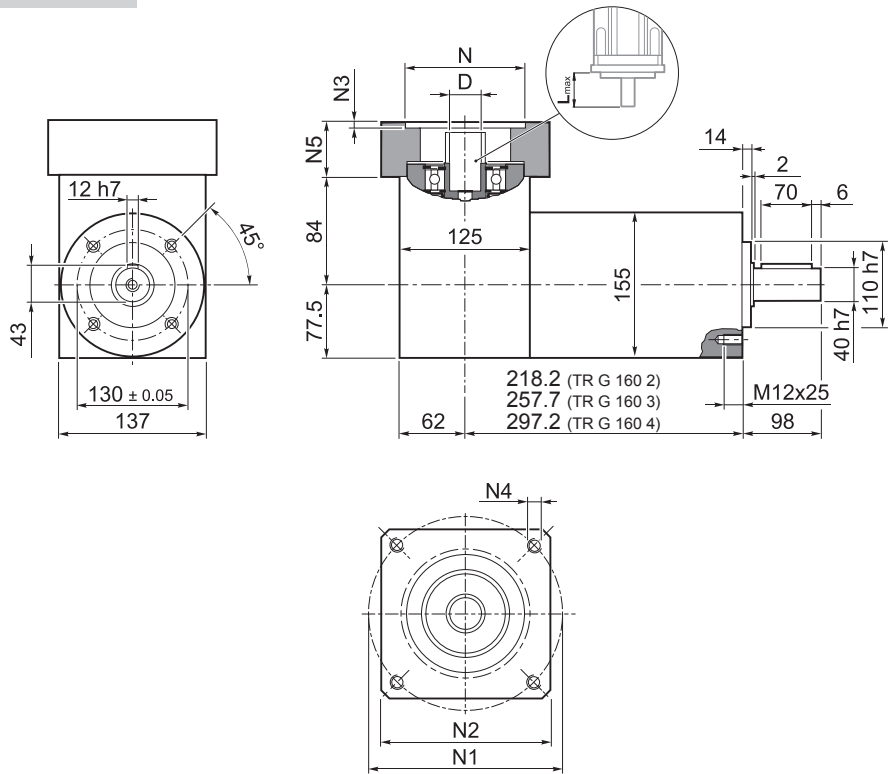
	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
14 15.875 16	48	130	142.5	M8x16	M6	40	27.5	6	20	14.5
19	51	130	142.5	M8x16	M6	40	27.5	6	20	16.5
22 24	56.5	130	142.5	M8x16	M6	41	28.5	6	19.5	19
28	67	130	142.5	M8x16	M8	41	28.5	6	19.5	22.5
32	71	130	142.5	M8x16	M8	41	28.5	6	19.5	24.5
35	73	130	142.5	M8x16	M8	50	37.5	11.25	26	26
38	77.5	130	142.5	M8x16	M8	50	37.5	11.25	26	28

	i	M <sub>n 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub>	C <sub>t</sub> [Nm/arcmin]	R <sub>1 max</sub> [N]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
														14 ... 19	22 - 24	28 - 32
TR 160 1_3		350	660	1200	3000	5'	3'	90	1200	6500	7500	97	8.39	8.60	8.95	10.30
TR 160 1_4		500	750	1400	3500	5'	3'	90	1200	6500	7500	97	4.68	4.89	5.24	6.59
TR 160 1_5		500	750	1400	3500	5'	3'	90	1200	6500	7500	97	3.28	3.49	3.84	5.19
TR 160 1_6		500	750	1400	3500	5'	3'	90	1200	6500	7500	97	1.32	1.53	1.88	3.23
TR 160 1_7		500	750	1400	4000	5'	3'	90	1200	6500	7500	97	2.03	2.24	2.59	3.94
TR 160 1_10		350	660	1200	4000	5'	3'	90	1200	6500	7500	97	1.33	1.53	1.88	3.24
TR 160 2_9		350	660	1200	3000	5'	3'	83.5	1200	6500	7500	94	7.51	7.72	8.07	9.42
TR 160 2_12		700	950	1800	3000	5'	3'	83.5	1200	6500	7500	94	7.10	7.30	7.65	9.01
TR 160 2_15		700	950	1800	3000	5'	3'	83.5	1200	6500	7500	94	6.94	7.15	7.50	8.85
TR 160 2_16		700	950	1800	3500	5'	3'	83.5	1200	6500	7500	94	3.95	4.16	4.51	5.86
TR 160 2_20		700	950	1800	3500	5'	3'	83.5	1200	6500	7500	94	2.82	3.02	3.37	4.73
TR 160 2_25		700	950	1800	3500	5'	3'	83.5	1200	6500	7500	94	2.76	2.97	3.32	4.67
TR 160 2_28		700	950	1800	4000	5'	3'	83.5	1200	6500	7500	94	1.79	2.00	2.35	3.70
TR 160 2_30		350	660	1200	4000	5'	3'	83.5	1200	6500	7500	94	1.25	1.46	1.81	3.16
TR 160 2_35		700	950	1800	4000	5'	3'	83.5	1200	6500	7500	94	1.77	1.97	2.32	3.68
TR 160 2_36		500	750	1400	3500	5'	3'	83.5	1200	6500	7500	94	1.06	1.27	1.62	2.97
TR 160 2_40		700	950	1800	4000	5'	3'	83.5	1200	6500	7500	94	1.21	1.42	1.77	3.12
TR 160 2_50		700	950	1800	4000	5'	3'	83.5	1200	6500	7500	94	1.20	1.40	1.75	3.11
TR 160 2_70		700	950	1800	4000	5'	3'	83.5	1200	6500	7500	94	1.18	1.39	1.74	3.09
TR 160 2_100		350	660	1200	4000	5'	3'	83.5	1200	6500	7500	94	1.18	1.38	1.73	3.09
TR 160 3_48		700	950	1800	3500	7'	5'	60	1200	6500	7500	91	4.10	4.31	4.66	6.01
TR 160 3_64		700	950	1800	3500	7'	5'	60	1200	6500	7500	91	3.90	4.11	4.46	5.81
TR 160 3_75		700	950	1800	3500	7'	5'	60	1200	6500	7500	91	2.91	3.11	3.46	4.82
TR 160 3_80		700	950	1800	3500	7'	5'	60	1200	6500	7500	91	3.90	4.11	4.46	5.81
TR 160 3_84		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.84	2.05	2.40	3.75
TR 160 3_90		350	660	1200	4000	7'	5'	60	1200	6500	7500	91	1.24	1.45	1.80	3.15
TR 160 3_120		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.23	1.44	1.79	3.14
TR 160 3_125		700	950	1800	3500	7'	5'	60	1200	6500	7500	91	2.74	2.95	3.30	4.65
TR 160 3_140		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.78	1.98	2.33	3.69
TR 160 3_150		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.23	1.44	1.79	3.14
TR 160 3_160		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.20	1.41	1.76	3.11
TR 160 3_175		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.76	1.96	2.31	3.67
TR 160 3_200		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.20	1.41	1.76	3.11
TR 160 3_210		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.23	1.44	1.79	3.14
TR 160 3_250		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.19	1.40	1.75	3.10
TR 160 3_280		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.18	1.39	1.74	3.09
TR 160 3_350		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.18	1.39	1.74	3.09
TR 160 3_400		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.18	1.38	1.73	3.09
TR 160 3_500		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.18	1.38	1.73	3.09
TR 160 3_700		700	950	1800	4000	7'	5'	60	1200	6500	7500	91	1.18	1.38	1.73	3.09
TR 160 3_1000		350	660	1200	4000	7'	5'	60	1200	6500	7500	91	1.18	1.38	1.73	3.09



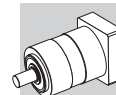
# TR G 160

## 55A1...180A1

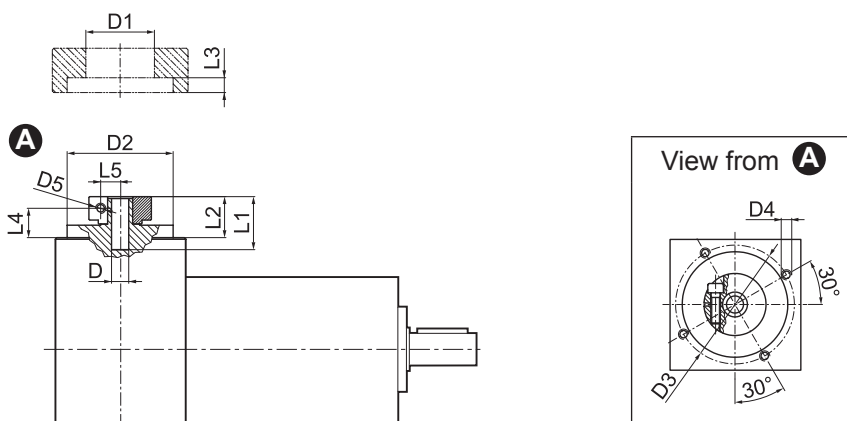


	Kg
TR G 160 2	24
TR G 160 3	28
TR G 160 4	34

											N	N1	N2	N3	N4	N5	L <sub>max</sub>
	14	15.875	16	19													
<b>55A1</b>	14	15.875	16	19	-	-	-	-	-	-	55.5	125.7	140	5	M6x15	39.5	50
<b>80A2</b>	14	15.875	16	19	-	-	-	-	-	-	80	100	140	5	M6x15	39.5	50
<b>95A1</b>	14	15.875	16	19	22	24	-	-	-	-	95	115	140	5	M8x20	39.5	50
<b>110A1</b>	14	15.875	16	19	22	24	-	-	-	-	110	130	140	5	M8x20	39.5	50
<b>110B1</b>	14	15.875	16	19	22	24	-	-	-	-	110	145	140	6.5	M8x20	49.5	60
<b>114A</b>	14	15.875	16	19	22	24	28	32	35	38	114.3	200	170	6.5	M12x25	69.5	80
<b>130A</b>	14	15.875	16	19	22	24	-	-	-	-	130	165	140	5	M10x20	39.5	50
<b>130A1</b>	14	15.875	16	19	22	24	28	32	-	-	130	165	140	5	M10x20	49.5	60
<b>180A</b>	14	15.875	16	19	22	24	28	32	-	-	180	215	190	6.5	M14x25	49.5	60
<b>180A1</b>	14	15.875	16	19	22	24	28	32	35	38	180	215	190	6.5	M14x25	69.5	80

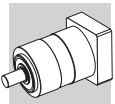


## FM



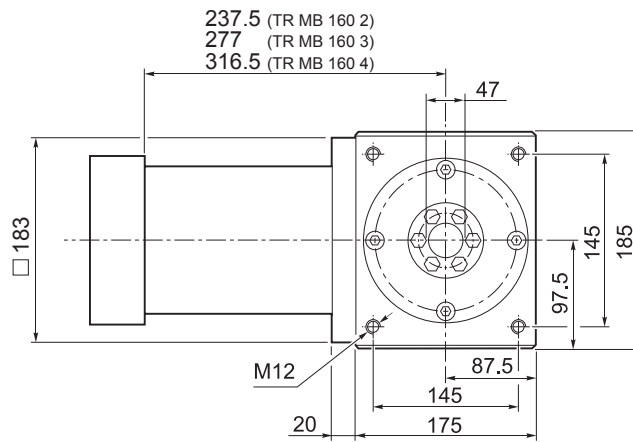
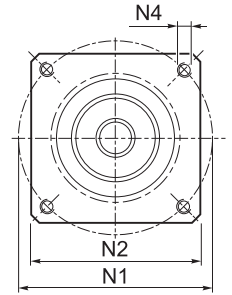
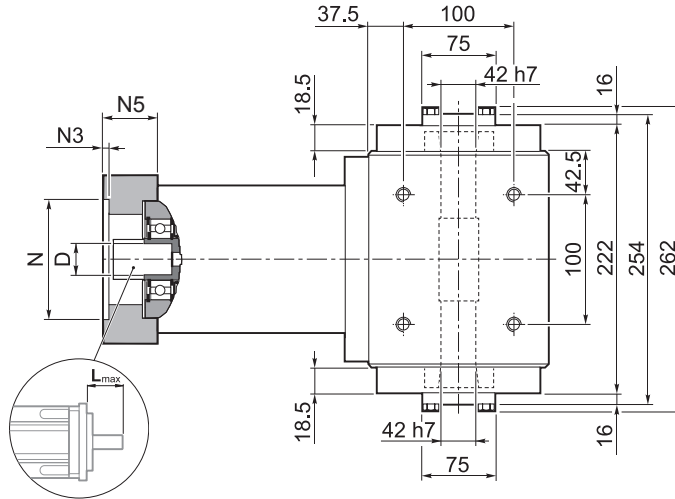
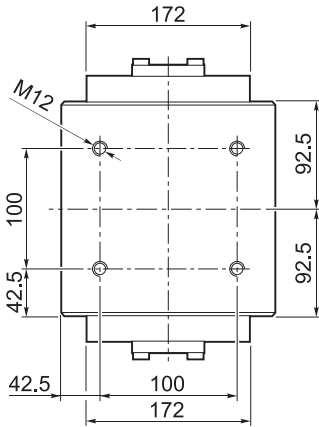
D	D		D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
	14 ... 19	20 ... 38										
14	15.875	16	48	130	142.5	M8x16	M6	40	27.5	6	20	14.5
19			51	130	142.5	M8x16	M6	40	27.5	6	20	16.5
22	24		56.5	130	142.5	M8x16	M6	41	28.5	6	19.5	19
28			67	130	142.5	M8x16	M8	41	28.5	6	19.5	22.5
32			71	130	142.5	M8x16	M8	41	28.5	6	19.5	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

i	M <sub>N 2</sub> [Nm]	M <sub>a 2</sub> [Nm]	M <sub>p 2</sub> [Nm]	n <sub>1 max</sub> [min <sup>-1</sup> ]	φ <sub>S</sub> [arcmin]	φ <sub>R</sub> [arcmin]	C <sub>t</sub> [Nm/arcmin]	R <sub>2 max</sub> [N]	A <sub>2 max</sub> [N]	η %	J <sub>G</sub> [kgcm <sup>2</sup> ]			
											D			
											14 ... 19	22 - 24	28 - 32	35 - 38
TR G 160 2_3	350	660	1200	3000	5'	3'	90	6500	7500	94	10.23	10.42	10.80	13.51
TR G 160 2_4	500	750	1400	3500	5'	3'	90	6500	7500	94	6.52	6.71	7.09	9.80
TR G 160 2_5	500	750	1400	3500	5'	3'	90	6500	7500	94	5.87	6.06	6.45	9.16
TR G 160 2_6	500	750	1400	3500	5'	3'	90	6500	7500	94	4.58	4.77	5.16	7.86
TR G 160 2_7	500	750	1400	4000	5'	3'	90	6500	7500	94	5.29	5.48	5.87	8.57
TR G 160 2_10	350	660	1200	4000	5'	3'	90	6500	7500	94	4.97	5.16	5.54	8.25
TR G 160 3_9	350	660	1200	3000	5'	3'	83.5	6500	7500	91	9.35	9.54	9.92	12.63
TR G 160 3_12	700	950	1800	3000	5'	3'	83.5	6500	7500	91	8.78	8.97	9.36	12.07
TR G 160 3_15	700	950	1800	3000	5'	3'	83.5	6500	7500	91	8.71	8.90	9.29	11.99
TR G 160 3_16	700	950	1800	3500	5'	3'	83.5	6500	7500	91	5.79	5.98	6.36	9.07
TR G 160 3_20	700	950	1800	3500	5'	3'	83.5	6500	7500	91	5.41	6.20	6.59	9.30
TR G 160 3_25	700	950	1800	3500	5'	3'	83.5	6500	7500	91	5.95	5.54	5.93	8.64
TR G 160 3_28	700	950	1800	4000	5'	3'	83.5	6500	7500	91	5.05	5.24	5.63	8.33
TR G 160 3_30	350	660	1200	4000	5'	3'	83.5	6500	7500	91	4.89	5.09	5.47	8.18
TR G 160 3_35	700	950	1800	4000	5'	3'	83.5	6500	7500	91	5.36	5.54	5.93	8.64
TR G 160 3_36	500	750	1400	3500	5'	3'	83.5	6500	7500	91	4.32	4.51	4.90	7.60
TR G 160 3_40	700	950	1800	4000	5'	3'	83.5	6500	7500	91	5.00	5.19	5.58	8.28
TR G 160 3_50	700	950	1800	4000	5'	3'	83.5	6500	7500	91	4.99	5.18	5.56	8.27
TR G 160 3_70	700	950	1800	4000	5'	3'	83.5	6500	7500	91	4.82	5.02	5.40	8.11
TR G 160 3_100	350	660	1200	4000	5'	3'	83.5	6500	7500	91	4.82	5.01	5.39	8.10
TR G 160 4_48	700	950	1800	3500	7'	5'	60	6500	7500	89	5.94	6.13	6.53	9.22
TR G 160 4_64	700	950	1800	3500	7'	5'	60	6500	7500	89	5.74	5.93	6.31	9.02
TR G 160 4_75	700	950	1800	3500	7'	5'	60	6500	7500	89	5.50	5.68	6.07	8.79
TR G 160 4_80	700	950	1800	3500	7'	5'	60	6500	7500	89	5.74	5.93	6.31	9.02
TR G 160 4_84	700	950	1800	4000	7'	5'	60	6500	7500	89	5.10	5.29	5.68	8.38
TR G 160 4_90	350	660	1200	4000	7'	5'	60	6500	7500	89	4.88	5.08	5.46	8.17
TR G 160 4_120	700	950	1800	4000	7'	5'	60	6500	7500	89	4.87	5.07	5.45	8.16
TR G 160 4_125	700	950	1800	3500	7'	5'	60	6500	7500	89	5.33	5.52	5.91	8.62
TR G 160 4_140	700	950	1800	4000	7'	5'	60	6500	7500	89	5.04	5.22	5.61	8.32
TR G 160 4_150	700	950	1800	4000	7'	5'	60	6500	7500	89	4.87	5.07	5.45	8.16
TR G 160 4_160	700	950	1800	4000	7'	5'	60	6500	7500	89	4.84	5.04	5.42	8.13
TR G 160 4_175	700	950	1800	4000	7'	5'	60	6500	7500	89	5.02	5.20	5.59	8.30
TR G 160 4_200	700	950	1800	4000	7'	5'	60	6500	7500	89	4.84	5.04	5.42	8.13
TR G 160 4_210	700	950	1800	4000	7'	5'	60	6500	7500	89	4.87	5.07	5.45	8.16
TR G 160 4_250	700	950	1800	4000	7'	5'	60	6500	7500	89	4.83	5.03	5.41	8.12
TR G 160 4_280	700	950	1800	4000	7'	5'	60	6500	7500	89	4.82	5.02	5.40	8.11
TR G 160 4_350	700	950	1800	4000	7'	5'	60	6500	7500	89	4.82	2.05	5.40	8.11
TR G 160 4_400	700	950	1800	4000	7'	5'	60	6500	7500	89	4.82	5.01	5.39	8.11
TR G 160 4_500	700	950	1800	4000	7'	5'	60	6500	7500	89	4.82	5.01	5.39	8.11
TR G 160 4_700	700	950	1800	4000	7'	5'	60	6500	7500	89	4.82	5.01	5.39	8.11
TR G 160 4_1000	350	660	1200	4000	7'	5'	60	6500	7500	89	4.82	5.01	5.39	8.11



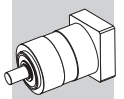
# TR MB 160

## 55A1 ... 180A1

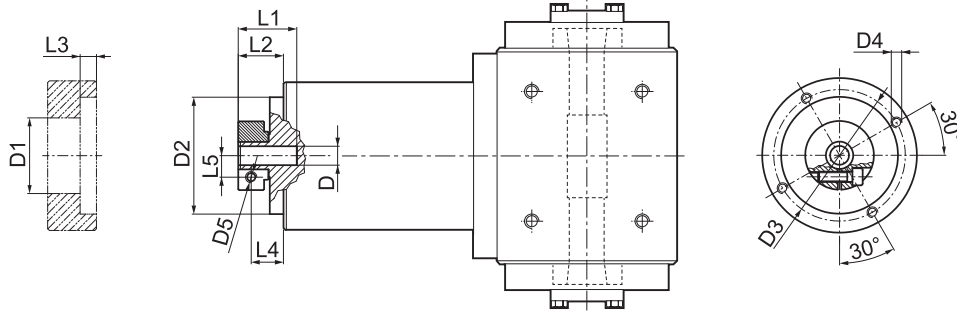



TR MB 160 2	54
TR MB 160 3	58
TR MB 160 4	61

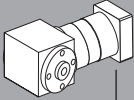

											N	N1	N2	N3	N4	N5	L <sub>max</sub>
	D																
55A1	14	15.875	16	19	-	-	-	-	-	-	55.5	125.7	140	5	M6x15	39.5	50
80A2	14	15.875	16	19	-	-	-	-	-	-	80	100	140	5	M6x15	39.5	50
95A1	14	15.875	16	19	22	24	-	-	-	-	95	115	140	5	M8x20	39.5	50
110A1	14	15.875	16	19	22	24	-	-	-	-	110	130	140	5	M8x20	39.5	50
110B1	14	15.875	16	19	22	24	-	-	-	-	110	145	140	6.5	M8x20	49.5	60
114A	14	15.875	16	19	22	24	28	32	35	38	114.3	200	170	6.5	M12x25	69.5	80
130A	14	15.875	16	19	22	24	-	-	-	-	130	165	140	5	M10x20	39.5	50
130A1	14	15.875	16	19	22	24	28	32	-	-	130	165	140	5	M10x20	49.5	60
180A	14	15.875	16	19	22	24	28	32	-	-	180	215	190	6.5	M14x25	49.5	60
180A1	14	15.875	16	19	22	24	28	32	35	38	180	215	190	6.5	M14x25	69.5	80

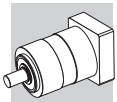


## FM



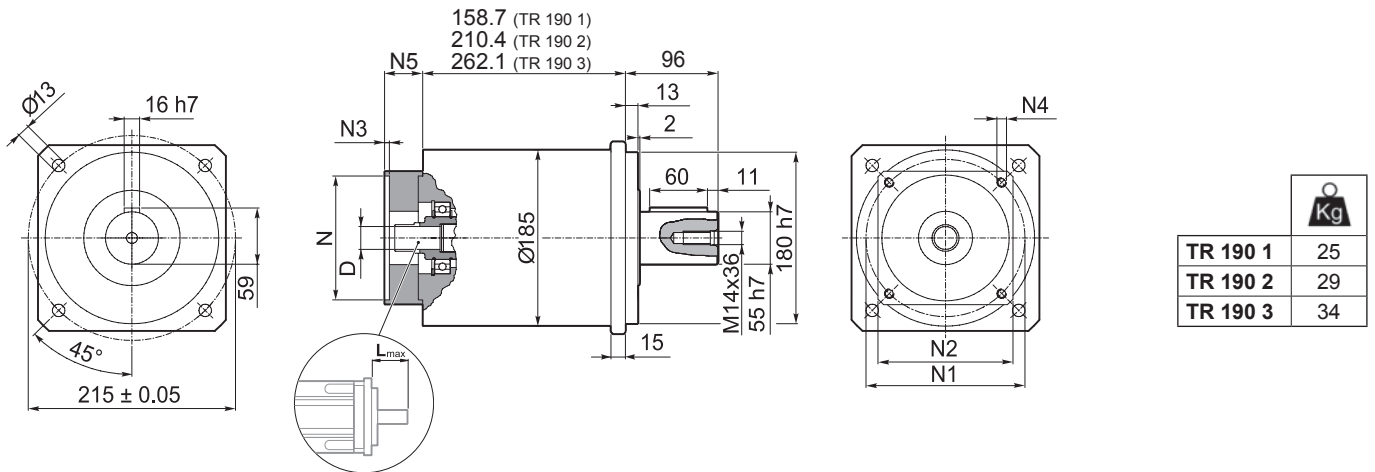
	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
14 15.875 16	48	130	142.5	M8x16	M6	40	27.5	6	20	14.5
19	51	130	142.5	M8x16	M6	40	27.5	6	20	16.5
22 24	56.5	130	142.5	M8x16	M6	41	28.5	6	19.5	19
28	67	130	142.5	M8x16	M8	41	28.5	6	19.5	22.5
32	71	130	142.5	M8x16	M8	41	28.5	6	19.5	24.5
35	73	130	142.5	M8x16	M8	50	37.5	11.25	26	26
38	77.5	130	142.5	M8x16	M8	50	37.5	11.25	26	28

	$M_{n2}$	$M_{a2}$	$M_{p2}$	$n_{1 \max}$	$\varphi_S$	$\varphi_R$	$C_t$	$\eta$	$J_G$ [kgcm <sup>2</sup> ]			
									$D$ 	14 ... 19	22 - 24	28 - 32
$i$	[Nm]	[Nm]	[Nm]	[min <sup>-1</sup> ]	[arcmin]	[arcmin]	$\left[ \frac{Nm}{arcmin} \right]$	%				
TR MB 160 2_3	350	660	1200	3000	5'	3'	90	94	8.39	8.60	8.95	10.30
TR MB 160 2_4	500	750	1400	3500	5'	3'	90	94	4.68	4.89	5.24	6.59
TR MB 160 2_5	500	750	1400	3500	5'	3'	90	94	3.28	3.49	3.84	5.19
TR MB 160 2_6	500	750	1400	3500	5'	3'	90	94	1.32	1.53	1.88	3.23
TR MB 160 2_7	500	750	1400	4000	5'	3'	90	94	2.03	2.24	2.59	3.94
TR MB 160 2_10	350	660	1200	4000	5'	3'	90	94	1.33	1.53	1.88	3.24
TR MB 160 3_9	350	660	1200	3000	5'	3'	83	91	7.51	7.72	8.07	9.42
TR MB 160 3_12	700	950	1800	3000	5'	3'	83	91	7.10	7.30	7.65	9.01
TR MB 160 3_15	700	950	1800	3000	5'	3'	83	91	6.94	7.15	7.50	8.85
TR MB 160 3_16	700	950	1800	3500	5'	3'	83	91	3.95	4.16	4.51	5.86
TR MB 160 3_20	700	950	1800	3500	5'	3'	83	91	2.82	3.02	3.37	4.73
TR MB 160 3_25	700	950	1800	3500	5'	3'	83	91	2.76	2.97	3.32	4.67
TR MB 160 3_28	700	950	1800	4000	5'	3'	83	91	1.79	2.00	2.35	3.70
TR MB 160 3_30	350	660	1200	4000	5'	3'	83	91	1.25	1.46	1.81	3.16
TR MB 160 3_35	700	950	1800	4000	5'	3'	83	91	1.77	1.97	2.32	3.68
TR MB 160 3_36	500	750	1400	3500	5'	3'	83	91	1.06	1.27	1.62	2.97
TR MB 160 3_40	700	950	1800	4000	5'	3'	83	91	1.21	1.42	1.77	3.12
TR MB 160 3_50	700	950	1800	4000	5'	3'	83	91	1.20	1.40	1.75	3.11
TR MB 160 3_70	700	950	1800	4000	5'	3'	83	91	1.18	1.39	1.74	3.09
TR MB 160 3_100	350	660	1200	4000	5'	3'	83	91	1.18	1.38	1.73	3.09
TR MB 160 4_48	700	950	1800	3500	7'	5'	60	89	4.10	4.31	4.66	6.01
TR MB 160 4_64	700	950	1800	3500	7'	5'	60	89	3.90	4.11	4.46	5.81
TR MB 160 4_75	700	950	1800	3500	7'	5'	60	89	2.91	3.11	3.46	4.82
TR MB 160 4_80	700	950	1800	3500	7'	5'	60	89	3.90	4.11	4.46	5.81
TR MB 160 4_84	700	950	1800	4000	7'	5'	60	89	1.84	2.05	2.40	3.75
TR MB 160 4_90	350	660	1200	4000	7'	5'	60	89	1.24	1.45	1.80	3.15
TR MB 160 4_120	700	950	1800	4000	7'	5'	60	89	1.23	1.44	1.79	3.14
TR MB 160 4_125	700	950	1800	3500	7'	5'	60	89	2.74	2.95	3.30	4.65
TR MB 160 4_140	700	950	1800	4000	7'	5'	60	89	1.78	1.98	2.33	3.69
TR MB 160 4_150	700	950	1800	4000	7'	5'	60	89	1.23	1.44	1.79	3.14
TR MB 160 4_160	700	950	1800	4000	7'	5'	60	89	1.20	1.41	1.76	3.11
TR MB 160 4_175	700	950	1800	4000	7'	5'	60	89	1.76	1.96	2.31	3.67
TR MB 160 4_200	700	950	1800	4000	7'	5'	60	89	1.20	1.41	1.76	3.11
TR MB 160 4_210	700	950	1800	4000	7'	5'	60	89	1.23	1.44	1.79	3.14
TR MB 160 4_250	700	950	1800	4000	7'	5'	60	89	1.19	1.40	1.75	3.10
TR MB 160 4_280	700	950	1800	4000	7'	5'	60	89	1.18	1.39	1.74	3.09
TR MB 160 4_350	700	950	1800	4000	7'	5'	60	89	1.18	1.39	1.74	3.09
TR MB 160 4_400	700	950	1800	4000	7'	5'	60	89	1.18	1.38	1.73	3.09
TR MB 160 4_500	700	950	1800	4000	7'	5'	60	89	1.18	1.38	1.73	3.09
TR MB 160 4_700	700	950	1800	4000	7'	5'	60	89	1.18	1.38	1.73	3.09
TR MB 160 4_1000	350	660	1200	4000	7'	5'	60	89	1.18	1.38	1.73	3.09



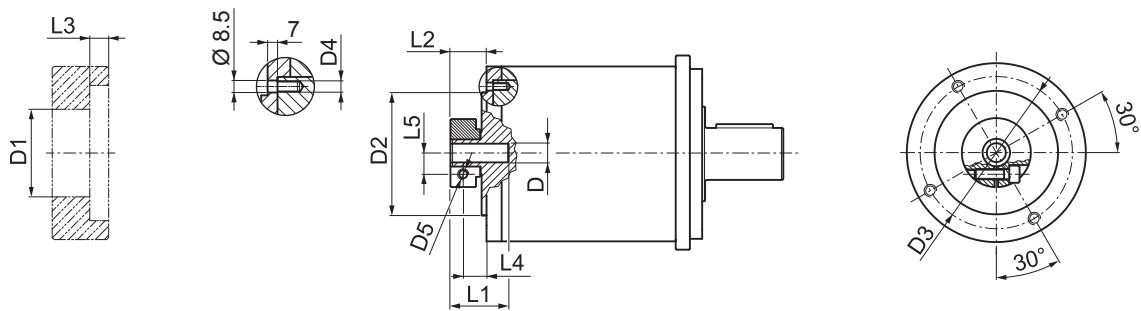
# TR 190

## 55A1 ... 180A1

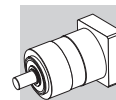


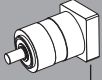
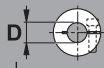
												N	N1	N2	N3	N4	N5	L <sub>max</sub>
<b>55A1</b>	14	16	19	-	-	-	-	-	-	-	-	55.5	125.7	140	5	M6x15	39.5	50
<b>80A2</b>	14	16	19	-	-	-	-	-	-	-	-	80	100	140	5	M6x15	39.5	50
<b>95A1</b>	14	16	19	22	24	-	-	-	-	-	-	95	115	140	5	M8x20	39.5	50
<b>110A1</b>	14	16	19	22	24	-	-	-	-	-	-	110	130	140	5	M8x20	39.5	50
<b>110B1</b>	14	16	19	22	24	-	-	-	-	-	-	110	145	140	6.5	M8x20	49.5	60
<b>114A</b>	14	16	19	22	24	28	32	35	38	42	45	114.3	200	170	6.5	M12x25	69.5	80
<b>130A</b>	14	16	19	22	24	-	-	-	-	-	-	130	165	140	5	M10x20	39.5	50
<b>130A1</b>	14	16	19	22	24	28	32	-	-	-	-	130	165	140	5	M10x20	49.5	60
<b>180A</b>	14	16	19	22	24	28	32	-	-	-	-	180	215	190	6.5	M14x25	49.5	60
<b>180A1</b>	14	16	19	22	24	28	32	35	38	42	45	180	215	190	6.5	M14x25	69.5	80

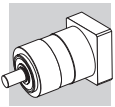
## FM




	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5
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



 i	$M_{n2}$	$M_{a2}$	$M_{p2}$	$n_{1max}$	$\varphi_S$	$\varphi_R$	$C_t$	$R_{2max}$	$A_{2max}$	$\eta$	$J_G$ [kgcm <sup>2</sup> ]				
	[Nm]	[Nm]	[Nm]	[min <sup>-1</sup> ]	[arcmin]	[arcmin]	$\left[ \frac{Nm}{arcmin} \right]$	[N]	[N]	%	14 ... 24	28 - 32	 35 - 35	42	45 - 48
TR 190 1_3	500	800	1400	2500	5'	3'	130	14000	15000	97	24.20	24.88	25.65	29.30	29.90
TR 190 1_4	700	950	1800	3000	5'	3'	130	14000	15000	97	13.41	14.09	14.85	18.51	19.11
TR 190 1_5	700	950	1800	3000	5'	3'	130	14000	15000	97	9.32	10.00	10.77	14.42	15.02
TR 190 1_6	700	950	1800	3000	5'	3'	130	14000	15000	97	2.88	3.56	4.33	7.98	8.58
TR 190 1_7	700	950	1800	3500	5'	3'	130	14000	15000	97	5.68	6.36	7.13	10.78	11.38
TR 190 1_10	500	800	1400	3500	5'	3'	130	14000	15000	97	3.57	4.25	5.02	8.67	9.27
TR 190 2_9	500	800	1400	2500	5'	3'	100	14000	15000	94	23.23	23.91	24.67	28.33	28.93
TR 190 2_12	1000	1200	2200	2500	5'	3'	100	14000	15000	94	22.03	22.71	23.48	27.13	27.73
TR 190 2_15	1000	1200	2200	2500	5'	3'	100	14000	15000	94	21.58	22.25	23.02	26.68	27.27
TR 190 2_16	1000	1200	2200	3000	5'	3'	100	14000	15000	94	12.19	12.86	13.63	17.29	17.89
TR 190 2_20	1000	1200	2200	3000	5'	3'	100	14000	15000	94	8.54	9.22	9.98	13.64	14.24
TR 190 2_25	1000	1200	2200	3000	5'	3'	100	14000	15000	94	8.37	9.05	9.82	13.48	14.07
TR 190 2_28	1000	1200	2200	3500	5'	3'	100	14000	15000	94	5.28	5.96	6.73	10.38	10.98
TR 190 2_30	500	800	1400	3500	5'	3'	100	14000	15000	94	3.48	4.16	4.93	8.58	9.18
TR 190 2_35	1000	1200	2200	3500	5'	3'	100	14000	15000	94	5.20	5.87	6.64	10.30	10.90
TR 190 2_36	700	950	1800	3000	5'	3'	100	14000	15000	94	2.18	2.86	3.63	7.28	7.88
TR 190 2_40	1000	1200	2200	3500	5'	3'	100	14000	15000	94	3.37	4.05	4.82	8.48	9.07
TR 190 2_50	1000	1200	2200	3500	5'	3'	100	14000	15000	94	3.33	4.01	4.78	8.44	9.03
TR 190 2_70	1000	1200	2200	3500	5'	3'	100	14000	15000	94	3.30	3.97	4.74	8.40	9.00
TR 190 2_100	500	800	1400	3500	5'	3'	100	14000	15000	94	3.28	3.95	4.72	8.38	8.98
TR 190 3_48	1000	1200	2200	3000	7'	5'	90	14000	15000	91	12.73	13.40	14.17	17.83	18.43
TR 190 3_64	1000	1200	2200	3000	7'	5'	90	14000	15000	91	12.10	12.78	13.55	17.21	17.80
TR 190 3_75	1000	1200	2200	3000	7'	5'	90	14000	15000	91	8.86	9.54	10.31	13.97	14.56
TR 190 3_80	1000	1200	2200	3000	7'	5'	90	14000	15000	91	12.09	12.76	13.53	17.19	17.79
TR 190 3_84	1000	1200	2200	3500	7'	5'	90	14000	15000	91	5.46	6.13	6.90	10.56	11.16
TR 190 3_90	500	800	1400	3500	7'	5'	90	14000	15000	91	3.47	4.15	4.92	8.57	9.17
TR 190 3_120	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.46	4.14	4.91	8.56	9.16
TR 190 3_125	1000	1200	2200	3000	7'	5'	90	14000	15000	91	8.34	9.01	9.78	13.44	14.04
TR 190 3_140	1000	1200	2200	3500	7'	5'	90	14000	15000	91	5.25	5.92	6.69	10.35	10.95
TR 190 3_150	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.46	4.13	4.90	8.56	9.15
TR 190 3_160	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.36	4.04	4.81	8.46	9.06
TR 190 3_175	1000	1200	2200	3500	7'	5'	90	14000	15000	91	5.18	5.85	6.62	10.28	10.88
TR 190 3_200	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.36	4.03	4.80	8.46	9.06
TR 190 3_210	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.45	4.13	4.90	8.55	9.15
TR 190 3_250	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.32	4.00	4.77	8.42	9.02
TR 190 3_280	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.29	3.97	4.74	8.39	8.99
TR 190 3_350	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.29	3.97	4.74	8.39	8.99
TR 190 3_400	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.27	3.95	4.72	8.38	8.97
TR 190 3_500	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.27	3.95	4.72	8.38	8.97
TR 190 3_700	1000	1200	2200	3500	7'	5'	90	14000	15000	91	3.27	3.95	4.72	8.38	8.97
TR 190 3_1000	500	800	1400	3500	7'	5'	90	14000	15000	91	3.27	3.95	4.72	8.38	8.97



## INDEX OF REVISIONS (R)

R2	
	Description
4	Sect 1.2 "Selecting the gear unit": - new selection procedure
6	Sect. 1.3 "Service life of bearings": - new calculation procedure
8 ... 9	Sect 2 "Features of TR series": - updated the whole chapter
10	Sect 3 "Ordering code": - updated product designation
12 ... 45	Sect. 5 "Dimensions and technical specifications": - new designation of motor adapters

120118

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