SPINEA
EXCELLENCE IN MOTION

NEW TwinSpin G

Perfection improved

TwinSpin **G**

A New Generation of Reduction Gears

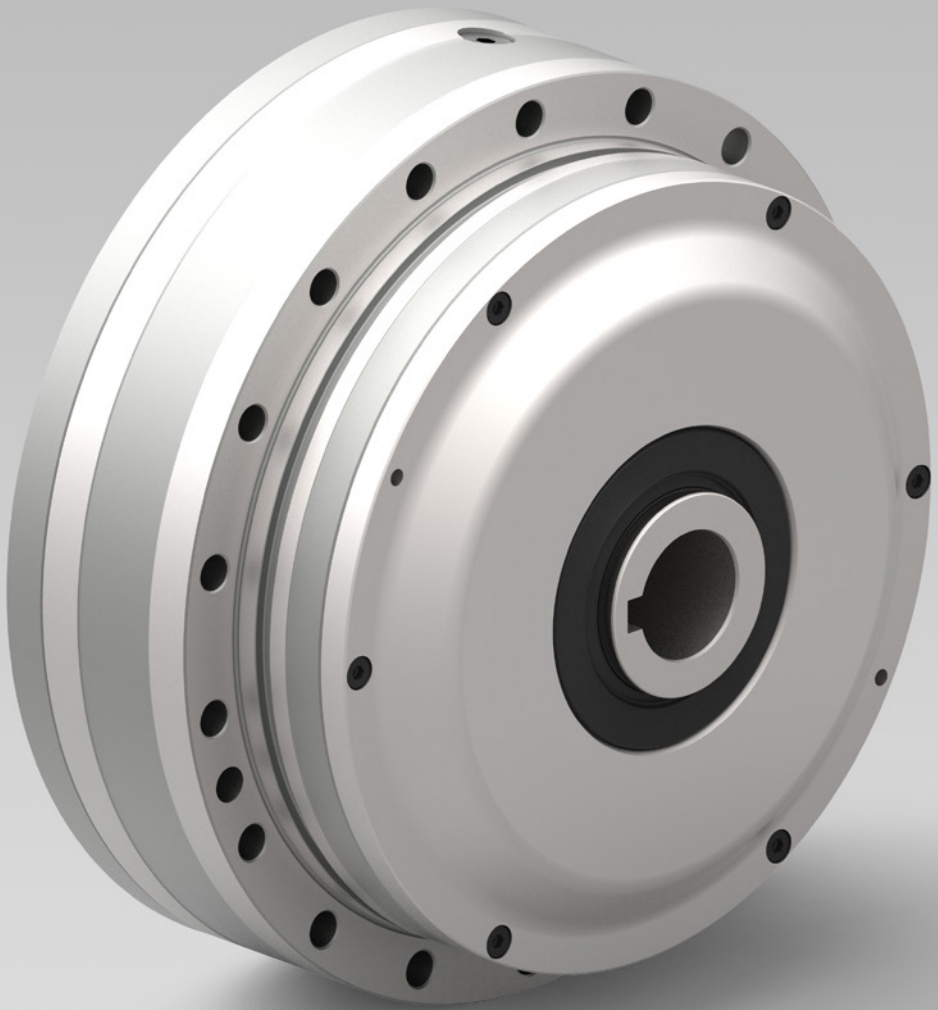
Edition I / 2014

SPINEA is a modern
Slovak engineering company,
involved in the development,
manufacture and sales
of high-precision reduction
gears, sold under
the TwinSpin brand.

The invention of a new transmission principle was an impulse for the company´s establishment in 1994.

The high precision reduction gear TwinSpin belongs to a category of Hi-Tech products and represents a unique technical solution, integrating radial-axial bearings with a high precision reduction gear into a single compact unit.

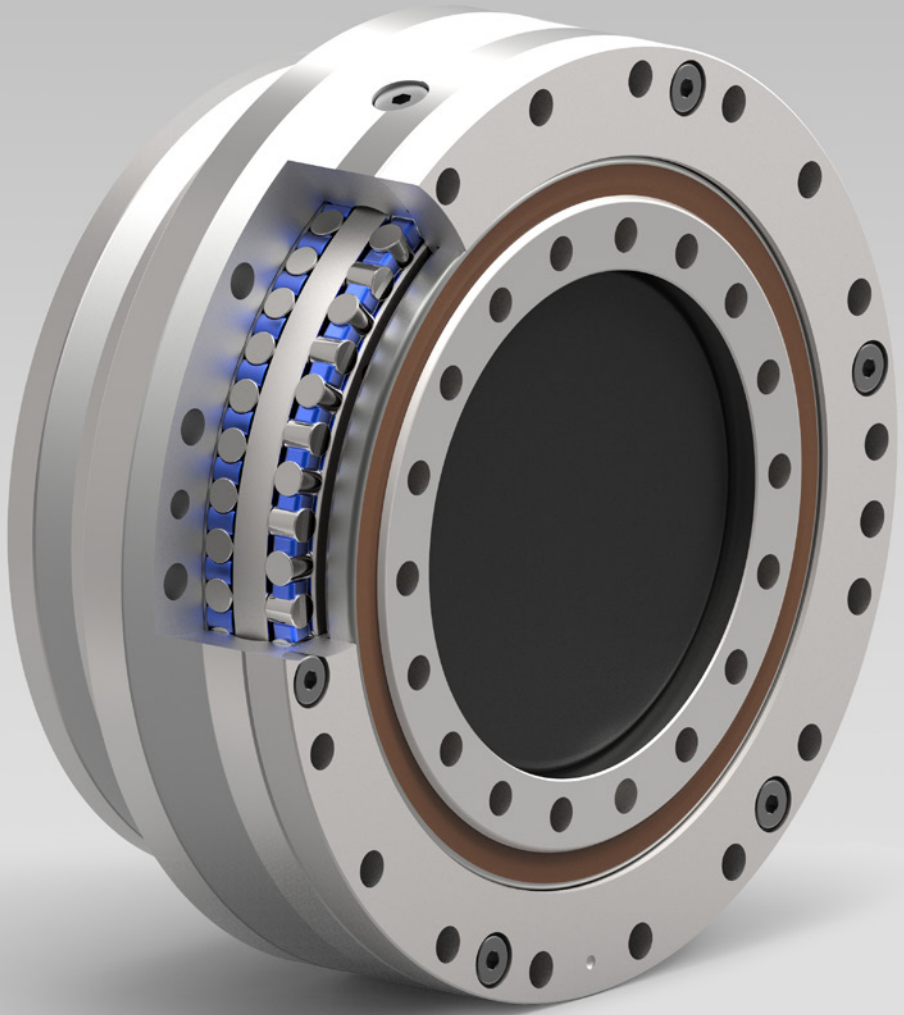
The products of the company are suitable for applications, that require high reduction-gear ratio, high kinematic precision, zero-backlash motion, high torque capacity, high rigidity, a compact design in a limited installation space as well as low weight. They are widely used in automation and industrial robotics, manufacture of machine tools, navigation and camera equipment, medical systems, and many other fields.



A New Generation of **Reduction Gears**

A new generation of TwinSpin high-precision reduction gears with a new design of the main bearing and improved performance for the most demanding applications.

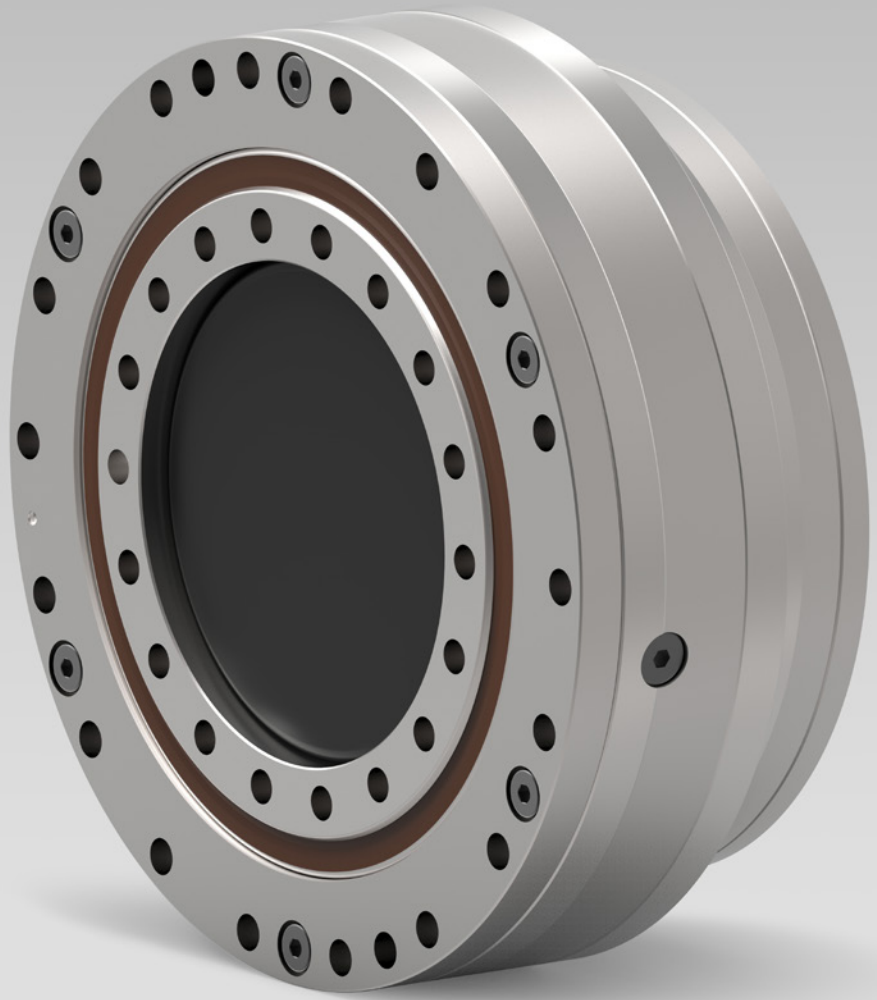
In the new generation, we have concentrated the results of several years of the development of the reduction gear's design, together with the implementation of the latest manufacturing processes and technologies.

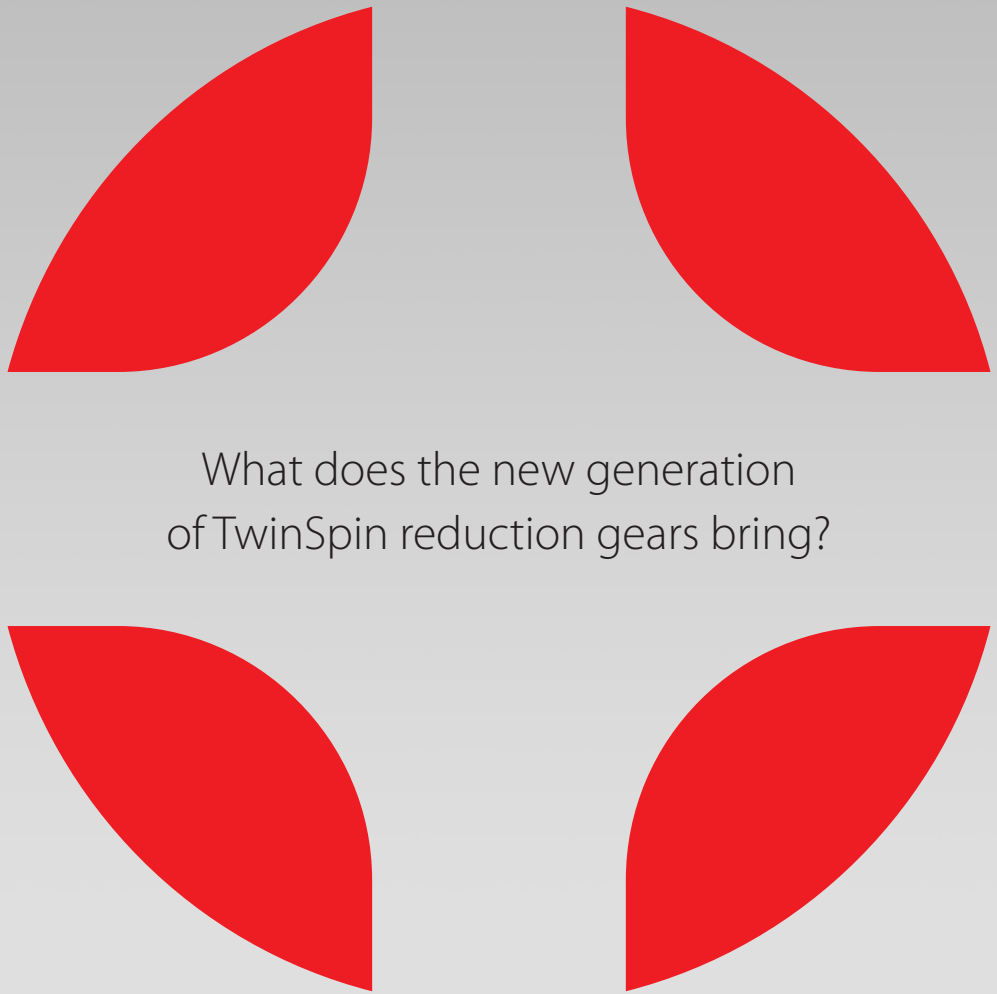


TS **G**
new series

A new series of the high precision reduction gears with an innovative design of the main bearing system and the TwinSpin reduction principle inside.

It comes in two variants, with sealed output only or as a fully sealed gear for direct connection with a motor.

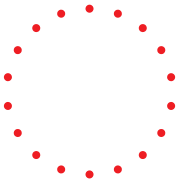




What does the new generation
of TwinSpin reduction gears bring?

Torque-to-weight ratio

The new generation of reduction gears brings a remarkable increase in the torque to weight ratio in comparison with the previous TwinSpin design.



Tilting Rigidity

Compared with the older TwinSpin generation, a double-digit increase in the tilting rigidity of individual reduction gear sizes has been achieved. The new robust design of the main bearing also allows the customization of the parameters of the main bearing to the customer´s needs.

High precision bearing

The main output bearing of the new generation of reduction gears can be manufactured with a very high precision of up to a few microns. Together with high stiffness, this brings cost benefits, especially to the machine tool industry.

Linearity of torsional characteristics

The high linearity of torsional characteristics, which reaches almost 100 % in the case of the new TwinSpin generation, is a characteristic feature of TwinSpin reduction gears.

Lower hysteresis / friction

The new design of the reduction gear has brought a significant decrease in hysteresis due to lower internal friction.

Lower lost motion

The new generation comes with a new optional standard of Lost Motion setting of less than 0,5 Arcmin, even in the smallest gear sizes.

New reduction gear sizes

They substantially widen the offer, particularly in the area of low and medium torques, compared to the original series.

Ready to use

The completely sealed variant can be used as a plug-and-play solution.
No additional support bearing or sealings are necessary.

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Examples of improvements

Torque to weight ratio

The new generation of reduction gears brings a remarkable increase in the torque to weight ratio in comparison with the previous TwinSpin design.

⇧ + 29%

TS 080 T – torque to weight ratio 47.6 Nm/kg
TS 085 G – torque to weight ratio 61.48 Nm/kg

⇧ + 71%

TS 110 T – torque to weight ratio 32.5 Nm/kg
TS 115 G – torque to weight ratio 55.81 Nm/kg

⇧ + 32%

TS 170 T – torque to weight ratio 44.7 Nm/kg
TS 175 G – torque to weight ratio 59.18 Nm/kg

Tilting rigidity

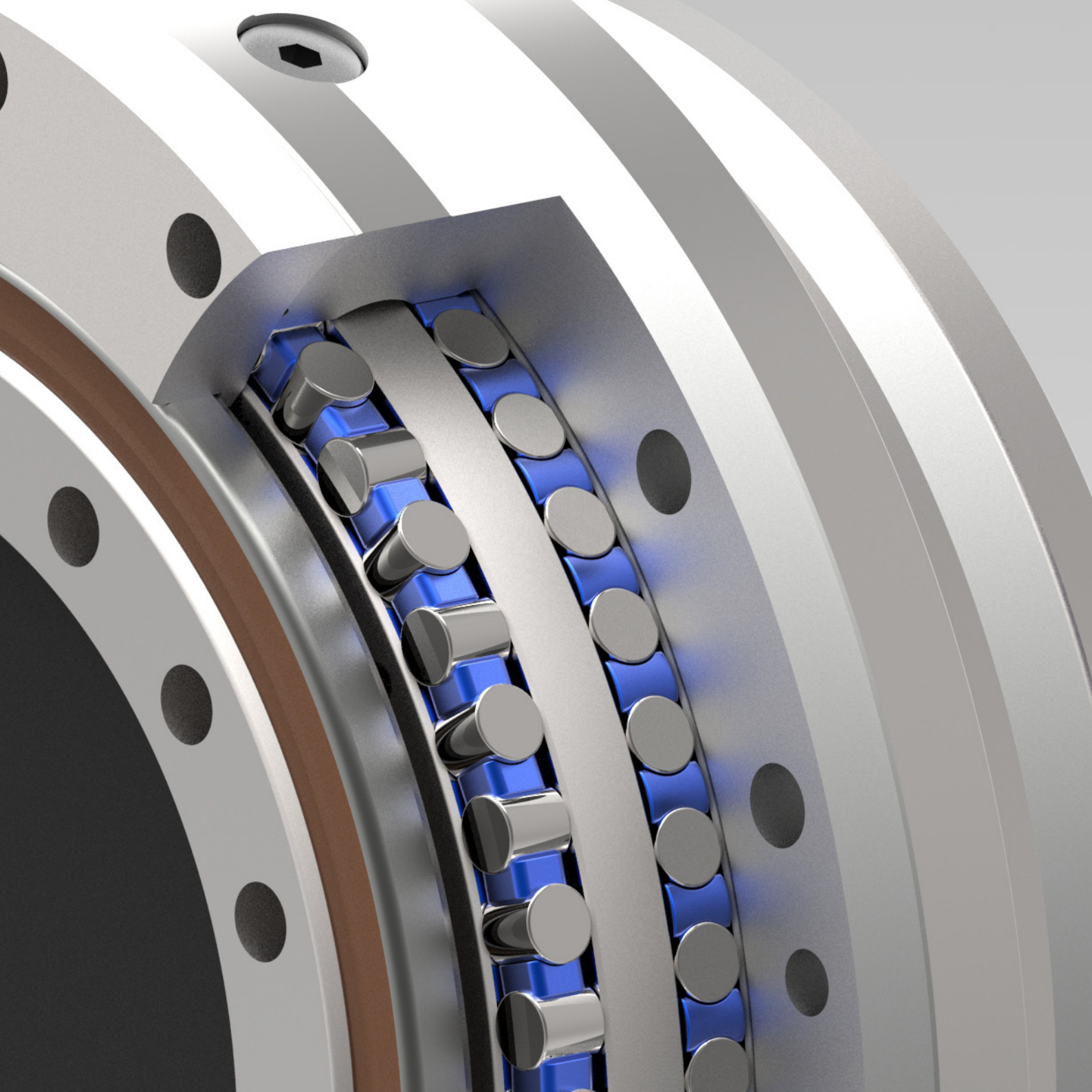
Compared with the older TwinSpin generation, a double-digit increase in the tilting rigidity of individual reduction gear sizes has been achieved. The new robust design of the main bearing also allows the customization of the parameters of the main bearing to the customer´s needs.

⇧ + 41%

TS 110 E – tilting rigidity 155 Nm/arcmin
TS 115 G – tilting rigidity 220 Nm/arcmin

⇧ + 30%

TS 200 E – tilting rigidity 1300 Nm/arcmin
TS 200 G – tilting rigidity 1700 Nm/arcmin



Specifications and Drawings

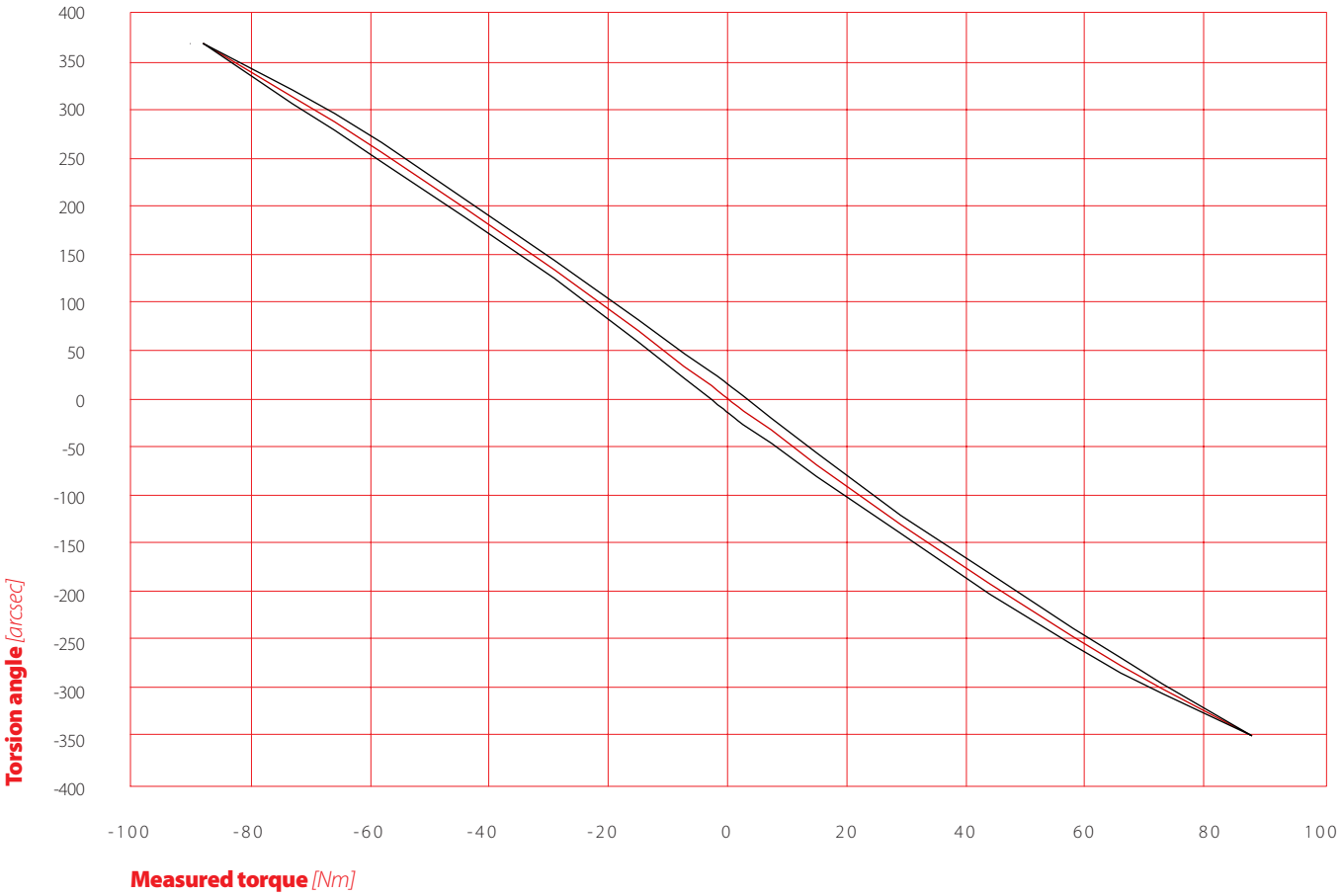
Specifications

Model	TS 075 G	TS 085 G	TS 095 G	TS 115 G	TS 135 G	TS 175 G	TS 184 G	TS 200 G
Ratio *[i]*	41 57 75	37 47 63 87	43 53 73 95	43 55 69 93 123	45 53 63 81 109 135	53 61 71 85 107 131	57 65 77 93 117 139	59 71 83 99 125
Rated torque [TR] *[Nm]*	34	75	85	173	250	580	780	950
Maximum acceleration torque *[Nm]*	68	150	170	346	625	1450	1950	2375
Rated input speed [nR] *[rpm]*	2000	2000	2000	2000	2000	2000	2000	2000
Torsional rigidity *[Nm/Arcmin]*	9	11.2	17	36	63	145	178	217
Torsional rigidity *[10^{4} Nm/rad]*	3.09	3.8	5.8	12.4	21.6	49.8	61	75
Tilting rigidity* *[Nm/Arcmin]*	53	58	130	220	440	1200	1300	1700
Input inertia *[10^{-4}kgm^{2}]*	0.019	0.034	0.12	0.29	0.71	2.04	1.98	2.94
Weight *[kg]*	0.92	1.22	1.80	3.10	4.90	9.80	11.80	15.40

Nominal life L10=6000 Hrs. Measured values are mean values.

**Presented series G is now coming with lightweight version of main bearing.*

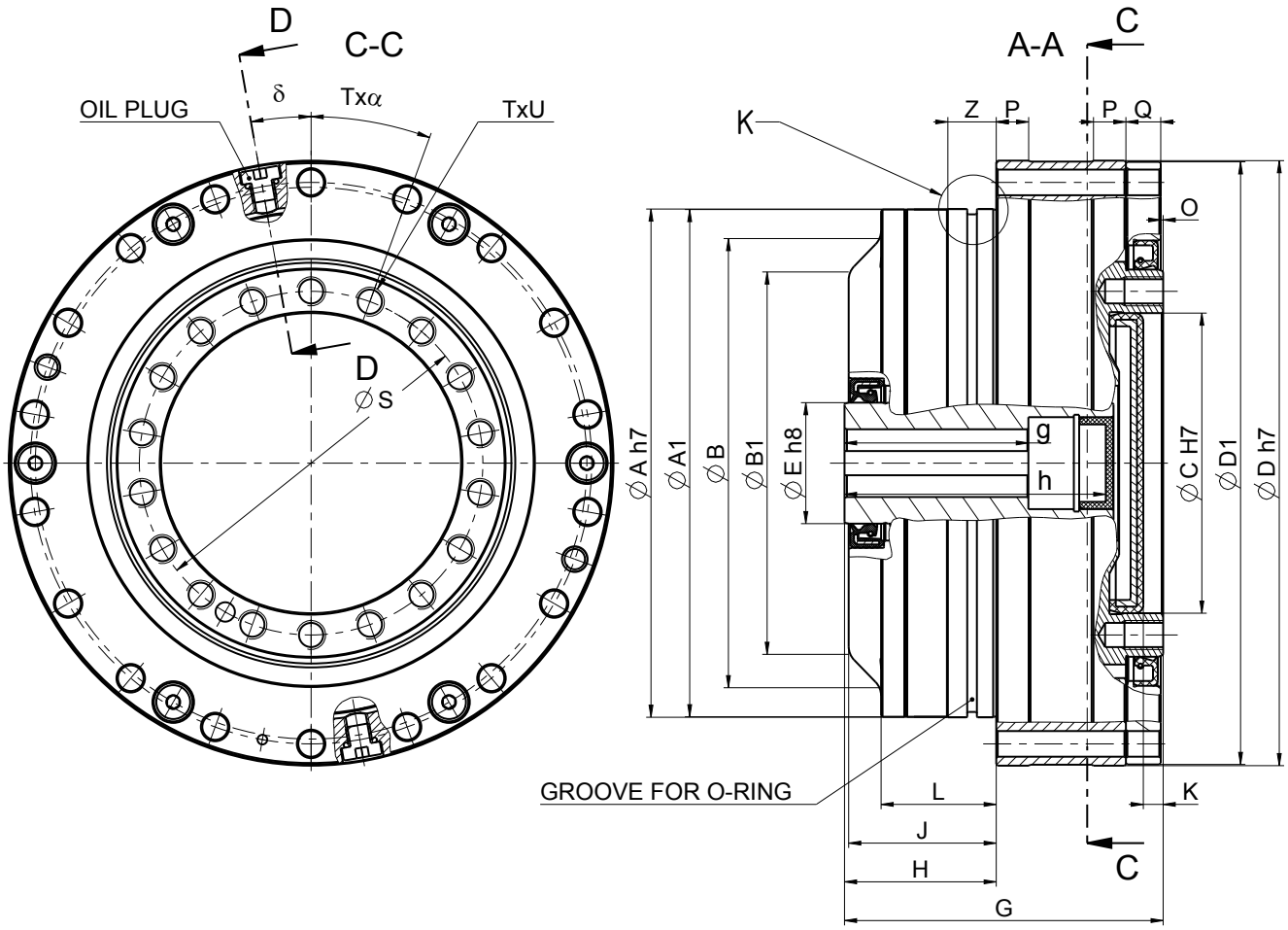
Hysteresis curve

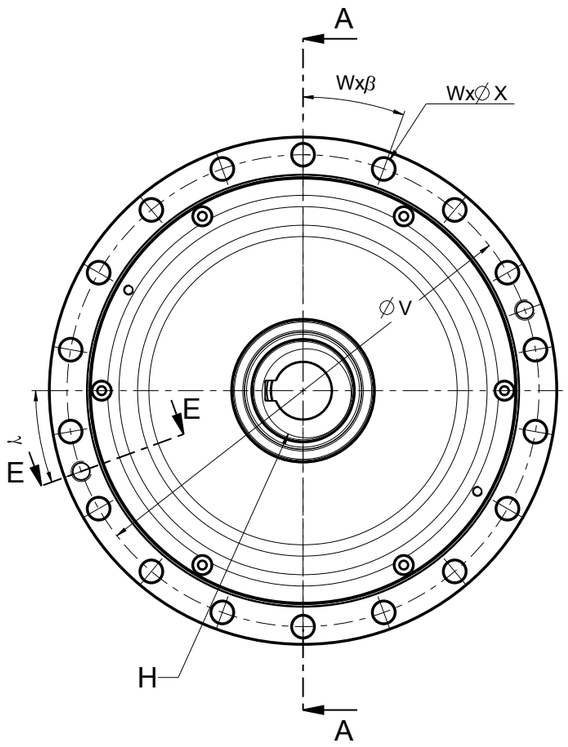


Measuring protocol of TS 095 G

Hysteresis *[arcmin]*	0,58
Lost motion *[arcmin]*	0,45
Torsional rigidity at 0 % TR *[Nm/arcmin]*	11,76
Torsional rigidity at 3 - 50 % TR *[Nm/arcmin]*	13,83
Torsional rigidity at 50 - 100 % TR *[Nm/arcmin]*	16,11

TwinSpin **G** Completely sealed





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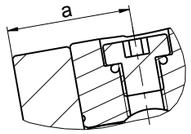

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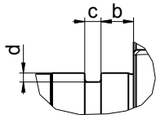

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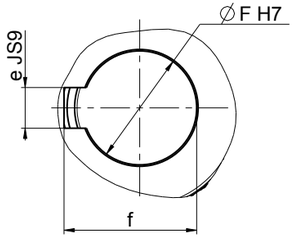

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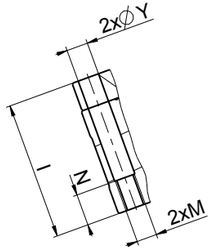
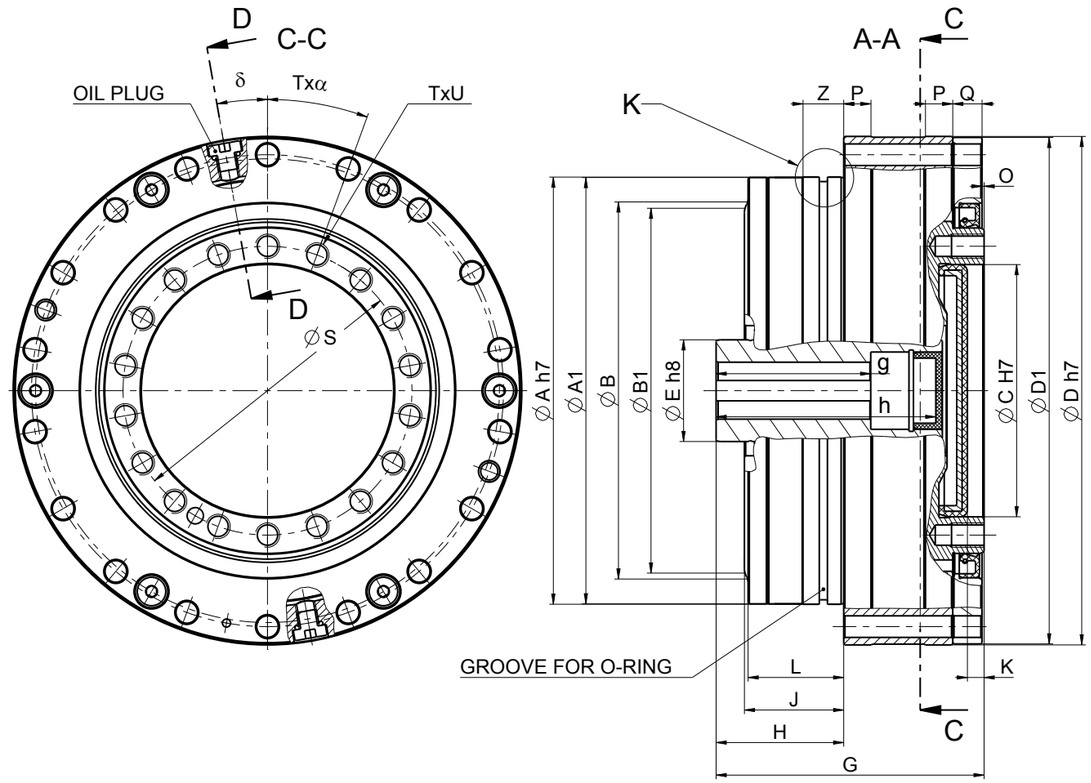
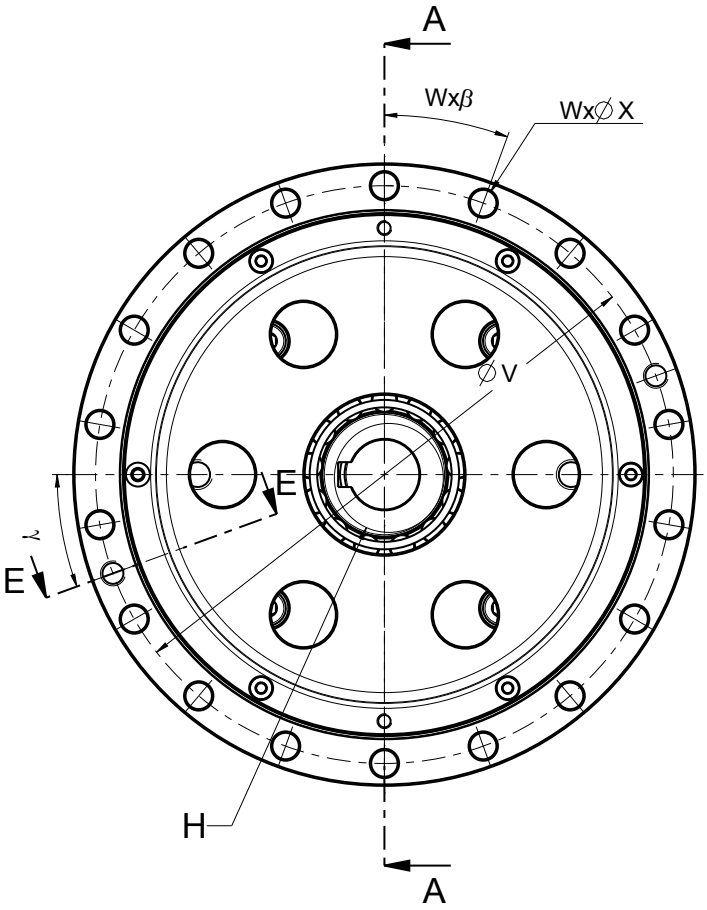


	TS 075 G	TS 085 G	TS 095 G	TS 115 G	TS 135 G	TS 175 G	TS 185 G	TS 200 G
ΦA h7	63	67	80	100	116	151	161	175
ΦA1	62.8	66.8	79.8	99.85	115.8	150.5	160.5	174.5
ΦB	57.3	61	71.2	89	102.05	135	145	155
ΦB1	39.3	45	62	80.8	86.95	116.6	133.4	145.8
ΦC H7	30	37	45	60	72	95	100	110
ΦD h7	75	84	95	115	136	175	184	200
ΦD1	74.8	83.8	94.8	114.8	135.8	174.6	183.5	199.5
ΦE h8	15	18	24	25	30	38	38	38
ΦF H7	9	11	14	14	19	19	24	24
G	46	50.45	58.5	64	69.1	85.55	98.8	109.3
H	22.1	24.05	28	28.5	32.2	35.05	49.4	50.4
I	23.4	25.9	30	35	36.4	50	48.9	58.4
J	14.7	23.2	23.5	24.7	29.2	32.9	38	39
K	2.4	3.1	3	3	4	5	5.5	7.5
L	12	13.8	15.5	17.4	21.9	23.7	30	31
M	-	-	-	M4	M5	M6	M6	M6
N	-	-	-	7	9	10	10	10
O	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
P	4.5	4.7	6	7	7.25	10.5	10	12
Q	5.4	5.5	6	6.5	7.4	9	9	10
ΦS	38	44	53	68	82	111	119	128
T	12	12	18	18	18	18	21	21
U	M5x7	M5x7	M4x7.5	M5x8	M6x8	M8x13	M8x10	M8x10
ΦV	69	76	88	108	126	163	173	188
W	18	18	18	18	18	24	30	30
ΦX	3.3	4.3	4.3	4.3	5.3	6.4	6.4	6.4
ΦY	-	-	-	4.2	5.3	6.4	6.4	6.4
Z	5	6	7	7	10	12	12	12
a	10	10.5	13	13.6	15.4	18.55	18.5	22.5
b	1.5	-	3	3	4	5	6	6
c	2	-	2	2	2.7	2.7	2.7	2.7
d	1.1	-	1	1	1.5	1.5	1.5	1.5
e JS9	3	4	5	5	6	6	8	8
f	10.4	12.8	16.3	16.3	21.8	21.8	27.8	27.3
g	16	20	28	38	30	33	44.5	44.5
h	31.3	38.5	50.9	55.6	56	64	88	95
α	30°	30°	20°	20°	20°	20°	17.14°	17.14°
β	20°	20°	20°	20°	20°	15°	12°	12°
γ	-	-	-	20°	20°	22.5°	54°	54°
δ	10°	10°	10°	10°	10°	7.5°	6°	6°
OIL PLUG	M3	M4	M4	M5	M5	M5	M6	M8
O-RING	60x1.5	65x1.5	76x1.5	92x1.5	110x2	146x2	150x2	165x2

TwinSpin **G** Sealed output

	TS 075 G	TS 085 G	TS 095 G	TS 115 G	TS 135 G	TS 175 G	TS 185 G	TS 200 G
ΦA h7	63	67	80	100	116	151	161	175
ΦA1	62.8	66.8	79.8	99.85	115.8	150.5	160.5	174.5
ΦB	57.3	58.8	69.2	86.4	103.8	135	145	155
ΦB1	48	48.4	59.5	80	98.3	124	137	149.5
ΦC H7	30	37	45	60	72	95	100	110
ΦD h7	75	84	95	115	136	175	184	200
ΦD1	74.8	83.8	94.8	114.8	135.8	174.6	183.5	199.5
ΦE h8	15	18	24	25	30	38	38	38
ΦF H7	9	11	14	14	19	19	24	24
G	46	50.45	58.5	64	69.1	85.55	98.8	109.3
H	22.1	24,05	28	28.5	32.2	35.05	49.4	50.4
I	23.4	25.9	30	35	36.4	50	48.9	58.4
J	14.7	16.8	18	18.9	23.5	26.9	32	32
K	2.4	3,1	3	3	4	5	5.5	7.5
L	12	13.8	15.2	17.4	21.9	23.7	30	31
M	-	-	-	M4	M5	M6	M6	M6
N	-	-	-	7	9	10	10	10
O	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
P	4.5	4.7	6	7	7.25	10.5	10	12
Q	5.4	5.5	6	6.5	7.4	9	9	10
ΦS	38	44	53	68	82	111	119	128
T	12	12	18	18	18	18	21	21
U	M5x7	M5x7	M4x7.5	M5x8	M6x8	M8x13	M8x10	M8x10
ΦV	69	76	88	108	126	163	173	188
W	18	18	18	18	18	24	30	30
ΦX	3.3	4.3	4.3	4.3	5.3	6.4	6.4	6.4
ΦY	-	-	-	4.2	5.3	6.4	6.4	6.4
Z	5	6	7	7	10	12	12	12
a	10	10.5	13	13.6	15.4	18.55	18.5	22.5
b	1.5	-	3	3	4	5	6	6
c	2	-	2	2	2.7	2.7	2.7	2.7
d	1.1	-	1	1	1.5	1.5	1.5	1.5
e JS9	3	4	5	5	6	6	8	8
f	10.4	12.8	16.3	16.3	21.8	21.8	27.8	27.8
g	16	20	28	38	30	33	44.5	44.5
h	31.3	38.5	50.9	55.6	56	64	88	95
α	30°	30°	20°	20°	20°	20°	17.14°	17.14°
β	20°	20°	20°	20°	20°	15°	12°	12°
γ	-	-	-	20°	20°	22.5°	54°	54°
δ	10°	10°	10°	10°	10°	7.5°	6°	6°
OIL PLUG	M3	M4	M4	M5	M5	M5	M6	M8
O-RING	60x1.5	65x1.5	76x1.5	92x1.5	110x2	146x2	150x2	165x2





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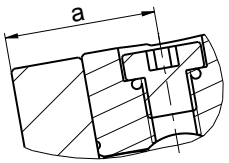

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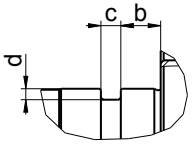

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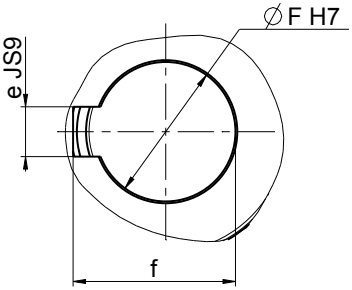

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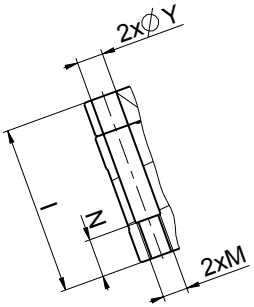

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