

**NEW** TwinSpin **G**

 **SPINEA**  
EXCELLENCE IN MOTION



**Perfection**  
improved





# TwinSpin **G**

A New Generation of Reduction Gears





|                |           |
|----------------|-----------|
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Edition II / 2016

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

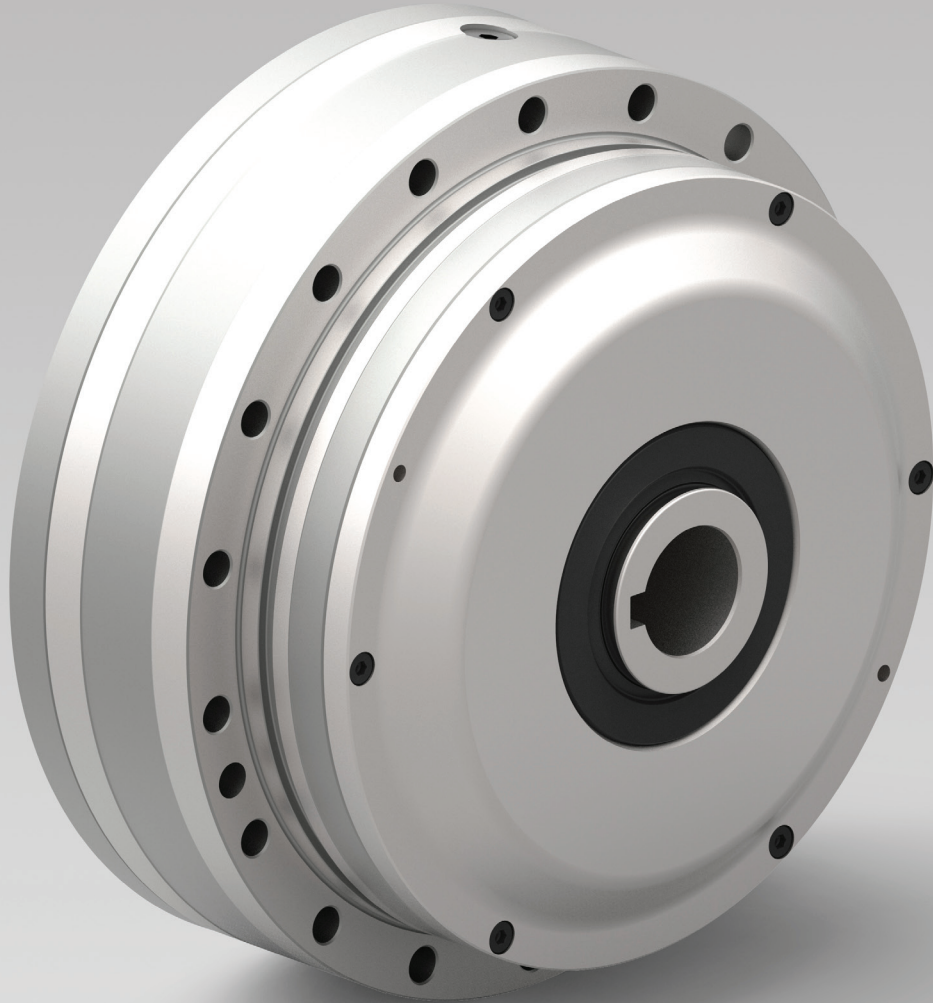




The invention of a new transmission principle was an impulse for the company's establishment in 1994.

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.

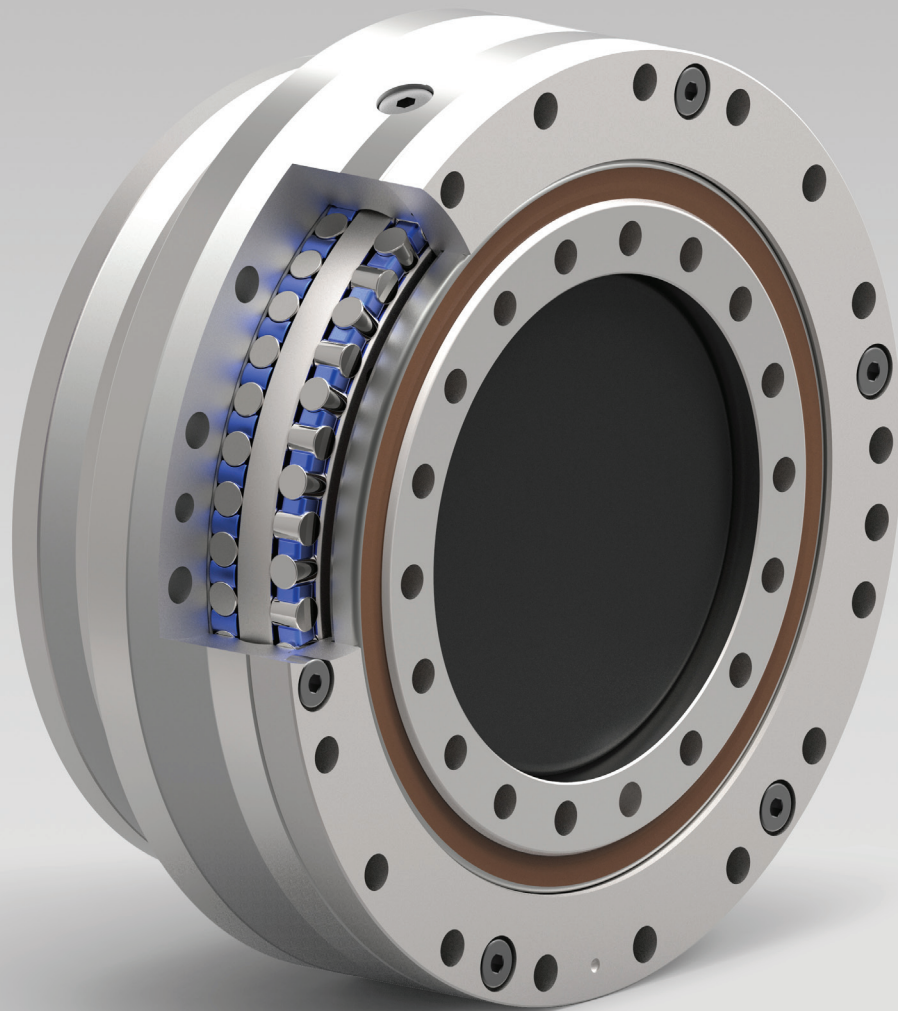
The products of the company are suitable for applications, that require high reduction-gear ratio, high kinematic precision, zero-backlash motion, high torque capacity, high rigidity, a compact design in a limited installation space as well as low weight. They are widely used in automation and industrial 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.





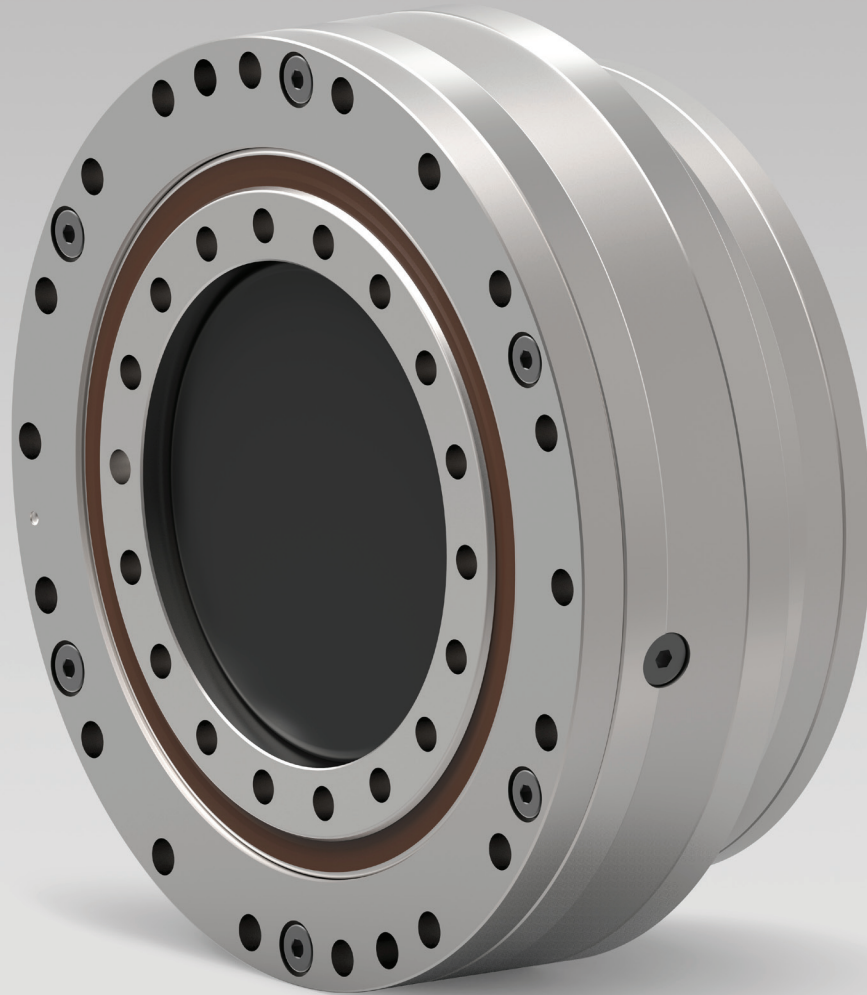


# TS G

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.





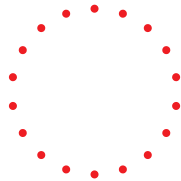
What does the new generation  
of TwinSpin reduction gears bring?





## 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 Stiffness

Compared with the older TwinSpin generation, a double-digit increase in the tilting stiffness 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.

## 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

## Tilting stiffness

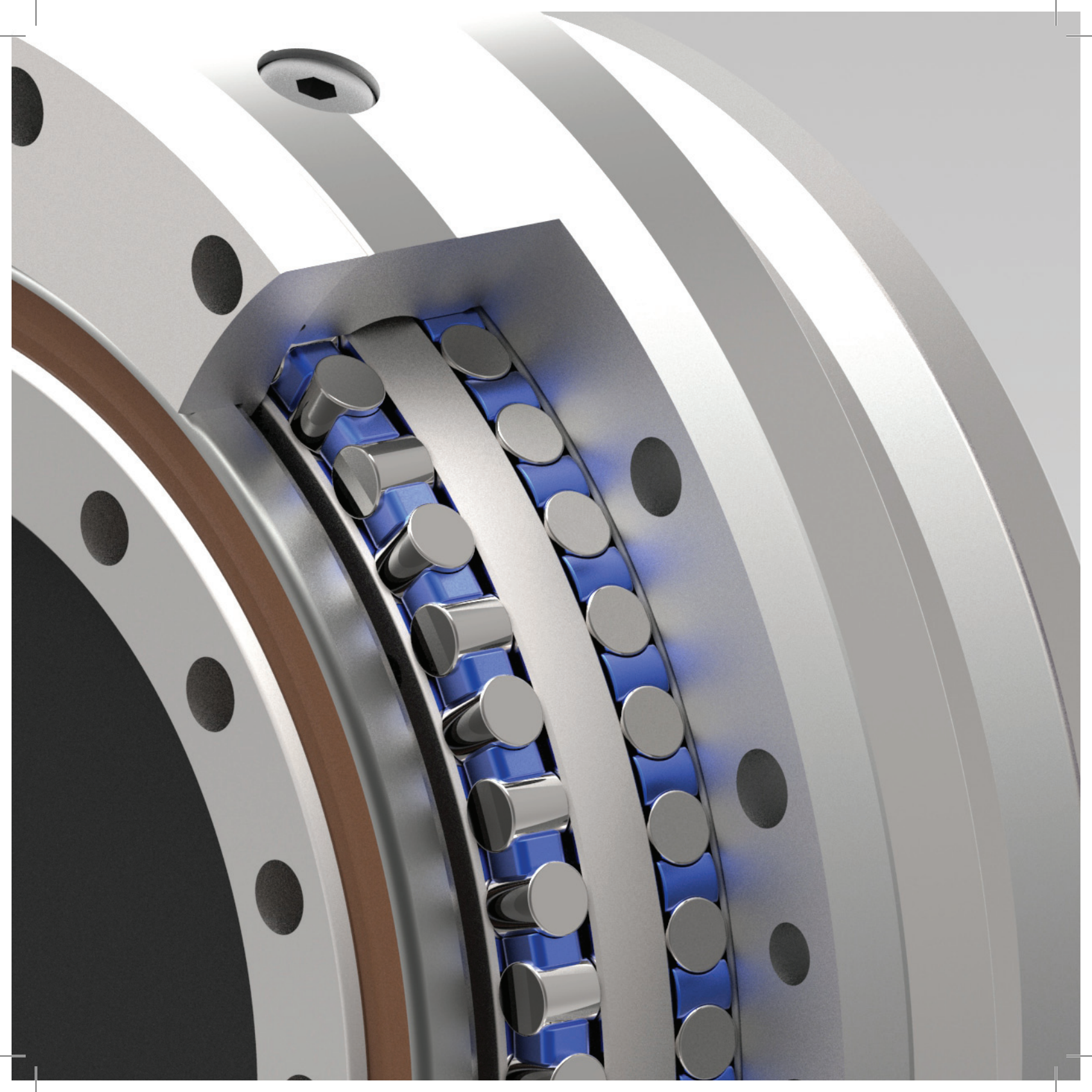
Compared with the older TwinSpin generation, a double-digit increase in the tilting stiffness of individual reduction gear sizes has been achieved. The new robust design of the main bearing also allows the customization of the parameters of the main bearing to the customer's needs.

↑ + 41%

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

↑ + 30%

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





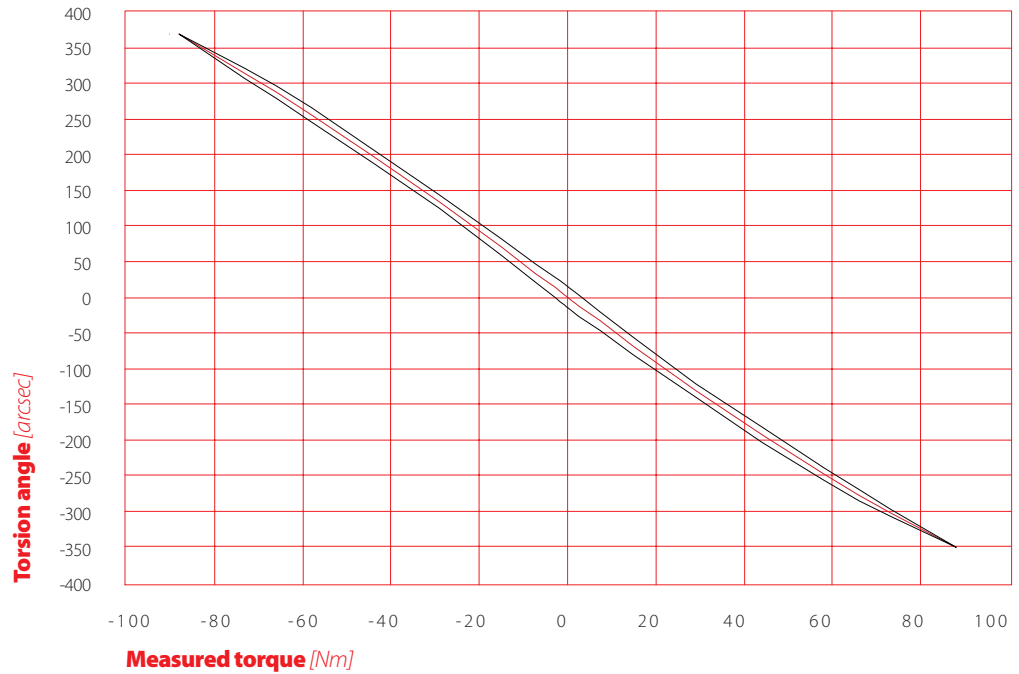


Specifications  
and Drawings

# Specifications

| Model  | TS 075 G              | TS 085 G                                  | TS 085 GL                                 | TS 095 G              | TS 095 GL             | TS 115 G               | TS 135 G  | TS 155 G                | TS 185 G                                    | TS 225 G                             | TS 335 G         | TS 500 G |
|--|-----------------------|---|---|-----------------------|-----------------------|------------------------|-----------|-------------------------|---|--------------------------------------|------------------|----------|
| <b>Available Ratio</b><br>[i]                                | 41<br><b>63</b><br>75 | <b>33</b><br>47<br><b>63</b><br><b>79</b> | <b>33</b><br>47<br><b>63</b><br><b>79</b> | 43<br>73<br><b>95</b> | 43<br>73<br><b>95</b> | <b>43</b><br>69<br>103 | 97<br>135 | 53<br><b>109</b><br>133 | <b>57</b><br><b>65</b><br><b>117</b><br>139 | <b>55</b><br><b>69</b><br><b>137</b> | 59<br><b>107</b> |          |
| <b>Rated torque [T<sub>R</sub>]</b><br>[Nm]                  | 34                    | 75  | 75  | 85                    | 85                    | 173                    | 250       | 450                     | 780   | 1270                                 | 4000             |          |
| <b>Maximum acceleration torque</b><br>[Nm]                   | 68                    | 150                                       | 150                                       | 170                   | 170                   | 346                    | 625       | 1150                    | 1950  | 3175                                 | 10000            |          |
| <b>Rated input speed [n<sub>R</sub>]</b><br>[rpm]            | 2000                  | 2000                                      | 2000                                      | 2000                  | 2000                  | 2000                   | 2000      | 2000                    | 2000  | 2000                                 | 1500             |          |
| <b>Torsional stiffness</b><br>[Nm/Arcmin]                    | 9                     | 11  | 11  | 15                    | 15                    | 36                     | 53        | 92                      | 153   | 310                                  | 1120             |          |
| <b>Tilting stiffness</b><br>[Nm/Arcmin]                      | 53                    | 65  | 80  | 120                   | 140                   | 220                    | 430       | 920                     | 1300  | 2300                                 | 6000             |          |
| <b>Allowable radial force*</b><br>[kN]                       | 2                     | 2.2                                       | 3.2                                       | 3.5                   | 5.1                   | 4                      | 6.6       | 8.3                     | 9.4   | 15.2                                 | 34.2             |          |
| <b>Allowable axial force*</b><br>[kN]                        | 6.4                   | 6.8                                       | 10  | 11.1                  | 16                    | 12.5                   | 20.5      | 26.1                    | 29.3  | 47.4                                 | 106.3            |          |
| <b>Allowable tilting moment</b><br>[Nm]                      | 190                   | 220                                       | 336                                       | 410                   | 630                   | 550                    | 810       | 1640                    | 2300  | 4380                                 | 11500            |          |
| <b>Input inertia</b><br>[10 <sup>-4</sup> kgm <sup>2</sup> ] | 0.019                 | 0.034                                     | 0.034                                     | 0.12                  | 0.12                  | 0.29                   | 0.71      | 0.96                    | 1.98  | 3.2                                  | 28               |          |
| <b>Weight</b><br>[kg]  | 0.92                  | 1.22                                      | 1.7                                       | 1.80                  | 2.10                  | 3.05                   | 4.9       | 8.00                    | 12.6  | 22                                   | 76               |          |
| <b>Hollowshaft diameter</b><br>[mm]                          |                       |   |   |                       |                       |                        |           |                         |   |                                      |                  |          |

## Hysteresis curve



## Measuring protocol of TS 095 G

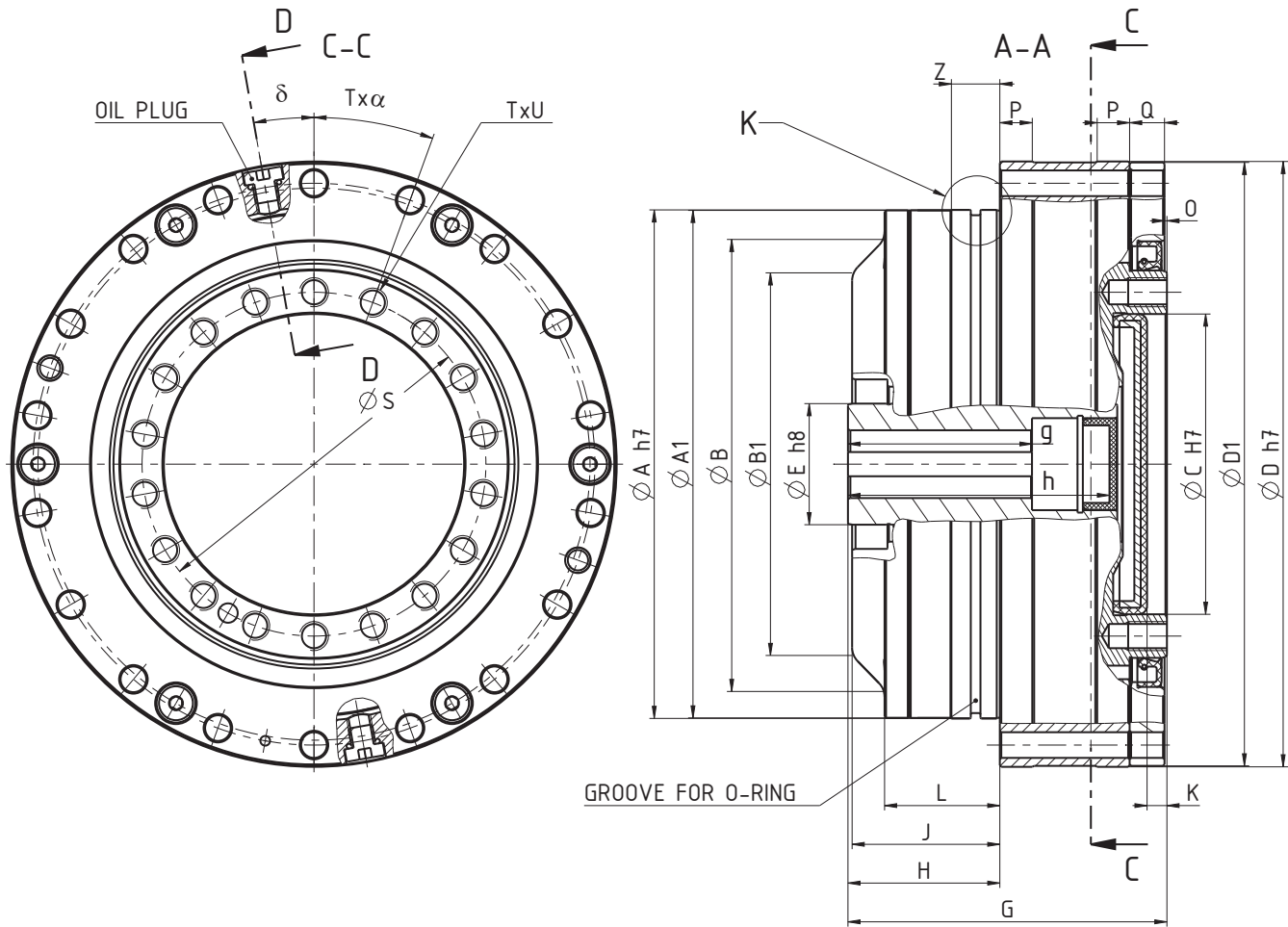
|  |       |
|--|-------|
| Hysteresis [arcmin]                              | 0,58  |
| Lost motion [arcmin]                             | 0,45  |
| Torsional stiffness at 0 % TR [Nm/arcmin]        | 11,76 |
| Torsional stiffness at 3 - 50 % TR [Nm/arcmin]   | 13,83 |
| Torsional stiffness at 50 - 100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

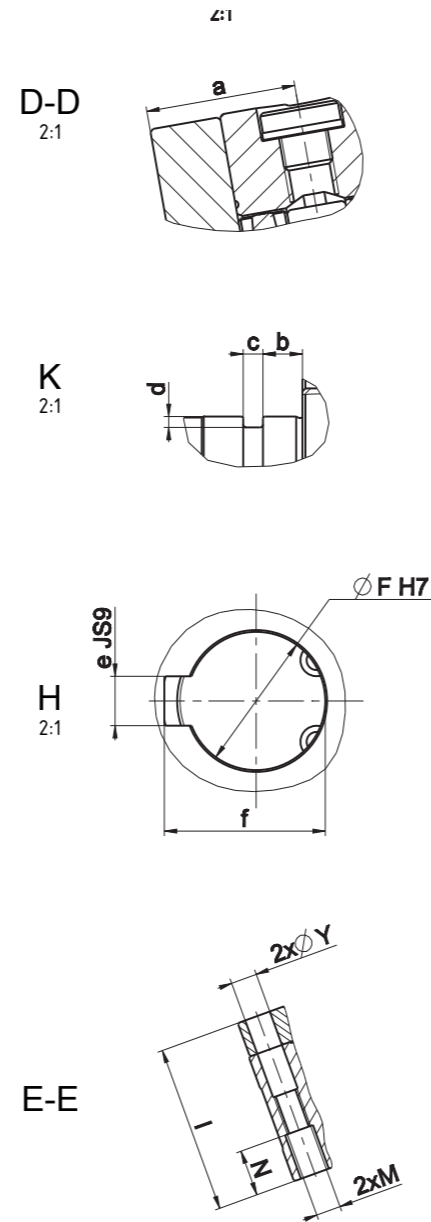
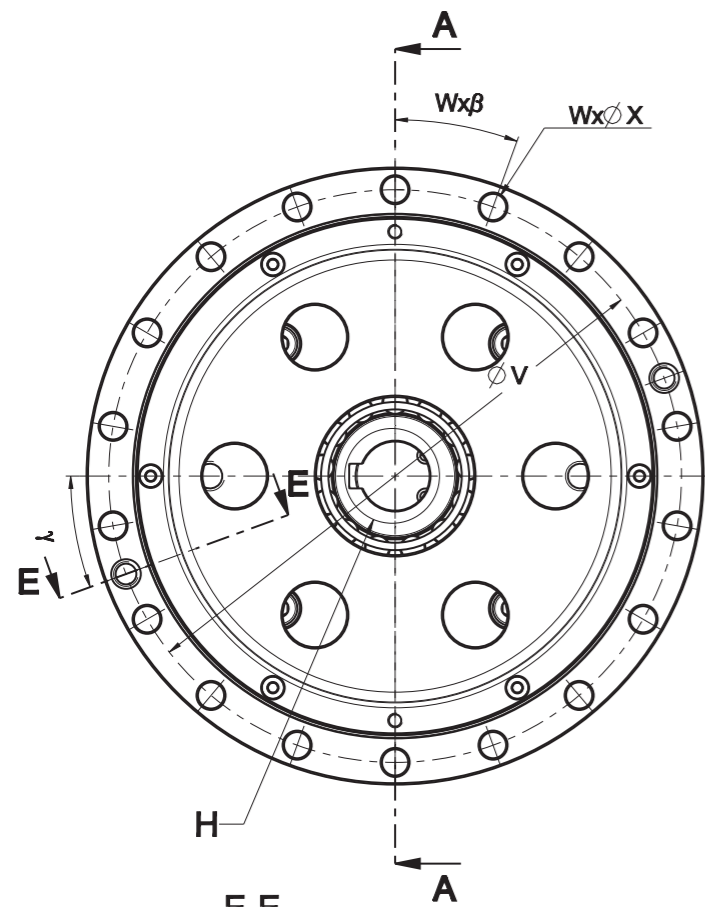
Measured values are mean values Nominal life  $L_{10}$ =6000 Hrs.  
Further specifications are available on the customer's request.

\*Values for output speed  $n_{out}$ =15/min and  $L_{10}$ =12 000 Hrs.

| G | TS115 GHx | TS125 GH  | TS 155GHx |
|---|-----------|-----------|-----------|
|   | 69<br>103 | <b>49</b> | 53<br>109 |
|   | 130       | 180       | 260       |
|   | 260       | 450       | 650       |
|   | 2000      | 2000      | 2000      |
|   | 23        | 29        | 67        |
|   | 220       | 280       | 920       |
|   | 4         | 4.4       | 8.3       |
|   | 12.5      | 13.8      | 26.1      |
|   | 550       | 880       | 1640      |
|   | 0.65      | 1.06      | 5.6       |
|   | 2.70      | 3.5       | 6.9       |
|   | 35        | 32        | 55        |

# TwinSpin G Completely sealed





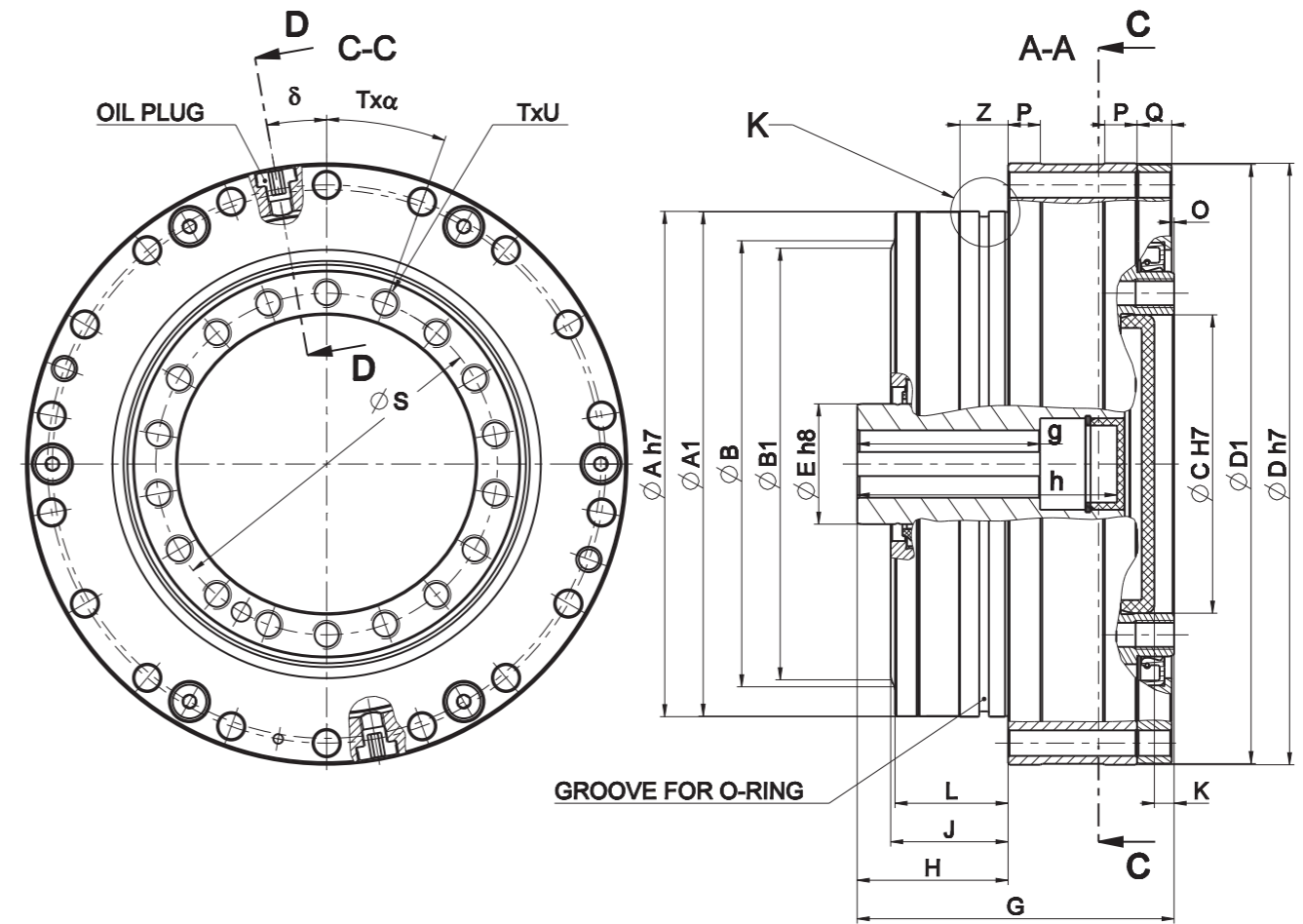
|          | TS 075 G | TS 085 G | TS 095 G | TS 115 G | TS 135 G | TS 155 G | TS 185 G |
|----------|----------|----------|----------|----------|----------|----------|----------|
| ΦA h7    | 63       | 67       | 80       | 100      | 116      | 136      | 161      |
| ΦA1      | 62.8     | 66.8     | 79.8     | 99.85    | 115.8    | 135.5    | 160.5    |
| ΦB       | 57.3     | 61       | 71.2     | 90       | 102      | 115      | 145      |
| ΦB1      | 39.3     | 45       | 62       | 81.7     | 86.9     | 107.7    | 133.4    |
| ΦC H7    | 30       | 37       | 45       | 60       | 72       | 90       | 100      |
| ΦD h7    | 75       | 84       | 95       | 115      | 136      | 156      | 184      |
| ΦD1      | 74.8     | 83.8     | 94.8     | 114.9    | 135.8    | 155.6    | 183.5    |
| ΦE h8    | 15       | 18       | 24       | 25       | 30       | 30       | 38       |
| ΦF H7    | 9        | 11       | 14       | 14       | 19       | 19       | 24       |
| G        | 46       | 51.44    | 58.5     | 63.5     | 69.1     | 79       | 98.8     |
| H        | 22.1     | 24.54    | 28       | 28.5     | 32.2     | 25.6     | 49.4     |
| I        | 23.4     | 25.9     | 30       | 35       | 36.4     | 46       | 48.9     |
| J        | 21       | 23.2     | 23.5     | 24.7     | 29.2     | 30       | 38       |
| K        | 2.4      | 3.1      | 3        | 3        | 4        | 13.1     | 5.5      |
| L        | 12       | 16.8     | 15.5     | 17.4     | 21.9     | 25.6     | 30       |
| M        | -        | -        | -        | M4       | M5       | M5       | M6       |
| N        | -        | -        | -        | 7        | 9        | 10       | 10       |
| O        | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      |
| P        | 4.5      | 5.2      | 6        | 7.1      | 7.25     | 9.5      | 10       |
| Q        | 5.4      | 5.5      | 6        | 6.5      | 7.4      | 8        | 9        |
| ΦS       | 38       | 44       | 53       | 68       | 82       | 96       | 116      |
| T        | 12       | 12       | 18       | 18       | 18       | 18       | 21       |
| U        | M5x7     | M5x7     | M4x7.5   | M5x7.5   | M6x8     | M8x13    | M8x10    |
| ΦV       | 69       | 76       | 88       | 108      | 126      | 146      | 173      |
| W        | 18       | 18       | 18       | 18       | 18       | 28       | 30       |
| ΦX       | 3.3      | 4.3      | 4.3      | 4.3      | 5.3      | 5.3      | 6.4      |
| ΦY       | -        | -        | -        | 4.2      | 5.3      | 5.3      | 6.4      |
| Z        | 5        | 6        | 7        | 7        | 10       | 10       | 12       |
| a        | 10       | 10.5     | 13       | 13.6     | 15.4     | 18       | 18.5     |
| b        | 1.5      | 2.1      | 3        | 3        | 4        | 2.5      | 6        |
| c        | 2        | 2.2      | 2        | 2        | 2.7      | 4        | 2.7      |
| d        | 1.1      | 1.1      | 1        | 1        | 1.5      | 2.3      | 1.5      |
| e JS9    | 3        | 4        | 5        | 5        | 5        | 6        | 8        |
| f        | 10       | 12.8     | 16.3     | 16.3     | 21.8     | 21.8     | 27.8     |
| g        | 16       | 20       | 28       | 38       | 30       | 25       | 44.5     |
| h        | 31.3     | 38.5     | 50.9     |          | 56       | 53       | 88       |
| α        | 30°      | 30°      | 20°      | 20°      | 20°      | 20°      | 17.14°   |
| β        | 20°      | 20°      | 20°      | 20°      | 20°      | 12.86°   | 12°      |
| γ        | -        | -        | -        | -        | 20°      | 12.86°   | 54°      |
| δ        | 10°      | 10°      | 10°      | 10°      | 10°      | 6.43°    | 6°       |
| OIL PLUG | M3       | M3       | M4       | M5       | M4       | M7       | M6       |
| O-RING   | 60x1.5   | 65x1.5   | 76x1.5   | 92x1.5   | 110x2    | 132x3    | 150x2    |

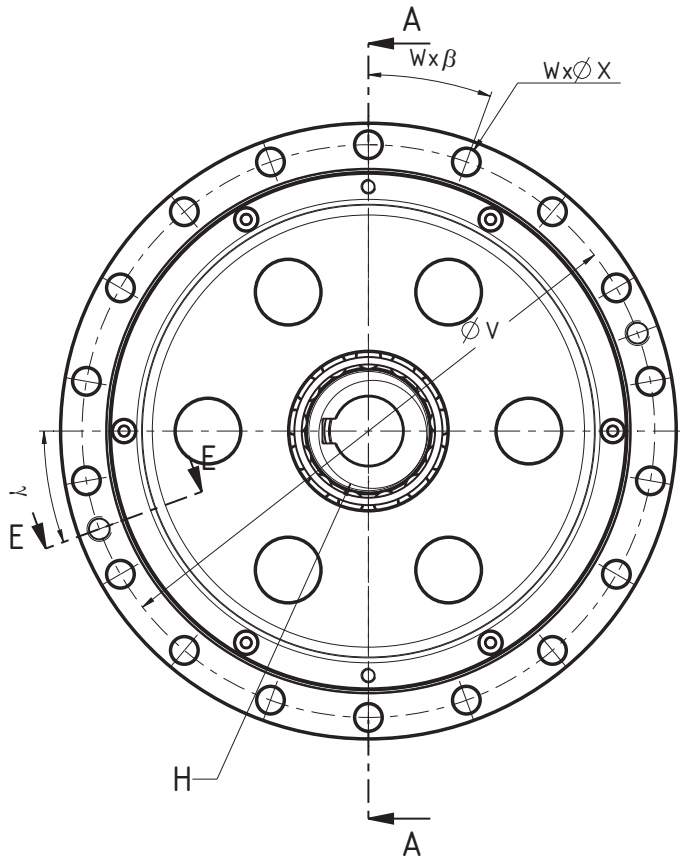
Drawings for high the precision reduction gears TS 85 GL, TS95 GL, TS 225 G, TS 335 G and hollow-shaft versions TS 115 GHx, TS125 GH, TS 155 GHx are available on the customer's request.

|          | TS 075 G | TS 085 G | TS 095 G | TS 115 G | TS 135 G | TS 155 G | TS 185 G |
|----------|----------|----------|----------|----------|----------|----------|----------|
| ΦA h7    | 63       | 67       | 80       | 100      | 116      | 136      | 161      |
| ΦA1      | 62.8     | 66.8     | 79.8     | 99.85    | 115.8    | 135.5    | 160.5    |
| ΦB       | 57.3     | 58.8     | 69.2     | 86.4     | 103.8    | 115      | 145      |
| ΦB1      | 48       | 48.4     | 59.5     | 80       | 98.3     | 107.7    | 137      |
| ΦC H7    | 30       | 37       | 45       | 60       | 72       | 90       | 100      |
| ΦD h7    | 75       | 84       | 95       | 115      | 136      | 156      | 184      |
| ΦD1      | 74.8     | 83.8     | 94.8     | 114.9    | 135.8    | 155.6    | 183.5    |
| ΦE h8    | 15       | 18       | 24       | 25       | 30       | 30       | 38       |
| ΦF H7    | 9        | 11       | 14       | 14       | 19       | 19       | 24       |
| G        | 46       | 50.45    | 58.5     | 63.5     | 69.1     | 71.6     | 98.8     |
| H        | 22.1     | 24.4     | 28       | 28.5     | 32.2     | 25.6     | 49.4     |
| I        | 23.4     | 25.9     | 30       | 35       | 36.4     | 46       | 48.9     |
| J        | 14.7     | 23.2     | 18.1     | 18.9     | 23.5     | 24.8     | 32       |
| K        | 2.4      | 3.1      | 3        | 3        | 4        | 13.1     | 5.5      |
| L        | 12       | 13.8     | 15.2     | 17.4     | 21.9     | 25.6     | 30       |
| M        | -        | -        | -        | M4       | M5       | M5       | M6       |
| N        | -        | -        | -        | 7        | 9        | 10       | 10       |
| O        | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      |
| P        | 4.5      | 5.2      | 6        | 7        | 7.25     | 9.5      | 10       |
| Q        | 5.4      | 5.5      | 6        | 6.5      | 7.4      | 8        | 9        |
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| ΦV       | 69       | 76       | 88       | 108      | 126      | 146      | 173      |
| W        | 18       | 18       | 18       | 18       | 18       | 28       | 30       |
| ΦX       | 3.3      | 4.3      | 4.3      | 4.3      | 5.3      | 5.3      | 6.4      |
| ΦY       | -        | -        | -        | 4.2      | 5.3      | 5.3      | 6.4      |
| Z        | 5        | 6        | 7        | 7        | 10       | 10       | 12       |
| a        | 10       | 10.5     | 13       | 13.6     | 15.4     | 18       | 18.5     |
| b        | 1.5      | -        | 3        | 3        | 4        | 2.5      | 6        |
| c        | 2        | -        | 2        | 2        | 2.7      | 4        | 2.7      |
| d        | 1.1      | -        | 1        | 1        | 1.5      | 2.3      | 1.5      |
| e JS9    | 3        | 4        | 5        | 5        | 5        | 6        | 8        |
| f        | 10       | 12.8     | 16.3     | 16.3     | 21.8     | 21.8     | 27.8     |
| g        | 16       | 20       | 28       | 38       | 30       | 25       | 44.5     |
| h        | 31.3     | 38.5     | 50.9     | 55.6     | 56       | 53       | 88       |
| α        | 30°      | 30°      | 20°      | 20°      | 20°      | 20°      | 17.14°   |
| β        | 20°      | 20°      | 20°      | 20°      | 20°      | 12.86°   | 12°      |
| γ        | -        | -        | -        | 20°      | 20°      | 12.86°   | 54°      |
| δ        | 10°      | 10°      | 10°      | 10°      | 10°      | 6.43°    | 6°       |
| OIL PLUG | M3       | M3       | M4       | M5       | M4       | M7       | M6       |
| O-RING   | 60x1.5   | 65x1.5   | 76x1.5   | 92x1.5   | 110x2    | 132x3    | 150x2    |

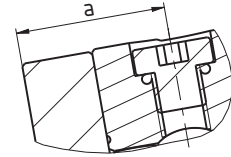
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## TwinSpin G Sealed output

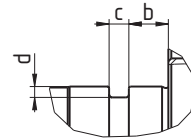




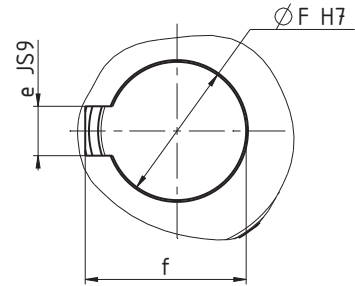
**D-D**  
2:1



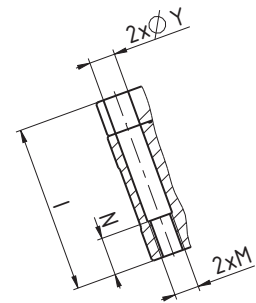
**K**  
2:1



**H**  
2:1



**E-E**



[www.TwinSpinGear.com](http://www.TwinSpinGear.com)

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