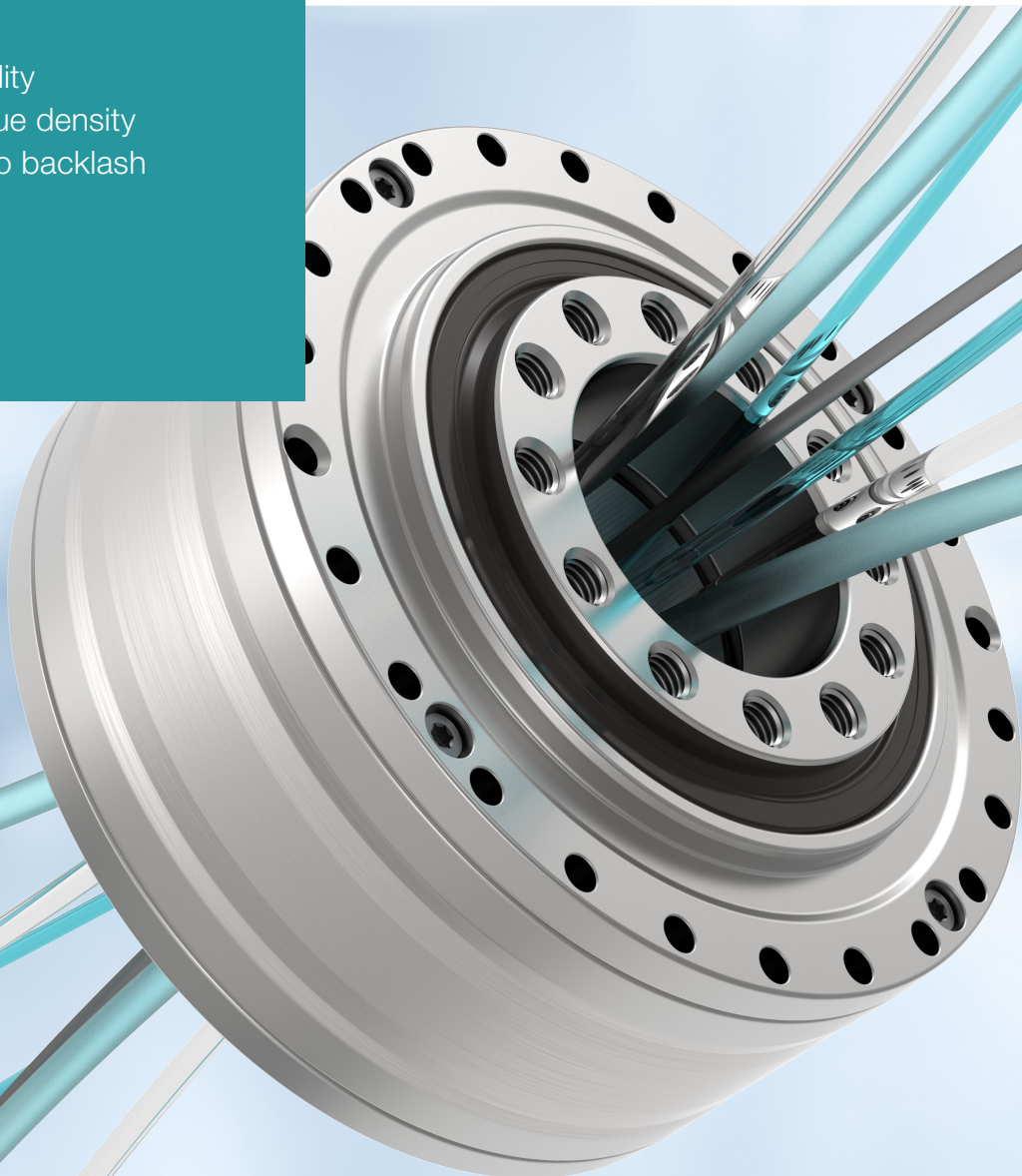




WITTENSTEIN

## The miniaturized Galaxie®

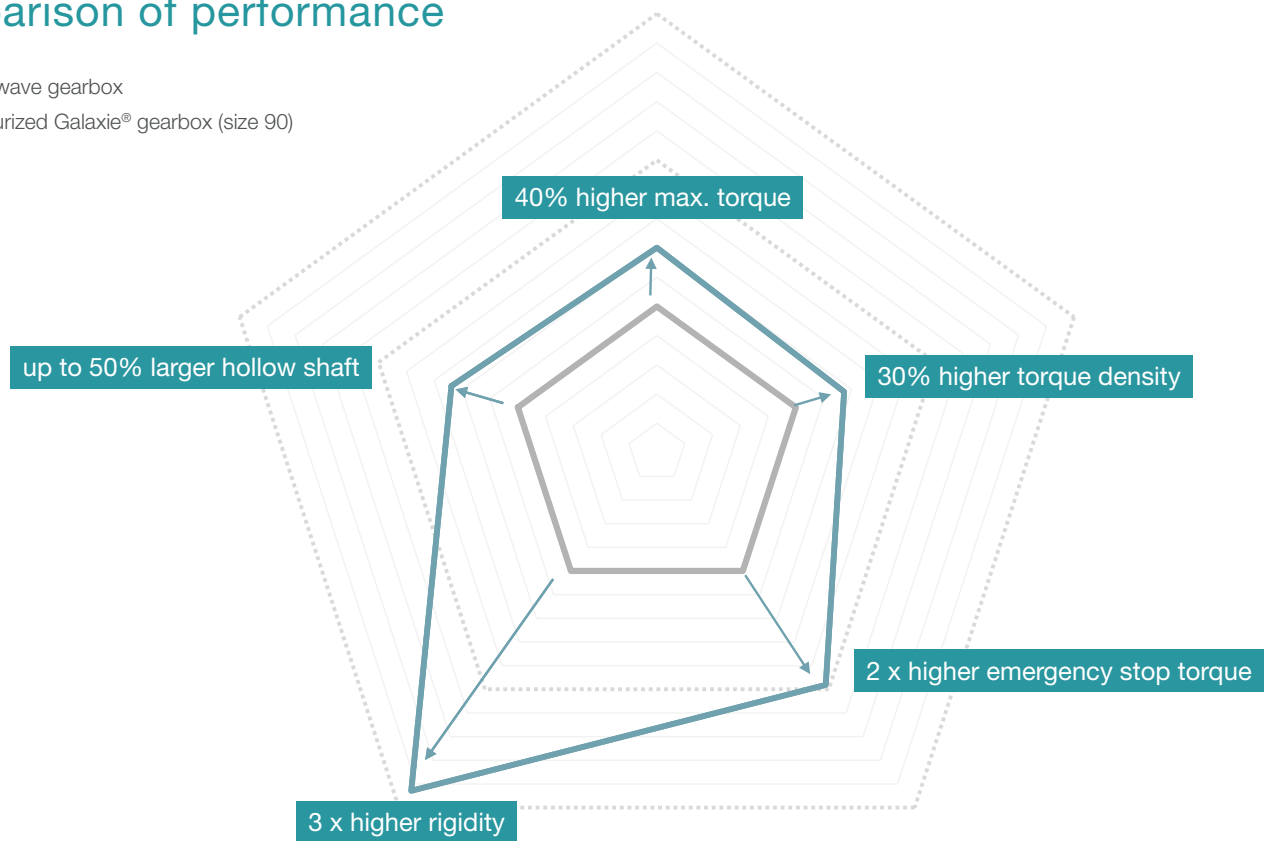
Extreme rigidity  
Highest torque density  
Absolute zero backlash



## Comparison of performance

— strain wave gearbox

— miniaturized Galaxie® gearbox (size 90)



## More precision

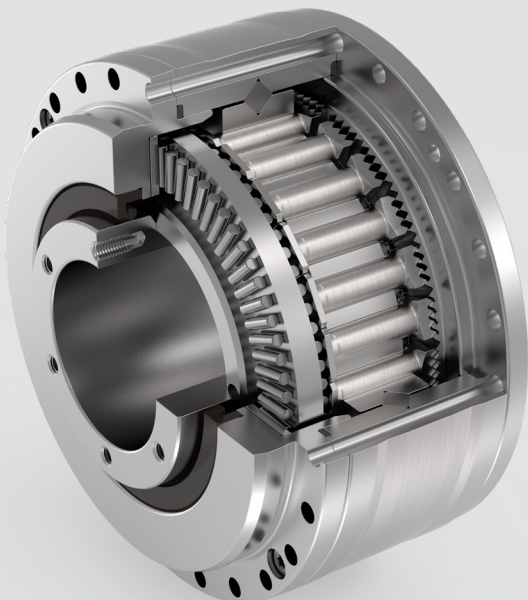
The miniaturized Galaxie® extremely high torsional rigidity and higher dampening mean medical robots can perform surgical procedures much more precisely. Thanks to the higher machining precision, the quality of industrial products can likewise be increased. Absolute zero backlash likewise enables more precision in the application, e. g. when moving robot axes.

## Space and weight savings

The miniaturized Galaxie® extremely high torsional rigidity and high torque density mean you can downsize the drive train or upgrade the application without any increase in footprint. The large hollow shaft can be used very efficiently, e. g. for wiring or for integrating media and / or components. The high torque density simultaneously permits the weight of the drive train to be reduced.

## Maximum safety

The miniaturized Galaxie® extremely high torsional rigidity provides crucial safety reserves in case of overload. For example, there are no consequences if the surgeon accidentally touches the surgical robot's arm. Media can be supplied through the large hollow shaft without any problem – and downtime due to broken or pinched cables is reduced to a minimum. The high torque density can serve as a safety buffer.



# Gearbox

The miniaturized Galaxie® gearbox takes the proven principle of our classic Galaxie® a step further. The result: innovative kinematics enabling almost full surface contact during power transmission – in an extremely compact footprint.

The miniaturized Galaxie® combines the highest levels of torsional rigidity, torque density and overload capacity with a very large hollow shaft and maintains zero backlash throughout its entire lifetime.

## Technical Data

Gearbox		SAG 090	SAG 110
Gearbox diameter	mm	90	110
Length	mm	55.5	59.6
Hollow shaft diameter	mm	31	41
Weight	kg	1.5	2.5
<b>Technical data</b>			
Overall ratio		60	61
Nominal output torque	Nm	70	120
Max. acceleration torque	Nm	150	250
Emergency stop torque	Nm	375	625
Max. input speed	rpm	4200	3600
<b>Torsional rigidity</b>			
Ct21 <sup>1)</sup>	Nm/arcmin   10 <sup>4</sup> Nm/rad	35   12.0	70   24.0
K3 <sup>1)</sup>	Nm/arcmin   10 <sup>4</sup> Nm/rad	24   8.3	42   14.4
K2 <sup>1)</sup>	Nm/arcmin   10 <sup>4</sup> Nm/rad	23   7.9	40   13.8
K1 <sup>1)</sup>	Nm/arcmin   10 <sup>4</sup> Nm/rad	17   5.8	30   10.3
<b>Output bearing</b>			
Max. tilting moment	Nm	150	250
Axial load C <sub>a</sub>   C <sub>0a</sub>	kN	17.7   56.0	26.5   84.5
Radial load C <sub>r</sub>   C <sub>0r</sub>	kN	13.5   22.4	20.0   33.5
<b>Accuracy</b>			
Hysteresis loss <sup>***</sup>	arcmin	0.5	0.5
Lost motion <sup>***</sup>	arcmin	0.3	0.3
Transmission accuracy	arcmin	< 1.5	< 1.5
Repeatability	arcmin	± 0.1	± 0.1
<b>Conditions for operation</b>			
Operating temperature	°C	0 to 40	0 to 40
Protection class	-	IP64	IP64

<sup>1)</sup> Torsional rigidity:

C<sub>a1</sub>: Average gradient of the hysteresis in the range of 50 to 100% of T<sub>nom</sub>

K<sub>3</sub>: Average gradient of the hysteresis in the range below 10 Nm for SAG090 and below 15 Nm for SAG110

K<sub>2</sub>: Average gradient of the hysteresis in the range between 10 and 25 Nm for SAG090 and between 15 and 50 Nm for SAG110

K<sub>1</sub>: Average gradient of the hysteresis in the range over 25 Nm for SAG090 and over 50 Nm for SAG110

\*\*\*: in validation

# Actuator solutions

## Miniaturized Galaxie® actuator with hollow-shaft

For the most compact solution of our miniaturized Galaxie®:

Integrate a plug-and-play solution of our actuator with integrated motor, encoder systems and brake.

Actuator specific data		SAGM090	SAGM110
Actuator diameter	mm	90	110
Length	mm	140	160
Hollow shaft diameter	mm	26	35
Weight	kg	3.1	4.5
Operating voltage	V	560   48	560   48
Nominal current	A	4.1   23	4.6   31
Maximum current*	A <sub>eff</sub>	10   60	15   89
Number of pole pairs	-	10	10

\*: Please note that the maximum motor current can lead a higher acceleration torque than the permitted maximum acceleration torque.

### Configuration options:

#### Motors:

- cyber® kit line 85-20
- cyber® kit line 85-40

#### Electrical connection:

- Direct cable outlet
- Straight or angled integral socket

#### Brake:

- Without
- Spring-loaded brake

#### Operating voltage:

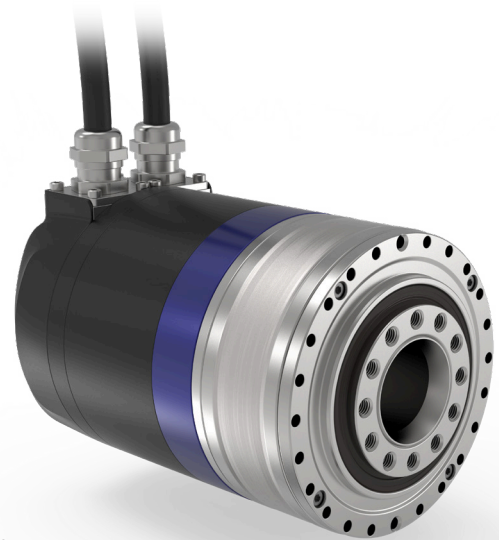
- 48 V DC
- 560 V DC

#### Encoder:

- EnDat 2.2
- BISS-C
- Hiperface
- Dual Encoder

#### Connection to the application via:

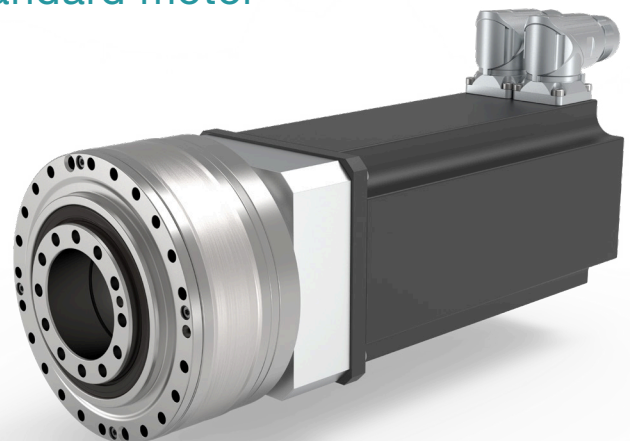
- Output flange (standard)
- Additional housing flange (customized)



## Miniaturized Galaxie® gearbox with standard motor

If no hollow shaft is needed and an existing motor should be used:

Combine our miniaturized Galaxie® gearbox with a standard motor adapted via adapter plate and clamping hubs, available for most standard motors. Easy and fast integration in existing and new developed machine structures.



# Applications

## Miniaturized Galaxie® in high precision robotics



- **Extreme rigidity:** high precision in medical or industrial robots
- **High torque and overload capacity** for safety purposes and high system robustness
- **Small footprint:** flexibility of system
- **Easy replacement** of existing strain wave gearboxes due to output interface compatibility

## Miniaturized Galaxie® in antennas

- **Highest rigidity:** to keep antenna stable – even with high wind gusts
- **Best precision accuracy** to position the Satellite Tracking System
- **Lightweight and compact solution** for mobility of antenna



## Miniaturized Galaxie® in mechanical engineering industry



- **Extreme rigidity:** enables simultaneous machining
- **Zero backlash brings** higher quality and higher productivity
- **High torque and overload capacity** for potential downsizing in the drive train
- **Huge hollow shaft** facilitates integration of e.g. additional media



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More Information about the  
miniaturized Galaxie®



More Information about our  
Galaxie® portfolio (bigger sizes)



**WITTENSTEIN – one with the future**

[www.wittenstein.de/en-en/mini-galaxie](http://www.wittenstein.de/en-en/mini-galaxie)