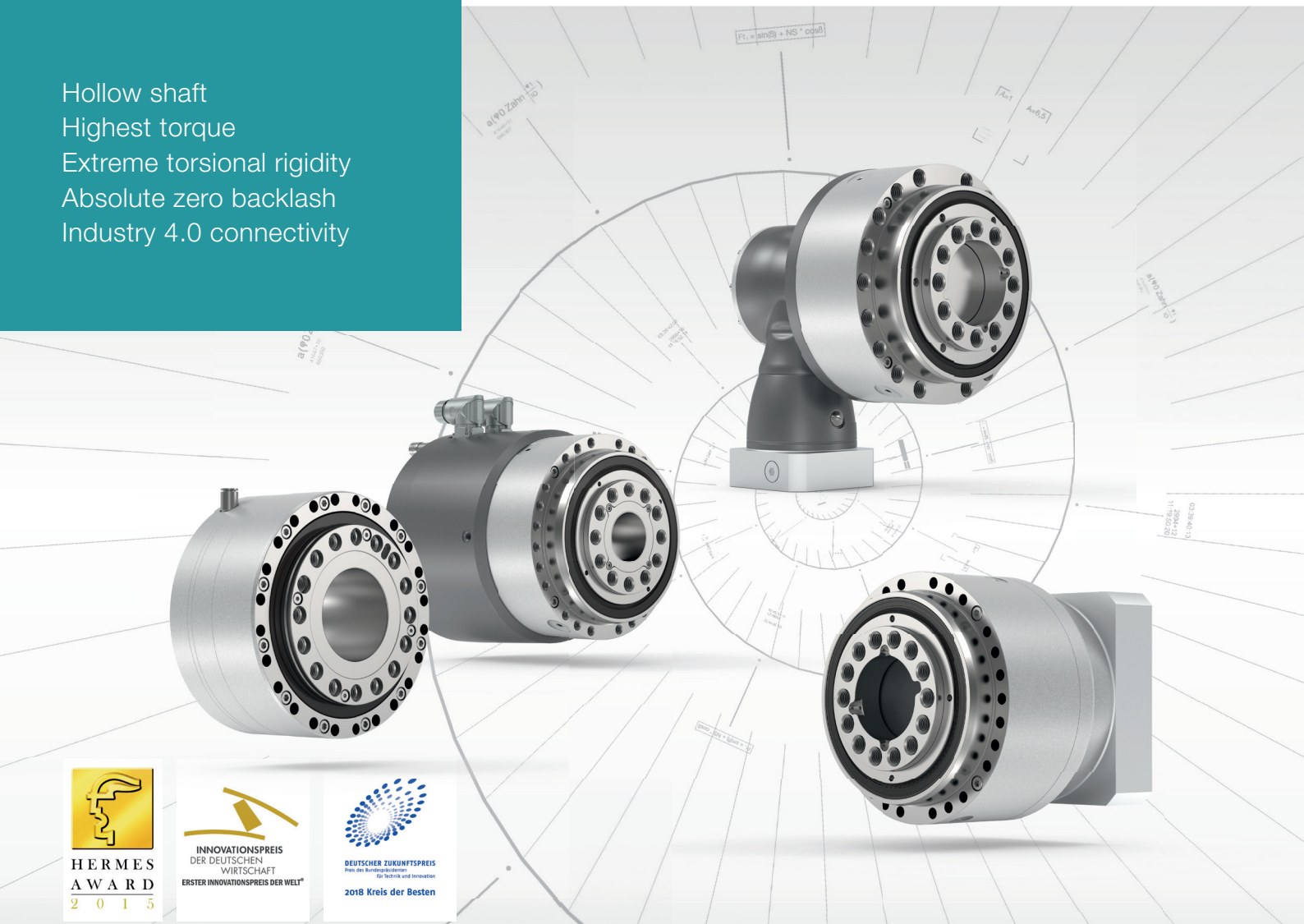
WITTENSTEIN | galaxie

Galaxie®

Superior on principle

Hollow shaft
Highest torque
Extreme torsional rigidity
Absolute zero backlash
Industry 4.0 connectivity



HERMES AWARD 2015

INNOVATIONSPREIS DER DEUTSCHEN WIRTSCHAFT
ERSTER INNOVATIONSPREIS DER WELT®

DEUTSCHER ZUKUNFTSPREIS
Preis des Bundespräsidenten für Technik und Innovation
2018 Kreis der Besten

Fundamentally new overall concept

When we developed the Galaxie®, we took it upon ourselves to subject drive concepts to a fundamental reassessment. The result: a brand new type of gearbox. Its unique kinematics enable virtually full surface contact of the teeth, as compared to single points of contact in other technologies, during power transmission. This means that the compact Galaxie® Drive Systems and gearboxes with hollow shaft achieve previously inconceivable performance. These include extremely high torque density, torsional rigidity, smooth running, positioning accuracy and completely backlash-free operation.

From Linear to Surface Contact

The innovative core of the new Galaxie® Drive System is the virtually full surface contact during power transmission. This achieves a tooth contact surface that is six and a half times larger compared to conventional involute teeth with line contact. The resulting kinematics are fundamentally new: the gearbox is the only one of its kind in the world to guide a large number of individual teeth simultaneously along an internal ring gear.
The tooth surface geometry is based on the logarithmic spiral which allows the teeth to engage with the internal ring gear across the full surface.

Next Technology Drive

The Galaxie® Drive System achieves a previously unattainable performance level: the gearbox boasts zero backlash – even at the torque zero crossing – while retaining full stiffness. The teeth follow a logarithmic spiral which ensures optimal synchronization accuracy. The system's performance features are all significantly better than those of traditional hollow-shaft drives with the same outer diameter.

Contents

Superior gearbox and drive systems

Highest precision over complete lifetime

Anti-vibration

Dampening due to unique design, hydrodynamic lubrication between teeth

Extreme Rigidity

Positioning accuracy during extreme dynamic movements exceeds the market standard by a factor of 5

Overload capacity

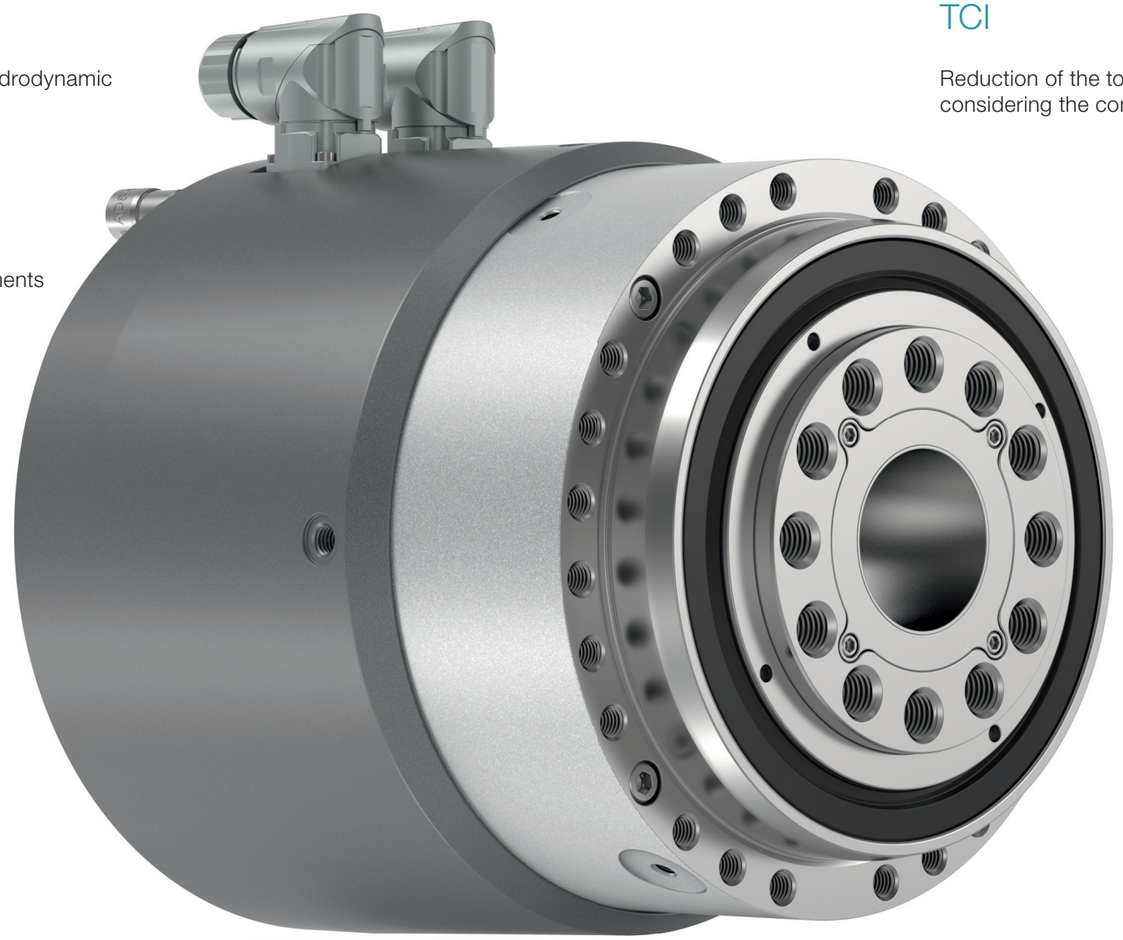
Surface contact between teeth enables
E-Stop torque 3 times the maximum torque

True zero backlash

Over the entire lifetime

Torque density

Torque up to 3 times higher than dimensionally similar drive solutions



TCI

Reduction of the total cost of investment by considering the complete system

Maintenance free

Gearbox lubricated over lifetime with virtually wear free tooth properties

Energy efficient

Up to 50 % lower energy consumption through reduced losses and downsizing

TCO

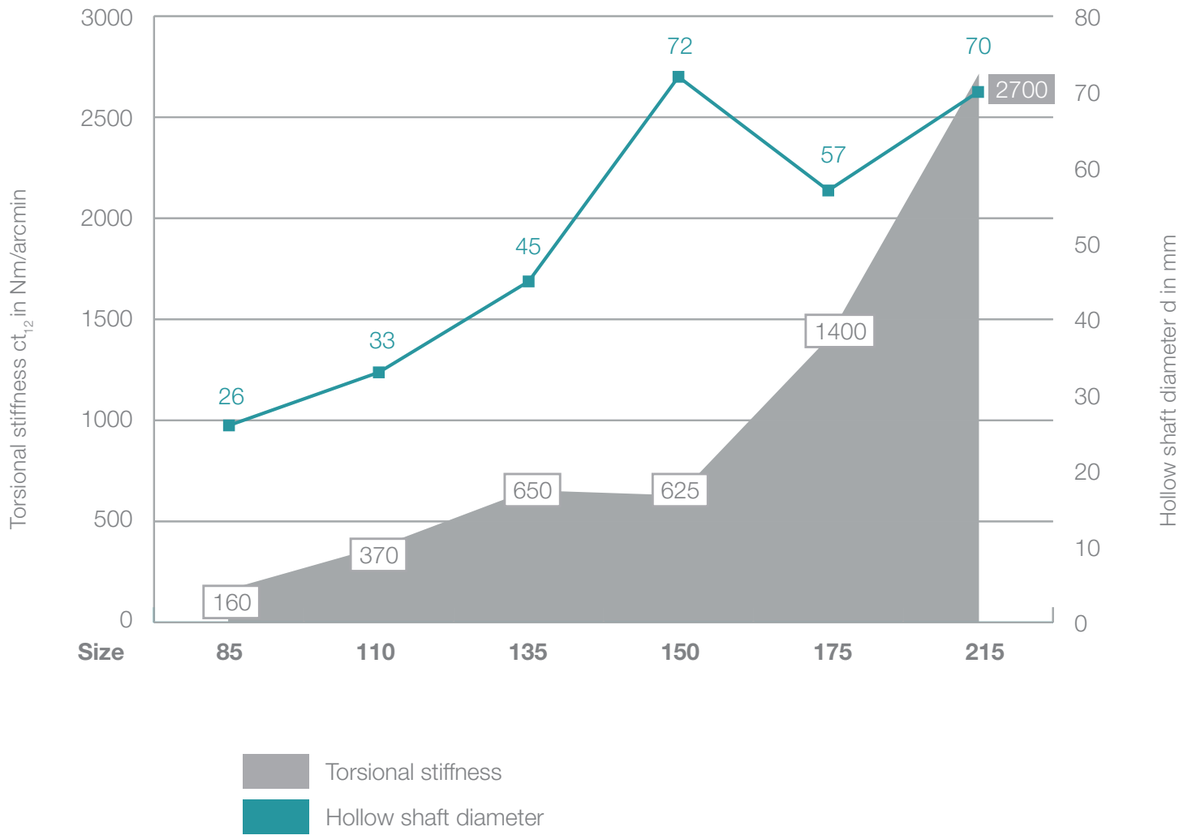
Increase in productivity by up to 40 % through the use of disruptive technology

Configurable

Perfectly adapted drive system to your application without any compromises

An ingenious concept in four variants and six sizes

Galaxie® properties of true zero backlash with highest torque density, torsional stiffness, and positioning accuracy are valid for all versions



Gearbox + adapter plate
= maximum flexibility

Galaxie® G

Backlash-free gearbox with optional inline planetary pre-stage and adapter plate for mounting on standard industrial servo motors.

Galaxie® GH

Galaxie® right-angle gearbox with hypoid input stage and adapter plate with optional inline planetary prestage and hollow shaft.

Gearbox + motor
= ultra-compact actuator

Galaxie® D

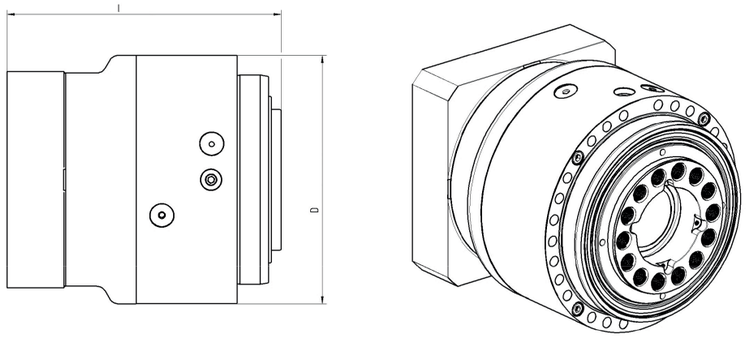
Hollow-shaft compact drive, axially integrated brushless servo motor with standard encoder systems.

Gearbox + drive interface
= large hollow shaft + extremely short design

Galaxie® GS

Compact, configurable zero backlash gearbox with hollow shaft and input drive flange.

Galaxie® G



Product characteristics:
Configurable zero backlash gearbox with optional planetary pre-stage and motor mounting adapter plate.

Typical applications:
A/B/C Axis for precise positioning in CNC applications like milling and turning, gantry end effectors or medical technology.

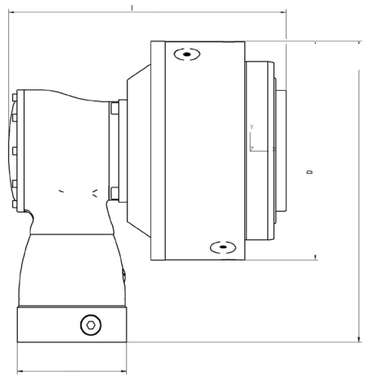
Note:
Motor adapter plate and shaft coupling configurable for all common industrial motors. Ratio up to i = 301 can be realized with planetary pre-stage.

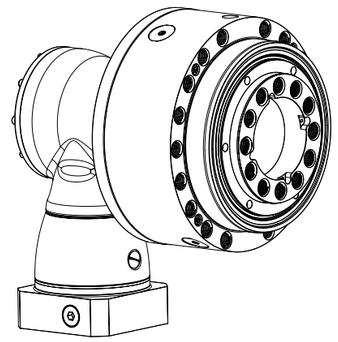
Size	Unit		85	110	135	150	175	215
variant			G	G	G	G	G	G
outer diameter[1]	D	in mm	115	160	191	193	241	300
length[2]	l	in mm	157	177	226	157	267	316
max. acceleration torque[3]	T_{2B}	in Nm	450	1086	1800	1500	4050	7500
max. output speed[3]	n_{2max}	in rpm	125	95	80	80	61	50
nominal output torque[3] @ n_{2N}	T_{2N}	in Nm	190	450	750	750	1685	3130
nominal output speed[3] @ T_{2N}	n_{2N}	in rpm	31	23	20	23	15	12
emergency stop torque[3]	T_{2Not}	in Nm	1350	3000	5400	3000	12000	22500
torsional rigidity[3]	C_{t21}	in Nm/arcmin	160	370	650	625	1400	2700
ratio[4]	i		-24			31	-24	

[1] without connectors/varies depending on mounting position
[2] without cooling connectors/varies depending on pre stage and motor dependent adapterplate
[3] values are subject to variations of ± 10%
[4] with negative gear ratio, output turns in opposite direction to input; with positive gear ratio, output turns in same direction as input

Technical data for reference only; technical data for 2-stage gearboxes and gearboxes with water cooling may vary – available on request.

Galaxie® GH





Product characteristics:
Galaxie® gearbox with hypoid pre-stage and motor mounting adapter plate – additional planetary pre-stage and hollow shaft are optional.

Typical applications:
A/B/C Axis for precise positioning in CNC applications like milling and turning, Gantry end effectors and wafer handling.

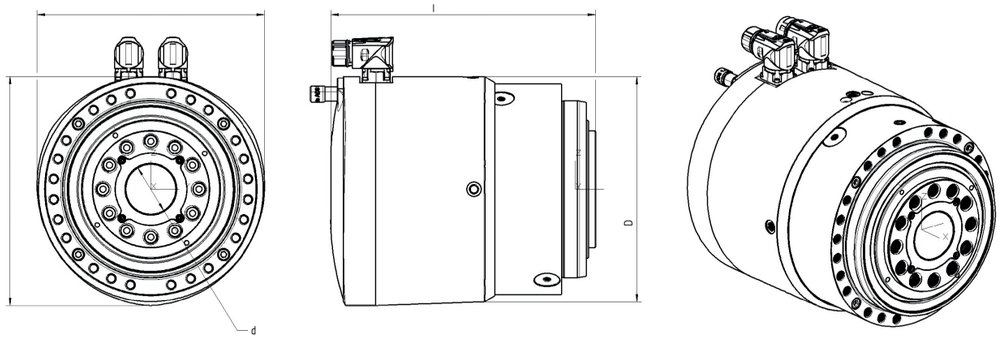
Note:
Optional hollow shaft may be possible on request. Ratio up to 2400:1 can be realized with additional planetary pre stage (no hollow shaft). Motor adapter plate and shaft coupling configurable for all common industrial motors.

Size	Unit		110	135	175	215
variant			GH	GH	GH	GH
outer diameter[1]	D	in mm	160	191	241	300
length[2]	l	in mm	215	260	302	381
max. acceleration torque[3]	T_{2B}	in Nm	1086	1800	4050	7500
max. output speed[3]	n_{2max}	in rpm	95	80	61	50
nominal output torque[3] @ n_{2N}	T_{2N}	in Nm	450	750	1685	3130
nominal output speed[3] @ T_{2N}	n_{2N}	in rpm	23	20	15	12
emergency stop torque[3]	T_{2Not}	in Nm	3000	5400	12000	22500
torsional rigidity[3]	C_{t21}	in Nm/arcmin	370	650	1400	2700
ratio[4]	i		72-240			

[1] without connectors/varies depending on mounting position
[2] without cooling connectors/varies depending on pre stage and motor dependent adapterplate
[3] values are subject to variations of ± 10%
[4] output turns to input

Technical data for reference only; specified values only valid with hollow shaft design / MF3 (with additional coaxial pre-stage) on request.

Galaxie® D



Product characteristics:
Compact hollow shaft drive with integrated synchronous motor and same characteristics as gearbox version: zero backlash with highest torque density, torsional rigidity and positioning accuracy with compact integrated synchronous motor.

Typical applications:
A/B/C Axis for precise positioning in CNC applications like milling and turning or indexing tables.

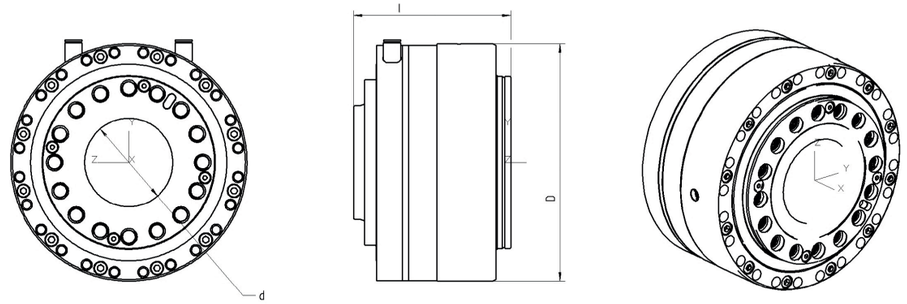
Note:
Different encoder options, cooling options (liquid cooled, free convection), electrical connectors, and an optional holding brake are available depending on application requirements.

Size	Unit		85	110	135	175
variant			D	D	D	D
outer diameter[1]	D	in mm	144	187	211	263
hollowshaft diameter	d	in mm	26	33	45	57
length[2]	l	in mm	197	232	240	325
max. acceleration torque[3]	T_{2B}	in Nm	450	1086	1800	4050
max. output speed[3]	n_{2max}	in rpm	125	95	80	61
nominal output torque[3] @ n_{2N}	T_{2N}	in Nm	190	450	750	1685
nominal output speed[3] @ T_{2N}	n_{2N}	in rpm	31	23	20	15
emergency stop torque[3]	T_{2Not}	in Nm	1350	3000	5400	12000
torsional rigidity[3]	C_{t21}	in Nm/arcmin	160	370	650	1400
ratio[4]	i		-24			

[1] without connectors/varies depending on mounting position
[2] without cooling connectors
[3] values are subject to variations of ±10%
[4] negative ratio indicates output rotates in opposite direction to input

Technical data valid for actuators with water cooling; data for convection cooling may vary.

Galaxie® GS



Product characteristics:
Configurable zero backlash gearbox with hollow shaft and input drive flange.

Typical applications:
A/B/C Axis for precise positioning in CNC applications like milling and turning, indexing tables or medical technology.

Note:
Drive possible by belt input with parallel motor mount or direct drive motor mounting. Configurable variants also available for sizes 085 and 215 on request.

Size	Unit		110	135	150	175
variant			GS	GS	GS	GS
outer diameter[1]	D	in mm	160	191	193	241
hollowshaft diameter	d	in mm	33	45	72	57
length[2]	l	in mm	145	161	128,5	213
max. acceleration torque[3]	T_{2B}	in Nm	1086	1800	1500	4050
max. output speed[3]	n_{2max}	in rpm	95	80	80	61
nominal output torque[3] @ n_{2N}	T_{2N}	in Nm	450	750	750	1685
nominal output speed[3] @ T_{2N}	n_{2N}	in rpm	23	20	17	15
emergency stop torque[3]	T_{2Not}	in Nm	3000	5400	3000	12000
torsional rigidity[3]	C_{t21}	in Nm/arcmin	370	650	625	1400
max input radial load	F1Q(SF1)	in N	2150	4500	4800	5850
ratio[4]	i		-24		31	-24

[1] without connectors/varies depending on mounting position
[2] without cooling connectors
[3] values are subject to variations of ±10%
[4] with negative gear ratio, output turns in opposite direction to input; with positive gear ratio, output turns in same direction as input

Technical data valid for gearboxes without water cooling.
Technical data for reference only.

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