ServoFlex
Type 328

Mönninghoff
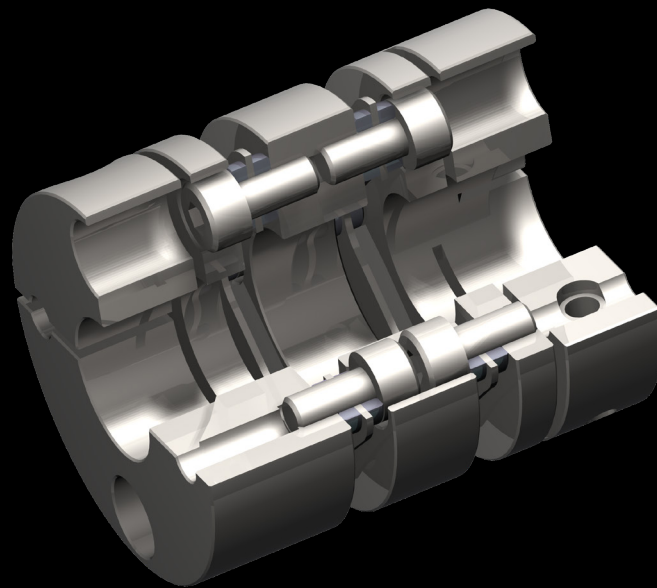
ServoFlex - Type 328

Characteristics and features

- torque transmission is free of backlash and torsionally stiff
- wear-free and maintenance-free
- high misalignment values
- high strength and bending elasticy stainless steel disc pack
- membrane shape is optimized with finite element design methods
- small resultant restoring forces
- transmitted torque up to 25 Nm, depending on the angular misalignment
- recommended temperature range: -30 °C to 100 °C
  use outside of this spectrum on request
- single and double joint designs
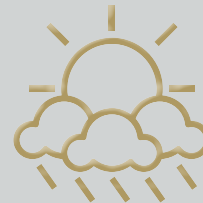
Mönninghoff power transmission represents an infinite variant diversity that is applied by all areas of modern mechanical engineering.

Our technologies are mostly designed to operate under extreme conditions. We offer high precision products for medical robotics, fail-proof security for aerospace technology or synchronization soultions for the packaging or printing industry.
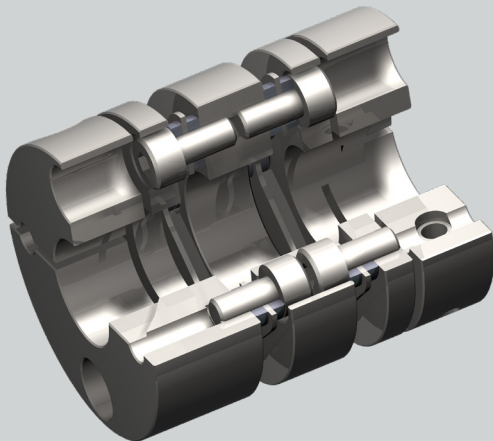
We thus address customers who have the highest standards for their own machines or systems. To them, we can offer highly complex, application-specific solutions.
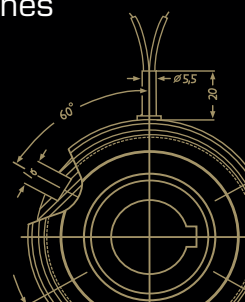
Match code

Mönninghoff shaft couplings are indicated by the following match code:

328 . A . B . 4

A coupling size
B design

other individual characteristics:

- bore size
- options of mounting and integrating

According to these characteristics, we design individual solutions concerning transmitted torque, engaging behavior or rotation speed.

Our engineers can assist with finding an application-specific coupling at any time. Together, we can develop individual and innovative solutions for extreme operating conditions.

Ordering example

Mönninghoff ServoFlex coupling
Type 328.14.4.4

Bore d	10 mm H7
Bore d_1	12 mm H7
mounting option	A
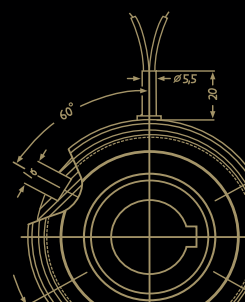
ServoFlex - Type 328

Coupling size

When dimensioning a Mönninghoff ServoFlex coupling, several technical preconditions should be considered:

- Membrane coupling transmit torque without virtually any dampening. Therefore the size must be determined so that a possible peak torque - caused by drive or load - does not exceed the specified nominal torque T_{KN}. We recommend that the torque which have been determined theoretically are corrected with the appropriate safety or operating factor.

$$T_{KN} > T \cdot K_B \text{ oder } T_{KN} > T \cdot K_S$$

- As misalignment reduces the transmitted torque of the coupling, the values specified for T_{KN} in the table must be taken into consideration depending on the angle of displacement. In the case of alternating operation and the demand for backlash free torque transmission, the alternating torque may not be exceeded.

$$T_{KW} > T \cdot K_B \text{ oder } T_{KW} > T \cdot K_S$$

- In the case of servo-drives and inverter controlled drives, possible maximum torque must be taken into consideration due to the interaction between motor and controller.

$$T_{Motor} = \frac{9550 \cdot P_{Motor}}{n}$$

- If clamping hubs or clamping elements are used, the max. torque which can be transmitted by the clamping connection must be taken into consideration.

T	= torque	T_{Motor}	= torque of the motor
T_{KN}	= nominal torque	P_{Motor}	= power of the motor [kW]
T_{Kw}	= alternating torque	n	= max. speed [min^{-1}]
K_B	= operating factor		
K_S	= shock factor		

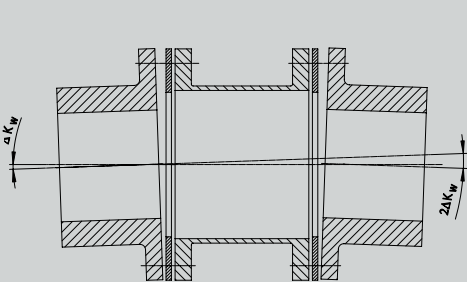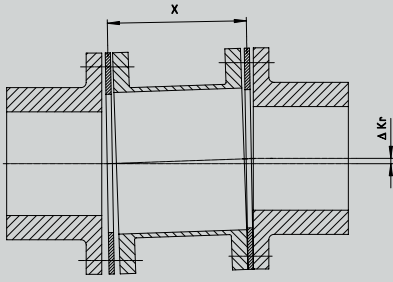## Coupling size - starting factor

If the starting factor is bigger than 2 times of the coupling torque, or if there are more than 50 starts/stops per hour, please consult our engineers.

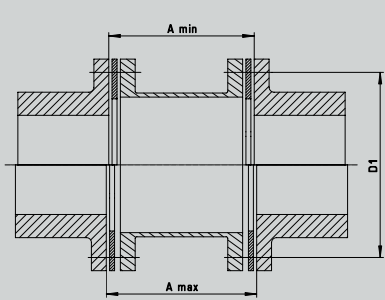## Coupling size - angular misalignment factor

When calculating the angular misalignment factor, the radial and axial misalignment must also be taken into account.
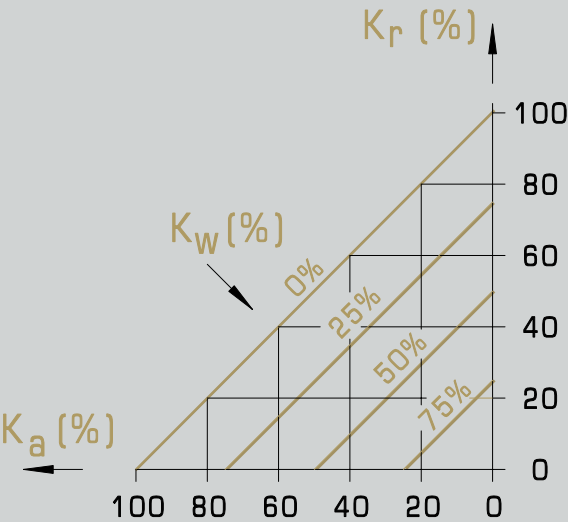
angle misalignment	radial misalignment	axial misalignment

$$\Delta K_{total} = \Delta K_a + \Delta K_r + \Delta K_w \leq 100\%$$

modification of ΔK_a [mm] and ΔK_r [mm] in ΔK_{wa} [°] an ΔK_{wr} [°]

$$\Delta K_{wa} = arcsin \ \frac{\Delta K_a}{0,75 \cdot D_1} \ [°]$$

$$\Delta K_{wr} = arcsin \ \frac{\Delta K_r}{x} \ [°]$$

$$\Delta K_{wg} = \Delta K_w + \Delta K_{wa} + \Delta K_{wr} \ [°]$$

K_r (%)

K_w (%)

K_a (%)

0% 25% 50% 75%

100 80 60 40 20 0

100 80 60 40 20 0

X = distance of

K_{wg} = total angular misalignment

K_{wa} = angular misalignment axial

K_{wr} = angular misalignment radial

Design 1.4

The Mönninghoff ServoFlex coupling is offered in many different designs.

Design _.1.4, single joint = equalization of axial and angular misalignment

Type 328, Design _.1.4
single joint
connection option A:
- stepped hub - stepped hub

only sizes
14; 19; 25

Type 328, Design _.1.4
single joint
connection option B:
- stepped hub - full hub

only sizes
14; 19; 25

Type 328, Design _.1.4
single joint
connection option C:
- full hub - full hub

ServoFlex - Type 328

Technical data design 1.4

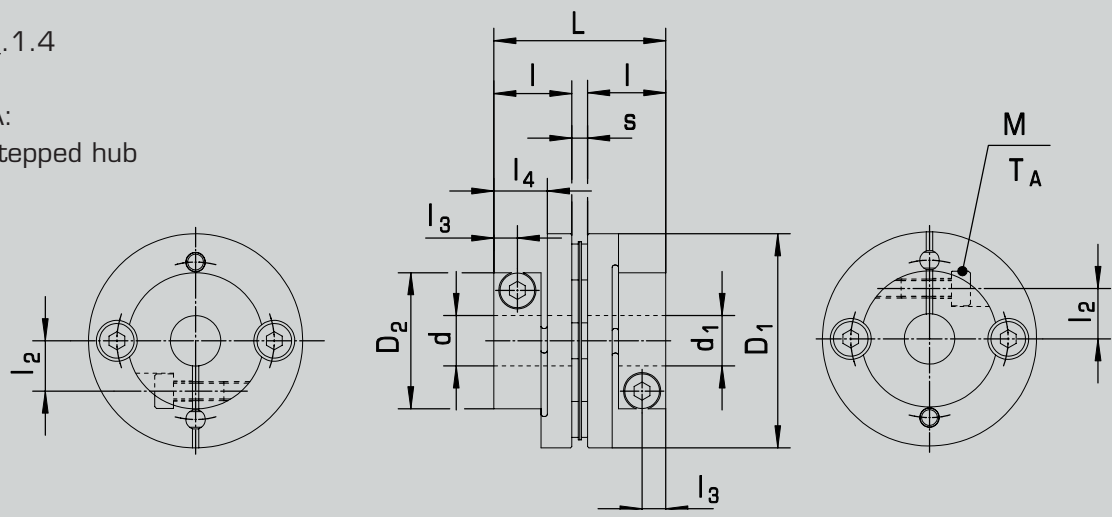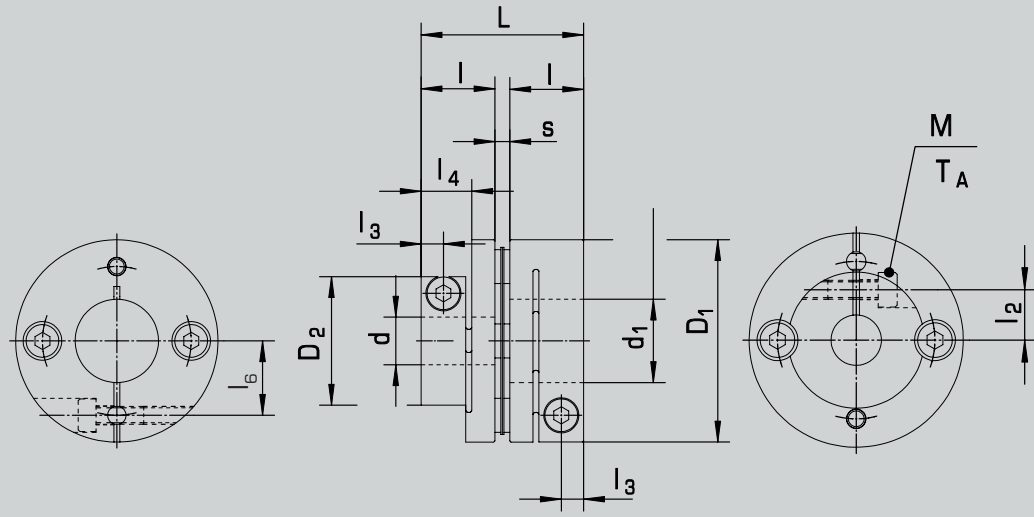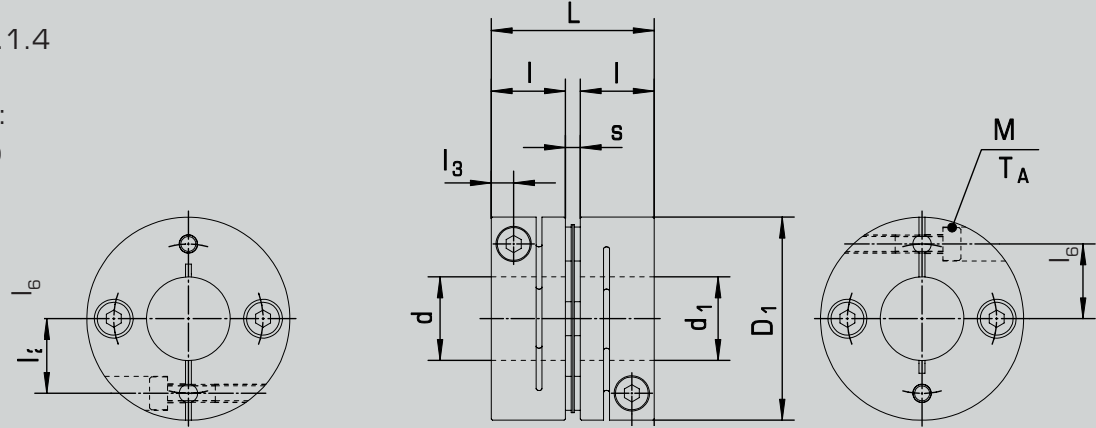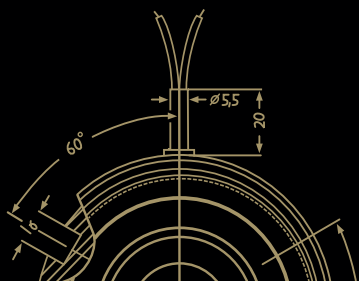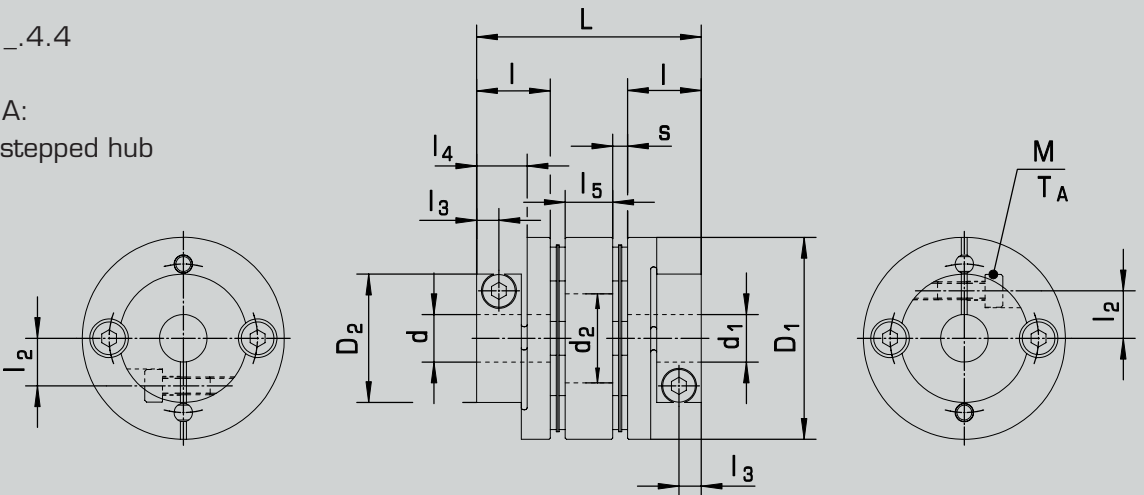| Size			05	08	10	14	16	19	25
torque		[Nm]	0,6	0,8	1,5	4,0	6	10	25
max. speed		[min⁻¹]	10000	10000	10000	10000	10000	10000	10000
axial stiffness		[N/mm]	140	140	64	64	112	80	48
torsional stiffness		[Nm/rad]	500	1400	3700	8000	18000	10000	32000
inertia	type A	[10^{-3}kg m²]	–	–	–	4,01	–	16,41	54,88
	type B		–	–	–	6,07	–	22,97	77,10
	type C		0,26	0,57	2,39	8,13	18,43	29,53	99,33
weight	type A	[kg]	–	–	–	0,033	–	0,075	0,156
	type B		–	–	–	0,041	–	0,090	0,185
	type C		0,007	0,011	0,025	0,049	0,084	0,105	0,214
max. angular misalignment		[°]	0,5	1	1	1	1	1	1
max. axial misalignment		[mm]	± 0,05	± 0,1	± 0,15	± 0,2	± 0,25	± 0,3	± 0,8
max. offset		[mm]	0,02	0,02	0,02	0,02	0,02	0,02	0,02
type A	bore d H7		-	-	-	5 - 10	-	8 - 15	10 - 19
	bore d_1 H7		-	-	-	5 - 10	-	8 - 15	10 - 19
type B	bore d H7		-	-	-	5 - 10	-	8 - 15	10 - 19
	bore d_1 H7		-	-	-	10 - 14	-	15 - 19	19 - 25
type C	bore d H7		3 - 6	4 - 8	5 - 10	10 - 14	8 - 16	15 - 19	19 - 25
	bore d_1 H7		3 - 6	4 - 8	5 - 10	10 - 14	8 - 16	15 - 19	19 - 25
dimensions	D	[mm]	16	19	26	34	39	44	56
	D_2		–	–	–	21,6	–	29,6	38
	L		16,7	19,35	23,15	27,3	34	34	43,4
	l		7,85	9,15	10,75	12,4	15,5	15,5	20,5
	l_2		–	–	–	8	–	11	14,5
	l_6		4,8	Ø 4 – 7 = 5,8 Ø 8 = 6	9,5	12,5	14	17	22
	l_3		2,5	3,15	3,3	3,75	4,5	4,5	6
	l_4		–	–	–	8,5	–	10	13,5
	s		1	1,05	1,65	2,5	3	3	2,4
	M		2	Ø 4 – 7 = 2 Ø 8 = 2,5	2,5	3	4	4	5
	T_A	[Nm]	0,4	Ø 4 – 7 = 0,4 Ø 8 = 1	1,0	1,5	3,4	3,4	7,5

ServoFlex - Type 328

Design 4.4

The Mönninghoff ServoFlex coupling is offered in many different designs.

Design _.4.4, double joint = equalization of axial and angular misalignment and additional of radial misalignment
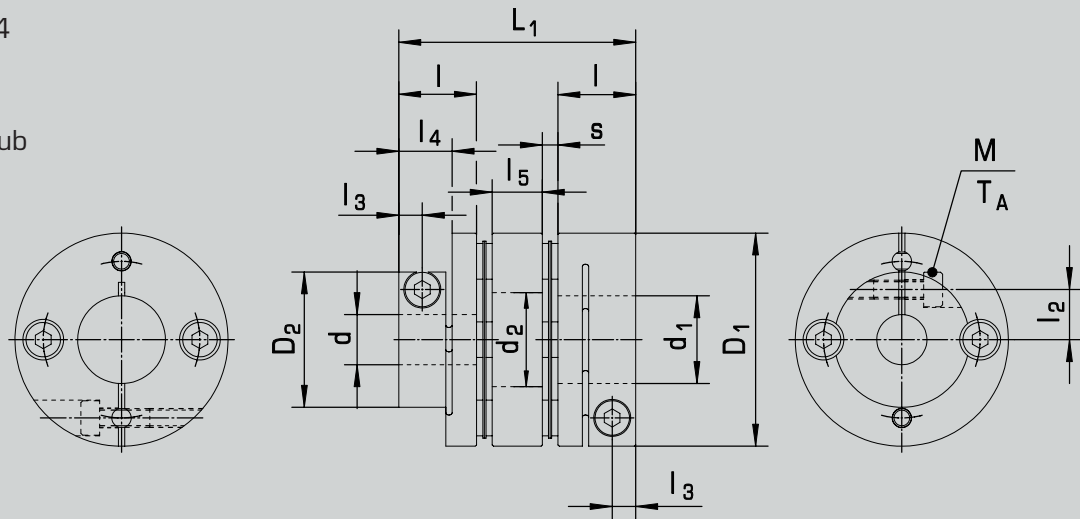
Type 328, Design _.4.4
double joint
connection option A:
- stepped hub - stepped hub
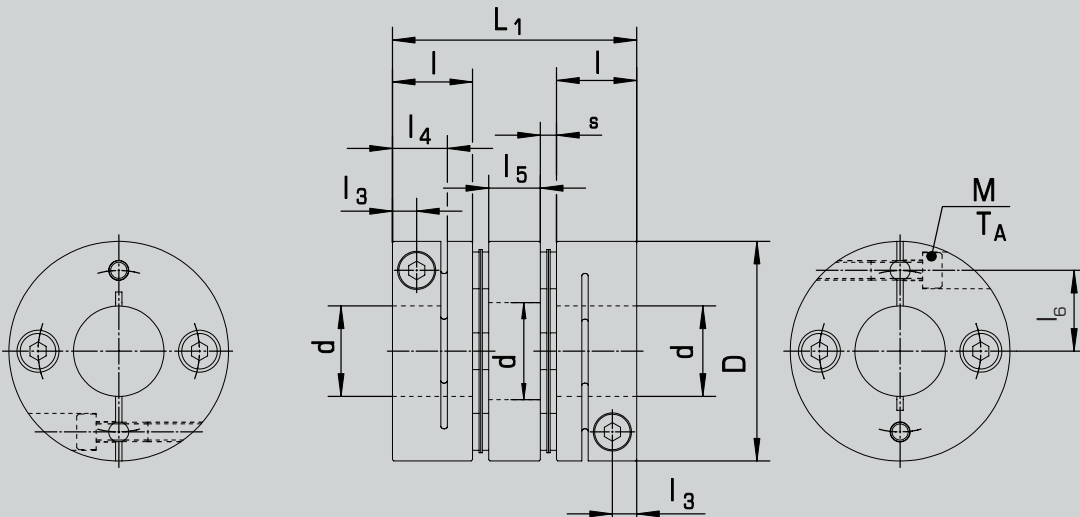
only sizes
14; 19; 25

Type 328, Design _.4.4
double joint
connection option B:
- stepped hub - full hub

only sizes
14; 19; 25

Typ 328, Design_.4.4
double joint
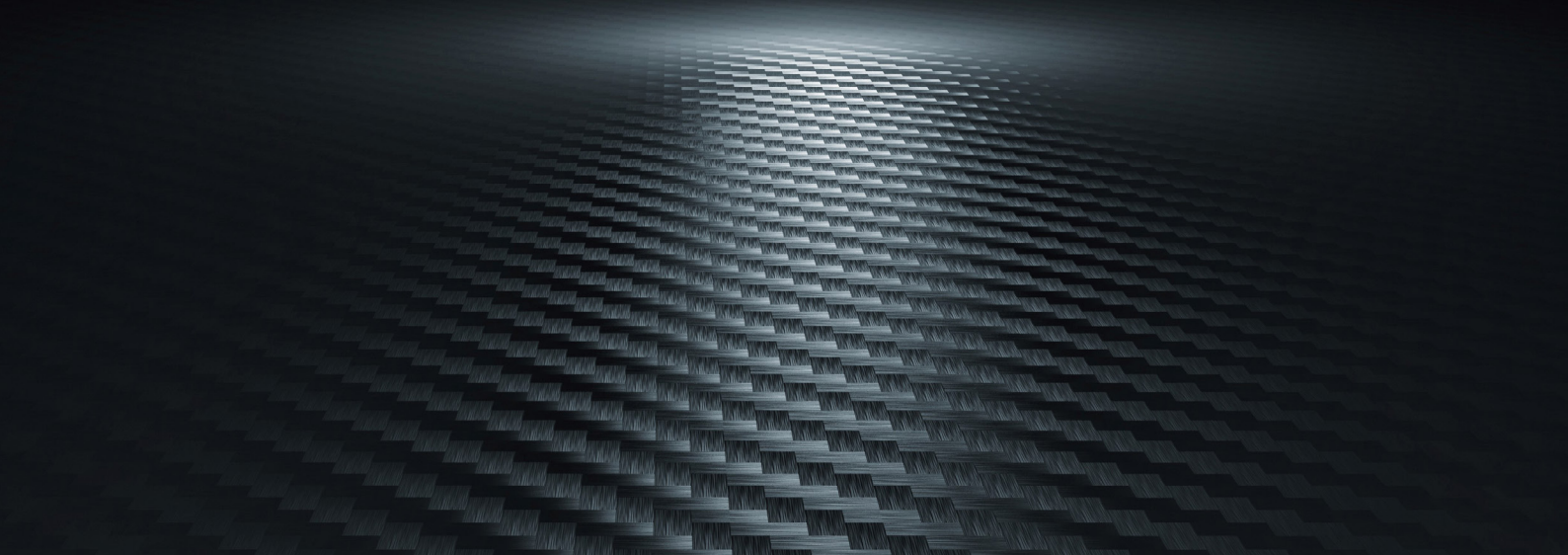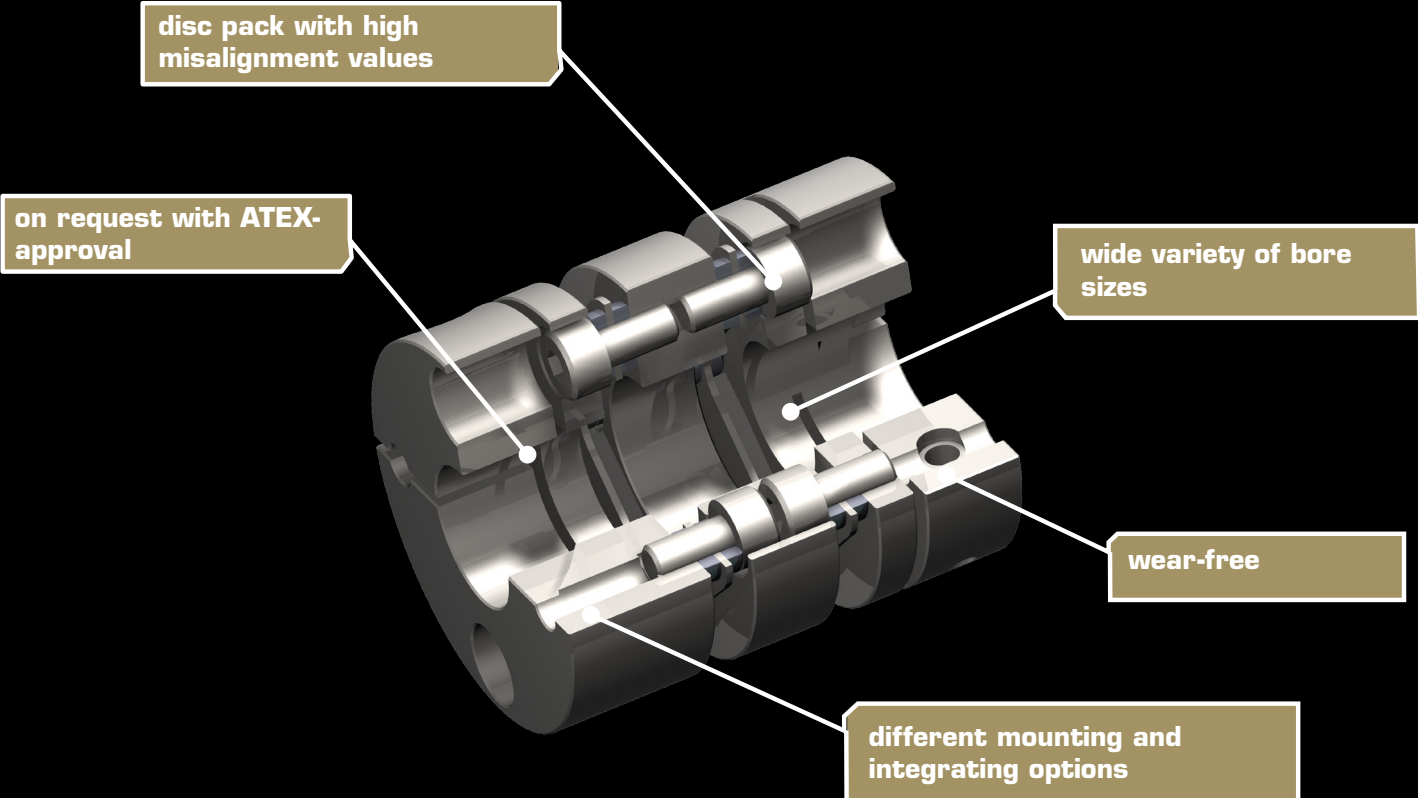connection option C:
- full hub - full hub

ServoFlex - Type 328

Technical data design 4.4

Size			05	08	10	14	16	19	25
torque		[Nm]	0,6	0,8	1,5	4,0	6	10	25
max. speed		[min^{-1}]	10000	10000	10000	10000	10000	10000	10000
axial stiffness		[N/mm]	70	70	32	32	56	40	48
torsional stiffness		[Nm/rad]	250	700	1850	4000	9000	10000	16000
inertia	type A	[kgm^2 x 10^{-6}]	–	–	–	4,01	–	16,4	54,88
	type B		–	–	–	6,07	–	22,97	77,10
	type C		0,36	0,8	3,43	8,13	18,43	29,53	99,33
weight	type A	[kg]	–	–	–	0,053	–	0,121	0,246
	type B		–	–	–	0,061	–	0,136	0,275
	type C		0,010	0,016	0,036	0,069	0,123	0,151	0,304
max. angular misalignment		[°]	0,5	2	2	2	2	2	2
max. axial misalignment		[mm]	± 0,1	± 0,2	± 0,33	± 0,4	± 0,5	± 0,6	± 0,8
max. offset		[mm]	0,02	0,02	0,02	0,02	0,02	0,02	0,02
type A	bore d H7		-	-	-	5 - 10	-	8 - 15	10 - 19
	bore d_1 H7		-	-	-	5 - 10	-	8 - 15	10 - 19
type B	bore d H7		-	-	-	5 - 10	-	8 - 15	10 - 19
	bore d_1 H7		-	-	-	10 - 14	-	15 - 19	19 - 25
type C	bore d H7		3 - 6	4 - 8	5 - 10	10 - 14	8 - 16	15 - 19	19 - 25
	bore d_1 H7		3 - 6	4 - 8	5 - 10	10 - 14	8 - 16	15 - 19	19 - 25
bore d_2			6,5	8,5	10,5	15	17	20	26
dimensions	D	[mm]	16	19	26	34	39	44	56
	D_2		–	–	–	21,6	–	29,6	38
	L_1		23,2	25,9	32,3	37,8	48	48	59,8
	l		7,85	9,15	10,75	12,4	15,5	15,5	20,5
	l_2		–	–	–	8	–	11	14,5
	l_6		4,8	Ø 4 – 7 = 5,8 Ø 8 = 6	9,5	12,5	14	17	22
	l_3		2,5	3,15	3,3	3,75	4,5	4,5	6
	l_4		–	–	–	8,5	–	10	13,5
	l_5		5,5	5,5	7,5	8	11	11	14
	s		1	1,05	1,65	2,5	3	3	2,4
	M		2	Ø 4 – 7 = 2 Ø 8 = 2,5	2,5	3	4	4	5
	T_A	[Nm]	0,4	Ø 4 – 7 = 0,4 Ø 8 = 1	1,0	1,5	3,4	3,4	7,5

ServoFlex - Type 328

At a glance

disc pack with high misalignment values

on request with ATEX-approval

wide variety of bore sizes

wear-free

different mounting and integrating options

Mönninghoff

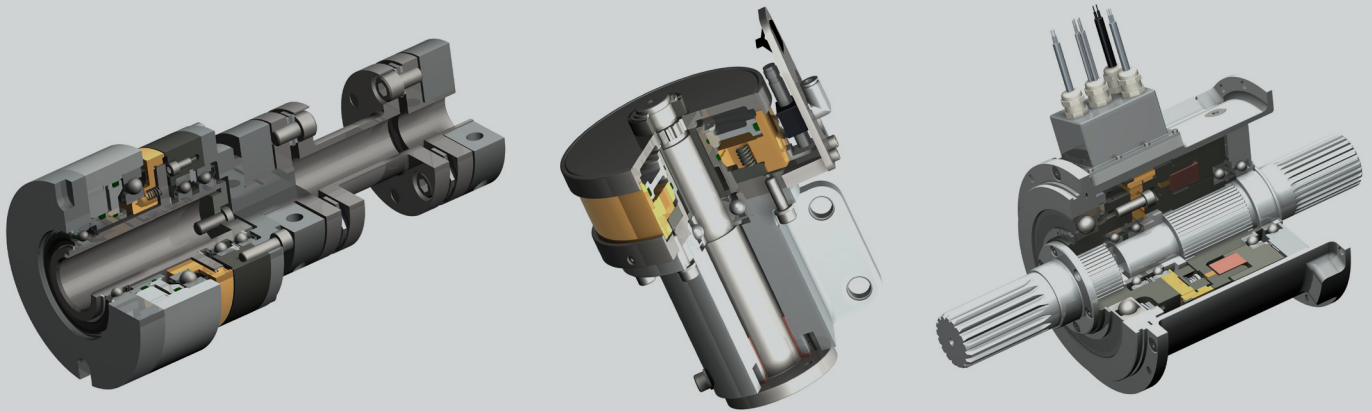## System solutions

You need more?

Mönninghoff clutches can be combined with a variety of many other power transmission elements. Such complex high-tech systems can solve any application-specific tasks and can fulfill any customer-specific wishes.

In many cases, a combination of different drive elements is needed to solve the applications particular problems and difficulties. Being not just supplier but technological partner to our customers, our extensive engineering is part of extraordinary and challenging power transmission projects.
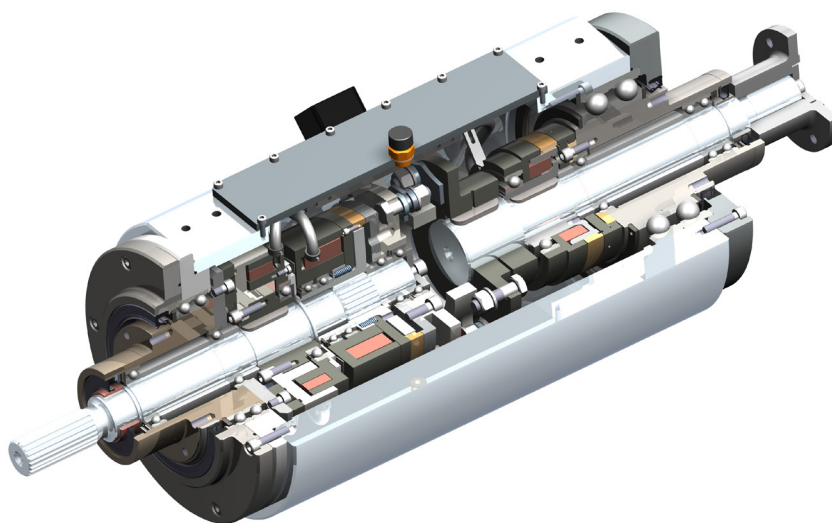
Our product is the know-how, with hardware as an added bonus.
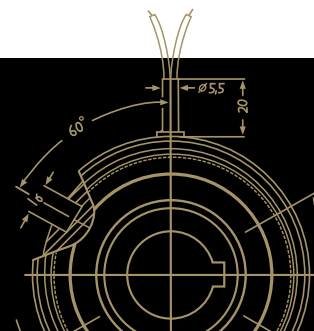
Mönninghoff

Driven by excellence

Why Mönninghoff

- intensive dialog with our customers' engineers
- decades of experience and competence
- deep understanding for all areas of mechanical engineering
- highly modern and flexible machine park
- enthusiasm for quality
- flexibility, inventiveness and communication skills of our employees
- commitment to Germany and Bochum as industrial location

Helps you find a customer-specific power transmission solution for extraordinary circumstances.

For the competent processing and smooth handling of your orders and delivery dates.

Feels committed to protect and preserve the high value of your machine and to secure its availability.

CHAIN & DRIVES®