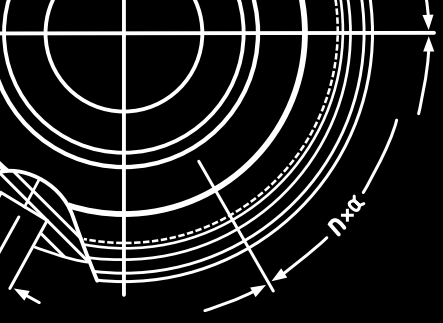
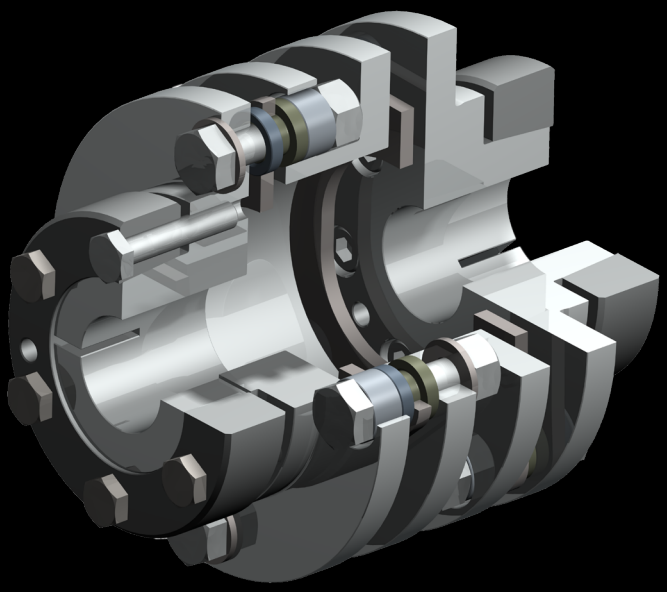


Mönninghoff

ServoFlex
Type 338



CHAIN & DRIVES®
COMPLETE BEARINGS & POWER TRANSMISSION

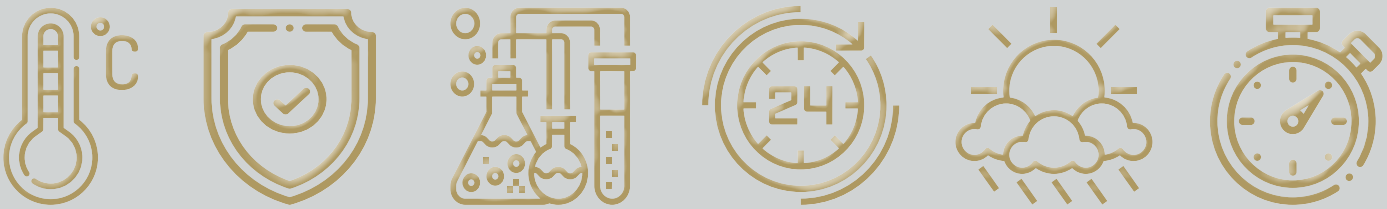
POWER > SPEED > TORQUE

Mönninghoff

ServoFlex - Type 338

Characteristics and features

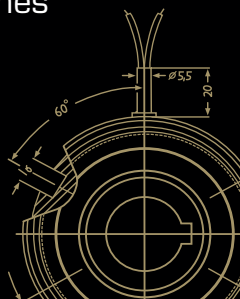
- particularly lightly through the use of aluminum
- torque transmission is free of backlash and torsionally stiff
- wear-free and maintenance-free
- high misalignment values
- high strength and bending elasticy stainless steel disc pack
- membrane shape is optimized with finite element design methods
- small resultant restoring forces
- transmitted torque up to 500 Nm, depending on the angular misalignment
- higher torque possible for special designs
- recommended temperature range: -35 °C to 150 °C
  use outside of this spectrum on request
- single and double joint designs
- spacer made of CFK/GFK or spring steel on request
- spacer also possible in use case-related lengths
- on request with ATEX-approval Ⓔx II 2GD c IIC X / I M2 c (hub design 1 or 2)
  or Ⓔx II 3GD c IIC X (hub design 4)



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.

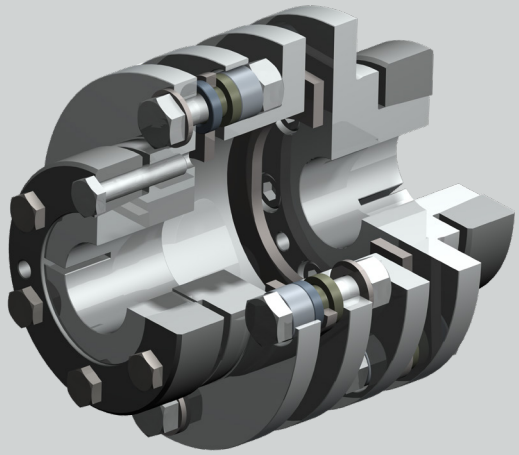
We thus address customers who have the highest standards for their own machines or systems. To them, we can offer highly complex, application-specific solutions.



ServoFlex - Type 338

Match code

Mönninghoff shaft couplings are indicated by the following match code:



338 . A . B . C

A coupling size
B design
C options of mounting and integrating

other individual characteristics:

- bore size with keyways

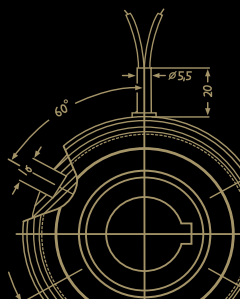
According to these characteristics, we design individual solutions concerning transmitted torque, engaging behavior or rotation speed.

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 338.38.2.4

Bore size d	26 mm H7, keyway acc. to DIN 6885/1
Bore size d_1	26 mm H7, keyway acc. to DIN 6885/1



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_{KN} = nominal torque

T_{Kw} = alternating torque

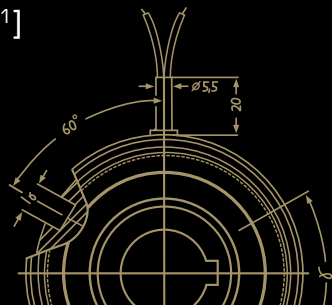
K_B = operating factor

K_S = shock factor

T_{Motor} = torque of the motor

P_{Motor} = power of the motor [kW]

n = max. speed [min^{-1}]

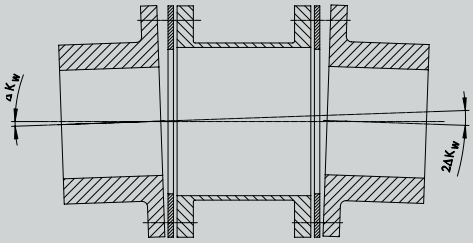


Coupling size - starting factor

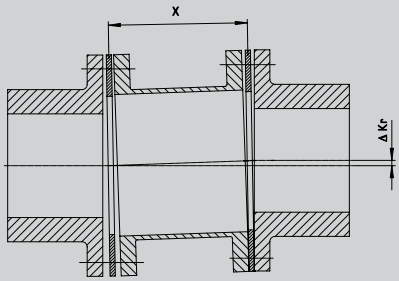
If the starting factor is bigger than 2 times of the coupling torque, or if there are more than 50 starts/stops per hour, please consult our engineers.

Coupling size - angular misalignment factor

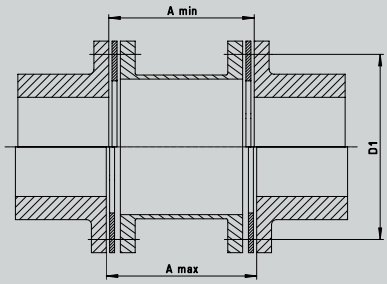
When calculating the angular misalignment factor, the radial and axial misalignment must also be taken into account.



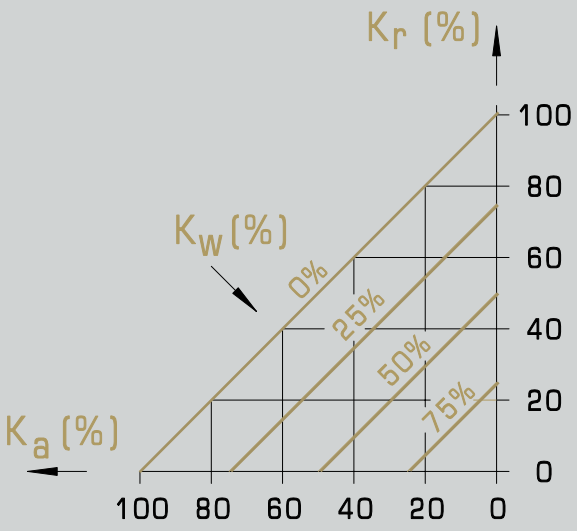
angle misalignment



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} [°]

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

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

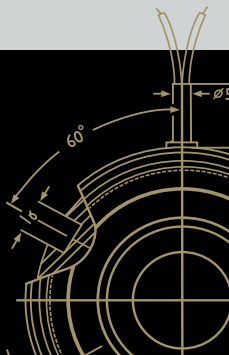
$$\Delta K_{wg} = \Delta K_w + \Delta K_{wa} + \Delta K_{wr} \; [°]$$

X = distance of membrane

K_{wg} = total angular misalignment

K_{wa} = angular misalignment axial

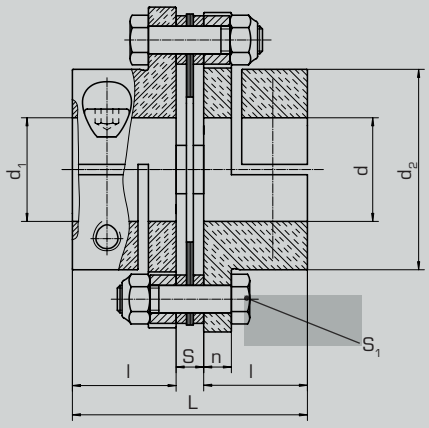
K_{wr} = angular misalignment radial



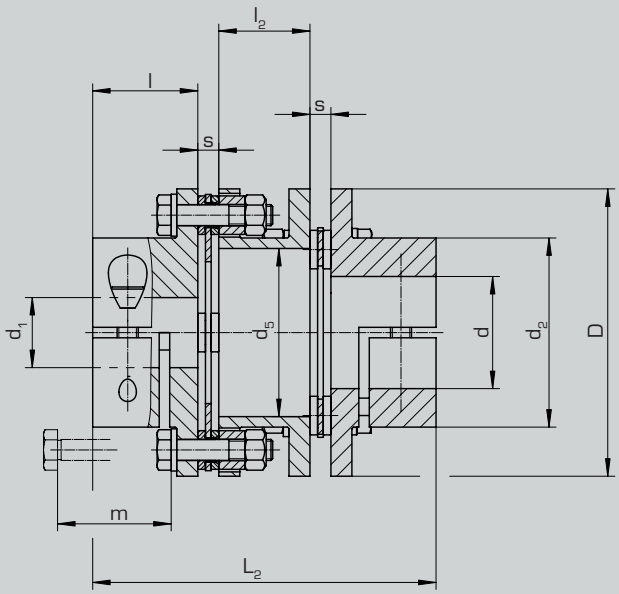
ServoFlex - Type 338

Design

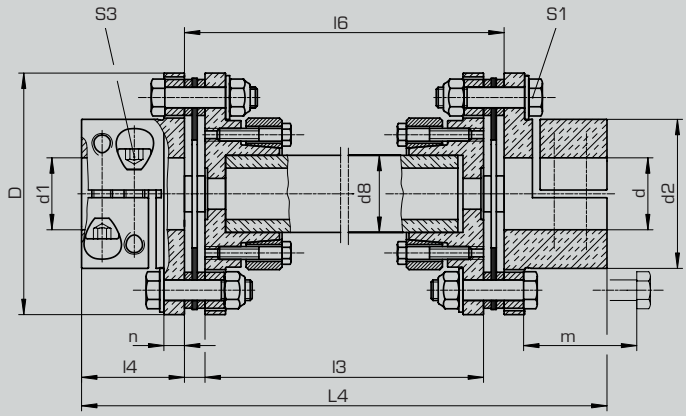
The Mönninghoff ServoFlex coupling is offered in many different designs.



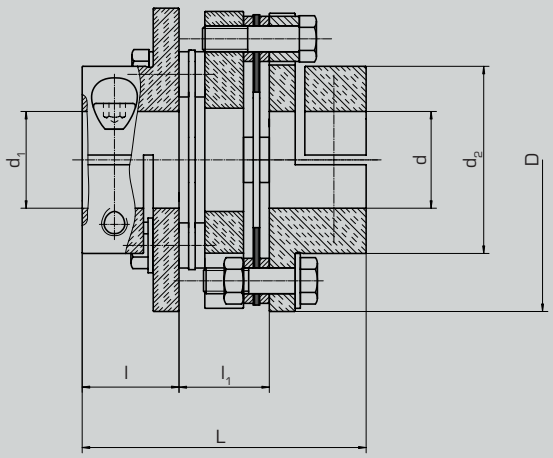
Type 338, design _.1:
single joint



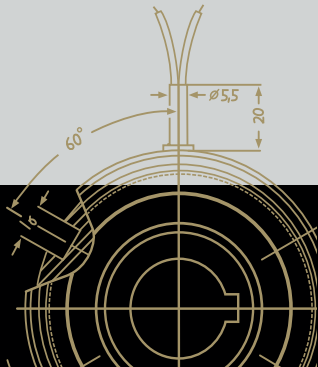
Type 338, design _.2:
double joint



Type 338, design _.3:
double joint with variable spacer



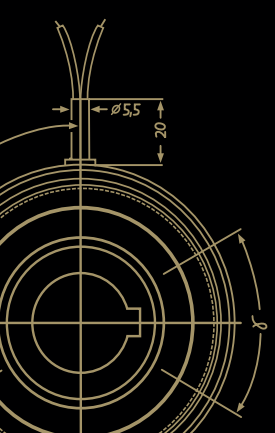
Type 338, design _.4:
double joint with small spacer



ServoFlex - Type 338

Technical data

Size					20	25	35	38	42	50
torque at		0,50°		[Nm]	35	60	150	200	300	500
angular misalignment	T_{KN}	0,75°			25	40	100	120	160	200
per membrane pack		1,00°			10	25	50	70	—	—
design 4._	T_{KMax}			[Nm]	25	45	55	120	135	250
alternating torque	T_{KW}			[Nm]	18	40	55	120	135	250
max. misalignment	angular	type 1._		[°]	1	1	1	1	1	1
		type 2._,4._			2	2	2	2	2	2
	axial	type 1._		[mm]	0,6	0,8	1	1,2	1,4	1,6
		type 2._, 4._			1,2	1,6	2	2,4	2,8	3,2
	offset	type 2._		[mm]	0,5	0,5	0,5	0,6	0,6	0,8
		type 4._			0,1	0,2	0,2	0,3	0,3	0,4
max. speed				n [min^{-1}]	on request					
inertia		type 1._		I [10^{-3}kg m^2]	0,11	0,30	0,87	1,6	2,6	6,5
		type 2._			0,20	0,55	1,5	2,9	4,6	11,8
		type 4._			0,15	0,42	1,1	2,2	3,6	9,2
weight		type 1._		[kg]	0,13	0,26	0,43	0,6	0,9	1,5
		type 2._			0,21	0,47	0,72	0,96	1,4	2,4
		type 4._			0,17	0,4	0,51	0,8	1,2	2,1
torsional stiffness		type 1._		C_T [10^6 Nm/rad]	0,016	0,029	0,083	0,17	0,25	0,43
		type 2._, 4._		C_K [10^0 Nm/rad]	0,007	0,013	0,037	0,072	0,109	0,185
axial stiffness		type 1._		[Nm/mm]	43	45	60	122	160	197
		type 2._, 4._			21	22	30	61	80	98
screw S1		size		[Nm]	M5	M6	M6	M 8	M 8	M 10
		tightening torque			5,5	13	13	33	33	65
dimensions			D	[mm]	56	68	82	94	104	128
			d/d_1 min. H7		12	12	19	24	20	25
			d/d_1 max. H7		17	22	32	32	35	42
			d_2		32	40	54	58	68	78
			d_4		35	42	56	59	70	82
			d_5		27	35	48	50	60	69
			d_7		20	24	28	32	34	40
			L		45	56	66	68	80	91
			L_1		56	70	80	88	102	116
			L_2		74	88	98	106	118	140
			l		20	25	30	30	35	40
			l_1		16	20	20	28	32	36
			l_2		24	26	26	30	28	38
			l_4		25	30	35	40	50	55
			S		5	6	6	8	10	11
			s		5	6	6	8	10	11
			s_1		—	16	16	16	18	19
			x		50	62	72	76	90	102
			m type 1._, 2._	min.	27	31	35	44	44	57
			m type 4._	min.	20	24	26	35	35	44

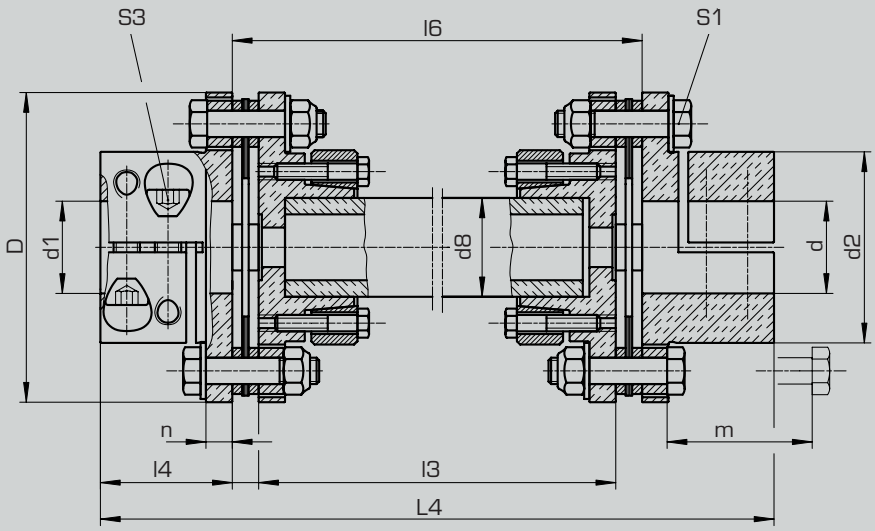


Mönninghoff

ServoFlex - Type 338

Design _.3 with variable spacer

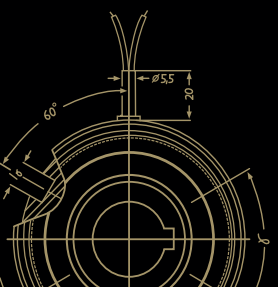
The double joint design has some additional properties of the spacer to consider.



- length changes through temperature variations are possible
- spacer length l_3 is limited to 1500 mm or 2000 mm due to the manufacturing process
- spacermaterial in CFK or GFK on request possible

Technical data

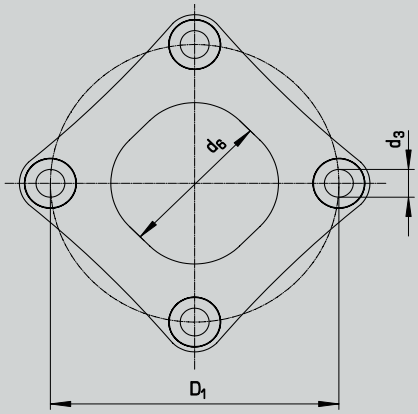
Size				20	25	35	38	42	50
torque				see first table					
max speed	n		[min^{-1}]	on request					
inertia	by l_3 = 1000 mm		[10^{-3} kg m^2]	0,16	0,42	1,19	2,07	3,49	8,89
	per 100 mm			0,002	0,004	0,009	0,017	0,029	0,069
weight	by l_3 = 1000 mm		[kg]	0,53	0,93	1,71	2,26	3,07	4,7
	per 100 mm			0,03	0,04	0,09	0,11	0,13	0,17
torsional stiffness pipe	C_R		[10^6 Nm/rad]	0,2: l3	0,4 : l3	0,9:l3	1,8 : l3	3,1 : l3	7,1 : l3
axial stiffness	C_a		[Nm/mm]	21	22	30	61	80	98
screw S1	size		[Nm]	M5	M6	M6	M8	M8	M10
	tightening torque			5,5	13	13	33	33	65
screw S3	size		[Nm]	M4	M5	M6	M8	M10	M10
	tightening torque			3,6	7	11	25	50	50
max. misalignment	angula		[°]	2	2	2	2	2	2
	axial		[mm]	1,2	1,6	2	2,4	2,8	3,2
	offset		[mm]	0,0175 (l3 + s)					
bore d, d1 H7		min.	[mm]	12	12	19	20	20	25
		max.		17	22	32	32	35	42
dimensions		D	[mm]	56	68	82	94	104	128
		d_2		32	40	54	58	68	78
		d_s		18x2	20x5	25x5	30x5	35x5	40x5
		L_4		must be given in ordering					
		$l_{3max.}$		1500	1500	1500	2000	2000	2000
		l_4		25	30	35	40	50	55
		l_6		distance between shaft ends					
		S		5	6	6	8	10	11
		n		4,5	5	6	8	8	9
		$m_{min.}$		27	31	35	44	44	57



Mönninghoff

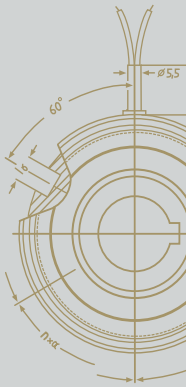
ServoFlex - Type 338

Disc pack

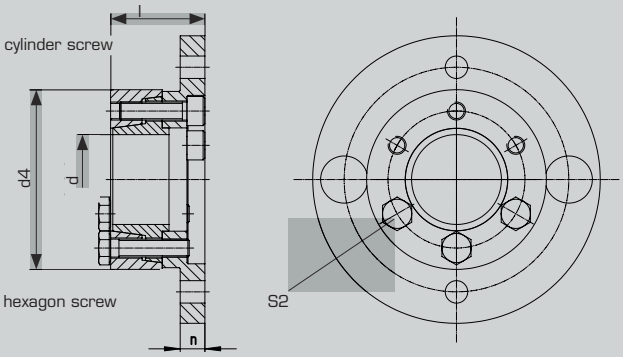


Membrane shape of the ServoFlex shaft coupling is characterized by the following technical properties:

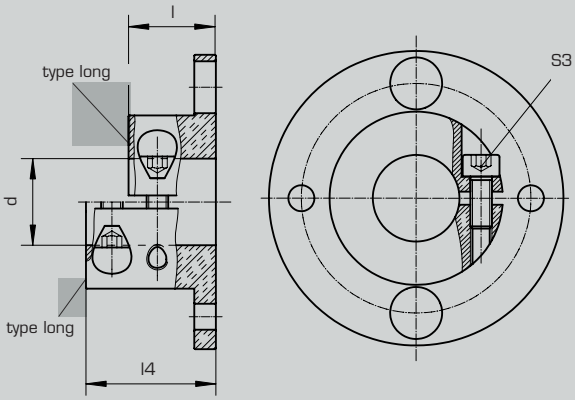
- stainless spring steel
- connected via fitting screws
- optimized with FEM-method



Mounting and connection options



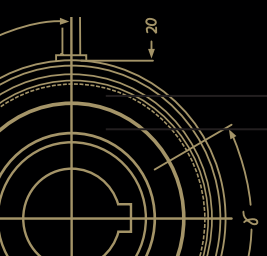
Type 338, connection option_._.2



Type 338, connection option _._.4

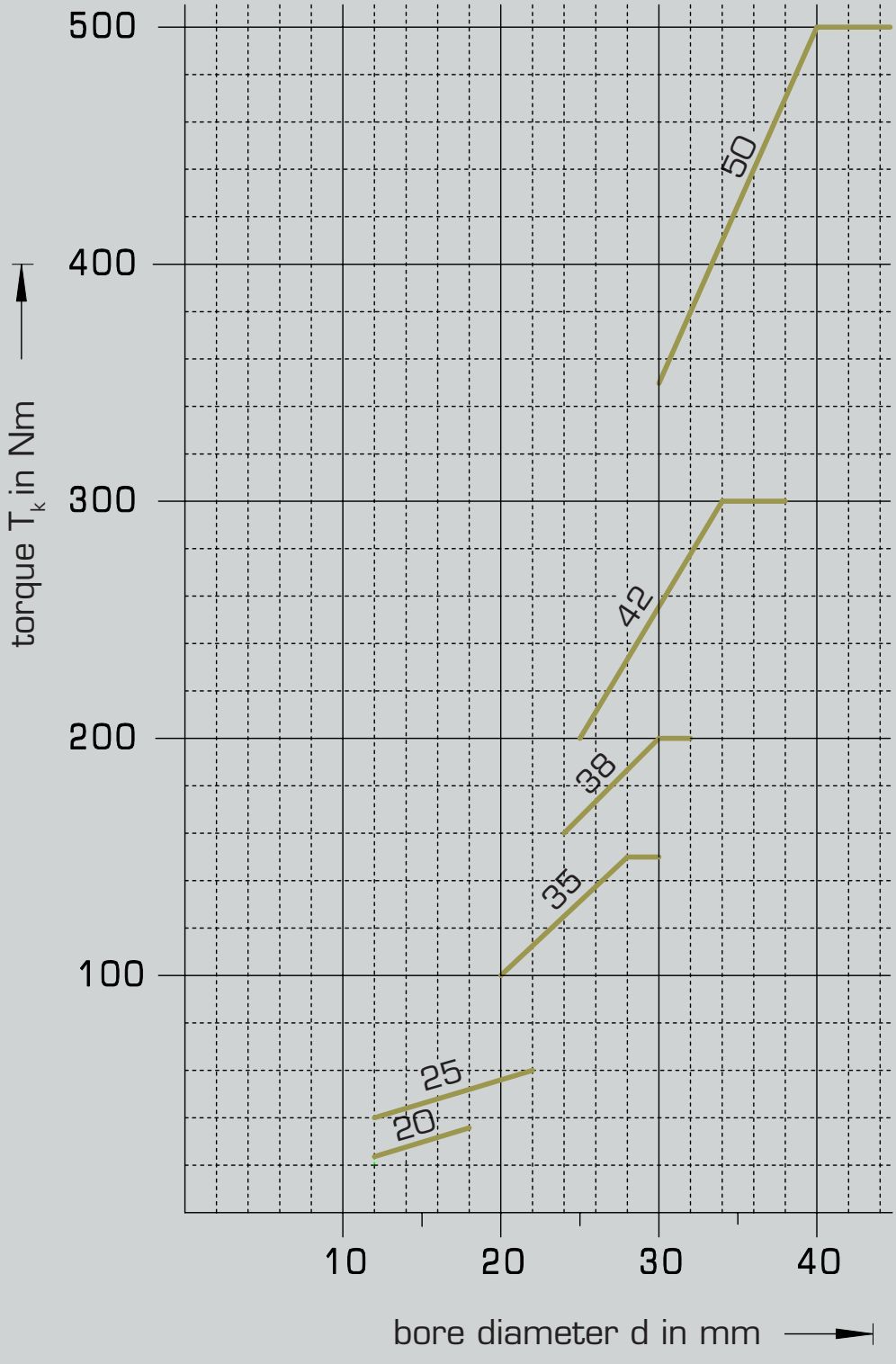
Technical data

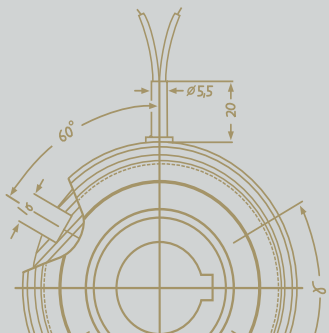
Size				20	25	35	38	42	50
screw S2		size		M3	M4	M5	M5	M6	M6
		tightening torque	[Nm]	1	2,2	5,5	5,5	8,5	8,5
screw S3		size		M4	M5	M6	M8	M10	M10
		tightening torque	[Nm]	3,6	7	11	25	50	50
bore type _.2	$d/d1_{min}$ H7			12	14	20	24	25	30
	$d/d1_{max}$ H7			18	22	28	32	38	45
bore type _.4	$d/d1_{min}$ H7			12	12	19	20	20	25
	$d/d1_{max}$ H7			17	22	32	32	35	42
dimensions		D_1	[mm]	44	53	67	75	85	100
		d_3 H8		5	6	6	8	8	10
		d_4		35	42	56	59	70	80
		d_6		24	30	38	42	48	54
		n		4,5	5	6	8	8	9



Clamping-hub connection option _._.2

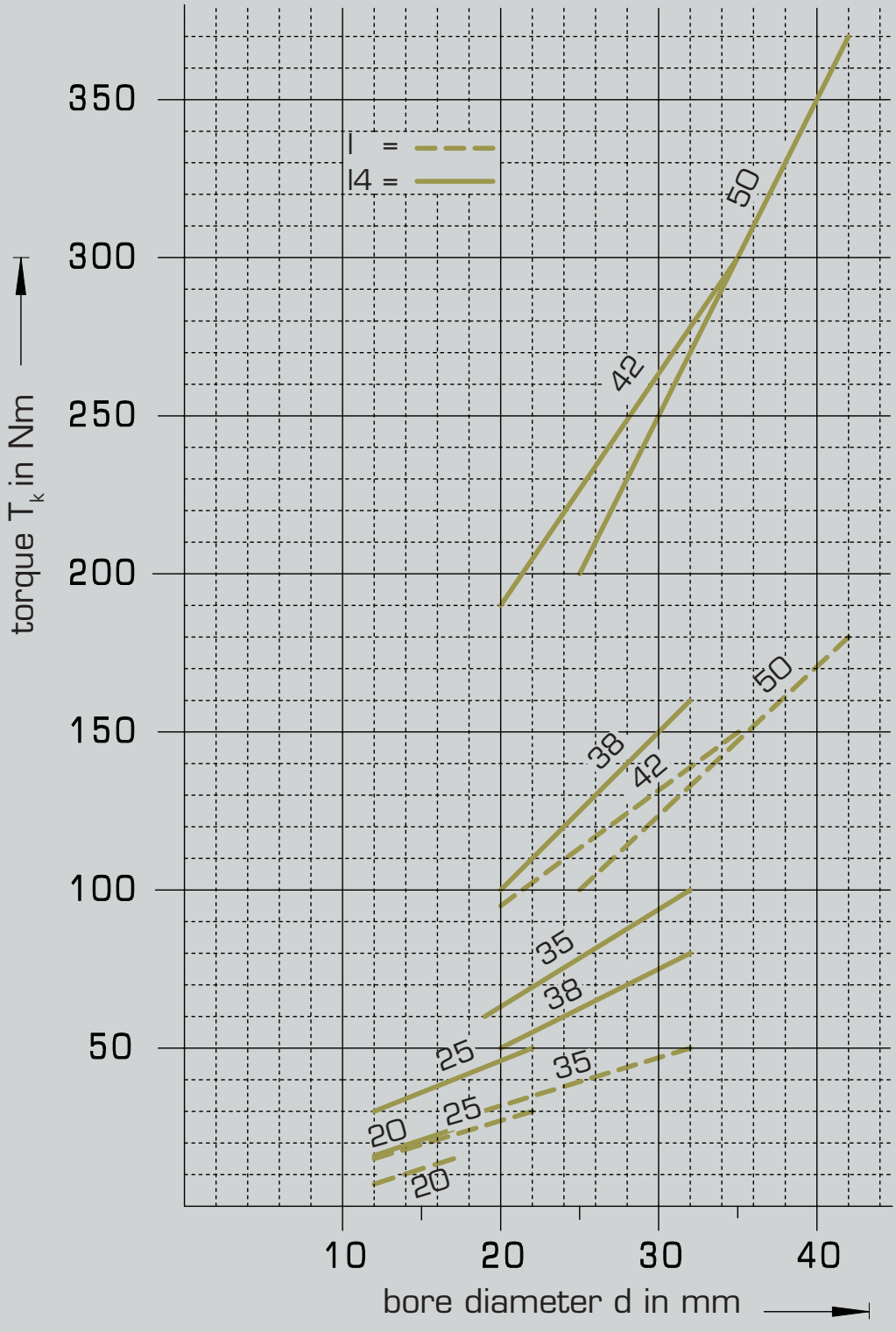
For design in stainless steel consult our technical department

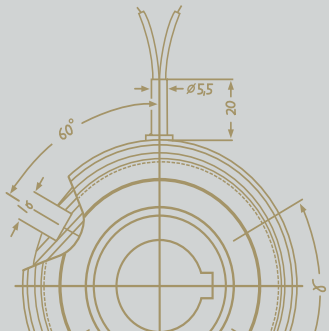




Clamping-hub connection option _._.4

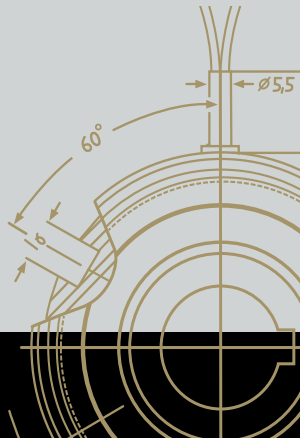
For design in stainless steel consult our technical department





Estimated operating factors for torsionally rigid shaft couplings

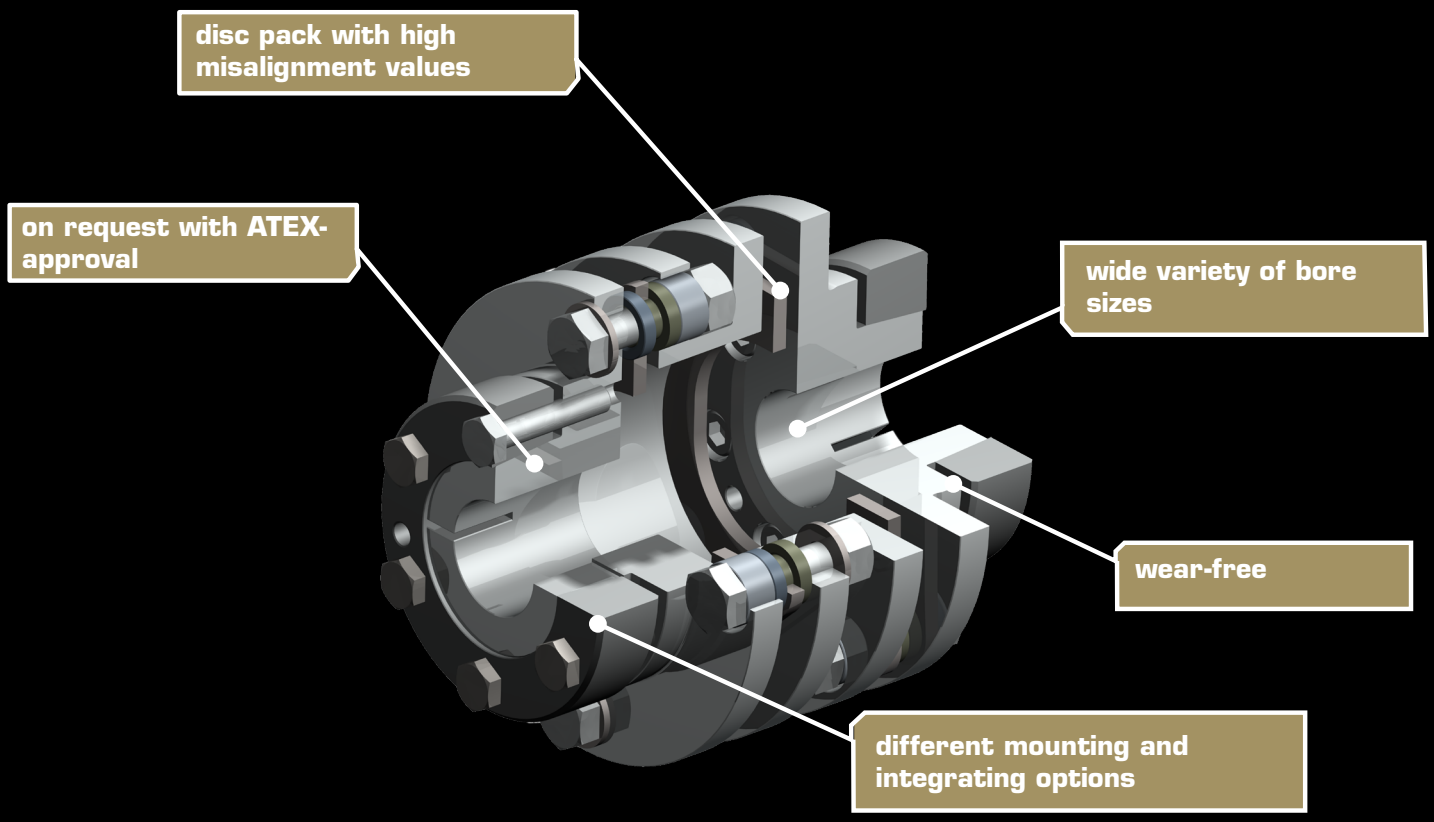
	Operating factor KB			
	elektric motors turbines hydraulic motors	piston engines with more than 2 zylinders	piston engines with 1 or 2 zylinders	shock factor K_s
building construction machines	2,1	2,5	3	4
chemical industry				
agitators (semi-liquid material)	1,7	2,1	2,6	3,5
agitators (liquid material)	1	1,4	1,7	2,5
centrifuges	1,35	1,75	2,2	2,5
pipeline pumps	1,7	2,1	2,6	4
conveyors and lifts				
goods lifts	1,7	2,1	2,6	4
passenger lifts	1,7	2,1	2,6	3,5
belt conveyors	1,7	2,1	2,6	3,5
blowers, ventilators	1,35	1,75	2,2	2,5
generators, transformers	1	1,4	1,7	3
wood-plastic industry machinery				
planing machines	1,7	2,1	2,6	4
woodworking machines	1	1,4	1,7	4
mixers	1,7	2,1	2,6	3
extruders	1,7	2,1	2,6	4
cranes	1,7	2,1	2,6	4
metal working machines				
presses	2,4	2,8	3,3	5
machine tools	1,7	2,1	2,6	3
food industry machinery				
kneading machines	1,7	2,1	2,6	3
mills	2,4	2,8	3,3	4,5
packaging machines	1	1,4	1,7	2
paper machines				
pulp grinders	2,4	2,8	3,3	4
shredder	2,4	2,8	3,3	4
presses, rolls	2,4	2,8	3,3	4
calenders	1,7	2,1	2,6	3,5
pumps				
piston pumps	2,4	2,8	3,3	4,5
centrifugal pumps	1,35	1,75	2,2	3
stone and clay working machines				
mills, breakers	2,4	2,8	3,3	6
rotary ovens	2,4	2,8	3,3	4
textile machines				
looms	1,7	2,1	2,6	3
winders	1,7	2,1	2,6	3
compressors				
pistons compressors	2,4	2,8	3,3	4
turbo compressors	1,7	2,1	2,6	2,5
metal rolling mills				
shears	2,4	2,8	3,3	5,5
plate-mill lines	2,4	2,8	3,3	5
cold rolling mills	2,4	2,8	3,3	5
rolling mill adjusters	1,7	2,1	2,6	4
winding machines	1,7	2,1	2,6	4
continous casting plant	2,4	2,8	3,3	5
laundries	1,7	2,1	2,6	2,5



Mönninghoff

ServoFlex - Type 338

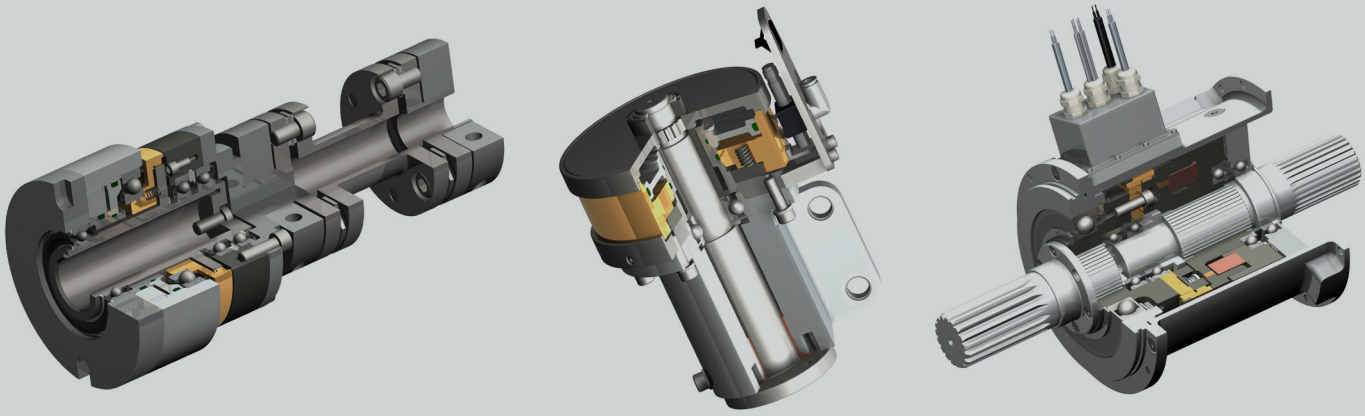
At a glance



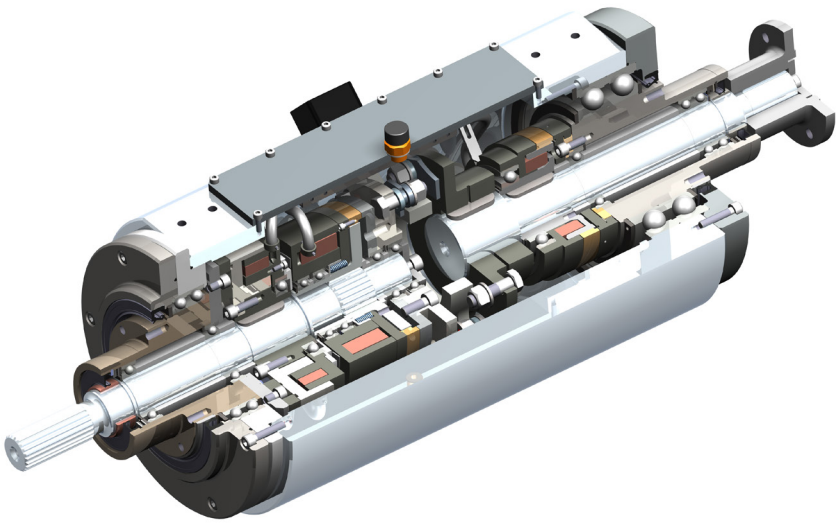
System solutions

You need more?

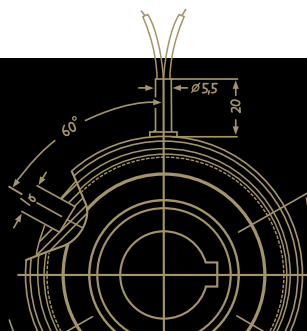
Mönninghoff clutches can be combined with a variety of many other power transmission elements. Such complex high-tech systems can solve any application-specific tasks and can fulfill any customer-specific wishes.



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®

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