Couplings for the construction machinery industry

Long-life and powerful

Made for Motion KTR

www.ktr.com

If you want to set things in motion: KTR

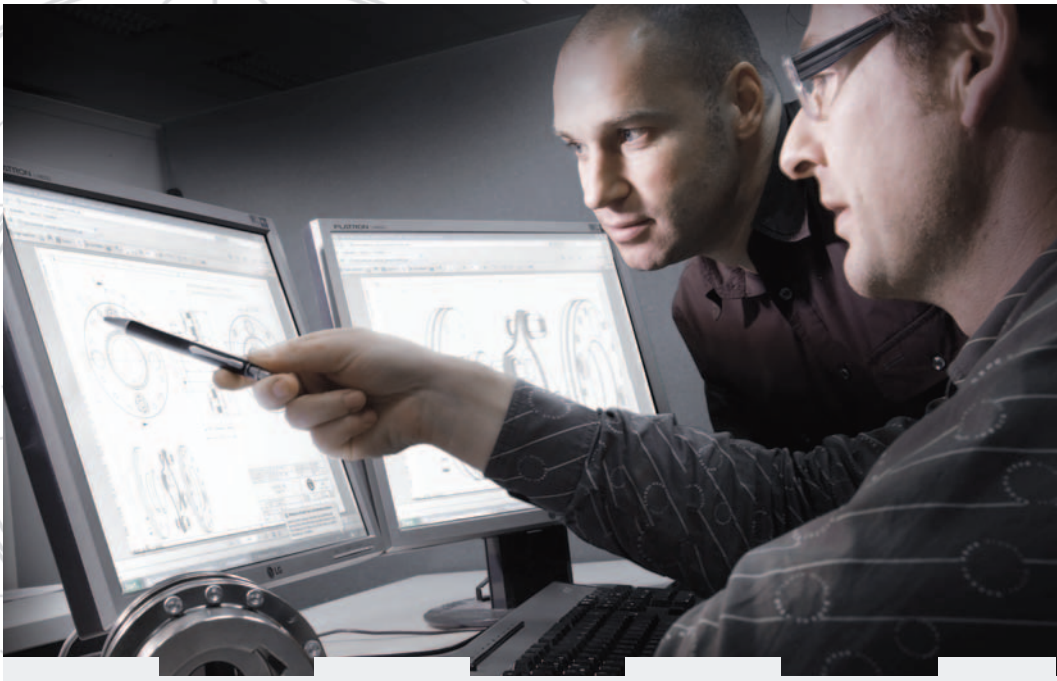
Competence meets creativity

As a leading manufacturer of high-quality drive components, KTR supplies mechanical couplings, clamping sets, torque limiters, torque measuring systems and hydraulic components all over the world. With more than 50 years experience in power transmission we are trendsetters in the development of coupling technology and offer customised solutions to all industries. The KTR trademark characterises quality and innovation, speed, reliability, flexibility and a close working relationship with customers.

Having started with the curved-tooth gear coupling® BoWex® and the torsionally flexible jaw coupling ROTEX®, KTR has built up an extensive product portfolio covering torques from 0,15 to over 750.000 Nm. The production by KTR's in-house, up-to-date machinery ensures that the couplings are made to the utmost accuracy. The couplings having a unit weight of up to 2 tons. Flexible automation ensures a quick and low-cost production even if the product has to be customised to meet customers individual specifications. KTR produce several million couplings a year.

Even though KTR's standard product portfolio is quite extensive, it only represents a fraction of the different options available. KTR is not only a subcontractor but also a solution provider. The knowledge gained from thousands of applications in the field allows us to find optimum, low-cost solutions for customised applications. We will consult you during the planning stage providing drawings and prototypes or arranging for local discussions if required. Every year KTR produces more than 10.000 new products ordered by customers. This trend increases year on year. This leads to many special products becoming standard items: We permanently give vital ideas to the Power Transmission technology – in cooperation with our customers.

Cover photo: CAT



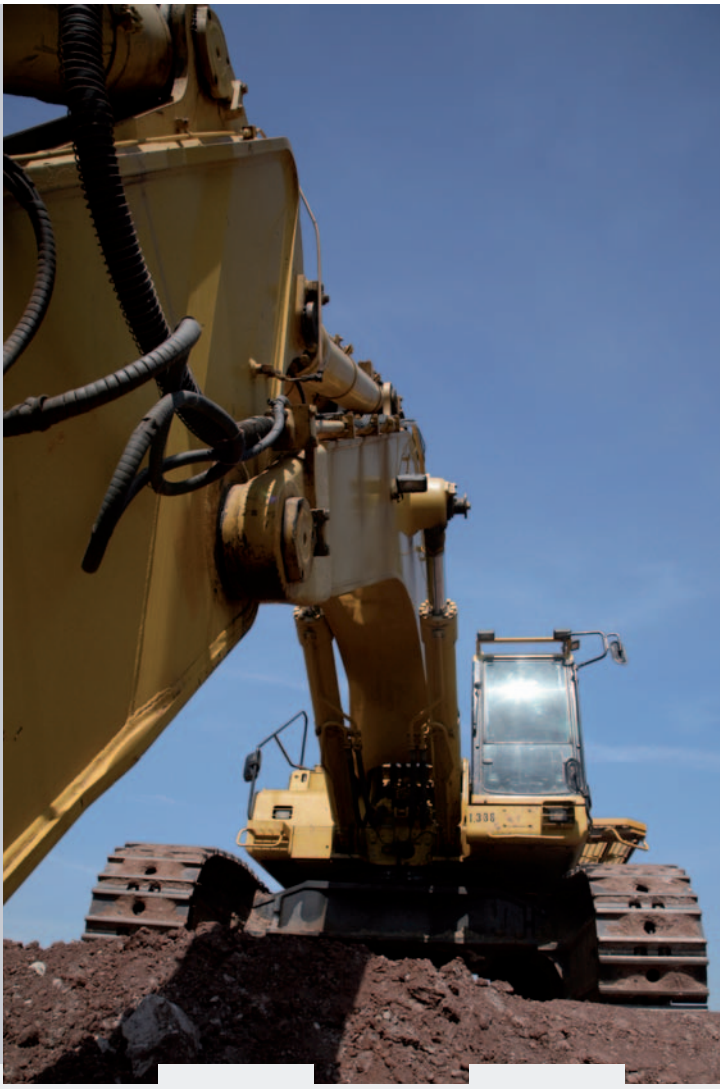
Accuracy meets speed

KTR products are evidence of well-designed, quality components resulting in improved characteristics of the drive system and as a consequence, a longer service life. It is our aim to continually improve the quality of our products and services. We can analyse the stiffness of components by utilising FEM (Finite Element Method) system and we can also perform torsional vibration calculations for entire drive systems. In our in-house Research and Development Centre we test our products on accurate test benches in realistic operating conditions. Our main objective is to provide the uppermost satisfaction to our customers.

Our technical sales engineers and our well-trained sales staff will be pleased to give you advice. KTR provides you with extensive services online, too: At www.ktr.com you can request information, including our product catalogue, 3D-CAD-models and assembly instructions. Depending on your application you can select your drive component from of more than 3.500 standard products. Having selected which one is the right component for your application by using our online calculation program, you are now in a position to order the products by contacting your nearest KTR company. Alternatively our Euro shop is open 24 hours a day.

Our latest scheduling system SAP ERP ensures an optimum networking with our customers and allows for a quick and reliable delivery service. A selection of 3.500 couplings and hydraulic components are permanently available from stock. For orders placed by 2:00pm we guarantee the despatch of orders the same day! In the KTR Logistics Centre the overall flow of goods is supervised by radio-controlled barcode scanning. Leading distribution partners ensure delivery on time. Our tracking and tracing system allows you to follow the progress of your order at all times. KTR supplies to every location in the world.

For further details about us and our products:
www.ktr.com



How about facilitating your work?

Couplings for construction machines have to withstand the same demands as the machines themselves. They are designed to be used on numerous applications, operate flexibly and free from maintenance, and have a sturdy and compact design. At the same time, they should save both time and money. KTR couplings meet with such requirements whilst, in some cases, exceed them. They contribute to a long service life of the overall drive system while at the same time increasing the comfort.

It does not matter if the applications are heavy duty or high rise, earth moving or materials handling: As far as the designing of mobile machines is concerned, you can rely on KTR couplings. Even if there are many hydraulic applications in the machine, two items are decisive: mobility and productivity.

For digging, loading, driving

Diesel engines are particular; at least as far as torque transmission is concerned. Even the most advanced and latest diesel engines are run in an uncultured way compared to electric drives. That is why the connection between diesel engine and hydraulic pump does not only have to compensate for misalignment, but at the same time dampen torsional vibrations. This can be achieved – even with an engine power of up to 1,000 kW and rated torques up to 10,000 Nm – by using the highly flexible BoWex-ELASTIC® coupling.

The cardan shaft design BoWex-ELASTIC® HEG with integrated friction damper in addition reduces torque peaks which mainly arise during start-up.

For lifting, lowering, controlling

On smaller construction machines with a power up to 30 kW - such as mini excavators – we would recommend the use of our flexible flange coupling MONOLASTIC®. It dampens torsional vibrations reliably while compensating for radial and angular displacement. As it consists of a vulcanised combination of rubber and nylon, except for the hub, it does not require any maintenance at all. KTR has done pioneering work in this range – resulting in considerable benefits for the users; since less work means less expense!

For resonance-free operation of hydrostatic drives you require torsionally rigid couplings. The couplings have to be in prime condition even if the application on a construction site causes a lot of heat. No problem at all for KTR. The thermal resistance of up to 130 °C is one of many excellent features of the BoWex® FLE-PA, our curved-tooth flange coupling for an engine power of up to 500 kW.

For saving time and expenses

KTR will save some work for you by using the BoWex® FLE-PA or MONOLASTIC® ready-to-assemble packages and pump mounting flange! This will often allow you to do without the usual SAE ring and as a result reduce effort and cost. We offer such housing sets for a large number of engines as well as offering bespoke solutions for special applications.
KTR supplies couplings for material handling technologies along with many other components. Please have a look at our extensive range in our current literature.

For cooling and staying cool

Based on your thermal data we will develop tailor-made heat exchangers for cooling air, water and all kinds of oil. No matter if single-circuit or multiple-circuit coolers are used, we will be pleased to adapt them to your application either as a module or system solution in a compact and optimum design.

Perfect combinations for Diesel Engines

BoWex® FLE-PA couplings

For mobile hydraulics as a positive-locking combination of diesel engine and hydraulic pumps:
BoWex® FLE-PA couplings are torsionally rigid curved-tooth flange couplings made from the maintenance-free material combination nylon/steel. The BoWex® FLE-PA flange is made from fibre-glass reinforced polyamide with high mechanical stiffness and dimensional stability to heat (+130 °C). The hub of the coupling with the external curved toothing consists of steel.

BoWex® FLE-PA allows for an extremely short assembly. Its compact design ensures a time-saving assembly. The coupling is easy to assemble with no need for any extra alignment tools and is easy to plug in axially. This process saves additional time, also with the disassembly of hydraulics for maintenance purposes. Apart from transmitting the torque the BoWex® FLE-PA allows to compensate for radial, angular and axial inaccuracies in production.

MONOLASTIC® couplings

For mobile hydraulics of small devices as a torsionally flexible combination of diesel engines and hydraulic pumps:
MONOLASTIC® is a single-parted, flexible coupling capable of torques up to 1,000 Nm and made from natural rubber and nylon. The hub, which is made from steel with a hardened internal spline, comes already assembled and allows for an immediate axial plug connection of the hydraulic pump. The coupling bores are available with all usual SAE or DIN involute splines as well as taper bores. Screwing to flywheels with special dimensions can be produced.

The MONOLASTIC® coupling will compensate for radial and angular displacements with extremely low restoring forces via the elastomer part. That is why it is particularly suitable for the drive of hydraulic pumps in individual or multiple arrangements. The assembly and centring of the coupling to the engine flywheel is achieved directly via the flange of the coupling.

BoWex-ELASTIC® couplings

For drives subject to dangerous torsional vibrations to transmit the torque flexibly for the combination of diesel engine with splitterbox, generator, compressor, feed pump, high-pressure pump, etc.:
BoWex-ELASTIC® is highly flexible combining the benefits of the well-approved BoWex® system in a compact design with the option of an axial plug-in assembly inside the curved toothing. Torsional vibrations and shock loads are damped and reduced. Also, the coupling allows for compensation of radial, angular and axial inaccuracies in alignment with extremely low restoring forces.

BoWex-ELASTIC® consists of a highly flexible, rubber element made from natural rubber which is governed by the size of the coupling. The internal axial plug-in hub with external spline corresponds to the BoWex® basic design. BoWex-ELASTIC® is available in different kinds of elastomer hardness with engine flywheel connection flanges to SAE J620 and special dimensions for a power up to 1,000 kW.

Packages ready to assemble

Pump mounting flanges and housings for diesel engines:
For the connection of hydraulic pumps to the diesel engine KTR supplies connection flange sizes SAE 6 to SAE 1 in accordance with the SAE connection dimensions. The flanges are made from steel or casted material for hydraulic pumps with flange connections to SAE-A, -B, -C, -D, -E in a design with 2 holes or 4 holes respectively.

Moreover, a large number of pump mounting housings are available. They are available for most engine manufacturers throughout the world. As a result the necessary SAE adapter ring can often be omitted offering further cost savings.

As a standard the unmachined surfaces on the mounting housings are painted black. If requested, the mounting housings or mounted flanges can be electrogalvanised and chromated or passivated.

DEUTZ engine with pump mounting housing

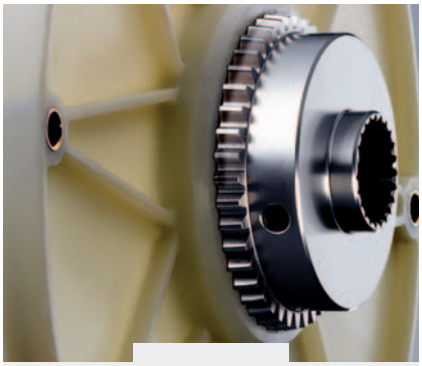
Save to be spoilt for choice!

Just as you strive for speed and reliability with your customers, then KTR offer you the same service with our selection and supply of couplings. This applies both for our standard range and special designs.

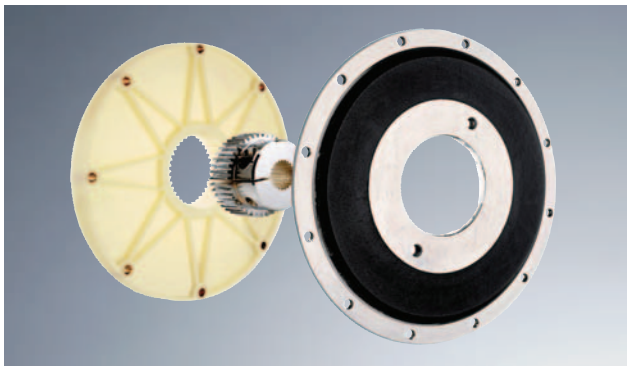
Couplings for high power applications are ordered very rarely on the basis of a catalogue. That is why we design and produce a large number of couplings for construction machines as per specifications from our customers. Our design engineers will be pleased to assist you with your calculations to ensure the correct selection of the coupling for your application in the shortest time possible.

A coupling which is correctly selected for elasticity and damping will reduce the vibrations and loads in the drive train considerably. This will result in a low-vibration operation and a long service life of the overall machine.

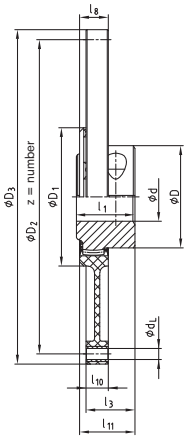
Overview



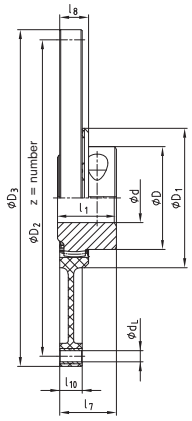
Type FLE-PA



- Flange coupling for connection to I. C.-engines and hydraulic pumps
- Applicable to all hydrostatic drives of construction machines, harvesting machines, etc.
- High torsional stiffness – operation free from resonance
- Maintenance-free due to the material combination nylon/steel
- Nylon flange with high mechanical resistance and thermal strength (+ 130 °C)
- Extremely short assembly
- Easy assembly by axial mounting
- Special mounting flanges available



Mounting short



Mounting long

Flange dimensions according to SAE J 620 [mm]				
Size	D_3	D_2	z	d_L
6 ½"	215,9	200,02	6	9
7 ½"	241,3	222,25	8	9
8"	263,52	244,47	6	11
10"	314,32	295,27	8	11
11 ½"	352,42	333,37	8	11
14"	466,72	438,15	8	14

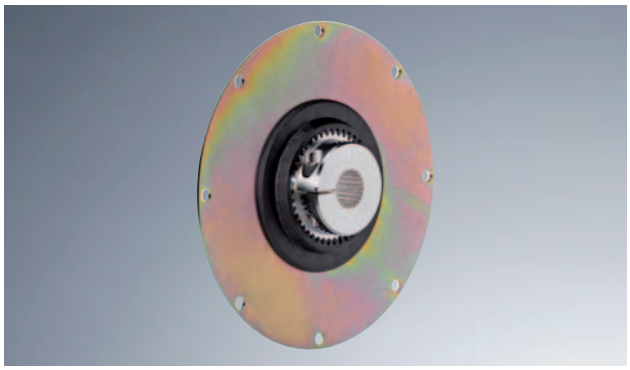
BoWex®-FLE-PA – dimensions/dimension to SAE

Size	Pilot bore	Finish bore d		Dimensions [mm]								Special length	Dimension to SAE (D_3)						Max. axial displacement
		min.	max.	D	D_1	l_1	l_3	l_7	l_8	l_{10}	l_{11}	l_1 max.	6 ½"	7 ½"	8"	10"	11 ½"	14"	[mm]
48	-	20	48	68	100	50	41	50	20	13	48	up to 60	●	●	●	●			± 2
T 48	13	20	48	68	100	50	38	45	20	13	46	-	●	●	●	●			± 1
T 55	17	20	55	85	115	50	37	48	24	13	48	-	●	●	●	●			± 2
65 / T 65	26	30	65	96	132	55	45	54	27	21	51	up to 70			●	●	●		± 2
T 70	26	30	70	100	153	60	48	56	30	21	57	-				●			± 2
80 / T 80	31	35	80	124	170	90	78	87	30	21	87	-					●		± 2
100 / T 100	35	40	100	152	265	110	78	108	35	21	110	-					●	●	± 2
125	45	50	125	192	250	140	37	133	50	28	97	-					●	●	± 2

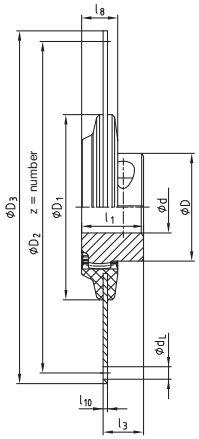
Technical data of BoWex® FLE-PA – torques/weight/mass moments of inertia/torsion spring stiffness

Size	Torque T_K [Nm]			Weight / Mass moment of inertia J	Hub with max. bore Ø	FLE-PA flanges according to SAE						Dynamic torsion spring stiffness with + 60 °C / ψ = 0,4 [Nm/rad]			
	T_{KN}	$T_{K\,max.}$	T_{KW}			6 ½"	7 ½"	8"	10"	11 ½"	14"	0,30 T_{KN}	0,50 T_{KN}	0,75 T_{KN}	1,00 T_{KN}
48	240	600	120	[kg]	0,79	0,32	0,43	0,51	0,64	–	–	35 x 10^3	75 x 10^3	105 x 10^3	125 x 10^3
				[kgm²]	0,0007	0,0021	0,0035	0,0049	0,0085						
T 48	300	750	150	[kg]	0,79	0,32	0,43	0,51	0,64	–	–	40 x 10^3	86 x 10^3	120 x 10^3	143 x 10^3
				[kgm²]	0,0007	0,0021	0,0035	0,0049	0,0085						
T 55	450	1125	225	[kg]	1,12	0,34	0,62	0,45	0,646	–	–	90 x 10^3	140 x 10^3	170 x 10^3	195 x 10^3
				[kgm²]	0,0016	0,0022	0,0053	0,0044	0,0086						
65	650	1600	325	[kg]	2,30	–	–	0,63	0,64	0,89	–	110 x 10^3	160 x 10^3	200 x 10^3	230 x 10^3
				[kgm²]	0,0044			0,0064	0,0065	0,012					
T 65	800	2000	400	[kg]	2,40	–	–	0,63	0,64	0,89	–	130 x 10^3	190 x 10^3	240 x 10^3	280 x 10^3
				[kgm²]	0,0044			0,0064	0,0065	0,012					
T 70	1000	2500	500	[kg]	2,60	–	–	–	0,941	–	–	230 x 10^3	345 x 10^3	440 x 10^3	517 x 10^3
				[kgm²]	0,0059				0,0132						
80	1200	3000	600	[kg]	5,20	–	–	–	–	1,12	–	200 x 10^3	410 x 10^3	580 x 10^3	700 x 10^3
				[kgm²]	0,0151					0,022					
T 80	1500	3750	750	[kg]	5,20	–	–	–	–	1,12	–	240 x 10^3	450 x 10^3	638 x 10^3	770 x 10^3
				[kgm²]	0,0151					0,022					
100	2050	5150	1025	[kg]	9,37	–	–	–	–	1,16	8,45	500 x 10^3	700 x 10^3	856 x 10^3	950 x 10^3
				[kgm²]	0,0401					0,021	0,234				
T 100	2500	6250	1250	[kg]	9,37	–	–	–	–	1,16	8,45	600 x 10^3	830 x 10^3	960 x 10^3	1070 x 10^3
				[kgm²]	0,0401					0,021	0,234				
125	4250	10700	2125	[kg]	19,73	–	–	–	–	2,09	9,85	4200 x 10^3	5000 x 10^3	5600 x 10^3	6200 x 10^3
				[kgm²]	0,1359					0,043	0,306				

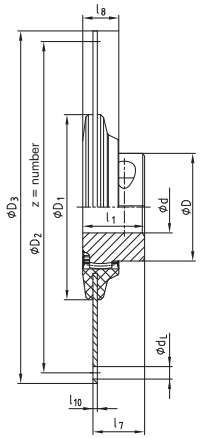
Type FLE-PAC



- Flange coupling for connection to I. C.-engines and hydraulic pumps
- Applicable to all hydrostatic drives of construction machines, harvesting machines, etc.
- High torsional stiffness – operation free from resonance
- Maintenance-free due to the material combination nylon (PAC)/steel
- Nylon flange with high mechanical resistance and thermal strength (+ 130 °C)
- Extremely short assembly
- Easy assembly by axial mounting
- Special mounting flanges available



Mounting short



Mounting long

Flange dimensions according to SAE J 620 [mm]				
Size	D_3	D_2	z	d_L
6 ½"	215,9	200,02	6	9
7 ½"	241,3	222,25	8	9
8"	263,52	244,47	6	11
10"	314,32	295,27	8	11
11 ½"	352,42	333,37	8	11
14"	466,72	438,15	8	14

BoWex®-FLE-PAC – dimensions/dimension to SAE

Size	Pilot bore	Finish bore d		Dimensions [mm]							Special length	Dimension to SAE (D_3)						Max. axial displacement
		min.	max.	D	D_1	l_1	l_3	l_7	l_8	l_{10}	l_1 max.	6 ½"	7 ½"	8"	10"	11 ½"	14"	[mm]
48 / T 48	13	20	48	68	110	50	35	46	25	3	up to 60	●	●	●	●			± 3
65 / T 65	26	30	65	96	165	55	36	46	32	4	up to 70			●	●	●		± 3
80 / T 80	31	35	80	124	220	90	72	76	35	4	-				●	●	●	± 3

Technical data of BoWex® FLE-PAC – torques/weight/mass moments of inertia/torsion spring stiffness

Size	Torque T_K [Nm]			Weight / Mass moment of inertia J	Hub with max. bore Ø	FLE-PAC flanges according to SAE						Dynamic torsion spring stiffness with + 60 °C / ψ = 0,45 [Nm/rad]			
	T_{KN}	$T_{K\,max.}$	T_{KW}			6 ½"	7 ½"	8"	10"	11 ½"	14"	0,30 T_{KN}	0,50 T_{KN}	0,75 T_{KN}	1,00 T_{KN}
48	240	600	120	[kg]	0,79	0,77	0,98	1,19	1,73			57 x 10^3	89 x 10^3	109 x 10^3	126 x 10^3
				[kgm²]	0,0007	0,0049	0,0077	0,0109	0,0221						
T 48	300	750	150	[kg]	0,79	0,77	0,98	1,19	1,73			74 x 10^3	115 x 10^3	141 x 10^3	164 x 10^3
				[kgm²]	0,0007	0,0049	0,0077	0,0109	0,0221						
65	650	1600	325	[kg]	2,3			1,48	2,20	2,83		164 x 10^3	286 x 10^3	365 x 10^3	411 x 10^3
				[kgm²]	0,0044			0,0145	0,0294	0,0467					
T 65	800	2000	400	[kg]	2,4			1,48	2,20	2,83		202 x 10^3	328 x 10^3	420 x 10^3	473 x 10^3
				[kgm²]	0,004			0,0145	0,0294	0,0467					
80	1200	3000	600	[kg]	5,2				2,27	2,90	5,20	433 x 10^3	765 x 10^3	990 x 10^3	1200 x 10^3
				[kgm²]	0,0151				0,0312	0,0485	0,1462				
T 80	1500	3750	750	[kg]	5,2				2,27	2,90	5,20	520 x 10^3	920 x 10^3	1200 x 10^3	1400 x 10^3
				[kgm²]	0,151				0,0312	0,0485	0,1462				

Selection according to engine torque T_{AN} for BoWex® FLE-PA/FLE-PAC

For a selection according to the engine driving torque T_{AN} a service factor K = 1,3 – 1,6 should be considered, depending on the load.

$$T_{KN} \geq T_{AN} \cdot K$$

wheel loaders	K 1,6	fork lift trucks	K 1,6
compact loaders	K 1,6	concrete mixer trucks	K 1,3
hydraulic excavators	K 1,4	concrete pumps	K 1,4
mobile cranes	K 1,6	asphalt finishers	K 1,4
graders	K 1,5	concrete cutters	K 1,4
vibration rollers	K 1,4	road mortisers	K 1,4

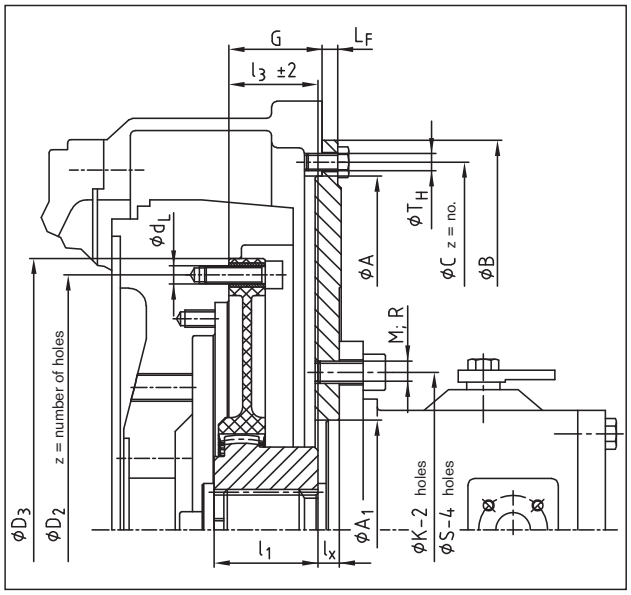
Selection according to SAE standard

Selection of the coupling

Determination of coupling size	Table 1
Connection dimension of coupling	Table 2
Hub design/Mounting length	Table 3

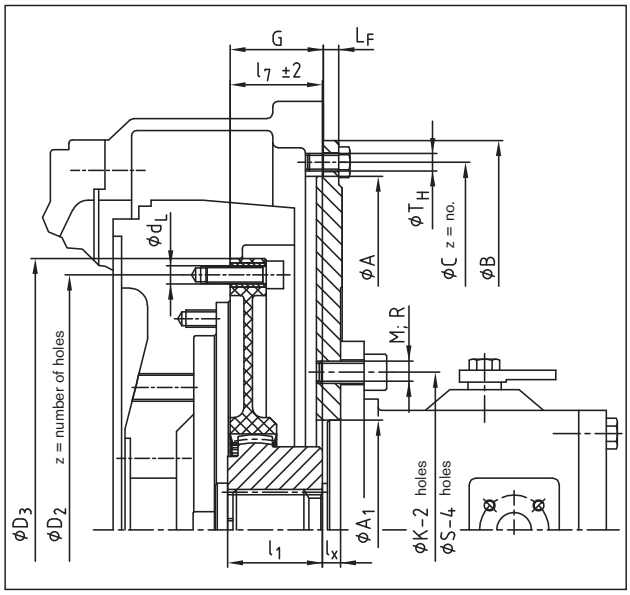
SAE - pump mounting flange

Flange size according to SAE 617	Table 4
Mounting flange of hydraulic pump	Table 5



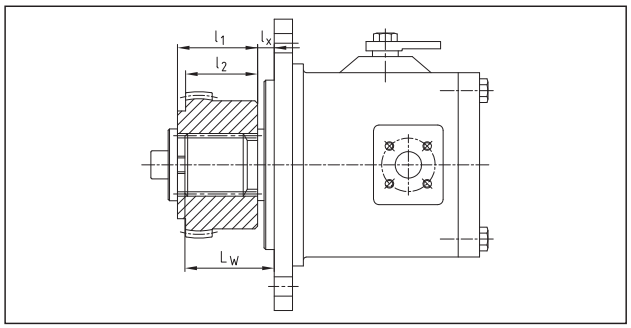
Coupling-mounting short (l_3)

Marking on PA flange

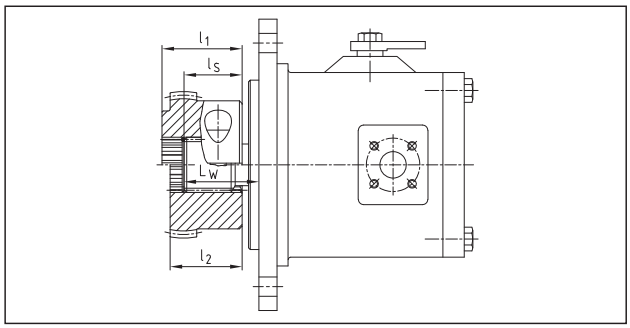


Coupling-mounting long (l_7)

Marking on PA flange



Spline hub



Clamping hub

Determination of mounting length l_3 oder l_7	
SAE shaft	$l_3 / l_7 = G + L_F - L_W + l_S$
DIN shaft	$l_3 / l_7 = G + L_F - l_X$

If axial fixing of the hub by means of an end plate and a screw is not possible for a pump shaft with involute spline, we would recommend to use our clamping hub.

Mounting instructions:

The flange can be fastened to the engine flywheel by means of socket head cap screws according to DIN EN ISO 4762 quality 8.8 or by hexagon head screw quality 8.8. We recommend screws are loctited in position.

Screw tightening torque of FLE-PA flange to flywheel	
M8	25 Nm
M10	49 Nm
M12	86 Nm

Screw tightening torque of spline clamping hubs DIN EN ISO 4762		
42/48	M10	49 Nm
65	M12	86 Nm
80/100	M16	210 Nm

Mounting dimensions according to SAE standard

1. Selection of coupling for diesel engine

Diesel engine power kW	Diesel engine power HP	Coupling size	Flywheel to SAE	G		Pump mounting flange	LF		Driving shaft of pump
		48	6 1/2"	30,15	1,19"	Dimensions to SAE see tables 3 and 4			See table 3 Hub design SAE J 498 / DIN 5480
up to 60 kW	up to 80 PS	T48	7 1/2"	30,15	1,19"				
		55	8"	62	2,44"		9,5	0,375"	
		FLE-PA	10"	54	2,12"				
		65	8"	62	2,44"				
up to 110 kW	up to 150 PS	T65	10"	54	2,12"		9,5	0,375"	
		FLE-PA	11 1/2"	39,6	1,56"		12,7	0,5"	
up to 180 kW	up to 240 PS	80 FLE-PA	11 1/2"	39,6	1,56"		12,7	0,5"	

2. Dimensions of coupling flange acc. to SAE J 620 [mm]

Size	D_3	D_2	z=number	d_L
6 1/2"	215,90	200,02	6	9
7 1/2"	241,30	225,25	8	9
8"	263,52	244,47	6	11
10"	314,32	295,27	8	11
11 1/2"	352,42	333,37	8	11

4. Housing dimensions according to SAE 617 [mm]

SAE size	A	B	C	Z	TH	
SAE-1	511,18	552	530,2	12	M10	3/8"
SAE-2	447,68	489	466,7	12	M10	3/8"
SAE-3	409,58	451	428,6	12	M10	3/8"
SAE-4	361,95	403	381,0	12	M10	3/8"
SAE-5	314,33	356	333,4	8	M10	3/8"

5. Mounting flange for hydraulic pump to SAE [mm]

SAE size	SAE – 2-hole-flange					SAE – 4-hole-flange				
	A_1	K-2	M		Z	A_1	S-4	R		Z
A	82,55	106,4	M10		2	82,55	104,6	M10	3/8"	4
B	101,6	146,0	M12	1/2"	2	101,6	127,0	M12	1/2"	4
C	127,0	181,0	M16		2	127,0	162,0	M12	1/2"	4
D	152,4	228,6	M16	5/8"	2	152,4	228,6	M16	5/8"	4
E	-	-	-	-	-	165,1	317,5	M20	3/4"	4

3. Selection of coupling hub - Determination of mounting lenght l_3 or l_7

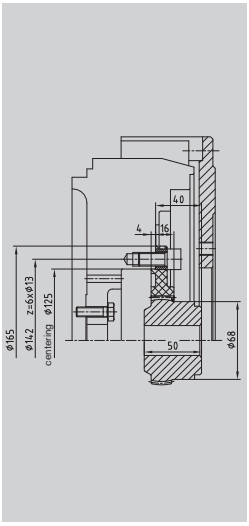
Please mention type	BoWex® coupling size	Pump shaft to SAE J 498 and DIN 5480	Spline hub	Clamping hub	Dimensions of coupling size [mm]			Mounting length of coupling l_3 or l_7								Code to order coupling hub
								Flange size 6 1/2" and 7 1/2"		Flange size 8"		Flange size 10"		Flange size 11 1/2"		
								K	L	K	L	K	L	K	L	Please mention coupling size
					l_1	l_2	l_S	l_3	l_7	l_3	l_7	l_3	l_7	l_3	l_7	
	42	SAE-16/32 DP		x	42	-	33	33	42							P559101
		PI-S 3/4"														
		z=11														
	42	SAE-16/32 DP		x	42	-	-	33	42							P567101
		PB-S 7/8"														
		z=13														
	42	SAE-16/32 DP		x	42	-	27	33	42							P660201
		PB-BS 1"														
		z=15														
	48	SAE-16/32 DP		x	50	-	45	41	50		50	41	50			P660301
	65	PA-S 1 3/8"		x	50	-	48				54	45	54	41		P660301
		z=21														
	65	SAE-12/24 DP		x	55	-	44				54	45	54	41		P656201
		PC-S 1 1/4"														
		z=14														
	65	SAE-16/32 DP		x	-	49	45						53	41		P664301
		PD-S 1 1/2"														
		z=23														
	80	SAE-16/32 DP		x	55	-	-							44	33	P565402
		PE-S 1 3/4"														
		z=27														
	42	25 x 1,25 x 18 DIN 5480	x		42	-	-	33	42							P000205
	42			x	42	-	-	33	42							P500202
	42	30 x 2 x 14 DIN 5480		x	42	-	-	33	42							P500203
	48		x		50	-	-	41	50							P000206
	48			x	50	-	-	41	50		50		50			P500203
	48	35 x 2 x 16 DIN 5480	x		46	-	-	37	46							P000303
	65		x		55	-	-						54	39		P000303
	65			x	60	-	-			50	59	50	59	39		P500301
	65	40 x 2 x 18 DIN 5480	x		55	-	-						54	39		P000304
	65			x	55	-	-				54	45	54	39		P500302
	65	45 x 2 x 21 DIN 5480	x		-	64	-			60	69	60	69	39		P000403
	65			x	55	-	-				54	45	54	39		P500401
	80	50 x 2 x 24 DIN 5480		x	55	-	-							42	37	P500405

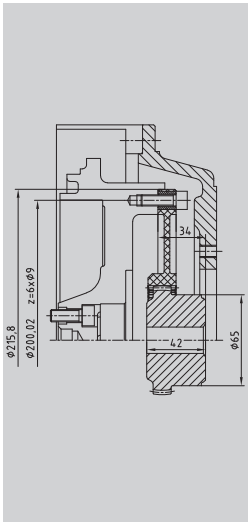
Please photocopy dimension sheet and highlight all details required for design.

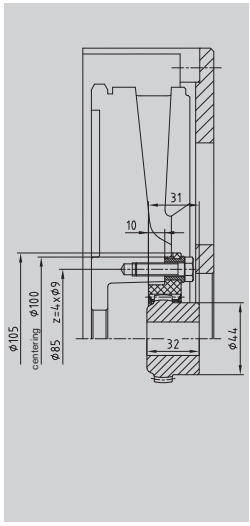
Order form: FLE-PA coupling			SAE pump mounting flange	
BoWex® 48 FLE-PA	7 1/2"	P663301	SAE-4	B-2L
Coupling size	SAE connection of coupling	Code of coupling hub	Pump mounting flange for engine housing	Pump mounting to SAE 2 holes/4 holes standard - metric fastening thread
Table 1	Table 2	Table 3	Table 4	Table 5

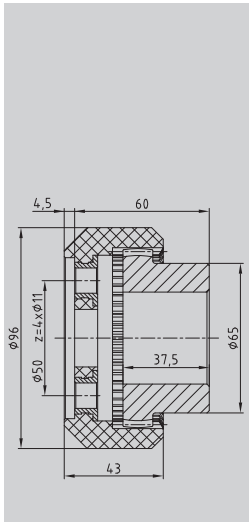
Special flange programme, deviations from the SAE standard

Fitting to Hatz diesel engines



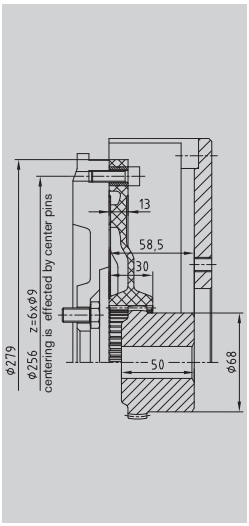


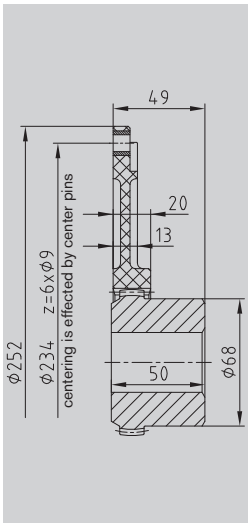


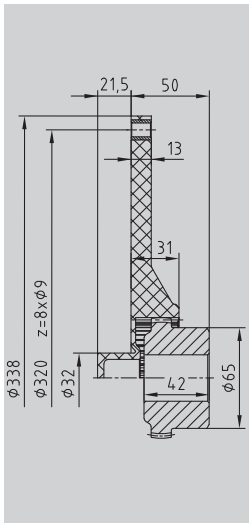


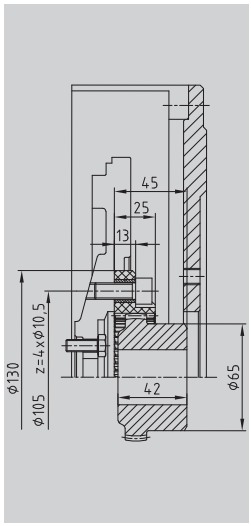
Coupling size	BoWex® 48 FLE-PA, Ø 165	BoWex® 48 FLE-PA, 6.5	BoWex® 28 FLE-PA, Ø 105	BoWex® 48 FLE-PA, Ø 96
Engine type	Hatz 2L/3L/4L41C 2M/3M/4M41	Hatz W35	Hatz 1D81 / 1D90	Hatz Z788 / Z789 / Z790

Fitting to VW Mitsubishi diesel engines



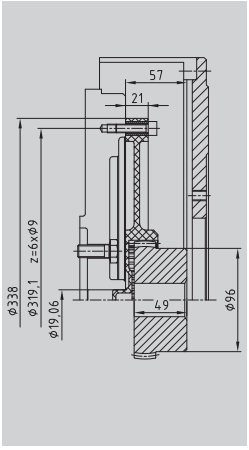


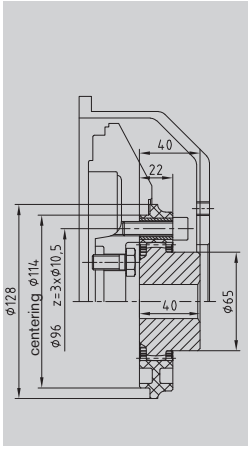


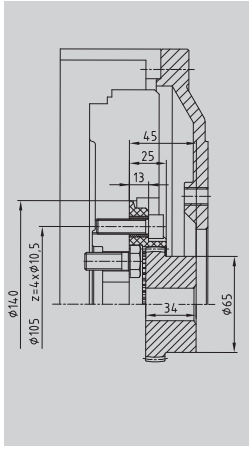


Coupling size	BoWex® 48 FLE-PA, Ø 279	BoWex® 48 FLE-PA, Ø 252	BoWex® 48 FLE-PA	BoWex® 48 FLE-PA, Ø 130
Engine type	VW 028.B / M344	VW 062.2 / 068.5 / 6 / A / D	Mitsubishi Ø 338-32	Mitsubishi L-series / K-series

Fitting to Perkins Lombardini diesel engines



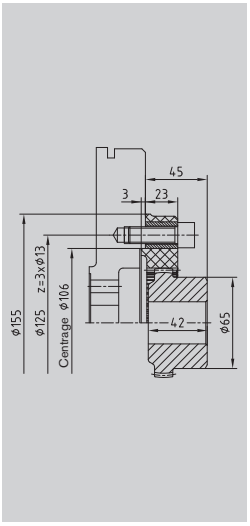


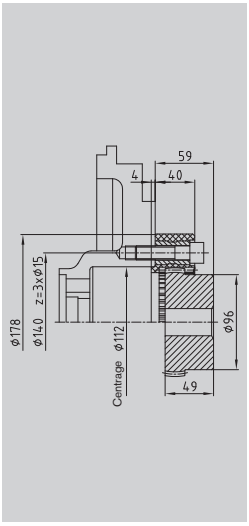


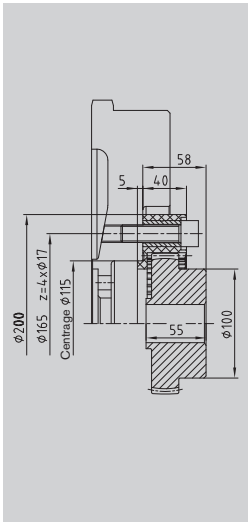
Coupling size	BoWex® 65 FLE-PA, Ø 338	BoWex® 48 FLE-PA, Ø 128	BoWex® 48 FLE-PA, Ø 140
Engine type	Perkins 1104C-44T Flywheel-No. D0014	Lombardini FOCS-Serie	Lombardini LDW 1303/1503/2004

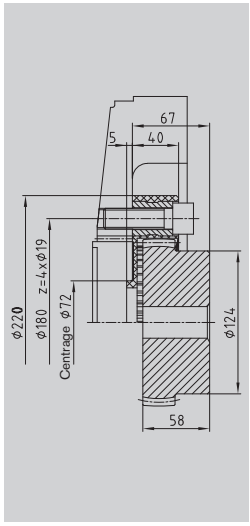
Special flange programme, deviations from the SAE standard

Fitting to Perkins Isuzu Cummins diesel engines



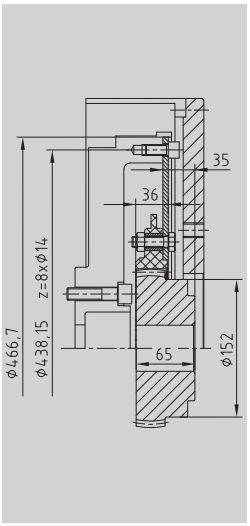


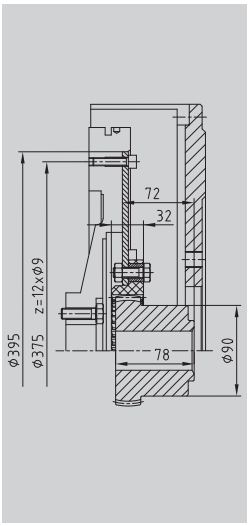


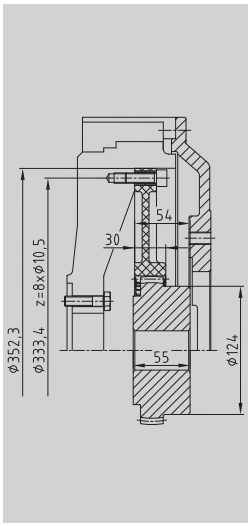


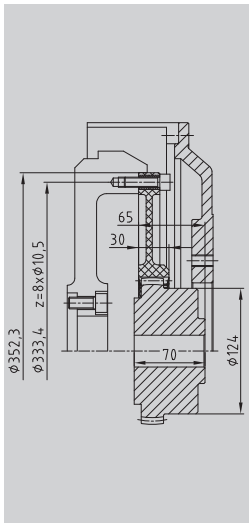
Coupling size	BoWex® 48 FLE-PA, Ø 155	BoWex® 65 FLE-PA, Ø 178	BoWex® 70 FLE-PA, Ø 200	BoWex® 80 FLE-PA, Ø 220
Engine type	3-hole, Ø 125	3-hole, Ø 140	4-hole, Ø 165	4-hole, Ø 180

Fitting to Caterpillar Daimler-Chrysler Cummins John-Deere diesel engine



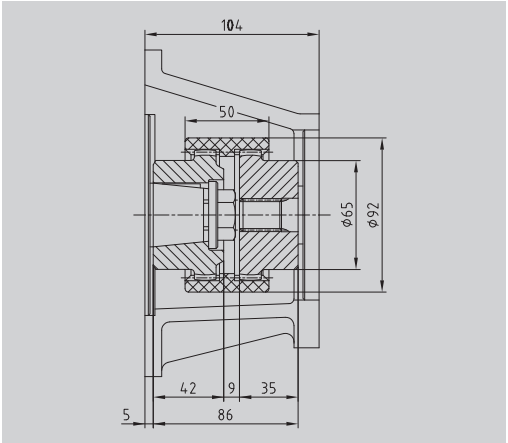


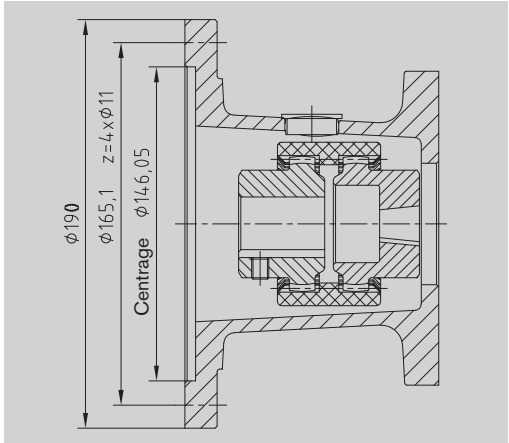




Coupling size	BoWex® T100 FLE-PA, 14"	BoWex® T65 FLE-PA, Ø 395	BoWex® 80 FLE-PA, 11 1/2"	BoWex® 80 FLE-PA 11 1/2"
Engine type	Caterpillar C 10 / C 12	Daimler-Chrysler OM904	Cummins 6BTA5.9	John Deere 1010D / 1110D / 1400D

Fitting to shaft engines Hatz Honda Briggs-Stratton Yanmar Kohler Robin engines



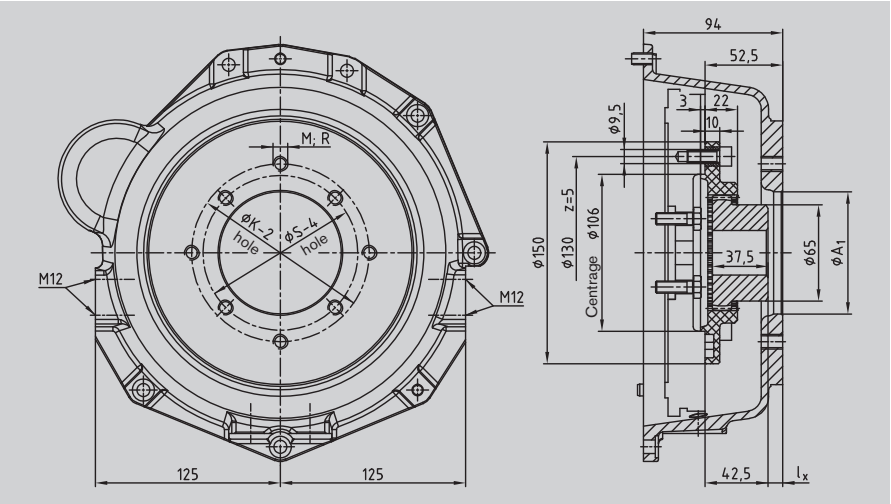


Coupling size	BoWex® M42	BoWex® shaft coupling types M28 and M32
Engine type	Hatz 2G30	Pump mounting housing acc. to SAE J609A

Flange couplings and pump mounting housing for KUBOTA engines

KUBOTA
Super MINI series

Z-400
Z-442-B
Z-482-B
D-600
D-662-B
D-722-B
V-800



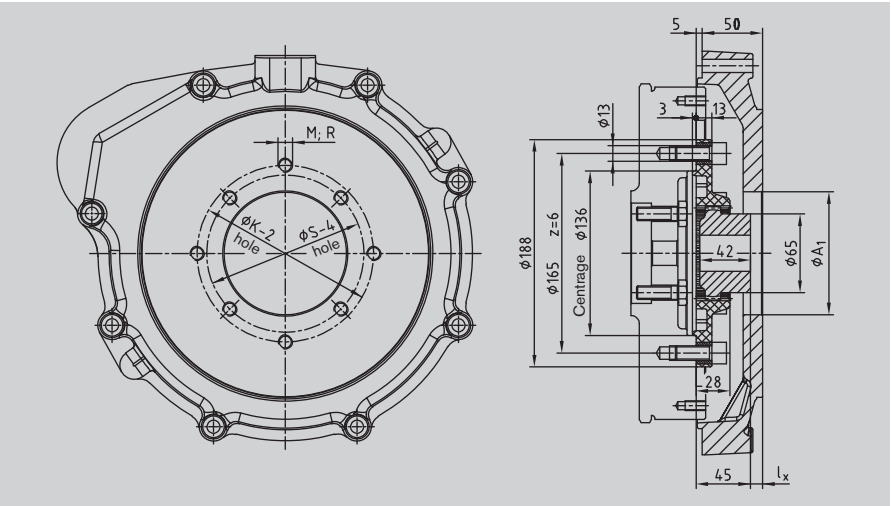
BoWex® 48 FLE-PA Ø 150 / pump mounting housing

KUBOTA
Super 3 series

D 1403/1703
flywheel
Nr. 190027991

V 1903/2203
flywheel
Nr. 190002369

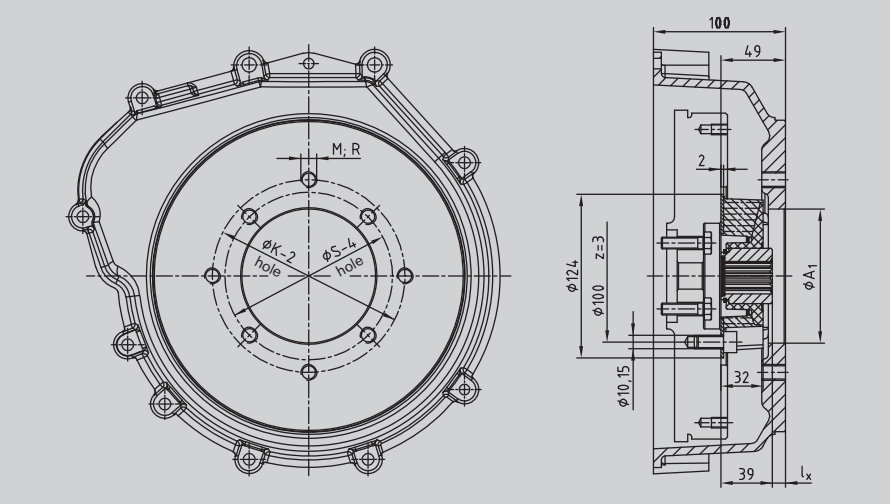
V 2003-T



BoWex® 48 FLE-PA Ø 188 / pump mounting housing

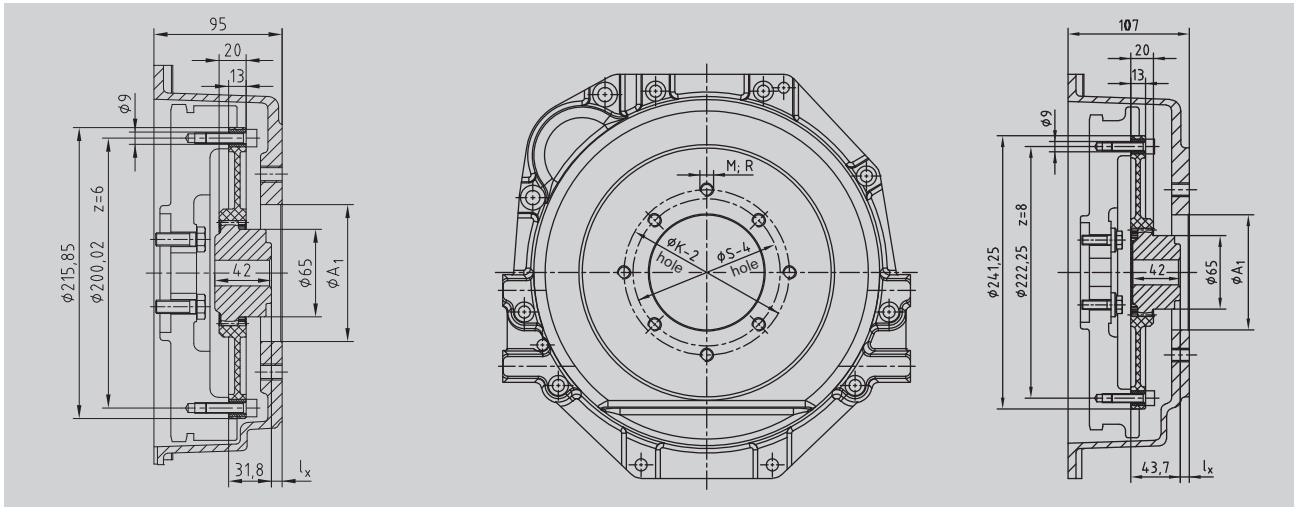
KUBOTA
Super 5 series

D 905
D 1005
D 1105
D 1105-T
V 1205
V 1305
V 1505
V 1505-T



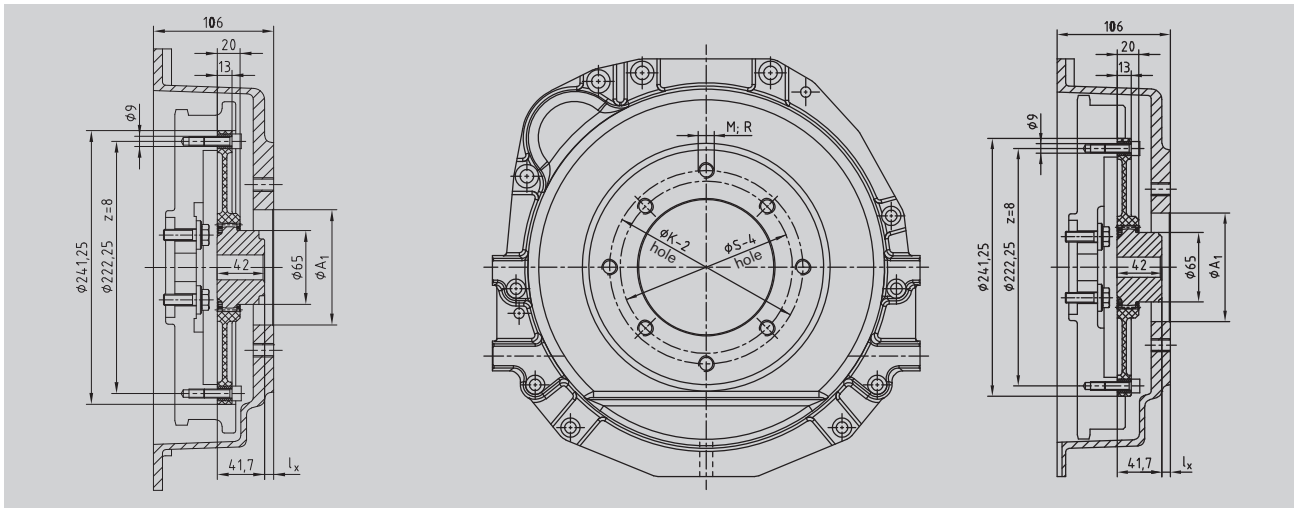
MONOLASTIC® 28 Ø 124 / pump mounting housing

Flange couplings and pump mounting housing for Perkins engines



Perkins 403C - 10/11

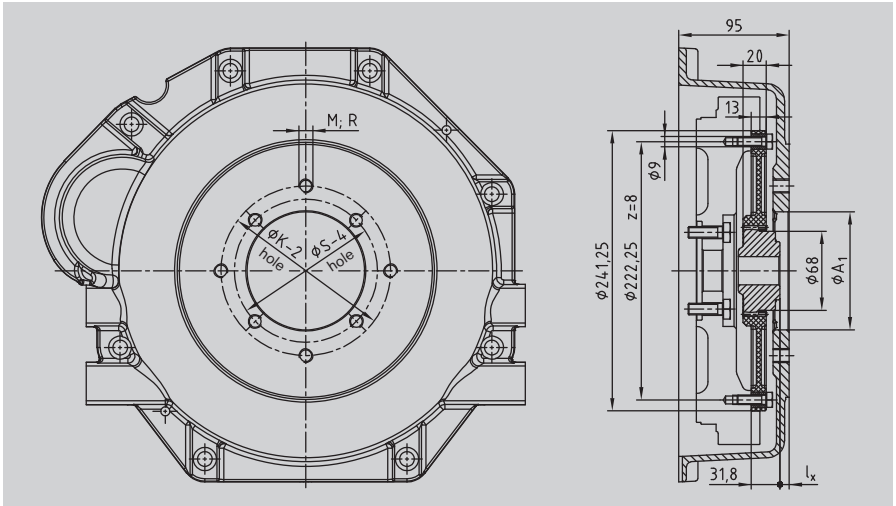
Perkins 403C - 13/15



Perkins 404C - 20

Perkins 404C - 22

Further selections on request for
Yanmar
Mitsubishi
etc.

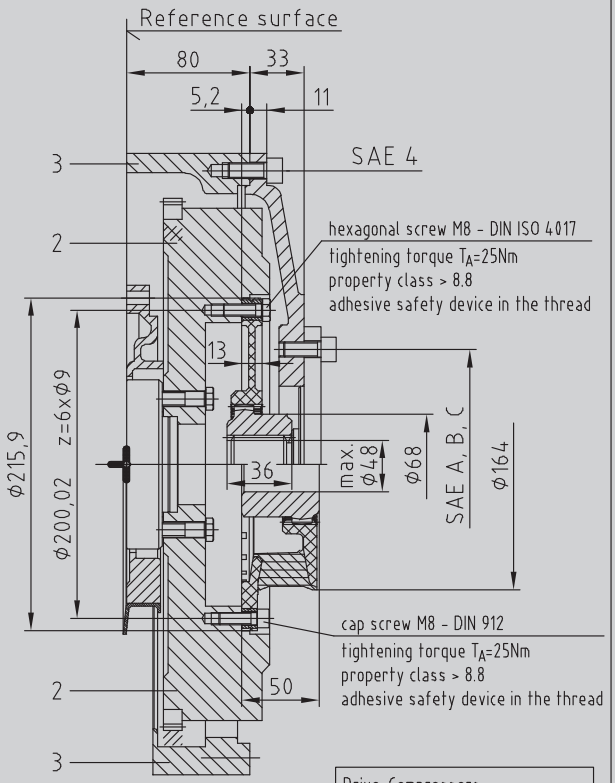


Cummins A series

Selection of DEUTZ engines FL/M 1011 and FL/M 2011

Assembly combination A

Drive: Hydraulic pumps
BoWex® 48 FLE-PA 6 1/2"
SAE-4.0/33 pump mounting flange

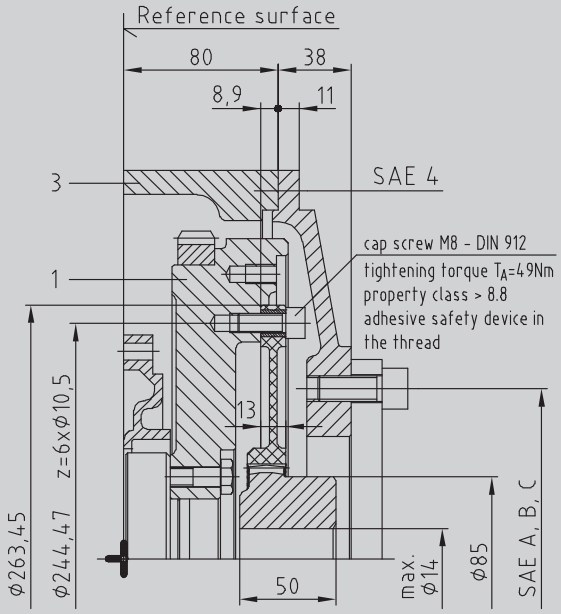


Assembly combination B

Drive: Compressors,
water pumps etc.
BoWex-Elastic® HE 6 1/2"

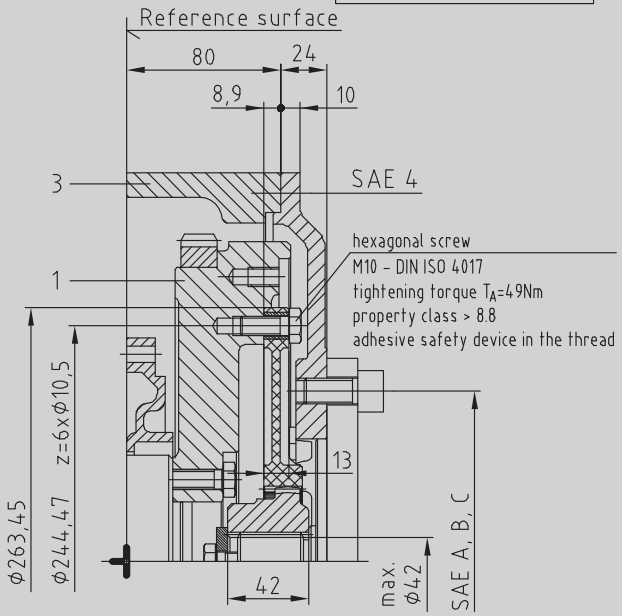
Assembly combination D

Drive: Hydraulic pumps
BoWex® T55 FLE-PA 8"
SAE-4.0/38 pump mounting flange



Assembly combination C

Drive: Hydraulic pumps
BoWex® 48 FLE-PA 8"
SAE-4.3/24 pump mounting flange



ATTENTION: The user must check the coupling arrangement corresponding motor performance. After assembling the coupling please check the longitudinal backlash of the crankshaft. Nominal dimension for bearing looseness 0,1 ... 0,3 mm.
DEUTZ does not assume anx guarantee for dimensions and/ or parts not belonging to the scope of delivery of DEUTZ.

In case of technical questions regarding the coupling type please contact
KTR-Kupplungstechnik GmbH
Postfach 1763 D-48407 Rheine
Phone: +49 - 05971 / 798-0

D	C	B	A	Pos.	Designation	Number	G(kg)	Kit.-No.
1	1	1	1	3	connecting ring (SAE-4)	0427 0980 KZ 0138-52 0417 1040 UA 0138-52	15	0553
-	-	1	1	2	fly wheel (SAE 6 1/2") J= 0,499 kgm²	0428 0586 KZ 0138-05 0417 1301 UA 0138-05	30,3	3174
1	1	-	-	1	fly wheel (SAE 8 u.10") J= 0,405 kgm²	0427 2426 KZ 0138-05 0417 1301 UA 0138-05	25,3	2461

Assembly combination

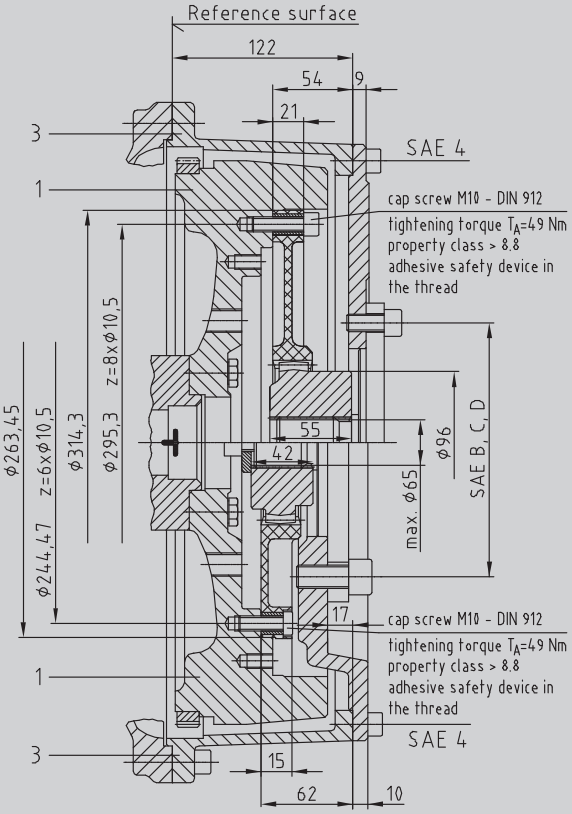
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
CORNERS PER DIN 4144
GEOMETRIC TOLERANCES PER ISO 1101 GENERAL TOLERANCES
SURFACE TEXTURE PER ISO 1302 IN MICROMETERS
MATERIAL
PROJECTION METHOD
Bauart TYPE FL/M1011 FL/M2011
Werkstückkanten nach DIN 4144
Form- und Lageinterbanden nach DIN 7184 Allgemeintoleranzen
Oberflächen Angaben nach ISO 1302 Rz nach DIN 4768
Maßstab SCALE 1:1
Gewicht WEIGHT -
Werkstoff Roh-teil-Nr. BLANK NO. -
Datum
Name
Bearb. 17.12.13 Sha
Gepr. 12.12.13 Sh
Norm
QE DEPT.
Gen.
Benennung TITLE Assembly of coupling BoWex® FLE-PA / ELASTIC HE
DEUTZ AG
Zeichnungsnummer 0428 0967
Ers. f.: REPLACES:
Änderung REVISION
Urspr. ORIGIN.

Selection of DEUTZ engines BFM 1012/1013/2012/2013/1015

Assembly combination A

Deutz-Motor
BF4M1012/E / BF4M1012/C/E / BF4M2012/C
BF4M1013/E / BF6M1012/E/C

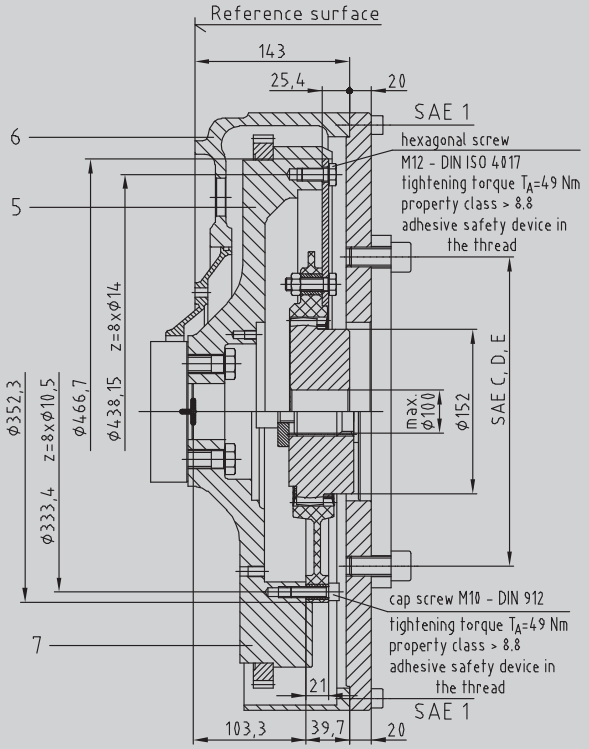
BoWex® 65 FLE-PA 10"
SAE-4/9 pump mounting flange



Assembly combination D

Deutz-Motor
BF6M1015/C/CP

BoWex® 100 FLE-PA 14"
SAE-1/20 pump mounting flange



Assembly combination B

Deutz-Motor
BF4M1013/C/E / BF4M2013/C
BF6M1012/C/E / BF6M1013/E / BF6M2013

BoWex® 65 FLE-PA 8"
SAE-4.2/-17 pump mounting flange

Assembly combination E

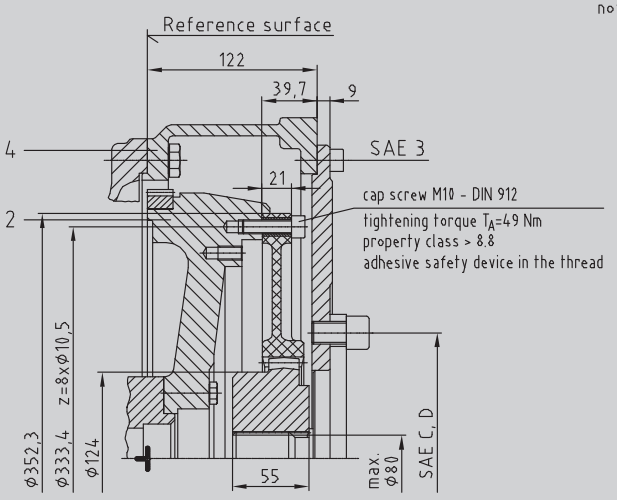
Deutz-Motor
BF6M1015/C

BoWex® 100 FLE-PA 11 1/2"
SAE-1/20 pump mounting flange

Assembly combination C

Deutz-Motor
BF4M1013/C/E/EC/FC
BF6M1012/C/E / BF6M1013/C/CP
BF6M2012/C / BF6M2013/C

BoWex® 80 FLE-PA 11 1/2"
SAE-3/9 pump mounting flange



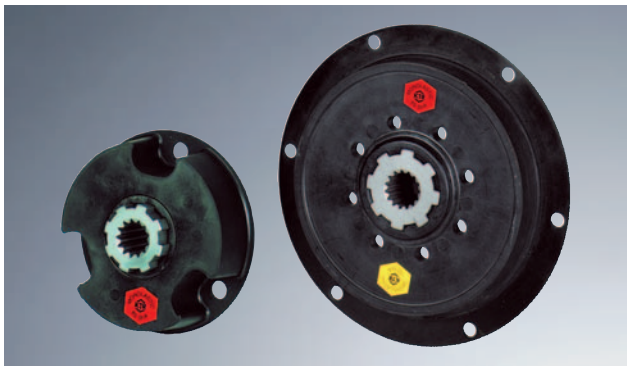
ATTENTION: The user must check the coupling arrangement corresponding motor performance. After assembling the coupling please check the longitudinal backlash of the crankshaft. Nominal dimension for bearing looseness: motor 1012/1013/2012/2013 = 0,1 - 0,28 mm;
motor 1015 = 0,2 - 0,4 mm
DEUTZ does not assume anx guarantee for dimensions and/or parts not belonging to the scope of delivery of DEUTZ.

In case of technical questions regarding the coupling type please contact KTR-Kupplungstechnik GmbH; Postfach 1763; D-48407 Rheine; Phone: +49-5971/798-0

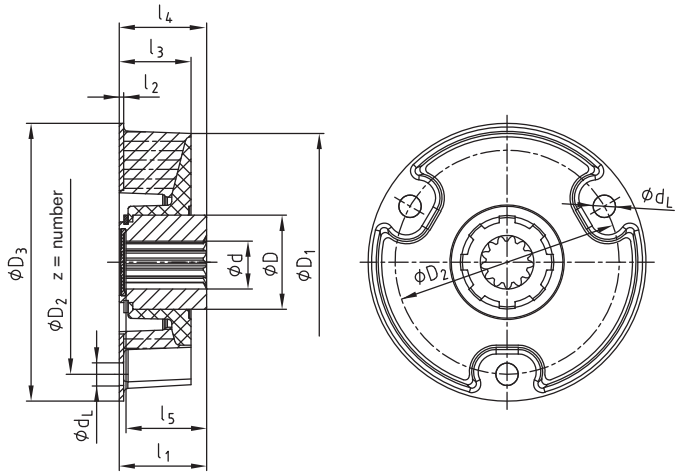
E	D	C	B	A	Pos.	Designation	Number	G (kg)	Kit.-No.
Assembly combination									
1	-	-	-	-	7	fly wheel (SAE-11 1/2") J= 2,255 kgm²		66,7	
1	1	-	-	-	6	connecting housing (SAE-1)		45,6	
-	1	-	-	-	5	fly wheel (SAE-14") J= 2,264 kgm²		61,6	
-	-	1	-	-	4	connecting housing (SAE-3)			
-	-	-	1	1	3	connecting housing (SAE-4)			
-	-	1	-	-	2	fly wheel (SAE-10 and 11 1/2") J= 0,872 kgm²			
-	-	-	1	1	1	fly wheel (SAE-8 and 10") J= 1,03 kgm²			

DEUTZ 1012 / 1013
see 0420 8900 UB 0130-97

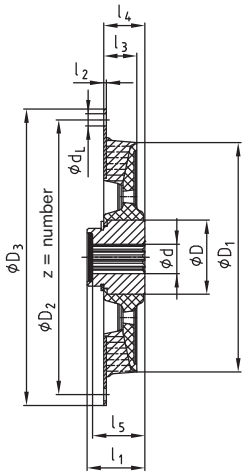
for I. C.-engines (EP 0853203/U.S. Patent 6,117,017)



- MONOLASTIC® – for the drive of diesel engine/hydraulic pump up to 100 kW
- Single-part design with flange fastening by three bolts (sizes 22, 28, 32, 50-140, 50-165, 50-170)
- Flange connection according to SAE 6 ½" to 11 ½" (size 30, 50, 65)
- Easy assembly of coupling
- Axial plug-in in combination with the pump shaft
- Compensation for high radial and angular displacements
- Available for pump shafts according to SAE and DIN



Size 22, 28, 32, 50-140, 50-165, 50-170

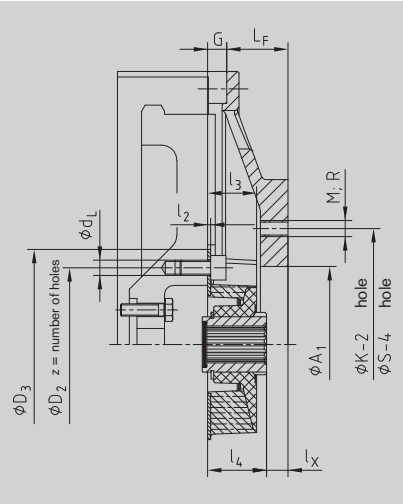


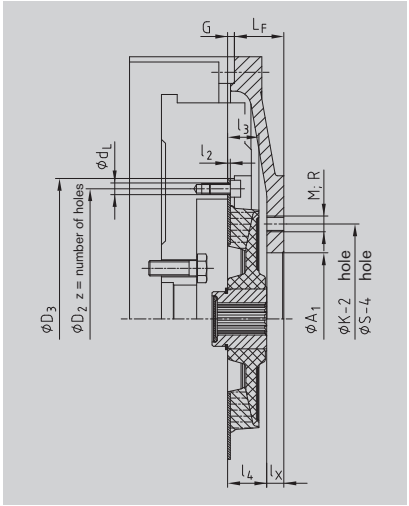
Size 30, 50, 65

MONOLASTIC®																
Size	Elastomer hardness [Shore A]	Torque [Nm]			Dimension [mm]											
		T_{KN}	$T_{K\,max.}$	T_{KW}	d	D	D_1	D_2	z	d_L	D_3	l_1	l_2	l_3	l_4	l_5
22	65	40	100	20	20	34	93	80	3	8,10	100	33	1,5	32	34	30
28	65	70	175	35	25	42	115	100	3	10,10	124	40	2	32	40	38
	70	100	300	50												
32	65	160	400	80	32	50	140	125	3	12,10	150	42	2	42	43	38
	70	225	675	112												
50-140	70	260	650	130	32	50	167	140	3	14,10	175	46	3	35	46	43
50-165	70	300	750	150	32	50	175	165	3	16,15	200	46	3	35	46	43
50-170	70	300	750	150	32	50	175	170	3	16,15	200	46	3	35	46	43
30	65	160	400	80	25	42	120	SAE-connection 6 ½", 7 ½"				39	2	21	30	36
50	65	300	750	150	32	50	167	SAE-connection 6 ½", 7 ½", 8", 10"				42	2	24	30	38
65	65	600	1600	180	48	68	200	SAE-connection 10", 11 ½"				45	3	32	45	42

Technical data										
Size	Elastomer hardness [Shore A]	$C_{dyn.}$ 60°C [Nm/rad]	Perm. damping power with 60°C P_{KW} [W]	Permissible radial displacement with 2200 min^{-1} ΔK_r [mm]	Permissible angular displacement with 2200 min^{-1} ΔK_w [°]	Radial spring stiffness C_r [N/mm]	Mass moment of inertia [kgm^2]		Max. permissible operating speed
							J_A	J_L	n_{max} [min^{-1}]
22	65	600	10	0,6		200	0,00017	0,00010	6000
28	65	900	15	0,6		300	0,00054	0,00033	6000
	70	1300		0,5		400			
32	65	1800	25	0,6		400	0,00120	0,00081	6000
	70	2400		0,5		500			
50-140	70	4200	35	0,5		1365	0,00210	0,00130	6000
50-165	70	5600	40	0,5	1	1550	0,00250	0,00130	6000
50-170	70	5600	40	0,5		1550		0,00130	6000
30	65	3750	25	0,6		1150	6,5" 0,0038	0,00030	6000
							7,5" 0,0057		
50	65	9000	35	0,6		1300	8" 0,0078	0,00120	6000
							10" 0,0153		
65	65	14000	45	0,6		1900	10" 0,0238	0,00380	6000
							11,5" 0,0368		

Couplings - pump mounting flanges - assembly



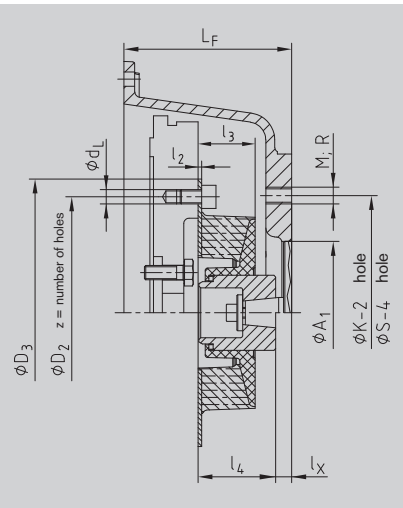


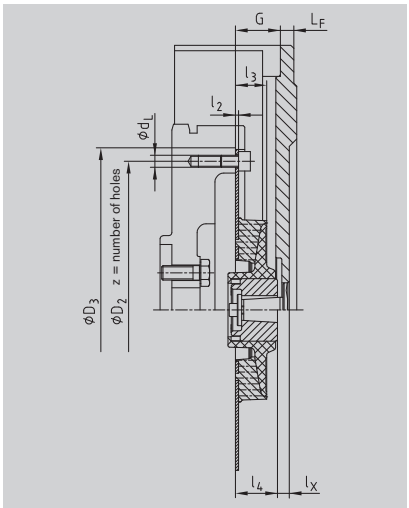
MONOLASTIC®
Couplings for spline shafts

Assembly of MONOLASTIC® coupling with 3-hole fixing and SAE-5 pump mounting flange made from EN-GJL-250 (GG 25).

Further coupling sizes on page 14. Additionally, KTR pump mounting flanges are available for all usual hydraulic pumps.

Assembly: The hydraulic pump is axially inserted into the coupling with the spline shaft.





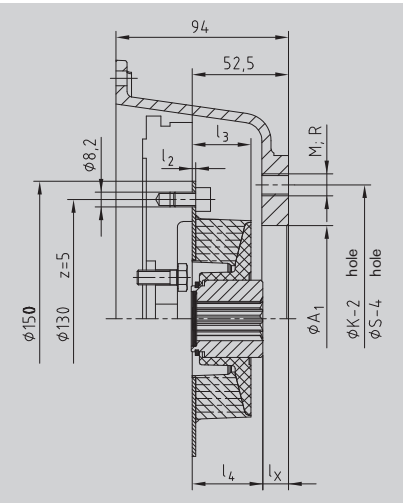
MONOLASTIC®
Couplings for taper shafts

Assembly of MONOLASTIC® coupling for hydraulic pumps with spline shaft.

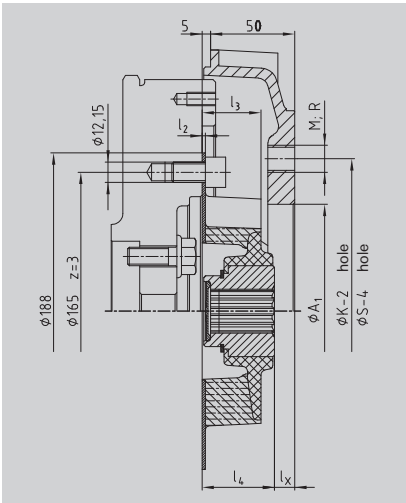
KTR pump mounting housing made from EN-GJL-250 (GG 25). This combination in connection with the flexible coupling is particularly suitable for the drive of gear pumps.

Assembly: The hydraulic pump with assembled coupling hub is axially inserted into the coupling (tooth connection).

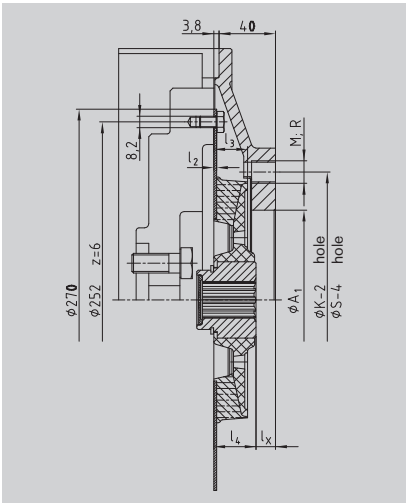
Further components:



MONOLASTIC® 28
KUBOTA - Mini

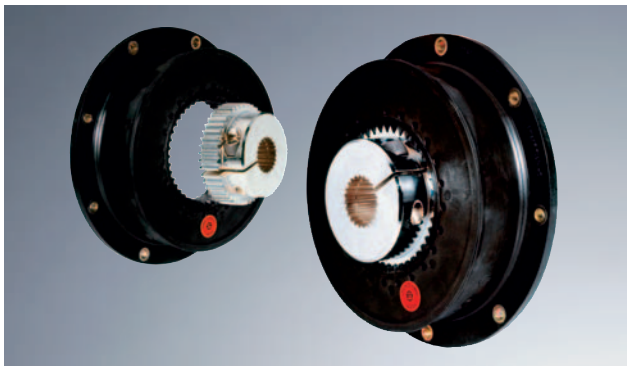


MONOLASTIC® 32 - 188
KUBOTA - Super Three Series

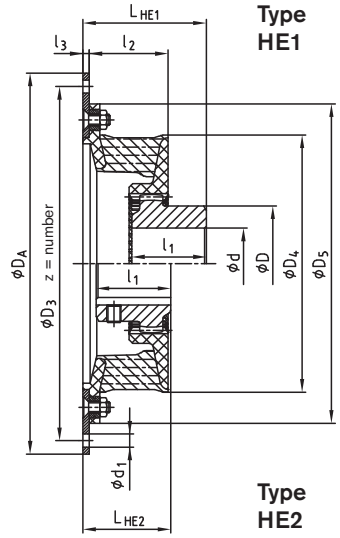


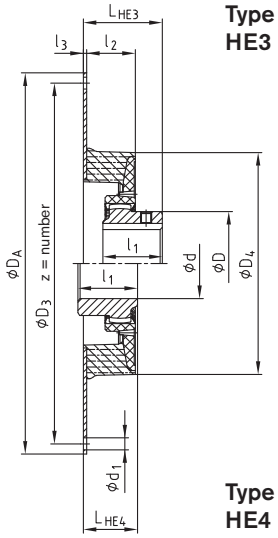
MONOLASTIC® 50 - 270
KUBOTA-engine
D1803, V2403, V2403T

Type HE



- Flange coupling with flanges according to SAE and special dimensions for mounting to I. C.-engines
- Easy assembly by axial plug-in
- Compensation of misalignment on driving and driven side
- Use of coupling hubs from the BoWex standard programme
- Finish bore according to ISO fit H7, keyway to DIN 6885, sheet 1 (JS9) - inch bores, taper bores, spline clamping hub
- Available in the hardness 40, 50 and 65 Shore A
- Ⓔx Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95) until size 80 including





Flange dimensions according to SAE J 620 [mm]				
Size	D_A	D_3	z	d_1
6 ½"	215,90	200,02	6	9
7 ½"	241,30	222,25	8	9
8"	263,52	244,47	6	11
10"	314,32	295,27	8	11
11 ½"	352,42	333,37	8	11
14"	466,72	438,15	8	14
16"	517,50	489,00	8	14
18"	571,50	542,90	6	18

BoWex-ELASTIC® type HE

Size	Design		Bore d [mm]		Flange connection according to SAE - J 620								Dimensions [mm]								Weight with pilot bored coupling	Mass moment of inertia with pilot bored coupling	
	HE1 HE2	HE3 HE4	Pilot bored	max.	6 ½"	7 ½"	8"	10"	11 ½"	14"	16"	18"	l_3	l_2	D_4	D_5	D	l_1	L_{HE1} L_{HE3}	L_{HE2} L_{HE4}	[kg]	J_A [kgm²]	J_L [kgm²]
42 HE	●		-	42	●	●							4	45	146	180	65	42	70	50	2,7	0,0061	0,0014
	●						●														2,9	0,0083	0,0014
	●				●	●															2,9	0,0106	0,0019
48 HE	●		-	48			●						4	45	164	198	68	50	78	50	3,1	0,0148	0,0019
	●							●													3,9	0,0298	0,0019
65 HE	●		-	65				●					5	55	205	244	96	55	85	62	6,4	0,0377	0,0064
	●								●												7,2	0,0594	0,0064
G 65 HE		●	-	65				●					3	45	205	-	96	55	73	50	5,3	0,0242	0,0076
		●							●												5,7	0,0372	0,0076
80 HE	●		31	80				●					-	70	266	-	124	90	126	74	10,9	0,0211	0,0283
	●								●				6			316			132	80	13,0	0,0726	0,0283
G 80 HE	●		31	80					●				-	80	302	-	124	90	136	84	12,5	0,0402	0,0428
	●									●			6			356			142	90	17,3	0,2251	0,0428
100 HE		●	35	100						●			4	80	350	-	152	110	150	82	24,1	0,1951	0,1019
125 HE		●	45	125						●			-	98	416	-	192	140	186	103	45,8	0,3013	0,2861
		●									●		6						192	109	47,7	0,4123	0,2861
G 125 HE		●	45	125							●		6	89	440	-	192	140	179	91	48,4	0,4781	0,2916
		●										●				-					50,5	0,6380	0,2916
150 HE		●	50	150								●	6	134	470	-	225	150	205	157	66,7	0,6918	0,5192

Order form:

BoWex-ELASTIC® 42	HE 1	40	8	70	U
Coupling size	Design	Elastomer hardness	Flange diameter D_A acc. to SAE or special	Mounting length L_{HE}	Unbored or with finish bore

Technical data

Technical Data																							
Coupling sizes		42 HE			48 HE			65 HE			80 HE			100 HE			125 HE			150 HE		
								G 65 HE			G 80 HE						G 125 HE					
Elastomer hardness [Shore A]	Shore A	40 Sh	50 Sh	65 Sh	40 Sh	50 Sh	65 Sh	40 Sh	50 Sh	65 Sh	40 Sh	50 Sh	65 Sh	40 Sh	50 Sh	65 Sh	40 Sh	50 Sh	70 Sh	40 Sh	50 Sh	70 Sh
Rated torque	T_{KN} [Nm]	130	150	180	200	230	280	350 430	400 500	500 620	750 1250	950 1600	1200 2000	2000	2500	3200	3000 4000	4000 5200	5000 6500	5500	7000	9000
Maximum torque	$T_{K\ max.}$ [Nm]	390	450	540	600	690	840	1050 1290	1200 1500	1500 1860	2250 3750	2850 4800	3600 6000	6000	7500	9600	9000 12000	12000 16000	15000 20000	16500	21000	27000
Vibratory torque with 10 Hz	T_{KW} [Nm]	36	45	54	60	69	84	105 129	120 150	150 186	225 375	285 480	360 600	600	7505	960	900 1200	1200 1600	1500 2000	1650	2100	2700
Permissible damping power 60 °C	P_{KW} [W]	20			27			45 51			90 135			160			180 200			225		
Permissible damping power 80 °C	P_{KW} [W]	6,5			9			15 17			30 45			53			60 67			75		
Max. perm. operating speed	$n_{max.}$ [min^{-1}]	6200			5600			4500 4300			3600 3000			2700			2300 2100			1800		
Twisting angle with rated torque	φ_{TKN} [°]	16	13	8	16	13	8	16 12	13 10	8 6	14 12	13 10	6 6	12	10	6	12 11	10 9	6 5	10	8	5
Dynamic torsion spring stiffness	C_{dyn} [Nm/rad]	550	850	2700	850	1300	3500	1600 2350	2200 3000	6000 8500	4500 7500	6500 12000	18000 32000	12000	19000	48000	19000 30000	30000 44000	75000 110000	42000	67000	166000
Relative damping	ψ	0,6	0,8	1,2	0,6	0,8	1,2	0,6	0,8	1,2	0,6	0,8	1,2	0,6	0,8	1,2	0,6	0,8	1,2	0,6	0,8	1,2
Resonance-factor $V_R \approx \frac{2 \cdot \pi}{\psi}$	V_R	10,5	7,9	5,2	10,5	7,9	5,2	10,5	7,9	5,2	10,5	7,9	5,2	10,5	7,9	5,2	10,5	7,9	5,2	10,5	7,9	5,2
Radial spring stiffness	C_r [N/mm]	142	219	697	176	269	724	209 259	288 346	784 975	351 476	507 762	1404 2031	366	570	1200	617 560	974 920	2434 1915	714	1200	2500
Perm. rad. coupling misalignment with n = 1500 min^{-1}	ΔKr [mm]	1,1	1,0	0,5	1,2	1,1	0,5	1,6	1,5	0,7	1,8	1,7	0,8	2,2	2,0	1,0	2,5	2,3	1,1	2,8	2,5	1,3
Max. perm. rad. coupl. misalignment for short-term start	$\Delta Kr_{max.}$ [mm]	3,6	3,3	1,5	3,8	3,5	1,7	5,1	4,7	2,2	5,7	5,3	2,4	6,5	6,0	3,0	7,5	6,9	3,3	8,0	7,5	4,0
Perm. angular coupl. misalignment with n = 1500 min^{-1}	ΔKw [°]	1,0	0,75	0,5	1,0	0,75	0,5	1,0	0,75	0,5	1,0	0,75	0,5	1,0	0,75	0,5	1,0	0,75	0,5	1,0	0,75	0,5
Perm. angular coupl. misalignment with n = 3000 min^{-1}	ΔKw [°]	0,5	0,4	0,25	0,5	0,4	0,25	0,5	0,4	0,25	0,5	0,4	0,25	0,5	0,4	0,25	0,5	0,4	0,25	0,5	0,4	0,25
Max. perm. angular coupl. misalignment for short-term start	$\Delta Kw_{max.}$ [mm]	1,5			1,5			1,5			1,5			1,5			1,5			1,5		
Perm. axial coupling misalignment	ΔKa [mm]	± 2			± 2			± 2			± 2 ± 3			± 3			± 3			± 5		

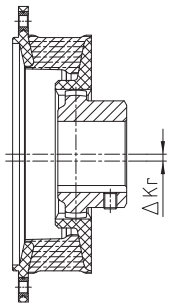
The technical data mentioned apply for an ambient temperature of T = 60 °C.

We would recommend to perform the coupling selection based on a torsional vibration analysis. For the respective necessary data please see our questionnaire on page 28.

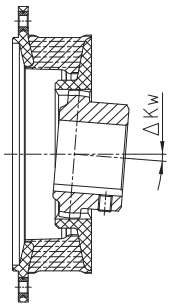
Displacements

For other operating speeds or higher operating temperatures the permissible radial displacement is calculated as follows:

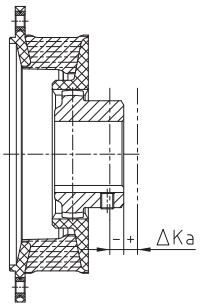
$$\Delta Kr_{perm.} = \Delta Kr \cdot S_t \cdot \sqrt{\frac{1500}{n_x}}$$



Radial displacement ΔKr



Angular displacement ΔKw



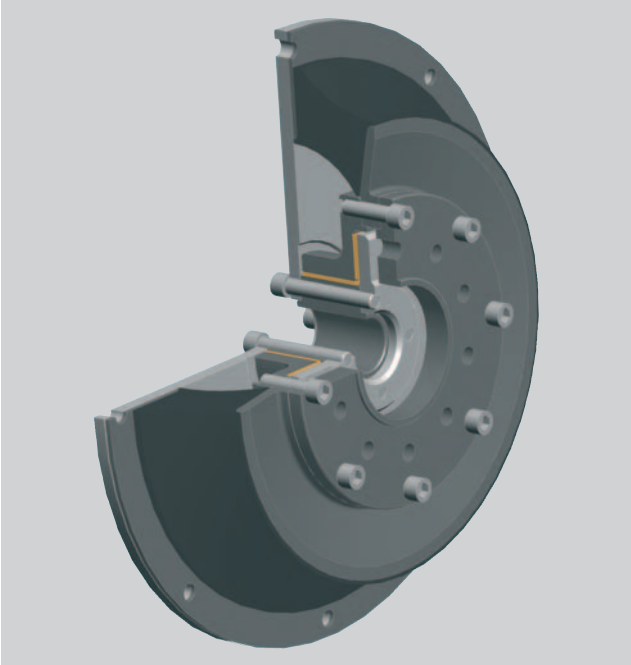
Axial displacement ΔKa

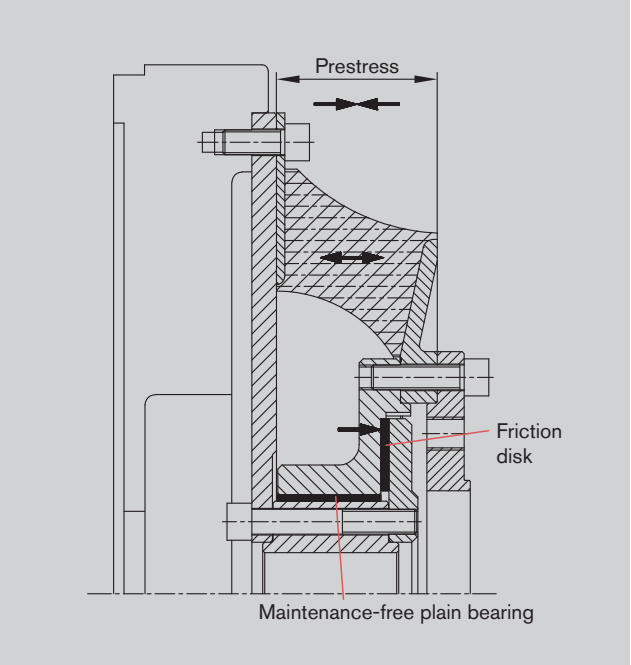
Process of assembly, screw type with quality, tightening torques according to KTR assembly instructions (see www.ktr.com).

Type HEG with friction damper for cardan shaft connection

Apart from transmitting the torque the demand on a torsionally flexible cardan shaft connecting coupling is higher torsional flexibility to ensure that the main critical speed of the machine can be shifted far below the idle-running speed.

In addition the **BoWex-ELASTIC**® HEG shall have good damping properties in the resonant range, i. e. when passing through the resonance, in order to keep the high coupling loads that arise as low as possible.



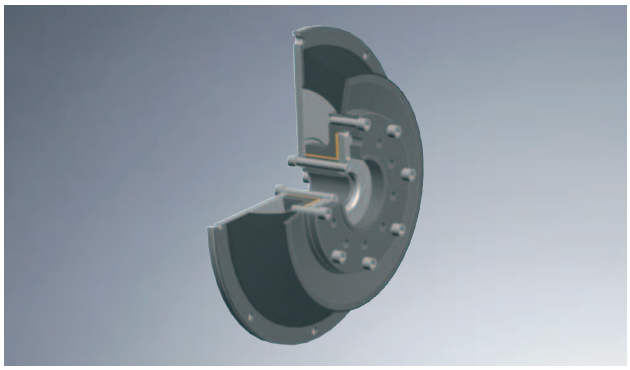


BoWex-ELASTIC® HEG
Operating principle of friction damping

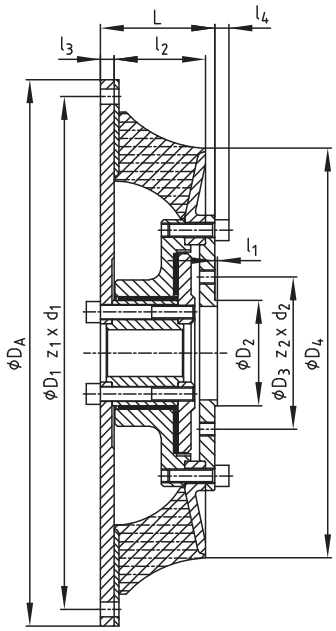
BoWex-ELASTIC® type HEG has a maintenance-free plain bearing to absorb the radial loads produced by the cardan shaft. Moreover, the coupling includes a friction disk which is prestressed axially by means of the elastomer part. The elastomer part is produced from natural rubber during a vulcanizing process.
Due to the permanent friction the coupling has excellent damping properties, reducing the high alternating loads arising in the coupling considerably when starting and passing through the resonance.

The elastomer part and the friction disk in the coupling operate in parallel with each other. The friction disk reduces torque peaks at a high extent, i. e. converting into heat. Here the corresponding heat is dissipated via the mechanical components. As a consequence a heat accumulation in the elastomer part produced during the frequent starting of the diesel engine and the resulting high load on the coupling is avoided. In this way the expected lifetime of the coupling is extended considerably.
Couplings type **BoWex-ELASTIC**® HEG are supplied as an assembled, pre-set unit. After the coupling has been mounted to the flywheel, the cardan shaft can be assembled.

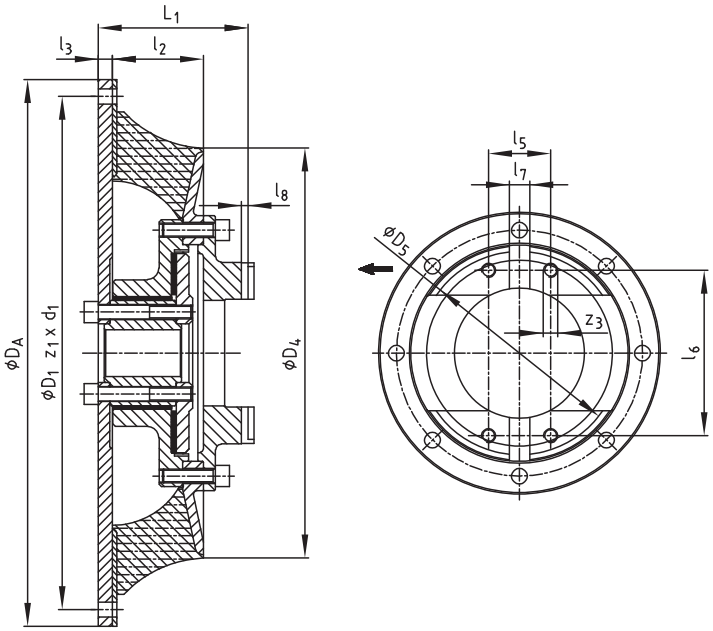
Type HEG for cardan shaft connections



- Highly-flexible cardan shaft auxiliary coupling for I. C. engines
- Available in different elastomer hardness's
- High torsional flexibility
- Excellent damping properties due to additional friction damping
- Reduction of torque peaks in the elastomer part
- Radial plain bearing in maintenance-free design
- Cardan shaft connection for usual designs



Type HEG1



Type HEG2

BoWex-ELASTIC® type HEG1 and type HEG2

Size	Flywheel connection to SAE-J 620					Metric cardan shaft connection HEG1 dimensions [mm]										MECHANICS cardan shaft connection HEG2 dimensions [mm]								Dimensions [mm]			Weight	Mass moment of inertia	
	8"	10"	11 ½"	14"	16"	58	65	75	90	100	120	150	180	l_4	L	2 C	4 C	5 C	6 C	7 C	8,5 C	8 C	L_1	D_4	l_2	l_3	[kg]	J_A [kgm²]	J_L [kgm²]
48	●					●	●	●						8	58,5									163	43,5	8	7	0,03	0,006
		●				●	●	●																			8	0,06	0,006
G 65		●						●	●	●				8	66	●	●	●					71	205	48,0	10	12	0,07	0,02
			●					●	●	●						●	●	●									14	0,10	0,02
80		●						●	●	●	●			10	88,5		●	●	●				104	265	68,5	23	21	0,11	0,06
			●					●	●	●	●						●	●	●								12	23	0,17	0,06
G 80			●						●	●	●	●		10	96			●	●	●			110	302	74,0	23	26	0,18	0,09
				●					●	●	●	●						●	●	●							12	33	0,48	0,09
100				●						●	●	●	●	12	98					●	●		128	350	78,0	16	41	0,63	0,19
125				●						●	●	●	●	12	111						●	●	135	416	96,0	18	56	0,74	0,42
					●					●	●	●	●								●	●				12	59	0,97	0,42

Flywheel connection to SAE-J 620 [mm]

Size	D_A	D_1	z_1	d_1
8"	263,52	244,47	6	11
10"	314,32	295,27	8	11
11 ½"	352,42	333,37	8	11
14"	466,72	438,15	8	14
16"	517,50	489,00	8	14

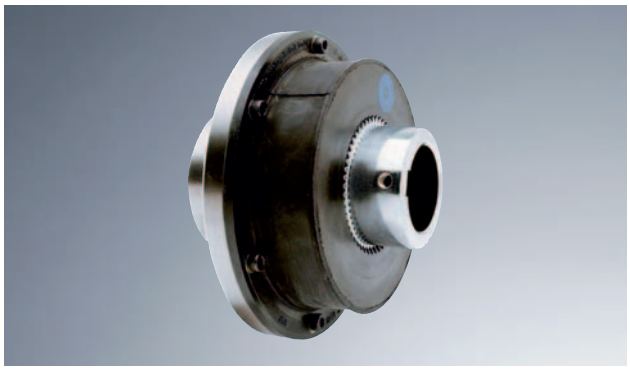
Metric cardan shaft connection HEG1 [mm]

Size	D_2	l_1	D_3	z_2	d_2
58	30	1,0	47,0	4	M5
65	35	1,0	52,0	4	M6
75	42	1,5	62,0	6	M6
90	47	2,0	74,5	4	M8
100	57	2,0	84,0	6	M8
120	75	2,0	101,5	8	M10
150	90	2,5	130,0	8	M12
180	110	2,5	155,5	8	M14

MECHANICS cardan shaft connection HEG2 [mm]

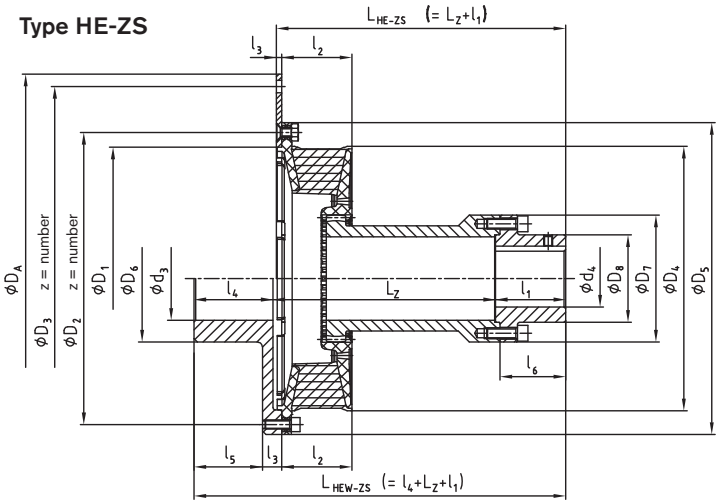
Size	D_5	l_5	l_6	l_7	l_8	z_3
2 C	79,35	33,3	59,5	9,50	3,8	M8
4 C	107,92	36,5	87,3	9,50	3,8	M8
5 C	115,06	42,9	88,9	14,26	5,1	M10
6 C	140,46	42,9	114,3	14,26	5,1	M10
7 C	148,39	49,2	117,5	15,85	6,0	M12
8,5 C	165,08	71,4	123,8	15,85	6,0	M12
8 C	206,32	49,2	174,6	15,85	6,0	M12

Type HE-ZS, type HEW-ZS and type HEW



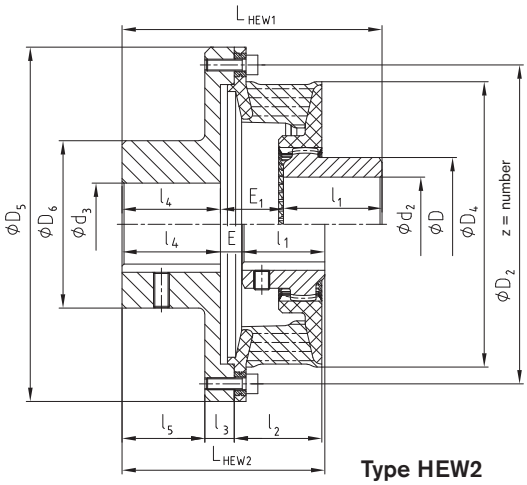
- Highly flexible coupling to be mounted to combustion engines and electric motors
- Elastomer parts available as hardness 40, 50 and 65 Shore A
- High degree of compensation of errors in alignment
- Type HE-ZS with flange connection according to SAE-J 620 and removable part for pump drives
- Type HEW-ZS for shaft connections with removable part
- Type HEW1/HEW2 highly flexible shaft coupling
- Finish bore according to ISO fit H7, feather key according to DIN 6885 sheet 1 - JS9
- Ⓔx Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95)

Type HE-ZS



Type HEW-ZS

Type HEW1



Type HEW2

BoWex-ELASTIC® type HE-ZS

Size	max. finish bore d_4	Flange connection to SAE-J 620 D_A for HE-ZS						Dimensions [mm]									Removable part HE-ZS L_Z [mm]					Weight with max. bore [kg]	Mass moment of inertia [kgm²]	
		6 ½"	7 ½"	8"	10"	11 ½"	14"	D_1	D_4	D_5	D_7	D_8	l_1	l_2	l_3	l_6	100	120	140	180	250		J_A	J_L
		●												48	10		●	●				2,9	0,0028	0,0050
48	28		●					160	164	200	78	45	40			45	●	●				3,6	0,0106	0,0050
				●										37	4		●	●				3,9	0,0148	0,0050
					●												●	●				4,6	0,0298	0,0050
G 65	45				●			198	205	245	110	72	60	45	3	56		●	●			7,7	0,0242	0,0223
						●												●	●			8,2	0,0372	0,0223
80	65				●			265	266	318	145	100	80	70	11	75			●	●		13,7	0,0211	0,0701
						●									6				●	●		15,9	0,0726	0,0701
G 80	65					●		300	302	358	145	100	80	80	11	75				●	●	17,4	0,0402	0,1412
							●								6					●	●	22,3	0,2251	0,1412

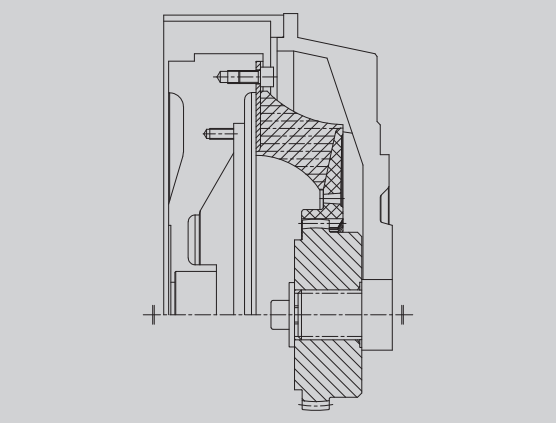
BoWex-ELASTIC® type HEW-ZS

Size	max. finish bore		Dimensions [mm]											Removable part HEW-ZS L_Z [mm]					Weight with max. bore [kg]	Mass moment of inertia [kgm²]	
	d_3	d_4	D_2	z_1 x M		D_4	D_5	D_6	l_1	l_2	l_3	l_4	l_5	100	120	140	180	250		J_A	J_L
48	55	28	180	8	M6	164	200	92	50	45	17	55	45	●	●				6,9	0,0203	0,0050
65	75	45	224	8	M8	205	245	125	55	55	28	75	63		●	●			16,0	0,0747	0,0160
80	80	65	295,3	8	M10	266	318	130	90	70	17	80	70			●	●		25,5	0,1447	0,0699
G 80	95	65	333,4	8	M10	302	358	145	90	80	22	90	78				●	●	34,2	0,2752	0,1412

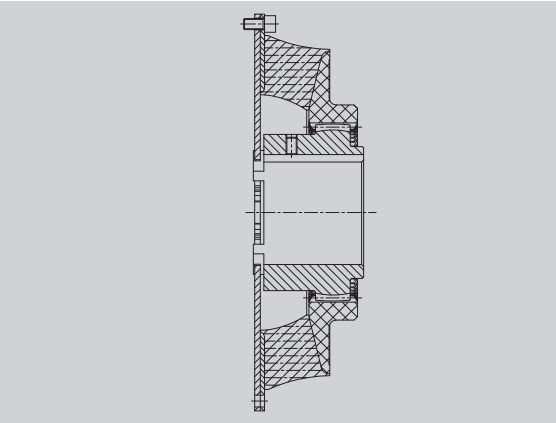
BoWex-ELASTIC® type HEW

Size	max. finish bore		Dimensions [mm]																Weight with max. bore [kg]	Mass moment of inertia [kgm²]	
	d_2	d_3	D	D_2	z x M		D_4	D_5	D_6	l_1	l_2	l_3	l_4	l_5	E	E_1	L_{HEW1}	L_{HEW2}		J_A	J_L
42	48	50	68	162	6	M6	146	180	85	50	45	15	50	42	4	32	132	104	4,3	0,0121	0,0015
48	48	55	68	180	8	M6	164	200	92	50	45	17	55	45	4	32	137	109	5,5	0,0204	0,0019
65	65	75	96	224	8	M8	205	245	125	70	55	28	75	63	5	42	187	150	13,2	0,0752	0,0071
80	80	80	124	295,27	8	M10	266	318	130	90	70	17	80	70	5	45	215	160	19,7	0,1449	0,0285
G 80	85	95	124	333,4	8	M10	302	358	145	90	80	22	90	78	5	55	235	185	25,9	0,2748	0,0422

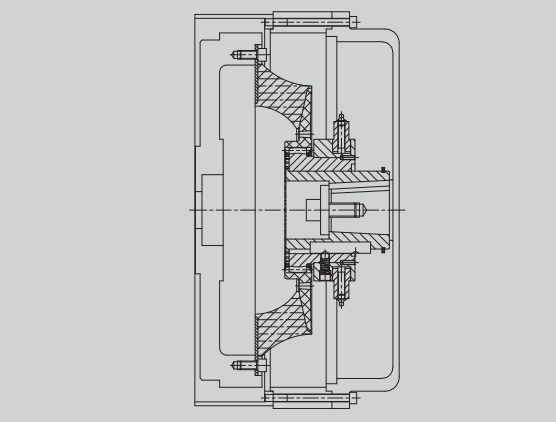
Other coupling types



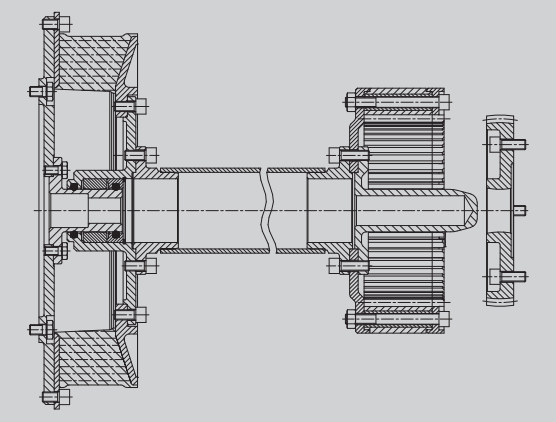
Assembly of the **BoWex-ELASTIC®** coupling - highly flexible flange coupling between diesel engine and splitterbox. Having assembled the elastomer part, the splitterbox can be pushed into the elastomer part with the coupling hub assembled. The coupling is selected by means of a torsional vibration analysis ensuring a permanent operation free from resonance. Various kinds of elastomer hardness are available to adapt to the torsional vibration conditions.



Highly flexible **BoWex-ELASTIC®** flange couplings with safety device against racing. If the coupling fails or wears off, the safety device against racing allows a limited torque transmission.



Highly flexible **BoWex-ELASTIC®** flange couplings shiftable at standstill. This design allows to engage or disengage driving machines with operation limited in time or for maintenance work. The design can be adapted.



BoWex-ELASTIC®/BoWex® FLE-PA couplings for engine test benches as a variable spacer type in combination with a highly flexible curved-tooth gear coupling free from maintenance on the counter side in the material combination nylon/steel. The curved-tooth gear coupling is used as an axial plug-in component for the non-positive connection of the test machine. The operating principle of the coupling is double-cardanic, consequently ensuring a bigger compensation of radial displacement.

Coupling selection

1. BoWex-ELASTIC® couplings should be selected in accordance with DIN 740 part 2. The coupling must be sufficiently sized to ensure that the maximum permissible coupling load is not exceeded in any operating condition. It is therefore necessary to compare the actual loads with the permissible rated parameters of the coupling according to tables 1.1 - 1.4 listed below.

   For drives subject to dangerous torsional vibrations it is necessary for a safe operation to review the drive by means of a torsional vibration calculation.

1.1 Load by rated torque

$$T_{KN} \geq T_N \cdot S_t$$

The permissible rated torque T_{KN} of the coupling must, at all operating temperatures, be at least as high as the rated torque T_N of the machine.

$$T_N\,[Nm] = 9550 \cdot \frac{P_{AN/LN}\,[kW]}{n\,[1/min]}$$

1.2 Load by torque shocks

$$T_{K\,max} \geq T_S \cdot S_Z \cdot S_t$$

The maximum permissible torque of the coupling must, at all operating temperatures, be as high as the operational peak torque T_S, taking into account the shock factor S_Z.

Shock on driving side
$T_S = T_{AS} \cdot M_A \cdot S_A$

Shock on driven side
$T_S = T_{LS} \cdot M_L \cdot S_L$

$$M_A = \frac{J_L}{J_A + J_L} \qquad M_L = \frac{J_A}{J_A + J_L}$$

With knowledge of mass distribution, direction and type of shock it is possible to calculate the peak torque T_S. If the moments of inertia are unknown, M_A or $M_L = 1$.

1.3 Passing through resonance range

$$T_{K\,max} \geq T_S \cdot S_Z \cdot S_t$$

The peak torque T_S arising when the resonance range is passed through must not exceed the maximum torque T_{Kmax} of the coupling, taking into account the temperature.

1.4 Load by vibratory torque shocks

$$T_{KW} \geq T_W \cdot S_t$$

The permissible vibratory torque T_{KW} of the coupling, at the operating speed and ambient temperature, must not be exceeded by the biggest periodical vibratory torque T_W.

$$P_{KW} \geq P_W$$

With operating frequencies f > 10 Hz the heat produced by damping in the elastomer is considered as damping power P_W.

The permissible damping power P_{KW} of the coupling depends on the ambient temperature and must not be exceeded by the actual damping power produced.

Temperature factor S_t

	- 40 °C + 60 °C	+ 70 °C	+ 80 °C
S_t	1,0	1,2	1,6

Table No. 1

Starting factor S_Z

Starting frequency/h	< 10	> 10 < 60	> 60 < 120	> 120
S_Z	1,0	1,5	2,0	on request

Table No. 2

Shock factor S_A/S_L

Moderate shocks		1,5
Average shocks	S_A/S_L	1,8
Heavy shocks		2,5

Table No. 3

Technical data for coupling selection / Torsional vibration calculation

Driving side

diesel ☐ gas ☐ engine-type ☐

straight-type engine ☐ V-engine/angle ☐ stroke ☐ mm

2-cycles ☐ 4-cycles ☐ piston Ø mm ☐ no. of cylinders ☐

nominal torque T_{AN} ☐ Nm speed range n: idle speed ☐ 1/min.

peak torque T_{AS} ☐ Nm $n_{min.}$ operational ☐ $n_{max.}$ operational ☐ 1/min.

mass moment of inertia J_A or flywheel effect GD^2_A for

flywheel J_A ☐ kgm² or GD^2_A ☐ kgm²

driving gear J_A ☐ kgm² or GD^2_A ☐ kgm²

Driven side

hydraulic pump ☐ splitterbox ☐ generator ☐ screw compressor ☐

piston compressor ☐ no. of cylinders ☐ order of cylinder ☐ tangential force diagram

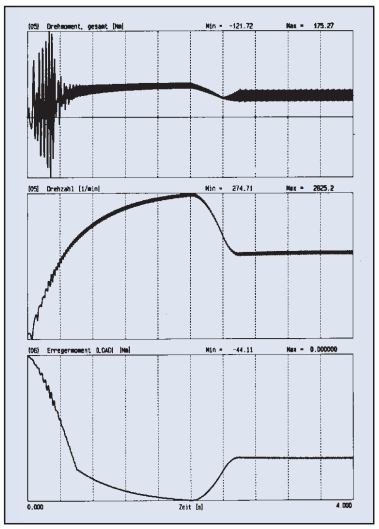
manufacturer/type ☐

nominal torque T_{LN} ☐ Nm peak torque ☐ Nm

mass moment of inertia J_L ☐ kgm² or flywheel effect GD^2_L ☐ kpm²

Additional Information

Use of PC with special software for coupling selection



Application:
3-cylinder diesel engine - screw compressor

Use:
BoWex-ELASTIC®
42 HE - 50 Shore A

Calculation:
Acceleration
from 300 min^{-1}
to 2700 min^{-1}

KTR makes use of special simulation calculation programs for the coupling selection and the torsional vibration determination of the drive system.

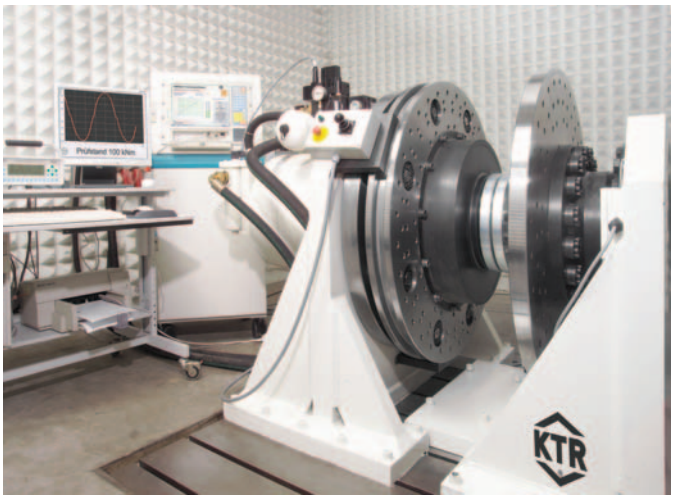
This ensures a resonance-free operation of the machine, along with a safe, long-lasting operation of the drive components. This is part of the usual KTR standard service.

Use of CAD and FEM systems for development and construction

Apart from new products the team of KTR design engineers develops specific drive solutions for customers which are adapted to your application in detail.

For that purpose we make use of latest 3D-CAD and FEM equipment, ensuring an optimum and quick service.

R & D center
Test benches



KTR has test benches in its research and development center with servo-hydraulic and electronic control and data processing by PC. A special software which was developed for KTR ensures a short-term and detailed evaluation.

In total ten static and dynamic test benches of different performance are installed in the R & D center.

These test benches are used to test performance, capacity of resistance to wear, etc. of KTR drive elements.

Apart from that serial tests are performed to ensure a constant quality standard of KTR products.

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