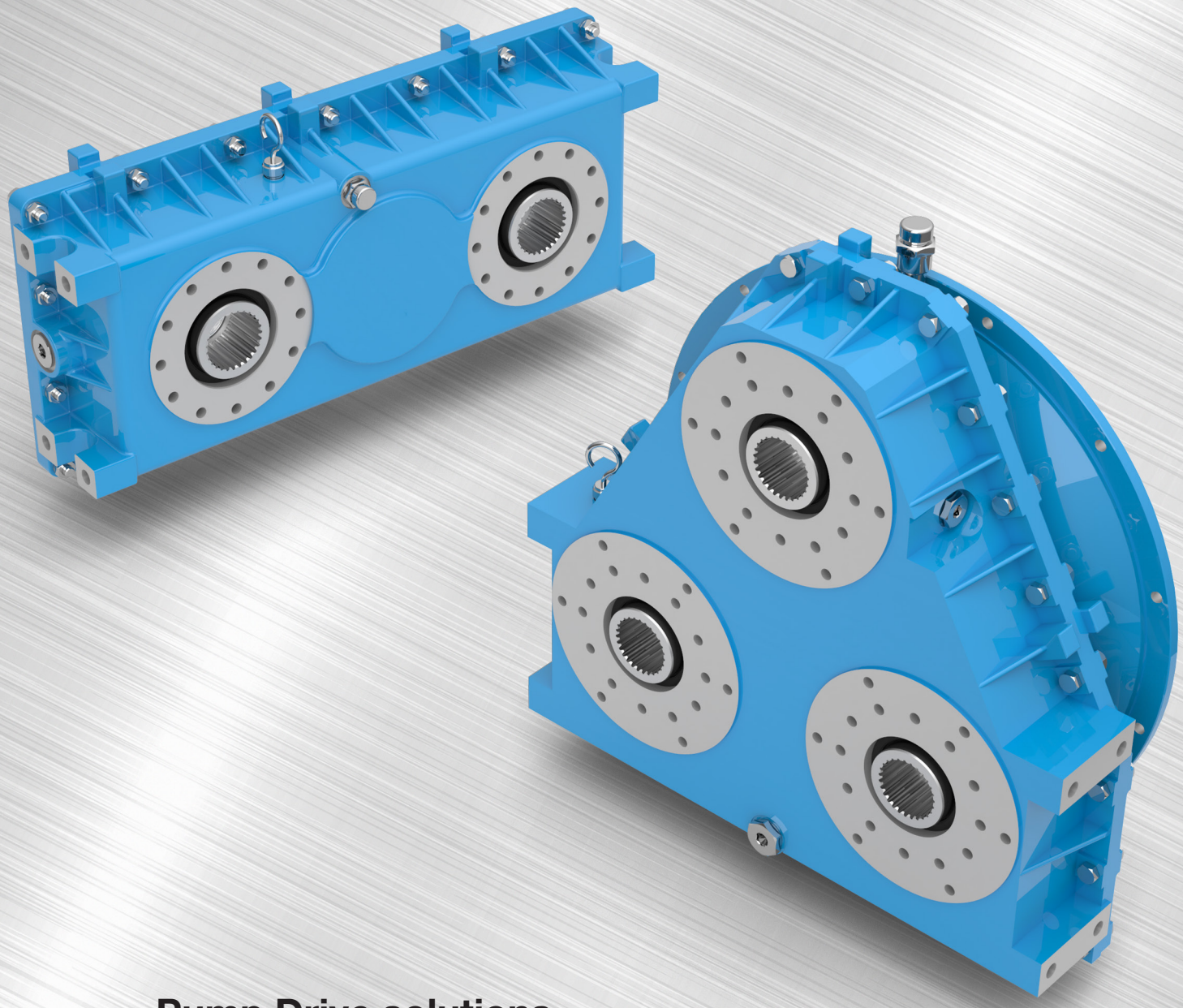
DANA BREVINI® Motion Systems

DC1M1B1_0000000
01 2022

Product Catalog

Brevini Pump Drives
BZ Series

Power from 110-480 kW



Pump Drive solutions

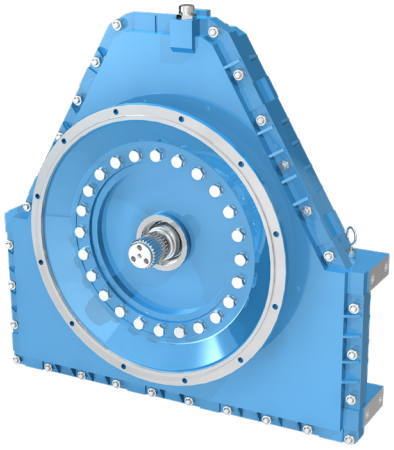
A complete Pump Drive range with dual or multiple pumps ports to satisfy all machine needs.

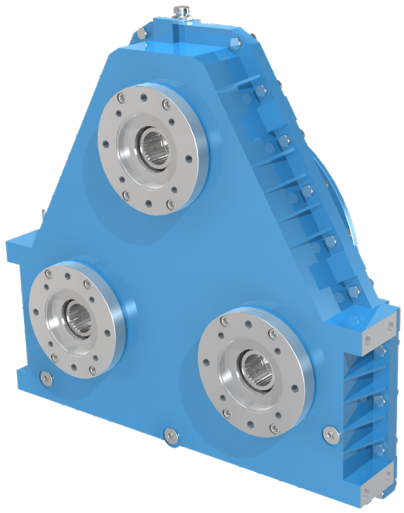
Pump Drives

The Pump Drive is a gearbox allowing the connection between a prime mover (internal combustion engine or electric motor for example) and one or more hydraulic pumps.

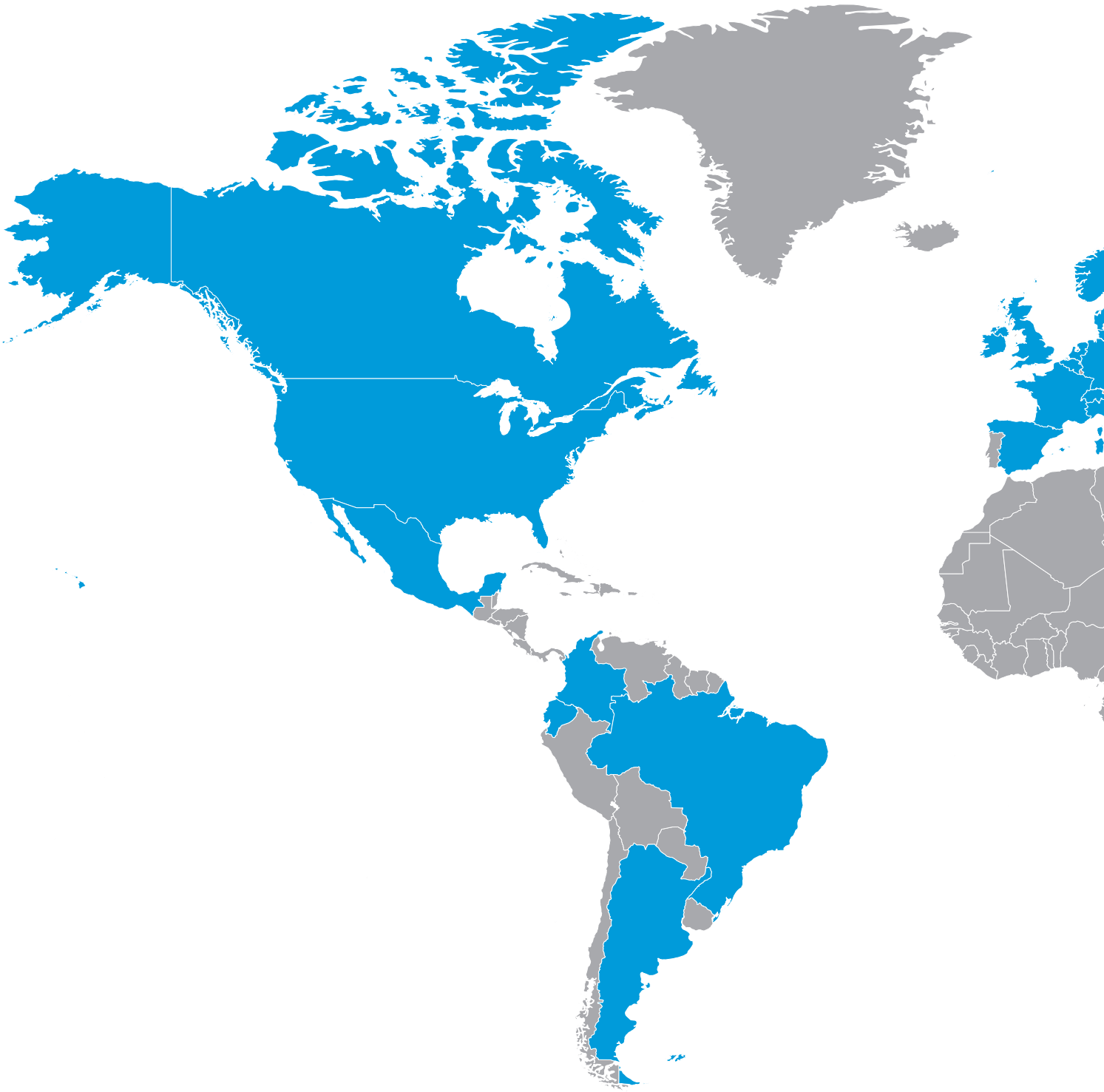
Usually it is used on both stationary and mobile application where mechanical power must be converted into hydraulic power for the purpose of operating travel functions and services.

The range of pump drives shown in this catalogue features 4 standard sizes and the option of coupling from 1 to 4 pumps.
The large stock of flanges and coupling flanges for almost all widely available pumps means Dana 's range of pump drives gives you the utmost flexibility when selecting and sizing components for hydraulic circuits.

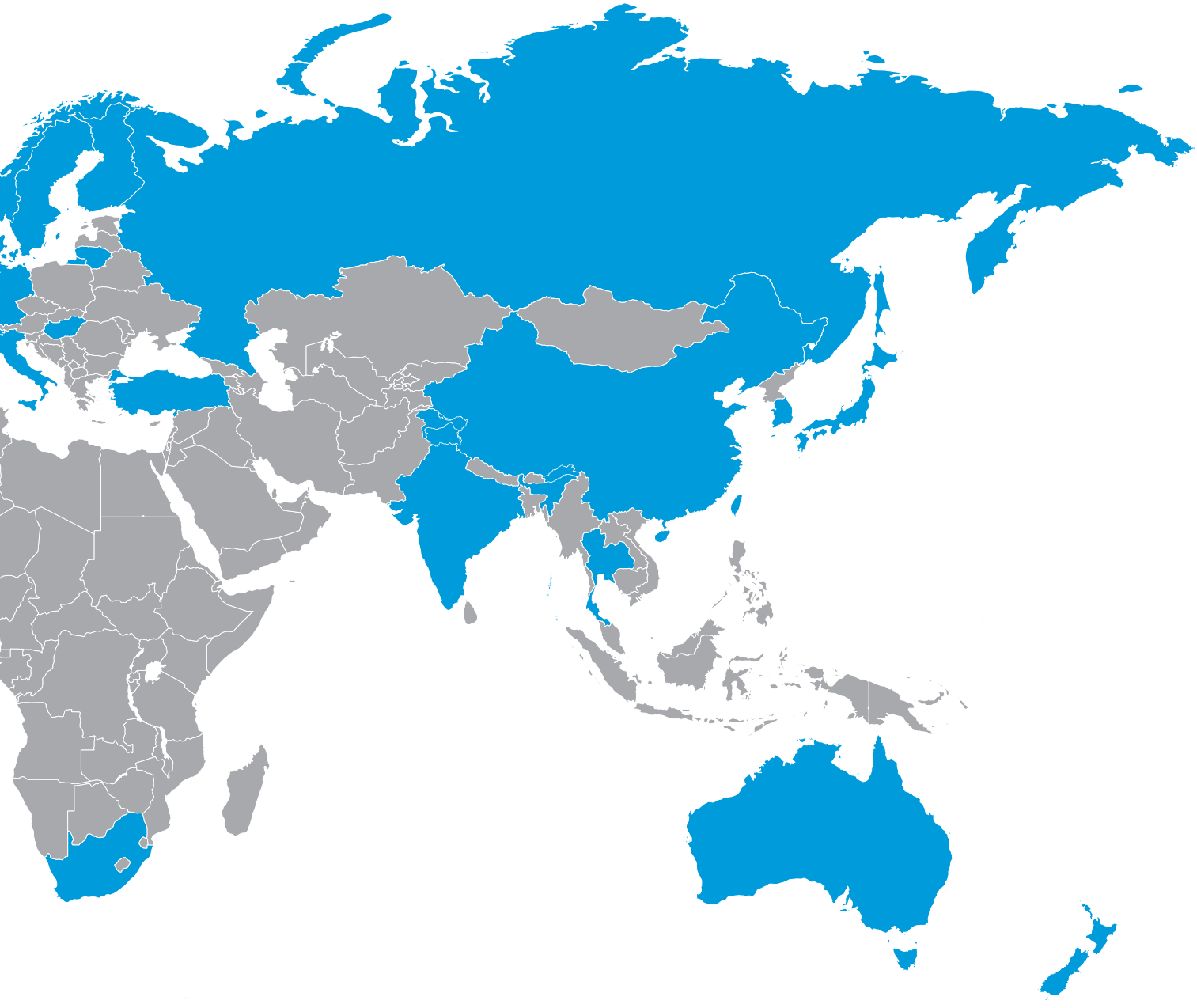




DANA OFF-HIGHWAY



GLOBAL PRESENCE




DANA
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Motion Systems

INDEX

Dana has introduced the introductive index and bookmars, which allow you to arrive and print the relevant section.
Clicking the Dana logo at the bottom page, you'll come back to the index

TECHNICAL FEATURES & DATA

Technical Features

The Dana pump drive gear units in this catalogue can drive up to four pumps from a single prime mover - usually an I.C. engine or electric motor.

The central gear, made integral with the input shaft, meshes with the outer gears which are also integral with the pump drive shafts.

This operating principle applies to all gearboxes in this range, irrespective of the number of pump outlets on each pump drive.

The transmission ratio is the same for each output whilst pump shafts rotate in the opposite direction from input shafts.

Our new series of pump drive gearboxes are offered in two versions:

1. CS - with SAE flange on the input side to mate with an I.C. engine flywheel housing
2. ADI - for use with independently mounted prime mover.

On larger sizes it is possible to provide the means to drive an additional pump from the non-drive end of the input shaft.

Pumps are directly mounted on to the gear unit by means of an adaptor flange and splined coupling bush, similar to the well proven system used on Dana reduction gear units.

Gearcases are made in aluminium alloy on the smaller sizes and nodular cast iron on the largest ones. The surface area is increased by the addition of ribs to improve cooling.

Gears are manufactured from high quality alloy steel forged blanks and have spur teeth which are case hardened and profile ground.

On larger sizes the central input gear has crown ground teeth and is made integral with the shaft (as are the driven gears). These features lead to longer life expectancy and lower noise.

All shafts are mounted on ball bearings and Viton seals are fitted as standard on the input shafts.

Technical Data

i		Ratio of input speed n_1 to output speed n_2 of the coupler. Ratios greater than 1 refer to couplers running as speed reducers, ratios less than 1 refer to speed multipliers.
T_1	[Nm]	This is the value of input torque calculated for stress on gears and equivalent to the threshold value under ISO (DP 6336), which generally equals an unlimited theoretical duration.
T_2	[Nm]	Input torque (**T_1**) divided by the number of pump outlets and reduction ratio.
n_{1max}	[rpm]	Maximum speed at the coupler input to assure minimum noise levels and appropriate lubrication.
J	[kgm^2]	Moments of inertia, referring to the pump drive input and defined in accordance with internationally recognized units of measure.
Pm	[kW]	Mechanical output; this is the maximum output that the pump drive can transmit in mechanical terms.
Pt	[kW]	Thermal rating; the maximum output that the pump drive can transmit in terms of thermal power under normal lubrication (correct amount of lubrication and stable temperature below 90°C) with no additional system to cool the oil contained in the pump drive. This value is influenced by a number of different elements such as ambient temperature, ventilation, type of oil, input speed and work cycle, which may vary in part or in whole across applications. Our calculations are based on a pump drive assembled as shown in the catalogue at an external temperature of 20°C, in the open air, using VG150 mineral oil, input speed of 2000 min^{-1} and a work cycle defined as follows: 75% of the time at 75% of the output listed herein 25% of the time at an output 25% greater than the listed one.

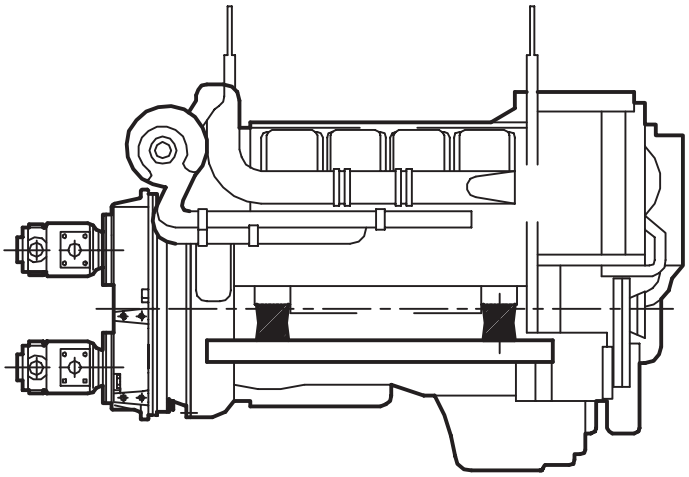
Symbols:

00 **Universal input:** gearbox input configuration for connection to most types of motors.

lt. [lt.]:Amount of oil required

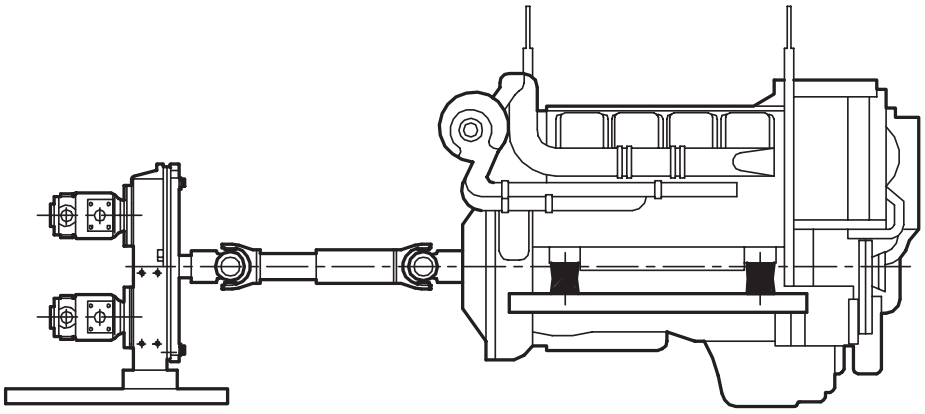
Kg. [kg.]: Weight of gearbox without oil

The normal mounting position is as illustra-ted in the catalogue.
The CS version is arranged for flange mounting on to the SAE flywheel housing of an I.C. engine.
Dana can supply the gear unit with a flexible coupling, type RDB or FP to connect to the I.C. engine flywheel.

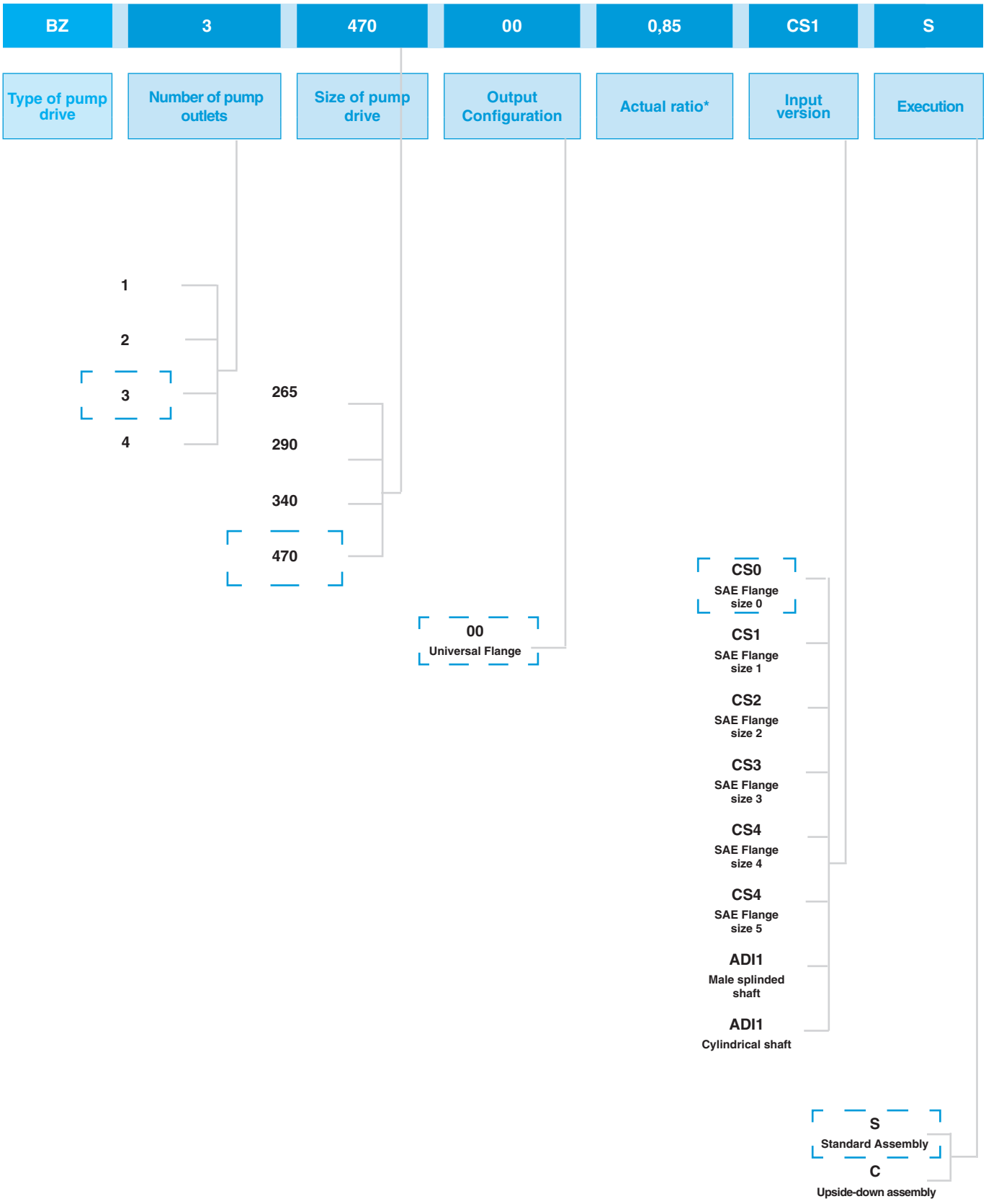


The ADI version is for use when the prime mover (I.C. engine, electric motor or any other) is mounted independently of the gear unit. Both ADI and CS versions have pads on each side to facilitate mounting using correctly designed brackets.
In all cases, the gear unit must be connected to the prime mover by means of a coupling which has the following characteristics:

- no radial or axial loads are induced on to the gear unit input shaft
- any torsional vibrations created by the prime mover and/or pumps must be adequately damped out.



DESIGNATION



*See the relevant specifications table for all pump drive sizes

SELECTING A PUMP DRIVE

There are two basic elements to consider when making a selection:

- the power to be transmitted
- the number of pump outlets required.

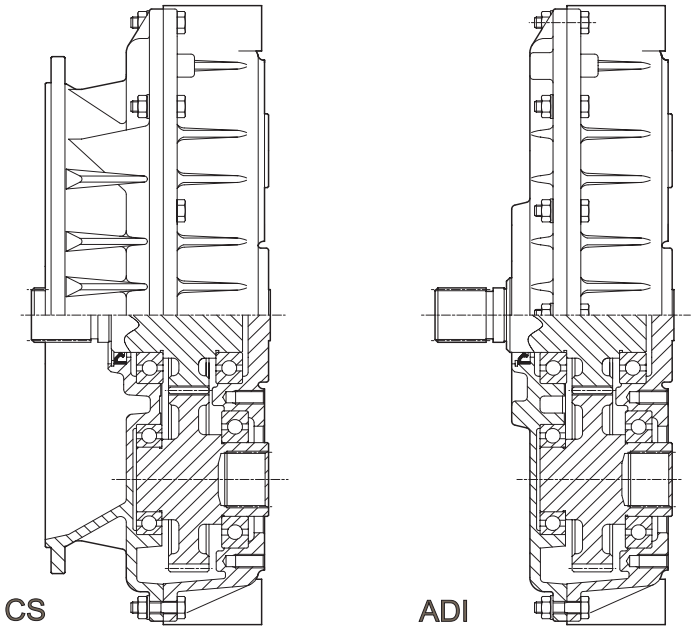
Within these general choices, it is also necessary to verify that:

- the ratio requested is available for the unit size being considered
- the speed does not exceed the maximum values stated in the catalogue
- the input and output torques are within the values given in the catalogue
- the power which has to be delivered is conveniently divided between each output; if not, consult Dana
- the average transmitted power calculated from the duty involved does not exceed the thermal capacity of the unit being considered.
- If it does, some form of external cooling must be utilised.

The final considerations to take into account:

- which version is required, ADI or CS?
- what type of coupling will be used between the gear unit and prime mover? It can be an RDB or FP, or another similar type of flexible coupling, suitable to damp out potentially damaging torsional vibrations
- the exact definition of each pump mounting characteristics to enable Dana Motion Systems SpA to ensure that the correct mounting adaptors are supplied
- any special conditions which could affect the selection of the gear unit.

SPECIAL NOTE: Whilst proper observation of all of the above mentioned procedures should result in the selection of a gear unit capable of meeting the required operating parameters, it is the responsibility of the Customer to ensure that sufficient space exists between the gear centres to mount the pumps and associated connections. Dana Motion Systems SpA technical staff are always available to assist with the correct selection of a pump drive gear unit.

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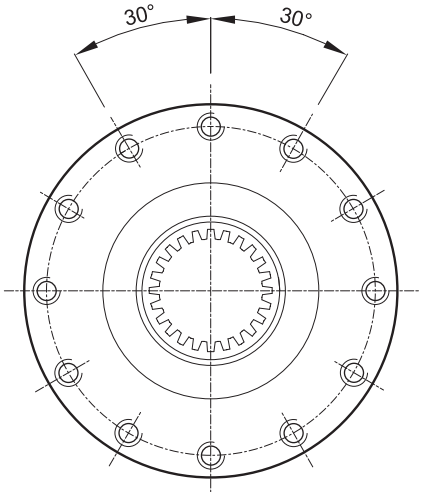
BZ265

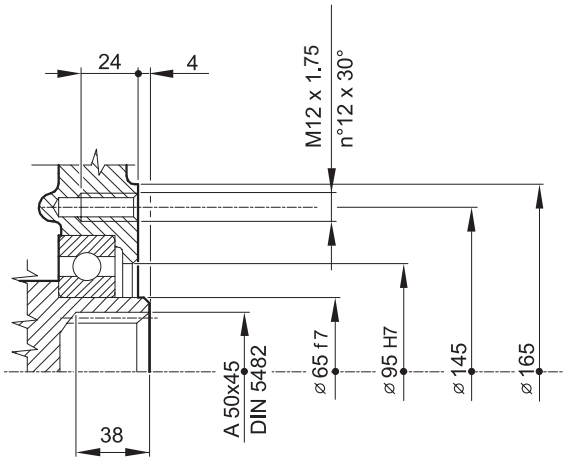
Specifications

N° Pumps	Type	SAE (CS)	Pm [kW]	Pt [kW]
2-	265	3	110	40
3-	265	3	130	45

Type	i =	T1 (Nm)	T2 (Nm)	J (Kg. m²)	n1 max (rpm)	lt.	Kg.
2-265	0,85	910	385	0,0197	3000	1	33 (CS3)
	1,02	840	430	0,0173	3250		
	1,17	800	470	0,0152	3500		
3-265	0,85	1365	385	0,0258	3000	2,25	47 (CS3)
	1,02	1260	430	0,0230	3250		
	1,17	1200	470	0,0205	3500		

Flange connections: pump side





Input Configuration

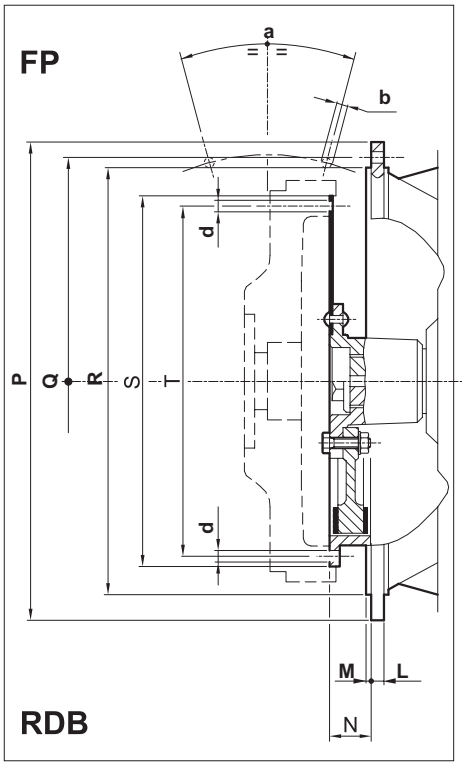
On request; pls. specify the code

SAE	RDB 7”	RDB 8”	RDB 10”	RDB 11,5”	RDB 14”	RDB 14D”	FP10”	FP11,5”	FP14”
0									
1									
2									
3			C4600525120	C4600625130			C8918405120	C8918505130	
4									
5									

(*) SAE flange and elastic joint dimensions (mm)

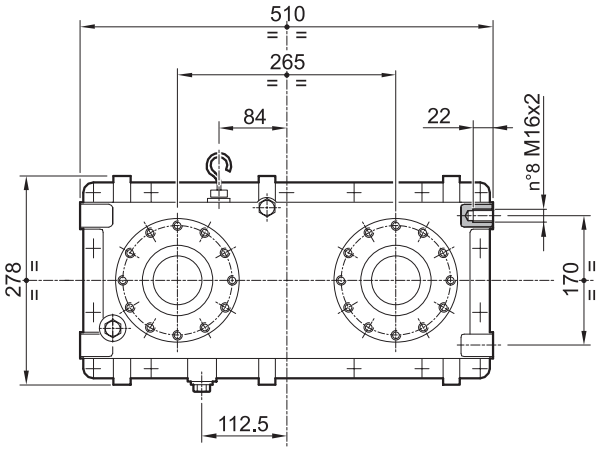
BZ	CS	RDB (*)	FP (*)	M	L	N	P	Q	R	S	T	a	b	d
2-265	3	10”	10”	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	Ø11 n° 12x30°	Ø11 n° 8x45°
3-265		11,5”	11,5”			39,6				352,42	333,4			

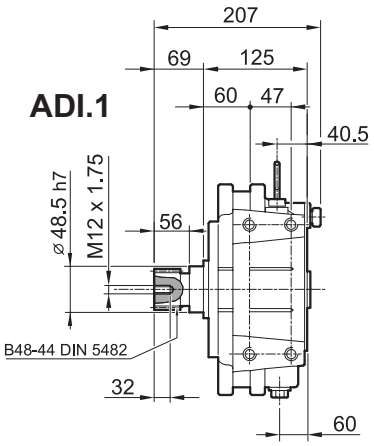
FP
“Steel disk” type elastic joint

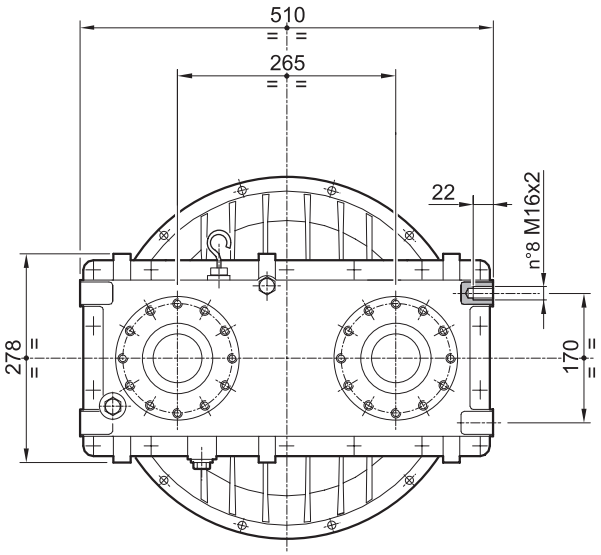


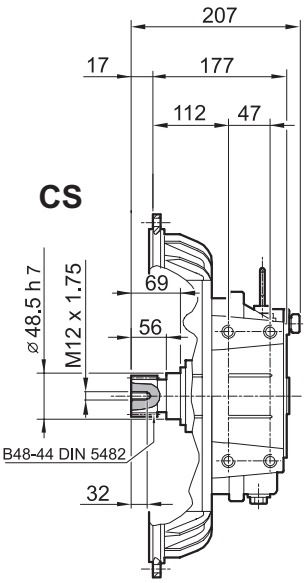
RDB
“Rubber Block” type elastic joint

Dimensions

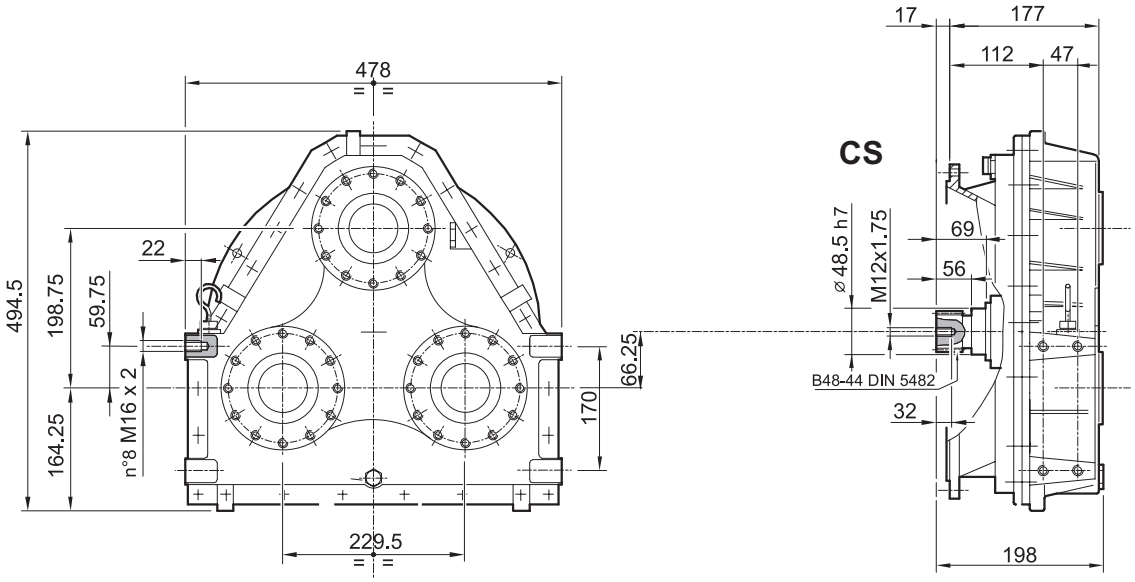

510
265
84
22
n°8 M16x2
278
170
112.5


ADI.1
207
69
125
60
47
40.5
ø 48.5 h7
M12 x 1.75
56
B48-44 DIN 5482
32
60


510
265
22
n°8 M16x2
278
170


CS
207
17
177
112
47
ø 48.5 h 7
M12 x 1.75
69
56
B48-44 DIN 5482
32

Dimensions

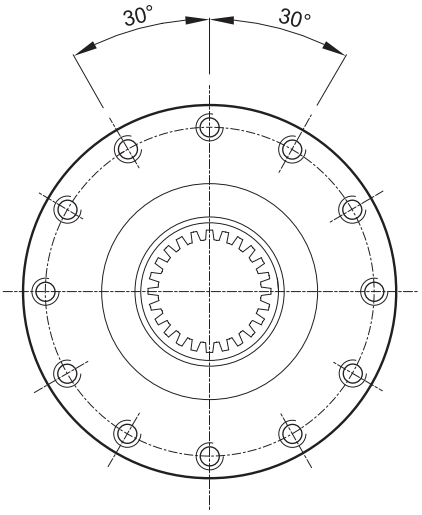

478
494.5
198.75
59.75
164.25
22
n°8 M16 x 2
66.25
170
229.5
CS
17
177
112
47
ø48.5 h7
M12x1.75
69
56
B48-44 DIN 5482
32
198

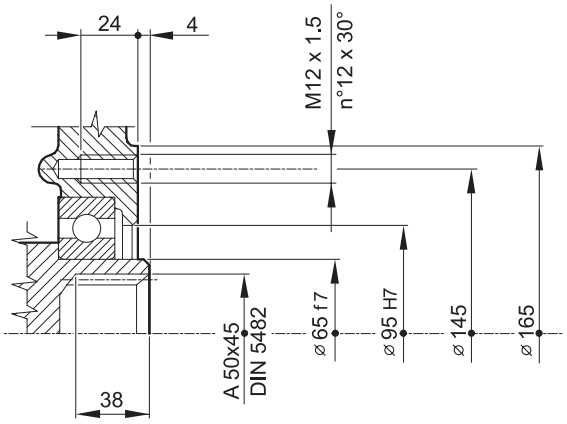
Specifications

N° Pumps	Type	SAE (CS)	Pm [kW]	Pt [kW]
2-	290	3	170	50
3-	290	1 -3 - 4	190	55

Type	i =	T_1 (Nm)	T_2 (Nm)	J (Kg. m²)	$n1_{max}$ (rpm)	lt.	Kg.
2-290	0,74	1550	575	0,0453	2500	1	35 (ADI) 42 (CS3)
	0,85	1450	620	0,0392	2750		
	1	1350	675	0,0339	3000		
	1,18	1240	730	0,0297	3250		
	1,34	1160	780	0,0260	3450		
3-290	0,85	2180	620	0,0512	2750	2,8	77 (ADI) 84 (CS3) 82 (CS4)
	1	2016	675	0,0449	3000		
	1,18	1850	730	0,0398	3250		

Flange connections: pump side





Input Configuration

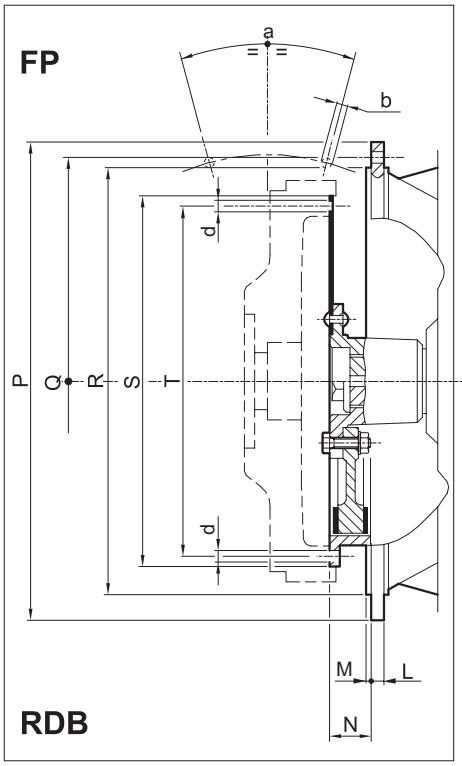
On request; pls. specify the code

SAE	RDB 7”	RDB 8”	RDB 10”	RDB 11,5”	RDB 14”	RDB 14D”	FP10”	FP11,5”	FP14”
0									
1									
2									
3			C4600525120	C4600625130			C8918405120	C8918505130	
4			C4600525120	C4600625130			C8918405120	C8918505130	
5									

(*) SAE flange and elastic joint dimensions (mm)

BZ	CS	RDB (*)	FP (*)	M	L	N	P	Q	R	S	T	a	b	d
2-290	3	10”	10”	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	Ø11 n° 12x30°	Ø11 n° 8x45°
		11,5”	11,5”			39,6				352,42	333,4			
3-290	3	10”	10”	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	Ø11 n° 12x30°	Ø11 n° 8x45°
		11,5”	11,5”			39,6				352,42	333,4			
	4	10”	-			54	407	381	361,95 f7	314,32	295,3			
		11,5”				39,6				352,42	333,4			

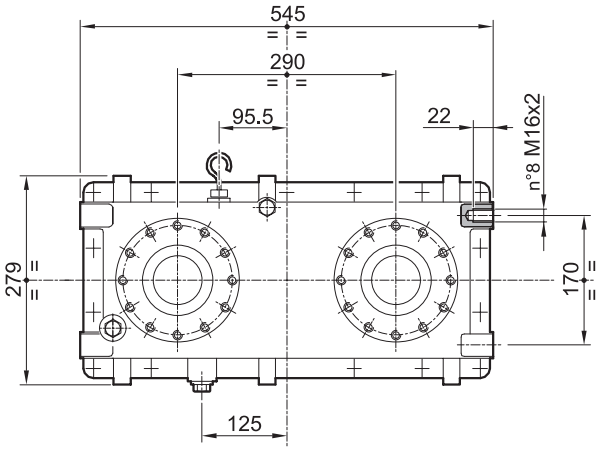
FP
“Steel disk” type elastic joint

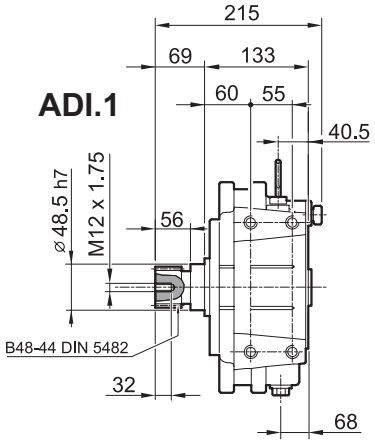


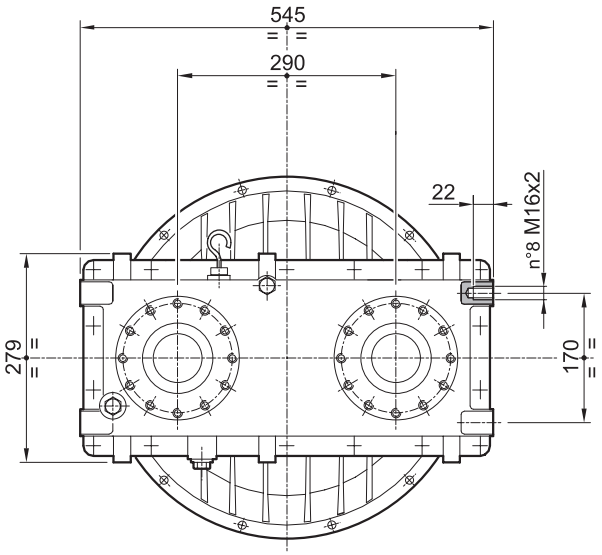
RDB
“Rubber Block” type elastic joint

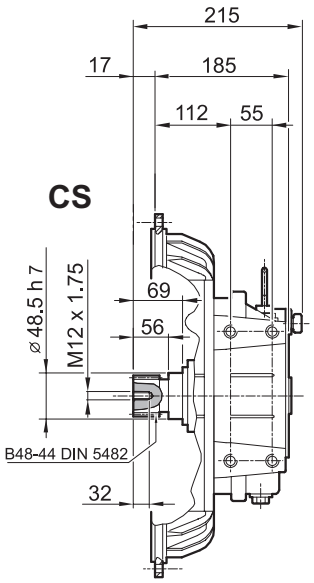
BZ2-290

Dimensions

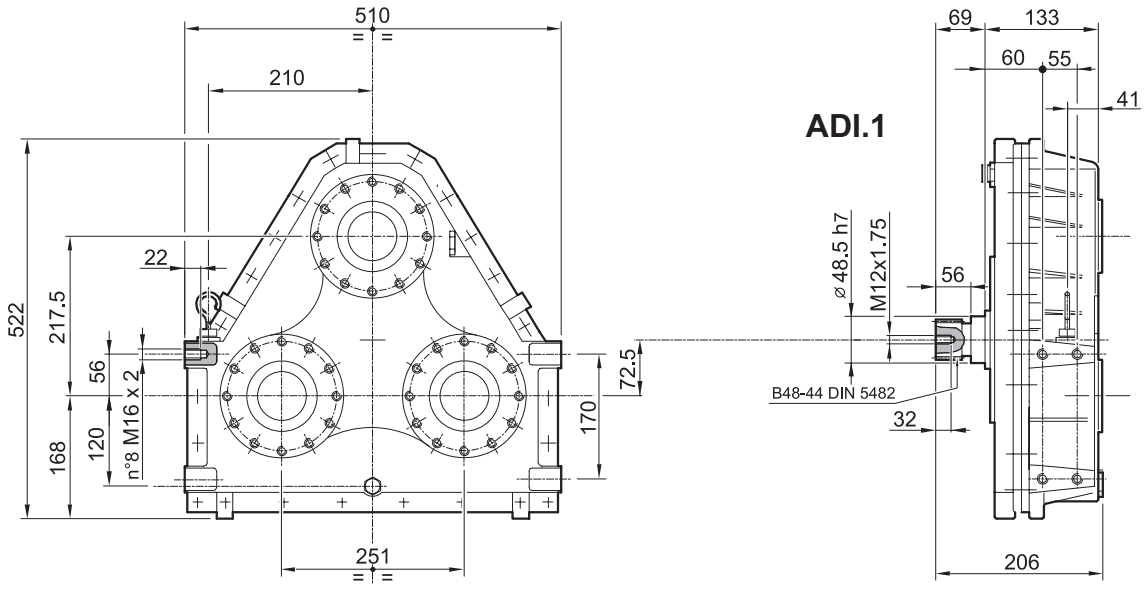


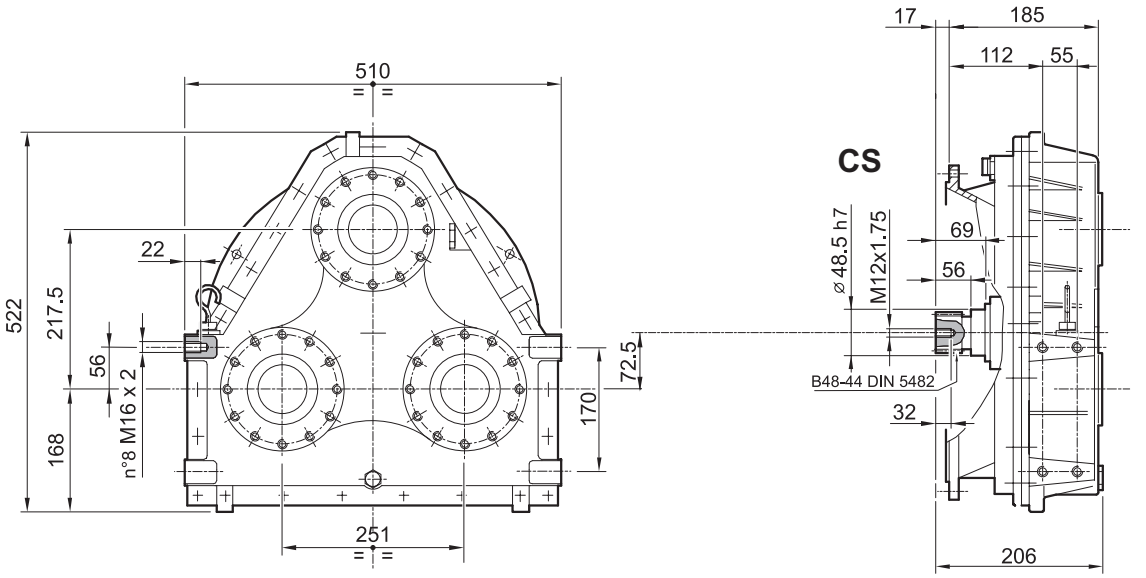






Dimensions


510
210
522
217.5
22
56
n°8 M16 x 2
120
168
72.5
170
251
ADI.1
69
133
60
55
41
ø 48.5 h7
M12x1.75
56
B48-44 DIN 5482
32
206


510
522
217.5
22
56
n°8 M16 x 2
168
72.5
170
251
CS
17
185
112
55
ø 48.5 h7
M12x1.75
69
56
B48-44 DIN 5482
32
206

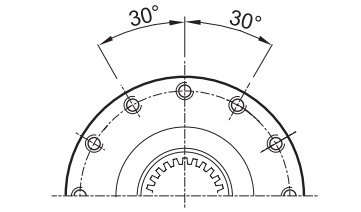
BZ340

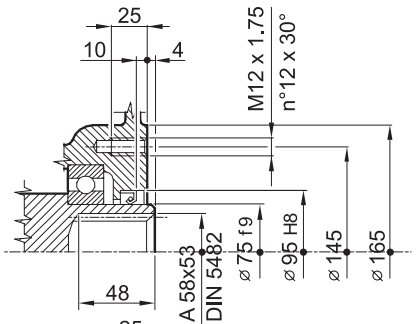
Specifications

N° Pumps	Type	SAE (CS)	Pm [kW]	Pt [kW]
2-	340	3	220	70
3-	340	1 - 2 - 3	240	80

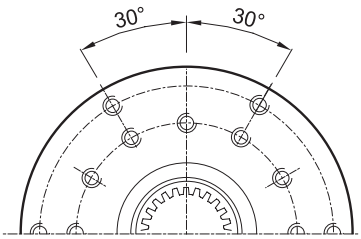
Type	i =	T1 (Nm)	T2 (Nm)	J (Kg. m²)	n1 max (rpm)	lt.	Kg.
2-340	0,73	1840	672	0,0734	2600	1,8	86 (ADI) 93 (CS3)
	0,85	1705	730	0,0582	2750		
	1,02	1540	770	0,0505	3000		
	1,17	1470	860	0,0453	3250		
	1,35	1350	910	0,0406	3450		
3-340	0,73	2760	670	0,1071	2600	4,2	102 (ADI) 116 (CS1) 113 (CS2) 109 (CS3)
	0,85	2570	730	0,0849	2750		
	1,02	2310	785	0,0670	3000		
	1,17	2210	860	0,0582	3250		
	1,35	2030	910	0,0541	3450		

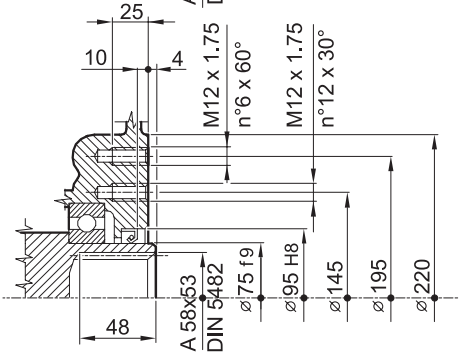
Flange connections: pump side





2 - 340





3 - 340

Input Configuration

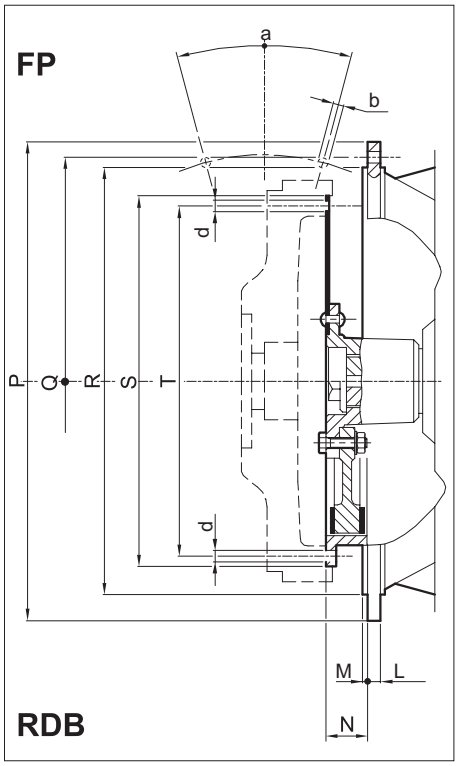
On request; pls. specify the code

SAE	RDB 7”	RDB 8”	RDB 10”	RDB 11,5”	RDB 14”	RDB 14D”	FP10”	FP11,5”	FP14”
0									
1			C4600525120	C4600625130	C4600725140		C8918405120	C8918505130	C8918605140
2			C4600525120	C4600625130			C8918405120	C8918505130	
3			C4600525120	C4600625130			C8918405120	C8918505130	
4									
5									

(*) SAE flange and elastic joint dimensions (mm)

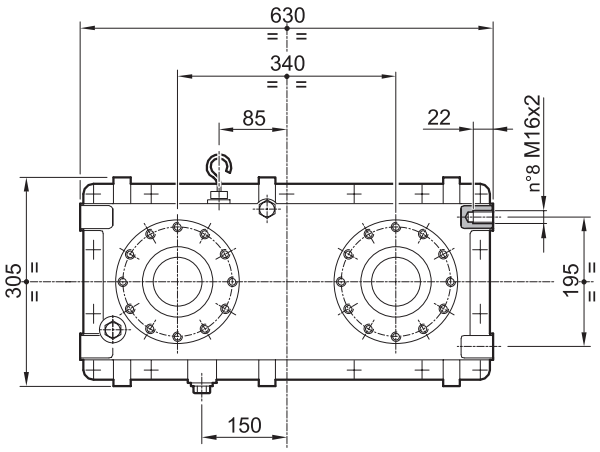
BZ	CS	RDB (*)	FP (*)	M	L	N	P	Q	R	S	T	a	b	d
2-340	3	10”	10”	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	Ø11 n° 12	Ø11 8x45°
		11,5”	11,5”			39,62				352,42	333,4			
3-340	1	14”	14”	5	12	25,4	533	530,22	511,18 f7	466,72	438,2	30°	Ø11 n° 12	Ø13,5 8x45°
	2	10”	10”	5	12	54	495	466,7	447,67 f7	314,32	295,3	30°	Ø11 n° 12	Ø11 8x45°
		11,5”	11,5”			39,62				352,42	333,4			
	3	10”	10”	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	Ø11 n° 12	Ø11 8x45°
		11,5”	11,5”			39,62				352,42	333,4			

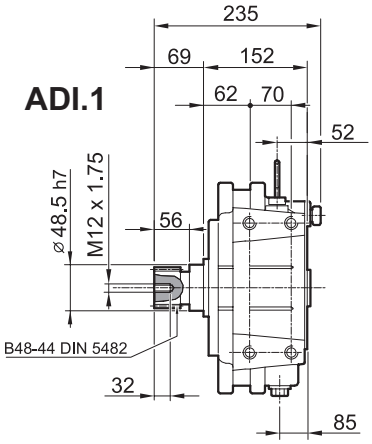
FP
“Steel disk” type elastic joint

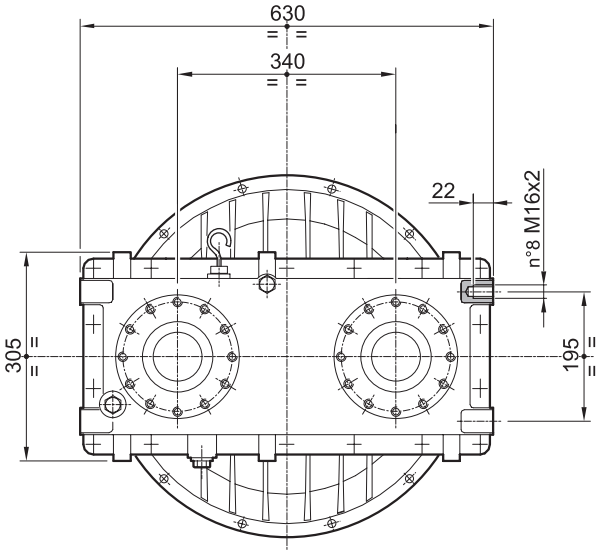


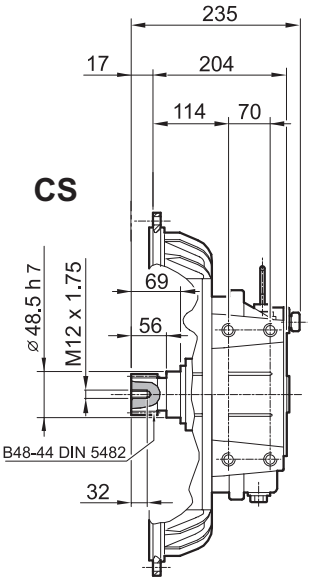
RDB
“Rubber Block” type elastic joint

Dimensions

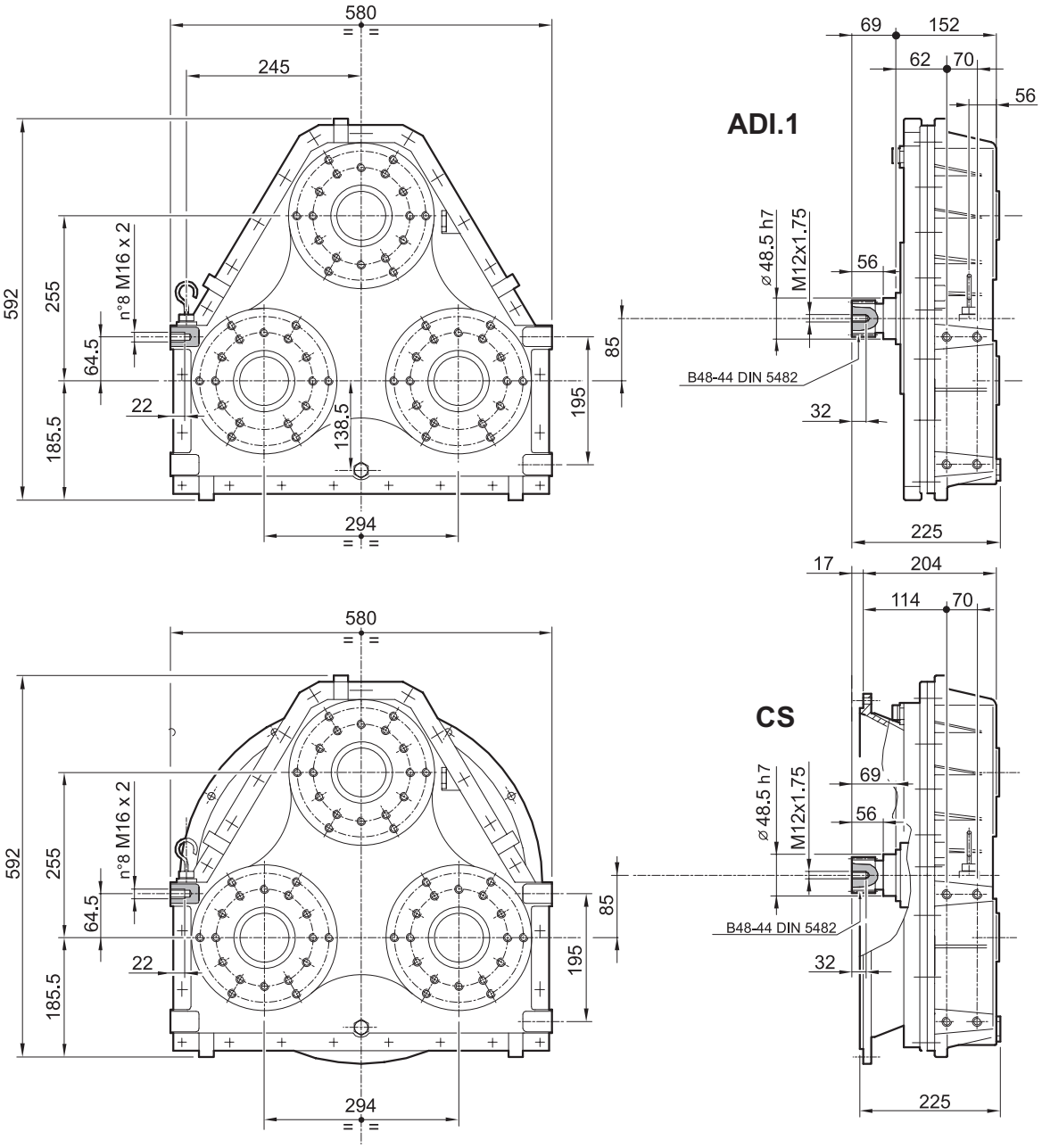

630
340
85
22
n°8 M16x2
305
195
150


ADI.1
235
69
152
62
70
52
ø 48.5 h7
M12 x 1.75
56
B48-44 DIN 5482
32
85


630
340
22
n°8 M16x2
305
195


CS
235
17
204
114
70
ø 48.5 h 7
M12 x 1.75
69
56
B48-44 DIN 5482
32

Dimensions


580
245
592
255
n°8 M16 x 2
64.5
22
185.5
138.5
195
85
294
ADI.1
69
152
62
70
56
ø 48.5 h7
M12x1.75
56
B48-44 DIN 5482
32
225
CS
17
204
114
70
69
56
ø 48.5 h7
M12x1.75
B48-44 DIN 5482
32
225

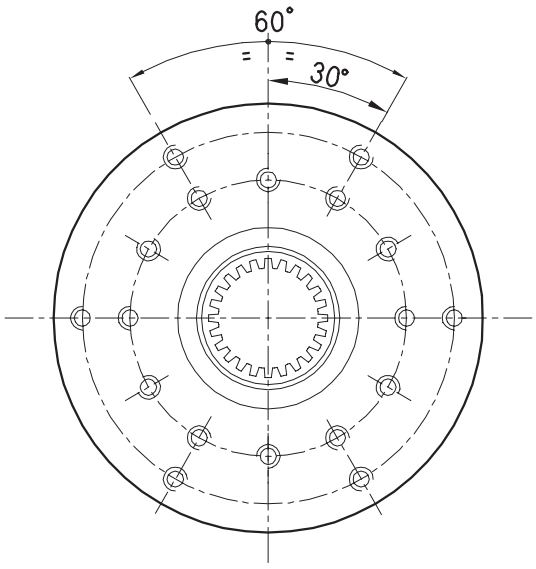
BZ470

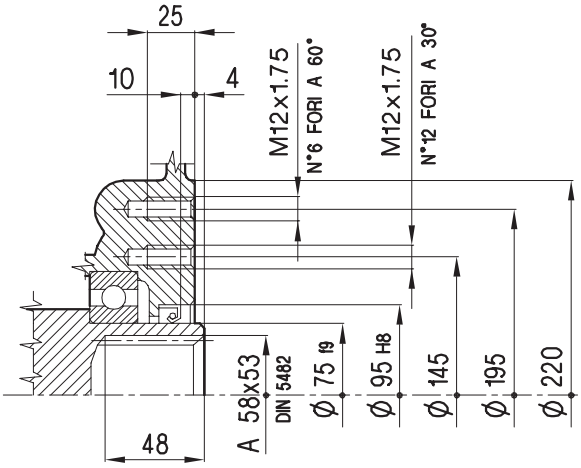
Specifications

N° Pumps	Type	SAE (CS)	Pm [kW]	Pt [kW]
2-	470	1	380	130
3-	470	0 - 1	420	150
4-	470	1	480	160

Type	i =	T_1 (Nm)	T_2 (Nm)	J (Kg. m²)	$n1_{max}$ (rpm)	lt.	Kg.
2-470	0,83	3200	1330	0,1906	2100	2,3	180 (CS1)
	1	2915	1460	0,1659	2300		
	1,19	2680	1590	0,1463	2500		
3-470	0,69	5220	1200	0,2645	1550	7,5	190 (ADI) 210 (CS0) 200 (CS1)
	0,83	4800	1330	0,2480	2100		
	1	4370	1460	0,2210	2300		
	1,19	4015	1590	0,1994	2500		
4-470	0,69	6950	1200	0,3197	1550	3,5	234 (ADI) 248 (CS1)
	0,83	6400	1330	0,3055	2100		
	1	5825	1460	0,2762	2300		
	1,19	5350	1590	0,2524	2500		

Flange connections: pump side





0,51 - 0.77 ratios for 3-470 and 4-470 available on request

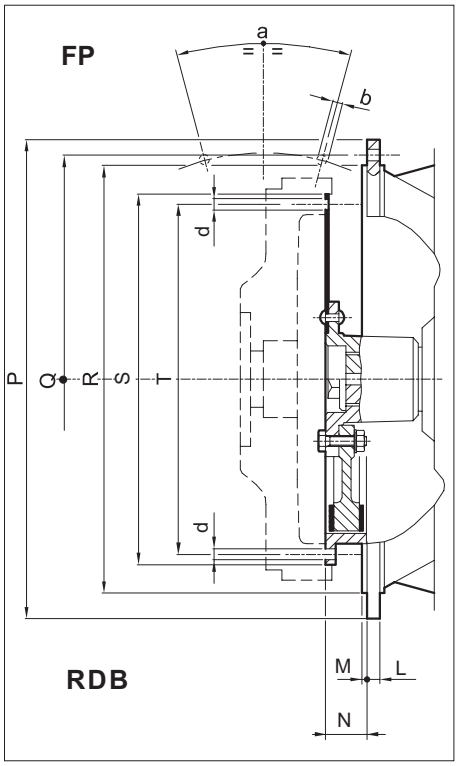
Input Configuration

On request; pls. specify the code

SAE	RDB 7”	RDB 8”	RDB 10”	RDB 11,5”	RDB 14”	RDB 14D”	FP10”	FP11,5”	FP14”
0				C4600625150	C4600725160	C4600825410		C8918505150	C8918605160
1				C4600625150	C4600725160	C4600825410		C8918505150	C8918605160
2									
3									
4									
5									

(*) SAE flange and elastic joint dimensions (mm)

BZ	CS	RDB (*)	FP (*)	M	L	N	P	Q	R	S	T	a	b	d
2-470	1	11,5”	11,5	5	12	39,62	553	530,22	511,18 f7	466,72	438,2	30°	Ø11 n° 12	Ø13,5 8x45°
		14”	14”			25,4								
		14D”												
3-470	0	11,5	11,5”	5	15	39,62	711	679,45	647,7 g7	352,4 f8	334,40	22° 30’	Ø15 n° 16	Ø12 n° 8x45°
		14”	14”			25,4				466,72	438,2			Ø14 n° 8x45°
		14D”	-											Ø13,5 8x45°
	1	11,5”	11,5”		12	39,62	553	530,22	511,18 f7	352,4 f8	334,40	30°	Ø11 n° 12	Ø12 n° 8x45°
		14”	14”			25,4				466,72	438,2			Ø13,5 8x45°
		14D”	-											
4-470	1	11,5”	11,5”	5	12	39,62	553	530,22	511,18 f7	352,4 f8	334,40	30°	Ø11 n° 12	Ø12 n° 8x45°
		14”	14”			25,4				466,72	438,2			Ø13,5 8x45°
		14D”	-											



FP

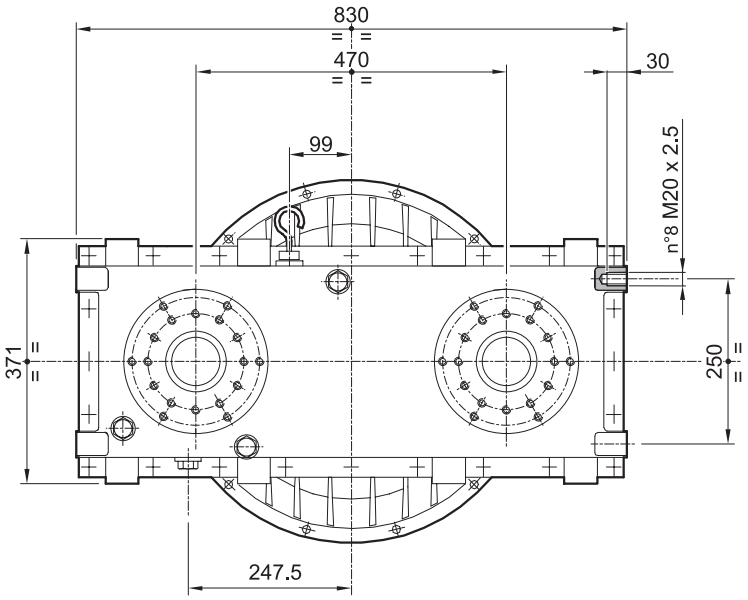
“Steel disk” type elastic joint

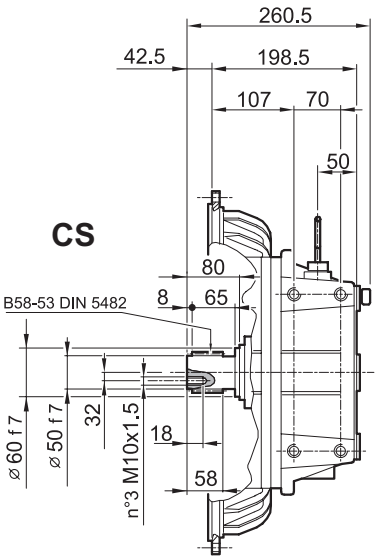
RDB

“Rubber Block” type elastic joint

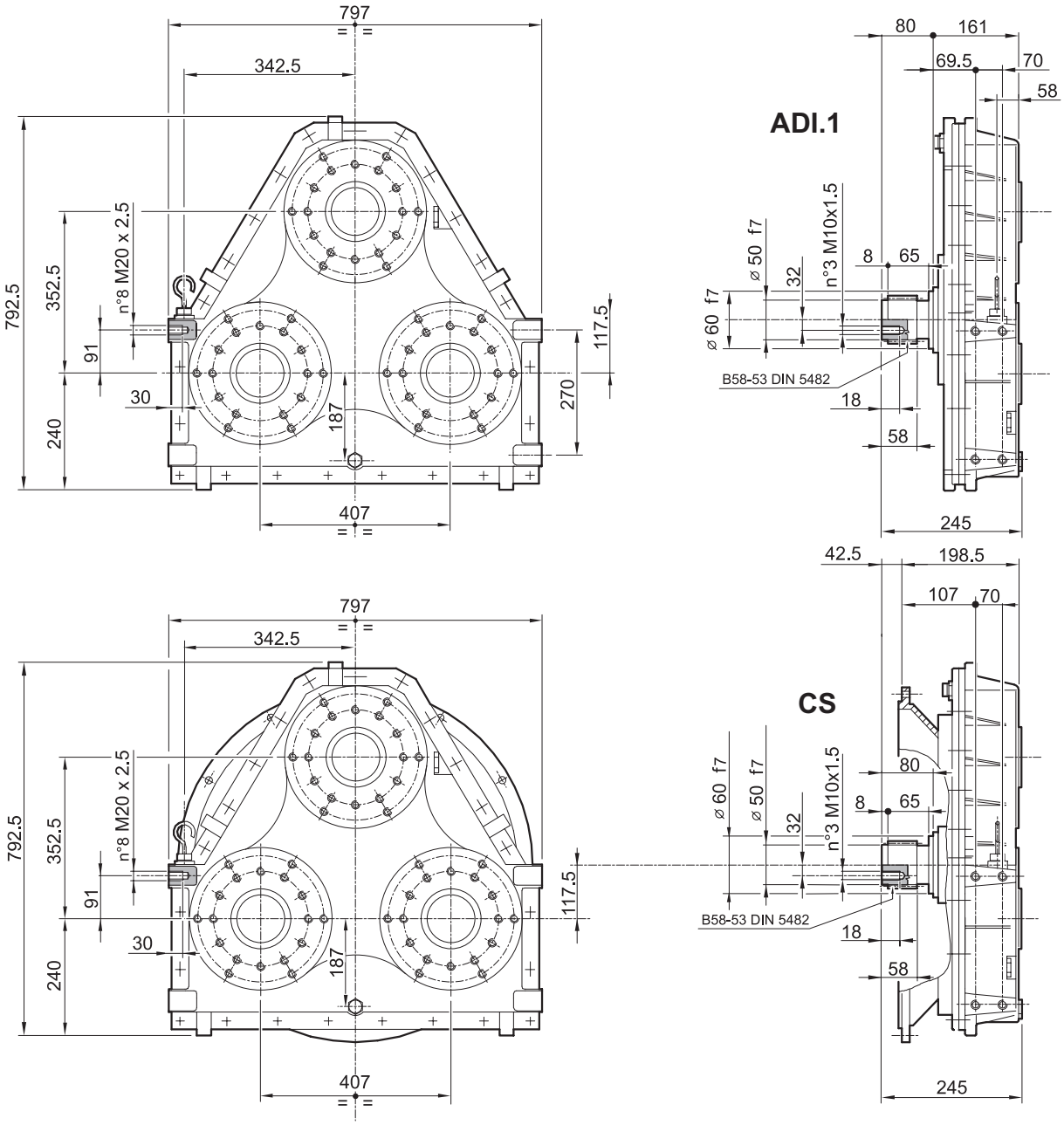
BZ2-470

Dimensions



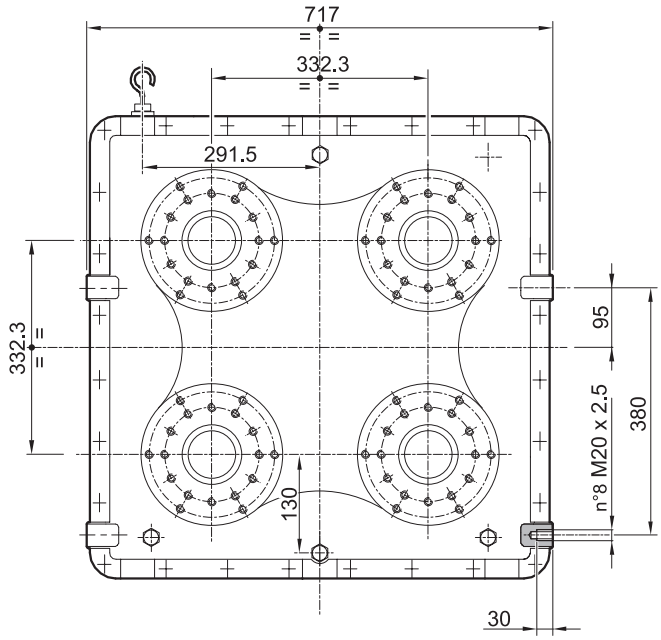


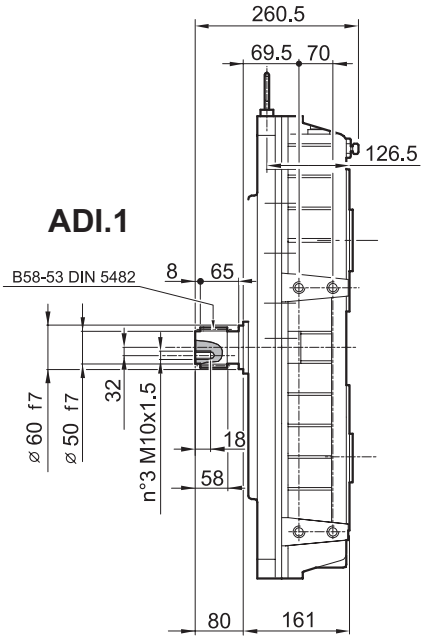
Dimensions

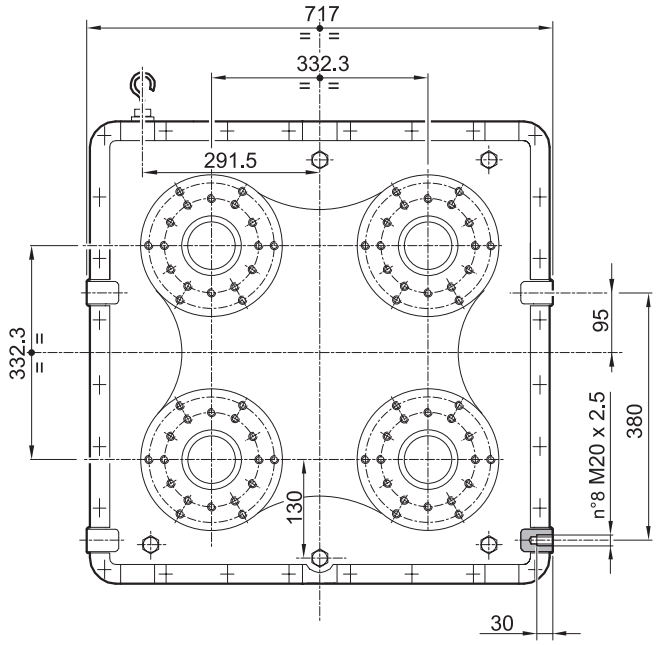

797
342.5
792.5
352.5
n°8 M20 x 2.5
91
30
240
187
270
117.5
407
ADI.1
80
161
69.5
70
58
ø 50 f7
ø 60 f7
32
n°3 M10x1.5
8
65
B58-53 DIN 5482
18
58
245
CS
42.5
198.5
107
70
80

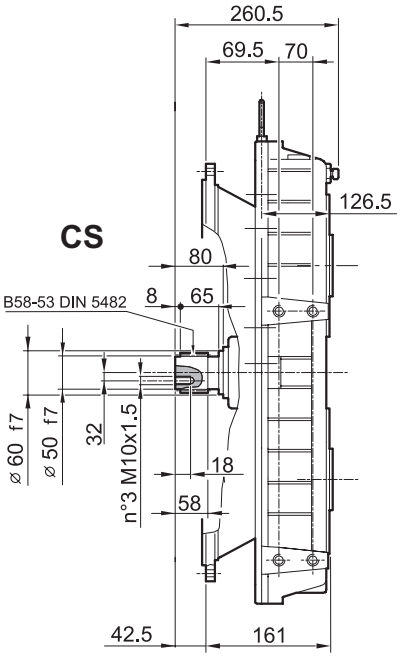
BZ4-470

Dimensions



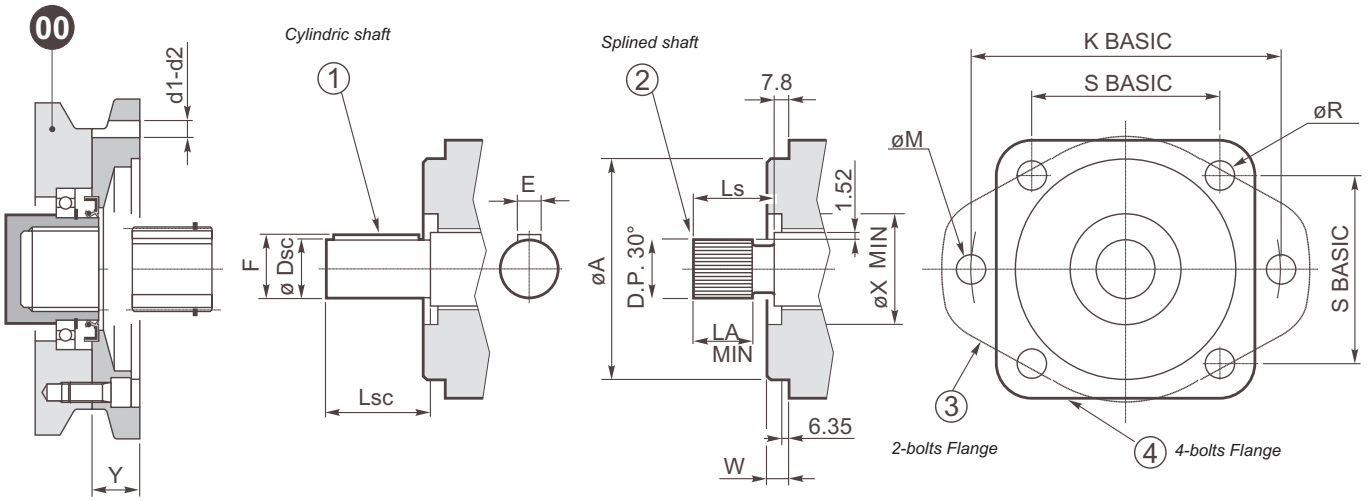







DANA
BREVINI™
Motion Systems

SAE J 744 C PUMP FLANGES



mm / inches /
d1 = metric thead
d2 = inch thead

SAE		Ø A	W	Ø X min.	K basic	Ø M	S basic	Ø R	Splinded shaft				Cylindrical shaft			
									No. of teeth	30° D.P.	LS	LA min.	Ø DSC	LSC	F	E
A	mm.	82.55	6.35	-	106.4	13	75.22	-	9	16/32	24	7.6	15.88	24	17.6	4
	inches	3.250	0.25	-	4.188	0.438	2.96	-			0.938	0.30	0.625	0.938	0.693	0.1563
B	mm.	101.6	9.65	50.8	146	14.3	89.8	14.3	13		33.3	10.2	22.22	33.3	24.95	6.35
	inches	4.00	0.38	2.00	5.75	0.562	3.536	0.562			1.312	0.40	0.875	1.312	0.982	0.25
B-B	mm.	10.6	9.65	50.8	146	14.3	89.8	14.3	15		38.1	12.7	25.4	38.1	28.1	6.35
	inches	4.00	0.38	2.00	5.75	0.562	3.536	0.562			1.50	0.50	1.00	1.50	1.106	0.25
C	mm.	127.0	12.7	63.5	181	17.5	114.5	14.3	14	12/24	47.6	15.2	31.75	47.6	35.2	7.8
	inches	5.00	0.50	2.50	7.125	0.688	4.508	0.562			1.875	0.60	1.25	1.875	1.386	0.3125
C-C	mm.	127.0	12.7	63.5	181	17.5	114.5	14.3	17		54	17.8	38.1	54	42.25	9.525
	inches	5.00	0.50	2.50	7.125	0.688	4.508	0.562			2.125	0.70	1.50	2.125	1.662	0.375
D	mm.	152.4	12.7	70	228.6	20.6	161.6	20.6	13	8/16	66.67	20.3	44.45	66.67	49.3	11.1
	inches	6.00	0.50	2.75	9.00	0.812	6.364	0.812			2.625	0.80	1.75	2.625	1.947	0.4375
E	mm.	165.1	15.87	70	317.5	27	224.5	20.6	13		66.67	20.3	44.45	66.67	49.3	11.1
	inches	6.50	0.625	2.75	12.50	1.062	8.839	0.812			2.625	0.80	1.75	2.625	1.941	0.4375

SAE J 744 C PUMP FLANGES

SAE	Y [mm.]	No. bolts	Order code					
			Flange with d1			Flange with d2		
			d1 Metric	Splinded shaft	Cylindrical shaft	d2 Inches	Splinded shaft	Cylindrical shaft
A	25	2 - 4	M10 T.U.15	61325500510 61425503330 62225502680	62225500900	3/8 0.59 min. Full threaded	-	-
B	25	2 - 4	M12 T.U.25	61325700410 61425702100 62225700580	61325700450 61425700060 62225700460	1/2 - 13 1.00 min. Full threaded	61343900410 61443902100 62243900580	61343900450 61443900060 62243900460
B - B	25	2 - 4	M12 T.U.25	61325700620 61425702440 62225701940	61425701990 62225700050	1/2 - 13 1.00 min. Full threaded	61343900620 61443902440 62243901940	61243901990 62243900500
C	28	2	M16 T.U.20	61301800160 61401802180 62201801480	61301800080 61401802040 62201800510	5/8 - 11 0.78 min. F.T.	61345300160 61445302180 62245301480	61345300080 61445302040 62245300510
		4	M14 T.U.20			1/2 - 13 0.78 min. F.T.		
C - C	79	2	M16 T.U.20	61301800630 62201802540	62201801750	5/8 - 11 0.78 min. F.T.	61345300630 62245302530	62245301750
		4	M14 T.U.20			1/2 - 13 0.78 min. F.T.		
D	93	2 - 4	M18 T.U.20	61303500020 62203501930	61303500220 62203501720	3/4 - 10 1.00 min. Full threaded	61347800020 62247801930	61347800220 62247801780
E	93	2 - 4	Ø 22 T.U.30	61318200020 62218201930	61318200220 62218201720	Ø 0.875 1.11 min.	-	-

Other flanges are available on request in addition to those shown in the table.

SUPPLY CONDITION

The gear units are painted externally with synthetic primer in blue “RAL 5012”, unless otherwise specified in the contract. The protection is suitable for withstanding normal industrial environments (also external) and can be finished with synthetic paints. If particular aggressive ambient conditions are foreseen, special painting is required.
The worked external parts of the gear unit, such as the ends of the hollow and solid shafts, support tables, centerings, etc., must be protected with antioxidant oil (tectyl). The parts inside the gear unit casings are painted wiyh oil-proof paint and the kinematic mechanisms are protected with antioxidant oil. Unless otherwise specified in the contract, **all the gear units are supplied without lubrication**: as specified by a special sticker placed on the unit to indicate its condition.
Dana products are packed and shipped in boxes or on pallets, as required.
Unless otherwise specified in the contract, all Dana products **are packed with packing suitable to withstand normal industrial environments.**
Every Dana gear unit comes with a specific “Installation and Maintenance” manual, manufacturer’s declaration and certificate of conformity- UNI EM10204-2.1

Dana gear units are supplied without lubricant; therefore the user must carry out correct filling before starting the machine.

Fundamental characteristics of the oils

The important parameters to consider when choosing the type of oil are:

- viscosity at nominal operating conditions
- additives

The oil must lubricate the bearings and the gears and all these components work inside the same box, in different operating conditions. We will consider the individual parameters.

Viscosity

Nominal viscosity is referred to a tempera-ture of 40 °C, but rapidly decreases with an increase in temperature. If the operating temperature is between 50 °C and 70 °C, a nominal viscosity can be chosen according to the following guide table, choosing the highest viscosity if the highest temperature is foreseen.

n_2 [rpm.]	50 °C	70 °C
$n_2 > 20$	VG 150	VG 220
$20 > n_2 > 5$	VG 220	VG 320
$n_2 < 5$	VG 320	VG 460

Special attention must be paid to very loaded output stages with very low speeds (<1 rpm). In such cases, always use high viscosity oils with a good amount of Extreme Pressure (EP) additive.

Additives

In addition to the normal antifoaming and antioxidant additives, it is important to use lubricating oils with additives that provide EP (extreme pressure) and antiwear properties, according to ISO 6743-6 L-CKC or DIN 51517-3 CLP. Obviously you will have to find products with higher EP values (such as MOBILGEAR SHC) the slower the gearbox speed. It should be remembered that the chemical compounds replacing hydrodynamic lubrication are formed to the detriment of the original EP load. Therefore, with very low speeds and high loads it is important to respect the maintenance periods so as not to excessively diminish the lubricating charac-teristics of the oil.

LUBRICATION

Types of oils

The oils available generally belong to three big families.

1. Mineral oils
2. Poly-Alpha-Olefin synthetic oils
3. Poly-Glycol synthetic oils

The most suitable choice is generally tied to the conditions of use.
Gear units that are not particularly loaded and with a discontinuous operating cycle, without considerable temperature ranges, can certainly be lubricated with mineral oil.
In cases of heavy use, when the gear units are very loaded and in a continuous way, with resultant temperature increase, it is best to use polyalphaolefin synthetic lubricants (PAO).
Polyglycol oils (PG) are to be used strictly in the applications with heavy sliding between contacts, e.g. in worms. They must be employed with great care since they are not compatible with the other oils but are fully mixable with water. This phenomenon is particularly dangerous, since it is not noticed, but rapidly diminishes the lubricating characteristics of the oil.
In addition to the above, there are also hydraulic oils and oils for the food industry.
The former are used for the command of negative brakes. For better environmental protection there are several biodegradable types.
The latter have a specific use in the food industry since they are special products that are not harmful to the health. Various producers supply oils belonging to all the families with very similar characteristics. A comparison table of the best known brands is given later on.

Contamination

During normal operation, due to running-in of the surfaces, metallic microparticles will inevitably form in the oil. This contamination can shorten the life of the bearings, resulting in early breakdown of the gear unit. To limit
and control this phenomenon, without resorting to frequent and costly oil changes, a suitable auxiliary oil circulating system must be provided. This system offers the dual advantage of controlling the level of contamination with the use of special filters and stabilizing the operating temperature at a level more suitable to guarantee the required viscosity.
In fact, the specific thermal capacity of the gear unit is sometimes insufficient to ensure a correct and stable operating temperature level. The auxiliary systems available from Dana Riduttori will be described later on.
For lubrication problems with gear units intended for particular uses, for construction type and operating parameters, it is advisable to contact the Dana Technical Commercial service.
In this regarding the provision of preventive advice for specific applications and to monitor applications lubricated with MOBIL products.
Change the oil after the first 50 to 100 hours of operation. Subsequently, change the oil every 2500 hours of operation or at least once every 12 months.These intervals may, however, be varied on a case by case basis to suit actual operating conditions.

Oil Changes

Always change the oil when the gearbox is hot, to prevent sludge from depositing inside the gearbox.
Pump drives in the BZ range have dipsticks indicating minimum and maximum lubricant levels.
Check the oil level at least once a month. If more than 10% of the total volume of oil has to be added to top up the gearbox, inspect the gearbox carefully for leaks.
Never mix different types of oil, even from the same manufacturer. It is especially important to avoid mixing mineral oil with synthetic oil.

LUBRICANT TABLE

Manufacturer	Mineral oils			Poly-Alpha-Ole n synthtetic oils (PAO)			Polyglycol synthetic oils (PG)		
	ISO VG 150	**ISO VG 220**	**ISO VG 320**	**ISO VG 150**	**ISO VG 220**	**ISO VG 320**	**ISO VG 150**	**ISO VG 220**	**ISO VG 320**
ADDINOL	Transmission Oil CLP 150	Transmission Oil CLP 220	Transmission Oil CLP 320	Eco Gear 150 S	Eco Gear 220 S	Eco Gear 320 S	Luboil RS 150	Luboil RS 220	-
AGIP	Blasia 150	Blasia 220	Blasia 320	-	Blasia SX 220	Blasia SX 320	Blasia S 150	Blasia S 220	Blasia S 320
ARAL	Degol BG 150 Plus	Degol BG 220 Plus	Degol BG 320 Plus	Degol PAS 150	Degol PAS 220	Degol PAS 320	Degol GS 150	Degol GS 220	Degol GS 320
BP	Energol GR-XP 150	Energol GR-XP 220	Energol GR-XP 320	Enersyn EPX 150	Enersyn EPX 220	Enersyn EPX 320	Enersyn SG 150	Enersyn SG-XP 220	Enersyn SG-XP 320
CASTROL	Alpha SP 150	Alpha SP 220	AlphaSP 320	Alphasyn EP 150	Alphasyn EP 220	Alphasyn EP 320	Alphasyn PG 150	Alphasyn PG 220	Alphasyn PG 320
CEPSA	Engranajes HP 150	Engranajes HP 220	Engranajes HP 320	Engranajes HPX 150	Engranajes HPX 220	Engranajes HPX 320	Engranajes HPS 150	Engranajes HPS 220	Engranajes HPS 320
CHEVRON	Ultra Gear 150	Ultra Gear 220	Ultra Gear 320	Tegra Synthetic Gear 150	Tegra Synthetic Gear 220	Tegra Synthetic Gear 320	HiPerSYN 150	HiPerSYN 220	HiPerSYN 320
DEA	Falcon 150	Falcon 220	Falcon 320	Intor 150	Intor 220	Intor 20	Polydea 150	Polydea 220	Polydea 320
ERG	Roxin S EP 150	Roxin S EP 220	Roxin S EP 320	-	-	-	-	-	-
FUCHS	Renolin CKC 150	Renolin CKC 220	Renolin CKC 320	Renolin Unisyn CKC 150	Renolin Unisyn CKC 220	Renolin Unisyn CKC 320	Renolin PG 150	Renolin PG 220	Renolin PG 320
LUBRITECH	Gearmaster CLP 150	Gearmaster CLP 220	Gearmaster CLP 320	Gearmaster SYN 150	Gearmaster SYN 220	Gearmaster SYN 320	Gearmaster PGP 150	Gearmaster PGP 220	Gearmaster PGP 320
KL BER	Kl beroil GEM 1-150	Kl beroil GEM 1-220	Kl beroil GEM 1-320	Kl bersynth EG 4-150	Kl bersynth EG 4-220	Kl bersynth EG 4-320	Kl bersynth GH 6-150	Kl bersynth GH 6-220	Kl bersynth GH 6-320
LUBMARINE	Epona Z 150	Epona Z 220	Epona Z 320	-	Epona SA 220	Epona SA 320	-	-	-
MOBIL	Mobilgear XMP 150	Mobilgear XMP 220	Mobilgear XMP 320	Mobil SHC gear 150	Mobil SHC gear 220	Mobil SHC gear 320	Glygoyle 22	Glygoyle 30	Glygoyle HE320
MOLIKOTE	L-0115	L-0122	L-0132	L-1115	L-1122	L-1132	-	-	-
NILS	Ripress EP 150	Ripress EP 220	Ripress EP 320	Arcol Synt 150	Arcol Synt 220	Arcol Synt 320	Ripress Synt 150	Ripress Synt 220	Ripress Synt 320
OMV	Gear HST 150	Gear HST 220	Gear HST 320	-	Gear SHG 220	Gear SHG 320	Gear PG 150	Gear PG 220	Gear PG 320
OPTIMOL	Optigear BM 150	Optigear BM 220	Optigear BM 320	Optigear Synthetic A 150	Optigear Synthetic A 220	Optigear Synthetic A 320	Opti ex A 150	Opti ex A 220	Opti ex A 320
PAKELO	Erolube EP-C ISO 150	Erolube EP-C ISO 220	Erolube EP-C ISO 320	Gearsint EP ISO 150	Gearsint EP ISO 220	Gearsint EP ISO 320	Allsint EP-C ISO 150	Allsint EP-C ISO 220	Allsint EP-C ISO 320
PENNZOIL	Super Maxol EP 150	Super Maxol EP 220	Super Maxol EP 320	-	-	-	-	-	-
PANOLIN	IG CLP 150	IG CLP 220	IG CLP 320	Tecsynth 150	Tecsynth 220	Tecsynth 320	Synthgear 150	Synthgear 220	Synthgear 320
Q8	Goya 150	Goya 220	Goya 320	El Greco 150	El Greco 220	El Greco 320	Gade 150	Gade 220	Gade 320
ROLOIL	EP/150	EP/220	EP/320	-	-	-	Sincat 150	Sincat 220	Sincat 320
ROYAL PURPLE	-	-	-	Synergy 150	Synergy 220	Synergy 320	-	-	-
SHELL	Omala S2 G 150 (ex Omala 150)	Omala S2 G 220 (ex Omala 220)	Omala S2 G 320 (ex Omala 320)	Omala S4 GX 150 (ex Omala HD150)	Omala S4 GX 220 (ex Omala HD220)	Omala S4 GX 320 (ex Omala HD320)	Omala S4 WE 150 (ex Tivela 150)	Omala S4 WE 220 (ex Tivela 220)	Omala S4 WE 320 (ex Tivela 320)
SINCLAIR	Warrior EP/ NL 150	Warrior EP/ NL 220	Warrior EP/ NL 320	-	-	-	-	-	-
SUNOCO	Sun EP 150	Sun EP 220	Sun EP 320	Duragear 150	Duragear 220	Duragear 320	-	-	-
TAMOIL	Carter EP Lubricant 150	Carter EP Lubricant 220	Carter Ep Lubricant 320	-	-	-	-	-	-
TEXACO	Meropa 150	Meropa 220	Meropa 320	Pinnacle EP 150	Pinnacle EP 220	Pinnacle EP 320	-	Synlube CLP 220	Synlube CLP 320
TOTAL	Carter EP 150	Carter EP 220	Carter EP 320	Carter SH 150	Carter SH 220	Carter SH 320	Carter SY 150	Carter SY 220	Carter SY 320
TRIBOL	1100/150	1100/220	1100/320	1510/150	1510/220	1510/320	800\150	800\220	800\320

TABLE OF FOOD GRADE LUBRICANTS

Manufacturer	Hydraulic oils			Gear Oils		
	ISO VG 32	**ISO VG 46**	**ISO VG 68**	**ISO VG 150**	**ISO VG 220**	**ISO VG 320**
AGIP	Rocol Foodlube Hi-Power 32	-	-	Rocol Foodlube Hi-Torque 150	-	Rocol Foodlube Hi-Torque 320
ARAL	Eural Hyd 32	Eural Hyd 46	Eural Hyd 68	Eural Gear 150	Eural Gear 220	-
BEL - RAY	No-Tox HD Hyd Oil 32	No-Tox HD Hyd Oil 46	No-Tox HD Hyd Oil 68	No-Tox Syn Gear Oil 150	No-Tox Syn Gear Oil 220	No-Tox Syn Gear Oil 320
BP	Enerpar M 32	Enerpar M 46	Enerpar M 68	-	-	-
CHEVRON	Lubricating Oil FM 32	Lubricating Oil FM 46	Lubricating Oil FM 68	-	Lubricating Oil FM 220	-
KEYSTONE	Nevastane SL 32	Nevastane SL 46	Nevastane SL 68	Nevastane EP 150	Nevastane EP 220	Nevastane EP 320
KLÜBER	Summit Hysyn FG 32	Summit Hysyn FG 46	Summit Hysyn FG 68	Klüberoil 4 UH1 N 150	Klüberoil 4 UH1 N 220	Klüberoil 4 UH1 N 320
MOBIL	SHC Cibus 32	SHC Cibus 46	SHC Cibus 68	SHC Cibus 150	SHC Cibus 220	SHC Cibus 320
NILS	Mizar 32	Mizar 46	Mizar 68	Riprees Synt Food 150	Riprees Synt Food 220	Riprees Synt Food 320
OPTIMOL	Optileb HY 32	Optileb HY 46	Optileb HY 68	Optileb GT 150	Optileb GT 220	Optileb GT 320
PANOLIN	-	-	-	Orcon Gear 150	Orcon Gear 220	Orcon Gear 320
PAKELO	Non-Tox Oil Hydraulic ISO 32	Non-Tox Oil Hydraulic ISO 46	Non-Tox Oil Hydraulic ISO 68	Non-Tox Oil Gear EP ISO 150	Non-Tox Oil Gear EP ISO 220	Non-Tox Oil Gear EP ISO 320
ROYAL PURPLE	Poly-Guard FDA 32	Poly-Guard FDA 46	Poly-Guard FDA 68	Poly-Guard FDA 150	Poly-Guard FDA 220	Poly-Guard FDA 320
SHELL	Cassida Fluid HF 32	Cassida Fluid HF 46	Cassida Fluid HF 68	Cassida Fluid GL 150	Cassida Fluid GL 220	Cassida Fluid GL 320
TEXACO	Cygnus Hydraulic Oil 32	Cygnus Hydraulic Oil 46	Cygnus Hydraulic Oil 68	Cygnus Hydraulic PAO 150	Cygnus Hydraulic PAO 220	-
TRIBOL	Food Proof 1840/32	Food Proof 1840/46	Food Proof 1840/68	-	Food Proof 1810/220	Food Proof 1810/320

approved according to USDA-H1 and NSF-H1 specifications

SELECTION PUMP DRIVE TECHNICAL SHEET

DANA BREVINI™ Motion Systems

Customer info	Customer	
	Address	
	City / Town	
	Country / State	
	Contact name	
	E-mail	
	Phone	
	Fax	

DANA network	DANA Subsidiary	
	Contact name	

Machine info	Type/Description of machine	
	Description of pump drive application	
	Markets and applications (see website category)	
Pump drive info	Quantity Required per year	
	Pump Drive ratio	
	Number of pumps	
	Product to be replaced / current solution	

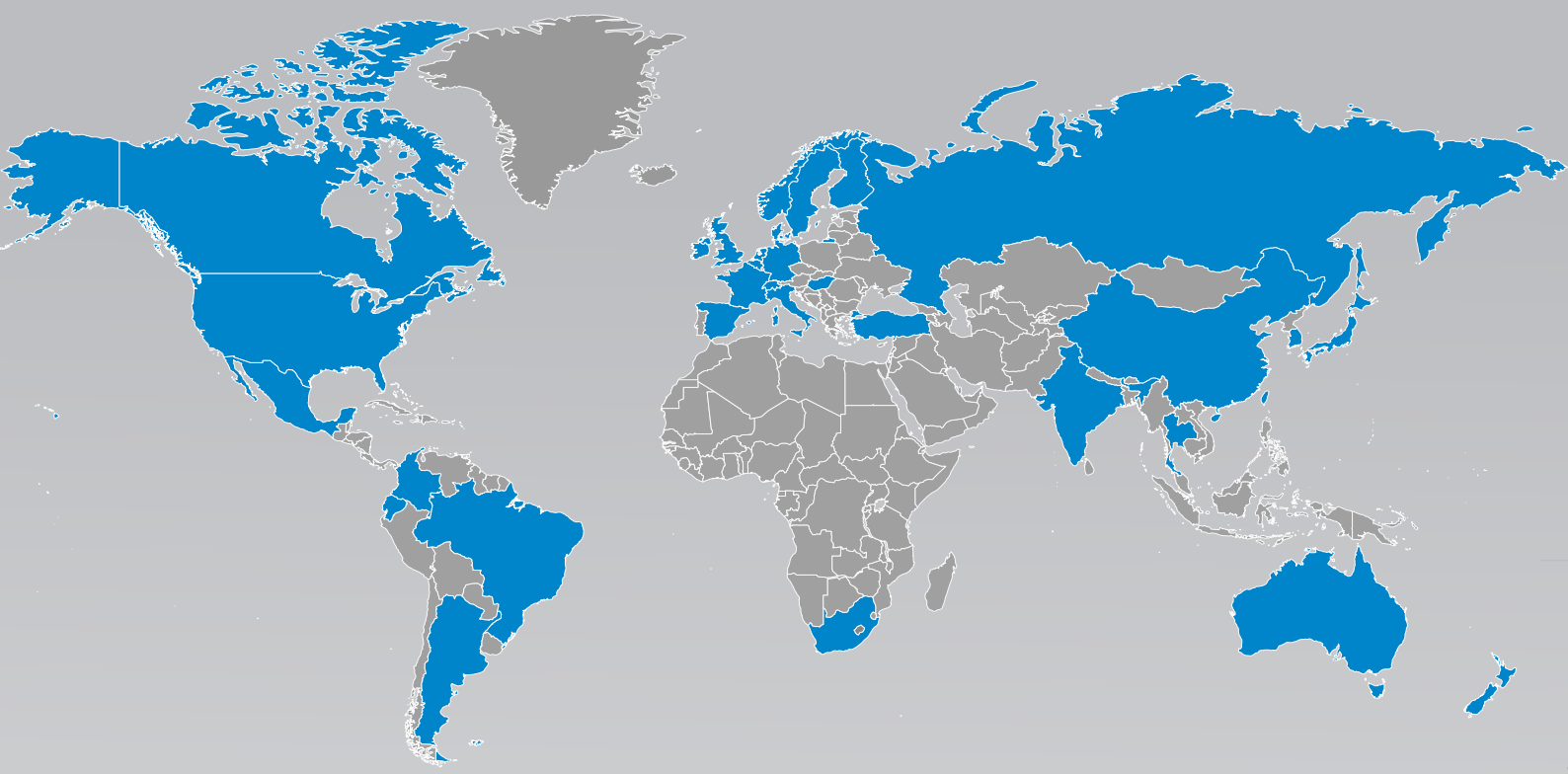
Input	Type of motor/engine (Electric or Combustion)		
	Motor power [kW]		
	Max working power [kW]		
	Motor speed [rpm]		
	Type of input: shaft		
	SAE flange		
	Flange size SAE		
	Rubber block	(•) Yes	( ) No
	Flex plate	(•) Yes	( ) No

Outputs	Minimum Centre Distance				
		Pump 1	Pump 2	Pump 3	Pump 4
	Manufacturer of pumps				
	Model size				
	Flange type				
	Shaft type				
	Weight				

Duty	Operating time - Hours per days				
		Pump 1	Pump 2	Pump 3	Pump 4
	Duty cycle: % of operating time				
	Output torque [Nm]				
	Output speed [rpm]				
	Do all pumps require full power simultaneosly? Yes / No				
	If not, give details				

Mounting position	Describe mounting position and fixing points	
Paint	RAL and Protection required	
Oil	Specify Oil type if required	
Plugs and Lifting points	Specify oil plugs and position, oil-glass or oil-stick checker, Specify lifting points and position.	
Package	Specify any Special package needed	
Certification	Specify any certification if required	
Initernal TEST/Certification	Specify any internal test and certification if required	

	Date	24/02/2022
	Selection Reference	
	Signature	
Gearbox selected		



Technologies Customized to **Every Part of the Globe**

With a presence in 33 countries, Dana Incorporated boasts more than 150 engineering, manufacturing, and distribution facilities. Our worldwide network of local service centers provides assurance that each customer will benefit from the local proximity and responsiveness.

About Dana Incorporated

Dana is an integral partner for virtually every major vehicle and engine manufacturer worldwide. We are a leading supplier of drivetrain, sealing, and thermal technologies to the global automotive, commercial-vehicle, and off-highway markets. Founded in 1904, we employ thousands of people across six continents.

About Dana Off-Highway Drive and Motion Technologies

Dana delivers fully optimized Spicer® drivetrain and Brevini® motion systems to customers in construction, agriculture, material-handling, mining, and industrial markets.
We bring our global expertise to the local level with technologies customized to individual requirements through a network of strategically located technology centers, manufacturing locations, and distribution facilities.

Learn more about Dana's drivetrain and motion systems at **dana.com/offhighway**.

Dana-Industrial.com

Application Policy
Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from Dana; contact your representative for application approval. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.

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BREVINI®
Motion Systems