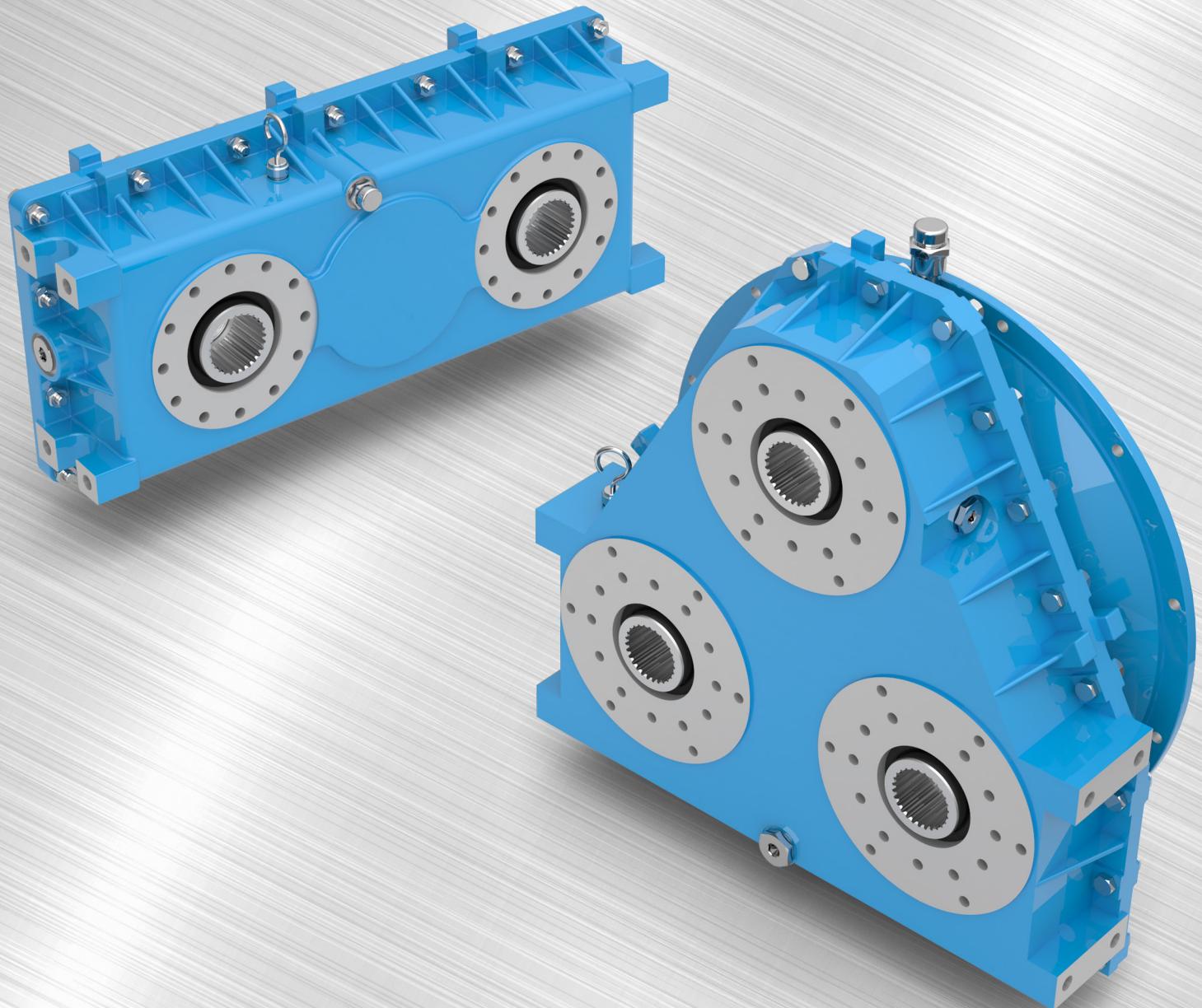




Brevini Pump Drives **BZ Series**

Power from 110-480 kW



Pump Drive solutions

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

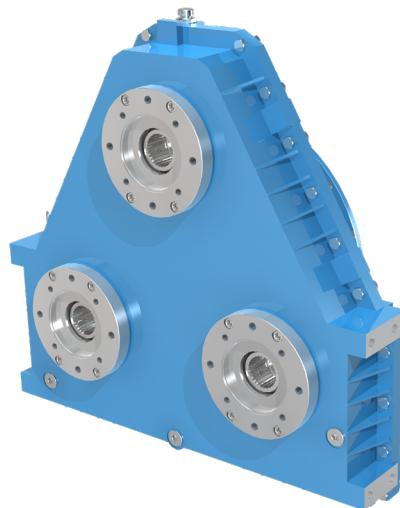
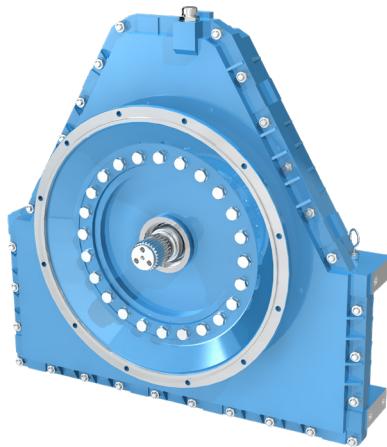
Pump Drives

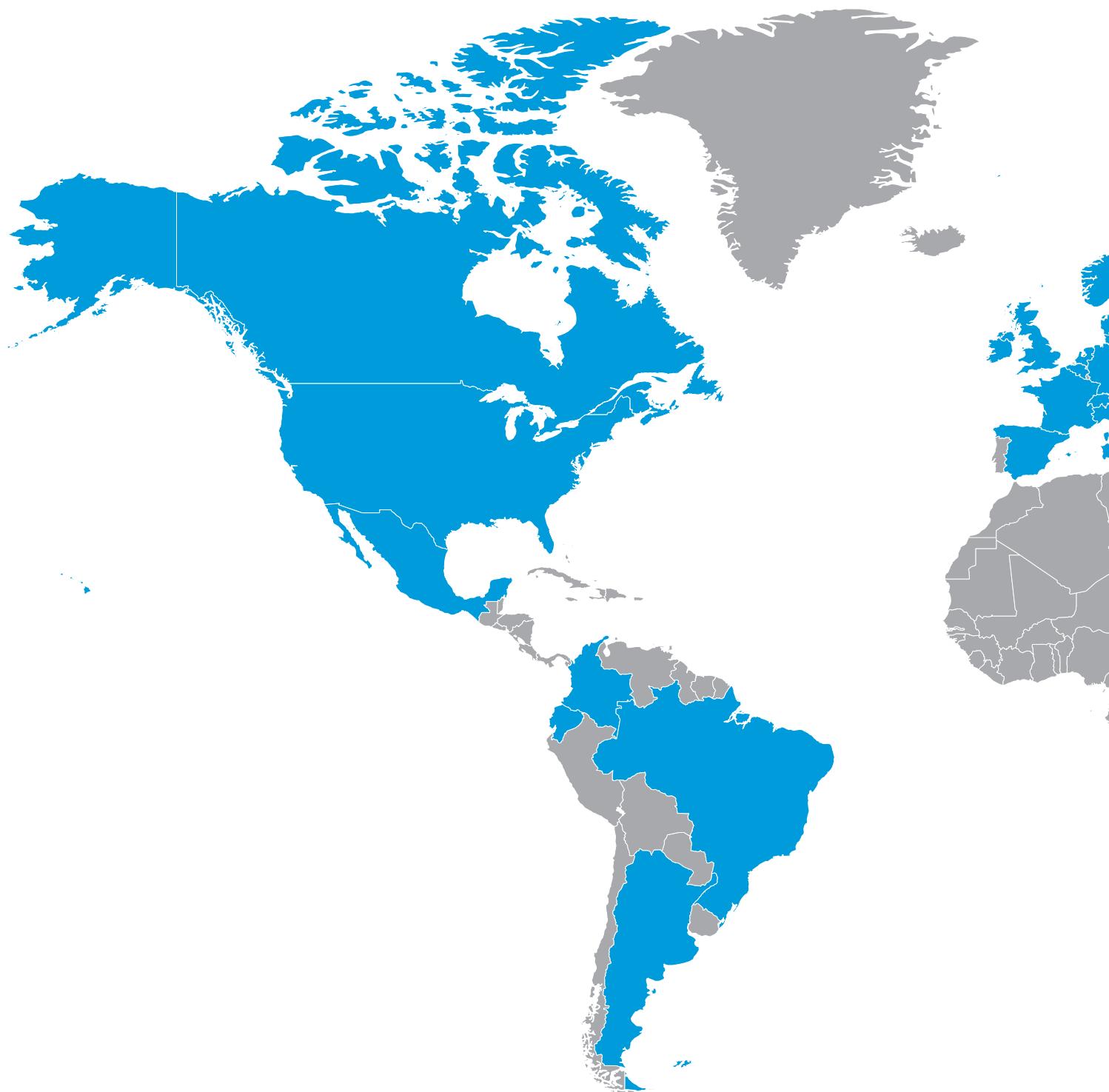
The Pump Drive is a gearbox allowing the connection between a prime mover (internal combustion engine or electric motor for example) and one or more hydraulic pumps.

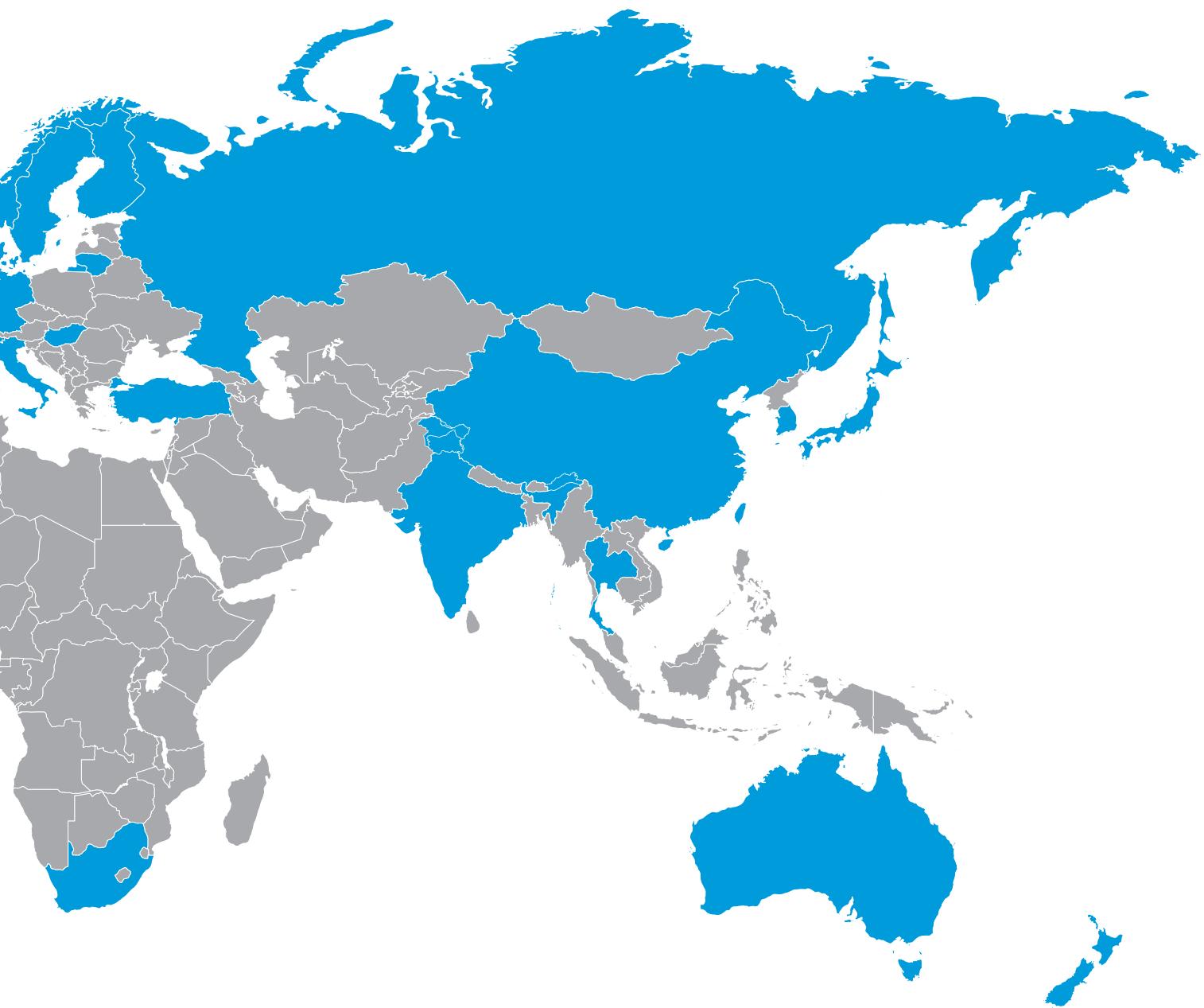
Usually it is used on both stationary and mobile application where mechanical power must be converted into hydraulic power for the purpose of operating travel functions and services.

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.









BREVINITM

Motion Systems

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

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.
T₁	[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.
T₂	[Nm]	Input torque (T₁) 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.
P_m	[kW]	Mechanical output; this is the maximum output that the pump drive can transmit in mechanical terms.
P_t	[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:

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

 **lt.** [lt.]:Amount of oil required

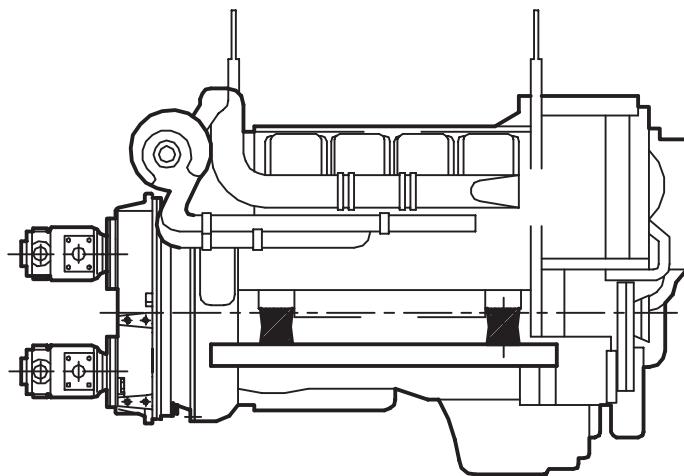
 **kg.** [kg.]: Weight of gearbox without oil

PUMP DRIVE INSTALLATION INSTRUCTIONS

The normal mounting position is as illustrated in the catalogue.

The CS version is arranged for flange mounting on to the SAE flywheel housing of an I.C. engine.

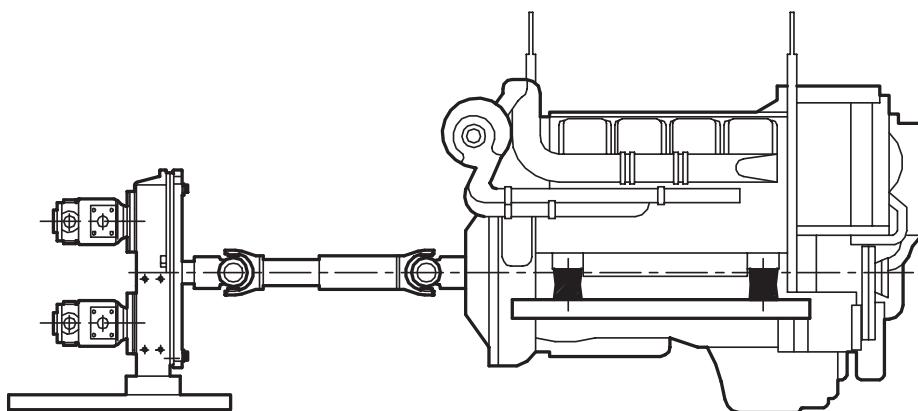
Dana can supply the gear unit with a flexible coupling, type RDB or FP to connect to the I.C. engine flywheel.



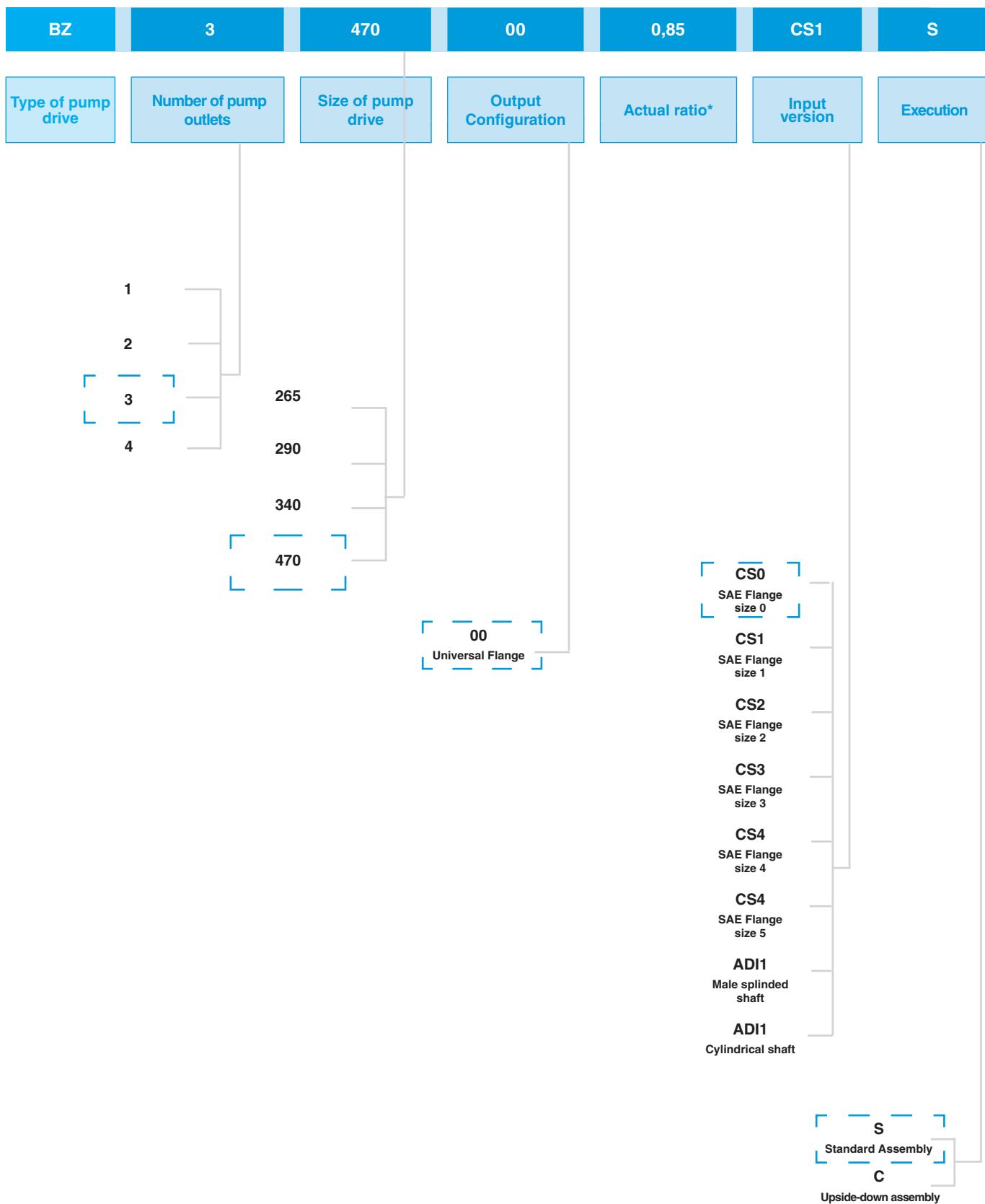
The ADI version is for use when the prime mover (I.C. engine, electric motor or any other) is mounted independently of the gear unit. Both ADI and CS versions have pads on each side to facilitate mounting using correctly designed brackets.

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

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

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

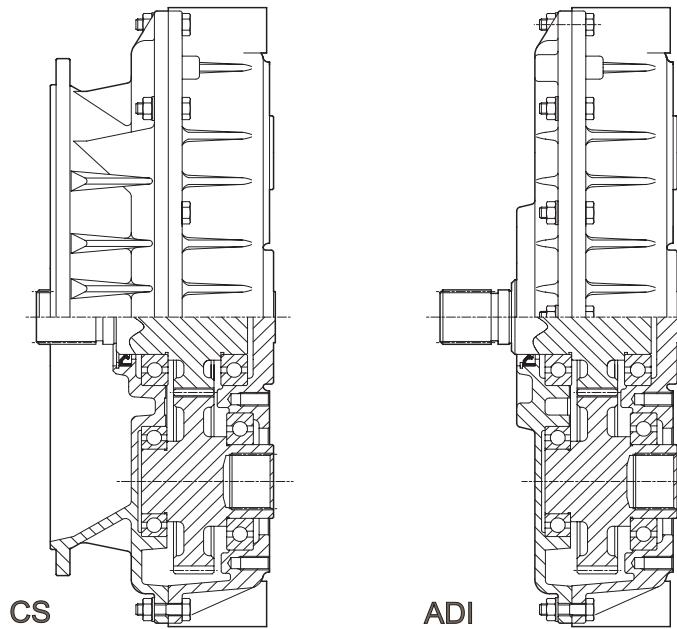
Within these general choices, it is also necessary to verify that:

- 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.





BREVINITM

Motion Systems

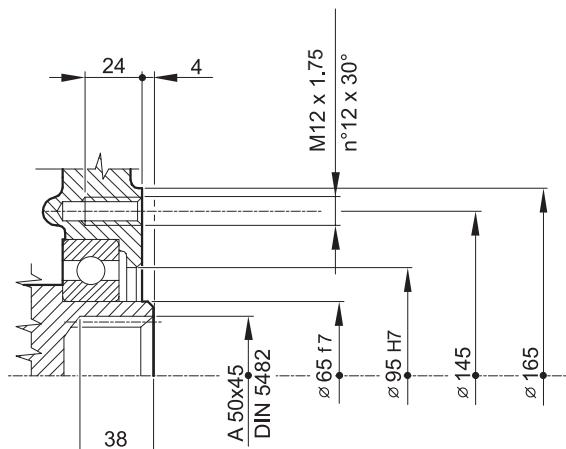
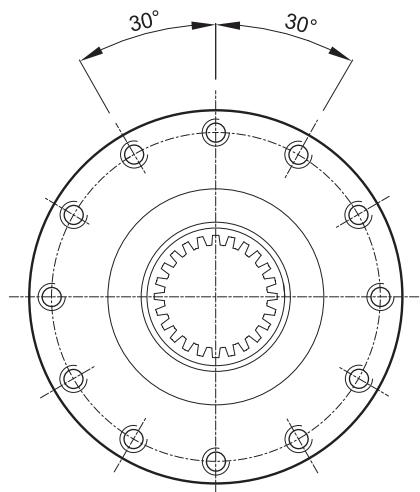
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BZ265				10
	BZ2-265	110	40	12
	BZ3-265	130	45	13
BZ290				14
	BZ2-290	170	50	16
	BZ3-290	190	55	17
BZ340				18
	BZ2-340	220	70	20
	BZ3-340	240	80	21
BZ470				22
	BZ2-470	380	130	24
	BZ3-470	420	150	25
	BZ4-470	480	160	26

Specifications

Nº Pumps	Type	SAE (CS)	Pm [kW]	Pt [kW]
2-	265	3	110	40
3-	265	3	130	45

Type	i =	T ₁ (Nm)	T ₂ (Nm)	J (Kg. m ²)	n ₁ _{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

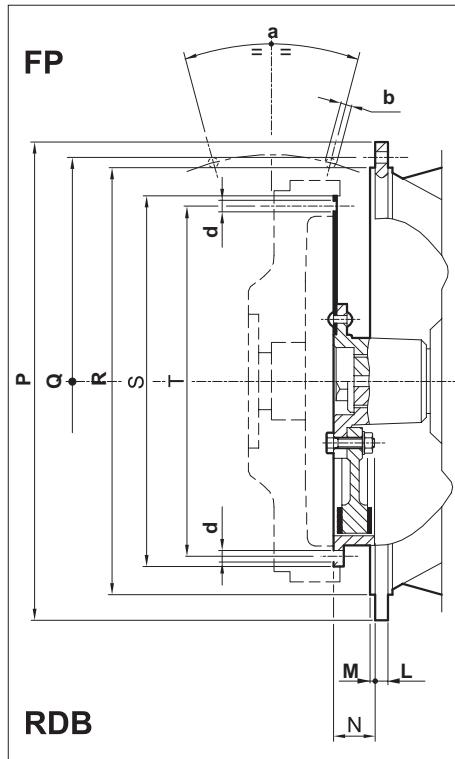
On request; pls. specify the code

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)

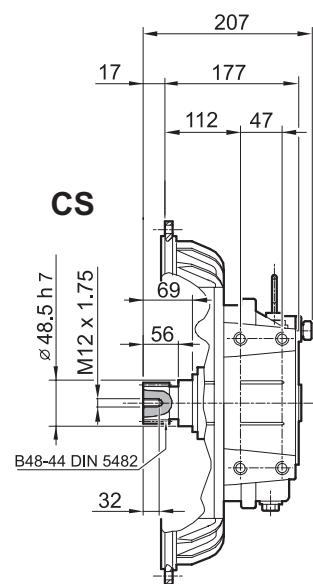
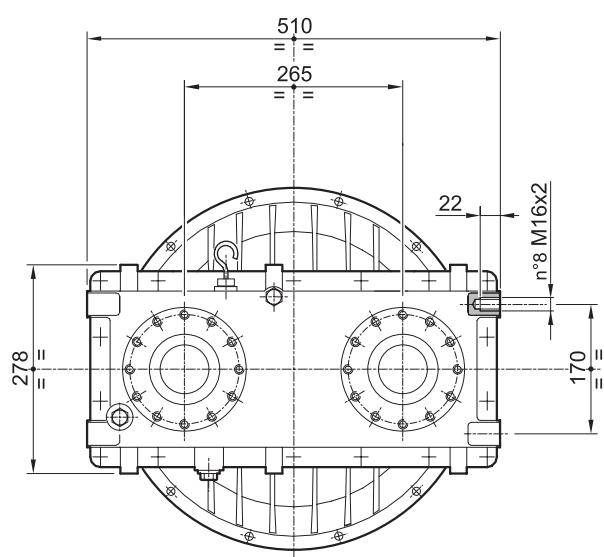
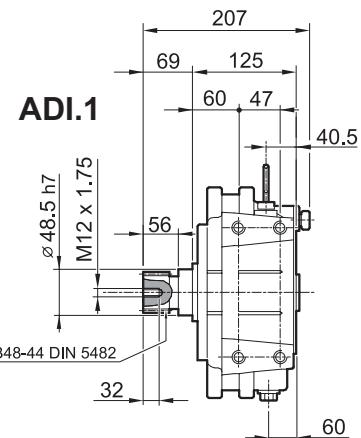
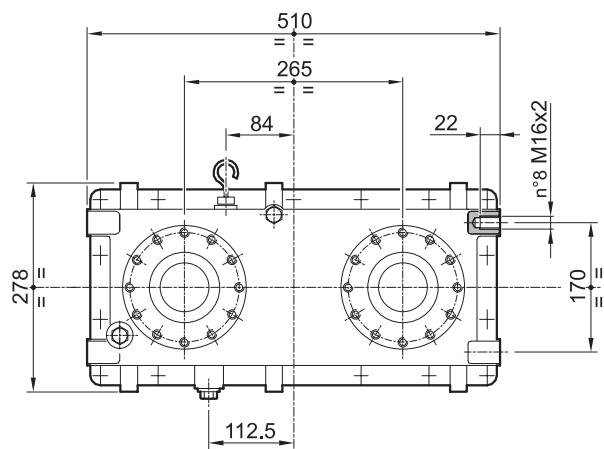
BZ	CS	RDB (*)	FP (*)	M	L	N	P	Q	R	S	T	a	b	d
2-265	3	10"	10"	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	$\varnothing 11$ n° 12x30°	$\varnothing 11$ n° 8x45°
3-265		11,5"	11,5"			39,6				352,42	333,4			

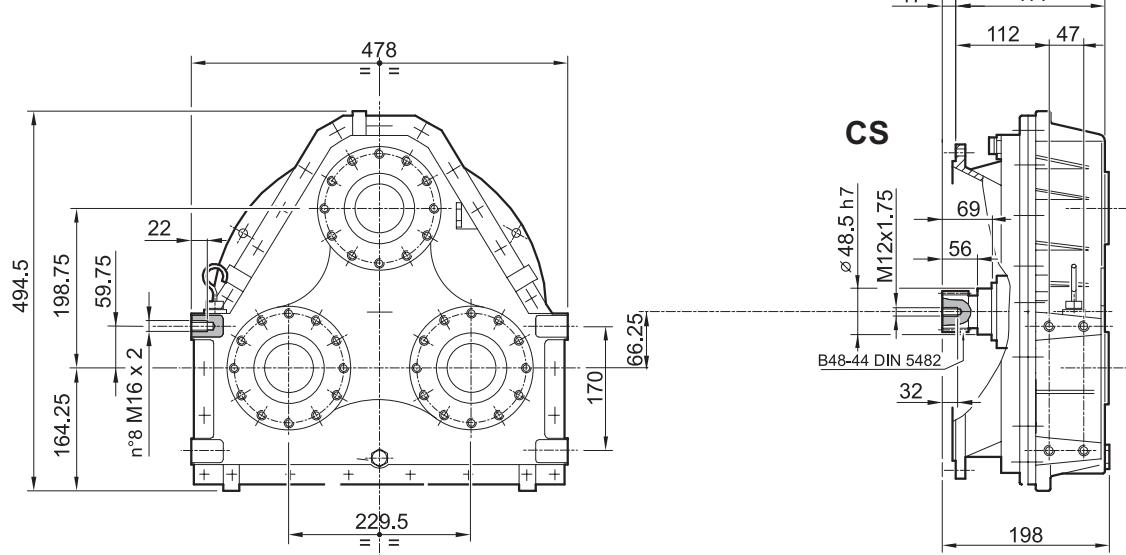
FP
"Steel disk" type elastic joint



RDB
"Rubber Block" type elastic joint

Dimensions



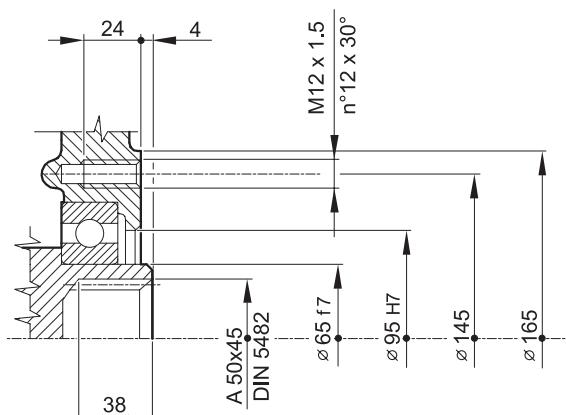
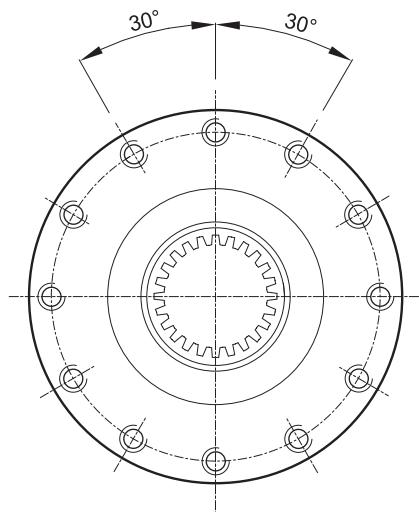
Dimensions

Specifications

Nº 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. m ²)	n ₁ _{max} (rpm)		It.		Kg.
2-290	0,74	1550	575	0,0453	2500	1	35 (ADI) 42 (CS3)		Kg.
	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)		Kg.
	1	2016	675	0,0449	3000				
	1,18	1850	730	0,0398	3250				

Flange connections: pump side



Input Configuration

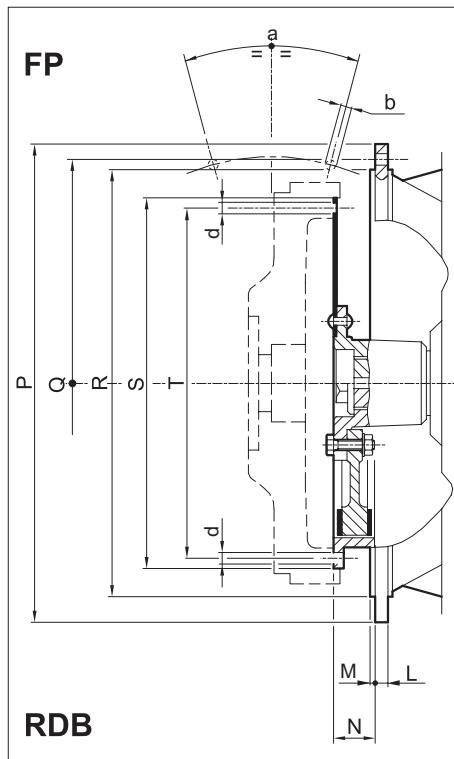
On request; pls. specify the code

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)

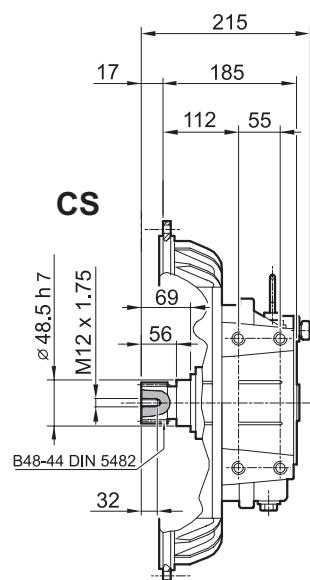
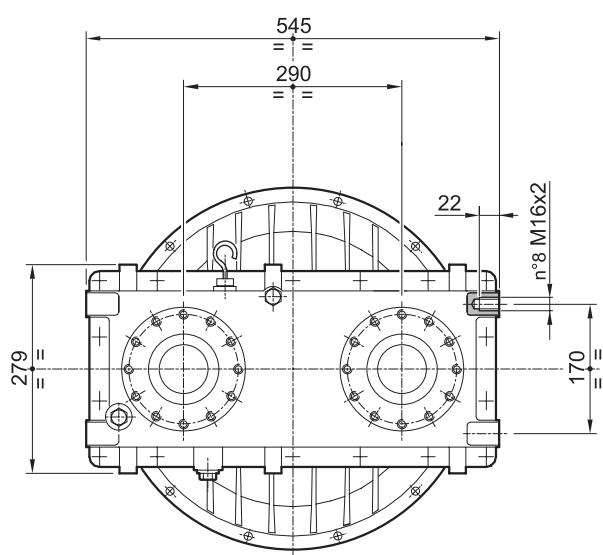
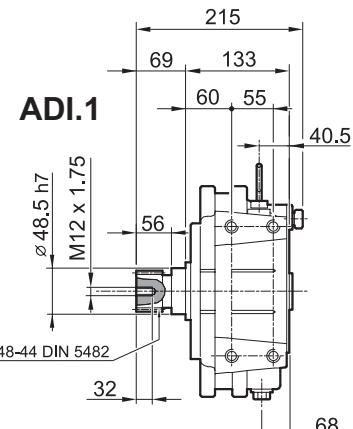
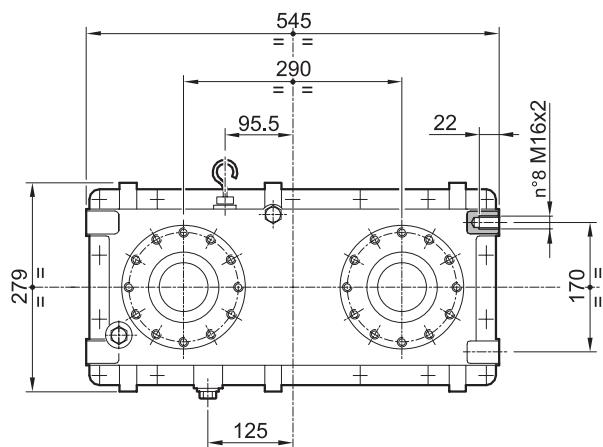
BZ	CS	RDB (*)	FP (*)	M	L	N	P	Q	R	S	T	a	b	d
2-290	3	10"	10"	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	$\varnothing 11$ n° 12x30°	$\varnothing 11$ n° 8x45°
		11,5"	11,5"			39,6				352,42	333,4			
3-290	3	10"	10"	5	12	54	455	428,62	409,57 f7	314,32	295,3	30°	$\varnothing 11$ n° 12x30°	$\varnothing 11$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

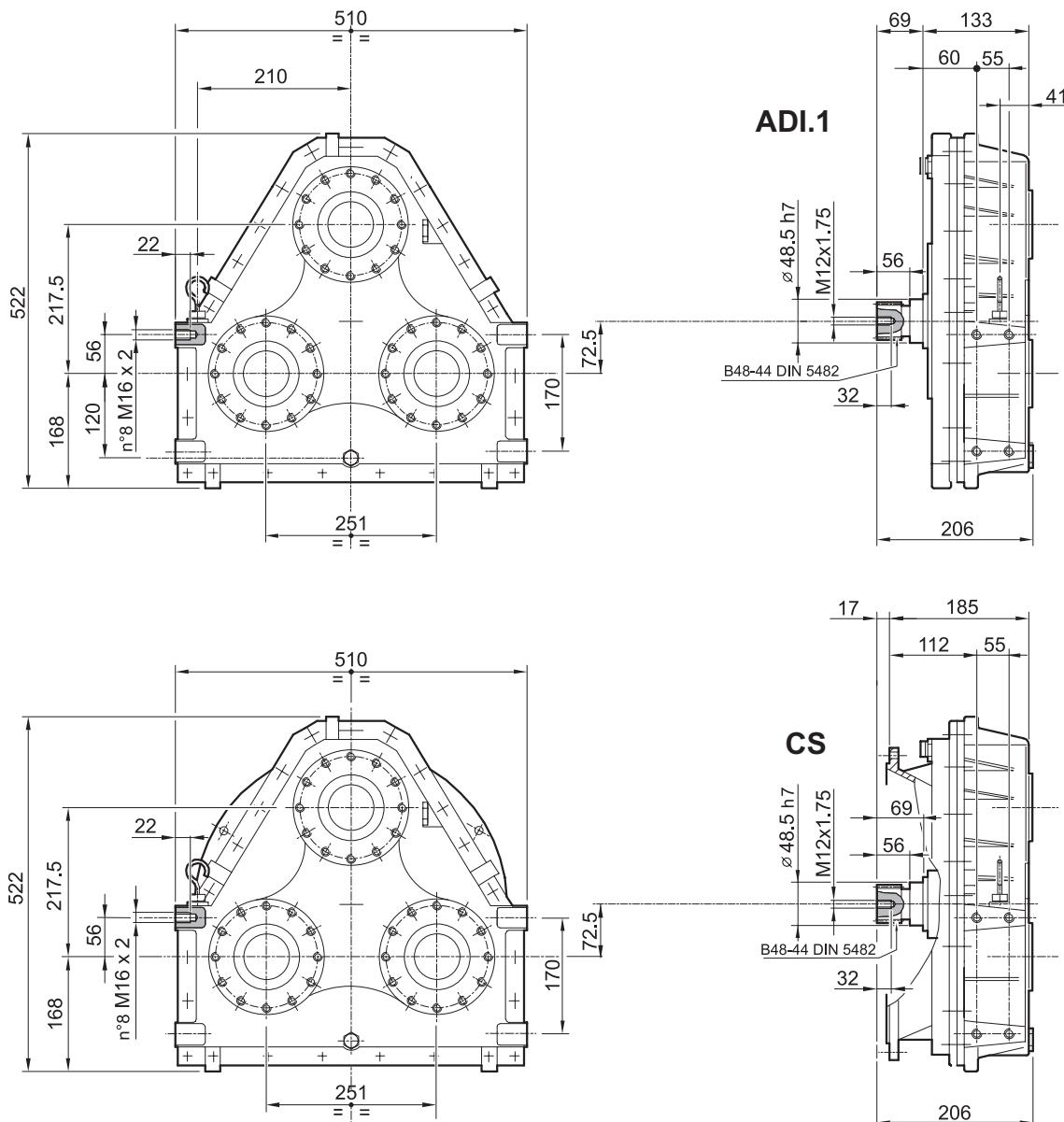


RDB
"Rubber Block" type elastic joint

Dimensions



Dimensions

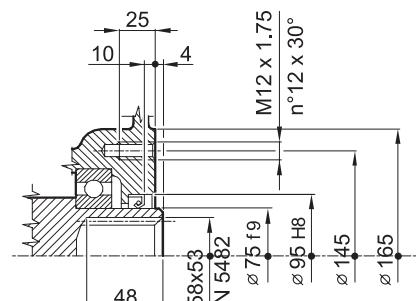
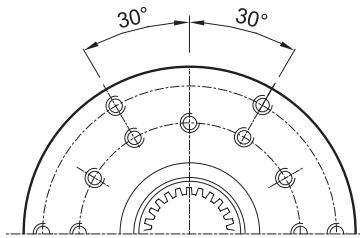
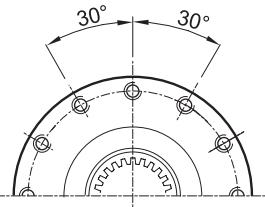


Specifications

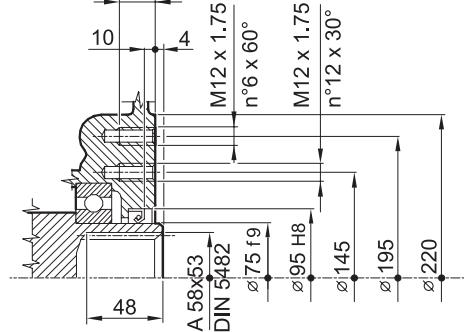
Nº Pumps	Type	SAE (CS)	Pm [kW]	Pt [kW]
2-	340	3	220	70
3-	340	1 - 2 - 3	240	80

Type	i =	T1 (Nm)	T2 (Nm)	J (Kg. m ²)	n1 _{max} (rpm)	 It.	 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

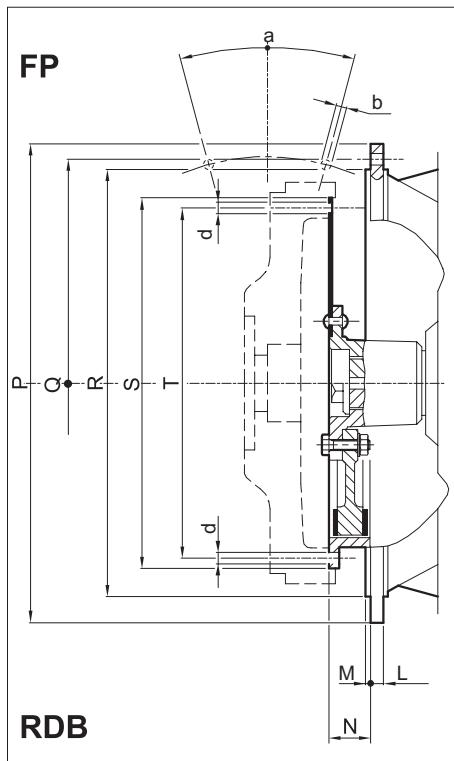
SAE	RDB 7"	RDB 8"	RDB 10"	RDB 11,5"	RDB 14"	RDB 14D"	FP10"	FP11,5"	FP14"
0									
1				C4600525120	C4600625130	C4600725140		C8918405120	C8918505130
2				C4600525120	C4600625130			C8918405120	C8918505130
3				C4600525120	C4600625130			C8918405120	C8918505130
4									
5									

(*) 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

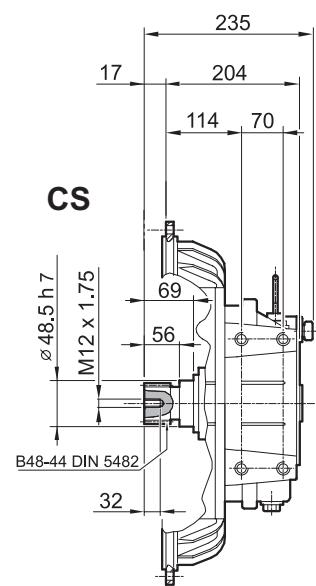
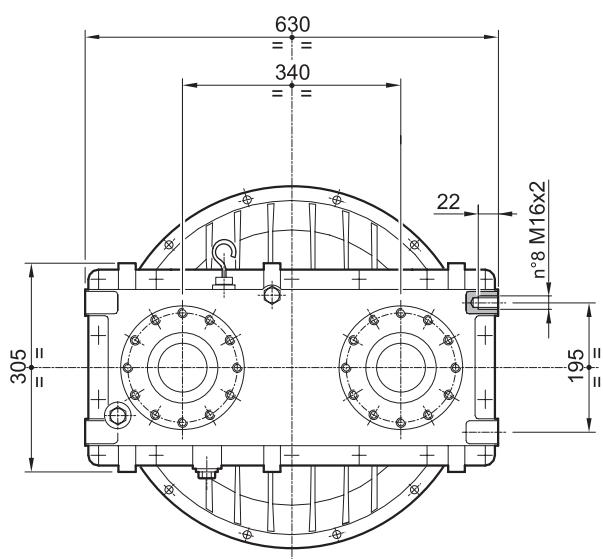
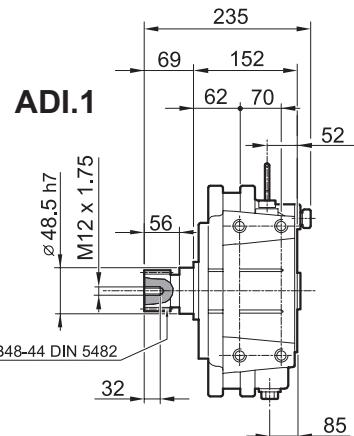
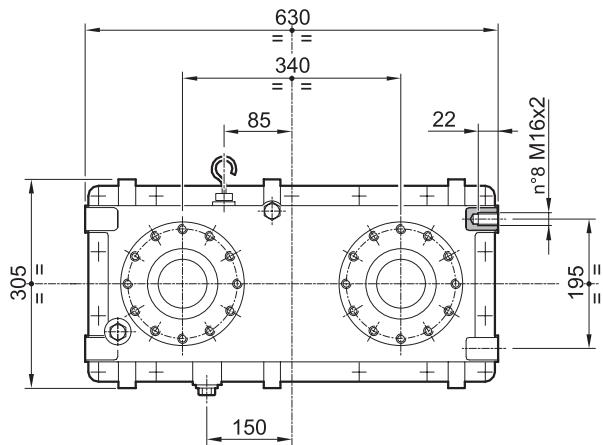
"Steel disk" type elastic joint



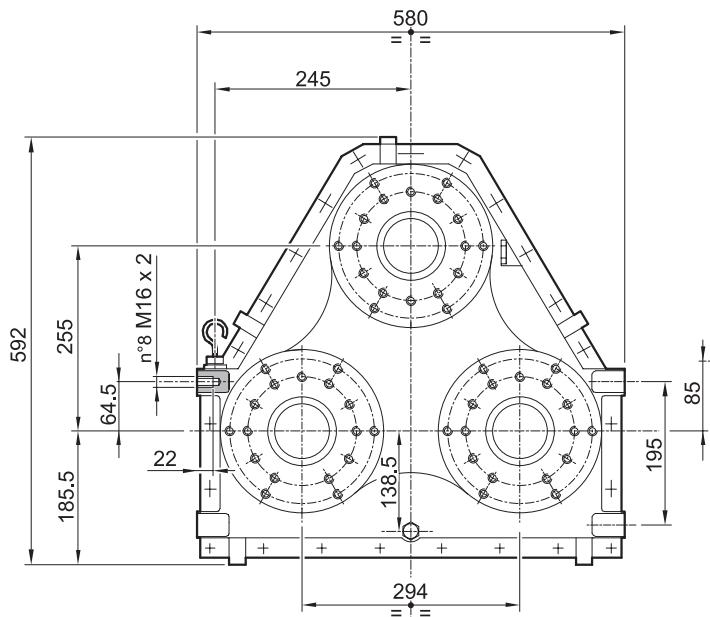
RDB

"Rubber Block" type elastic joint

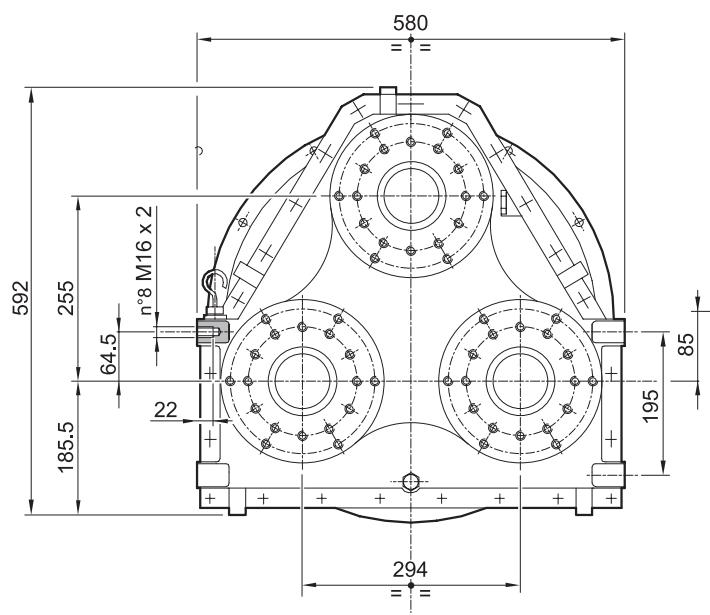
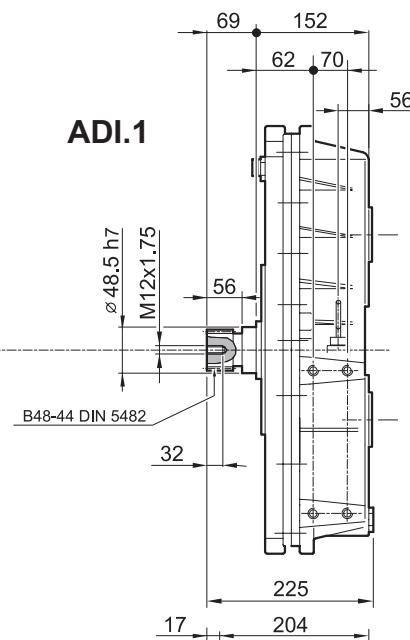
Dimensions



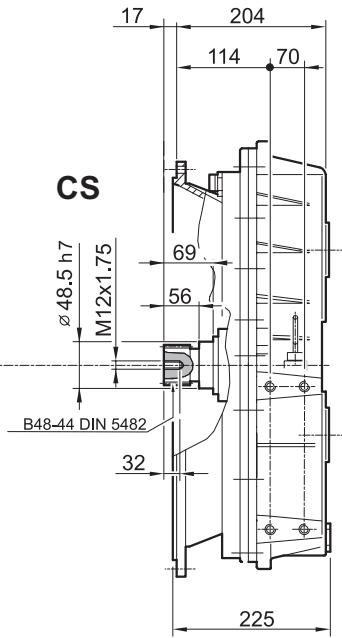
Dimensions



ADI.1



CS

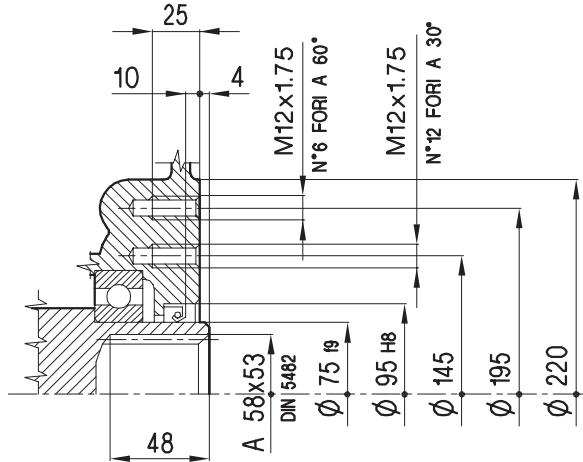
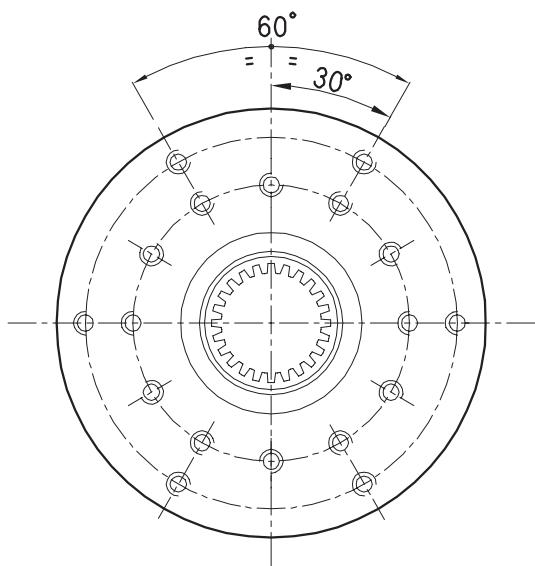


Specifications

Nº 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. m ²)	n ₁ _{max} (rpm)		
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

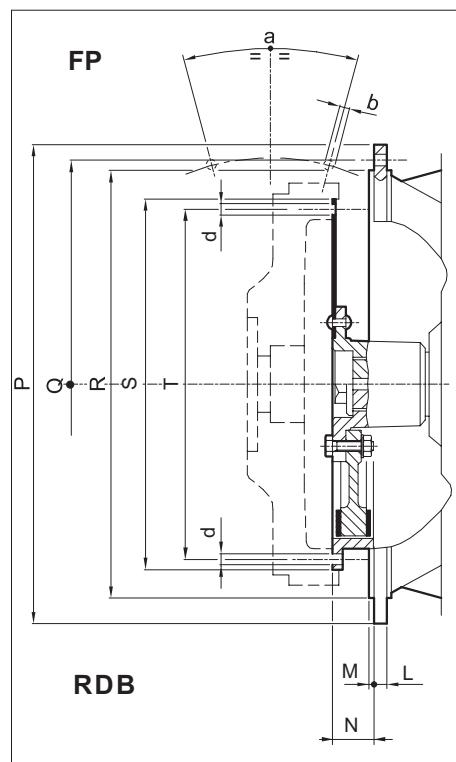
Input Configuration

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°	$\varnothing 11$ n° 12	$\varnothing 13,5$ 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'	$\varnothing 15$ n° 16	$\varnothing 12$ n° 8x45°
		14"	14"			25,4				466,72	438,2			
		14D"	-											
	1	11,5"	11,5"	5	12	39,62	553	530,22	511,18 f7	352,4 f8	334,40	30°	$\varnothing 11$ n° 12	$\varnothing 13,5$ 8x45°
		14"	14"			25,4				466,72	438,2			
		14D"	-											
4-470	1	11,5"	11,5"	5	12	39,62	553	530,22	511,18 f7	352,4 f8	334,40	30°	$\varnothing 11$ n° 12	$\varnothing 12$ n° 8x45°
		14"	14"			25,4				466,72	438,2			
		14D"	-											

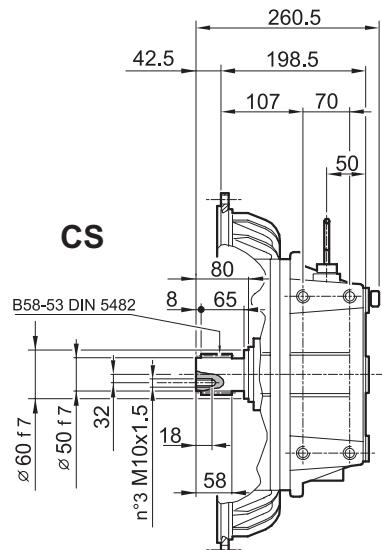
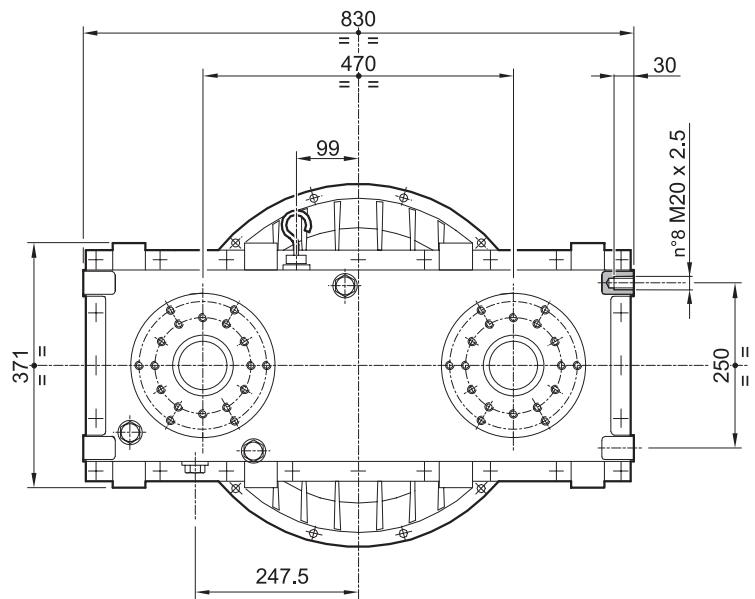


FP

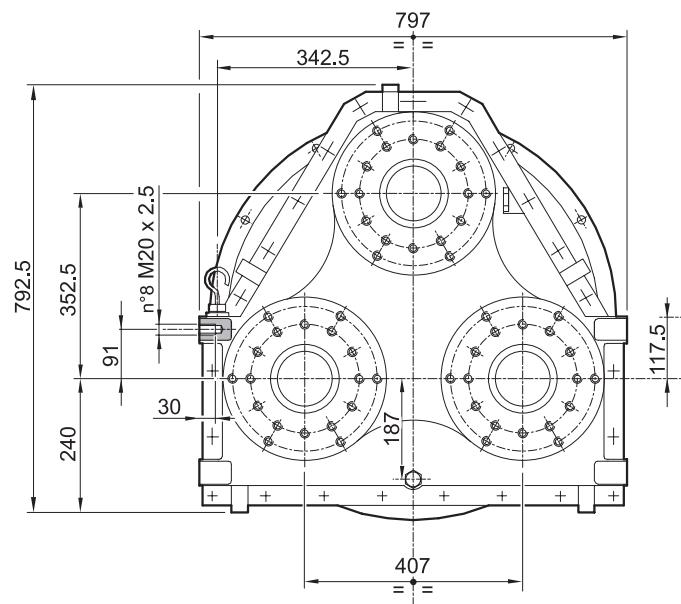
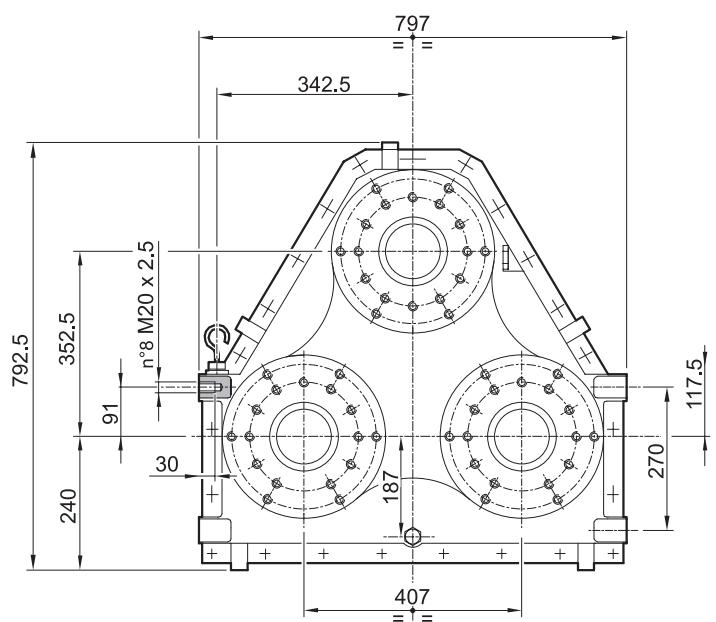
"Steel disk" type elastic joint

RDB

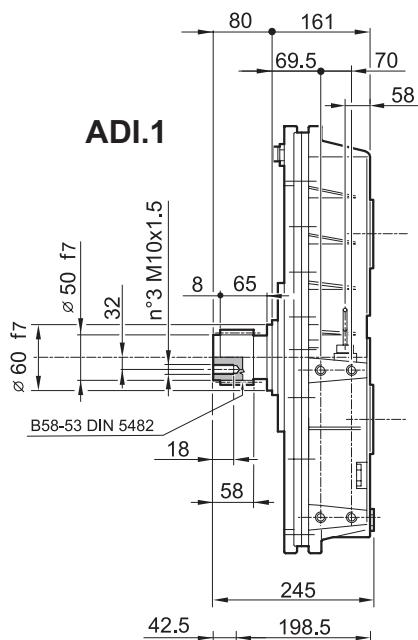
"Rubber Block" type elastic joint

Dimensions

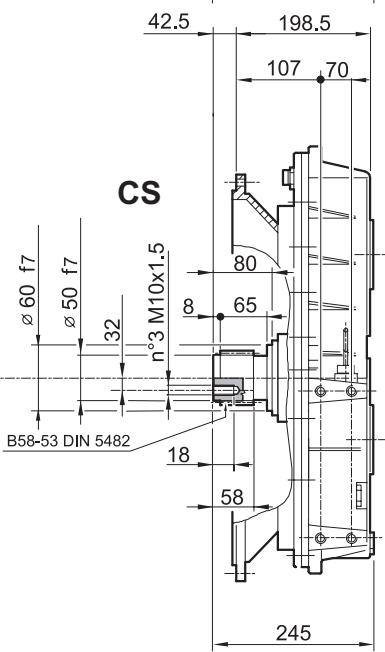
Dimensions



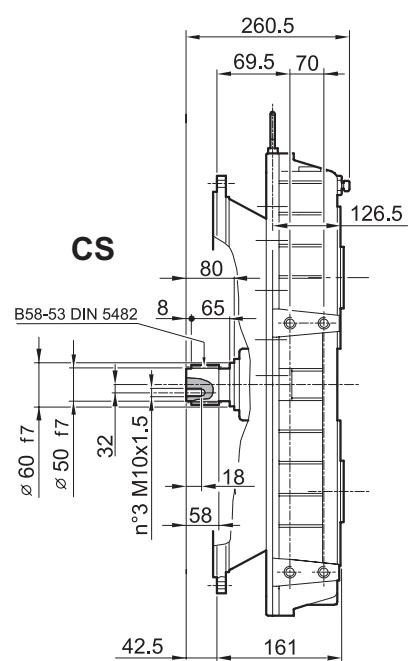
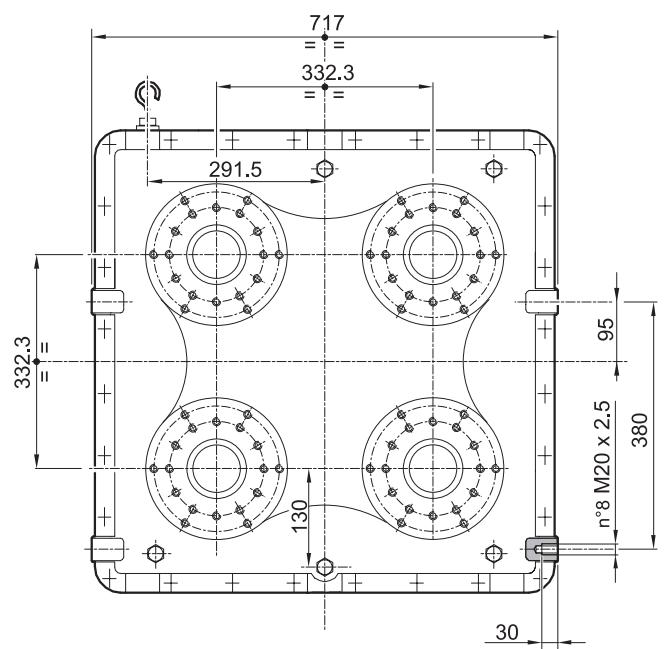
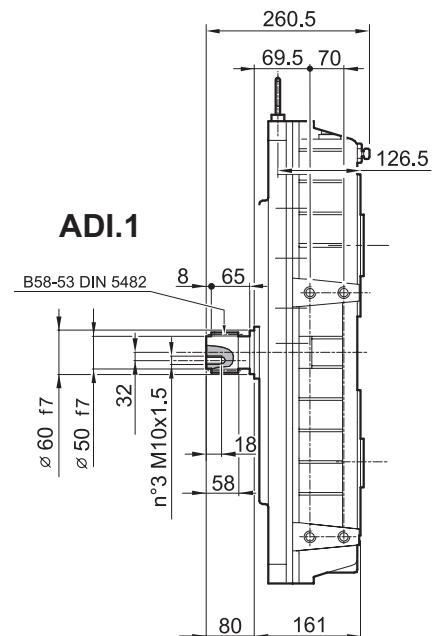
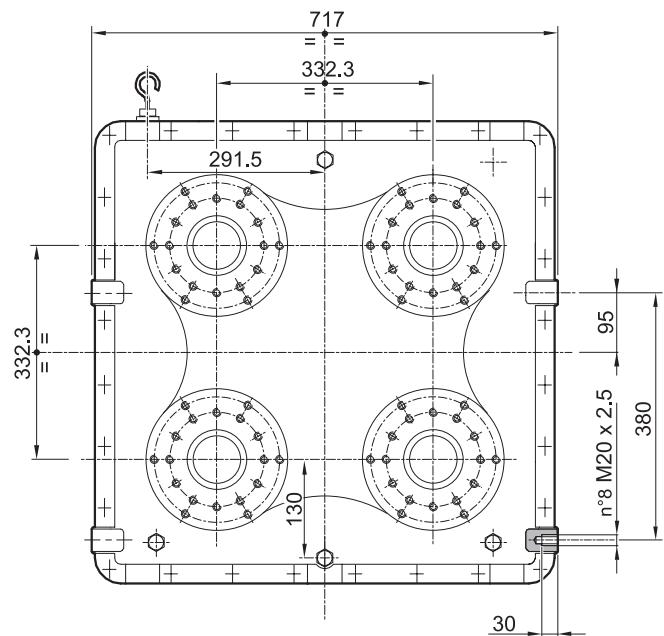
ADI.1



CS



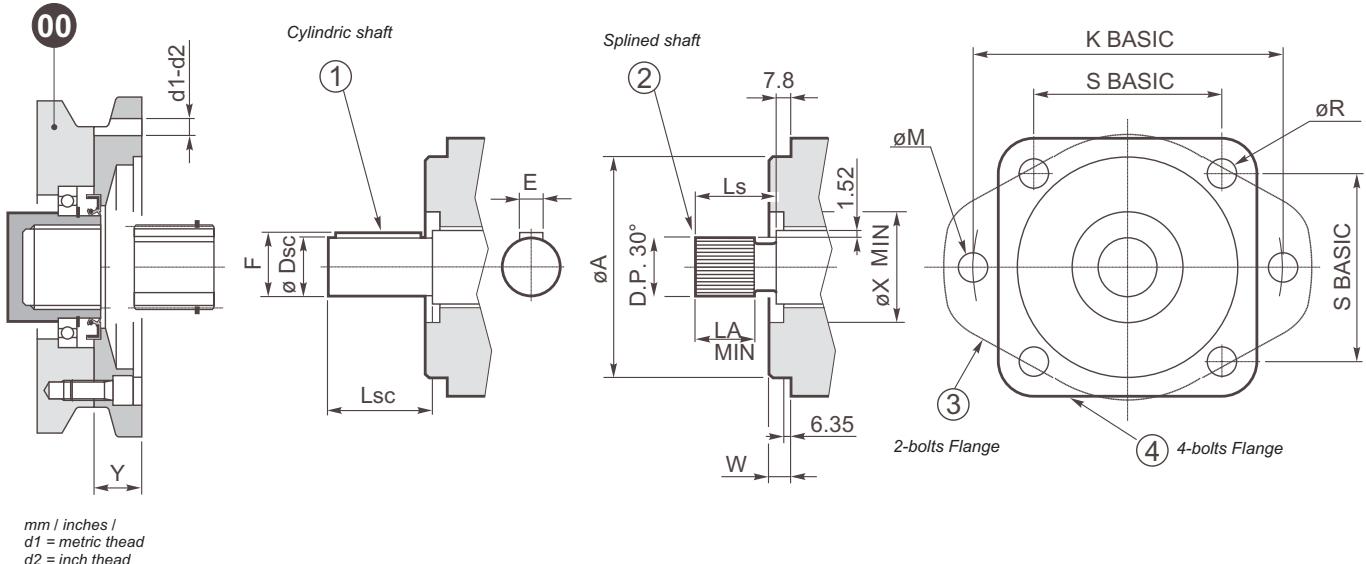
Dimensions





BREVINITM

Motion Systems



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

SAE		Ø A	W	Ø X min.	K basic	Ø M	S basic	Ø R	Splined 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	Y [mm.]	No. bolts	Order code					
			Flange with d1			Flange with d2		
			d1 Metric	Splined shaft	Cylindrical shaft	d2 Inches	Splined 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	61301800630 62201802540	62201801750	1/2 - 13 0.78 min. F.T.	61345300630 62245302530	62245301750
C - C	79	2	M16 T.U.20			5/8 - 11 0.78 min. F.T.		
		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.

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 with 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 temperature 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 characteristics of the oil.

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.

Manufacturer	Mineral oils			Poly-Alpha-Olefin synthetic 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	KI beroil GEM 1-150	KI beroil GEM 1-220	KI beroil GEM 1-320	KI bersynth EG 4-150	KI bersynth EG 4-220	KI bersynth EG 4-320	KI bersynth GH 6-150	KI bersynth GH 6-220	KI 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	Arco Synt 150	Arco Synt 220	Arco 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



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					
		Manufacturer of pumps	Pump 1	Pump 2	Pump 3	Pump 4	
		Model size					
		Flange type					
		Shaft type					
		Weight					
Duty		Operating time - Hours per days					
		Duty cycle: % of operating time	Pump 1	Pump 2	Pump 3	Pump 4	
		Output torque [Nm]					
		Output speed [rpm]					
		Do all pumps require full power simultaneously? 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					
Internal TEST/Certification		Specify any internal test and certification if required					
		Date					
		Selection Reference					
		Signature					
Gearbox selected							



BREVINITM

Motion Systems

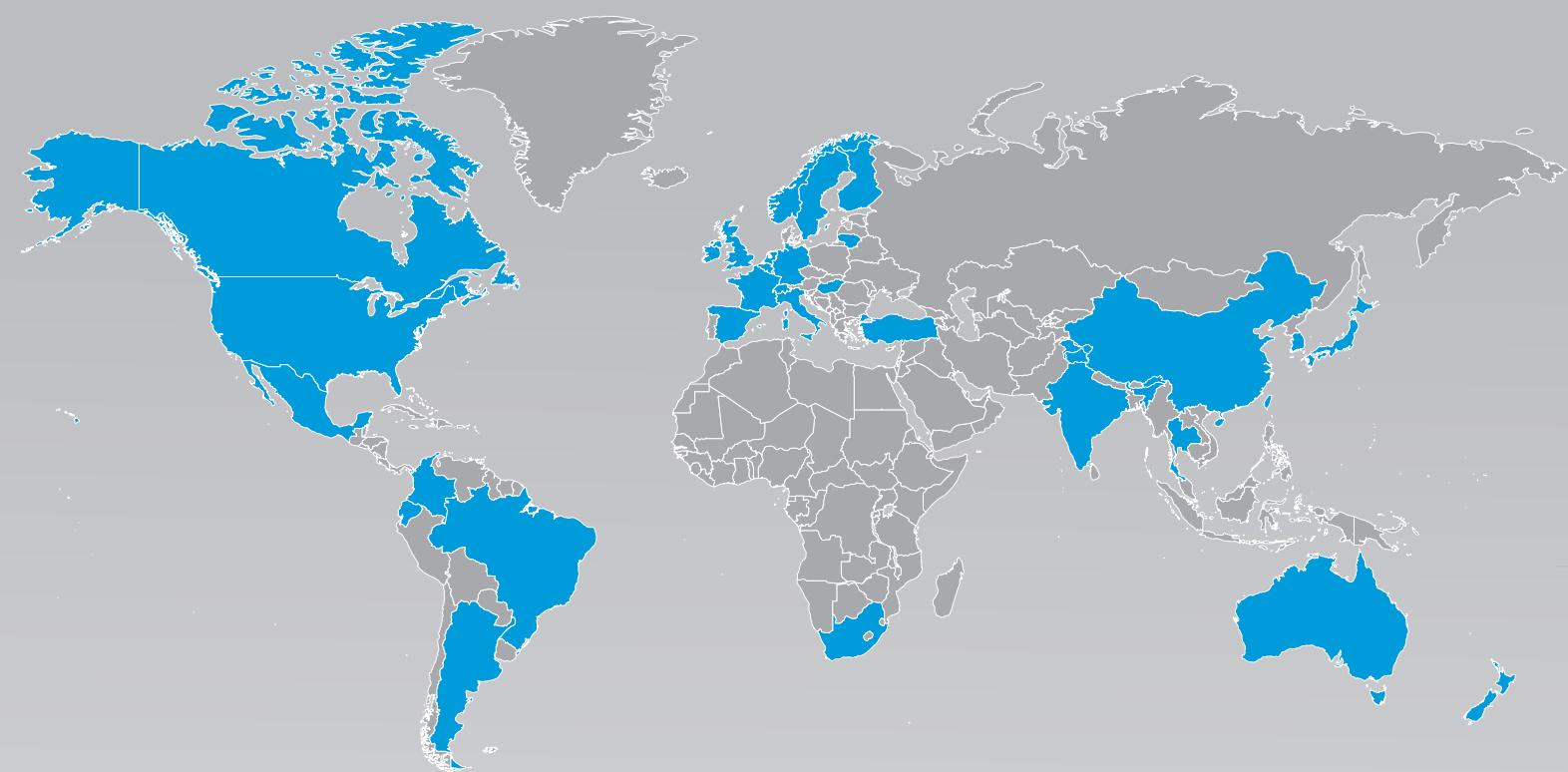
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Technologies Customized to **Every Part of the Globe**

With a presence in 31 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 a leader in the design and manufacture of highly efficient propulsion and energy-management solutions that power vehicles and machines in all mobility markets across the globe. The company is shaping sustainable progress through its conventional and clean-energy solutions that support nearly every vehicle manufacturer with drive and motion systems; electrodynamic technologies, including software and controls; and thermal, sealing, and digital solutions. Founded in 1904, we employ thousands of people across six continents.

About Dana Off-Highway Drive and Motion Systems

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.



BREVINI®

Motion Systems