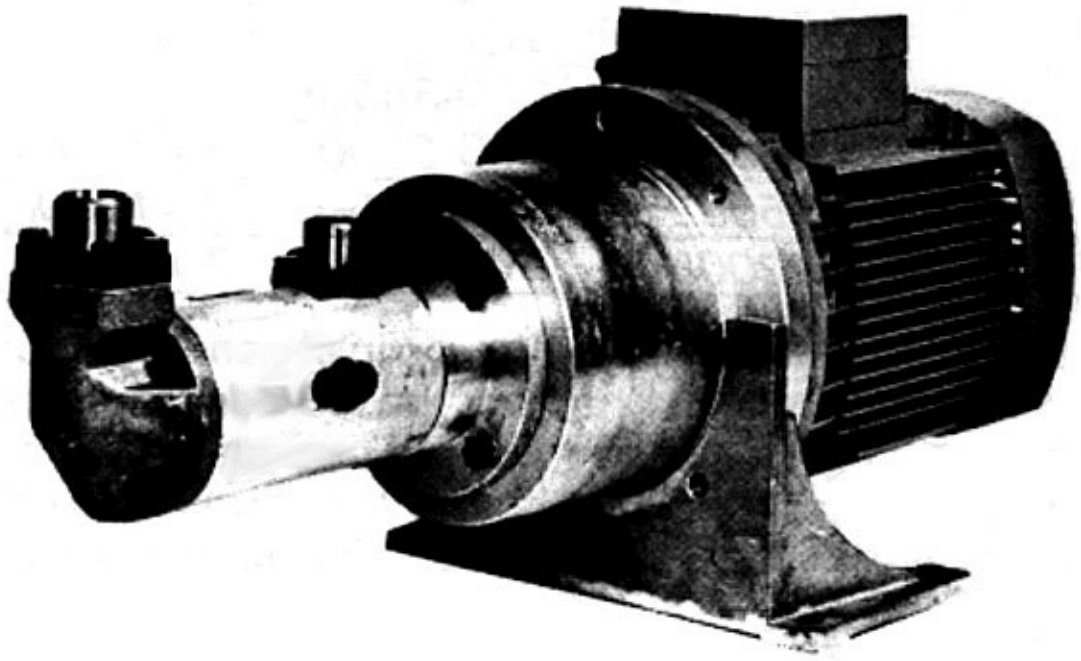
D4
Std Line

Product Description



Flow volume:	10 - 1050 l/min
Max differential pressure:	16 MPa (4 MPa for version with internal relief valve)
Applications:	Burner, hydraulic and circulation system

1. Applications

1.1 Functionality

The D4 pumps are used for a number of different fluids:
Lube oil, hydraulic oil, diesel & fuel oil and any non-aggressive fluid with sufficient lubricating properties.

1.2 Applications

Typical applications are:

- Fuel oil burner pumps for steam boilers (at paper mills, marine boilers, power plants)
- Circulation of fuel oil
- Lubrication oil systems
- Power hydraulic pumps for milling plants
- Filling pumps for hydraulic presses
- Seal oil pumps for compressors

1.3 Installation

The pump is designed to be flange mounted to its electrical motor via a connection frame and a flexible shaft coupling. By the angle bracket, the pump may be mounted horizontally or vertically.

As standard, counter flanges are included.

For more information about installation, see Installation and Start-up instructions for medium and high pressure pumps.

2. Pump model code

Pump series
D4

Size
Power rotor diameter [mm]
025, 032, 038, 045, 052, 060, 070

Lead
K and L = Low lead
N = Normal lead

Generation
Design generation 2

Material in pump body
I = Cast iron
L = Aluminium
N = Nodular cast iron, seal chamber in steel (code group A434)

Shaft seal design
V = Carbon/NI-resist, elastomers in Viton
T = Carbon/Silicon carbide, elastomers in Viton

Mounting
B = Flange mounting
J = For vertical mounting, with prolonged inlet pipe, strainer included
T = For vertical mounting, with mounted strainer

Valve
E = Without valve
P = Valve with external return or internal return (max 4 MPa)

Special design
Code group omitted for standard design
A056 = Ball bearing version
A070 = Hydraulic design
A101 = Counter clock wise rotation
A434 = A056 and pvd covered rotors (only size 025, 032 and 038)

3. Technical Data

3.1 Pressure Information

Pressure relief valve

Pump version D4 xxBP is equipped with an internal relief valve, intended as a pressure limiting valve only. It must not be used for regulation of pump discharge pressure or to regulating the flow rate.
As standard the pump is delivered with the valve adapted for external return of the bypassed flow. From the valve outlet port this flow shall be brought back to the system as far as possible from the pump inlet.

The valve has a maximum pressure of 4 MPa.

Inlet pressure

Minimum inlet pressure (suction capability) is dependent on fluid viscosity and rotation speed. It increases with decreasing viscosity and decreasing speed. Information about minimum inlet pressure for each individual duty case can be obtained from IMO AB or pump selection software WinPump.

Maximum inlet pressure (suction capability) is 1 MPa.

Discharge pressure

Max. Discharge Pressure
- Model D4: 16 MPa
- Models D4 xxBP: 4 MPa

Differential pressure

Maximum differential pressure is 16 MPa for D4 and 4 MPa for version D4 xxBP but reduced at low viscosities according to table below

D4 (except D4 NTBP A434)

Viscosity [cSt]	1,4	2	6	10	30	>55
Max. diff. pressure [MPa]	-	3,5	6,2	8,0	12,5	16,0
D4 NTBP A434 [MPa]	4,0	4,0	4,0	4,0	4,0	4,0

Refer to your IMO representative or use the pump selection software WinPump to determine the exact operating limits.

3.2 Driver information

Driver type

The pump is designed to be connected to an electrical motor by a flexible shaft coupling which must allow a axial pump movement if min. 0,3 mm. Axial or transverse load on pump shaft is not allowed.

Speed

The maximum speed is 3600 rpm. Maximum operating speed may be reduced depending on inlet conditions. Contact IMO or use the pump selection software WinPump to find a corresponding speed limit in order to avoid cavitation problems.

Rotation

The pump is designed to operate in one rotational direction only, as standard clockwise when facing the shaft end. Pumps for CCW operation can be delivered on special request.

3. Technical Data

3.3 Sound level

Typical pump sound levels refer to free field conditions at a distance of 1 m from the pump. Noise of driver excluded in the quoted figures.
The sound levels are measured at speed 2900 rpm and viscosity 20 cSt.

Pump Size	025	032	038	045	052	060	070
Sound level @ 2 MPa dB[A]	55	56	60	63	67	70	72
Sound level @ 10 MPa dB[A]	57	59	62	66	69	72	75

3.4 Moment of Inertia

Moment of intertia [10^{-6} kgm^2]

Size	025	032	038	045	052	060	070
Value	20	70	170	400	800	1700	3600

3.5 Fluid viscosity

2 – 400 cSt in general for D4.
1,4 – 1500 cSt for version D4 NTBP A434.
For higher viscosity, contact IMO AB.

3.6 Fluid temperature

Pump version
LRxx: 0 – +90 °C
LVxx: 0 – +130 °C
IVxx: -10 – +130 °C
ITxx & NTxx: -10 – +155 °C

4. Design

4.1 Configuration

The D4 pump is available as following models (flange mounted):

- D4 xxxE: without built-in pressure relief valve (radial inlet)
- D4 xxBP: built-in pressure relief valve with external or internal return
- D4 xxTE: built-on inlet strainer for tank-top mounting for shallow tank operation, no built-in pressure relief valve
- D4 xxJE: as D4 xxTE with extended inlet pipe for deep tank operation, no built-in pressure relief valve

4.2 Filtration

In order to protect the D4 pump from foreign matter such as weld slag, weld beads, pipe scale and rust etc. a strainer should be installed on the pump inlet pipe near the pump. Recommended strainer-open mesh width for the D4 pump is:

- 400 – 800 µm at flow rates below 300 l/min
- 600 – 1000 µm at flow rates above 300 l/min

Max. pressure difference over clean strainer: 10 kPa at full flow rate.

The built-on strainer of pumps D4 xxTx & xxJx have an open mesh width of 500 µm (40 mesh straining cloth).When the D4 pump is used in power hydraulic systems or as lube/seal oil pump, no extra filtering precautions are required other than those prescribed for the remaining components in the system. If no other filtration is prescribed it is recommended that the hydraulic fluid of a power hydraulic system is pumped through a filter – in the return line to the fluid reservoir or in a separate fluid reconditioning circuit – with an open-mesh width as follows:

- 100µm at system pressure below 10 MPa
- 50µm at system pressure above 10 MPa

Max. pressure difference over clean filter: 0.1 MPa at full flow rate.

4.3 Ball bearing

As standard, D4 pump does not have ball bearing.

For ball bearing version use special design code A056. Note that ball bearing is included in version D4 NTBP A434.

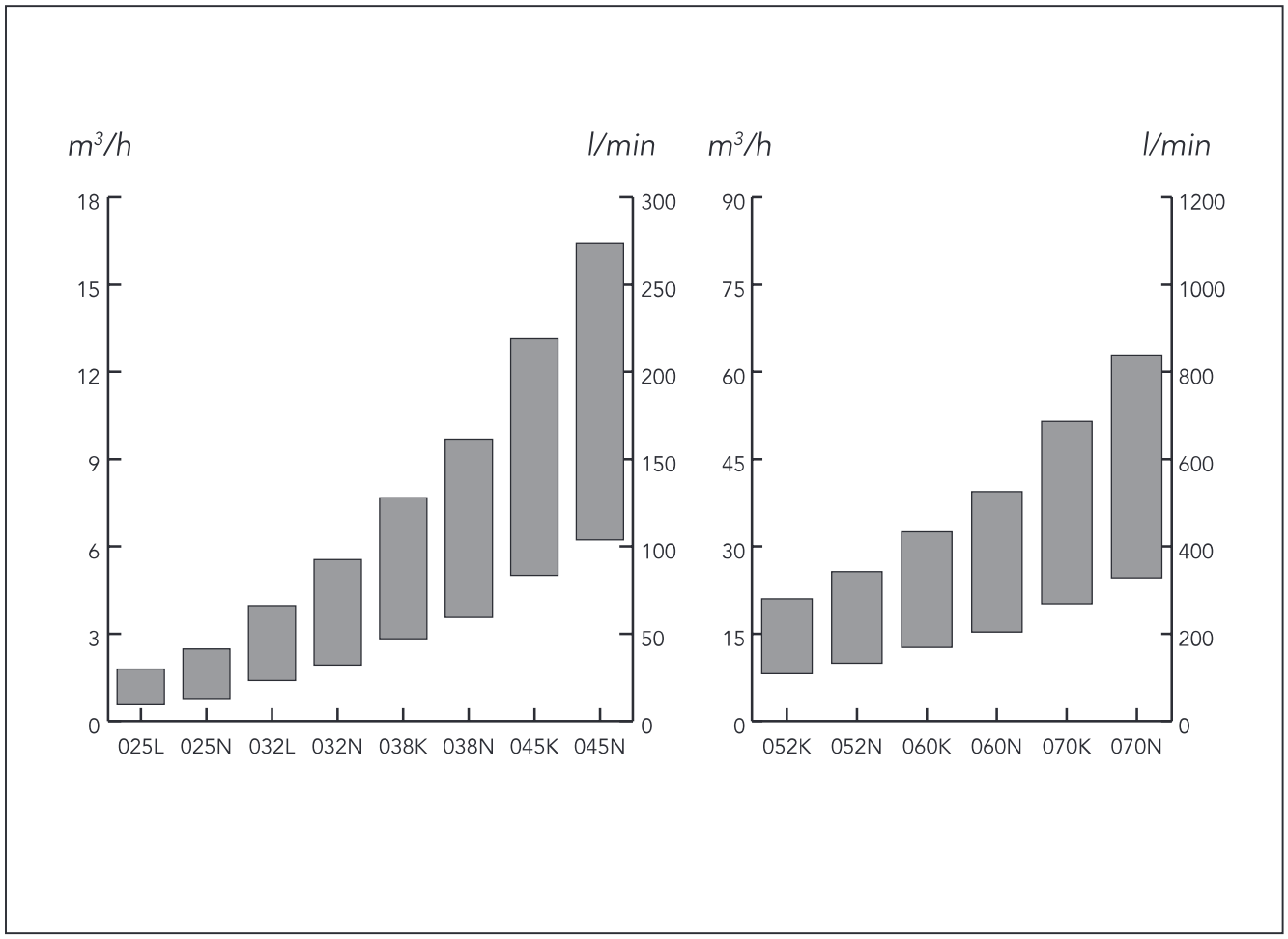
For ball bearing version; the ball bearing is placed inside the pump and is therefor continously greased by the handling media.

4.4 Design material

Model	Material pump	Material rotor	Material idler	Material seal	Material Elastomers
D4 LPxx	Aluminium	Steel	Steel	Carbon/Ni resist	Nitrile
D4 LVxx	Aluminium	Steel	Steel	Carbon/Ni resist	Viton
D4 IVxx	Cast iron	Steel	Steel	Carbon/Ni resist	Viton
D4 ITxx	Cast iron	Steel	Steel	Carbon/Silicon carbide	Viton
D4 NTxx	Nitrated nodular cast iron	Hardened steel	Hardened steel	Carbon/Silicon carbide	Viton

5. Performance

Typical performance values at 3,5 MPa
Flow calculated at 26 cSt, power at 260 cSt.
For values under other operating conditions, refer to the IMO AB pump selection software Win-Pump.

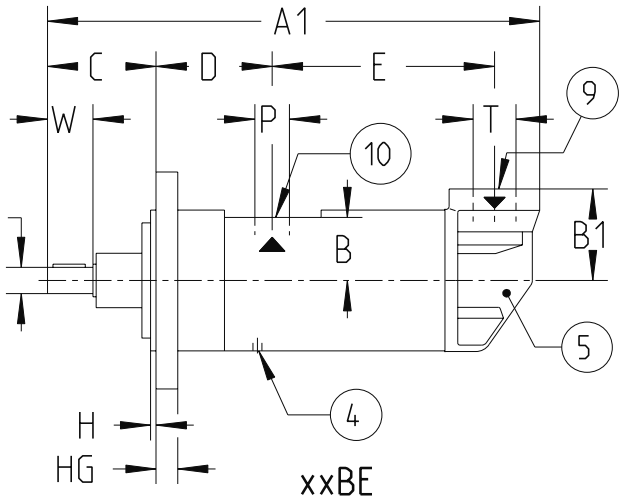


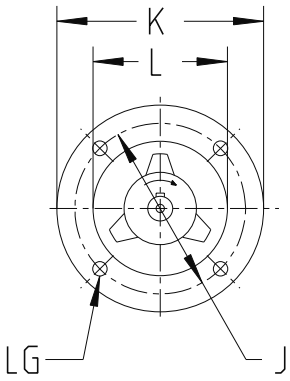
rpm	025L l/min	kW	025N l/min	kW	032L l/min	kW	032N l/min	kW
1470	9,6	1,0	12,5	1,4	23,2	2,0	32,0	2,8
1770	12,5	1,2	16,7	1,6	29,3	2,4	40,7	3,5
2950	24,1	2,0	33,1	2,9	53,7	4,2	75,1	6,0
3550	30,0	2,5	41,4	3,5	66,1	5,2	92,5	7,3

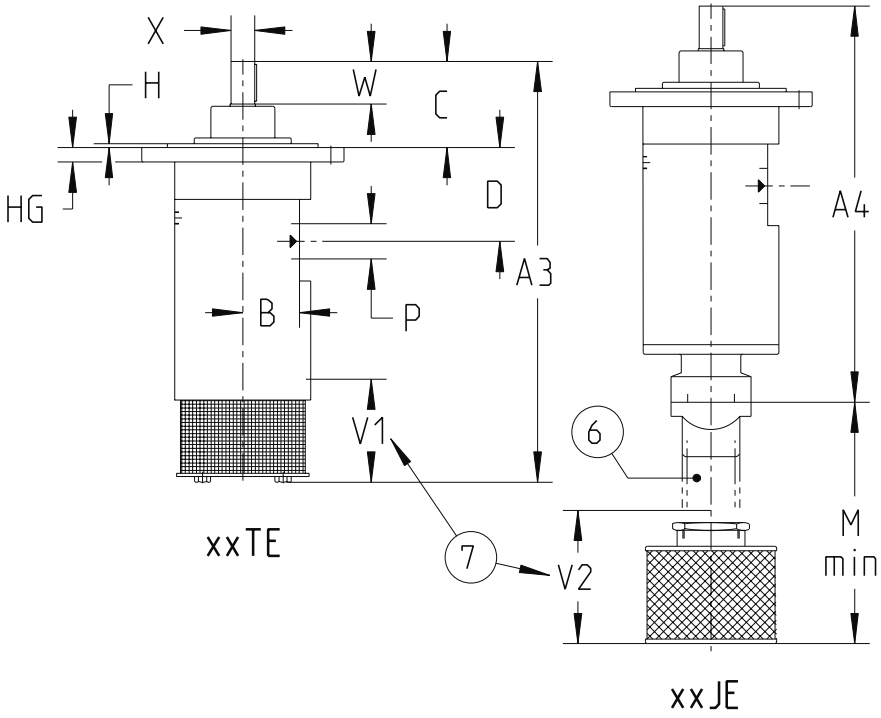
rpm	038K l/min	kW	038N l/min	kW	045K l/min	kW	045N l/min	kW
1470	47,1	3,8	59,4	4,8	83,3	1,0	103,7	1,4
1770	58,8	4,6	74,1	5,8	102,9	1,2	128,1	1,6
2950	104,6	8,0	132,1	10,1	179,8	2,0	224,4	2,9
3550	127,8	9,7	161,5	12,3	218,9	2,5	273,4	3,5

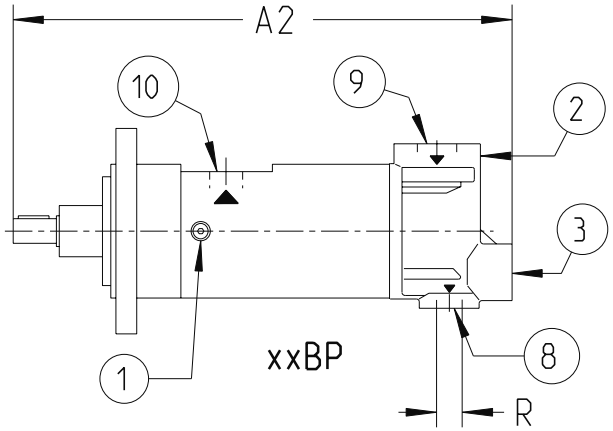
rpm	052K l/min	kW	052N l/min	kW	060K l/min	kW	060N l/min	kW	070K l/min	kW	070N l/min	kW
1470	135,6	2,0	165,4	2,8	210,8	3,8	255,1	4,8	335,7	3,8	409,5	4,8
1770	166,5	2,4	203,2	3,5	258,5	4,6	313,0	5,8	411,0	4,6	501,6	5,8
2950	288,0	4,2	351,9	6,0	446,2	8,0	540,7	10,1	707,2	8,0	863,8	10,1
3550	349,8	5,2	427,5	7,3	541,6	9,7	656,5	12,3	857,8	9,7	1048,0	12,3

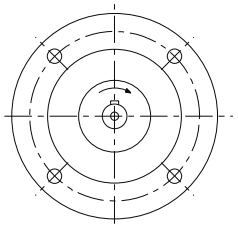
Size			025	032	038	045	052	060	070
Main dimensions	A1		342	409	455	526	576	667	736
	A2		388	439	501	596	636	765	814
	A3		360	411	462	518	574	658	748
	A4		359	410	449	523	550	622	682
	B		44	48	58	59	77	86	97
	B1		70	75	85	85	100	125	125
	C		85	85	100	117	117	145	145
	D		90	90	107	115	128	142	142
	E		138	197	206	244	276	314	373
	Mmin		150	157	173	205	252	297	323
	V1		105	105	125	125	140	160	200
	V2		100	100	125	160	190	225	240
Mounting Flange	H		4	4	5	5	5	5	5
	HG		15	15	20	20	20	30	30
	J	Dia.	145	145	165	240	240	265	265
	K	Dia.	175	175	200	275	275	300	300
	L*	Dia.	120	120	130	205	205	230	230
	LG	No.off	4	4	4	4	4	4	4
		Dia.	11	11	14	18	18	18	18
Outlet/Inlet Ports	P	Dia	25	25	32	38	48	60	60
	T	Dia	25	30	38	48	58	73	98
	R	Dia.	19	19	25	32	38	48	48
Outlet/Inlet Counter Flanges Size	P		1”	1”	1 1/4”	1 1/2”	2”	2 1/2”	2 1/2”
	T		1”	1 1/4”	1 1/2”	2”	2 1/2”	3”	4”
	R		3/4”	3/4”	1”	1 1/4”	1 1/2”	2”	2”
Shaft	W		36	36	42	58	58	82	82
	X**	Dia.	19	19	24	32	32	42	42
	Key***		6x6	6x6	8x7	10x8	10x8	12x8	12x8
Appr. Weight kg	D4F/B/T/V		10-11	12-13	14-15	24-25	33-35	48-51	66-68











Notes:

* *Tolerance ISO h7 D4 Lxxx*

** *Tolerance ISO j6*

*** *Key/keyway ISO/R773 - 1969*

Outlet/Inlet flange bolt pattern according to SAE Standard J518 for 3.000 PSI (max.) working pressure and dimensions of from IMO AB for the D4 pump available counterflanges, see page 13.

Drawing remarks:

(1) Outlet gauge. ISO G1/8. Only valid for execution code xxBP special design A434

(2) Inlet gauge. ISO G1/8. Only valid for execution code xxBP special design A434

(3) Relief valve

(4) ISO G3/8. Can be connected to an aeration-valve.

(5) Inlet port can be rotated in 90° increments to suit pipe layouts

(6) Pipe not included in IMO delivery

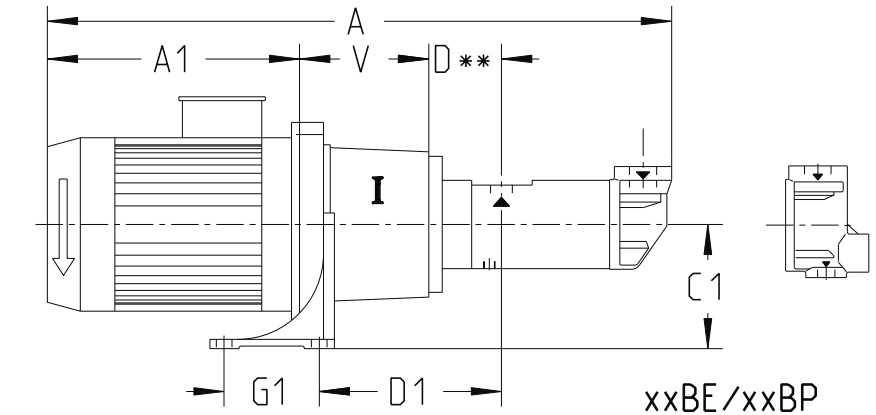
(7) Min. Oil level

(8) External return

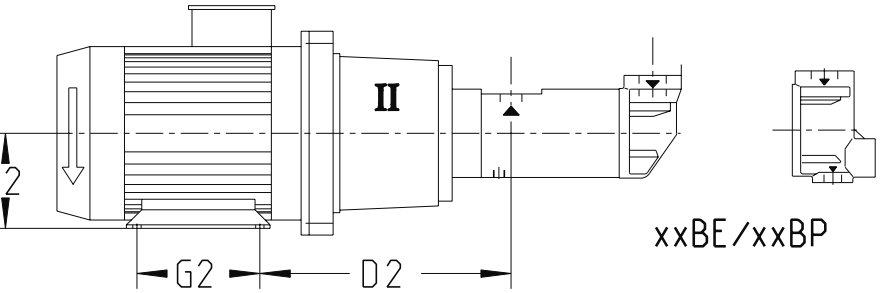
(9) Inlet

(10) Outlet

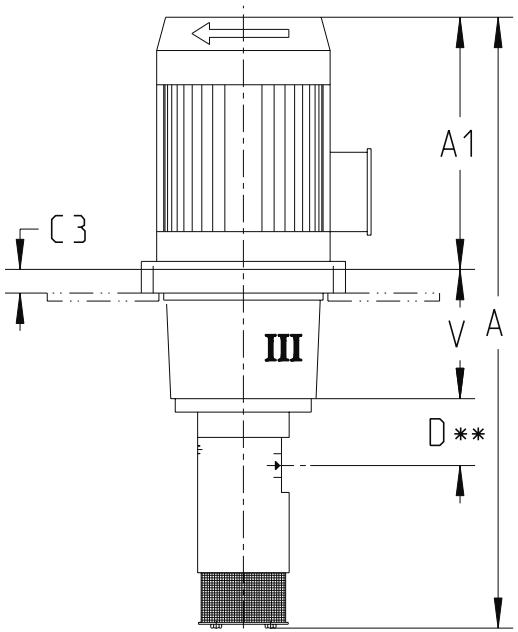
Pump size	TEFC Electric motor IEC no.	Mounting flange Flange	Unit Mount I	II	III	Approx. weight without el. motor (kg) I	II/III	Overall length A xxBE	xxBP	xxTE	xxJE	A1	V	C1	D1	G1	C2	D2	G2	C3
	80, 90	F165	•	•		14 - 15	13 - 14	745	800			350	138	126	204	95	80/90	278/284	100/125	
25	100,112	F215	•	•	•	16 - 17	15 - 16	800	855	818	967	395	148	152	217	115	100/112	301/308	140	26
	132	F265	•	•	•	19 - 20	17 - 18	862	917	880	1029	435	170	183	231	140	132	349	140/178	35
	160, 180	F300	•	•	•	23 - 26	20 - 22	1054	1109	1072	1221	597	200	210	260	170	160	398/411	210-279	37
	80/90	F165	•	•		16 - 17	15 - 16	812	861	*	*	350	138	126	204	95	80/90	278/284	100/125	
32	100,112	F215	•	•	•	18 - 19	17 - 18	867	916	869	1029	395	148	152	217	115	100/112	301/308	140	26
	132	F265	•	•	•	21 - 22	19 - 20	929	978	931	1087	435	170	183	231	140	132	349	140/178	35
	160,180	F300	•	•	•	25 - 28	22 - 24	1121	1170	1123	1279	597	200	210	260	170	160/180	398/411	210-279	37
	100,112	F215	•	•		23 - 24	21 - 22	915	963	*	*	395	165	152	251	115	100/112	335/342	140	
38	132	F265	•	•	•	24 - 25	21 - 22	980	1028	987	1147	435	190	183	268	140	132	386	140/178	35
	160,180	F300	•	•	•	28 - 30	24 - 26	1166	1216	1175	1335	597	216	210	297	170	160/180	431-444	210-279	33
	200	F350	•	•	•	36 - 37	31 - 32	1270	1318	1277	1437	700	215	240	295	200	200	455	305	34
	100,112	F215	•	•		33 - 34	32 - 33	984	1055	*	*	395	180	152	128	115	100/112	128	115	
45	132	F265	•	•		36 - 37	34 - 35	1044	1115	*	*	435	200	183	301	140	132	404	140/178	
	160,180	F300	•	•	•	40 - 42	36 - 39	1241	1312	1123	1443	597	235	210	310	170	160/180	458/471	210-279	
	200	F350	•	•	•	47 - 48	42 - 43	1339	1410	1331	1541	700	230	240	328	200	200	478	305	24
	225	F400		•	•		43 - 44	1489	1560	1481	1691	850	23O				225	494	286/311	35
	225	F400 - 140		•	•		50 - 51	1524	1595	1516	1726		265					529		
	250, 280	F500		•	•		47 - 54	1674	1745	1666	1876	1000	260				250/280	548/570	349-419	26
	132	F265	•	•		45 - 47	43 - 45	1094	1155	*	*	435	200	183	314	140	132	417	140/ 178	
	160,180	F300	•	•	•	49 - 52	45 - 49	1291	1352	1289	1517	597	235	210	323	170	160/180	471-484	210-279	
52	200	F350	•	•	•	56 - 58	51 - 53	1389	1450	1387	1615	700	230	240	341	200	200	491	305	24
	225	F400		•	•		52 - 54	1539	1600	1537	1765	850	230				225	507	286/311	35
	225	F400 - 140		•	•		59 - 61	1574	1635	1572	1800		265					542		
	250, 280	F500		•	•		56 - 64	1724	1785	1722	1950	1000	260				250/280	561-583	349-419	26
	315	F600		•	•		69 - 71	1749	1810	1747	1975	1030	260				315	604	406/457	35
	160, 180	F300	•	•	•	65 - 70	62 - 66	1380	1483	*	*	597	261	210	377	170	160/180	511-524	210-279	
	200	F350	•	•	•	72 - 75	67 - 70	1492	1595	1483	1744	700	270	240	395	200	200	545	305	24
60	225	F400		•	•		69 - 72	1637	1740	1628	1889	850	265				225	556	286 /311	35
	225	F400 - 140		•	•		72 - 75	1672	1775	1663	1924		300					591		25
	250, 280	F500		•	•		78 - 87	1822	1925	1813	2074	1000	300				250/280	610-632	349-419	21
	315	F600		•	•		86 - 89	1847	1950	1838	2099	1030	295				315	653	406 /457	30
	315	F600 - 170		•	•		98 - 101	1887	1990	1878	2139		335					693		
70	160, 180	F300	•	•		83 - 87	80 - 83	1449	1533	*	*	597	261	210	377	170	160/180	511-524	210-279	
	200	F350	•	•	•	90 - 92	85 - 87	1561	1645	1573	1830	700	270	240	395	200	200	545	305	24
	225	F400		•	•		87 - 89	1706	1790	1718	1948	850	265				225	556	286/311	35
	225	F400 - 140		•	•		90 - 92	1741	1825	1753	2010		300					591		25
	250, 280	F500		•	•		96 - 104	1891	1975	1903	2160	1000	300				250/280	610-632	349-419	21
	315	F600		•	•		104 - 106	1916	2000	1928	2185	1030	295				315	653	406/457	30
	315	F600 - 170		•	•		116 - 118	1956	2040	1968	2225		335					693		



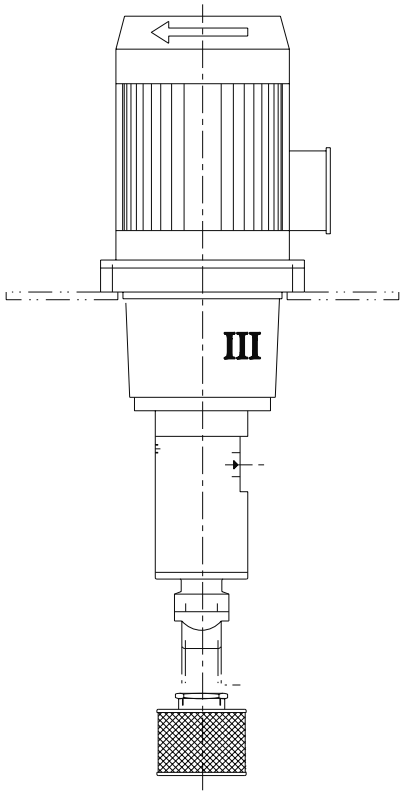
xxBE/xxBP



xxBE/xxBP



xxTE



xxJE

Remarks:

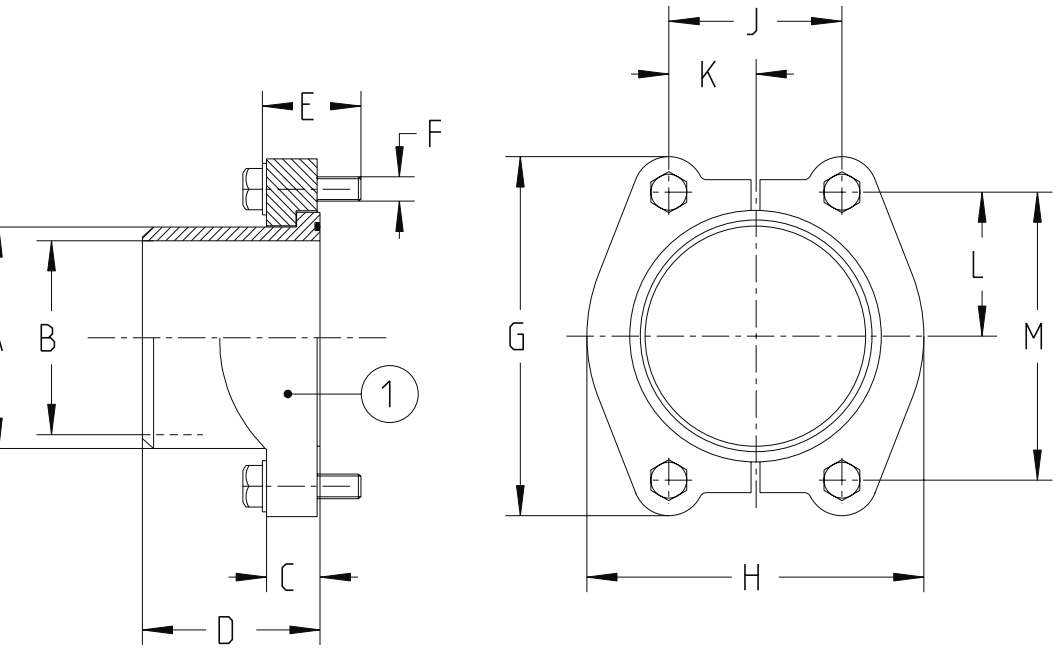
1. *TEFC = totally enclosed (IP 54) Fan Cooled (IC 41). For other motor types compare mounting flange size with column "Mounting Flange".*
2. *Denomination of electric motor mounting flange (= connecting frame size) refers to pitch diameter of holes for mounting bolts and length of the longer motor shaft (if more than one shaft length per IEC No.).*

* *Can not be mounted as a complete pump aggregate through the hole in the tanktop*

** *Identical to dimension D of pump dimension table on page 8*

3. *Dimensions A and A1 may vary with make of electric motor.*
4. *D4 xxJE: Overall length A corresponds to min length of pump inlet pipe.*
5. *For certain motor sizes the motor mounting flange projects (max 25 mm) below the motor foot.*
6. *Size 045 with F215 in Unit Mount I: Frame angle bracket mounted with the floor fastening bolts under the connecting frame (reversed position compared to that shown in Unit Mount I).*

Flange	Weld Connection Dimensions							Common Dimensions				
size	A	B	C	D	E	G	H	F	J	K	L	M
3/4”	27	20	14	40	30	66	52	M10	22.4	11.2	23.9	47.8
1”	38	25	16	45	35*	70	59	M10**	26.2	13.1	26.2	52.4
1 1/4”	43	32	14	50	35*	80	73	M10	30.2	15.1	29.4	58.7
1 1/2”	50	40	16	50	40*	94	84	M12	35.8	17.9	34.9	69.8
2”	62	50	17	55	40*	101.5	97	M12	43	21.5	39	78
2 1/2”	72	60	19	75	45	114	109	M12	51	25.5	44.5	89
3”	90	75	22	85	55	135	131	M16	62	31	53	106
4”	114	100	26	90	55	162	152	M16	78	39	65	130



Notes:

* *Pipe weld connection set size 1", 1 1/4", 1 1/2" and 2" for the D4 xxBP valve discharge port has dimension E 5 mm shorter than stated value.*

** *M8 for use on original designs N1 and L1.*

Pipe weld connection set comprising pipe weld "O" ring SAE JS 18 split flange and bolts- bolts in steel property Class ISO 8.8 and with min. length E.

Drawing remarks:

(1) Weld connection

10. Accessories

For the D4 xxBE, xxBP, xxJE and xxTE pumps, following standard accessories are available:

- Circular frame for connecting the pump to flange/foot mount IM 2001 and flange mount IM 3011 IEC Standard electric motors
- Circular frame with angle foot for connecting the pump to IM 3001 IEC Standard electric motor
- Flexible shaft coupling
- Inlet/ outlet counter flange set for pipe weld connection or pipe thread connection
- For version NTBP: gauge panel

11. Maintenance

Spare parts for these pumps are easily available from stock. For detailed information and know-how about service, see the Maintenance & Service Instruction for D4 pumps or contact IMO AB.

01 GB

For latest updates, check:
www.imo.se

001 GB