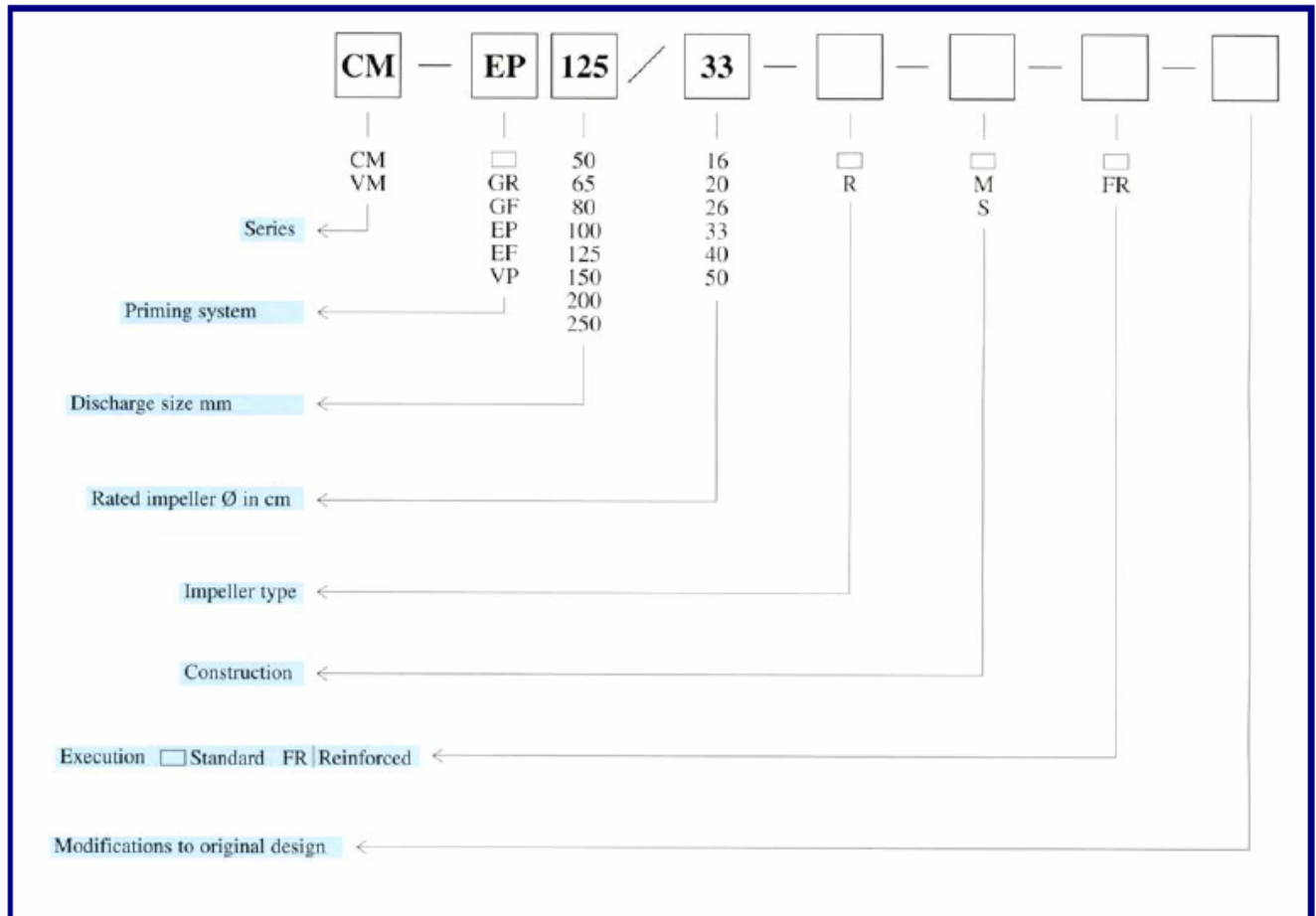


VERTICAL IN-LINE PUMPS SERIES CM-VM



DESCRIPTION



Main pump

Vertical one stage centrifugal pumps, IN-LINE execution. The pump can be assembled on small spaces as suction and discharge flanges are In-Line. The impeller is mounted in a reversed way, with upwards looking suction. This enables a better balance of the axial forces acting on the pump shaft supporting ball bearings.

Priming pump

Liquid ring priming pump, with high suction capacity. Compact and studied design with simple maintenance and repair.

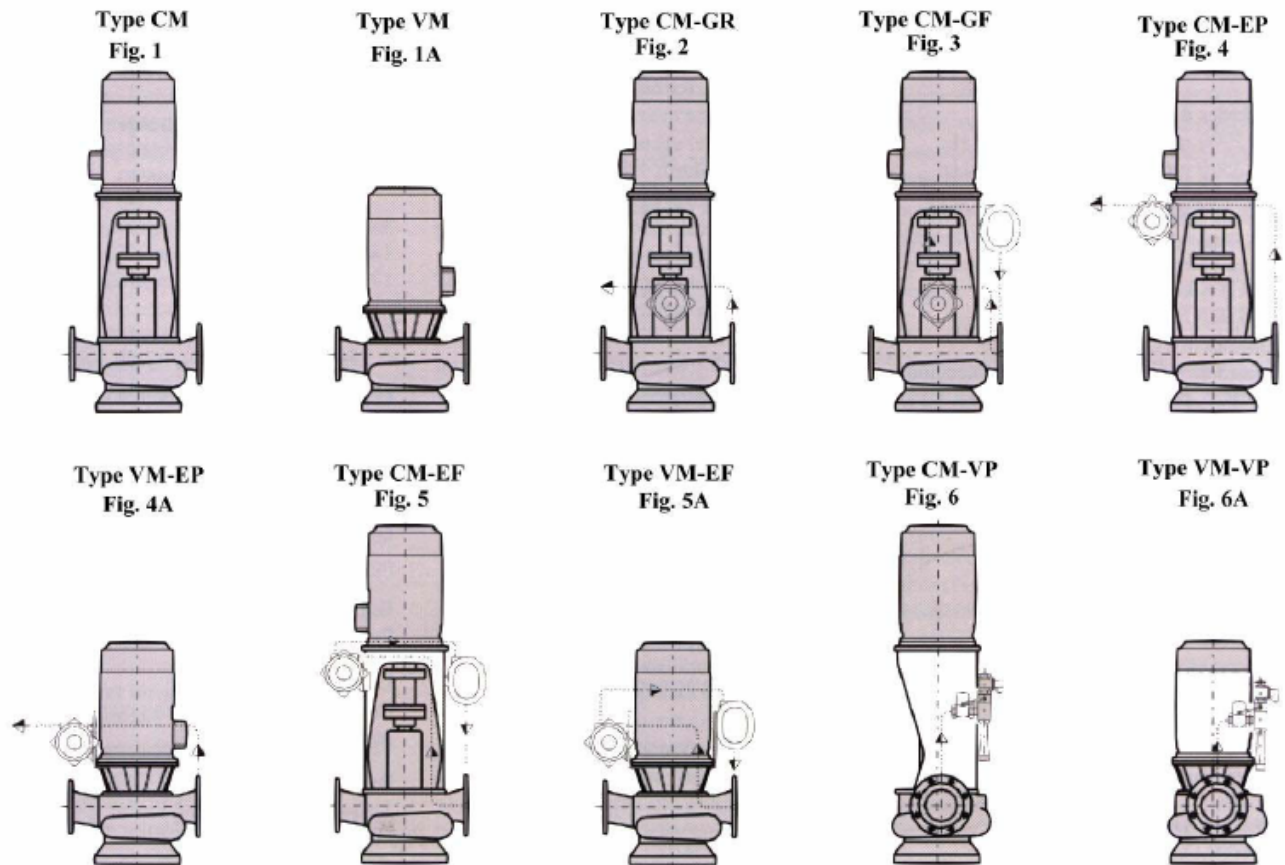
Executions

CM series (CM, CM-GR, CM-GF, CM-EP, CM-EF and CM-VP)

With flexible coupling and spacer coupling, the inner parts (impeller, mechanical seal, etc.) can be easily dismantled without any suction or discharge pipe removal, nor the electric motor from its location. This version simplifies the maintenance and repair tasks making possible the disassembly on minimum space. The pump shaft rotates over widely sized ball bearings. Under requirement, for severe applications and extreme loads, there is the possibility to use the reinforced execution FR, with oversized shaft and ball bearings.

VM series (VM, VM-EP, VM-EF and VM-VP)

Rigid coupling between pump and motor, with dismantlable and interchangeable added shaft. The access to pump inner part is enabled, without any suction and discharge pipe removal, raising upwards the motor and inner part assembly set. Compact set with reduced dimensions.



CM and VM Fig. 1 and 1A:
Without priming pump.

CM-GR Fig. 2:
With priming pump and manual control valve for “priming” and “work” positions selection. Priming pump driven by main pump shaft and conical gears.

CM-GF Fig. 3:
Identical to CM-GR but, with automatic set into service, once the priming stage is over

CM-EP and VM-EP Fig. 4 and 4A:
With priming pump and automatic unit stop, once the priming stage is over. Priming pump driven by electric motor.

CM-EF and VM-EF Fig. 5 and 5A:
Identical to CM-EP and VM-EP, but with mechanical purger with float, to avoid the outside liquid discharge by the priming pump during its operation.

CM-VP and VM-VP Fig 6 and 6A:
Priming system by means of venturi ejector driven by air pressure.

Operating Features

Maximum liquid temperature

Standard version: 90°C

Under requirement: 130°C

Rotating Speeds

1450/2900 rpm for 50 Hz.

1750/3500 rpm for 60 Hz.

Rotating sense

Counterclockwise, seen from the motor.

Constructive features

Driving

By electric motors, IP 55 protection or IP 23, according to IEC, V1 execution for main pump and B3/B5 for priming pump.

Shaft seal

Standard version: mechanical seal.

Lubrication

By grease, with greasers for periodical filling

Connection flanges

Up to size DN 150 included: DIN 2501 PN 16.

From size DN 200 included: DIN 2501 PN 10.

Priming systems

Operation

The offered different priming systems are basically divided in the following different executions:

GR execution Fig. 7

Including a manual control 3-way valve on priming pump discharge. The 1st stage starts with the 3-way valve on suction position, extracting air from pump casing and suction pipe. On this stage the priming pump discharges an air and liquid mixture. When, after a while, a continuous liquid stream flows outside, the main pump is already primed.

On this moment, on the 2nd stage, the valve is set to work position. Then the priming pump discharges the liquid into the main pump casing, working on a closed loop. On these conditions the unit is ready to fulfill its service.

GF execution Fig. 8

On this execution the manual control 3-way valve is replaced by a mechanical purger with float, having the same mission but in an automatic way, without any foreign action. The floater assembled on the purger, depending on the liquid level inside it, opens the air discharge duct on the 1st stage, and the liquid return duct on main pump suction on the 2nd stage.

This priming system has the advantage of its automatic operation and also that no pumped liquid is discharged outside.

EP execution Fig. 9

The priming electro pump is controlled by a pressure switch, delay contactors and a motor protection starter.

On the 1st stage, just after the unit start up, the priming pump starts evacuating on the air outside. Once the 1st stage is over and the main pump primed, the discharge pressure increases, opening the pressure switch. This gives the order to stop the priming pump, which is stopped after the delayed time. The delay contactor task is to retard the stop, in order to ensure a perfect main pump priming. This delay time can be changed and it is normally set to 30 to 60 seconds. If for any reason, the centrifugal pump gets unprimed, the pressure goes down closing the pressure switch, which gives the order to start the priming pump, repeating all the cycle.

Optionally, the main pump start can be delay form the priming start with another delayed contactor. An electromagnetic valve, normally closed, is assembled on the priming pump inlet, to avoid outside continuous liquid discharge from the priming pump outlet when the unit is stopped. This situation happens when the pump works “on load”, that means the liquid level is above the pump. This event is very common in every kind of vessels. The motor protecting starter and delay contactors are not supplied on the standard supply.

EF execution Fig. 10

System and operation similar to EP execution. The only difference is that it includes also a mechanical purger with float on the priming pump discharge, to avoid the outside liquid exit.

Note: The described priming systems with liquid ring pump do not include a service liquid connection. The service liquid avoids the priming capacity reduction due to liquid temperature rise into the pump. For priming times below 60 seconds, it is not necessary any service liquid. In case of longer priming times, it must be consulted.

VP execution Fig. 11

Priming system based on a venturi ejector, driven by 5 to 7 bar air pressure. The vacuum created by the airflow on the ejector sucks the air on the 1st stage. Once the main pump is primed, the pressure on the pump discharge open the pressure switch and after the delayed time by the delay contactor, an electromagnetic valve closes the ejector air inlet. On that moment, the pneumatic valve closes the connection between pump and ejector, being the pump ready for its service.

Optionally, the main pump start can be delayed form the ejector start with another delay contactor. The described delay contactors are not supplied on the standard supply.

Materials

Volute casing	Bronze G-CuSn5ZnPb (Rg5)	GG25
Impeller	Bronze G-CuSn5ZnPb (Rg5)	GG25
Casing cover	Bronze G-CuSn5ZnPb (Rg5)	GG25
Shaft	Stainless steel X5CrNiMo18.10 (AISI 316)	Stainless steel X5CrNiMo18.10 (AISI 316)

Under requirement the pump components are available in different materials as nodular cast iron, stainless steel, other kinds of bronze etc.

Applications

The design of these pumps enables its application on services where the small space is a critical question. These vertical In-Line pumps can be assembled on straight pipelines. The pump inner parts as impeller, mechanical seal, ball bearings, wear rings etc. are easily accessible without any need for suction and discharge pipe removal.

On the CM series, moreover it is not necessary to disassembly the motor, nor the electrical connections. Fig. 12 and 12A.

Some application fields are:

Marine

- General services: bilge, ballast, deck wash or fire fighting
- Fresh water and seawater cooling of: main engine, auxiliary, gearbox etc.
- Brine circulation and transfer
- Water circulation on condensers and f.w. generators
- Air conditioning and freezing services
- Harbor and shipyard services

General applications

- Power plants
- Air conditioning and heating
- Cooling systems
- Water supply
- Irrigation systems
- Clear or lightly charged liquid pumping

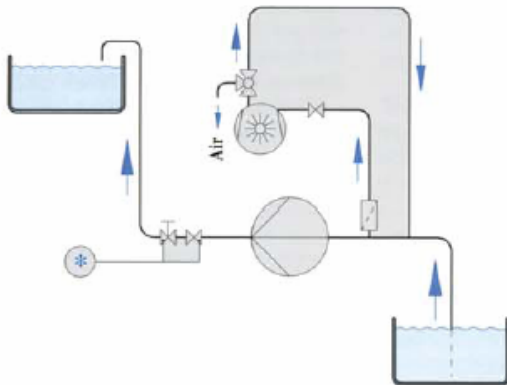
Pump type selection

On the performance graphs, select the available frequency, 50 or 60 Hz and the desired speed (rpm).

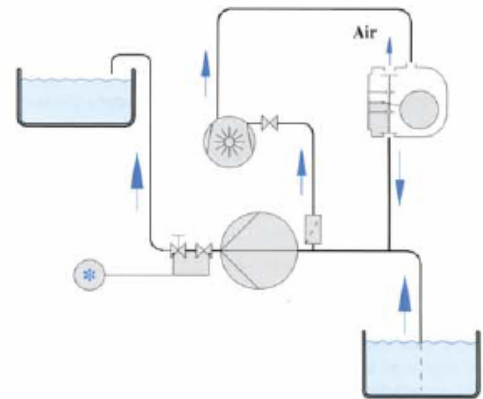
With the required capacity Q and manometric head H preselect the suitable type or types.

For the final selection, check the individual pump curves. These curves indicate the efficiency (%), impeller diameter, consumed power P , capacity Q , head H and NPSH required.

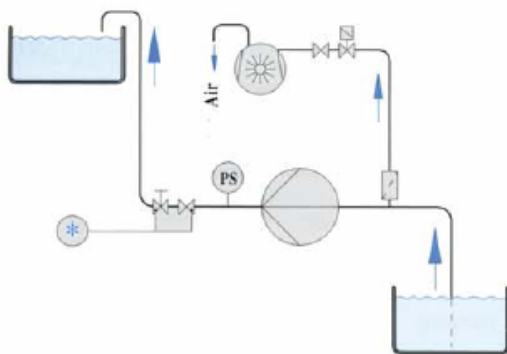
PRIMING SYSTEM



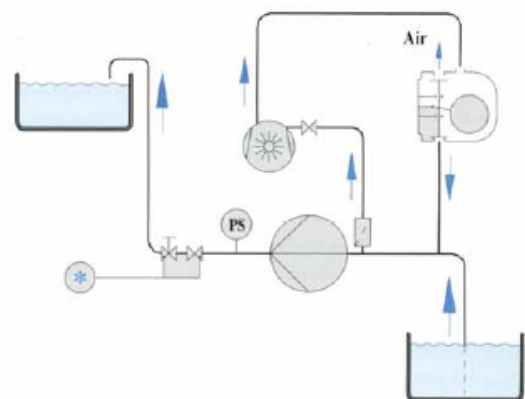
Version GR
Fig. 7



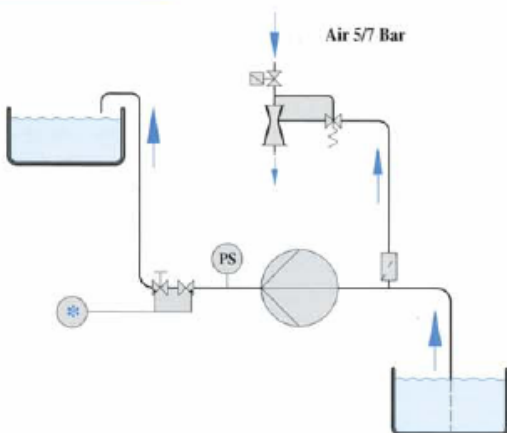
Version GF
Fig. 8



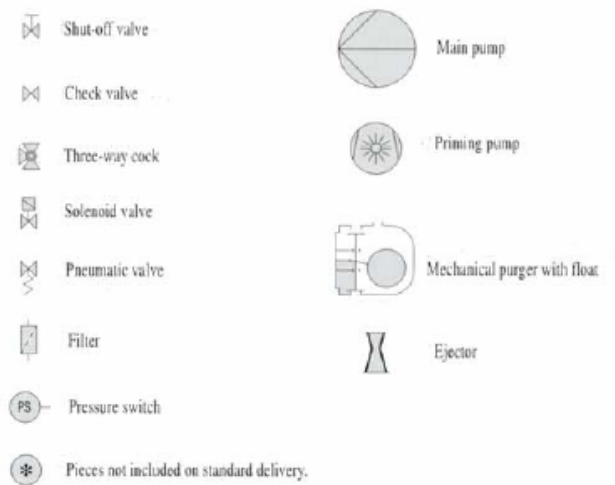
Version EP
Fig. 9



Version EF
Fig. 10



Version VP
Fig. 11



DISASSEMBLY

Series CM

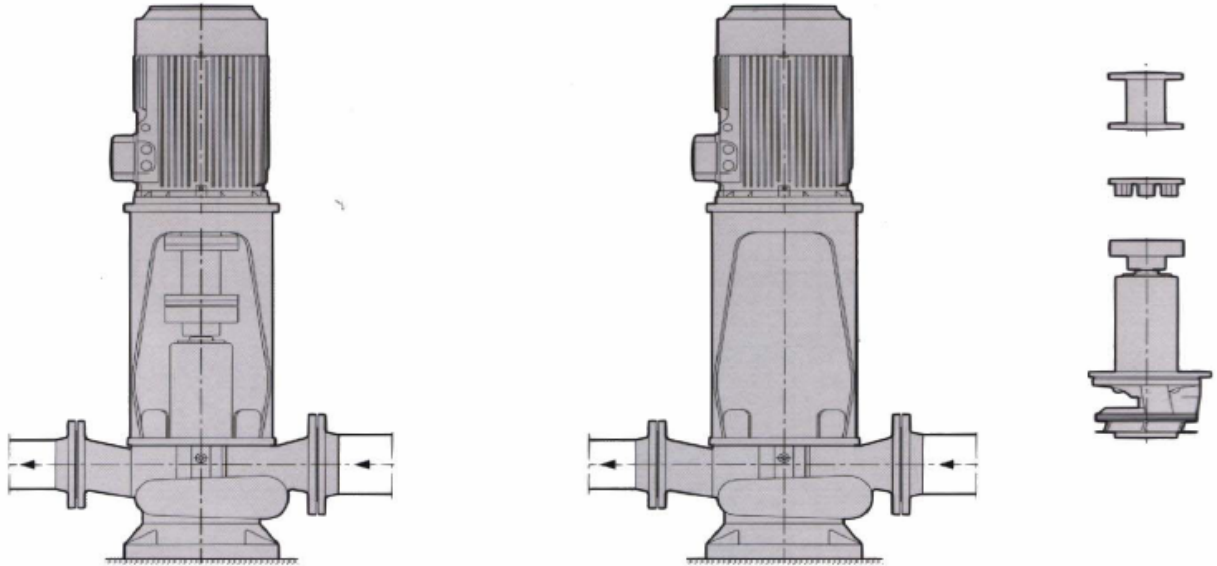


Fig. 12

Series VM

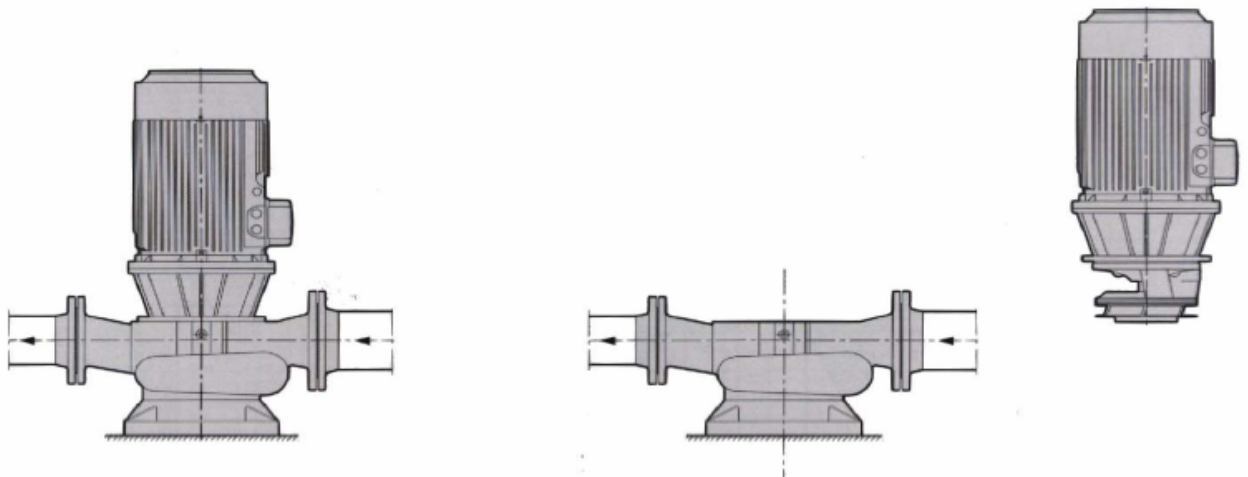
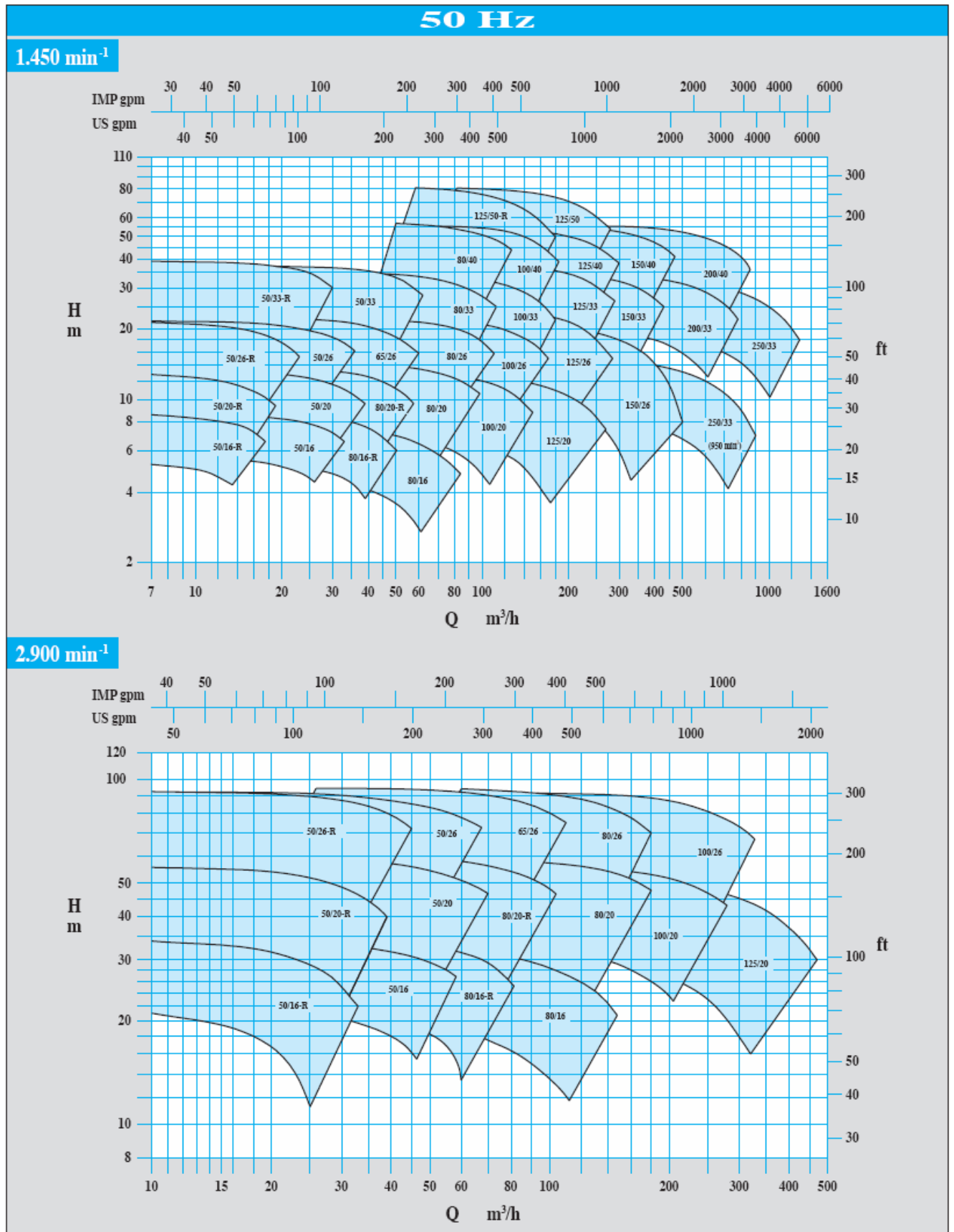
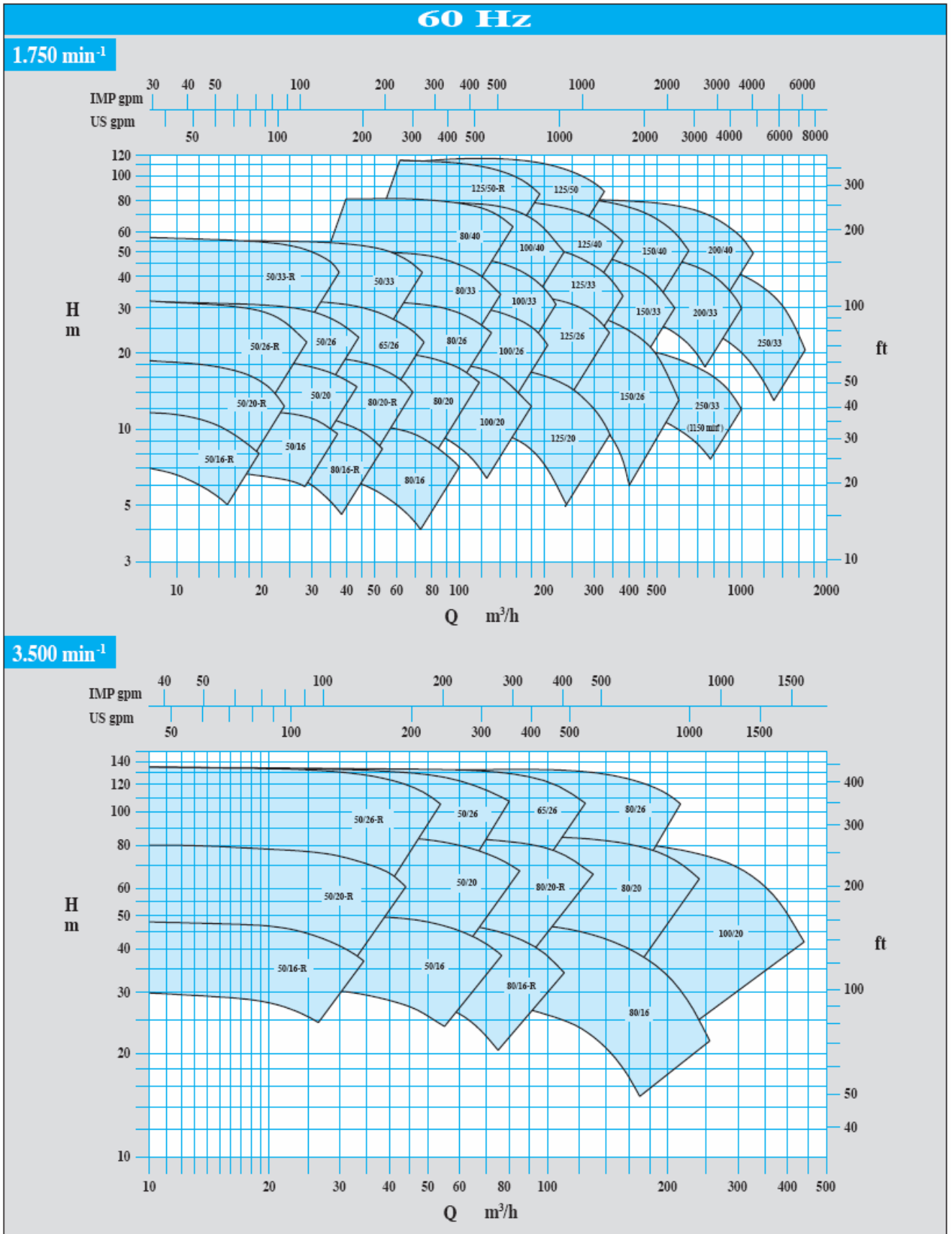


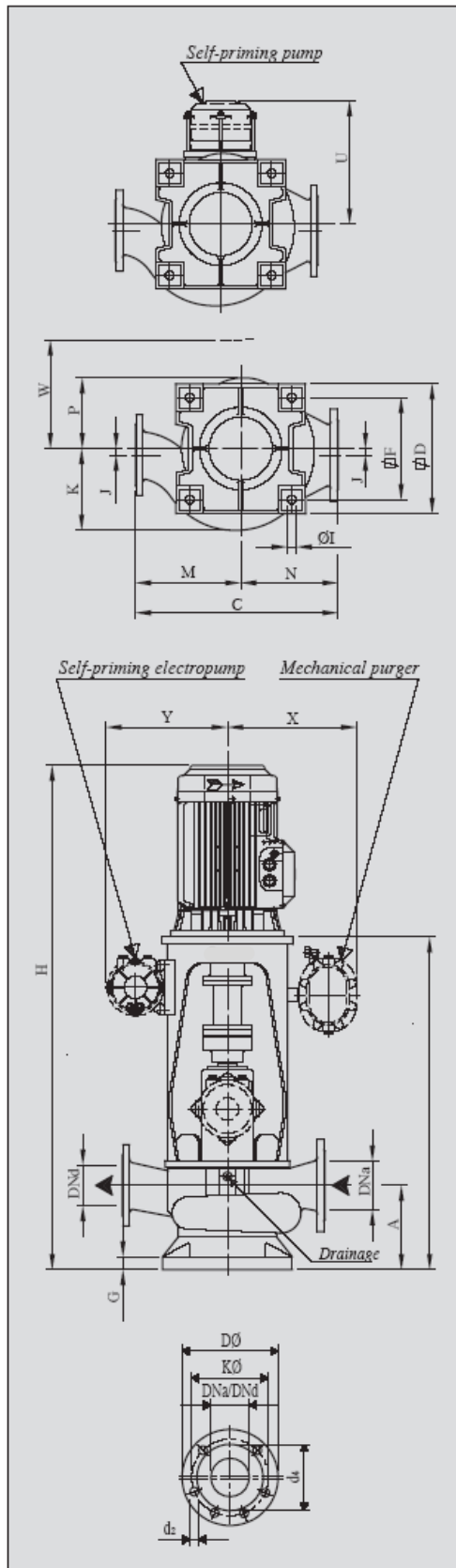
Fig. 12A

PERFORMANCE GRAPHS





DIMENSIONS CM SERIES



Subject to alterations

TYPE	DNa	DNd	A	B	D	F	G	I	J	M	N	C	K	P	U	W	X	Y	H	Kg
50/16 (R)	65	50	175	905	300	250	40	21	10	190	190	300	175	-	369	725	330	405	1185 1435	100
50/20 (R)	65	50	170	905	300	250	40	21	10	225	235	460	175	-	369	750	365	440	1165 1485	135
50/26 (R)	65	50	196	970	400	315	40	28	80	240	250	490	-	-	369	750	385	460	1215 1600	195
50/33	65	50	185	980	400	315	40	28	65	275	275	550	235	-	381	850	425	500	1320 1680	195
65/26	80	65	218	990	400	315	40	28	10	275	275	550	225	-	369	750	385	460	1230 1690	200
80/16 (R)	100	80	185	910	300	250	40	21	10	225	225	450	175	-	369	725	365	440	1190 1490	135
80/20 (R)	100	80	180	930	300	250	40	21	10	250	240	490	225	-	369	750	365	440	1190 1635	145
80/26	100	80	240	1030	400	315	40	28	20	300	300	600	275	-	381	775	385	460	1245 1805	185
80/33	100	80	230	1010	500	405	40	28	65	325	325	650	275	-	381	850	425	500	1350 1910	235
80/40	100	80	225	1015	500	405	40	28	65	350	350	700	-	-	381	900	450	525	1545 1715	265
100/20	125	100	225	1020	400	315	40	28	80	250	250	500	275	-	381	775	385	460	1265 1720	200
100/26	125	100	230	1055	400	315	40	28	10	300	300	600	275	-	381	775	385	460	1365 1950	195
100/33	125	100	235	1010	500	405	40	28	60	330	330	660	-	-	381	850	425	500	1540 2010	240
100/40	125	100	232	1190	500	405	40	28	10	405	380	785	275	-	391	925	450	525	1690 1965	360
125/20	150	125	255	1040	400	315	40	28	20	325	300	625	225	-	381	775	385	460	1285 1740	225
125/26	150	125	260	1030	400	315	40	28	20	325	300	625	255	210	381	775	385	460	1560 1660	205
125/33	150	125	280	1230	500	405	40	28	20	350	350	700	330	-	391	875	425	500	1780 2330	310
125/40	150	125	280	1215	500	405	40	28	20	425	400	825	300	290	391	925	450	525	1845 2115	375
125/50 (R)	150	125	265	1235	625	515	30	28	80	425	400	825	335	-	391	975	500	575	2100 2335	590
150/26	200	150	276	1250	500	405	40	28	80	315	315	630	300	-	391	875	425	500	1780 1950	350
150/33	200	150	292	1225	500	405	40	28	20	375	350	725	275	-	391	875	425	500	1805 2000	360
150/40	200	150	260	1265	500	405	40	28	80	400	375	775	330	290	391	925	450	525	1925 2265	385
200/33	250	200	249	1275	500	405	40	28	20	400	375	775	350	-	391	875	425	500	1945 2275	390
200/40	250	200	262	1300	500	405	40	28	20	525	500	1025	365	290	391	875	425	500	2070 2430	440
250/33	300	250	290	1350	500	405	40	28	80	400	400	800	375	290	391	925	450	525	2115 2350	475
250/40	300	250	290	1350	625	515	30	28	80	525	500	1025	410	330	391	950	500	575	2250 2450	550

"W": Minimum necessary space for pump disarming.

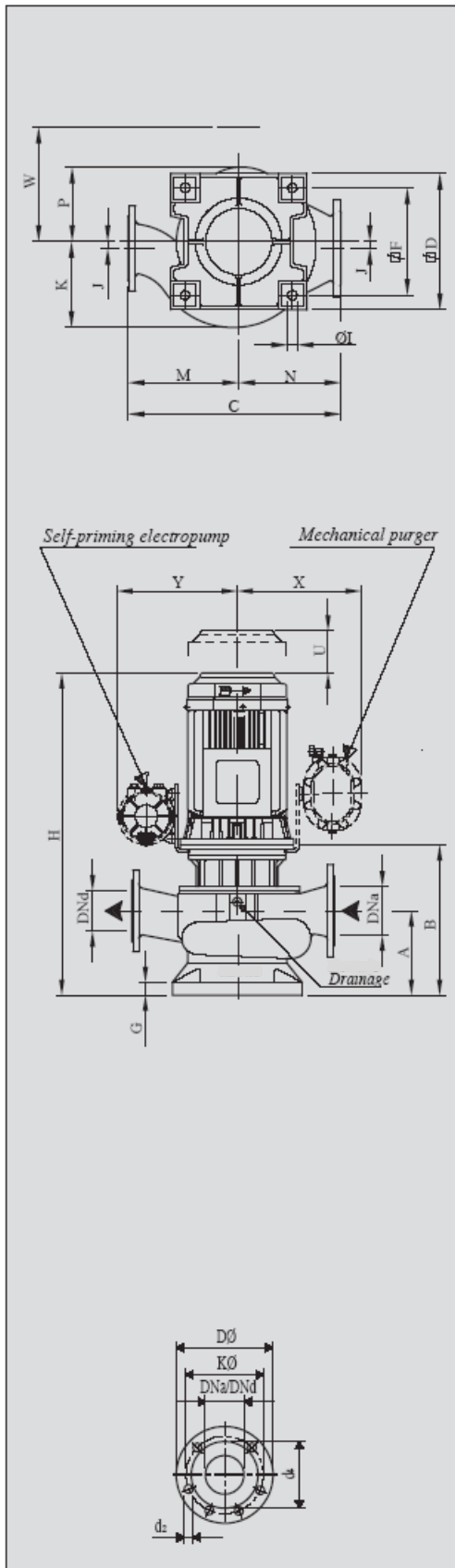
"H": Aproximate maximum and minimum total height for the different possible motors.

WEIGHTS: For CM series, without motor. CM-GR series add 28 kg.
CM-GF series add 42 kg. CM-EP series add 48 kg.

DNa	DNd	50	65	80	100	125	150	200	250	300
d1		102	122	138	158	188	212	268	320	370
KØ		125	145	160	180	210	240	295	350	400
DØ		165	185	200	220	250	285	340	395	445
Nº		4	4	8	8	8	8	8	12	12
d2		18	18	18	18	18	22	22	22	22

DN 50, 65, 80, 100, 125, 150 DIN 2501, PN 16
DN 200, 250, 300 DIN 2501, PN10

VM SERIES



Subject to alterations

TTYPE	DNa	DNd	A	B max.	D	F	G	I	J	M	N	C	K	P	U	W	Y	X	H max.	Kg
50/16 (R)	65	50	175	375	320	250	40	21	10	190	190	380	-	-	190	450	365	390	945	59
50/20 (R)	65	50	170	410	320	250	40	21	10	225	235	460	-	-	190	450	390	415	980	75
50/26 (R)	65	50	196	436	400	315	40	28	80	240	250	490	-	-	190	565	390	415	980	90
50/33	65	50	185	410	400	315	40	28	65	275	275	550	210	-	190	565	390	415	980	105
65/26	80	65	218	435	400	315	40	28	10	275	275	550	-	-	190	565	390	415	1050	135
80/16 (R)	100	80	185	420	320	250	40	21	10	225	225	450	-	-	210	450	390	415	990	75
80/20 (R)	100	80	180	415	320	250	40	21	10	250	240	490	175	-	190	450	390	415	1030	75
80/26	100	80	240	425	400	315	40	28	20	300	300	600	-	-	200	565	390	415	1040	115
80/33	100	80	230	420	520	405	40	28	65	325	325	650	-	-	200	565	390	415	1035	145
80/40	100	80	225	400	520	405	40	28	65	350	350	700	-	-	200	565	390	415	1015	170
100/20	125	100	225	440	400	315	40	28	80	250	250	500	-	-	210	565	390	415	1055	125
100/26	125	100	230	440	400	315	40	28	10	300	300	600	215	-	210	565	390	415	1055	130
100/33	125	100	235	410	520	405	40	28	60	330	330	660	-	-	225	565	390	415	1025	155
125/20	150	125	255	440	400	315	40	28	20	325	300	625	225	-	225	565	390	415	1055	145
125/26	150	125	260	430	400	315	40	28	20	325	300	625	255	210	225	565	390	415	1045	140

"W": Minimum necessary space for pump dismatling.

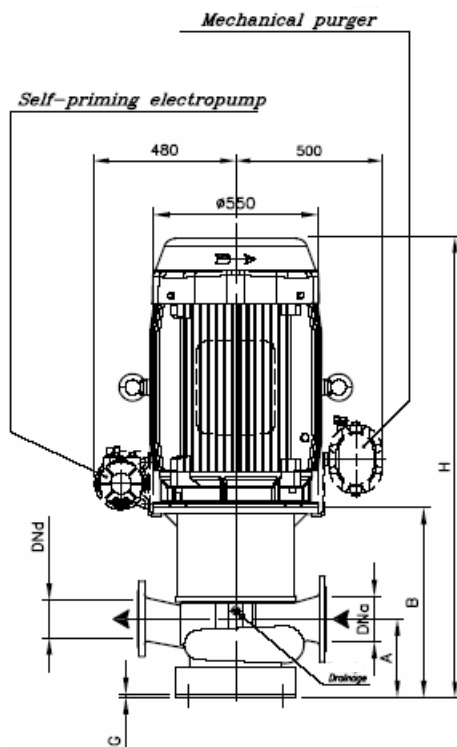
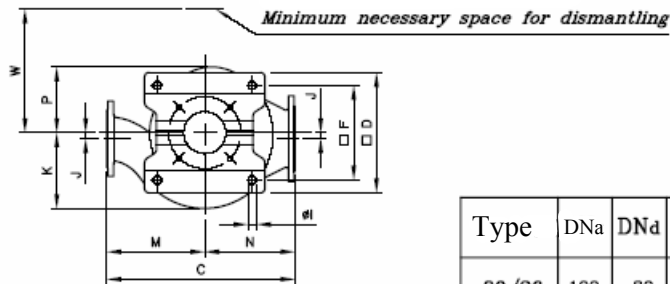
"H": Aproximate maximum total height for the different possible motors.

WEIGHTS: For VM series. without motor. VM-EP series add 48 kg. VM-EF series add 62 kg.

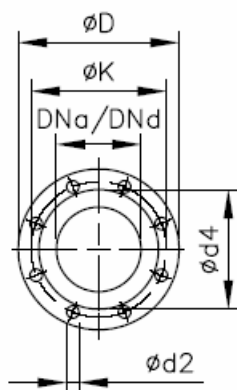
DNa	DNd	50	65	80	100	125	150
d4		102	122	138	158	188	212
KØ		125	145	160	180	210	240
DØ		165	185	200	220	250	285
Nº		4	4	8	8	8	8
d2		18	18	18	18	18	22

DN 50, 65, 80, 100, 125, 150 DIN 2501, PN 16

VM SERIES



Type	DNa	DNd	A	B	D	F	G	I	J	M	N	C	K	P	W	H
80/26	100	80	240	600	400	315	10	28	20	300	300	600	-	-	775	1600
80/33	100	80	230	590	520	405	10	28	65	325	325	650	-	-	850	1590
100/26	125	100	230	625	400	315	10	28	10	300	300	600	215	-	775	1525
100/33	125	100	235	610	520	405	10	28	60	330	330	660	-	-	850	1610
125/40	150	125	280	698	520	405	10	28	20	425	400	825	-	-	925	1798
125/50	150	125	265	690	625	515	12	28	80	425	400	825	-	-	975	1690
150/33	200	150	292	704	520	405	10	28	20	375	350	725	-	-	875	1479
150/40	200	150	260	718	520	405	10	28	80	400	375	775	330	290	925	1618
150/50	200	150	265	700	625	515	12	28	80	450	425	900	382	-	975	1700
200/33	250	200	249	733	520	405	10	28	20	400	375	775	350	-	875	1833
250/33	300	250	290	791	520	405	10	28	80	400	400	800	-	-	925	1791
250/40	300	250	270	758	625	515	12	28	80	475	500	975	405	-	950	1758



DN 80,100,125,150 ----> DIN 2501, PN16
 DN 200,250,300 -----> DIN 2501, PN10

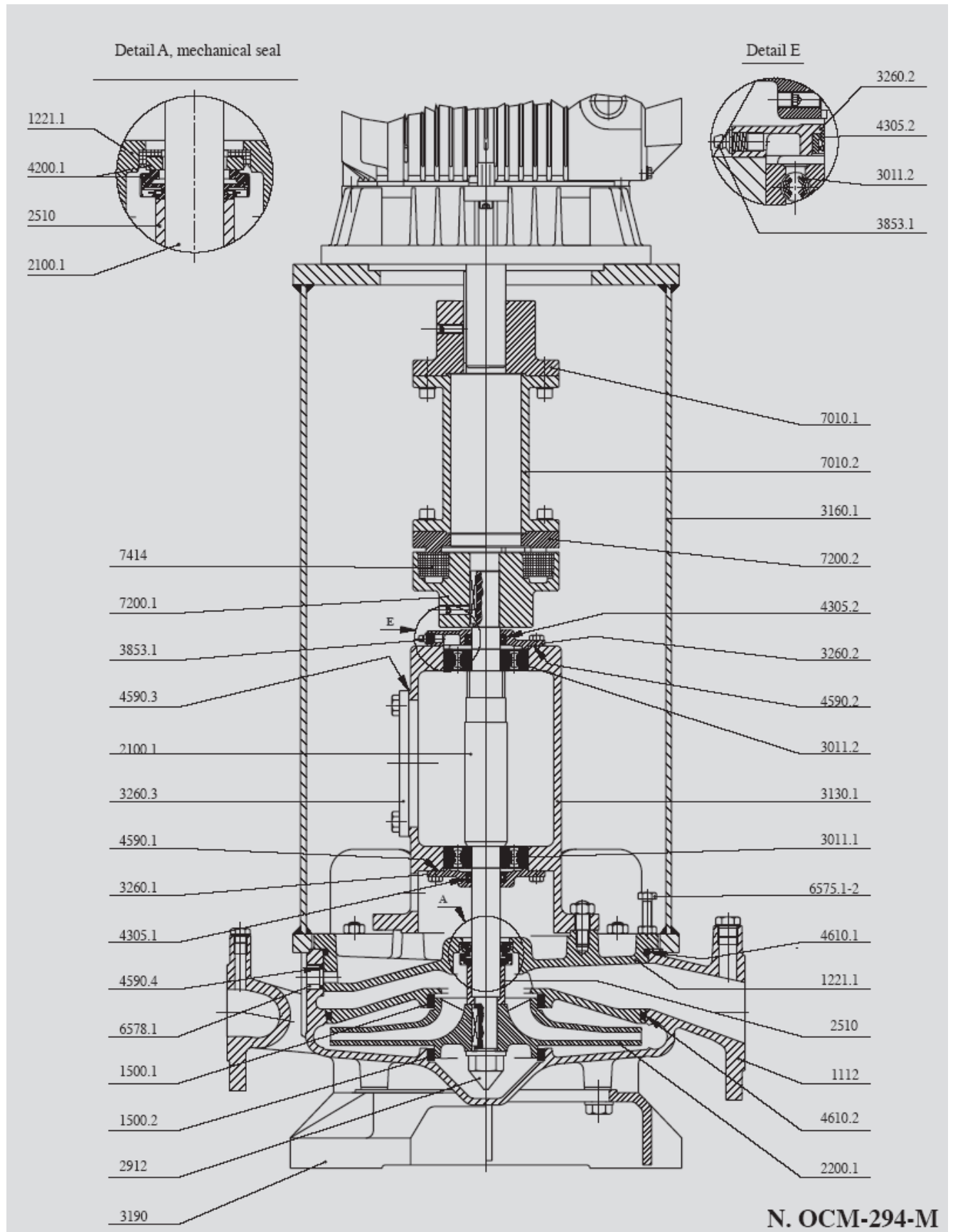
DNa DNd	80	100	125	150	200	250	300
d4	138	158	188	212	268	320	370
K	160	180	210	240	295	350	400
D	200	220	250	285	340	395	445
N ^a	8	8	8	8	8	12	12
d2	18	18	18	22	22	22	22

COMPONENTS INTERCHANGEABILITY

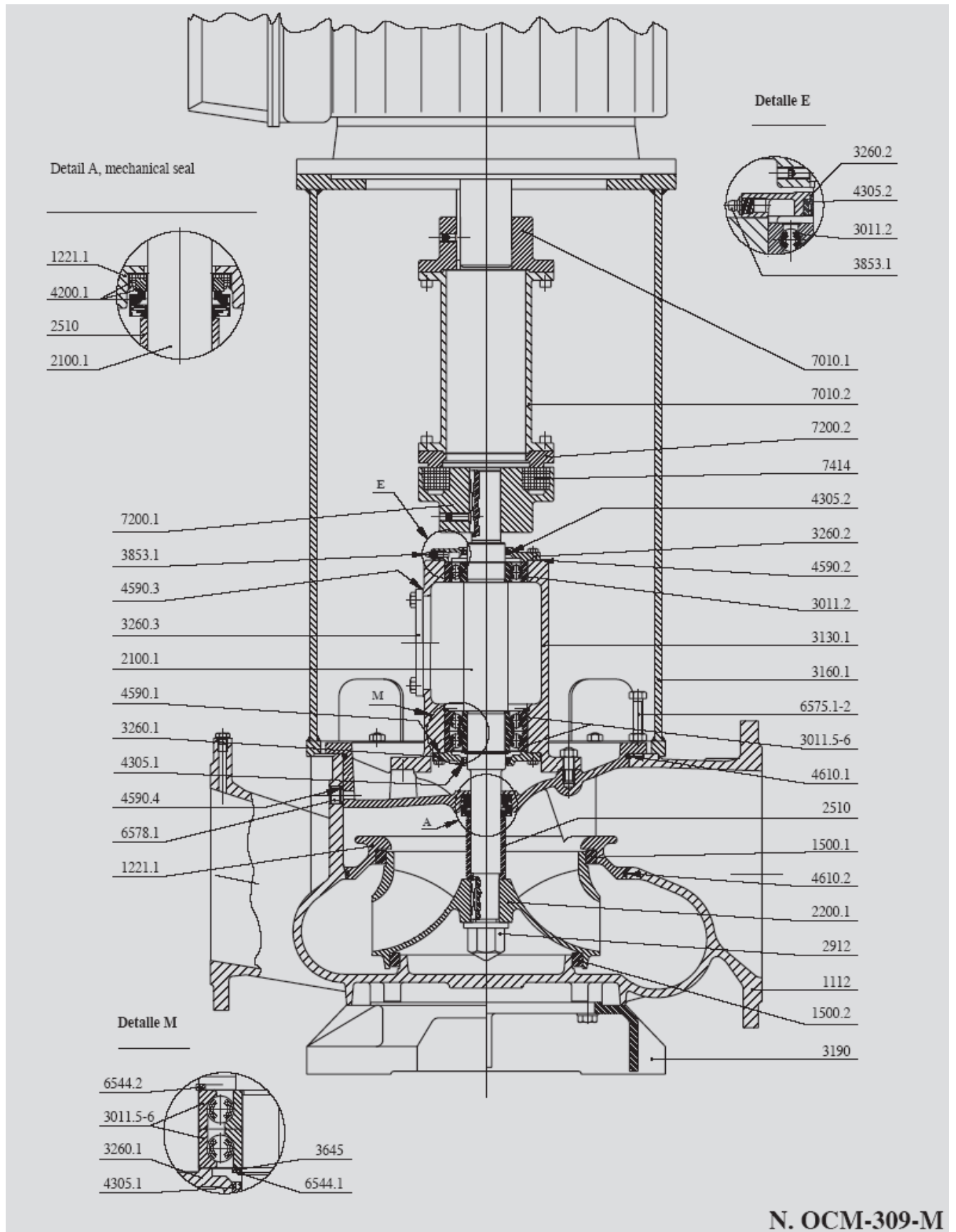
Denomination	1	1	2	3	4	1	1	1	1
	Volute casing and cover	Impeller	Shaft	Bearings	Mechanical seal	Cover wear ring	Volute wear ring	Set of joints	
Ref.	1112-1221.1	2200.1	2100.1	3011.1-2-3-4	4200.1	1500.1	1500.2		
PUMP TYPE	50/16-R	1	1	1A	1B	1	1	2	1
	50/16	1	2	1A	1B	1	3	3	1
	50/20-R	2	3	1A	1B	1	4	5	2
	50/20	2	4	1A	1B	1	3	3	2
	50/26-R	3	5	1A	1B	1	6	6	3
	50/26	3	6	1A	1B	1	3	3	3
	50/33	4	7	2A	2B	2	7	7	4
	65/26	5	8	1A	1B	1	8	8	3
	80/16-R	6	9	1A	1B	1	9	10	1
	80/16	6	10	1A	1B	1	7	7	1
	80/20-R	7	11	1A	1B	1	9	10	2
	80/20	7	12	1A	1B	1	7	7	2
	80/26	8	13	2A	2B	2	11	11	3
	80/33	9	14	2A	2B	2	7	7	4
	80/40	10	15	2A	2B	2	7	7	5
	100/20	11	16	2A	2B	2	12	12	3
	100/26	12	17	2A	2B	2	13	13	3
	100/33	13	18	2A	2B	2	13	13	4
	100/40	14	19	3A	3B	3	14	14	5
	125/20	15	20	2A	2B	2	15	16	3
	125/26	16	21	2A	2B	2	15	15	3
	125/33	17	22	3A	3B	3	17	17	4
	125/40	18	23	3A	3B	3	17	17	5
	125/50-R	19	24	4A	4B	4	18	19	6
	125/50	19	25	4A	4B	4	19	19	6
150/26	20	26	3A	3B	3	20	21	7	
150/33	21	27	3A	3B	3	19	19	4	
150/40	22	28	5A	5B	5	21	22	5	
200/33	23	29	3A	3B	3	23	24	4	
200/40	24	30	5A	5B	5	23	23	5	
250/33	25	31	5A	5B	5	25	26	5	

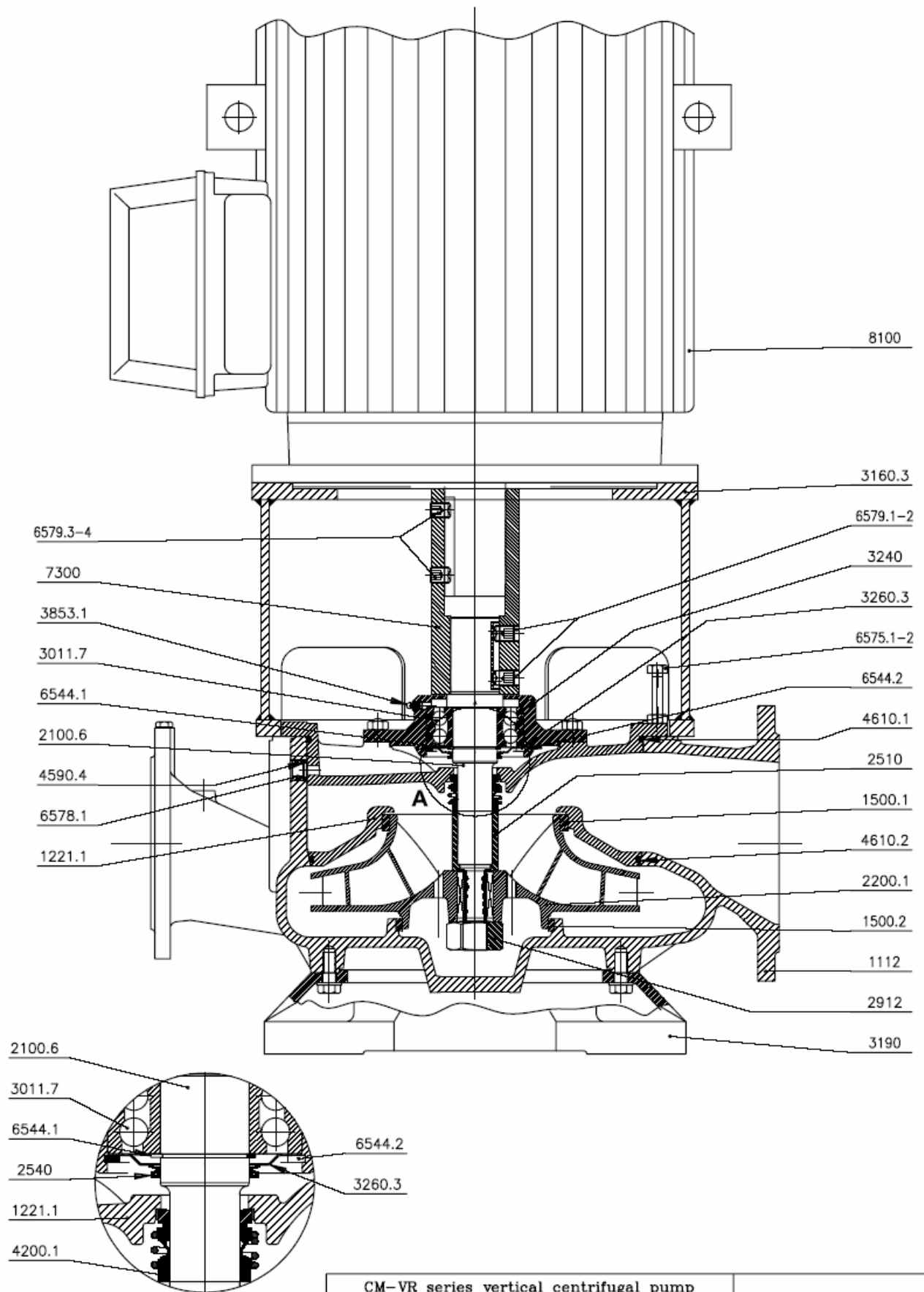
1. Same pieces for CM and VM series
2. Shaft for CM, CM-EP, VM-VP and CM-EF executions. VM series has different shafts for the same pump type, depending on the different motors
3. Shaft for CM-GR and CM-GF
4. The VM series does not include pump ball bearings

**SECTIONAL DRAWING
CM SERIES**



CM-FR SERIES



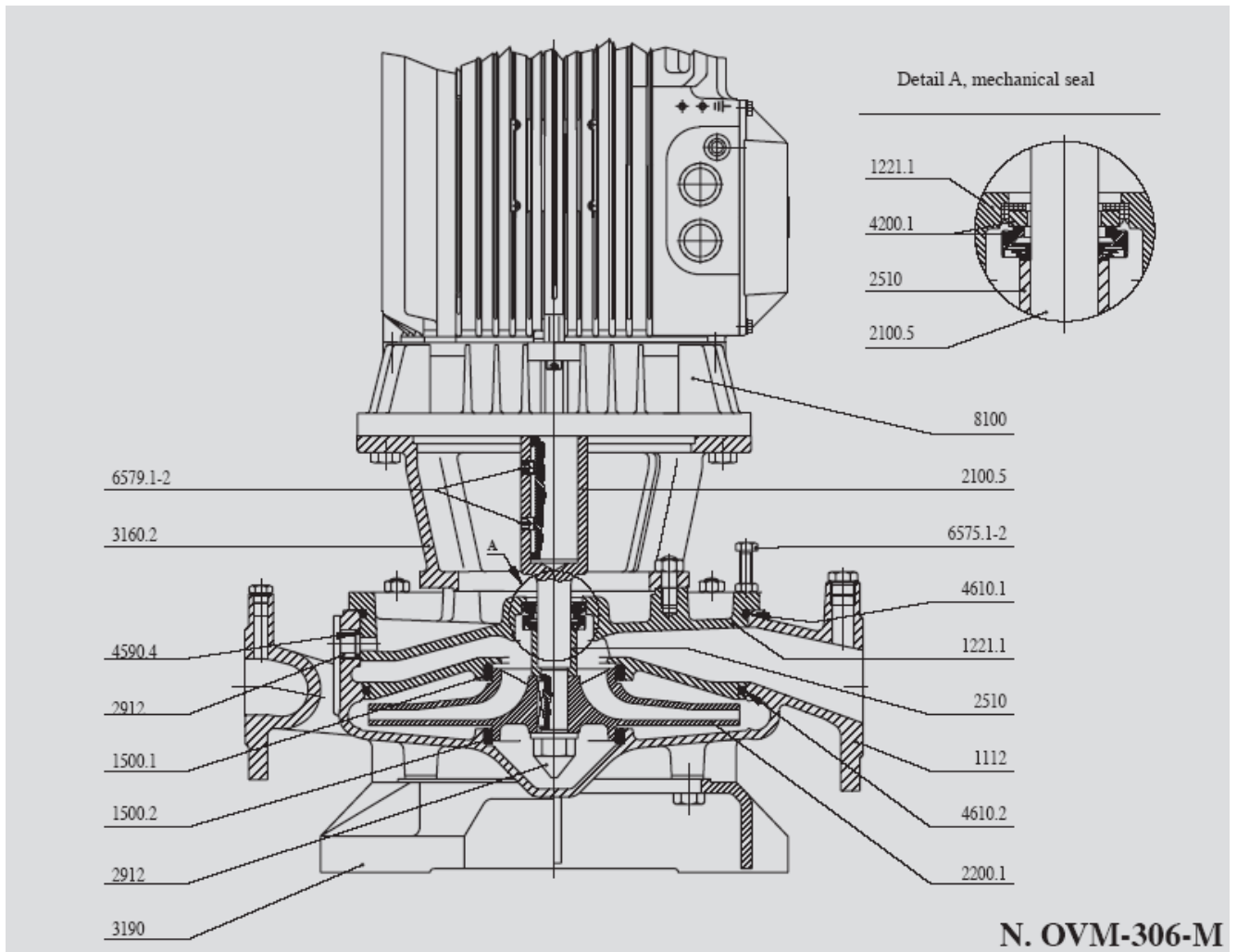


A Detail

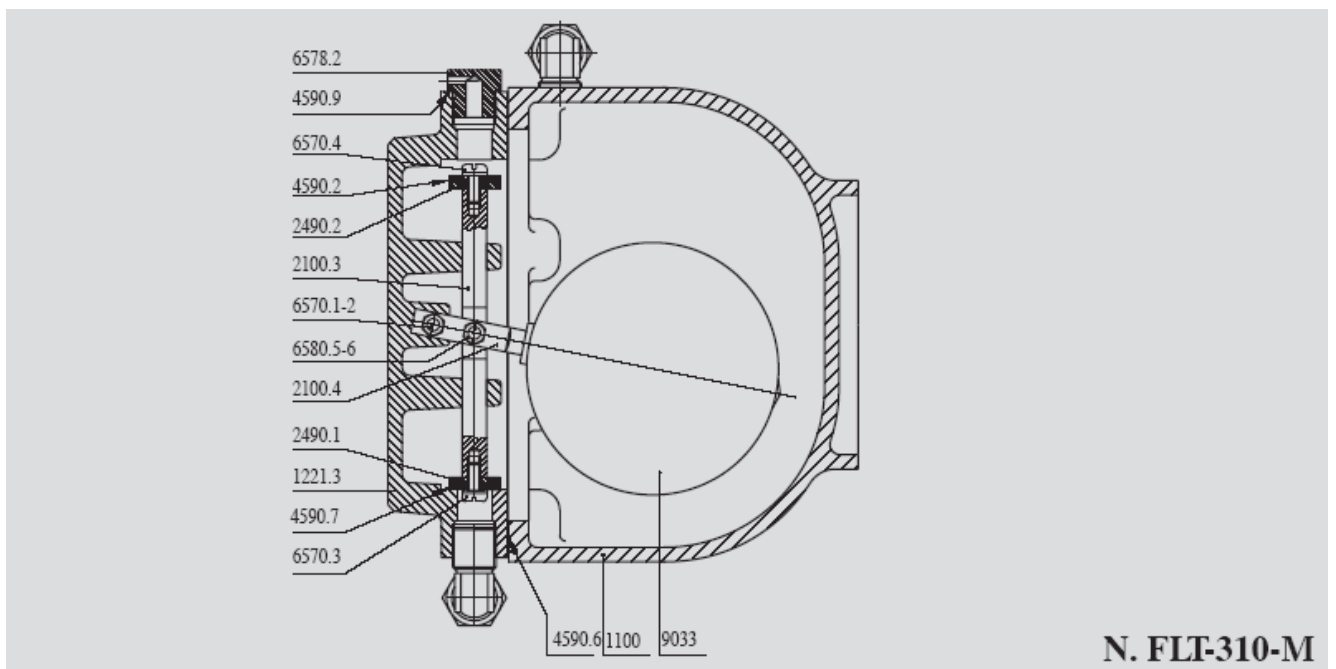
CM-VR series vertical centrifugal pump

N. OVR-384-M

VM SERIES

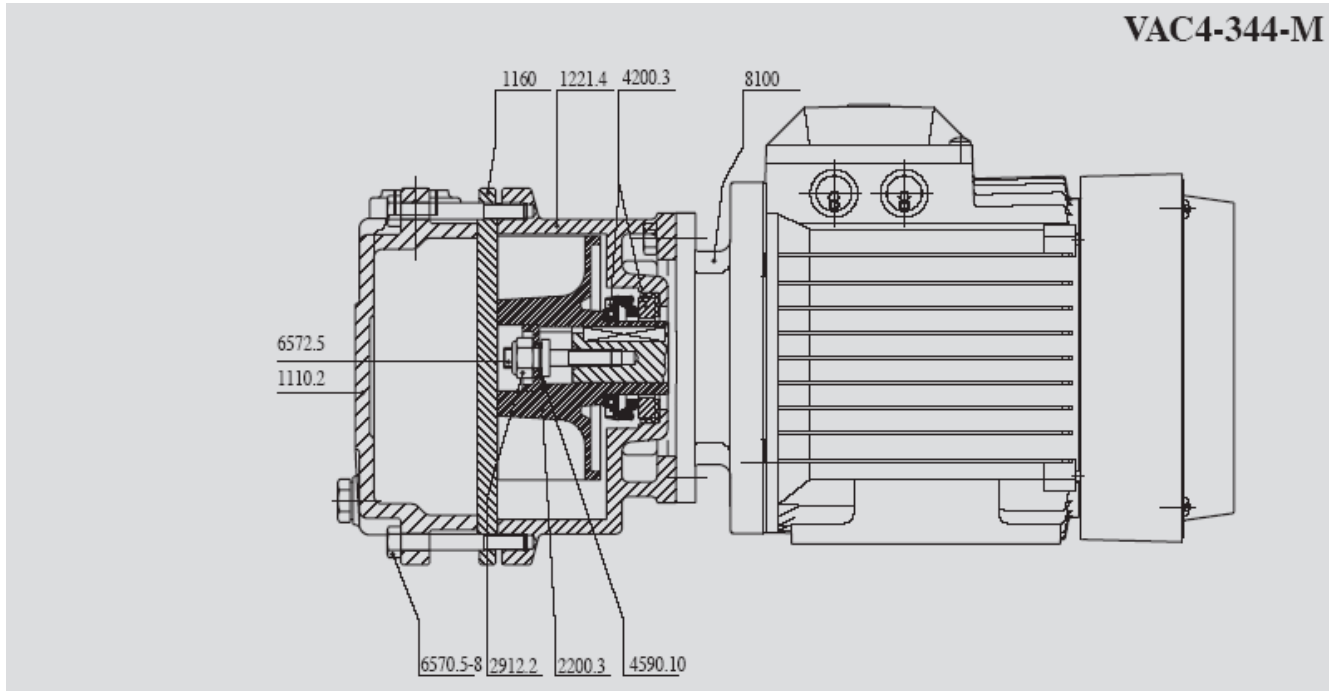


GF SERIES

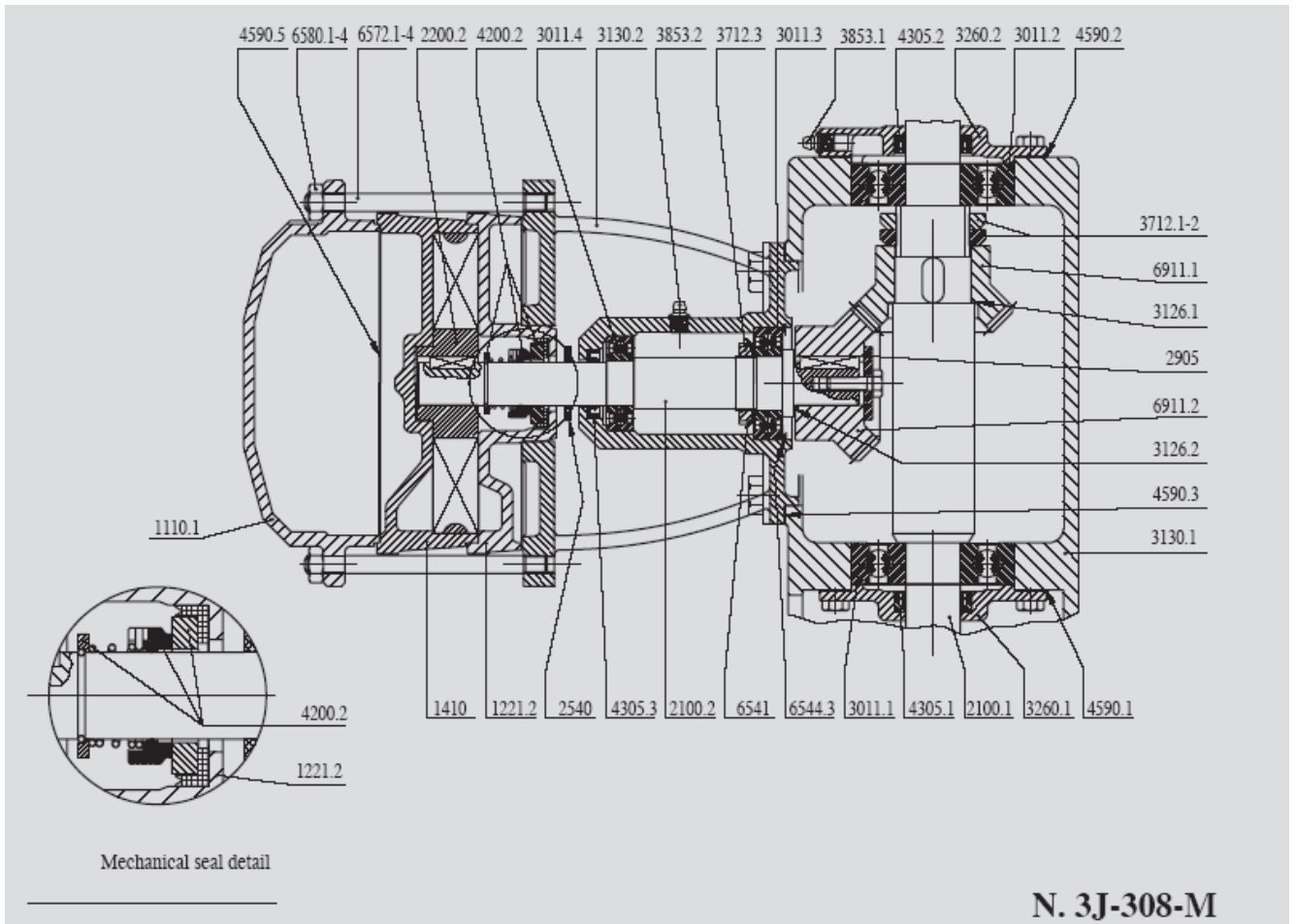


EP SERIES

VAC4-344-M



GR SERIES



N. 3J-308-M

DESCRIPTION	Ref.
Casing	1100
Pump casing	1110.1
Pump casing	1110.2
Volute casing	1112
Stage casing	1160
Casing cover	1221. 1
Casing cover	1221. 2
Casing cover	1221. 3
Casing cover	1221. 4
Diffuser	1410
Casing wear ring	1500. 1
Casing wear ring	1500. 2
Shaft	2100. 1
Shaft	2100. 2
Shaft	2100. 3
Shaft	2100. 4
Shaft	2100. 5
Impeller	2200. 1
Impeller	2200. 2
Impeller	2200. 3
Locating collar	2490. 1-2
Spacer ring	2510
Thower	2540
Washer	2905
Impeller nut	2912
Impeller nut	2912.2
Radial ball bearing	3011. 1-2
Radial ball bearing	3011. 3
Radial ball bearing	3011. 4
Radial ball bearing	3011. 5-6
Shim	3126. 1
Shim	3126. 2
Bearing bracket	3130. 1
Bearing bracket	3130. 2
Motor stool	3160. 1
Motor stool	3160. 2
Foot	3190
Bearing cover	3260. 1-2
Bearing cover	3260. 3
Disc spacer	3645
Bearing nut	3712. 1-2
Bearing nut	3712. 3
Grease nipple	3853. 1-2
Mechanical seal	4200. 1
Mechanical seal	4200. 2
Mechanical seal	4200. 3
Shaft seal ring	4305. 1-2
Shaft seal ring	4305. 3
Gasket	4590. 1-2
Gasket	4590. 3
Gasket	4590. 4
Gasket	4590. 5
Gasket	4590. 6
Gasket	4590. 7-8
Gasket	4590. 9
O-ring	4590. 10
O-ring	4610. 1
O-ring	4610. 2
Lockwasher	6541
Circlip	6544.1
Circlip	6544.2
Circlip	6544.3
Screw	6570. 1-2
Screw	6570. 3-4
Screw	6570. 5-6
Stud	6572. 1-4
Stud	6572.5
Jack screw	6575. 1-2
Threaded plug	6578. 1
Threaded plug	6578. 2
Socket head cap screw	6579. 1-2
Nut	6580. 1-4
Nut	6580. 5-6
Driving pinion	6911. 1
Driven pinion	6911. 2
Drive coupling	7010. 1
Spacer coupling	7010. 2
Coupling half	7200. 1
Coupling half	7200. 2
Coupling bush	7414
Motor	8100
Float	9033



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