

Vertical centrifugal multistage water-supply pumps

CVEV

VERTICAL CENTRIFUGAL MULTISTAGE WATER-SUPPLY PUMPS CVEV

APPLICATION

Main application of vertical pumps „CVEV“ is for water management and industrial supply of clean and slightly polluted service water.

They are intended for pumping potable and service water up to max. temperature of 60 °C and with pH values from 6 to 11, or even slightly turbid or polluted water with max. 5 g of sludge or further impurities per 1 litre of water and max. grain size of 0.5 mm.

Those pumps may be also applied to industrial, power generation and further duties for auxiliary and technological services, as pumping condensates, cooling water, and so on.

VERSIONS

Wet sump version

Basic version for direct pumping from a water supply, with arrangement of the „TEE“ discharge branch under the machine room floor or the „TEV“ one, above the floor.

Wet sump version with intermediate floor closure

With objects wherein it is necessary to expect level rise in a sump and flooding of a space below the machine floor, there a pump with special anchored closure of intermediate floor for max. upward pressures up to 4 bar may be applied. There both „TEE“ and „TEV“ discharge branches may be used.

DESIGN

Complete low-pressure centrifugal multistage pump consists of following main parts:

- Hydraulic part (lower part)
- Column pipe with a shaft and guide bearings
- Bearing suspension assembly in the pump-set (upper part)
- Vertical electric motor

Column pipe

The Shaft is carried through the wet part in journal bearings and it is lubricated with a pumped water. Through the dry part (version „TEE“) it is carried in rolling-contact bearings being grease-lubricated.

Bearing suspension assembly

Bearing suspension carries weight of the complete pump-set inclusive of a driving motor and it is mounted on the foundation frame anchored to the machine room floor. Axial thrust and the pump-set rotor weight are taken up by rolling-contact bearings grease-lubricated. In the bearing suspension space there is the driving motor shaft coupled with the pump by flexible coupling, construction of which excludes the motor rotor axial load.

MATERIAL VERSIONS

With basic version, that is, the pump is intended for pumping chemically neutral water with pH values ranging from 6.5 to 8.5, pump casings, impellers and diffusers, wear rings, bearing housings of column pipes and elements of bearing suspension are of grey cast iron.

With special version, there are impellers and spacer bushes of chrome steel. Further parts and elements are of the same materials as with the basic version. This version is intended for pumping water with natural moderate acidity (max. pH 6) and it may be applied with the pump greater sizes.

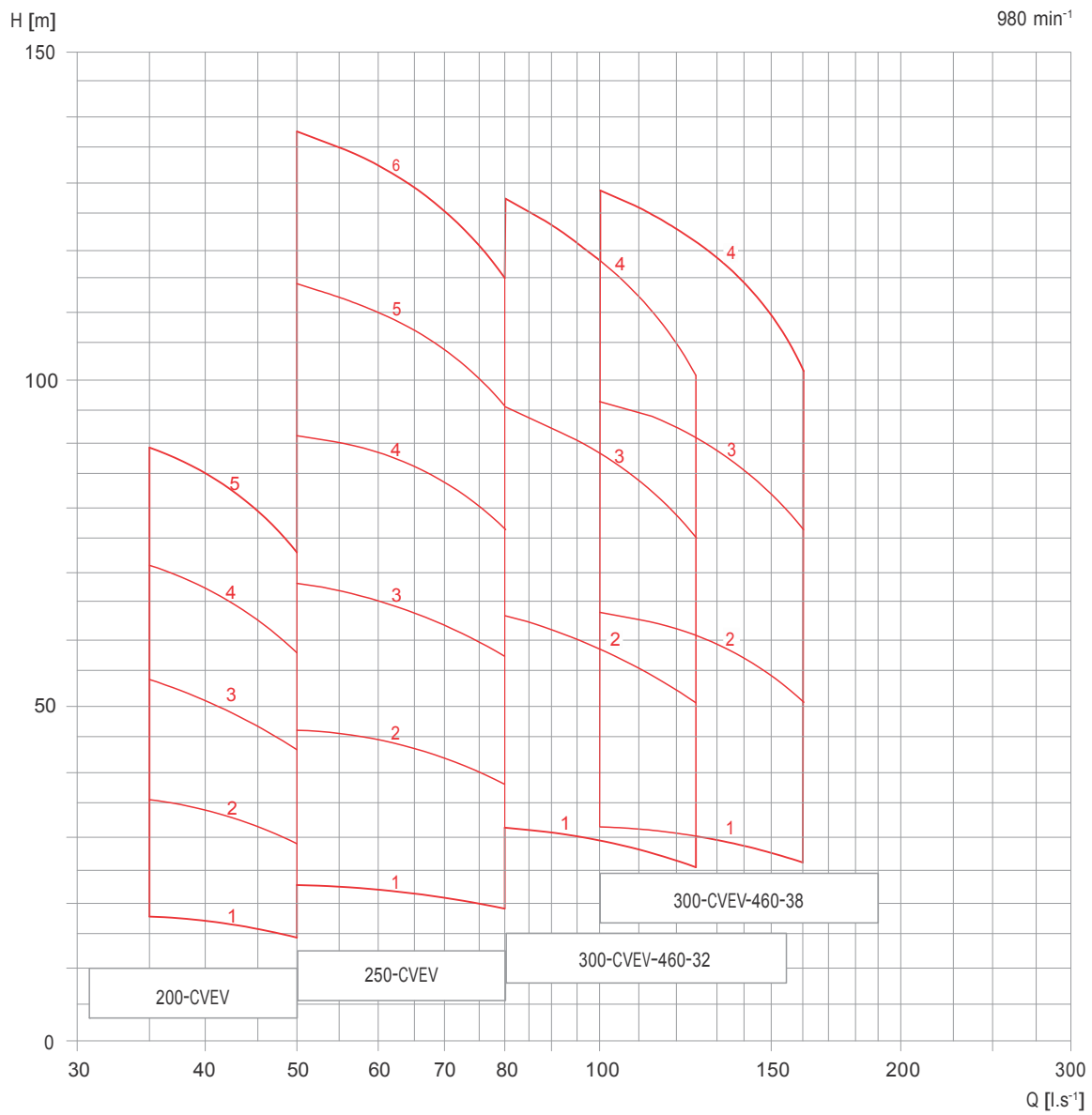
With special version, there are impellers and spacer bushes of bronze. Structure of further parts and elements are similar as with the basic version. This version may only be applied with the pump smallest sizes, that is with 50-CVEV.

With unique version, a special material and design version may be manufactured following characteristics of pumped media and whole environment. These versions may be manufactured from carbon steel, stainless steel and so on.

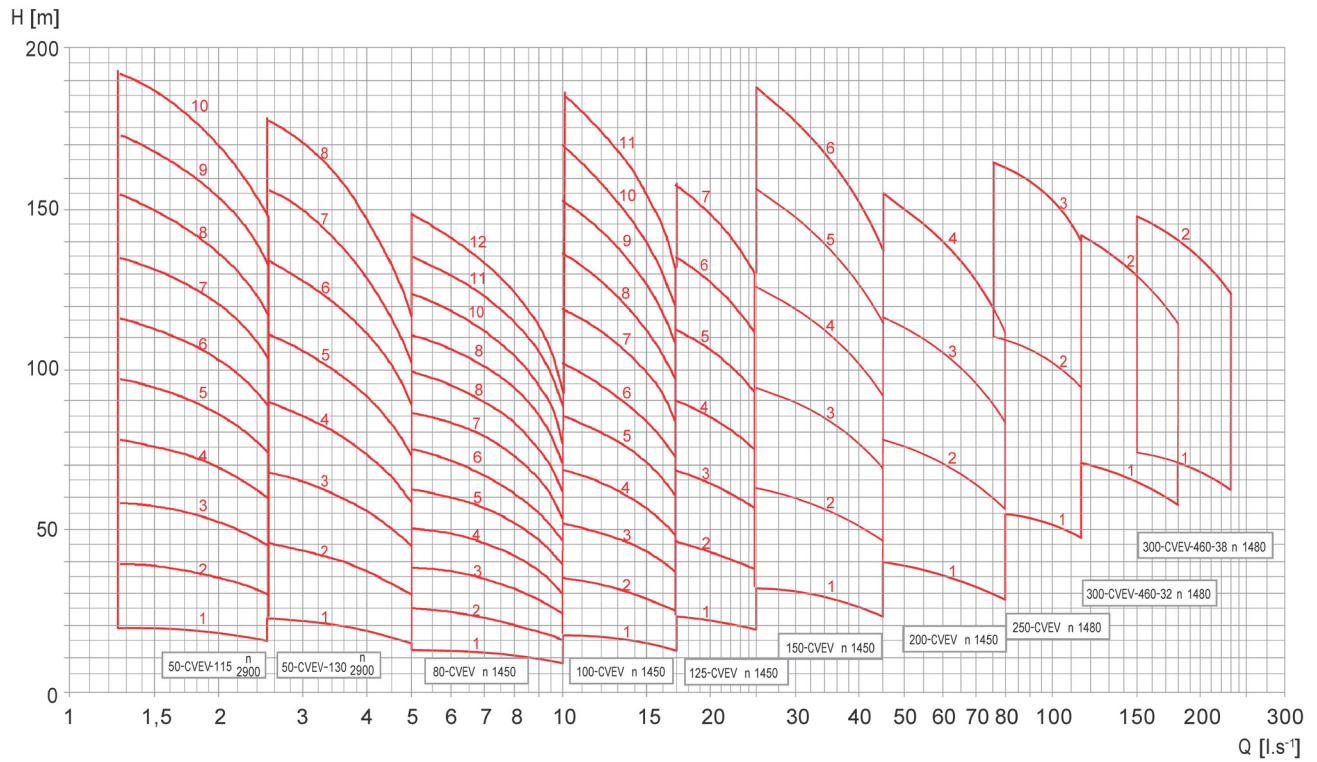
TECHNICAL AND DESIGN DATA OF PUMPS CVEV

Pump model	Speed n min ⁻¹	Number of stages	PN of discharge branch	Moment of inertia I (kgm ²)				Údaje hmotnosti pro zatížení podlahy (kg)						Max. face-to-face dimension I (m)	
				Pump + bearing suspension TEV	Pump + bearing suspension TEE	1m of column pipe L ₁	1m of column pipe L ₂	Pump + bearing suspension TEV	Pump + bearing suspension TEE	1m of column pipe L ₁	1m of column pipe L ₂	Suction strainer	1 m of suction pipe		
50-CVEV 115-5	2900	1	16	0,0146	0,0142	0,0010	0,0010	77	69	13	14	2,5	8	19	
		2		0,0160	0,0158			81	73						
		3		0,0290	0,0288			92	84						
		4		0,0304	0,0302			96	88						
		5		0,0318	0,0316			100	92						
		6		0,0331	0,0329			105	97						
		7		0,0345	0,0343			109	101						
		8		0,0359	0,0357			113	105						
		9		0,0373	0,0371			117	109						
		10		0,0385	0,0383			134	126						
50-CVEV 130-7	2900	1	16	0,0148	0,0146	0,0010	0,0010	83	75	13	14	3,8	11	19,3	
		2		0,0281	0,0279			96	88						
		3		0,0298	0,0296			103	95						
		4		0,0314	0,0312			110	102						
		5		0,0331	0,0329			117	109						
		6		0,0348	0,0346			124	116						
		7		0,0363	0,0361			133	125						
		8		0,0380	0,0378			140	132						
80-CVEV 200-10	1450	1	16	0,0195	0,0146	0,0011	0,0012	144	120	23	24	22	21	19,7	
		2		0,0365	0,0363			172	148						
		3		0,0427	0,0425			192	169						
		4		0,0489	0,0487			215	191						
		5		0,0550	0,0548			239	216						
		6		0,0612	0,0610			260	237						
		7		0,0674	0,0672			281	258						
		8		0,0736	0,0734			302	299						
		9		0,0798	0,0796			322	299						
		10		0,0860	0,0858			343	320						
		11		0,1328	0,1326			382	359						
		12		0,1388	0,1386			403	380						
100-CVEV 230-12	1450	1	10	0,0378	0,0376	0,0012	0,0015	182	145	27	35	22	21	20	
		2		0,0487	0,0485			216	178						
		3		0,0595	0,0593			256	219						
		4		0,0695	0,0693			292	255						
		5		0,0805	0,0803			329	292						
		6		0,0915	0,0913			366	328						
			7	16	0,1433	0,1432	0,0012	0,0015	412	375	27	35	22	21	20
			8		0,1543	0,1542			449	412					
			9		0,1640	0,1638			490	453					
			10		0,1750	0,1748			526	489					
			11		0,1860	0,1858			563	526					
125-CVEV 265-15	1450	1	10	0,0320	0,0310	0,0014	0,0020	252	222	34	44	32	26	20	
		2		0,0460	0,0450			293	268						
		3		0,1140	0,0450			367	336						
		4		0,1280	0,1270			413	328						
			5	16	0,1430	0,1420	0,0014	0,0020	455	425	34	44	32	26	20
			6		0,1570	0,1560			505	474					
			7		0,1730	0,1720			547	517					
150-CVEV 305-19	1450	1	10	0,0890	0,0880	0,0030	0,0030	316	304	37	45	46	35	20	
		2		0,1700	0,1690			394	383						
		3		0,2960	0,2950			484	472						
			4	16	0,3440	0,3430	0,0030	0,0030	550	538	37	45	46	35	20
			5		0,3920	0,3910			615	604					
			6		0,4400	0,4390			680	669					
200-CVEV 350-23	1450	1	10	0,2680	0,2680	0,0031	0,0030	579	429	59	75	75	54	21	
		2		0,5390	0,5380			700	552						
		3		0,7320	0,7310			801	653						
			4	16	1,4510			0,4470	989						833
			1		10			0,2700	0,2700						569
	980	2	10	0,4620		0,4620	675	526							
		3		0,7320	0,7310	801	653								
		4		0,9250	0,9240	902	755								
		5		1,1180	1,1170	1004	856								
250-CVEV 400-30	1480	1	10	0,4930	0,4920	0,0031	0,0030	698	589	75	89	103	70	20	
		2		1,3680	1,3620			1024	802						
		3		1,7540	1,7480			1313	1083						
		980	1	10	0,4160			0,4150	678						568
			2		0,8310			0,8300	829						720
			3		1,1690			1,1680	959						850
		4	16	2,0440	2,0380	1286	1063								
		5		2,3820	2,3760	1416	1194								
		6		2,7680	2,7620	1705	1475								
300-CVEV 460-32/38	1480	1	10	1,0700	1,0620	0,0104	0,0100	1074	586	104	122	83	91	20	
		2		1,4900	1,4810			1617	1301						
		980	1	10	0,5610			0,5600	1018						929
			2		1,4410			1,4330	1311						1222
		3	16	1,8610	1,8520	1853	1538								
		4		2,2320	2,2230	2140	1824								

INFORMATORY PERFORMANCE DATA OF PUMPS CVEV FOR SPEED $n=980 \text{ min.}^{-1}$

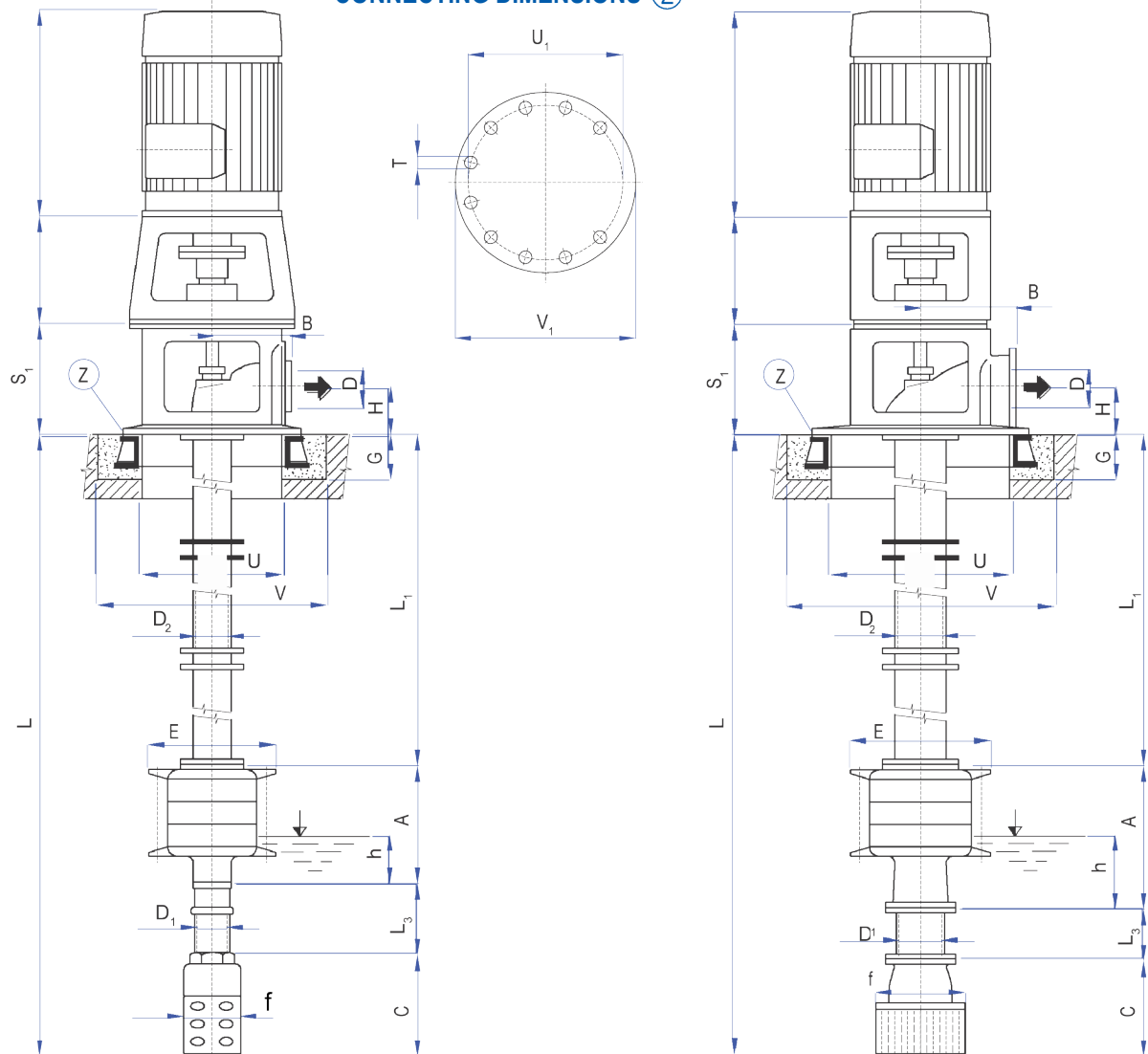


INFORMATORY PERFORMANCE DATA OF PUMPS CVEV

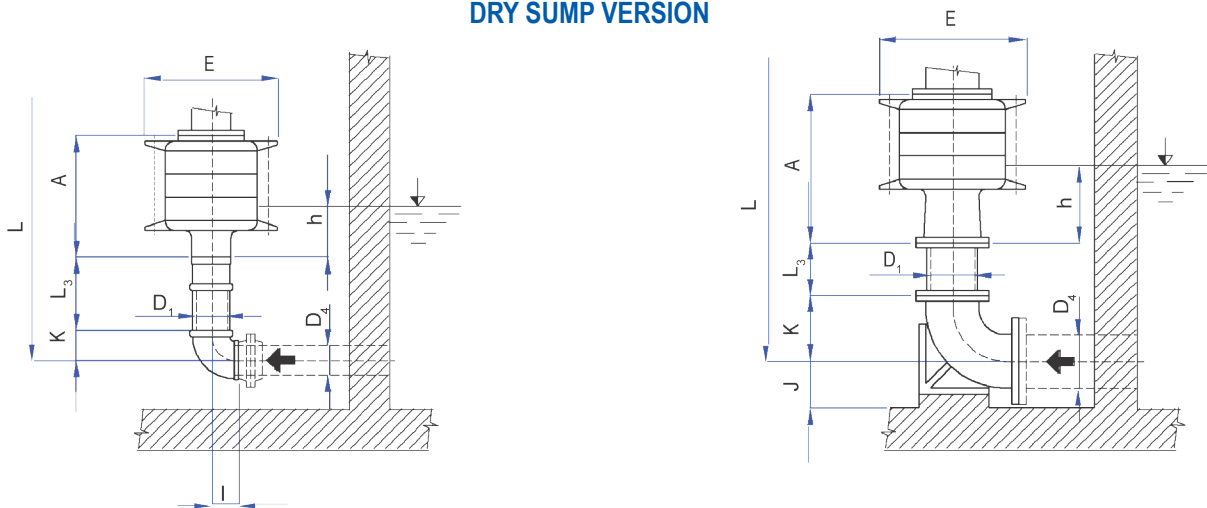


VERSION TEV - WITH DISCHARGE BRANCH ABOVE FLOOR

CONNECTING DIMENSIONS (Z)



DRY SUMP VERSION



ARRANGEMENT I.

ARRANGEMENT II.

VERSION TEV - TABLE OF DIMENSIONS FOR PUMPS CVEV WITH DISCHARGE BRANCH ABOVE FLOOR

Pump model		50-CVEV 115-5	50-CVEV 130-7	80-CVEV 200-10	100-CVEV 230-12	125-CVEV 265-15	150-CVEV 305-19	200-CVEV 350-23	250-CVEV 400-30	300-CVEV 460-32/38					
		MODIFICATION I			MODIFICATION II										
A	upon number of stages	1	120	145	250	275	315	370	400	450	550				
		2	156	194	315	350	400	470	515	590	725				
		3	192	243	380	425	485	570	630	730	900				
		4	228	292	445	500	570	670	745	870	1075				
		5	264	341	510	575	655	770	860	1010	-				
		6	300	390	575	650	740	870	-	1150	-				
		7	336	439	640	725	825	-	-	-	-				
		8	372	488	705	800	-	-	-	-	-				
		9	408	-	770	875	-	-	-	-	-				
		10	444	-	835	950	-	-	-	-	-				
		11	-	-	900	1025	-	-	-	-	-				
		12	-	-	965	-	-	-	-	-	-				
B		200	200	250	270	290	340	350	420	450					
C		168	215	270	270	290	370	450	500	670					
∅D		DN 50	DN 50	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300					
∅D ₁		DN 50	DN 70	DN 100	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300					
∅D ₂		DN 70	DN 70	DN 100	DN 125	DN 150	DN 150	DN 200	DN 250	DN 300					
∅D ₄		G 2"	G 2½"	DN 100	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300					
∅E		204	251	370	420	490	555	635	709	825					
∅F		100	115	270	270	310	360	440	520	504					
G		100	100	120	140	150	160	180	200	220					
h		65	85	180	190	235	280	300	400	400					
H		100	100	120	135	155	180	210	240	280					
I		58	69	200	200	225	250	300	350	400					
J		-	-	~150	~150	~150	~200	~220	~250	~280					
K		58	69	200	200	225	250	300	350	400					
L		C+L ₃ +A+L ₁ (Wet sump version)				K+L ₃ +A+L ₁ (Dry sump version)									
L ₁		970				6970				965	6965	960	6960	955	6955
		1470				7970				1465	7965	1460	7960	1455	7955
		1970				8970				1965	8965	1960	8960	1955	8955
		2470				9970				2465	9965	2460	9960	2455	9955
		2970				10970				2965	10965	2960	10960	2955	10955
		3470				11970				3465	11965	3460	11960	3455	11955
		3970				12970				3965	12965	3960	12960	3955	12955
		4470				13970				4465	13965	4460	13960	4455	13955
		4970				14970				4965	14965	4960	14960	4955	14955
		5470				15970				5465	15965	5460	15960	5455	15955
		5970				16970				5965	16965	5960	16960	5955	16955
L ₃		250		500		750		1000		1250		1500			
S _T		260	260	280	300	350	400	440	480	580					
∅T		10×∅14	10×∅14	10×∅18	10×∅18	10×∅18	10×∅18	10×∅23	10×∅23	10×∅23					
∅U		350	350	450	500	550	650	700	800	900					
∅V		530	530	680	750	800	900	1000	1150	1300					
∅U ₁		390	390	500	550	610	710	770	900	960					
∅V ₁		430	430	540	590	640	740	810	960	1040					

Dimensions given in mm.

Dimensions pre-sized but not given are variable as they depend on a motor type and size. They may be given on request within contract. Connecting dimensions of the pump suction branch flange „D4“ are for PN 10.

Connecting dimensions of the discharge branch flange are intended for PN according to Table „TECHNICAL AND DESIGN DATA OF PUMPS CVEV“.

h represents minimal „on“ level necessary within the pump starting-up for its thorough flooding and reliable operation.

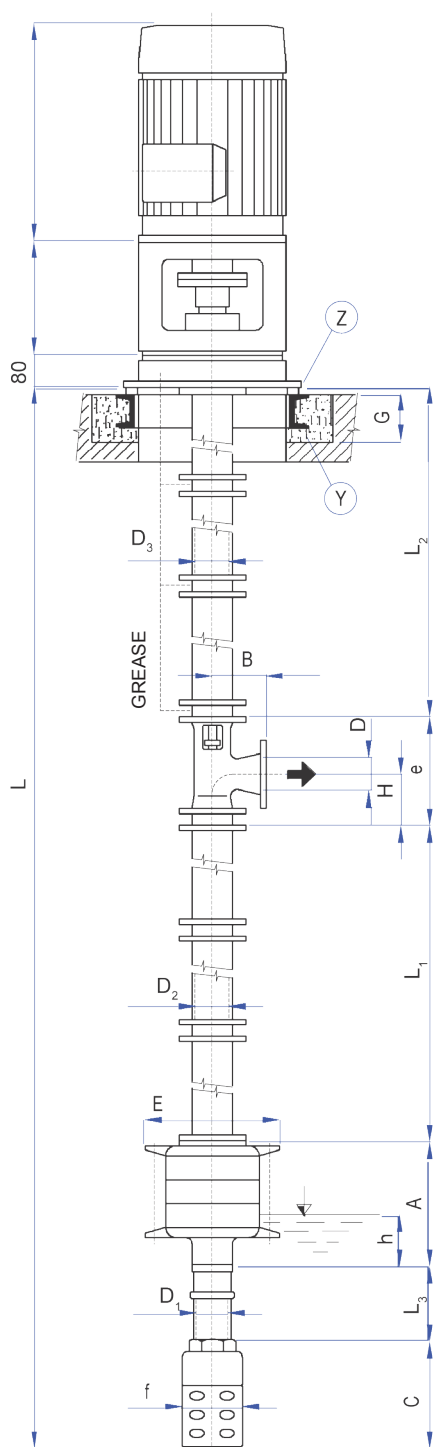
L₃ suction pipe individually, for extension the pump total face-to-face dimension. Maximal face-to-face dimension for individual types of pumps may be found in Table „TECHNICAL AND DESIGN DATA OF PUMPS CVEV“.

Discharge DN follows EN 1092, eventually other standards.

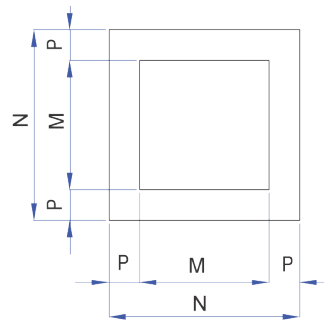
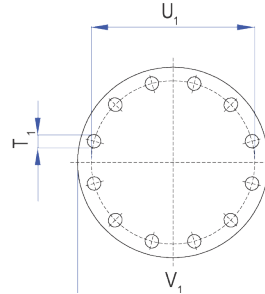
C and *F*.... according to individual version

VERSION TEE - WITH DISCHARGE BRANCH UNDER FLOOR

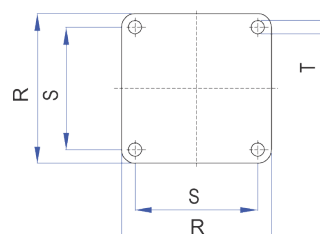
CONNECTING DIMENSIONS (X)



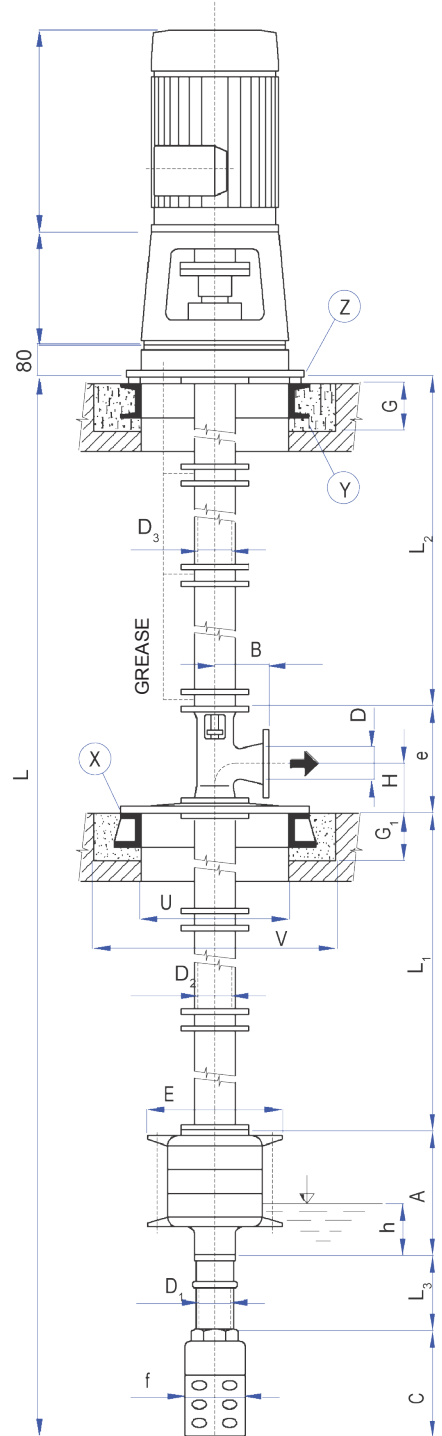
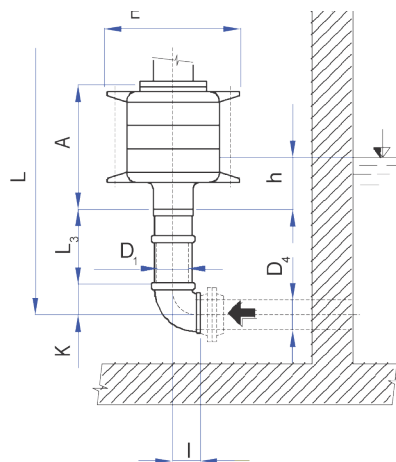
HOLE FOR FOUNDATION FRAME (Y)



CONNECTING DIMENSIONS (Z)



DRY SUMP VERSION



VERSION TEE - TABLE OF DIMENSIONS FOR SMALLEST TYPES OF CVEV PUMPS WITH DISCHARGE BRANCH UNDER FLOOR

Pump model			50-CVEV-115-5			50-CVEV-130-7				
A	Number of stages	1	120			145				
		2	156			194				
		3	192			243				
		4	228			292				
		5	264			341				
		6	300			390				
		7	336			439				
		8	372			488				
		9	408			-				
		10	444			-				
B			130			130				
C			168			215				
∅D			DN 50			DN 50				
∅D ₁			DN 50			DN 70				
∅D ₂			DN 70			DN 70				
∅D ₃			DN 70			DN 70				
∅D ₄			G 2"			G 2½"				
e			300			300				
∅E			204			251				
∅F			100			115				
G			100			100				
G ₁			100			100				
h			65			85				
H			160			160				
I			58			69				
K			58			69				
L			C+L ₃ +A+L ₁ +e+L ₂ (Wet sump version with intermediate floor) K+L ₃ +A+L ₁ +e+L ₂ (Dry sump version)							
L ₁			970	2470	3970	5470	7970	10970		
			1470	2970	4470	5970	8970	11970		
			1970	3470	4970	6970	9970	12970		
L ₂			1000	1500	2000	2500	3000	3500	4000	4500
L ₃			250	500	750	1000	1250	1500		
M			300			300				
N			480			480				
P			90			90				
R			375			375				
S			330			330				
∅T			4 × ∅14			4 × ∅14				
∅T ₁			12 × ∅14			12 × ∅14				
∅U			300			300				
∅V			480			480				
∅U ₁			340			340				
∅V ₁			370			370				

Dimensions given in mm.

Dimensions pre-sized but not given there are variable as they depend on a motor type and size. They may be given on request within contract. Connecting dimensions of the discharge branch flange are intended for PN according to Table „TECHNICAL AND DESIGN DATA OF PUMPS CVEV“.

h represents minimal „on“ level necessary within the pump starting-up for its thorough flooding and reliable operation.

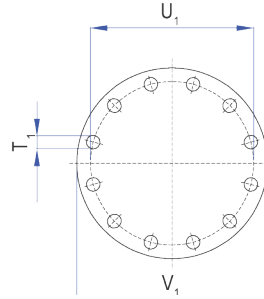
L₃ using suction pipe individually, for lengthening the pump total face-to-face dimension. Maximal face-to-face dimension „L“ for individual types of pumps may be found in Table „TECHNICAL AND DESIGN DATA OF PUMPS CVEV“.

Discharge DN follows EN 1092, eventually other standards.

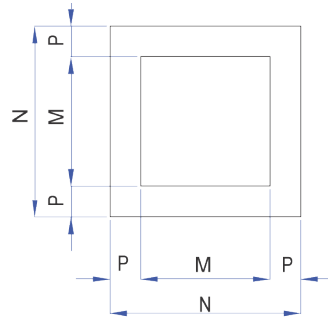
C and **F**.... according to individual version.

VERSION TEE - WITH DISCHARGE BRANCH UNDER FLOOR

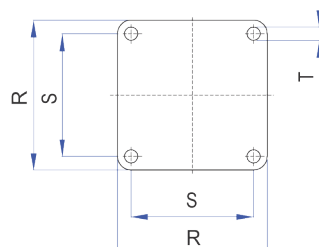
CONNECTING DIMENSIONS (X)



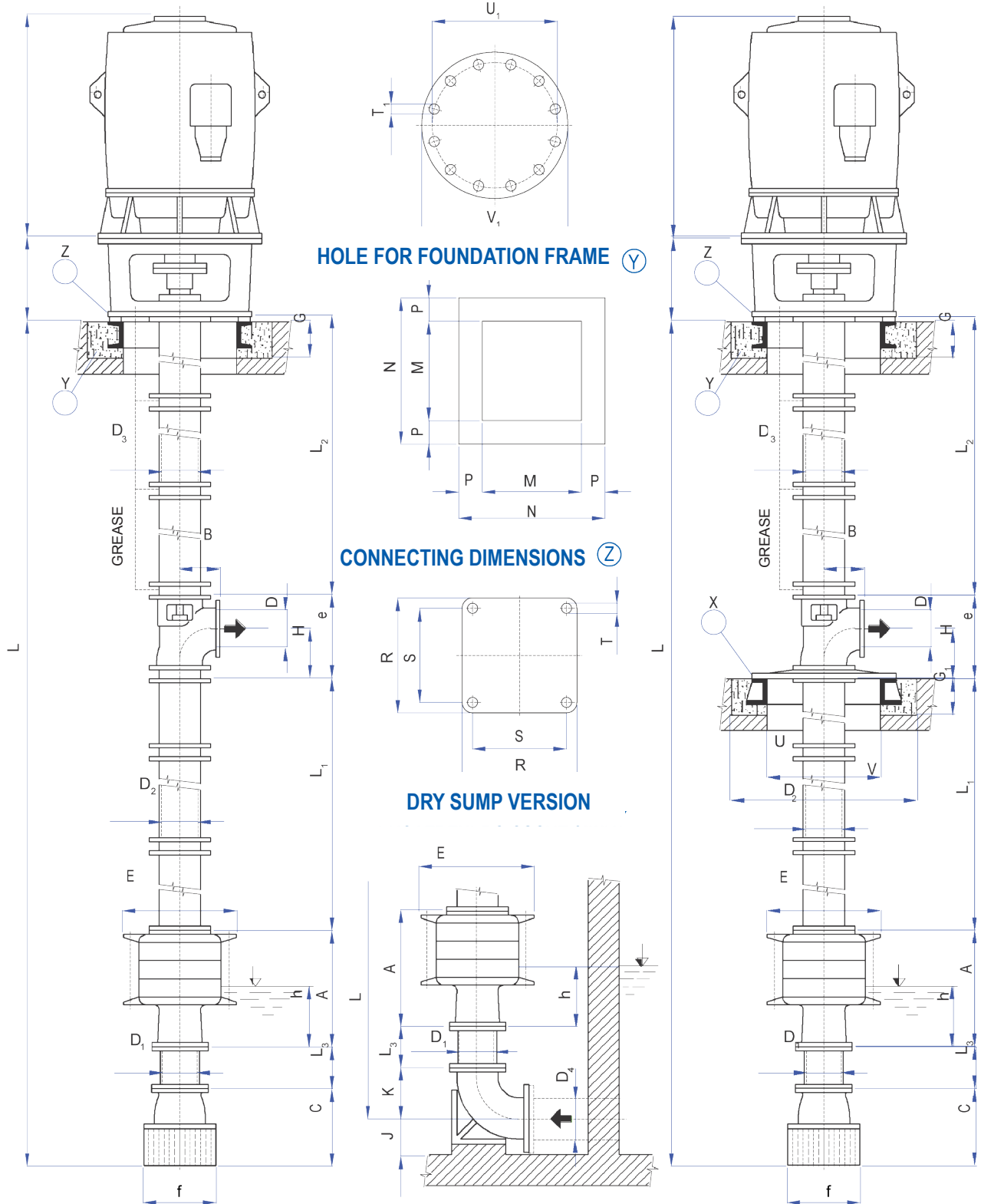
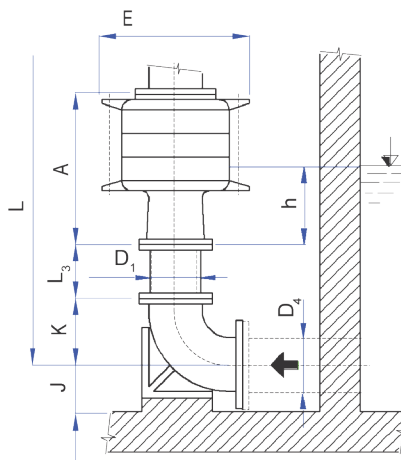
HOLE FOR FOUNDATION FRAME (Y)



CONNECTING DIMENSIONS (Z)



DRY SUMP VERSION



VERSION TEE - TABLE OF DIMENSIONS OF BIGGER TYPES OF PUMPS CVEV WITH DISCHARGE BRANCH UNDER FLOOR

Pump model			80-CVEV	100-CVEV	125-CVEV	150-CVEV	200-CVEV	250-CVEV	300-CVEV	
A	Number of stages	1	250	275	315	370	400	450	550	
		2	315	350	400	470	515	590	725	
		3	330	425	485	570	630	730	900	
		4	445	500	570	670	745	870	1075	
		5	510	575	655	770	860	1010	-	
		6	575	650	740	870	-	1150	-	
		7	640	725	825	-	-	-	-	
		8	705	800	-	-	-	-	-	
		9	770	875	-	-	-	-	-	
		10	835	950	-	-	-	-	-	
		11	900	1025	-	-	-	-	-	
		12	965	-	-	-	-	-	-	
B			160	180	200	200	280	300	350	
C			270	270	290	370	450	500	670	
∅D			DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	
∅D ₁			DN 100	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	
∅D ₂			DN 100	DN 125	DN 150	DN 150	DN 200	DN 250	DN 300	
∅D ₃			DN 100	DN 125	DN 150	DN 150	DN 200	DN 250	DN 300	
∅D ₄			DN 100	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	
e			350	370	400	450	490	590	700	
∅E			370	420	490	555	635	709	825	
∅F			270	270	310	360	440	520	504	
G			120	140	150	180	180	200	220	
G ₁			120	140	150	160	180	200	220	
h			180	190	235	280	300	400	400	
H			200	220	220	250	290	340	400	
I			200	200	225	250	300	350	400	
J			~150	~150	~150	~200	~220	~250	~280	
K			200	200	225	250	300	350	400	
L			C+L ₃ +A+L ₁ +e+L ₂ L (Wet sump version with intermediate floor) K+L ₃ +A+L ₁ +e+L ₂ (Dry sump version)							
L1			970	5470	965	5465	960	5460	955	5455
			1470	5970	1465	5965	1460	5960	1455	5955
			1970	6970	1965	6965	1960	6960	1955	6955
			2470	7970	2465	7965	2460	7960	2455	7955
			2970	8970	2965	8965	2960	8960	2955	8955
			3470	9970	3465	9965	3460	9960	3455	9955
			3970	10970	3965	10965	3960	10960	3955	10955
			4470	11970	4465	11965	4460	11960	4455	11955
			4970	12970	4965	12965	4960	12960	4955	12955
L ₂			1000	1500	2000	2500	3000	3500	4000	4500
L ₃				250	500	750	1000	1250	1500	
M			450	500	550	650	700	800	900	
N			680	750	800	900	1000	1150	1300	
P			115	125	125	125	150	175	200	
R			540	590	640	760	810	920	1040	
S			490	550	600	710	760	850	960	
∅T			4 × ∅18	8 × ∅18	8 × ∅18	8 × ∅18	8 × ∅23	8 × ∅23	8 × ∅23	
∅T ₁			12 × ∅18	12 × ∅18	12 × ∅18	12 × ∅18	12 × ∅23	12 × ∅23	12 × ∅23	
∅U			450	500	550	650	700	800	900	
∅V			680	750	800	900	1000	1150	1300	
∅U ₁			500	550	610	710	770	900	960	
∅V ₁			540	590	640	740	810	960	1040	

Dimensions given in mm.

Dimensions pre-sized but not given there are variable as they depend on a motor type and size. They may be given on request with a contract. Connecting dimensions of the pump suction branch flange „D4“ are for PN 10.

Connecting dimensions of the discharge branch flange „D“ are intended for PN according to „TECHNICAL AND DESIGN DATA OF PUMPS CVEV“.

h represents minimal „on“ level necessary within the pump starting-up for its thorough flooding and reliable operation.

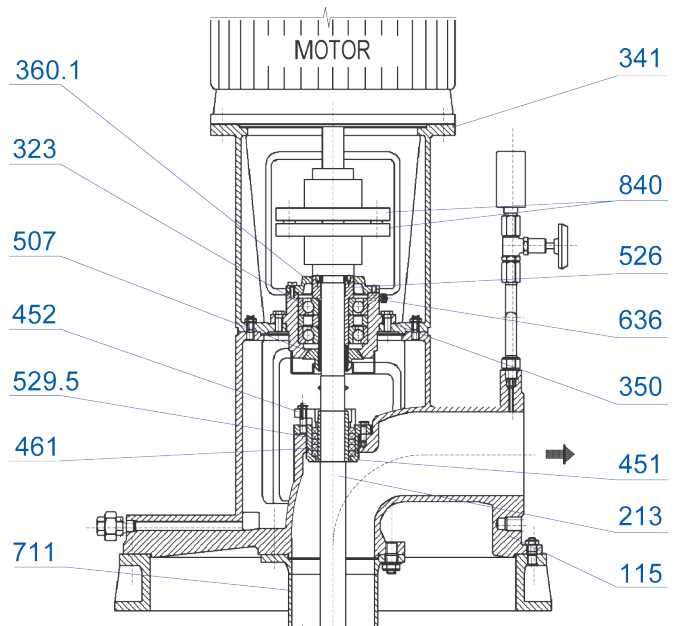
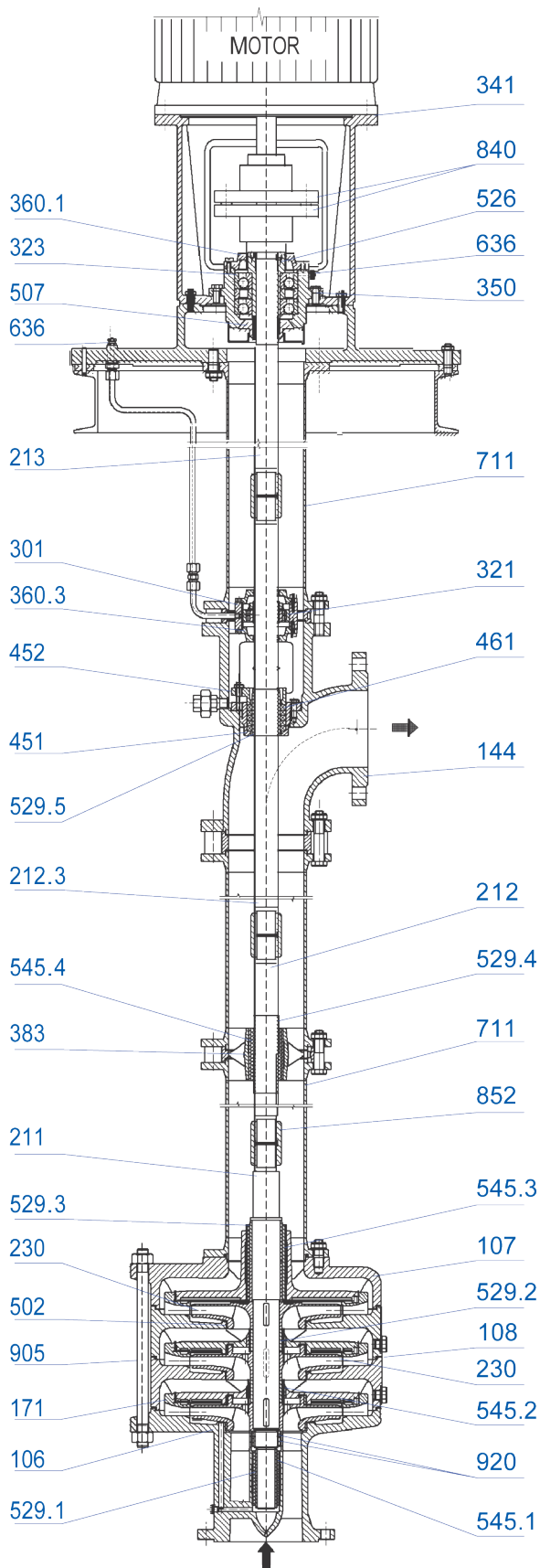
L₃ using suction pipe individually, for lengthening the pump total face-to-face dimension. Maximal face-to-face dimension „L“ for individual types of pumps may be found in Table „TECHNICAL AND DESIGN DATA OF PUMPS CVEV“.

Discharge DN follows EN 1092, eventually other standards.

C and **F** according to individual version.

PUMP CROSS-SECTION WITH DISCHARGE BRANCH UNDER FLOOR – VERSION TEE

PUMP PARTIAL CROSS-SECTION THROUGH PUMP WITH DISCHARGE BRANCH ABOVE FLOOR – VERSION TEV



106	Suction cover
107	Discharge casing
108	Stage casing
115	Suspension body
144	Discharge elbow
171	Diffuser
211	Pump shaft
212	Shaft of column pipe
212.3	Shaft of discharge elbow
213	Suspension shaft
230	Impeller
301	Rolling-contact bearing housing
321	Radial ball bearing
323	Thrust ball bearing
341	Motor stoot
350	Bearing housing
360.1	Thrust bearing cover
360.3	Radial/journal bearing cover
383	Sliding guide bearing housing
451	Stuffing box

452	Gland
461	Gland packing
502	Wear ring
507	Thrower
526	Bearing hub
529.1	Shaft sleeve, suction
529.2	Spacer sleeve
529.3	Shaft sleeve, discharge side
529.4	Shaft sleeve
529.5	Stuffing box sleeve
529.5	Bearing of suction cover
545.1	Stage bush
545.2	Bearing of discharge casing
545.3	Column pipe bearing
545.4	Lubricating nipple
636	Column pipe
711	Coupling
840	Coupling
852	Screwed coupling
905	Connection bolt
920	Shaft nut



SIGMA GROUP a. s.
Jana Sigmunda 79
783 49 Lutín, Česká republika
+420 585 652 011, +420 585 652 060
+420 585 652 051, +420 585 944 294
info@sigma.cz
2014

www.sigma.cz