

# Volute Pumps

for heat carrier oils up to 350 °C

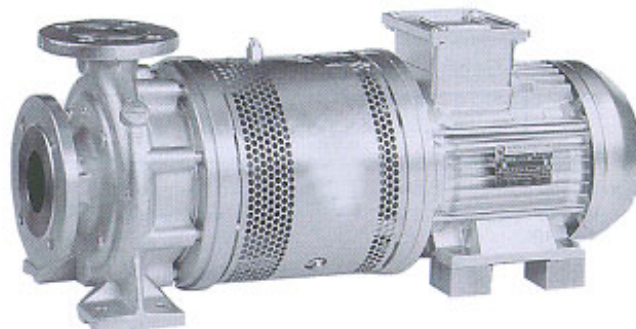
SIHI *SuperNova*



ZTK 032-160 . . . 080-160

## TECHNICAL DATA

Flow:	max. 200 m <sup>3</sup> /h
Delivery head:	max. 60 m
Speed:	max. 3600 rpm
Temperature:	max. 350 °C
Casing pressure:	PN 16
Shaft sealing:	mechanical seal
Flange connections:	DIN EN 1092-2 / PN 16
Sense of rotation:	clockwise, when seen from drive on the pump



## APPLICATION

When developing the unit construction type volute pumps of series ZTKD, the main objective has been to turn out a number of floor space saving, easy-installation types especially adapted to the circulation of mineral and synthetic heat carriers in

primary  
secondary and  
tertiary

circuits.

Besides these units can advantageously be used as main circulating pumps in heat exchangers of

compact design

where they, owing to their constructional features, offer brand-new possibilities to the plant manufacturer for the layout of a system.

## DESIGN

Single-stage pumping units of compact design. Nominal performances and flange connection sizes according to DIN 24255 / EN 733.

There is **no** common shaft for motor and pump, the motors used are of the standard type listed.

Owing to the process design, it is possible to withdraw the whole insert assembly without removing the casing of the pump from the piping system.

The individual shafts of the unit connected by a plug-in coupling facilitate the dismantling or replacement of the motor without affecting the pump.

The DIN 4754 specifications are complied with.

At present, the programme comprises 9 pump sizes.

## CONSTRUCTION

### Casing pressure:

Max. 16 bar from 0 °C to 120 °C  
Max. 13 bar from 120 °C to 300 °C  
Max. 10 bar from 300 °C to 350 °C  
Intermediate values can be interpolated

### Please note:

Technical rules and safety regulations.  
Casing pressure = inlet pressure + zero delivery head  
Permissible inlet pressure (system pressure) 5 bar  
Permissible inlet pressure = permissible casing pressure at shaft sealing GBC

### Position of branches:

Axial suction flange; discharge flange radially upwards.

### Flanges:

The flanges correspond to DIN EN 1092-2 / PN 16.  
Flange design drilled as per ANSI 150 is possible.

### Hydraulic:

First Hydraulic: Design code A  
Second Hydraulic: Design code B

### Bearing:

A groove ball bearing acc. to DIN 625 grease lubricated for service life. A liquid surrounded step bearing in the pump.  
Code of this construction: ·A

### Sense of rotation:

Clockwise when seen from drive on the pump.

### Shaft sealing:

Code GBC: unbalanced bellows mechanical seal  
seal face materials cast chromium steel/carbon elastomer FPM (Viton)

**Material design:**

Item	COMPONENTS	MATERIAL EXECUTION 1B					
		EN Mat.number	EN Mat.denomination	DIN Mat.number	DIN Mat.denomination	US denomination	
						ASTM Standard	AISI
10.20	volute casing	EN-JS 1025	EN-GJS-400-18-LT	0.7043	GGG 40.3	A395	
16.10	casing cover						
21.00	shaft	1.1191	C 45 E	1.1191	CK 45 K + N	A 576 Gr 1045	1045
23.00	impeller	EN-JL 1040	EN-GJL 250	0.6025	GG 25	A 278 Class 30	
34.00	bearing bracket						
43.30	mechanical seal	chrome cast / carbon FPM (viton)					
44.10	casing shaft seal	1.1191	C 45 E	1.1191	CK 45 K + N	A 576 Gr 1045	1045
54.51	bush	carbon					

**Casing seal:**

The casing is sealed by flat gaskets of graphite. Code of this construction: 2

**Drive / Speed:**

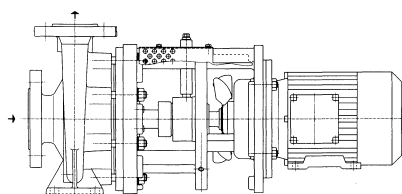
By commercial electric motors, construction type IM B 35.

The following maximum speeds are to be observed:

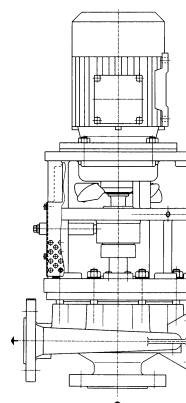
max. speed n = 3600 rpm	size		max. speed n = 3000 rpm	size
t ≤ 120 °C	032160	050160	t ≤ 120 °C	-
	032200	050200		
	040160	065160		
	040200	065200		
	040200	080160		
t ≤ 350 °C	032160	050160	t ≤ 350 °C	065200 080160
	032200	050200		
	040160	065160		
	040200	065160		

**Mounting position:**

The ZTKD units can be mounted either in horizontal or in vertical position. Provided the sturdiness of the piping system is sufficient, the pumps can directly be suspended in a pipeline.



Horizontal installation



Vertical installation

**Please note:**

The installation of the motor below the pump is, for reasons of operating safety, not allowed. The installation of compensators is **not** necessary. **Saving of costs!**

**General comments:**

For horizontal single-stage heat carrier volute pump with dimensions and flange connections as per DIN 24255/EN 733, refer to our series **ZTN**.

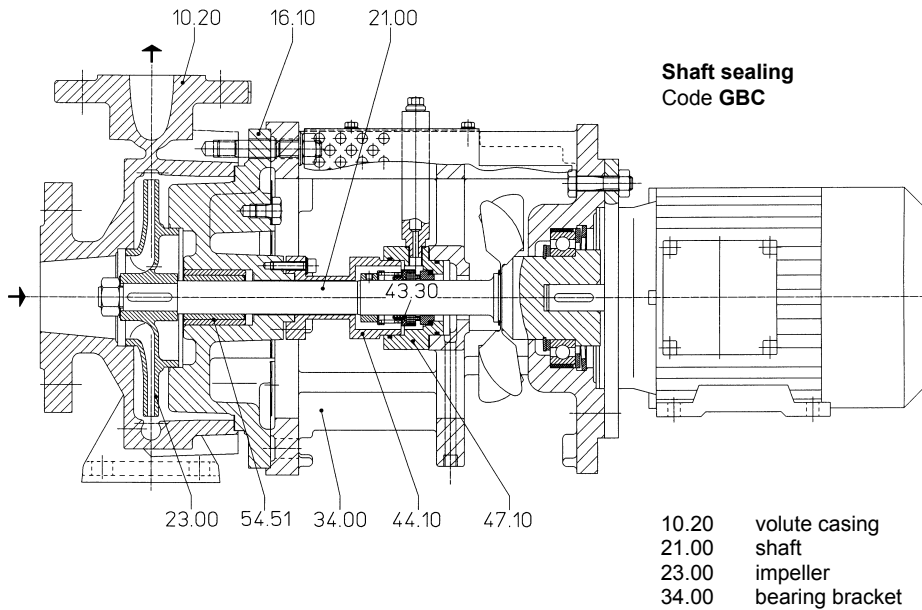
For **INLINE** pumps with the same drive unit, consisting of bearing bracket with bearing, stub shaft and mechanical seal, casing cover, impeller and impeller nut, refer to our series **ZTI**.

For equipping hot media systems, a complete programme is available for a flow range between 1-1000 m<sup>3</sup>/h consisting of the range:

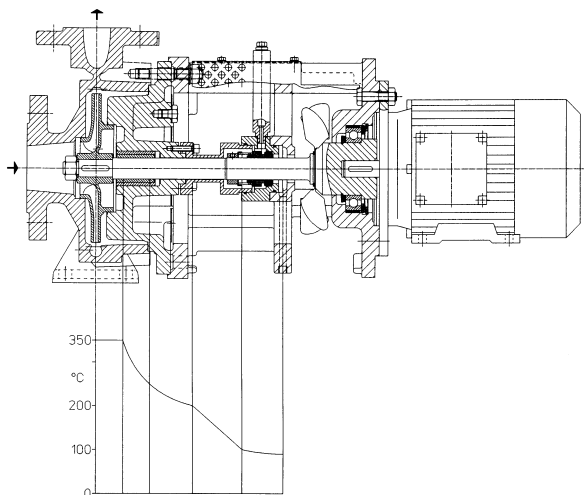
- ZEN** volute pumps to EN 22858, t<sub>max</sub> 230°C PN 40. Hot water design
- ZDN** volute pumps to EN 22858, t<sub>max</sub> 207°C PN 25. Hot water design
- ZHN** volute pumps to EN 733, t<sub>max</sub> 180°C PN 16. Hot water design
- ZLI** volute pumps to EN 733 as **INLINE** construction, t<sub>max</sub> 150°C PN 25. Hot water design

Technical documentation regarding these programmes will readily be supplied on request.

**Sectional drawing and Nomenclature**



**Heat blocking / shaft sealing / bearing**



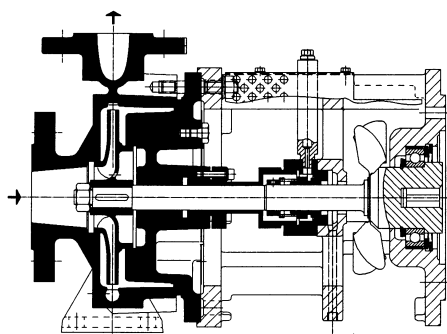
Heat transfer plants have reached a high state of technical development. Therefore pumps handling heat carriers are facing, with regard to safety of operation, environmental neutrality, maintenance facility, and operating costs, much severer requirements now than in former times. The pump type ZTKD, based on many years of experience and on the most up-to-date know-how, fully complies with these requirements.

By the heat blocking, behind the cover, with integrate throttling clearance a favourable temperature lowering towards the drive end is reached (see drawing on the left). Heat losses of the product handled are effectively prevented (energy saving). The temperature lowering makes possible the safe use of a single, uncooled type of shaft sealing. As the lubricating qualities of heat carrier oils are not very good for antifriction bearings, at impeller side a liquid surrounded step bearing is installed. The external anti-friction bearing in the bearing bracket is not in contact with the heat carrier and causes no problems. Noiseless operation and long durability are attained.

### Pumping unit / bearing bracket-plug coupling / standard motor\* / space requirements

By completion of the pumping unit, consisting of volute casing, casing cover, impeller and mechanical seal, with a special bearing bracket, one obtains an closed coupled pump which is **easy to combine**. The bearing bracket relieves the standard motor from hydraulic axial forces and allows suitable motor combinations at the complete mounted pumping unit.

Even with these possibilities of combination one has a place saving of about 25-30% compared with the pumps mounted on base plates.



#### Motor combination

- + type IM B 35
- + protection type IP up to e II (Ex)
- + speed 50 and 60 cycle
- = motor at your choice
- + shaft sealing pumping unit
- = readiness for operation

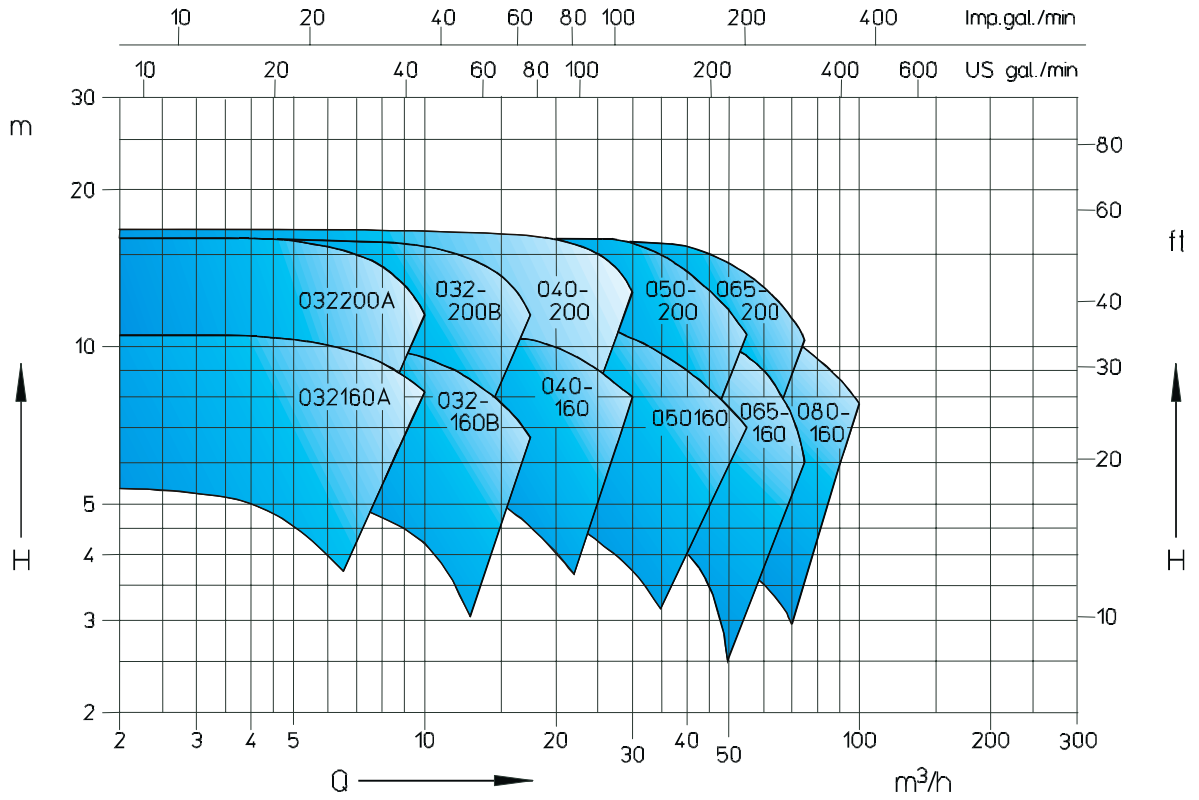
\*shaft end            as per DIN 748 T 3  
key                    as per DIN 6885 T 1  
flanges                as per DIN 42677

In case of necessity the motor can be changed in the unit without draining the pipe work. The pump unit remains as „**shaft tight armature**“ in the pipe work and so the readiness for operation in increased.

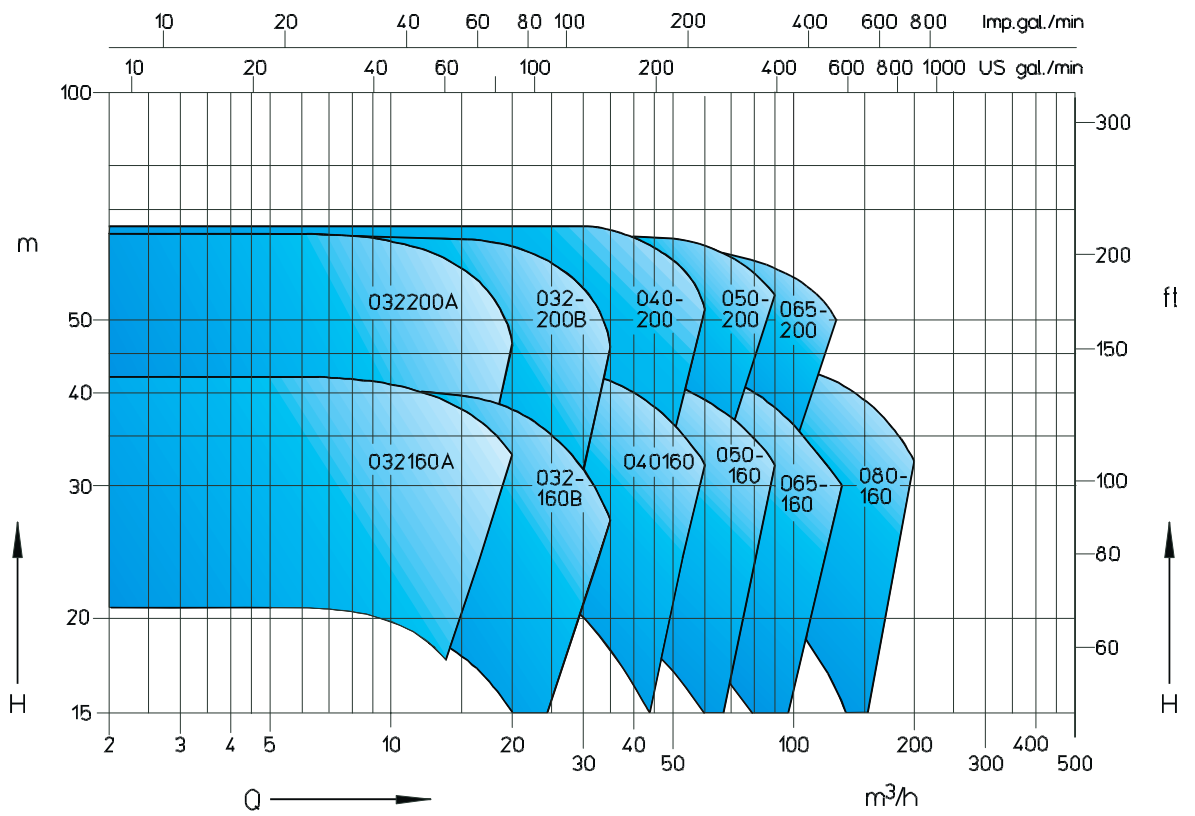
Performance graph

50 Hz

n=1450 1/min

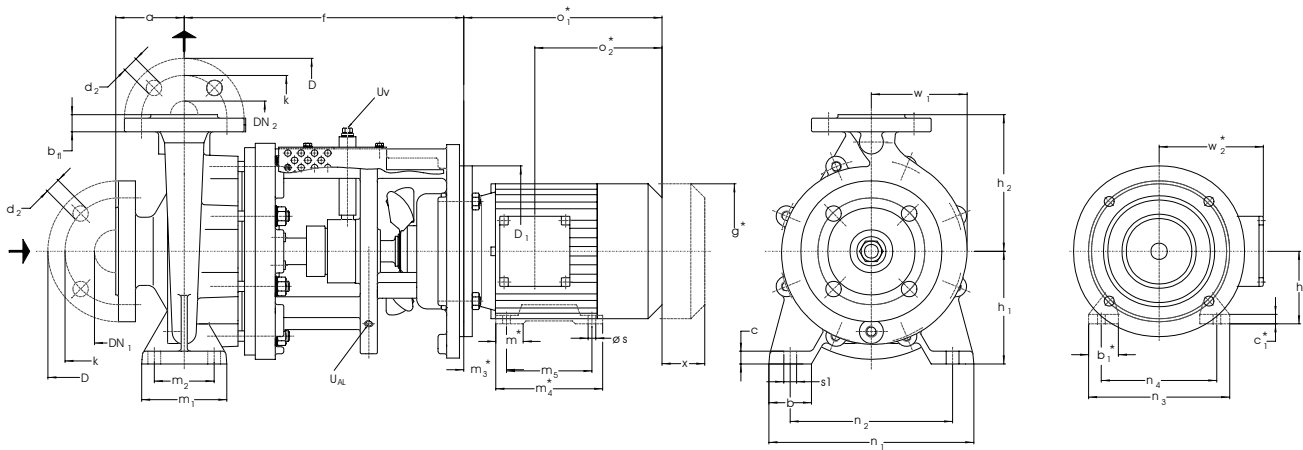


n=2900 1/min



Dimension table

n = 1450 rpm



U<sub>AL</sub> = connection for leakage liquid G ¼

U<sub>V</sub> = vent connection G ½

Size	Motor size n = 1450 rpm				DN <sub>2</sub>	DN <sub>1</sub>	a	b	c	f	h <sub>1</sub>	h <sub>2</sub>	m <sub>1</sub>	m <sub>2</sub>	n <sub>1</sub>	n <sub>2</sub>	s <sub>1</sub>	x	Pump Weight kg												
	080	090	100	112																											
032160A	080				32	50	80	50	327	15	132	160	100	70	240	190	15	80	51												
032160B	080	090																													50
032200A	080	090																													
032200B	080	090																		54											
040160	080	090			40	65	100	65	327	15	132	160	100	70	240	190	15	80	49												
040200	080	090	100																											54	
050160	080	090	100		50	65	100	65	327	15	160	180	100	70	240	190	15	80	54												
050200	080	090	100	112																										55	
065160	080	090	100		65	80	100	65	327	15	180	200	100	70	240	190	15	80	55												
065200	080	090	100	112																										58	
080160		090	100	112	80	100	125				180	225	125	95	280	250		100	61												

motor		b <sub>1</sub> *	c <sub>1</sub> *	D <sub>1</sub>	g*	h	m*	m <sub>3</sub> *	m <sub>4</sub> *	m <sub>5</sub>	n <sub>3</sub> *	n <sub>4</sub>	o <sub>1</sub> *	o <sub>2</sub> *	s	w*	kg	
size	kW																	
80 a	0,55	35	13	200	158	80	40	50	126	100	149	125	238	169	9	135	9	
80 b	0,75																	
90 S	1,1	38	15			178	90	42	56	131		164	140	255		179		150
90 L	1,5									156	125			280	202			
100 L1	2,2	44	15	250	198	100	50	63	173	140	188	160	316	207	11,5	160	24	
100 L2	3,0																	
112 M	4,0	48	18	250	223	112		70	177		220	190	334	231	12	179	41	

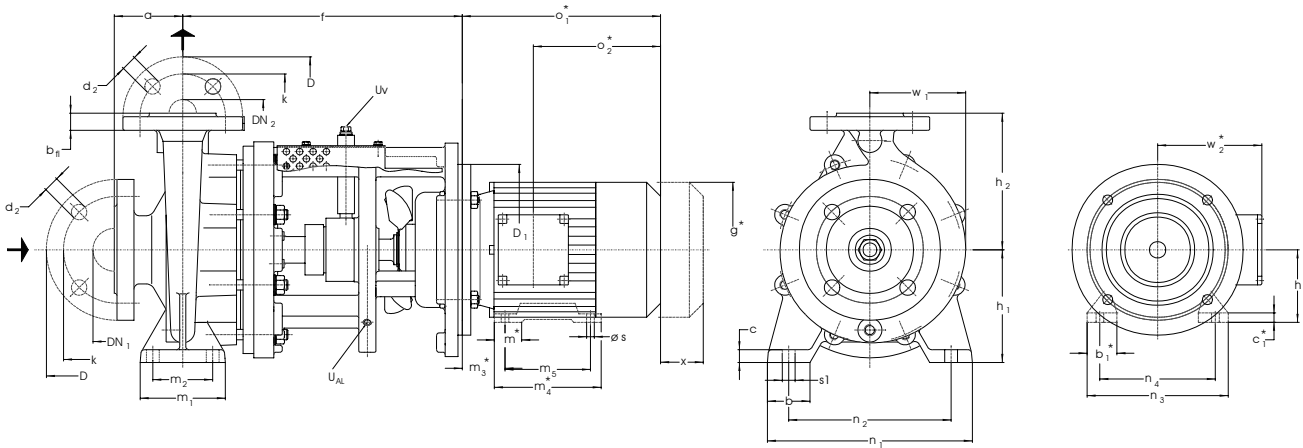
Flange connection size acc. to DIN EN 1092-2 PN 16						
DN <sub>2</sub> /DN <sub>1</sub>	32	40	50	65	80	100
D	140	150	165	185	200	220
k	100	110	125	145	160	180
b <sub>n</sub>	18	19	19	19	19	19
Tolerances	+4 -3					
d <sub>2</sub> x number	19x4	19x4	19x4	19x4	19x8	19x8

Standard motor DIN 42677. Truth of rotation, centricity and right angle of shaft ends and mounting flange to DIN 42955, normal precision.

\* Motors protection type IP 55, dimensions depend on the motor make.

**Dimension table**

**n = 2900 rpm**



U<sub>AL</sub> = connection for leakage liquid G ¼

U<sub>V</sub> = vent connection G ⅙

Size	Motor size n = 2900 rpm				DN <sub>2</sub>	DN <sub>1</sub>	a	b	c	f	h <sub>1</sub>	h <sub>2</sub>	m <sub>1</sub>	m <sub>2</sub>	n <sub>1</sub>	n <sub>2</sub>	s <sub>1</sub>	x	kg																																																	
032160A	090	100	112		32	50	80	50	15	327	132	160	100	70	240	190	15	80	x	51																																																
				132						352																																																										
032160B	090	100	112							32	50	80								50	15	327	132	160	100	70	240	190	15	80	x	50																																				
				132																		352																																														
032200A	090	100	112																			32	50	80								50	15	327	160	180	100	70	240	190	15	80	x	57																								
				132																														352																																		
				160																														377																																		
032200B		100	112																															32	50	80								50	15	327	160	180	100	70	240	190	15	80	x	50												
				132																																										352																						
				160																																										377																						
040160		100	112																																											40	65	100								50	15	327	132	160	100	70	240	190	15	80	x	49
				132																																																						352										
				160	377																																																															
040200			112		40	65	100	50	15				327	132	160	100	70	240	190																																							15	80	x								54
				132						352																																																										
				160						180	377																																																									
050160			112							50	80	100	50	15	327					160	180	100	70	240	190	15	80	x	59																																							
				132											352																																																					
				160											377																																																					
050200				132											50					80	100								50	15	327	160	180	100	70	240	190	15	80	x	64																											
				160																											352																																					
				180																											377																																					
065160			112																												65	80	100								50	15	327	180	225	125	95	280	250	15	80	x	60															
				132																																							352																									
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065200				132	65	80	100	50	15							327	180	225	125																								95	280	250								15	80	x	64												
				160												352																																																				
				180												377																																																				
080160				132						80	100	125	50	15		327	180	225				125	95	280	250	15	80	x																												67												
				160												352																																																				
																377																																																				
080160				160											80	100	125	50		15	352								180	225				125	95	280	250	15	80	x																70												
																					377																																															

motor		b <sub>1</sub> *	c <sub>1</sub> *	D <sub>1</sub>	g*	h	m*	m <sub>3</sub> *	m <sub>4</sub> *	m <sub>5</sub>	n <sub>3</sub> *	n <sub>4</sub>	o <sub>1</sub> *	o <sub>2</sub> *	s	w*	kg
size	kW																
80a	0,55	35	13	200	158	80	40	50	126	100	149	125	238	169	9	135	9
80b	0,75				178	90	42	56	131		164	140	255	179		150	10
90S	1,1	38	15		178	90	42	56	131	156	125	164	140	255		179	150
90L	1,5	44		250	198	100	50	63	173	140	188	160	316	207	11,5	160	18
100L1	2,2		48	18	250	223		112	70		177	220	190	334	231	12	179
100L2	3,0	51	20	300	262	132	55	89	187	140	248	216	372	244	12	205	25
112M	4,0			64	650	312	160	65	108	256	210	308	254	485	317	15	248
132S1	5,5	80	28	350	357	180	75	121	294	241	350			279			
132S2	7,5											59					
160M1	11,0	64	20	350	357	180	75	121	294	241	350	279	557	443	241	134	165
160M2	15,0																134
160L	18,5	80	28	350	357	180	75	121	294	241	350	279	557	443	241	165	165
180M	22,0																165

Flange connection size acc. to DIN EN 1092-2 PN 16						
DN <sub>2</sub> /DN <sub>1</sub>	32	40	50	65	80	100
D	140	150	165	185	200	220
k	100	110	125	145	160	180
b <sub>fl</sub>	18	19	19	19	19	19
Tolerances	+4					
	-3					
d <sub>2</sub> x number	19x4	19x4	19x4	19x4	19x8	19x8

Standard motor DIN 42677. Truth of rotation, centricity and right angle of shaft ends and mounting flange to DIN 42955, normal precision.

\* Motors protection type IP 55, dimensions depend on the motor make.



### Data regarding size – Order information

Type	Size	Hydraulic + Bearing	Shaft seal	Material	Casing gasket	Motor connection
		A♦ hydraulic 1 B♦ hydraulic 2  ♦A one groove ball bearing grease lubricated for service life and one liquid surrounded sleeve bearing	GBC unbalanced mechanical seal	1B main parts of spheroidal cast iron	2 confined flat gasket made by special graphite with A4 insertion	080 - 180 IEC 72 motor frame size, IBM35, IP55, Class F
ZTKD	032160	AA	GBC	1B	2	080 – 132
	032160	BA				080 – 160
	032200	AA				
	032200	BA				
	040160	AA				080 – 180
	040200					080 – 160
	050160					080 – 180
	050200					080 – 160
	065160					080 – 180
	065200					080 – 160
	080160					090 – 160

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