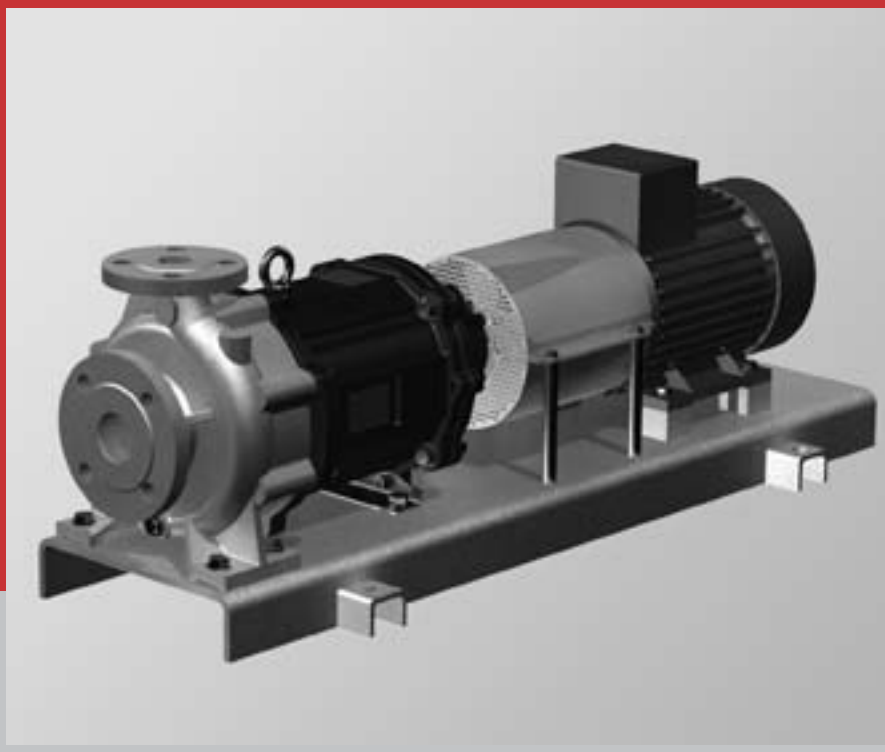
speck pumpen



TOE-MN Series
Heat transfer pumps
for heat transfer oils up to 330 °C

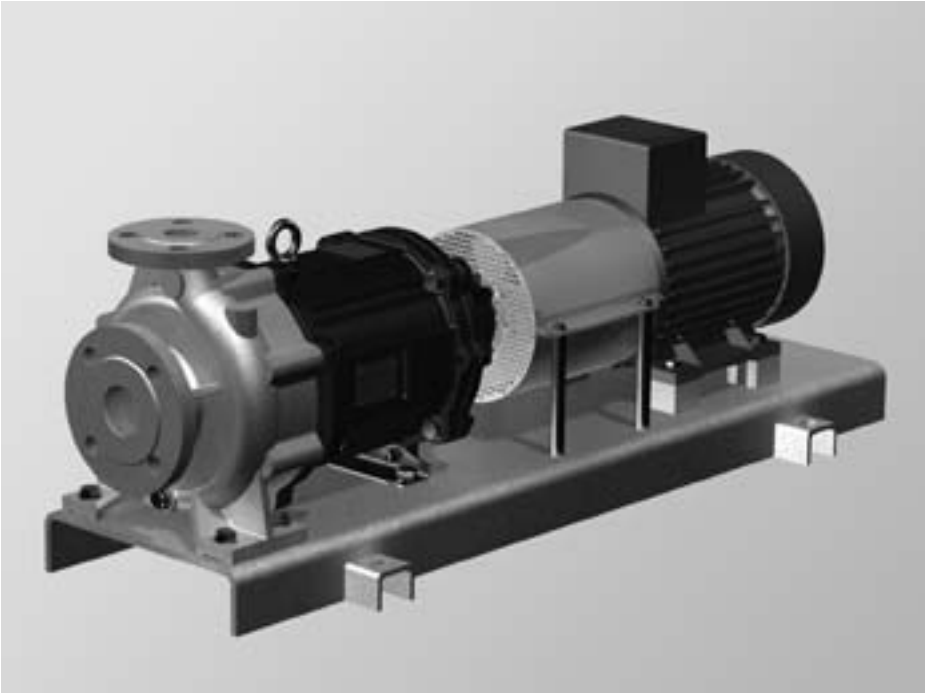
With magnetic coupling in base plate version
Hydraulic power ratings and casing dimensions in acc. with EN 733

Volute casing PN 16
Bearing bracket 360

TOE-MN Series

Heat transfer pumps for heat transfer oils up to 330 °C

With magnetic coupling in base plate version
Except for the length between the centre of the outlet nozzle and the shaft end (f measurement), hydraulic power ratings and casing dimensions are in acc. with EN 733
Volute casing PN 16, bearing bracket 360



Index

Usage

Pumps of the TOE-MN series are designed for the transportation and recirculation of organic liquids on mineral oil or synthetic basis in heat transfer plants in acc. with DIN 4754. Special versions for eutectic mixtures upon request.

They are suitable for clean media to be pumped which do not chemically attack the pump materials used.

Main applications

The pumps are mainly used in the following industrial sectors:

- Tempering in the plastics and die cast industry
- Baking ovens, large frying units as well as in the production of edible oil and dry mass for the food and feedstuff industries
- Heating of calenders and melting pots in the leather and rubber industry
- Heating of agitator and mixing tanks for the processing of colours, paints and lacquers
- Heating of tanks on stationary and FPSE platforms as well as in tank vessels
- Heating of press lines in the wood and pulp industry
- Flat glass production
- Solar power stations & ORC processes

Operating data

- Flow rate up to approx. 200 m^3/h
- Total heads up to approx. 100 m
- Max. operating temperatures up to + 330 °C
  Special versions for eutectic mixtures up to + 400 °C upon request.

Standard conditions at site

- Relative humidity during continuous operation max. 55%
- Ambient temperature up to + 40 °C
- Permissible altitude up to 1000 m above sea level

Deviations from the site conditions specified herein must already be disclosed in the inquiry.

Flow rate

The permissible operating range of centrifugal pumps depends on diverse factors such as

- impeller shape
- speed
- type of liquid
- viscosity
- bearing load
- heat dissipation - particularly with regard to insulated volute casings
- clearance between the net positive suction head of the plant and the pump
- size of magnet coupling

The hydraulic operating range applicable to the TOE-MN series is indicated in the individual performance curves and the pump data sheet.

Pump outlet pressure

The pump outlet pressure at the outlet nozzle depends on

- the pump inlet pressure
- the maximum total head of the selected impeller diameter
- the density of the medium to be pumped

The maximum pump outlet pressure $p_{2max\ op}$ is calculated using the formula:

$$p_{2max\ op} = p_{1max\ op} + \rho \cdot g \cdot H \cdot 10^{-5}$$

With:

$p_{2max\ op}$ = maximum pump outlet pressure [bar]

$p_{1max\ op}$ = maximum pump inlet pressure [bar]

ρ = density of the medium to be pumped [kg/m^3]

g = gravitation constant [m/s^2]

H = maximum total head at zero flow or at the peak of the pump´s characteristic curve at the selected impeller diameter [m]

Pumps must be selected and operated in a way which ensures that the maximum pump outlet pressure does by no means exceed the maximum permissible operating pressure of the casing $p_{all\ w\ c}$ at operating temperature.

This also applies to commissioning while the discharge valve is closed (refer to Fig. 1).

Pressure and temperature limitations

The maximum casing operating pressure $p_{all\ w\ c}$ of the volute casing and the casing cover depends on the operating temperature:

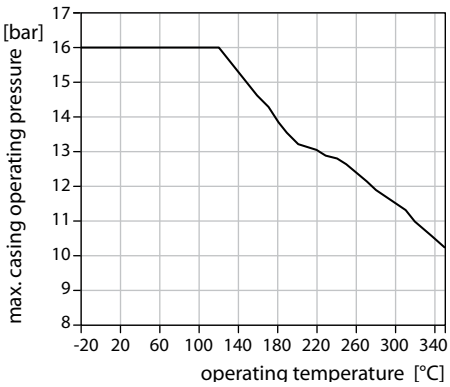


Fig. 1: Maximum permissible casing operating pressure $p_{all\ wc}$

Speeds

The operating speed of the pump shaft must not exceed the maximum permissible peripheral speed of the impeller, which corresponds to 48 m/s.

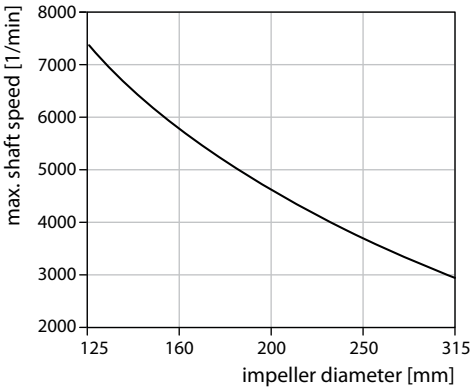


Fig. 2: Maximum permissible shaft speed

Denomination

The denomination of a centrifugal pump of the TOE-MN series with bearing bracket is illustrated in the following example:

TOE – M N 32 – 160 / 150

- Actual impeller diameter in mm
- Nominal impeller diameter in mm
- Nominal width of outlet nozzle
- Standard dimensions EN 733
- Magnetic coupling
- Denomination of series

Design details

Pumps of the TOE-MN series are magnetically-coupled horizontal, single-stage, single-entry centrifugal pumps with volute casing, foot-mounted, axial inlet and radial outlet in process design (disassembly of the plug-in unit while the volute casing remains in the conduit).

The hydraulic power ratings and all dimensions are in accordance with EN 733, 1995 issue.

The tolerances of the mating dimensions are subject to the EN 735 standard.

Allocation of components

Pumps of this series are part of a modular system, whose components can also be used for other pump series.
The complete plug-in unit including the impeller is used in the following series:

TOE-MN - base plate pumps with volute casing featuring axial inlet

TOE-MA - close coupled pumps with volute casing featuring axial inlet

TOE-MI - close coupled pumps with volute casing in inline design

For the parts allocation, refer to page 11.

Materials

Volute casing	EN-GJS-400-15 Spheroidal graphite cast iron	EN-GJS-400-18-LT Spheroidal graphite cast iron
Casing cover		
Impeller	EN-GJL-250 Cast iron	
Bracket	EN-GJS-400-15 Spheroidal graphite cast iron	EN-GJS-400-18-LT Spheroidal graphite cast iron
Bearing casing	EN-GJL-250 Cast iron	
Shafts	1.4122 CrMo-steel	
Plain bearing	S SiC	
Magnets	Sm_2Co_{17}	
Separating can	1.4571 CrNiMo-steel	2.4610 NiCo-alloy

EN-GJS-400-15 = EN-JS1030 = GGG-40
EN-GJS-400-18LT = EN-JS-025 = GGG-40.3
EN-GJL-250 = EN-JL1040 = GG-25

Tab. 1: Materials

Volute casing

The nominal pressure of the volute casing is PN 16.

The outlet and inlet nozzles are fitted with bosses to allow for the subsequent connection of pressure gauges. These ports are only drilled upon request of the customer.

The volute casings are self-venting and provided with a plugged drain (G 3/8) as a standard.

Nozzle positions and flanges

Inlet nozzle	axial
Outlet nozzle	radial to the top
Flange dimensions	EN 1092-2 (for the corresponding dimensions, refer to the dimension chart)

Tab. 2 : Nozzle positions

Plain bearing bracket

The plain bearing bracket consists of the casing cover, the plain bearing cartridge, the internal rotor and the separating can.

Casing cover

The casing cover accomodates the plain bearing cartridge and the separating can. Depending on the torque to be transferred, the design of the casing cover allows for the use of different magnetic coupling sizes.

Plain bearing cartridge

The plain bearing cartridge carries the internal rotor and consists of the plain bearing casing, the bearing bushings and the bearing sleeves, which support the radial load and the remaining axial thrust.

Internal rotor

The internal rotor consists of the impeller, the shaft and the internal magnetic rotor. Most of the axial forces generated during operation are hydraulically compensated by the impeller.

Via a flow control system, the internal magnetic rotor is continuously cooled with the medium to be pumped to dissipate the heat additionally generated during operation by eddy current, viscosity and bearing friction loss. This way, light ends are prevented from accumulating in the area of the magnetic drive and the plain bearings.

The internal rotor is equipped with a start-up safety device, preventing the separating can from being internally destructed by the rotor in case of a plain bearing failure.

Separating can

Together with the casing cover and the volute casing, the separating can hermetically seals the part of the pump which is in contact with the media to be pumped.

Plug-in unit

= plain bearing bracket + impeller
The plain bearing bracket and the volute casing form the pump part which is in direct with the medium.

Ball bearing bracket

The ball bearing consists of the bearing housing, the bearing cover and the external rotor.

Bearing housing

The bearing housing accomodates the ball bearings and is provided with slots in axial direction at the junction between the housing and the bracket to draw cooling air for the magnetic coupling.

The ball bearings are life-time lubricated, designed for a service life of 26,300 hours and not suitable for re-lubrication. This is why they should be replaced prior to the indicated period of time. The ball bearing bracket may optionally also be provided for oil lubrication.

Bearing cover

The bearing covers are positioned at both sides of the bearing housing and form an enclosed space. This way, the covers and the radial seal lips protect the ball bearings against external influences.

External rotor

The external rotor consists of the shaft and the external magnetic rotor. It transfers the torque exerted by the drive via the magnetic coupling to the internal rotor.

The external rotor is equipped with a start-up safety device, preventing the separating can from being externally destructed by the rotor in case of a ball bearing failure.

Magnetic coupling

The magnetic coupling consists of the following components:
internal magnetic rotor, separating can and external magnetic rotor.

Four different coupling sizes with different magnetic lengths are available.

The transferable torques range between 10 and 500 Nm at ambient temperature.

Designation example of a magnetic coupling:

135 - 70

Magnetic length (mm)

Nominal magnetic coupling diameter (mm)

Allocation of the magnetic coupling sizes to be used for the different pump sizes:

Sizes	Nominal impeller diameter in mm		
	160	200	250
	possible magnetic coupling sizes		
32	75 / 110	75 / 110	110 / 135
40	75 / 110	75 / 110	110 / 135
50	75 / 110	75 / 110 / 135	75 / 110 / 135
65	110 / 135	110 / 135	-
80	110 / 135	-	110 / 135 / 165

Each magnetic coupling is sized individually by means of an EDP sizing program.

Bracket

In its function as variant carrier of the different pump types TOE-MN, TOE-MA and TOE-MI, the bracket accomodates on one side the inner part and, on the other side, the outer part of the pump. The bracket is provided with radial cooling slots, which support the heat dissipation in the area of the magnetic coupling.

Cooling fan

The coupling half of the flexible shaft coupling at the pump side is equipped with a cooling fan as a standard, which supports heat dissipation in the area of the ball bearing and the magnetic drive.

Utility connections

For the exact positions and dimensions of the utility connections, refer to the dimension drawings of the pump on pages 8 and 9.

Accessories

Separating can temperature monitoring

The bracket features threaded connections for the installation of a temperature sensor (PT 100) in case the separating can´s surface temperature is to be monitored. The temperature sensor can be supplied with the pump. Non-required threaded connections are closed by a screw plug.

Load monitor

A load monitor with start-up override and release delay can be optionally supplied to monitor the pump for underload and overload or as dry running protection. This load monitor allows for e.g. the monitoring of the power factor (cos φ) or the active power of the motor and, hence, of the pump aggregate´s operating state.

Shaft coupling and protection guards

When complete base plate aggregates are delivered, double cardanic flexible shaft couplings without spacer are used in acc. with DIN 740.

If couplings with spacers are to be used, this has to be specified accordingly in the order.

The guards providing protection against accidental contact meet the requirements of DIN EN 294.

Base plate

Torsion-resistant C profiles with dimensions following the recommendations of DIN 24259.

Drives

Surface-cooled three-phase asynchronous motors for low voltages with cage rotor

- design IM B3
- degree of protection IP 54
- insulation class F
- power ratings and dimensions in acc. with DIN 42673 / IEC 72
- make according to our choice

Other motor versions are available upon request.

If the motors are provided by the customer, a sufficient cooling power of the motor fan must be ensured (> 3 m/s flow rate measured at the motor's bearing shield at the pump side).

Tests

If required, test certificates in acc. with DIN 55350-18 can be provided for the individual tests, which, however, has to be indicated in the order.

Material tests in acc. with EN 10204

The exact scope of the tests (which test for which parts) as well as the type of certificate (certificate of compliance with the order, factory certificate, inspection certificate) must be specified in the order.

Non-specific material tests do not have any impact on the delivery time of the pump.

If specific material tests are required, the delivery time of the pump depends on the availability of raw materials and will be checked on a case-to-case basis. Test certificates for specific material tests cannot be provided after the raw materials and/or semi-finished goods have been negotiated.

Gas pressure tests

All pressure bearing parts, e.g.

- volute casing
- casing cover

are subject to a gas pressure test (leakage test)

The gas pressure test is carried out by applying forming gas at 2 bar. The holding time is 15 minutes. By means of this test, the tightness of the parts is proven.

Hydrostatic pressure test

All pressure bearing parts are subject to a pressure test, during which the hydrostatic test pressure (p_{test}) corresponds to 1.3 times the basic design pressure (p_N) at 20° C, following the recommendations of prEN 12162. The holding time is 10 minutes.

If pressure tests are to be carried out in acc. with other criteria, such criteria must be indicated in the inquiry.

By means of this test, the strength of the parts is proven.

Hydraulic tests (performance curves)

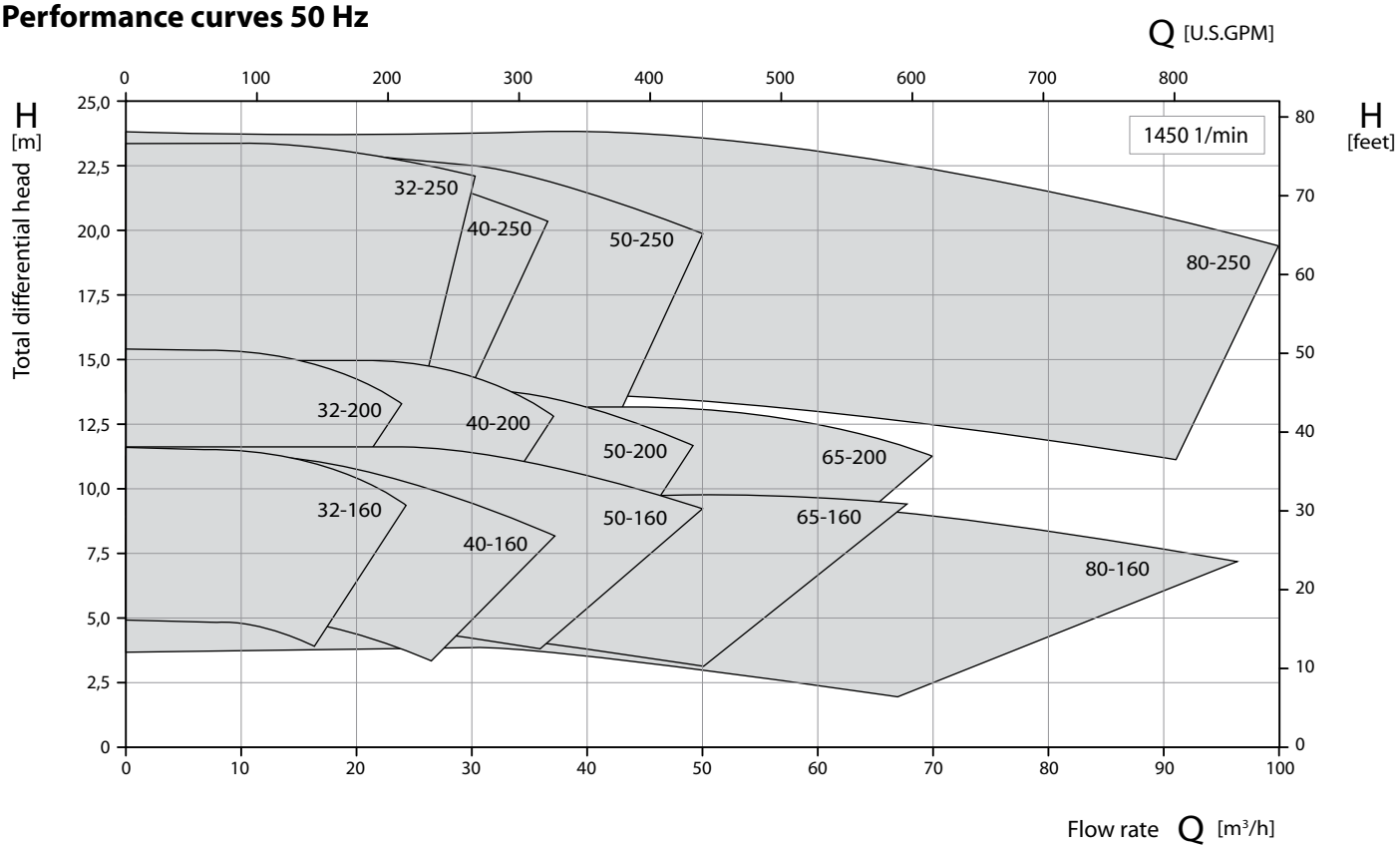
If required, hydraulic tests in acc. with ISO 9906, accuracy class II, can be implemented and the characteristic curves measured for the corresponding impeller diameter documented.

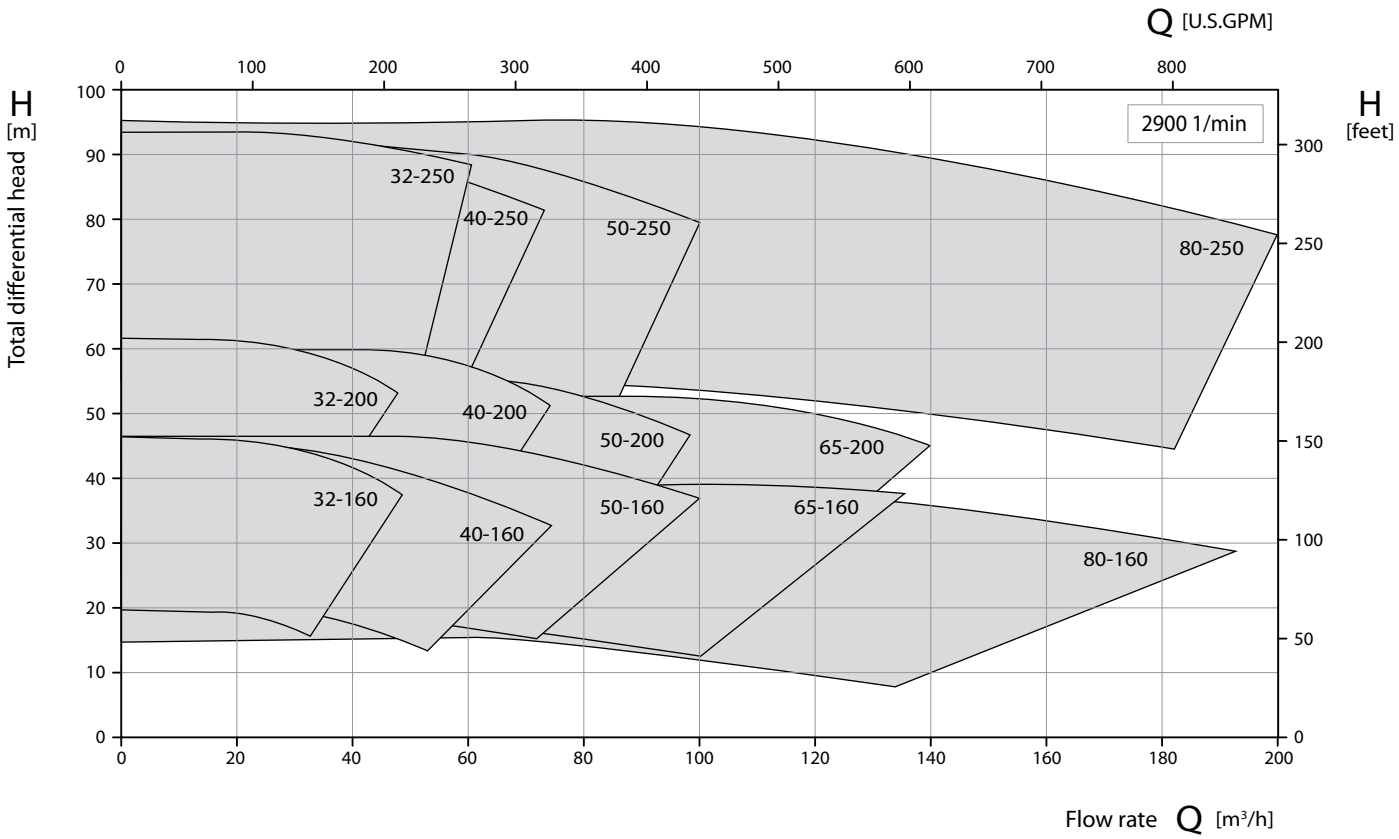
This option has to be indicated accordingly in the order. The purpose of this test is to verify that the duty point of the manufactured pump complies with the contractual duty point.

Painting

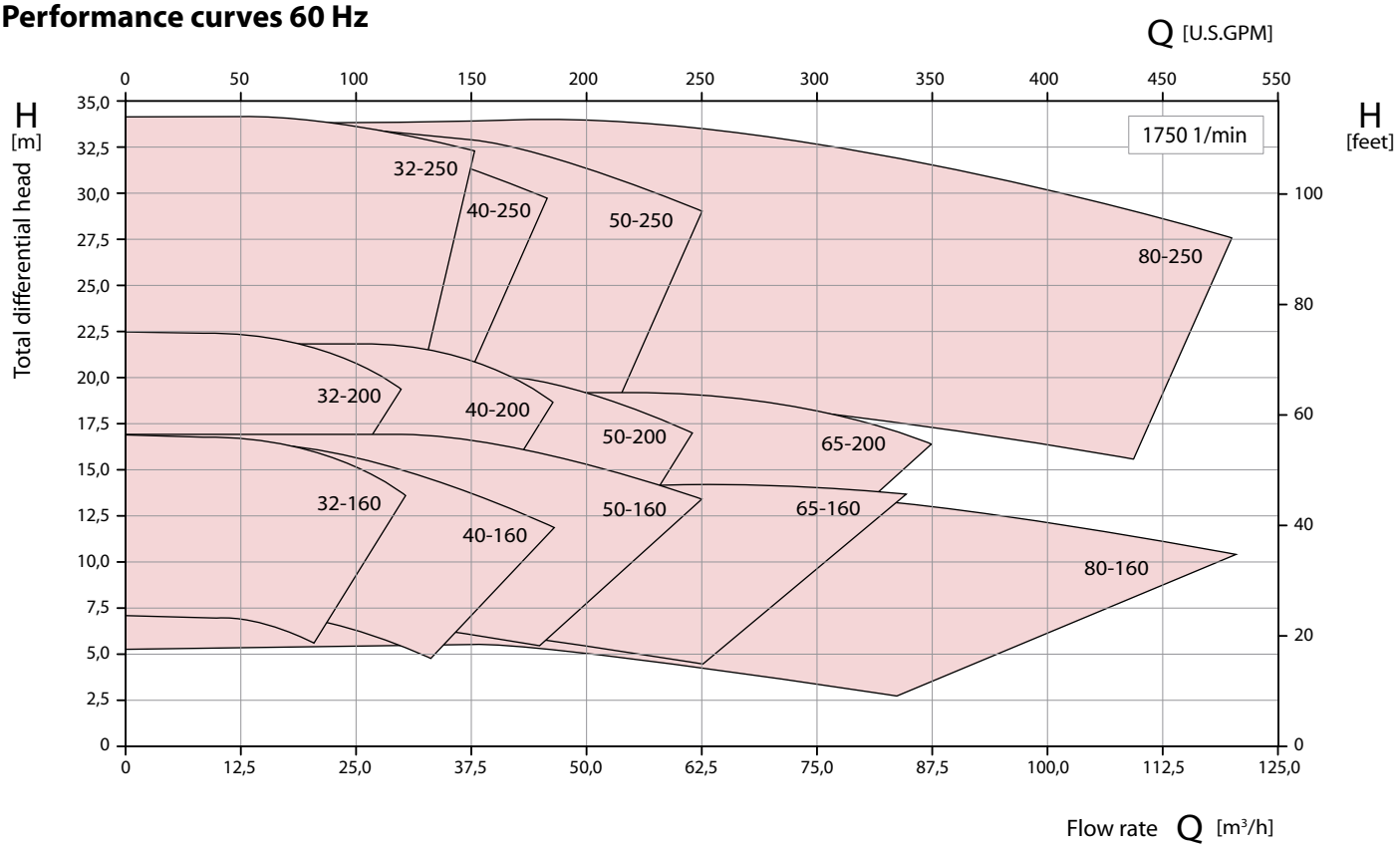
The pumps are coated with highly heat-resistant white aluminium paint, colour code RAL 9006.

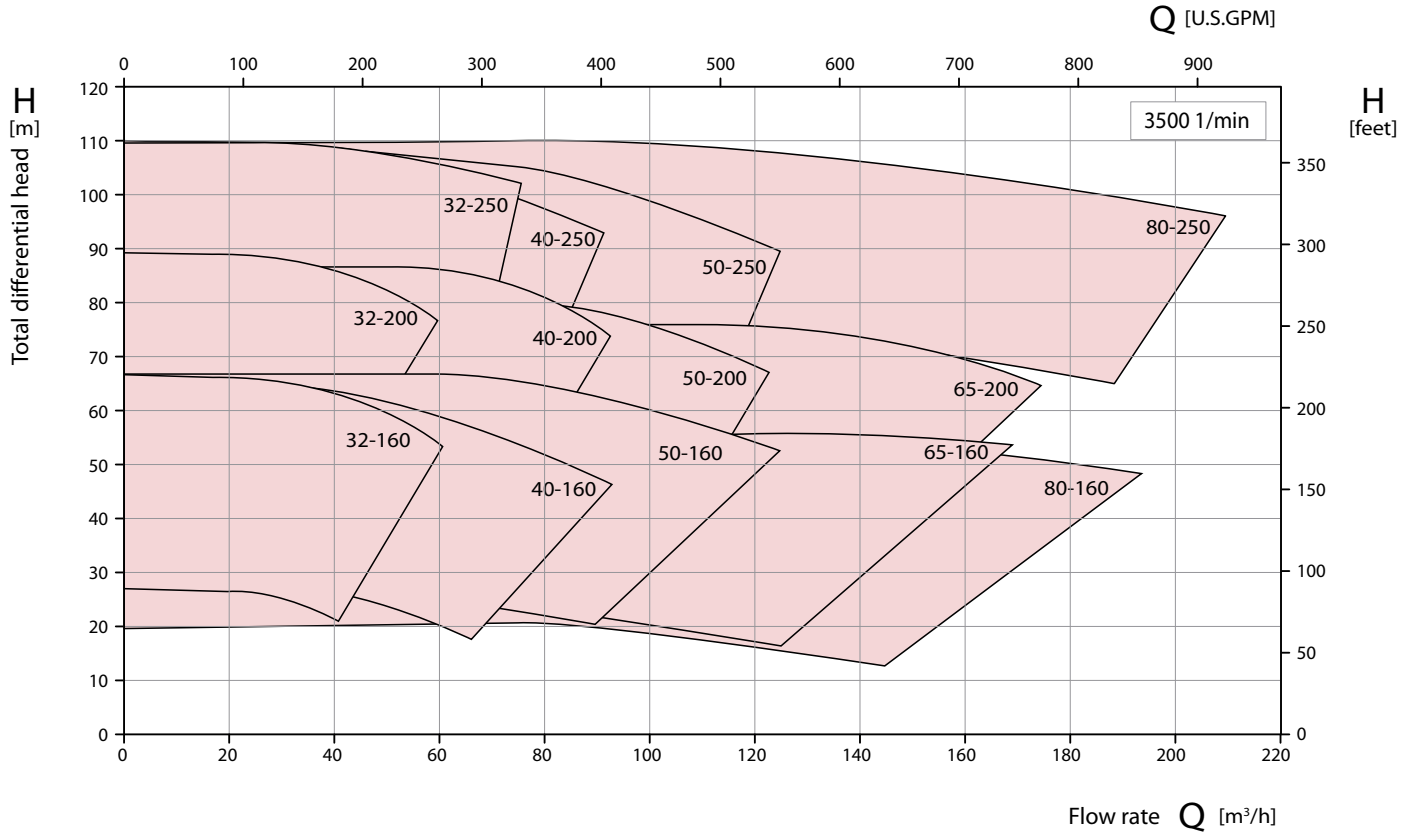
Performance curves 50 Hz



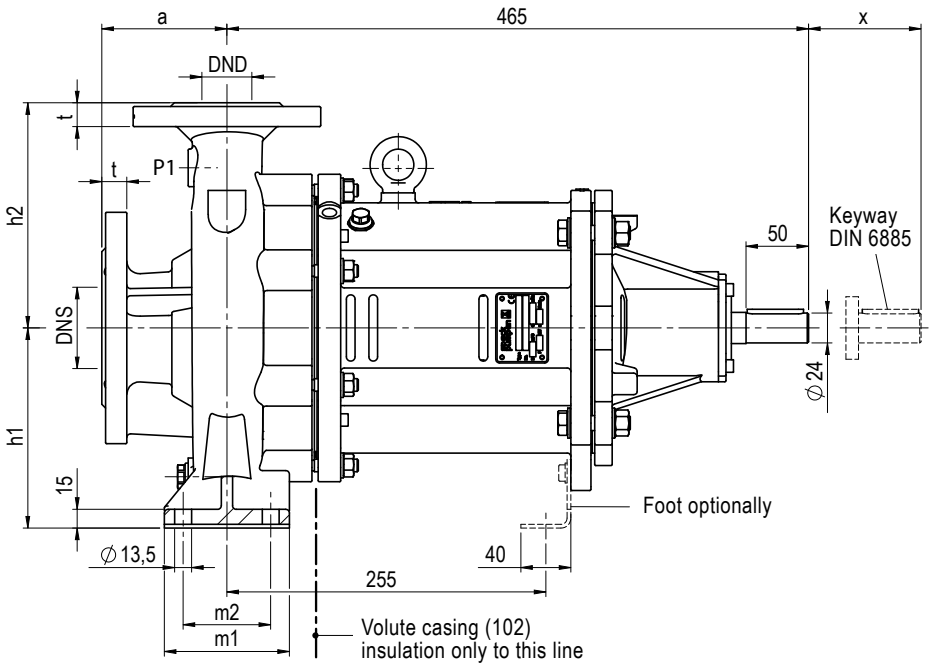


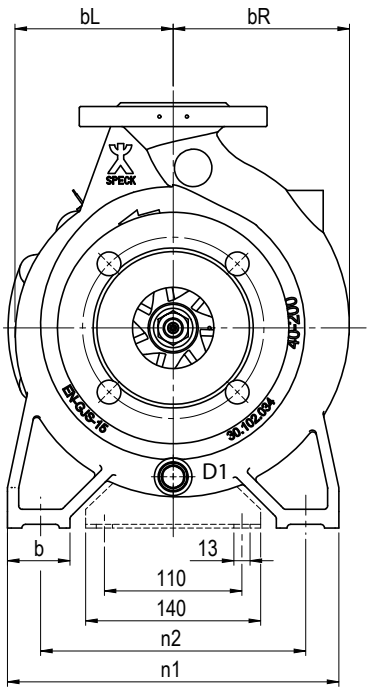
Performance curves 60 Hz

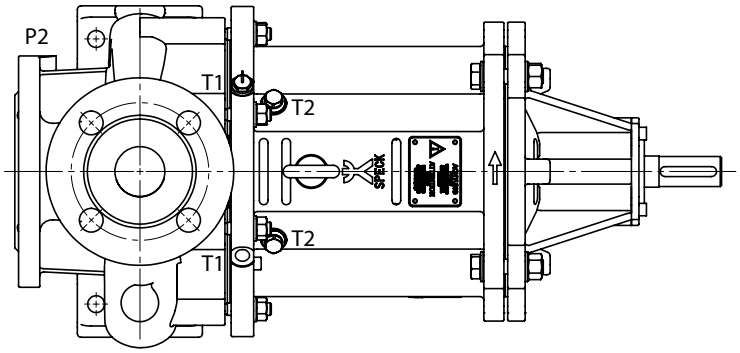




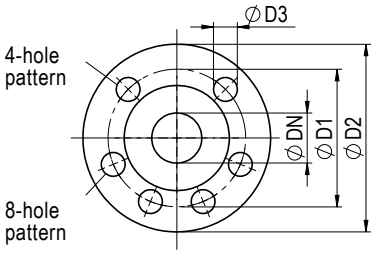
Pump dimensions





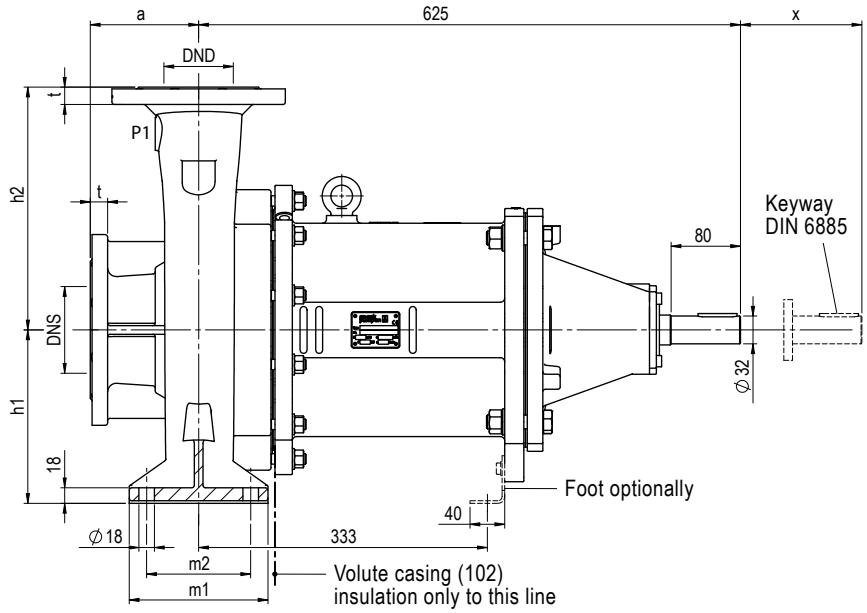


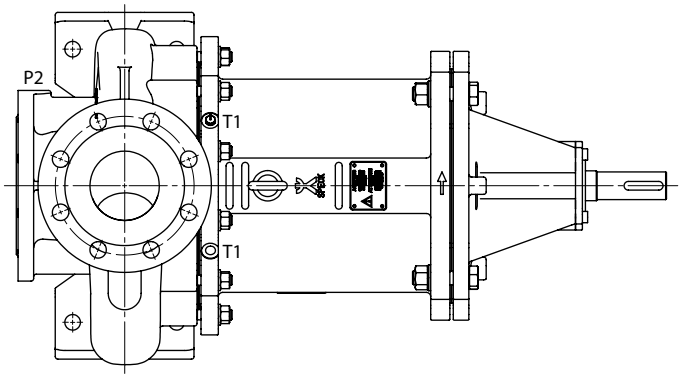
Flange dimensions EN 1092-2

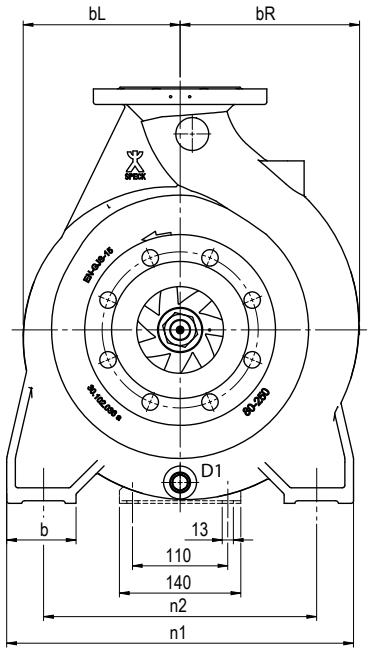


Pump	Pump dimensions							Foot dimensions					Pull-out
Size	DNS	DND	a	bL	bR	h1	h2	b	m1	m2	n1	n2	x
32-160	50	32	80	123	123	132	160	50	100	70	240	190	110
32-200					135	160	180						
32-250			100	152	163	180	225	65	125	95	320	250	
40-160	65	40	80	123	129	132	160	50	100	70	240	190	
40-200				127	141	160	180				265	212	
40-250				151	160	180	225	65	125	95	320	250	
50-160				123	136	160	180	50	100	70	265	212	
50-200		50	100	130	148		200						
50-250				157	170	180	225	65	125	95	320	250	
65-160	80	65		124	151	160	200				280	212	
65-200				136	164	180	225				320	250	
80-160	100	80	125	139	174								

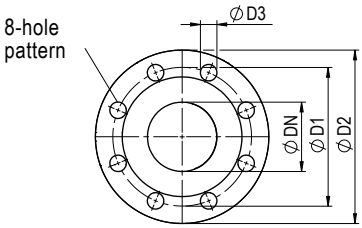
Pump dimensions







Flange dimensions EN 1092-2



Pump	Pump dimensions							Foot dimensions					Pull-out
Size	DNS	DND	a	bL	bR	h1	h2	b	m1	m2	n1	n2	x
80-250	100	80	125	181	207	200	280	80	160	120	400	315	110

Utility connections and flange dimensions

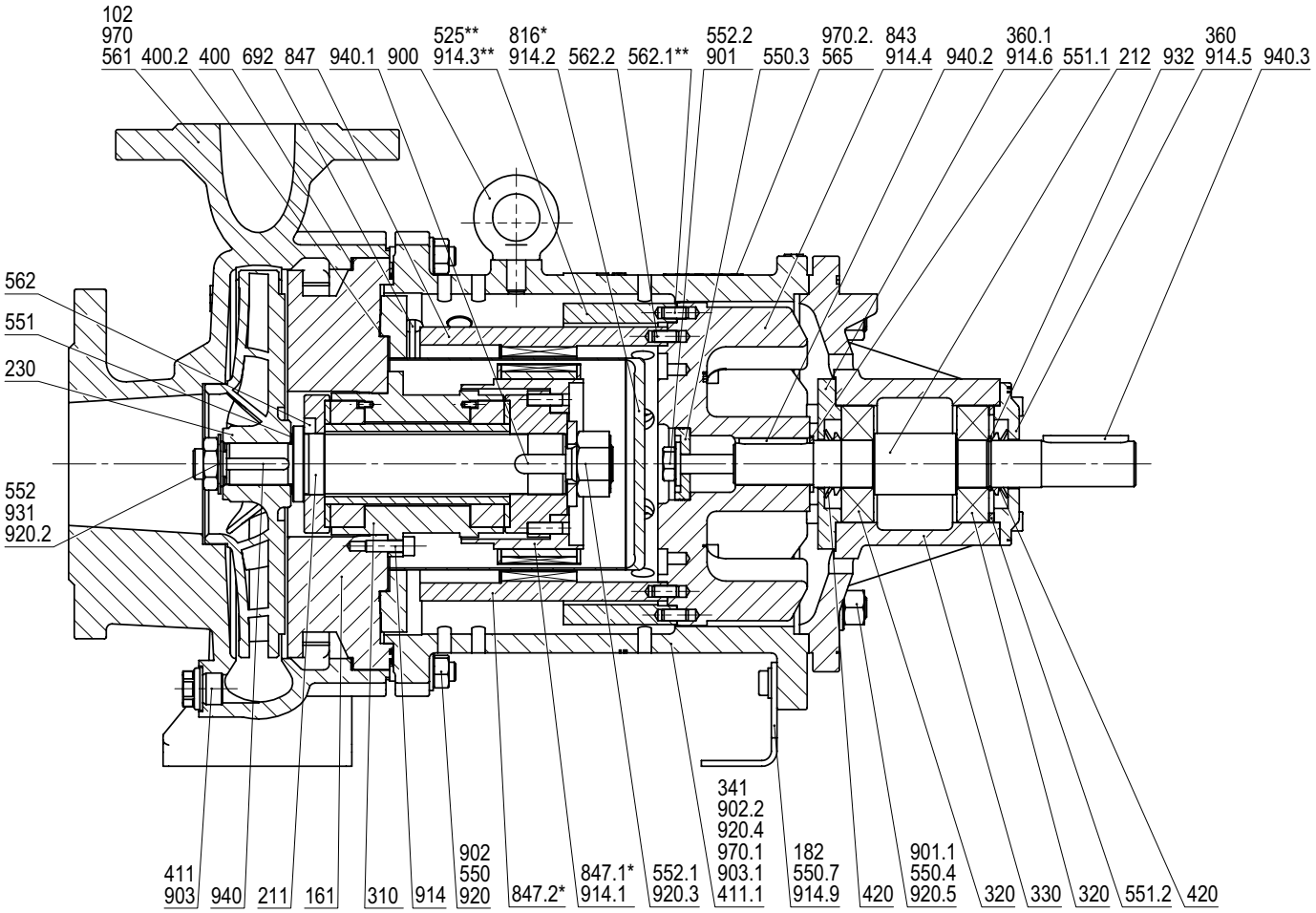
Utility connections

P1	Outlet pressure indicator connection (not drilled)	G 1/4
P2	Inlet pressure indicator connection (not drilled)	G 1/8
D1	Volute casing drain	G 3/8
T1	Temperature sensor PT 100 MK 110 / 135	G 1/4
T2	Temperature sensor PT 100 MK 75	G 1/4

Flange dimensions in acc. with DIN EN 1092-2

øDN	øD2	øD1	t	øD3	Qt. holes
32	140	100	18	19	4
40	150	110	18		
50	165	125	20		
65	185	145	20		
80	200	160	22		8
100	220	180	24		

Cross-sectional drawing and part list



Standard design with nominal impeller diameter 160 and 200 mm

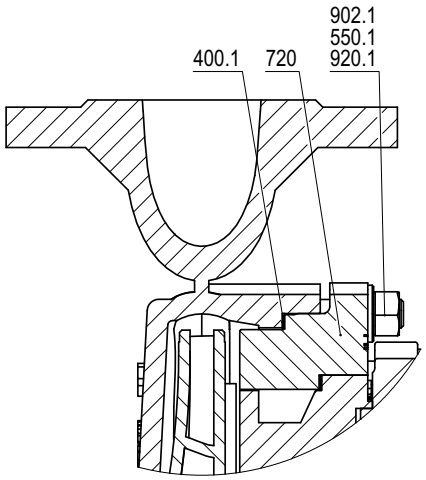
102	Volute casing
161	Casing cover
182	Pump foot
211	Shaft
212	Intermediate shaft
230	Impeller
310	Bearing complete
320	Ball bearing
330	Bearing housing
341	Bracket
360-360.1	Bearing cover
400, 400.2	Flat gasket
411-411.1	Ring gasket
420	Shaft sealing
525**	Distance sleeve
550, 550.3-550.4, 550.7	Washer
551-551.2	Shim washer
552-552.2	Disk spring
561	Grooved pin
562-562.1**, 562.2	Parallel pin

565	Rivet
692	Temperature sensor
816*	Separating can
843	Coupling insert
847	Magnetic coupling, complete
847.1*	Internal rotor
847.2*	External rotor
900	Ring bolt
901-901.1	Hexagon head screw
902, 902.2	Stud
903-903.1	Screwed plug
914-914.3** 914.4-914.6, 914.9	Socket head cap screw
920, 920.2-920.5	Hexagon nut
931	Lock washer
932	Lock ring
940-940.3	Key
970-970.2	Plate

* Single components of magnetic coupling (847)
** execution with MK 75 / 110 only

Execution with nom. impeller diameter 250 mm

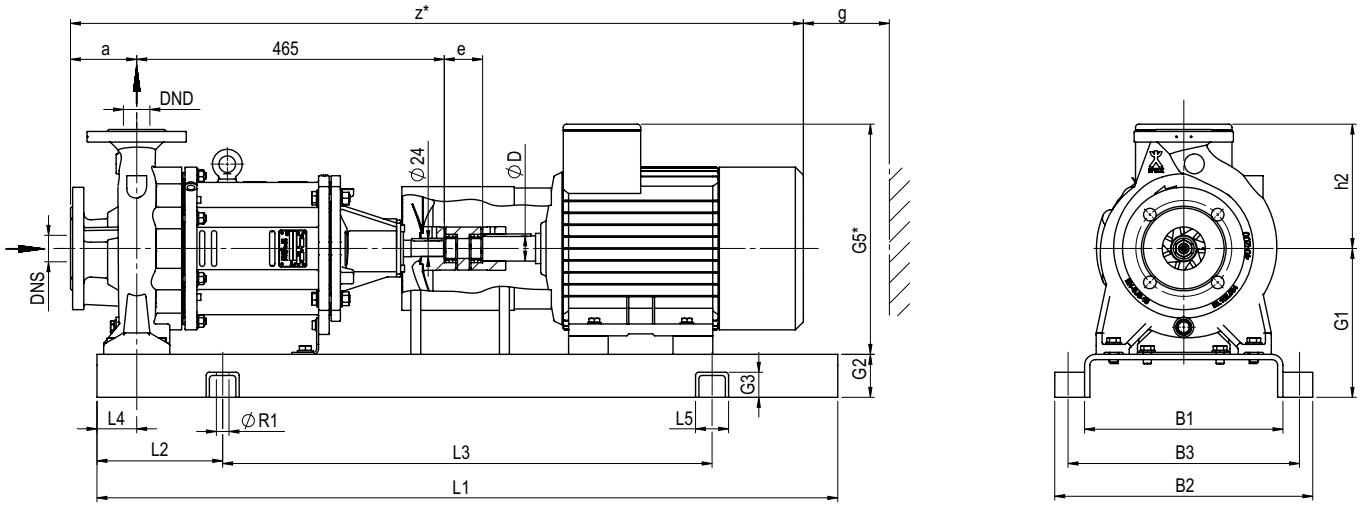
400.1	Flat gasket
550.1	Washer
720	Counter flange
902.1	Stud
920.1	Hexagon nut



Interchangeability of parts in between TOE-MN / MA / MI series

Component	Position	Pump type	Pump size											
			32-160	32-200	32-250	40-160	40-200	40-250	50-160	50-200	50-250	65-160	65-200	80-160
Volute casing	102	TOE-MN / MA	1	2	3	4	5	6	7	8	9	10	11	12
		TOE-MI	0			1	2	0		3	0		4	0
Casing cover	161	TOE-MN / MA	1	2		1	2	2	1	2	2	1	2	2
		TOE-MI	0			1	2	0		2	0		2	0
Shaft	211	TOE-MN / MA / MI	1											
Shaft	212	TOE-MN	1											
		TOE-MA / MI	0											
Impeller	230	TOE-MN / MA	1	2	3	4	5	6	7	8	9	10	11	12
		TOE-MI	0			1	2	0		3	0		4	0
Bearing	310	TOE-MN / MA / MI	1											
Ball bearing	320	TOE-MN	1											
		TOE-MA / MI	0											
Bearing housing	330	TOE-MN	1											
		TOE-MA / MI	0											
Bracket	341	TOE-MN / MA / MI	0											
Bearing cover	360	TOE-MN	1											
		TOE-MA / MI	0											
Shaft sealing	420	TOE-MN	1											
		TOE-MA / MI	0											
Counter flange	720	TOE-MN / MA	0		1	0		1	0		1	0		
		TOE-MI	0											
Flat gasket	400	TOE-MN / MA / MI	1											
Flat gasket	400.1	TOE-MN / MA	0		1	0		1	0		1	0		
		TOE-MI	0											
Flat gasket	400.2	TOE-MN / MA / MI	1											
Distance sleeve MK 75 / 110	525	TOE-MN / MA / MI	1											
Distance sleeve MK 135	525	TOE-MN / MA / MI	0											
Coupling insert	843	TOE-MN / MA / MI	1											
Magnetic coupling	847	TOE-MN / MA / MI	1											
Other parts		TOE-MN / MA / MI	1											

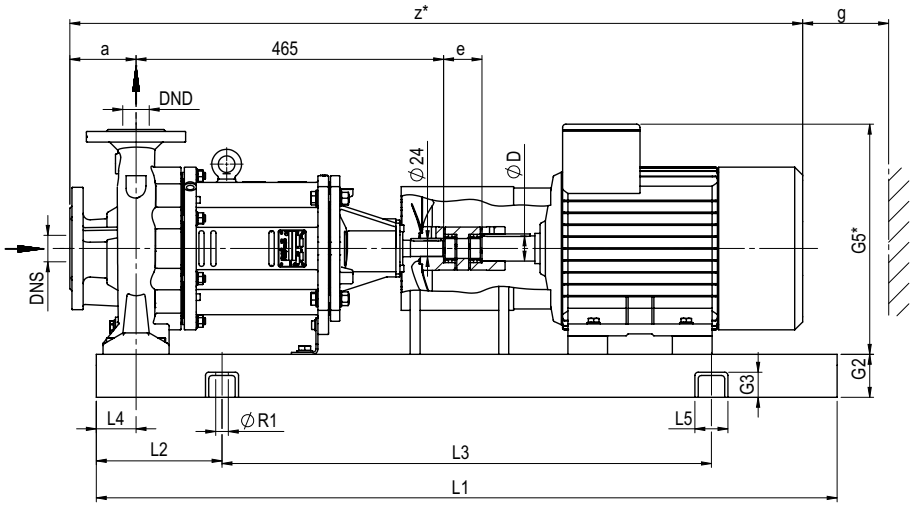
Dimensional drawing

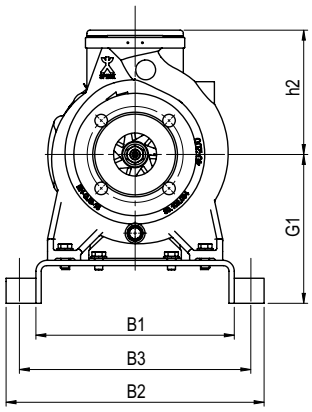


Pump	Motor	Power kW		Pump dimensions				Pump set dimensions																
Size	Frame size	4-pole	2-pole	DNS	DND	a	h2	e	z*	g	G1	G2	G3	G5*	L1	L2	L3	L4	L5	B1	B2	B3	øR1	øD
		1450 / 1750	2900 / 3500																					
	80	0.55 / 0.75	0.75 / 1.1						882	30				261										19
	90 S	1.1	1.5					42	881	35				280	900	150	600							24
	90L	1.5	2.2						906											270	360	320		
	100L	2.2 / 3	3					52	960	50	197	65	38	287	1000	170	660		50				19	28
32-160	112M	4	4	50	32	80	132		977					300				60						
	132 S	5.5	5.5 / 7.5					58	1088	100				320	1120	190	740			300	390	350		38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1240		240	80	42	410	1250	205	840		65	380	490	440	24	42
	160 L	15	18.5																					
	80	0.55 / 0.75	0.75 / 1.1						882	30				289										19
	90 S	1.1	1.5					42	881	35				308	900	150	600							24
	90L	1.5	2.2						906											270	360	320		
	100L	2.2 / 3	3					52	960	50	197	65	38	315	1000	170	660		50				19	28
	112M	4	4						977					328										
32-200	132 S	5.5	5.5 / 7.5	50	32	80	160	58	1088	100				348	1120	190	740	60		300	390	350		38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1240		240	80	42	410	1250	205	840		65	380	490	440	24	42
	160 L	15	18.5																					
	180 M	18.5	22					74	1307	110	260			471						430	540	490		48
	180L	22	-																					
	90 S	1.1	1.5					42	901	35				328	900	150	600							24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				335	1000	170	660							28
	112M	4	4						997					348										
	132 S	5.5	5.5 / 7.5					58	1108	100	260	80	42	368	1120	190	740		65	380	490	440	24	38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260					430										42
32-250	160 L	15	18.5	50	32	100	180								1250	205	840	70						
	180 M	18.5	22					74	1327	110				471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300			491										55
	225M	45	45						1416		325	100	42	563	1400	230	940		65	480	610	550	28	
	225S	37	-					80	1427	140				565										60
	250M	55	55						1535		350			611	1600	270	1060			530	660	600		

*Dimensions can differ depending on the motor supplier.

Dimensional drawing

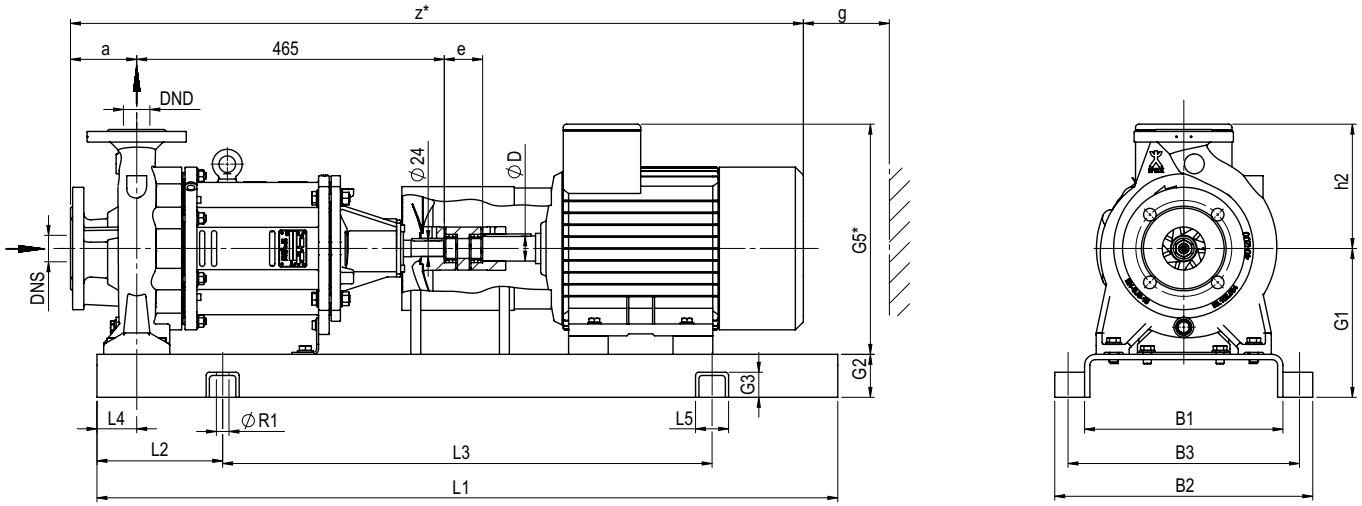




Pump	Motor	Power kW		Pump dimensions				Pump set dimensions															
Size	Frame size	4-pole	2-pole	DNS	DND	a	h2	e	z*	g	G1	G2	G3	G5*	L1	L2	L3	L4	L5	B1	B2	B3	øR1	øD
		1450 / 1750	2900 / 3500																					
	80	0.55 / 0.75	0.75 / 1.1						882	30				261										19
	90 S	1.1	1.5					42	881	35				280	900	150	600							24
	90L	1.5	2.2						906											270	360	320		
	100L	2.2 / 3	3					52	960	50	197	65	38	287	1000	170	660		50				19	28
	112M	4	4						977					300										
40-160	132 S	5.5	5.5 / 7.5	65	40	80	132	58	1088	100				320	1120	190	740	60		300	390	350		38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1240		240			410	1250	205	840			380	490	440		42
	160 L	15	18.5									80	42											
	180 M	18.5	22					74	1307	110	260			471	1120	190	740		65	430	540	490	24	48
	180L	22	-																					
	80	0.55 / 0.75	0.75 / 1.1						902	30				289										19
	90 S	1.1	1.5					42	901	35				308	900	150	600							24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50	225	65	38	315	1000	170	660		50	300	390	350	19	28
	112M	4	4						997					328										
	132 S	5.5	5.5 / 7.5																					
40-200	132M	7.5	-	65	40	100	160	58	1108	100				348	1120	190	740	60						38
	160 M	11	11 / 15																					
	160 L	15	18.5					68	1260		240			410						380	490	440		42
	180 M	18.5	22						1327			80	42		1250	205	840		65				24	
	180L	22	-					74		110	260			471						430	540	490		48
	200 L	30	30 / 37						1377		300	100		491	1400	230	940			480	610	550	28	55
	90 S	1.1	1.5					42	901	35				328	900	150	600							24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				335	1000	170	660							28
	112M	4	4						997					348										
	132 S	5.5	5.5 / 7.5					58	1108	100	260	80	42	368	1120	190	740		65	380	490	440	24	38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260					430										42
40-250	160 L	15	18.5	65	40	100	180								1250	205	840	70						
	180 M	18.5	22					74	1327	110				471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300			491										55
	225M	-	45						1416		325	100	42	563	1400	230	940		65	480	610	550	28	
	225S	37	-					80	1427	140				565										60
	250M	-	55						1535		350			611	1600	270	1060			530	660	600		

*Dimensions can differ depending on the motor supplier.

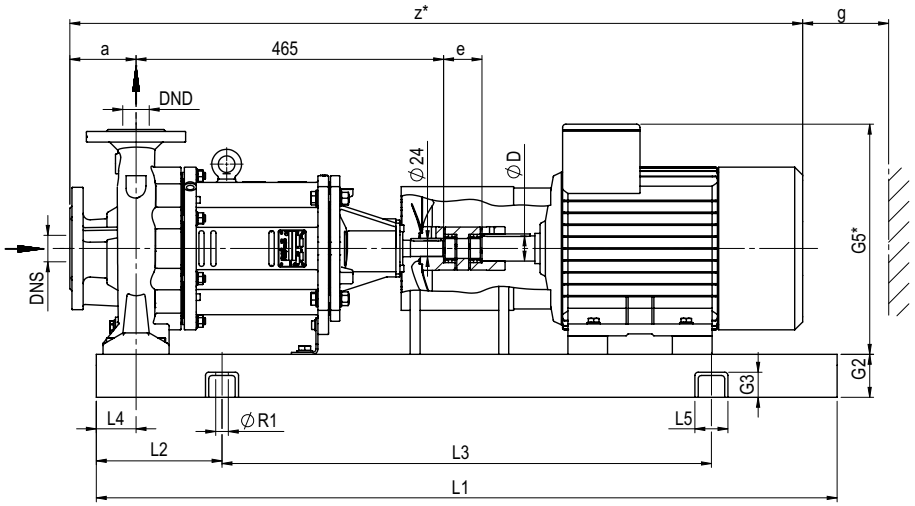
Dimensional drawing

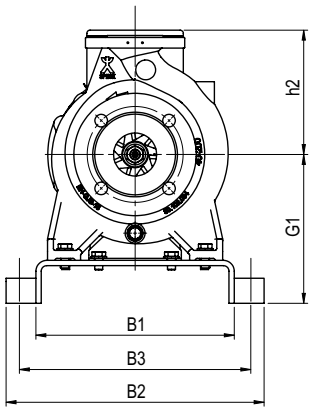


Pump	Motor	Power kW		Pump dimensions				Pump set dimensions																
Size	Frame size	4-pole	2-pole	DNS	DND	a	h2	e	z*	g	G1	G2	G3	G5*	L1	L2	L3	L4	L5	B1	B2	B3	øR1	øD
		1450 / 1750	2900 / 3500																					
50-160	80	0.55 / 0.75	0.75 / 1.1	65	50	100	160	42	902	30	225	65	38	289	900	150	600	60	50	300	390	350	19	19
	90 S	1.1	1.5						901	35				308										24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				315	1000	170	660							28
	112M	4	4						997					328										
	132 S	5.5	5.5 / 7.5					58	1108	100				348	1120	190	740							38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260		240	80	42	410	1250	205	840		65	380	490	440	24	42
	160 L	15	18.5																					
	180 M	18.5	22					74	1327	110	260			471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300	100		491	1400	230	940			480	610	550	28	55
50-200	80	0.55 / 0.75	0.75 / 1.1	65	50	100	160	42	902	30	225	65	38	289	900	150	600	60	50	300	390	350	19	19
	90 S	1.1	1.5						901	35				308										24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				315	1000	170	660							28
	112M	4	4						997					328										
	132 S	5.5	5.5 / 7.5					58	1108	100				348	1120	190	740							38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260		240	80	42	410	1250	205	840		65	380	490	440	24	42
	160 L	15	18.5																					
	180 M	18.5	22					74	1327	110	260			471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300	100		491	1400	230	940			480	610	550	28	55
50-250	90 S	1.1	1.5	65	50	100	180	42	901	35	260	80	42	328	900	150	600	70	65	380	490	440	24	24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				335	1000	170	660							28
	112M	4	4						997					348										
	132 S	5.5	5.5 / 7.5					58	1108	100				368	1120	190	740							38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260					430	1250	205	840							42
	160 L	15	18.5																					
	180 M	18.5	22					74	1327	110				471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300	100	42	491	1400	230	940		65	480	610	550	28	55
	225M	45	45						1416		325			563										
	225S	37	-					80	1427	140				565										60
	250M	55	55						1535		350			611	1600	270	1060			530	660	600		

*Dimensions can differ depending on the motor supplier.

Dimensional drawing

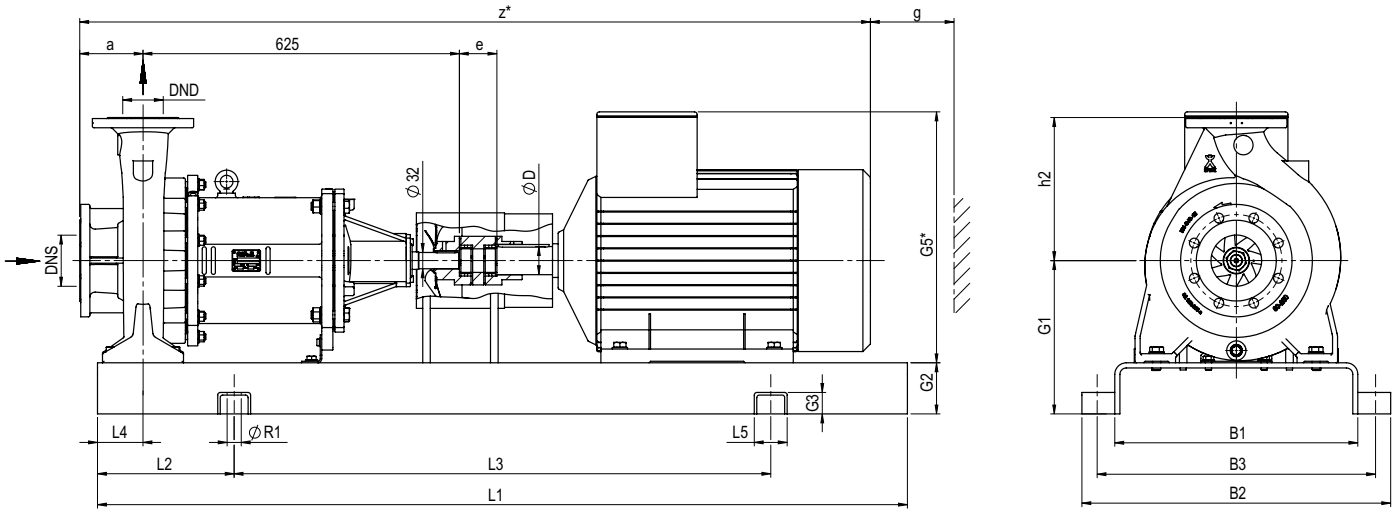




Pump	Motor	Power kW		Pump dimensions				Pump set dimensions															
Size	Frame size	4-pole	2-pole	DNS	DND	a	h2	e	z*	g	G1	G2	G3	G5*	L1	L2	L3	L4	L5	B1	B2	B3	øR1	øD
		1450 / 1750	2900 / 3500																					
65-160	80	0.55 / 0.75	0.75 / 1.1	80	65	100	180	42	902	30	240	80	42	289	900	150	600	70	65	340	450	400	24	19
	90 S	1.1	1.5						901	35				308										24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				315	1000	170	660			340	450	400		28
	112M	4	4						997					328										
	132 S	5.5	5.5 / 7.5					58	1108	100				348	1120	190	740							38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260					410	1250	205	840			380	490	440		42
	160 L	15	18.5																					
	180 M	18.5	22					74	1327	110				471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300			491										55
	225M	45	45						1416		325	100	42	563	1400	230	940		65	480	610	550	28	
	225S	37	-					80	1427	140														60
65-200	90 S	1.1	1.5	80	65	100	180	42	901	35	260	80	42	328	900	150	600	70	65	380	490	440	24	24
	90L	1.5	2.2						926															
	100L	2.2 / 3	3					52	980	50				335	1000	170	660							28
	112M	4	4						997					348										
	132 S	5.5	5.5 / 7.5					58	1108	100				368	1120	190	740							38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1260					430	1250	205	840							42
	160 L	15	18.5																					
	180 M	18.5	22					74	1327	110				471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1377		300			491										55
	225M	45	45						1416		325	100	42	563	1400	230	940		65	480	610	550	28	
	225S	37	-					80	1427	140				565										60
	250M	55	55						1535		350			611	1600	270	1060			530	660	600		
80-160	90 S	1.1	1.5	100	80	125	180	42	926	35	260	80	42	328	900	150	600	70	65	380	490	440	24	24
	90L	1.5	2.2						951															
	100L	2.2 / 3	3					52	1005	50				335	1000	170	660							28
	112M	4	4						1022					348										
	132 S	5.5	5.5 / 7.5					58	1133	100				368	1120	190	740							38
	132M	7.5	-																					
	160 M	11	11 / 15					68	1285					430	1250	205	840							42
	160 L	15	18.5																					
	180 M	18.5	22					74	1352	110				471						430	540	490		48
	180L	22	-																					
	200 L	30	30 / 37						1402		300			491										55
	225M	45	45						1441		325	100	42	563	1400	230	940		65	480	610	550	28	
	225S	37	-					80	1452	140				565										60
	250M	55	55						1560		350			611	1600	270	1060			530	660	600		

*Dimensions can differ depending on the motor supplier.

Dimensional drawing



Pump	Motor	Power kW		Pump dimensions				Pump set dimensions																
Size	Frame size	4-pole	2-pole	DNS	DND	a	h2	e	z*	g	G1	G2	G3	G5*	L1	L2	L3	L4	L5	B1	B2	B3	øR1	øD
		1450 / 1750	2900 / 3500																					
	180M	18.5	22						1512															48
	180L	22	-					74			300			491										
	200L	30	30 / 37						1562	110					1600	270	1060			480	610	550		55
	225M		45						1601															
	225M	45							1636		325			563										
	225S	37	-					80	1612															60
80-250	250M		55	100	80	125	280		1720			100	42					90	65				28	
	250M	55									350			611										
	280S		75					88	1728						1800	300	1200			600	730	670		65
	280S	75						102	1882	140														
	280M		90					88	1896		380			758										75
	280M	90						102	1933						1900	320	1260							65
									1947															75

*Dimensions can differ depending on the motor supplier.

Allocation of coupling and base plate

Pump size ▼ / Motor size ▶		80	90S	90L	100L	112M	132S	132M	160M	160L	180M	180L	200L	225M	250M	280S	280M
32-160	Coupling Base plate										-						
32-200	Coupling Base plate	019 3-270		024 3-270	024 4-270												
40-160	Coupling Base plate						028 5-300						-				
40-200	Coupling Base plate																
50-160	Coupling Base plate	019 3-300		024 3-300	024 4-300								042 7-480	-			
50-200	Coupling Base plate																
65-160	Coupling Base plate	019 3-340		024 2-340	024 4-340		028 5-340		038 6-380		042 6-430						
65-200	Coupling Base plate																
80-160	Coupling Base plate																
32-250	Coupling Base plate	-	019 3-380	024 3-380	024 4-380		028 5-380						042 7-480		048 8-530	-	
40-250	Coupling Base plate																
50-250	Coupling Base plate																
80-250	Coupling Base plate	-									042 8-480				048 9-600	055 9-600	055 10-600

Substance data of heat transfer media

	Water		Marlotherm® SH		Syltherm® XLT		Galden® HT 200	
Temperature	ρ Density	ν Kinematic viscosity	ρ Density	ν Kinematic viscosity	ρ Density	ν Kinematic viscosity	ρ Density	ν Kinematic viscosity
[°C]	[kg/m³]	[mm²/s]	[kg/m³]	[mm²/s]	[kg/m³]	[mm²/s]	[kg/m³]	[mm²/s]
-40	–	–	–	–	–	–	1935	80.00
0	1000	1.789	1058	321.00	862	2.40	1845	5.20
40	992	0.658	1030	16.50	827	1.34	1755	1.80
100	958	0.294	987	3.10	769	0.73	1625	0.86
150	917	0.201	951	1.60	714	0.50	1520	0.41
160			944	1.40	702	0.48	1490	0.38
180			930	1.20	678	0.43	1445	0.36
200			915	0.92	652	0.40		
220			901	0.77	624	0.37		
240			887	0.65	595	0.35		
260			873	0.57	563	0.34		
280			858	0.50				
300			844	0.45				
320			830	0.40				
340			815	0.36				

Pump data sheet

speck pumpen	**Heat Transfer Pump Technical Data Sheet** **Pump Model**		Quotation Date Item

SPECK PUMPEN Systemtechnik GmbH
Regensburger Ring 6 - 8 D-91154 Roth Tel.: 09171/809-0 Fax: 09171/809-10 www.speck-pumps.de

1	**Pump Model:**		**Quantity:**					
2	Customer		Location			Page:	of:	pages
3	Phone		Fax			Iss. / Dpt.:		
4	Contact		E-Mail			Phone:		
5	PO		dated			Fax:		
6	Project		Pump No.			E-Mail		

Installation / Environment

7	Building / Outside		Altitude		m	Amb. temp		Start-up temp.		rel. Humidity	
8	under roof yes/no		Hazardous area		-	min.:	max:	min.:	°C		%

Operating (Contractual) Data

9	Fluid			**Flow rate**	**rated**		m^3/h	Reference Speed			1/min
10	corrosive matters		Wght.-%		min / max		m^3/h	direction of rotation	1)		-
11	abrasive matters		Wght.-%	**Pressure**	Inlet		bar (ü)	Hydr. efficiency			%
12	Solid content		Wght.-%		Disch.		bar (ü)	hydr. power cons.			kW
13	**Oper. Temp. tA**		°C	**Tot. Diff. Head**	**rated**		m	power loss			kW
14	**Density @ tA**		kg/m^3	pressure differential			bar	Total abs. power			kW
15	**Kin. viscosity @tA**		mm^2/s	NPSH	available		m	abs. power at cold start			kW
16	**Vapor press. @ tA**		bar (a)		required		m	Duty point data to		DIN EN ISO 9906 Cl. 2	

Pump design

17	Impeller-Ø		mm	Inlet-nozzle	nom. diam. DN		Bearings	impeller side	coupling side
18	No of stages		-		location		Type		
19	nom. pressure PN		bar		machined to		Lubrication		
20	max. all. Cas. press. @ tA		bar	Outlet-nozzle	nom. diam. DN		Shaft seal	Mechanical seal	
21	Cooling 'C' / Heating 'H'				location		Type		
22	Volute casing	Casing cover	Bearing bracket		machined to		Size		
23	-	-	-	Sound pressure level	2)	- dB(A)	Quench yes/no		

Accessories

24	AC Electric Motor	Power	kW	Frame		Ex-protection		Coupling	Size/Spacer /	mm
25		Frequency	Hz	Enclos.		Make			Make	
26		Voltage	V	Construct.		Delivered by			Type	
27		Nom. Speed	1/min	Current		mounted by		Baseplate		

Materials

28	Volute casing		bearing bracket		containm. shell	
29	Casing cover		motor lantern		sleeve bearing	
30	Impeller		cas. wear ring		coupl.+guard	/
31	Shaft		imp. wear ring		Baseplate	

Tests and Inspections

32	**1. Material Tests:**	**Kind of Test**	**Test Certificate** 3)	**4. Other Tests Tests:**	**Witnessed by:**	**Test Certif.**
33	1.1 volute casing			4.1 **Hydrost. Pressure Test** 4)		
34	1.2 Cas. Cover			4.2 **Gas Pressure Test**		
35	1.3 Bearing frame			4.3 **Performance curve** 5)		
36	1.4 Impeller			4.4 **Final check**		
37	1.5 Shaft			4.5		
38	1.6			4.6		

Shipping data 6)

39	Total net weight appr.	kg	/	Total gross weight appr.	kg

Documentation

40	**Dimensional drwg.**	**Cross sect. drwg**	**Performance curve**	**Oper. & Instruct. Man.**	**Other (see attached)**	**Qty each**	**fold**
41						Language	

Remarks

42 ◥ = min. information required for quotation
43 1) = seen from driver to pump 2) = calcul. to EUROPUMP
44 3) = acc. to EN 10204 4) = volute casing & casing cover
45 5) = without NPSH-Test 6) = scope of supply see price sheet

46 Revision: Issued: Date:

D Germany

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01_10

Edition
11/2009
replaces edition 08/2009

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11/2009 – 1096.0744