



SB,SBI,SBN 1,3,5,10,15,20,32,45,64,90,120,150 series

**Vertical Multistage Centrifugal
In-line Pumps**

50Hz



STAIRS INDUSTRIAL CO., LTD.

Product data

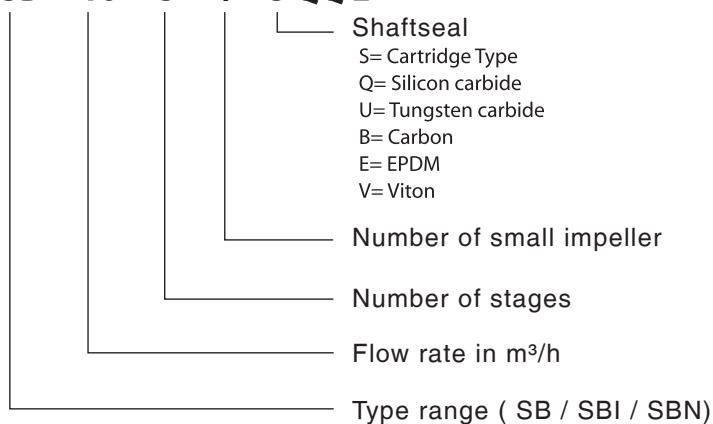
Vertical Multistage Centrifugal In-line Pumps



STAIRS PUMPS

Identification Code

SB - 10 - 5 - 1 - S Q Q E



Pump nameplate information

Type	①				
Model	②				
f	③	Hz	P2	④	kW
n	⑤	min ⁻¹	H _{max}	⑥	m
Q	⑦	m ³ /h	H	⑧	m
p _{max} /t _{max}	⑨	bar/°C	↻	⑩	
Serial No.	⑪				

CE

- ① Pump Type - Seal Type
- ② Pump Model
- ③ Frequency
- ④ Rated Power
- ⑤ Speed
- ⑥ Maximum Head
- ⑦ Capacity
- ⑧ Head Range
- ⑨ Max. Operating Pressure / Max. temperature
- ⑩ Rotating Direction
- ⑪ Serial number

Motor nameplate information

STAIRS ① INDUCTION MOTOR CE					
TYPE	②		FR.	③	POLES 2 IEC 60034
OUTPUT	④	HP	kW	RATING CONT.	INS. ⑤ IP ⑥
⑦ Hz	△	⑧	V	⑨	A E.F.F.% ⑩
	Y		V	A	rpm ⑪
BEARINGS	⑫			WEIGHT	kg
SER.NO.	⑬			DATE	

- ① Phase
- ② Motor Model
- ③ Frame
- ④ Rated Power
- ⑤ Insulation
- ⑥ International Protection
- ⑦ Frequency
- ⑧ Voltage
- ⑨ Ampere
- ⑩ Efficiency
- ⑪ Revolutions Per Minute
- ⑫ Bearing type
- ⑬ Serial number

Product data

Vertical Multistage Centrifugal In-line Pumps



STAIRS PUMPS

Mechanical Seal

Standard Cartridge type mechanical seal made of Silicon Carbide/Silicon Carbide/EPDM or Viton. Based on the type of application, alternative materials are available for the seal and the elastomers. The cartridge type mechanical seal can be replaced in minutes without special tools and without dismantling the pump.



List of Materials

Q : Silicon carbide	E : EPDM
U : Tungsten carbide	V : Viton
B : Carbon	

Type of Seal

Seal Type	SB/SBI/SBN		
	1/3/5/10/15/20 /32/45/64/90	120/150	
		0.5-60HP	75-100HP
Mechanical Seals			
S: O-ring seal Cartridge type	●	●	
B: Rubber bellows seal Cartridge type			●
QQ	●	●	●
UU	Optional	Optional	
QB	Optional	Optional	
UB	Optional	Optional	
Seals			
E	●	●	●
V	Optional	Optional	Optional

Minimum inlet pressure - NPSHA

Calculation of the inlet pressure "H" is recommended in these situations:

- The liquid temperature is high.
- The flow is significantly higher than the rated flow.
- Water is drawn from depths.
- Water is drawn through long pipes.
- Inlet conditions are poor.

To avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump. The maximum suction lift "H" in feet can be calculated as follows:

$$H = P_b - \text{NPSHR} - H_f - H_v - H_s$$

P_b = Barometric pressure in feet absolute.
(Barometric pressure can be set to 33.9 feet. At sea level. In closed systems, p_b indicates system pressure in feet.)

NPSHR = Net Positive Suction Head Required in feet.
(To be read from the NPSHR curve at the highest flow the pump will be delivering.)

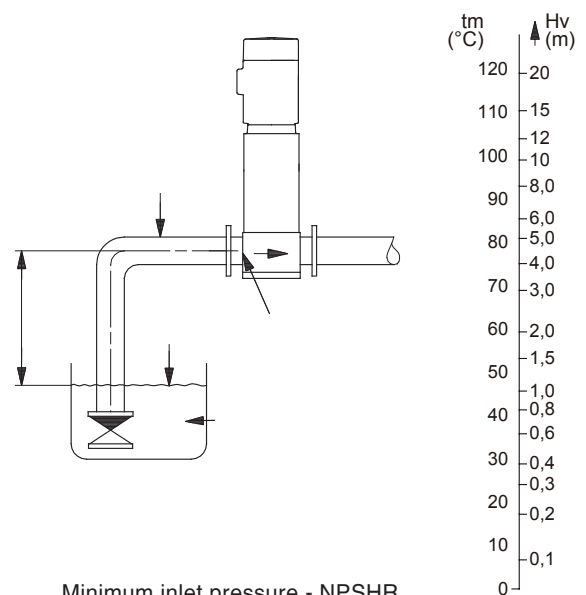
H_f = Friction loss in suction pipe in feet. (At the highest flow the pump will be delivering.)

H_v = Vapor pressure in feet. (To be read from the vapor pressure scale. " H_v " depends on the liquid temperature " T_m ").

H_s = Safety margin = minimum 2.0 feet.

If the "H" calculated is positive, the pump can operate at a suction lift of maximum "H" feet.

If the "H" calculated is negative, an inlet pressure of minimum "H" feet is required.



Minimum inlet pressure - NPSHR

Note: In order to avoid cavitation **never**, select a pump whose duty point lies too far to the right on the NPSHR curve.

Always check the NPSHR value of the pump at the highest possible flow.



Motor

- Squirrel cage in short circuit, aluminum casing up to 22 kW, totally enclosed, fan-cooled, 2-pole standard motor.
- Electrical data
 - ⊙ Enclosure class: IP55
 - ⊙ Insulation class: F
- The motors have efficiency values that fall within the range normally referred to as high efficiency.
- Ambient temperature: Max. +50°C

Motor Data

50Hz

Motor Type				Nominal current in [A]					
Pole	HP	kW	Flange	Frame	1Ø	3Ø		3Ø	
					220-240V	△ 220-240V	Y 380-415V	△ 380-415V	Y 660-720V
2	0.5	0.37	B14	71A	2.5 - 2.5	1.7 - 1.9	1.0 - 1.1	-----	-----
	0.75	0.55		71B	4.0 - 3.5	2.6 - 2.9	1.5 - 1.7	-----	-----
	1.0	0.75		80A	5.1 - 4.1	3.4 - 3.4	2.0 - 2.0	-----	-----
	1.5	1.1		80B	8.0 - 6.9	4.8 - 5.0	2.8 - 2.9	-----	-----
	2.0	1.5		90S	9.5 - 8.9	6.2 - 6.6	3.6 - 3.8	-----	-----
	3.0	2.2		90L	13.4 - 12.7	8.8 - 9.4	5.1 - 5.4	-----	-----
	4.0	3.0		100L	-----	11.8 - 12.3	6.8 - 7.1	6.8 - 6.9	3.9 - 4.0
	5.5	4.0		112M	-----	15.1 - 15.2	8.7 - 8.8	8.7 - 8.3	5.0 - 4.8
	7.5	5.5	B5	132S	-----	18.7 - 18.0	10.8 - 10.4	10.9 - 10.8	6.3 - 6.2
	10	7.5		132S	-----	25.5 - 24.9	14.7 - 14.4	14.9 - 14.8	8.6 - 8.5
	15	11		160M	-----	38.8 - 39.1	22.4 - 22.6	22.9 - 23.8	13.2 - 13.7
	20	15		160M	-----	49.3 - 46.5	28.5 - 26.9	24.9 - 29.0	16.9 - 16.7
	25	18.5		160L	-----	60.2 - 55.4	34.8 - 32.0	35.2 - 33.5	20.3 - 19.3
	30	22		180M	-----	71.3 - 67.5	41.2 - 39.0	41.3 - 39.6	23.8 - 22.8
	40	30		200L	-----	-----	-----	55.4 - 50.7	31.9 - 29.2
	50	37		200L	-----	-----	-----	67.7 - 62.0	39.0 - 35.7
	60	45		225M	-----	-----	-----	82.3 - 75.4	47.4 - 43.4
	75	55		250M	-----	-----	-----	101 - 92.5	58.2 - 53.3
	100	75		280S	-----	-----	-----	134 - 123	77.2 - 70.7

Max. Operating Pressure and Inlet Pressures

Vertical Multistage Centrifugal In-line Pumps



STAIRS PUMPS

Maximum inlet pressure

The following table shows the maximum permissible inlet pressure. However, the current inlet pressure + the pressure against a closed valve must always be lower than the maximum permissible operating pressure.

If the maximum permissible operating pressure is exceeded, the bearing in the motor may be damaged and the life of the shaft seal reduced.

* Rule to follow : The inlet pressure+ the pressure against a closed valve < Max. Operating pressure.

50Hz

Pump type	Stages	Max. Operating Pressure	Stages	Max. Inlet Pressures
SB(I/N) 1	2 - 36	25 bar	2 - 36	10 bar
SB(I/N) 3	2 - 36	25 bar	2 - 29	10 bar
			31 - 36	15 bar
SB(I/N) 5	2 - 36	25 bar	2 - 16	10 bar
			18 - 36	15 bar
SB(I/N) 10	1 - 16	16 bar	1 - 6	8 bar
	17 - 22	25 bar	7 - 22	10 bar
SB(I/N) 15	1 - 10	16 bar	1 - 3	8 bar
	12 - 17	25 bar	4 - 17	10 bar
SB(I/N) 20	1 - 10	16 bar	1 - 3	8 bar
	12 - 17	25 bar	4 - 17	10 bar
SB(I/N) 32	(1-1) - 7	16 bar	(1-1) - 4	4 bar
	(8-2) - 14	30 bar	(5-2) - 10	10 bar
			(11-2) - 14	15 bar
SB(I/N) 45	(1-1) - 5	16 bar	(1-1) - 2	4 bar
	(6-2) - 11	30 bar	(3-2) - 5	10 bar
	(12-2) - (13-2)	33 bar	(6-2) - (13-2)	15 bar
SB(I/N) 64	(1-1) - 5	16 bar	(1-1) - (2-2)	4 bar
	(6-2) - (8-1)	30 bar	(2-1) - (4-2)	10 bar
			(4-1) - (8-1)	15 bar
SB(I/N) 90	(1-1) - 4	16 bar	(1-1) - 1	4 bar
	(5-2) - 6	30 bar	(2-1) - (3-2)	10 bar
			3 - 6	15 bar
SB(I/N) 120	1 - 7	30 bar	1 - (2-1)	10 bar
			2 - (5-1)	15 bar
			(6-1) - 7	20 bar
SB(I/N) 150	(1-1) - 6	30 bar	(1-1) - 1	10 bar
			(2-1) - (4-2)	15 bar
			(5-2) - 6	20 bar

Example of operating and inlet pressures

The values for operating and inlet pressures shown in the tables must not be considered individually but must always be compared, see the following examples:

Example 1:

The following pump type has been selected: SB 3-29

Max. operating pressure: 25 bar

Max. inlet pressure: 10 bar

Discharge pressure against a closed valve: 18.6 bar , (see p.16)

This pump is not allowed to start at an inlet pressure of 10 bar , but at an inlet pressure of 25 bar - 18.6 bar = 6.4 bar.

Example 2:

The following pump type has been selected: SB 10-2

Maximum operating pressure: 16 bar.

Maximum inlet pressure: 8 bar.

Discharge pressure against a closed valve: 2 bar. (See p.16)

This pump is allowed to start at an inlet pressure of 8 bar, as the discharge pressure against a closed valve is only 2 bar, which results in an operating pressure of 8 bar + 2 bar = 10 bar. On the contrary, the maximum operating pressure of this pump is limited to 16 bar as a higher operating pressure will require an inlet pressure of more than 8 bar.



Pumped Liquids

SB (I, N) pumps can handle a wide variety of liquids, each with its own characteristic.

SB(I)

Non-corrosive liquids

For fluid transfer, circulation and pressure boosting of cold or hot clean water.

SBN

Industrial liquids

Light acids

The fluids covered in the list are not complete. Data on the application limits of different pump materials when handling any of the listed fluids are considered to be the best choices. However, the table is intended as a general guide only, and cannot replace actual testing of the pumped fluids and pump materials under specific working conditions.

When choosing the pump version, sufficient attention should be given to the flow medium, such as density, solidification point, viscosity as well as ex-protection requirement. The limits of applicability of the pumps, based on pressure and temperature must also be considered.

● Recommended

Pumped fluid	"Fluid Concentration, temperature"	SB (I)		SBN	
		EPDM	Viton	EPDM	Viton
Acetic acid anhydride	25°C			●	
Alkaline cleaner		●			
Aluminium sulphate	10%, 25°C				●
Ammonia water (A. hydroxide)	20%, 40°C	●			
Ammonia hydrogen carbonate	10%, 40°C	●		●	
Benzoic acid	10%, 90°C				●
Boric acid	Unsaturated solution, 60°C				●
Butanol	60°C	●			
Calcium acetate	30%, 50°C	●			
Calcium hydroxide	Saturated solution, 50°C	●			
Chromic acid	1%, 20°C				●
Condensate	90°C	●			
Copper sulphate	Unsaturated solution, 60°C				●
Deionic (fully desalinated water)	50°C			●	
Ethanol	100%, 20°C	●			
Ethylene glycol/Diethylene glycol	40%, 70°C	●	●	●	●
Fixer	25°C				●
Formic acid	5%, 20°C			●	

Technical data

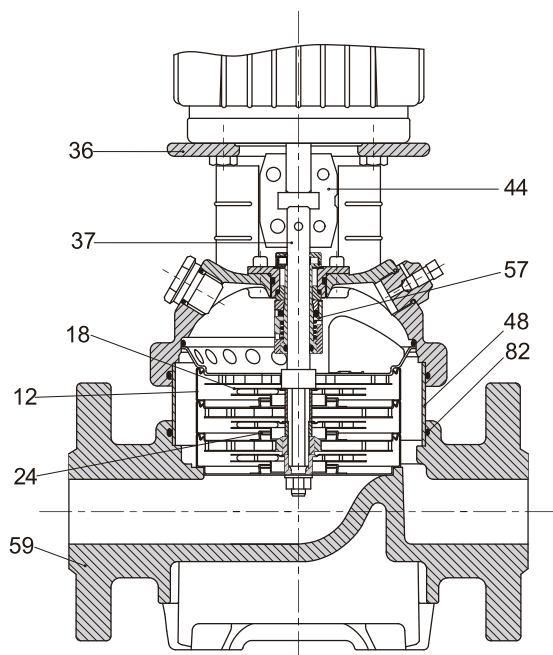
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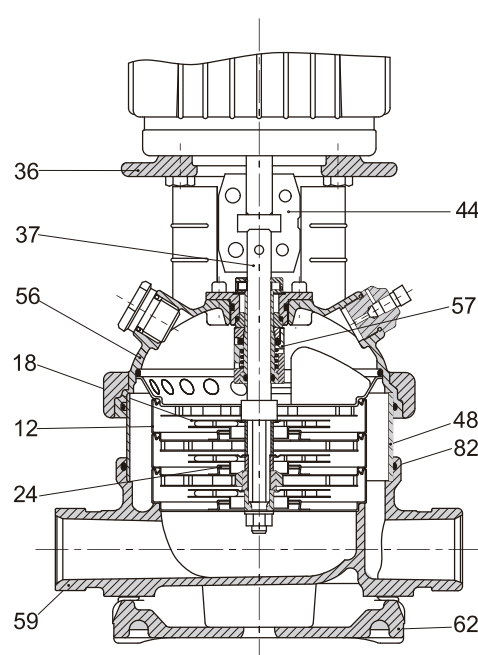
STAIRS PUMPS

Pumped fluid	"Fluid Concentration, temperature"	SB (I)		SBN	
		EPDM	Viton	EPDM	Viton
Fruit juice	50°C				●
Glycerine	50%, 50°C	●			
Heating oil (Light)		●			●
Hydraulic oil	100%, 100°C		●		
Isopropanol		●			
Lactic acid	10%, 20°C				●
Linoleic acid	100%, 20°C	●			
Linseed oil	60°C		●		
Liqueur	60°C				●
Maize oil	80°C		●		
Maleic acid	50%, 50°C				●
Methanol	100%, 20°C	●			
Motor oil	100%, 80°C	●			
Oil-water-mixture	100°C		●		
Oxalic acid	1%, 20°C			●	
Peanut oil	100%, 80°C		●		
Phosphoric acid	20%, 20°C			●	
Polyglycols	90°C		●		●
Polyethylene glycols	40%, 70°C	●			
Potassium carbonate	10%, 60°C	●			
Potassium hydrogen carbonate	10%, 60°C	●			
Potassium permanganate	5%, 20°C			●	
Potassium sulphate	Unsaturated solution, 80°C			●	
Rapeseed oil	100%, 80°C		●		
Silicone oil	100%		●		
Sodium carbonate	10%, 60°C			●	
Sodium hydroxide	25%, 50°C			●	
Sodium nitrate	Unsaturated solution, 80°C			●	
Sodium phosphate	5%, 100°C			●	
Sodium sulphate	10%, 60°C			●	
Sulphuric acid	5%, 25°C				●
Water					
Swimming pool water	35°C	● SBI		●	
Deionic	50°C			●	
Distilled water	50°C			●	
Decarbonated water				●	
Soft water				●	
Heating water				●	
Boiler water				●	
Pure water				●	
Rinsing water		● SBI		●	

SB-1,3,5,10,15,20



SBI(N)-1,3,5,10,15,20



CONSTRUCTION

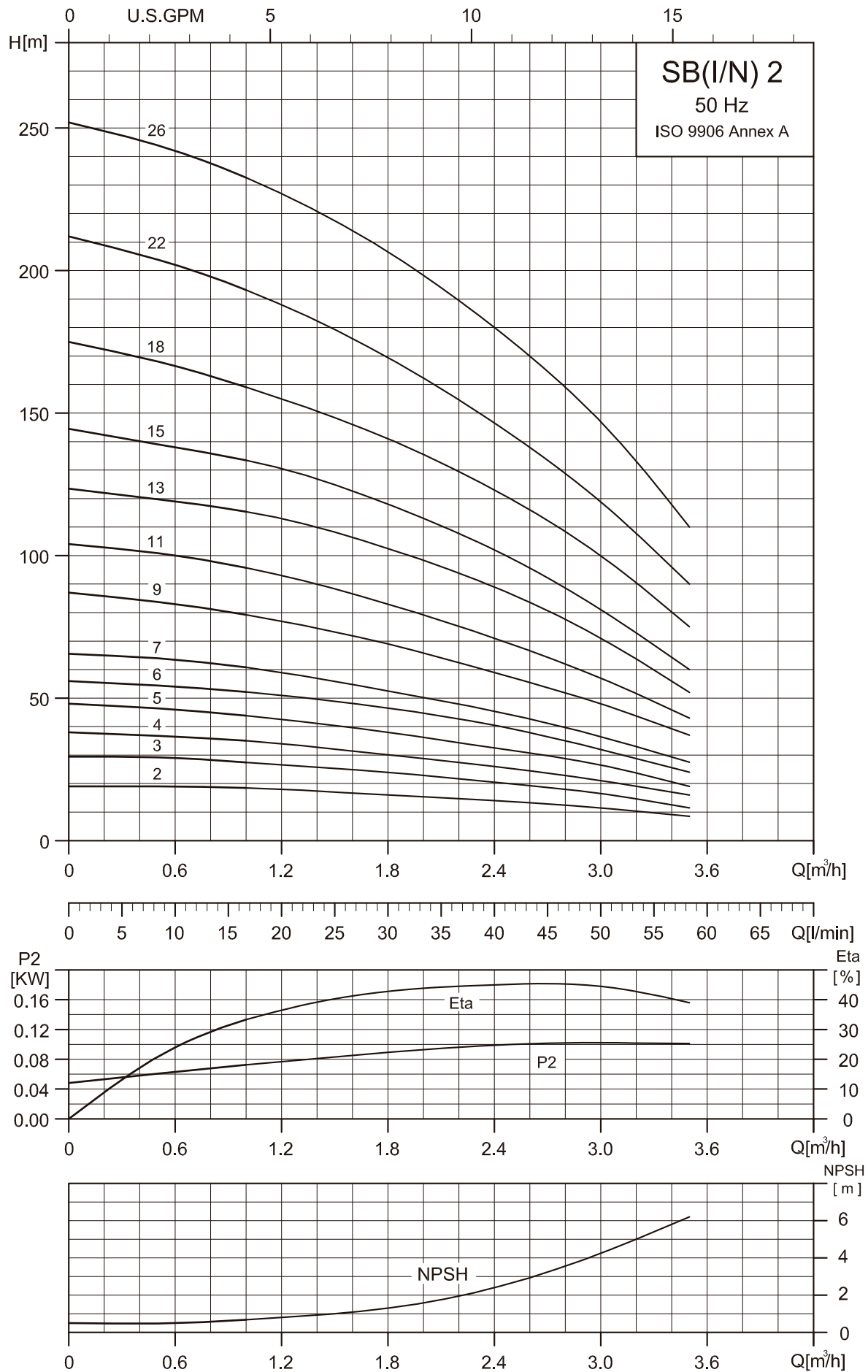
Pos.	Name	Material	SB 1,3,5,10,15,20		SBI 1,3,5,10,15,20		SBN 1,3,5,10,15,20	
			Standard		Standard		Standard	
			Europe	USA	Europe	USA	Europe	USA
36	Pump head	Cast Iron	EN-GJL-200	ASTM 25B	EN-GJS-450-10	ASTM 65-45-12	EN-GJS-450-10	ASTM 65-45-12
56	Pump head cover	Stainless steel	N/A		1.4301	AISI 304	1.4401	AISI 316
18	Impeller	Stainless steel	1.4301	AISI 304	1.4301	AISI 304	1.4401	AISI 316
37	Shaft	Stainless steel	1.4057	AISI 431	1.4057	AISI 431	1.4401	AISI 316
48	Outer Sleeve	Stainless steel	1.4301	AISI 304	1.4301	AISI 304	1.4401	AISI 316
82	O-ring for outer sleeve	EPDM						
12	Chamber	Stainless steel	1.4301	AISI 304	1.4301	AISI 304	1.4401	AISI 316
24	Neck ring	PTFE						
59	Base	Cast Iron	EN-GJL-200	ASTM 25B	N/A			
	Base	Stainless steel	N/A		1.4301	AISI 304	1.4401	AISI 316
62	Base plate	Cast Iron	N/A		EN-GJL-200	ASTM 25B	EN-GJL-200	ASTM 25B
44	Coupling	Fe-Cu-C	SINT C11	MPIF FC0525	SINT C11	MPIF FC0525	SINT C11	MPIF FC0525
57	Mechanical seal	Cartridge type						

Contents

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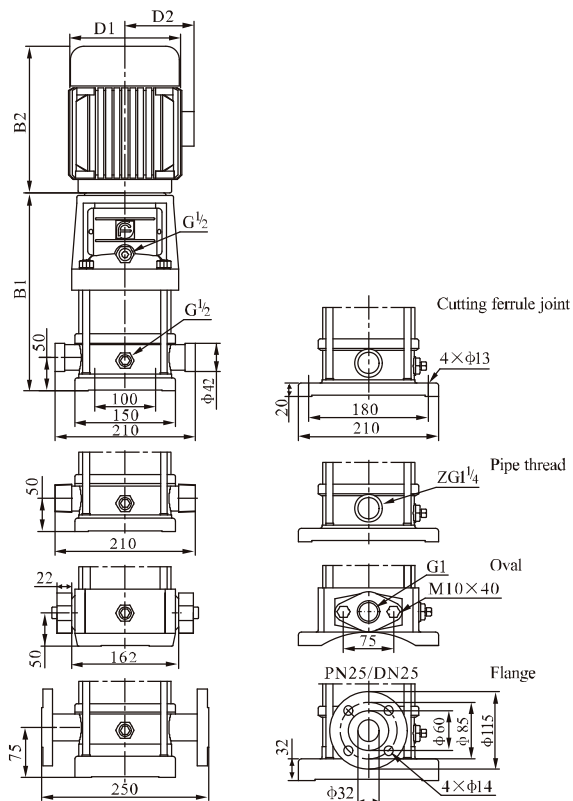


STAIRS PUMPS

● Performance table

Model	Driving motor		Q (m ³ /h)	1	1.2	1.6	2.0	2.4	2.8	3.2	3.5
	(kW)	(hp)									
SBI 2-2	0.37	0.5	H (m)	18	17	16	15	13	12	10	8
SBI 2-3	0.37	0.5		27	26	24	22	20	18	15	12
SBI 2-4	0.55	0.75		36	35	33	30	26	24	20	16
SBI 2-5	0.55	0.75		45	43	40	37	33	30	24	20
SBI 2-6	0.75	1		53	52	50	45	40	36	30	24
SBI 2-7	0.75	1		63	61	57	52	47	41	35	28
SBI 2-9	1.1	1.5		80	78	73	67	61	54	45	37
SBI 2-11	1.1	1.5		98	95	89	82	73	64	54	44
SBI 2-13	1.5	2		116	114	106	98	89	78	65	52
SBI 2-15	1.5	2		134	130	123	112	100	90	73	60
SBI 2-18	2.2	3		161	157	148	136	121	108	91	76
SBI 2-22	2.2	3		197	192	180	165	148	130	110	90
SBI 2-26	3.0	4		232	228	214	198	179	158	130	110

● Installation sketch



● Size and weight

Model	Size (mm)					Weight (kg)
	B1	B2	B1+B2	D1	D2	
SBI 2-2	258	210	468	148	117	20
SBI 2-3	276	210	486	148	117	20
SBI 2-4	294	210	504	148	117	20
SBI 2-5	312	210	522	148	117	20
SBI 2-6	340	245	585	170	142	25
SBI 2-7	358	245	603	170	142	25
SBI 2-9	394	245	639	170	142	30
SBI 2-11	430	245	675	170	142	30
SBI 2-13	476	290	766	190	155	35
SBI 2-15	512	290	802	190	155	35
SBI 2-18	566	290	856	190	155	40
SBI 2-22	638	290	928	190	155	45
SBI 2-26	720	315	1035	197	165	50



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