



SYSTEMFLO

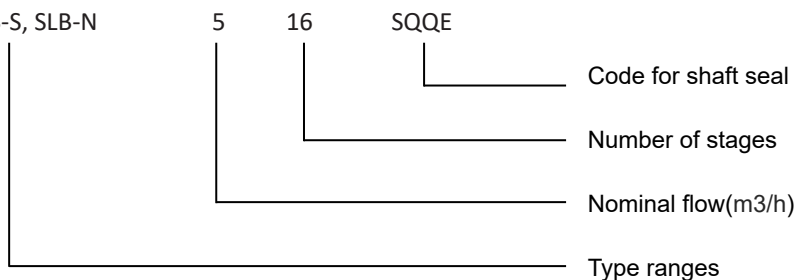
Installation and Operation Manual
SLB-C, SLB-S, SLB-N SERIES
VERTICAL MULTISTAGE CENTRIFUGAL PUMPS



1. Model numbering and nameplate format

1.1 Model numbering

Example: SLB-C, SLB-S, SLB-N



1.2 Nameplate format

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

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				

2. Handling

Read these instructions carefully before beginning installation.

Lift and handle these pumps carefully.

SLB-C, SLB-S, SLB-N series are vertical multi-stage non-self priming pumps coupled with standard electric motors.

This manual applies to standard version pumps and for standard applications.

Contact your supplier or the factory for information about special pump versions and applications.

3. Application

SLB-C, SLB-S, SLB-N series in-line pumps are designed for a wide range of applications in various industries—water treatment, water boosting, water supply, cooling, cleaning, etc.

3.1 Pumped liquids

The pumps are designed for use with clean, non-explosive liquids that do not contain abrasive material.

⚠ These pumps are not designed to be used with abrasive, solid containing, explosive and corrosive liquids. For special application, please contact your supplier or the factory.

4. Technical Data

4.1 Temperatures

➤ Ambient temperature: 0°C to +50°C

⚠ If ambient temperatures are above +40 degrees C, or if the pump is located at elevations more than 1,000 meters above sea level, the motor’s output must be derated to compensate for less effective cooling, and may have to be replaced with a larger size motor.

➤ Liquid temperature: -15°C to + 120°C

4.2 Minimum inlet pressure-NPSH

➤ To avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump

NPSHA : Net Positive Suction Head Available

--The NPSHA is a function of the pump suction system

NPSHR : Net Positive Suction Head Required

--The NPSHR is a function of the pump design at the operating point on the pump performance curve

NPSHA=Ha-Hs-Hf-Hv-Hst(in meters head)

Ha : Barometric pressure (That can be set to 10.2 m.)

Hs : Suction lift

Hf : Friction loss in suction pipe

Hv=KT+KH : Vapor pressure

KT : Flow resistance due to liquid temperature

KH : Flow resistance due to elevation above sea level

If the liquid is water, you can consult the tables to determine the values of **KT** and **KH**.

T (°C)	20	30	40	50	60	70	80	90	100	110	120
KT (m)	0.2	0.4	0.8	1.3	2.2	3.3	5	7.4	11	15	22
H (m)	0	500	1,000	1,500	2,000	2,500	3,000				
KH (m)	0	0.55	1.1	1.65	2.2	2.75	3.3				

Hst : Safety margin (minimum: 0.5 meters head)

NPSH A ≥ NPSH R : Pump running will be fine

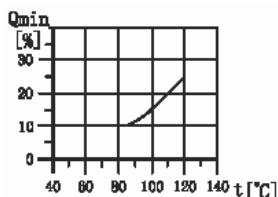
NPSH A < NPSH R : Pump will be dry running or cavitating

➤ Stop operation of the pump if cavitation occurs. Cavitation will cause pump damage and the resultant damage is not subject to warranty.

4.3 Minimum nominal flow rate

➤ To prevent overheating of the internal pump components, the pump should not be used at flows below the minimum flow rate.

⚠ Do not run the pump against a closed discharge valve for longer than a few seconds. The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature.



4.4 Electrical data

⚠ Make sure that the supply voltages, phase and frequencies correspond to the motor specifications.

4.5 Number of starts per hour

Motors up to and including 4 kW : Maximum 100 times per hour.

Motors of 5.5 kW and up : Maximum 40 times per hour.

⚠ For other manufacturer's motors, check their instructions for the maximum frequency of starts.

5. Installation

Always refer to the local or national regulations and codes relating to the selection of the installation site, the water and power connections, etc.

5.1 Position

Pumps should be installed in a protected environment—not exposed to weather. Make sure that there are no obstructions to prevent proper motor cooling.

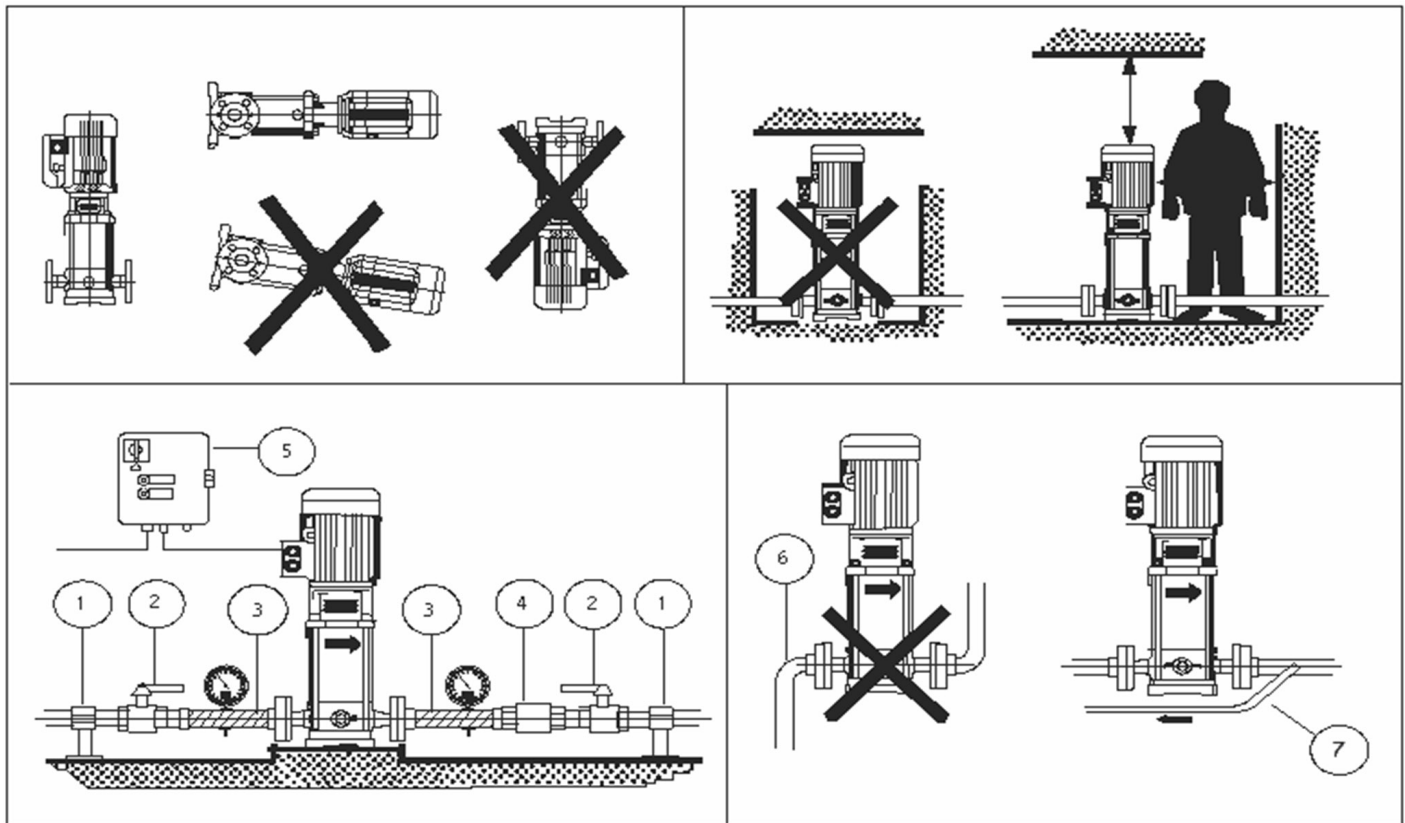
5.2 Anchoring

The pump must be secured to a solid foundation by bolts through the holes in the flange or base plate.

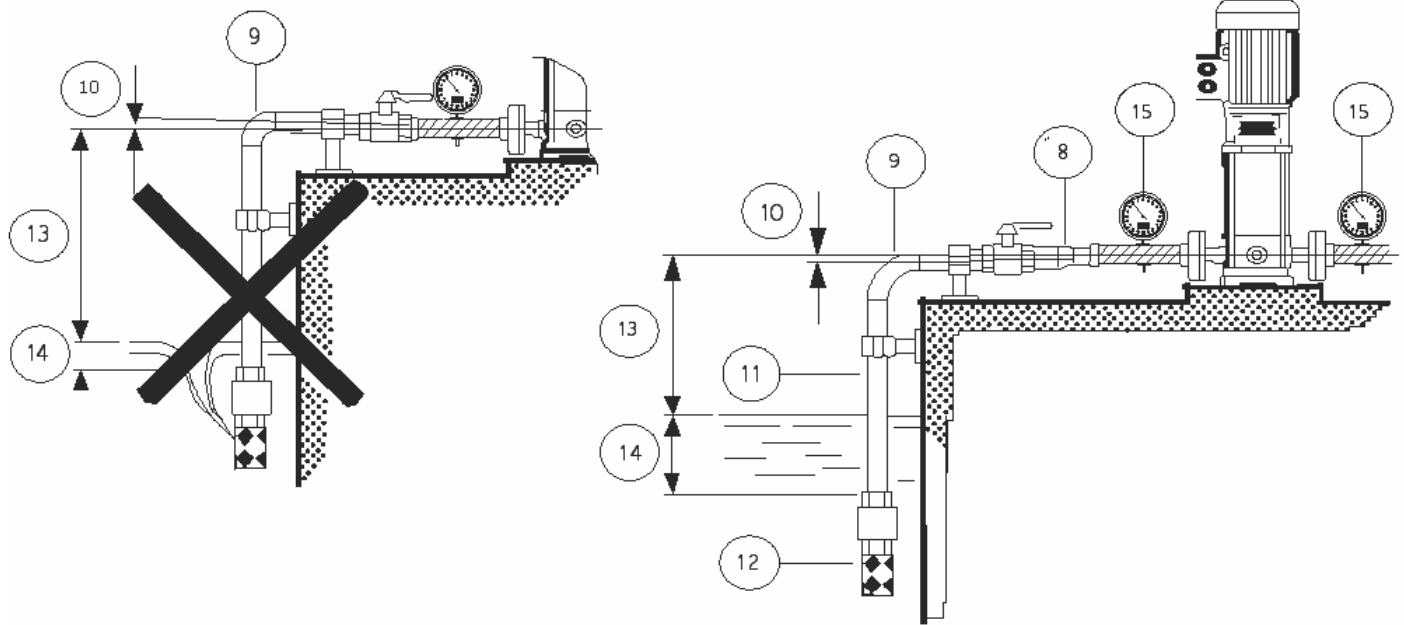
An illustration on page 8 shows the bolt location and the pipe connections.

5.3 Installation Example

When positioning and installing the pump, follow the installation examples in the next page in order to avoid damaging the pump.



Pos.	Description
1	Pipe support: Support piping system properly to avoid stresses on connections.
2	On-off valves: Install on-off valves for easy access before the pump intake and after the pump discharge.
3	Use flexible piping on both input and output sides of the pump to reduce vibration and transmission of noise.
4	Check valves will prevent return flow of pumped liquid when pump is stopped, reducing the danger of pump damage
5	Make sure that the control panel conforms to local standards and regulations.
6	Do not place elbows next to the pump intake and discharge.
7	If pump needs to be operated with on-off valve closed, install a bypass line to avoid damaging the pumping system.



Pos.	Description
8	If it is necessary to increase the diameter of the suction pipe, place an eccentric reducer between the check valve and the flexible pipe section.
9	Using elbows will increase the flow resistance. Wide bends will result in lesser flow resistance.
10	The piping must have a level or positive gradient to prevent the formation of air pockets.
11	The diameter of the drop pipe must be larger than the diameter of the pump's suction port.
12	Use a foot valve in case of negative suction head.
13	Size pump for correct head.
14	Place the intake of the suction pipe so that the intake is always submerged to prevent entry of air.
15	Install a compound gauge at the pump suction and a pressure gauge at the pump discharge.

6. Electrical Connection

- All electrical connections should be in accordance with the local regulations and carried out by a qualified electrician.
- Make sure that the supply voltages, frequencies, and phase are suitable for the motor specifications.
- Before proceeding, make sure that all the connections are grounded and well insulated.
- Overload protection should be provided.
- Wiring information is shown on the inside of the terminal box cover.
- The terminal box can be turned to four positions.
- Check the direction of rotation is consistent with the direction marked on the fan cover (three-phase motor only).
- Make sure that the controls are properly grounded.
- We strongly recommend installing dry running protection.

7. Start-up

The pump and suction pipe should be filled with liquid before start-up to prevent dry running.

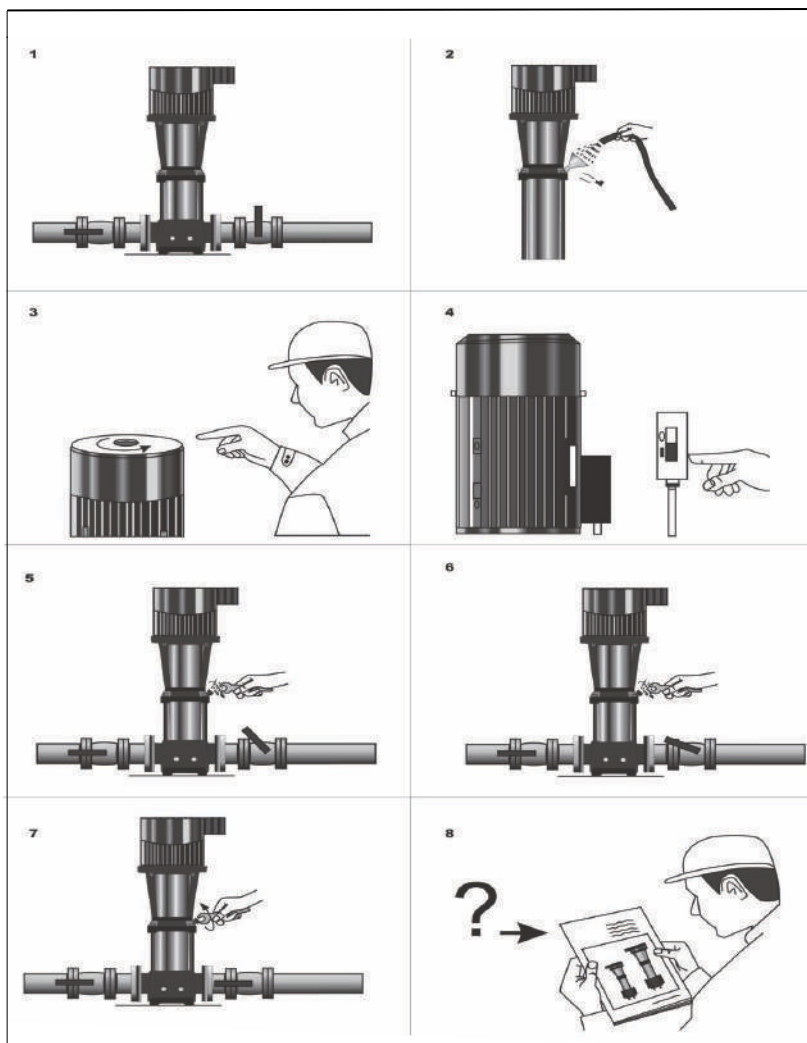
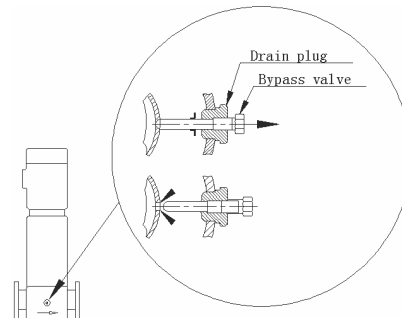
⚠ Dry running can damage the pump bearing and shaft seal.

7.1 Operation

- Start the pump and check the direction of rotation of the motor (three-phase motors).
 - Start the pump while the on-off valve of the discharge is closed. Right after start-up, open the on-off valve slowly. The pump should be running smoothly and quietly. Otherwise, it may be necessary to re-prime the pump.
 - Check the current draw of the power. If necessary, adjust the setting of the thermal relay.
 - Air pockets trapped inside the pump may be released by adjusting the air screw.
- ⚠** If the pump is installed in a location that may be exposed to freezing when not in operation, the pump and the pipe system must be drained to prevent freezing damage.

7.1 Operation

- It is recommended to open the bypass valve during start-up. The bypass valve that connects the suction and discharge of the pump will make the filling procedure easier. When the operation is stable, the bypass valve can be closed.
- If the pumped liquid contains air or the operating pressure is lower than 6 kg/cm^2 , it is advisable to leave the bypass valve open. If the operating pressure constantly exceeds 6 kg/cm^2 , the bypass valve must be closed. Otherwise, the material at the opening will be worn out because of the high liquid velocity.



8. Maintenance

⚠ Before starting maintenance work on the pump, the motor, or other parts of the system, make sure that the power supply has been switched off.

- The pump does not need a regular maintenance schedule.
- If the motor is fitted with grease nipples, the motor should be lubricated with a high temperature, lithium-based grease.
- If the pump and motor are not regularly in use, with long intervals of non-operation, the motor must be greased before restarting.

9. Troubleshooting

Fault	Probable Cause	Possible Solution
Pump does not run when the motor starter is activated	Supply failure or no power supply	Check connections or restart the power supply
	Main contacts in motor starter are not making contact or the motor coils are defective	Reconnect or replace contacts or magnetic coil
	Pump or auxiliary circuits protection fuses blow	Replace fuses
	Pump or piping system may be obstructed, causing a jam	Clean the obstruction and restart pump
	Motor may have failed	Replace the motor
	Motor protector or thermal relay has tripped out	Reset the motor or thermal protector
	Tripping of anti-dry running protection	Check the water level in the tank or the water system pressure. If everything is in order, check the protection device and its connection cables
Starter overload trips immediately when the power is switched on	Overload setting is too low	Set the motor starter correctly
	The cable connection is loose or faulty	Fasten or replace the cable connection
	One fuse is blown	Replace fuse and try starting again
	Pump is jammed by an obstruction	Check and clean obstruction from system
	Contacts in overload are faulty	Replace motor starter contacts
	The motor winding is defective	Replace the motor
	Low voltage (especially at peak time)	Check the power supply
The pump starts but, after a short time, the thermal protector trips out or the fuses blow	The voltage is not within the motor's operating limits	Check the operating conditions of the pump
	The control panel is situated in an excessively heated area or is exposed to direct sunlight	Protect the control panel from heat sources and from the sun
	A phase in the power supply is missing	Check the power supply
The pump starts up but, after a period of time, the thermal protector trips	Worn motor bearings causing motor to overheat	Replace motor bearings
	The pump's delivery rate is higher than the specified rate on the pump nameplate	Partially close the on-off valve located discharge side until the delivery rate returns to within the specified limits
	There are obstructions inside the pump or pumping system	Disassemble and clean the pump and piping
	Less viscous liquids may cause the motor to work too hard and overload the motor, causing the motor to overheat	Check the actual power requirements based on the characteristics of the liquid being pumped, and replace the motor accordingly
Water delivered	Pump is not primed with liquid	Fill the pump with the liquid to be pumped
	The pump, suction or discharge pipes are blocked by solids in the liquid being pumped	Clean the pump, suction or discharge pipe
	The foot or check valve is blocked or has failed	Replace the foot or check valve
	The suction pipe leaks	Repair or replace the suction pipe
	The air is in the suction pipe or pump	Remove trapped air from system
	Motor operating in the wrong direction (three-phase motor)	Change the direction of rotation of the motor by reversing motor connections
The pump capacity is not constant	The pump draws in air or the inlet pressure is too low	Improve the suction conditions
	The pump or the suction side of the piping system partly blocked by foreign bodies	Clean the pump or suction pipe
The system's general protection cuts in	Short circuit	Check electrical system
The pump rotates in the wrong direction when switched off	The foot or the check valve has failed	Check and replace check valve
	Leakage in the suction pipe	Repair or replace the suction pipe

Fault	Probable cause	Possible Solution
The frequency of pump start-up is too high	Leakage in the foot valve, check valve or system	Repair or replace the components
	Ruptured membrane or no air pre-charge in surge tank	See relevant instructions in surge tank's manual
Vibration and noise	Cavitation	Reduce the required flow or improve the operating conditions of the pump (suction conditions, head, flow resistance, liquid temperature, viscosity,...etc.)
	Make sure that pump and motor shafts are properly aligned	Adjust the pump and/or motor shafts
	Worn motor bearings	Replace the bearings or the motor
	Operation with frequency converter	Consult a qualified engineer from the supplier of the frequency-converter
	Check vibration and noise damping devices	Replace vibration & noise dampers, if worn

LIMITED WARRANTY

Systemflo pumps are warranted to the first user only to be free of defects in material and workmanship for a period of 12 months from date of installation, but no more than 24 months from date of shipment. Systemflo's liability under this warranty shall be limited to repairing or replacing at our discretion, without charges, FOB Systemflo's distribution center or authorized service agent. Systemflo will not be liable for any cost of removal, installation, transportation, or any other charges that may arise in connection with warranty claim.

The warranty period commences on the date of original purchase of the equipment. Proof of purchase and installation date, failure date, and supporting installation data must be provided when claiming repairs under warranty.

This warranty is subject to due compliance by the original purchaser with all directions and conditions set out in the installation and operating instructions. Failure to comply with these instructions, damage or breakdown caused by fair wear and tear, negligence, misuse, incorrect installation, inappropriate chemicals, or additive in the water, inadequate protection against freezing, rain or other adverse weather conditions, corrosive or abrasive water, lightning or high voltage spikes or through unauthorized persons attempting repairs are not covered under warranty.

Systemflo will not be liable for any incidental or consequential damages, losses, or expenses arising from installation, use, or any other causes. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

Certain states do not permit the exclusion or limitation of incidental or consequential damages or the placing of limitations on the duration of an implied warranty, therefore, the limitations or exclusions herein may not apply. This warranty sets forth specific legal rights and obligations, however, additional rights may exist, which may vary from state to state.



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