SPCO®

makes life easier

Installation and operating instructions

PD

In-line Circulating Pump

Approvals

CB TEST CERTIFICATE

Ref. Certificate No. CH-5876

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

Issued by: Electrosuisse

Product: Horizontal and vertical multistage pumps

Applicant: Swiss Pump Company AG, Moosweg 36, CH-3645 Gwatt (Thun), Switzerland

Manufacturer: Swiss Pump Company AG, Moosweg 36, CH-3645 Gwatt (Thun), Switzerland

Factory: Swiss Pump Company AG, Moosweg 36, CH-3645 Gwatt (Thun), Switzerland

Rating and principal characteristics: 3 x 200 - 277/346 - 480V~, 50/60Hz; 220-230V~, 50/60Hz; 127-220-240V~, 60Hz; class I, IP55

Trade mark (if any): Swiss Pump Company AG (SPCO)

Model/Type reference: HM..., CHL..., VM..., CDL..., ND..., CC..., PD..., MB..., QB..., EMP..., COP..., SCP... see appendix type list in test report

Additional information: —

Sample of product tested to be in conformity with IEC: 60335-1(ed.4)am1,am2; 60335-2-41(ed.3)am1,am2

National differences: EU Group Differences; EU Special National Conditions; EU A-Deviations

Test Report Ref. No.: 06-HG-6218.01 + .02 + .03 + .05

This CB Test Certificate is issued by the National Certification Body:

Electrosuisse, Luppmenstrasse 1, CH-8320 Fehraltorf

Signed by: Erich Obrist, 2010-07-27

electrosuisse

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Contents

General Data

Declaration of conformity

EU Declaration of conformity

according to the Low Voltage Directive 2006/95/EC
and the Machinery Directive 2006/42/EC
and Electromagnetic Directive 2004/108/EC.

For the following equipment:

Product:	Pump
Trademark:	In-line Circulation Pumps
Type Designation:	PD
Manufacture's Name:	Swiss Pump Company AG
Manufacture's Address:	Moosweg 36, CH-3645, Thun-Gwatt -Switzerland

is herewith confirmed to comply with the requirements set out in the Council Directive 2006/95/EC.
And the Machinery Directive 2006/42/EC and Electromagnetic Directive 2004/108/EC.
For the evaluation of the compliance with this Directives, the following standards are applied:

EN 12100-1:2003 +A1:2009
EN 12100-2:2003 +A1:2009
EN 14121-1:2007
EN 14121-2:2007
EN 809:1998 +A1:2009

Responsible for making this declaration is the:
Manufacture [V] Authorized representative established within the EU [ ]
Authorized representative established within the EU (if applicable):

Company Name:	Swiss Pump Company AG
Company Address:	Moosweg 36, CH-3645, Thun-Gwatt -Switzerland

Person responsible for making this declaration

Name, Surname:	Michael Bähler
Position/Title:	production Manager

(Place)	(Date)	(Company stamp and legal signature)
Switzerland	20/12/2012	

Introduction

PD in line circulation centrifugal pump is single stage, single suction centrifugal pump. We use an excelletly performed hydraulic model when designing. Flow part of pump is manufactured by precision casting technology. The technology makes flow part smooth with little friction and high efficiency.

The advantage of PD series is energy saving, little noise, reliable performance. The structure is compact. It is easy to assemple and dismantle. It can be connected with pipe work directly. It is used for liquid transferring and circulation and boosting.

Shipment and Moving

PD is packed by wood. Pump unit and motor is supplied as one part.

When installation big pump, connect casing with pipes firstly, then lift motor and pump head including motor, pump head, shaft, impeller onto the casing. When lifting a full pump, note not lift it very high.

Operating Conditions

Application

- Boiler pumping.
- Water pumping for residential subdistricts.
- Center heat supply system for subdistricts and apartments.
- Water circulating system for refrigeration for center air conditioning system.
- Washing system.
- Warm water home system.
- Normal industrial water system.

Pumping liquid

The pump liquid should be thin, clean, non-flammable, and non-explosive which should not contain grain and fibre that might damage the pump mechanical seal.

- Pumping water for center heating system of normal industrial water system
- Liquid for cooling.
- Water for using home.
- Water for industrial use or industrial liquid.
- Intenerated water.

When pumping liquids with a density and/or viscosity higher than those of water, it will lead to the follows.

- Pressure dropped down greatly.
- Hydraulic perfomance decreases.
- Power consuming increased.

Some time, pump need to be supplied with bigger power motor motor in some condition. The original rubber ring is only suitable for water or liquid at PH 4-9

If the pumping liquid contains of mineral, oil, chemical preparation, or any other liquid different from water, rubber ring should be re-chosen.

Installation and Operation

• When pump hot or poison liquid, there should be a guard or a sign to prevent people from touching pump surface by accident.

• The pump should be sited in a well ventiled and ambient temperature should be bigger than 0C (frost free position).

• The arrow on the flange indicates the flowing direction. The direction of motor rotation is clockwise from motor end which can be seen from the sign on motor fan cover.

• If motor power is not more than 2.2Kw, pump can be installed horizontally or vertically on pipes.

• If motor power is bigger than 2.2kW, pump must be installed vertically on pipes.

Notice:

• The motor for pump must site higher than pipes.

• When installation, there should be enough space on top of pump for cleaning and dismantling in order to move motor and clean up parts.
The enough space as follows:

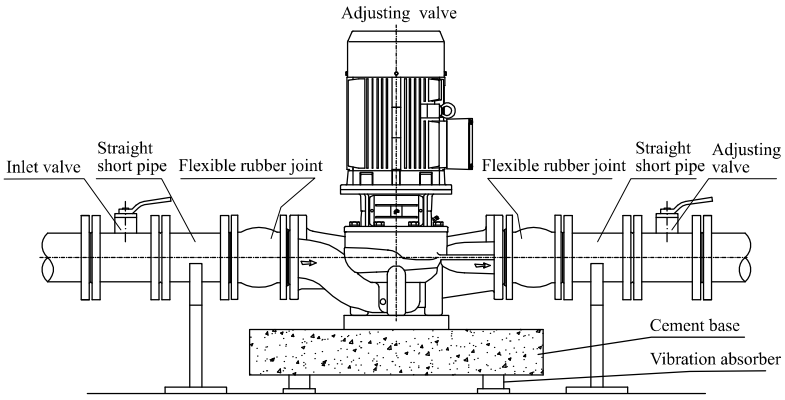
- It should be 300mm if motor is less than 4.0kW.
- It should be 100mm if motor is 5.5kW or bigger than 5.5kW.
- In the pump room, on very top of the motor, it should be well ventilated by air or by mechanism device.

If the pump is used to pump thick and easy to froze liquid at 0C which will lead to block the pump, heat device can be used. When the pump stops, if it is so cold that will lead to frozen the folowing liquid, water-out hole must face down and it must be opend.

• Requirement for pipes

1. If the pump or pipes will be cleaned or maintained usually, it is required to install valves on the two sides of the pipes to prevent from draining the system.
2. If the pipes on the two sides can support pump and matched motor power is less or equal to 2.2kW, pump can be hung on the pipes.
3. If the matched motor power is bigger than 2.2kW, place some concrete base or vibaration resistant device as fig. shows below. The base or vibaration resistance device is also workable with motor less than 3kW.
4. When installing pipes, pump must be supported hardly. in order to prevent pipes from being pressed greatly.
5. The inlet size of pump must be fulfilled with the designed flow and designed pressure for suction.
6. When installing pipes, it must be avoided that grain or deposit to go down to the bottom of the pump.
7. When installing pipes; it must be avoided that there was air in the pipes, especially in suction pipe.

Noteice: Pump is not allowed to be started if the valves are closed completely, which will lead to temperature rising or vapor. It will damage flow part or seal of pump. Before starting pump, open inlet valves fully, open outlet valve a little or open little flow bypass, the flow should be 10% of the nominal flow which is indicated in the pump nameplate.



Installation and Operation

• Terminal box

Before starting pump, power cables should be checked, check the switch if it is switched on on not. Make sure switch will not be switched on by accident before connecting cables. Terminal box can be installed by turning at 900 with motor.
To change the place of terminal box can be done as follows:

1. Switch off the power.
2. Remove the screw locking motor and pump.
3. Turn motor to the required place.
4. Rescrew the screw locking motor and pump and tighten screw.
5. Refit the safe device and connect power cables.

• Base

There are two screwed holes in the bottom of pump which is for connecting base. The base size will be decided as required.

• Frost-free protection

Pump can't be used in the cold days or easy to be frozen days. If it must be used in the above condition, drain pump and pipes when pump stops.

Electronical connection

1. The power cable connection of the pump should be complied with local regulations.
2. The electrical connection should be carried out by an authorized electrician.
3. Before changing or turning terminal box or moving or dismantling pump, power supply must be switched off.
4. Pump must be connected with outer main power cables by one-way switch.
5. Power voltage and frequency should comply with operating voltage and frequency indicated in the pump nameplate.
6. Pump should be earthed and electricaly leackage precauton should be applied. Electrical device should be connected reliably, to ensure that the motor will not be damaged by lack of phase, unstable voltage or overload.

two-pole motor parameter(380V 50Hz/60Hz)

No.	Motro Power (kW)	Cable connecation	Current (A)		Cable spec (mm^2)
			YE2/IE2	YE3/IE3	
1	0.75	Y	1.8	1.7	0.75
2	1.1	Y	2.5	2.4	1
3	1.5	Y	3.3	3.2	1
4	2.2	Y	4.7	4.6	1.5
5	3	Y	6.2	6.0	1.5
6	4	Δ	8.0	7.8	2.5
7	5.5	Δ	10.9	10.6	2.5
8	7.5	Δ	14.5	14.4	4
9	11	Δ	21.0	20.6	4
10	15	Δ	28.4	27.9	6
11	18.5	Δ	34.7	34.2	10
12	22	Δ	41.1	40.5	16
13	30	Δ	55.7	54.9	16
14	37	Δ	68.3	67.4	25

four-pole motor parameter〈380V 50Hz/60Hz〉

No.	Motro Power (kW)	Cable connecation	Current (A)		Cable spec (mm^2)
			YE2/IE2	YE3/IE3	
1	5.5	Δ	11.6	11.2	2.5
2	7.5	Δ	15.5	15.0	4
3	11	Δ	22.4	21.5	4
4	15	Δ	29.9	28.8	6
5	18.5	Δ	36.3	35.3	10
6	22	Δ	42.9	41.8	16
7	30	Δ	58.1	56.6	16
8	37	Δ	70.5	69.6	25
9	45	Δ	85.4	84.4	35
10	55	Δ	104	101.5	35
11	75	Δ	139.3	136.3	50
12	90	Δ	165	163.2	70
13	110	Δ	199	197	95
14	132	Δ	238	236	120
15	160	Δ	285	285	150
16	200	Δ	355	352	185

Pump starting

Do not start the pump until it has been filled with liquid fully and air vented fully.

• Filling water to pump

1. Close the pump valve, release air vent screw on the pump head, unscrew it a little to vent the air fully. Be careful not let the air vent screw aim to people or motor or other objects that will be damaged by the liquid in the pump. And do not take away the air vent screw. Do not aim the air vent screw hole to people or motor or other objects that will be damaged by the liquid in the pump especially pumping hot water or chemical preparation to prevent them from hurting.
2. Open valve slowly until liquid flow from air vent screw steadily.
3. Tighten air vent screw and open valve fully.

Running

1. Before pump starting, open inlet valve fully and open outlet valve a little.
2. Checking pump rotating direction, open outlet valve slowly to adjust the flow till required.
3. Note pump running, stop and repair it when there is somthing wrong..

Assembly and disassembly

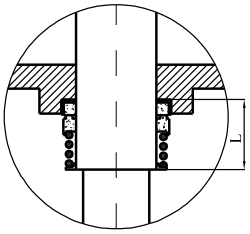
PD 32-150 extension shaft structure

1. Fit stationary part of mechanical seal on pump head, fit shaft sleeve on pump shaft, then fit pump head, fasten screw of shaft to ensure the axial dimension L of the mechanical seal as shown. For PD 32-**G to PD80-**G the axial dimension should be 40mm. For others, the axial dimension should be 51 mm.

2. Follow exploded view to assemble spare parts as rotating part of mechanical seal, Impeller, washer, nut, casing, etc.

3. When Installation finish, rotate shaft, it should be free, no block.

4. To disassemble pump, repeat the same procedure in reverse.



PD 125-150 easy disassemble structure

1. Fit bearing on support ring, compress bearing by support cover, fasten screw.

2. Fit support ring on seam under pump head, fasten screw.

3. Fit sleeve on shaft , then fit Impeller, Impeller washer, spring washer and nut fasten screw.

4. Fit assembly of shaft and Impeller on casing, fit pump head with O-ring, fit motor, fasten screw.

5. Fit O-ring and mechanical seal, fasten screw of mechanical seal fixed ring and gland.

6. Lift shaft(there is threaded hole on pump shaft by which you can use lifting eye bolt to lift it), put adjustment sheet between mechanical seal fixed ring and gland.

7. Fit coupling and fasten screw evenly, remove adjustment sheet, rotate shaft to ensure free movement.

8. To disassemble pump, repeat same procedure in reverse.

PD 200-250

1. Fit Impeller on shaft, then fit tab washer, round nut, lower bearing and bearing cover, fasten screw.

2. Fit shaft assembly on casing, then fit pump head with O-ring, fit mechanical seal and motor.

3. Fasten screw of mechanical seal fixed ring and gland, lift shaft , put adjustment sheet between mechanical seal fixed ring and gland.

4. Fit coupling and fasten screw evenly, remove adjustment sheet, rotate shaft to ensure free movement.

5. To disassemble pump, repeat same procedure in reverse.

PD 300

1. Fit Impeller on shaft, then fit tab washer, round nut, lower bearing and bearing cover, fasten screw.

2. Fit lower shaft sleeve on casing then fasten it by screw and washer, press neck ring to casing.

3. Fit shaft assembly on casing, then fit pump head with O-ring and nick ring, fit mechanical seal and motor.

4. Fasten screw of mechanical seal fixed ring and gland, lift shaft , put adjustment sheet between mechanical seal fixed ring and gland.

5. Fit coupling and fasten screw evenly, remove adjustment sheet, rotate shaft to ensure free movement.

6. To disassemble pump, repeat same procedure in reverse.

Repair and Maintenance

Before pump starting, make sure switches can be switched on/off to guarantee power can be switched freely.

1. Pump unit
Pump should be checked and maintaind periodically. If the pump will not used for along time, inject some silicone grease for lubricating in shaft and shaft seal to prevent the surface of shaft seal from being choked.

2. Motor
• Motor should be checked regularly. Ensure site well ventilated, keep motor clean.
• If pump is installed in a place full of dust, check and clean up motor regularly.

Technical data

• Ambient temperature: Max +40 C.

• Liquid temperature: -15 C to 120 C .

• Performance data refer to pump name plate or pump catalog.

• Working pressure/testing pressure.

• Testing pressure: The value is got by testing with 20 C clean water without purities.

•Inlet pressure: In order to keep pump run correctly, adjust pump inlet pressure correctly.
Pressure condition of PD (the net bositive suction head NPSH).

We recommend applying to the NPSH as following table listed in order to prevent impeller from being cavitation, make sure pump work well, deduce vibration and noise.

NPSH

The following formula can be used for calculation of minimum inlet pressure:

H= Pb X 10.2 - NPSH - Hf - Hv - Hs
H - maximum suction head (m)
Pd - atmosphere pressure (bar)
In a closed system, Pd means system pressure (bar)

NPSH - Net positive suction head (m)
It can be read out from the point of possible max. flow rat shown on NPSH curve.

Hf - Pipeline loss at the inlet (m)
it is in accordance with pipeline possible max. flow.

Hv - Steam pressure (m)
It depends on liquid temperature and steam pressure value.

Hs - Safety margin (m)
Minimum 0.5m delivery head.

If the calculated result H is negative, a delivery head of Min. inlet pressure is necessary.

Note: Normally, the above calculation will not be done. H is calculated in the following conditions:

1. The liquid temperature is comparatively higher.
2. Liquid flow exceeds rated value.
3. Suction stroke is comparatively large or inlet pipeline long.
4. System pressure is too low.
5. Bad inlet condition.

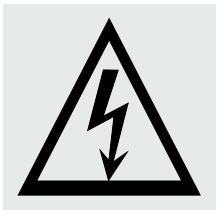
Trouble and troubleshooting

Before open, repair, dismantle or move pump, make sure that the electricity power has been switched off and will not be switched on by accident. For parallel connected pumps, spare pump moving slowly is normal.

Fault	Cause
Motor does not run when started	Circulation is defective Fuses blown Motor Starter trips Contacts of motor starter are disconected or not conected well. Fuse of control device is blown. Somthing wrong with motor.
Motor starter trips when switch on	Circulation is defective. Motor starter trips. Cables connection is loose. Twisted cables of motor is defective. Pump is blocked. Overload setting is two low.
Motor start trips occasionally	Overload setting is two low. Power waves periodically Pressure of outlet subtracts inlet is too low.
Motor starter does not trip occasionally but motor does not start	Power cable is defective. Fuse blow. Control circuit is defective. Main cable of motor starter and start coil are defective.

Warning

Before opening the terminal box, please shut off the power supply to prevent from electric shock.



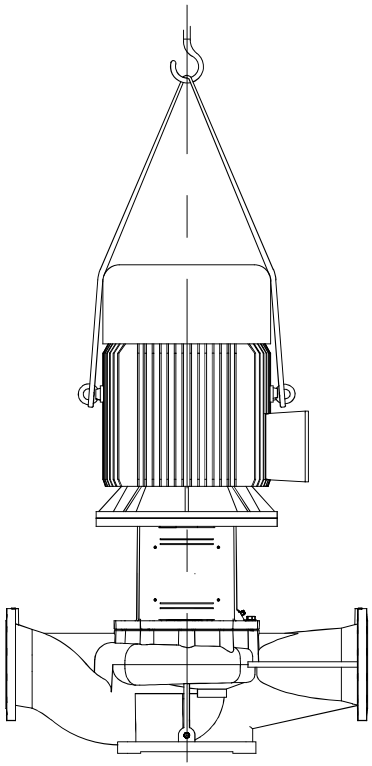
Before opening the coupling guards, please stop pump firstly to prevent from hurts.

When installing the pump, please fix the foundation bolts vertically to prevent from pump failing to hurt people.

Please fill grease to the pump when it requires. For motor power less than 5.5kw, it is free of filling grease. For motor power equal or higher than 5.5kw, please fil grease every 5000 runng hours.

The lifting ring on the pump motor could not be used to lift the pump.

The pump should be lifted by nylon tape and retaining ring or hock.



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