



## Installation and operation instructions



**NW, NC, NA**  
Sewage Pumps

# Approvals

IEC		IECEE CB SCHEME		CB TEST CERTIFICATE		Ref. Certificate No. CH-8875
<b>IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME</b>						
Issued by:	Electrosuisse					
Product:	Submersible 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:	220-240V~, 50/60Hz 3 x 220V~, 50/60Hz 3 x 400V~, 50/60Hz 3 x 480V~, 50/60Hz Power range: 0.37-30kW class I, IP68					
Trade mark (if any):	Swiss Pump Company AG (SPCO)					
Model/Type reference:	UG, QF, Sewage (0.37-30kW) 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 60335-2-1(ed.3):am1,am2		National differences: EU Group Differences; EU Special National Conditions; EU A-Deviations			
Test Report Ref. No.:	06-HG-0208.01 + .02 + .03 + .06					

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

Electrosuisse  
Luppenstrasse 1,  
CH-8320 Fehraltorf

Signed by: Erich Obrist  
2010-07-27

electrosuisse

page 1 of 1

 <b>THE INTERNATIONAL CERTIFICATION NETWORK</b> <b>CERTIFICATE</b> <b>IQNet and SQS</b> hereby certify that the organisation	
<b>Swiss Pump Company AG</b> <b>3645 Thun-Gwatt</b> <b>Switzerland</b>	
Certified area <b>Whole company</b>	
Field of activity <b>Manufacture and sale of products for the transportation of liquids</b>	
has implemented and maintains a <b>Management System</b> which fulfills the requirements of the following standard(s) <b>ISO 9001:2008</b>	
Scope No(s): 17, 18, 19 Issued on: 2015-03-03 Validity date: 2018-03-02 Registration Number: <b>CH-32160</b>	
 Michael Drechsel President of IQNet	 Roland Glauser CEO SQS
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# General Data

Declaration of conformity	page	4
Introduction		5
Specification		5
Installation		6
Operation		6
Maintenance		6
NW • Material construction		8
NC • Material construction		10
NA • Material construction		12
Disassembly and assembly		14
Trouble and trouble shooting		15

## Declaration of conformity

# EC – Declaration of Conformity

We declare that the following units

MODEL: NW / NC / NA

Comply with following provisions:

- EN ISO 12100:2010 / Safety of machinery — General principles for design — Risk assessment and risk reduction
- EN 809:1998+A1:2009/AC:2010 / Pumps and pump units for liquids - Common safety requirements
- EN 12162:2001+A1:2009 / Liquid pumps - Safety requirements - Procedure for hydrostatic testing
- EN 60204-1:2006+A1:2009+AC: 2010 / Safety of machinery - Electrical equipment of machines - Part 1 : General requirements. Industrial electrical device.
- EN 61000-6-2 : 2005 / Electromagnetic compatibility (EMC) Part 6-2 : Generic standards – Immunity for industrial environments
- EN 61000-6-4:2007+A1:2011 / Electromagnetic compatibility (EMC) Part 6-4 : Generic standards – Emission standard for industrial environments

## Introduction

Check the following points upon receipt of your pump:

- Is the pump exactly what you ordered? Check nameplate.  
It is especially important that you check whether the pump is to be used with 50 or 60 Hz.
- Has any damage occurred during shipment? Are any bolts or nuts loose?
- Have all necessary accessories been supplied? (For a list of standard accessories see Construction.)

**Note:** We recommend that you keep a spare pump on hand in case of emergencies.

Keep this instruction manual in a place for future reference.

## Specifications

Check the name plate for your pump head, discharge, speed, motor voltage and current.

Item		Specifications		
Liquid handled	Type	Sewage, waste water, miscellaneous drain water		
	Temperature	Non-Automation	0.4~5.5 kw	0~40℃ (32~104F)
		Automation	0.4~1.5 kw	0~40℃ (32~104F)
Materials	Casing	Cast iron		
	Impeller	Cast iron		
	Shaft	SS410		
Motor type		Dry type submersible motor		
Shaft seal lubrication oil		Turbine No.32 ISO VG-32		
Maximum water depth		10m (33ft)		

## Installation

### 1. Check the following before beginning installation.

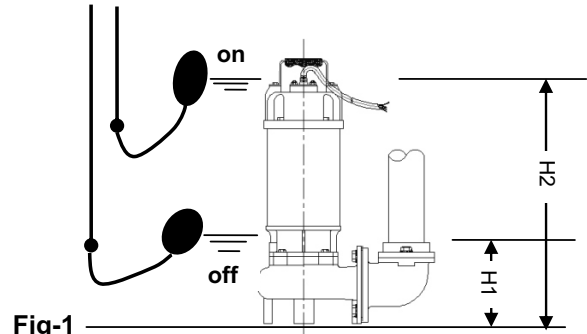
#### Insulation resistance measurement:

With the motor and cable (excluding the power supply cable) immersed in water, use a Megger to measure the insulation resistance between ground and each phase of the motor, and again between each phase of the motor. The Megger should indicate an insulation resistance of not less than 20mega ohms. While making the measurement, keep the power supply cable off the ground.

**We recommend that an auxiliary pump be kept on hand in case of emergency.**

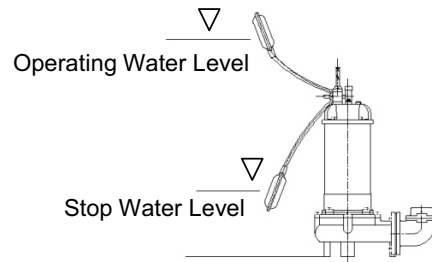
### 2. Installation

- 1. ! WARNING :** Under no circumstances should cable be pulled while the pump is being transported or installed. Attach a chain or rope to the grip and install the pump.
- This pump must not be installed on its side or operated a dry condition. Ensure that it is installed upright on a secure base.
- Install the pump at a location in the tank where there is the least turbulence.
- If there is a flow of liquid inside the tank, support the piping where appropriate.
- Install piping so that air will not be entrapped. If piping must be installed in such a way that air pockets are unavoidable, install an air release valve wherever such air pockets are most likely to develop.
- Do not permit end of discharge piping to be submerged, as backflow will result when the pump is shut down.
- ! WARNING :** Non-automatic pumps do not have an automatic operating system. Do not operate the pump for a long time with the water level near the lowest water level (H1) as shown in Fig.1, as the automatic cut-off switch incorporated inside the motor will be activated.
- To avoid dry operation, install an automatic operating system so that this will not happen, as shown in Fig.2 and maintain a safe operating water level.



**Fig-1**

**H1:** Lowest water level (Motor flange)  
**H2:** Operating water level  
 This must be above the top of the motor



**Fig-2**

## Electrical wiring

### 1.Wiring

A. Wire as indicated for the appropriate start system as shown in **Fig-3**.

B. Loose connections will stop the pump. Make sure all electrical connections secure.

### 2. Cable

**C. ! WARNING :** Never let the end of the cable contact water.

D. If the cable is extended, do not immerse the splice in water.

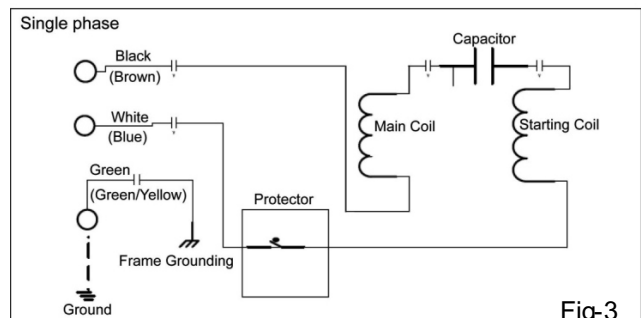
E. Fasten the cable to the discharge piping with tape or vinyl strips.

F. Install the cable so that it will not overheat. Overheating caused by coiling the cable and exposing it to direct sunlight.

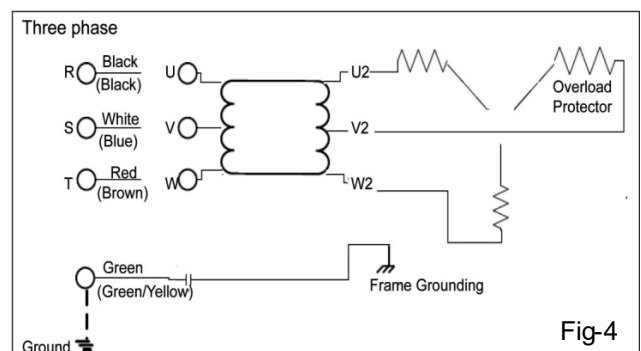
### 3. Grounding

As shown in **Fig-4** ground the green wire (label E). Under no circumstances should the green wire be connected to the power supply.

**4. ! WARNING :** Use short circuit breakers to prevent danger of electrical shock.



**Fig-3**



**Fig-4**



## Operation

### 1. Before starting the pump

- After completing installation, measure the insulation resistance again as described in Installation.
- Check water level.

If the pump is operated continuously for an extended period of time in a dry condition or at the lowest water level, the motor protector will be activated. Constant repetition of this action will shorten pump service life. Do not start the pump again in such a situation until after the motor has completely cooled.

### 2. Test operation....

#### Non-automatic pump

#### Automatic pump

- Turn the operating switch on and off a couple of times to check for normal pump start.  
Floating switch must be raised for the pump to start.
- Next, check direction of rotation. If discharge volume is low or unusual sounds are heard when the pump is operating, rotation has been reversed. When this happens, reverse two of the wires.

## Maintenance

**Check pressure, output, voltage, current and other specifications. Unusual readings may indicate. Refer to Troubleshooting and correct as soon as possible.**

### 1. Daily inspections

Check current and ammeter fluctuation daily. If ammeter fluctuation is great, even though within the limits of pump rating, foreign matter may be clogging the pump. If the quantity of liquid discharged falls suddenly, foreign matter may be blocking the suction inlet.

### 2. Regular inspections

#### 1. Monthly inspections

Measure the insulation resistance. The value should be more than 1M ohm. If resistance starts to fall rapidly even with an initial indication of over 1M ohm, this may be an indication of trouble and repair work is required.

#### 2. Annual inspections

To prolong the service life of the mechanical seal by replacing the oil in the mechanical seal chamber once a year. Water mixed the oil or cloudy textures are indications of a defective mechanical seal requiring replacement. When replacing the oil, lay the pump on its side with filler plug on top. Inject suitable amount turbine oil No.32 (ISO VG-32)

#### 3. Inspections at 3-5year intervals

Conduct an overhaul of the pump. These intervals will preclude the possibility of future trouble.

### 3. Parts that will need to be replaced

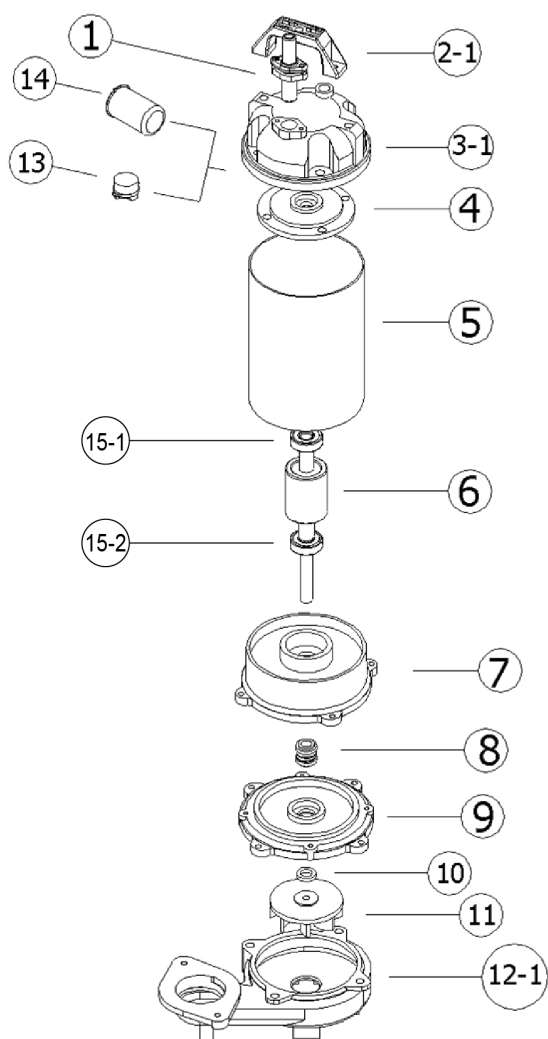
Replace the appropriate part when the following conditions are apparent.

Replaceable part	Mechanical seal	Oil filler plug gasket	Lubricating oil	O-ring
Replacement guide	Whenever oil in mechanical seal chamber is clouded	Whenever oil is replaced or inspected	Whenever clouded or dirty	Whenever pump is overhauled
Frequency	Annually	A half yearly	A half yearly	Annually

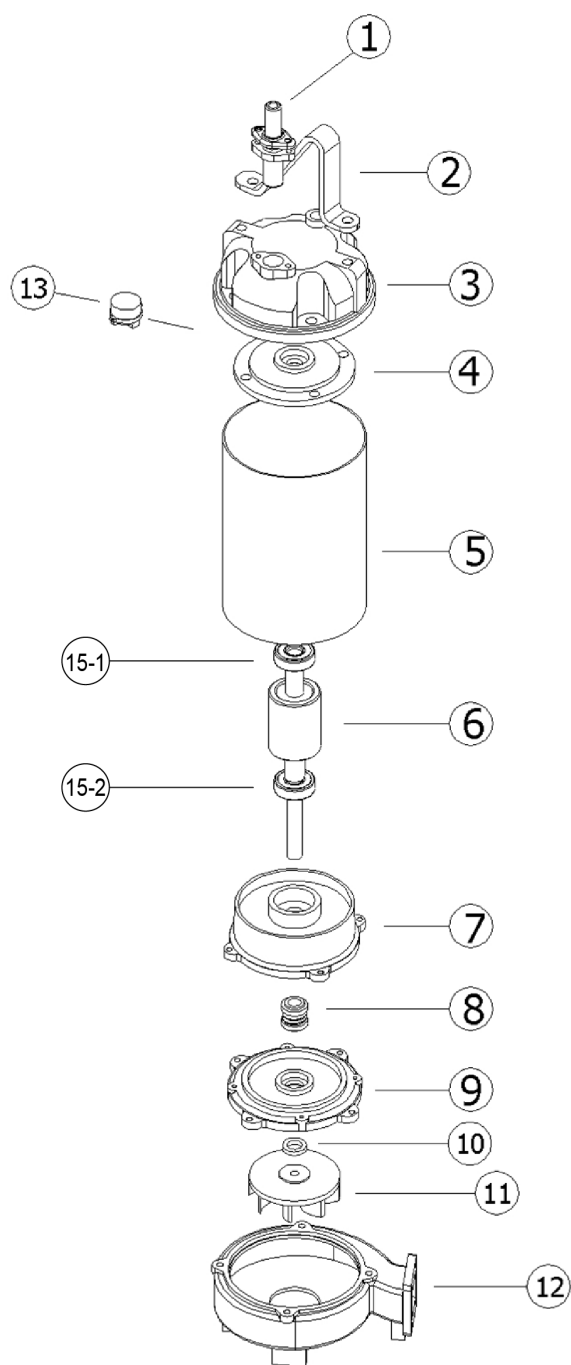
Note: above replacement schedule is based on normal operating conditions.

Motor output	0.4HP	0.5HP	1HP	2HP	3HP	5HP	7.5HP
Mechanical seal	12Ø			19.875(3/4”)Ø		25Ø	
Oil seal	12Øx 24Øx 7 t			18Øx 35Øx 7 t		25Øx 47Øx 8 t	
Oil filler plug gasket	(Inner diameter) x (outer diameter) x (thickness) =7.52Øx 14.5Øx 3.53t PE washer						
Lubricating oil (turbine oil #32)	120 cc		220cc	500 cc		600 cc	

## NW • Material construction



**NW-0.3~1 HP**

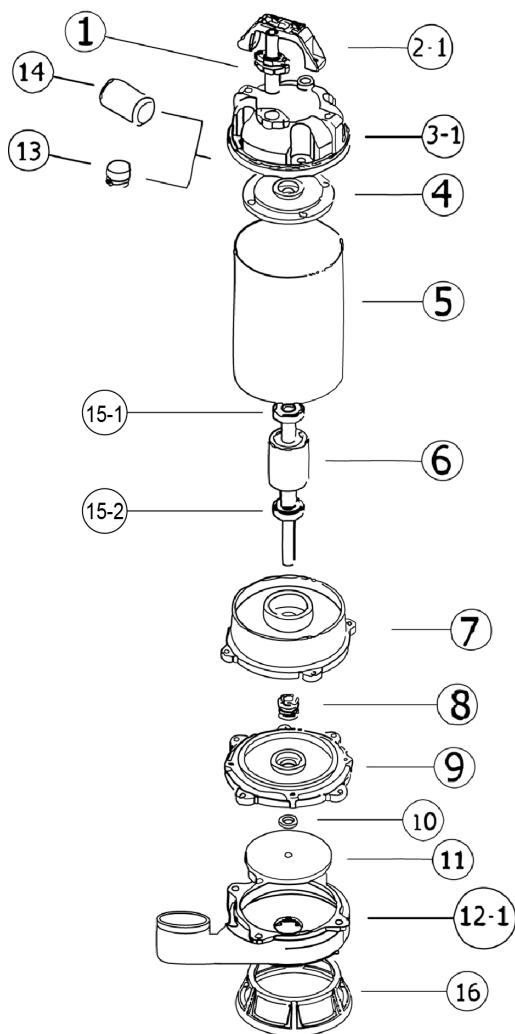


**NW-2~7.5 HP**

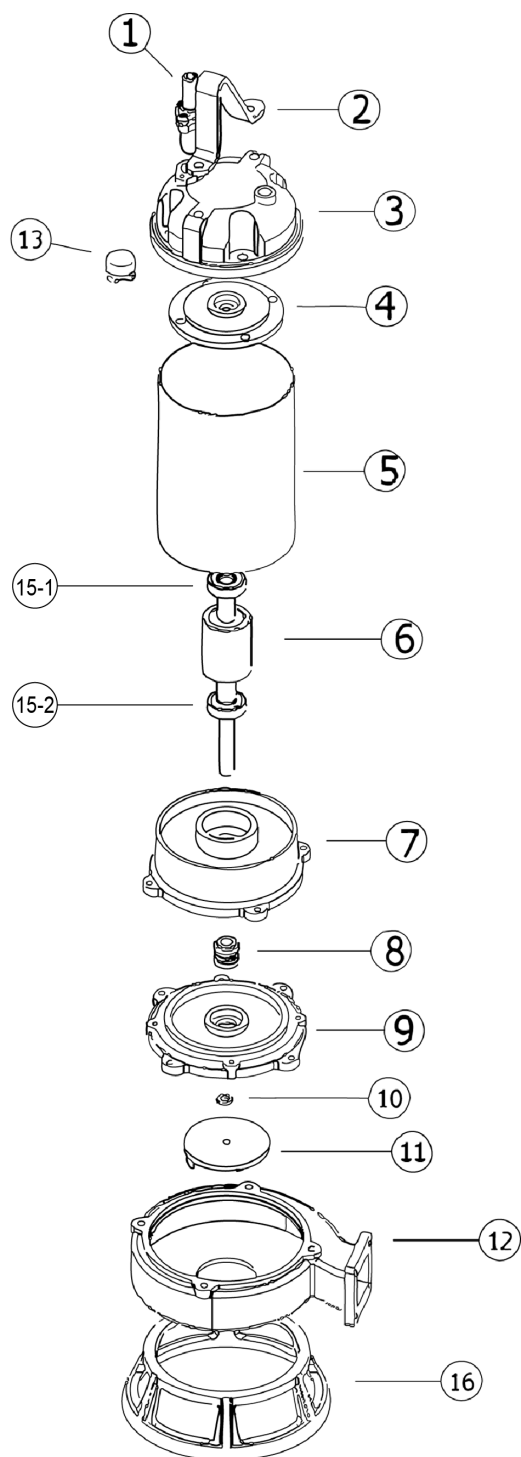


NO	Name	Material	Photo	NO	Name	Material	Photo
1	Cable	H07 / UL		8	Mech. Seal (0.4~3HP)	Upper : CA/CE Lower: CA/CE	
2	Handle	SS41		8	Mech. Seal (5~7.5HP)	Upper : CA/CE Lower : SIC/SIC	
2-1	Handle	Nylon 6		9	Seal Housing	Cast Iron	
3	Motor Cover	Cast Iron		10	Oil Seal	NBR	
3-1	Motor Cover	Nylon 66		11	Impeller	Cast Iron	
4	Bracket (0.5~1HP)	Cast Iron		12	Pump Casing	Cast Iron	
4	Bracket (over 2HP)	Cast Iron		12-1	Pump Casing	Cast Iron	
5	Motor Housing	SS-304		13	Protector		
6	Shaft with Rotor			14	Capacitor (Single Phase Only)		
7	Oil Chamber	Cast Iron		15-1 15-2	Bearing		

## NC • Material construction



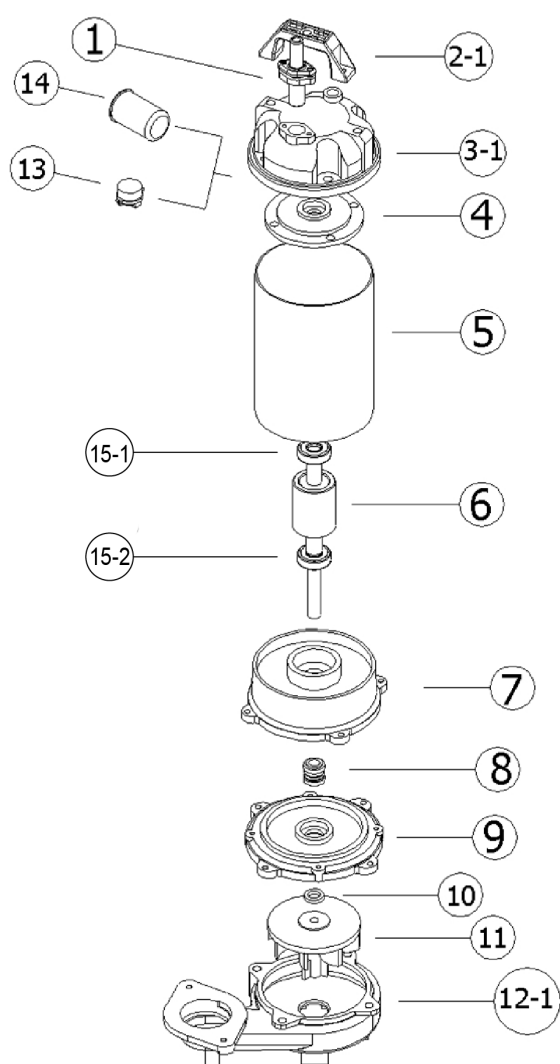
**NC-0.3~1 HP**



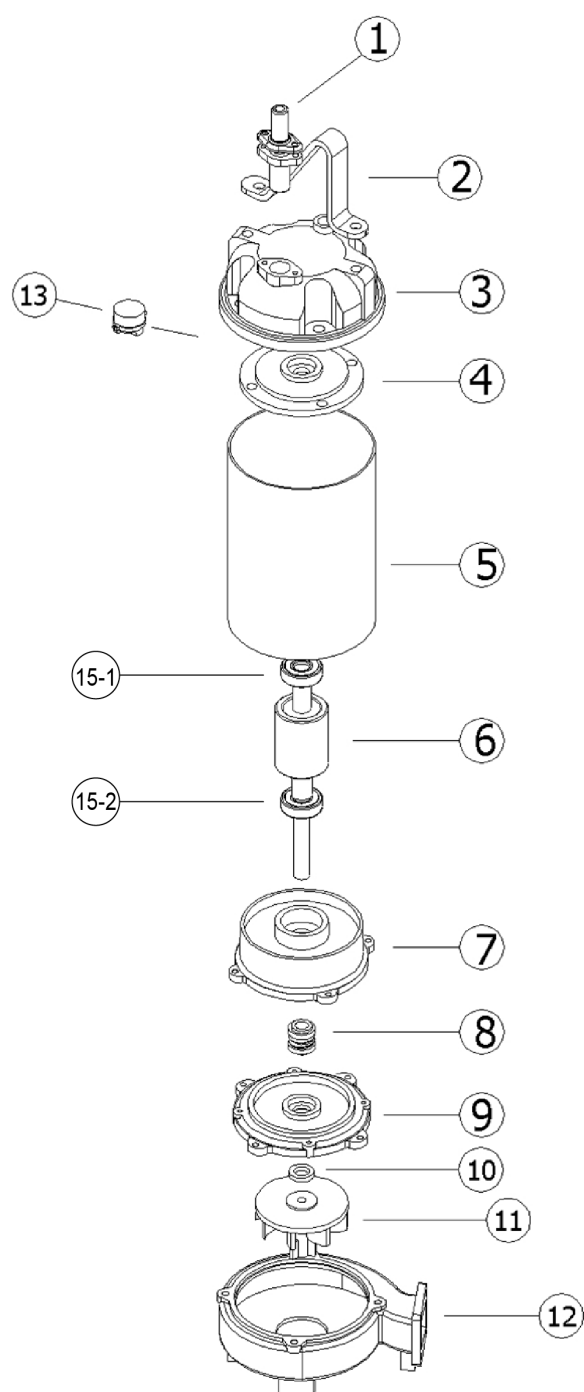
**NC-2~7.5 HP**

NO	Name	Material	Photo	NO	Name	Material	Photo
1	Cable	H07 / UL		8	Mech. Seal (5~7.5HP)	Upper : CA/CE Lower : SIC/SIC	
2	Handle	SS41		9	Seal Housing	Cast Iron	
2-1	Handle	Nylon 6		10	Oil Seal	NBR	
3	Motor Cover	Cast Iron		11	Impeller	Cast Iron	
3-1	Motor Cover	Nylon 66		12	Pump Casing	Cast Iron	
4	Bracket (0.5~1HP)	Cast Iron		12-1	Pump Casing	Cast Iron	
4	Bracket (over 2HP)	Cast Iron		13	Protector		
5	Motor Housing	Cast Iron		14	Capacitor (Single Phase Only)		
6	Shaft with Rotor			15-1	Bearing		
7	Oil Chamber	Cast Iron		15-2	Bearing		
8	Mech. Seal (0.4~3HP)	Upper : CA/CE Lower : CA/CE		16	Strainer	Cast Iron	



## NA • Material construction



NA-0.3~1 HP



NA-2~7.5 HP

NO	Name	Material	Photo	NO	Name	Material	Photo
1	Cable	H07 / UL		8	Mech. Seal	Upper : CA/CE Lower : SIC/SIC	
2	Handle	SS41		9	Seal Housing	Cast Iron	
2-1	Handle	Nylon 6		10	Oil Seal	NBR	
3	Motor Cover	Cast Iron		11	Impeller with Agitator	Impeller : FC-200 Agitator : SUS-316	
3-1	Motor Cover	Nylon 66		12	Pump Casing	Cast Iron	
4	Bracket (0.5~1HP)	Cast Iron		12-1	Pump Casing	Cast Iron	
4	Bracket (over 2HP)	Cast Iron		13	Protector		
5	Motor Housing	SS-304		14	Capacitor (Single Phase Only)		
6	Shaft with Rotor			15-1	Bearing		
7	Oil Chamber	Cast Iron		15-2	Bearing		

## Disassembly and Assembly

### 1. Disassembly-

When disassembling pump, have a piece of cardboard or wooden board ready to place the different parts on as you work. Do not pile parts on top of each other. They should be laid out neatly in rows. The “O” ring and gasket cannot be used again once they are removed. Have replacement parts ready. Disassemble in the following order, referring to the sectional view.

**Be sure to cut off power source before disassembly.**

- (1) Remove pump casing bolts, raise the motor section and remove pump casing.
- (2) Remove shaft head bolt and impeller.
- (3) Remove oil filler plug and drain lubricating oil.
- (4) Remove intermediate casing bolts and oil chamber.  
(Remember that any lubricating oil remaining in the mechanical seal chamber will flow out.)
- (5) Carefully remove mechanical seal, beware of not to scratch sliding surface of motor shaft.

### 2. Assembly-

**Re-assemble in reverse order of disassembly.**

**Be careful of the following points.**

- (a) During re-assembly, rotate the impeller by hand and check for smooth rotation. If rotation is not smooth, perform steps-(3) through -(5) again.
- (b) Upon completion of re-assembly step -(1) rotate the impeller by hand from the suction inlet and check that it rotates smoothly without touching the suction cover before operating the pump.

**Please order “O” rings, packing, shaft seals and other parts from your dealer.**

## Nameplate

<b>Swiss Pump Company AG</b> <b>SPCO</b> <small>makes life easier</small> (Thun-Switzerland)				
MODEL				
OUTPUT		DISC.		
CYCLE/P	Hz	P	PH/VOLT	$\varphi$
HEAD		m	CAPACITY	m <sup>3</sup> /min
MAX H.		m	MAX C.	m <sup>3</sup> /min
CURRENT		A	WEIGHT	kg
ROTATION ↻		SPCO		



## Trouble and trouble shooting

Trouble	Cause	Remedy
<b>Does not start. Starts, but immediately stops.</b>	(1) Power failure	(1)~(3) Contact electric power company and devise counter-measures
	(2) Large discrepancy between power source and voltage	
	(3) Significant drop in voltage	
	(4) Motor phase malfunction	(4) Inspect electric circuit
	(5) Electric circuit connection faulty	(5) Correct wiring
	(6) Faulty connection of control circuit	(6) Inspect connections and magnetic coil
	(7) Fuses is blown	(7) Check circuit then replace fuse
	(8) Faulty magnetic switch	(8) Replace with correct one
	(9) Water is not at level indicated by Float	(9) Raise water level
	(10) Float is not in appropriate level	(10) Adjust the position of float
	(11) Float is not effective	(11) Repair or replace
	(12) Short circuit breaker is functioning	(12) Repair location of short circuit
	(13) Foreign matter clogging pump	(13) Remove foreign matter
	(14) Motor burned out	(14) Repair or replace
	(15) Motor bearing broken	(15) Repair or replace
<b>Operates, but stops after a while.</b>	(1) Prolonged dry operation has activated motor protector and caused pump to stop	(1) Raise water level to C.W.L
	(2) High liquid temperature has activated motor protector and caused pump to stop	(2) Lower liquid temperature
	(3) Reverse rotation	(3) Correct rotation
<b>Does not pump. Inadequate volume.</b>	(1) Reverse rotation	(1) Correct rotation (see Operation)
	(2) Significant drop in voltage	(2) Contact electric power company
	(3) Operating a 60Hz pump with 50Hz	(3) Check nameplate
	(4) Discharge head is high	(4) Recalculate and adjust
	(5) Large piping loss	(5) Recalculate and adjust
	(6) Low operating water level causes air suction	(6) Raise water level or lower pump
	(7) Leaking from discharge piping	(7) Inspect, repair
	(8) Clogging of discharge piping	(8) Remove foreign matter
	(9) Foreign matter in suction inlet	(9) Remove foreign matter
	(10) Foreign matter clogging pump	(10) Remove foreign matter
	(11) Worn impeller	(11) Replace impeller
<b>Over current</b>	(1) Unbalanced current and voltage	(1) Contact electric power company
	(2) Significant voltage drop	(2) Contact electric power company and devise counter-measure
	(3) Motor phase malfunction	(3) Inspect connections and magnetic switch
	(4) Operating 50Hz pump on 60Hz	(4) Check nameplate
	(5) Reverse rotation	(5) Correct rotation (see Operation2)
	(6) Low head. Excessive volume of water	(6) Replace pump with high head pump
	(7) Foreign matter clogging pump	(7) Remove foreign matter
	(8) Motor bearing is worn out or damaged	(8) Replace bearing
<b>Pump vibrates; excessive operating noise.</b>	(1) Reverse rotation	(1) Correct rotation
	(2) Pump clogged with foreign matter	(2) Disassemble and remove foreign matter
	(3) Piping resonates	(3) Improve piping
	(4) Strainer is closed too far	(4) Open strainer







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