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Installation and operating instructions

Sewage Pumps

Approvals

EU Declaration of conformity

according to the Low Voltage Directive 2014/35/EU
and the Machinery Directive 2006/42/EC
and Electromagnetic Directive 2014/30/EU.

For the following equipment:

Product:	Pump
Trademark:	Submersible Sewage
Type Designation:	Wastewater pump
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 ISO 12100:2010
EN 60204-1: 2006 + A1:2009
EN 809:1998+A1:2009/AC :2010
EN 60335-1:2012+A11:2014
EN 60335-2-41:2003+A2 :2010
EN 62233 :2008
EN 55014-1 :2006/A2 :2011
EN 55014-2 :2015
EN 61000-3-2:2014
EN 61000-3-3 :2013
EN 61000-6-1: 2007

Responsible fo ☒ aking this declaration is the: ☐
Manufacture — 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 02/01/2019

M. Bähler

Contents

SAFETY Cautions

Precautions in these Operating Instructions provide the necessary information on pump operations safety and tutorials on how to prevent danger and injury to the user. These shall be used as reminders for making you aware of the extent and severity of dangers indicated by the warning sign. Failure to observe the instructions may lead to accidents of different levels. There are two types of Warning Signs: Warning and Caution. Both of them contain important information and shall be read and observed accordingly.

Potential risk that may result in death or severe injury if the instruction is not observed.

Use qualified control panel when installing the pump. Make sure to use a leak-current breaker and connect the grounding wire (green/yellow) correctly. Otherwise current leakage from the motor may cause electrocution and accidents.

No one shall enter a water tank if the pump is operating in the tank. Otherwise current leakage from the motor may cause electrocution and accidents.

If any anomaly occurs after starting the pump, or if the pump does not start, immediately stop using the pump and switch off the power. Otherwise electrocution or fire may occur.

Make sure that the power is switched off before checking and maintaining a pump. Otherwise the pump may start suddenly and cause danger to the user.

Injury of people or damage to the pump may occur if the instruction is not observed.

Never extend a hand or foot into intake of a running pump or a severe injury may occur.

Never apply any load on the power cable, or process or pull the cable, otherwise the cable may be damaged or have a short circuit, which may result in injury or fire.

Never run the pump on dry ground, doing so may result in a burnt motor.

Except for professional maintenance personnel, never attempt to repair, modify or dismantle the pump on your own or the pump may become abnormal and cause electrocution, fire or injury to people.

Wire connection must be carried out only by qualified technicians following safe wiring rules and conforming to local electrical rules.

Make sure to switch off the general power switch if the pump is to be left unused for a long period of time. If the power switch is left on, an electric leak and electrocution may occur if the motor insulation gets deteriorated.

We are highly concerned with the quality and safety of our products, however this booklet is unable to cover all the safety issues, therefore the user or maintenance people must take care of their own safety as well.

Cautions Prior before installation

Unpack the pump and check for completeness of all the accessories.

Check nameplate information. Make sure that the pump model, voltage, phase, frequency, discharge diameter and lifting head of the pump are correct; especially the voltage and frequency. Selecting the wrong specifications may also cause pump failure or damage.

Check the pump for any impact during the shipment. Verify if all the parts are intact.

When finding any damage, faulty assembly or missing parts of the product before installing, please contact the shop you purchased the product from or call a local licensed SPCO dealer.

If the vertical lift of the installation is greater than 5M, or the horizontal pipeline is rather lengthy, a check valve or other water-hammer prevention device shall be incorporated to protect the pump from being damaged by water hammering.

This pump is not applicable to a frequency inverter. Using a frequency inverter to control the pump may result in pump failure or damage.

For pumping special liquids such as oil or organic solvent, first consider the suitability of the pump; make sure that a correct selection is made, or the pump may be damaged due to improper use.

When using the pump in a special environment, consult the shop where you purchased the pump or the local dealer to verify if the product is suitable for the specific environment.

Do not operate this product in conditions other than that specified in the Operating Instructions

Operating Environment

Do not pump liquids other than sewage and wastewater, such as oils, organic solvents, etc.

Suitable range of Liquid Temperature: 0~40°C

Suitable range of Liquid pH value: 5~ 9 (MA/N/N/H/HN/NA//GP)

Suitable range of Liquid pH value: 4~10 (SG)

Applicable to impurity content of less than 3% (volumetric ratio).

This pump is not suitable for food processing or potable water.

Voltage Range of power supply: within ±10% of the nominal voltage.

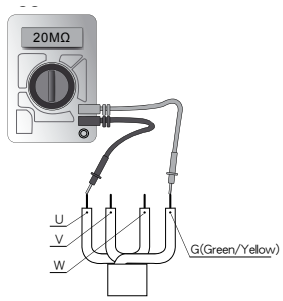
When pumping sea water, the air content will be different from that of wastewater.

Warning

Wire connection must be carried out only by qualified technicians following safe wiring rules and conforming local electrical rules.

Reference insulation value: Use a megger (500V) to check pump insulation. A repair is recommended if the insulation value is smaller than 10MΩ; electrocution may occur if it is <1MΩ, if this is the case, immediately switch off the machine and send it for repair.

After unpacking, dispose of the waste packing materials according to local statutes.



Installation Precautions

Verify if model, voltage, phase, frequency, discharge diameter and lift of the pump conform to that specified on the nameplate.

Use a qualified control panel when installing the pump. Make sure to use a leak-current breaker and connect the grounding wire (green/yellow) correctly. Otherwise current leakage of the motor may cause electrocution and accidents.

Prevent the cable end from getting in contact with the water, or electrocution may occur.

If the installation requires lowering the pump, do so by connecting a rope or chain to the pump handle bar.

On completion of pump installation, tidy up excessive lengths of power cable, chain or rope, so that it will not be sucked into the impeller and damage the pump when the pump is activated.

Place the pump on a solid surface and prevent it from tumbling. This principle is applicable to all the handling, move, test and installation tasks of the pump.

Use the pump with rated voltage only; allowable voltage fluctuation is ±10%. Temperature of pumped liquid shall be within 0~40°C range, or else a motor anomaly, electric leak or burn may occur.

Precautions on installing J-type pumps:

When installing a jet aerator pump, a 0.5M~2M water depth gives the optimum aeration effect. Use a noise attenuator to lower the noise if the suction pipe gives off excessive noise.

Safe length of extension cable

If an extension cable is required, make sure to use a cable of at least one grade higher (than the standard cable for the pump). Or, you may refer to the following table for selecting an extension cable.

Safe length (m) of extension power cable is calculated based on a surrounding temperature of 30°C.

WARNING Never pull the power cable when moving the pump, otherwise the cable may develop a short circuit and cause electrocution or fire.

Ph	Start Method	Rated Voltage	HP(Power) HP(kW)	Current (A)	Conductor Strand Section Area mm^2										
					0.75 27.61	1.25 16.61	2.0 10.77	3.5 5.76	5.5 3.71	8.0 2.51	14 1.43	22 0.965	30 0.715	38 0.568	50 0.444
1Φ	Direct Start Capacitor	110	0.5(0.4)	6.5		25	39	73							
			1(0.75)	10			26	48	74						
		220	1(0.75)	5.0		66	102	191							
			2(1.5)	10			51	95	148						
			3(2.2)	14.0		68	106	157							
				15.0		64	99	146							
			4(3)	18.0				53	82	122					
				19.0				50	78	115					

Ph	Start Method	Rated Voltage	HP(Power) HP(kW)	Current (A)	Conductor Strand Section Area mm2										
					0.75 27.61	1.25 16.61	2.0 10.77	3.5 5.76	5.5 3.71	8.0 2.51	14 1.43	22 0.965	30 0.715	38 0.568	50 0.444
3Φ	Direct Start	220	1(0.75)	3.5		109	168	315							
			2(1.5)	6.0		64	98	184							
			3(2.2)	8.5			69	130	201						
				9.0		42	66	123							
			5(3.7)	14.0			42	79	122						
				15.0			39	74	114						
			7.5(5.5)	21.0		18	28	53							
			10(7.5)	26.0					66	97	171				
				27.0					63	94	164				
			15(11)	32.0					53	79	139				
		380	0.5(0.4)	1.5		440	679	1270							
			1(0.75)	2.0		330	509	952							
			2(1.5)	3.5		189	291	544							
			3(2.2)	5.0		132	204	381							
				6.0		110	170	317							
			5(3.7)	8.0		83	127	238							
			7.5(5.5)	12.0		55	85	159							
			10(7.5)	15.0					197	291	511				
				16.0					185	273	479				
			15(11)	18.0		37	57	106							
				22.0				87	134	199					
	S-D	220	20(15)	50.0					51	76	133				
		380	10(7.5)	15.0					296	437	767				
			20(15)	29.0				99	153	226					
			50(37)	76.0		13	20	38							

Pump Operations

Double-check the model, voltage, phase, frequency, discharge diameter and lift of the pump

Pump rotation shall be clockwise when viewed from above the pump (see illustration on the right). If viewed from the impeller side when laying the pump on the ground, the rotation shall be counter-clockwise.

Check screws and welds at any part of the pipeline, pump or installation for proper tightening and to keep them free from leakage.

Check the wiring, power voltage, current leak breaker specifications and motor for conformity of insulation value of 20 MΩ minimum. Make sure that the grounding wire is connected correctly.

Set the Over Load Relay in the control panel to approx. 1.25 times (standard setting) of the current rating. If it fails to start at this 1.25-time setting, check the power source and pump for any anomalies.

Clear out excessively large objects from the water before running the pump; impurities shall be controlled below the allowable diameter of the impeller and strainer, otherwise the object will clog the strainer to reduce the flow or jam the impeller and damage the pump.

After running up, check the voltage, current, flow output, aeration , and noise for normal values. For GP/MAC type, attention is required to make sure that the pumped substances can be crushed down. Crushing effect is dependent on the power specifications.

It is recommended to use the pump for sludge of 3% concentration (volumetric ratio); the pump will have a longer service life this way.

Select suitable pipe diameter for the pump flow. (Over or under-sized pipe diameter will cause noise and/or vibrations).

Check valves of the pipeline for normal open and drain for non-clogging. If the pump is running but water is not pumped out, it is most likely that air is trapped in the check valve and venting (priming) must be carried out.

⚠WARNING When lifting a pump, make sure that the pump will not be activated; otherwise injury may occur.

Never extend a hand or foot into the intake of a running pump or a severe injury may occur.

⚠ Caution

Pump motor is provided with an Overload Protection which cuts power automatically when the pump operation causes excessive temperature rise in the motor, therefore protecting the motor. The Overload Protection resumes automatically when motor temperature lowers down; this starts the pump again. This state may repeat itself continuously and cause a burnt motor eventually. If this state is detected, it is recommended to switch off the pump immediately and have the pump checked and repaired.

Do not allow the pump to stop and start frequently for this may cause a motor burn out. The repetitive switching shall be controlled as not to exceed 10 counts per hour.
This type of pump is not suitable for 24 hour continuous operations; it is preferred not to run the pump for more than 8 hours a day. Twenty-four hours continuous operation of the pump is prone to speed up bearing wear and shorten the service life. It is recommended to use a timer to control the operations or set up for alternative operations of 2 or more pumps.

Make sure that the diameter of the pipeline is proper for the pump flow; too small or too large pipe diameter may cause the pump to generate noise of vibration and result in damage to the pump.

In the event of a pump anomaly (e.g., Severe Vibration, Noise, Smell, etc.), immediately cut off the power and contact the shop where the pump is purchased or contact an authorized local dealer. Continuous abnormal operations of the pump may result in electric leakage, electrocution or fire that causes injuries.

Pump Protection Devices

External factors often cause a burnt motor, resulting in user inconvenience and repair costs; therefore a fault detection device is necessary to ensure the service life of the pump.

The fault detection device will continue to trip if an on-site fault is not remedied; the site personnel need to troubleshoot the fault as soon as possible.

If the fault is not remedied and the pump operates repetitively for a prolonged period of time, the motor will still be burnt eventually.

Individual models may be equipped with different fault detection devices.

Motor Overload Protection Device

Used for models up to 10HP)

An Overload Protection Device is normally a built-in device inside the motor and no external wiring is required; it is a self-resetting device that protects the motor from being burnt immediately. This device activates to cut off the power when current or temperature in the motor becomes abnormal and prevents the motor from being burnt. When the temperature lowers down (in about 10-30 minute) the pump will start to operate again.

Thermal Relay Protection

Thermal Relay is a bi-metal relay that protects the motor by sensing the temperature; it mainly works by the thermal expansion of metals (closed normally and opened in an anomaly). This device is installed within the motor winding; when the motor overheats (temperature setting of the protection device differs by motor model), or when an over-current occurs, the metal sheet in the device will expand due to the heat and activate the device; often used in single phase models no bigger than 1HP.

Motor Thermal Sensor (MTS)

(Standard for 15HP and above models; optional for other power (HP) values)

Purpose:

for providing alarm circuitry for motor overload or over-heating

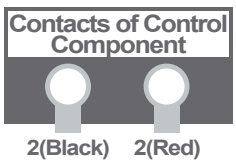
Bi-Metal Temperature Sensor

A Sensor is provided in each phase and wired to the control panel; when the motor temperature exceeds the specifications of the sensor chip, it will trip and send out an anomaly signal to the control panel, where the signal responds by cutting off the power supply or topping the motor operations. (The sensor is in Closed mode in the normal state and in Open mode for an anomaly, thus protecting the motor from burning out.)

Connection Method

The protection device can be connected in series with an Overload Relay (O.L). The coil of a solenoid, or a power relay. Components in the control panel cut off the power supply when the temperature in the motor exceeds the setting value, therefore protecting the motor. (SPCO provides 2-core connection cables)

- Circuit Diagram



Inlet Water Sensor (MS)

(Standard for 15HP model and higher; option for other power ratings.)

Purpose

When the mechanical seal fails and water get s into the motor, the sensor will be noticed before the being burnout out the motor. So that a new mechanical seal and lubricant can be replaced early to prolong pump service life and to save on maintenance costs.

Electrode-type Water Ingression Detector

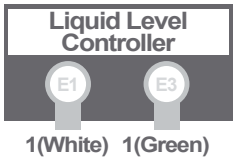
Metal electrodes are used as sensor interface for detecting if water leaks into shaft seal chamber. Leads of this Water Ingression Detector are used as an insulation detector inside the pump. When the mechanical seal is worn out and water gets into the shaft seal chamber, a circuit is established by the sensor and casing (ground) since the water is a conductive matter. Since the control panel gives a very small current into the sensor leads, enabling the leads to be capable of sensing water. This circuitry will give an anomaly signal when the shaft seal chamber is flooded; the control panel will therefore cut off the power supply or activate a stop mode to prevent the motor from running in the anomaly, thus achieving the functionality of a Leak Alarm. (The sensor is in the Open mode in the normal state and Closed mode in an anomaly)

Connection Method

Connect E1 and E3 level controller to form a sensing circuit; a low voltage and low current control are used for safety purposes. (We provide a 2-core connection cable if we're using number should be: marked with number "1")

Circuit Diagram

Connect the voltage output terminal with white sensor lead. (Current leakage in this way is less hazardous to the human body.



Caution

These sensor devices are dependent on machine types or custom-made; see specifications of the purchased pump for details. When the sensor activates an alarm, immediately stop using the pump and call the dealer or the manufacturer for troubleshooting. The SPCO warrant will become void if pump damage is caused by failure to connect the alarm device or by continued operation after alarm activation.

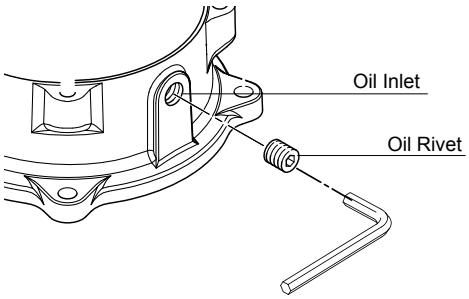
Periodical Check Items

Check flow rate, voltage, current, vibration and noise level. In the event of any of the above anomalies or its precursor, take preventive actions immediately. See Section VII Troubleshooting for identifying causes and taking proper remedial actions.

If the pump is to be left unused for a long period, pull the pump up and clean and dry it thoroughly before storing it indoors. Should the pump be left in the water and unused for a long period of time, start the pump periodically to prevent jamming the impeller caused by rust; also measure the resistance to verify if the standard specifications are met.

At the end of pump operation, DO NOT loosen the oil injection nozzle immediately, otherwise the high-temperature oil may spray out and cause injury.

It is recommended to keep a daily log of operation checks, which can be of additional reference to inspections.



Routine Check Items

Daily	1. Operating Current: within range of current rating. 2. Operating Voltage: within a safe range (±10% of rated value) 3. Check output flow rate for normal value.
Monthly	1. Check pump insulation with a 500V megger; repair is recommended if < 10MΩ; immediately Shot down the pump and send for repair if < 1MΩ.
Annually	1. Replace Oil: For ≤ 0.75KW, every 3000hr or 12-month (Depends on comes first.) For ≥ 1.5 KW, every 6000hr or 12-month (depend comes first.) 2. Replace Method: Remove oil inlet screw and drain the oil; add in new oil and replace the screw; apply screw setting agent or tape seal when replacing the screw. [Remarks] Check oil for correct color. If oil turns creamy white, replace the mechanical seal and the oil immediately. Oil Specifications: VG32 or equivalent. Refer to X. Oil Specifications for quantity of oil.
Every 2-5 year	1. Overhaul: Pump operation is normal but overhaul is due; an overhaul is still necessary, especially if the pump is in continuous operations. 2. When an overhaul is required, please contact the shop where the pump is purchased or call a local authorized dealer.

If necessary, the user may remove the bottom of the pump for clearing out foreign objects. If removing the motor or mechanical seal is required, the pump shall be sent to the purchasing shop or a local authorized dealer for repairs, otherwise water-tightness of the pump may be affected, which may further lead to water ingression and failure of the motor.

Installing parts other than the specified ones may cause failure or reduce the service life of the pump.

Dispose of waste oil products in accordance with relevant local statutes; never drain them directly into a river or drainage.

WARNING

Make sure that the power is switched off before carrying out checks or repairs of the pump, otherwise the pump may cause injury because of operation started suddenly Dismantle and repair of pump must be carried out only by professionals; otherwise incorrect procedures may lead to electrocution, fire, pump malfunction or even severe injury of the people.

Caution

Electrocution (electric leak) may occur if insulation resistance gets below 10MΩ, switch off the power and stop using the pump as soon as possible.

Troubleshooting

Fault	Cause	Solution
Pump Not Operating	• Power failure. • Defective cable. • Impeller clogged. • Auto-cut Tripping • Motor burnt • Water gets into motor after mechanical seal wear • Float switch defective. • Bad control panel.	• Check power and correct connection. • Replace power cable. • Remove the foreign objects from impeller or casing. • Identify and remove tripping cause • Rewind or Replace new motor. • Send to repair • Replace new float switch. • Repair or replaced.
Insufficient output, insufficient aeration	• Motor rotation reversed • Impeller worn or cavitation • Strainer Clogged • Foreign object in pump or impeller • Leakage or clog of pipeline/valve • Excessive lift • Air suction due to low water level • Clogged aeration chamber • Worn nozzle • Water level too high	• Correct motor rotation • Replace Impeller • Clear out foreign objects • Clear out foreign objects • Repair or replace • Recalculate or adjust horsepower • Adjust the Level Switch higher • Clear out foreign objects • Replace with new nozzle • Adjust the Level Switch lower
Over Current	• Voltage anomaly • Motor rotation reversed • Viscosity of pumped liquid High • Impeller tangled or clogged by foreign Objects • Worn Shaft	• Check the power. Use only the correct voltage • Correct motor rotation • Dilute the liquid • Remove foreign objects • Repair and replace
Pump stops during operations	• Impeller tangled or clogged foreign Objects • Voltage Anomaly • Motor Overload Trip	• Remove foreign objects • Check the power. Use only the correct voltage • Identify and remove tripping cause
Current-leak Breaker Activates	• Power Cable Wear and Tear • Moisture in cable connection • Water ingress caused by worn mechanical seal • Burnt Motor	• Send for repair • Re-connect wires using waterproof tape after drying • Send for repair • Send for repair

⚠WARNING

Dismantle and repair of pump must be carried out only by professionals; otherwise incorrect procedures may lead to electrocution, fire, pump malfunction or even severe injury of people.

#1. Pump impeller may become rusty and clogged due to being submerged in the water for some time without operation. Clean the impeller before re-using the pump to ensure normal operations.

Parts and Disassembly/Assembly

If it is necessary to disassemble the pump to repair the mechanical seal, power cable or motor that requires special facilities, please contact the purchasing shop or a local authorized dealer.

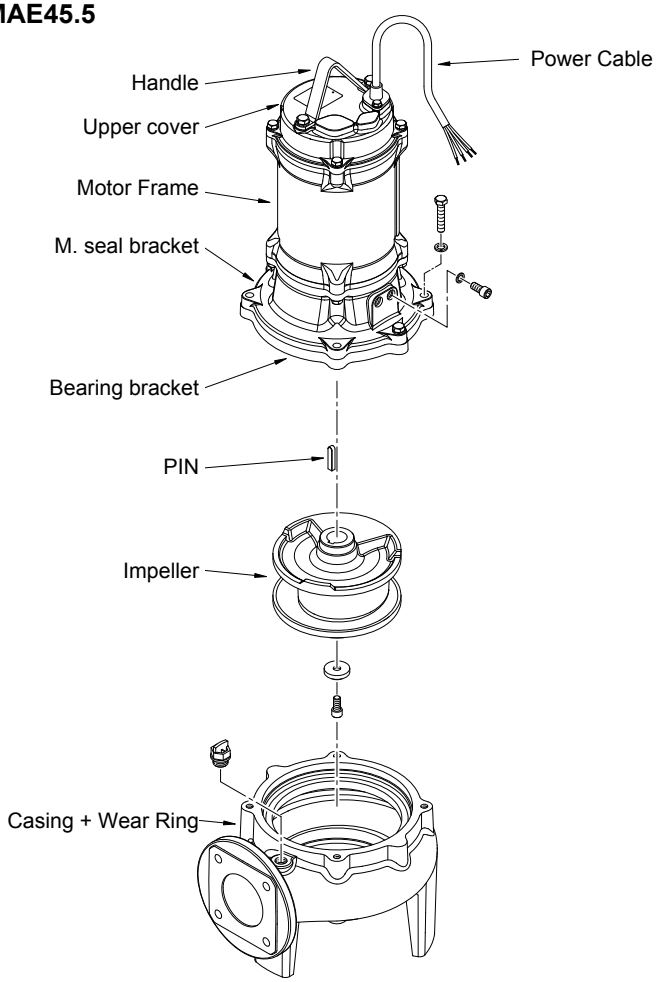
Structural diagram of dismantled parts differs depending on the models. Please refer to that of the actual model.

⚠WARNING

Make sure that the power is disconnected before disassemble/assembly.

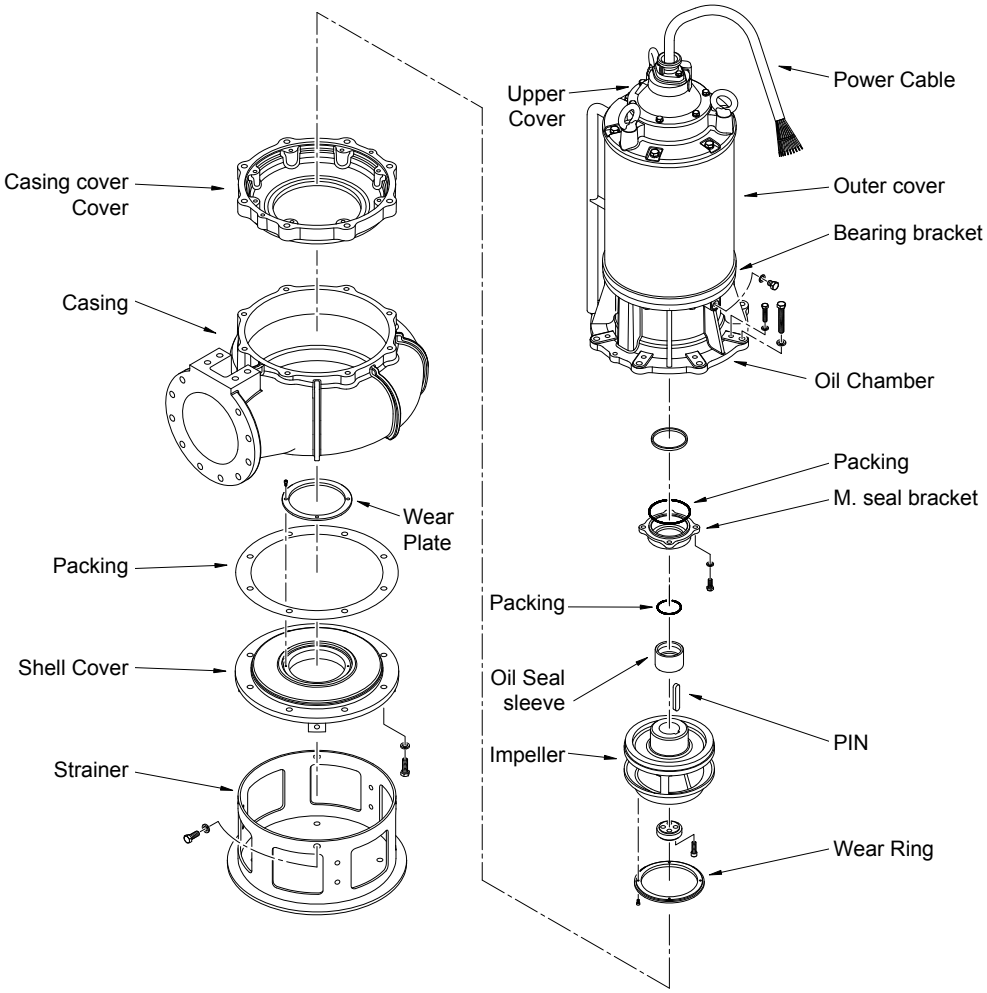
Never touch the plug or switch with wet hands or electrocution may occur. Never perform a starting test while dismantling or re-assembling. Failure to observe this regulation may lead to severe incident and injury.

MA– Illustration of Sewage and Wastewater Pump
100(150)MAE45.5



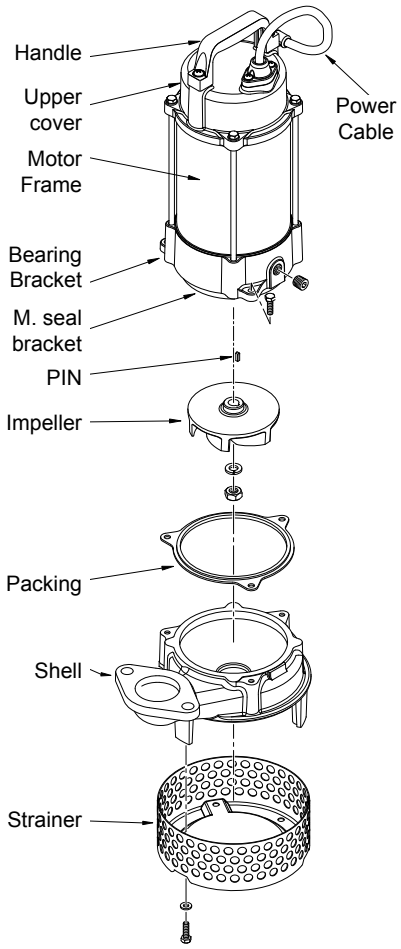
MA – Illustration of Sewage and Wastewater Pump

MA-1050



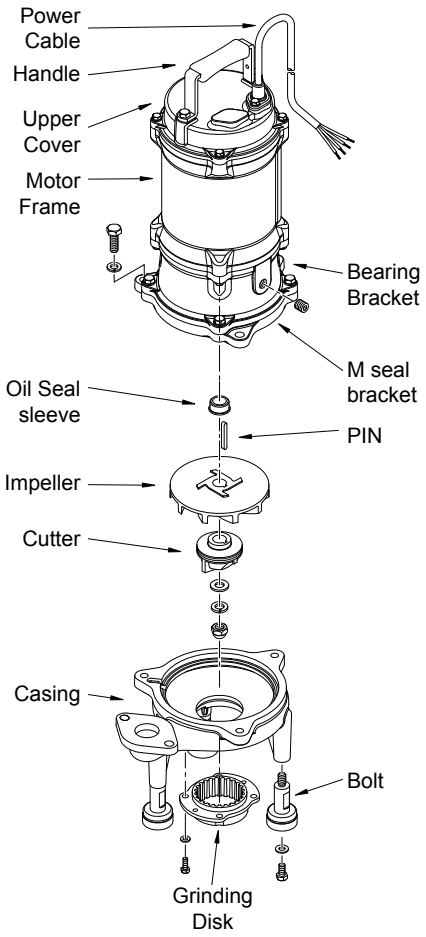
N/NN – Illustration of General purpose Wastewater Pump

N-21



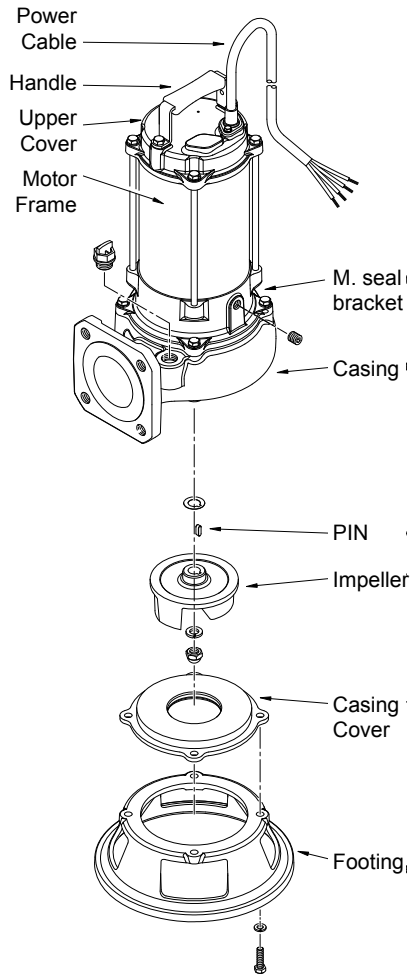
GP – Illustration of Grinding Pump

32GP22.2



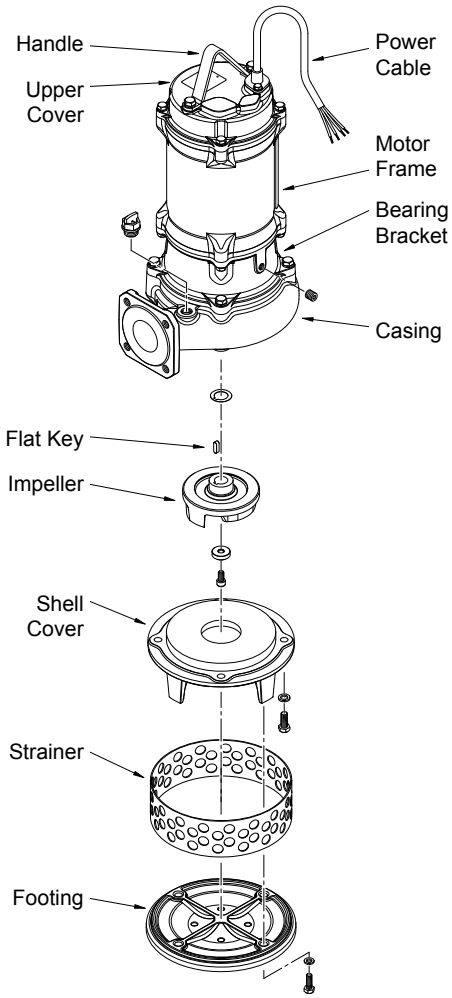
H/HN – Illustration of General purpose Swage Pump

HN-32P



NA – Illustration of Cast Iron Sewage Pump

80(100)NA25.5

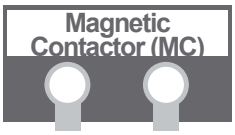


Pump Starter Connection

Direct start

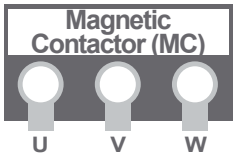
Single Phase Start

(<= 3HP (2.2kW) Standard Model)

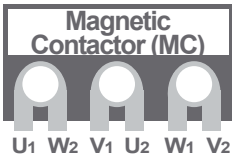


3-phase start

(<= 10HP (7.5kW) Standard Model)

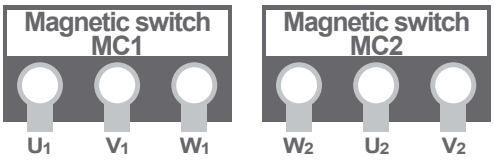


3-phase start (>= 15HP (11kW))



Star-Delta

(>= 15HP (11kW) standard model) Start by higher voltage Y-connection and run by lower voltage Δ–connection.



Oil Gauge Specifications

MA – Sewage and Wastewater Pump

Model	Poles	Horsepower HP(kW)	Oil cc
MAx2.4x	2P	0.5(0.4)	240
MAx2.8x		1(0.75)	240
MAx21.5x		2(1.5)	850
MAx22.2x		3(2.2)	850
MAx23.7xA		5(3.7)	1250
MAx25.5x		7.5(5.5)	2000
MAx27.5x		10(7.5)	2000
MAx211x		15(11)	2000
MAx4.4	4P	0.5(0.4)	530
MAx4.8		1(0.75)	530
MAx41.5		2(1.5)	920
Mx42.2		3(2.2)	1350
MAx43.7		5(3.7)	1350
MAx45.5		7.5(5.5)	2700
MAx47.5		10(7.5)	2700
MA-55Ax	4P	7.5(5.5)	4500
MA-75x		10(7.5)	5000
MA-610		10(7.5)	4300
MA-615/815		15(11)	4800
MA-820		20(15)	4800
MA-1030S		30(22)	7500
MA-1040		40(30)	7500
MA-1050		50(37)	7500
MA-1060		60(45)	7500
MA-1440	6P	40(30)	7500
MA-1650		50(37)	7500
MA-1660		60(45)	7500
MA-1430	8P	30(22)	7500

N/NN – General purpose Wastewater Pump

Model	Poles	Horsepower HP(kW)	Oil cc
N-05A	2P	0.5(0.4)	700
N-05B		0.5(0.4)	125
N-05x		0.5(0.4)	160
N-21/31		1(0.75)	160
NN-21		1(0.75)	190
NN-21.5		1.5(1.1)	190
NN-22/32		2(1.5)	800
NN-23/33/43		3(2.2)	800
NN-35		5(3.7)	800

H/HN – General purpose Swage Pump

Model	Poles	Horsepower HP(kW)	Oil cc
H-05A	2P	0.5(0.4)	700
H-05x		0.5(0.4)	160
H-21x/H31x		1(0.75)	160
HN-22x/32x		2(1.5)	800
H-33x		3(2.2)	460
HN-35x		5(3.7)	800

NA – Cast Iron Sewage Pump

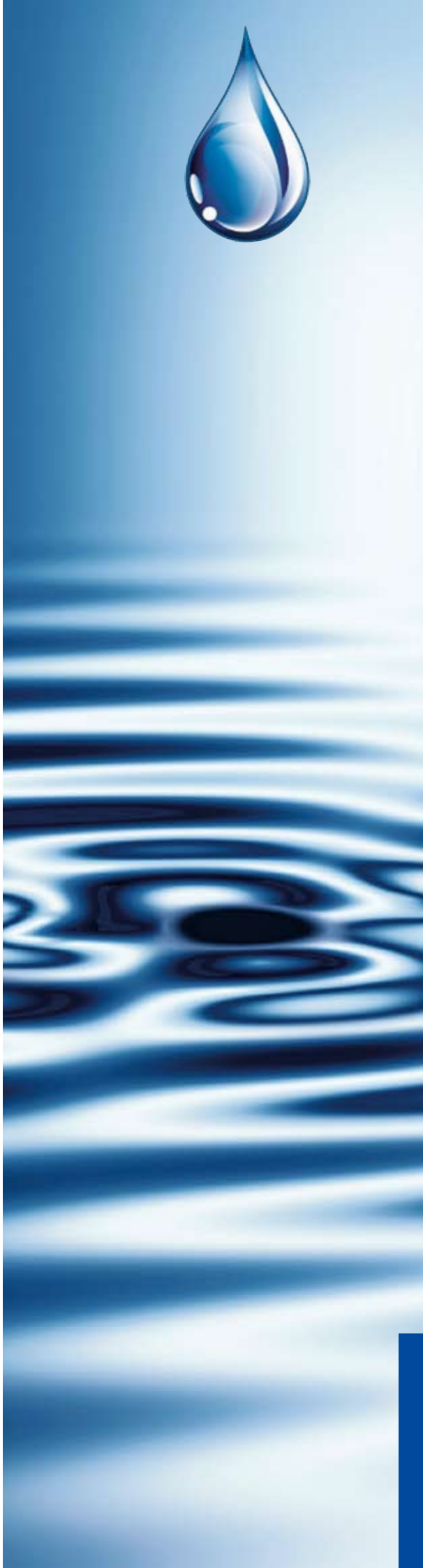
Model	Poles	Horsepower HP(kW)	Oil cc
NA21.5	2P	2(1.5)	850
NA22.2		3(2.2)	850
NA23.7A		5(3.7)	1250
NA25.5		7.5(5.5)	2000
NA27.5		10(7.5)	2000
NA211		15(11)	2000

GP – Grinding Pump

Model	Poles	Horsepower HP(kW)	Oil cc
GP21.0	2P	1.3(1.0)	580
GP21.5		2(1.5)	870
GP22.2		3(2.2)	1400
GP23.7		5(3.7)	1400

SG – Stainless Steel Sewage Pump / Wastewater Pump

Model	Poles	Horsepower HP(kW)	Oil cc
SGx2.4A	2P	0.5(0.4)	340
SGx2.8A		1(0.75)	340
SGx21.5		2(1.5)	850
SGx22.2		3(2.2)	850
SGx23.7		5(3.7)	1250
SGx25.5		7.5(5.5)	2000
SGx27.5		10(7.5)	2000
SGx211		15(11)	2000



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