



Installation and operating instructions



UGM
Submersible Motors

®



IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and SQS
herby certify that the organisation

Swiss Pump Company AG
3645 Thun-Gwatt
Switzerland

Certified area
Whole company

Field of activity
Manufacture and sale of products for the transportation of liquids

has implemented and maintains a
Management System
which fulfills the requirements of the following standard(s)

ISO 9001:2008

Scope No(s): 17, 18, 19
Issued on: 2015-03-03
Validity date: 2018-03-02
Registration Number: **CH-32160**



Michael Drechsel
President of IQNet



Roland Glauser
CEO SQS



IQNet Partners*

AENOR Spain AFNOR Certification France AIB-Vincent International Belgium ANCE-SICE Mexico APCER Portugal CCC-Cyprus
CISQ Italy CQC China CQM China CQS Czech Republic Cio Cert Croatia DQS Holding GmbH Germany
FCBV Brazil FONDENORMA Venezuela IQNET Colombia IMPC Mexico Inspeco Certification Finland IRAM Argentina
JQA Japan KPC Korea MIRTEC Greece MSST Hungary Nemko AS Norway NSAI Ireland PCBC Poland
Quality Austria Austria SRAC Romania TEST St Petersburg Russia TSE Turkey YUQS Serbia
*Notary registered in the DPA has a AFNOR Certification, CIPRO, DQS, ISO 9001 and ISO 9001:2015



Contents

Introduction	page	4
Prior to operation		4
Installation		5
Electrical wiring		6
Operation		7
Maintenance		7
Spare Parts 0.5HP		8
Spare Parts 1HP		10
Spare Parts 2HP		12
Trouble and troubleshooting		14

Guaranty and service

GUARANTY TERMS

⚠ *Read this manuel book carefully before you run the motor*

This user manuel is for 5" 6" 7" 8" and 10" submersible motor types.,
Submersible motors are guarantied for 1 year on condition that the basics ,
warnings and standarts mentioned in this user manuel are being conformed.
Lifetime of motors depends on the conditions of the place that it will be run.
Submersible motors have got the quality and technology that can serve
long years without any problems.

⚠ *Please keep this user manual in order to apply in the required conditions after you start to use your motor.*

REMARKS ABOUT GUARANTY

Please do not change any settings of your submersible motors for running ,
setting and maintaining except the processes mentioned in the user manuel.
The defections , occured by the power cable type and unsuitability on the sections
are not under the guaranty terms. You can find all the information about cable
types and sections in this manuel book.
The defections occured by the faulty connection of motor outlet cable and power
cable will be considered out of guaranty terms.
It is highly adviced that external check valve should be used on the pushing
pipe and between pump and valve against to the hydraulic ram. The defections
occured because of hydraulic ram in the motor will be considered out of guaranty terms.

USAGE INFORMATION

⚠ *Attention: Submersible Motors are operated by electrical power. So please consider the general protection basics of electrical devices while running and maintaning the motor conditions after you start to use your motor.*

Please beware that the grounding has been processed correctly before running the motor.
Electric voltage that the motor will be rested should be $\pm \%10$
Do not change thermic setting

Installation


If you are not using automatic fuse system, exchange the defected fuse with equal fuse and never connect wire instead of the fuses

The control panel should be set into a place that air conditions will not affect because electrical equipments are being affected quickly by the dust, humidity and heat

Fix the cable extension after measuring voltage

While assembling the motors into water well, electro cable and motor feeding cable should be attached to the main pipe with clamps in 3 meters

The maintenance should be done in 6 months, required parts should be changed and no outlet power should be given to any other device except motor from control panel.

 ***Submersible Motors are rewindable type with wet stator, have water coolant system, can be lubricated and designed to be used for clean water pumps at the deep well with three phase***

STANDARD FEATURES

Shaft and motor connections are according to NEMA standards

Radial and axial carbon bearings that are lubricated by water

Water coolant system

Unlimited immersion depth

± %10 voltage tolerance

30 °C maximum Water temperature

2900 rpm/min motor rotation speed

IP68 motor protection class

5 meter motor feeding cable

Rewindable motor class B

SIC Mechanical Seal

OPTIONAL FEATURES

Various voltage and frequency

Type of starting as requirements

Special casting material

Water heat till 70 °C

Pt 100 heat sensor

Carrying and storing

CARRYING AND STORING

⚠ *While carrying the motor with package or without package and getting it from the package, it should not be damaged and power cable should not be damaged also*

There should not be any damage on the motor and it should not be dropped while carrying and transportation. If these events happen, the motor's control should be done at authorized service.

Do not damage to electrical cable while opening motor packing

Keep the motors without water at the stores because of the freezing danger.

So do not let the water to be frozen in the motor.

FILLING WITH WATER

⚠ *Never fill the motor with oil...*

Motor should be filled by the water before lowering into the water well

When the motor is vertical position, unfix water filling plug by using allen wrench

Fill the motor with clean water that does not include sand and acid

Keep the plug opened for 30 minutes for the bubbles go out, then add clear water till it overflows and then close the plug.

If you want to add mixage – (anti-freeze – water) into the motor

Water and anti-freeze (1,2 Propilen Glikol) mixage rates are given in the table below

Freezing degree	1,2 Propilen Glikol	Water
° C	weight %	weight %
-10	18	82
-15	25	75
-20	32	68
-25	37	63
-30	41	59

Filling with antifreeze

⚠ *While filling with anti-freeze , it is highly adviced that protective glasses and glaves should be used*

⚠ *Motor, su + antifiriz karışımı ile doldurulmuştur.
Motor is filled with mixture of water + anti-freeze*

$H_2O + \text{❄} (-10^0C)$

Yeniden doldurmak gerektiğinde kullanma kılavuzuna uyunuz.

When necessary to refill the motor keep the instructions in the user manual.

⚠ *kuyuya indirme öncesi motor su seviyesini kontrol ediniz.
Check top-up before installation.*

⚠ *All the motors that carry the label above are filled with anti-freeze water mixage
that has -10 C degree*

Assembly

CONNECTION WITH PUMP

Pump that motor will be assembled with should have non-return valve

The motor suction case should be designed for protecting the sands coming from the water well

Before assembling motor to the pump, check if the spindle turns easily by hand

Motor axis and pump axis should be on the same line

Pump clutch should not be squeezed to motor shaft

Do not let passing vibration from pump to motor

Do not remove sand splash ring and motor top seals while running the motor

POINTS THAT SHOULD BE CONSIDERED IN USAGE

Never run the motor without water

Before starting the motor , it should be filled with clear water

Never put oil into the motor

Water well temprature should not exceed 30 C

Motor should not be located at the bottom of the well. Motor should be located minimum 2 meters up from the bottom of the water well.

If there is no hydraulic ram, vibration and water at the plant , it should not be forgotten that the axial bearing life is endless as theoretical

Pumps that will be assembled with motor should be selected for not loading on motor axial bearing

Before running the motor, grounding should be done

Starting number of the motor in one hour should be controlled , this safety should be supplied by adjusting pumps's outlet valve

The lightning conductor should be fixed to motor feeding line

The voltage allowance of the network that motors connected should be max $\pm 10\%$ (in load)

The voltage deviations between phases should be max 5%

Motor energy cable should be selected as maximum. Voltage drop becomes 3%

Employed motor protection thermal relays should be as type of opening quickly. (it should be opened in 5 multiple for thermal relays adjustment current at 10 second)

The passing over time from λ to Δ at λ / Δ motors should be under 3 second

Thermal setting should be adjusted to 0.58 multiple of current value on the table at the λ / Δ motors

Do not make any energy feeding to any place except pump to control panel

Motor runs by electric ,so obey the general safety conditions for usage of electrical devices.

TECHNICAL DEFINATIONS

Well Diameter : Internal diameter of the pipe installed in the drilling well (mm or inch)

Static Water Level : Distance of water level from the surface before taking out water from the drilling well (m)

Dynamic Water Level : Distance of water level from the surface when water is taken according to well yield m^3

Quantity : The quantity of water obtainable from the well according to the yield of drilling well lt/sec or m^3/h

Well Depth : Total depth of the drilling well (m)

ASSEMBLYING MOTOPUMP INTO THE WATER WELL

Please make laboratory to check drilling well water temprature and sand quantity

Diameter of the well should be larger than the diameter of the pump as 2" or 3"

The distance between lower part of motor and well basement should be minimum 50 cm

The distance between pump suction filter and water well filter should be in maximum distance.

Information and instructions

CARRYING AND PACKAGING INSTRUCTIONS

Submersible motors are being delivered to the customers in wooden boxes. There should not be any damage on the motor and it should not be dropped while carrying and transporting. If these events happen, the motor's control should be done at authorized service. All the faults occurred while carrying are out of warranty terms.

Lowering the motor and pump into the water well should be done by authorized service.

Motor should not be lifted up by its power cable.

Power supply cable should be checked carefully and it is checked if there is any laceration and scratch. If there is any damage it should be done by authorized service.

Keep the cable tips from rain and humidity.

Check if the control panel is assembled properly and there is power in the control panel.

Check the label values

ASSEMBLYING CONTROL PANNEL

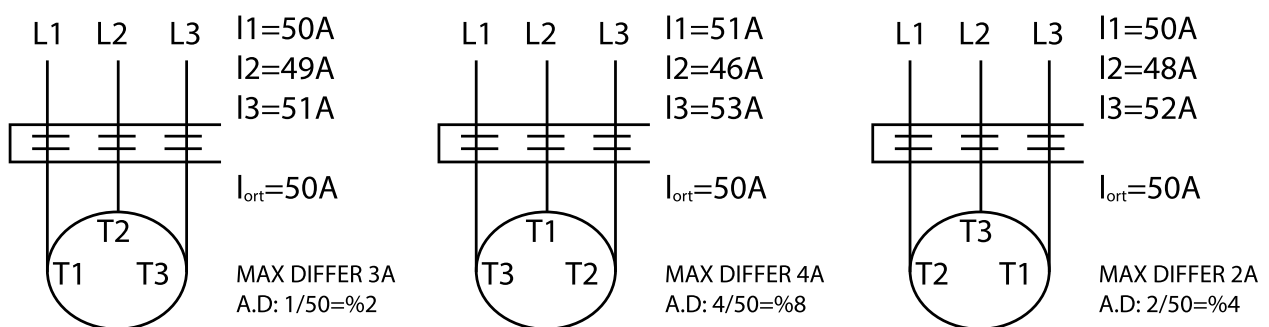
Control pannel should be mounted in a place that weather conditions will not affect.

Power cable of the pump should be connected into the control pannel without any mechanical affects.

Electrical connections should be done according to electrical circuit schema.

VOLTAGE IMBALANCE

In order to lower the voltage imbalance to the minimum, the places of the phases are changed as the motor turning rotation stays same and it is determined where the lowest current imbalance happens



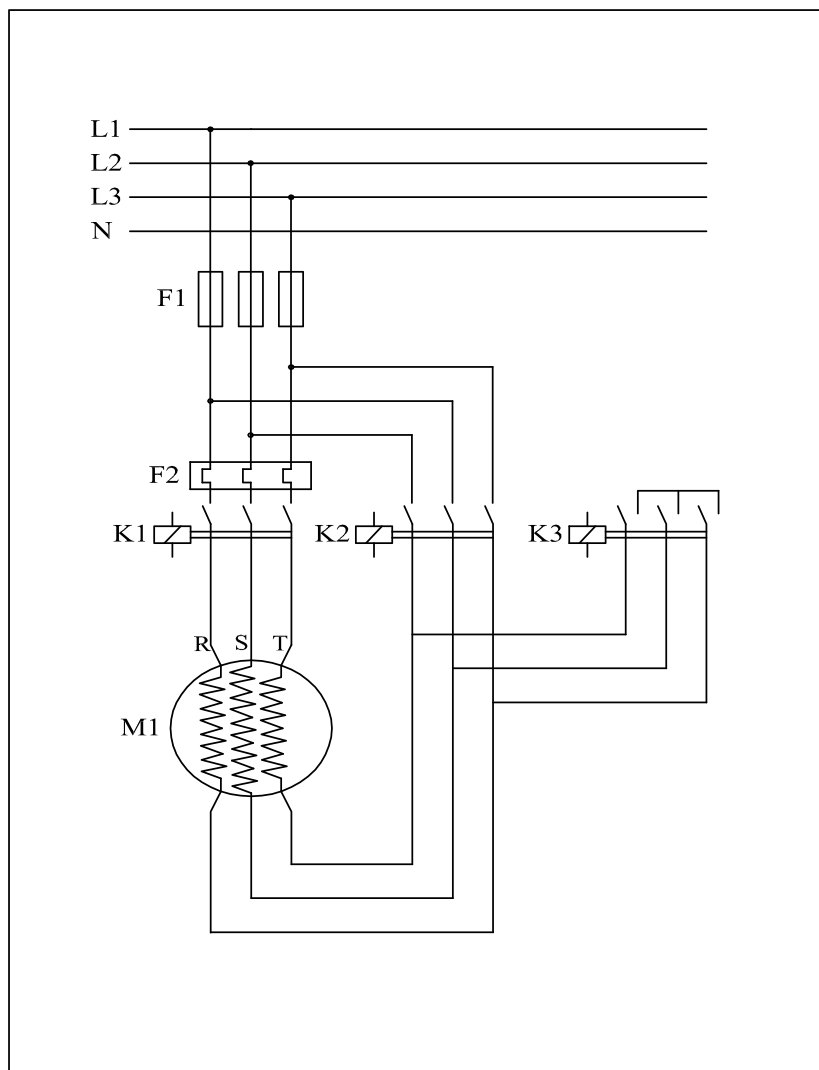
As seen in the schema above , motor can be attached to the electric in 3 ways providing that the turning rotation stays same. Although the average current stays same the current imbalance can be different from each 3 ways. If the rate of current imbalance is under %2 the current connection is kept. If the rate of current imbalance increase over than %2 , the way shown above is processed and a connection type is found for minimum imbalance. It is necessary that the current imbalance increase over %5.

CABLE CONNECTION

Triple series can be connected as well as quartet for one voltage motors. Green-yellow cable is connected for ground. The cables should be attached to the terminal for controlling. If 2 voltage is being designed for the motor ;

(for example: 220v – 380v) there are 2 series for each 3 wires. The wires are marked with a letter. U1,V1,W1 ve U2,V2,W3 this wires should be attached respective and according to their usage.

STAR DELTA CONNECTION



Information and instructions

RUNNING THE MOTOR FIRST TIME

⚠ *Do not permit kids and not authorized people to run the motor*

Measure voltage of the network

Calibrate the thermic settings according to the label values for direct started motors.

For star delta motors thermic setting should be calibrated as 0,58 times of current value

Leave the valve opened which is mounted to the pump

Run the pump with using the main switch and control switch. Read the manometer values

Attach the phases in their places and run the pump.

LAST CONTROLS

Please check the thermic role settings

Remove one of the fuse and run the pump in two phases.

In this case thermic fuse is supposed to be broken in 30 or 40 seconds. Check the thermic is working or not.

Repeat this control for three phases. In each experiment give time to the motor and starter three minutes

Check the ammeter values with motors nominal values in different valve conditions. If it is much more, please contact us

Set the pump pressure by the means of valve

MAINTENANCE

Check the izolation rates as soon as the motor starts to work

After a while that the motor starts to work , izolation value is supposed to be under 10 megaohm and stay staitable.

If this value is under 2 megaohms , contact us.

Izolation control should be done every month and izolation control should be done when the motor is cold.

⚠ *Keep away unauthorized people from maintenance and repair*

Information and instructions

IN CASE NOT USING THE MOTOR FOR A LONG TIME

Motor can wait inside the water well incase it is not used for a long time.

CONTROLLING ELECTRICAL RATES

After the motor is started to be used, the current ,voltage and pressure values should be saved and the changes should be observed during the time.

CONTROLLING ELECTRICAL

Electrical equipments should be controled once in six months.

It should be controlled if there is loosening in the contactor circuits and motor pole connections.

CONDITIONS ABOUT THE SUPPLY

The grounding should be done before running the motor.

2- Thermic role that prevents motor from damage should be in the type that opens fastly

3- The maximum tolerance of the voltage rate should be $\pm 10\%$. This voltage should be gauged from the tips of the power cable. The maximum starting per hour should not exceed because of the electric cuts and voltage fallings.

4- The current imbalance between the phases for submersible pump motor affects the lifetime of the motor and occures current imbalances. This will cause vibration and shorten the winding lifetime.

5- No phase should not exceed 5% more than the average of 3 phases in the load. It is necessary to chance the places of the phases providing that the turning rotation stays same and it is determined that the lowest phase imbalance range.

6- While assembling the submersible motopumps into the water well, electrode and power supply cable should be attached to the pipe in 3 meters.

7- The cable connections and attachments should be done by the authorized people and the izolation should be checked. Izolation control should be done with 500 V meger model device. The izolation current should be 100 M Ω when it is filled with water.

8- Damaged fuses should be changed with the same models.

9- Electrical control panel maintenance should be done in each 6 months.

C – CONDITIONS ABOUT THE FLOODING PIPE INSTALLATION

1- Water pressure possibility is too much in the long flooding pipe installations. Water pressure causes that the pump loads on the axial bearings and cracks the axial bearings. The other factors that causes stopping are electrical cutdowns and lack of the water inside the well. To prevent from the water pressure, the check valve should be used and the check valve should not be drilled. The flooding pipe should be full of water. Air storage and anti pressure valves should be used.

2- The flooding pipe should be chosen in convenient diameter and strength in as it carries the electrical power supply cable and carries the water upside.

3- The valve should be used in order to balance the well flowing and pump flowing on the flooding pipe. The height of the pump depends that the valve is opened or closed. Running the pump in opened valve situation or running the pump without valve will make the lifetime of the motor and pump less. There is advantage if a manometer is used before the valve. Manometer is needed for determining the pumps turning rotation. The turning rotation of the motopump is the side where the pressure is high.

4- Submersible motors should be lowered inside the water well, inside the installation pipe and well filter. It should be mounted as it will be located under the pump filter.

D- CONDITIONS ABOUT WATER WELL AND WATER

1- Submersible motors are being designed for running inside the 30 °C water. It should be checked that the degree of the water does not exceed 30 °C.

2- Submersible motor should not be run outside the water well and waterness areas. If the motor will be used inside the lake, pool vertically and horizontally a jacket that supply 0.5 m/sec flow should be covered outside the motor.

3- One of the reason that shorten the life of submersible pump is the sand. The sand corrodes the part of the pump and causes the vibration. This spoils both radial and axial bearings.

4- Dynamic and static water levels of the water well should be determined for each season. Therefore the records that covers all the saved events and applications during drilling should be used. The records should consist date and place of the drilling and diameter of the water well and equipment plan and experiment records.

E- PUMP ASSEMBLE DEPTH

- 1- The motor should be upper from the base of the well minimum one meter and should not be assembled in the stuff like mud and sand. This will block the the water movement around the motor and it will cause over heat on the motor.
- 2- While deciding the dept that the pump will be assembled inside, it should be considered that the dynamic water leves changes according to the season. The water level will decrease and the water well flow will decrease because of the lack of water in the watering season. In this case while determining the pump assemblage , the minimum level should be considered that the dynamic level will decrease. The reducing flow will be understood with the pumps working and stopping continuously. In this case the pump flowing should be set from the valve
- 3- Pump should not work without water although it is a short time. Pump should be worked in a height that is mentioned in the second section. This will prevent vibration and supply the axial bearings work properly.

F – LEVEL ELECTRODES

- 1- The lower level electrode should be mounted until the allowable water level. Lower level electrode provides shutting down the motors when the water level falls under the electrode level.
- 2- The top level electrode should be mounted by calculating pump and water well flow thus maximum starts / hour will not be exceeded. The distance between upper electrode and lower electrode should be exceeded water well flow and maximum starts / hour of the motor.

SPECIFICATION OF MOTORS

5" FEATURES OF MOTORS								
Motor Type	Power		Efficiency	Power Factor	Current	Revolution	Starting	Axial Load
			η	$\cos \varphi$		d/dak		
	HP	Kw	4/4	4/4	I (n)	r.p.m.	H	kN
PL 5/4	4	3	0,77	0,8	7,5	2870	20	20
PL 5/5,5	5,5	4	0,78	0,79	10,5	2860	20	20
PL 5/7,5	7,5	5,5	0,80	0,8	13,5	2860	20	20
PL 5/10	10	7,5	0,82	0,82	17,5	2850	20	20
PL 5/12,5	12,5	9	0,82	0,81	21,5	2850	20	20
PL 5/15	15	11	0,82	0,83	25	2840	20	20

Specification of motors

6" FEATURES OF MOTORS								
Motor Type	Power		Efficiency	Power Factor	Current	Revolution	Starting	Axial Load
			η	$\cos \varphi$		d/dak		
	HP	Kw	4/4	4/4	l (n)	r.p.m.	H	kN
PL 6/4	4	3	0,78	0,84	7,5	2860	20	25
PL 6/6	6	4,5	0,80	0,83	11	2860	20	25
PL 6/7,5	7,5	5,5	0,80	0,84	13	2865	20	25
PL 6/10	10	7,5	0,80	0,82	17,5	2870	20	25
PL 6/12,5	12,5	9	0,82	0,83	20,5	2880	20	25
PL 6/15	15	11	0,82	0,81	25	2870	20	25
PL 6/17,5	17,5	13	0,82	0,82	29	2875	20	25
PL 6/20	20	15	0,83	0,84	32	2870	20	25
PL 6/25	25	18,5	0,83	0,80	42	2870	20	25
PL 6/30	30	22	0,83	0,82	50	2860	20	25
PL 6/35	35	26	0,84	0,83	56	2860	20	25
PL 6/40	40	30	0,84	0,85	63	2840	20	25
PL 6/50	50	37	0,85	0,84	80	2850	20	25
PL 6/60	60	45	0,84	0,84	95	2850	20	25

7" FEATURES OF MOTORS								
Motor Type	Power		Efficiency	Power Factor	Current	Revolution	Starting	Axial Load
			η	$\cos \varphi$		d/dak		
	HP	Kw	4/4	4/4	l (n)	r.p.m.	H	kN
PL 7/30	30	22	0,84	0,85	48	2890	17	35
PL 7/40	40	30	0,85	0,86	62	2875	17	35
PL 7/50	50	37	0,86	0,86	77	2875	17	35
PL 7/60	60	45	0,86	0,86	91	2885	17	35
PL 7/70	70	51	0,86	0,85	107	2890	17	35
PL 7/80	80	59	0,88	0,86	119	2890	15	45
PL 7/90	90	66	0,88	0,86	133	2890	15	45

8" FEATURES OF MOTORS								
Motor Type	Power		Efficiency	Power Factor	Current	Revolution	Starting	Axial Load
			η	$\cos \varphi$		d/dak		
	HP	Kw	4/4	4/4	I (n)	r.p.m.	H	kN
PL 8/15	15	11	0,83	0,81	24	2920	15	45
PL 8/20	20	15	0,84	0,83	32	2915	15	45
PL 8/25	25	18,5	0,84	0,84	40	2905	15	45
PL 8/30	30	22	0,82	0,85	50	2880	15	45
PL 8/40	40	30	0,83	0,87	62	2880	15	45
PL 8/50	50	37	0,85	0,87	76	2885	15	45
PL 8/60	60	45	0,86	0,87	90	2885	15	45
PL 8/75	75	55	0,86	0,87	112	2885	15	45
PL 8/80	80	59	0,88	0,87	117	2870	15	45
PL 8/85	85	63	0,87	0,87	126	2875	15	45
PL 8/90	90	66	0,88	0,87	131	2885	15	45
PL 8/95	95	70	0,87	0,87	141	2890	15	45
PL 8/100	100	75	0,88	0,87	147	2890	15	45
PL 8/110	110	81	0,88	0,87	161	2900	10	45
PL 8/125	125	92	0,88	0,87	182	2900	10	65
PL 8/150	150	110	0,88	0,87	220	2910	10	65

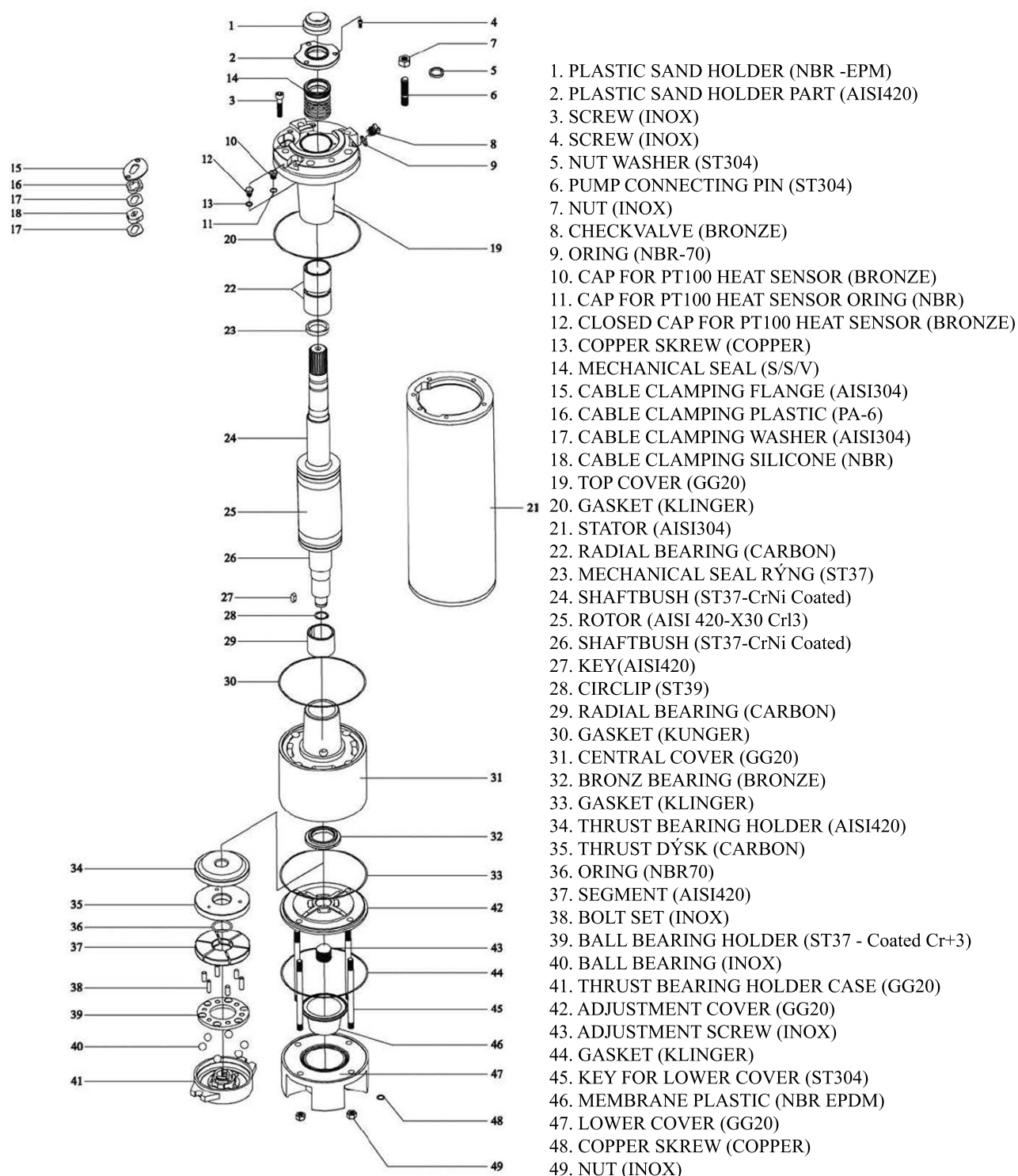
10" FEATURES OF MOTORS								
Motor Type	Power		Efficiency	Power Factor	Current	Revolution	Starting	Axial Load
			η	$\cos \varphi$		d/dak		
	HP	Kw	4/4	4/4	I (n)	r.p.m.	H	kN
PL 10/100	100	75	0,86	0,87	150	2910	10	75
PL 10/110	110	81	0,86	0,87	166	2915	10	75
PL 10/125	125	92	0,87	0,89	181	2910	10	75
PL 10/150	150	110	0,87	0,89	220	2915	10	75
PL 10/175	175	129	0,87	0,89	255	2920	10	75
PL 10/200	200	147	0,88	0,89	290	2925	10	75
PL 10/225	225	165	0,88	0,89	325	2930	10	75
PL 10/250	250	185	0,89	0,90	355	2930	10	75

Choosing the cable

Star/Delta														
MotorPower		Voltage	Cable cross sections 3X... mm2											
			2.5	4	6	10	16	25	35	50	70	95	120	150
kW	CV-HP		Max.Lenght											
3	4	380V	150	240	360									
4.5	6	380V	110	170	260	450								
5.5	7.5	380V	80	130	190	340	540							
7.5	10	380V	60	100	150	250	410							
11	15	380V		60	100	170	280	440						
15	20	380V			80	130	210	330	460	660				
18.5	25	380V				100	170	260	370	175				
22	30	380V				90	140	220	310	440				
30	40	380V					100	170	230	330	460			
37	50	380V						130	190	270	380	520		
45	60	380V						110	160	230	320	440	550	
55	75	380V							120	170	240	330	410	530
62.5	85	380V							110	150	220	290	370	470
81	110	380V							86	130	180	245	310	390
92	125	380V								110	160	220	275	340
110	150	380V									130	180	220	290
129	175	380V										155	195	250
150	200	380V										130	170	220
165	225	380V										125	150	190
185	250	380V												170

Star/Delta															
MotorPower		Voltage	Cable cross sections 3X... mm2												
			1,5	2,5	4	6	10	16	25	35	50	70	95	120	150
kW	CV-HP		Max.Lenght												
3	4	380V	140	230	370										
4.5	6	380V	100	170	270	400									
5.5	7.5	380V	70	120	200	300	500								
7.5	10	380V	57	90	150	220	380								
11	15	380V	39	60	100	150	260	400							
15	20	380V		50	80	110	200	310	490						
18.5	25	380V			60	90	160	250	400	560					
22	30	380V			50	70	130	210	340	470					
30	40	380V				60	100	160	250	360	500				
37	50	380V				40	80	130	200	290	410				
45	60	380V					70	110	170	240	350	480			
55	75	380V						80	130	180	260	360	500		
62.5	85	380V						70	120	170	245	340	465	535	
81	110	380V							100	150	200	290	380	440	540
92	125	380V								120	170	230	300	370	450
110	150	380V								100	140	200	250	300	370
129	175	380V									125	170	230	280	330
150	200	380V										150	190	230	280
165	225	380V										130	170	200	240
185	250	380V										125	160	190	230

Parts of the motor









Swiss Pump Company AG
Moosweg 36
CH - 3645 Thun - Gwatt
Switzerland
Tel. +41 33 223 11 00
Fax +41 33 223 11 22
mail@swisspump.com

www.swisspump.com