



INSTALLATION, OPERATION & MAINTENANCE MANUAL

PERFECTA Pump® Electric Submersible Pumps

GF32, IGF32 & TIGF32 Pump Models

Single Phase

115V, 60Hz
220V, 50Hz

Three Phase

230V, 60Hz
460V, 60Hz
415V, 50Hz
440V, 50Hz
460V, 50Hz

Read this manual carefully before installing, operating, or servicing these pump models. Observe all safety information. Failure to comply with instructions may result in personal injury and/or property damage. Please retain these instructions.

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INTRODUCTION

This Installation, Operation and Maintenance manual provides important information on safety and the proper inspection, installation, operation, maintenance, and primary testing of the BJM Pumps® PERFECTA Series Submersible Pumps. This manual also contains information to optimize performance and longevity of your **BJM Pumps® PERFECTA Series Submersible Pumps**.

The PERFECTA Series Submersible Pumps are designed to pump variety of fluids ranging from water to chemicals. The PERFECTA Series Submersible Pumps are designed and built with different material configurations suitable to cater various fluid, Water or Harsh Chemicals, transferring applications. The PERFECTA Series Submersible Pumps are not Explosion-Proof. They are not designed to pump volatile or flammable liquids.

Note: Consult Chemical Resistance Chart for compatibility between pump materials and liquid before operating pump.

If you have any questions regarding the inspection, installation, operation, maintenance, and primary testing please contact your **BJM Pumps®** Distributor, or Industrial Flow Solutions Operating, LLC.

Industrial Flow Solutions Operating, LLC

104 John W Murphy Drive

New Haven, CT 06513, USA

Fax: 860-399-7784

Phone: 860-399-5937

Information, including pump data sheets and performance curves, is also available on our web site: www.flowsolutions.com

For assistance with your electric power source, please contact a certified electrician.

Please pay attention to the following alert notifications. They are used to notify operators and maintenance personnel to pay special attention to procedures, to avoid causing damage to the equipment, and to avoid situations that could be dangerous to personnel.

NOTE: Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

⚠ DANGER Immediate hazards that WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

⚠ WARNING Hazards or unsafe practices that COULD result in severe personal injury or death. These instructions describe the procedure required, and the injury which could result from failure to follow the procedure.

⚠ CAUTION Hazards or unsafe practices which COULD result in personal injury or product or property damage. These instructions describe the procedure required and the possible damage which could result from failure to follow the procedure.

SAFETY

Pump installations are seldom identical. Each installation and application can vary due to many different factors. It is the owner/service mechanics responsibility to install, operate, repair, service, and test to ensure that the pump integrity is not compromised according to this manual.

⚠ WARNING Risk of electric shock – this pump has not been investigated for use in swimming pool areas.

⚠ DANGER Do not pump flammable, inflammable, or volatile liquids. Death or serious injury will result.

⚠ WARNING Before attempting to open or service the pump:

- 1) Familiarize yourself with this manual.
- 2) Unplug or disconnect the pump power cable to ensure that the pump will remain inoperative.
- 3) Allow the pump to cool if overheated.

⚠ WARNING Do not operate the pump with a worn or damaged electric power cable. Death or serious injury could occur.

⚠ WARNING Never attempt to alter the length or repair any power cable with a splice. The pump motor and cable must be completely waterproof. Damage to the pump or personal injury may result from alterations.

⚠ WARNING After the pump has been installed, make sure that the pump and all piping are secure before operation.

⚠ WARNING Do not lift the pump by the power cable piping or discharge hose. Attach proper lifting equipment to the lifting handle fitted to the pump. Do not suspend the pump by the power cable.

⚠ WARNING Obtain the services of a qualified electrician to troubleshoot, test and/or service the electrical components of this pump.

⚠ CAUTION Pumps and related equipment must be installed and operated according to all national, local and industry standards.

INSPECTION

Review all safety information before servicing pump.

The following are recommended installation practices / procedures for the pump. If there are questions regarding your specific application, contact your local **BJM Pumps®** distributor or Industrial Flow Solutions Operating, LLC.

PRE-INSTALLATION INSPECTION

- 1) Check the pump for damage that may have occurred during shipment.
- 2) Inspect the pump for any cracks, dents, damaged threads, etc.
- 3) Check cord/s for any cuts or damage.
- 4) Check for and tighten any hardware that appears loose.
- 5) Carefully read all tags, decals, and markings on the pump.

If anything appears to be abnormal, contact your **BJM Pumps** distributor or Industrial Flow Solutions Operating, LLC. If damaged, the pump may need to be repaired before use. Do not install or use the pump until appropriate action has been taken.

Lubrication:

No additional lubrication is necessary. The motor stator is WET, Oil-Filled type, filled with suitable oil from the factory. This oil helps keep the stator winding cool and it also provides lubrication to the shaft seal and bearings. Stator oil should be checked and changed once per year. See table below for the type and quantity of the oil.

OIL FILL QUANTITY/TYPE

<u>Pump Models</u>	<u>Qty., Oil in Stator</u>		<u>Type of Oil</u>
	<u>(U.S. fl. oz.)</u>	<u>Metric C.C.</u>	
With BUNA-N & FKM O-Rings, Sealings	15	443	ISO-32 NSF Mineral based Oil
With EPDM O-Rings, Sealings	15	443	ISO-32 NSF Vegetable based Oil

Contact your **BJM Pumps** distributor or Industrial Flow Solutions Operating, LLC to get assistance on replacing the oil.

PUMP INSTALLATION

PERFECTA Series Submersible Pumps have been evaluated for use with various fluid applications. Please contact the manufacturer for additional information.

⚠ WARNING Risk of Electric Shock.

Single Phase Pump models for 115V, 60Hz are supplied with a cable having grounding conductor and grounding-type attachment plug. Whereas Single Phase Pump models for 220V, 50Hz are supplied with a cable having grounding conductor but pumps do not come with electric plug connectors. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle. Refer PERFECTA Single Phase Pump Power Cable Ends Diagram A.

Three Phase Pump models are supplied with cable/s having grounding conductor, and suitable Control Panel to operate the pump. The Control Panel does have a grounding bolt provision on the Control Panel side wall. Make sure to use that bolt to create proper grounding for safety.

INTENDED METHODS OF WIRING CONNECTION

SINGLE PHASE WIRING INSTRUCTIONS

⚠ WARNING FOR YOUR PROTECTION, ALWAYS DISCONNECT PUMP FROM ITS POWER SOURCE BEFORE HANDLING. Single Phase Pumps-115V/60Hz are supplied with a three prong grounded plug to help protect you against the possibility of electrical shock. **DO NOT UNDER ANY CIRCUMSTANCES REMOVE THE GROUND PIN.** The three prong plug **must** be inserted into a mating three prong grounded receptacle. **IF** the installation does not have such a receptacle, it must be changed to the proper type, wired, and grounded in accordance with the National Electrical Code and all applicable local codes and ordinances. The 220V/50Hz types of pumps are supplied without plug. For safety it is recommended to use proper plug as per the local, national standards and specifications.

⚠ WARNING “Risk of electrical shock” Do not remove power supply cord or connect conduit directly to the pump.

⚠ WARNING Installation and checking of electrical circuits and hardware should be performed by a qualified licensed electrician.

THREE PHASE WIRING INSTRUCTIONS

⚠ WARNING FOR YOUR PROTECTION, ALWAYS DISCONNECT PUMP FROM ITS POWER SOURCE BEFORE HANDLING.

⚠ WARNING “Risk of electrical shock” Do not remove power supply cord or connect conduit directly to the pump.

⚠ WARNING Installation and checking of electrical circuits and hardware should be performed by a qualified licensed electrician.

Follow the instructions provided with the Control Panel to wire the system.

SUMP, PIPING AND POWERING- Refer PERFECTA Pump Installation Diagram B

- The pump can be installed in a sump or into a small pit in the sump. The small pit should be well-leveled and having total volumetric size approximately double than that of the pump.
- For maximum pumping capacity, use the proper size non-collapsible hose fixed with a Tapered Hose Connection (1 1/4" – 1 1/2") by metal clamps, or rigid piping of Metal/uPVC fixed with a Threaded Female Flange (1 1/4" NPT). A check valve may be installed after the discharge to prevent back flow when the pump is shut off. Select delivery pipe material suitable to pumping liquid.
- The most preferred installation position is vertical with strainer on the sump ground, or the pump / strainer can also be placed (optional) on a rigid support of about 4" height.
- The cable/s should be run properly in the sump, and a cable conduit should be provided from sump to the power supply source for the pump.
- **Pump Rotation:** Check the rotational direction of the pump, before installing the pump in the sump, by supplying power momentarily (2-3 Sec). Single Phase Pumps are having cable with plug (115V, 60Hz) and without plug (220V, 50Hz). Connect suitable plug to a cable of 220V, 50Hz pumps. All Three Phase Pumps are supplied with a Control Panel. Connect pump cable/s to Control Panel as per Diagram C and a power supply cable from Main Power Source to a Control Panel. Single Phase Pump can be powered by direct plug-in to the power source while the Three Phase Pumps are with a Control Panel. Put the pump in vertical position with Pump Handle remains on TOP SIDE and powered it for 2-3 Sec to check the rotational direction while facing towards a Pump Handle. The pump should show kick-back motion in counter-clockwise direction as shown in the image E.
- **Lifting:** Attach a rope/lifting chain, not included in supply & shown in Diagram B, to the handle on the top of the pump. Do not lift the pump by the power cable/s or discharge hose/piping. Proper lifting equipment (rope/chain) must be used.

⚠ CAUTION

- Do not run pump dry.
- Pumping liquid should not exceed a maximum temperature of 135°F (57°C) for continuous (S₁) Duty and 195°F (90°C) for Intermittent use submergence less than 20 minutes.
- Never place the pump on loose or soft ground. The pump may sink, preventing water from reaching the impeller. Place on a solid surface or suspend the pump vertically with a lifting rope/chain.

PUMP OPERATION

⚠ WARNING This pump is designed to handle different type of liquids excluding volatile or flammable liquids. Do not attempt to pump any such liquid which may damage the pump or endanger personnel because of pump failure.

⚠ DANGER Do not operate this pump where explosive vapors or flammable materials exist. Death or Serious injury will result.

⚠ WARNING Do not alter the length or repair any power cable with a splice. The pump motor and cable must be completely waterproof. Damage to the pump or personal injury may result from alterations.

Single Phase Pump Operation: The Single Phase Pumps are available with or without a Float Switch. They are also having in-built Overload Relay as per their current ratings. The 115V/60Hz pump is supplied with its power cable connected with plug. Plug the power cable into 115V grounded receptacle. The 220/50Hz pump needs to be attached with a suitable plug. First, Check the direction of the rotation as instructed above. Tilt the pump and start it. It should give kick back motion in a counter-clockwise direction as shown in an image E. It is recommended that a Ground Fault Interrupter (GFI) type receptacle (or equivalent) be used. Make the piping as instructed above and now pump is ready for sump duty. To stop pump operation manually unplug it from female receptacle or close the ON/OFF Switch, if provided. A Float Switch will control the pump operation with respect to liquid level as shown in Diagram F. In case of pump overloading due to any reason, the in-built Relay will STOP the pump and the pump will restart automatically when it cools down sufficiently.

Three Phase Pump Operation: All Three Phase Pumps are supplied with a Float Switch and suitable Control Panel for operation. Diagram D shows internal wiring connection of the Control Panel. Refer Diagram C for making Pump Cable/s connection to Control Panel, and connection for the Power Supply Cable and Breaker to Control Panel from the MAIN Power Source. The Cable and Breaker from MAIN Power Source to Control Panel is not in a scope of supply, and its user's responsibility. The Control Panel does also have connection ports for Float + Overload Cable. Refer an instruction given on Diagram C for connection of that cable too. Make the connections and check the direction of the rotation as instructed above. Tilt the pump and start it. It should give a kick back motion in a counter-clockwise direction as shown in an image E. Make the piping as instructed above and now pump is ready for sump duty. Different operation modes are possible for Three Phase Pump with Control Panel. Refer Table 1 for it. To STOP the pump manually turn-off a Breaker. A Float Switch will control pump operation based on the liquid level as shown in Diagram F. The Table 1 represents different modes of pump operation.

⚠ CAUTION The Control Panel is suitable for internal area applications only. Do not install Control Panel in an open area. Install it in a dry, clean space that is free of hazards like fire, high temperatures, splashing water etc. Fix the Control Panel on a Wooden Board of 1" thickness.

Table 1. PERFECTA Three Phase Pump Operation with Control Panel

#	Single Phasing Preventor (SPP)	Float Switch Position	Pump Operation	Control Panel	Breaker
1	*Manual Mode	Up	OFF	OFF	OFF
		Up	To START	Press ON/Green Push Button	ON
		Down	Will STOP	Will remain energized	ON
		Up	To START	Press ON/Green Push Button	ON
			TO STOP	Press OFF/RED Push Button	OFF
2	AUTO Mode	Up	OFF	OFF	OFF
		Up	AUTO START (15-30Sec)	ON	ON
		Down	Will STOP	Will remain energized	ON
		Up	AUTO START (15-30Sec)	ON	ON
			TO STOP	OFF	OFF

* SPP Manual Mode- No Pump Protection against Single Phasing

Note: - Maximum recommended **PUMP STARTS** should not exceed 10 times per hour.
 - The Control Panel Relay/s are pre-set from factory at 1.1 X Rated Current of Pump.

TROUBLE SHOOTING



Disconnect the power source to the pump BEFORE attempting any type of trouble shooting, service or repair.

Condition: Pump does not run/start

1. Power Supply- Check Power Supply (Fuses, Breaker). Reset Power Supply
2. Defective Cable- Check for any damage or crack, and replace if needed
3. Weak Insulation- Check Stator Insulation, should be $\geq 100M\Omega$
4. Blocked Impeller-Removed Strainer, Check and Clean it
5. Strainer clogged- Check and clean as necessary
6. Float Switch obstructed- Clean and free Float Switch from obstruction
7. Float Switch defective- Replace defective Float Switch
8. *Pump overheated, or temperature of liquid exceeds pump operating temperature- Let pump cool down. Check the liquid temperature and control it.

* Warning: Single Phase Pump and Three Phase Pump on SPP Auto mode (Breaker ON) will restart automatically when motor relay cools down

Condition: Pump runs but does not deliver rated capacity

1. Discharge line clogged, restricted or hose kinked- Check discharge hose/pipe. Clean / Reset it.
2. Worn impeller and/or Suction Cover- Inspect and replace, as necessary
3. Pumping air- Check liquid level and position of pump
4. Excessive Voltage drops due to long cables
5. Pump (Three Phase) running backwards- Check rotation
6. Check impeller for free rotation- Clean it if clogged

Condition: Pump is Heating Up

1. Check impeller for free rotation- Clean if clogged
2. Check Supply Voltage

SERVICING PERFECTA SUBMERSIBLE PUMP

Pump must be disconnected from the electric power supply before proceeding to do any service or maintenance. To service or repair your pump, please contact your local **BJM Pumps®** distributor. Service should only be performed by a qualified electrician.

Tools Needed

Phillips Screw Drivers - #1 and #2
Locking Pliers
Wrench -10 mm and 17 mm
Ball Bearing Puller

A. Disassembly of Pump Top

- Check Wires, Rotor (Pos.10), Stator (Pos.58), Ball Bearings (Pos.53 & 54) & Oil.
- Remove Pump Handle Screws (Pos.18). Remove Pump Handle (Pos.1).
- Remove Pump Top Cover Screws (Pos.2) and open Pump Top Cover (Pos.3).
- Disconnect Wires and remove Motor Housing Cover (Pos.9).
- Inspect the quality of the Oil. If milky or whitish in color, check Shaft Seal Rings (Pos.12 & 13) and replace (both Seals and Oil) if necessary.
- To remove Rotor (Pos.10), Ball Bearings (Pos.53 & 54) and Shaft Seal Rings (Pos.12 & 13), follow steps described in B. Disassemble Pump bottom before proceeding. Once Impeller (Pos.19) is off, pull out Rotor (Pos.10). Inspect Ball Bearings, replace if necessary. Press out Shaft Seal Rings (Pos.12 & 13). Inspect and replace, as necessary.

B. Disassembly of Pump Bottom

- To dismantle Strainer (Pos.21), Suction Cover Plate (Pos.20), Impeller (Pos.19).
- Remove Strainer Screws (Pos.22) and remove Strainer (Pos.21) and Suction Cover Plate (Pos.20). Hold Impeller (Pos.19) with small vise grip and remove Impeller Screw & Washer (Pos.14 & 15). Remove Impeller (Pos.19). Impeller Vanes should have sharp edges to maximize performance. Replace Impeller if Vanes are rounded or dull.
- Inspection of Pump bottom parts.
Look at lower Shaft Seal Ring (Pos.13) for visible wear. If damaged or worn replace both Seals (Pos.12 & 13). To replace Seals, disassemble top portion of pump first and remove the oil (See, A. Disassembly of Pump Top).

Note: Both Shaft Seal Ring (Pos.12 & 13) openings should face down

C. Important notes on re-assembly of Pump

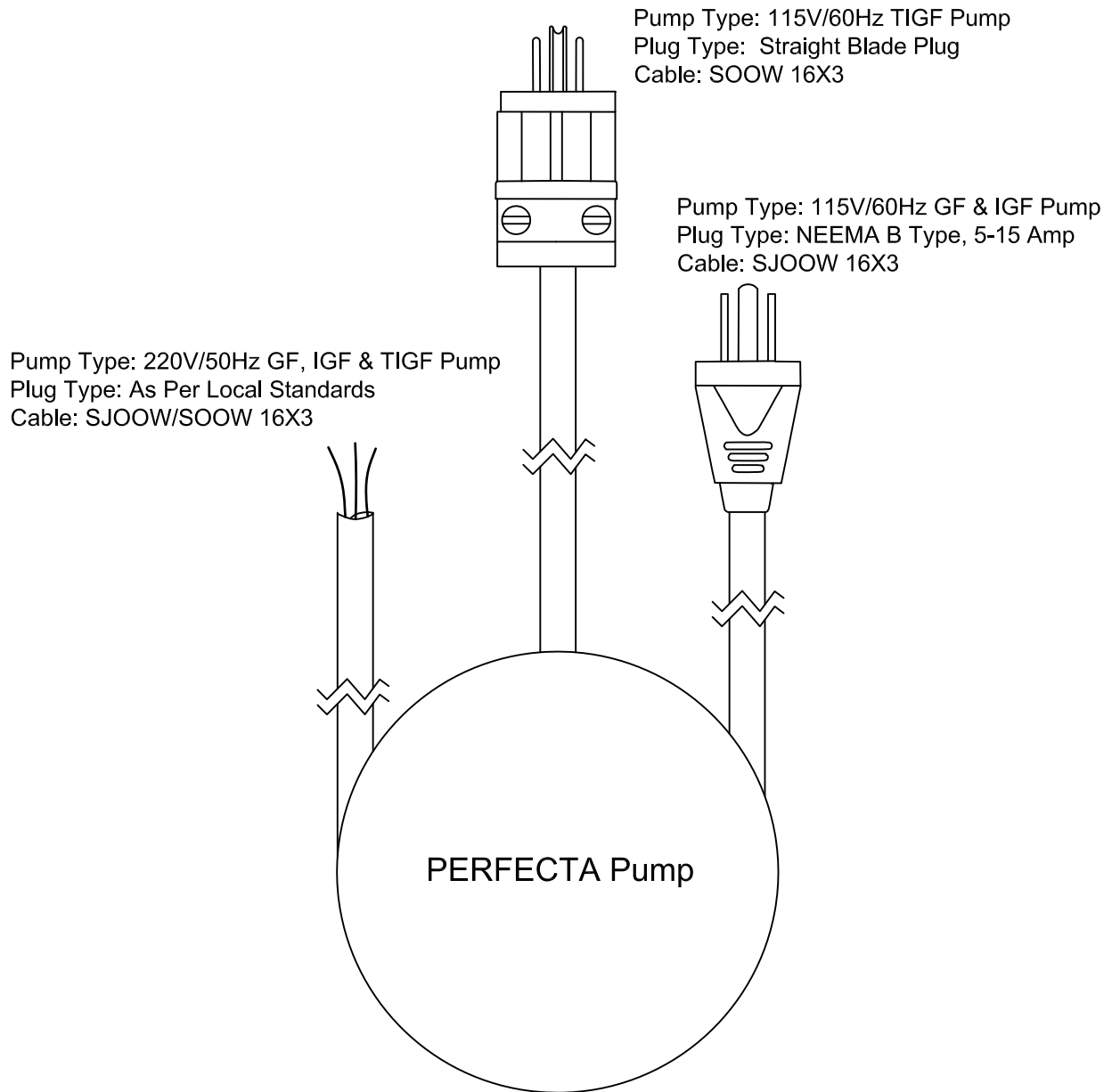
- All O-rings should be lubricated with a Silicone based grease, or lubricated with same oil as in motor, before assembly.
- Replace Ball Bearings to shaft.
- To re-install Motor Housing Cover, lubricate bearing holder. Use a plastic or rubber mallet to lightly tap until cover is in place. It is important that the bearing is in the absolute center of the bearing holder when closing the Top Cover. If not centered, the shaft will not turn freely.

MAINTAINING PERFECTA SUBMERSIBLE PUMP

- Pump should be disconnected from the electric power supply before proceeding to do any service or maintenance.
- Pump should be inspected at regular intervals.
- More frequent inspections are required if the pump is used in harsh environment.
- Preventative maintenance should be performed to reduce the chance of premature failure.
- Worn Impeller and Shaft Seals should be replaced.
- Cut or cracked power cables must be replaced. **(Never operate a pump with a cut, cracked or damaged power cable)**
- Stator Oil should be checked once per year.
- Maintenance should always be done when taking a pump out of service before storage.
 - 1) Clean pump of dirt and other build up.
 - 2) Check condition of oil around the shaft seals.
 - 3) Check hydraulic parts-Impeller, Suction Cover Plate for wear.
 - 4) Inspect power cable. Make sure that it is free of nicks or cuts.

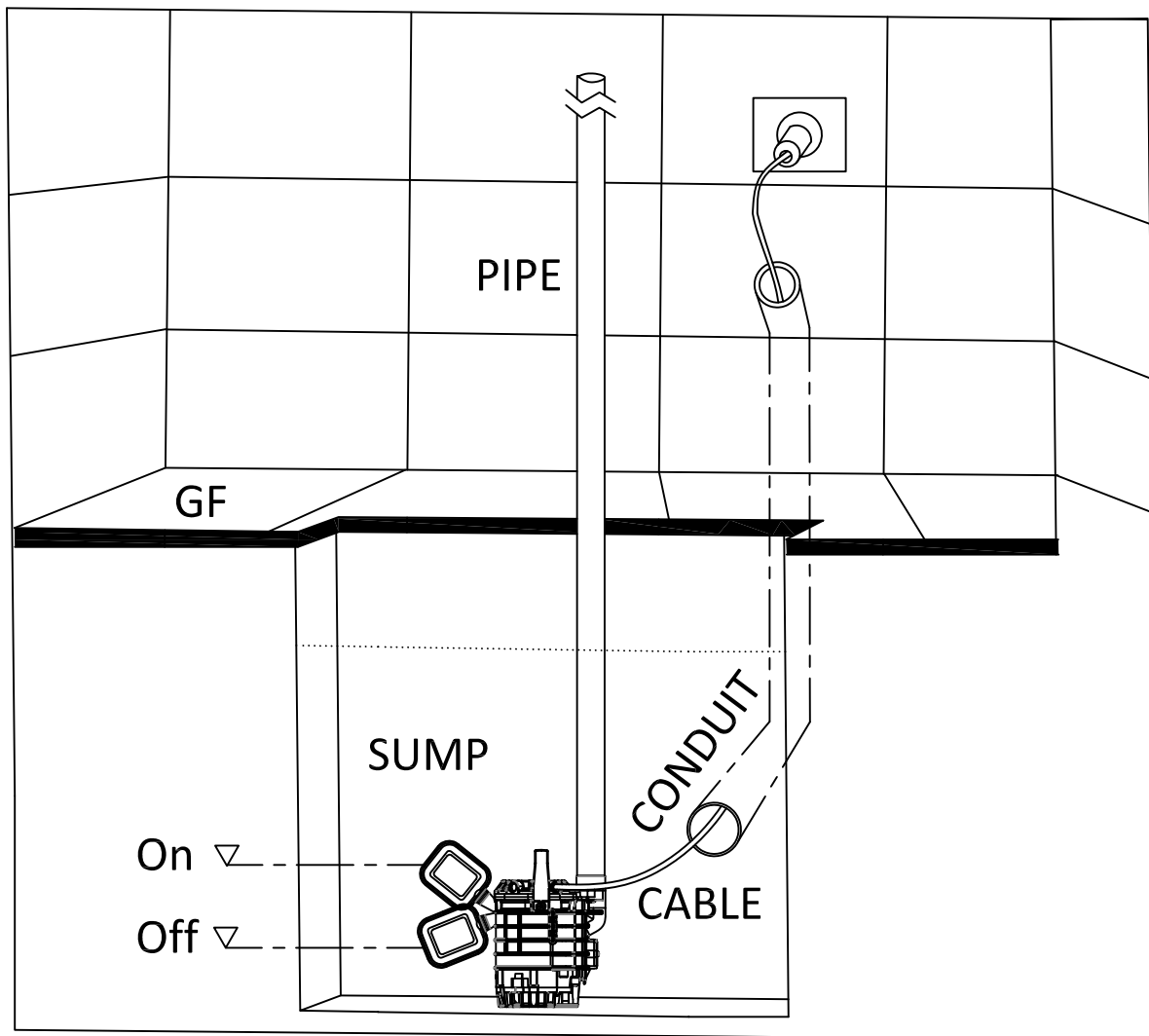
PERFECTA Single Phase Pump Power Cable Ends

Diagram : A



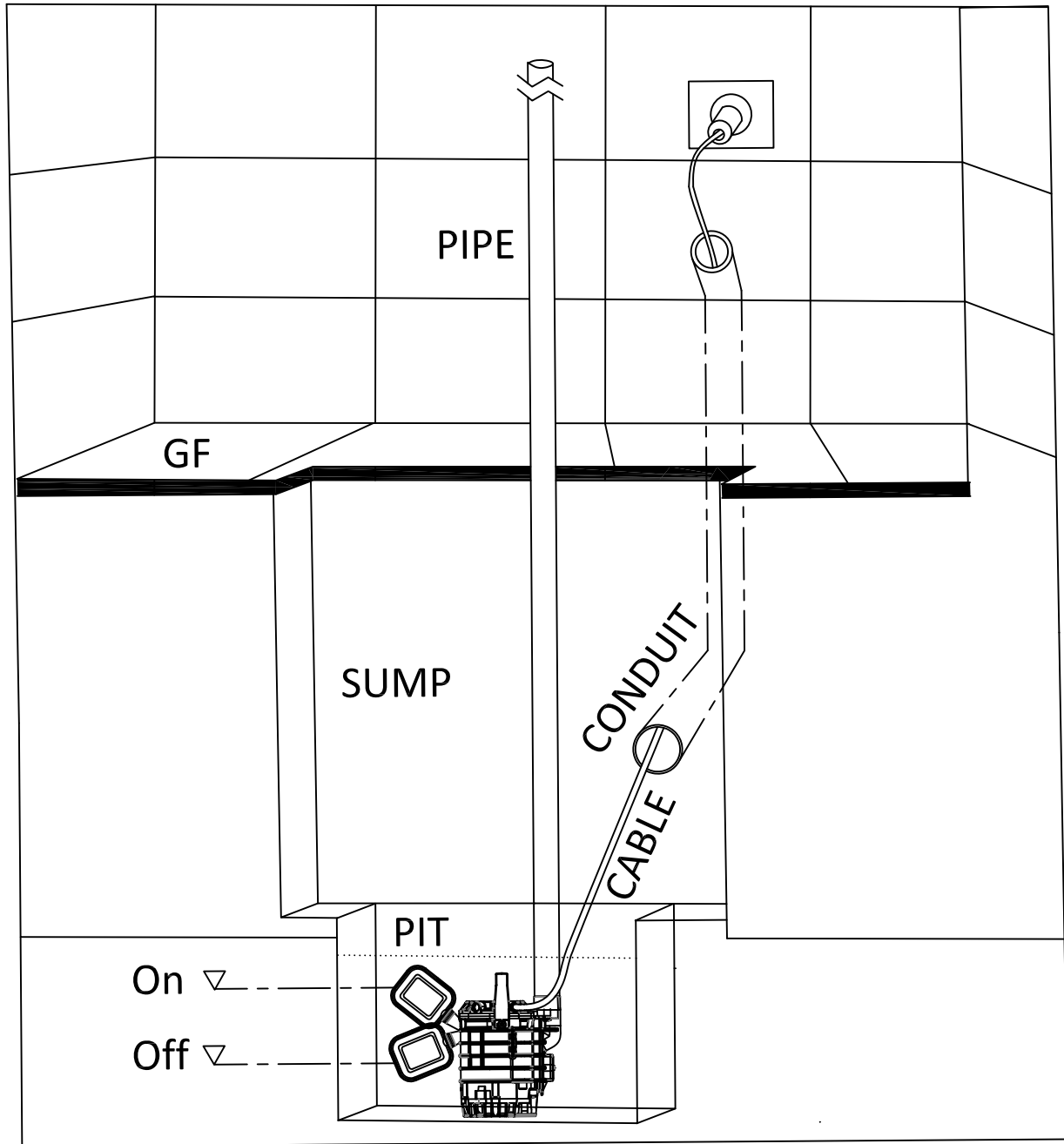
PERFECTA Single Phase Pump Installation In Sump

Diagram: B



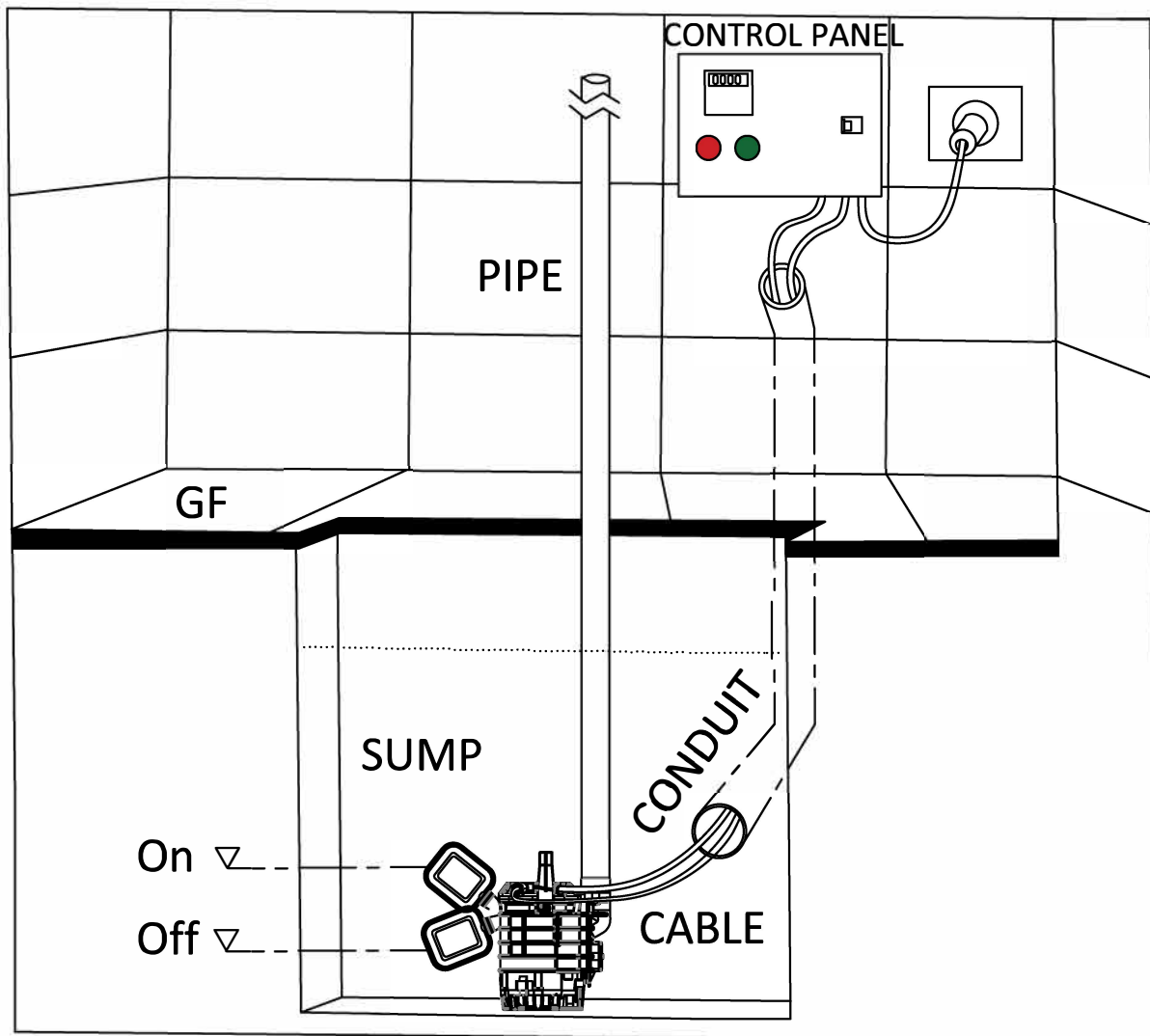
PERFECTA Single Phase Pump Installation In Pit

Diagram: B



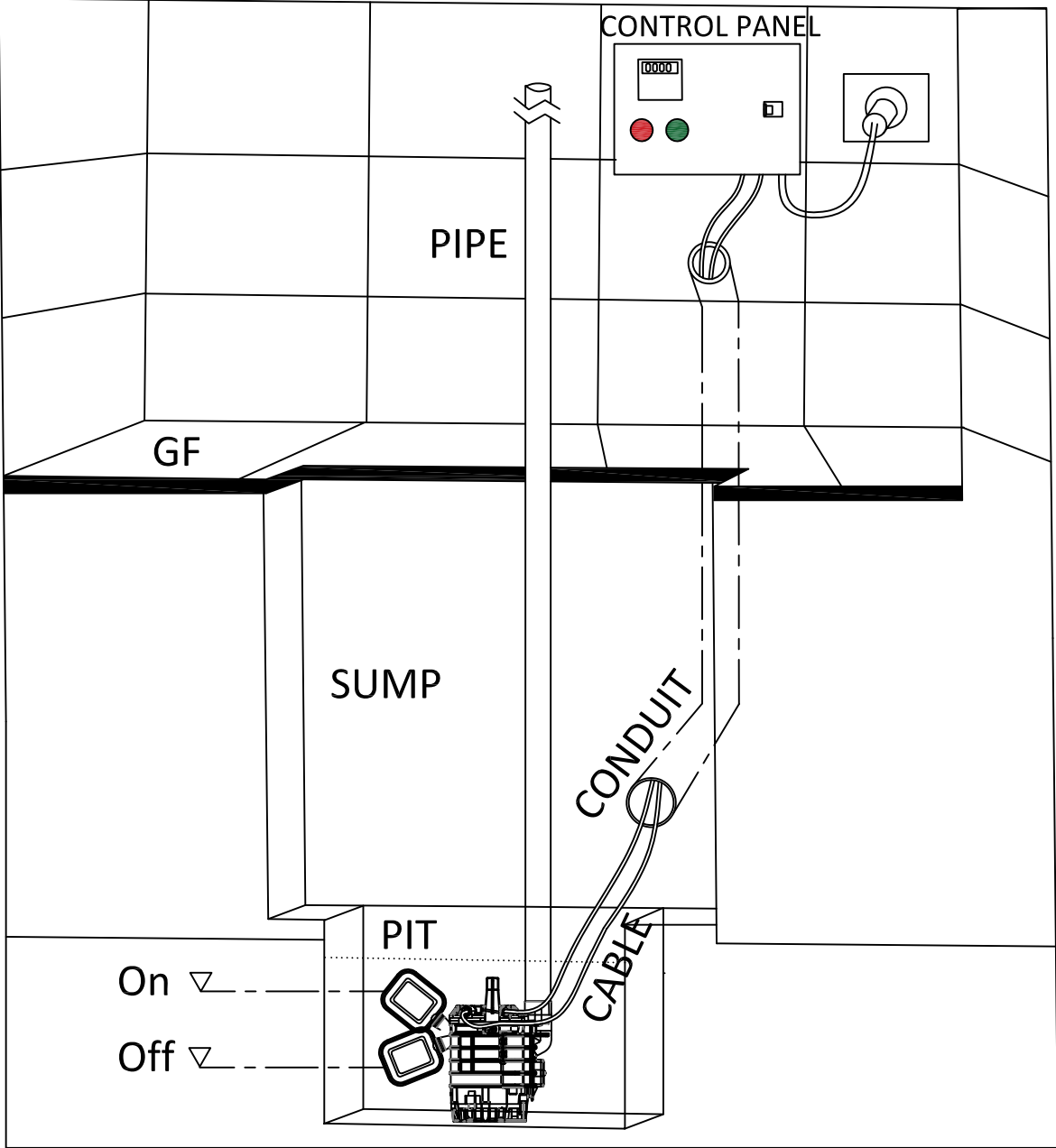
PERFECTA Three Phase Pump Installation In Sump

Diagram: B

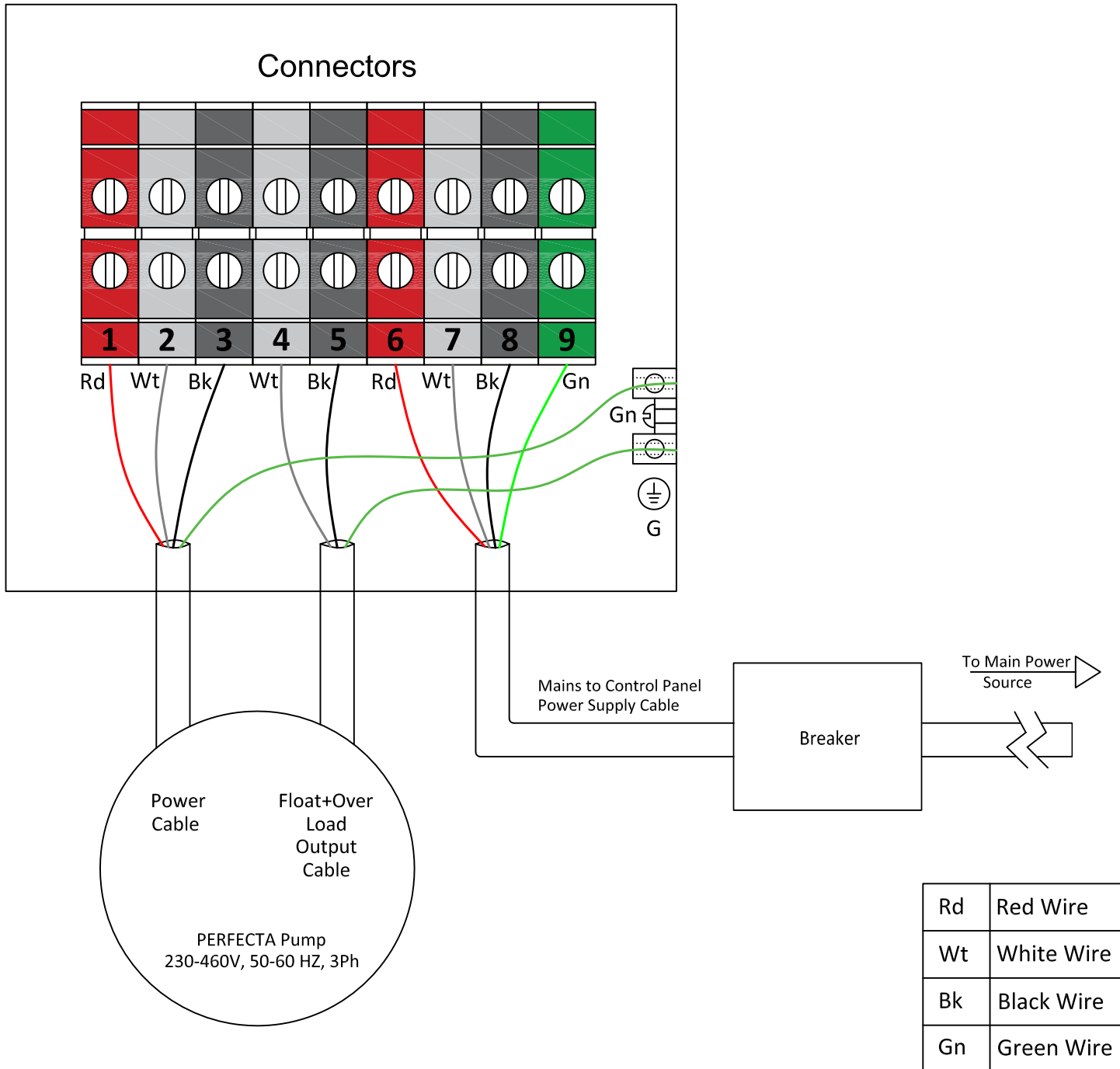


PERFECTA Three Phase Pump Installation In Pit

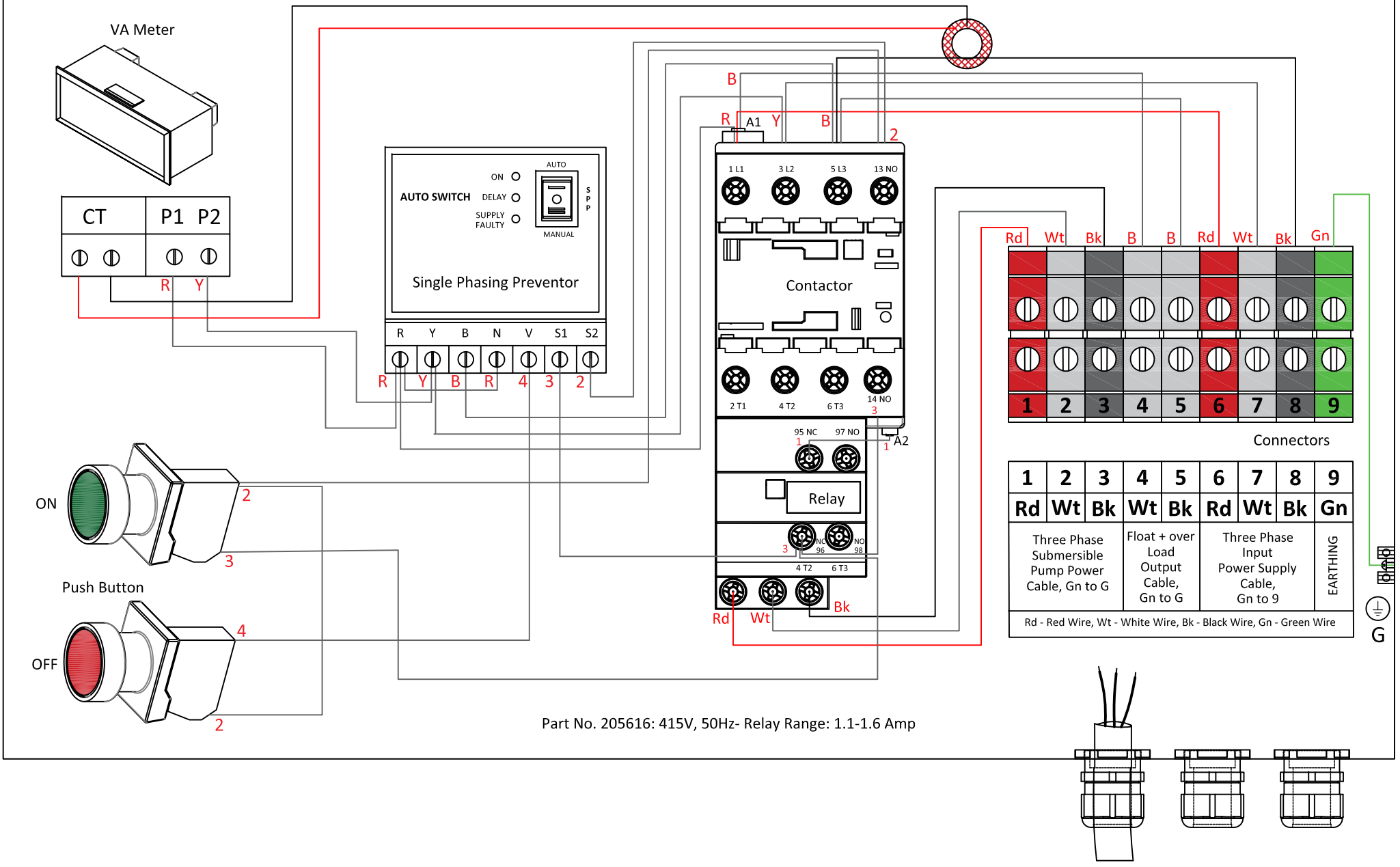
Diagram: B



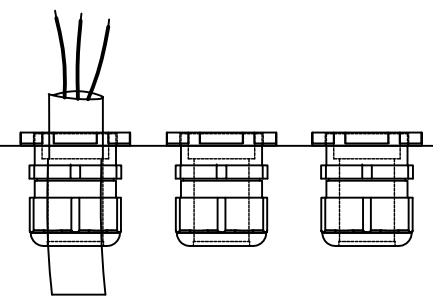
PERFECTA Three Phase Pump Cable to Control Panel Connection Diagram: C



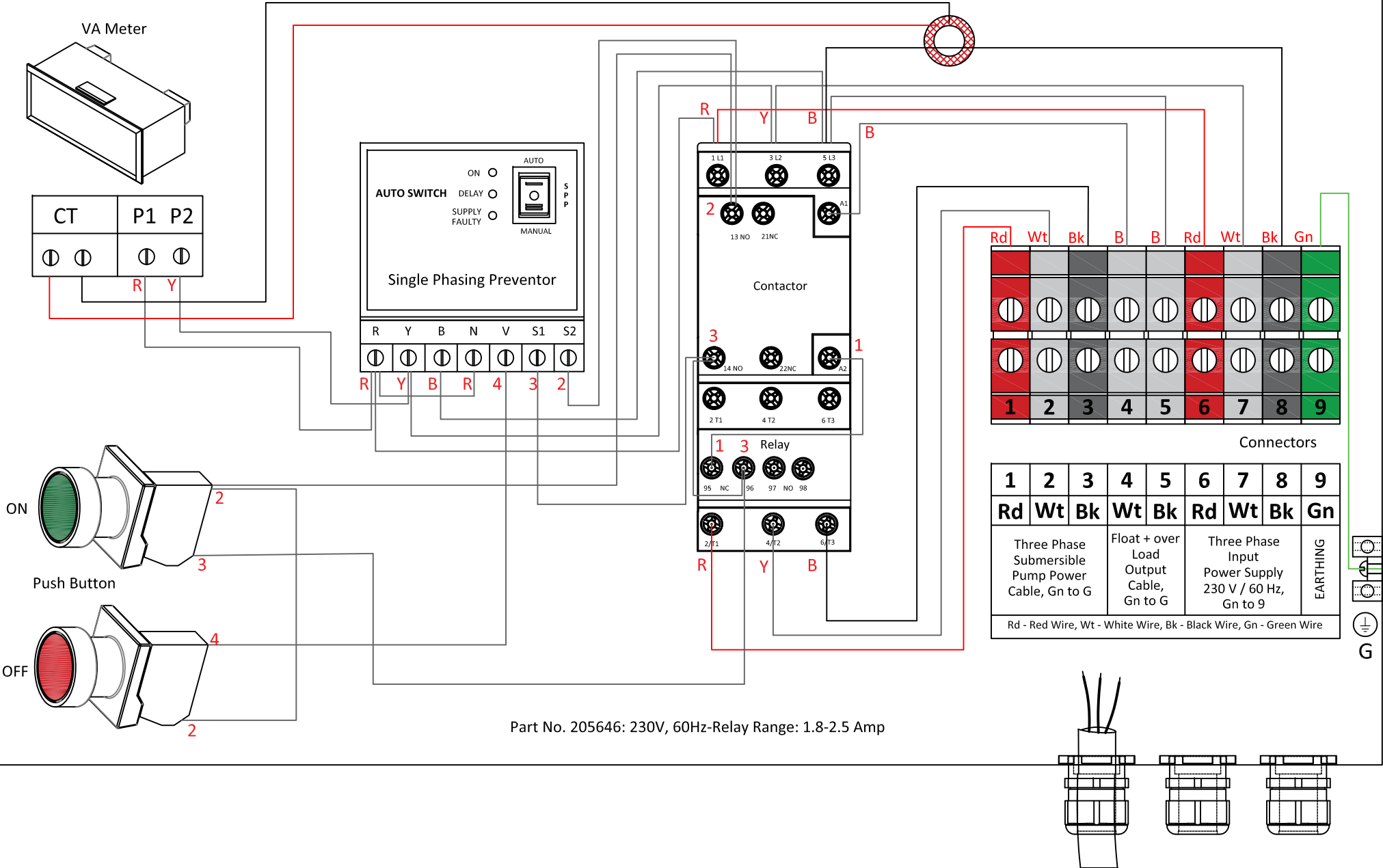
PERFECTA Three Phase Pump Control Panel-415V/50Hz, Internal Wiring Connection
Diagram : D



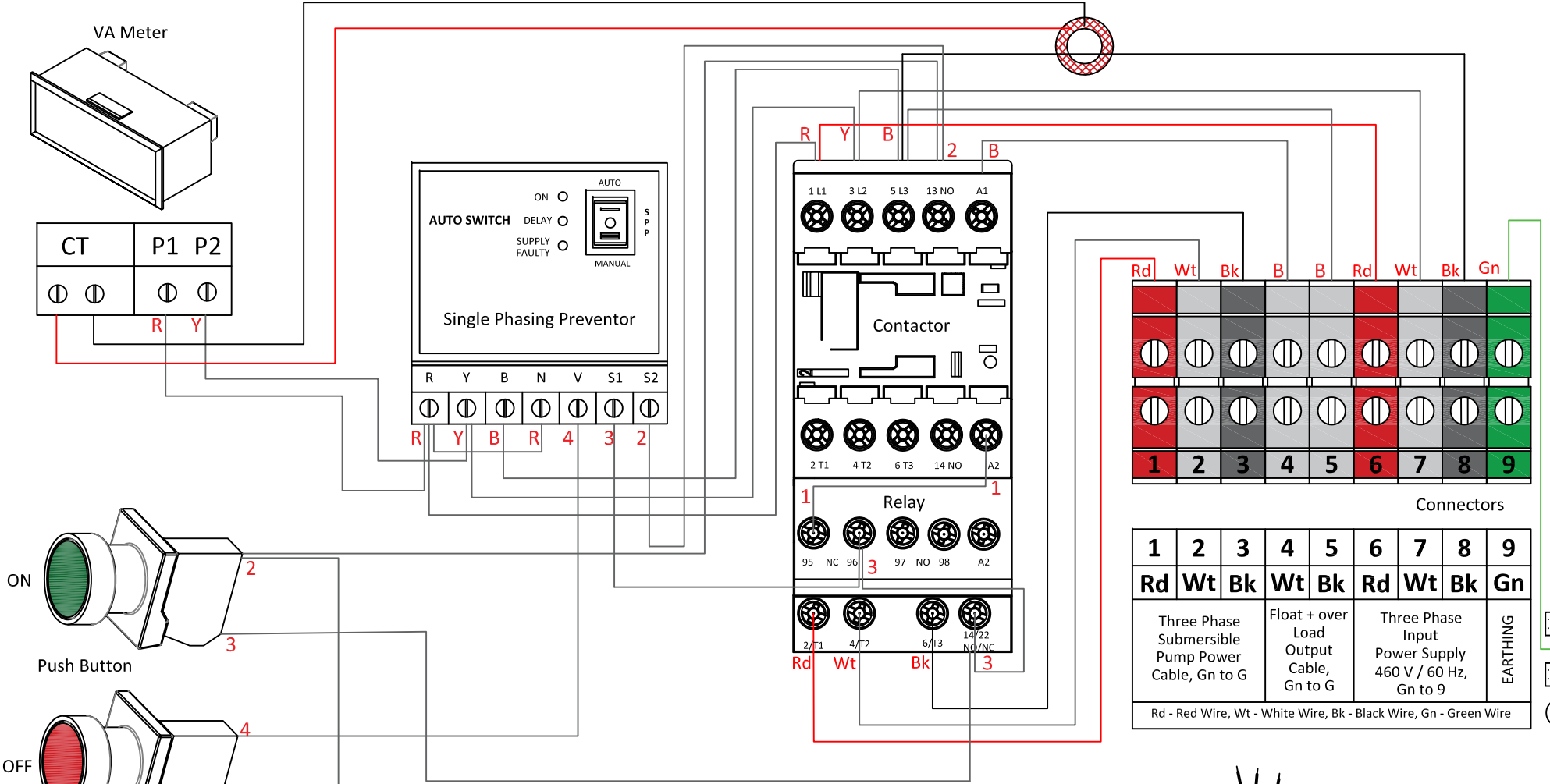
Part No. 205616: 415V, 50Hz- Relay Range: 1.1-1.6 Amp



PERFECTA Three Phase Pump Control Panel-230V/60Hz, Internal Wiring Connection
Diagram : D



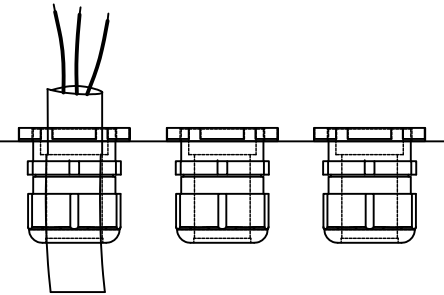
PERFECTA Three Phase Pump Control Panel-460V/60Hz, Internal Wiring Connection
Diagram : D



1	2	3	4	5	6	7	8	9
Rd	Wt	Bk	Wt	Bk	Rd	Wt	Bk	Gn
Three Phase Submersible Pump Power Cable, Gn to G	Float + over Load Output Cable, Gn to G		Three Phase Input Power Supply 460 V / 60 Hz, Gn to 9			EARTHING		

Rd - Red Wire, Wt - White Wire, Bk - Black Wire, Gn - Green Wire

Part No. 205647: 460V, 60Hz-Relay Range: 1.1-1.6 Amp



PERFECTA Pump Kick Back Motion

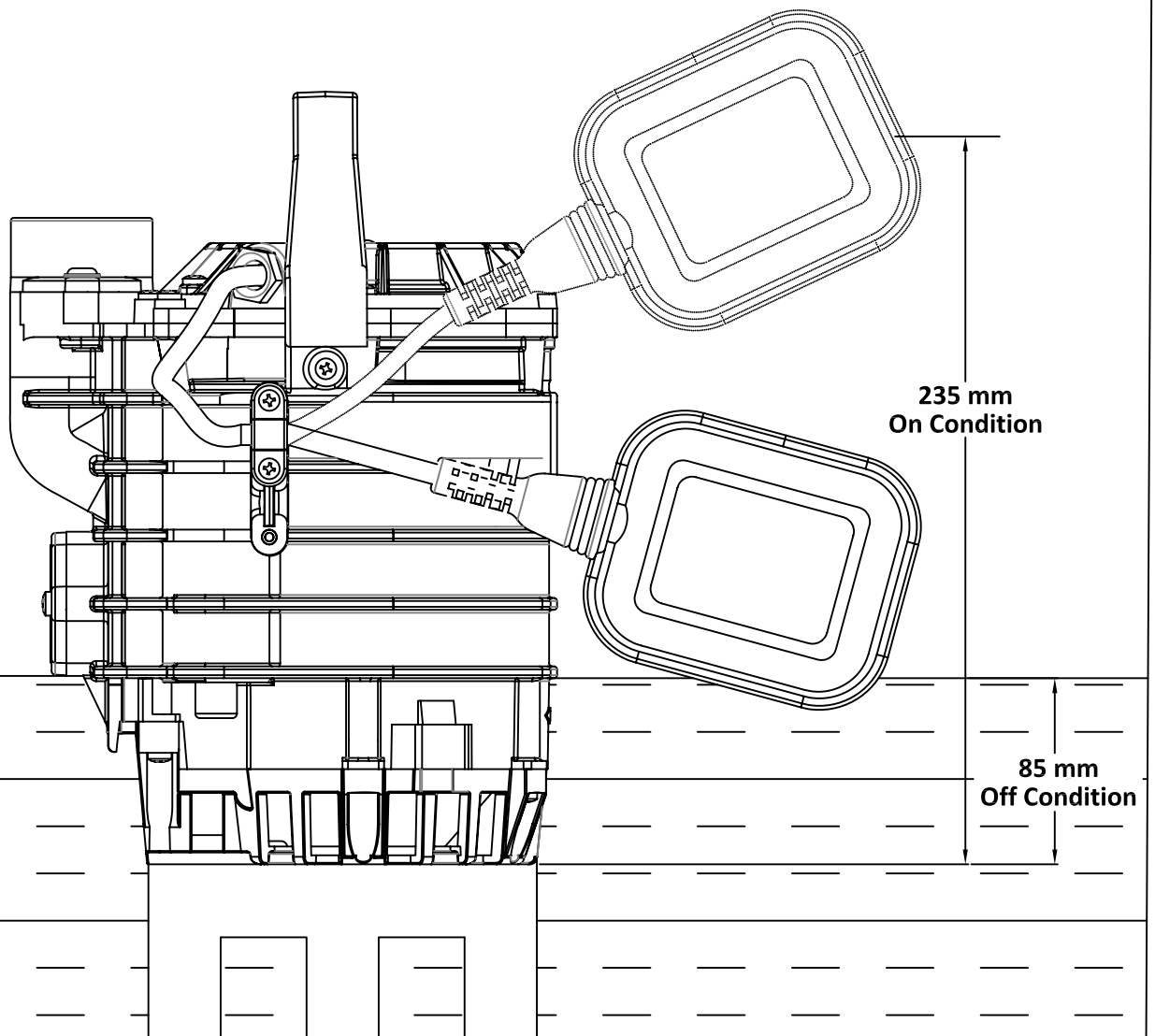
Image: E



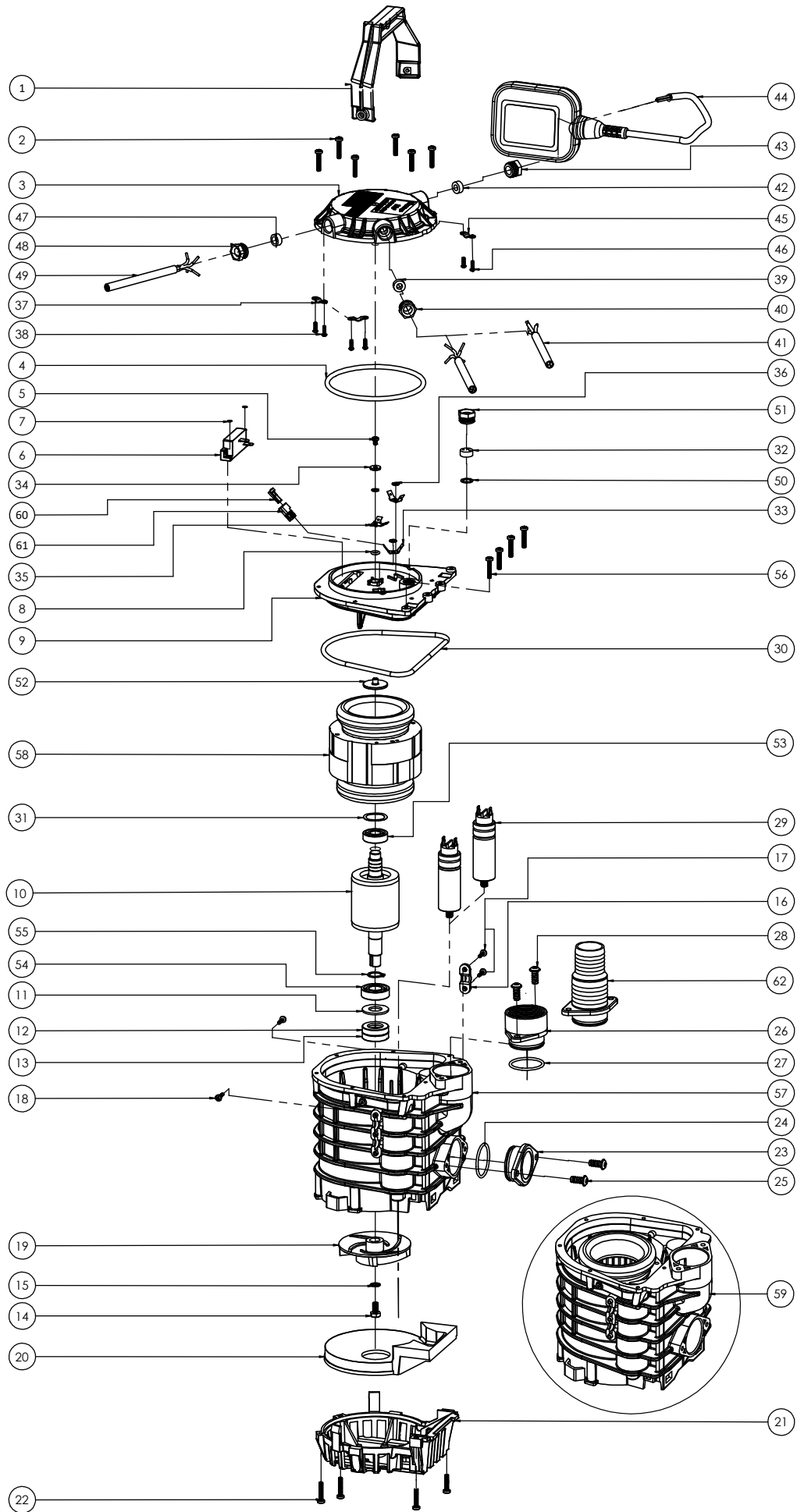
Kick Back Motion

PERFECTA Pump Float Switch Operation

Diagram : F



PERFECTA Pump Exploded View, Diagram : G

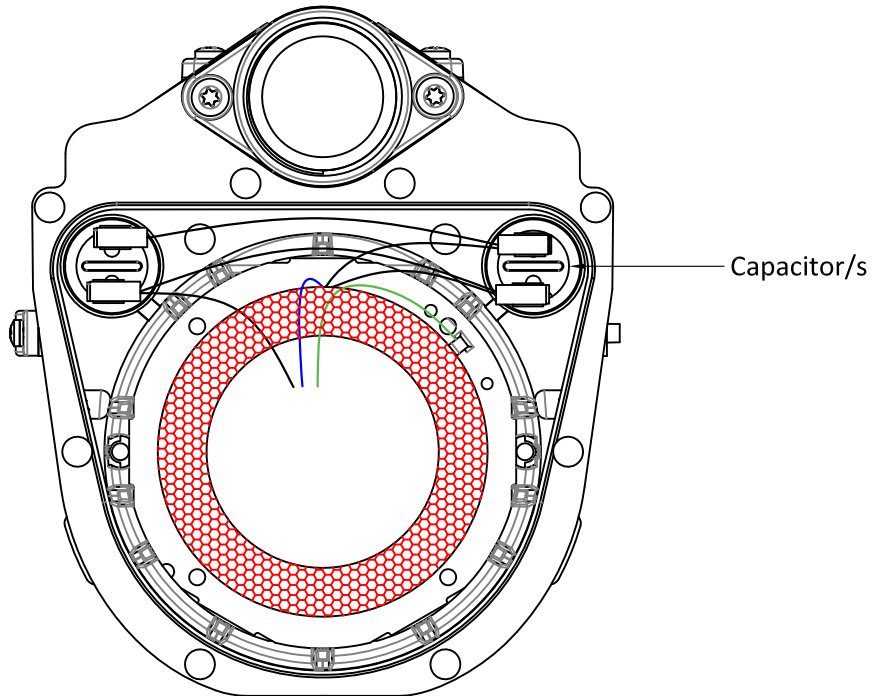
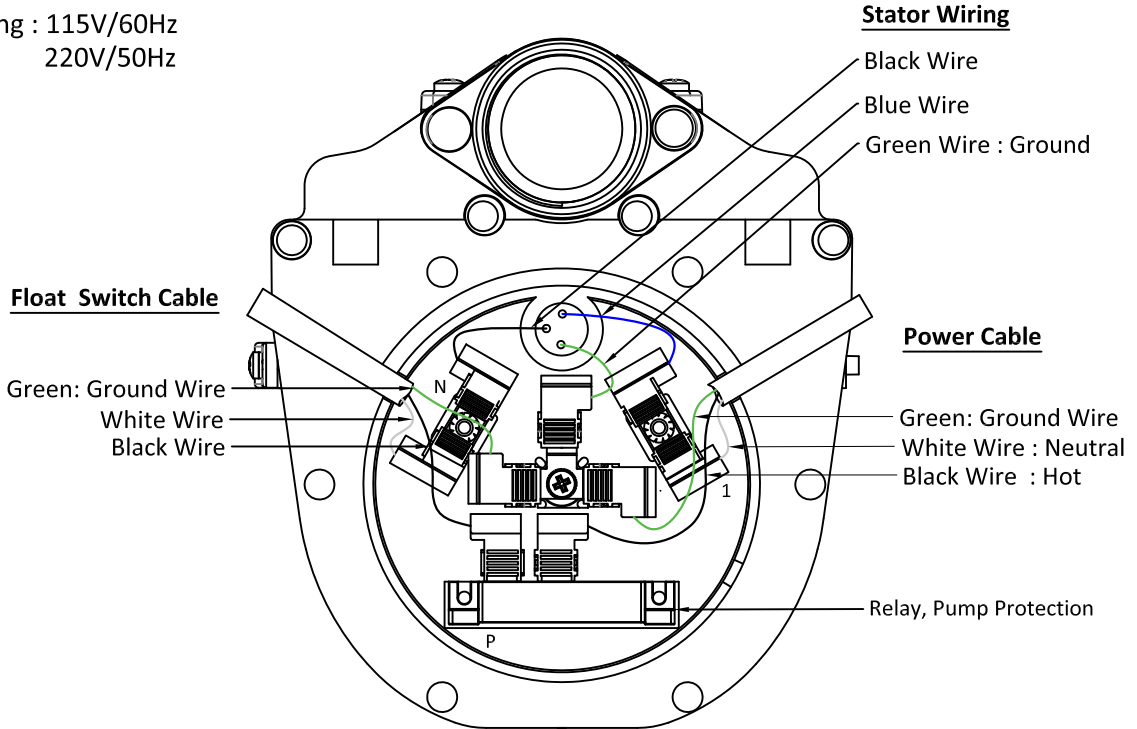


PERFECTA Pump-0.4HP, 2 Pole Parts List			
Pos. No.	Part Name	Pos. No.	Part Name
1	Pump Handle	42	Cable Grommet (for Float Cable)
2	Screw 4.2X22	43	Cable Entry (for Float Cable)
3	Pump Top Cover	44	Float Switch
4	O-ring 105X5	45	Cable Clamp (In side Top Cover)
5	Screw 4X6	46	Screw 2.9X9.5
6	Relay, Pump Protection	47	Cable Grommet (for Float + Over Load Cable)
7	Washer, Lock Relay	48	Cable Entry (for Float + Over Load Cable)
8	O-ring 6X2	49	Float+Over Load Output Cable
9	Motor Housing Cover	50	Washer, Sealing Ring
10	Rotor	51	Cable Entry (for Sealing Ring)
11	Spacer	52	Bronze Washer
12	Shaft Seal Ring (Upper Lip Seal)	53	Upper Ball Bearing 6001
13	Shaft Seal Ring (Lower Lip Seal)	54	Lower Ball Bearing 6002
14	Shaft Bolt M6X15	55	Retaining Ring, Lower Bearing
15	Serrated Washer	56	Screw 4.2X22
16	Cable Clamp For Float Switch	57	Pump Casing
17	Screw 2.9X13	58	PERFECTA, Wound Stator Core
18	Screw 2.9X13	59	PERFECTA, Wound Stator
19	Impeller	60	PERFECTA, Flag Type Terminal
20	Suction Cover Plate	61	PERFECTA, Flag Type Housing
21	Strainer	62	Tapered Hose Connection, 1 1/4"-1 1/2"
22	Screw 4.2X22		
23	Discharge Cap		
24	O-ring 35X2.5		
25	Screw 6X15		
26	Threaded Female Flange		
27	O-ring 35X2.5		
28	Screw 6X15		
29	Capacitor		
30	O-ring 125X5		
31	Wave Washer		
32	Sealing Ring		
33	Terminal, 2 Prong		
34	Washer 12X4		
35	Terminal, 3 Prong		
36	Serrated Washer		
37	Cable Clamp (In side Top Cover)		
38	Screw 2.9X9.5		
39	Cable Grommet (for Power Cable)		
40	Cable Entry (for Power Cable)		
41	Power Cable		

PERFECTA Single Phase Pump Internal Wiring with Float Switch

Diagram : H

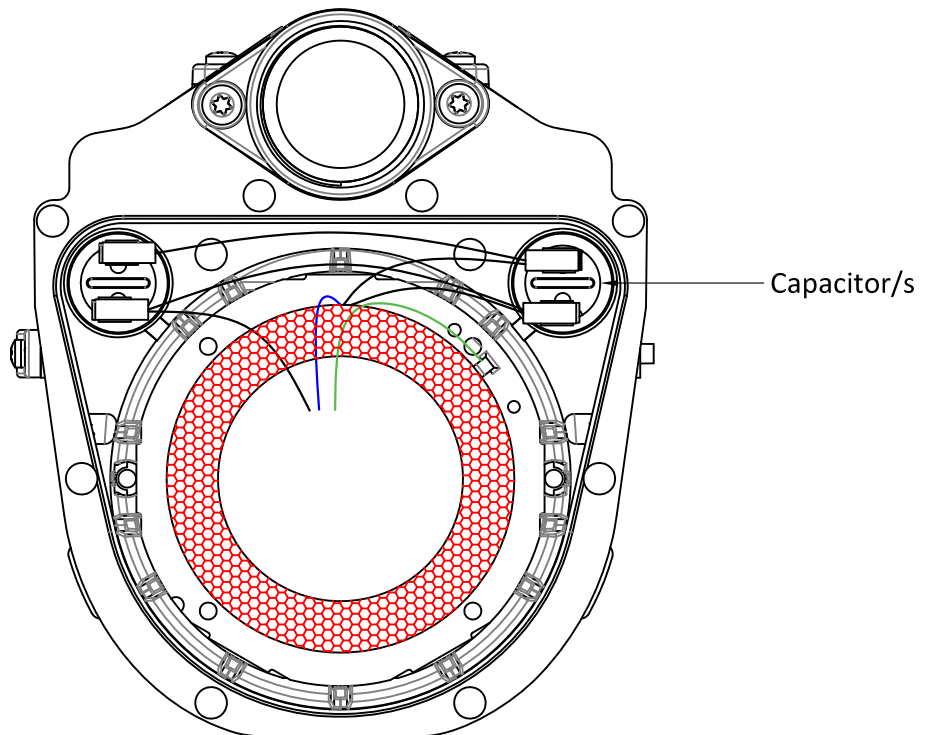
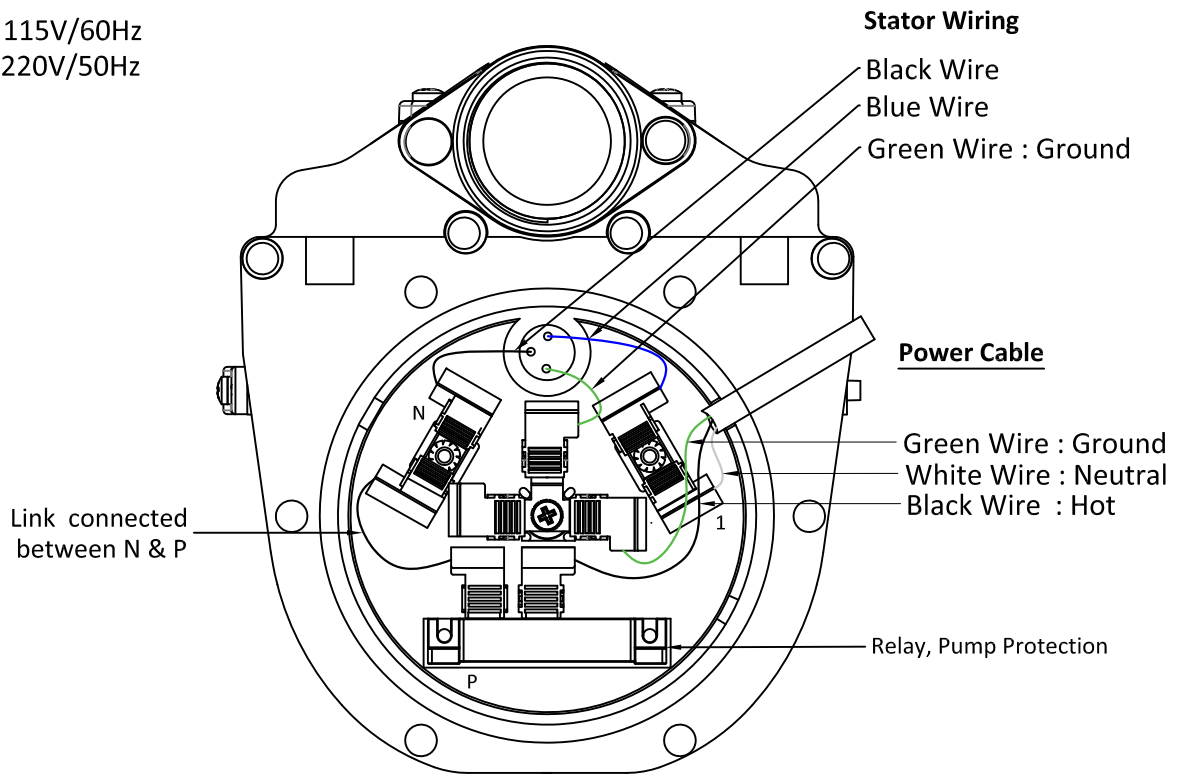
Rating : 115V/60Hz
220V/50Hz



PERFECTA Single Phase Pump Internal Wiring without Float Switch

Diagram : H

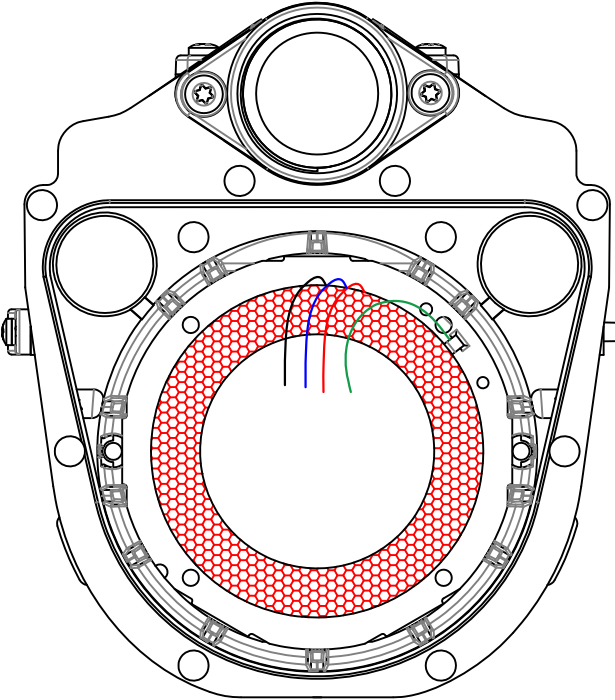
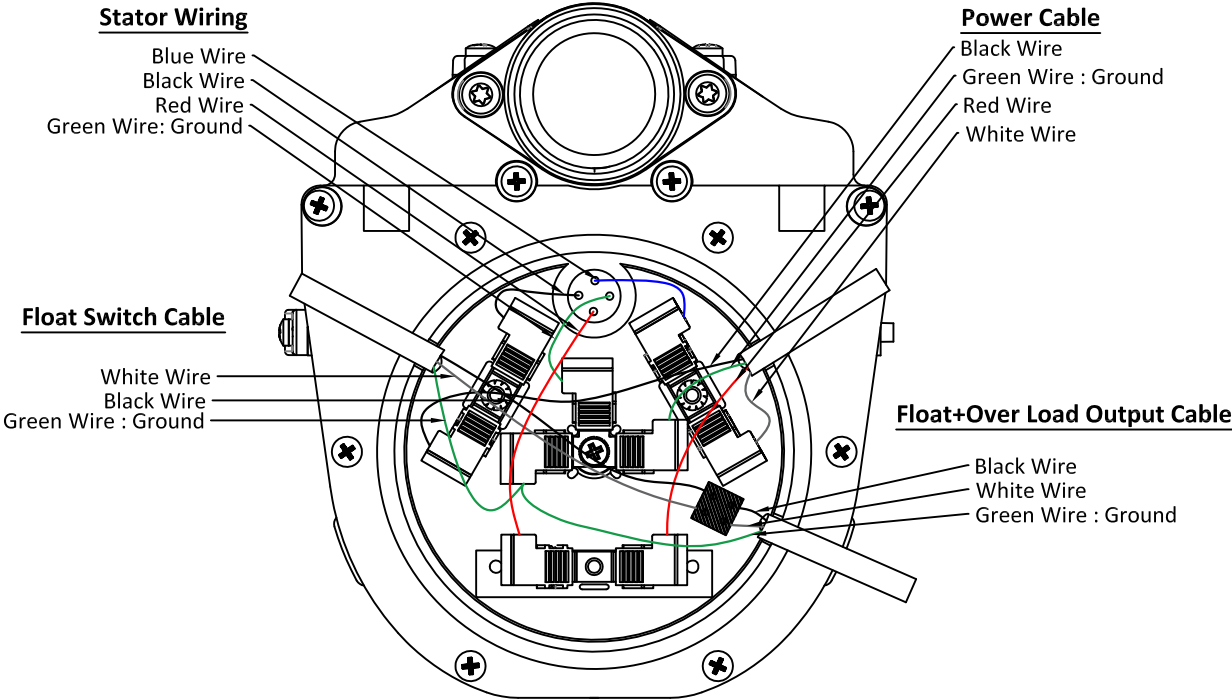
Rating : 115V/60Hz
220V/50Hz



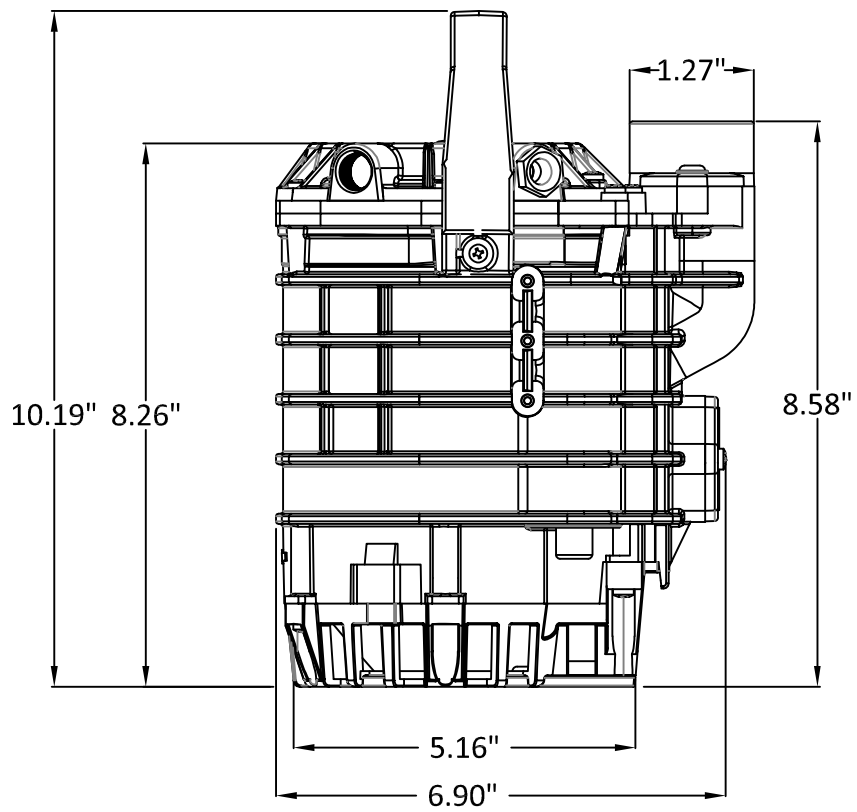
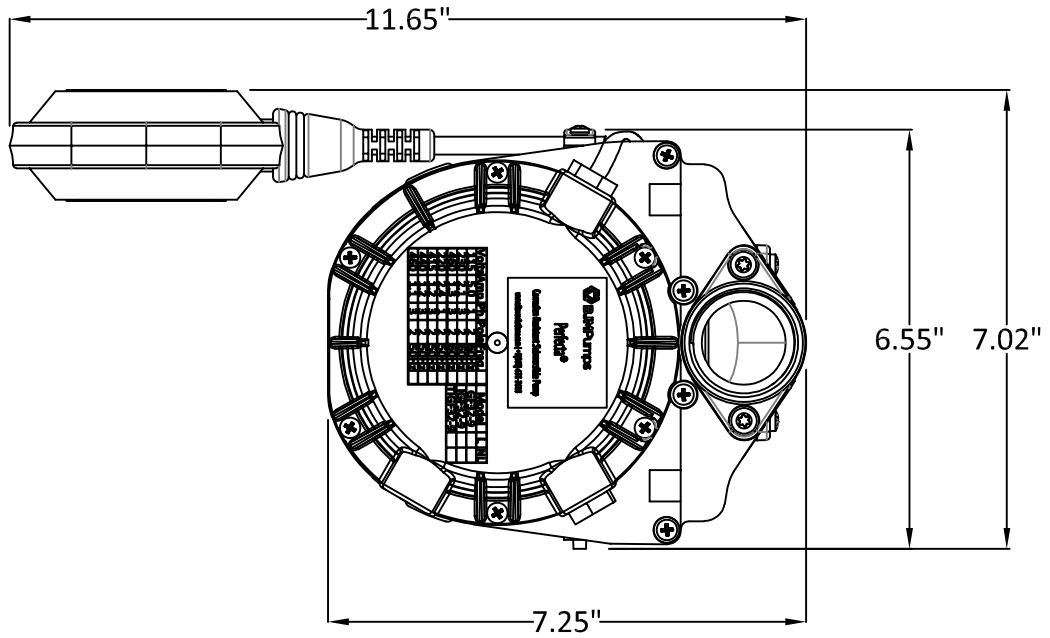
PERFECTA Three Phase Pump Internal Wiring

Diagram : I

Rating : 230V/60Hz, 460V/60Hz
415V/50Hz, 440V/50Hz
460V/50Hz

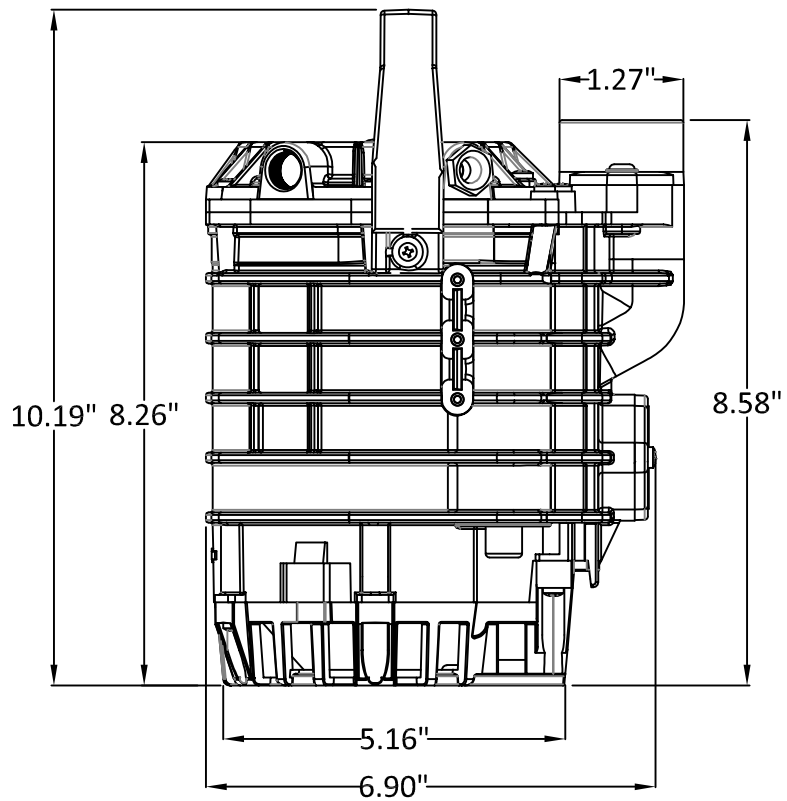
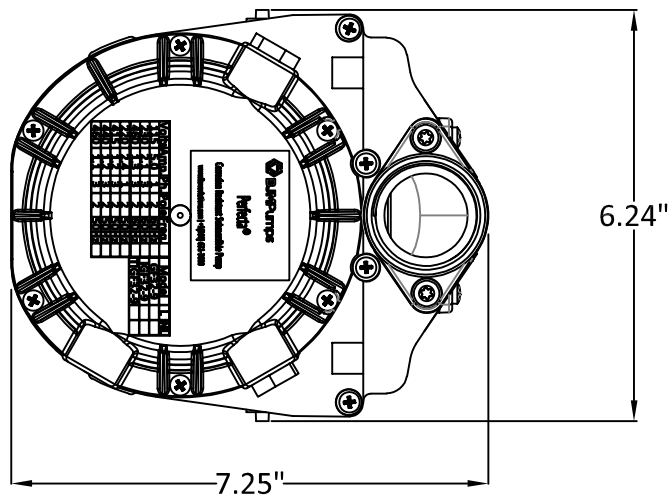


PERFECTA Pump Dimensions with Float Switch Diagram : J



PERFECTA Pump Dimensions without Float Switch

Diagram : K



PERFECTA Pump Three Phase Control Panel Dimensions

Diagram : L

