

**OWNERS MANUAL
&
PARTS BOOK**



**SUBMERSIBLE PUMP
CONTROL BOX**

MODELS CB101, CB102 AND **CB200**

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Revision #0 (12/27/00)



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SUBMERSIBLE PUMP/CONTROL BOX — RULES FOR SAFE OPERATION

CAUTION:



Failure to follow instructions in this manual may lead to serious injury or even death! This equipment is to be operated by trained and qualified personnel only! This equipment is for industrial use only.

The following safety guidelines should always be used when operating the control box and submersible pump.

GENERAL SAFETY

- **DO NOT** operate or service this equipment before reading this entire manual.



- This equipment should not be operated by persons under 18 years of age.

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, steel-toed boots and other protective devices required by the job.



- **NEVER** operate this equipment when not feeling well due to fatigue, illness or taking medicine.



- **NEVER** operate this equipment under the influence of drugs or alcohol.



- **NEVER** use accessories or attachments, which are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.

- Manufacturer does not assume responsibility for any accident due to equipment modifications.

- **ALWAYS** make sure the control box is grounded properly.

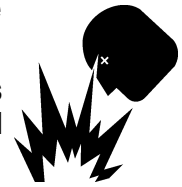
- Make sure that the correct voltage phase and current is being supplied to the pump motor.

- Make sure that the control box and pump installation are in accordance with national and local electrical codes.

- **ALWAYS** use a properly sized electrical cord.

- **DO NOT** use this pump to pump flammable liquids.

- **DO NOT** place this pump in hazardous locations as defined by the National Electrical Code, ANSI/NFPA 70.



- **ALWAYS** have a licensed electrician perform the installation of the control box.

- **ALWAYS** mount the control box in an vertical position, protected from severe elements (rain, sand, dust, etc.).

- **ALWAYS** provide a circuit breaker or quick disconnect switch as a means of removing power from the control box.

- **NEVER** let extension cord lay in water.

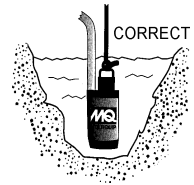
- **NEVER** use electrical cords with frayed, cut or brittle insulation.

- **CHECK** the submersible pump's AC power cord for nicks in the insulation.

- **NEVER** use gas piping as an electrical ground.

- **NEVER** attempt to use the pump's AC power cord as a lifting or lowering device.

- When lowering or lifting the pump, always attach a lifting cable to the manufacturer's recommended lifting point on the pump.



- **NEVER** position the pump directly on soft loose soil.



- To prevent excessive pump wear, position the pump so that it will not burrow itself into sand or mud.

- **ALWAYS** position the pump on a plank or bed of coarse gravel, within a perforated container on a suitable flotation device, or just hang the pump freely with the lifting cable.



SUBMERSIBLE PUMP/CONTROL BOX —GENERAL INSTALLATION

DANGER:



This control box contains hazardous voltages. Disconnect all sources of power before installing or servicing. There exists the possibility of electric shock or burn, which can cause severe bodily harm or even death.

CAUTION:



This control box should only be installed or serviced by a licensed electrician or qualified personnel.

CONTROL BOX MOUNTING

Mount the control box in an upright vertical position. Make sure the control box is securely fastened to a flat surface, that is free of dust, dirt, moisture or any elements that may contaminate or erode the electronic components of the control box.

SUBMERSIBLE PUMP POWER REQUIREMENTS

Before any electrical connections can be made to the submersible pump, it must first be determined what type of voltage and phasing the pump will require, single phase or three phase?

To determine the power requirements of your pump, either look at the vendor supplied identification name tag attached to the pump or reference Table 7.

■ If your pump requires **three phase** power, proceed to pages 6 and 7.

■ If your pump requires **single phase** power, proceed to pages 8 and 9,

If you cannot determine what your pump's power requirements are, please contact Multiquip's Service/Technical Assistance department.

CAUTION:



Applying incorrect power (**voltage phasing**) to the submersible pump can cause severe damage to the pump. Please make sure that the correct voltage and phase are transferred to the pump at all times.

POWER CORD REQUIREMENTS

When routing either single or three phase power via a power cord to the control box, **ALWAYS** use the correct wire size. Please reference Table 1 below (Cord Length/Wire Size) to determine the correct wire size. Incorrect wire size can adversely affect the performance of the pump.

TABLE 1. CORD LENGTH AND WIRE SIZE

AMPS	50 FT.	100 FT.	150 FT.
6	16 AWG	16 AWG	14 AWG
8	16 AWG	14 AWG	12 AWG
10	16 AWG	14 AWG	12 AWG
12	14 AWG	14 AWG	12 AWG
14	14 AWG	12 AWG	10 AWG
16	12 AWG	12 AWG	10 AWG

FLOAT SWITCH INSTALLATION

The wiring of the float switches is the same for both single phase and three phase applications.

1. Remove the float switch input connector housing, then route the float switch wires through the cable gland on the control box. Attach the wires to the float switch terminal block as indicated by Table 2. Reference Figures 2 and 3.

TABLE 2. FLOAT SWITCH CONNECTIONS

FLOAT SWITCH	FLOAT SWITCH TERMINAL BLOCK NUMBER
START	TERMINALS 1 AND 2
STOP	TERMINALS 3 AND 4

2. Tighten the connector housing to ensure a tight fit between the cord and the connector body. This will prevent the cable from pulling out of the terminal block and also prevent moisture from entering the control box..
3. Determine the length of the float switch wires, then secure float switch wires to pump discharge hose.

SUBMERSIBLE PUMP/CONTROL BOX — TRANSFORMER WIRING

TRANSFORMER 230/460 VOLTAGE SETTINGS

The wiring of the transformer is the same for both single phase and three phase applications.

CAUTION:



Transformer 230/460 Voltage Settings: Pump motors are factory set at 230 VAC. The transformer of this control box **must** be set to the voltage requirements of the pump in use. Refer to the attached wiring diagram located inside the "Control Box" or Figure 1 below and use the two supplied **jumper tabs** to set the transformer to the required output voltage.

WARNING:



ALWAYS make sure that the transformer is set to the correct output voltage. Incorrect transformer output voltage settings can cause severe damage to the pump.

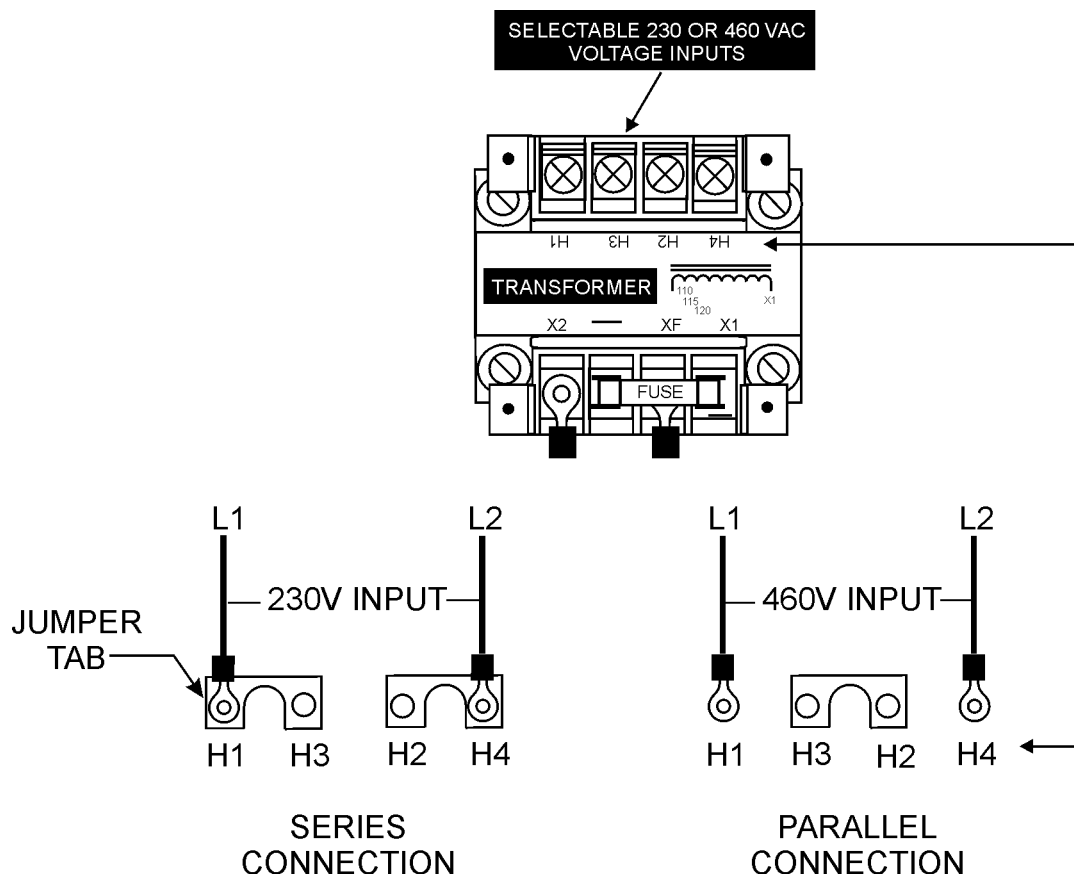
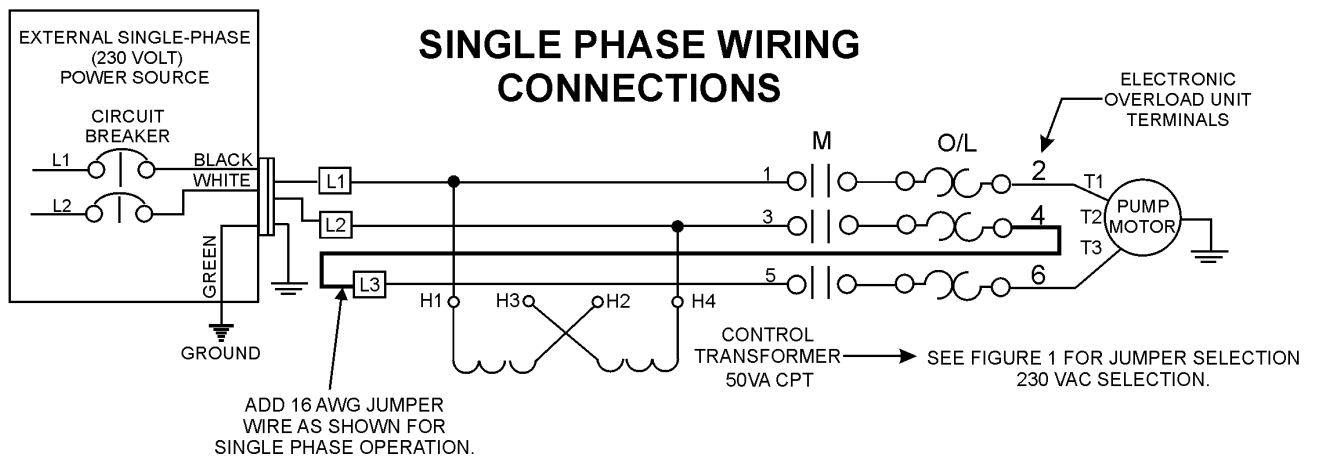
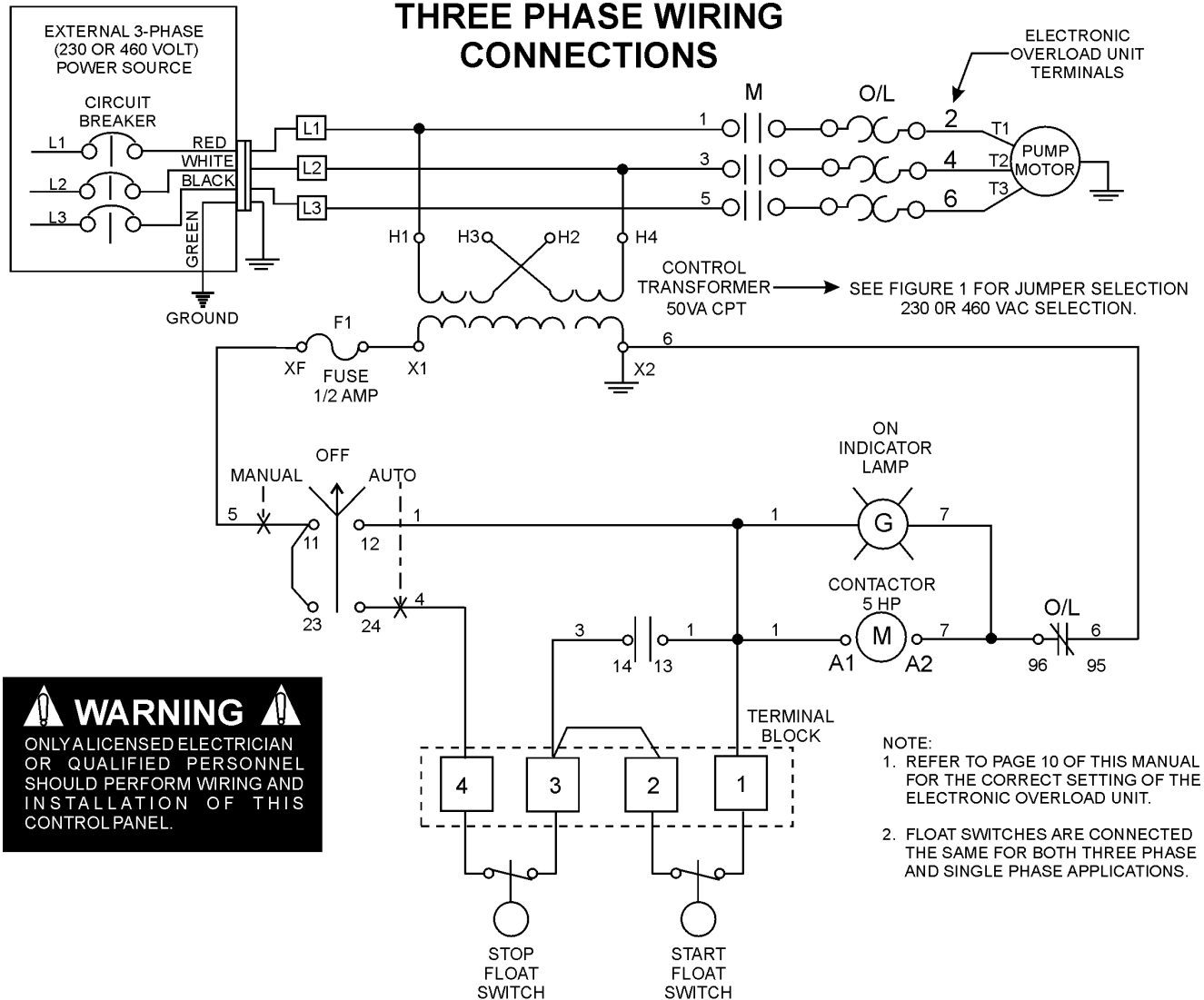


Figure 1. Transformer AC Voltage Settings (Jumper Tabs)

SUBMERSIBLE PUMP/CONTROL BOX — WIRING DIAGRAM



SUBMERSIBLE PUMP/CONTROL BOX — 3-PHASE PWR. INSTALLATION

3-PHASE POWER CORD (INPUT TO BOX) INSTALLATION

1. The three phase **input** power cord should have four wires. Each wire is color coded. The colors are **RED, WHITE, BLACK** and **GREEN**.
2. Remove the 3-phase AC input connector housing from the control box, then route the three phase input power cable through the cable gland on the control box. Attach the wires to the AC terminal block inside the control box as indicated by Table 3 and Figure 2.

TABLE 3. 3-PHASE AC INPUT POWER CONNECTIONS

CABLE WIRE COLOR	AC TERMINAL BLOCK #
RED	L1
WHITE	L2
BLACK	L3
GREEN	GROUND

3. Tighten the connector housing to ensure a tight fit between the power cord and the connector body. This will prevent the cable from pulling out of the terminal block and also prevent moisture from entering the control box.

It is recommended that the power being supplied to the control box **ALWAYS** be connected to a **circuit breaker** or a **quick disconnect** switch. This safety feature allows for quick removal of power from the control box in the event of an emergency.

4. Connect the other end of the 3 phase input power cord to the voltage source. Remember to provide a means of disconnecting the power from the control box (circuit breaker or quick disconnect switch). Also make sure to provide a good earth ground to the control box.

NOTE

Electrical connections to the power source should only be performed by a **licensed electrician** or **qualified personnel**.

3-PHASE POWER INSTALLATION (OUTPUT TO PUMP)

1. The three phase **output** power cord should have four wires. Each wire is color coded. The colors are **RED, WHITE, BLACK** and **GREEN**.
2. Remove the 3-phase AC output power connector housing on the control box, then route the three phase output power cable through the cable gland on the control box. Attach the wires to the AC terminal blocks on the **electronic overload** unit as indicated by Table 4 and Figure 2.

TABLE 4. 3-PHASE AC OUTPUT POWER CONNECTIONS

CABLE WIRE COLOR	ELECTRONIC OVERLOAD UNIT TERMINAL BLOCK#
RED	2
WHITE	4
BLACK	6
GREEN	GROUND

SUBMERSIBLE PUMP/CONTROL BOX — 3-PHASE PWR. INSTALLATION

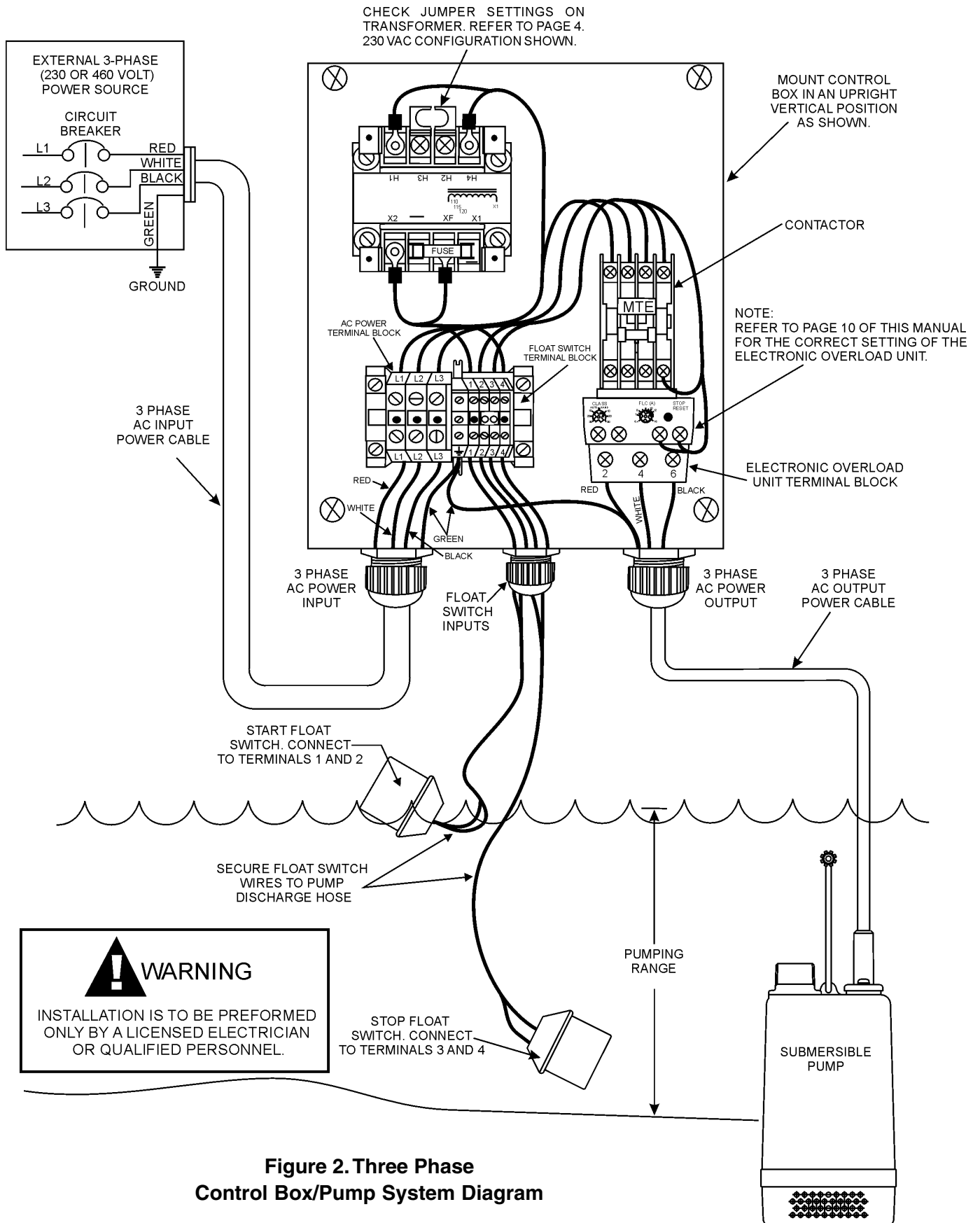


Figure 2. Three Phase Control Box/Pump System Diagram

SUBMERSIBLE PUMP/CONTROL BOX — 1-PHASE PWR. INSTALLATION

1-PHASE POWER CORD CONTROL BOX INSTALLATION

1. The three phase **input** power cord should have three wires. Each wire is color coded. The colors are **BLACK, WHITE, and GREEN**.
2. Remove the 1-phase AC input connector housing from the control box, then route the single phase input power cable through the cable gland on the control box. Attach the wires to the AC terminal block inside the control box as indicated by Table 5 and Figure 3.

TABLE 5. 1-PHASE AC INPUT POWER CONNECTIONS

CABLE WIRE COLOR	AC TERMINAL BLOCK #
BLACK	L1
WHITE	L2
GREEN	GROUND

3. Tighten the connector housing to ensure a tight fit between the power cord and the connector body. This will prevent the cable from pulling out of the terminal block and also prevent moisture from entering the control box.

It is recommended that the power being supplied to the control box **ALWAYS** be connected to a **circuit breaker** or a **quick disconnect** switch. This safety feature allows for quick removal of power from the control box in the event of an emergency.

4. Connect the other end of the single phase input power cord to the voltage source. Remember to provide a means of disconnecting the power from the control box (circuit breaker or quick disconnect switch). Also make sure to provide a good earth ground to the control box.

NOTE

Electrical connections to the power source should only be performed by a **licensed electrician** or **qualified personnel**.

1-PHASE POWER INSTALLATION (OUTPUT TO PUMP)

1. The single phase **output** power cord should have three wires. Each wire is color coded. The colors are **BLACK, WHITE, and GREEN**.
2. Remove the single-phase AC output power connector housing on the control box, then route the single phase output power cable through the cable gland on the control box. Attach the wires to the AC terminal blocks on the **electronic overload** unit as indicated by Table 6 and Figure 3.

TABLE 6. 1-PHASE AC OUTPUT POWER CONNECTIONS

CABLE WIRE COLOR	ELECTRONIC OVERLOAD UNIT TERMINAL BLOCK#
BLACK	2
WHITE	6
GREEN	GROUND

1-PHASE JUMPER WIRE INSTALLATION

1. Add a 16 AWG jumper wire, approximately 5-inches in length between the input terminal block marked **L3** and terminal **4** of the electronic overload unit. See Figure 3.

CAUTION:



Failure to connect the single phase jumper wire will cause the control box to malfunction. For proper single phase operation **ALWAYS** have the jumper wire installed. For three phase operation **REMOVE** the jumper wire.

SUBMERSIBLE PUMP/CONTROL BOX — 1-PHASE PWR. INSTALLATION

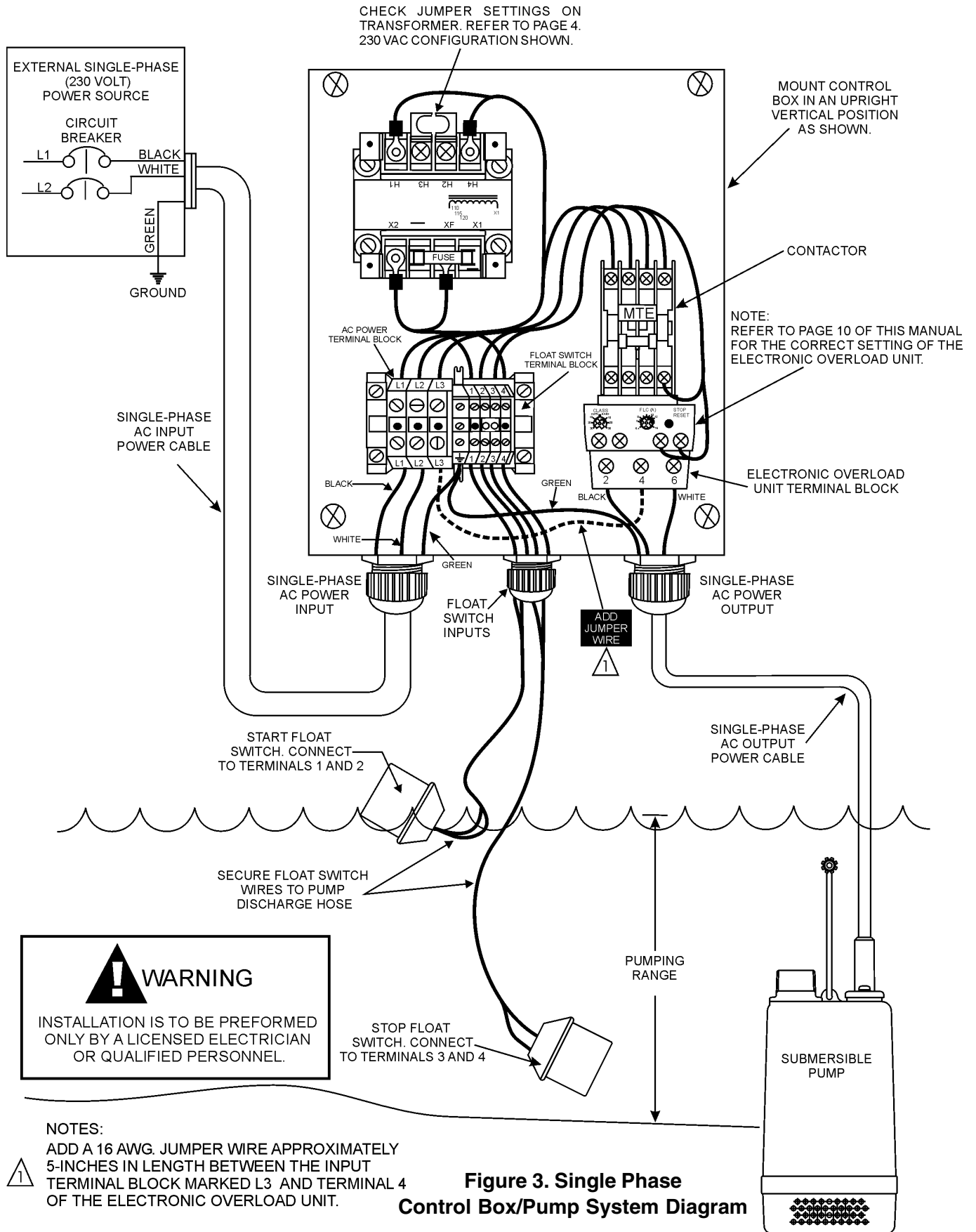


Figure 3. Single Phase Control Box/Pump System Diagram

SUBMERSIBLE PUMP/CONTROL BOX — PRE-SETUP/OPERATION

ELECTRONIC OVERLOAD UNIT SETTINGS

CAUTION:



Electronic Overload Unit: Always make sure that the electronic unit supplied with the control box is set to the correct amperage. This overload unit must **MATCH** the amperage requirements of the pump motor.

Using an electronic overload unit with incorrect settings may result in serious damage to the pump. Refer to the **Pump Amperage Requirements Table** (Table 7), for the correct overload amperage settings.

There are two dials on the **Electronic Overload Unit** (Figure 4) that require adjustment to meet the amperage requirement of the pump motor in use.

These dials are located on top of the overload unit and are labeled **CLASS** and **FLC (A)**.

Use a phillips-head screw driver to adjust the dials to the correct settings.

FLC (A) Dial Setting

1. Set the **FLC (A)** dial pointer (Figure 4) to the correct amperage for the pump motor in use. Use Table 5, to determine the correct amperage setting. This setting will depend on the model of the pump.

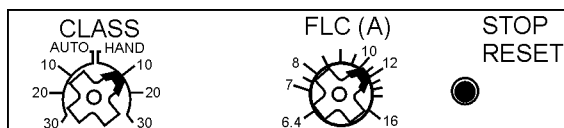


Figure 4. Electronic Overload Module

TABLE 7. PUMP MOTOR AMPERAGE REQUIREMENTS

Pump Model	Control Box	Volts (VAC)	Amps	Overload Unit
ST2020BD Three-Phase	CB101	230	5.6	AXE06-3.20-8.0A
ST2020BD Three-Phase	CB102	460	2.8	AXE02-1.30-3.2A
ST3020B1 Single-Phase	CB200	230	14.2	AXE016-6.40-16A
ST3050D Three-Phase	CB200	230/460	7.1	AXE016-6.40-16A

Class Dial Setting

1. Set the **CLASS** dial pointer (Figure 4) to position 10. This controls the reset function only. It does not affect the ability of the pump to run with or without float switches.

RESET Operation

This electronic control unit has two modes of reset. The modes are defined as follows:

MODE 1

When the **CLASS** dial on the electronic overload module is in the **HAND** position (manual) the reset button (Figure 5) on the front of the control box must be **pushed** to reset the unit (restore power) in the event of an overload.



Figure 5. Control Box Reset Button

MODE 1

When the **CLASS** dial on the electronic overload module is in the **AUTO** position (automatic mode) the unit will automatically be reset in the event of an overload

NOTE

All Multiquip **control boxes** should have the **CLASS** dial set to the **HAND** position.

Operation

1. From the voltage source set the circuit breaker or quick disconnect switch to the **ON** position.
2. For manual operation of the pump, place the 3-position operation switch (Figure 6) on the control box in the manual position.

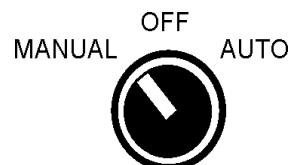


Figure 6. Manual-Off-On SW. (Man Position)

SUBMERSIBLE PUMP/CONTROL BOX — OPERATION

3. Verify that the **ON** indicator (Figure 7) on the control box is **LIT**. This means that power is being supplied to the control box.



Figure 7. Control Box Power ON Indicator

4. In the manual mode the pump will run continuously. Pay close attention when running the pump in this mode. **DAMAGE** to the pump may occur if pump is not immersed in water.
5. To operate the pump automatically (float switches), place the 3-position operation switch in the **AUTO** position (Figure 8).

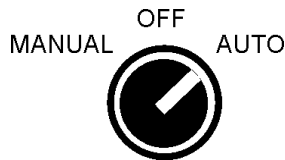


Figure 8. Manual-Off-On SW. (Auto Position)

6. In the **AUTO** mode the pump will run as long as there is a sufficient amount of water. This amount is determined by the setting of the float switches. The **stop float** switch contacts will open when the water level is low and power will be removed from the pump's motor.

Once the water level has risen back to the appropriate level the **start float** switch contacts will close and power will be restored to the pump's motor.

Shut-Down

1. Place the 3-position operation switch on the control box to the **OFF** position (Figure 9).

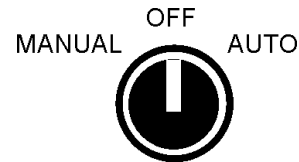


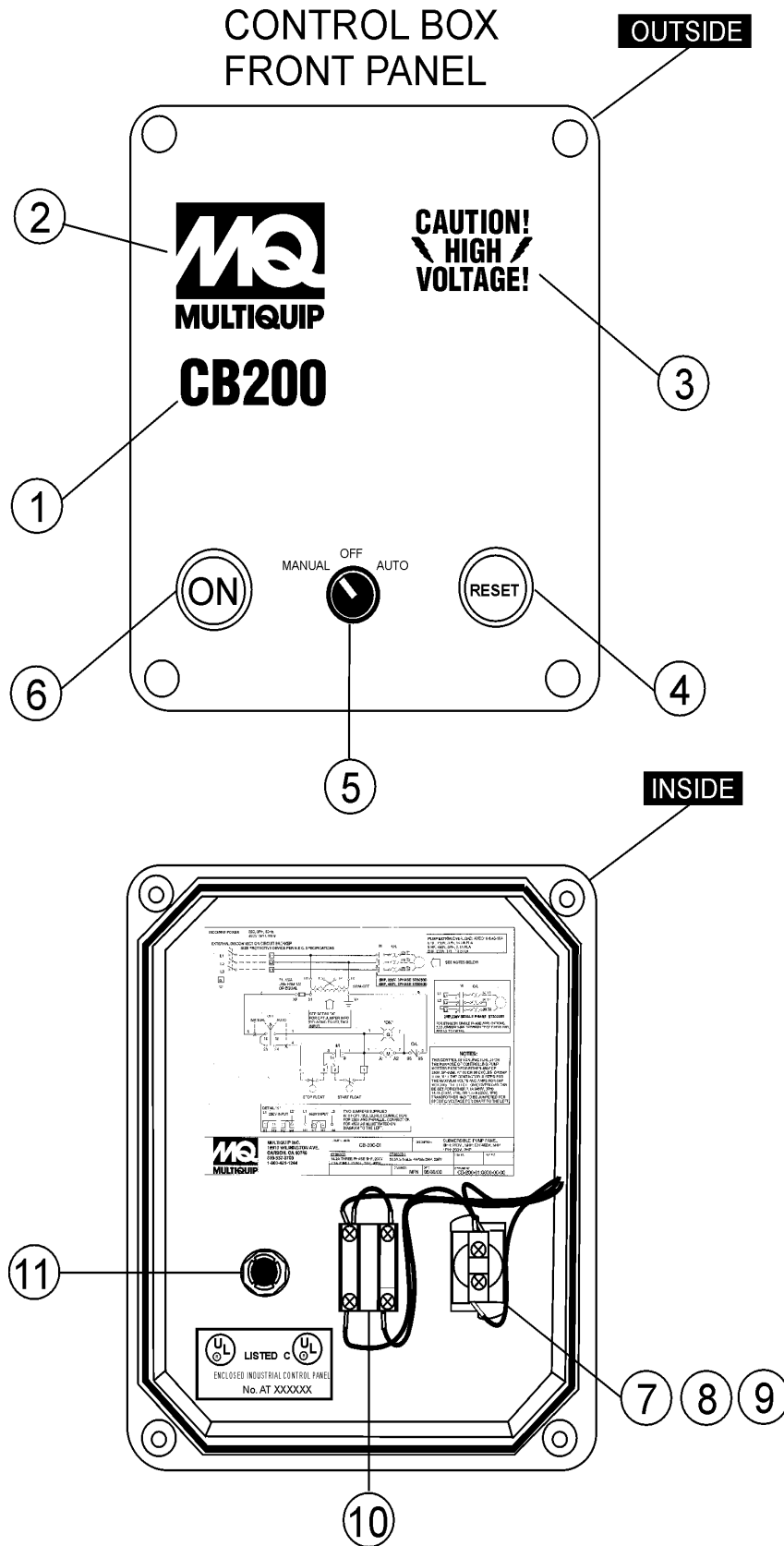
Figure 9. Manual-Off-On SW. (OFF Position)

2. Verify that the control box power ON light is OFF.
3. Turn the circuit breaker or quick disconnect switch to the OFF position.

Cleanup

1. Remove the pump from the water. Wipe off any mud or debris that might have attached itself to the pump.
2. Store pump in a clean dry place.
3. Remove all power cables and float switches from the control box. Place cables and float switches in a suitable container where they will not get damaged.

SUBMERSIBLE PUMP/CONTROL BOX — FRONT PANEL ASSY.



SUBMERSIBLE PUMP/CONTROL BOX — FRONT PANEL ASSY.

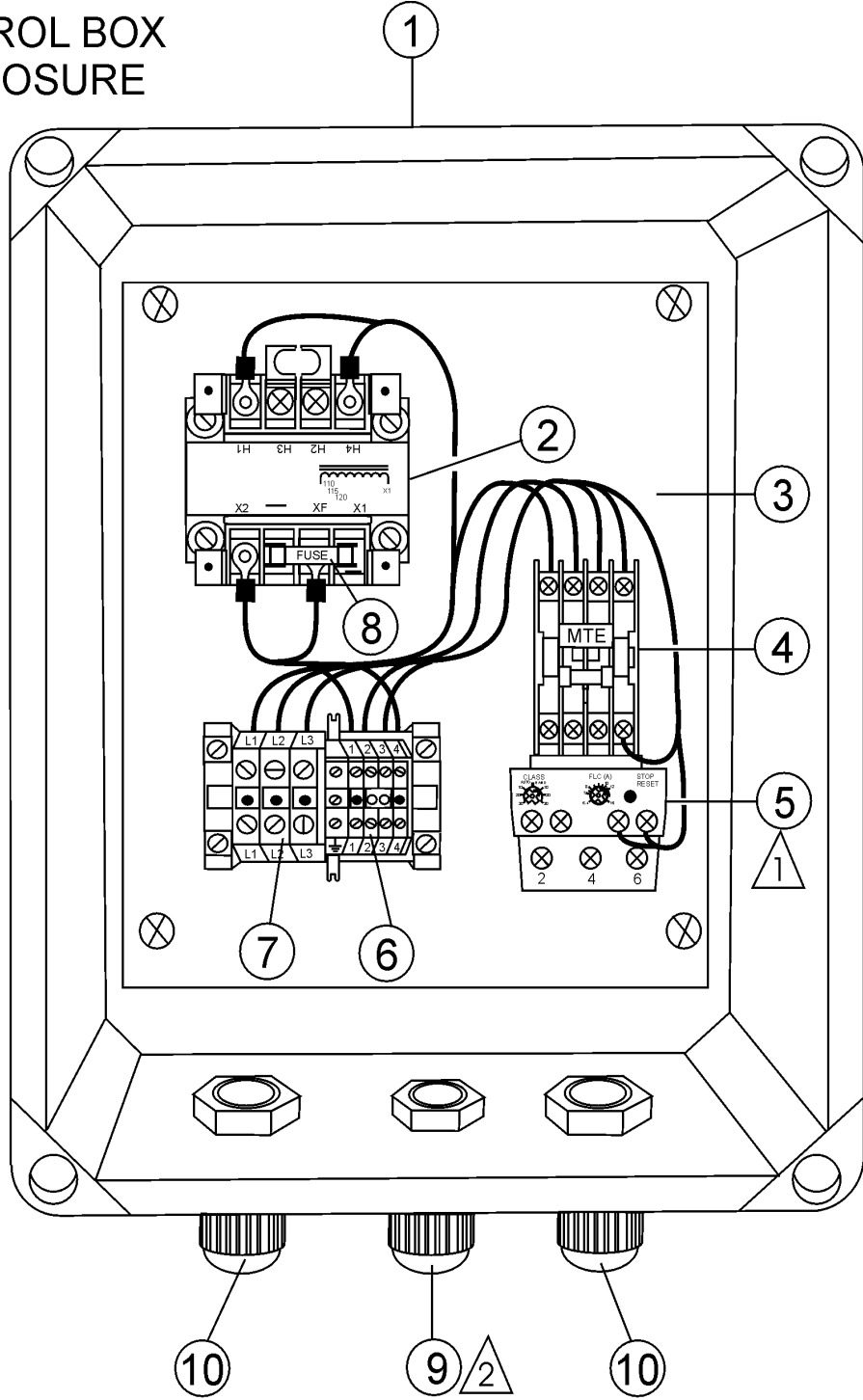
FRONT PANEL ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1*		DECAL: CB101	1	USE ON CONTROL BOX CB101 ONLY
1*		DECAL: CB102	1	USE ON CONTROL BOX CB102 ONLY
1*		DECAL: CB200	1	USE ON CONTROL BOX CB200 ONLY
2*		DECAL: MULTIQUIP	1	
3*		DECAL: CAUTION, HIGH VOLTAGE	1	
4	RATO	PUSH BUTTON	1	
5	RWB	3-POSITION SELECTOR SWITCH	1	
6	KF23GN	LENS, DOMED, GREEN	1	
7	ML	LAMP MODULE, YELLOW	1	
8	120MB	MINI BAYONET 120V BULB	1	
9	MHR3	MODULE HOLDER, 3 CONTACT	1	
10	ETR	CONTACT BLOCK, MOM. ACTION	1	
11	AS80	PLUNGER, CUT-OFF 78 MM	1	
	34537	DECAL KIT	1	INCLUDES ITEMS W/*

NOTE:
DECALS CANNOT BE PURCHASED SEPARATELY.

SUBMERSIBLE PUMP/CONTROL BOX — ENCLOSURE ASSY.

CONTROL BOX
ENCLOSURE



NOTES:

⚠️ SEE TABLE 7 FOR CORRECT OVERLOAD UNIT. OVERLOAD UNIT IS DEPENDENT ON CONTROL BOX USED.

⚠️ IF CABLE GLAND PG-16 (P/N CSPG16YS) IS NOT USED, PLACE HOLE PLUG P/N BVR22 IN CENTER CONNECTOR OPENING OF CONTROL BOX.

SUBMERSIBLE PUMP/CONTROL BOX — ENCLOSURE ASSY.

ENCLOSURE ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	VJ1008HWILL1	ENCLOSURE WITH HINGE AND AND LATCH 10 X 8 X 5"	1	
2	B050BTZ13JK	CONTROL TRANSFORMER 220-480V, 110-120V 50 VA	1	
3	MP1008S	BACKPLATE, STEEL	1	
4	MAX0310115VAC	CONTACTOR, 5HP-240 10HP-480	1	
5	AXE0213023A	MTE: O/L RELAY ELECTRONIC	1	USE WITH CB 101 AND CB102 CURRENT RANGE 1.3-2.3A SEE TABLE 7.
5	AXE0632080A	MTE: O/L RELAY ELECTRONIC	1	USE WITH CB 101 AND CB102 CURRENT RANGE 3.20-8.0A SEE TABLE 7.
5	AXE06640A16A	MTE: O/L RELAY ELECTRONIC	1	USE WITH CB 200 SEE TABLE 7. CURRENT RANGE 6.40A-16A
6	IK5	TERMINAL BLOCK, 600V-30A	4	
7	IK10	TERMINAL BLOCK, 55 AMPS	3	
8	FNM1/2	FUSE DUAL ELEMENT	1	USE BUSSMAN FUSE OR EQUIVALENT. TIME DELAY, 250V
9	CSPG16YS	CABLE GLAND, PG-16 W/NUT	1	SEE NOTE 1
10	CSPG21YS	CABLE GLAND, PG-21 W/NUT	2	

NOTES:

- IF CABLE GLAND P-16, ITEM 9 (P/N CSPG16YS) IS NOT USED, PLACE HOLE PLUG P/N BVR22 IN CENTER CONNECTOR OPENING OF CONTROL BOX

PAYMENT TERMS

Terms of payment for parts are net 10 days.

FREIGHT POLICY

All parts orders will be shipped collect or prepaid with the charges added to the invoice. All shipments are F.O.B. point of origin. Multiquip's responsibility ceases when a signed manifest has been obtained from the carrier, and any claim for shortage or damage must be settled between the consignee and the carrier.

MINIMUM ORDER

The minimum charge for orders from Multiquip is \$15.00 net. Customers will be asked for instructions regarding handling of orders not meeting this requirement.

RETURNED GOODS POLICY

Return shipments will be accepted and credit will be allowed, subject to the following provisions:

1. A Returned Material Authorization must be approved by Multiquip prior to shipment.
2. To obtain a Return Material Authorization, a list must be provided to Multiquip Parts Sales that defines item numbers, quantities, and descriptions of the items to be returned.
 - a. The parts numbers and descriptions must match the current parts price list.
 - b. The list must be typed or computer generated.
 - c. The list must state the reason(s) for the return.
 - d. The list must reference the sales order(s) or invoice(s) under which the items were originally purchased.
 - e. The list must include the name and phone number of the person requesting the RMA.
3. A copy of the Return Material Authorization must accompany the return shipment.

4. Freight is at the sender's expense. All parts must be returned freight prepaid to Multiquip's designated receiving point.
5. Parts must be in new and resalable condition, in the original Multiquip package (if any), and with Multiquip part numbers clearly marked.
6. The following items are not returnable:
 - a. Obsolete parts. (If an item is listed in the parts price book as being replaced by another item, it is obsolete.)
 - b. Any parts with a limited shelf life (such as gaskets, seals, "O" rings, and other rubber parts) that were purchased more than six months prior to the return date.
 - c. Any line item with an extended dealer net price of less than \$5.00.
 - d. Special order items.
 - e. Electrical components.
 - f. Paint, chemicals, and lubricants.
 - g. Decals and paper products.
 - h. Items purchased in kits.
7. The sender will be notified of any material received that is not acceptable.
8. Such material will be held for 5 working days from notification, pending instructions. If a reply is not received within 5 days, the material will be returned to the sender at his expense.
9. Credit on returned parts will be issued at dealer net price at time of the original purchase, less a 15% restocking charge.
10. In cases where an item is accepted for which the original purchase document can not be determined, the price will be based on the list price that was effective twelve months prior to the RMA date.
11. Credit issued will be applied to future purchases only.

PRICING AND REBATES

Prices are subject to change without prior notice. Price changes are effective on a specific date and all orders received on or after that date will be billed at the revised price. Rebates for price declines and added charges for price increases will not be made for stock on hand at the time of any price change.

Multiquip reserves the right to quote and sell direct to Government agencies, and to Original Equipment Manufacturer accounts who use our products as integral parts of their own products.

SPECIAL EXPEDITING SERVICE

A \$20.00 to \$50.00 surcharge will be added to the invoice for special handling including bus shipments, insured parcel post or in cases where Multiquip must personally deliver the parts to the carrier.

LIMITATIONS OF SELLER'S LIABILITY

Multiquip shall not be liable here under for damages in excess of the purchase price of the item with respect to which damages are claimed, and in no event shall Multiquip be liable for loss of profit or good will or for any other special, consequential or incidental damages.

LIMITATION OF WARRANTIES

No warranties, express or implied, are made in connection with the sale of parts or trade accessories nor as to any engine not manufactured by Multiquip. Such warranties made in connection with the sale of new, complete units are made exclusively by a statement of warranty packaged with such units, and Multiquip neither assumes nor authorizes any person to assume for it any other obligation or liability whatever in connection with the sale of its products. A part from such written statement of warranty, there are no warranties, express, implied or statutory, which extend beyond the description of the products on the face hereof.

PARTS AND OPERATION MANUAL

HERE'S HOW TO GET HELP

*PLEASE HAVE THE MODEL AND SERIAL NUMBER
ON-HAND WHEN CALLING*

PARTS DEPARTMENT

800/427-1244

FAX: 800/672-7877

SERVICE DEPARTMENT

800/478-1244

FAX: (310) 537-4259

WARRANTY DEPARTMENT

800/421-1244, EXT. 279

FAX: (310) 537-1173

MAIN

800/421-1244

FAX: (310) 537-3927



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