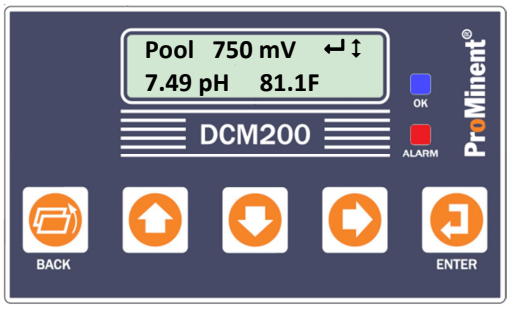
DCM200 Aquatics Controller



Keypad Navigation

BACK Button.
In navigation screens, used to go back 1 level.
NOTE: In Output Status Screens 1-9, BACK is used to change output HOA (HAND / OFF / AUTO) mode.
CAUTION: On the LCD screen **BACK** is represented as **0**, so pressing can force the output ON or OFF depending on the Output Status LCD screen.

press ENTER **UP & DOWN** Buttons.
Move up or down to view options or to EDIT numbers.

RIGHT Button.
Advance to the next integer when changing values, or change HOA mode in Output Status Screens 1-9.

ENTER Button.
Used to progress to the next sub menu level or accept parameter changes made.

LCD Display Symbols

↕ Permits movement in indicated directions to scroll UP or DOWN, or EDIT values using related buttons.

↵ Permits selection of displayed menu option or execution of editing changes by pressing ENTER.

C 3 Letters indicate inputs and numbers represent outputs.

Status Lights

Blue OK light - Controller is operational, and no alarms exist.
Flashing Blue OK light - Controller is operational, no alarms, flow recovery timer is counting.
Red **Alarm** light – Controller has logged one or more alarms. Alarms may have corrected themselves, but may need to be acknowledged

Quick Start Guide

Alarms

Resetting Alarms

When the Red ALARM LED is flashing, an alarm has occurred. To clear all alarms without viewing their causes, press DOWN ↓ then ENTER ↵. To view which input or output has caused the alarm, press the DOWN ↓ button once. The screen will toggle to show the status of the oxidant feed status, and any latched alarms, by input letter or output number.

Pool Oxidant ↵ ↕ **Off: Setpoints**	**Alarms: ↵ ↕** **A C**

To view specific causes for these Alarms, press ENTER ↵, then scroll to **Alarms**, press ENTER ↵, and scroll to view specific alarm and cause (high or low) for each alarm. An alarm may have recovered on its own after the alarm delay time, leaving the alarm latched. After viewing all alarms that interest you, press ENTER ↵, and select **Clear Alarms**, and press ENTER ↵ to clear all alarms. Screen will then show Alarms cleared, and the red ALARM LED should trade for the blue OK LED. Press ENTER ↵ again to reset all alarms and timers.

A_pH Sensor ↵ ↕ **Alarmed High**
Clear Alarms ↵ **Activity Log ↕**
Cleared Alarms **Reset All ↵**

Menu Selections

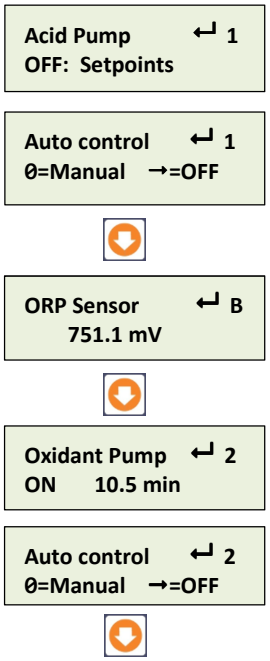
Main Menu

The Main default display shows "Pool" followed by the ORP millivolts and an ENTER symbol ↵, and the UP/DOWN ↕ symbol. The second line shows the pH measurement and the Temperature reading. Pressing the ENTER ↵ key in any menu allows access to available submenus. Pressing the BACK button several times will take you to the main display shown below.

Pool 751 mV ↵ ↕ **7.43pH 81.1F**
↓
Pool Oxidant ↵ ↕ **OFF: Setpoints**
Alarms: ↵ ↕ **A C**
↓
A_pH Sensor ↵A **7.43 pH**

Pressing the DOWN ↓ key lets you see status of the pool primary oxidant feed, and any alarms. Active alarms are displayed by input letters A to F or outputs 1 to 5. Pressing enter here will take you to the alarms menu discussed in the Alarms section above.

Pressing the down ↓ key again progresses to the next status screen, showing the present value of the pH sensor connected to sensor input A. Press ENTER to calibrate, view/set alarms, & review pH input diagnostics.



The menus are similar for the other 3 inputs and outputs.

The acid pump is shown as controlled by relay output 1 and is OFF because the pH value is less than the control setpoint. This screen alternates with Auto-Man-Off selector. Press & hold BACK '**0**' or RIGHT→to select forced ON or OFF. Press DOWN ↓, to go to ORP input.

Present value of the ORP sensor connected to sensor input B. Press ENTER↵ to calibrate, view/set alarms, & diagnostics.

The Oxidant pump is controlled by relay output 2 and is ON for 10.5 minutes this feed cycle. Press ENTER to view/modify setpoints, alarms, diagnostics. Alternates with Auto-Man-Off selector. Press & hold BACK '**0**' or RIGHT → to select forced ON or Off.

Diagnostics

To view the Diagnostic status for any parameter or the DCM200 System, key UP or DOWN to the menu for the specific input or output. The top menu provides access to the current System state. Press ENTER and key DOWN to 'Diagnostic' & key ENTER, then UP or DOWN. Diagnostic menu status provides valuable information if you have a configuration problem or fault.

Adjusting Setpoints

Control Setpoints are changed in the numbered Output or Relay settings. To change a setpoint, press the **DOWN** button until the control output (relay) number associated is shown, then press **ENTER**. Use the **UP** and **DOWN** buttons to find, then choose Setpoints, by pressing the **ENTER** key once. For ON/OFF control, the display will show 'Turn ON setpoint' and a value. To change the turns ON value, press **ENTER** again and the screen will change to **`Editing,`** ↵ **`or Exit.`** Use the **UP** or **DOWN,** and **RIGHT** buttons to change to the new value, then press **ENTER.** To exit without changing the setpoint, press **BACK.** Scroll down to choose and change the 'Off Setpoint' in the same way. The difference between the Turn ON and Turn Off values is the dead-band or hysteresis, and should be set only large enough to keep the relay from 'chattering'.

Sensor Calibrations

Calibrations are performed much like the setpoint adjustment, but adjusting the readings to a known value introduced to the sensor input. Calibrations are performed in the Lettered Input menus, A for pH, and C for Temperature. Most routine calibrations are single point calibrations synchronizing to a test kit or buffer reading. *ORP input is factory calibrated and should never be field calibrated except to reset to factory calibration.*

Chemical Feed Controls

Chemical feed setpoints can be set or changed as per the method in 'Adjusting Setpoints' above. Feed limit alarms are time limits for pumps & solenoids controlled by relays and digital outputs 1...5. Set feed time limits so that worst-case normal operation avoids nuisance alarms. Maximum is 1440 minutes (24 hours).

Configuration Changes

Most configuration changes beyond calibrations and setpoints are more easily done using the Ethernet Web Browser interface. The graphical view reflects operation and permits all available configuration changes. Consult the browser manual for details.

Security and Passwords

There are four Operations Passwords (Operators) and three Configuration Passwords (Owners, Managers or Distributors) that can be used to change settings in the controller. Your **ProMinent** distributor should work with you to assign these passwords at the time of installation and commissioning. These passwords, once assigned are the same for all forms of access to the controller, the pushbuttons, or the Ethernet Web Browser interface.

Communication

The controller can be interrogated remotely by using a web browser. It is possible to make changes via a remote computer, using a wireless router or building network with access to the internet. 3G EVDO modem is also an option. Once connected, a the controller can send information to the Aquatics SMTP server for report generation and email on alarms, if configured. Refer to the browser manual for more information.

Flow Switch Operation

IMPORTANT: Digital input 'E' is configured by default as the primary sensor flow switch and will inhibit all chemical feed if not connected.

WARNING Disabling the flow switch can cause personal injury or death if concentrated chemicals are allowed to feed into an empty return water line.

For safety considerations, **do not** attempt to **disable** the interlocks of **input "E"** with any chemical feed control outputs.

⚠WARNING

NEVER CONNECT FEEDER DIRECTLY TO POWER SOURCE

This will bypass critical safety features of the ProMinent controller and may cause severe injury or death.

See Install Manual for more detailed information.

120 VAC Power Wiring

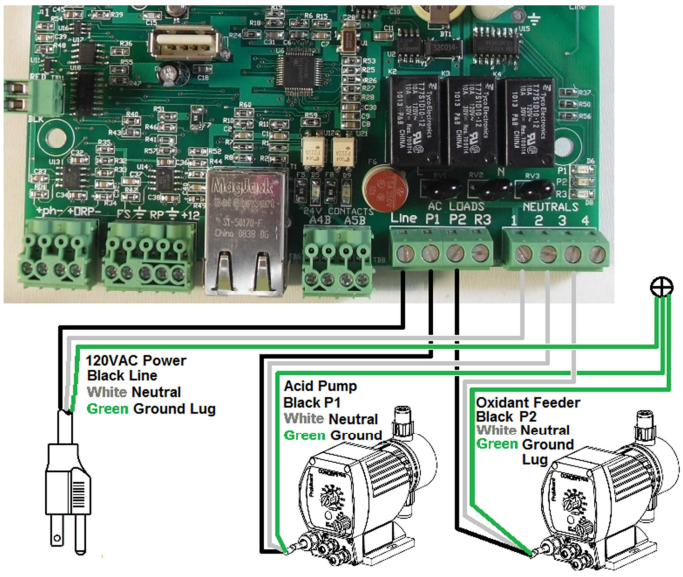
⚠ DANGER

Hazardous voltages cause severe injury or death.

Disconnect all sources of power before servicing.

(Multiple and/or remote sources of power may be present).

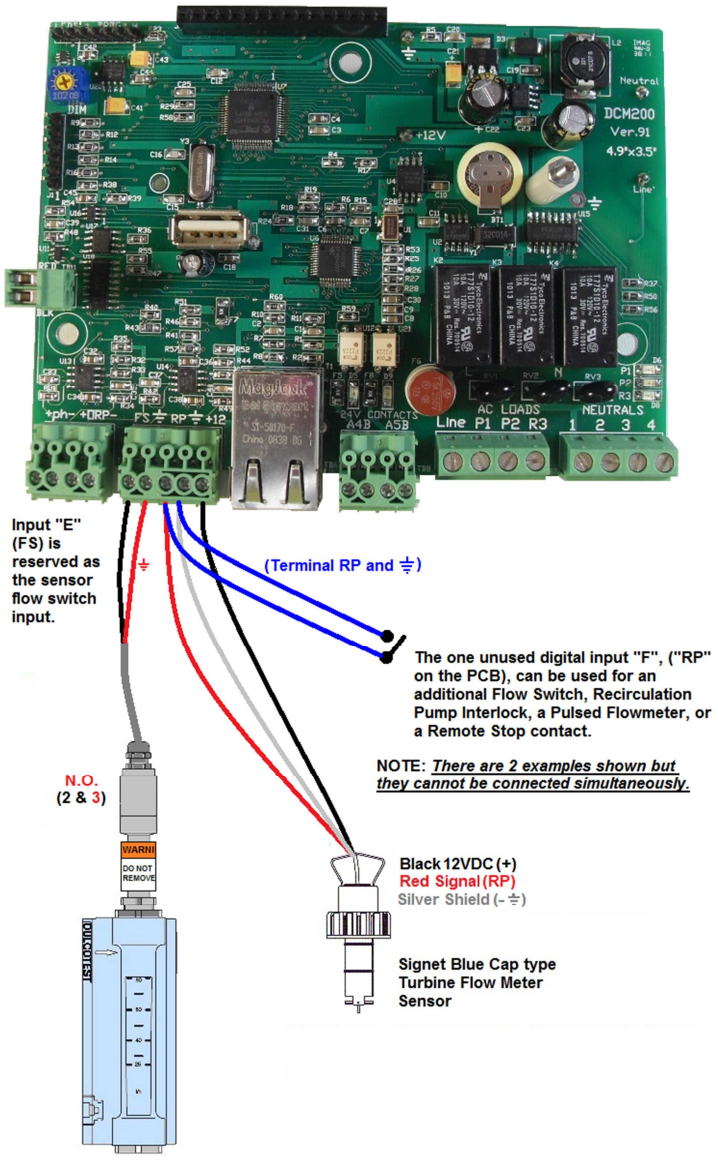
Connect 120VAC Line power and 120VAC chemical feed pumps as shown. Consult Install manual for more details. If you are using 230VAC power, consult ProMinent. Single phase 230VAC can be used, but it is extremely unusual line power in North America.



Flow Switches, Water Meters and Digital Inputs (Contact Sets)

Water meters, flow switches or any 'dry' contact input is connected to input "F" using terminal 'RP' and a ground terminal as shown. 5VDC limited by 10KΩ puts 1/2mA through a closed contact set. Input 'E' is reserved for the sample flow switch function and should not be changed. Paddlewheel and Turbine water meters (Square Wave types) are powered by the 12VDC controller power supply and are thermally fused at 100mA.

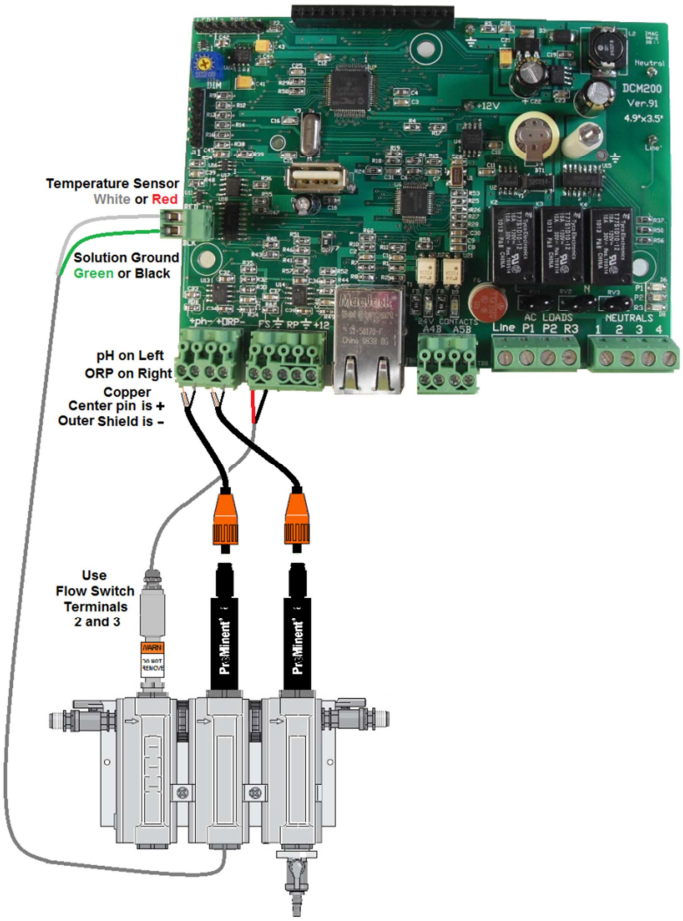
WARNING **Removal of shaft safety clip may allow flow switch minimum flow rate to drop to an unsafe level. If concentrated chemicals are allowed to feed with inadequate water flow, chlorine gas can be released, causing severe injury or death.**



Sensor Connections

pH and ORP Sensor Wiring

DCM 200 controllers have the cables for the pH and ORP sensors pre-wired and marked on the cables for the appropriate sensor. Connect center pins on coaxial cables to the positive [+] terminal and the metallic shield is connected to negative [-]. A solution ground reference is required for proper operation. An SGT sensor, located in the bottom of the center flow module, has a solution reference (Green or Black) and temperature sensor (White or Red). Even if the temperature sensor is not being used, the solution reference must be connected to the terminal marked BLK. Typical factory installed wiring is shown to the right.



Sensor Sample

The optimum location to obtain a sample for chemistry control is just after the main filters and prior to the heaters, UV or any other water treatment, especially upstream of chemical injection. The optimum return point is to the surge pit or to a point downstream of the sample that creates a difference in pressure to cause 10-12 g/h flow.

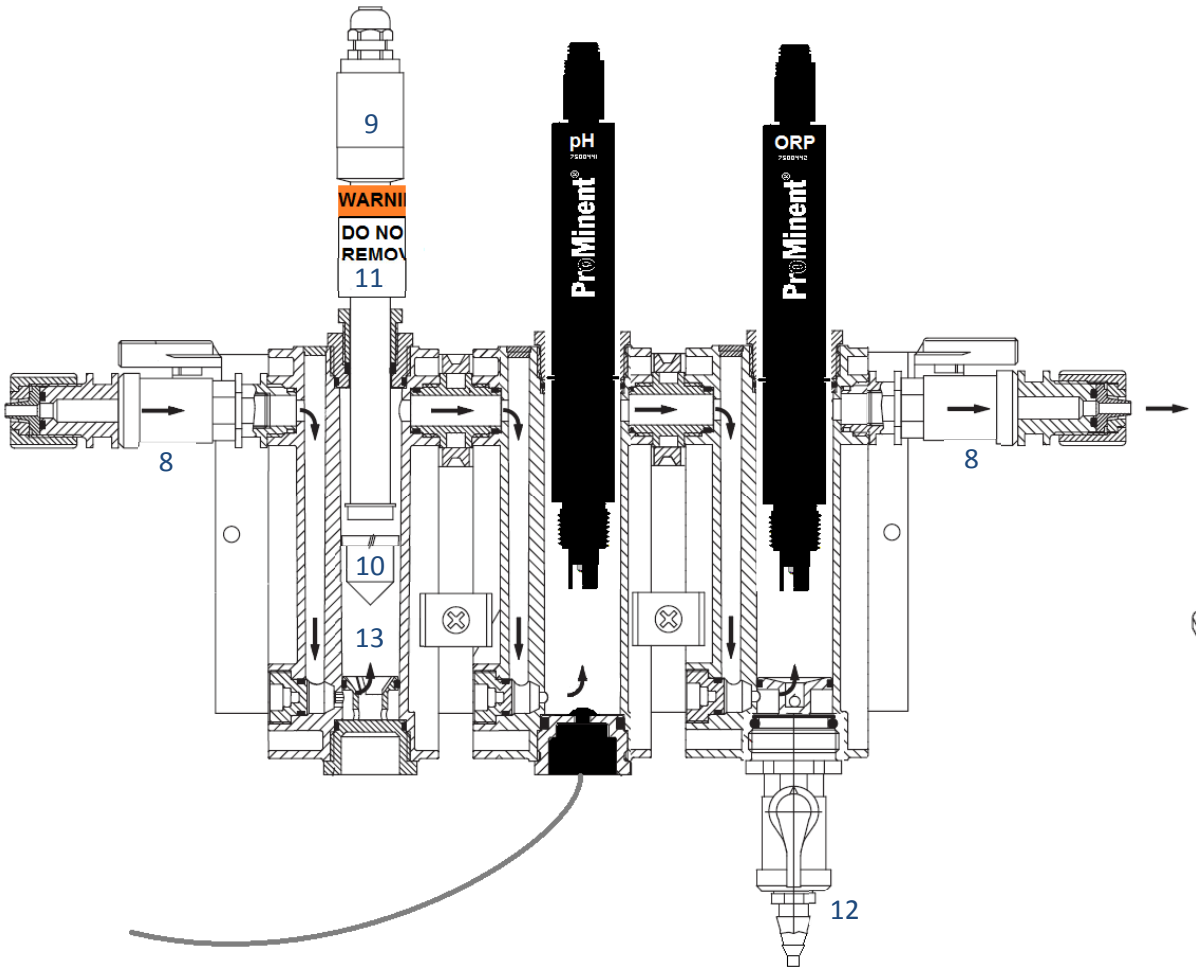
CAUTION never return the sample to the suction side of the main circulation pump as this will cause a vacuum on the sample stream which will cause inaccurate sensor readings and permanent sensor damage [non-warranty].

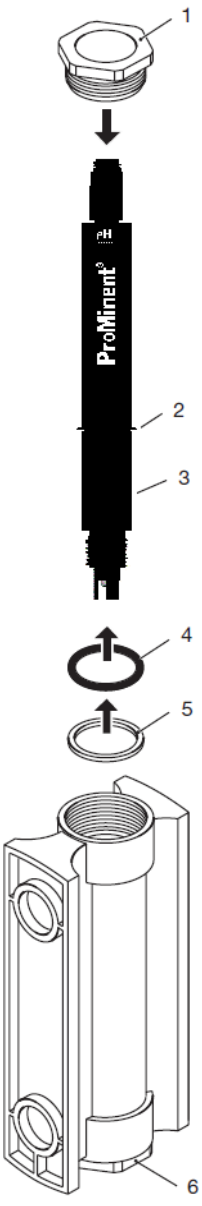
WARNING Water must be circulating to safely allow chemical feed. The flow switch safety clip prevents setting the flow switch below 10 g/h that might inadvertently allow chemical feed in an empty line. DO NOT REMOVE this important safety device, nor operate the controller if this device or flow switch is removed.

Commissioning the Sensors

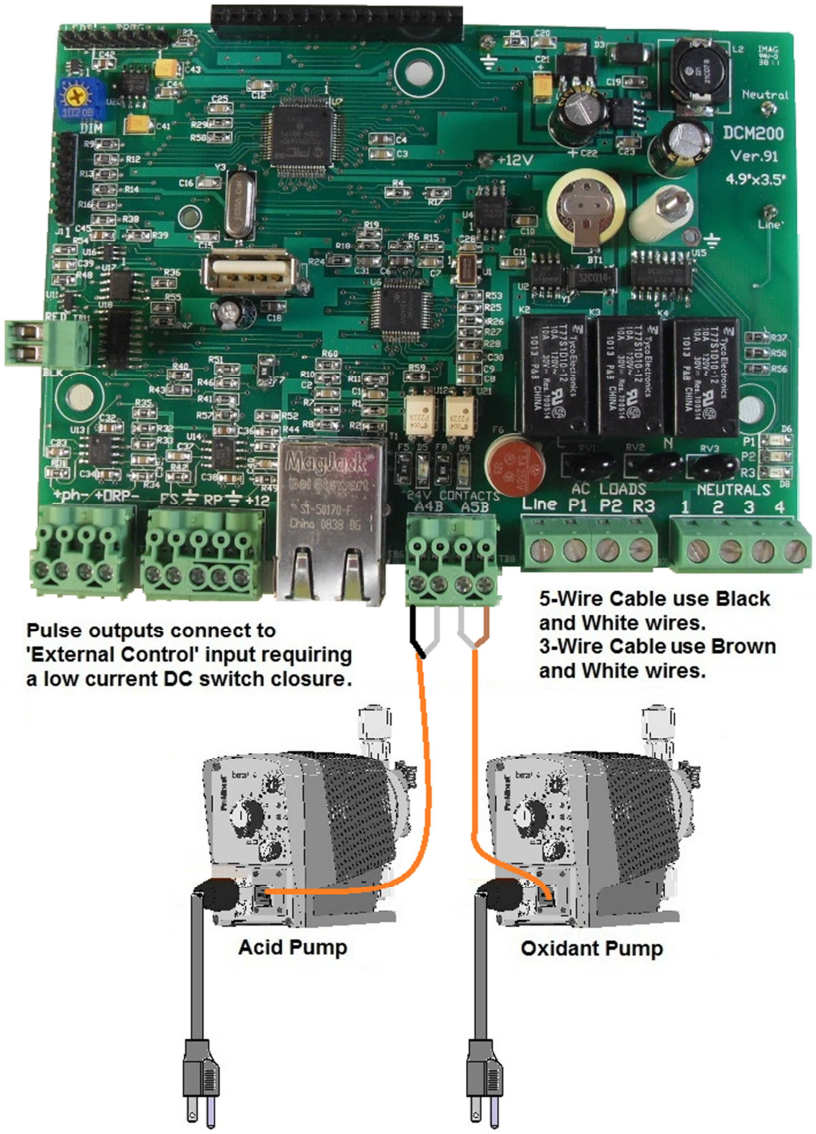
pH and ORP Sensors

CAUTION Sensors cannot be left exposed to air for more than a few minutes without permanent damage. Do not remove the pH or ORP sensors from their protective wetting caps until the sensor housing is fully plumbed and ready for sample flow. Remove the protective caps by unscrewing the caps with the probe caps in the down position to avoid spilling the potassium chloride salt solution trapped within the cap. Set the cap aside for future use, or use a ½" NPT plug to seal the salt solution in the cap. Next, using OSHA recommended personal protection equipment, like safety goggles, and protective gloves, carefully clean the sensor tips using, isopropyl alcohol and a soft toothbrush, followed by a few drops of acid on the same toothbrush. Rinse the sensors in pool water and insert into the probe housing modules, assuring the sensors stay wet during the process.





7500441	pH Sensor – Aquatics (3 at right)
7500442	ORP Sensor – Aquatics
7746896	Solution Ground Temperature Sensor (7 above)
1010380	Lab valve for DGMa flowcell (8 above)
791635	Flow Switch Sensor (9 above)
791634	Flow Switch Float (10 above)
7500521	Flow Switch Safety clip, with Warning Label (11 above)
1033011	SN6 to BNC connector for retrofits on controllers with BNC Connection
1004739	Sampling tap for 25mm flow modules (petcock) (12 above)
1023973	Flow expansion module with scale in gph (13 above)
987356	DGMa In-line housing Operating Instructions, G/GB/F/E
792866	Clamping disc D30/D23x2.1 PVC (5 at right)
1002722	O-ring/m 25.00 – 3.50 83FPM-A 25mm (4 at right)
7500609	Fuse, Miniature 5A, 250VAC



Sensor and Output Settings

Input	Type	Configuration or typical use
A	Analog Fixed	pH
B	Analog Fixed	ORP
C	Analog Fixed	Temperature
D	Analog Virtual	LSI / Ryznar's
E	Digital Fixed	Sample Flow Switch
F	Digital	Recirculation Flow switch or Flow meter

Output	Type	Configuration or typical use
1	120 VAC NO Relay	Acid Feed
2	120 VAC NO Relay	Oxidant Feed
3	120 VAC NO Relay	Booster Pump or Alarm Device
4	DC Dry contact output	Pulsed Pump control
5	DC Dry contact output	Alarm Contact

Browser Connect Windows 7

(Refer to Browser manual for other OS instructions)

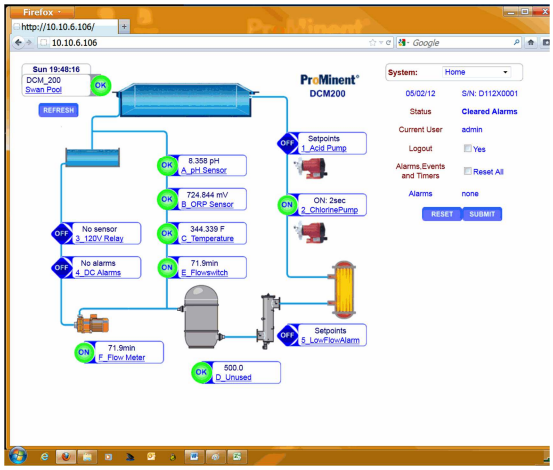
Connect an Ethernet 'cross-over' cable between your computer's Ethernet jack and the jack in the controller.

Remember how to "undo" what you will need to configure below, so your computer will re-connect to your network after you are done.

NOTE: You may need to have administrator access to your computer.

Verify your computer is configured for a fixed IP address by using the following steps:
From the main Windows desktop, Click on **START \ Control Panel \ Network and Internet \ View network status and tasks \ Local Area Connection**. In the **Local Area Connection Status** box, click '**Properties**' button, then highlight "**Internet Protocol Version 4 (TCP/IPv4)**" (*do not uncheck this line*), then click the "**Properties**" button. In the "**Internet Protocol Version 4 (TCP/IPv4) Properties**" window select "**Use the following IP address:**" and fill in the following information:
IP address : **10.10.6.200**
Subnet mask: **255.255.255.0**

The click the "**OK**" button and close all the open windows.
Open your internet browser [Windows Internet Explorer] and enter the controller's default IP address **10.10.6.106** into the http:// address line.
The Live View screen something like this should appear:



LCD Display MENU TREE

On the first page of this guide we graphically showed the main menu structure for the first few inputs. Below is a more complete layout of the LCD menu tree. NOTE: *The values shown below are only examples and will be different on your controller.*

Starting at the main LCD screen:

```
Pool ###.#mV  ↵⇳
#.#pH -#.#F
```

The **System** menus are accessed by pressing the ENTER↵ key, and are organized this way:

```
Diagnostic      ↵
   12VDC Power
        11.86       ⇳
⇩
   Factory Reset
   19:03 21/06/11 ⇳
⇩
   Admin Password
   Default         ⇳
⇩
   Watchdog Resets
            0      ⇳
⇩
   Firmware Version
   D212            ⇳
Back
Communicate     ↵
   IP Address      ↵
   10.10.6.106     ⇳
⇩
   Netmask         ↵
   255.255.255.0   ⇳
⇩
   Gateway         ↵
   10.10.6.1       ⇳
⇩
   Primary DNS     ↵
   10.10.6.1       ⇳
⇩
   HTML Port
           80      ⇳
⇩
   MAC Address↵
  ####:#####:####  ⇳
Back
```

```
Configure
⇩
   Metric Units    ↵
   No              ⇳
⇩
   Keypad Password↵
   No              ⇳
⇩
   Log Period      ↵
   30 Min          ⇳
⇩
   USB Log Size    ↵
   Last 7 Days     ⇳
⇩
   Key response    ↵
          200 mS   ⇳
⇩
   HOA response    ↵
       2000 mSec   ⇳
Back

Time&Date          ↵
DD/MM/YY HH:MM     ↵
01/01/11 00:00     →⇳
⇩
Weekday            ↵
Sunday             ⇳
Back
Enable I/O         ↵
   Enable Inputs   ↵
   0 Unused        ⇳
⇩
   Enable Outputs  ↵
   0 Unused        ⇳
Back
```

Next, the **Operation** menus are organized and accessed this way. Starting at the main LCD screen:

```
Pool ###.#mV  ↵
#.#pH ##.#F   ⇳
```

pressing the **DOWN** ⇩ key,

```
⇩
Pool Oxidant    ↵
OFF: Setpoints  ⇳
```

If alarms are present, screen will toggle between these two screens

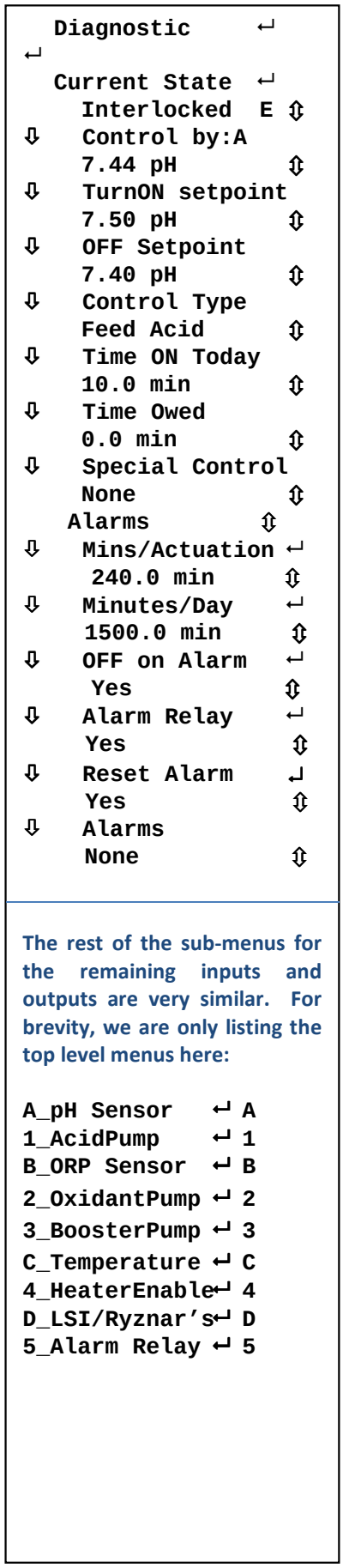
```
Alarms:         ↵
A D 1           ⇳
```

Pressing ↵ will take you into the alarm option screens:

```
     Clear Alarms   ↵
↵
     Cleared Alarms
      Reset All     ↵
⇩
     Activity Log   ↵
⇩
     Alarms         ↵
Back
     Alarms         ↵⇳
↵
     A_pH           →
     Alarm Low      ⇳
⇩
     1_Acid Pump    →
     Alarm High     ⇳
       .
       .
   Activity Log     ↵
    A_pH Sensor     →
    Calibrated      ⇳
⇨
   Admin            →
   13:59 12/01/12⇳

⇩  3_Booster Pump  →
    Disabled        ⇳

⇨   admin           ⇨
    13:49 12/01/12⇳
       .
       .
Back
```

Pressing the down arrow will cycle through all the active inputs and outputs in alphabetical order, starting with the inputs being used for control of an output, followed by the associated relay the input is controlling. After the alarm screen pressing the down arrow key ⇩ shows:

```
  A_pH Sensor   ↵A
  7.44 pH       ⇳
↵
   Calibrate    ↵
↵
    Enter Value ↵
    7.44 pH     ⇳
⇩
    Factory Reset ↵
    Yes           ⇳
⇩
    1 Point Calib. ↵
    Yes            ⇳
  Alarms           ↵
↵
    High Alarm     ↵
    7.80 pH        ⇳
⇩
    Low Alarm      ↵
    7.00 pH        ⇳
⇩
    Delay on alarm ↵
      5.0 Min      ⇳
    ⇳
Back

Diagnostic      ↵
⇩ Sensor Type
   pH Sensor       ⇳
⇩ Current State
   Operational     ⇳
⇩  Displayed Value
   7.45 pH         ⇳
⇩  Compensation
   None            ⇳
⇩  Gain Multiply
     -0.0170       ⇳
⇩  Default Gain
     -0.0170       ⇳
⇩ Offset Adjust
     6.9422        ⇳
⇩ Default Offset
     7.0000        ⇳
⇩ Measured Level
     -83.5 mV      ⇳
Back
⇩
1_Acid Pump   ↵1
OFF:Setpoints

Auto Control  ↵1
Ø=Auto →=Of   ↵
↵
  Setpoints       ↵
↵
   TurnON setpoint↵
   7.50 pH         ⇳
⇩   OFF Setpoint   ↵
   7.40 pH         ⇳
Back
```



The rest of the sub-menus for the remaining inputs and outputs are very similar. For brevity, we are only listing the top level menus here:

```
A_pH Sensor    ↵ A
1_AcidPump     ↵ 1
B_ORP Sensor   ↵ B
2_OxidantPump  ↵ 2
3_BoosterPump  ↵ 3
C_Temperature  ↵ C
4_HeaterEnable ↵ 4
D_LSI/Ryznar's ↵ D
5_Alarm Relay  ↵ 5
```

More Information

More detailed electrical connections and configuration information can be found in the Users, Browser and Install manuals available from your **ProMinent** Aquatics distributor, or from:

ProMinent Fluid Controls, Inc.
136 Industry Drive
Pittsburgh, PA 15275-1014
Tel: (412) 787-2484
Fax: (412) 787-0704
eMail: sales@prominent.us
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