Browser Manual

ProMinent® DCM 2 series

Aquatic Water Quality Controller

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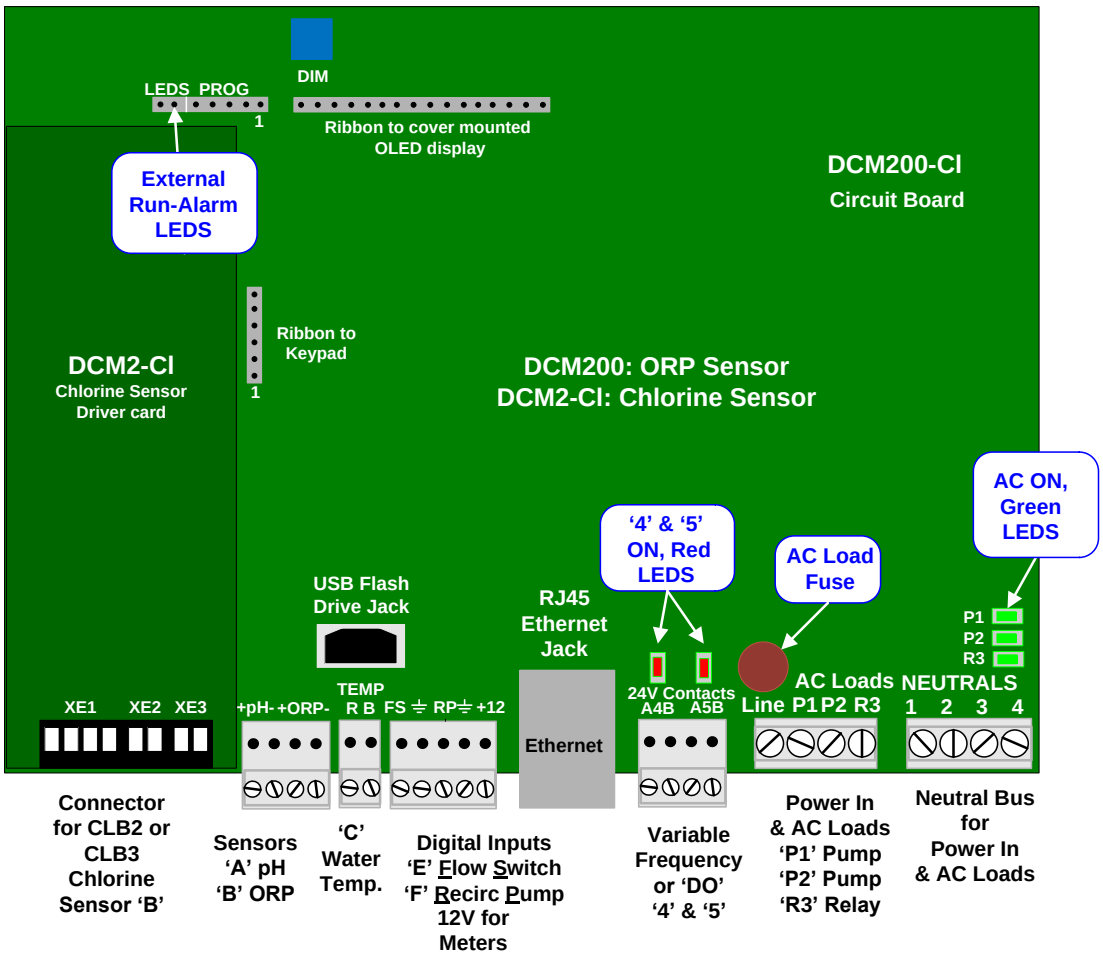
CONTENTS

Sidebars:
Are used to explain typical uses for feed and control functions.
Sidebars are at the bottom of the page detailing the function.
New users & users new to automated controls should find these explanations helpful.

DCM2 series controllers are shipped preconfigured.
This manual supports re-configuration required as you add and modify the way
you feed chemicals and manage filters, heaters and sensors

Users may re-name controller inputs & outputs at each site.

DCM2-Cl Browser
DCM2-Cl Input-Output Names



Physical Connection Locations on the Circuit Board.

Sidebar:

The physical connection points for inputs & outputs are designated in the DCM2 software by letters (**A-F**) for inputs & numbers (**1-5**) for outputs.

Inputs: Analog Sensors: **A to C** Virtual input '**D**' is the calculated LSI-Ryznar index values.
E is dedicated as the sample flow switch, and cannot be changed.
F can be used as a flow switch, level switch, water flow meter or other contact set.

Outputs: Outputs: **1 to 3** are 120VAC Relays.
Outputs: **4 & 5** are Dry contacts or frequency pulse outputs (Rated 24VDC & 250mA max)

Using letters & numbers provides a compact, generic way of defining a control input or output;
Example: The sensor connected to input '**B**' controls the pump connected to relay '**2**' when the flowswitch connected to input '**E**' is closed. Users can label **B** & **2** with site specific names, but **E** cannot be changed.

Complex controls can be defined by letters (sensors) & numbers (pumps & solenoids).
Inputs & outputs don't need to have fixed functions & a more flexible controller results.
You will see references to these letters and numbers throughout the software, including the browser screens. Understanding the software's use of these generic labels should help you as you navigate the controller's software.

DCM2-Cl Browser
1.0 Day-to-Day Browsing

1.1 Connect

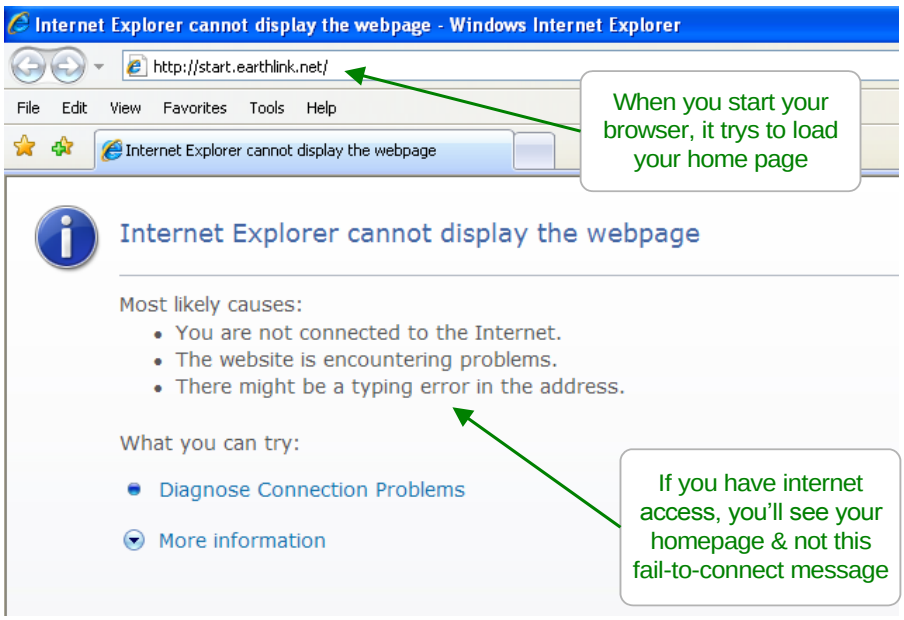
On-Site using a Notebook PC to a DCM2 with an Ethernet cable. (Not connected to the Site Local Area Network (LAN)

A. You may need an Ethernet crossover cable available from office supply & electronics stores, depending on the age and sophistication of your computer. Newer PC's have auto crossover Ethernet connections.

B. You'll need to set up a new connection in your notebook or PC.
Refer to Section 8.

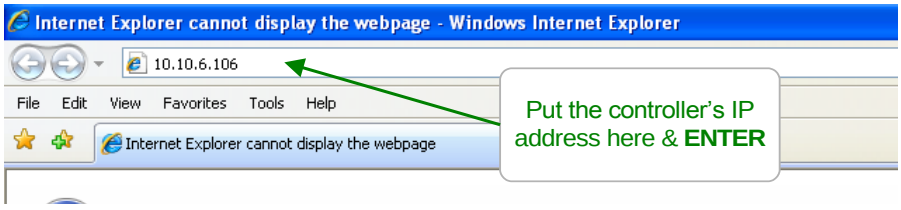
Connect into the Ethernet jack extension conveniently protruding from the bottom of the DCM2, or you can remove the cover screws, open the controller enclosure lid and plug into the controller's Ethernet jack located on the lower center of the main circuit board.

Start your preferred browser like **Internet Explorer, Google Chrome** or **Mozilla's Firefox**.
NOTE: ProMinent's **Trackster 3** program does not connect to the DCM2 controller platform.



Notebook PC & Over the Site LAN

Key the controller IP address into the PC's browser address.
You can find the controller's IP address using the controller keypad (default = **10.10.6.106**).
Refer to Section 9.

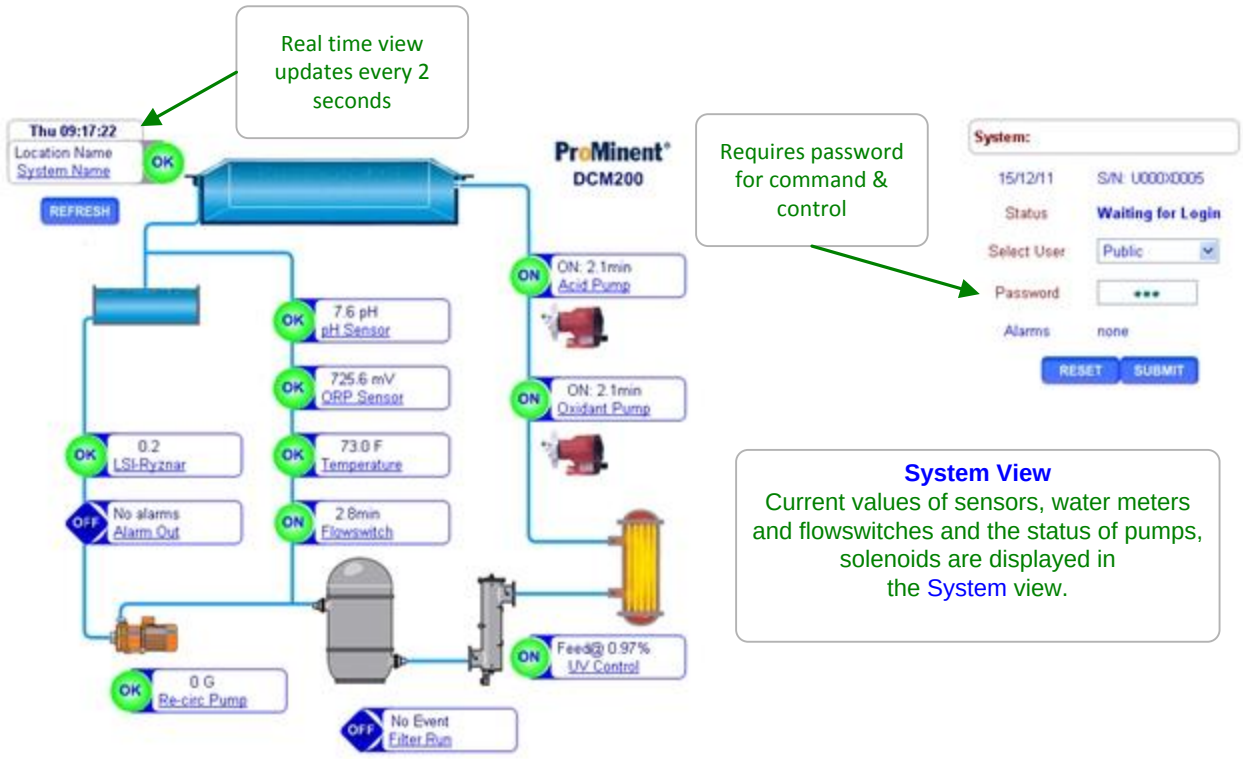


DCM2-Cl Browser

1.1 Connect continued

Remotely using a VPN
If the network administrator has provided you with VPN (Virtual Private Network) access to the site LAN, you'll need to start the VPN application on your PC to gain access to the site's LAN. See your IT person or the VPN administrator for more details. Once connected to the site LAN, follow the previous, **'Over the Site LAN'** procedure.

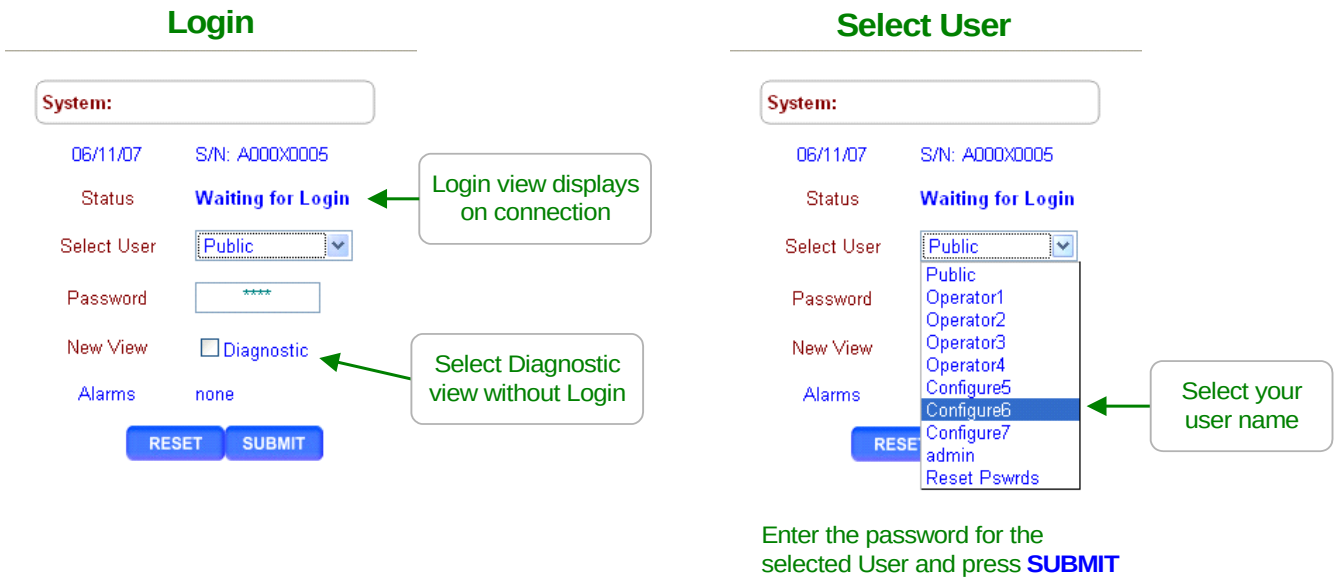
Here's what you'll see in your browser on first connect.



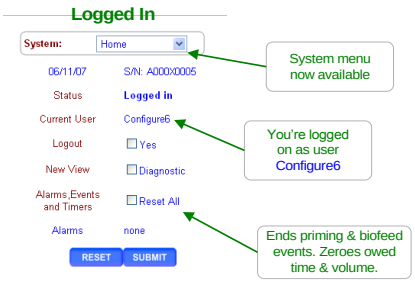
Note: Views are optimized for limited resolution displays, notebooks & PCs at 1024 x 768 pixels.

DCM2-Cl Browser
1.2 Log-in

Pull down the **Select User** list and select a user id.
Key in the **Password** for the selected user ID & press **SUBMIT**.
Status updates you on an incorrect password.
Once you've logged in you can change your user ID & password.



Once you've logged in, the controller's home page changes to show your user ID, **Current User**.
Press the link at any sensor, meter, pump, solenoid or valve to view or modify.



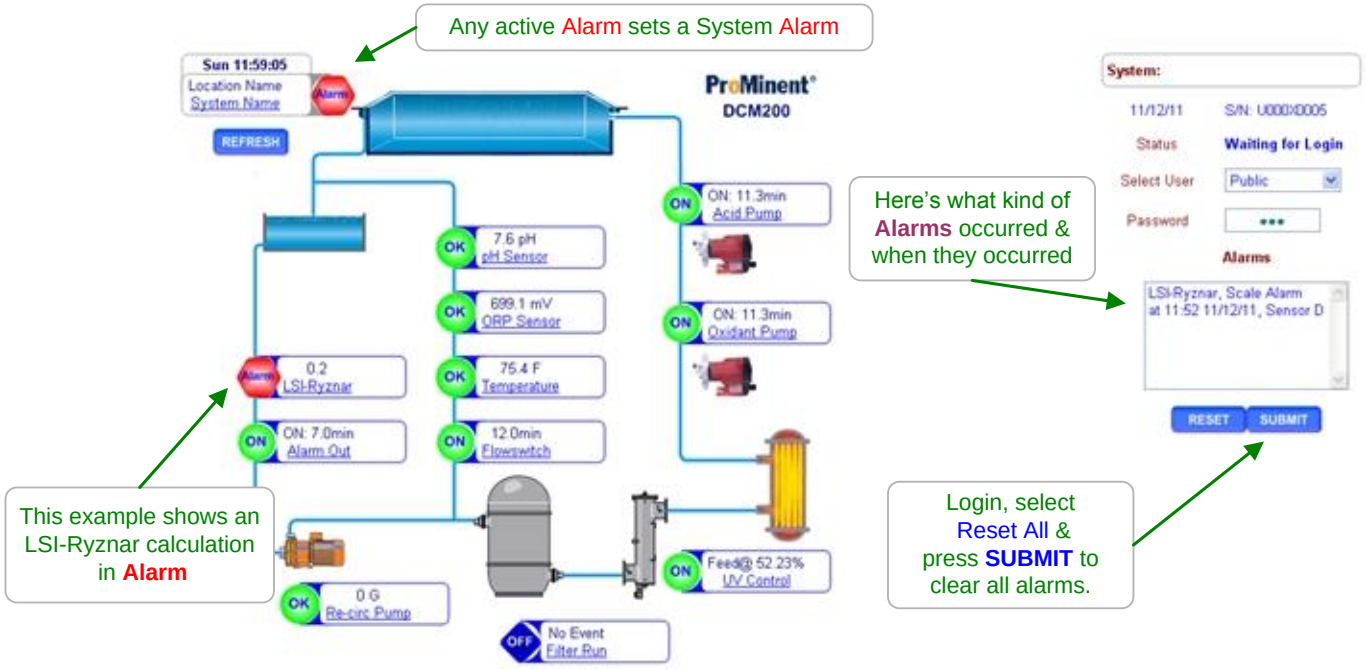
Default Passwords:
The factory default passwords are**:**
Operator1 = **1** Operator2 = **2** Operator3 = **3** Operator4 = **4**.
Configure5 = **5** Configure6 = **6** Configure7 = **7** Administrator = **AAAA**
There are 3 password levels, Operator, Configure and Administrator.
The User IDs are used in the controller's keypress log.

WARNING: 5 incorrect passwords, blocks logon until 7:00AM or until a power OFF/ON.

DCM2-Cl Browser

1.3 Checking & Clearing Alarms

Alarms display as **RED Alarm** hexagons.
Any alarm also sets the System alarm beside the Day-Time display.



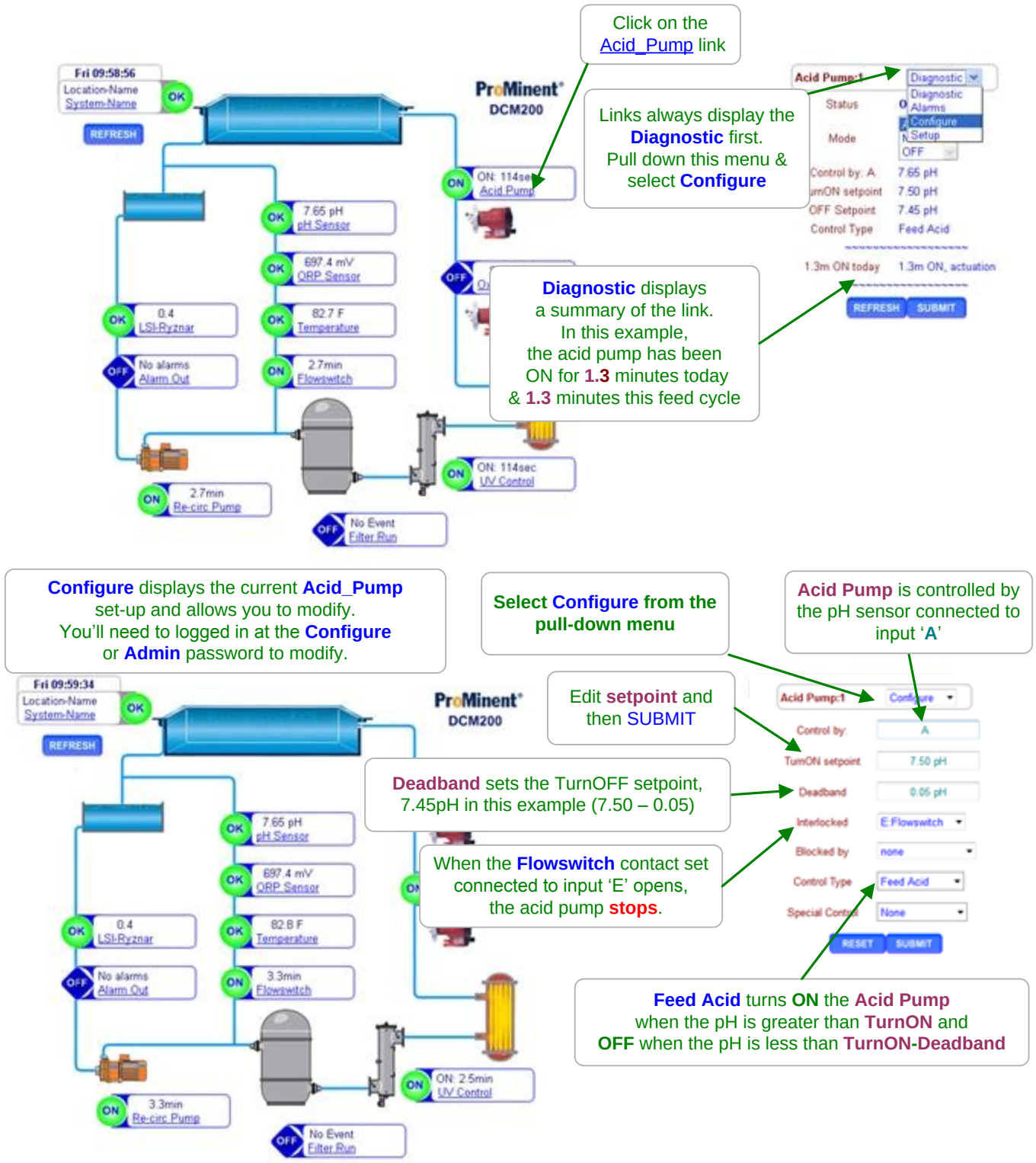
Sidebar:
Sensor alarms will alarm again, or re-trip, after the user set "Delay on Alarm", unless the fault is corrected.
Relay controlled pumps will alarm on Minutes/Actuation time. Frequency controlled pumps alarm on volume.

Individual input-output alarms may be cleared by selecting the input or output link and then selecting **Alarms** from the pull down menu at the top of the right side of the screen.

DCM2-Cl Browser

1.4 View & Adjust Setpoints

Setpoint controls are located in the Feeder or Pump (Relay) settings. Setpoint values will vary with the use of the feeder.
The following typical example changes the pH sensor controlled Acid Pump setpoints.



1.4 View & Adjust Setpoints continued

Relays (Pumps or Feeders) controlled by Chlorine, ORP, pH or temperature sensors have a setpoint limited by each sensors High and Low Alarm setpoints. If you attempt to adjust a control setpoint outside of the alarm limits, you'll get an **ON=OFF fault Status** message.

'**Interlocked**', '**Blocked by**', '**Control Type**' and '**Special Control**' are detailed in following sections of this manual.

Interlocked turns off pumps & feeders when flowswitch or another contact set turns OFF(opens).

Blocked by prevents a feeder from turning ON when another feeder is ON.

Control Type selects the setpoint order. For example, when you select **Feed Caustic**,
TurnON is less than **TurnOFF**. **Feed Acid**, reverses this setpoint order.
TurnOFF is calculating by adding or subtracting **Deadband** from **TurnON**

Special Control selections vary with sensor and output type.
For example,
Oxidant feeds may select PID control.
Outputs without a controlling sensor may be used to feed a chemical by a timer (filter aid or probe wash), or activate an alarm signal.

Sidebar:
Relays (AC powered contacts) are controlled by sensors to power Pumps and Solenoids ON and OFF. (AC Relays are outputs **1** to **3**)

24VDC output contacts can be used for Frequency control of pumps or Simple On/Off control of other devices.
Frequency controlled Pumps feed chemicals at varying rates. Other devices that are frequently controlled by DC contacts in pools are: Salt Chlorine Generators, Heaters, and UV systems.
(24VDC contacts are outputs **4** & **5**)

Digital Outputs are dry contacts rated 24VDC & 250mA and are either ON/closed or OFF/open (Digital Outputs, DO are outputs **4** & **5.** Outputs **4** & **5** are user configurable as frequency or Simple ON/OFF)

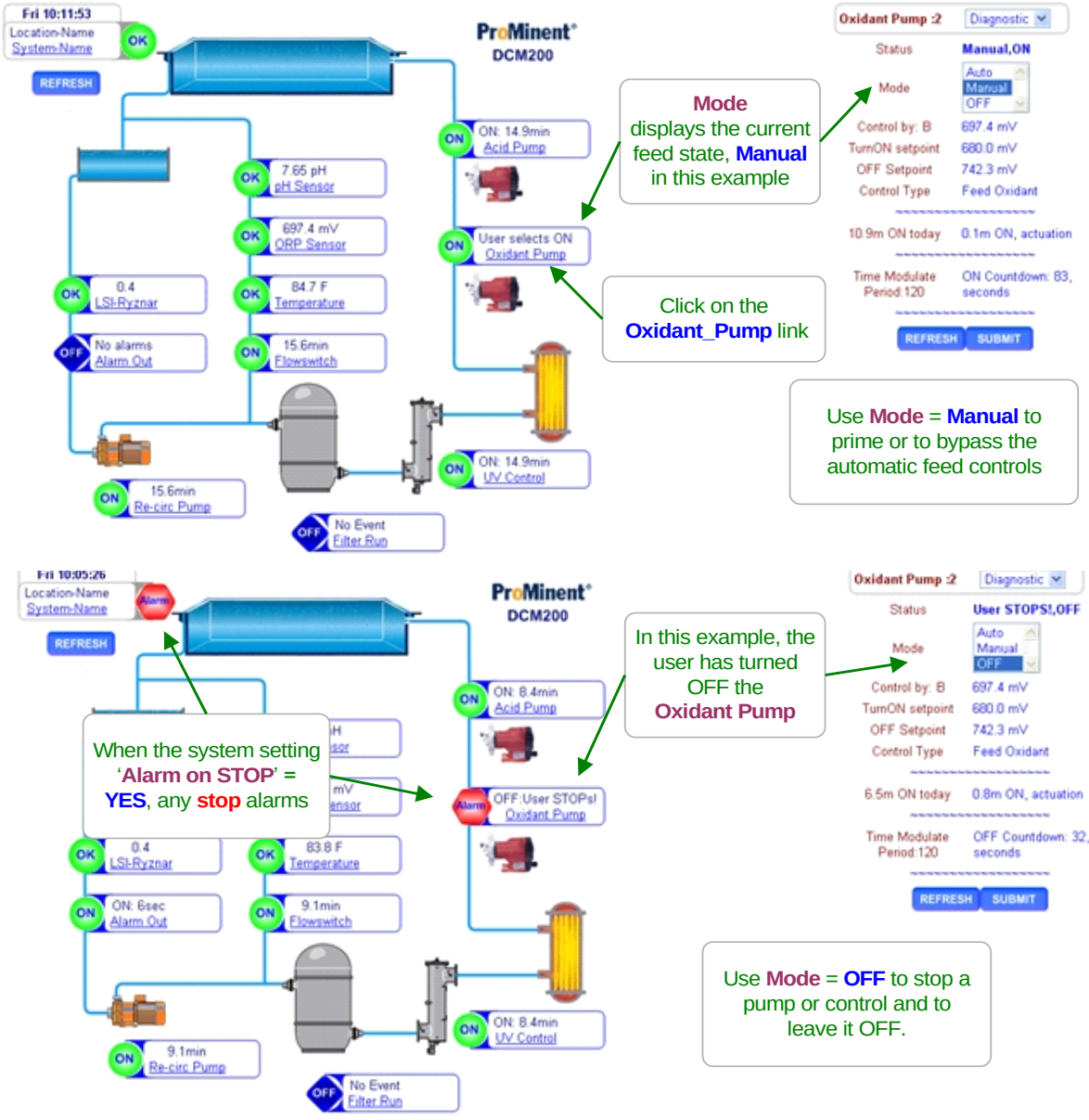
ON-OFF Acid pumps typically use setpoints 0.05 pH apart so that the delay between feeding acid and measuring its pH does not cause wide pH swings.

Pay attention to the number **:1** to **:5** that follows the pump or solenoid name.
It's the physical location on the controller circuit board that connects to the feeder or output device.

You may modify the name of the pump, feeder or solenoid but you'll need to know which output is controlling it, so you can check that the P**1** to R**3** **GREEN** or **4** & **5** **RED** indicating LED is ON when the pump, feeder or solenoid is ON.

1.5 HOA: Manual On (Hand)-OFF-Auto

Controlled outputs default to '**Auto**' allowing the DCM2 to control the pump, solenoid or feeder using an associated sensor.
'**Manual**' overrides controls and turns the output ON for priming & testing of pumps & solenoids. The default minutes/manual time is 5 minutes, after which the feeder reverts to AUTO
'**OFF**' turns the feeder OFF, by opening the digital output (DO).
Cycling controller power has no effect on an '**OFF**' pump or solenoid.



Sidebar:
Manual may also be used to slug feed during a system start-up in addition to testing pumps, dry contact outputs or solenoids.
Safeguards: A pump or solenoid that is Interlocked, Blocked or OFF on alarm will not turn ON when **Manual** is selected. This safeguard blocks feeding chemicals into a non-flowing line. Minutes/Manual will turn OFF **Manual** on time or volume limit if configured for **OFF on Alarm**.

DCM2-Cl Browser
2.0 Chemical Feed Controls

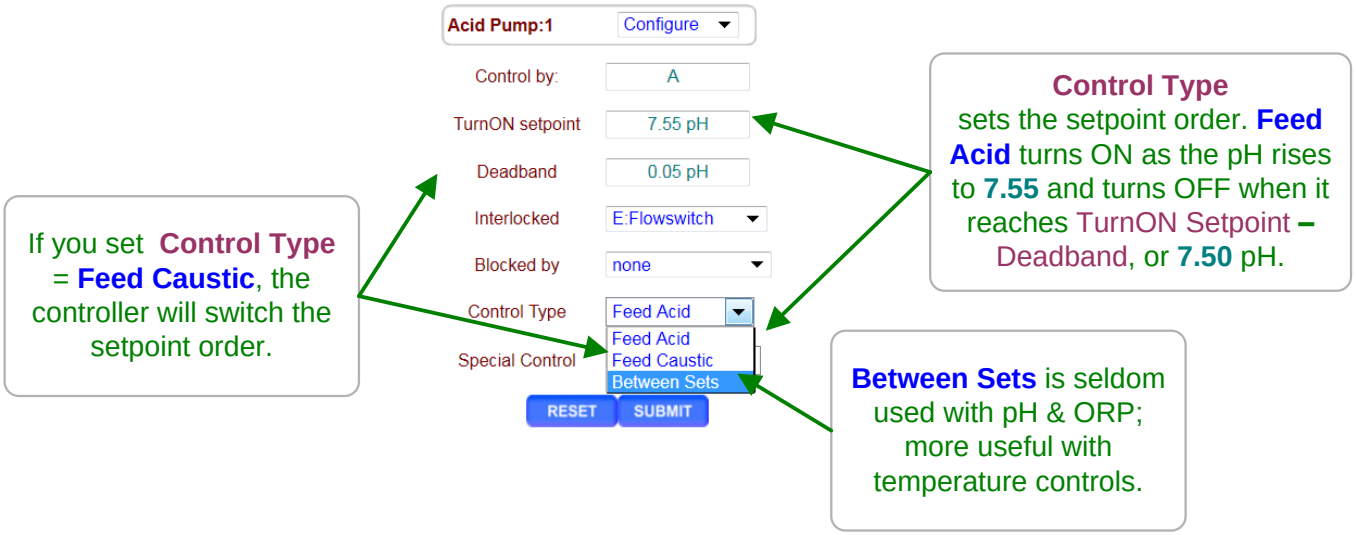
2.1 Sensor Controlled ON/OFF Feed

Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Configure.**

Sidebar
Setpoints may be set incorrectly. Sensors eventually fail. Solenoids & Pumps fault.
Refer to **Section 2.5 Limiting Feed & Alarms** to control a fault response.

DCM2-Cl Browser
2.1 Sensor Controlled ON/OFF Feed continued

Control type:
Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Configure.**



Each feeder controlled by a sensor uses a **Control Type** set by the chemical being fed. ORP, pH and temperature sensors have **Control Type's** specific to the sensor.

For example, when you select a temperature sensor, the **Control Type** options are **Lower Temp** & **Increase Temp**.

Sidebar:
Control Type is not applicable or displayed for water meter based feeds.

Between Sets turns ON a pump or solenoid whenever the controlling sensor value is between the TurnON &TurnOFF setpoints. This **Control Type** finds use in blocking and sequential PLC type controls.

Setpoint Order:
The controller will automatically switch the setpoint order to fit the selected **Control Type**, inserting a **Setpoints Switched** message into the **Status** line of the right hand side of the page.

DCM2-Cl Browser
2.2 Proportional Feed

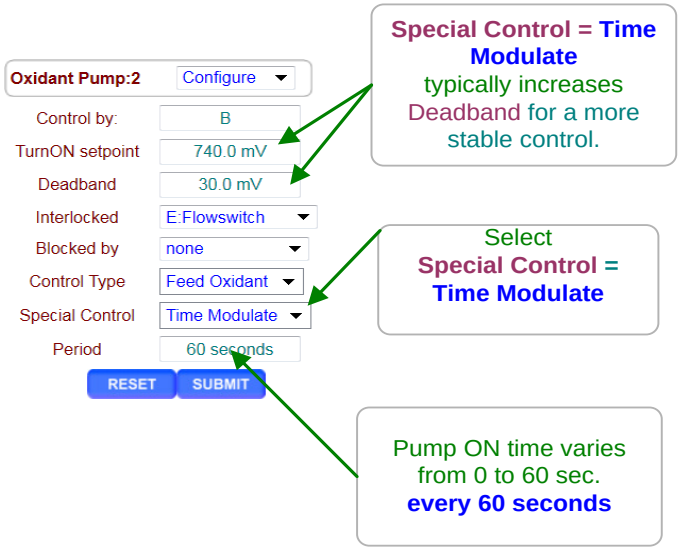
Special Control: Time Modulate for ON-OFF Pumps

Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Configure.**

Time Modulate allows an ON/OFF pump or feeder to operate like a frequency or 4-20mA controlled pump.

This **Special Control** is used feed proportionally to a sensor value.

ON-OFF pumps are typically set to maximum stroke and rate when **Time Modulate** is selected.



Sidebar:

Frequency controlled pumps connected to controller outputs '**4**' & '**5**' are proportionally controlled as the controlling sensor varies the pump frequency.

Often there is a desire to proportionally control an ON/OFF pump connected to one of the controller power relays '**1**' to '**3**'.
Examples: The pump may be oversized for light loads or turning down the pump stroke or frequency may cause loss of prime or feed line blocking.

The **Time Modulate Special Control:**
The Deadband setting used for ON/OFF control is used differently in the Time Modulate Special Control. In Time Modulate, the "Deadband" is used to define the proportional span or the proportional range between completely ON and completely OFF. Specifically between the TurnON Setpoint, and the value of (TurnON Setpoint + Deadband [Proportional Span]).

Between setpoints, linearly increases the ON time from zero @ the **TurnOFF** to always ON at the **Turn ON** setpoint.

Example Above: Period=60 seconds, ORP **Turn ON** = 740mV, Deadband= 30mV, TurnOFF= 740+30=70mV.
Current ORP = 750mV. 750 is 1/3 of the way between the range of 740-770mV, or 2/3 of the way to 100% ON point of 740mV.
ON time = 2/3 of 60 seconds or 40 seconds in every 60 seconds, OFF time is = 20 seconds in every 60 seconds.

Time Modulate Special Control works for acid & caustic, chlorine, oxidant & de-chlor, setpoints.

DCM2-Cl Browser

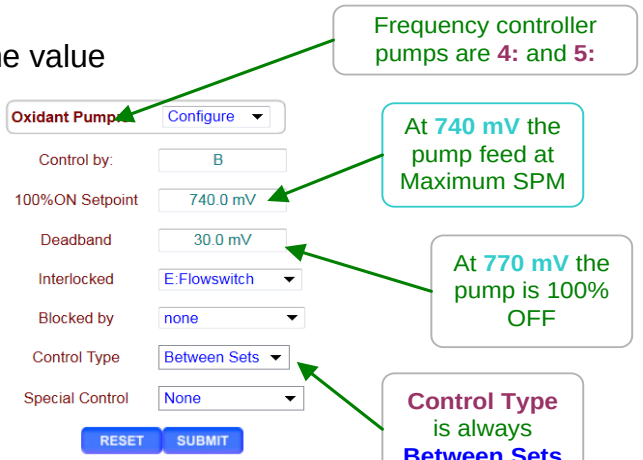
2.2 Proportional Feed

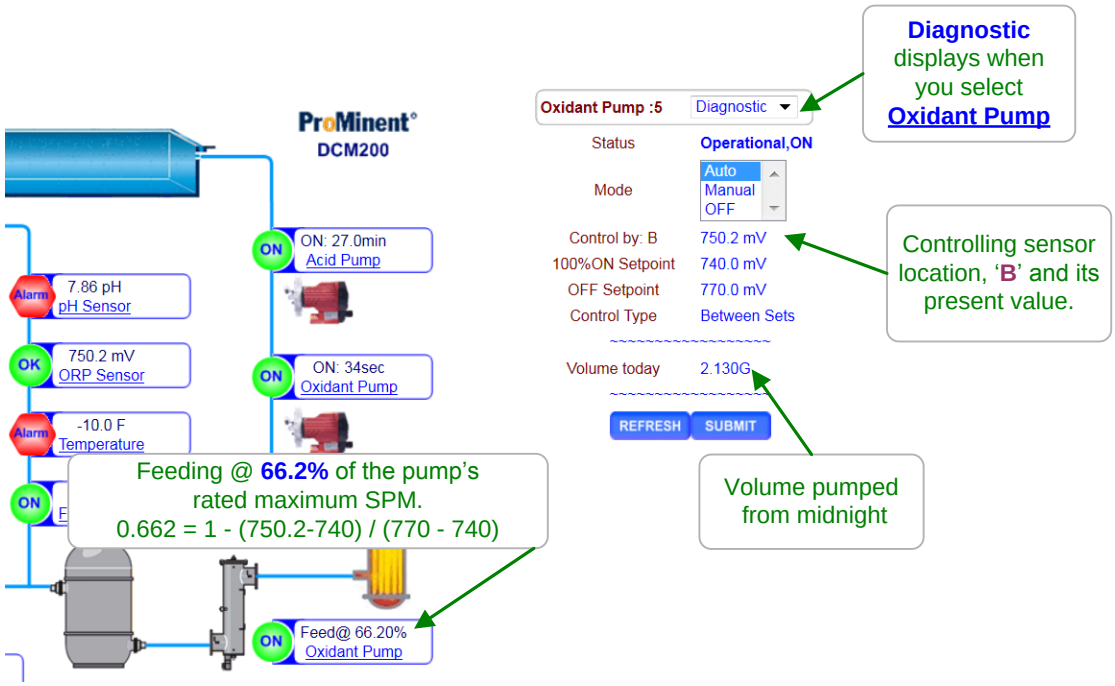
Frequency Controlled Pumps

Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Configure.**

Frequency controlled pumps modify the feed rate as the value of the controlling sensor changes.

In this example, the pump frequency increases as the ORP falls towards 740mV.
At 740mV the oxidant is fed at the maximum rate, increasing as the ORP decreases.





Sidebar:
In this example the pump is rated @ 180 SPM, Strokes per Minute, and pumps 0.10mL / stroke so we're pumping (180 x 0.1 x 0.662) 11.92 ml/minute or 715 mL/Hr or 0.188 Gallons/hour

DCM2-Cl Browser
2.3 Base Feed

Base feed is rarely used in Pools and Spas, but the controller has the ability to feed a pump at a constant rate of less than 100%, if needed.

Here's how: Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Configure.**

AC ON-OFF Pumps: Setting the **% ON Time** greater than 100%, sets the % to 100.
12% ON time is 36 seconds ON in every 5 minutes (0.12 x 300 seconds).

Frequency Controlled Pumps: If you set a **Feed** rate greater than the pump rating, the controller will set the feed rate to pump maximum SPM. If the pump is rated 180 strokes/minute & 0.1mL stroke, the rate will be set to **18mL/min**.

Sidebar:
Base Feeds are used to continuously feed a chemical with a frequency controlled pump.
While not normally used in Pools and Spas, the ability to remotely control a frequency controlled pump could be useful for unique situations.

Concentration is modified by changing the frequency controlled pump (**4** & **5**) feed rate or Relay (**1** to **3**)**% ON Time**.

DCM2-Cl Browser
2.4 PID Controls

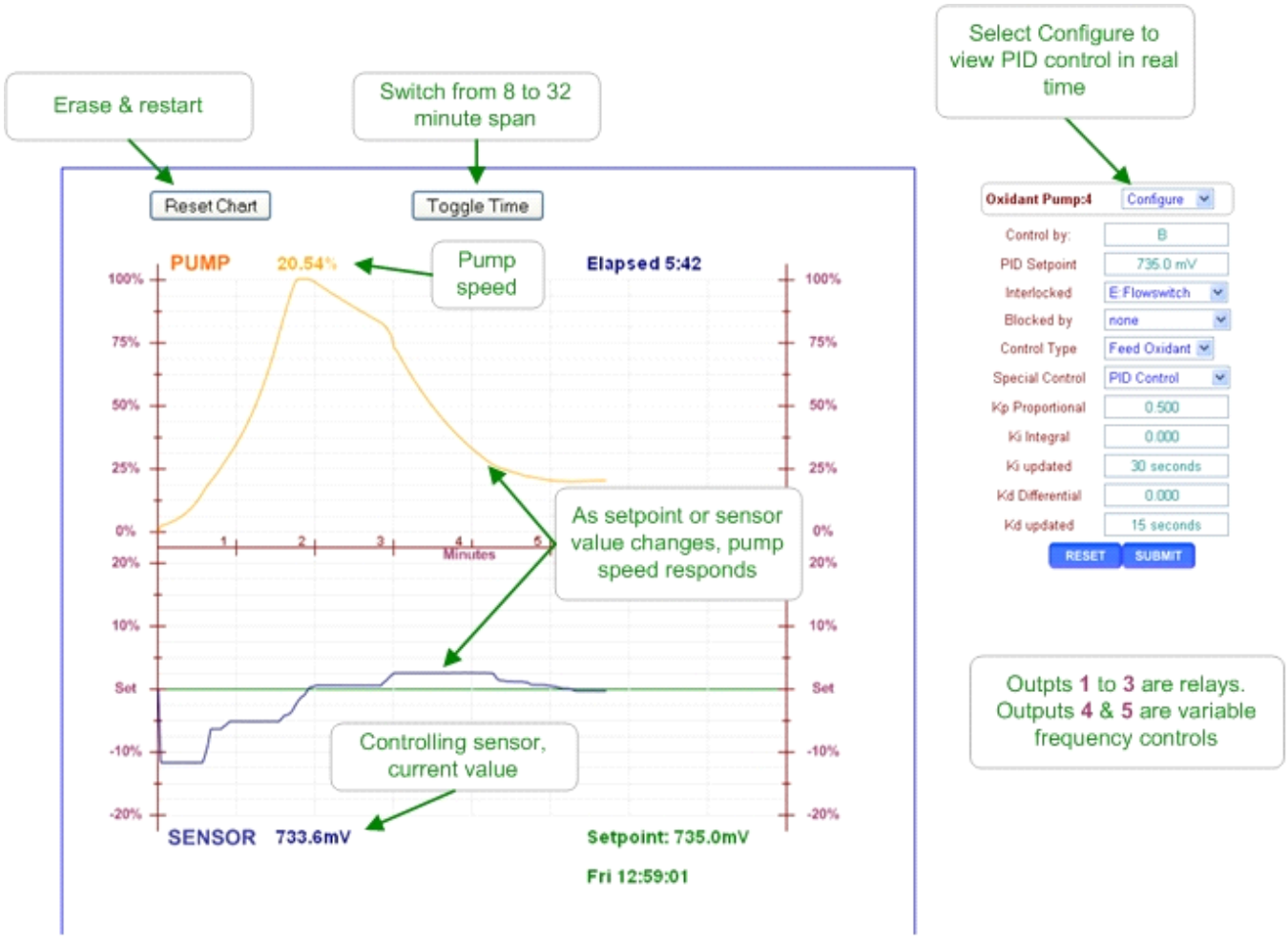
Each of the frequency-controlled pumps, outputs 4 & 5, can be configured for PID (Proportional-Integral-Derivative) control.

Relay outputs 1 to 3 may also be configured for PID control, implemented by continuously modifying the pump-powering relay ON & OFF times.

Users of the Mozilla Firefox browser and newer Microsoft Internet Explorer versions can view a real time 'chart' of pump rate versus setpoint as they adjust Kp, Ki & Kd to tune the PID loop response. The 'chart' HTML tag is not supported by Internet Explorer prior to Version 9.

Chart time spans of 8/16 minutes and 32/64 minutes are supported.

Set a pump **Special Control** = **PID Control** & charting will start on the next **SUBMIT** & re-start every time you select **Configure** on the pump.



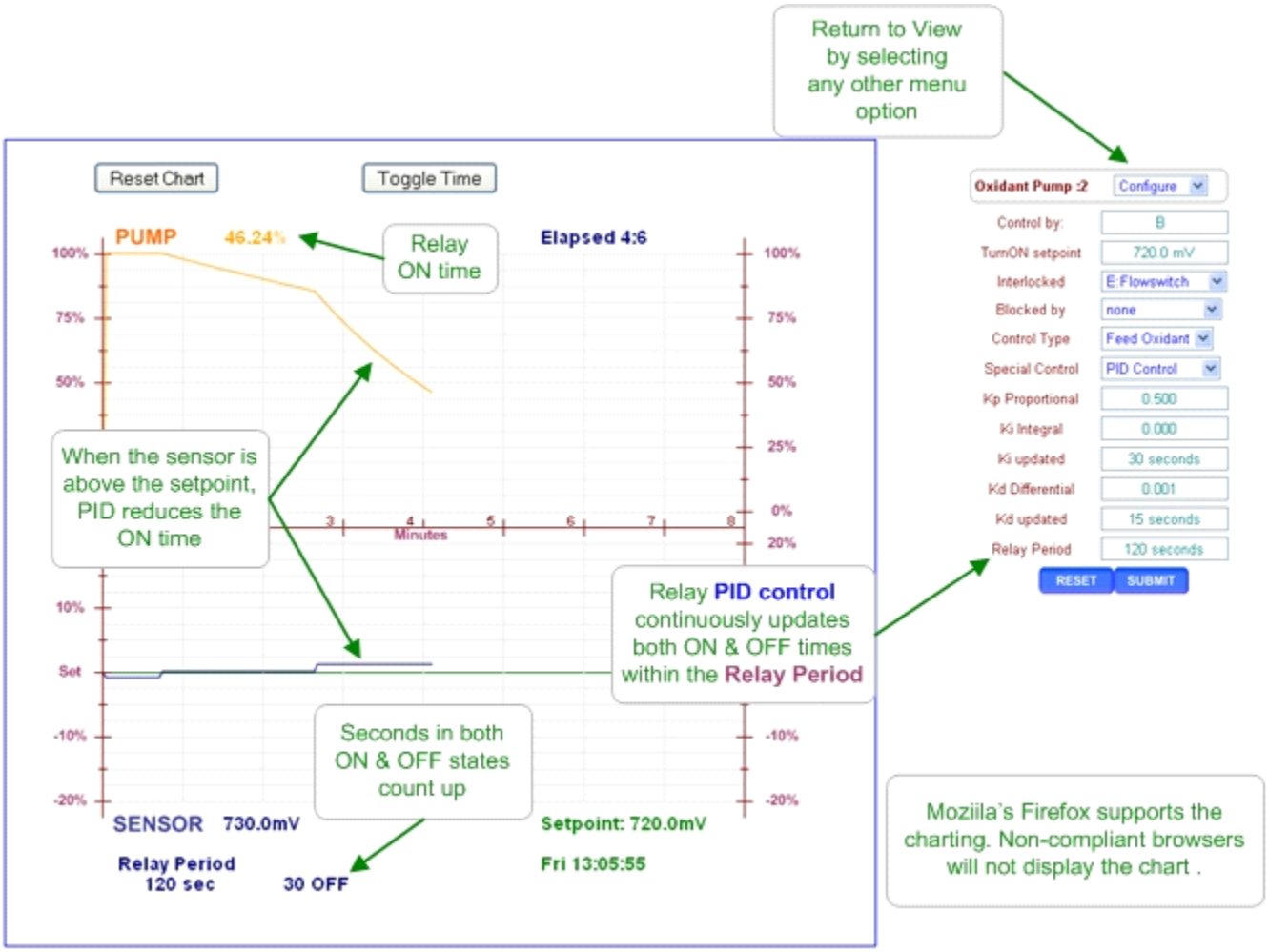
DCM2-Cl Browser
2.4 PID Controls

Most aquatics systems have a time delay between feeding the chemical and the controlling sensor measuring the effect of the fed chemical.

This delay effectively adds to the **Kp** value to make PID feed systems oscillate & means that few aquatics chemical feed systems will need **Ki**.
The default **Ki** & **Kd** settings (0.001) disable the Integral & Derivative control.

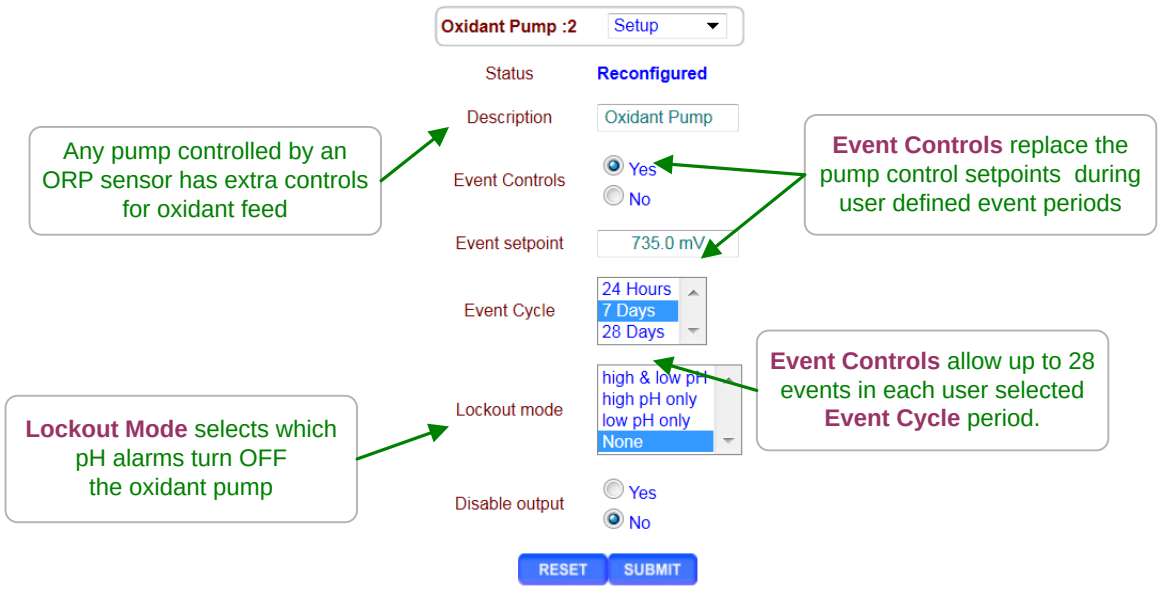
Most feed systems and slow responding systems in particular will benefit from frequent (**Kd Updated** = **1 second**)., differential control (**Kd** > **1.0**).

ON/OFF pump PID controls include the **Relay Period** field and the real time chart includes a display of the ON & OFF times within each **Relay Period**.



DCM2-Cl Browser
2.5 Oxidant Feed Controls

Pumps and solenoids controlled by ORP & Chlorine sensors have additional, optional controls.



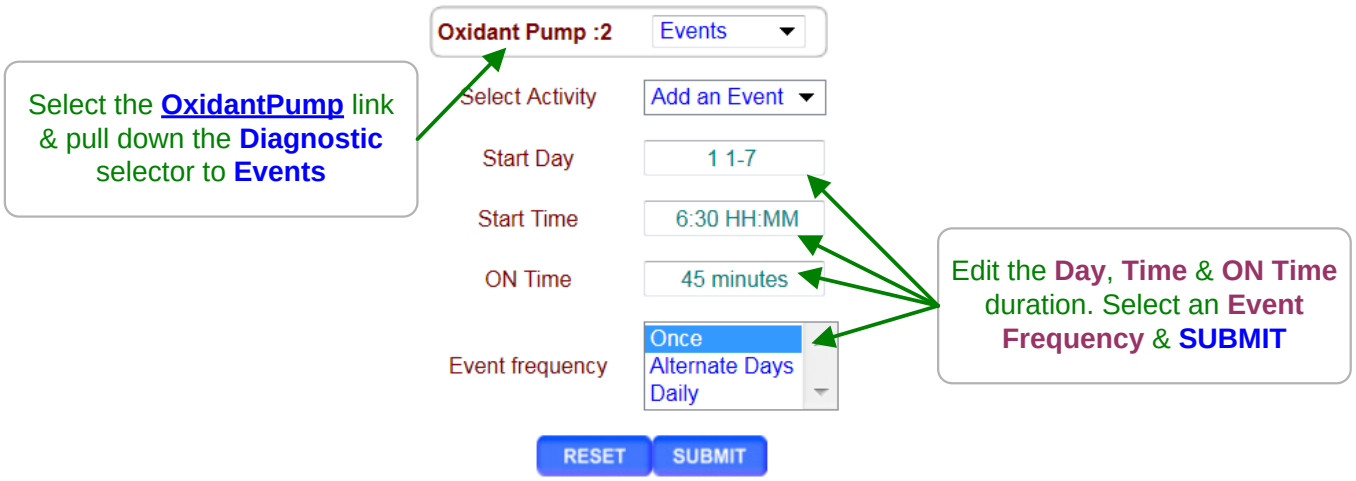
Sidebar:

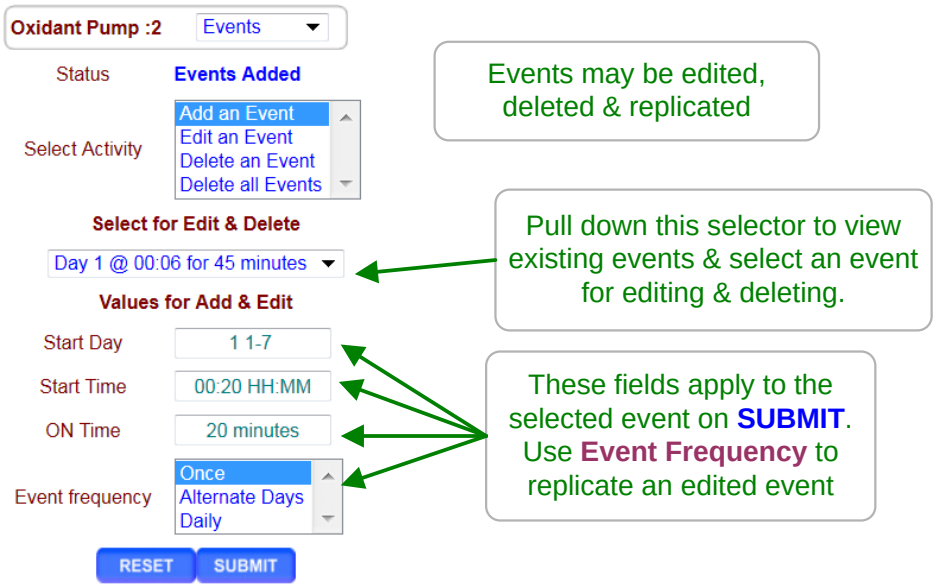
Event Controls are used to implement periods of high oxidant or low ppm (alternate setpoint) typically when the water feature or pool is offline.

If **Event Controls** = **No**, the **Events** pull-down option and Event sub-fields on the **Setup** page do not display.

DCM2-Cl Browser
2.5 Oxidant Feed Controls

If **Setup Event Controls** = **Yes**, pull down & select **Events** on the oxidant feeder pull down to view and/or set events.





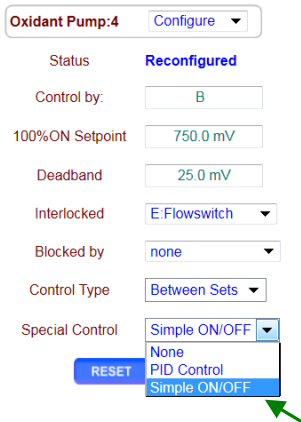
DCM2-Cl Browser
2.6 'Simple' ON/OFF Controls

Frequency controlled outputs **4** & **5** may be re-configured as dry contact ON/OFF outputs by selecting the **Simple ON/OFF Special Control**.

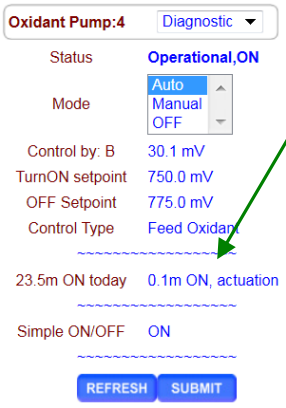
The **Simple ON/OFF** option is available for outputs controlled by sensors connected to inputs '**A**' to '**C**'.

Special Control = **Simple ON/OFF** is used to control devices, filters, UV's… that require a dry contact set to operate

Relay outputs **1** to **3** are powered at AC line voltage & would require an interposing relay to convert control to a dry contact set.



Select **Simple ON/OFF** to make a variable frequency output, a dry contact ON/OFF output



Simple ON/OFF controls report and log ON time, not volume pumped.

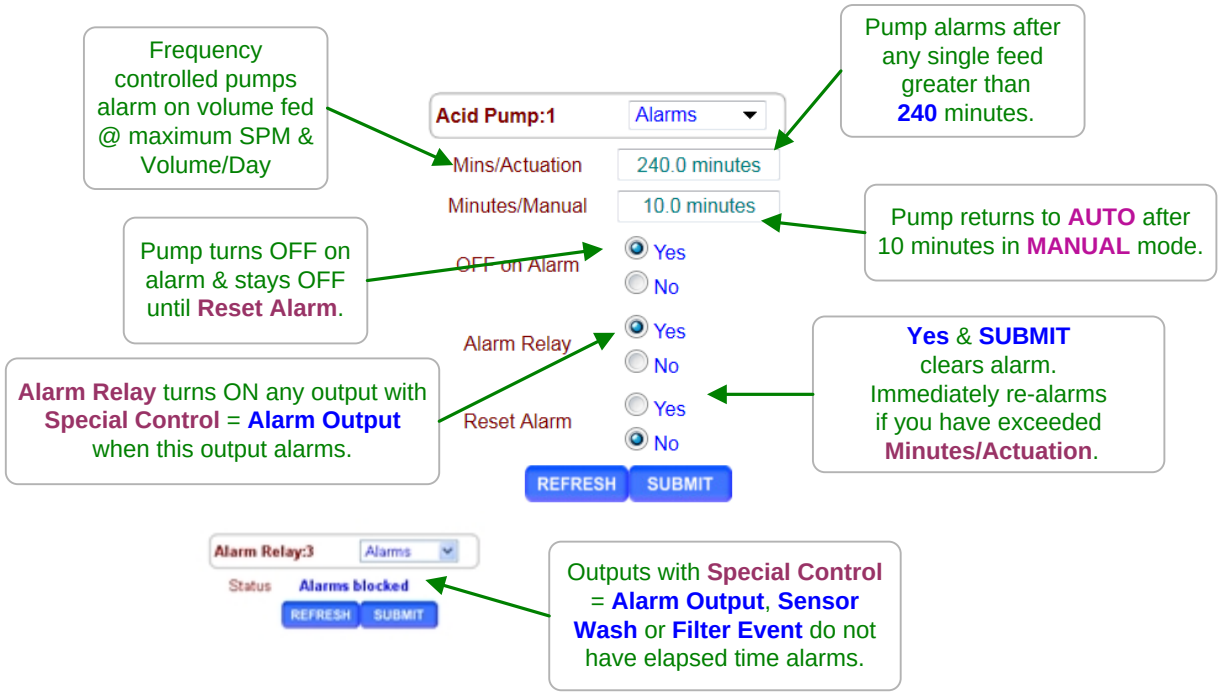
Simple ON/OFF controls by pH, chlorine ORP and temperature sensors do not require pump type selection and do not have added control options in the **Setup** page.

Sidebar:
Digital outputs **4** & **5** are DC isolated, floating, non-polarized, electronic contact sets. thermally fused @ 250mA & 30VDC.
Do not switch AC line voltages with these contact sets.

Thermal fusing prevents damage to the contact set due to wiring errors, recovering automatically when the wiring fault is corrected.

DCM2-Cl Browser
2.7 Limiting Feed & Alarms

Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Alarms.**



Sidebar:
Feed Limits are ON times for pumps & solenoids controlled by relays **1** to **3** and simple ON/OFF configured outputs **4** & **5.**
Feed Limits are volumes for frequency controlled outputs **4** & **5**.

Set the limit so that worst case operation on the hottest day or highest load will not trip the limit, avoiding nuisance alarms. In more critical applications, run the limit close to actual operating volume or time & use the limit alarms to flag unusual system operation.

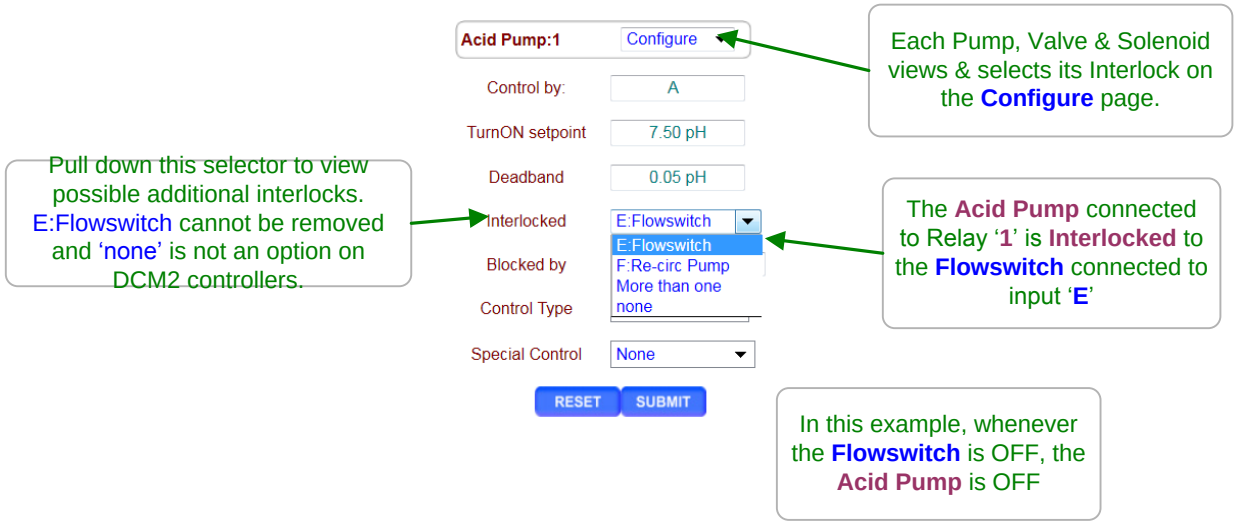
Chemical feeds other than Chlorine, Oxidant & Acid feeds are usually all set to **OFF on alarm** since an overfeed indicates an operating problem which requires correction whereas continuing to feed Chlorine, Oxidant or Acid may put users at risk. NSF Standard 50 Requires OFF on Alarm to be enabled.

The Minutes/Manual limit automatically returns to automatic control for users that inadvertently leave a controller in Manual mode.

Note: Unlike most timers in the DCM2 controller, the Minutes/Actuation alarm does not reset @ midnight so that feed events that start prior to midnight alarm correctly.

DCM2-Cl Browser
2.8 No Feed on No Flow

Select the link on the target chemical feed pump and pull down the top, right menu, selecting **Configure.**



Sidebar:
Interlocks are contact sets that must be closed for a Pump to feed, a Solenoid to open or a Feed Valve to operate.

Aquatics sites use a flowswitch installed in the modular sensor flow cell (DGMa) to detect that the pool/spa/water sample stream is flowing & it's OK to feed chemicals.

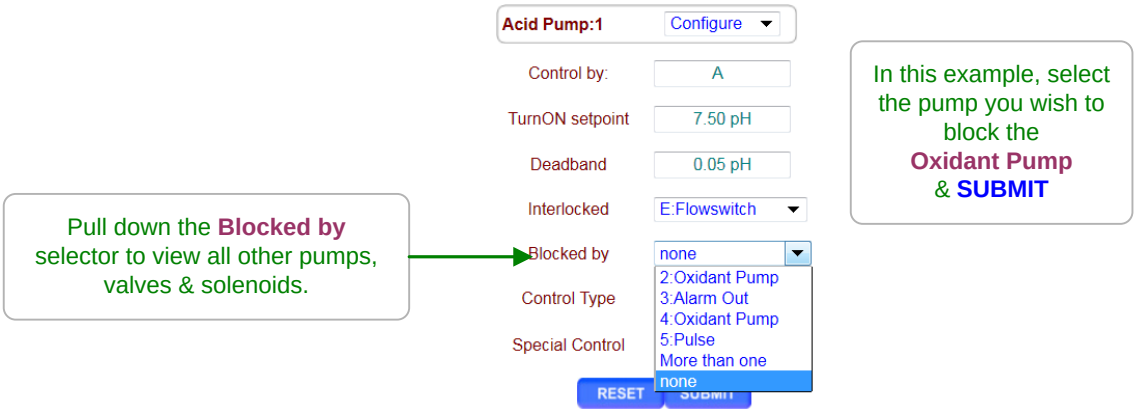
One or more closed contact sets may be required to **Interlock** a pump.
Examples:
If both the sensor sample flow switch (Input '**E**') and the circulation flow switch (Recirculation Pump Input '**F**') are ON, enable the oxidant pump. The oxidant pump **Interlocked = More than one**, **SUBMIT.** Then enter **E+F** in the Interlocked box, then press **SUBMIT** again.

If there is flow in the sensor sample flow line (Input '**E**') and the tank level switch (Input '**F**') shows chemical available, feed chemical. The chemical pump **Interlocked** = **E+F**

Interlocks may be configured with **OR** logic (either switch will allow chemical feed) using the '**/**' symbol or **AND** logic (both switches must be closed to feed chemicals) using the '**+**' symbol.

DCM2-Cl Browser
2.9 Blocking a Feed

Blocking prevents one or more chemicals from feeding at the same time. To configure a feeder with the Blocking feature, select the link on the chemical feed pump that you wish to block and pull down the top, right menu, selecting **Configure.**



Sidebar:
Blocking prevents one or more chemicals from feeding at the same time. If you are owed time or volume on the blocked pump (a timed feed event was interrupted), the controller remembers and feeds when the block clears.

A pump may be **Blocked** by one or more other feeders, pumps, solenoids or valves.

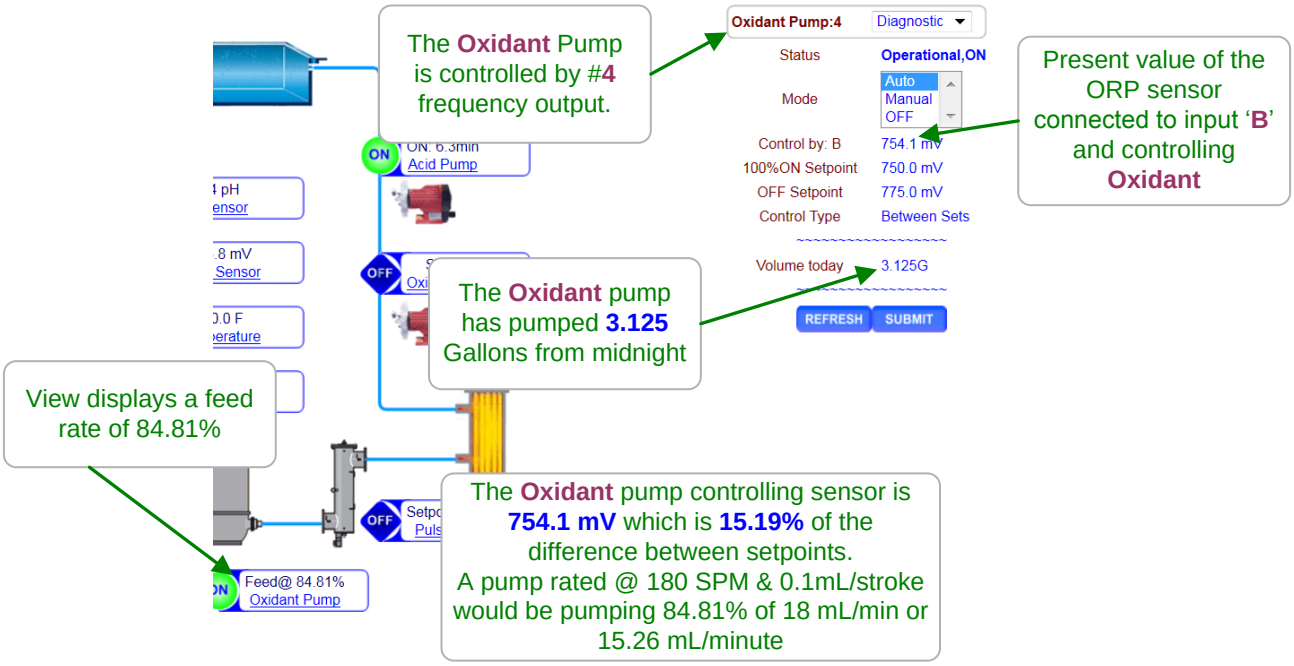
Examples:
1. You may wish to prevent acid and oxidant feed during an automatic water level 'fill' event. Blocking the Acid pump connected to Relay '**1**' and Oxidant pump connected to Relay '**2**' with the autofill solenoid connected to Relay **'3'**.
Acid & Oxidant Pumps **Blocked by = '3'.**

2. Some chemicals are degraded by high levels of oxidant. The Filter Aid pump is connected to Relay '**3**' & the Oxidant pump connected to Relay '**2**'. Filter Aid **Blocked by = '2'**

Caution: Be careful **Blocking** with frequency outputs '**4**' & '**5**' that are controlled by a sensor to ensure that they occasionally turn OFF to allow the blocked pump to feed.

DCM2-Cl Browser
2.10 Feed Diagnostics

Select the link on the target chemical feed pump. The pump **Diagnostic** displays on the right.



Sidebar:
Diagnostics vary with the output type and control.
Relays '**1**' to '**3**' use ON time instead of the volumes of Frequency controls '**4**' & '**5**'.

The main menu displays **Blocked** followed by the blocking output number OR **Lockout** & the **Interlock** input letter OR "**Alarmed"** if a pump cannot feed.

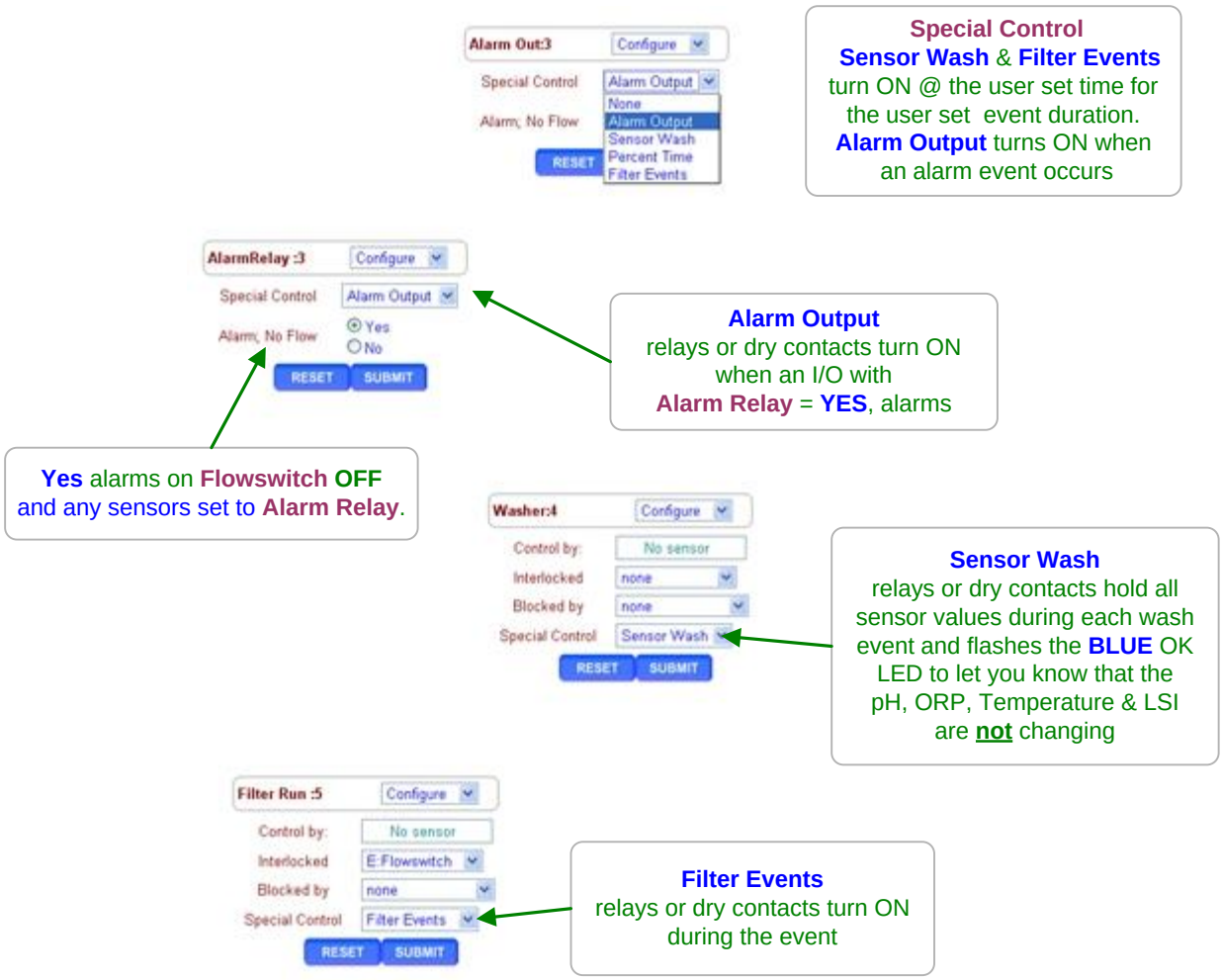
Diagnostic tells you a lot about the operation of the aquatics system and is invaluable if you have a configuration problem or feed fault.

Even if you have Keypad **Passwords** turned ON, any Keypad-LED user can still view the **Diagnostics**. An uninformed user reading the **Diagnostic** screen sequence over the phone to an experienced technician may prevent a service visit.

DCM2-Cl Browser
3.0 Event Controls

3.1 Four Types of Events

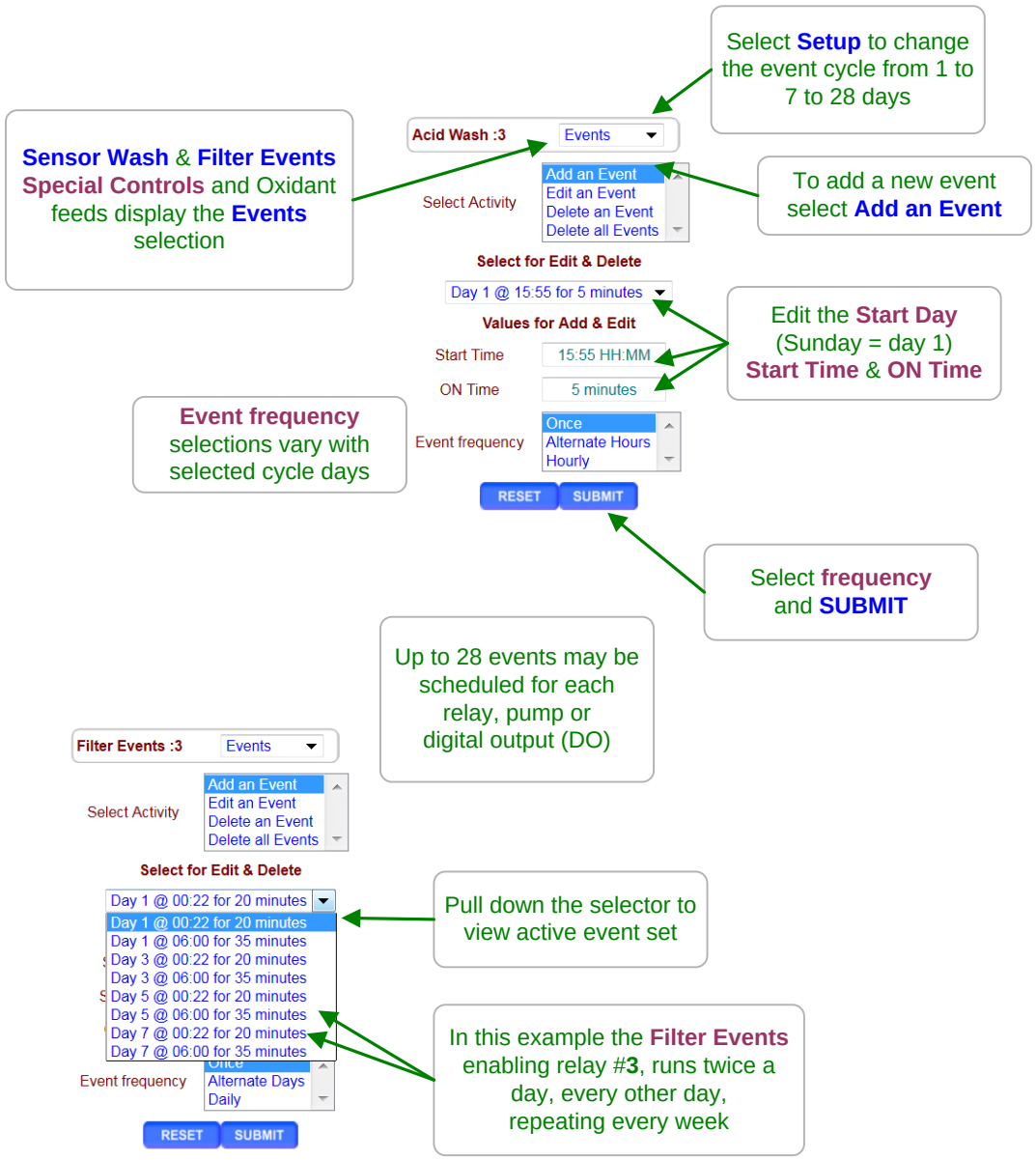
Alarm : **Sensor Wash** : **Filter** : **Oxidant-Chlorine Controlled** (refer to Section 2.5)
Events turn on a pump, solenoid, feeder or valve for user set time (Relay & Digital Outputs) at a user set day & time or on alarm.
Non-Alarm events can be repeated every Day, Week or Four Week cycle.



DCM2-Cl Browser

3.2 Setting & Viewing Events

Select the link on the target output, pump or solenoid and pull down the top, right menu, selecting **Setup** to modify the event cycle or **Events** to view, add or modify events.

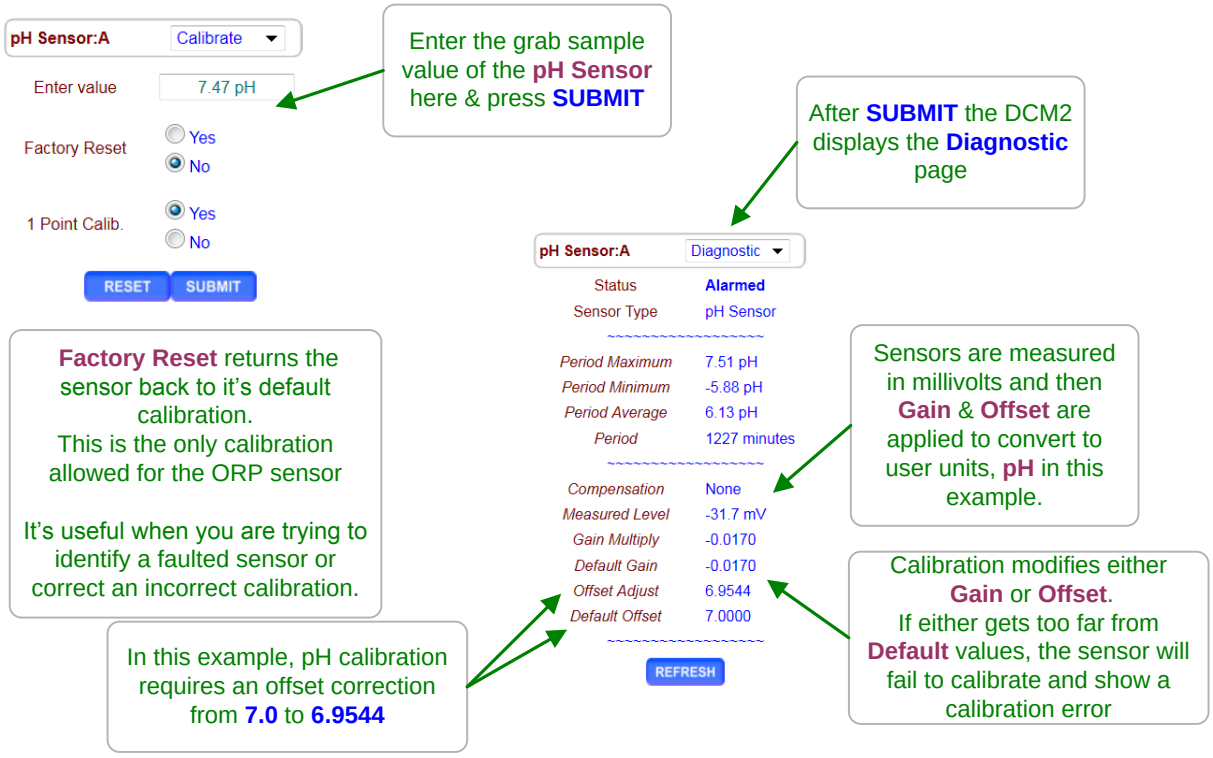


Sidebar:
Event Day can be set from **1** to **28** for Pumps set on a 28 day **Event Cycle** and from **1** to **7** for controllers set on a 7 day **Event Cycle** or always 1 on a 1 day **Event Cycle.**
Events repeat every **1**, **7** or **28** days.
Relays '**1**' to '**5**' feed time in minutes.

DCM2-Cl Browser
4.0 Sensors

4.1 Sensor Calibration

Select the underlined link for the sensor you'd like to calibrate and pull down the top, right menu, selecting **Calibrate**.



Sidebar:
Single Point Calibration: All sensors can be single point calibrated. Obtain a grab sample from the sensor sample petcock, perform the chemical test on the sample and then calibrate the sensor to the value of the tested grab sample. It's the simplest, most repeatable method.

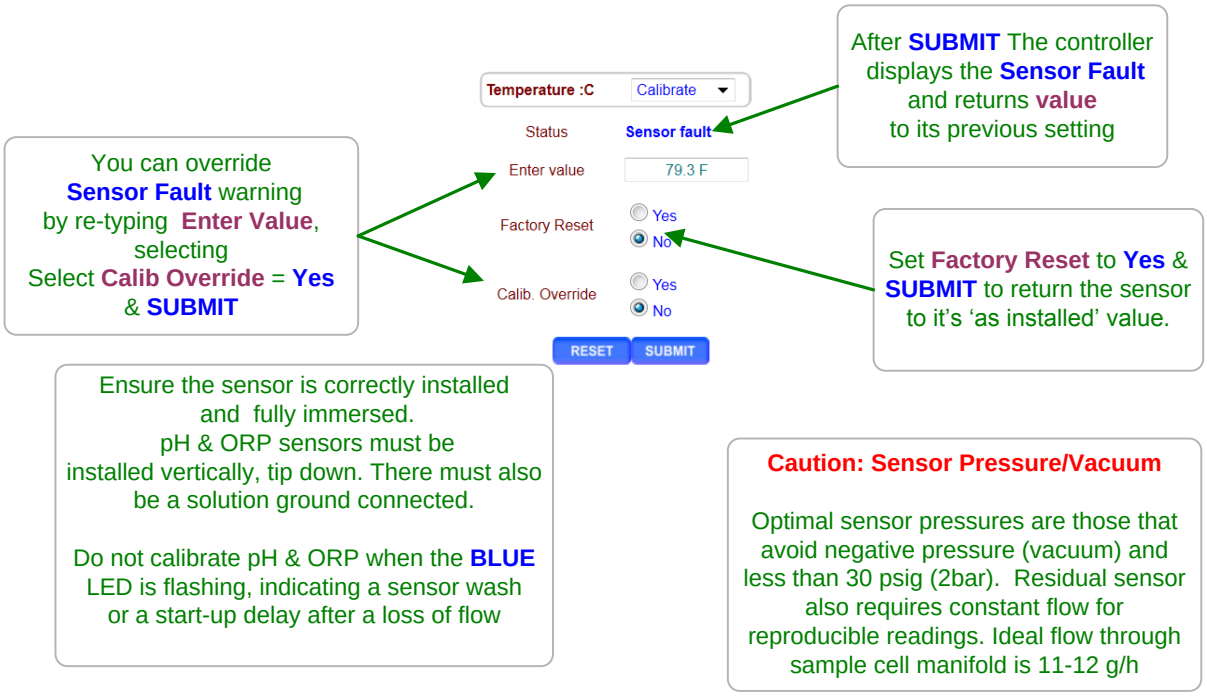
Process control and monitoring only sites which may operate over a wide sensor and temperature range (fountains or non-leisure applications), may benefit from 2 point calibrations. For these users, the controller supports direct set of sensor OFFSET & GAIN and 2 point calibration of pH. Consult the factory before attempting 2 point calibrations.

Calibration Faults: Refer to the next page for options on fault.
LSI-Ryznar sensors
Use **Calibrate** after you measure conductivity, alkalinity or hardness to update the **LSI_Ryznar** calculation.

DCM2-Cl Browser

4.1 Sensor Calibration

Sensor Fault displays on a failure to calibrate. Although you may elect to ignore and bypass this warning, it's usually indicating there's a problem with the sensor. You may force the sensor input to read a value, but it may not track changes in pH, ORP, Chlorine Residual or Temperature.



Sidebar:
Sensor Fault: The DCM2 verifies that sensor OFFSET or GAIN are within the range of typical sensor operation.
If out of range, **Sensor Fault** displays.
Fault Cause will vary with sensor type**.**

ORP: Verify solution ground connected. Verify sensor cable not damaged or altered & firmly connected at both the SN6 end and the removable terminal strip. Verify not visibly fouled. Clean platinum or gold cap and white Teflon liquid junction with alcohol followed by acid using a soft bristle toothbrush.

Chlorine: Verify sensor cable not damaged or altered & firmly connected at the spring loaded terminal strip. Verify not visibly fouled. Carefully clean gold tips with alcohol followed by acid using a soft bristle toothbrush.

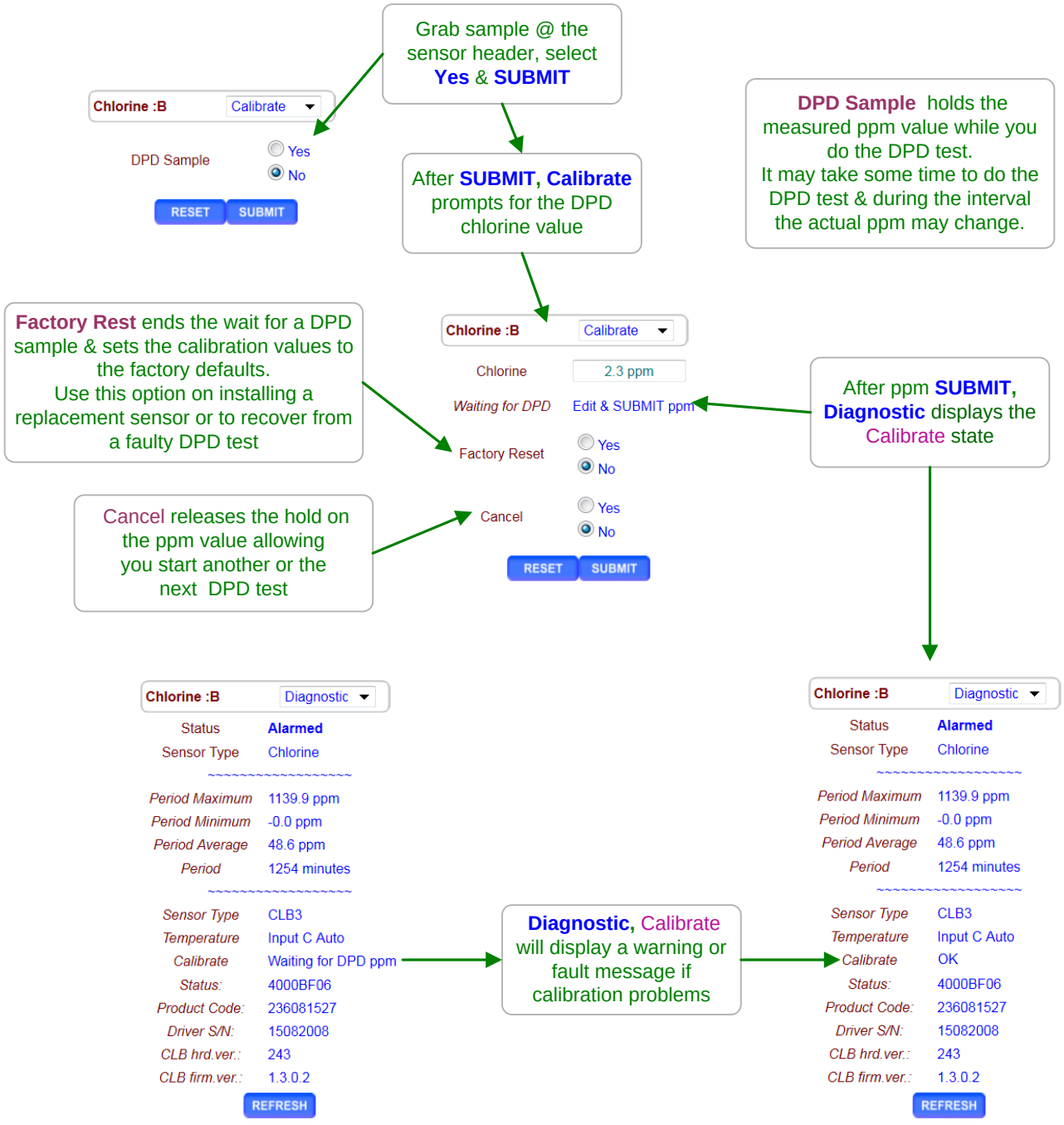
pH: Verify solution ground connected. Verify sensor cable not damaged or altered & firmly connected at both the SN6 end and the removable terminal strip. Verify not visibly fouled. Clean glass bulb and white Teflon liquid junction with alcohol followed by acid using a soft bristle toothbrush.

Temperature: Verify color coding correct and sensor wires firmly connected. Inspect sensor for damage or leaking.

DCM2-Cl Browser

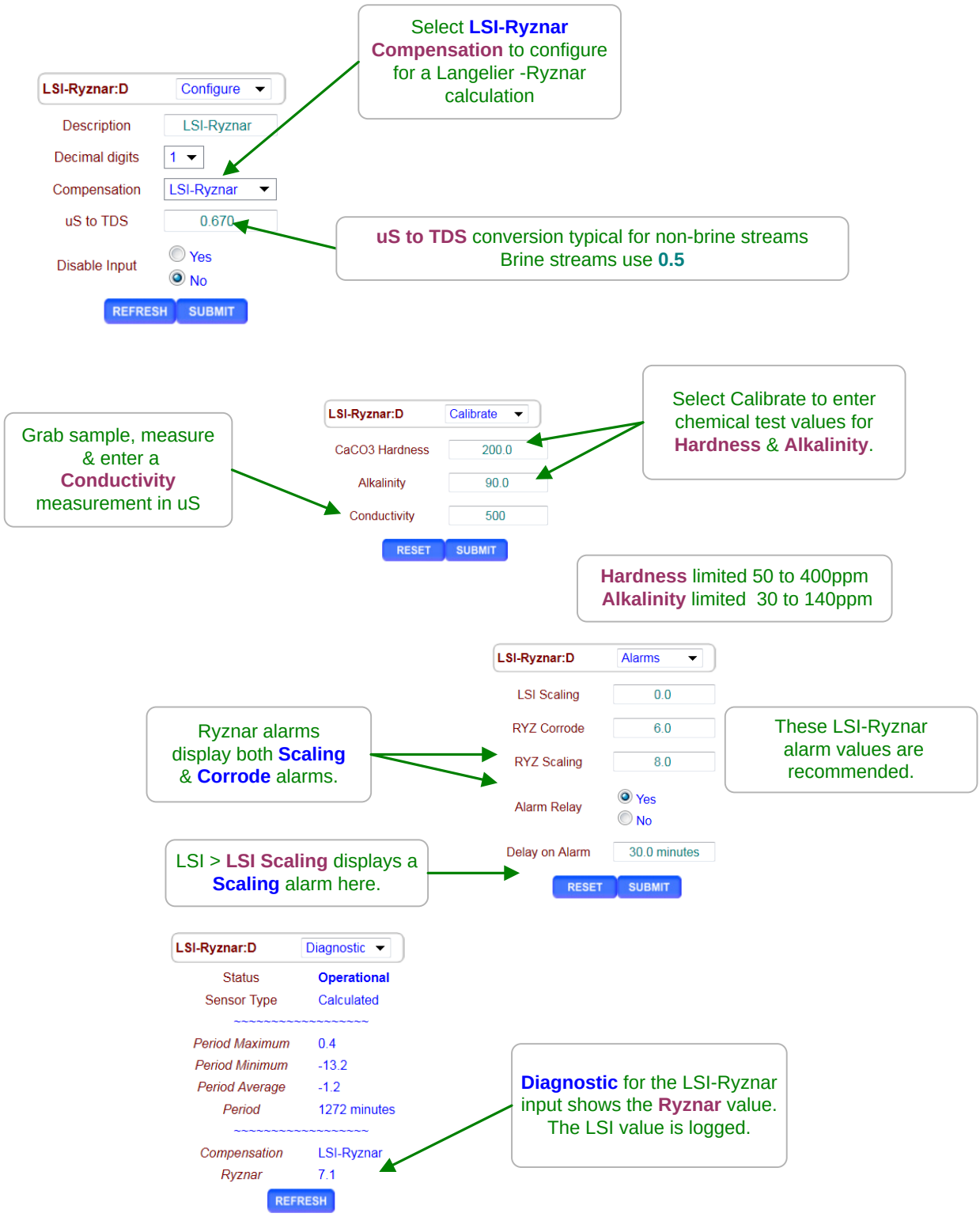
4.2 Chlorine Calibration

Select the link on the chlorine sensor and pull down the top, right menu, selecting **Calibrate**.



DCM2-Cl Browser
4.3 LSI-Ryznar Calculation

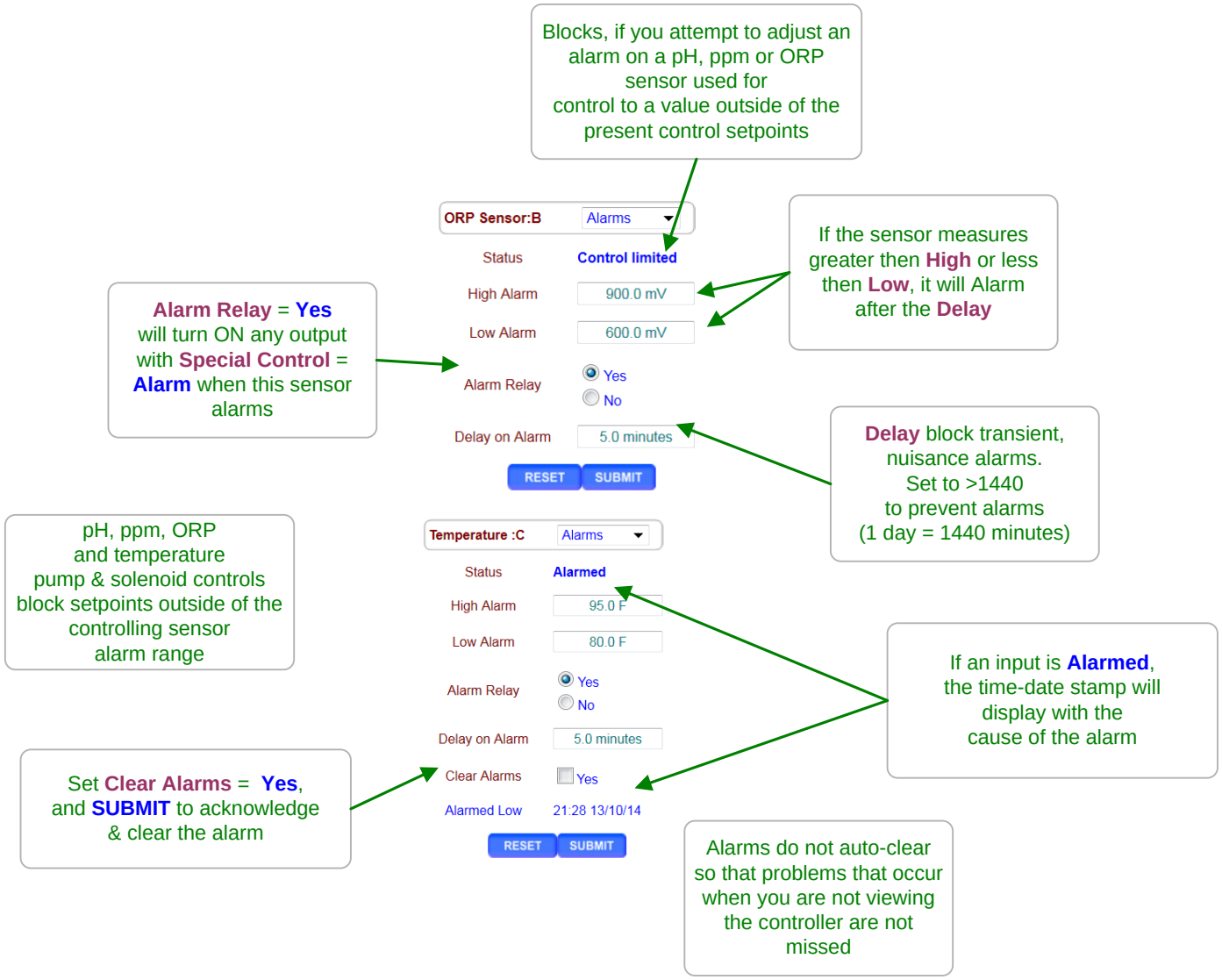
LSI-Ryznar calculations use a combination of measured sensor & manual test values.



DCM2-Cl Browser

4.4 Sensor Alarms

Select the link on the target sensor and pull down the top, right menu, selecting **Alarms**.

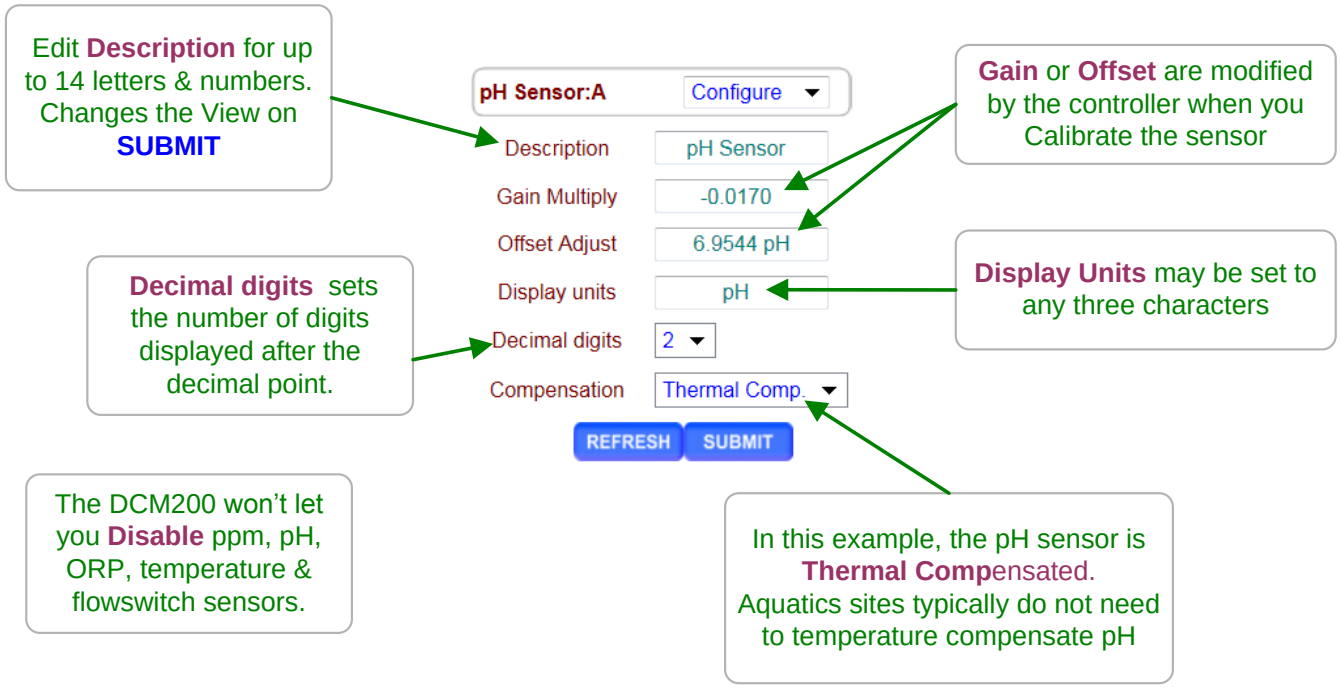


Sidebar:
Clear Alarms: Resets the **Delay on Alarm** time.
If the **Delay on Alarm** is set to zero minutes and the sensor is above the **High Alarm** or below the **Low Alarm**, the sensor alarm will immediately re-trip.

Water meters & Contact sets also have alarms & these are defaulted to not trip the **Alarm Relay**.

DCM2-Cl Browser
4.5 Sensor Configure

Select the link on the target sensor and pull down the top, right menu, selecting **Configure**.



Sidebar:
Description: Text is rejected if it contains special characters like < or >.
Avoid assigning duplicate or similar names for sensors, requiring the user to identify using only the identifying letter '**A**' to '**F**'.
Each sensor has only one name. It's the same for both Keypad-LED and Browser users and is included in the controller data logs.

Resolution: When you select the number of digits displayed after the decimal:
1. Keep the number to a minimum to unclutter the display, making sensor values easier to read & remember.
2. pH is typically displayed with 1 digits of resolution & ORP with 0 digits after the decimal point

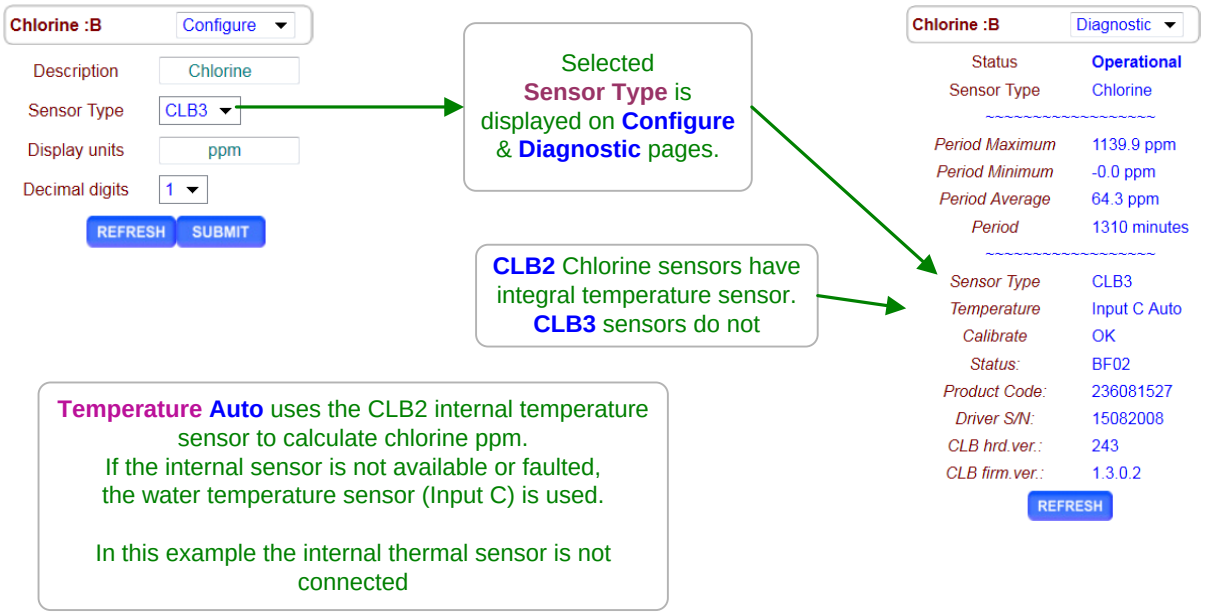
The displayed resolution of a sensor does not alter the data log resolution or the resolution used for control or the accuracy of sensor calculations.

Disabling a sensor removes it from the display and all selection menus used for control and compensation. Data logging stops for disabled sensors.

DCM2-Cl Browser
4.5 Sensor Configure cont.

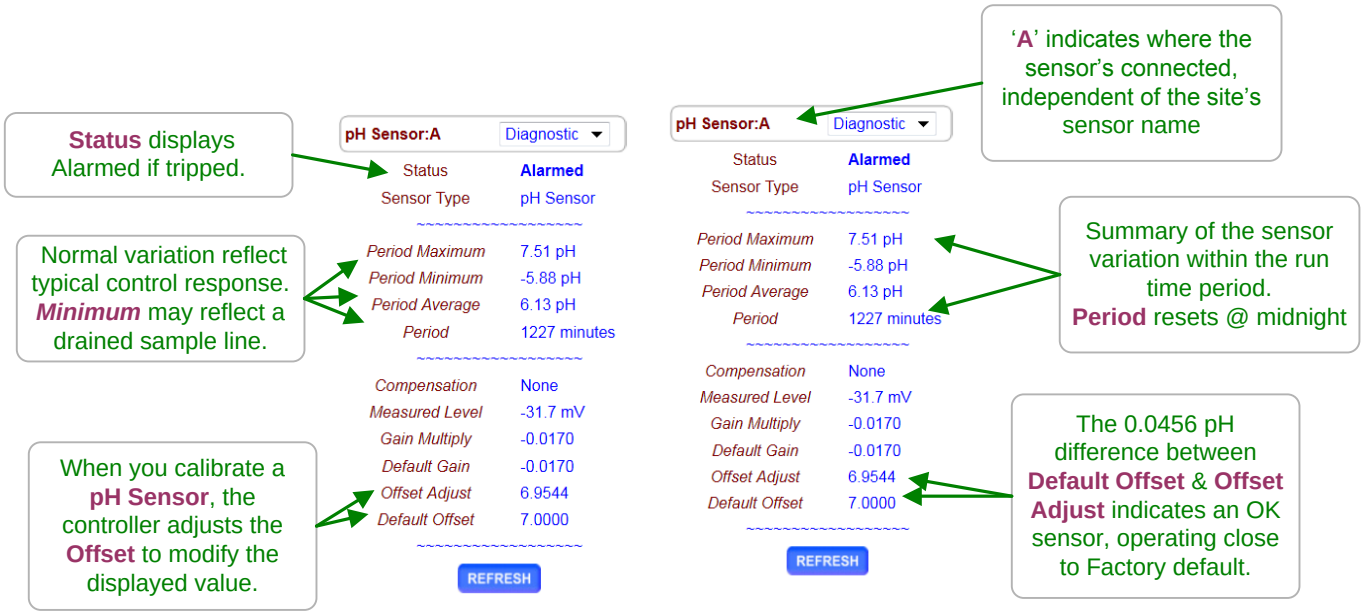
DCM2-Cl controllers include a CLB sensor driver card, mounted of the left side of the controller circuit board and usually a CLB3 chlorine sensor installed in the sensor manifold (DGMa). Alternatively, a CLB2 sensor may be provided in special circumstances.

Select the link on the chlorine sensor and pull down the top, right menu, selecting **Configure**.



DCM2-Cl Browser
4.6 Sensor Diagnostics

Select the link on any sensor to view the **Diagnostic** page for the sensor.



Sidebar:
Diagnostic displays how the sensor is configured, compensated and calibrated.

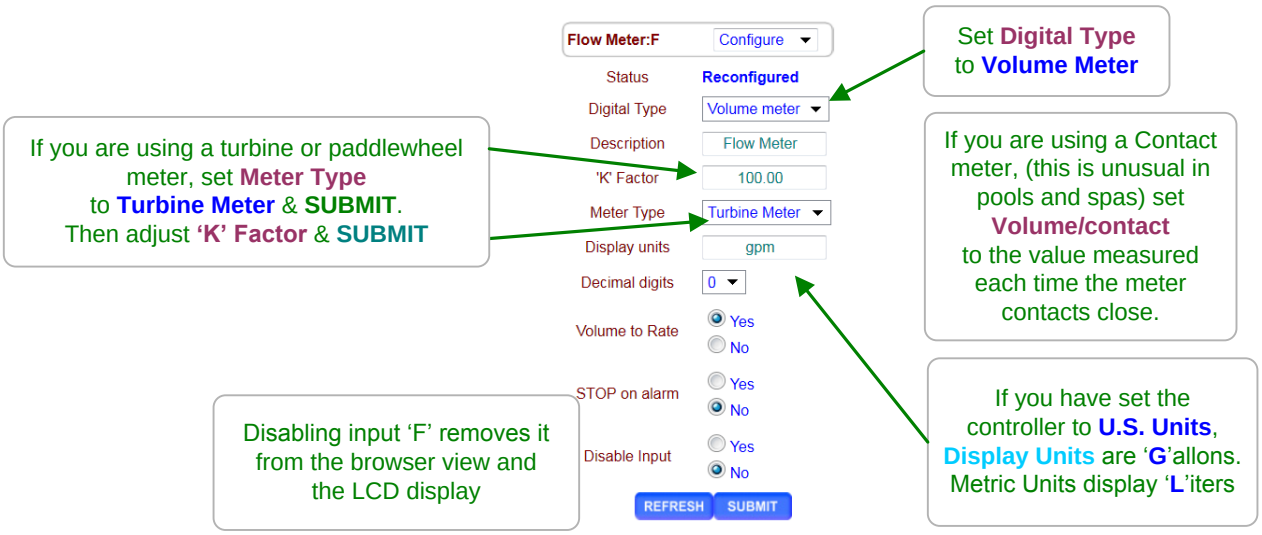
Offset & Default Offset
When you calibrate a pH, ORP or temperature, the DCM2 adjusts the OFFSET to make your measured value match the displayed value.

Manual Sensors:
These sensor types use only the OFFSET to set the displayed value.
The controller ignores GAIN for these sensor types.

Measured Level:
pH sensors have a well defined mV to pH relationship of 59.16mV/pH unit.
Example 7.000 pH = 0.0 mV, 10.000 pH = -177.48mV and 4.000 pH = 177.48 mV.
Displayed sensor value = (**GAIN** x **Measured Level**) + **OFFSET**.
Using this simple equation, you can directly modify the OFFSET & GAIN to get a desired display.
This is seldom done, and not recommended for typical aquatic sensors.

DCM2-Cl Browser
4.7 Water Meters: Volume & Rate

Select the link on the F input to configure and pull down the top, right menu, selecting **Configure**.



Sidebar:

Contact Head Meters (rarely used in Pools and Spas)

Meters may often be user configured for many Gallon/Contact or Liter/Contact settings. Make sure you get the volume/contact correct or volume errors will occur.

Turbine-Paddlewheel Meters

Nominal **'K' Factors** or Pulses-per-Gallon are listed for each pipe size on the manufacturer's web site or on the installation manual supplied with the meter.
When meters are supplied with entry fittings, the actual 'K' factor may be labeled on the body of the meter.

Common Meter Wiring Errors:

1. Switching wire colors when extending 3 wire meter cables.
2. Routing meter wiring in the same conduit as AC power.
   Meter cables are low voltage. If site practice allows, tie wrap meter cabling to the outside of conduit rather than share a conduit with AC power.

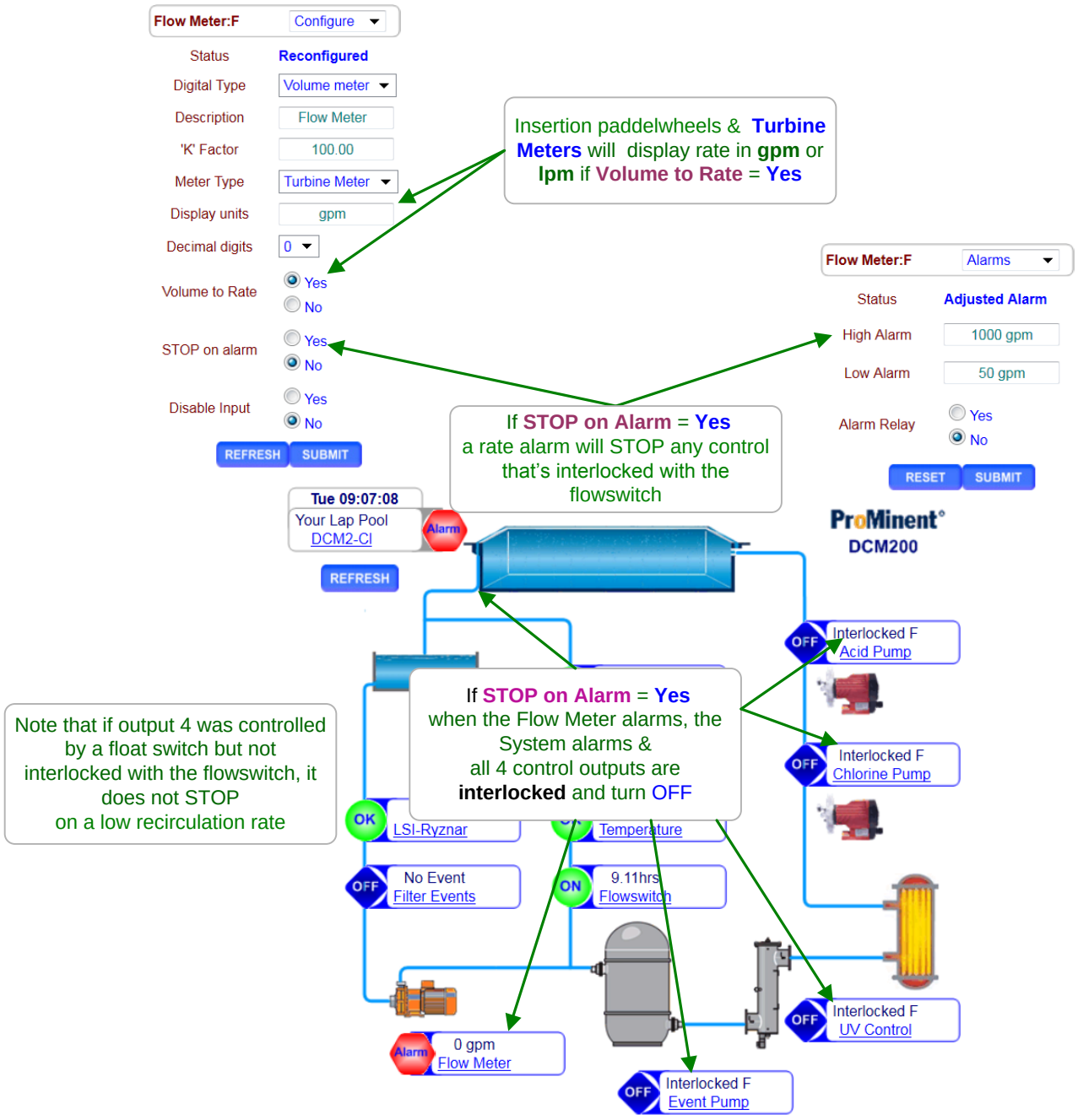
Contact Set Debouncing:

Mechanical water meter contact sets bounce when closing or opening. The DCM2 software debounces so that you don't measure extra counts when you select **Contact Meter**.

Maximum Turbine Pulse Rate:

Turbine pulse streams are not debounced and will measure up to 400 pulses/sec. or Hertz. 400 Hz. is faster than the pulse stream from the typical insertion flow meter at maximum flow rate**.**

DCM2-Cl Browser
4.7 Water Meters: Volume & Rate cont.



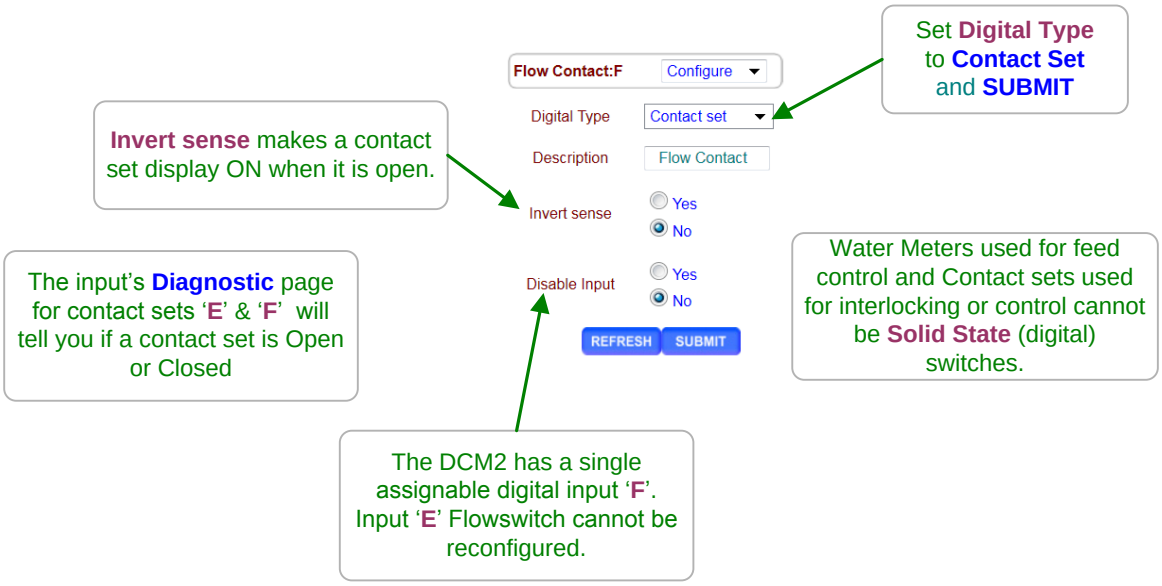
Sidebar:

1. The alarm on Volume-to-Rate is non-latching so that when flow recovers, feed & control restart automatically.
2. When a low rate alarm occurs, the System Alarm is set so the **Orange** ALARM LED on the enclosure face turns Flashes.
3. Control & feed will not restart until the cause of rate alarm is corrected, the alarm setpoints are changed or **STOP on Alarm** = **NO**

DCM2-Cl Browser
5.0 Flowswitches & Contact Sets

5.1 Switching Meters & Contact Sets

Select the link on the target water meter or contact and pull down the top, right menu, selecting **Configure**.

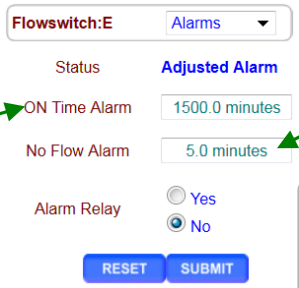


Sidebar:
Volume & Contact Set Input:
Controller input '**F**' may be set to be a water meter or a contact set.
The DCM2 is defaulted as a contact set at input '**F**', and is recommended that it be used as a circulation safety switch.

DCM2-Cl Browser
5.2 Contact Set Alarms

Select the link on the target sensor and pull down the top, right menu, selecting **Alarms**.

ON Time Alarm in this **Flowswitch** example is set to exceed the maximum number of minutes in a 24 hour period (1440). Alarm timers are reset at midnight. Flow=ON is a normal condition that should not cause an alarm. 1500 minutes is the default value to prevent an alarm.



The **No Flow Alarm** in this example would alarm **5.0 minutes** after a loss of flow.

Any event or condition that can be indicated by a contact set, can be alarmed… circulation flow high or low chemical or water levels, temperatures, pressures, etc.

Sidebar:
Default alarm times are set so that contact sets won't alarm unless user configured.
It's unlikely that you would set both alarms on any one contact set but the ability to alarm both ON & OFF states gives you a lot of application flexibility.

ON Time Alarm:
On Time alarms are used as a deadband of sorts so that a fleeting contact closure does not cause a nuisance alarm.
If the flow switch on your filter return line shows low flow you'd like to stop chemical feed immediately, and if low for more than a few minutes, display and log an alarm.
If the flowswitch on a water feature which typically is ON between 6:00AM & 8:00PM Is ON for more than 15 hours, either the flowswitch has faulted OR the water feature operation has changed.

No Flow Alarm:
If you have an aquatics system that runs 24/7 you'd want to alarm on a flowswitch that has no flow since it indicates that the circulation is too low for proper operation or inadvertently valved OFF.

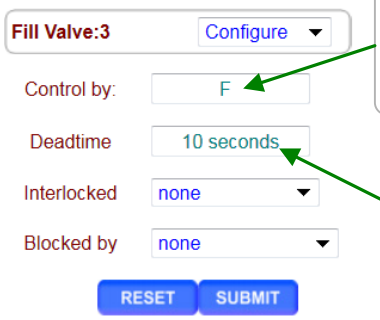
DCM2-Cl Browser
5.3 Contact Set Controls

Select the pump, valve or solenoid you wish to control using a contact set or flowswitch and pull down the top, right menu, selecting **Configure** and set **Control by** to either contact set '**E**' or '**F**'.

When the controlling contact set is **ON**, the relay is **ON** .

In this example when input '**F**' is **ON**, relay **3** is **ON** after the **Deadtime** has elapsed.

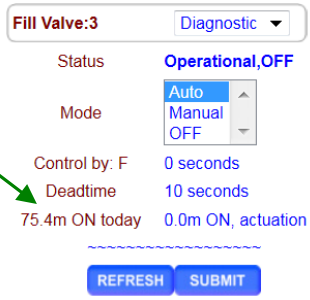
If the contact set is controlling a variable frequency pump output, **4** or **5**, the pump feeds at 100% when the contact set is ON.



Set **Control by** to a contact set input.
In this example we've selected input '**F**' to control relay **3**

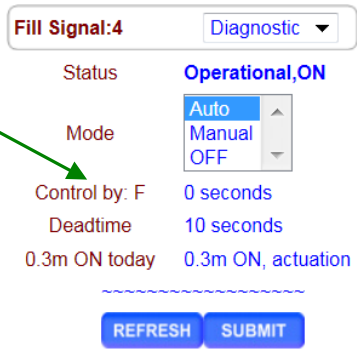
Deadtime in this example is used to remove bounce from a float switch

The **Diagnostic** display shows the total time the output has been **ON** today & **ON** time of the controlling contact set this **actuation** .



If **Invert sense** is set to **Yes**, the controlling contact set in this example will be **ON** when the contact set is **OPEN**.

This setting allows you to turn the relay or pump **ON** when the contact set is **OPEN** or **CLOSED**.

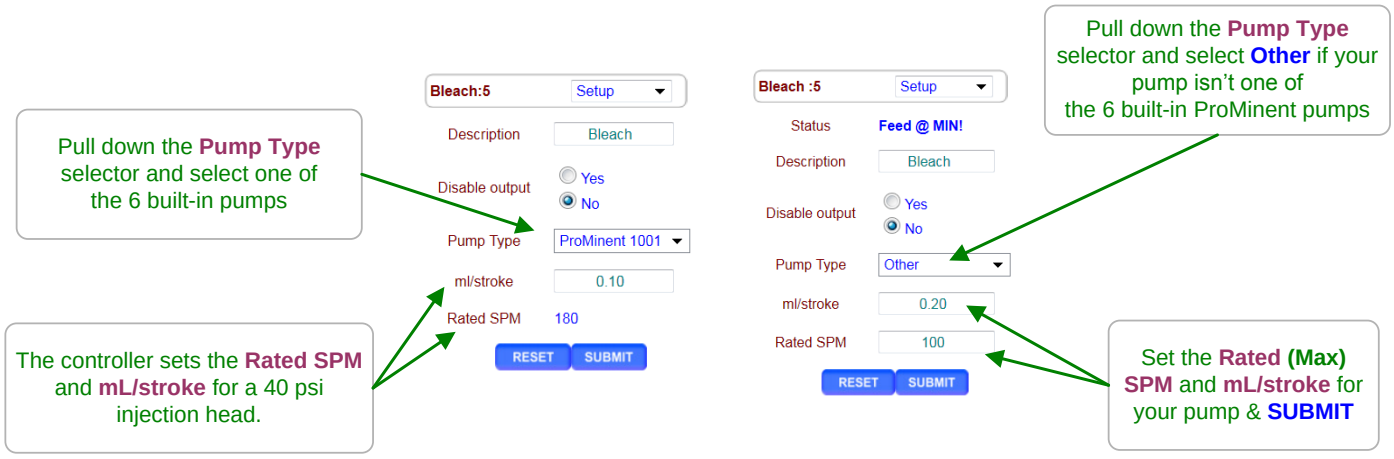


Contact set controls are simple. There are no setpoints or special controls, just a Deadtime.

DCM2-Cl Browser
6.0 Frequency Controlled Pumps

6.1 Selecting a Pump

Select the link on the target pump and pull down the top, right menu, selecting **Setup**.



Built-in Pump types

Pump Type	ml/stroke	Liters/hr	Gallons/hr
1601	0.13	1.404	0.371
1602	0.24	2.592	0.685
1001	0.10	1.080	0.285
1002	0.24	2.592	0.685
0704	0.42	4.536	1.198
0705	0.50	5.400	1.427

Sidebar:

Pump Type:

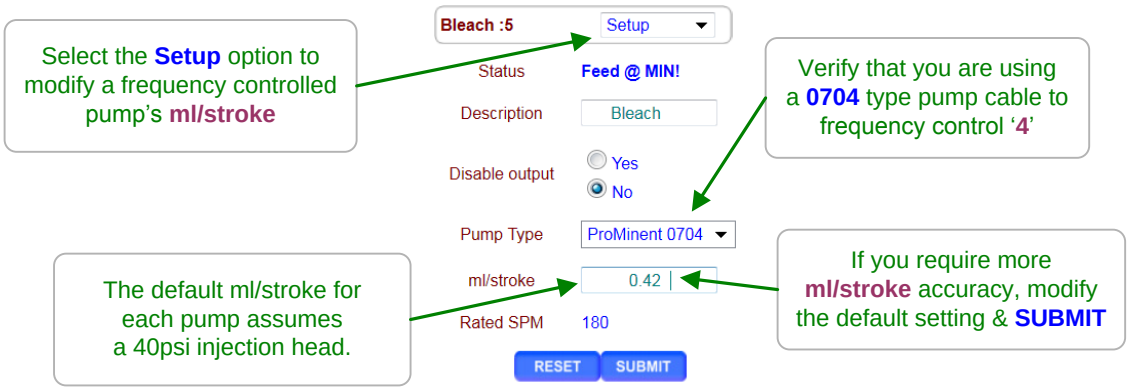
If you select one of the 6 built-in ProMinent pumps, the feed volume mL/stroke and maximum frequency are set correctly and automatically assuming a nominal 40 psi feed line pressure.
If you select '**Other**' as a pump type, you'll need to provide both the nominal mL/stroke and maximum stroke rate. Pumps with maximum stroke rates from 50 SPM to 400 SPM are supported by the controller.

Relay Controls:

Frequency controlled pumps may also be switched ON/OFF by one of the controller's relays '**1**' to '**3**'. Disconnect and remove the frequency control cable, if installed, and plug the pump power cord directly into the receptacle cord on the controller.
This is not the best use for a frequency controlled pump but if you need an additional pump and both the controller's frequency controls are being used, it's an option.

6.2 Adjusting mL/stroke

Select the link on the target frequency controlled pump and pull down the top, right menu, selecting **Setup**.



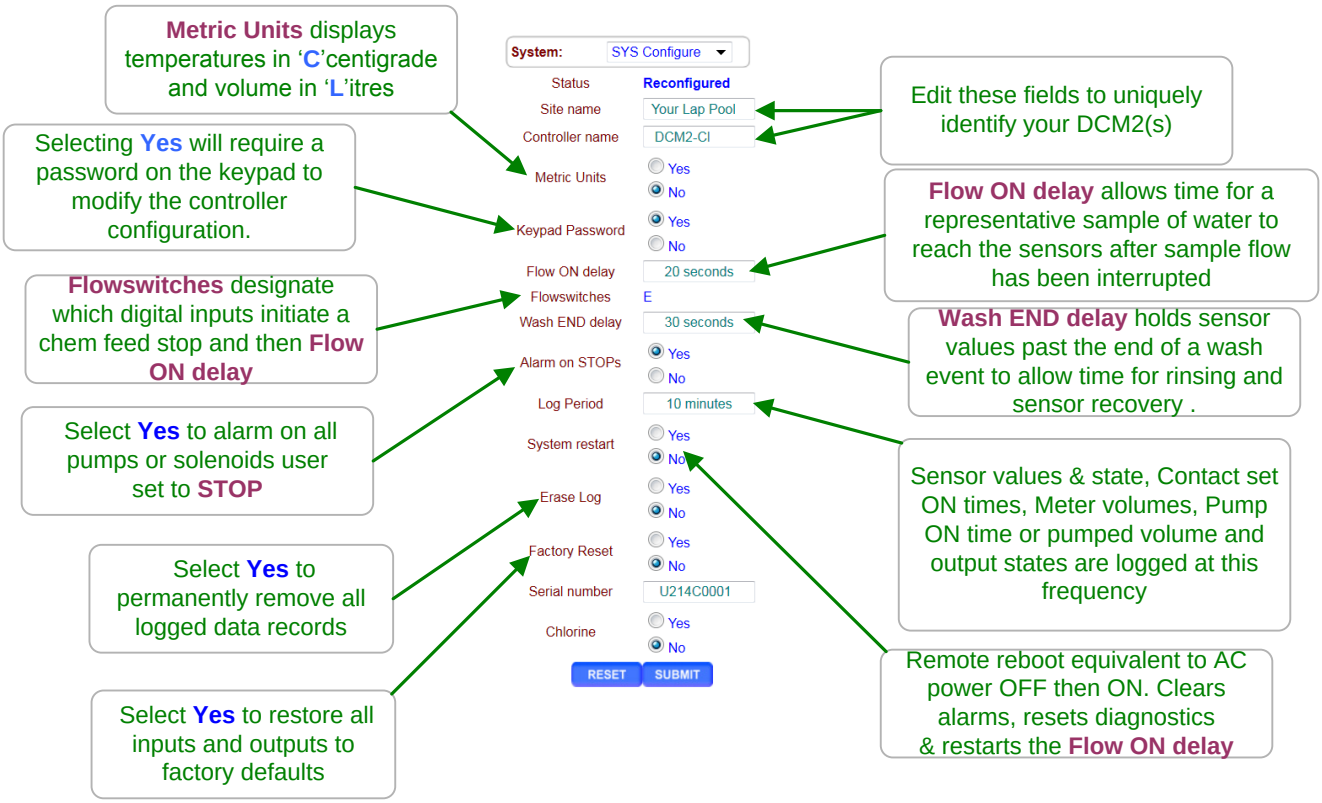
Sidebar:
Calibrating Stroke Volume:
Not normally used in Pools and Spas, but when your chemical ppm tests don't match the feed volume, then consider calibrating the pump ml/stroke.
If you find you're correcting the mL/stroke value frequently, then it's very likely that the error source is not the mL/stroke setting since the feed head hasn't changed.

Calibration Limits:
The controller limits the range of **mL/stroke** calibration for the built-in ProMinent pumps.

DCM2-Cl Browser
7.0 System Settings

7.1 Site Configuration

Select the system or home link. Pull down the top, right menu, selecting **SYS Configure**.



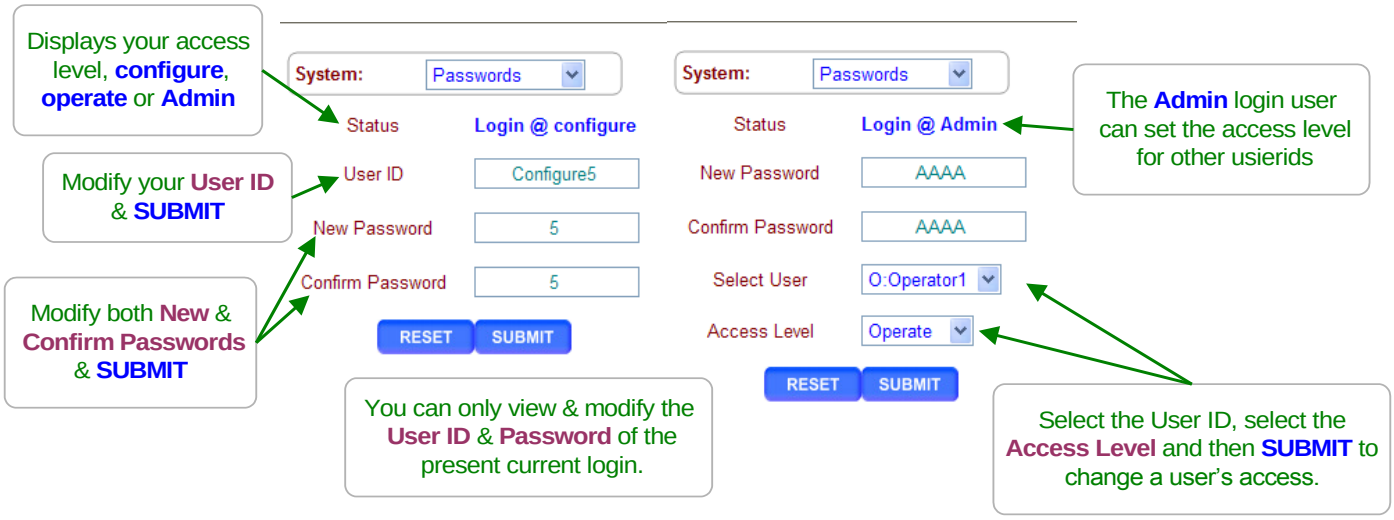
Sidebar:
Commissioning: *Select U.S. or Metric Units when you commission or install.*
Data logging uses the Units setting for the units on logged volumes and temperatures.
Changing units does not change data already logged, so this should be one of the first settings changed during a start-up commissioning.

Metric Inputs:
If you switch back to U.S. units, temperatures are converted to Fahrenheit using the default offset & gain, removing the effect of any user calibration.

Metric Outputs:
Pumped volumes are reported in mL & Liters.
Event feed volumes are in Liters and not Gallons.
The controller uses the units of the controlling sensor for setpoints.
If a water meter was set to measure Gallons prior to switching the **Metric Units**,
it will still display Gallons on the meter and wherever it's used for control.

DCM2-Cl Browser
7.2 Passwords

Select the system or home link. Pull down the top, right menu, selecting **Passwords**.



Default Passwords:
Operator1 = **1** Operator2 = **2** Operator3 = **3** Operator4 = **4**.
Configure5 = **5** Configure6 = **6** Configure7 = **7** Administrator = **AAAA**
There are 3 password access levels, Operate, Configure and Administrator.

The eight User IDs are used in the controller's keypress log.

Login Page: Operators can view all controller pages.
When you modify a page & **SUBMIT** the Status message will display **Login @ configure** OR **Login @ Admin** if a higher access level is required.
Go to the home page or select the system link and **Logout** & **SUBMIT**,
then login at the required access level.

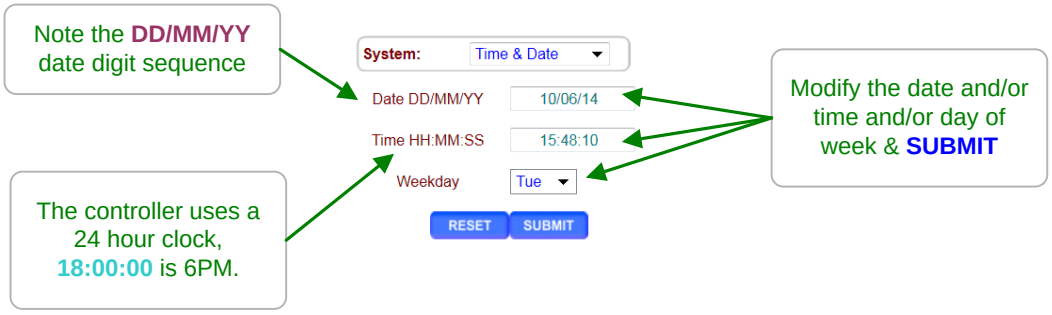
Modify Passwords:
If the controller is accessible on the site LAN, you should modify all 8 passwords.
Passwords are limited to 8 Capitol letters and numbers. Keypad passwords are the same as the browser passwords.
Any space in a password ends the password on both editing and **Login** password entry. (No spaces allowed)

Two users cannot share the same password because only the password is used to identify keypad users. The controller displays **Password Fail** on a duplicate password.
There are only 5 password attempts allowed. After 5 failed attempts, all access is locked out until the following 7:00AM, or until the power it turned off then on causing a reboot. The password status will show '**Alarmed**' to indicate users have been locked out.

Reset Passwords: If you forget your password, a **Reset Password**, available from ProMinent and is specific to your controller's serial number, setting all passwords to factory default.

7.3 Time & Date

Select the system or home link. Pull down the top, right menu, selecting **Time & Date**.



Sidebar:
Time & Date:
The controller uses a 24 hour clock where 14:30 is 2:30 PM.

Controller Response to a new Time&Date:
When you change the time & date, the controller:
1. Turns all outputs OFF, resets all control timing and restarts the logging period on each I/O

2. Zeroes time and volume owed which ends all timed & volume events.

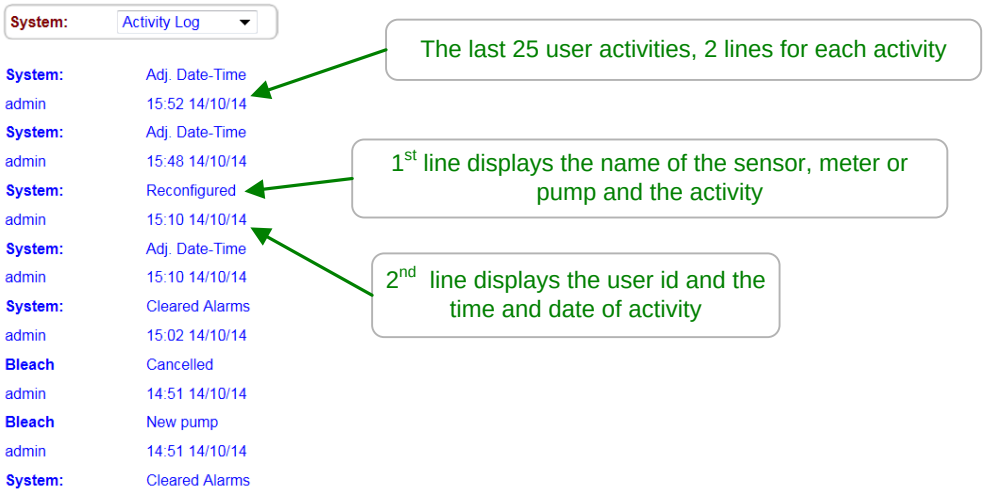
3. Does a midnight reset which will may set volume-meter Low Alarms.

4. Sets the events Day 1 to the most recent Sunday.

Example: If you are at Day 19, Thursday of week 3, on a 28 day event cycle.
After a **Time&Date** change you are now at, Day 5,Thursday of week 1

DCM2-Cl Browser
7.4 Activity Log

Select the system or home link. Pull down the top, right menu, selecting **Activity Log**.



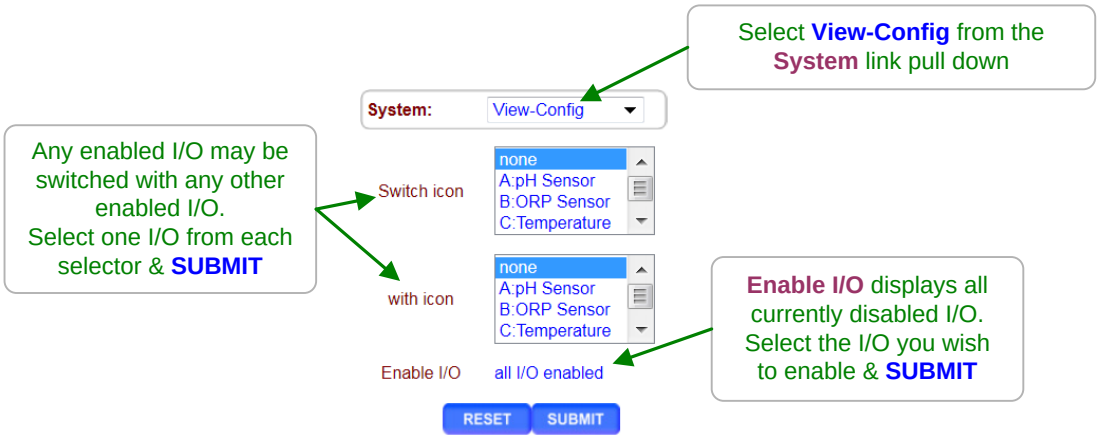
Sidebar:
Activity Log:
The log contains the last 25 activities that effect the operation of the controller.
The most recent activities are shown first. Both keypad and browser user activities are logged.

User IDs:
Keypad Password ON: Logs the User IDs listed in **Section 7.1 Default Passwords**.
Keypad Password OFF: Logs all User IDs as **Keypad**.

Browser user IDs are always logged because login is always required to make any changes.

Actions taken by the controller, like Power OFF/ON, use the **System** user ID.

DCM2-Cl Browser
7.5 Enabling I/O, Switching Icons



Disabling I/O:
Select Input link to disable and then the **Configure** top menu option, then **Disable** & **SUBMIT**.
Inputs **A**:pH, **B**:ORP or Chlorine, **C**:Temperature & **E**:Flowswitch cannot be disabled.
Sensor inputs **D** and **F** may be disabled if not being used for control.

Select Output link then the **Setup** top menu option, then **Disable** & **SUBMIT**.

I/O in use by the controller for control or sensor compensation cannot be disabled.
Disabled I/O is removed from the view.
Disabled I/O is not logged and does not appear in the selections used
to compensate and configure other enabled I/O

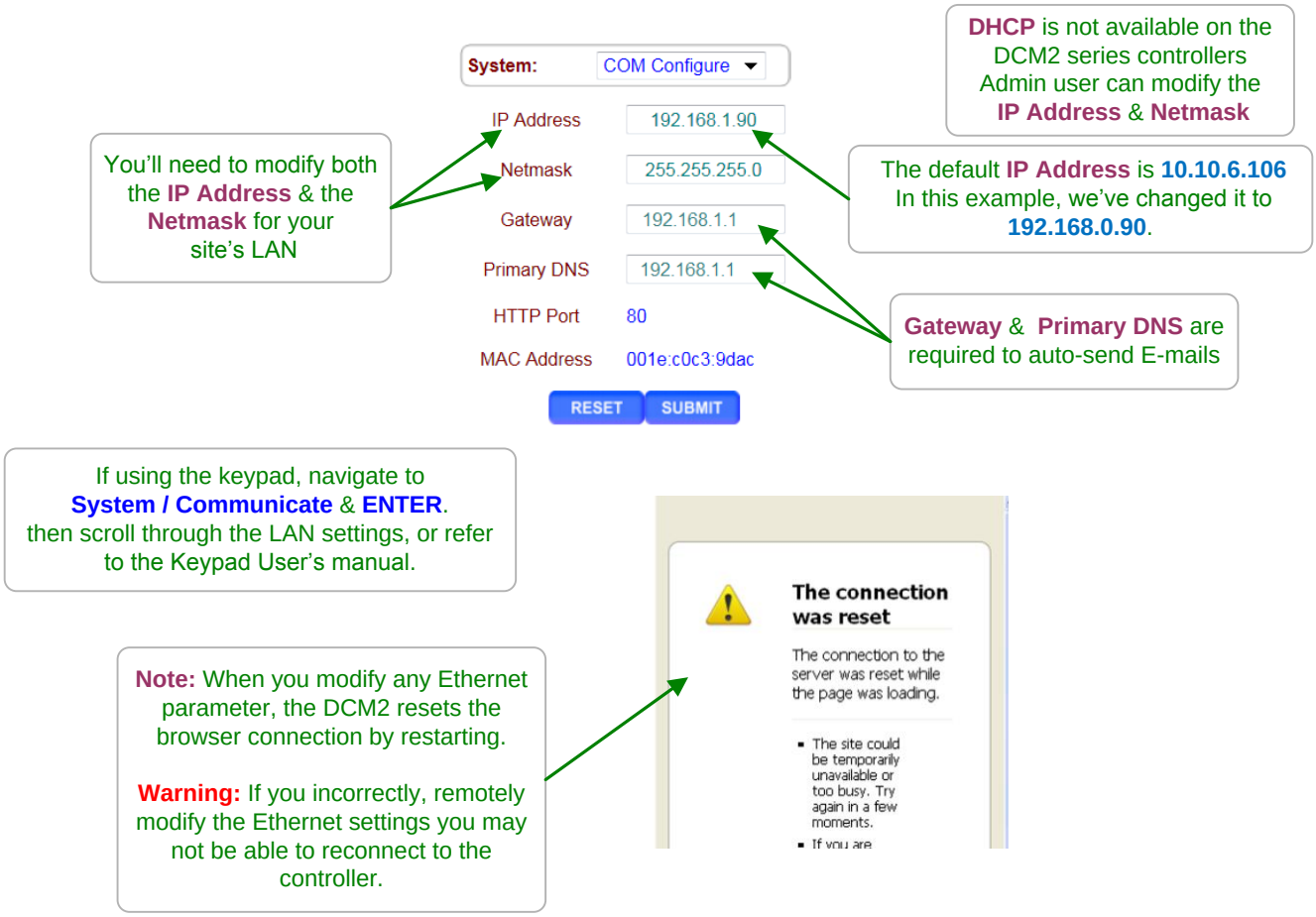
Enabling Inputs:
Flow Meter and Contact Set Input '**F**' is enabled and configured as either a flowswitch, water-flow meter OR, contact sets, level-pressure switches …

Enabling Outputs:
Outputs **1** to **3** are AC line powered switching relays that are enabled to power pumps, Solenoids, feeders or motorized valves.

Outputs **4** & **5** are frequency controlled outputs or dry contact digital outputs (DO) that are enabled to proportionally control pumps or enable external equipment, or send alarms.

DCM2-Cl Browser
7.6 Communications

Select the system or home link. Pull down the top, right menu, selecting **COM Configure**.
.



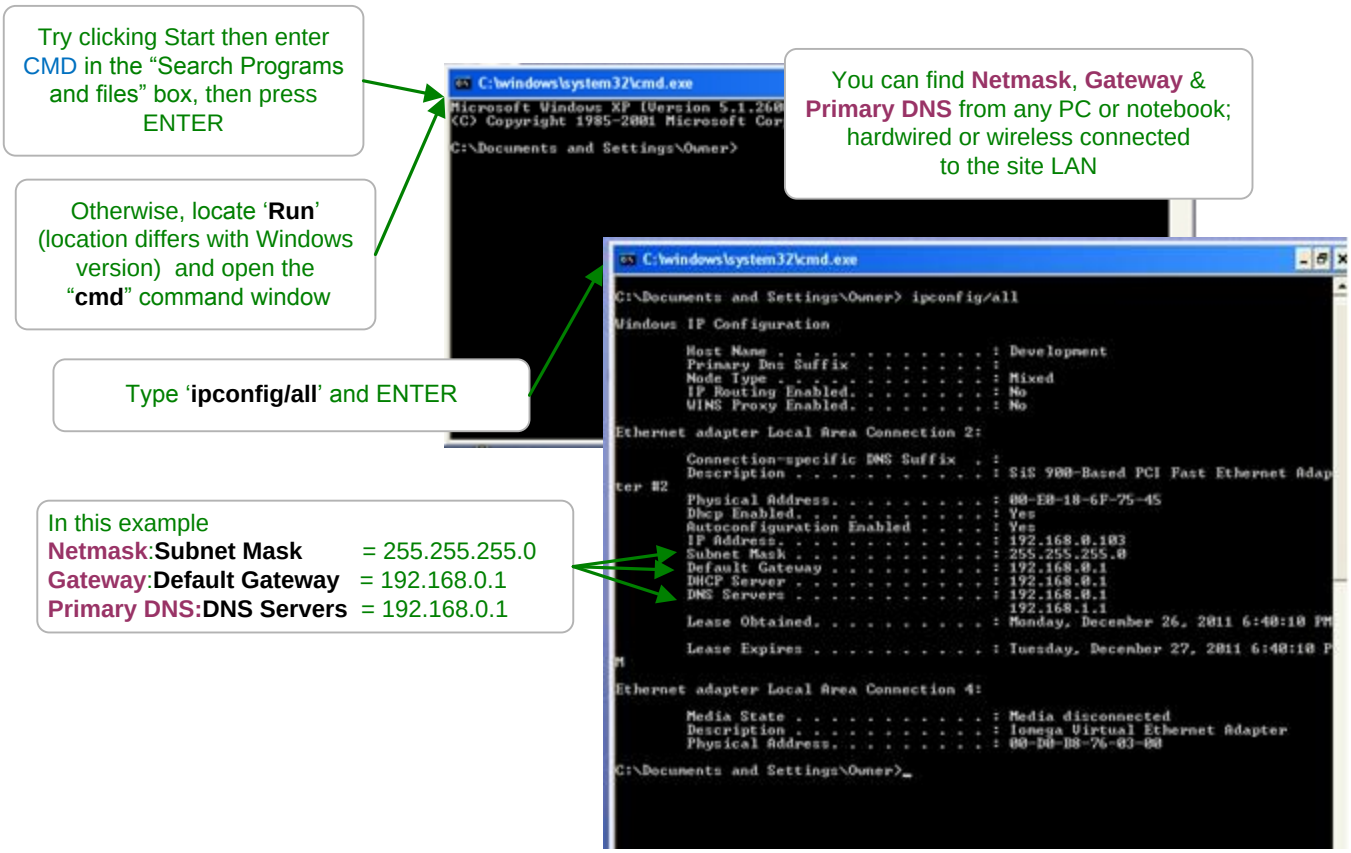
Sidebar:
Warning: Do not connect the DCM2 Ethernet connection into a site LAN without approval from site IT staff .
Browser passwords are the same as the default keypad passwords listed in Section **7.2 Passwords**.

You'll need to configure a portable computer to connect directly to the DCM2's Ethernet port.

Refer to Section 9 for Ethernet TCP-IP setup and the following page to get your site's LAN settings.

DCM2-Cl Browser
7.6 Communications cont.

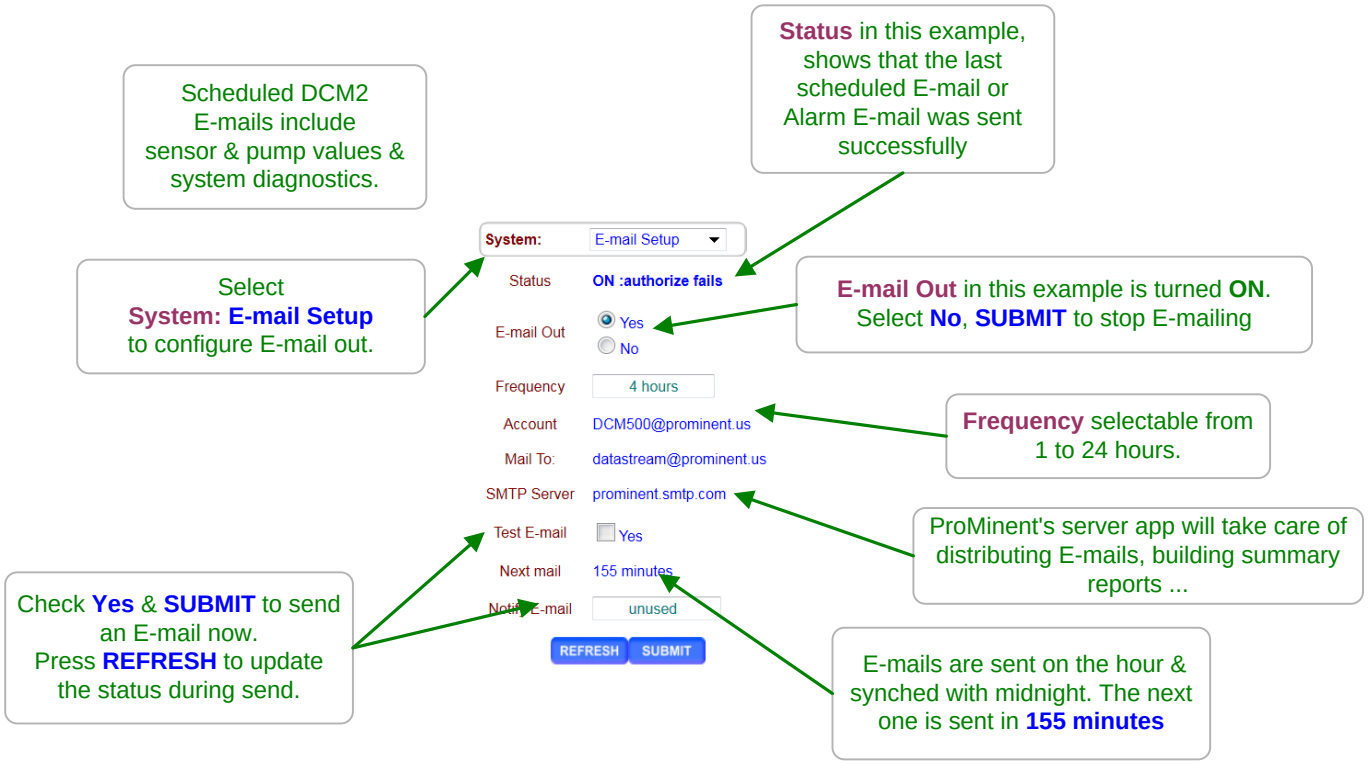
Windows operating systems have a simple way to find the Ethernet setup parameters:



You can use either the Keypad-LED interface or the browser to setup the controller's IP Address, Netmask, Gateway & Primary DNS. HTTP Port is not changeable on the DCM2.

DCM2-Cl Browser
7.7 E-Mail Out

DCM2's connected to the site LAN will soon be able to E-mail alarms & system operating parameters thru ProMinent's internet application.



Status: messages

OFF: = E-mail out Disabled by user
ON : = E-mail out Enabled by user
Testing: = User selects Test E-mail

:Mail Sent = last test, alarm or scheduled E-mail successfully sent.

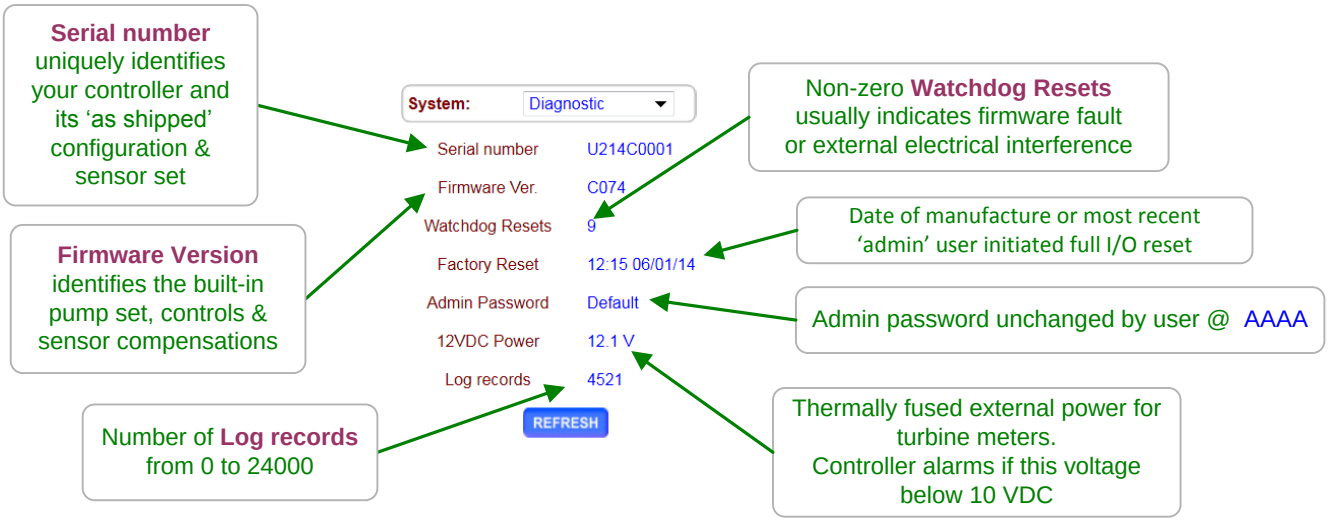
:Busy, wait! = file server temporarily unavailable. In use by LAN or USB log uploader.

:none sent = Power-on state, prior to 1st E-mail.

DCM2 Mail Server Messages
:Can't Send = E-mails blocked external to the DCM2
:fails, no DNS = cannot connect to SMTP server, check Primary DNS & Gateway settings
:authorize fails = password or user name incorrect, report fault to ProMinent

DCM2-Cl Browser
7.8 System Diagnostic

Select the system or home link then select **Diagnostic** at the top on the right side page.



Sidebar:
If the **System Diagnostic** Admin Password is not Default, then you will not be able to use the default 'AAAA' administrator password to log onto the controller.

Watchdog Resets should always be near zero.
If static has been discharged onto one of the controller circuit boards, or
one of the meter, sensor or contact set cables is in the same conduit as AC power switching transients, you may see the Watchdog Resets count up as the controller times-out & recovers.

Touch the grounded controller internal aluminum frame before handling controller terminals to avoid static discharge.
Static discharge is not typically a problem on-site in humid concrete pump rooms but is common in office settings.

Correct wiring to remove sensor and digital signal cabling from AC power conduits.

DCM2-Cl Browser
8.0 Notebook & PC Ethernet Set-up

8.1 Ethernet Overview

If you are going to occasionally browse the DCM2 using an Ethernet crossover cable, leave the controller IP address @ the default 10.10.6.106 & setup a connection to this IP in your portable computer, using the instructions later in this section for the Windows version operating your notebook. If you are connecting directly with an Apple computer, refer to the Apple owner's manual for how to configure the Apple for an Ethernet connection.

8.2 View-Modify the DCM2 IP Address

If the DCM2 is on the site LAN, you can use the keypad to view/modify the DCM2 IP parameters.

To view or adjust the controller Ethernet setting press **ENTER** and **DOWN** to **Communicate** at the power up or top of menu display.

Key **ENTER** @ **Communicate**

Displays the current LAN **IP address**. In this example, it's the factory default.

Key **ENTER** to modify.

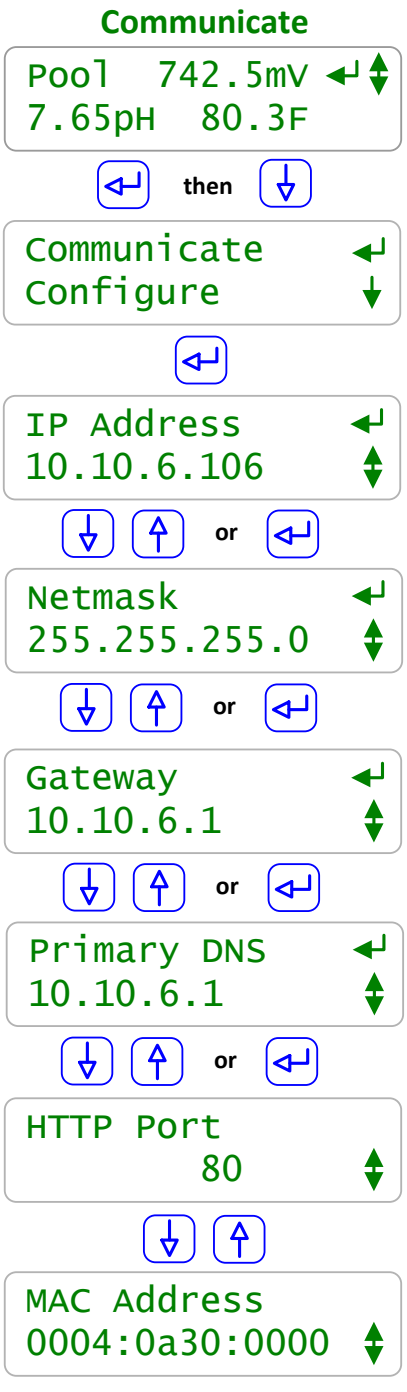
Netmask is usually this value for most sites. Key **ENTER** to modify.

Gateway is frequently the '1' address on the subnet Key **ENTER** to modify.

Primary DNS is frequently provided @ the same address as the **Gateway** Key **ENTER** to modify.

The DCM2 HTTP server is fixed at Port 80.

The **MAC address** is six 2 digit hexadecimal numbers, separated by colons into 3 groups of 4 to fit the LCD screen. In this example, the **MAC address** is **00 04 0a 30 00 00**



8.3 Browser Connect

If the DCM2 is on the site's LAN, you're ready to Ethernet connect & browse.

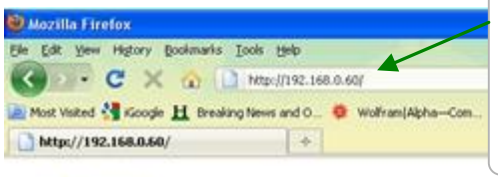
If you are not on the site LAN & are going to use a cable to directly connect, see one of the following sections for your operating system (Windows 7, Vista, XP or 8) TCP-IP connection set-up.

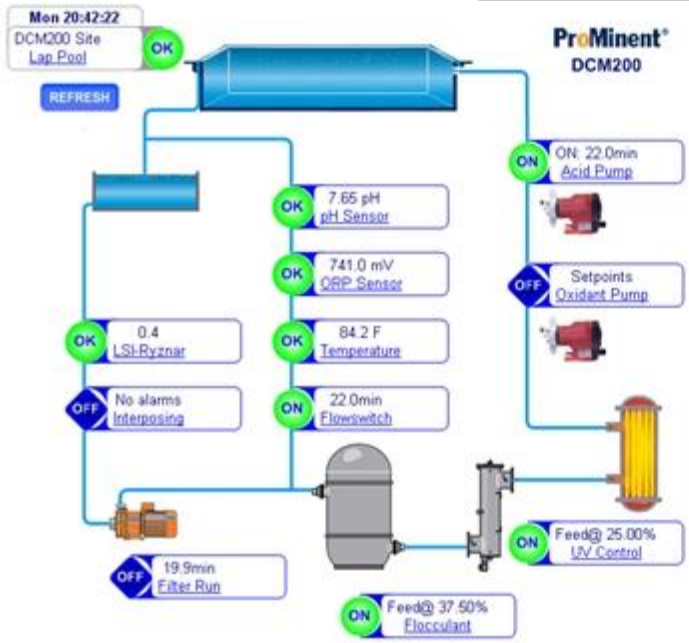
DCM2-Cl Browser

Connect a ‘cross-over’ cable between you notebook’s Ethernet jack & the controllers Ethernet jack.

Start you browser, Internet Explorer or Mozilla’s Firefox.
If you have wireless internet access you’ll connect to your ISP.

Then key the controller’s IP address into the browser’s address line.
192.168.0.60 in this example. Factory default IP is **10.10.6.106**.
In either case, your browser will convert to **http://[IP Address]**



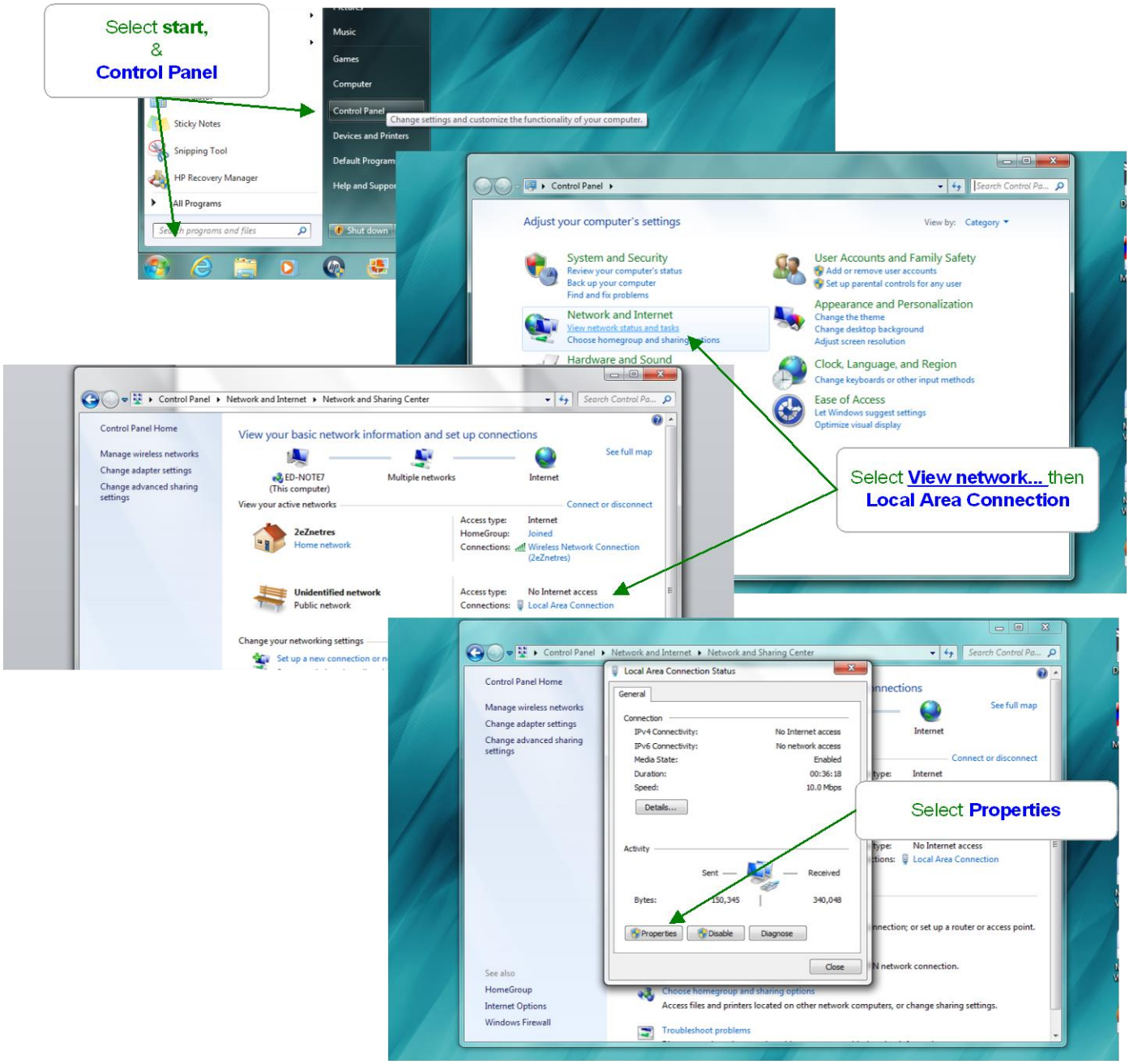


You’ll see a real time view of your DCM2 updated automatically every 2 seconds.

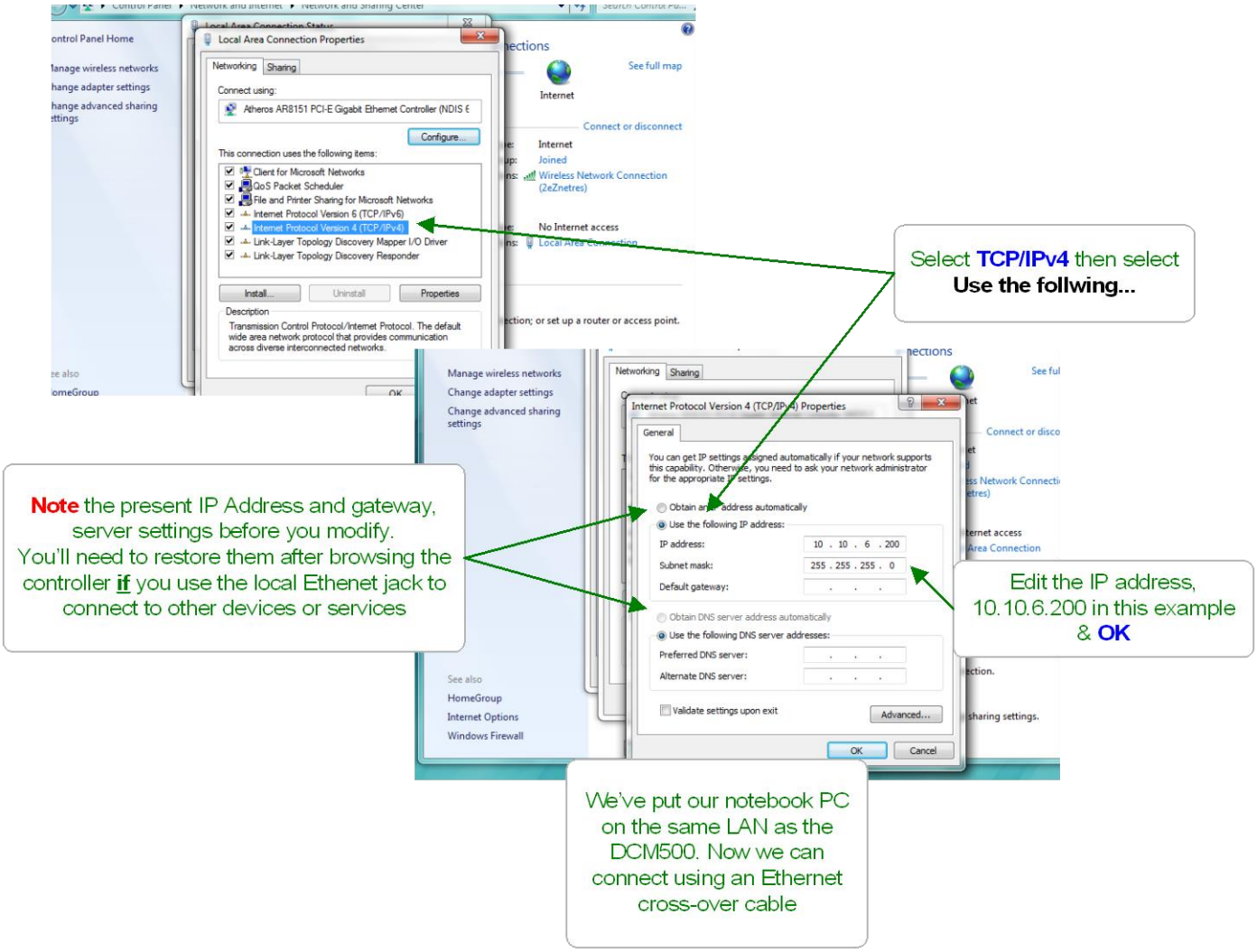
To do anything else, you’ll have to **Login** to the controller.

Five incorrect **Login** attempts will lock all users out until a power OFF/ON reset or 7:00 AM the following morning

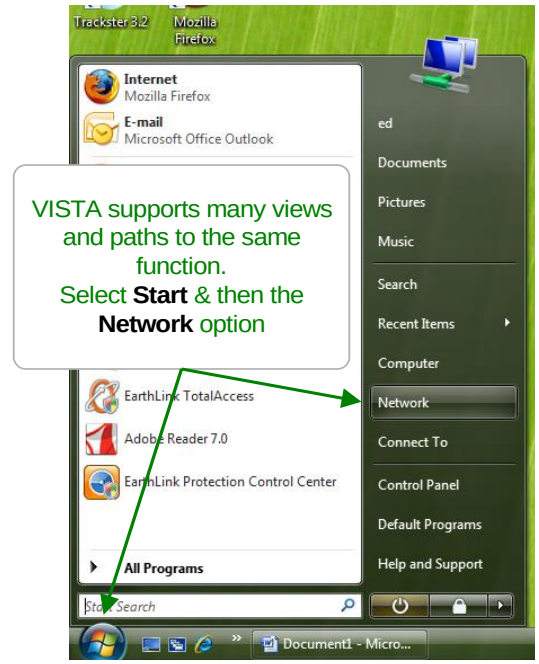
DCM2-Cl Browser
8.4 Windows 7 Cross-Over Set-up

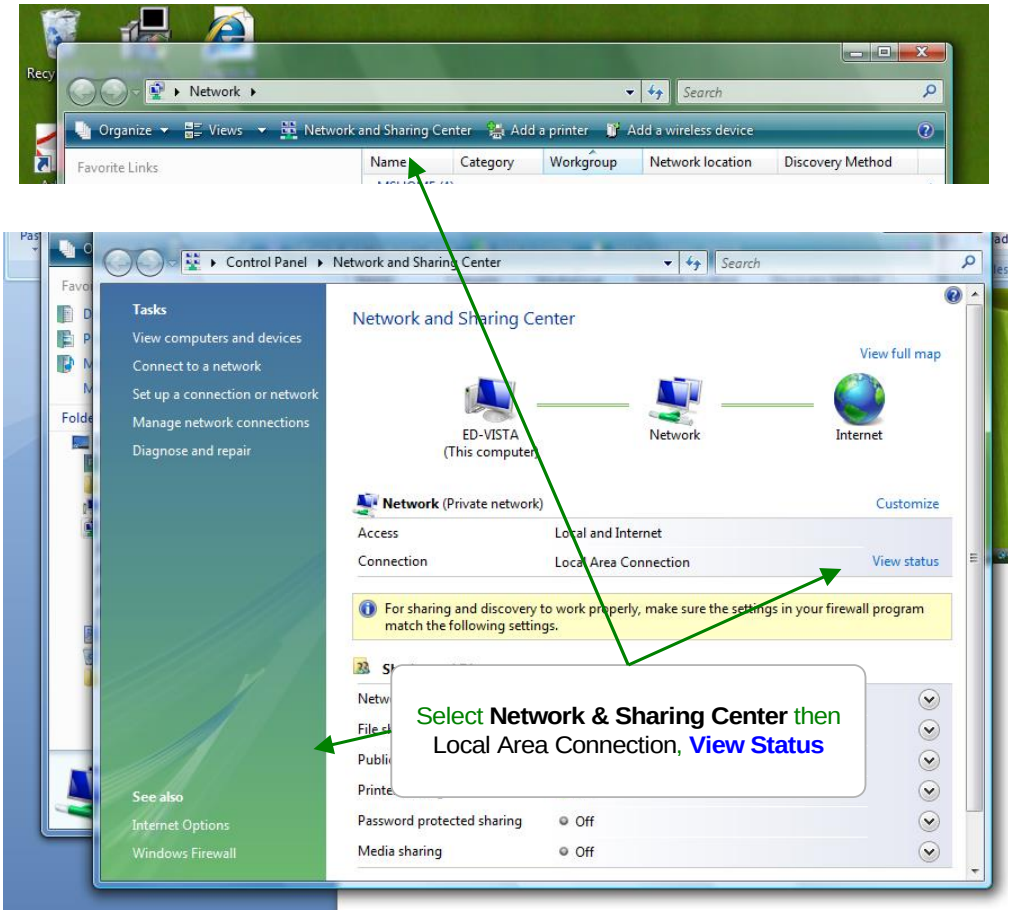


8.4 Windows 7 Cross-Over Set-up cont.

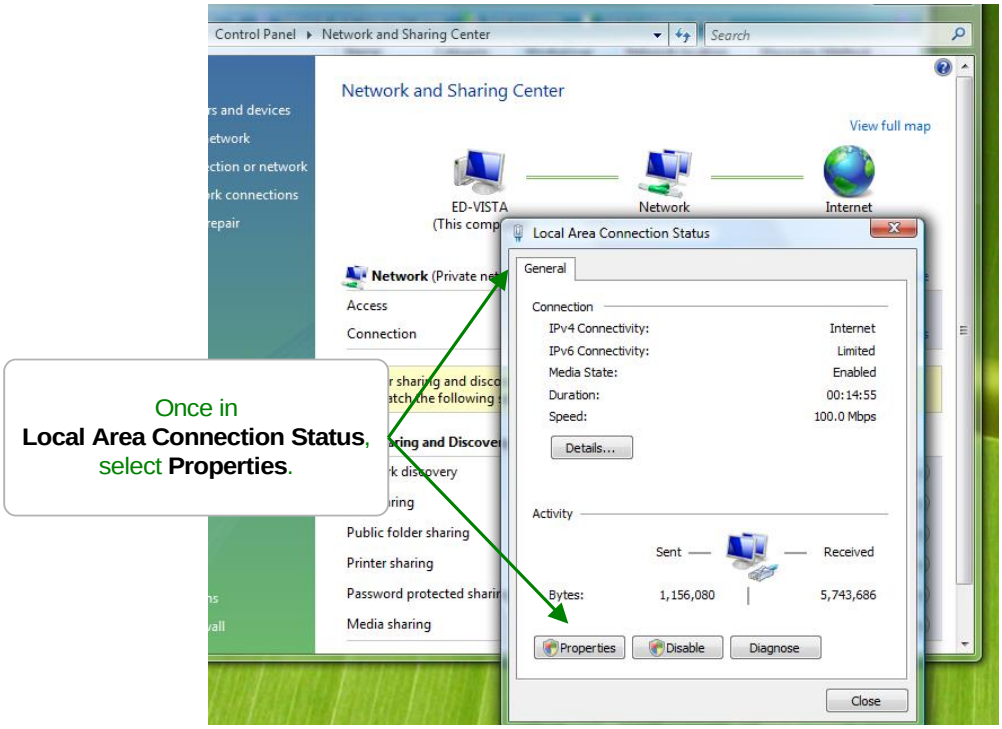


DCM2-Cl Browser
8.5 Windows VISTA Cross-Over Set-up

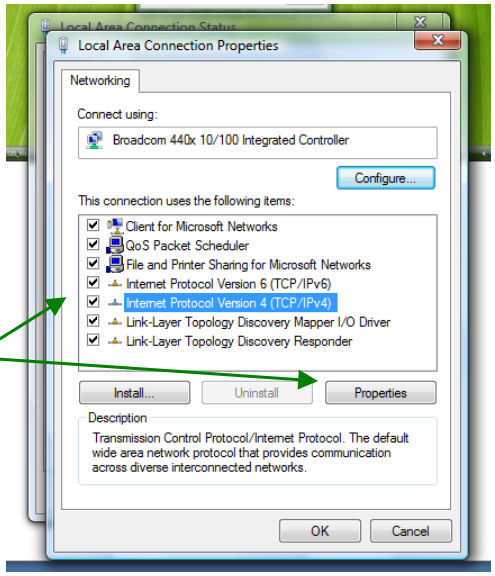




DCM2-Cl Browser
8.5 Windows VISTA Cross-Over Set-up cont.

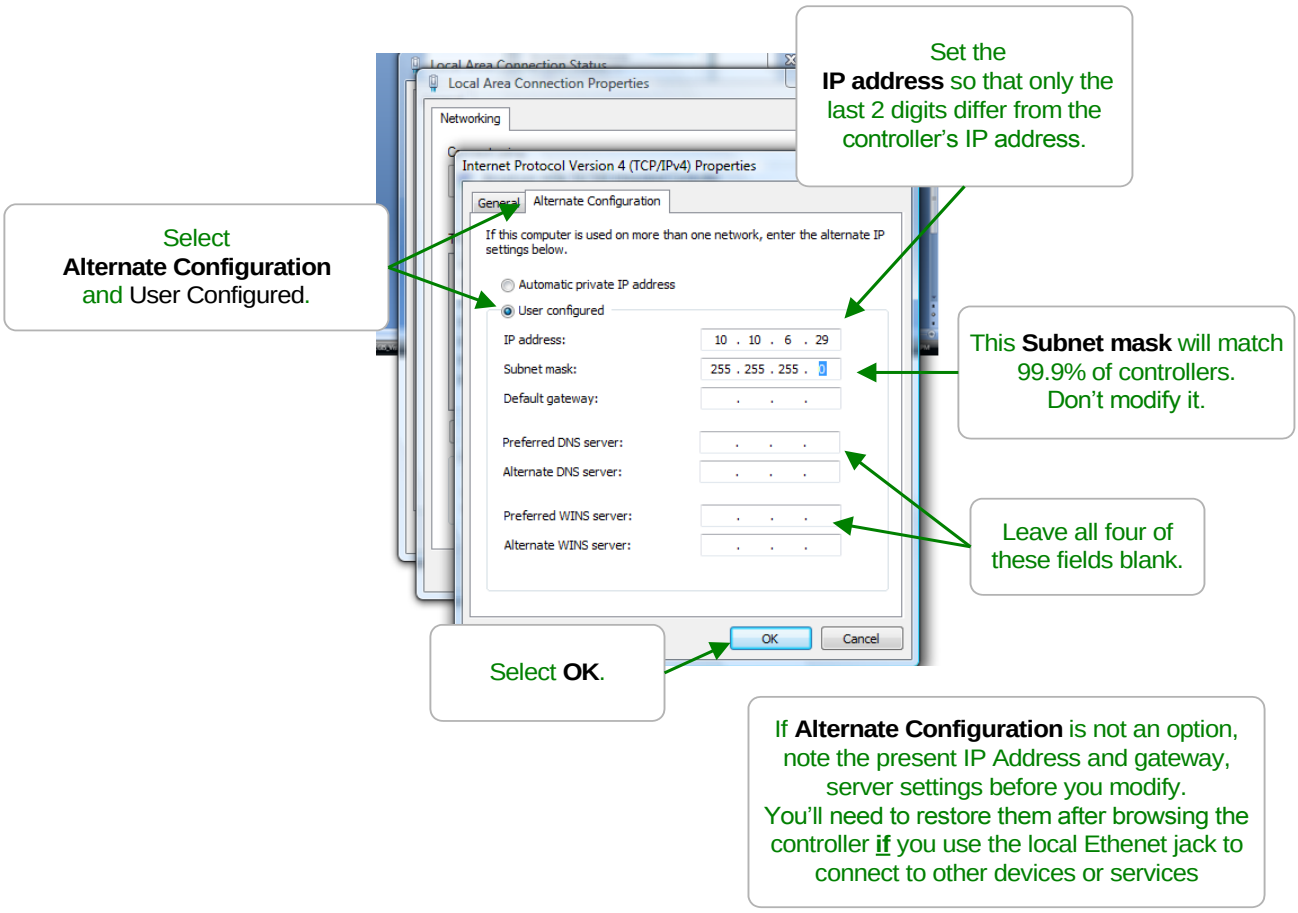


Once in **Local Area Connection Status**, select **Properties**.

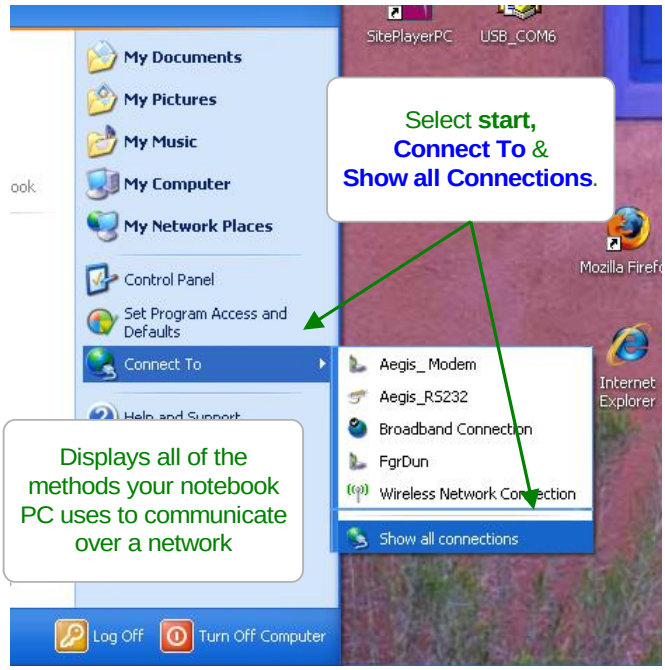


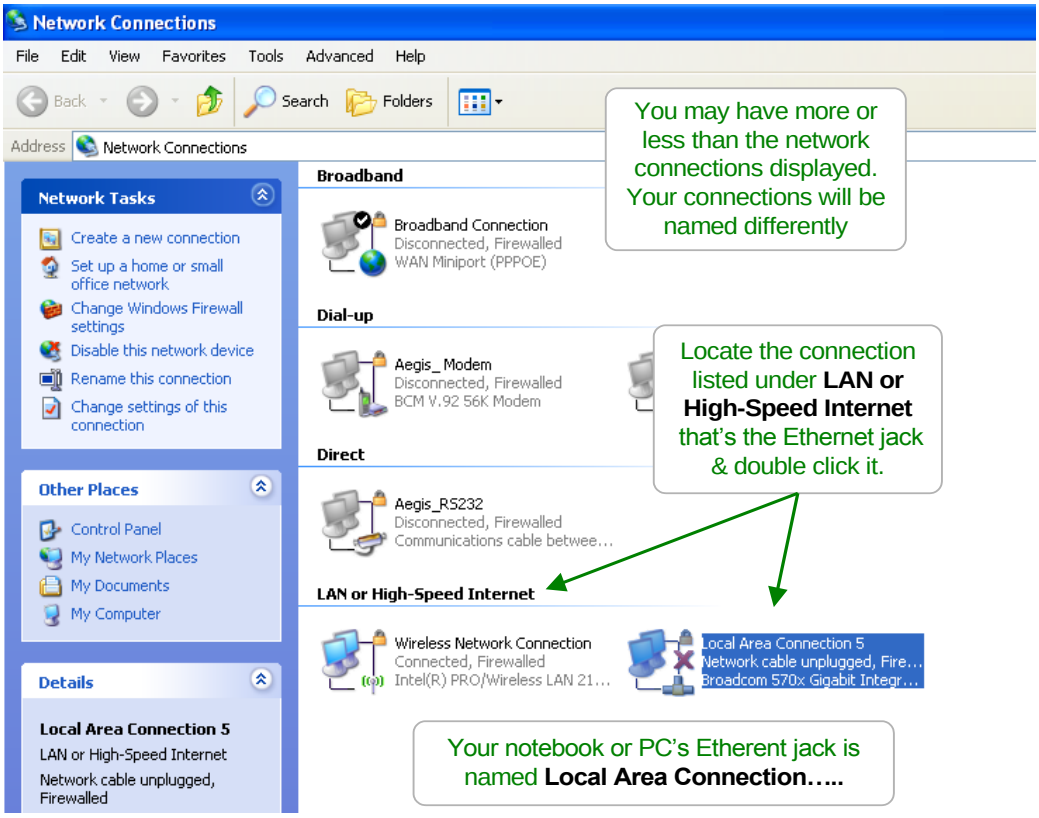
Select **Internet Protocol Version 4**, and then select **Properties**.

DCM2-CI Browser
8.5 Windows VISTA Cross-Over Set-up cont.

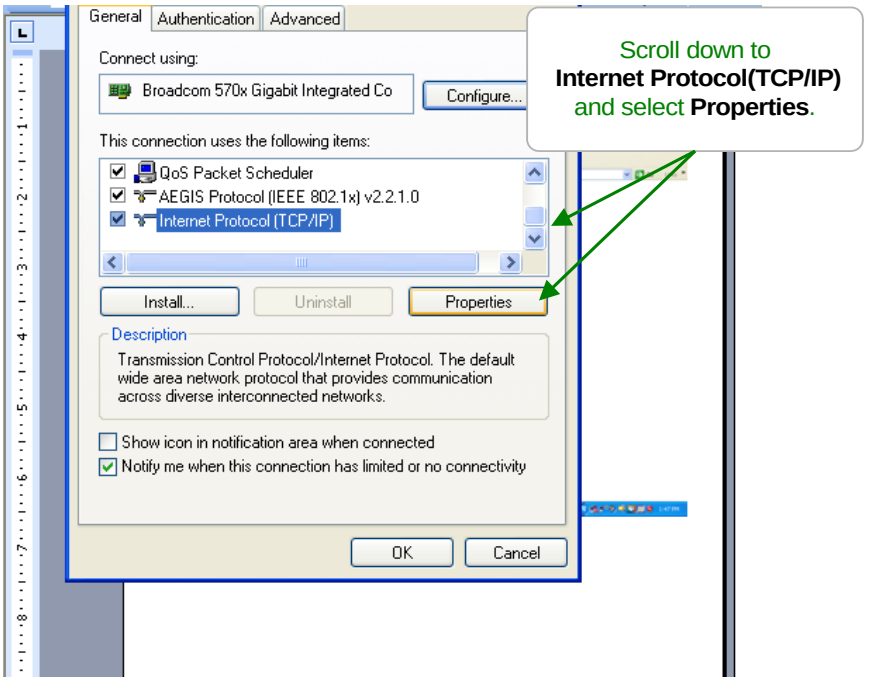


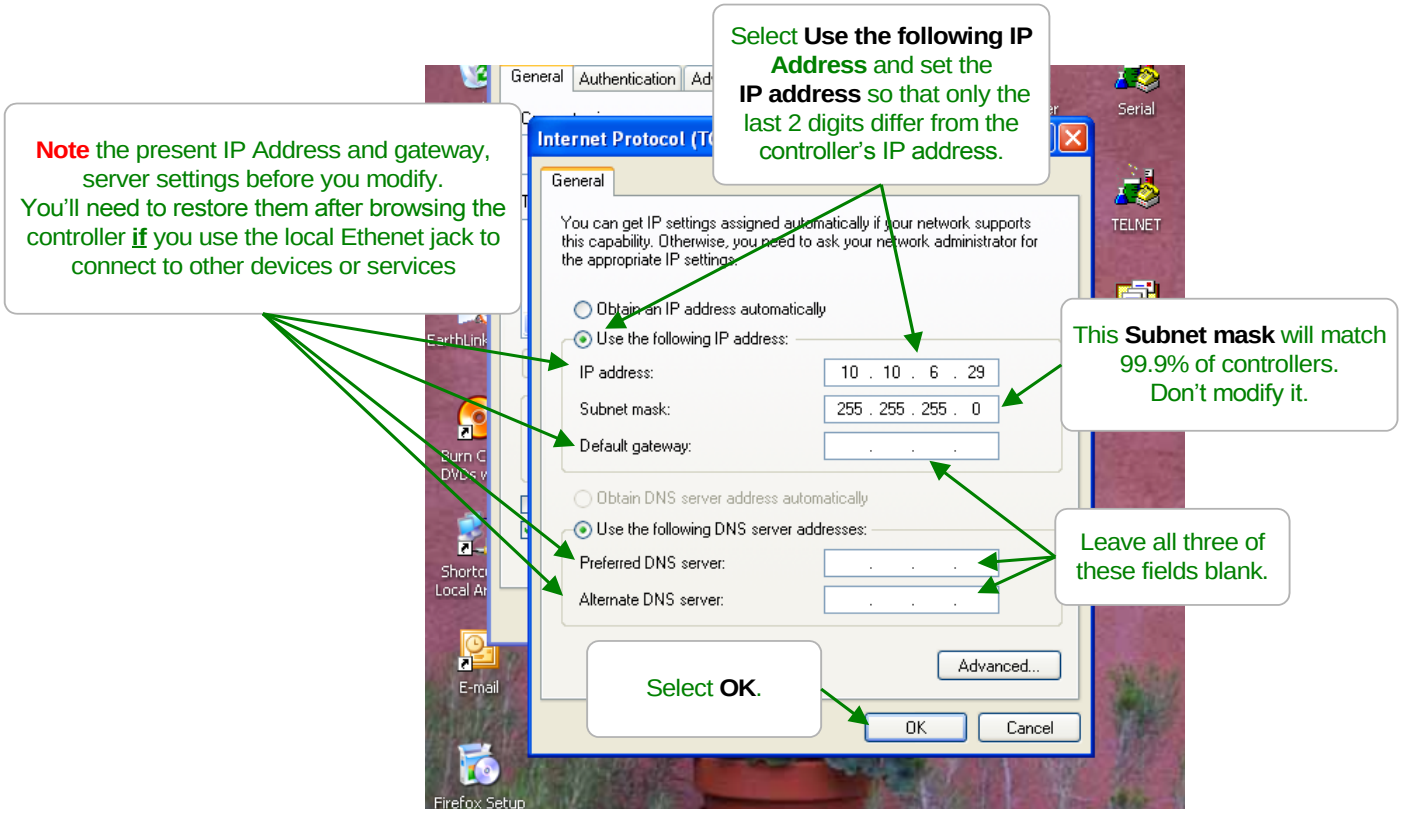
8.6 Windows XP Cross-Over Set-up





8.6 Windows XP Cross-Over Set-up cont.

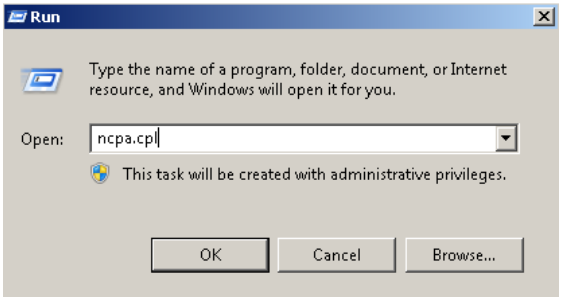




DCM2-CI Browser
8.7 Windows 8 Cross-Over Set-up

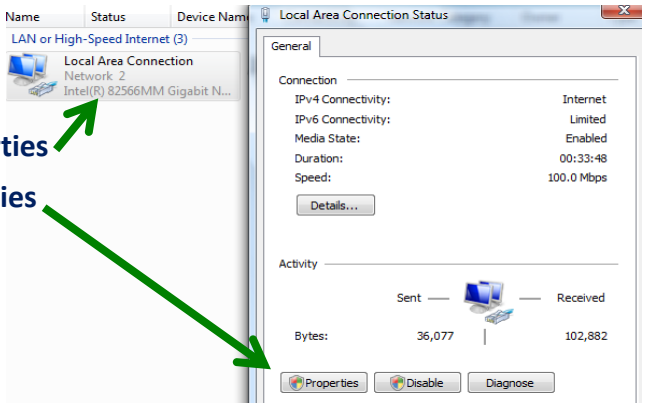
1 Logon to Windows 8 computer with any account that has administrative privileges.
2 From the available options click on **Desktop**.

3 On the desktop screen press **Windows + R** keys simultaneously to initiate **Run** command box.
4 In the available field type **NCPA.CPL** command and press OK.

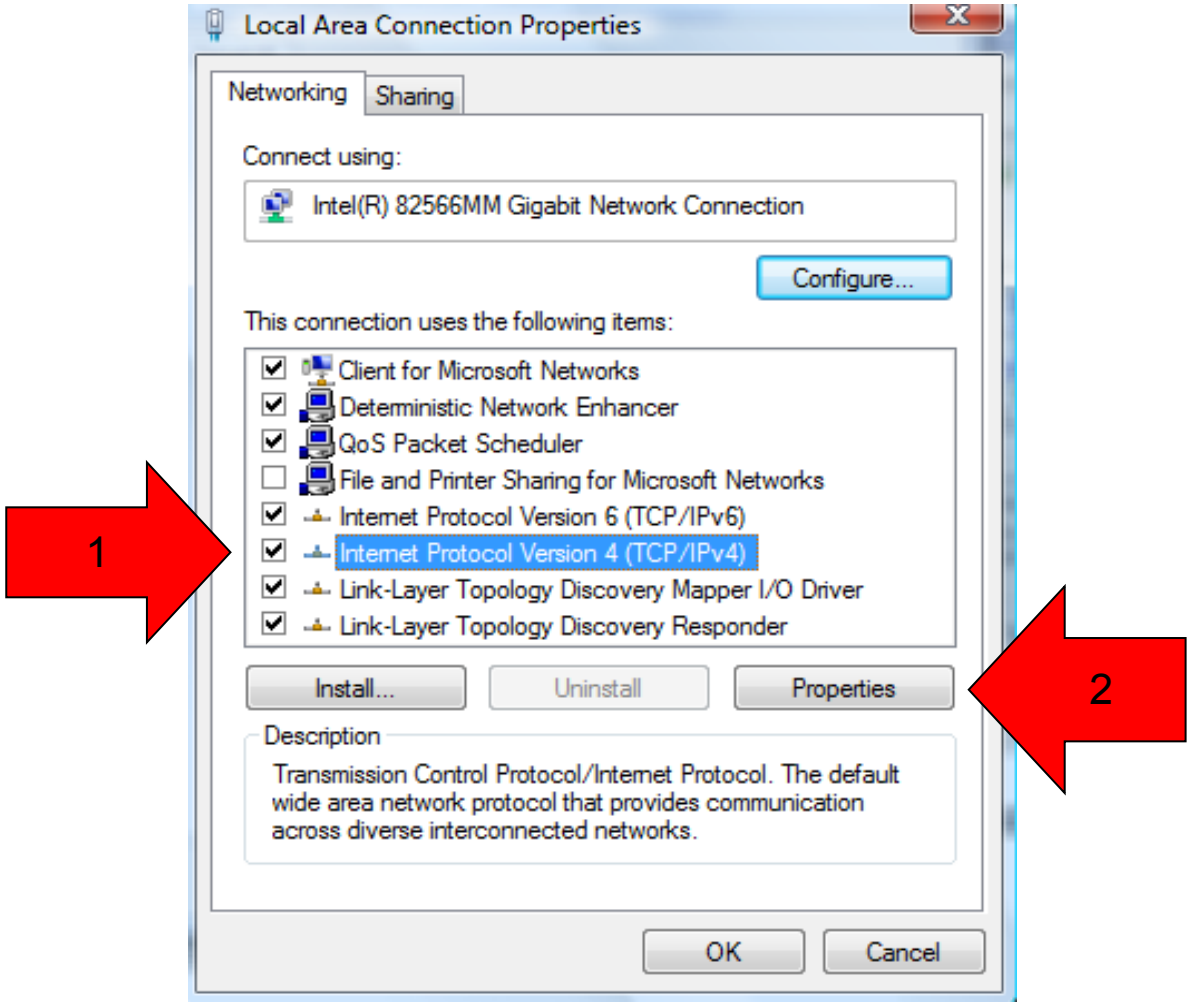


Double click on **Local Area Connection** and select **Properties**

OR you may see **Ethernet Connection** and select **Properties**



8.7 Windows 8 Cross-Over Set-up cont.



(1) Highlight Internet Protocol **Version 4** (TCP/IPv4)

(2)Select Properties

8.7 Windows 8 Cross-Over Set-up cont.

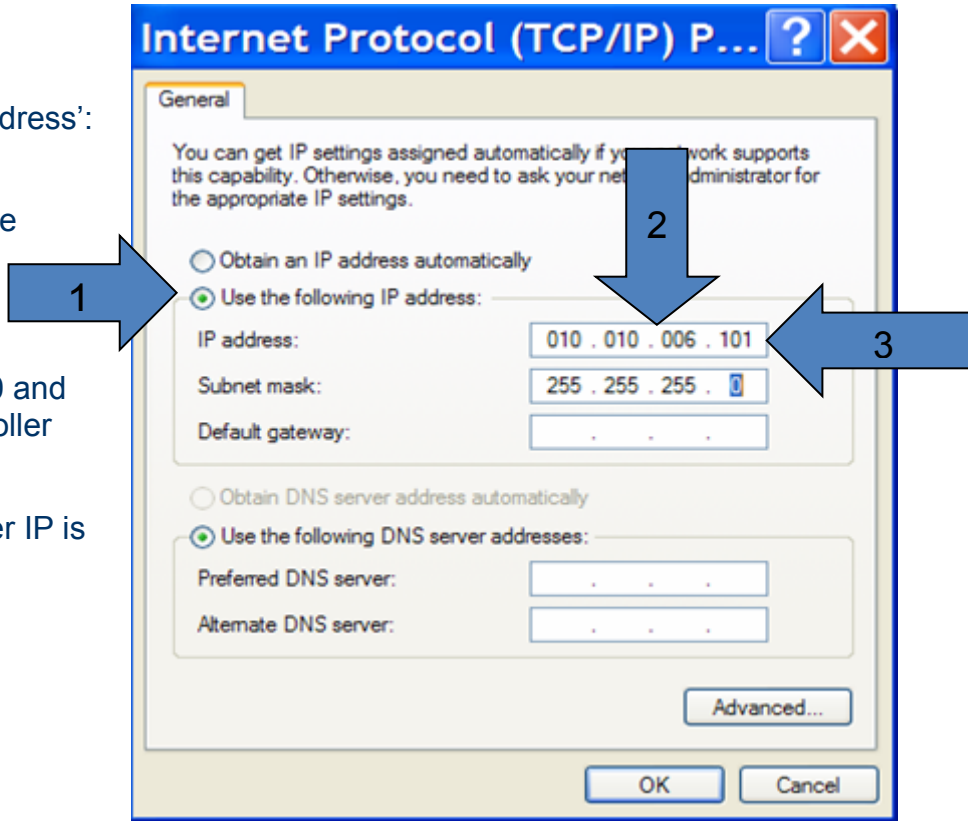
Select the 'Use the following IP address': circle (1)

Enter the first three numbers of the controller's IP address (2)

Example: 010.010.006.___

Then enter a number between 000 and 255 that is different from the controller address

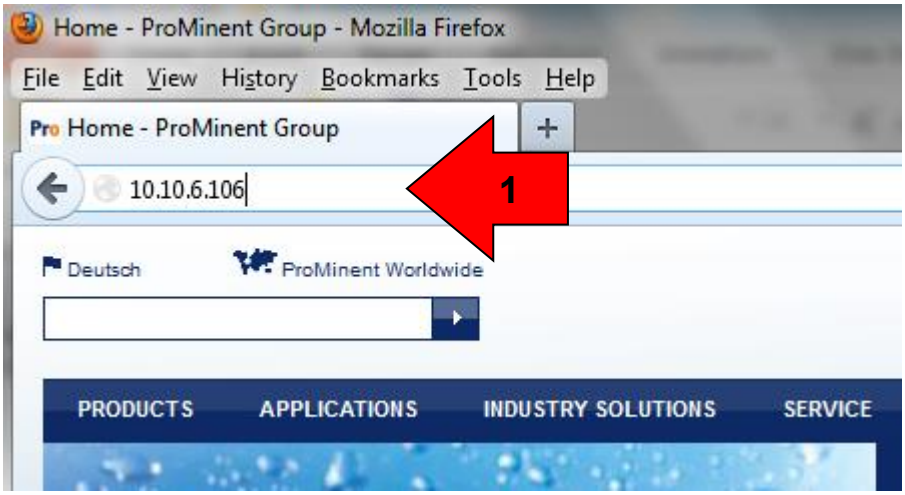
In this example, since the controller IP is 010.010.006.106, we used 010.010.006.101 (3)



Press the Tab key and enter the Subnet mask of 255.255.255.0

Select OK here and on the Local Area Connection window

DCM2-CI Browser
8.7 Windows 8 Cross-Over Set-up cont.



Connect CAT5 Ethernet crossover cable from PC to controller

Open WEB Browser

Enter controller IP address (1). Default is 10.10.6.106. Press enter

'http' and 'www' are not necessary.

8.7 Windows 8 Cross-Over Set-up cont.

Once you have concluded your Browser session with the controller, you should reconfigure your PC to the previous configuration, usually this is 'Obtain an IP address automatically' by selecting the circle (1) as shown

Use Connection – Ethernet setup steps above to get to this screen

Select OK on this screen and then again on the Local Internet Connection window to save the change.