

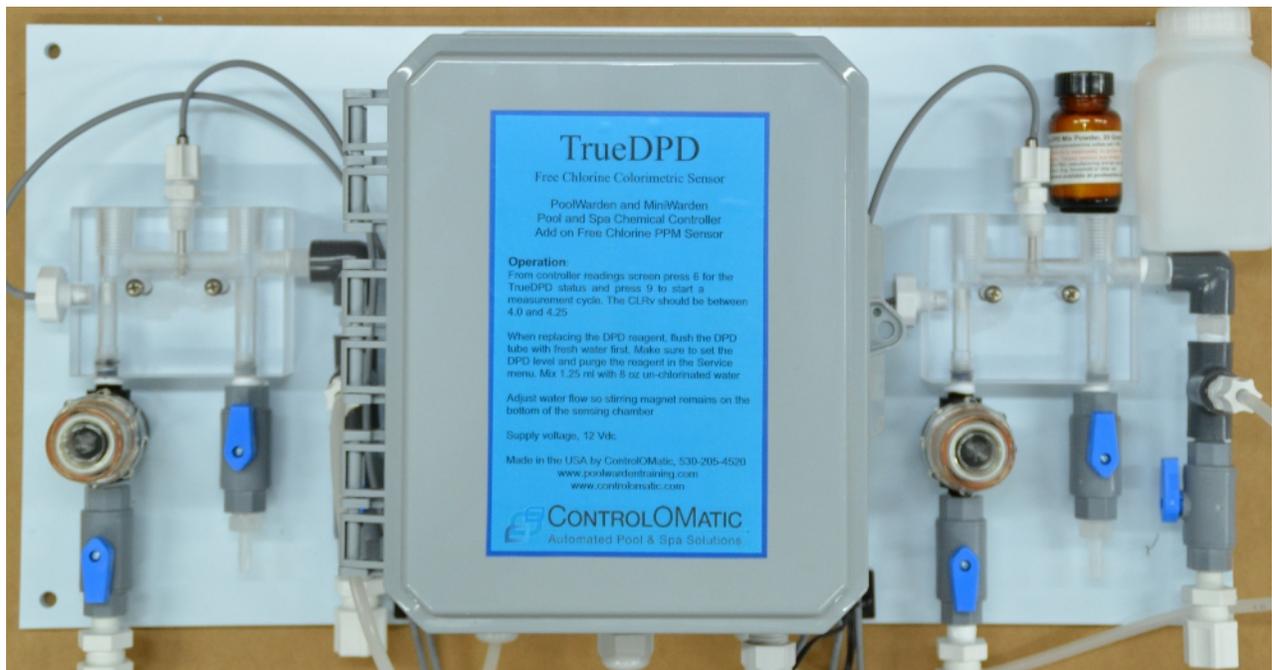
# TrueDPD Operation

## PoolWarden and MiniWarden

### Colorimetric DPD Free Chlorine Sensor

## A New Era In Pool & Spa Chemical Automation!

The TrueDPD is an optional accessory that adds a free chlorine measurement to the PoolWarden and MiniWarden. The measurement uses the DPD method and is not affected by pH, cyanuric acid, saltwater chlorine generators or any other variables that affect an ORP measurement. It interfaces with the controllers using one of the existing flow switch inputs and is setup in the system and service menus.



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For software version date 03/01/2016

## Step 1 - Installation

**Mounting:** Locate a vertical section of wall space close enough to the controller so that the interface wire is long enough. Attach to the wall with 4 screws.

**Drain:** Attach 1/2" tubing to the drain connection on the front of the measuring cell. The tube needs to be routed through the cable grip near the front bottom center of the box. The tube end should be placed to a waste drain that is lower than the TrueDPD and should have no obstructions.

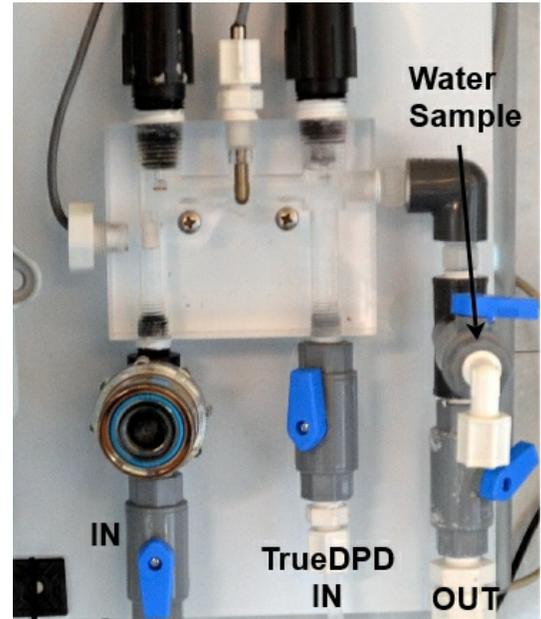
**Water In:** Attach a 1/4" tube from the water to be measured to the TrueDPD. The controller's flow cell has a 1/4" right angle tube connector for the TrueDPD IN.

- Single pool version: the input will be the solenoid on the right. The left solenoid is not installed.
- Two pool version: Pool1 (PPM1) uses the solenoid on the left and Pool2 (PPM2) uses the solenoid on the right.

**PoolWarden Interface:** Connect the red interface wire to the Flow4 input on the PoolWarden display board and the black wire to GND.

**MiniWarden Interface:** Connect the red interface wire to the Flow2 input on the MiniWarden display board and the black wire to GND.

**Power Supply:** Plug the power supply into the power source. The power supply does not support 220 VAC. If power source is 220 VAC then a suitable plug adapter may be needed.



## Step 2 - DPD Bottle Fill

1. Remove the bottle from the TrueDPD. Hold the lid and twist the bottle to keep the tube from twisting.
2. Rinse out the bottle with tap water. Make sure to not get any of the liquid from the bottle on your hands, wear protective rubber gloves.
3. **CLEANING:** Fill the bottle with tap water and place back into the TrueDPD. Turn the system on and go to the manual operation menu and run a continuous purge for 60 seconds. This will clean out the tubes. Remove the bottle and any remaining water.
4. Add 0.5 grams of the DPD powder to the empty bottle using the small supplied spoon. Keep spoon dry.
5. Fill the bottle to the neck, no need to fill all the way to the top. If TrueDPD is in a location over 80 degrees Fahrenheit the DPD mixture will get dark over time. If this is the case, make a half full bottle at a time. The initial color of the mixture is light pink.
6. Replace the bottle back into the TrueDPD and tighten the lid.
7. Use the manual mode to prime the DPD pump. Observe the liquid progressing down the tube and entering the measuring chamber.
8. In the service menu the last selection is the DPD level percentage, press the right arrow or the Enter button to change the value.

## Step 2 - Configuration

The initial setup is the same for both the PoolWarden and the MiniWarden.

**System Menu:** Press the back button to access the Main Menu and scroll down to the System Menu.

**Enabling PoolWarden:** Scroll down to TrueDPD PPM and select None, Pool1, Dual, or Pool2. Cycle power for this change to take effect.

**Enabling MiniWarden:** Scroll down to TrueDPD PPM and select None or Pool1. Cycle power for this change to take effect.

**Cycle Time:** Scroll to the next item which is TrueDPD Cycle and select the desired measurement cycle time: 10, 20, 30 or 60 minutes. The shorter the measurement time the quicker the DPD mix will run out.

## Step 3 - Manual Operation

The TrueDPD should be manually operated to verify correct operation after installation and from time to time. Go to the Service menu and scroll down to TrueDPD PPM Manual to manually control the TrueDPD. Note that when some of the manual actions are turned on, the stirring motor and green LED may turn on.



1. 1 = DPD: Pressing number 1 will manually feed a drop of DPD
2. 2,4 = Flow: Pressing numbers 2 or 4 will turn on a water flow solenoid
3. 3 = AllOFF: Will turn off anything that may be on in the TrueDPD except for the green LED.
4. 5 = AllOn: Will turn on everything to run continuously.

TrueDPD Manual Mode	
1=DPD	9=DPD Purge
2=Flow1	4=Flow2
3=AllOFF	5=AllOn
6=Stir	v=4.25

5. 9 = DPD Purge, this will turn on the DPD pump to purge the lines and you must press 3 to stop it. Select this option to prime the DPD pump when re-filling the bottle.

**Water Flow:** The water flow solenoid will turn on from time to time and the flow needs to be adjusted. Manually turn on the flow and observe the water entering the small clear chamber. If there are many air bubbles or the stirring magnet is bouncing around, gradually close the valves so there are only a few bubbles. Excessive water flow may cause the small magnet to exit and lead to higher water loss. Also observe the water leaving the drain tube to make sure water is actually leaving the chamber. When done

press 3 to turn off the flow. For the two pool version repeat for the second pool. When done, make sure the controller flow cell magnet still registers flow.

**Priming the DPD:** Press number 9 to prime the DPD pump which also turns everything on. If the DPD tube is empty observe the liquid traveling in the tube. If there is any chlorine in the flow water also observe in the chamber a color change of the water to pink. Press number 3 to turn everything off. Then turn on a flow to clean out the sensing chamber.

**Voltage:** When the sensing chamber is clear the voltage should be between 4.1 and 4.35 V. There is a small adjustment dial inside the TrueDPD that is used to set this voltage. When some DPD is added and the sensing chamber water turns pink this voltage will drop. The amount that it drops is an indication of the free chlorine level. The water is clear after a flow solenoid has been on.

**Manual Cycle:** To operate a manual cycle, turn on the flow to clean out the sensing chamber with the water to be measured, the magnet will also be spinning. The voltage should be between 4 and 4.5 V. Press number 1 two times to feed two drops of DPD, press at least 1 second apart. Observe the voltage dropping and leveling off after 20 to 40 seconds. When done turn on a flow to clean out the sensing chamber.

### Step 3 - Normal Operation

In the normal operation the TrueDPD will start a measurement at the cycle time in line with the actual time in the controller. If every 30 minutes, then on the hour and 30 minutes after the hour it will make a measurement. To observe the previous measurement information: from the readings screen press 6 to bring up the TrueDPD information screen.

CLRv	DPDv	PPM	CTR	Number
4.30	2.15	2.6		cd0
4.10	3.15	1.3		cd0
CTR:25		v=4.30	0	

- CLRv: Clear Voltage reading without DPD in the sensing chamber (> 4.0 V)
- DPDv: Voltage after DPD has been added
- PPM: Calibrated free chlorine PPM measurement
- CTR: Counts the complete measurement cycle in seconds
- V: Current measured voltage
- Last Number: If shown, 1 is flow 1 and 2 is flow 2
- Error code “c”: The clear voltage was below 4V and a second attempt was made
- Error code “d”: The DPD voltage was 0 volts and a second attempt was made
- Error code “0”: The DPD voltage was greater than the clear voltage and the measurement was repeated.

The error codes are latching and let you know if the TrueDPD had some issues with a measurement cycle since the last time this screen was visited or power cycled. When exiting this screen the error codes clear.

**Take a Reading:** When in this screen, press number 9 to start the cycle and take a measurement. Observe the counter start from 0 and at various times the TrueDPD will perform the actions to refresh the sample chamber, add DPD, take the measurement and finally clean out the sample chamber.

### Step 4 - Calibration

When calibrating the free chlorine the entered calibrated value will update the calibration data on the next measurement at the configured cycle time. The displayed value will be the new calibrated value, but if the controller is turned off before the next cycle measurement there will be no calibration performed.

To calibrate go to the service menu and select calibration. Scroll down to PPM and enter the actual free chlorine PPM. To finish the calibration go to the readings screen and press 6 to visit the TrueDPD status screen and press 9 to start a measurement cycle.

### Step 5 - Relay Control

**IMPORTANT:** If adding the TrueDPD to an existing controller you must go to the Relay Type menu in the controller and reset the ORP relays and alarms to defaults after the TrueDPD has been enabled in the System menu to add the PPM capability to the relay setup and alarm conditions. There is also an Update All selection in the Relay Type menu that will update all relays to the selected types.

**Setpoints:** You will be able to have either an ORP or PPM or both as setpoints. For PPM control there is also a new setting: “and If PPM > 0.0 - YES/NO”. If set to YES, then if the PPM measurement is 0.0 that will not turn the relay on, it must be greater than 0. If something is wrong with the TrueDPD such as out of DPD reagent that would give a 0 reading even if there is chlorine in the water.