

# Alternating Duplex Timed (Model DTD Control Panel)

**Manufacturer:** SJE Rhombus

**Model:**

- DTD1W914X (115 V)
- DTD1W114X (115/208/230 V)

**Phase:** Single

**Number of Pumps:** 2

**Float Tree(s) Required:** One 4-Float Tree

**Electrical Schematic Available at:**

[www.waterloo-biofilter.com](http://www.waterloo-biofilter.com) → Products → Control Panels → Alternating Duplex Timed

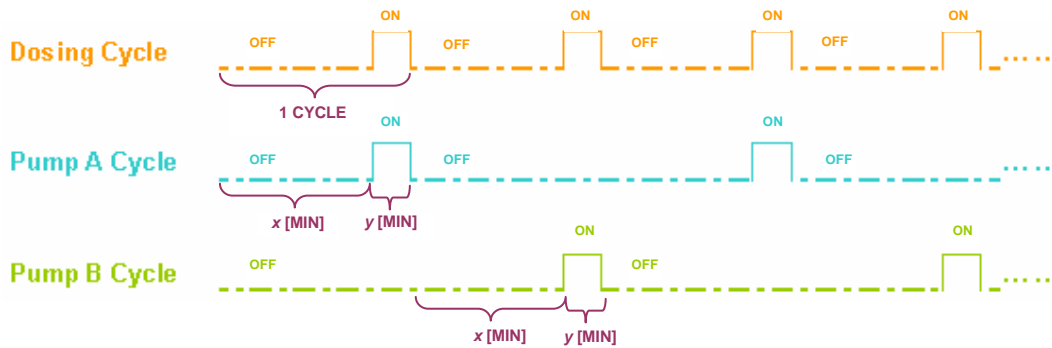
**Dosing Type:** Alternating Timed

**Typical Applications:**

Dosing to Biofilter for Large Configurations (> 3000 L/d)

## Operational Description

In this operation, 2 pumps placed in the same chamber operate on a timed off-on<sup>1</sup> cycle. Each cycle consists of  $x$  minutes of pump off time followed by  $y$  minutes of pump on time. Two pumps operate on an alternating sequence, whereby when Pump A is finished it's off-on cycle, Pump B will start it's off-on cycle, and vice-versa.



**Figure 1 Alternating Duplex Timer Dosing Cycle Schematic**

The purpose of the timer is to balance flow evenly to the Biofilter<sup>®</sup> for better treatment; thus, the goal is to dose consistently over the entire day. To achieve this goal, it is crucial to set the cycle timer properly. This also gives the system some added redundancy, where in the event one pump fails, there is a second pump to take over.

<sup>1</sup> Cycles always begin with OFF Time

Typically, a DTD panel requires 4 float switches for operation. They include (from lowest to highest in elevation):

1. *Redundant OFF float* (Turns both pumps off/protects pump from pumping dry)
2. *Timer Enable* (Starts/stops cycle timer)
3. *High Water Alarm float* (Activates audible and visual alarms)
4. *Timer Override float* (Turns both pumps on until water level drops below *Timer Enable*)

The *Redundant OFF float* ensures that the pumps are completely submerged in water for adequate cooling. When this switch drops, it turns off both pumps regardless of the timer setting. It is called "redundant" because ideally, water level would be kept well above it by the *Timer Enable float*; it would only drop if the *Timer Enable* is malfunctioning, hung up, or the pump chamber is leaky. The *Redundant OFF float* should be clamped to 12" from the bottom of the pump chamber.

The *Timer Enable float* starts/stops the cycle timer. When this switch rises, the cycle timer starts. The two pumps would be turned on alternately to complete timed cycles until the *Timer Enable float* drops, upon which the cycle timer stops. Please note that the timer always starts with the off portion of the cycle. The *Timer Enable/Low Level Cutout float* should be clamped to 4" above the *Redundant OFF float*.

The *High Water Alarm float* notifies the operator of a high water level in the tank. When this switch rises for more than 2 seconds, it activates the audible and visual alarms. A high water level may result from a surge of influent. The *High Water Alarm float* should be clamped to  $\frac{3}{4}$  the height of the pump chamber from the bottom of the chamber. This is a safety factor to provide time for the operator to investigate and react to the problem before outbreaks occur.

The *Timer Override float* prevents water from overflowing the tank. When this switch rises, it overrides the timer and turns on both pumps continuously until the water level falls enough for the *Timer Enable float* to drop. Overrides are undesirable as they result in large volumes of wastewater dosing through the Biofilter<sup>®</sup> and the treatment benefits

of timed dosing are therefore compromised. To prevent the activation of the *Timer Override float*, this switch should be clamped to 4" – 12" above the *High Water Alarm float*. This provides buffer time for the operator to react before the timer is overridden. Frequent activation of alarms may indicate the need for timer setting modification.

## 4. Timer Override

High Position  
Turns ON both pumps

Low Position  
Turns OFF Timer Override

## 3. High Water Alarm

High Position (>2 seconds)  
Turns ON audible and visual alarm

Low Position  
Turns OFF audible and visual alarm

## 2. Timer Enable

(Low Level Cutout)

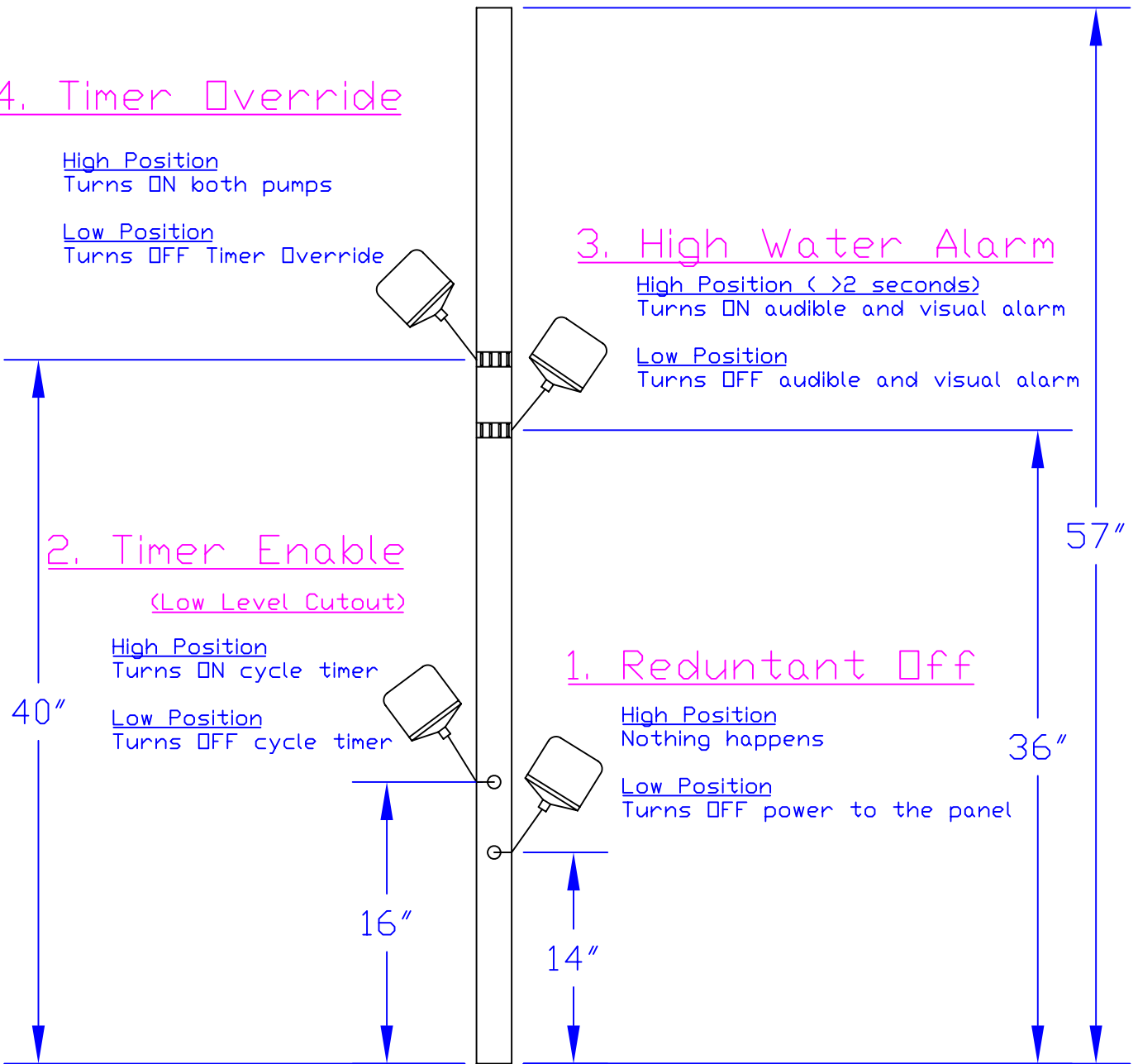
High Position  
Turns ON cycle timer

Low Position  
Turns OFF cycle timer

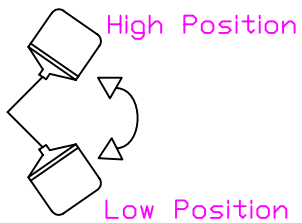
## 1. Redundant Off

High Position  
Nothing happens

Low Position  
Turns OFF power to the panel



## Legend



Alternating Duplex Timer  
Float Tree