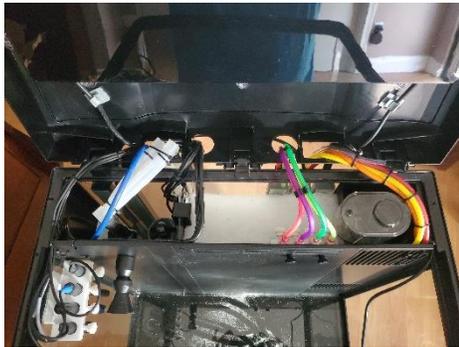


Coralife Biocube 32



Equipment



Apex Display (Inside Cabinet on Right Side at Top)

HurricaneX Controller, Steves Led's 843546835 (Located Inside Cabinet on Right Side at Top)



Meanwell LRS-200-48 200W, 48V @ 4.4A (Located Inside Cabinet Under Top)



48v to 12v Converter (Located Inside Cabinet on Right Side at Top)

1. HurricaneX Controller (Steves Led's 843546835)
2. Cabinet Fans (Coolerguys 60x20mm)



FMM_3 (On AWC Tank Inside Cabinet)

1. 24v Output = **Waste_S_Pump** (Waste Saltwater Pump, Apex PMUP)

-
1. **WT_H_1** (AWC Waste Tank Full)
 2. **WT_L_2** (AWC Waste Tank Empty)
 3. **ST_H_3** (AWC Saltwater Tank Full)
 4. **ST_L_4** (AWC Saltwater Tank Empty)



PM2_4 (Located Inside Cabinet on the Right Side of the Back Wall Under Shelf)

1. **M_Sw_1** (Fish Feed Mode), (**FeedMode**)
2. **M_Sw_2** (Reef Feed Mode), (**FeedMode2**)
3. **M_Sw_3** (Automatic Water Change)
4. **M_Sw_4** (Fill ATO)
5. **M_Sw_5** (Drain Waste Saltwater)
6. **M_Sw_6** (Fill Clean Saltwater)

-
1. **Salt** Salt Probe
 2. **Tmpx4** Temperature Sensor



ALD_5 (Outside Cabinet Bottom Rear on Back Wall)

1. **Swx5_1** (Right Rear Water Leak Sensor)
2. **Swx5_2** (Left Rear Water Leak Sensor)
3. Blank
4. Blank



FMM_6 (Inside Cabinet Bottom Right Corner on Back Wall)

24v Output = **Clean_S_Pump** (Relay 3, wire 33, Saltwater Refill Pump 12v Power Port)

-
1. **FLTR_1** (Filter Replace Sensor)
 2. **H_WL_2** (Hi Water Level)
 3. **O_WL_3** (Operating Water Level)
 4. **L_WL_4** (Low Water Level)



ILnk_7 (Inside Cabinet Top Right Corner on Back Wall)

1. **ATOPump** (24v Output 1 (A) Relay 1 Wire 31 ATO Pump AutoAqua DP-200)
2. **ATOFillPump** (24v Output 2 (B) Relay 2 Wire 32 Freshwater Refill Pump 12v Power Port)

-
1. DOS
 2. Blank
 3. Blank



FMM_8 (Inside Cabinet Bottom Left Corner on Back Wall)

24v Output = **24vPumpPower** (Relay 4 - Return Pump, Left Wavemaker & Right Wavemaker 24v Power)

-
1. **ATOH_1** (ATO Full)
 2. **ATOL_2** (ATO Empty)
 3. **Flow** (Return Pump Flow Sensor)
 4. **Swx8_4** (Water Leak Sensor Inside Cabinet)



AFS_1 (AFS_9) On Hood

- 08:01 First Feeding Time
- 1 Drum Rotations
- 2 Feedings Per Day
- 510 Repeat Interval
- A Feed Cycle

OSC 00:00/000:30/000:30 Then ON
 If Time 00:00 to 08:00 Then OFF
 If Time 08:02 to 16:30 Then OFF
 If Time 16:32 to 00:00 Then OFF
 If FeedA 000 Then ON

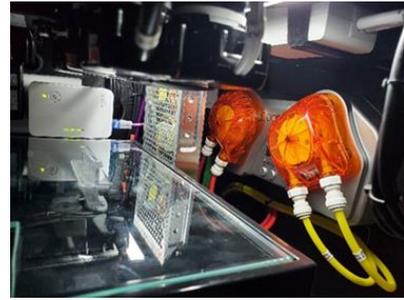


EB4_10 (Located Inside Cabinet Under Top)

1. **Reactor** (Aqua Gadget MiniMax 7301)
2. **Heater** (Vivosun Titanium 200 Watt)
3. **Chiller** (JBJ Artica DBA-075 1/10 HP)
4. **UV_Skimmer** (Coralife Biocube Skimmer 100538604 & UV Light 100115640)

EB4_11 (Located Inside Cabinet Under Top)

1. **12v_Power** (5amp)
2. **24v_Power** (4amp)
3. **Reef_Lights** (Steves Led's 8794102401)
4. **Doser** (Jebao 4-Channel WIFI Doser3.4)



DOS_12 (Inside Cabinet on Right Side Top)

1. **AWC_Drain_Pm** (AWC Drain Pump)
2. **AWC_FILL_Pm** (AWC Fill Pump)



Apex Base Unit (Located Inside Cabinet Bottom Left Corner on Back Wall)



12v Power Supply for Apex Power Monitoring (Inside Cabinet Top Left Corner on Back Wall)



D-Link WIFI Extender DAP-1330 (Inside Cabinet Top Left Corner on Back Wall)



Cabinet Door light Switch (Located on Right & Left Sides Inside Cabinet at the Top)



Cabinet Light (Located Inside Cabinet Under Top)



Cabinet Light (Located Inside Cabinet Shelf)



Cabinet Fans, Coolerguys 60x20mm (Located in Front Cabinet Doors)



Mechanical & Wet/Dry Filtration (Located in Center Rear Chamber)



UV & Media Filtration (located in Left Rear Chamber)



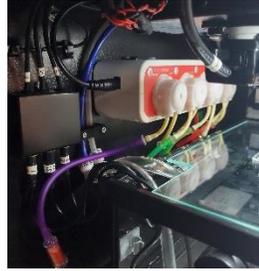
Co2 Scrubber (Located on the Back of the Cabinet)



Water Level Sensors (Located in Left Rear Chamber)



ATO Electrical Interface (Located inside cabinet on Left side wall towards the top)



Jebao 4-Channel WIFI Doser3.4 (Located inside cabinet on Left side wall towards the top)



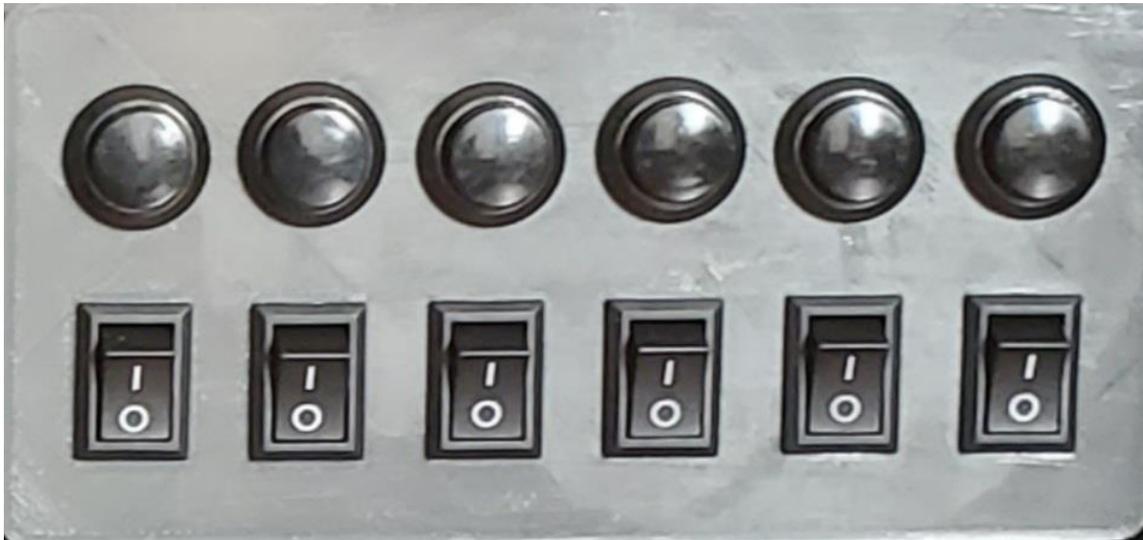
Co2 Scrubber (Located on the Back of the Cabinet)



Refill ATO Connection Ports (Located on the Back of the Cabinet)

Momentary Switches (PM2_4) Mounted to Shelf

1. M_Sw_1 (Fish Feed Mode), (FeedMode)
2. M_Sw_2 (Reef Feed Mode), (FeedMode2)
3. M_Sw_3 (Automatic Water Change)
4. M_Sw_4 (Fill ATO)
5. M_Sw_5 (Drain Waste Saltwater)
6. M_Sw_6 (Fill Clean Saltwater)



Rocker Switches (Apex Base Unit) Mounted to Shelf

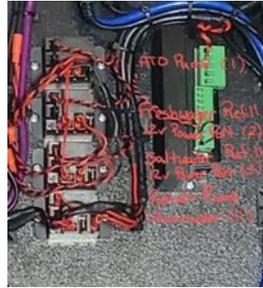
1. R_Sw_1 (Return Pump)
2. R_Sw_2 (ATO)
3. R_Sw_3 (Reactor)
4. R_Sw_4 (Skimmer & UV Light)
5. R_Sw_5 (Heater)
6. R_Sw_2 (Chiller)

ATO Operations

The ATO Tank is located inside the Cabinet on the left side of the Shelf. There are 2 Optical Level Sensors in the Reservoir. One to signal when the Tank is Full (**ATOH_1**) & one to signal when the Tank is Empty (**ATOL_2**). There are 3 Optical Level Sensors in the Return Pump Chamber. The lowest positioned sensor is the Low-level Sensor (**L_WL_4**). The middle sensor is the Operating Level Sensor (**O_WL_3**). The highest positioned sensor is the High-level Sensor (**H_WL_2**). There is 1 Optical Sensor in the Filter Chamber (**Fltr_1**). When the system detects the Water Level is Low by the **O_WL_3** sensor, Output 1 (A) of the ILink Module turns on Relay #1 and supplies 12v dc to the ATO Pump. If the **O_WL_3** sensor malfunctions it will use **L_WL_4** to turn on the Pump and **H_WL_2** to turn off the Pump. If the ATO Reservoir is Low indicated by **ATOL_2** sensor being Open, the Pump will be turned Off. If the filter is indicating that it needs to be replaced by sensor **Fltr_1** being Closed, the pump will be turned Off. When the AWC cycle is happening indicated by output **AWC_ATO_Ti** being On or a Manual Water Change is happening indicated by Output **AWC_Disable** being On, the Pump will be turned Off. When the system detects a Power Outage, the Pump will be turned Off. The Pump can be manually turned off by Rocker Switch #2 (**R_Sw_2**). If all else fails and the Pump stays running for 2:25 Minutes the program will switch to manual control and turn Off. You will have to switch the Output **ATOPump** back to Automatic. The Program always waits 5 Seconds before it will Change State. This keeps the Pump from Turning On/Off Rapidly.



ILink Module (**ILNK 7**)
(Inside Cabinet Top Right
Corner on Back Wall)



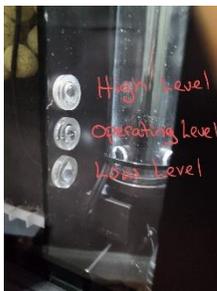
24v Control Relays
(Inside Cabinet Top Right
Corner on Back Wall)



ATO Electrical Interface
(Located inside cabinet
on Left side wall towards
the top)



ATO Tank (Located Inside
the Cabinet on the Left Side
of the Shelf)



Return Pump Chamber
Water Level Sensors
(Inside Return Pump
Chamber)



Replace Filter Sensor (**Fltr_1**)
(Inside Filter Chamber)

ATOPump (ILink 1 (A), Relay 1, Wire 31)
Fallback OFF
Set OFF
If **O_WL_3** OPEN Then ON
If **L_WL_4** OPEN Then ON
If **ATOL_2** OPEN Then OFF
If **R_Sw_2** OPEN Then OFF
If **H_WL_2** CLOSED Then OFF
If **FLTR_1** CLOSED Then OFF
If Output **AWC_ATO_Ti** = ON Then OFF
If Output **AWC_Disable** = ON Then OFF
If Power Apex Off 000 Then OFF
When On > 002:25 Then OFF
Defer 000:05 Then ON
Defer 000:05 Then OFF

Fill ATO Reservoir Process

This controls the Filling of the ATO Reservoir. Output **ATOFillPump** 24v Output 2 (B) on **ILnk_7** Controls Relay 2 Wire 33 ATO Refill Pump. To Refill the ATO Reservoir use straight RO/DI Water & the Bucket with the Dc Pump attached.



24v Control Relays (Inside Cabinet Top Right Corner on Back Wall)



ATO Tank (Located Inside the Cabinet on the Left Side of the Shelf)



3.5 gallon Refill Bucket



Refill ATO Connection Ports (Located on the Back of the Cabinet)

1. Connect the Pump Harness to the Top Connector of the 12v Power Center.
2. Connect the Hose to the Top Shut off Valve & Open the Valve.
3. Hold Momentary Switch #4 for one Second to Start the Fill Sequence.
4. Hold Momentary Switch #4 for 5 Seconds to Stop/Reset the Fill Sequence. (If Needed)
5. Once this Starts, it will Time Out after 4 minutes 15 seconds or when the Tank is Full.

Logic

ATOFillON (Virtual Output)
Fallback OFF
If **M_Sw_4** CLOSED Then ON
If **ATOH_1** CLOSED Then OFF
If Output **ATOFillOFF** = ON Then OFF
If Output **ATOFillTmr** = OFF Then OFF
Defer 000:01 Then ON

ATOFillOFF (Virtual Output)
Fallback OFF
Set OFF
If **M_Sw_4** CLOSED Then ON
If **ATOH_1** CLOSED Then OFF
If Output **ATOFillTmr** = OFF Then OFF
If Output **Auto_Fill_DT** = ON Then ON
Defer 000:05 Then ON
Min Time 000:01 Then ON

ATOFillPump (ILink 2 (B), Relay 2, Wire 32)
Fallback OFF
Set OFF
If Output **ATOFillON** = ON Then ON
If Output **ATOFillOFF** = ON Then OFF
If **M_Sw_4** CLOSED Then OFF
If **ATOH_1** CLOSED Then OFF

ATOFillTmr (Virtual Output)
Fallback OFF
Set OFF
If **M_Sw_4** CLOSED Then ON
If **ATOH_1** CLOSED Then OFF
Defer 004:15 Then OFF

Drain ATO Reservoir Process

To Drain the ATO use the Bucket without the Dc Pump attached.

1. Remove Hoses 46 & 47.
2. Connect Hose 46 to Port 47.
3. Hookup the Hose to the Top Port on the Back of the Tank and Open the Valve.
4. Depress the 4th Momentary Switch for 2 seconds.
5. Abort the ATO Drain by Depressing the 4th Momentary Switch for 5 seconds when the Tank is Empty.

Make sure to Reconnect Hoses 46 & 47 to their Corresponding Port when finished. If Removing the ATO Tank for Cleaning Disconnect Hoses 46 & 47. Remove Connectors 1, 2 & 31 from Interface Box. Now you are able to Remove the ATO Tank. After Cleaning Reinstall ATO Tank. Reconnect Hoses 46 & 47 to their Corresponding Ports. Reconnect Connectors 1, 2 & 31 to the Interface Box. Perform the Refill Process. You may have to Activate the Pump Twice if you want the ATO Completely Filled.



3.5 gallon Refill Bucket



Refill ATO Connection Ports (Located on the Back of the Cabinet)



ATO Electrical Interface (Located inside cabinet on Left side wall towards the top)



ATO Hose Connections (Located inside cabinet on Left side wall towards the top)

Automatic Water Change

This will Automatically Change the Display Tank Water. It has a Storage Tank Located Inside the Cabinet. The Storage Capacity of the AWC Tank is 2 Cycles. The Apex will start a Water Change one of 3 ways. 1st being Time Scheduled on the Day and Time you program it to start. 2nd by Feed Cycle D. 3rd by Depressing the 3rd Momentary Switch for 2 Seconds. You can also abort the AWC by Depressing the 3rd Momentary Switch for 5 Seconds. With these setting the AWC Cycle will be 1 hour to Fill & 1 hour to Drain. 1st it will go through 5 Pump Cycles to Fill the Display Tank with a Total Volume of 4050ml of Clean Saltwater. 2nd it will go through 5 Pump Cycles to Remove a Total Volume of 4050ml of Display Tank Saltwater. 3rd it will check to see if the Operating Water Level Sensor of the Display Tank is Closed (Low level). If the Water Level is at Operating Level, then it will Drain the Display Tank until the Water Level is Low. 4th it will Refill the Display Tank with Clean Saltwater to Operating Level. This Prevents the Salt Level in the Display Tank from Building Up.

Note:

1st make sure the High & Low Water Level Sensors in the Clean Saltwater Tank are positioned closer together than the Waste Saltwater Tank. I set the Waste Saltwater Tank to have 8 3/4 inches between the Sensors & the Clean Saltwater Tank to have 8 1/4 inches between the Sensors. The issue you will run into is after the 2 Water Change Cycles there will not be enough room to Drain the Water from the Display Tank. It will start a 3rd Cycle and depending on how much Clean Saltwater is Pumped into the Display Tank it may cause the Salt Level to Rise once the Water Evaporates in the Display Tank. The Display Tank Water Level will need to Evaporate before the ATO starts Topping Off again.



FMM_3 (On AWC Tank Inside Cabinet)

1. 24v Output = **Waste_S_Pump** (Waste Saltwater Pump, Apex PMUP)

1. **WT_H_1** (AWC Waste Tank Full)
2. **WT_L_2** (AWC Waste Tank Empty)
3. **ST_H_3** (AWC Saltwater Tank Full)
4. **ST_L_4** (AWC Saltwater Tank Empty)

Automatic Water Change Lines (Located in Right Rear Chamber)

DOS_12 (Inside Cabinet on Right Side Top)

1. **AWC_Drain_Pm** (AWC Drain Pump)
2. **AWC_FILL_Pm** (AWC Fill Pump)
- 3.

Dose Profile **Dose4050mL**

Amount to Dose 4050mL

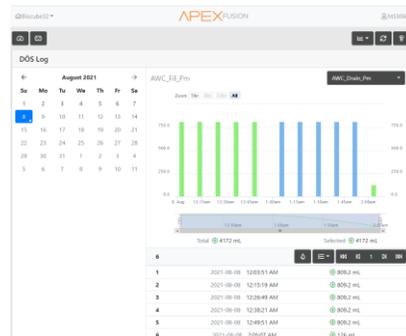
Time 57.5 min

Number of Doses 5

Dose Every 690 Sec (11.5 Min)

Volume per Dose 810.0mL

Pump Speed 250mL/min



Logic

AWC_Sch

Fallback OFF
Set OFF
If Time 00:00 to 00:01 Then ON
If DoW -MTW-FS Then OFF
If ST_L_4 OPEN Then OFF
If WT_H_1 CLOSED Then OFF

AWC_Trig

Fallback OFF
Set OFF
If FeedD 000 Then ON
If M_Sw_3 CLOSED Then ON
If Output AWC_Sch = ON Then ON
If Output AWC_Disable = ON Then OFF
If ST_L_4 OPEN Then OFF
If WT_H_1 CLOSED Then OFF
Defer 001:00 Then OFF

AWC_Fill_Ti

Fallback OFF
Set OFF
If Output AWC_Trig = ON Then ON
Defer 060:00 Then OFF

AWC_Fill

Fallback OFF
If Output AWC_Trig = ON Then ON
If Output AWC_Fill_Ti = OFF Then OFF
If Output AWC_Reset = ON Then OFF
If FLTR_1 CLOSED Then OFF
If ST_L_4 OPEN Then OFF
If Power Apex Off 000 Then OFF
Defer 000:01 Then ON

AWC_Drain_Dl

Fallback OFF
Set OFF
If Output AWC_Drain = ON Then ON
Defer 060:30 Then ON

AWC_M_Drain

Fallback OFF
Set OFF
If H_WL_2 CLOSED Then ON
If Output AWC_Fill_Ti = ON Then OFF
If Output AWC_Drain_Ti = ON Then OFF
If Output AWC_ATO_Ti = OFF Then OFF
If Output Man_Drain_DT = ON Then ON
If WT_H_1 CLOSED Then OFF
If O_WL_3 OPEN Then OFF
If Power Apex Off 000 Then OFF
Defer 000:10 Then ON
Defer 000:10 Then OFF

AWC_Fill_Pm

Fallback OFF
tdata 00:00:00,1,21,0,1,2,88,1,0,1,0,0,10,0
Set OFF
If Output AWC_Fill = ON Then Dose4050mL
If Output AWC_M_Fill = ON Then Dose12740mL
If Output Return_Pump = OFF Then OFF
Defer 002:02 Then ON

AWC_Mode

Fallback OFF
Set OFF
If Output AWC_Fill = ON Then ON
If Output AWC_Drain = ON Then ON
Defer 001:00 Then OFF

AWC_Reset

Fallback OFF
Set OFF
If M_Sw_3 CLOSED Then ON
Defer 000:05 Then ON
Defer 000:03 Then OFF

AWC_Drain_Ti

Fallback OFF
Set OFF
If Output AWC_Trig = ON Then ON
Defer 120:00 Then OFF

AWC_Drain

Fallback OFF
If Output AWC_Trig = ON Then ON
If Output AWC_Drain_Ti = OFF Then OFF
If Output AWC_Reset = ON Then OFF
If WT_H_1 CLOSED Then OFF
If O_WL_3 OPEN Then OFF
If Power Apex Off 000 Then OFF

AWC_M_Fill

Fallback OFF
Set ON
If O_WL_3 CLOSED Then OFF
If H_WL_2 CLOSED Then OFF
If FLTR_1 CLOSED Then OFF
If Output AWC_Fill_Ti = ON Then OFF
If Output AWC_Drain_Ti = ON Then OFF
If Output AWC_ATO_Ti = OFF Then OFF
If Output Man_Fill_DT = ON Then ON
If Output Fill_DT_2_OL = ON Then OFF
If ST_L_4 OPEN Then OFF
If Power Apex Off 000 Then OFF
Defer 001:00 Then ON
Defer 000:05 Then OFF

AWC_ATO_Ti

Fallback OFF
Set OFF
If Output AWC_Trig = ON Then ON
Defer 125:00 Then OFF

AWC_Drain_Pm

Fallback OFF
tdata 00:00:00,1,21,0,1,2,88,1,0,1,0,0,10,0
Set OFF
If Output AWC_Drain = ON Then Dose4050mL
If Output AWC_Drain_Dl = OFF Then OFF
If Output AWC_M_Drain = ON Then Dose12740mL

AWC_Disable

Fallback OFF
Set OFF
If Output Auto_Fill_DT = ON Then ON
If Output A_Fill_DT_Ti = ON Then ON
If Output Man_Fill_DT = ON Then ON
If Output Fill_DT_2_OL = ON Then ON
If Output Man_Drain_DT = ON Then ON
If Output AWC_2nd_WC = ON Then ON

Clean Saltwater Tank Fill

This controls the Filling of the Clean Saltwater Reservoir. Output **Clean_S_Pump** 24v Output 1 (A) on **FMM_6**. Controls Relay 3, wire 33, Saltwater Refill Pump



24v Control Relays (Inside Cabinet Top Right Corner on Back Wall)



Refill ATO Connection Ports (Located on the Back of the Cabinet)

1. Connect the Pump Harness to the Bottom Connector of the 12v Power Center.
2. Connect the Hose to the Bottom Shut off Valve & Open the Valve.
3. Hold Momentary Switch #6 for one Second to Start the Fill Sequence.
4. Hold Momentary Switch #6 for 5 Seconds to Stop/Reset the Fill Sequence. (If Needed)
5. Once this Starts, it will time out after 8 minutes 30 seconds or when the tank is full.

Logic

Refill_S_OFF (Virtual Output)

Fallback OFF

Set OFF

If **M_Sw_6** CLOSED Then ON

If **ST_H_3** CLOSED Then OFF

If Output **Refill_S_Tmr** = OFF Then OFF

Defer 000:05 Then ON

Min Time 000:01 Then ON

Refill_S_Tmr (Virtual Output)

Fallback OFF

Set OFF

If **M_Sw_6** CLOSED Then ON

If **ST_H_3** CLOSED Then OFF

Min Time 008:30 Then ON

Refill_S_ON (Virtual Output)

Fallback OFF

If **M_Sw_6** CLOSED Then ON

If **ST_H_3** CLOSED Then OFF

If Output **Refill_S_OFF** = ON Then OFF

If Output **Refill_S_Tmr** = OFF Then OFF

Defer 000:01 Then ON

Clean_S_Pump

Fallback OFF

Set OFF

If Output **Refill_S_ON** = ON Then ON

If Output **Refill_S_OFF** = ON Then OFF

If **M_Sw_6** CLOSED Then OFF

If **ST_H_3** CLOSED Then OFF

If Output **Auto_Fill_DT** = ON Then ON

Waste Saltwater Tank Drain

This controls the Draining of the Waste Saltwater Reservoir. Output **Waste_S_Pump** 24v Output 1 (A) on **FMM_3**. Connects directly to the Saltwater Refill Pump



FMM_3 (On AWC Tank
Inside Cabinet)



Drain Waste Saltwater
Connection Port (Located
on the Back of the Cabinet)

1. Connect the Hose to the Middle Shut off Valve & Open the Valve.
2. Hold Momentary Switch #5 for one Second to Start the Drain Sequence.
3. Hold Momentary Switch #5 for 5 Seconds to Stop/Reset the Drain Sequence. (If Needed)
4. Once this Starts, it will time out after 8 minutes 30 seconds or when the tank is Empty.

Logic

Waste_S_Pump

Fallback OFF

Set OFF

If Output **Waste_S_ON** = ON Then ON

If Output **Waste_S_OFF** = ON Then OFF

If Output **AWC_Drain_Pm** = ON Then OFF

If Output **AWC_Fill_Pm** = ON Then OFF

If **M_Sw_5** CLOSED Then OFF

If **WT_L_2** OPEN Then OFF

Waste_S_Tmr

Fallback OFF

Set OFF

If **M_Sw_5** CLOSED Then ON

If **WT_L_2** OPEN Then OFF

Min Time 008:30 Then ON

Waste_S_ON

Fallback OFF

If **M_Sw_5** CLOSED Then ON

If **WT_L_2** OPEN Then OFF

If Output **Waste_S_OFF** = ON Then OFF

If Output **Waste_S_Tmr** = OFF Then OFF

Defer 000:01 Then ON

Waste_S_OFF

Fallback OFF

Set OFF

If **M_Sw_5** CLOSED Then ON

If **WT_L_2** OPEN Then OFF

If Output **Waste_S_Tmr** = OFF Then OFF

Defer 000:05 Then ON

Min Time 000:01 Then ON

Manual Water Change

You can Manually Fill the Display Tank using the Dose Fill Pump or using the Bucket with the 12v Pump. Make sure to always use a Bucket of Saltwater that is Full.

Filling the Display Tank using a Bucket

To fill the DT using the 12v Pump you have two options.

The First Option is to Connect the Hose from Both the Fill Bucket and the Drain Bucket to the Display Tank Adapter 1. Connect one side of the 12v Extension Cord to the Pump. Connect the other end to the Center 12v Port on the Back of the Cabinet. With this Connection you will have to make sure the Pump Does Not Run Dry, Siphon Drain after the Pump Shuts Off or the Tank does not Overflow. You can Siphon Drain the Display Tank with the Display Tank Adapter 1.



- Connect the drain and the fill buckets to the display tank adapter 1.
- Open the valve on the display tank adapter attached to the fill bucket.
- Connect the power connector to the middle outlet on the back of the tank.
- When the tank is full or the pump starts sucking air, disconnect the power connector and close the valve to prevent siphoning the tank.
- To drain the tank open the valve to the drain bucket. When the water level reaches operating level or the bucket is full, shut off the valve to the drain tank.

The Second Option is to Connect the Hose from the Bucket to the Display Tank Adapter 2. Connect one side of the 12v Extension Cord to the Pump. Connect the other end to the Top 12v Port on the Back of the Cabinet. Turn Outputs **Auto_Fill_DT** and **A_Fill_DT_Ti** to Auto. Then Depress Momentary Switches #4 & 6 at the Same Time for 3 Seconds. With this Connection the Power will Shut Off after 8 Minutes or when the **FLTR_1** Sensor is Closed indicating the Tank is Full or Filter is Dirty.



- Connect the fill bucket to the display tank adapter 2.
- Open the valve on the display tank adapter.
- Connect the power connector to the Top outlet on the back of the tank.
- Turn outputs **Auto_Fill_DT** & **A_Fill_DT_Ti** to Auto
- Depress momentary switches #4 & 6 at the same time for 3 seconds.
- To drain the display tank start manual drain process using DOS.
- This adapter will not allow a siphon drain due to the adapter end being above the water level.

Auto_Fill_DT

Fallback OFF

Set OFF

If **H_WL_2** CLOSED Then ON

If Output **AWC_Fill_Ti** = ON Then OFF

If Output **AWC_Drain_Ti** = ON Then OFF

If Output **AWC_ATO_Ti** = OFF Then OFF

If Output **Man_Drain_DT** = ON Then ON

If **WT_H_1** CLOSED Then OFF

If **O_WL_3** OPEN Then OFF

If Power Apex Off 000 Then OFF

Defer 000:10 Then ON

Defer 000:10 Then OFF

A_Fill_DT_Ti

Fallback OFF

If **M_Sw_4** CLOSED Then ON

If **M_Sw_6** OPEN Then OFF

If **M_Sw_6** CLOSED Then ON

If **M_Sw_4** OPEN Then OFF

If **FLTR_1** CLOSED Then OFF

Defer 008:10 Then OFF

When On > 008:00 Then OFF

Filling the Display Tank using DOS

To Fill the DT using the DOS you have Two Options. Both Options use DOS Profile **Dose12740mL**.

The First Option using Output **Man_Fill_DT**. This will Time Out after 2hr 5min Run Time, when the Clean Saltwater Tank is Empty Indicated by **ST_L_4** Sensor being Open or when the **FLTR_1** Sensor is Closed Indicating the Tank is Full or Filter is Dirty. To Start this Cycle Turn Output **Man_Fill_DT** to Auto.

The Second Option is to use **Fill_DT_2_OL** Output with **Man_Fill_DT** Output. This will Fill the DT Water Level to Operating Range. To Start this Cycle Turn Outputs **Fill_DT_2_OL** and **Man_Fill_DT** to Auto.

Draining the Display Tank using DOS

To Drain the DT using the DOS Profile **Dose12740mL**.

This Function uses Output **Man_Drain_DT**. This will Time Out after 2hr 5min Run Time, when the Waste Saltwater Tank is Full Indicated by **WT_H_1** Sensor being Closed or when the **O_WL_3** Sensor is Open Indicating the Display Tank is at Operating Level. To Start this Cycle Turn Output **Man_Drain_DT** to Auto.

Dose Profile **Dose12740mL**

Amount to Dose 12740mL

Time 161 min

Number of Doses 14

Dose Every 690 Sec (11.5 Min)

Volume per Dose 910.0mL

Pump Speed 250mL/min

Logic

Man_Fill_DT

Fallback OFF

Set ON

If **FLTR_1** CLOSED Then OFF

When On > 125:00 Then OFF

Fill_DT_2_OL

Fallback OFF

Set OFF

If **O_WL_3** CLOSED Then ON

If Output **Man_Fill_DT** = OFF Then OFF

AWC_M_Drain

Fallback OFF

Set OFF

If **H_WL_2** CLOSED Then ON

If Output **AWC_Fill_Ti** = ON Then OFF

If Output **AWC_Drain_Ti** = ON Then OFF

If Output **AWC_ATO_Ti** = OFF Then OFF

If Output **Man_Drain_DT** = ON Then ON

If **WT_H_1** CLOSED Then OFF

If **O_WL_3** OPEN Then OFF

If Power Apex Off 000 Then OFF

Defer 000:10 Then ON

Defer 000:10 Then OFF

AWC_M_Fill

Fallback OFF

Set ON

If **O_WL_3** CLOSED Then OFF

If **H_WL_2** CLOSED Then OFF

If **FLTR_1** CLOSED Then OFF

If Output **AWC_Fill_Ti** = ON Then OFF

If Output **AWC_Drain_Ti** = ON Then OFF

If Output **AWC_ATO_Ti** = OFF Then OFF

If Output **Man_Fill_DT** = ON Then ON

If Output **Fill_DT_2_OL** = ON Then OFF

If **ST_L_4** OPEN Then OFF

If Power Apex Off 000 Then OFF

Defer 001:00 Then ON

Defer 000:05 Then OFF

AWC_Drain_Pm

Fallback OFF

tdata 00:00:00,1,21,0,1,2,88,1,0,1,0,0,10,0

Set OFF

If Output **AWC_Drain** = ON Then Dose4050mL

If Output **AWC_Drain_DI** = OFF Then OFF

If Output **AWC_M_Drain** = ON Then

Dose12740mL

AWC_Fill_Pm

Fallback OFF

tdata 00:00:00,1,21,0,1,2,88,1,0,1,0,0,10,0

Set OFF

If Output **AWC_Fill** = ON Then Dose4050mL

If Output **AWC_M_Fill** = ON Then Dose12740mL

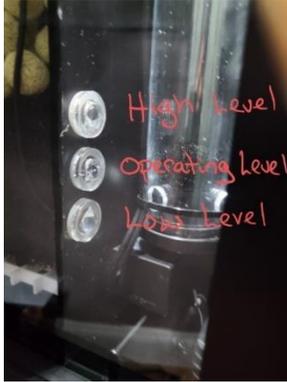
If Output **Return_Pump** = OFF Then OFF

Defer 000:30 Then ON

Water Pumps

Return Pump

The Return Pump is Controlled by the 0-10v Output #2 on the Apex Base Unit. The Motor Driver (WS55-180) Regulates the Speed of the Pump Motor Based off the Voltage Output of the Apex Base unit. Pump Profiles are used to Change the Flow of Water Throughout the Day. During normal operations the Return Pump uses Profile **Pump_79**. When the Chiller turns on the Return Pump uses Pump Profile **Pump_100**. If output **V_FeedMode** is ON, Output **L_WL_4** is Open (Water level Low Sensor), Output **WaterOnFloor** is ON, Output **24vPumpPower** is ON or Output **AWC_Disable** is ON then the Return Pump will Turn Off.



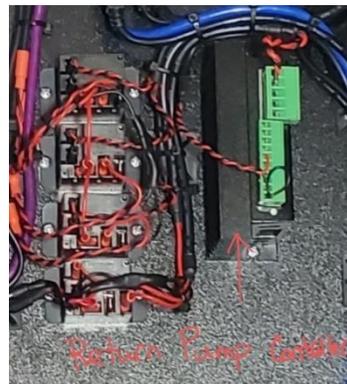
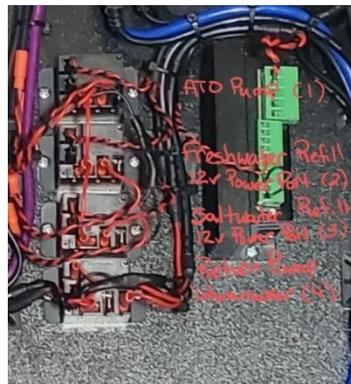
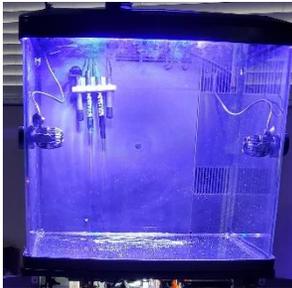
Return Pump Chamber Water Level Sensors **H_WL_2**, **O_WL_3** & **L_WL_4** (located in Left Rear Chamber)

Return Water Pump Jeabo DCP-2500 (located in Left Rear Chamber)



Powerheads

The Left Powerhead is Controlled by the 0-10v Output #3 on the Apex Base Unit. The Motor Driver (Jeabo SW-4) Regulates the Speed of the Pump Motor Based off the Voltage Output of the Apex Base unit. The Right Powerhead is Controlled by the 0-10v Output #3 on the Apex Base Unit. The Motor Driver (Jeabo SW-4) Regulates the Speed of the Pump Motor Based off the Voltage Output of the Apex Base unit. Timers are Used to Change Pump Profiles. Profiles are used to Change the Flow of Water Throughout the Day.

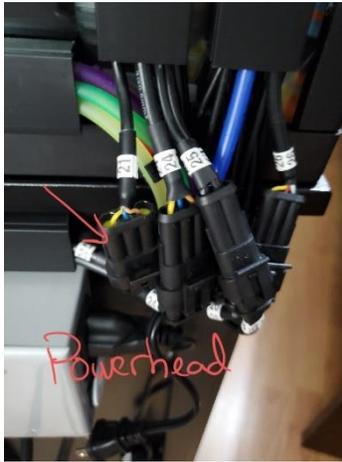


Jeabo SW4 Controllers (Located Inside Cabinet Top Left Corner on Back Wall)

FMM_6 (Inside Cabinet Bottom Right Corner on Back Wall)

24v Control Relays (Located Inside Cabinet Top Right Corner on Back Wall)

Return Pump Controller WS55-180 (Located Inside Cabinet Top Right Corner on Back Wall)



Quick Disconnects (Located on the Back of the Cabinet)

Logic

Wav_L

Fallback OFF
 Set OFF
 If Time 07:00 to 07:59 Then LWav_Calm
 If Time 08:00 to 09:59 Then LWav_Chop
 If Time 10:00 to 11:59 Then LWav_Wave
 If Time 12:00 to 16:29 Then LWav_Swell
 If Time 16:30 to 18:59 Then LWav_Chop
 If Time 19:00 to 04:59 Then LWav_Calm
 If Time 05:00 to 06:59 Then LWav_Wave
 If Output 24vPumpPower = ON Then OFF
 If Output V_Feed_A = ON Then OFF
 If Output WaterOnFloor = ON Then OFF
 If Output 24vPumpPower = ON Then OFF
 If Output AWC_Disable = ON Then LWav_Calm

Return_Pump

Fallback Pump_50
 Set Pump_79
 If Output Chiller = ON Then Pump_100
 If Output V_FeedMode = ON Then OFF
 If L_WL_4 OPEN Then OFF
 If Output WaterOnFloor = ON Then OFF
 If Output 24vPumpPower = ON Then OFF
 If Output AWC_Disable = ON Then Pump_79
 Defer 000:05 Then OFF

Wav_R

Fallback OFF
 Set OFF
 If Time 07:00 to 07:59 Then RWav_Calm
 If Time 08:00 to 09:59 Then RWav_Chop
 If Time 10:00 to 11:59 Then RWav_Wave
 If Time 12:00 to 16:29 Then RWav_Swell
 If Time 16:30 to 18:59 Then RWav_Chop
 If Time 19:00 to 04:59 Then RWav_Calm
 If Time 05:00 to 06:59 Then RWav_Wave
 If Output 24vPumpPower = ON Then OFF
 If Output V_Feed_A = ON Then OFF
 If Output WaterOnFloor = ON Then OFF
 If Output 24vPumpPower = ON Then OFF
 If Output AWC_Disable = ON Then RWav_Calm
 Defer 000:05 Then OFF

24vPumpPower

Fallback OFF
 If R_Sw_1 OPEN Then ON
 If R_Sw_1 CLOSED Then OFF

Pump Type Profiles

Synchronize: When Enabled, a Port using this Profile will Synchronize its Initial Off Time with the previous Pump Profile. It uses the Next Lowest Profile Number (regardless of what you named it) to Synchronize to. In these Cases, you would simply use the “SET” Statement and would not use the “If Time” statement. (i.e., if enabled on Profile 2, it will sync with Profile 1).

Synchronize is useful for creating large waves through constructive interference with Pumps on Either Side of the Tank.

Divide by 10: When Enabled, all times in the Profile are Divided by 10 (i.e. 56 Seconds becomes 5.6 Seconds).

Initial Off Time: When a Pump with this Profile is first Activated, it will be OFF initially for this time (in Seconds unless divide by 10 is Enabled).

On Time: Once the Initial Off Time Expires, the Pump will be ON for this amount of time (in seconds unless divide by 10 is Enabled).

Off Time: Once the On Time Expires, the Pump will be OFF for this amount of time (in seconds unless divide by 10 is Enabled).

Minimum Intensity: The Port Output in Percent when the Pump is “Off”

Maximum intensity: The Port output in Percent when the Pump is “On”

For example, assume the following settings:

Synchronize = Off

Divide by 10 = Off

Initial off time = 10

On time = 15

Off time = 20

Minimum Intensity = 30 Maximum Intensity = 70

Using this Profile, the Pump will Run at 30% for 10 Seconds, 70% for 15 Seconds, 30% for 20 Seconds, 30% for 10 Seconds, 70% for 15 Seconds, 30% for 20 Seconds, etc.

Pump_Pulse0

Type = Pump

Synchronize = Disabled

Divide by 10 = Disabled

Initial Off Time = 0

On Time = 1

Off Time = 0

Min Intensity = 0

Max Intensity = 0

LWav_Calm

Type = Pump

Synchronize = Disabled

Divide by 10 = Enabled

Initial Off Time = 0

On Time = 50

Off Time = 25

Min Intensity = 30

Max Intensity = 50

LWav_Swell

Type = Pump

Synchronize = Disable

Divide by 10 = Enabled

Initial Off Time = 0

On Time = 40

Off Time = 40

Min Intensity = 20

Max Intensity = 100

LWav_Chop

Type = Pump

Synchronize = Disable

Divide by 10 = Enabled

Initial Off Time = 0

On Time = 5

Off Time = 5

Min Intensity = 0

Max Intensity = 100

LWav_Wave

Type = Pump

Synchronize = Enabled

Divide by 10 = Enabled

Initial Off Time = 0

On Time = 30

Off Time = 30

Min Intensity = 0

Max Intensity = 100

RWav_Calm

Type = Pump

Synchronize = Enabled

Divide by 10 = Enabled

Initial Off Time = 25

On Time = 50

Off Time = 0

Min Intensity = 30

Max Intensity = 50

RWav_Swell

Type = Pump

Synchronize = Enabled

Divide by 10 = Enabled

Initial Off Time = 40

On Time = 40

Off Time = 0

Min Intensity = 20

Max Intensity = 100

RWav_Chop

Type = Pump

Synchronize = Enabled

Divide by 10 = Enabled

Initial Off Time = 5

On Time = 5

Off Time = 0

Min Intensity = 0

Max Intensity = 100

RWav_Wave

Type = Pump

Synchronize = Disable

Divide by 10 = Enabled

Initial Off Time = 30

On Time = 300

Off Time = 0

Min Intensity = 0

Max Intensity = 100

Ramp Type Profiles

The Setup for the RAMP Control Type is simpler than the PUMP setup and only contains Three Fields – Ramp Time, Start Intensity and End Intensity. The Intensity Fields perform the Exact Same Function as in the PUMP Type – they vary the Voltage to the Device from x% to y%. The Ramp Time Defines How Long this should take but unlike the PUMP Profile Type which is in Seconds, the RAMP Profile Type is in Minutes (Max 255 Minutes).

Pump_0

Type = Ramp
Ramp Time = 1
Start Intensity = 0
End Intensity = 0

Pump_50

Type = Ramp
Ramp Time = 1
Start Intensity = 50
End Intensity = 50

Pump_79

Type = Ramp
Ramp Time = 1
Start Intensity = 50
End Intensity = 79

Pump_60

Type = Ramp
Ramp Time = 1
Start Intensity = 50
End Intensity = 60

Pump_90

Type = Ramp
Ramp Time = 1
Start Intensity = 50
End Intensity = 90

Pump_64

Type = Ramp
Ramp Time = 1
Start Intensity = 50
End Intensity = 64

Pump_100

Type = Ramp
Ramp Time = 1
Start Intensity = 50
End Intensity = 100

Alarms, Warnings & Notifications

These Virtual Outputs will send you a Notification, Alarm or Warning to let you know the tank needs attention. Alarms & Warnings are Audible Tones from the Apex Display Module.

Logic

Notification

Fallback OFF
Set OFF
If Output AWC_Maint_Rq = ON Then ON
If Output Check_AWC_ST = ON Then ON
If Output Check_AWC_WT = ON Then ON
If Output Check_ATO_L = ON Then ON
If Output CheckCo2Scru = ON Then ON
If Time 20:01 to 06:59 Then OFF
If Output ChangeFilter = ON Then ON
If Output Check_PH = ON Then ON
If Output Check_Salt = ON Then ON
If Output Check_Temp = ON Then ON
If Output WaterOnFloor = ON Then ON
If Output Check_R_Pump = ON Then ON
If Output Ck_Water_Lvl = ON Then ON
Defer 000:05 Then ON
Defer 000:05 Then OFF

Alarm

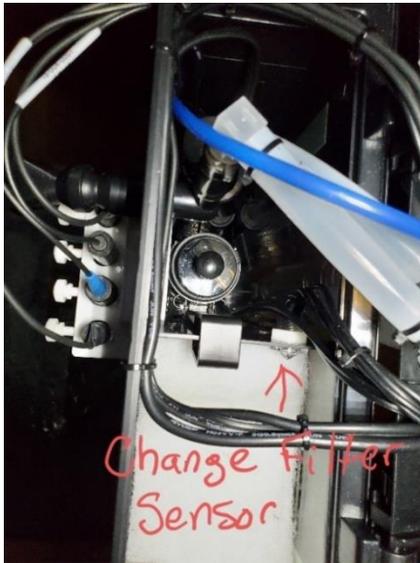
Fallback OFF
Set OFF
If Output ChangeFilter = ON Then ON
If Output Check_ATO_L = ON Then ON
If Time 20:01 to 06:59 Then OFF
If M_Sw_1 CLOSED Then ON
If M_Sw_2 CLOSED Then ON
If M_Sw_3 CLOSED Then ON
If M_Sw_4 CLOSED Then ON
If M_Sw_5 CLOSED Then ON
If M_Sw_6 CLOSED Then ON
If Output Check_PH = ON Then ON
If Output Check_Temp = ON Then ON
If Output WaterOnFloor = ON Then ON
If Output Check_R_Pump = ON Then ON
If Output Ck_Water_Lvl = ON Then ON
Defer 000:05 Then ON
Defer 000:05 Then OFF

Warning

Fallback OFF
Set OFF
If Output FeedbackBeep = ON Then ON
If Output Pause_Beep = ON Then OFF
Defer 000:05 Then OFF

Change Filter Indicator

When the water level in the Filter Chamber reaches the Middle of the Sensor for 1 minute the Virtual Output **ChangeFilter** will turn on. When this happens **Notification** will turn on and send a notification. Clean or Replace the Filter & Clean the Sensor Face. When the Water Level in the Filter Chamber is lower than the Middle of the Sensor **ChangeFilter** & **Notification** will turn off. When the alarm turns off a Notification that the alarm is off will be sent.



Change Filter Sensor, **FLTR_1** (Located in Center Rear Chamber)



FMM_6 (Inside Cabinet Bottom Right Corner on Back Wall)
1. **FLTR_1** (Filter Replace Sensor)

Logic

ChangeFilter (Notification & Alarm)

Fallback OFF
Set OFF
If **FLTR_1** CLOSED Then ON
Defer 001:00 Then ON

PH Level Warning

The Apex Base Unit Monitors the PH of the Display Tank. The Apex Base Unit has Automatic Temperature Compensation with connected temperature probe. If the PH of the Display Tank Water is out of range for 5 minutes the Virtual Output **Check_PH** will turn on. When this happens **Notification** will turn on and send a notification. Adjust the PH Levels as needed. When the PH Level is back in range **Check_PH** & **Notification** will turn off. When the Alarm Turns Off a Notification that the Alarm is Off will be Sent.



PH Probe connects to the Apex Classic Base Unit
(Inside Cabinet Bottom Left Corner on Back Wall)

Logic

Check_PH (Notification & Alarm)
Fallback OFF
Set OFF
If **pH** > 8.4 Then ON
If **pH** < 7.80 Then ON
Defer 005:00 Then ON

Salinity Level Warning

The Apex Probe Module 2 (PM2) has 2 probe ports Conductivity and Temperature. The PM2 has Automatic Temperature Compensation with connected Temperature Probe. If the Conductivity of the Display Tank Water is Out of Range for 5 Minutes the Virtual Output **Check_Salt** will Turn On. When this happens **Notification** will Turn On and Send a Notification. Manually Test the Water to Compare Readings and if they are the Same then adjust the Salinity Level as needed. If Manual Reading is Different than Apex Perform a Calibration & Retest. When the PH Level is back in Range **Check_PH** & **Notification** will Turn Off. When the Alarm Turns Off a Notification that the Alarm is Off will be Sent.



PM2_4 (Inside Cabinet on the Right Side of the Back Wall Under Shelf)

1. **Salt** Conductivity Probe
2. **Tmpx4** Temperature Sensor

Logic

Check_Salt (Notification)
Fallback OFF
Set OFF
If **Salt** > 35.8 Then ON
If **Salt** < 34.5 Then ON
Defer 005:00 Then ON

Temperature Level Warning

The Apex Base Unit Monitors the Temperature of the Display Tank. If the Temperature of the Display Tank Water is out of Range for 5 Minutes the Virtual Output **Check_Temp** will Turn On. When this happens **Notification** will Turn On and Send a Notification. Adjust the Temperature Levels as needed. When the Temperature is back in Range **Check_Temp** & **Notification** will Turn Off. When the Alarm Turns Off a Notification that the Alarm is Off will be Sent



Tmp Temp Probe connects to the Apex Classic Base Unit (Inside Cabinet Bottom Left Corner on Back Wall)



Temperature Probes (Inside Display Tank on Left Wall)



Tmpx4 Temp Probe connects to the PM Module (Inside Cabinet Bottom Left Corner on Back Wall)

Logic

Check_Temp (Notification & Alarm)

Fallback OFF

Set OFF

If **Tmp** > 80.0 Then ON

If **Tmpx4** > 80.0 Then ON

If **Tmp** < 73.0 Then ON

If **Tmpx4** < 73.0 Then ON

Defer 005:00 Then ON

Water On Floor Detected

The ALD Module Detects Water on the Floor in 3 Separate Locations. When any of the Leak Sensors **Swx5_1**, **Swx5_2** or **Swx8_4** are CLOSED for 5 Seconds the Virtual Output **WaterOnFloor** will Turn On. When this happens **Notification** will Turn On and Send a Notification. Dry the Sensors to keep Corrosion from happening. When the Sensor is Dry the Virtual Output **WaterOnFloor** will Turn Off. When the Alarm Turns Off a Notification that the Alarm is Off will be Sent. The ALD Module has 4 Probe Ports. Only Ports 1 & 2 are being used. Clean Sensors monthly to keep Corrosion off Sensors.



Water On Floor Sensor (2 Located Behind the Cabinet, 1 on the Left & 1 on the Right)

Water on Floor Sensor (Located Inside the Cabinet at the Bottom in the Center Towards the Back)

FMM_8 (Inside Cabinet Bottom Left Corner on Back Wall)

4. Swx8_4 (Water Leak Sensor Inside Cabinet)

ALD_5 (Outside Cabinet Bottom Rear on Back Wall)

1. Swx5_1 (Right Rear Water Leak Sensor)
2. Swx5_2 (Left Rear Water Leak Sensor)
3. Blank
4. Blank

Logic

WaterOnFloor (Notification & Alarm)

Fallback OFF

Set OFF

If Swx5_1 CLOSED Then ON

If Swx5_2 CLOSED Then ON

If Swx8_4 CLOSED Then ON

Defer 000:05 Then ON

Check Co2 Scrubber (Located on the Back of the Cabinet)

Used to Remove Co2 from the Skimmer Intake. Fill Cartridge completely with Soda Lime. The Soda Lime will change color from White to Violet When it needs to be Changed. You will also notice the PH Level in the Display Tank is Lower Than Normal when it needs to be Changed. If the PH Falls Below 7.9 a Notification will be sent Indicating the Scrubber needs to be Checked.



Logic

CheckCo2Scbr (Notification)

Fallback OFF

Set OFF

If pH < 7.90 Then ON

Defer 005:00 Then ON

AWC Maintenance Reminder

Output **AWC_Maint_Rq** Will Turn On Output **Notification** 125 Minutes after the Start of the Second Water Change Cycle Indicating that Draining and Refilling the AWC Tank is Necessary. This will Turn On 125 Minutes after the Clean Saltwater Level is Low or the Waste Saltwater Level is Full Indicating that Draining and/or Refilling the AWC Tank is Necessary.

Output **Check_AWC_ST** Will Turn On Output **Notification** when the Clean Saltwater Level is Low Indicating Refilling is Necessary.

Output **Check_AWC_WT** Will Turn On Output **Notification** when the Waste Saltwater Level is Full Indicating Draining is Required.



AWC_Maint_Rq (Notification)
Fallback OFF
Set OFF
If Output **AWC_2nd_WC** = ON Then ON
If **WT_H_1** CLOSED Then ON
If **ST_L_4** OPEN Then ON
Defer 125:00 Then ON

Check_AWC_ST (Notification)
Fallback OFF
Set OFF
If **ST_L_4** OPEN Then ON

Check_AWC_WT (Notification)
Fallback OFF
Set OFF
If **WT_H_1** CLOSED Then ON
If **ST_L_4** OPEN Then ON

ATO Water Level Low Warning

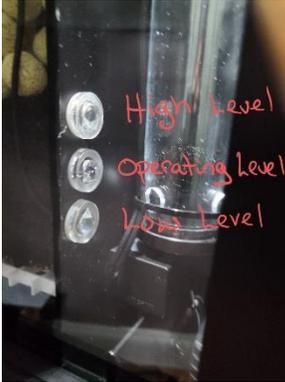
When the Water Level in the Automatic Top Off Tank gets Low (**ATOL_2** sensor is open) for Longer Than 10 Seconds Output **Check_ATO_L** will Turn On Indicating Refilling the ATO Tank is Necessary. Perform ATO Refill Process. This will have Notification & Alarm.



Check_ATO_L (Notification & Alarm)
Fallback OFF
Set OFF
If **ATOL_2** OPEN Then ON
Defer 000:10 Then ON

Check Display Tank Water Level

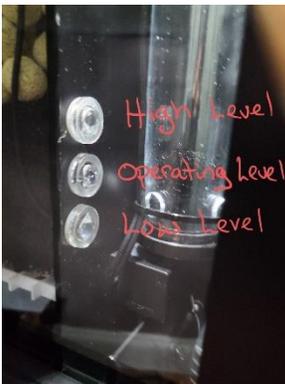
When the Water Level in the Display Tank Reaches the High-level (**H_WL_2**) or the Low-level (**L_WL_4**) Optical Sensors and/or the ChangeFilter (**FLTR_1**) Optical Sensor for Longer Than 1 Minute 30 Seconds Output **Ck_Water_Lvl** will Turn On Indicating a System Failure. This Output is Disabled when the Return Pump is Turned Off, Output AWC_ATO_Ti is On or Output AWC_Disable is On. This will have Notification & Alarm.



Ck_Water_Lvl (Notification & Alarm)
Fallback OFF
Set OFF
If **L_WL_4** OPEN Then ON
If **H_WL_2** CLOSED Then ON
If **FLTR_1** CLOSED Then ON
If Output **Return_Pump** = OFF Then OFF
If Output **AWC_ATO_Ti** = OFF Then OFF
If Output **AWC_Disable** = OFF Then OFF
Defer 00:30 Then ON

Check Return Pump

When the Water Level in the Display Tank Reaches the Low-level (**L_WL_4**) Optical Sensor or when the Flow through the Return Pump (**Return_Pump**) Drops Below 50 GPH for Longer Than 5 Seconds Output **Check_R_Pump** will Turn On Indicating a System Failure. This Output is Disabled when the Return Pump (**Return_Pump**) is Turned Off. This will have Notification & Alarm.



Display Tank Water Level Sensors (Located in the Return Pump Chamber)

Return Pump Flow Sensor (Located on the Back of the Display Tank)

Return Pump (Located in the Left Rear Chamber)

H_WL_2 High-level
O_WL_3 Operating Level
L_WL_4 Low-level

Check_R_Pump (Notification & Alarm)
Fallback OFF
Set OFF
If **Flow** < 50 Then ON
If Output **Return_Pump** = OFF Then OFF
Defer 00:05 Then ON
Defer 00:30 Then OFF

Apex Automatic Feeding System (AFS_1)

The Automatic Feeder is started by Clicking FeedA Cycle in Apex or by Timer on AFS_1.



Output	
Device	9_1
Name	AFS_1
Icon	Bars
Control Type	Feeder
Log	<input checked="" type="checkbox"/> Enable

Configuration	
First Feeding	08:00
Drum Rotations	1
Feedings Per Day	2
Repeat Interval	510
Feed Cycle	A

AFS_1

OSC 000:00/000:30/000:30 Then ON
If Time 00:00 to 08:00 Then OFF
If Time 08:02 to 16:30 Then OFF
If Time 16:30 to 00:00 Then OFF
If FeedA 000 Then ON

Feed Cycles

Fish Feeding Cycle is started by Clicking FeedA Cycle in Apex, Pressing Momentary Switch #1 (M_Sw_1) or by Timer on Virtual Outlet V_Feed_A. Coral Feeding Cycle is Started by Clicking FeedB Cycle in Apex or Pressing Momentary Switch #2 (M_Sw_2).

Apex Feed Cycles

- A. Fish Feed Mode (All Pumps Off)
- B. Reef Feed Mode (Powerheads On, All Other Pumps Off)
- C. Blank
- D. Automatic Water Change

Logic

V_FeedMode

Fallback OFF
Set OFF
If Output V_Feed_A = ON Then ON
If Output V_Feed_B = ON Then ON

V_Feed_A

Fallback OFF
If M_Sw_1 CLOSED Then ON
If Time 07:58 to 07:59 Then ON
If Time 16:28 to 16:29 Then ON
If FeedA 000 Then ON
If Output V_Feed_Rset = ON Then OFF
If Output V_Feed_Tmr = ON Then OFF

V_Feed_Rset

Fallback OFF
Set OFF
If M_Sw_1 CLOSED Then ON
Defer 000:05 Then ON
Min Time 001:00 Then ON

V_Feed_Tmr

Fallback OFF
Set OFF
If Output V_Feed_A = ON Then ON
Defer 012:30 Then ON
Defer 000:05 Then OFF

V_Feed_B

Fallback OFF
If M_Sw_2 CLOSED Then ON
If FeedB 000 Then ON
If Output V_Feed2_Rset = ON Then OFF
If Output V_Feed2_Tmr = ON Then OFF

V_Feed2_Rset

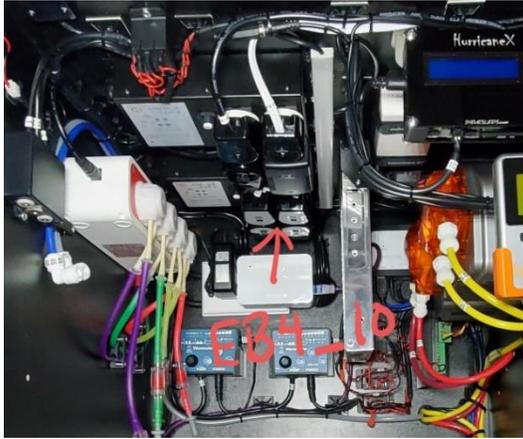
Fallback OFF
Set OFF
If M_Sw_2 CLOSED Then ON
Defer 000:05 Then ON
Min Time 001:00 Then ON

V_Feed2_Tmr

Fallback OFF
Set OFF
If Output V_Feed_B = ON Then ON
Defer 012:30 Then ON
Defer 000:05 Then OFF

(EB4_10) Power Bar

The EB4 Power Bar has Four Controllable Outlets. All Outlets are Controlled by High-current Mechanical Relays. Three of the Outlets are rated at 8A and one Outlet is rated at 12A. The Energy Bar continually sends information on the Present Total Current Draw to the Apex Controller.



EB4_10 (Inside Cabinet Under Top)

1. **Reactor** (Aqua Gadget MiniMax 7301)
2. **Heater** (Vivosun Titanium 200 Watt)
3. **Chiller** (JBJ Artica DBA-075 1/10 HP)
4. **UV_Skimmer** (Coralife Biocube Skimmer 100538604 & UV Light 100115640)

Auqa Gadget MiniMax 7301 Media Reactor (Outlet #1)

Fill the Reactor with Carbon, GFO or any other Media that can to be run through a Fluidized Reactor. Rotate the Center Chamber to Control the Flow. To Replace the Media, pull the Center Chamber out of the Housing. Remove the cap. Clean the Chamber & Sponges. Refill with Media. Reinstall the Chamber into the Housing and Rotate to Adjust the **Flow**. **Flow** requirements differ based on the Media so be sure to set the Flow correctly for the Media being used. The Reactor is controlled by Rocker Switch #3 (**R_Sw_3**). When Rocker Switch #3 is in the ON Position & the **Flow** of the Return Pump is less than 50 GPH for 5 Seconds the Power to Outlet #1 will turn OFF until the **Flow** is above 50 GPH. If the main power has been Interrupted for 5 Seconds the Power to Outlet #1 will Turn OFF until the Power is Restored.



Reactor Side View (Located in the return pump chamber)



Reactor Top View (Located in the return pump chamber)

Aqua Gadget MiniMax 7301 (Located in Left Rear Chamber)

Logic

Reactor
Fallback OFF
Set OFF
If **R_Sw_3** CLOSED Then ON
If Output **AWC_Drain_Ti** = ON Then OFF
If Output **V_FeedMode** = ON Then OFF
If Output **Return_Pump** = OFF Then OFF
If Power Apex Off 000 Then OFF
If **Flow** < 50 Then OFF
Defer 000:05 Then OFF

Vivosun Titanium 200 Watt Heater (Outlet #2)

The Heater is located in the Right Rear Chamber. The Thermostat is located on the Back of the Tank Stand. The Heater gets plugged into the Top Left Outlet of the 120v Power Center. The Heater is controlled by Rocker Switch #5 (R_Sw_5). When the switch is in the ON position, it uses Apex Logic from the Return Pump Flow Sensor (Flow), The Apex Base Unit Temp Sensor (Tmp) & The Temp Sensor from the PM2 Module (Tmpx4). If the Flow Sensor is less than 75 GPH it will shut OFF Power to Outlet #2. If the Temperature drops Below 74.5 Degrees & the Flow Sensor reads Above 50 GPH then the Power to Outlet #2 will turn ON. If the Temperature Rises Above 75 Degrees, The Flow Sensor reads Below 75 or The Main Power has been Interrupted, then the Power to Outlet #2 will Defer for 5 Seconds then Turn OFF. Set the Thermostat on the Heater to Turn OFF at 76 Degrees, based off of the Temperature Reading of The Apex Base Unit Not the Heater Thermostat Temperature Reading. This way the Apex will have control of the Heater & the Heater Thermostat becomes a Backup in case of a Failure. The Apex Logic uses 2 Temperature Sensors to control the Heater. This way there are a total of 2 Failsafe's. If the Main Power has been Interrupted for 5 Seconds the Heater will Turn OFF until the Power is Restored.

Logic

Heater

Fallback OFF

If Tmp < 74.5 Then ON

If Tmpx4 < 74.5 Then ON

If Tmp > 75.0 Then OFF

If Tmpx4 > 75.0 Then OFF

If R_Sw_5 OPEN Then OFF

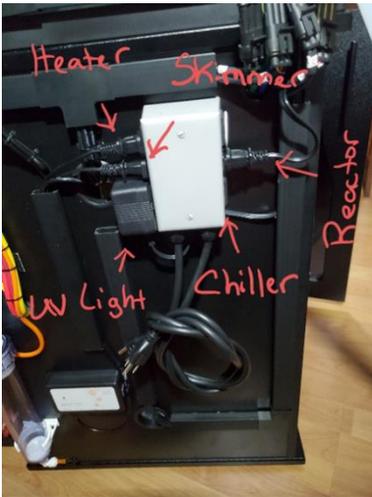
If Output V_FeedMode = ON Then OFF

If Output Return_Pump = OFF Then OFF

If Power Apex Off 000 Then OFF

If Flow < 50 Then OFF

Defer 000:05 Then OFF



120v Power Center (Located on the Back of the Cabinet)



Heater Thermostat (Located on the Back of the Cabinet)



Vivosun Titanium 200 Watt Heater (Located in the Right Rear Chamber)



PM2 Module (Located Inside Cabinet on the Right Side of the Back Wall Under Shelf)



Apex Base Unit (Located Inside Cabinet Bottom Left Corner on Back Wall)

JBJ Artica DBA-075 1/10 HP (Outlet #3)

The Chiller gets plugged into the Bottom Right Outlet of the 120v Power Center. The Chiller is controlled by Rocker Switch #6 (**R_Sw_6**). When the switch is in the ON position, it uses Apex Logic from the Return Pump Flow Sensor (**Flow**), The Apex Base Unit Temp Sensor (**Tmp**) & The Temp Sensor from the PM2 Module (**Tmpx4**). If the Flow Sensor is less than 50 GPH it will shut OFF Power to Outlet #3. If the Temperature Rises Above 77 Degrees & the Flow Sensor reads Above 50 GPH then the Power to Outlet #3 will Defer for 1 Minute & then it will turn ON. If the Temperature Drops Below 76 Degrees, The **Flow** Sensor reads Below 50 or The Main Power has been interrupted then the Power to Outlet #3 will Defer for 5 seconds then Turn OFF. Set the Thermostat on the Chiller to Turn OFF at 75 Degrees, based off the Temperature reading of The Apex Base Unit Not the Chiller Thermostat Temperature Reading. This way the Apex will have control of the Chiller & the Chiller Thermostat becomes a backup in case of a Failure. The Apex Logic uses 2 Temperature Sensors to control the Chiller. This way there are a total of 2 Failsafe's.



Chiller (Located next to the Tank Stand)



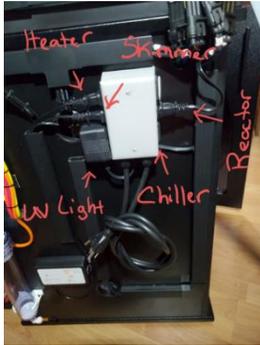
Return Pump Flow Sensor (Located on the Back of the Display Tank)

Logic

Chiller
 Fallback OFF
 If **Tmp** > 77.0 Then ON
 If **Tmpx4** > 77.0 Then ON
 If **Tmp** < 76.0 Then OFF
 If **Tmpx4** < 76.0 Then OFF
 If **R_Sw_6** OPEN Then OFF
 If Output **V_FeedMode** = ON Then OFF
 If Output **Return_Pump** = OFF Then OFF
 If Power Apex Off 000 Then OFF
 If **Flow** < 50 Then OFF
 Defer 001:00 Then ON
 Defer 000:05 Then OFF

Coralife UV Light 100115640 & Biocube Skimmer 100538604 (Outlet#4)

The UV Light is located in Left Rear Chamber. The UV Light gets plugged into the Bottom Left Outlet of the 120v Power Center. The Skimmer is located in the Right Rear Chamber. The Skimmer gets plugged into the Center Left Outlet of the 120v Power Center. The UV Light & Skimmer are controlled by Rocker Switch #4 (**R_Sw_4**). When the Switch is in the ON Position, it uses Apex Logic from the Return Pump Flow Sensor (**Flow**) & The Apex Base Unit PH Sensor (**pH**). If the Flow Sensor is Less than 50 GPH it will shut OFF Power to Outlet #4. If the PH is lower than 8.20 & the Flow Sensor reads Above 50 GPH then the Power to Outlet #4 will Defer for 2 Minutes & then it will Turn On. If the PH Rises Above 8.40, The **Flow** Sensor reads Below 50 GPH or The Main Power has been interrupted, then the Power to Outlet #4 will Defer for 5 Seconds then Turn OFF until the Power is Restored.



120v Power Center (Located on the Back of the Cabinet)



UV Light Quick Disconnect (Located on the Back of the Cabinet)



Coralife Biocube Skimmer 100538604 (Located in Right Rear Chamber)



Coralife UV Light 100115640 (Located in Left Rear Chamber)



UV & Media Filtration (located in Left Rear Chamber)



Apex Base Unit & FMM 8 (Inside Cabinet Bottom Left Corner on Back Wall)

Logic

UV_Skimmer

Fallback OFF

Set OFF

If R_Sw_4 CLOSED Then ON

If Output V_FeedMode = ON Then OFF

If Output Return_Pump = OFF Then OFF

If Power Apex Off 000 Then OFF

If Flow < 50 Then OFF

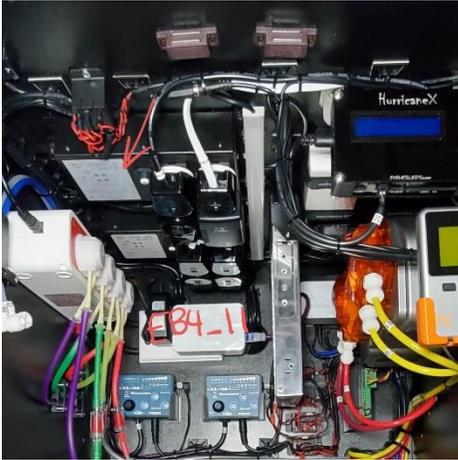
If pH > 8.40 Then OFF

Defer 002:00 Then ON

Defer 000:05 Then OFF

(EB4_11) Outlet Logic

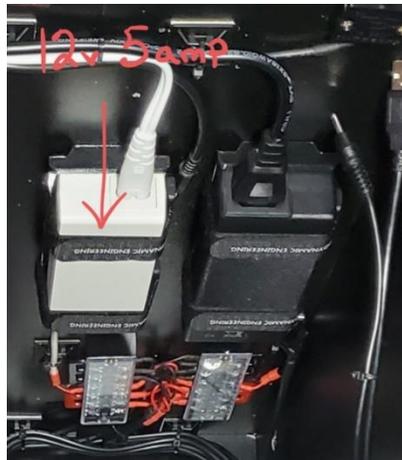
The EB4 Power Bar has Four Controllable Outlets. All outlets are Controlled by High-current Mechanical Relays. Three of the Outlets are rated at 8A and one Outlet is rated at 12A. The Energy Bar continually sends information on the Present Total Current Draw to the Apex Controller.



EB4_11 (Located Inside Cabinet Under Top)

1. 12v Power (5amp)
2. 24v Power (4amp)
3. Reef Lights (Steves Led's 8794102401)
4. Doser (Jebao 4-Channel WIFI Doser3.4)

12v Power (Outlet #1)



12v Power Supply 60w 5 amp (Located Inside Cabinet Under Top)

1. Cabinet Lights
2. 12v Power Outlet
3. ATOPump Power
4. ATOFillPump Power
5. Clean_S_Pump Power

Logic

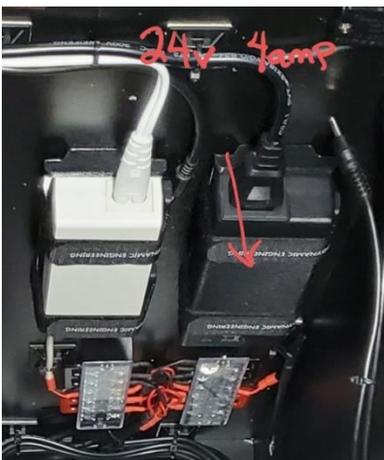
12v Power

Fallback OFF

Set ON

If Power Apex Off 000 Then OFF

24v Power (Outlet #2)



24v Power Supply 96w 4 amp (Located Inside Cabinet Under Top)

1. DCP-2500 Return Pump (23w 24v)
2. SW-4 Wavemaker (10w 24v) x2
3. DOS (22w 24v)
4. Trident (10w 24v)
5. PMUP (17w 24v)

Logic

24v Power

Fallback ON

Set ON

Steves Led's 8794102401 Reef Lights (Outlet#3)

This System is 4X Brighter than the stock LED version. Luxeon ES Premium LEDs in the 14,000K Super Full Spectrum - This can be adjusted from 4,000K - 24,000K with the Twist of a Knob. Outputs more than enough PAR to blast and Potentially Kill most Corals. The LED Panel is powered by the Meanwell LRS-200-48 200W, 48V Power Supply. The LED is controlled by the HurricaneX Controller. The HurricaneX Controller is powered by the 48v to 12v Converter. The 48v to 12v Converter is Powered off the Meanwell LRS-200-48.



Steves Led's 8794102401 Upgrade

Reef Lights
Fallback OFF
Set ON
If Power Apex Off 000 Then OFF

HurricaneX Controller

Rotate the knob (-R+)

Rotate Clockwise or Counter-clockwise to select different Menu items and to Change the Value of the Selected Item. Clockwise Scrolls Down or Increases the Value of the selected item. Counter-clockwise Scrolls Up or Decreases the Value of the selected item.

Short press (SP)

Pressing the Knob until you hear/feel it 'Click' then Immediately Releasing in less than 1 Second. This is used to go IN to a Menu item or Select a Menu item that you wish to Change.

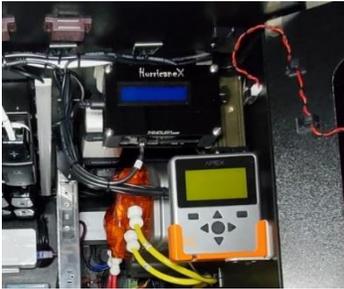
Long press (LP)

Pressing the Knob for more than 1 Second. This allows you to Enter the Setup Mode or to Back Out of a Menu Item once you are Finished Adjusting the Value.

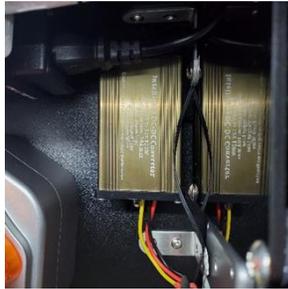
Lighting Setup

1. Enter the Setup Menu, (long press the button), and select "Y."
2. Set PWM (Day). Channels 1 & 2 will need to be Programmed. We will be Programming for a 4 Channel LED. The different Channels are Selected and Changed using a Short Presses and Knob Turns. Set CH1 to 1200 (which is the starting point for acclimation, or about 30%) & CH2 set to 1200. Short Press and then Long Press to Save Settings and Back Out of the Set PWM (Day) Settings.
3. Set PWM (Night). Set the moonlight to "003" for CH1 and CH2. Short Press and then Long Press to Save Settings and Back Out of the Set PWM (Day) Settings.
4. Sunrise Mode - Short press to Manual.
5. Sunrise - Set Sunrise start at 07:00.
6. Sunset - Set Sunset to 19:00.
7. Ramp Time - Set it to 120 Minutes.
8. Ramp Delay - The First and Last Color every day is Blue. To Delay the White Channels, so they will "rise" 60 Minutes after the Blues, and "set" 60 Minutes before the Blues. Set CH1 to 60 & CH2 to 00.
9. Cloud Freq - Set to the Min Setting of 00.
10. Cloud Channel - Set CH1 & CH2 to 0.

11. Lightning - Set to 0
12. Automatic Moon Phases - Set to Off.
13. Set Fan - Skip to the Next Step.
14. Lat/Long/GMT - Skip this Step.
15. Temp - Skip this Step.
16. Daylight Savings - Set to On
17. Set Clock- Set the Date and Time to our Actual Local Time.
18. Exit
19. Remove the Round Black Power Jack and plug it back in to Cycle the Power, so our settings can Begin. HurricaneX always starts on "Automatic Mode" and uses our Custom Settings. No further action is Required on your part for the HurricaneX to take Control.



HurricaneX Controller, Steves Led's 843546835 (Located Inside Cabinet on Right Side at Top)



48v to 12v Converter (Located Inside Cabinet on Right Side at Top)

1. HurricaneX Controller (Steves Led's 843546835)
2. Cabinet Fans (Coolerguys 60x20mm)



Meanwell LRS-200-48 200W, 48V @ 4.4A (Located Inside Cabinet Under Top)

Logic

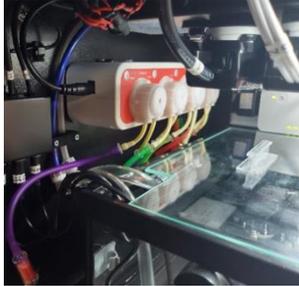
Reef_lights
 Fallback OFF
 Set ON
 If Power Apex Off 000 Then OFF



Quick Disconnects (Located on the Back of the Cabinet)

Jebao 4-Channel WIFI Doser3.4 (Outlet #4)

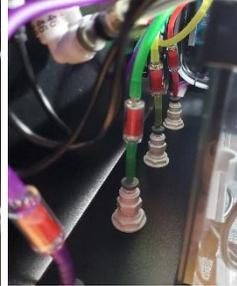
The Doser is Located inside Cabinet on Left Side Wall towards the Top. This operates on WIFI 2.4G Network only. Use the App to Control. Each Channel provides 1 to 9999ml per Day, 24 Timers Per Day. The Doser can be set for 30-day intervals for Dosing. You can Set the On Time of the Dosing Pump. The Storage Bottles are Attached to the Bottom of the Shelf. The Lids of the Bottles are held down by a 3/8" Bulkhead Connector. The Pickup Tube Inside the Storage Bottles is 3/8" Poly Tubing. On the Top Side of the Shelf there is a 3/8" to 1/4" Reducer followed by a 1/4" Stem x 3/16" Hose Barb (John Guest P1250806S). From there it goes through a Check Valve and into the Pump Inlet. The 3/16" Tubing is Cobalt Aquatics Premium Silicone Airline. From the Outlet of the Pump, it goes into another Check Valve. The Check Valves are Mounted into the Dosing Line Holder. The Dosing Line Holder is located in the Filter Chamber.



Jebao 4-Channel WIFI Doser3.4
(Located inside cabinet on Left
side wall towards the top)



Doser Lines, Jebao 4-
Channel WIFI Doser3.4
(Located in Center
Chamber)



Doser Lines, Jebao 4-
Channel WIFI
Doser3.4 (Located in
Cabinet on Left Side of
the Shelf)



Doser Storage Bottles
(Located in the cabinet
on the Bottom Left Side
of the Shelf)

Logic

Doser
Fallback OFF
Set ON
If Output V_FeedMode = ON Then OFF
If Output Return_Pump = OFF Then OFF
If Power Apex Off 000 Then OFF