INSTALLATION &
OPERATION MANUAL

HELIOS

SOLAR-POWERED DIGITAL VAV DIFFUSER

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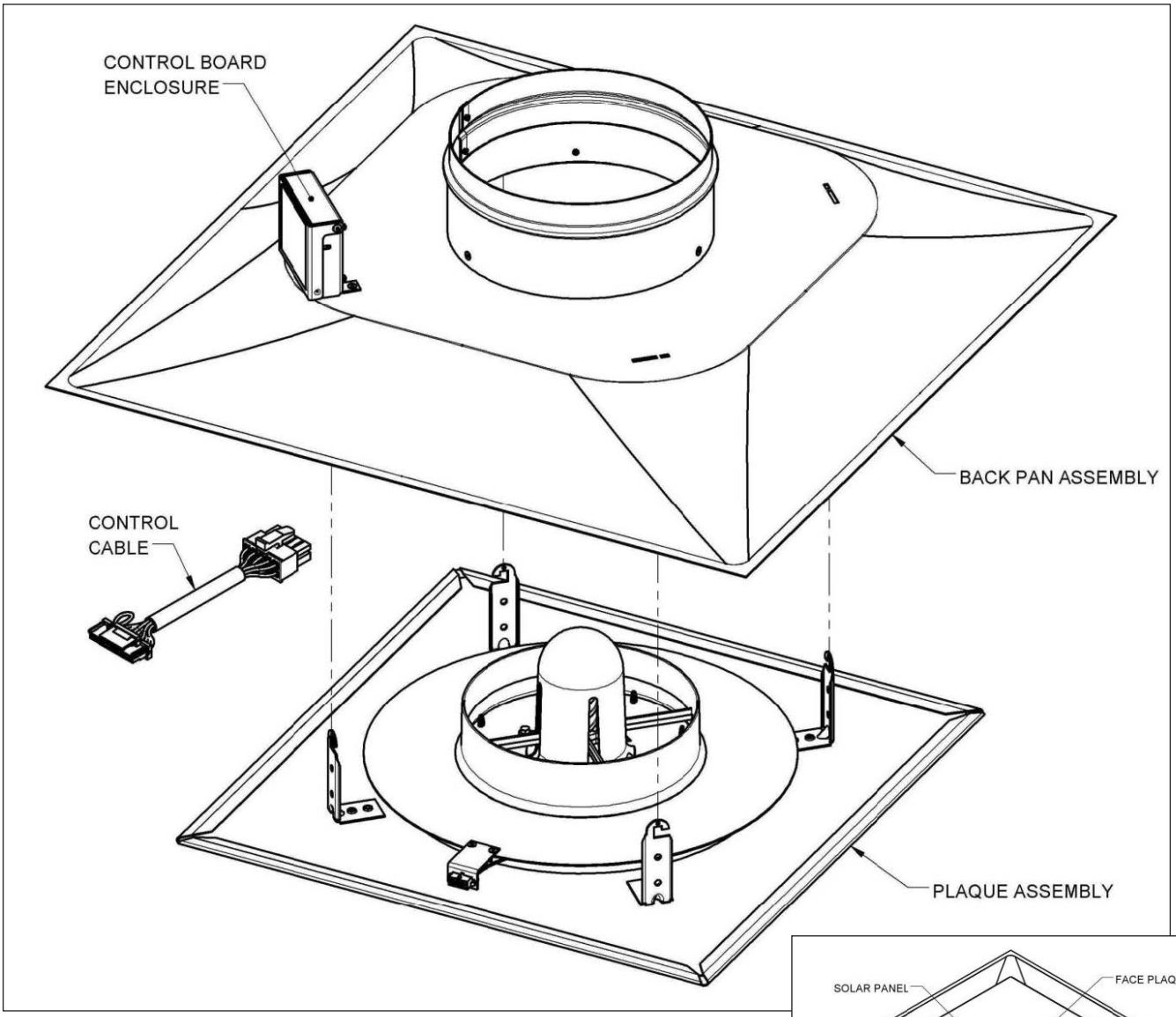
Titus

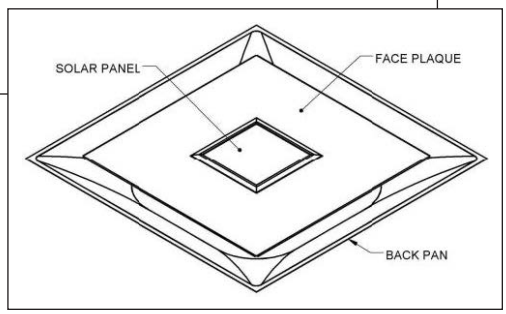
Helios IOM

UNPACKING

The units are shipped in two major sub-assemblies; the back pan assembly and the plaque assembly. An interface cable and quick start instructions are included and shipped loose.

Locate the control cable in the box (shown below). This cable used to connect the control board to the plaque assembly. Remove the top cardboard insert. Remove the diffuser back pan and plaque from the packaging taking care.





Precautions:

Care should be taken where handling the plaque assembly. The solar panel can be damaged or dislodged by applying pressure to it or dropping the plaque on a hard surface.

Standalone Installation

1. On the back pan, locate the control box and flip the cover open. There is an orange antenna on the control board. Rotate the antenna wire into the notch in the control box housing. Straighten it so it sticks straight out from the control box. Close the cover.

Figure 2. Antenna position

2. Plug the white connector of the interface cable into the control board which is accessible through the slot in the back pan.

Figure 3. Control board wiring connection

3. Install the back pan into the ceiling grid and connect the duct work to back pan inlet.

4. Install the plaque assembly:

- 1. Install the plaque assembly into the back pan by inserting the hanger legs into the mating slots in the back pan.
- 2. Rotate the plaque slightly clock-wise to align the hook tip with the small slot.
- 3. Lower the plaque to seat the hook tip in the small slot.

Warning: Do not apply pressure to solar panel.

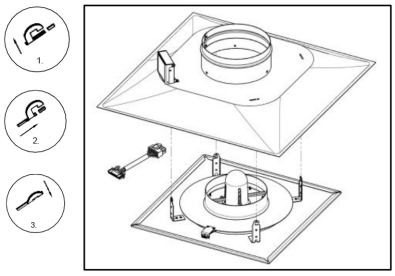


Figure 4. Plaque installation

5. Plug the black connector of the interface cable into receptacle on the plaque assembly which is located close to the edge of the plaque.

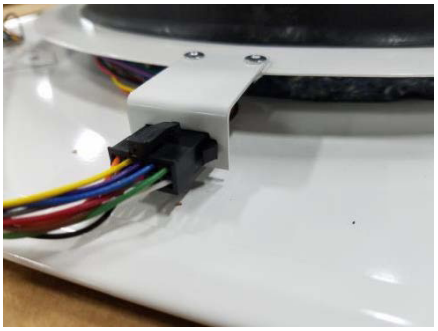


Figure 5.Plaque assembly wiring connection

Standalone Commissioning

1. On the back pan, locate the control box and flip the cover open. Locate the two rotary dial switches on the lower right corner of the control board.

Figure 6. Control Board Enclosure

2. The 10 position dial controls the minimum damper position setting and the 16 position dial controls the heating and cooling temperature set points. The tables below show the corresponding settings. Factory set positions are indicated by shaded cells below.

10 Position Dial Switch	
Dial Position	Minimum Position
0	0
1	5
2	10
3	15
4	20
5	25
6	30
7	35

10 Position Dial Switch		
Dial Position	Cooling Set Point	Heating Set Point
0	69	66
1	71	68
2	73	70
3	75	72
4	77	74
5	79	76
6, 7, 8, 9	75	72
A	69	64
B	71	66
C	73	68
D	75	70
E	77	72
F	79	74

Figure 7. Control Board Switch Settings

3. When the desired settings are selected, press the red button on the control board to read the new settings into memory.

4. To place the unit in maximum open position for airflow balancing, press the red button 3 times in quick succession. The LED will blink 3 times. The damper will be driven to full open position. The damper will stay in this position for 1-1/2 hours before returning to normal operating mode. If balancing is completed prior to this time, pressing the red button 1 time will return the diffuser to normal operating mode.

Single Zone Wireless Commissioning

To control Helios diffuser(s) with a wireless wall sensor, the diffuser(s), wall sensor and postmaster must be linked. Once you link a wireless device with the plug-in postmaster, it remains linked until it is unlinked.

Prior to linking, locate the onboard control enclosure on each Helios diffuser back pan to be linked. Open enclosure cover(s) to reveal control board(s) and reposition the orange antennae wire so that it is routed through the slot in the housing and out of the enclosure.

Locate the wall sensor and remove the rear cover of the wall sensor to reveal the control board.

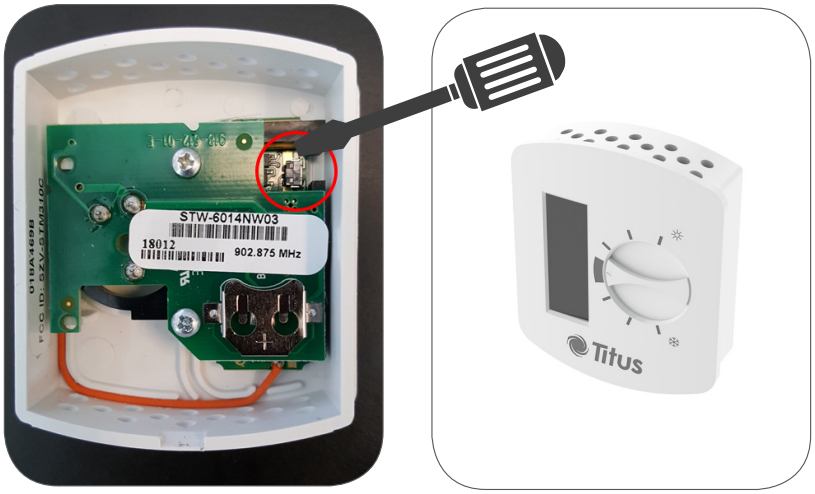
Linking Postmaster with Wall Sensor Instructions

1. Plug postmaster into 120V wall outlet

2. Press and hold both buttons on postmaster for 2 seconds. The two LED indicators on the postmaster will flash red. The postmaster is in learn mode and ready to be linked with devices.

3. Using the flat surface of a small screwdriver, momentarily press the learn button on the wall sensor. Both LEDs on the postmaster should display solid green for 3 seconds, indicating that the postmaster is linked with the sensor.

The two LED indicators will resume flashing red to indicate that the postmaster is again in learn mode and ready to be linked with another device.

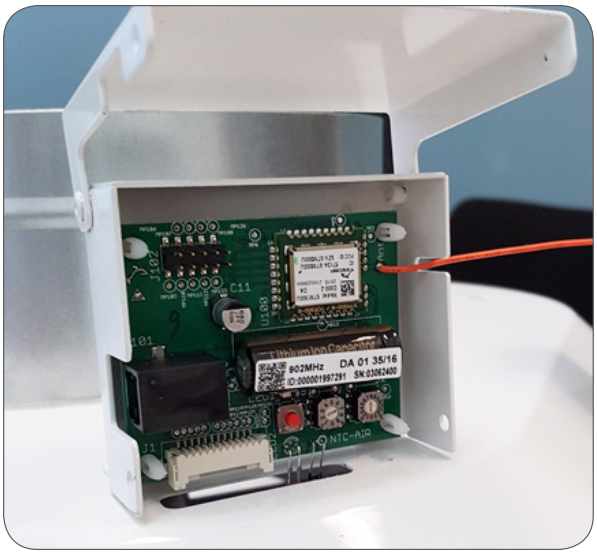


Linking Postmaster with Helios Instructions

4. With the postmaster LEDs flashing red in learn mode, momentarily press the red learnbutton on the Helios onboard control PCB. The two LEDs on the control board will flash one time. If linking is successful, the postmaster displays solid green for 3 seconds.

5. Following successful linking, the two postmaster LEDs will flash red indicating that the postmaster is ready for another linking. To link another diffuser to the sensor and postmaster, repeat step 4 until up to 15 diffusers have been linked.

NOTE: AFTER THE FINAL LINKING, THE POSTMASTER WILL REMAIN IN THE LEARN MODE FOR 2 MINUTES AND THEN RESUME NORMAL OPERATIONAL MODE. TO MANUALLY RETURN TO RUN MODE, PRESS AND HOLD BOTH POSTMASTER BUTTONS FOR TWO SECONDS.



Unlinking Devices

To un-link a device, momentarily press the learn button of the device you want to unlink once, the two LEDs on the postmaster will turn solid red for 3 seconds. The device now successfully unlinked from the postmaster.

WARNING: PRESS THE LEARN BUTTON OF A LINKED DEVICE WHILE THE POSTMASTER IS IN A LEARNED MODE WILL UN-LINK OR UNLINK THE DEVICE FROM THE POSTMASTER.

Troubleshooting

SELF-TEST PROCEDURE

1. Press the test button 4 consecutive times (4 short presses). This puts the diffuser n self-test mode. The damper ring should move through a full range of motion from (full open to full closed)

2. If there is no problem detected, the external led will be turn on and stay on. The extension harness may now be disconnected.

3. If a problem is detected, the external led will blink in a pattern indicating the type of error detected. Use the table below to troubleshoot possible solutions.

BLINK PATTERN	ERROR DETAILS	POSSIBLE CAUSES	CORRECTIVE ACTION
1x	Solar current out of range (light level measured at solar cell must be above 100 lux)	SOLAR CELL DEFECT	CHECK THAT SOLAR CELL IS CONNECTED. REPLACE SOLAR CELL IF NECESSARY.
		LIGHT LEVEL BELOW 100 LUX	CHECK THAT LIGHT SOURCE IS ON AND SOLAR CELL IS OVER THE LIGHT. ADJUST LIGHT SOURCE TO 100 LUX IF NECESSARY.
		BOARD DEFECT	REPLACE CONTROL BOARD
2x	Motor timeout error (increments prior to mechanical block exceed limit)	MOTOR OR WIRING DEFECT	CHECK THAT THE MOTOR IS CONNECTED. REPLACE MOTOR IF NECESSARY.
		MECHANICAL DEFECT	REPLACE MOTOR
		BOARD DEFECT	REPLACE CONTROL BOARD
3x	Other motor errors (no encoder increments detected)	MECHANICAL UNIT BLOCKED	CHECK FOR OBSTRUCTIONS ON ACTUATOR
		MOTOR DEFECT	REPLACE MOTOR
		BOARD DEFECT	REPLACE CONTROL BOARD
4x	Temperature out of range (<=5°C or >=50°C) (<=41°F or >=122°F)	ROOM OR SUPPLY AIR TEMPERATURE OUT OF RANGE	CHECK THAT ROOM TEMPERATURE SENSOR IS CONNECTED; CHECK THAT SUPPLY TEMPERATURE SENSOR IS NOT TOUCHING DIFFUSER BACKPAN
		SENSOR DEFECT	REPLACE ROOM TEMPERATURE SENSOR; REPLACE CONTROL BOARD
		BOARD DEFECT	REPLACE CONTROL BOARD

Figure 12. Control Board Error Codes

Theory of Operation

• The Helios diffuser is a self-powered variable geometry air distribution device capable of maintaining temperature control in an occupied space though digitally controlled VAV operation.

• A damper ring is vertically adjusted by a motorized lead screw which varies air flow through the diffuser.

• The digital control circuitry and motor are powered by an energy storage capacitor that is charge by a solar collection panel mounted in the plaque face of the diffuser. After full charge the capacitor will maintain a charge for 3 to 4 weeks

• The diffuser can be operated in two configurations:

- Standalone
- Single zone controlled by a wireless Helios wireless thermostat

Modes of Operation

Normal operating mode

Wakes every ten minutes to check:

- Capacitor charge level
- Light level- requires 100 Lux minimum (Average windowless office is about 130)
- Supply air and room temperature

Energy conservation mode - After 8 hours of low light (less than 100 Lux)

Maintains current damper position, wakes every ten minutes to check:

- Capacitor charge level
- Light level- requires 100 Lux minimum

Low Energy mode - capacitor charge drops below 2.8V

- Damper moves to full open
- 0 minute intervals between capacitor charge level check

Notes

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