



Figure 1

**ECONOMIZER 101**

Economizers are designed to provide “free” air conditioning when outside conditions are appropriate. When the outside air is cool and dry enough, the economizer automatically opens to introduce the cool air to the interior space, thereby eliminating the need to run the air conditioning compressor.

If the outside air becomes too warm or humid, the economizer automatically closes the fresh air damper and the compressor engages to begin cooling the space mechanically.

If a two stage thermostat is used it is possible to use a combination of economizer and mechanical cooling to condition the space.

The economizer can also be set to allow a minimum amount of fresh air to enter the space when the equipment’s indoor blower is operating.

Economizers are valuable tools to enhance indoor air quality, save energy and prolong the life of the air conditioning equipment.

**SEQUENCE OF OPERATION**

This sequence assumes employment of a single enthalpy economizer using a two stage thermostat.

1. A call for cooling comes from room thermostat.
2. The enthalpy sensor determines if the atmospheric conditions are conducive for using outside air for cooling. If YES, go to step 3. If NO, or if outdoor air temperature rises above enthalpy set point, go to step 4.
3. The outside air dampers open and modulate to maintain a mixed air temperature (outside air + indoor air) of 53 degrees F. If the outdoor air is insufficient to satisfy the thermostat alone and a second stage of cooling is required, the compressor starts and works in conjunction with the economizer to cool the space. In a system with two compressors, if the thermostat is still not satisfied by the economizer and stage 1 compressor, the Jade control will energize the second compressor. (Go to step 5)

4. Outdoor air dampers open to minimum position and the compressor engages to provide mechanical cooling.
5. When the thermostat is satisfied the outside air dampers return to a minimum position.



Figure 2

**INSTALLATION**

1. Open carton and inspect contents for shortages and damage.
2. Remove filter and upflow access panels from package unit.  
**Keep screws from the upflow access panel.**
3. Slide left side of internal damper rack such that actuator clears the left post of the unit, then slide the right side in so both flanges are flush with unit s flange openings. (Figure 2)
4. Plug 12-pin economizer plug into matching 12-pin plug in the unit. (Figure 3)

**NOTE**

Ensure neither the wire nor the plugs interfere with the movement of the dampers during operation. Install bottom portion of the new access panel on the unit.

5. Remove the blower access panel from the unit and locate the 2-pin MAT Sensor connector (Figure 4). Mount this Mixed Air Sensor to the blower housing per Figure 4, and plug the sensor into the 2-pin connector with the 4 ft. mixed air sensor wire harness. (see wire diagram)
6. Re-assemble the blower access panel with its screws.

Warranty: Honeywell Jade components have 5 year parts warranty. Workmanship and all other parts, 1 year parts only

7. Assemble hood per instructions starting on page 3.
8. Attach the hood to the side of the unit over economizer damper in the place of the discarded upflow access panel, with saved screws.
9. Power the unit and use the Honeywell Jade Economizer instructions provided and the 4 button interface on the Jade controller to configure the economizer for your application
10. Replace filter access panel on unit.



Figure 3

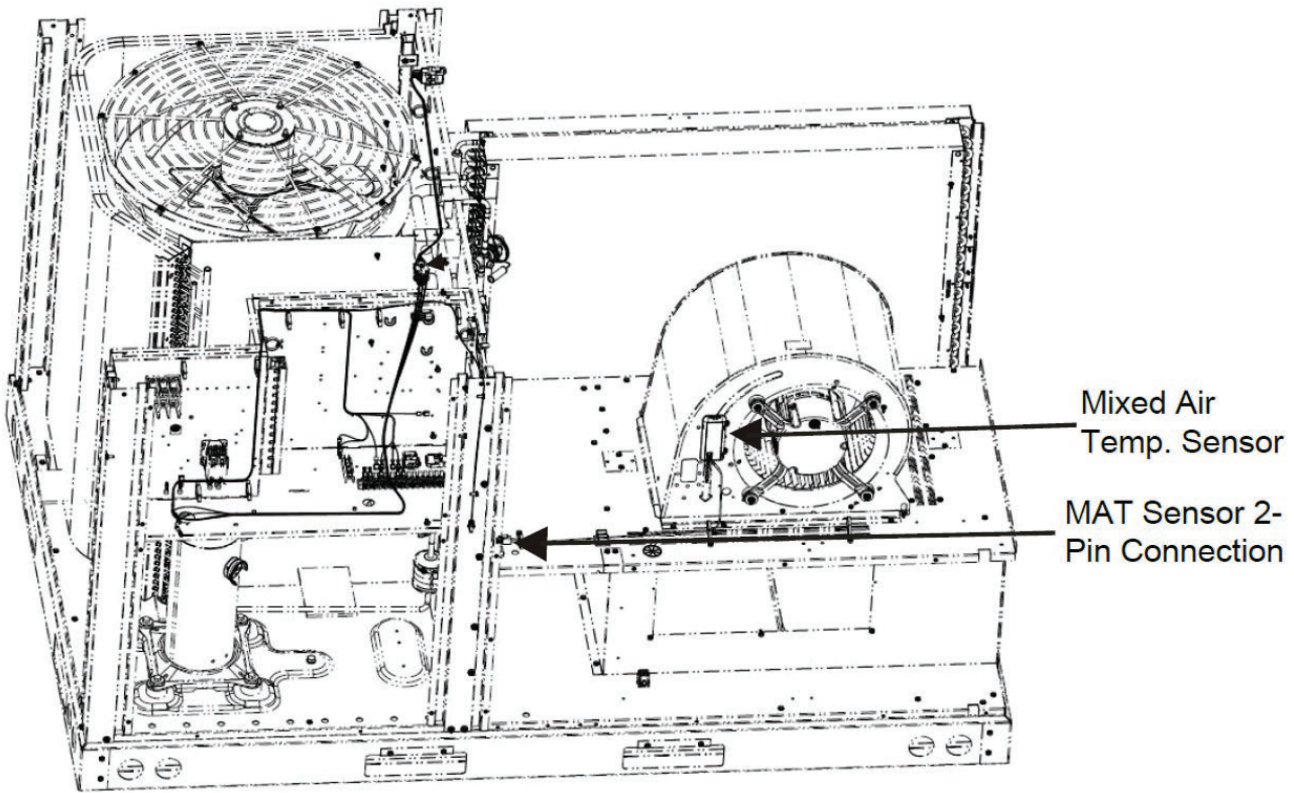


Figure 4

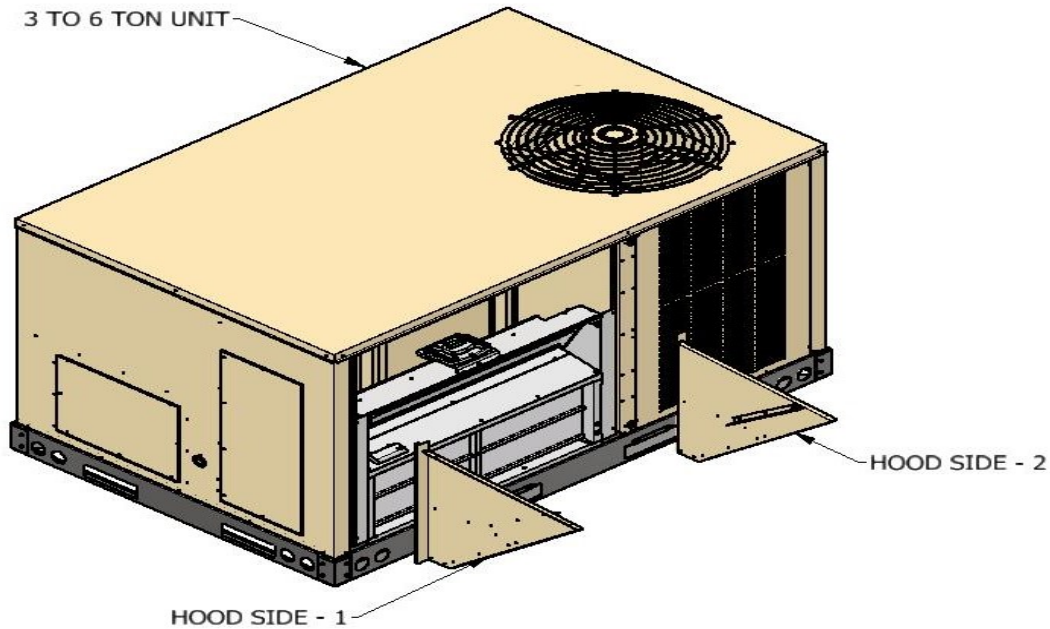
## HOOD ASSEMBLY

STEP - 1: REMOVE THE BUBBLE WRAP FROM EACH OF THE HOOD PARTS.

STEP - 2: SCREW BAFFLE SIDES 1 & 2 TO HOOD SIDES AS SHOWN.

STEP - 3: USE ONE OF THE SCREWS /W WASHERS RETAINED FROM THE PANEL IN STEP 2, TO ATTACH HOOD SIDE - 1 TO THE UNIT THRU THE ECONOMIZER.

STEP - 4: USE ONE OF THE SCREWS /W WASHERS RETAINED FROM THE PANEL IN STEP 2, TO ATTACH HOOD SIDE - 2 TO THE UNIT THRU THE ECONOMIZER.

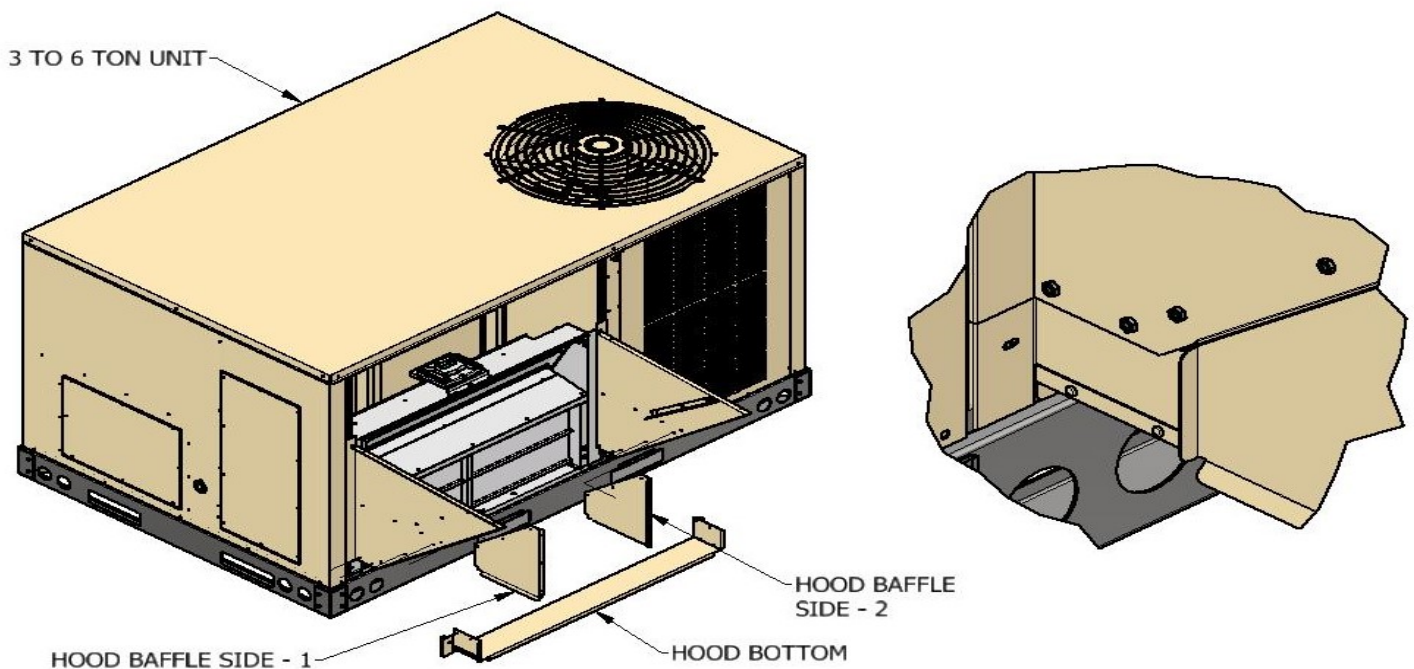


### HOOD ASSEMBLY 1

STEP - 1: USE THE REMAINING 2 SCREWS/WASHERS FROM THE PANEL TO ATTACH THE HOOD BOTTOM TO THE UNIT.

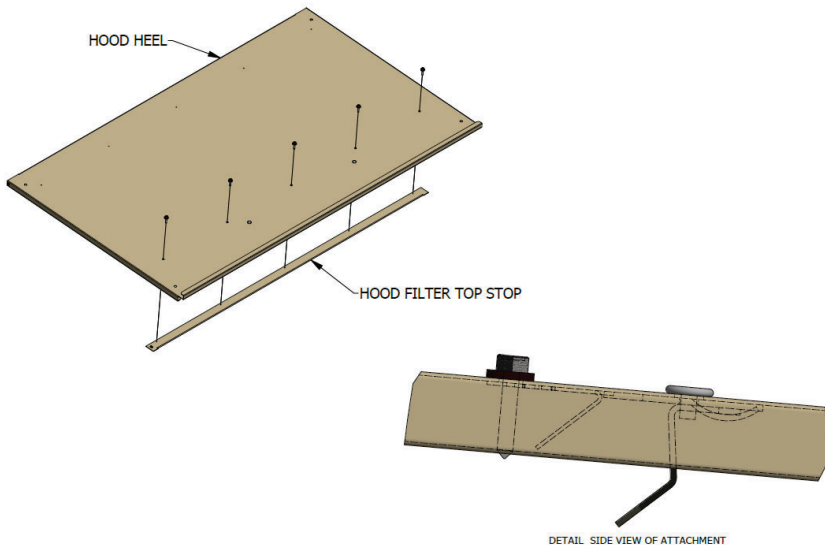
STEP - 2: USE THE  $\frac{5}{16}$ " HEAD SCREWS PROVIDED TO ATTACH THE HOOD BOTTOM TO THE HOOD SIDES THRU THE ALIGNED GUIDE HOLES.

STEP - 3: USE THE  $\frac{5}{16}$ " HEAD SCREWS PROVIDED TO ATTACH THE BAFFLE SIDES TO SIDES 1 & 2, THESE SHOULD OVERLAP THE BOTTOM.



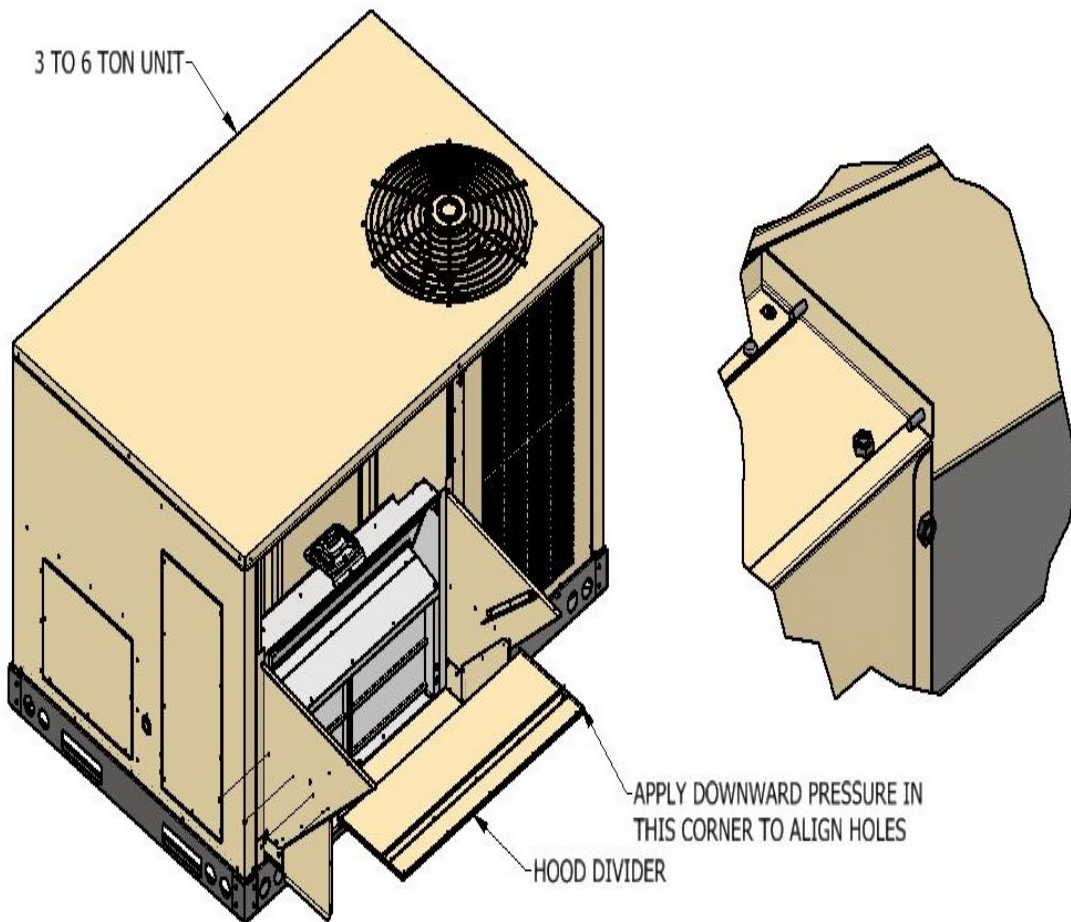
### HOOD ASSEMBLY 2

STEP - 1: USE PROVIDED SCREWS THAT HAVE NEOPRENE WASHERS TO ATTACH THE HOOD FILTER TOP STOP TO THE HOOD HEEL.



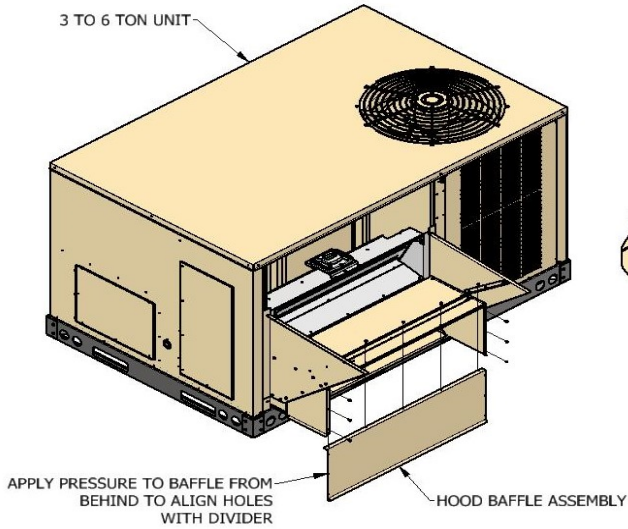
### HOOD ASSEMBLY 3

STEP - 1: USE  $\frac{5}{16}$ " HEAD SCREWS PROVIDED TO ATTACH THE HOOD DIVIDER TO THE HOOD SIDES.



### HOOD ASSEMBLY 4

STEP - 1: USE PROVIDED  $\frac{5}{16}$ " HEAD SCREWS TO ATTACH THE HOOD BAFFLE FRONT TO THE BAFFLE SIDES & DIVIDER.



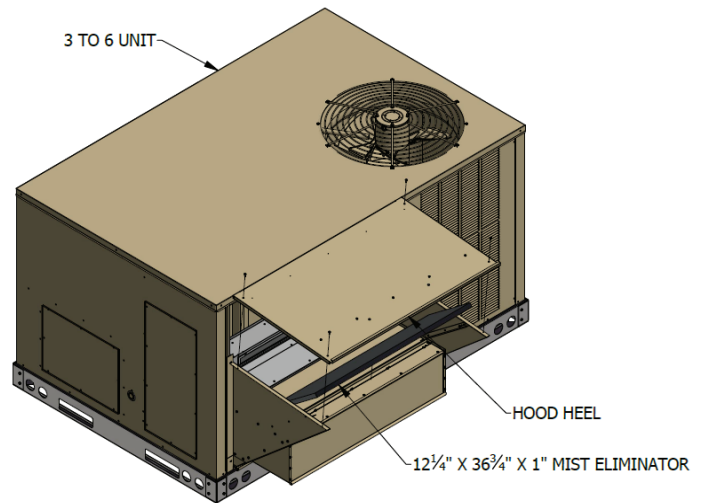
### HOOD ASSEMBLY 5

STEP - 1: SLIDE PROVIDED MIST ELIMINATOR INTO PLACE UP AGAINST THE FILTER ANGLES.

STEP - 2: USE PROVIDED  $\frac{5}{16}$ " HEAD SCREWS TO ATTACH THE HOOD HEEL TO THE HOOD SIDES.

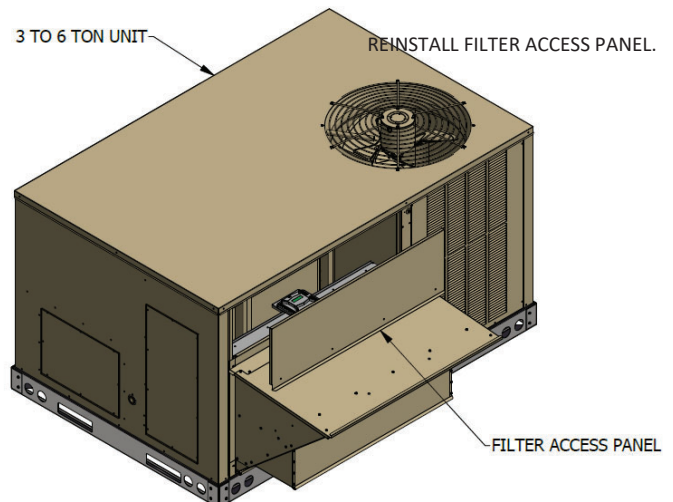
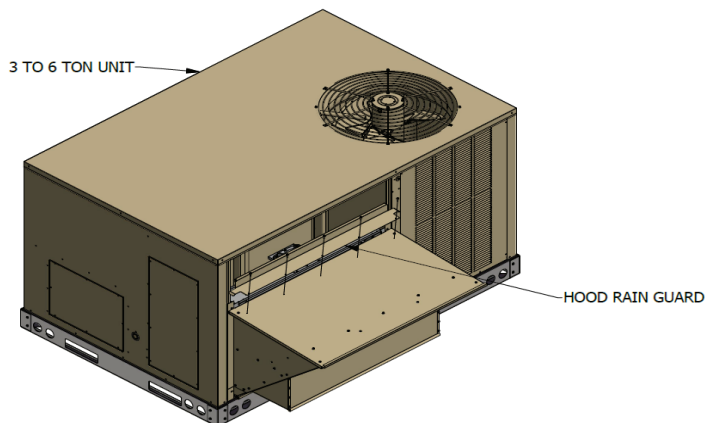
STEP - 3: FLIP DOWN THE LATCHES ON THE UNDERSIDE OF THE HOOD HEEL TO HOLD THE MIST ELIMINATOR INTO PLACE.

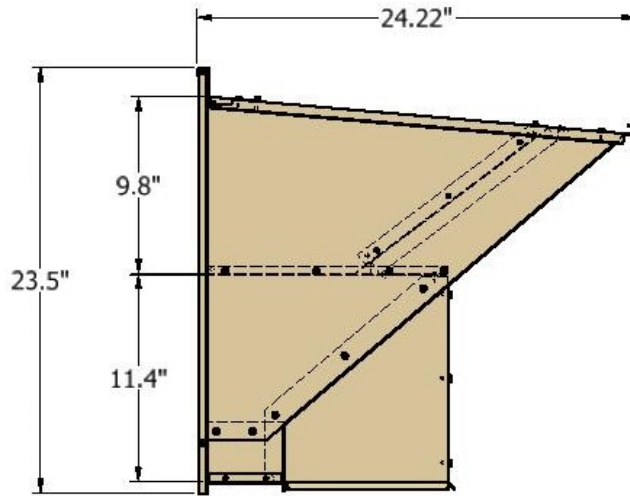
### HOOD ASSEMBLY 6



### HOOD ASSEMBLY 7 AND 8

STEP - 1: USE THE PROVIDED SCREWS WITH NEOPRENE WASHERS TO ATTACH THE HOOD RAIN GUARD TO THE HOOD HEEL.





### CONTENTS

1	Damper rack w/ economizer controls
1	Hood Assembly
1	Fresh Air Mist Eliminator
1	Screw package
1	Mixed Air Sensor
1	4 ft. Mixed Air Sensor Wire Harness
1	Installation/Component Manual

### ACCESSORIES / CAPABILITIES

Dual Enthalpy - Requires an additional C7400 enthalpy control installed in the return air duct.

Demand Control Ventilation - Requires a CO2 sensor.

Power Exhaust - 144/145/146-DK-036 power exhaust used in applications where barometric relief is not sufficient.

Remote Minimum Positioner - For applications requiring minimum position adjustments inside the conditioned space.

The equation below may be used to set the minimum position. The mixed air temperature and outside air temperature may be discerned by looking at the status menu on the Jade controller.

### MINIMUM SET POINT EQUATION

$$(To \times OA) + (Tr \times RA) = Tm$$

**To = Outdoor air temperature**

**OA= Percent of outdoor air**

**Tr = Return air temperature**

**RA= Percent of return air**

**Tm= Resulting mixed air temperature**

#### Example:

Fresh air required is 10% outdoor air.

Outdoor air temperature is 60 degrees F.

Return air temperature is 75 degrees F.

$$(0.1 \times 60) + (0.9 \times 75) =$$

$$6.0 + 67.5 = 73.5$$

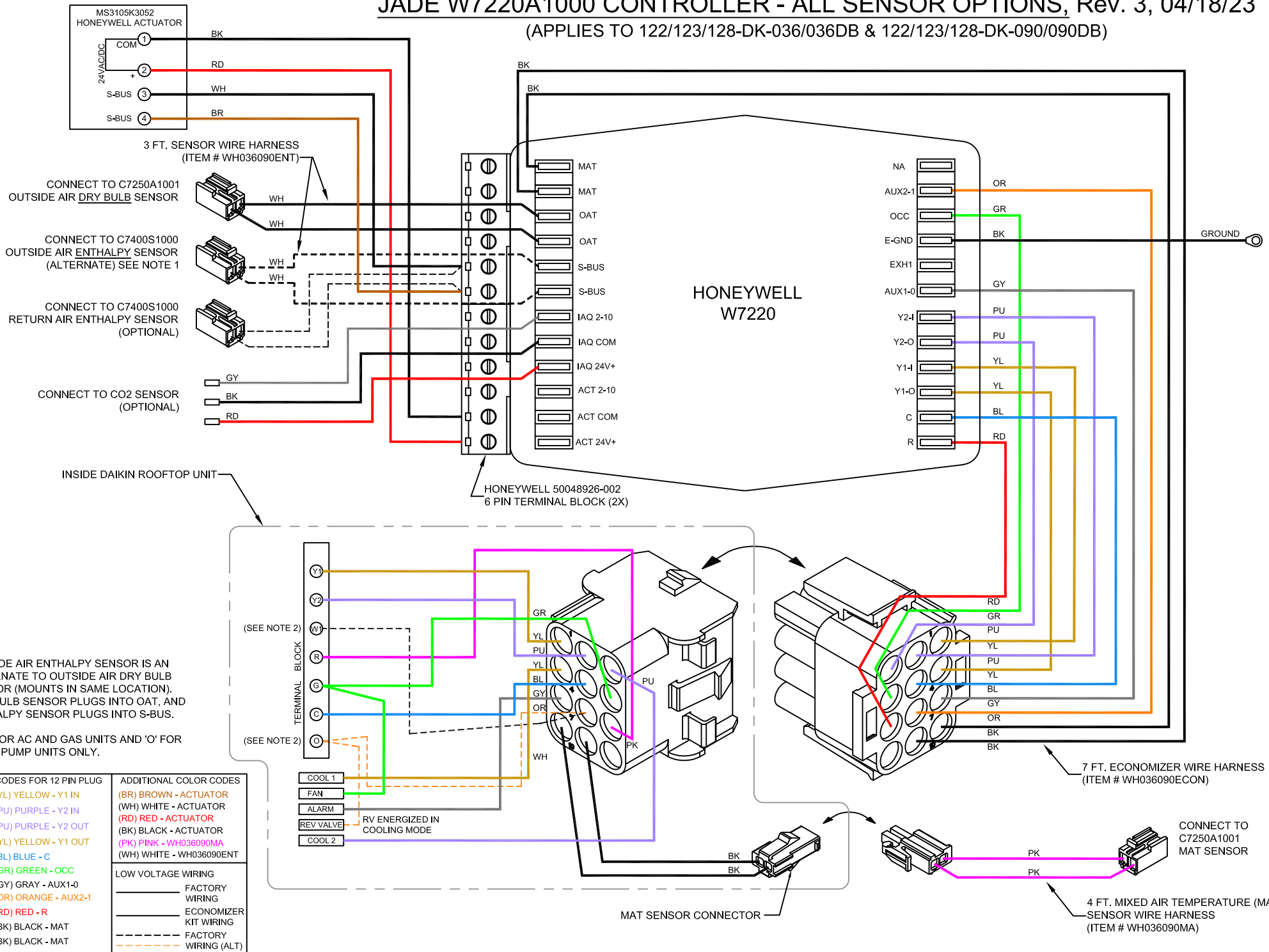
Mixed air temperature will be 73.5 degrees F when the OA is 60 degrees F and the RA is 75 degrees F with 10% outdoor air.

## Important Notes

- Please see enclosed brochure for Honeywell component trouble shooting in tructions as well as instructions for heat pump set up.
- The fresh air mist eliminator should be flushed periodically with warm soapy water.
- A two stage thermostat is recommended with this accessory.

# JADE W7220A1000 CONTROLLER - ALL SENSOR OPTIONS, Rev. 3, 04/18/23

(APPLIES TO 122/123/128-DK-036/036DB & 122/123/128-DK-090/090DB)



- NOTES:**
1. OUTSIDE AIR ENTHALPY SENSOR IS AN ALTERNATE TO OUTSIDE AIR DRY BULB SENSOR (MOUNTS IN SAME LOCATION). DRY BULB SENSOR PLUGS INTO OAT, AND ENTHALPY SENSOR PLUGS INTO S-BUS.
  2. 'W1' FOR AC AND GAS UNITS AND 'O' FOR HEAT PUMP UNITS ONLY.

COLOR CODES FOR 12 PIN PLUG		ADDITIONAL COLOR CODES	
①	(YL) YELLOW - Y1 IN	(BR) BROWN - ACTUATOR	
②	(PU) PURPLE - Y2 IN	(WH) WHITE - ACTUATOR	
③	(PU) PURPLE - Y2 OUT	(RD) RED - ACTUATOR	
④	(YL) YELLOW - Y1 OUT	(BK) BLACK - ACTUATOR	
⑤	(BL) BLUE - C	(PK) PINK - WH036090MA	
⑥	(GR) GREEN - OCC	(WH) WHITE - WH036090ENT	
⑦	(GY) GRAY - AUX1-0		
⑧	(OR) ORANGE - AUX2-1		
⑨	(RD) RED - R		
⑩	(BK) BLACK - MAT		
⑪	(BK) BLACK - MAT		

LOW VOLTAGE WIRING	
—————	FACTORY WIRING
—————	ECONOMIZER KIT WIRING
-----	FACTORY WIRING (ALT)

# McDaniel Metals

281-987-8400 • 281-987-9494 (fax)  
1318 Buschong, Houston, TX 77039  
www.mcdanielmetals.com

## 123-DK-036

ULTRA LOW LEAK TITLE 24  
DOWNFLOW ECONOMIZER FITS  
DAIKIN D\*G036-072, D\*H036-072,  
D\*C036-072 SANDSTONE BEIGE





### Reliability Certification

Model: McDaniel Metals 123-DK-036

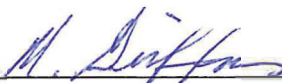
The damper sections of this economizer are in full compliance with the reliability requirements set forth in California Title 24 Building Efficiency Standard as verified by Energistics Laboratory, Houston TX. The standard states:

"Suppliers of economizers shall certify that the economizer assembly, including but not limited to outdoor air damper, return air damper, drive linkage and actuator have been tested and are able to open and close against the rated airflow and pressure of the system after 60,000 damper opening and closing cycles."

Test Start Information	
Test Number: 0749	
Start Date: 2/20/2019	
Start Time: 3:00 P.M.	
Test Operator: Ernesto Arriaga	
Signature: 	Digitally signed by earriaga@energisticslab.com DN: cn=earriaga@energisticslab.com Date: 2020.05.21 07:26:43 -05'00'
Test End Information	
End Date: 4/8/2019	
End Time: 8:00 A.M.	
Cycles: 62,743	
Test Operator: Ernesto Arriaga	
Signature: 	Digitally signed by earriaga@energisticslab.com DN: cn=earriaga@energisticslab.com Date: 2020.05.21 07:27:03 -05'00'
Economizer Information:	
OEM: Daikin	
OEM Part Number: 123-DK-036	
McDaniel Metals Part Number: 123-DK-036	
Actuator: Honeywell MS3105K	
Actuator Torque: 44 lbs-in.	

This economizer design has been rated and approved to open and close against the rated airflow of this system after opening and closing for at least 60,000 cycles.

McDaniel Metals Engineering Manager

A handwritten signature in blue ink, appearing to read "M. Duffins".

Date

A handwritten signature in blue ink, appearing to be the date "6/26/2020".



# Leakage Test

**McDaniel Metals 123-DK-036, Client Free Area: 2.53, Core Area: 2.53, Blade Type: Airfoil , Single Blade hp**

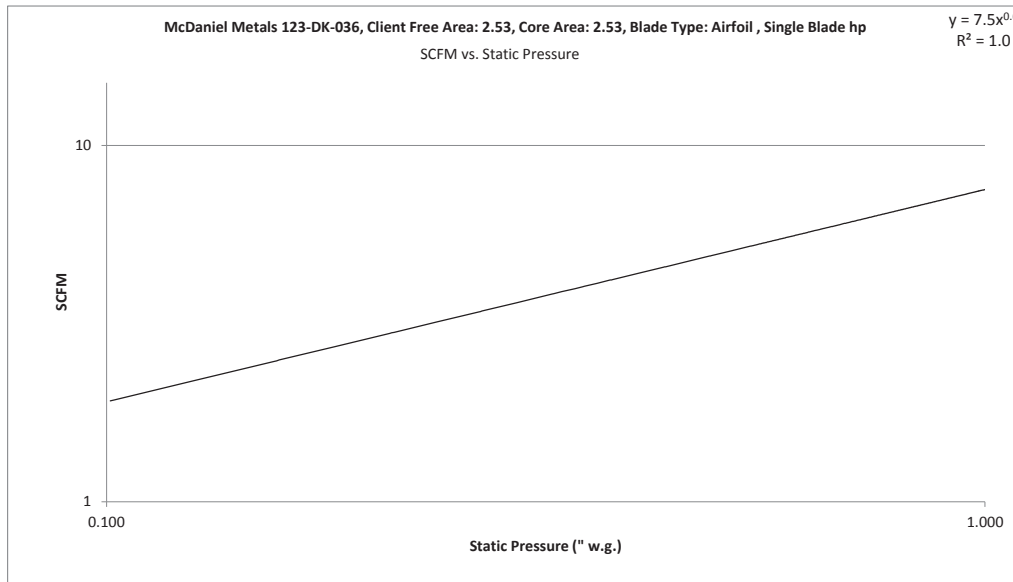
Test Details	Device Under Test	Psychometric Data	
Experiment Number: 1800 Test Number: 749 LTO Number: N/A Date: 1/29/2019 Personnel: TF Witness(es):  Lab: Energetics Laboratory Location: 4633 Winfield Houston, TX 77039 Program Version:	Manufacturer: McDaniel Metals Model: 123-DK-036 Unit Size: Client Free Area: 2.53 Core Area: 2.53 Damper Type: Economizer Blade Orientation: Horizontal Flow Direction: Fresh Air Opening Blade Type: Airfoil Blade Action: Single Blade	T <sub>D</sub> : 61.64 T <sub>W</sub> : 49.9 %RH: 34.57 P <sub>BAR</sub> : 29.3 ρ <sub>0</sub> : 0.0743 ρ <sub>0</sub> /ρ: 0.9906	
		<b>Primary 1</b> A: 7.04 B: 0.4691 Source: POP 5/8	
<b>Comments:</b> <span style="color: green;">PASS</span> : Max CFM allowed per sq/ft = 3 (Inlet = 2.53 sq/ft. ; Max CFM allowed = 7.6) Max CFM allowed does not exceed 7.6 CFM.			

## Leakage Test

Enter Static

CFM	Static Pressure
7.52	1.00
6.34	0.75
4.98	0.50
3.29	0.25
1.91	0.10

Equation Coefficients	
A:	7.5
B:	0.6
R <sup>2</sup> :	1.0



# Leakage Test

**McDaniel Metals 123-DK-036, Client Free Area: 3.8, Core Area: 3.8, Blade Type: Airfoil , Parallel hp**

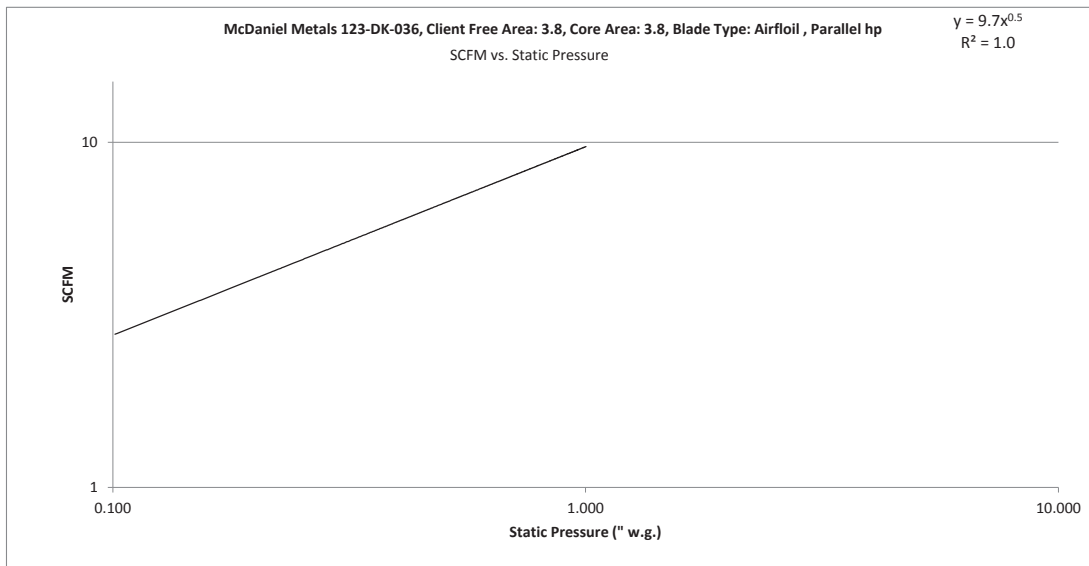
Test Details	Device Under Test	Psychometric Data		
Experiment Number: 1800 Test Number: 749 LTO Number: N/A Date: 1/29/2019 Personnel: TF Witness(es):  Lab: Energetics Laboratory Location: 4633 Winfield Houston, TX 77039 Program Version:	Manufacturer: McDaniel Metals Model: 123-DK-036 Unit Size: Client Free Area: 3.8 Core Area: 3.8 Damper Type: Economizer Blade Orientation: Horizontal Flow Direction: Return Opening Blade Type: Airfoil Blade Action: Parallel	T <sub>D</sub> : 62.53 T <sub>W</sub> : 50.34 %RH: 33.12 P <sub>BAR</sub> : 29.3 ρ <sub>0</sub> : 0.0742 ρ <sub>0</sub> /ρ: 0.9889		
		Primary 1 A: 7.04 B: 0.4691 Source: POP 5/8		
<b>Comments:</b> Pass: Max CFM allowed per sq/ft = 3 (Inlet = 3.8 sq/ft. ; Max CFM allowed = 11.4) Max CFM allowed does not exceed 11.4 CFM				

## Leakage Test

Enter Static

CFM	Static Pressure
9.71	1.00
8.3	0.75
6.65	0.50
4.56	0.25
2.76	0.10

Equation Coefficients	
A:	9.7
B:	0.5
R <sup>2</sup> :	0.9



# Pressure Drop

**McDanial Sheetmetals 123-DK-036, Client Free Area: 2.02, Core Area: 2.02, Blade Type: Airfoil , Single Blade Action hp**

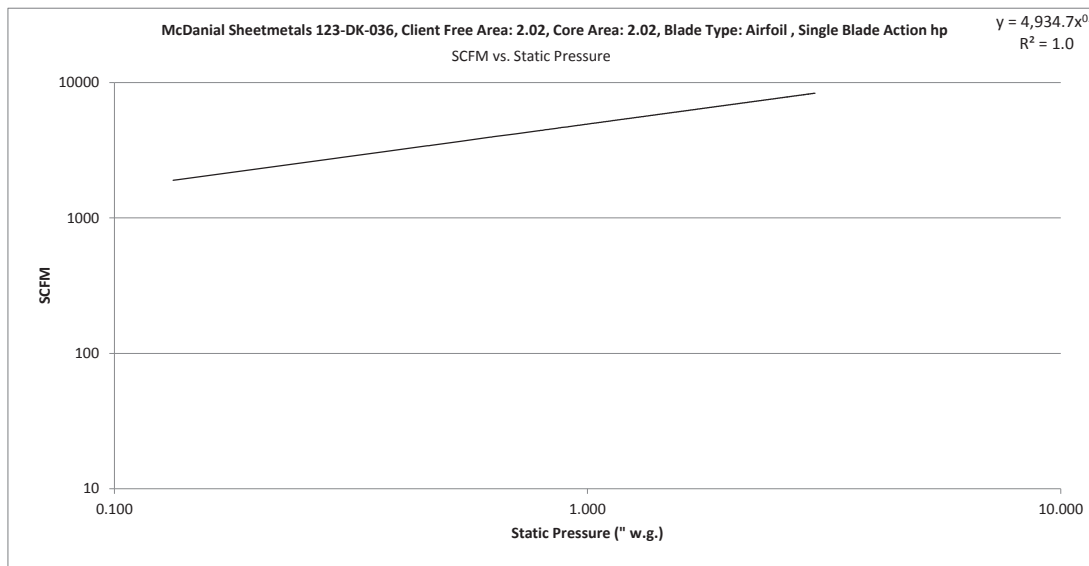
Test Details	Device Under Test	Psychometric Data	
Experiment Number:	Manufacturer: McDanial Sheetmetals	T <sub>D</sub> : 67	
Test Number: 749	Model: 123-DK-036	T <sub>w</sub> : 66.8	
LTO Number:	Unit Size:	%RH: 99.37	
Date: 2/4/2019	Client Free Area: 2.02	P <sub>BAR</sub> : 28.87	
Personnel: Chris Ulrickson	Core Area: 2.02	p0: 0.0720	
Witness(es):	Damper Type: Economizer	ρ0/ρ: 0.9605	
Lab: Energetics Laboratory	Blade Orientation: Horizontal	Primary 1 A: 6050 B: 0.5 Source:	Primary 1 A: B: Source:
Location: 4633 Winfield Houston, TX 77039	Flow Direction: Fresh Air Opening		
Program Version:	Blade Type: Airfoil Blade Action: Single Blade Action		
<b>Comments:</b> Core Area provided by Manufacturer. Psychometric data obtained by Wind Tunnel 2015 Software.			

### Pressure Drop

Enter CFM

CFM	Static Pressure
2500	0.24
2175	0.18
1850	0.13
1525	0.08
1200	0.05

Equation Coefficients	
A:	4934.7
B:	0.5
R <sup>2</sup> :	1.0



# Pressure Drop

**McDanial Sheetmetals 123-DK-036, Client Free Area: 2.27, Core Area: 2.27, Blade Type: Airfoil , Parallel hp**

Test Details	Device Under Test	Psychometric Data	
Experiment Number: Test Number: 749 LTO Number: Date: 2/4/2019 Personnel: Chris Ulrickson Witness(es):  Lab: Energetics Laboratory Location: 4633 Winfield Houston, TX 77039 Program Version:	Manufacturer: McDanial Sheetmetals Model: 123-DK-036 Unit Size: Client Free Area: 2.27 Core Area: 2.27 Damper Type: Economizer Blade Orientation: Horizontal Flow Direction: Return Air Opening Blade Type: Airfoil Blade Action: Parallel	T <sub>D</sub> : 67 T <sub>W</sub> : 66.8 %RH: 99.37 P <sub>BAR</sub> : 28.87 ρ <sub>0</sub> : 0.0720 ρ <sub>0</sub> /ρ: 0.9605	
		Primary 1 A: 6050 B: 0.5 Source:	Primary 1 A: B: Source:
<b>Comments:</b> Core Area provided by Manufacturer. Psychometric data obtained by Wind Tunnel 2015 Software.			

### Pressure Drop

Enter CFM

CFM	Static Pressure
2500	0.45
2175	0.34
1850	0.24
1525	0.17
1200	0.1

Equation Coefficients	
A:	3702.2
B:	0.5
R <sup>2</sup> :	0.9

