
INSTALLATION INSTRUCTIONS

I-TEC[®] ERV Economizer Ventilator System (Vent Code "E")



Climate Control Solutions

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Performance and Application Data

Summer Cooling Performance (Indoor Design Conditions 75°DB/62°WB)

Ambient O.D.	VENTILATION RATE 450 CFM 65% EFFICIENCY						VENTILATION RATE 375 CFM 66% EFFICIENCY						VENTILATION RATE 300 CFM 67% EFFICIENCY							
	DB/WB	F	VLT	VLS	VLL	HRT	HRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL
105	75		21465	14580	6884	13952	9477	4475	17887	12150	5737	11805	8018	3786	14310	9720	4590	9587	6512	3075
	70		14580	14580	0	9477	9477	0	12150	12150	0	8018	8018	0	9720	9720	0	6512	6512	0
	65		14580	14580	0	9477	9477	0	12150	12150	0	8018	8018	0	9720	9720	0	6512	6512	0
100	80		31590	12150	19440	20533	7897	12635	26325	10125	16200	17374	6682	10692	21060	8100	12960	14110	5427	8683
	75		21465	12150	9314	13952	7897	6054	17887	10125	7762	11805	6682	5123	14310	8100	6210	9587	5427	4160
	70		12352	12150	202	8029	7897	131	10293	10125	168	6793	6682	111	8235	8100	135	5517	5427	90
	65		12150	12150	0	7897	7897	0	10125	10125	0	6682	6682	0	8100	8100	0	5427	5427	0
	60		12150	12150	0	7897	7897	0	10125	10125	0	6682	6682	0	8100	8100	0	5427	5427	0
95	80		31590	9720	21870	20533	6318	14215	26325	8100	18225	17374	5345	12028	21060	6480	14580	14110	4341	9768
	75		21465	9720	11744	13952	6318	7634	17887	8100	9787	11805	5345	6459	14310	6480	7830	9587	4341	5246
	70		12352	9720	2632	8029	6318	1711	10293	8100	2193	6793	5345	1447	8235	6480	1755	5517	4341	1175
	65		9720	9720	0	6318	6318	0	8100	8100	0	5345	5345	0	6480	6480	0	4341	4341	0
	60		9720	9720	0	6318	6318	0	8100	8100	0	5345	5345	0	6480	6480	0	4341	4341	0
90	80		31590	7290	24300	20533	4738	15794	26325	6075	20250	17374	4009	13365	21060	4860	16200	14110	3256	10854
	75		21465	7290	14175	13952	4738	9213	17887	6075	11812	11805	4009	7796	14310	4860	9450	9587	3256	6331
	70		12352	7290	5062	8029	4738	3290	10293	6075	4218	6793	4009	2784	8235	4860	3375	5517	3256	2261
	65		7290	7290	0	4738	4738	0	6075	6075	0	4009	4009	0	4860	4860	0	3256	3256	0
	60		7290	7290	0	4738	4738	0	6075	6075	0	4009	4009	0	4860	4860	0	3256	3256	0
85	80		31590	4860	26730	20533	3159	17374	26325	4050	22275	17374	2672	14701	21060	3240	17820	14110	2170	11939
	75		21465	4860	16605	13952	3159	10793	17887	4050	13837	11805	2672	9132	14310	3240	11070	9587	2170	7416
	70		12352	4860	7492	8029	3159	4870	10293	4050	6243	6793	2672	4120	8235	3240	4995	5517	2170	3346
	65		4860	4860	0	3159	3159	0	4050	4050	0	2672	2672	0	3240	3240	0	2170	2170	0
	60		4860	4860	0	3159	3159	0	4050	4050	0	2672	2672	0	3240	3240	0	2170	2170	0
80	75		21465	2430	19035	13952	1579	12372	17887	2025	15862	11805	1336	10469	14310	1620	12690	9587	1085	8502
	70		12352	2430	9922	8029	1579	6449	10293	2025	8268	6793	1336	5457	8235	1620	6615	5517	1085	4432
	65		4252	2430	1822	2764	1579	1184	3543	2025	1518	2338	1336	1002	2835	1620	1215	1899	1085	814
	60		2430	2430	0	1579	1579	0	2025	2025	0	1336	1336	0	1620	1620	0	1085	1085	0
75	70		12352	0	12352	8029	0	8029	10293	0	10293	6793	0	6793	8235	0	8235	5517	0	5517
	65		4252	0	4252	2764	0	2764	3543	0	3543	2338	0	2338	2835	0	2835	1899	0	1899
	60		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Winter Heating Performance (Indoor Design Conditions 70°F DB)

Ambient O.D.	VENTILATION RATE					
	450 CFM 80% EFFICIENCY		375 CFM 81% EFFICIENCY		300 CFM 82% EFFICIENCY	
	WVL	WHR	WVL	WHR	WVL	WHR
65	2430	1944	2025	1640	1620	1328
60	4860	3888	4050	3280	3240	2656
55	7290	5832	6075	4920	4860	3985
50	9720	7776	8100	6561	6480	5313
45	12150	9720	10125	8201	8100	6642
40	14580	11664	12150	9841	9720	7970
35	17010	13608	14175	11481	11340	9298
30	19440	15552	16200	13122	12960	10627
25	21870	17496	18225	14762	14580	11955
20	24300	19440	20250	16402	16200	13284
15	26730	21384	22275	18042	17820	14612

LEGEND:

- VLT = Ventilation Load – Total
- VLS = Ventilation Load – Sensible
- VLL = Ventilation Load – Latent
- HRT = Heat Recovery – Total
- HRS = Heat Recovery – Sensible
- HRL = Heat Recovery – Latent
- WVL = Winter Ventilation Load
- WHR = Winter Heat Recovery

NOTE: All performance data is based on operating intake and exhaust blower on the same speed.

I-TEC ERV ECONOMIZER VENTILATOR SYSTEM (VENT CODE "E")

General Description

The I-TEC energy recovery ventilator (ERV) economizer ventilator system is designed to provide energy efficient, cost effective ventilation to meet IAQ (indoor air quality) requirements while still maintaining good indoor comfort and humidity control for a variety of applications such as schools, classrooms, lounges, conference rooms and others. It provides a constant supply of fresh air for control of airborne pollutants including CO₂, smoke, radon, formaldehyde, excess moisture, virus and bacteria.

The ERV incorporates rotary heat exchanger technology to remove both heat and moisture. The package consists of unique rotary energy recovery cassettes that can be easily removed for cleaning or maintenance. It has two 15" diameter heat transfer wheels for efficient heat transfer. The heat transfer wheels use a permanently bonded dry desiccant coating for total heat recovery.

The I-TEC ERV is also provided with filters to reduce the required service needed and to extend the life of the heat recovery wheels. The exhaust air blower is protected by disposable filters, and the intake air blower is protected by washable filters. Both are accessible without the need for tools.

Ventilation is accomplished with two blower/motor assemblies for maximum ventilation at low sound levels. The intake and exhaust blowers can be independently adjusted to maintain desired building pressurization conditions. The rotating wheels provide the heat transfer effectively during both summer and winter conditions. Provides required ventilation to meet the requirements of ASHRAE 62.1 Standard.

NOTE: During operation below 5°F outdoor temperature, freezing of moisture in the heat transfer wheel can occur. Consult the factory if this possibility exists.

When the outdoor air is cool, the unit provides economizer operation by stopping the ERV wheels and allowing the cool air into the room when needed.

The ERV economizer is designed to economize in cooling mode when the outdoor temperature is below the outdoor temperature sensor setpoint. This is factory set at 60° F. Above 60°, economizer operation is inhibited. Economizer operation is also inhibited when in heating mode.

Economizer operation consists of disabling the ERV cassette wheels from operating thus bringing in fresh air to the room and exhausting stale air. Since the ERV wheels are not turning, room heat is not recovered and is exhausted from the room. Bard Part #8403-060

programmable electronic thermostat must be used with this vent package because three stages of cooling are required.

Control Wiring

The I-TEC ERV comes wired from the factory ready to operate in manual mode (ON/OFF cycling) and set to 375 CFM of ventilation. Care must be taken when deciding how to control the operation of the ventilator. When designing the control circuit for the ventilator, the following requirements must be met.

1. The indoor blower must be run whenever the I-TEC ERV is run.
2. Select and configure the correct CFM ventilation level that the I-TEC ERV needs to operate and configure the system to this level following later instructions within this section. Over ventilating serves no useful purpose and significantly affects the overall efficiency of the heat pump system. System operating costs would also increase.
3. Run the I-TEC ERV only during periods when the conditioned space is occupied. Running the ERV during unoccupied periods wastes energy, decreases the expected life of the ERV and can result in large moisture buildup in the structure. The ERV removes 60-70% of the moisture in the incoming air, not 100% of it. Running the ERV when the structure is unoccupied allows moisture to build up in the structure because there is little or no cooling load. Thus, the air conditioner is not running enough to remove the excess moisture being brought in. Use a control system that in some way can control the system based upon occupancy.

NOTICE

Operating the I-TEC ERV during unoccupied periods can result in a build up of excess moisture in the structure.

Recommended Control Sequence

Use a programmable electronic thermostat with auxiliary terminal to control the ERV based on daily programmed occupancy periods. Bard markets and recommends Bard Part #8403-060 programmable electronic thermostat.

NOTE: The thermostat must have three stages of cooling.

NOTE: The ventilation package comes with a blower interlock function, but is disabled when it is shipped from the factory in case a thermostat with an occupancy output or occupancy sensor is not utilized and “A” terminal to “G” terminal must be tied to drive the ventilation package. If a thermostat or control does drive occupancy output, remove the tape from the orange wire located in the low voltage terminal box, and connect it to the “G” terminal to activate this function.

Changing Ventilation CFM Rates in Manual Mode



To adjust the airflow ventilation rate, first refer to Table 1 to look up the Flow Index needed for the intake and exhaust blowers for the CFM required. Then, perform the following steps:

1. Open front swinging doors of main unit (by popping front door latches).
2. Throw main power disconnect to the OFF position to eliminate risk of injury or death due to electrical shock.
3. Remove five (5) screws holding front ERV door in place (see Figure 1 on page 6).
4. Remove ERV control panel cover by removing four (4) screws.
5. Locate two 0-10Vdc motor control boards in control panel (see Figure 2 on page 7).
6. On intake motor control board, observing green status light, turn manual adjust potentiometer counterclockwise to increase flow index or clockwise to reduce flow index to match desired setting.

NOTE: After long pause, the green status light will blink long-blinks for the ten count of the flow rate index, then immediately followed by fast blinks which indicate the second digit. For example, a flow index of 23 would be two long blinks, followed by three fast blinks of the green status light.

7. On exhaust motor control board, observing green status light, turn manual adjust potentiometer counterclockwise to increase flow index or clockwise to reduce flow index to match desired setting.

NOTE: Same green status light blink as Step #6.

TABLE 1
ERV “Manual Mode” Jumper Pin on “M” Terminal

CFM	Flow Index (Light Blink Code)
450	100
425	89
400	83
375	76
350	59
325	50
300	40
275	32
250	25
225	12
200	9
175	4
150	1

To adjust the airflow ventilation rate (NO CO₂ CONTROL/NON-MODULATING), determine the flow index needed for the intake and exhaust blowers for the required CFM. Use a small phillips-head screwdriver to make adjustments.

1. Locate two (2) 0-10Vdc motor control boards in control panel.
2. On **intake** motor control board (RH side of control panel), observing green status light, turn manual adjust potentiometer counterclockwise to increase flow index or clockwise to reduce flow index to match desired setting. (**NOTE:** After long pause, the green status light will blink long-blinks for the ten count of the flow rate index, which then is immediately followed by fast blinks which indicate the second digit. For example, a flow index of 23 would be two long blinks, followed by 3 fast blinks of the green status light.)
3. On **exhaust** motor control board (LH side of control panel), observing green status light, turn manual adjust potentiometer counterclockwise to increase flow index or clockwise to reduce flow index to match desired setting. (See **NOTE** in Step 2.)

FIGURE 1
ERV Control Access

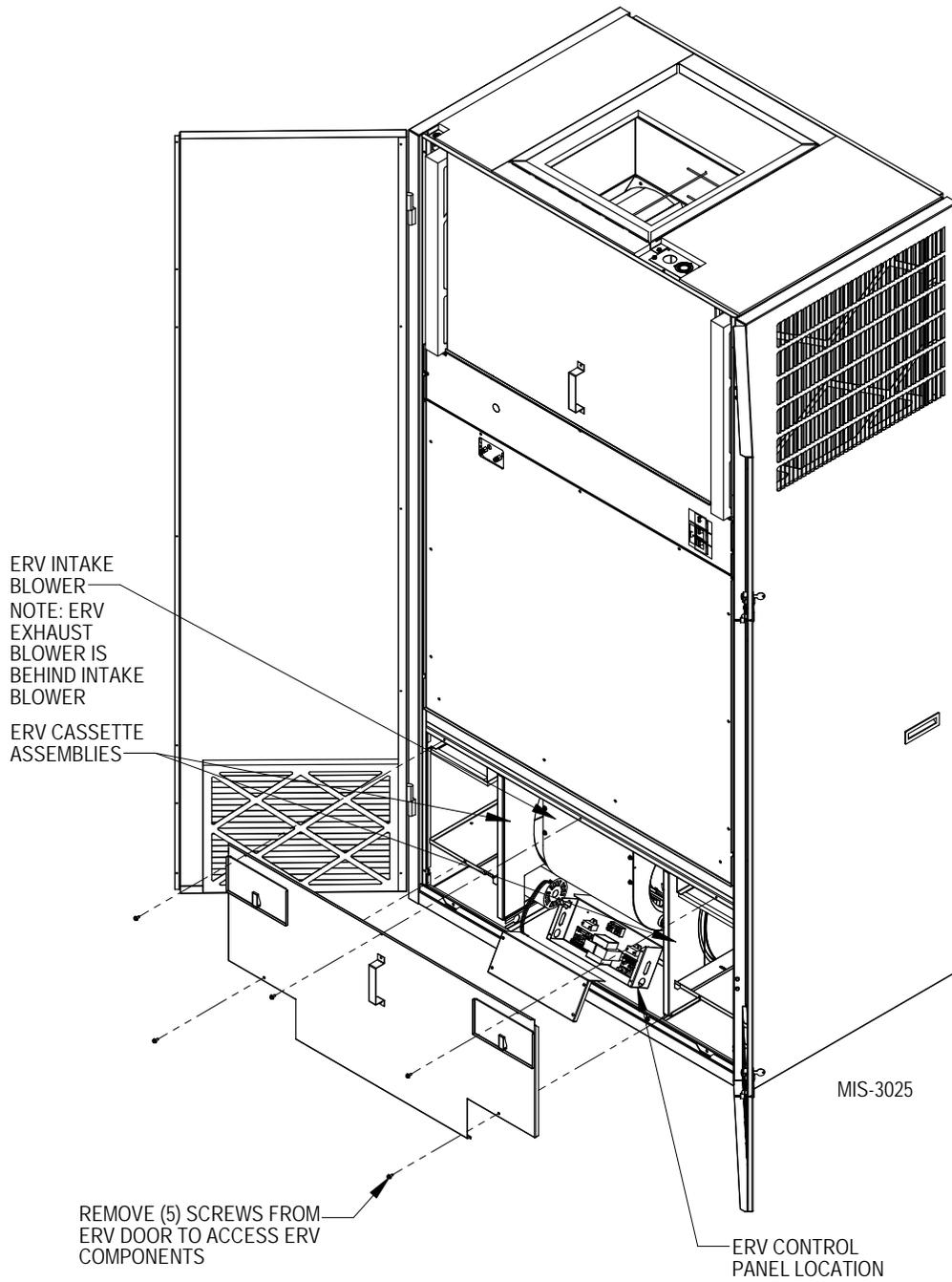
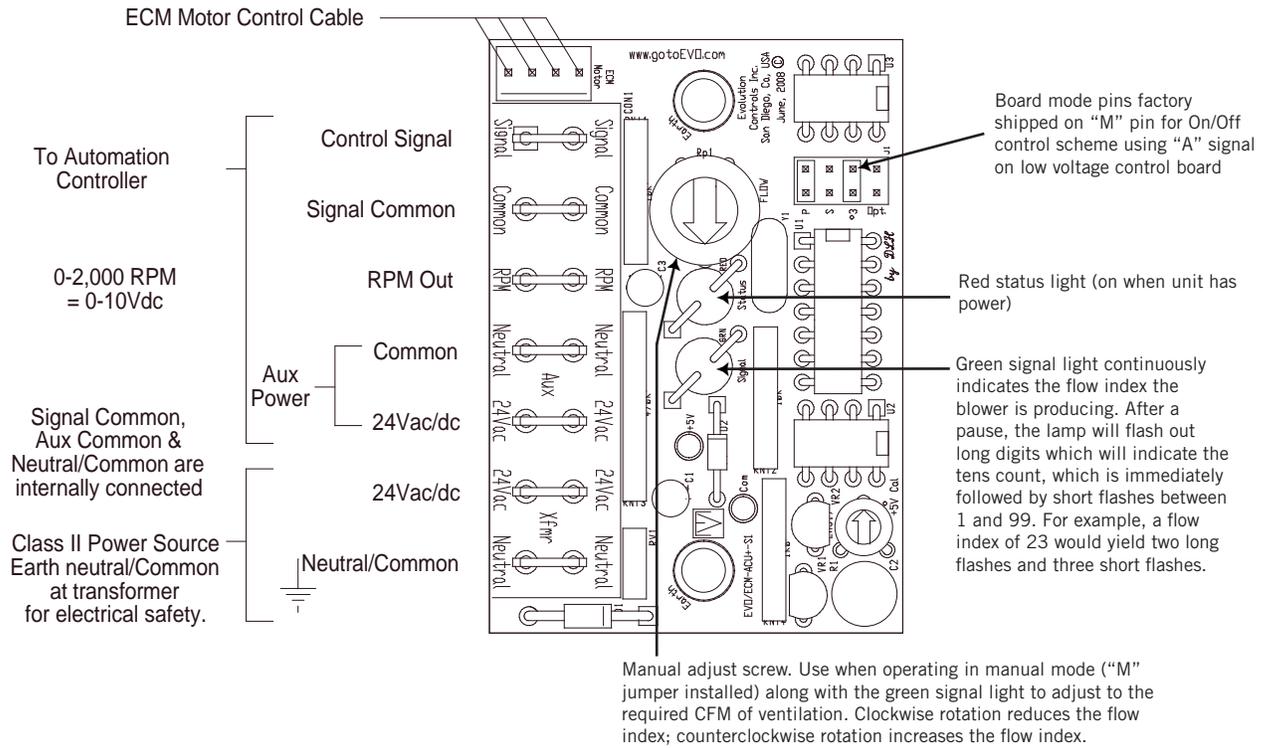


FIGURE 2
Control Board Configuration/Setting



Energy Recovery Ventilator Maintenance

General Information

The ability to clean exposed surfaces within air moving systems is an important design consideration for the maintenance of system performance and air quality. The need for periodic cleaning will be a function of operating schedule, climate and contaminants in the indoor air being exhausted and in the outdoor air being supplied to the building. All components exposed to the airstream, including energy recovery wheels, may require cleaning in most applications.

Rotary counterflow heat exchanges (heat wheels) with laminar airflow are “self-cleaning” with respect to dry particles. Smaller particles pass through; larger particles land on the surface and are blown clear as the flow direction is reversed. For this reason, the primary need for cleaning is to remove films of oil-based aerosols that have condensed on energy transfer surfaces. Buildup of material over time may eventually reduce airflow. Most importantly, in the case of desiccant-coated (enthalpy) wheels, such films can close off micron-sized pores at the surface of the desiccant material, reducing the efficiency with which the desiccant can absorb and desorb moisture.

Frequency

In a reasonably clean indoor environment such as a school, office building or home, experience shows that reductions of airflow or loss of sensible (temperature) effectiveness may not occur for 10 or more years. However, experience also shows that measurable changes in latent energy (water vapor) transfer can occur in shorter periods of time in commercial, institutional and residential applications experiencing moderate occupant smoking or with cooking facilities. In applications experiencing unusually high levels of occupant smoking, such as smoking lounges, nightclubs, bars and restaurants, washing of energy transfer surfaces, as frequently as every 6 months, may be necessary to maintain latent transfer efficiency. Similar washing cycles may also be appropriate for industrial applications involving the ventilation of high levels of smoke or oil-based aerosols such as those found in welding or machining operations, for example. In these applications, latent efficiency losses of as much as 40% or more may develop over a period of 1-3 years.

Cleanability and Performance

In order to maintain energy recovery ventilation systems, energy transfer surfaces must be accessible for washing to remove oils, grease, tars and dirt that can impede performance or generate odors. Washing of the desiccant surfaces is required to remove contaminate buildups that can reduce adsorption of water molecules. The continued ability of an enthalpy

wheel to transfer latent energy depends upon the permanence of the bond between the desiccant and the energy transfer surfaces.

Bard wheels feature silica gel desiccant permanently bonded to the heat exchange surface without adhesives; the desiccant will not be lost in the washing process. Proper cleaning of the Bard energy recovery wheel will restore latent effectiveness to near original performance.

Maintenance Procedures

NOTE: *Local conditions can vary and affect the required time between routine maintenance procedures, therefore all sites (or specific units at a site) may not have the same schedule to maintain acceptable performance. The following timetables are recommended and can be altered based on local experience.*

Quarterly Maintenance

1. Inspect mist eliminator/prefilter and clean if necessary. This filter is located in the fresh air intake hood on the front of the unit. This is an aluminum mesh filter and can be cleaned with water and any detergent not harmful to aluminum.
2. Inspect wall-mount unit filter and clean or replace as necessary. This filter is located either in the unit, in a return air filter grille assembly, or both. If in the unit it can be accessed by removing the lower service door on the front of the unit. If in a return air filter grille, by hinging the grille open to gain access.
3. Inspect energy recovery ventilator for proper wheel rotation and dirt buildup. This can be done in conjunction with Step 2 above. Energize the energy recovery ventilator after inspecting the filter and observe for proper rotation and/or dirt buildup.
4. Recommended energy recovery wheel cleaning procedures follow Steps 5 through 8.
5. Disconnect all power to unit. Remove the lower service door of the wall-mount unit to gain access to the energy recovery ventilator.
6. Remove the front access panel on the ventilator. Unplug amp connectors to cassette motors. Slide energy recovery cassette out of ventilator.
7. Use a shop vacuum with brush attachment to clean both sides of the energy recovery wheels.
8. Reverse shop vacuum to use as a blower and blow out any residual dry debris from the wheel.

NOTE: *Discoloration and staining of the wheel does not affect its performance. Only excessive buildup of foreign material needs to be removed.*

9. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.

Annual Maintenance

1. Inspect and conduct the same procedures as outlined under **Quarterly Maintenance**.
2. To maintain peak latent (moisture) removal capacity, it is recommended that the energy recovery wheels be sprayed with a diluted nonacid based evaporator coil cleaner or alkaline detergent solution such as 409.

NOTE: Do not use acid-based cleaners, aromatic solvents, temperatures in excess of 170° F or steam. Damage to the wheel may result.

Do not disassemble and immerse the entire heat wheel in a soaking solution, as bearing and other damage may result.

3. Rinse wheel thoroughly after application of the cleaning solution, and allow to drain before re-installing.
4. No re-lubrication is required to heat wheel bearings of the drive motor, or to the intake and exhaust blower motors.
5. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.

FIGURE 3
Hub Assembly with Ball Bearings

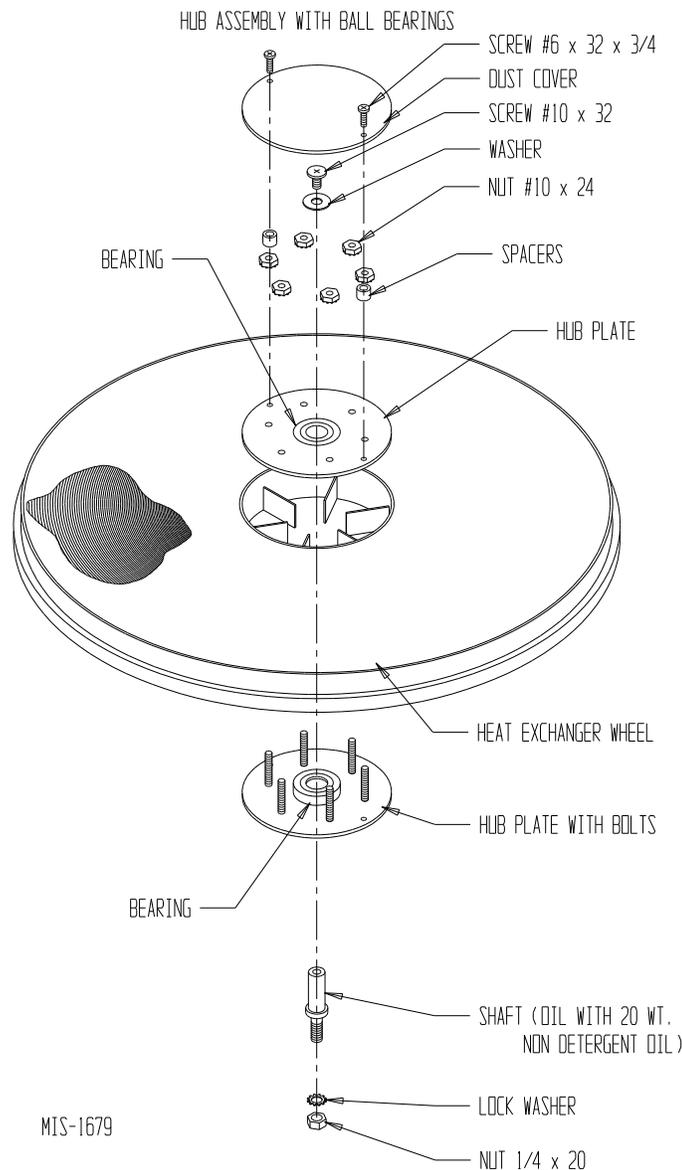


FIGURE 4
Ventilation Airflow Diagram

