

CLIMATE



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p. 9
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p. 8
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p. 9
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p. 7
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p. 8
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Agam Develops world changing energy products leading in the field of energy efficiency related to engines and for air conditioning. Agam Greenhouse Energy Systems Ltd is a privately held Israeli company, founded in 2008, comprised of a highly technical team aimed at continuing product development and providing service and support to distributors and end users worldwide.

Agam VLHC System

The Agam VLHC is a unique & revolutionary Dehumidifying, Filtering & Heating system for all controlled environments. Patented worldwide, the VLHC has been proven to efficiently reduce humidity while neutralizing airborne pathogens such as botrytis. VLHC converts humid air (water & heat) from inside the greenhouse into water vapor by blowing the air through a matrix of desiccant-filled elements in a compact cooling tower. In this process, water vapor is warmed up by the desiccant and this heat is released by the unit into the greenhouse as warm, dry air.

Typical energy-intensive heating & dehumidification systems rely primarily on ventilation, which releases excessive humidity along with the energy used to heat that air. The VLHC dramatically lowers your energy consumption by enabling your operation to remain closed & maintains healthy adjustable humidity levels according to your needs.

- Cleans and filters the air
- Saves 40-70% energy
- Reduces humidity
- Facilitates chemical free and organic agriculture



- Optionally, when heating is un-necessary, the VLHC can provide only little heat, or no heat and little night cooling.
- Recommended coverage area for vegetables 1000 M²
- Recommended coverage area for flowers 1500 M²
- Average Energy saving 70 kW

In this system, vapor condensation naturally warms up the desiccant; the heat is released by the unit into the greenhouse/warehouse as warm, dry air. The VLHC efficiently converts the latent heat, stored in the water vapor, to usable heat, a welcome by-product in cold-climate greenhouses, thus dramatically reducing energy consumption.





Green-tek's powerful and economical line of specialty circulation and exhaust fans improves the growing environment of any building by refreshing stagnant air, reducing temperature, and humidity variations. Green-tek's team of design engineers has developed ventilation components that are energy efficient, quiet, and low maintenance.

High Velocity Basket Fans

Our High velocity basket fan is the most powerful and efficient basket fan available in the market today. Our tapered intake and exhaust guard is designed for optimum performance, maximum air velocity and distance covered. The OSHA approved guard means the fan can be mounted at any height. Our totally enclosed air over motor can be used in the harshest greenhouse environments. The Green-Tek series High velocity basket fans are easy to install and will give years of trouble free service. The ideal spacing is every 50' but call one of our ventilation design engineers for proper sizing of your HAF fan or a recommendation of a Green-Tek complete Greenhouse environmental system.



Ideal Applications

- Exceptional air velocity and throw is ideal for cooling and heat de-stratification in greenhouses.
- Also ideal for people cooling in factories, warehouses, sporting events and animal cooling.
- Air de-stratification in buildings can reduce heating and cooling bills by up to 35%.
- Create a consistent air temperature in greenhouses.
- Insect control when creating a velocity of 300 feet per minute.
- Create an air exchange when placed in a wall.
- Used to change the air in shipping trucks and containers when loading or unloading.
- High velocity air pattern can develop an air curtain.
- Machine and compressor cooling.
- Surface drying for wet floors.

Features

- Standard OSHA safety guards on intake and exhaust.
- Ideal greenhouse spacing 50' but call your Green-Tek ventilation engineer for proper design recommendations.
- Polyester powder coated guards for corrosion resistance
- Versatile wall and ceiling mount pivots 180 degrees and fan can turn 360 degrees.
- Motors are totally enclosed, maintenance free, high efficiency with sealed ball bearing and UL/ULC certified.
- Well balanced and strong blade design for years of trouble free service.
- Industry leading fan efficiency, up to 26 CFM/Watt.



Part #	Size	Drive	HP	Speed	Volt	Ph	AMP	RPM	HZ	CFM @ 0" SP	CFM/WATT @ 0" S.P.	FPM @ 50'	FPM @ 100'	Thrust Efficiency
HVB1211OC	12"	DD	1/10	VAR	115	1	1.0	1725	60	2500/875	16	200	50	-
HVB2013C	20"	DD	1/3	VAR	115	1	3.5	1725	60	6400/2241	17	450	150	-
HVB2412C	24"	DD	1/2	VAR	115	1	4.8	1725	60	8800/3081	18	550	200	12.6 lbs/kw
HVB3612	36"	DD	1/2	1	115/230	1	6.0/3.0	825	60	14000	26	700	350	14.4 lbs/kw

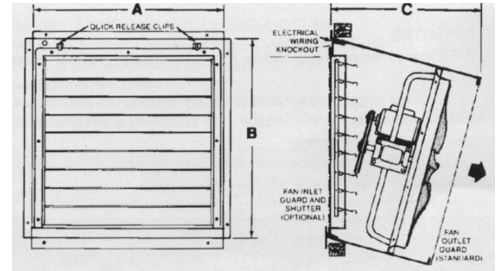
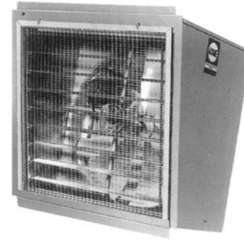
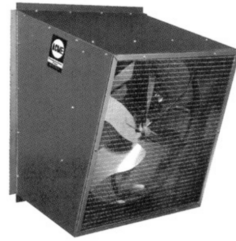


For nearly 75 years Acme Engineering & Manufacturing Corporation has grown to become a world leader in the design, manufacturing, and distribution of fans, blowers, and ventilation equipment. Acme has become an industry leader in providing the customer with a wide range of selections for every possible ventilation requirement. Acme supplies evaporative cooling and heating systems with an excellent line of controls.



Slanted Housing

- Constructed of heavy gauge galvanized steel or aluminum.
- For model DC, DCA, FQ and FN Fans.
- Energy Savings: with inside shutter saves up to 3750 BTU/HR heat loss per fan.
- High Flow Capacity: shutter directs air to fan-select fan at .05" sp instead of .10".
- Weather Protected: Slant arrangement protects motor and drives from elements.
- Outside Mounting: keeps equipment from blocking aisles.
- Assembled to fan for quick, easy field installation.
- Includes 1"x 1/2" guard on outlet side.
- Shutter and inlet guard held in place with quick release clips.
- Wiring knockout included to allow all wiring connections for motor to be made inside the building.



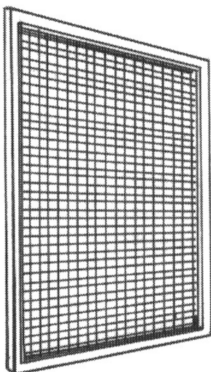
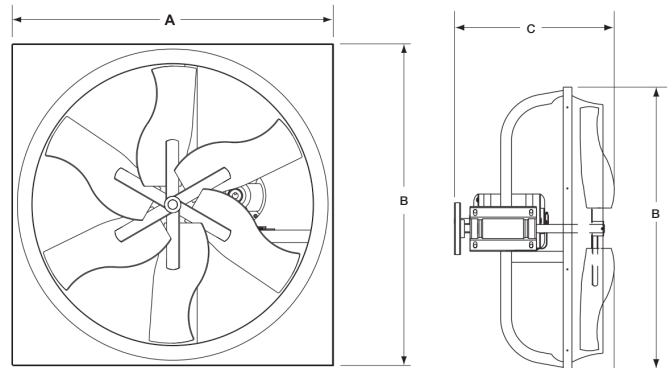
Fan Size	Wall Housing		Auto Aluminum Shutter		Inlet Guard		Inside Framed Opening Dimensions		
	Model	Wt.	Model	Wt.	Model	Wt.	A	B	C
12"	AEWS12FQ	20	AEWAA1515	4	AEGS12	4	16 3/4"	18"	24"
16"	AEWS16FQ	23	AEWAA2020	8	AEGS16	4	21 3/4"	23 1/4"	27"
18"	AEWS18FN	28	AEWAA2222	8	AEGS18	5	23 3/4"	25 1/4"	24"
24"	AEWS24DC	35	AEWAA2727	9	AEGS24	5	28 3/4"	30 3/4"	31 7/8"
30"	AEWS30DC	42	AEWAA3333	13	AEGS30	7	34 3/4"	36 1/2"	34 1/4"
36"	AEWS36DC	46	AEWAA3939	17	AEGS36	10	40 3/4"	42 3/4"	34 1/8"
42"	AEWS42DC	53	AEWAA4545	25	AEGS42	12	46 3/4"	49"	36 3/4"
48"	AEWS48DC	78	AEWAA5454	35	AEGS48	15	54 3/4"	57 1/4"	40 7/8"
54"	AEWS54DC	106	AEWAA6060	40	AEGS54	18	60 3/4"	63 1/2"	39 1/2"

WB Square Wall Housing

- Constructed of heavy gauge galvanized steel.
- For model DC and DCA
- Provides convenient means to install fan and shutter.
- Outside mounting - keeps equipment from blocking aisles.
- Mounting Flanges for attaching to wall and to attach shutter.
- Assembled to fan for quick and easy field installation.

All guards for wall housings have 1" x 1/2" welding galvanized wire in aluminum frame for inlet side of wall housing. Outlet Guards are included on WS wall housings as standard equipment.

Inlet Guards are mounted with quick release clips.



Fan Size	Wall Housing		Auto Aluminum Shutter		Inlet Guard		Inside Framed Opening Dimensions		
	Model	Wt.	Model	Wt.	Model	Wt.	A	B	C
24"	AEWB24DC	30	AEWAA2727	9	AEGD24	5	28 3/4"	28 3/4"	24"
30"	AEWB30DC	36	AEWAA3333	13	AEGD30	7	34 3/4"	34 3/4"	24"
36"	AEWB36DC	38	AEWAA3939	17	AEGD36	10	40 3/4"	40 3/4"	24"
42"	AEWB42DC	40	AEWAA4545	25	AEGD42	12	46 3/4"	46 3/4"	24"
48"	AEWB48DC	70	AEWAA5454	35	AEGD48	15	54 3/4"	54 3/4"	25"
54"	AEWB54DC	96	AEWAA6060	40	AEGD54	18	60 3/4"	60 3/4"	29"



Super Windmaster Fans

DC Series (Steel)

- Six-bladed propeller utilizing a cambered - twist blade designed with a unique dihedral tip for higher air flow capacities at less horsepower.
- Non-overloading design maintains horsepower within catalog range of static pressure, resulting in lower motor load and reduced operating costs.
- Streamlined orifice insures higher air flow capacity.
- Available mounted in either slant or square wall housing.
- Prelubricated oversize ball bearings are double sealed and require no service.
- Improved, more efficient drive assembly and super-duty neoprene balls provides longer service life.
- Heavy duty totally enclosed motors with shielded ball bearings are designed for continuous work load.
- Available in two speed.
- Built in thermal overload for low-line voltage protection on all single phase motors.



Motor Notes

- All single speed single phase motors are dual voltage (115/230) except 1/4 horsepower.
- All 1/4 horsepower single phase motors are single voltage (115 or 230).
- Two-speed motors are single voltage (115 or 230) and not available in 1 1/2 horsepower.
- Low speed capacity of two speed fans is approximately one half of maximum.
- All three phase motors are triple voltage (115/230/460).

Aluminum Wall Shutters

- Corrosion resistant heavy gauge aluminum frame.
- Precision counterbalanced aluminum blades open easier and wider to permit higher fan capacity.
- Nylon bearings throughout are corrosion proof to help prevent sticking.
- Suitable for dusty or humid applications.
- Stainless steel hinge pins will not rust and ensure easy positive blade action.
- All shutter blades are reinforced with polished galvanized steel rods and equipped with double tie-rods.
- Automatic - Used with exhaust fans; opens automatically when fan is on, closes automatically when fan is off.
- Keeps out wind, rain and backdrafts when fan is not in operation.



Single Panel Shutter



Double Panel Shutter

Motorized Inlet Shutters

- New cam pulley operator - provides long life to motor corrosion resistant.
- Motor draws only 17 watts.
- WAAC models are center pivoted to open easier against house static pressures.
- Motors are available in 24v, 115v, 230v, 460v, (Specify Voltage Required).



Motorized Shutter

Replacement Motor and Linkage for Motorized Inlet Shutter

Item Number:

AEMKCAM-115 - Replacement Motor and Linkage 115V

AEMKCAM-24 - Replacement Motor and Linkage 24V

AECAMO115V - Replacement Motor Only 115V

Shutter Model	Overall	Opening	Sq. Ft. Opening	Wt.
AEWAAC1818MT	18 x 18	15 x 15	1.56	10
AEWAAC2626MT	26 x 26	23 x 23	3.67	14
AEWAAC3333MT	33 x 33	30 x 30	6.25	18
AEWAAC4040MT	40 x 40	37 x 37	9.50	22
AEWAAC6318MT	63 x 18	60 x 15	6.25	19
AEWAAC6340MT	63 x 40	60 x 37	15.42	35
AEWAAC6362MT	63 x 62	60 x 59	24.58	52



Acme Turbulator

The Turbulator moves large quantities of air, at low velocities, in a flat cone-shaped pattern that follows the slope of the house roof downward. This provides a uniform airflow over a large area with the least amount of air blasts or dead spots, resulting in a very even heat distribution from the floor to the ridge. Cold or hot spots are virtually eliminated. The existing heating system becomes more efficient and fuel costs are reduced during the cold winter months.

The Turbulator is the perfect solution for destratification of heated air in an open truss poultry house. The Turbulator stir fan design is so unique that no other fan in today's market performs in the same way.

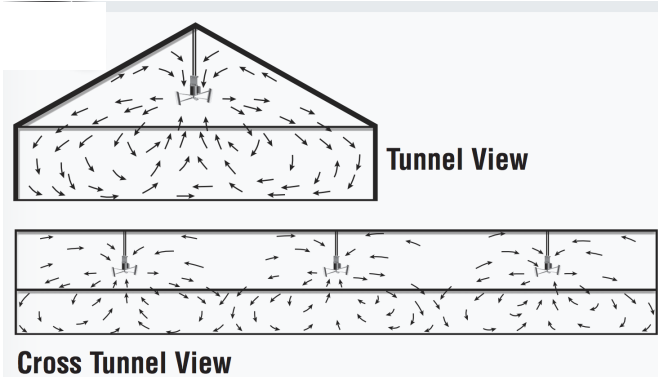


Construction features:

- Welded steel construction
- High efficiency 4 blade impeller
- Impeller safety locked to shaft
- Continuous duty, totally-enclosed motor

Key advantages:

- 360 degree air flow
- No direct air blasts to disrupt animals
- Moves large volumes of air at low velocities
- Even heat distribution from floor to ceiling
- Reduces heating fuel demand
- Drier litter throughout the house



Fans With Light Deprivation (in housing)

- Steel propeller and fan housing are powder coated with the ACME-SEAL Charcoal Gray, which has a high corrosion resistance.
- Steel Light Trap housing powder coated with the ACME-SEAL Solar Matte Black low gloss finish to provide a high corrosion resistance and reduce light penetration.
- Light Trap matte black plastic blades provide high light reduction.
- Six-bladed propeller utilizing a cambered-twist blade, designed with a unique dihedral tip for higher air flow capacities at less horsepower.
- Non-overloading design maintains horsepower within catalog range of static pressure, resulting in lower motor load and reduced operating costs.
- Streamlined fan orifice and light trap baffles insure higher air flow capacity.



- Available mounted in square wall housing for ease of installation and vertical baffles for simple cleaning.
- Utilizing ACME's 5 Year Warranty Duplex Split Pillow Block Shaft and Bearing Assembly.

Performance Data

Fan Model	HP	CFM vs. Static Pressure (inches w.g.)									
		0		0.05		0.1		0.125		0.15	
		CFM	CFM/W	CFM	CFM/W	CFM	CFM/W	CFM	CFM/W	CFM	CFM/W
DC36LTWB	1.0	11985	14.6	11565	13.7	11135	12.9	10918	12.5	10662	12.0
DC42LTWB	1.0	12850	10.9	12275	10.5	11400	9.8	10900	9.4	10375	8.9
DC48LTWB	1.5	20237	12.0	18910	11.1	17351	10.4	16351	9.9	15353	9.4
DC54TLWB	1.0	18538	14.4	17000	13.1	14450	11.6	13200	10.7	12200	9.8
DC54TLWB	1.5	20575	11.7	19250	10.9	17250	9.9	16000	9.4	14800	8.8



Light Deprivation for Fans

- **High Light Reduction**
Black-out tested at BESS Labs at a light reduction factor of 28,000,000:1.
- **Low Air Flow Resistance**
Less area required to maintain good ventilation rates and lower fan operating pressures.
- **High Corrosion Resistance**
Plastic profiles with painted galvanized steel frame provide years of maintenance free service.
- **Low Cost Installation**
Designed to facilitate ease of installation.
- **Streamline Baffles**
Reduces the chance for clogging air passage.
- **Special Application Sizes**
Special sizes for Fan-Jets and perimeter inlets
- **Existing Building Application**
No additional or extra horsepower required
- **Vertical Baffles**
Allows for simple cleaning



Model Number	Height x Width (in.)	Sqaure Feet
LTPF2424	24 x 24	4
LTPF3636	36 x 36	9
LTPF4242	42 x 42	12.25
LTPF4848	48 x 48	16
LTPF6060	60 x 60	25
LTPF6358	62.5 x 57.75	25
LTPF7260	72 x 60	30
LTPF7272	72 x 72	36

Light Deprivation for Inlet Shutters

MODEL LTPF/LTPI

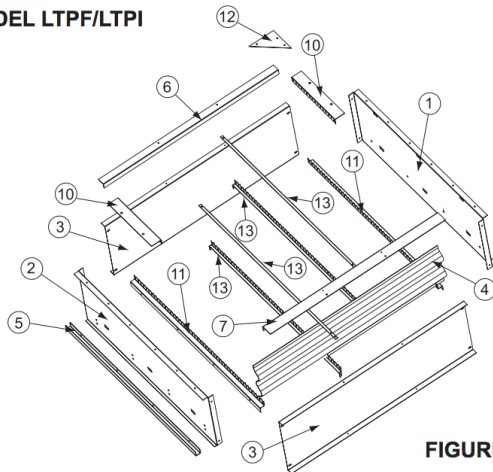
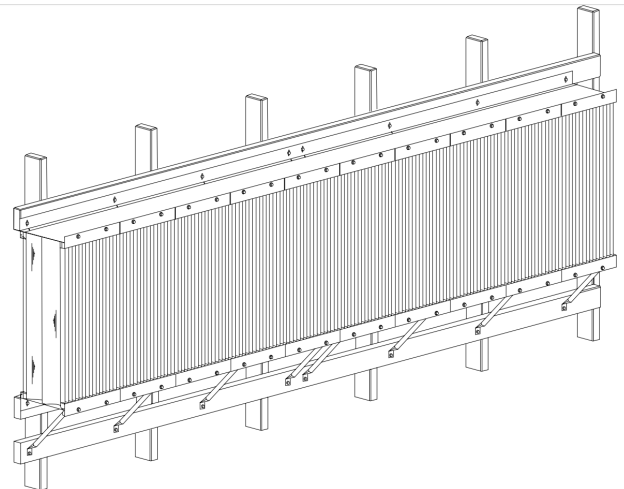


FIGURE 1

Light Deprivation for Continuous Wall Mount



Model Number	Height x Width (in.)	Sqaure Feet
LTPI1818	18.75 x 19	2.47
LTPI2626	27 x 27	5.06
LTPI3333	33.75 x 34	7.97
LTPI4040	40.5 x 41	11.53
LTPI6318	63 x 19	8.31
LTPI6340	63 x 41	17.94
LTPI6362	63 x 63	27.56



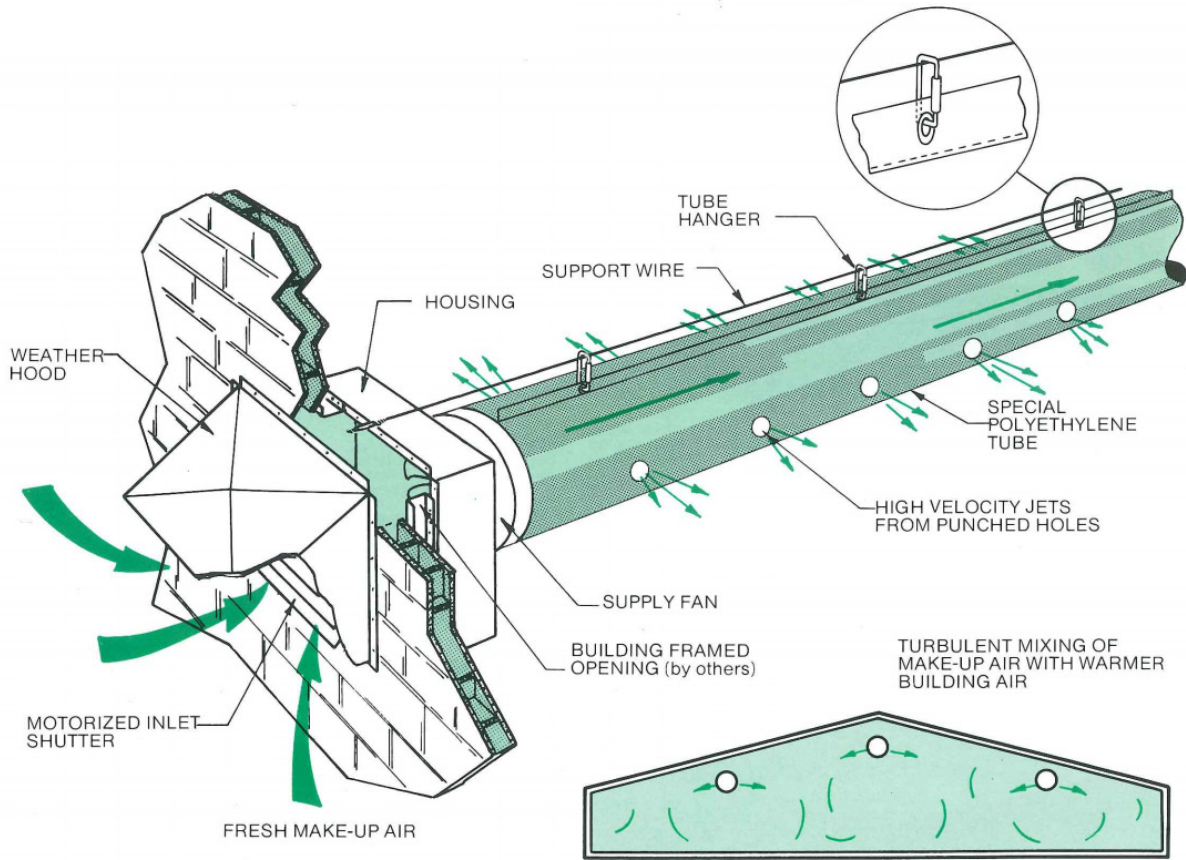


Acme Fan-Jet

Fan-Jet air distribution system is one of the most diversified air moving products ever introduced to greenhouse, agricultural and product storage buildings. It has industrial uses as well as hog, poultry and animal confinement uses.

The Acme Fan-Jet system integrates the movement of air for internal air circulation coupled with inducing fresh air into the building, removal of air through exhaust fans. It also dramatically increases air movement within the building. That is beneficial to growing crops, poultry, hog and animal health as well as providing much needed air circulation among product storage. The Fan-Jet (or fanjet) can be used as greenhouse fans, agricultural fans, poultry fans, hog fans, ventilation fans or general cooling fans. It also works well in a fan and pad cooling system.

The Fan-Jet is a special tube pressurizing fan with curved stationary discharge vanes that recover the rotational energy of discharging air to increase performance capacity and efficiency.



Performance Data

Fan-Jet Model	HP	RPM	Tube Size	System CFM	Motorized Shutter Model	Heat Accessory	Heating Capacity With Heat Kit (BTU/Hr.) Output Heater Temperature Rise of			
							40°	50°	60°	70°
RC12D4	1/8	1725	12"	1180/780	WAAC1818	N/A	N/A	N/A	N/A	N/A
RC18E6	1/4	1160	18"	3120	WAAC2626	HT18	112,000	138,000	163,000	186,000
RC/RCA24F	1/3	735	24"	5420	WAAC3333	HT24	172,000	212,000	250,000	287,000
RC/RCA30G	1/2	607	30"	8550	WAAC4040	HT30	278,000	342,000	403,000	463,000
RC/RCA30J	1	757	30"	10600	WAAC4040	HT30	345,000	424,000	500,000	574,000



Certified CFM vs. Static Pressure (Inches WG)

Fan Model	HP	RPM	CFM	.000" BHP	C/W	CFM	.050" BHP	C/W	CFM	.100" BHP	C/W	CFM	.125" BHP	C/W	CFM	.150" BHP	C/W	Max Static Pressure
DC24E	1/4	662	5280	0.25	18.3	4950	0.25	17.1	4530	0.26	15.5	4235	0.26	14.5	3075	0.25	10.8	.150
DC24F	1/3	735	6235	0.41	14.5	5960	0.41	13.8	5655	0.42	13.0	5475	0.42	12.5	5255	0.42	12.0	.250
DC24G	1/2	820	6960	0.57	12.1	6715	0.57	11.7	6450	0.57	11.2	6305	0.58	10.9	6145	0.58	10.6	.300
DC24G-2S	1/2	763	6475	0.46	14.0	6210	0.46	13.3	5920	0.46	12.7	5755	0.47	12.3	5555	0.47	11.8	.250
DC24H	3/4	949	8055	0.88	9.2	7840	0.88	8.9	7625	0.89	8.7	7510	0.89	8.5	7390	0.89	8.4	.375
DC24H-2S	3/4	875	7425	0.69	10.8	7195	0.69	10.4	6955	0.70	10.1	6825	0.70	9.9	6685	0.70	9.6	.375
DC30F	1/3	529	8475	0.40	20.1	7985	0.41	18.6	7400	0.42	17.0	7010	0.42	16.1	6560	0.41	15.2	.200
DC30G	1/2	607	9725	0.61	15.9	9305	0.61	15.0	8840	0.62	13.3	8570	0.63	13.6	8255	0.63	13.1	.250
DC30G-2S	1/2	546	8745	0.44	19.7	8275	0.45	18.3	7720	0.46	16.8	7365	0.46	16.0	6950	0.46	15.2	.200
DC30H	3/4	686	10990	0.87	12.7	10620	0.88	12.1	10230	0.89	11.5	10015	0.90	11.2	9780	0.90	10.9	.300
DC30H-2S	3/4	647	10365	0.73	14.2	9970	0.74	13.5	9550	0.75	12.8	9310	0.75	12.4	9040	0.76	12.0	.300
DC36F	1/3	431	10255	0.35	28.3	9750	0.36	25.2	8790	0.38	22.3	8300	0.38	20.8	1660	0.39	18.9	.150
DC36G	1/2	495	11780	0.52	22.4	11190	0.54	20.5	10555	0.56	18.7	10200	0.57	17.8	9805	0.57	17.0	.200
DC36G-2S	1/2	463	11015	0.43	25.5	10390	0.45	23.1	9680	0.46	20.8	9265	0.47	19.6	8795	0.47	18.4	.200
DC36H	3/4	575	13680	0.82	16.8	13175	0.84	15.7	12650	0.86	14.8	12375	0.87	14.3	12085	0.88	13.8	.300
DC36H-2S	3/4	511	12160	0.58	21.2	11595	0.60	19.6	10985	0.61	18.0	10640	0.62	17.2	10260	0.63	16.4	.250
DC36J	1	634	15085	1.10	14.0	14630	1.12	13.3	14160	1.15	12.6	13915	1.16	12.3	13665	1.17	11.9	.300
DC42G	1/2	385	14445	0.54	26.5	13550	0.56	24.1	12490	0.58	21.5	11830	0.58	20.1	11110	0.59	18.7	.150
DC42G-2S	1/2	356	13355	0.43	31.0	12385	0.44	27.7	11125	0.46	24.1	10410	0.47	22.1	9610	0.48	20.1	.150
DC42H	3/4	442	16580	0.82	20.4	15815	0.84	19.0	14970	0.86	17.6	14475	0.87	16.8	13915	0.88	16.0	.250
DC42H-2S	3/4	511	15495	0.67	23.4	14670	0.69	21.5	13725	0.71	19.6	13145	0.71	18.6	12520	0.72	17.4	.200
DC42J	1	485	18195	1.08	17.2	17500	1.10	16.2	16760	1.12	15.2	16950	1.14	14.7	15890	1.15	14.2	.300
DC48G	1/2	308	17470	0.55	31.8	16220	0.57	28.4	14650	0.58	24.9	13630	0.59	22.9	12160	0.61	19.9	.150
DC48G-S	1/2	276	15655	0.39	39.5	14230	0.41	34.4	12230	0.43	28.6	10075	0.45	22.1				.125
DC48H	3/4	354	20080	0.83	24.4	19005	0.86	22.3	17795	0.87	20.5	17065	0.88	19.4	16225	0.89	18.3	.200
DC48H-2S	3/4	314	17810	0.58	31.0	16585	0.60	27.9	15080	0.62	24.6	14105	0.62	22.7	12865	0.64	20.3	.150
DC48J	1	382	21670	1.04	21.2	20675	1.07	19.8	19600	1.09	18.3	18980	1.10	17.6	18285	1.11	16.8	.200
DC54J	1	311	25065	0.98	26.5	24030	1.06	23.2	22810	1.12	20.8	21990	1.14	19.7	20305	1.14	18.6	.200
DC54K	1 1/2	344	27725	1.33	21.8	26795	1.41	19.8	25770	1.49	18.1	25160	1.52	17.3	24420	1.54	16.5	.250



Acme Kuul Pad

Cooling pads and evaporative cooling media come in a variety of textures, thicknesses and heights. Most evaporative cooling media is CELdek which is stocked both domestically and in warehouses around the world. The Acme cooling pads and Kuul pads are manufactured and stocked in the U.S.

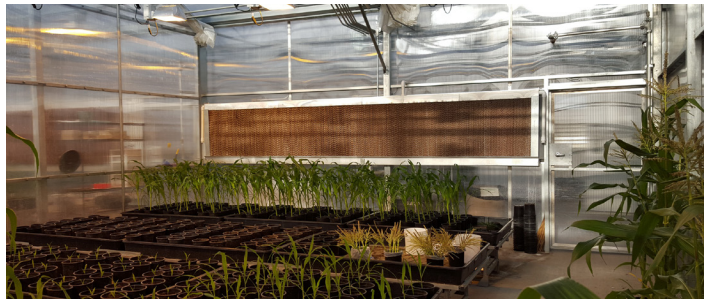
SELECTING KUUL PAD SIZE:

Kuul Pad is most efficient with air velocity of 250 fpm. Therefore, for maximum efficiency add the total exhaust selected and divide by 250 to get the square feet of pad required. Divide the square feet of pad by the available length of run to get the height of Kuul Pad required. Round off to the nearest foot.

The pads are 4" x 12" x 24", 36" and 48". Using the tall pad support, they may be stacked to provide 60", 72", 84" and 96" high pads. The number of Kuul Pad pads required is equal to the length of run.

Select the distribution system that matches the length of run up to 100'. (50' in PDR systems.)

Select the water pump according to the length of the distribution system. Use #15 pumps for systems up to 40', #30 up to 70', and #60 up to 100'.



SELECTING INLET SIZES:

Summer Ventilation and Cooling: The inlet area for Kuul-Pad pads should be continuous and at least 2/3 of the pad height. In no case should the velocity of air inlet for summer cooling or ventilation exceed 400 fpm. Divide total CFM by 400 to get square feet of inlet required.

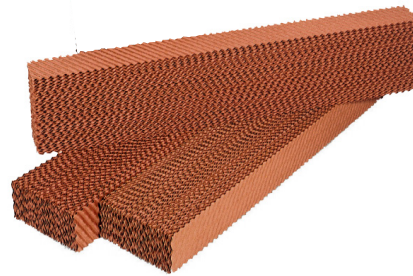
Typical Example:

A 25' x 100' greenhouse located in an area with less than 1000 feet elevation and 5000 f.c. of light. This example is based on 15 degree winter inside temperature above outside temperature and 7 degree rise from pad to fan in summer. Air flow will be end to end and, therefore, fan to pad distance is 100'.

CONTROLS:

Because of non-resident management of greenhouse operations today, automatic controls become a necessity.

If simple one or two step heating or cooling is required, thermostats will satisfactorily operate the equipment. But to conserve energy, staging equipment is recommended to use minimum equipment while achieving desired temperatures.



Kuul Pads Sizes:

- 4x12x24
- 4x12x36
- 4x12x48
- 4x12x60
- 4x12x72
- 6x12x24
- 6x12x36
- 6x12x48
- 6x12x60
- 6x12x72

Kuul Pad Calculations

Calculations

$$\text{Actual Width} \times F_e \times F_i \times F_w = (\text{Equivalent Width})$$
$$25' \times 1.0 \times 1.0 \times 1.0 = 25$$

(25' is less than 30'; therefore, one unit is OK)

$$\text{Winter: } L \times W \times 2 \times F_e \times F_i \times F_w = \text{CFM}$$
$$100 \times 25 \times 2 \times 1.0 \times 1.0 \times 1.0 = 5,000 \text{ CFM}$$

$$\text{Summer: } L \times W \times 8 \times F_e \times F_i \times F_w = \text{CFM}$$
$$100 \times 25 \times 8 \times 1.0 \times 1.0 \times 1.0 = 20,000 \text{ CFM}$$

21,120 CFM Divided by 250 = 84.48 sq. ft.
85 divided by 20 (length of pad) = 4.25 (use 48")

For 6" Pads use 400 instead of 250 for the denominator in the equation.

Winter - See Fan-Jets above
Summer - A balance of both pad height and length of run is required.
21,120 divided by 400 = 52.8 sq. ft.

Equipment Selection

Fan-Jet

1- AERCA24F from chart #1; AEWAAC333MT, 100 feet 24' tube punched "BP". 1-100' support package; 13 hangers and rings (100' divided by 8 = 13); 24" heat accessory if heat is to be distributed by the Fan-Jet.

Exhaust Fans

2 - AEDCA36G fans at .05" SP = 11,065 CFM each, one is 2 speed, (low speed for winter ventilation; therefore select 1 - AEDCA36G and 1 - AECDA36G-2S each with slant wall housing, shutter and guard. (Note 2 spd. max. = 10,055 CFM); (Total CFM = 11,065 + 10,055 = 21,120.)

Kuul Pad System

- 2 - 48" Kuul Pads
- 1 - 20' Distribution and Return System
- 1 - #15 S Pump
- 1 - Plumbing Package

Inlet Shutters

$$4 \times 15.4 = 61.6 \text{ sq. ft.}$$

4- AEWAAC6340MT @ 15.4 sq. ft. each

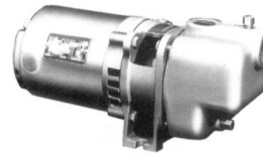


PDR 4 and 6 Kuul Pad Systems

The plumbing package is designed for use with all the pumps for the Kuul Pad systems and includes the necessary plumbing fittings and valve to complete the installation from the sump to the distributor and also contains the water strainer and float valve.

The sump tank cover and tank fittings are furnished by others and should be sized to provide 3/4 gallon per square foot of 4" pad area and 1 gallon per square foot of 6" pad area.

These pumps should be sized to provide 1/2 gallon per minute for 4" and 3/4 gallon per minute of 6" of flow per linear foot of pad to ensure adequate wetting.



These pumps are heavy duty centrifugal, self priming type featuring high volume and low head pressure performance.



These pumps are submersible type with cast iron housing, polypropylene base and polycarbonate cover. They include a lifetime oil supply and non-clog pumping head and impeller.

Model	Type	HP	Voltage	Capacity at 10' Head	Total System Length - 4"	Total System Length - 6"
#30	Centrifugal	1/3	115/230/1	42 GPM	70'	55'
#60	Centrifugal	1/2	115/230/1	55 GPM	100'	80'
#15S	Submersible	1/4	115/1	29 GPM	40'	35'
#30S	Submersible	1/3	115/1	42 GPM	70'	55'
#60S	Submersible	1/2	115/1	63 GPM	100'	80'

Kuul Pad Care

Kuul Pads are very durable and long lasting. To maximize the life of your pads and keep the efficiency of the original installation, correct any conditions that may be detrimental to the pad.

A. Ph of recirculating water (from sump) must be maintained between 6 and 9 (7 is pure water). If these limits are exceeded, the stiffening agents in the pad will leach out and destroy the pad.

B. Hard water resulting in Calcium Carbonate deposits on the pad is not harmful, but should be kept within limits.

C. Sodium Chloride (salt water) concentrate above 50,000 ppm (approx.) will deposit salt on the pad and reduce air flow. Keep salt concentrates below 50,000 ppm in recirculating water and below 40,000 ppm in make-up water.

D. Algae will grow on any surface that is wet and exposed to sunlight. To help prevent algae build up, follow these tips:

1. Do not draw make-up water from an open pond. Use well water or chlorinated water from city systems.

2. Cover the sump to avoid exposure to sunlight and airborne particles, and to keep animals from drinking it.

3. Keep the fans running after the pump is shut off to dry the pads, thus killing the algae spores left on the pad.

4. Isolate the water make up system from any other system.

5. Pads should be shaded from direct sunlight.

E. Airborne dust and bugs do not seem to clog airflow passages of Kuul-Pads. When the system is running this clogging washes away.

F. When Kuul-Pad is installed within reach of poultry or livestock, it should be guarded.

G. Bleed-Off - Since the water is continuously evaporating and being replaced by fresh water, the salts and mineral are left behind in the recirculating water. To reduce build-up of deposits and scale, a bleed off for the recirculating water is provided.

Aspen Pad

Pad roll for easy sizing and shipping. Just cut to size with heavy shears and install same as standard cooler pads.

36" Wide x 24' Long X 1" Thick

Item No. - **AP3624** - 36" x 24"





With over 65 years of industry experience, Schaefer is a leader in the design and manufacture of ventilation equipment for agricultural, industrial and commercial markets. Schaefer is committed to providing the highest quality, highest performing products, backed by industry leading customer service, to exceed customer expectations worldwide.

Schaefer Ultra-Cool Evaporative Cooling Systems

Reservoir: The "Ultra-Cool™" reservoir is constructed of very high UV PVC pipe. The pipe is solid, requiring no cutting. Our unique design is unequaled in the industry.

Supply Line: Our supply line pipe is made of 2" schedule 40 PVC pipe, designed to deliver maximum water supply to the system.

Pump Kit: Our system consists of a Gould Sump Pump, designed for use in many different system lengths. Pumps are available in 110 or 220 volts.

Spray Line: The spray line is constructed of 1-1/4" PVC pipe with holes drilled in line along the top. When water is pumped to the spray line, water shoots out of the holes onto the distribution panel then onto the pads.

Pads: Constructed of cellulose fibers with built-in anti-rot agents. When water flows down the pad, and air is drawn through the pads, the air evaporates some of the water, becoming much cooler. When the water reaches the bottom of the pads, it drips back into the reservoir.



Schaefer Way-Cool Evaporative Cooling Fans

WayCool® portable evaporative coolers use the natural cooling process of evaporating water to reduce temperatures up to 30°F at a fraction of the cost of air conditioning. WayCool blows cooled air in a focused narrow stream at high velocities long distances to provide greater cooling for employees, customers, guests, equipment and livestock both indoors and outdoors!

Features Include:

- U.L. approved, two speed, centrifugal blower is quieter and capable of greater air distribution than the fan blades found in other portable coolers. You'll feel cool air up to 100 feet away.
- High efficiency evaporative cooling pads on all four sides for maximum efficiency in the smallest possible space.
- High impact ABS plastic with UV protection.
- Aluminum frame interior.
- Six position recessed switch for high or low air speeds, with or without evaporation.
- Heavy-duty casters for easy movement.
- Low operating costs - less than 50 cents a day.
- Low maintenance - simply rinse with water.
- Self-contained water tank for stand-alone operation.



Model	H.P.	Volts	Air Velocity	Base	Height	Weight	Discharge Opening	Water Capacity
GAWC-1HP	1	115	55 MPH	33 x 33	52 Inches	155 Lbs	9 x 18	24 Gallon
GAWC-1/3HP	1/3	115	45 MPH	25 x 25	42 Inches	65 Lbs	8 x 15	14 Gallon

A review of weather data from hot weather regions shows that even in the most humid climates, midday relative humidity levels are well within range where WayCool can provide heat relief. Humidity levels may start the day in the 90% range during cool morning hours, but at 90 degrees F and above, it's almost impossible to have humidity levels above 70%.



Schaefer Air Ventilation System

The Features & Benefits of a Plant - Air Ventilation System for Horizontal Air Flow

The engineers at Schaefer Fan Company have been innovators in air circulation technology since 1951. The Plant Air system was created with this experience, vigorously tested and patented. The Schaefer Plant Air Circulation Fan is much more efficient in air-to-energy usage than other fans. The Schaefer guards are wider, with less restrictive wire spacing, allowing for twice the air flow of typical basket fans. The Plant Air fan design spreads air currents to insure efficient air circulation and optimum distribution of mist, fog, CO2, and spray chemicals. The Plant Air fan is no-maintenance. The totally enclosed motor never needs oiling and uses heavy-duty moisture resistant bearings for long life.

Air, light, water...

...you know what it takes to make your greenhouse thrive. Schaefer Plant Air Circulation Fans are your solution to healthy air circulation and healthy plant growth. Use Schaefer Plant Air Circulation Fans to implement Horizontal Air Flow (HAF) patterns throughout the greenhouse. The HAF system places small circulation fans strategically in the greenhouse creating a 'race-track' air flow pattern. This system created with Schaefer Plant Air fans encourages plant performance by:

Reducing humidity and moisture condensation.

- Prevent mildew and disease.
- Encourage healthy plant growth.
- Reduce heat loss from conduction through wet glazing.

Improving carbon dioxide availability:

- Improve photosynthesis by increased fresh air flow across plant leaf surface.
- Lower Levels of additional CO² needed.

Equalizing greenhouse temperature:

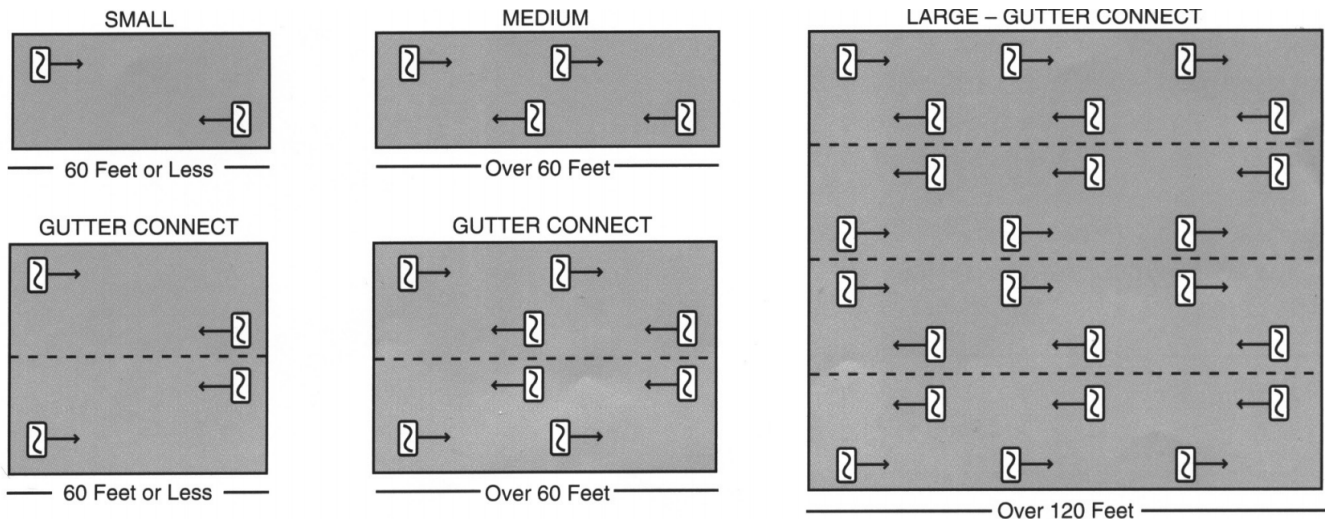
- Eliminate air stratification - moving hot air down from the peak.
- Uniform temperature, lower thermostat settings - save up to 5% in heating costs.
- Reduce burning of exposed leaves, flowers or fruit on warm days.

- Maintain consistent greenhouse temperatures.
- Motor mount provides for each Installation.
- Solid aluminum blades.
- Moisture resistant variable speed motor .
- White vinyl housing prevents shadowing.
- Fan holes are larger than traditional basket fans and provide double the circulation of traditional models.
- The fan's heavy duty bearing motors are maintenance-free and highly energy efficient.
- Noise levels are low-well below OSHA noise level requirements for plant environments.
- The fan mounts closer to the ceiling trusses for more headroom clearance.



Model #	Size	CFM	HP	Volts	Amps	Var. Speed
GAVS12	12"	2,600	1/10	115/230	.9/.45	Yes
GAVS20	20"	6,000	1/3	115/230	3.8/1.9	Yes
GAVS24	24"	8,500	1/2	115/230	4.0/2.0	Yes
GAVS36	36"	11,000	1/2	115/230	6.0/3.0	No

Suggested Placement of Schaefer Plant Air Fans in Single and Multiple Greenhouses



Schaefer Exhaust Fans (Belt Drive & Direct Drive)

Maintain a safe and productive work environment by exchanging hot or contaminated air using Schaefer low cost galvanized, box exhaust fans. These low cost, high volume exhaust fans are protected from the elements with outlet side aluminum shutters and mount in walls of almost any thickness, typically with the outlet shutter flush, or nearly flush with the outside wall. Fans ship fully assembled with aluminum inlet shutters, self-adjusting belt tensioner and galvanized outlet guard.



Features and Benefits:

- G90 galvanized construction, for corrosion resistance / long life
- Totally enclosed, thermally protected motors for safety / long life
- Easy belt replacement, minimal maintenance required
- Remote Lubrication System optional
- Made in the USA
- Suitable for buildings with any wall thickness
- Available in 36" or 48" sizes
- 3-wing or 5-wing blade style
- Two year warranty

Schaefer HAF Fans

Reduce heat stress and improve air quality with Schaefer's uniquely designed circulation fans. Unrivaled in the market, these fans are engineered to produce greater air movement and superior cooling no matter the application. You don't hear them. You don't see them. You only feel them!

Also known as Horizontal Air Flow (HAF) fans, these fans move air in a coherent horizontal pattern creating a gentle 'racetrack' air flow pattern needed in greenhouses to maximize heat distribution and humidity control by mixing the air, from ceiling to floor.



Schaefer Inlets & Shutters

Motorized Inlets

Use Schaefer intakes to ease fresh air into rooms and buildings at your desired rate. Ideal for slower exchange rates and providing make up air to exhaust fans. Louvers are curved for a tight seal when closed and corners are fused together for exceptional strength and durability.

Aluminum Shutters

Shutters control and improve air flow in a single direction and are used to direct air flow to building inlets and exhaust fans.



Schaefer Americ Confined Space Ventilators

When a life is on the line choose the best-in-class ventilator, Americ®. Americ confined space ventilators provide unrivaled performance to ensure safe, controlled and comfortable work conditions in the most extreme environments. Rugged and reliable, many units are still performing great after 15 years.

Features and Benefits:

- Industry leading airflow in all sizes, rated from 750-10,000 cfm
- Dual wall polyethylene housing designed to withstand the harshest of conditions, providing years of durability and dependability
- Premium quality motors rated for over 100,000 hours of heavy duty, continuous use for unmatched return on investment
- Safety tested to UL, CSA and CE certifications, exceeding industry standards
- Provides positive and negative airflow (blows and extracts)
- Lightweight for easy portability
- Stackable to save storage space
- Three year warranty
- Made in the USA

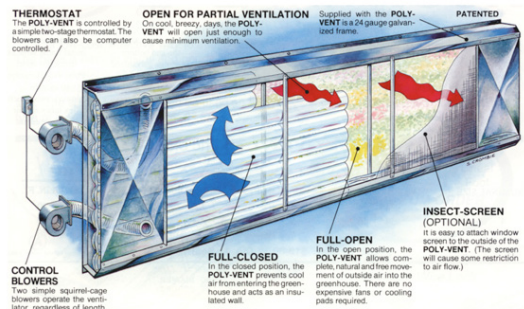




For over 30 years now, Poly-Tex has grown and changed along with the green industry while still holding true to our roots. We believe in the quality and value of our products and continually search for ways to meet the needs of our changing industry. Greenhouse ventilation equipment and ventilation systems can improve the air quality in your structure.

Poly-Vent

With our Poly-Vent ventilation system you'll have an economical alternative to rack & pinion, and you'll save in a host of other ways, too. Save on electrical bills by reducing the use of large fans, save on heating costs because Poly-Vent's dead air space provides an effective layer of insulation, and reduce your maintenance time with fewer moving parts. Able to accommodate most greenhouse sidewalls, our system provides improved water drainage. Choose from single-stage or two-stage options to provide your product with superior ventilation and yourself with savings. The winds of fortune are blowing in your direction.



Poly-Vent II (Single-stage)

Base Frame Includes: Poly-Vent II, top and bottom 24 gauge galvanized Poly-Vent gutter, galvanized front/rear guides and hardware.

Optional Stacking Frame Includes: Poly-Vent II, top and 24 gauge galvanized Poly-Vent gutter, galvanized front/rear guides and hardware.

End Package Includes: Sheet metal enclosures for both ends of frame, one blower to inflate Poly-Vent II, blower mount, one 3-inch diameter flex tube, air transfer gaskets and all hardware.

Sizes: 24" 36" 48" 60"

Poly-Vent III (Two-stage)

Base Frame Includes: Poly-Vent III, top and bottom 24 gauge galvanized Poly-Vent gutter, galvanized front/rear guides and hardware.

Optional Stacking Frame Includes: Poly-Vent III, top 24 gauge galvanized Poly-Vent gutter, galvanized front/rear guides and hardware.

End Package Includes: Sheet metal enclosures for both ends of frame, two blowers to inflate Poly-Vent III, blower mounts, two 3-inch diameter flex tubes, air transfer gaskets and all hardware.

Sizes: 36" 48" 60"

Replacement Poly-Vent Plastic

Sizes: 24" 36" 48" 60"

Poly-Vent Back-Up Blower System

The back-up blower system will keep your Poly-Vent system inflated in the unlikely event of a power outage. Includes adapter plate, control box, DC blower, battery charger w/ auto shut off. (12 volt battery is not included.)

Available for: Poly-Vent II & Poly-Vent III

Replacement Parts



Poly-Vent Blower



Blower Mounting Bracket



Air Transfer Gasket



Flex Tubing



Link4 Greenhouse Controls manufactures software and environmental controls for growers wanting to optimize their greenhouse production and reduce operating costs. We enable our customers to manage every aspect of their greenhouse from the palm of their hand, using state-of-the-art controls that relay greenhouse data to the Cloud where it is accessible on any Internet-connected device.



iGrow 400/800 Series

Get real-time energy use and track run time on greenhouse heating and cooling equipment with this simple, entry-level advanced controller system. iGrow 400/800 offers four (400 Model) or eight (800 Model) different controls for:

- Exhaust Fans
- Pad Pumps
- Pad Louvers
- HAF Fans
- Fan Jets
- Vents
- Shade Curtains
- Unit Heaters
- Perimeter Heating Systems
- Other Equipment



No more programming and reprogramming every crop cycle or season change – with the iGrow 800 series USB data logging feature you can easily save settings to any USB flash drive. When the time comes to switch settings, simply insert your USB flash drive into your iGrow data. These are some of the new and innovative ways Link4 has provided to reduce setup times and reduce your labor costs.

iGrow 400/800 Series Comparison Chart								
Hardware Features	400	400s	400vc	400vcs	800	800s	800vc	800vcs
Outputs	4	4	4	4	8	8	8	8
Programmable Outputs	4	4	4	4	8	8	8	8
Touch Sensitive Interface	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Back-lit LCD Display	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Onboard Memory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Features								
Cooling & Heating Stages	9	9	9	9	9	9	9	9
Daily Set Points	3	3	3	3	3	3	3	3
Humidity Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlled Equipment								
Heaters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cooling Pad	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exhaust Fans	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shutters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HAF Fans	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other ON/OFF Equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Variable Position Vents			Yes	Yes			Yes	Yes
Curtains			Yes	Yes			Yes	Yes
Special Features								
ROI Calculator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Energy Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
USB Connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Simple Graphing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Web Connection		Yes		Yes		Yes		Yes
Advanced Graphing			Yes	Yes			Yes	Yes



iGrow 1000 Series

The iGrow 1000 Series consists of two models: iGrow 1400 and iGrow 1800. Each of the models is based on the same hardware platform but with different microprocessor programs. The models are differentiated by the feature set as described below in the iGrow comparison chart. A standard feature for each controller is the digital temperature and humidity sensor with a radiation shield housing. These precision sensors are very stable and the sensor readings are not degraded by the length of the cable. The 1000 Series iGrow Environmental Controllers can interface with many additional sensor types including a very easy to install weather station. These iGrow's can be networked and linked to a host computer with Link4's iControl software.



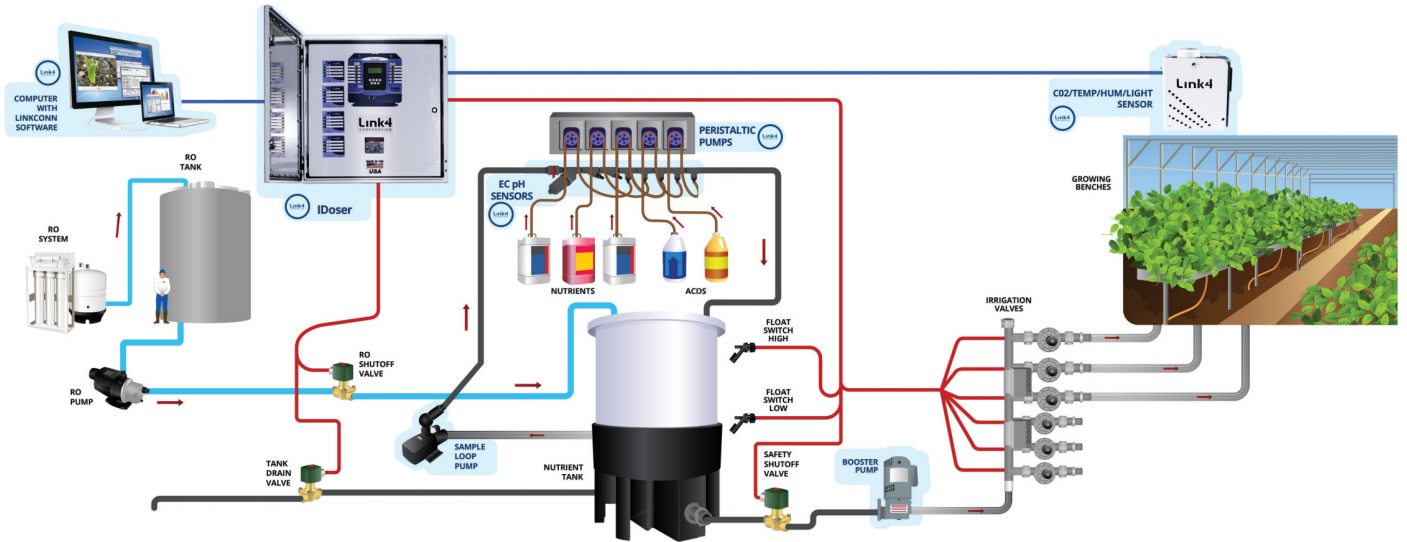
iGrow 1000 Series Comparison Chart

Hardware Features	iGrow 1400	iGrow 1800
Outputs	12	12
Programmable Outputs	12	12
Alarm Outputs	2	2
"Micro" Temp Zones	5	5
Override Switches	Standard	Standard
Control Features		
Cooling & Heating stages	12	12
Daily Set Points	4	4
Humidity Control	Standard	Standard
Controlled Equipment		
HAF Fans	Standard	Standard
Exhaust Fans	Standard	Standard
Cooling Pad	Standard	Standard
Heaters	Standard	Standard
Other ON/OFF Equipment	Standard	Standard
Variable Position Vents	Standard	Standard
Irrigation - Time Schedule	Standard	Standard
Irrigation - Misting	Standard	Standard
Irrigation - Accumulated Light	Standard	Standard
Irrigation - External Trigger	Standard	Standard
Curtains	Standard	Standard
CO2 Control	Standard	Standard
Grow Lights (HID)	Standard	Standard
Mixing Valves	Standard	Standard
Master Pumps	Standard	Standard
Multi-Zone Vents	Standard	Standard
Boiler Control	Standard	Standard
Special Features		
Smart Cool Predictive Cooling	Standard	Standard
Heat Boost	Standard	Standard
Overrides	Standard	Standard
Programmable Overrides	Standard	Standard
Conditional Controls	Standard	Standard
Advanced Master Pump Controls		Standard
Vent Position Sensing		Standard
Anticipatory Heating and Cooling		Standard
Variable Pulse Width Control		Standard
Variable Output Control		Optional
EC and pH Control		Standard



iDoser Automatic Dosing and Fertigation

The iDoser provides accurate nutrient dosing, and pH balancing for many different types of grow environments – from large-scale greenhouses to commercial warehouses and vertical farms. Plus, given that the LinkConn software is database driven, it can be controlled by an enterprise grade server or installed right onto your laptop for optimal control and visibility. The iDoser system can also include up to two backup sensors and logs all activity, so if a problem does occur, you're on top of it before it becomes an even bigger problem. This helps you pave the way for efficient and plentiful growth you can rely on.



iPonic Hydroponic Controller

The original iPonic hydroponic environmental controller enables growers to control a grow environment with Cloud-based access from any Internet-connected computer or smartphone.

Unlike most controllers on the market, the iPonic controller allows you to program all functions together and eliminate multiple controllers for multiple functions – the iPonic does it all: Fuzzy Logic CO2, light timer, temperature, humidity, recycle timers, vent fans, high temperature shut-off, irrigation, central air conditioning and heating – even add your own custom devices. This also means that you can change devices on the fly – add or delete devices to match the equipment in your grow house in minutes.



iPonic Commercial Controller

The iPonic Commercial enables growers to control a single or dual zone – with cloud-access from any Internet-connected computer or smartphone.

Unlike most controllers on the market, the iPonic Commercial controller allows total flexibility using software-based intelligence. This means that you can program all functions together and eliminate multiple controllers for multiple functions – the iPonic does it all: Fuzzy Logic CO2, light timer, irrigation, temperature, humidity, recycle timers, vent fans, high temperature shut-off, central air conditioning and heating – even add your own custom devices. This also means that you can change devices on the fly – add or delete devices to match the equipment in your grow house in minutes.

Controller includes a single (or dual) Digital Integrated Sensor Module (DISM). The sensor measures temperature, humidity, CO2 and lighting.





J&D Manufacturing, Inc. is a manufacturer and international distributor of ventilation system products for dairy, swine and poultry barns as well as horticulture, industrial and commercial applications. Located in Eau Claire, Wisconsin, J&D is a thriving family owned and operated business. We bring together competitive price, unmatched quality and total system solutions.

ES Shutter Fans

J&D Manufacturing's ES Shutter Fan is a durable agriculture grade exhaust fan perfect for barn and building peaks, greenhouses, warehouses and more. ES Shutter Fans are available without a cord, or pre-wired with a cord and plug for "No Electrician Required" installation.

Model #	Size	CFM	H/P	RPM	Volts	Amps	Rough Opening
VSF1285	12"	850	1/12	1600	115	1.4	12 3/8" x 12 5/8"
VSF12115	12"	1150	1/10	1725	115/230	.9/.45	12 3/8" x 12 5/8"
VSF16140	16"	1400	1/10	1725	115/230	.9/.45	16 3/8" x 16 5/8"
VSF16205	16"	2050	1/4	1700	115	2.8	16 3/8" x 16 5/8"
VSF20320	20"	3200	1/4	1700	115	2.8	20 3/8" x 20 5/8"
VFS20450	20"	4500	1/3	1725	115/230	3.75/1.9	20 3/8" x 20 5/8"
VSF24550	24"	5500	1/2	1100	115	6.5	24 3/8" x 24 5/8"
VSF24680	24"	6800	1/2	1725	115/230	4.5/2.2	24 3/8" x 24 5/8"



Intake Shutters - Motorized

Aluminum Power Shutters from J&D are designed to be used as an inlet to bring fresh air into your building, and may also be used for free-air exhaust. All Power Shutters include a shutter motor kit and heavy duty aluminum extrusion frame with welded corners for extra strength.

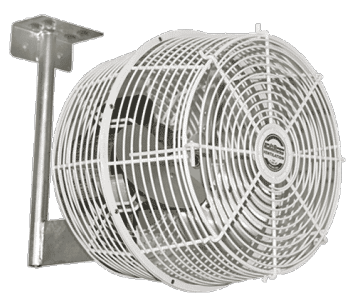
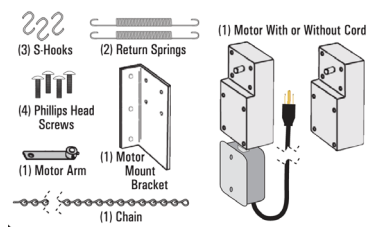
- Aluminum Powered Intake Shutters or free-air exhaust.
- Nylons bearings; solid shafts; drawn cup-type sleeves on all movable linkage.
- Frame of heavy aluminum extrusions with 1/2" channel lock water stop and precision milled corners.
- Interlocking blades for maximum weather seal.
- Double panel units constructed with rigid "T" section center member.

Sizes Available: 12" 16" 18" 20" 24" 30" 36" 40" 42" 48" 54" 60" 75"

Motorized Shutter Kits

- Rugged Heavy Duty Motors
- Easy to Install
- Hardware Included
- Dual Voltage (115/230)

Automate your ventilation system with environmental controls and motorized shutter kits.



Green Breeze H.A.F. Fans

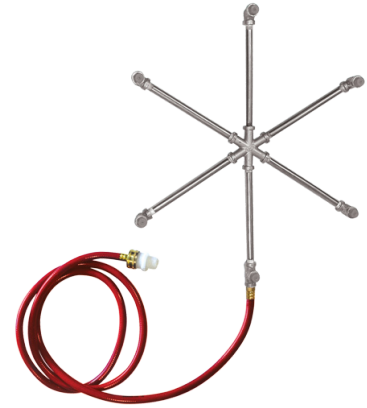
J&D's Green Breeze assists in reducing winter heating costs by efficiently moving air throughout the greenhouse creating a more uniform temperature. Then for overall improved plant health and to harden plants before shipping them to market, reduce the fan speed and adjust the air pattern towards the plants to stimulate hardiness and growth.

Sizes Available: 12" 20" 24"



Misting Systems

When air exchange and fan recirculation is not enough to cool your environment, consider a J&D Manufacturing misting system. Mist kits are available as poly rings or stainless steel crosses with 4 or 6 nozzles. The rigid construction of the stainless steel mist kits keeps nozzles perpendicular to the airflow for a consistent mist pattern. All models come completely assembled with nozzles, hose, and female hose connector. Mist Kits can be easily attached to any recirculation fan guard with cable ties. With low pressure misting, the area surrounding the fan must remain clear in order to provide ample time for the water droplets to evaporate so they do not reform on a solid surface. Whenever you inject moisture into a closed building, you must have a proper air exchange strategy. Contact J&D Manufacturing today to help design an effective cooling system.



Recirculation Fans

As the name implies, recirculation or circulation fans are designed to circulate air throughout your greenhouse or nursery. In the horticulture market, these fans are also called Horizontal Airflow Fans or HAF Fans. The main purpose of air recirculation is to cool and control the climate to produce healthy plants and produce. Recirculation fans keep your building dry by reducing the collection of moisture and condensation during periods of high humidity.

As the leader in air recirculation, J&D Manufacturing offers recirculation fans of all shapes and sizes including Box Fans, Basket Fans, Drum Fans, Ceiling Fans, Pedestal Fans and Funnel Fans for both indoor and outdoor use. Our greenhouse circulation fans range in size from our 12" Green Breeze HAF Fan to our new 60" Indoor/Outdoor Ceiling Fan.

Exhaust Fans

Whether you're looking for a new greenhouse exhaust fan or an exhaust fan replacement, J&D's selection ranges from a 10" ES Shutter Fan to a 50" wall exhaust fan to our brand new 72" Mega Storm fiberglass exhaust fan. Our high performing, low maintenance and low operating cost fans are an excellent way to expel or exhaust the air in your greenhouse. J&D manufactures a complete line of galvanized and fiberglass exhaust fans that are perfect for your building.



Tube Ventilation System

J&D Manufacturing's Tube Ventilation System is a specific method that gently introduces fresh air into enclosed environments without introducing damaging cold drafts. Each system is custom designed for proper airflow.

High Pressure Fog & Cooling

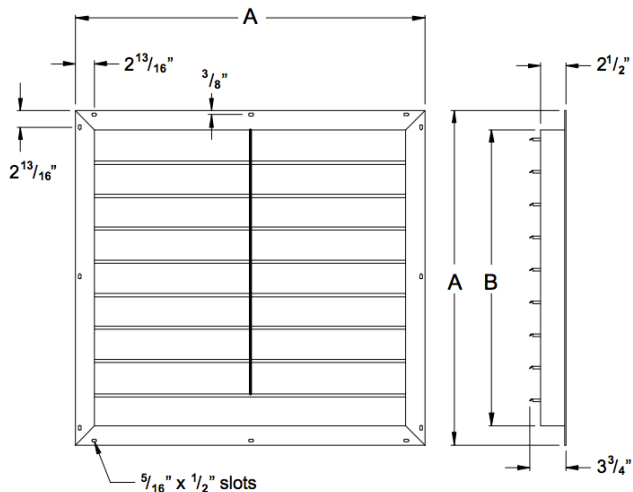
J&D Manufacturing has a variety of evaporative cooling products to enhance Mother Nature's cooling effect in your building or warehouse. Our high and low pressure misting and fogging systems are available as rings or crosses to attach to your recirculation fans, and also as lines of stainless steel tubing to run the entire length of your building.





Today's Coolair products are fabricated in a 210,000 sq. ft. manufacturing complex by employees who value economy and efficiency. Each ventilation system and accessory is crafted with quality materials for durable wear and low maintenance. American Coolair continues to design and manufacture the best, most cost-efficient ventilation products available anywhere.

Coolair Type LRW Shutter (all aluminum)



The LRW Shutter is an all aluminum damper featuring an extruded aluminum frame with interlocking aluminum blades for maximum weather seal. Double panel shutters (LRW45 and larger) are constructed with a rigid 'T' section center member to prevent shutter blades from sticking. The LRW Shutter has nylon bearings on all movable linkage. A sturdy, extruded aluminum tiebar is connected exactly on the blade centers. Double panel shutters feature dual tie-bars (one for each panel). The LRW Shutter can be gravity or motor operated.

Standard Features:

- Aluminum blades
- Extruded aluminum frame
- Aluminum blade brackets and tie bars
- Blades pivot on nylon bushings

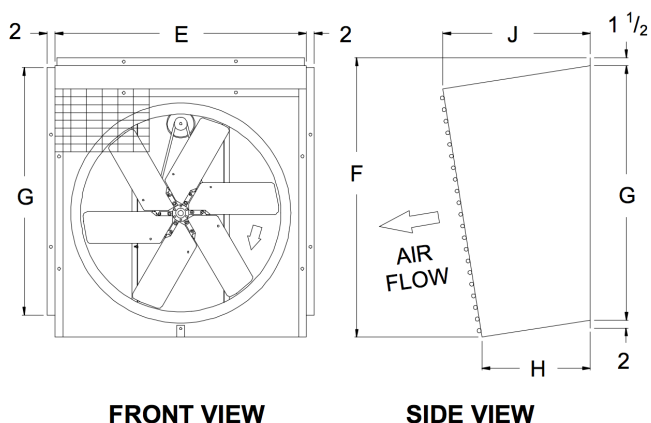
Dimensions:

- Dimension "A" is overall shutter width and height including flanges on all four sides. Width of the flange is 1^{5/8}".
- Dimension "B" is the shutter frame width and height without flanges.

Shutter Model	A	B	Shipping Wt.
ACLRW27	30 1/4	27	12
ACLRW33	36 1/4	33	14
ACLRW39	42 1/4	39	17
ACLRW45	48 1/4	45	30
ACLRW51	54 1/4	51	24
ACLRW57	60 1/4	57	30

*For Net Opening Add 1/2" to I.D.

Coolair Type GSWH (Slope) Wall Housing



The GSWH slope wall housing allows the shutter to be placed on the intake side of the fan and eliminates air turbulence that occurs with the shutter on the down-wind side of the fan. Locating the shutter on the inlet prevents the warm air from being lost through the metal wall housing to the outside cold air in cold climate conditions. The slope wall housing is constructed of galvanized steel for long, durable wear and low maintenance.

Rough Opening: Add 1/2" to E for width and for 2" wall add 3/4" to G for height. 4" wall add 1 1/4" to G for height. 6" wall add 1 1/2" to G for height.

Shutter Model	E	F	G	H	J	Shipping Wt.
ACGSWH24	32 3/8	37 11/16	32 11/16	23 7/8	29 1/16	52
ACGSWH30	38 3/8	44 1/2	38 3/4	23	29 1/16	67
ACGSWH36	44 3/8	50 5/16	44 13/16	22 1/2	29 9/16	82
ACGSWH42	50 3/8	56 5/16	50 15/16	21 3/4	29 11/16	104
ACGSWH48	56 3/8	62 3/8	57	21 5/8	30 1/2	122
ACGSWH54	62 3/8	68 11/16	63 1/16	22 3/4	32 9/16	132



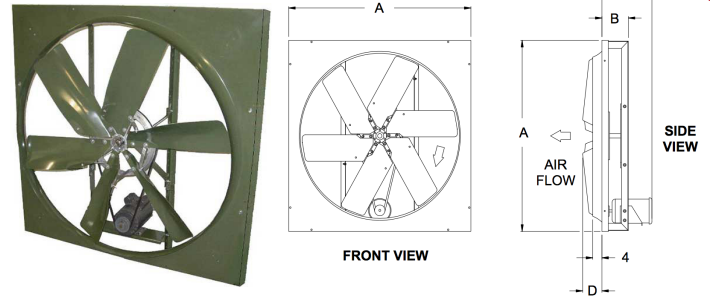
Coolair Type NBF Fans

Economical, Practical, Effective

American Coolair's Type NBF Fan provides the solution to fresh air ventilation in most types of greenhouses. Type NBF fans are built to give you years of heavy-duty trouble-free service. The rugged, belt driven construction operates in any position, has permanently lubricated ball bearings, and is available with single or two speed totally enclosed motors. Coolair has developed a complete ventilation system for greenhouse use combining the Type NBF fan with all aluminum shutter and heavy gauge galvanized steel wall housing (square box or slope) for exterior mounting, allowing a maximum of unobstructed interior space.

Basic Components

Frames are fabricated from heavy gauge steel with all welded construction offering the rigidity and strength for years of quiet trouble-free operation. A wide flared orifice is recessed and welded into the frame. Baked powder epoxy coating.



Fan Model	Blade Dia.	A	B	C
ACNBF24	24	32	10 5/16	17 7/8
ACNBF30	30	38	10 5/16	17 7/8
ACNBF36	36	44	10 1/16	17 3/4
ACNBF42	42	50	9 7/16	17 1/8
ACNBF48	48	56	10 1/4	17 7/8
ACNBFA54	54	62	10 5/8	18 1/4

Performance Data - Type NBF Fan
All specifications subject to change without notice.

Fan Model	Blade Dia.	Motor H.P.	Fan RPM	Shipping Wt.	.05" S.P. CFM	.05" S.P. BHP
ACNBF24G	24"	1/4	627	70	5100	0.248
ACNBF24H	24"	1/3	706	73	5800	0.350
ACNBF24J	24"	1/2	815	79	6760	0.534
ACNBF24K	24"	3/4	972	93	8140	0.897
ACNBF30G	30"	1/4	486	77	7100	0.282
ACNBF30H	30"	1/3	533	80	7890	0.369
ACNBF30J	30"	1/2	627	86	9430	0.594
ACNBF30K	30"	3/4	706	106	10715	0.842
ACNBF36H	36"	1/3	419	100	9840	0.387
ACNBF36J	36"	1/2	474	110	11325	0.554
ACNBF36K	36"	3/4	541	118	13105	0.815
ACNBF36L	36"	1	609	120	14895	1.153
ACNBF42J	42"	1/2	365	122	13070	0.523
ACNBF42K	42"	3/4	433	128	15865	0.860
ACNBF42L	42"	1	474	130	17515	1.121
ACNBF48J	48"	1/2	303	146	16250	0.589
ACNBF48K	48"	3/4	350	152	19240	0.904
ACNBF48L	48"	1	373	154	20665	1.092
ACNBFH48L	48"	1	396	154	22080	1.304
ACNBFA54L	54"	1	350	280	23060	1.027
ACNBFA54M	54"	1 1/2	414	296	27780	1.681

Coolair Motorized LRW Air Inlet Shutters

The LRW Air Inlet Shutter is designed to be used on opposite sides or ends of buildings. It features a sturdy aluminum frame, aluminum blades, aluminum reinforcing brackets and nylon bearings on all movable linkage. The LRW Air Inlet Shutter is fully automatic and comes standard with a motor to automatically open and close shutters.

Replacement Motor and Linkage

Item Number:

ACAM115V
Replacement 115V

ACAM230V

Replacement 230V

AEDM

Replacement Motor Only

Model	Air Flow Capacity CFM	Required Opening	Tot. Dim. w/Flange
ACLW16E	1,000	17" x 17"	19 1/4" x 19 1/4"
ACLW21E	1,800	22" x 22"	24 1/4" x 24 1/4"
ACLW27E	3,000	28" x 28"	30 1/4" x 30 1/4"
ACLW33E	4,500	34" x 34"	36 1/4" x 36 1/4"
ACLW39E	6,300	40" x 40"	42 1/4" x 42 1/4"
ACLW45E	84,00	46" x 46"	48 1/4" x 48 1/4"
ACLW51E	10,700	52" x 52"	54 1/4" x 54 1/4"
ACLW57E	13,400	58" x 58"	60 1/4" x 60 1/4"
ACLW4527E	5,000	46" x 28"	48 1/4" x 30 1/4"
ACLW4515E	2,800	46" x 16"	48 1/4" x 18 1/4"
ACLW6015E	3,700	61" x 16"	64 1/4" x 18 1/4"
ACLW6024E	6,000	61" x 25"	64 1/4" x 27 1/4"
ACLW6036E	8,900	61" x 37"	64 1/4" x 39 1/4"



Wadsworth Control Systems is a third generation family-owned business. The talented and dedicated team at Wadsworth is a key element to the company's success and growth. The people of Wadsworth, working with our network of resellers interface with growers of all types to offer a high level of knowledge and expertise, seeing projects through to a smooth and well-executed completion.

Wadsworth Controllers

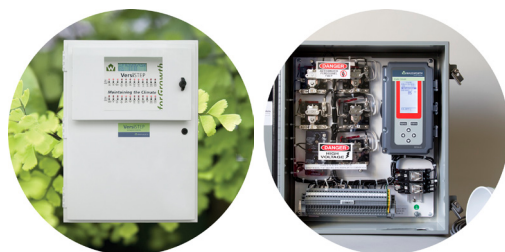
Integrated Controls

- Highly capable, designed to accommodate any growing situation, large or small.
- Manages light, CO2, irrigation, outdoor sensors
- Graphing, data logging,
- Each piece of equipment has individual settings, allowing it to act independently with greater efficiency.



Staged Controls

- Staged controls respond to changes in greenhouse temperature by activating groups or stages of heating and cooling equipment.
- The groups of equipment respond collectively to drive the temperature to the desired value.
- As the temperature moves further from the that value, additional stages of equipment engage.



Features	Staged Controls		Integrated Controls		
	MiniSTEP	STEP UP	EnviroSTEP	VersiSTEP	SEED
Number of zones	1	1	1	1 - 8	1 - many
Number of outputs or stages	4 stages 1 heat & 3 cool	6 stages 2 heat & 4 cool	12 outputs	24 outputs	12 - 24 expandable to many with Seed I/O
Setpoint Periods	2 setpoint periods	Day, night, DIF	Day, night, DIF	Day, night, DIF	4 setpoint periods
Ramping	No	Yes	Yes	Yes	Yes
Include sensors & cables	Temperature Probe with solar shield	Aspirated temp sensor; Options RH sensor	Aspirated & RH sensors; Additional sensors available	No	No
Manual Override	No	Yes	Yes	Yes	Yes
Display	Backlit Screen with current status	New bright screen with full menu & LED lights	New bright screen with full menu & LED lights	New bright screen with full menu & LED lights	Highly responsive touchscreen with Graphic User Interface
Logs & graphs	No	Yes temp only	Yes	54 3/4"	Yes
Equipment it controls	Heating & Cooling	Heating, cooling, vent & energy curtain	Virtually any equipment	Virtually any equipment	Virtually any equipment
Light Dep	No	No	Yes	Yes	Yes
Variable speed & modulating equipment	No	Yes	Yes	Yes	Yes
Track Daily Light Integral	No	No	No	No	Yes
Factors in outdoor humidity	No	No	No	No	Yes
Light control	No	No	Yes	Yes	Yes
Mist control	No	No	Yes	Yes	Yes
Integration control	No	No	Yes	Yes	Yes
CO2 control	No	No	Yes	Yes	Yes
Increments vents	No	Yes	Yes	Yes	Yes
Optional equipment	Weather Guard	Weather Guard Step Up Compass software Alarm Manager Lightning Protector	Weather Station STEPsaver software Alarm Manager Sensors: soil temp, light, hot water, CO2 Lightning Protector	Weather Station STEPsaver software Alarm Manager Sensors: soil temp, light, hot water, CO2	12-output Seed I/O Expansion Eather Station Alarm Manager Sensors: soil temp, light, hot water, CO2
Complete package	Contractor panel Solar shrouded temp sensor 75' cable Custom blueprints required	Aspirated temp sensor 100' of cable Override of Contactor Panel	Includes aspirated temp & RH sensor 100' of cable		

Wadsworth Ventilation Products



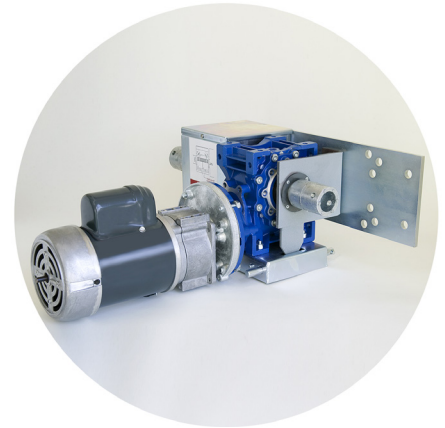
Drive Units

VC 2000 Vent Drive Unit

- Gear motor: 1/5 HP – 115V; 60Hz; 2.5amps – TEFC
- Ball bearing motor with copper windings – Class B insulation
- Gear reducer: total reduction 1350:1; 1.2 and 3 RPM final output
- Output torque 1500 inch lb / 169 Nm
- Lifts up to 325' of 4' polycarbonate roof ridge vent or 400' of 4' polycarbonate side vent

VC100A Vent Drive Unit

- Gear motor: 1/20 HP – 115V; 60Hz; 0.68 amps – TENV
- Ball bearing motor with copper windings – Class B insulation
- Gear reducer: total gear reduction 1900:1; 0.85 and 2.5 RPM final output
- Output torque 500 inch lb / 56 Nm
- Lifts up to 75' of 4' polycarbonate roof ridge vent or 125' of 4' polycarbonate side vent



Vent Controls

LST Lead Control:

This vent control moves the vent from full open to full close. It relies on the environmental control to send a signal to move incrementally.

2R Follower Control:

This vent control is a follower control. It requires either the LST or Versatile Vent as a lead control.

Versatile Vent:

Operates any motorized greenhouse vent-roll-up or retractable roof system incrementally. Opens proportionally with a computerized control.

Rack & Pinion

The rack and pinion connects the vent to the drive unit shaft. As the drive unit turns the shaft, the rack pushes the vent open or pulls it closed.

Features

- Zinc pinion gear with shoulders to bear the weight and extend the life of the gear
- Easy alignment: racks work even with vent is not square
- Freedom from corrosion – stainless clevis pins, cotter pins, set screws, cast sash brackets and tough Nylatron bearings
- Holes in pinion housing are punched with stamping tool to maintain exact spacing
- The PowerRack arm and housing are manufactured using aluminum alloy for strength and freedom from corrosion
- Wide load-bearing surfaces
- Replaceable parts





In 1986, Total Energy Group founders Peter Stuyt and Bert Neeft settled in Carpinteria CA, a thriving community of greenhouse flower growers. Bringing Dutch greenhouse technology and expertise to the area, they started installing light deprivation and shade systems for growers looking to automate and save energy. Working with growers, greenhouse manufacturers and distributors, has driven flexibility and innovation.

Light Deprivation Systems



Complete black out provided by Total Energy Group's fully automated Light Deprivation Systems.

You can expect our light deprivation systems to make your crop flower reliably, securing the steady production flow modern greenhouse operations want. Our systems can be engineered to fit a wide range of greenhouse types and styles.

Shade Systems



Sun protection and energy savings provided by Total Energy Group's fully automated Shade Systems

During the day time our systems will protect your plants from receiving too much light and heat, creating a growing environment in which your crop will thrive. At night closing the system will save on nighttime heating costs by containing the heat underneath the shade cloth.



Holland Heater guarantees the quality of the whole installation and leaves simple box-shifting to others. An optimal greenhouse climate is the ultimate aim and your heating installation is an essential part of this. Numerous factors play a role in a good heating plan. Holland Heater can offer you optimum advice about the heating options in your commercial greenhouse thanks to its many years' experience and expertise.

Holland Heaters

Holland Heaters are very efficient direct fired units. Due to their clean burning, all the heat can be sent directly into the greenhouse. There is no need to use a chimney or exhaust stack. Because of this they are 99% fuel efficient. The largest unit available has a capacity of 440,000 BTU. Because there is minimal heat loss, less units will be needed to heat your greenhouse.

The heater has an air throw of 150 ft, convection tubing should not be used. In addition there is no need for a chimney or a support frame. The heater can be hung directly from trusses. Installation is therefore quite simple. With 220V, 1 phase power and a natural gas line with 5 lbs. pressure available the heater can be placed anywhere in the greenhouse. Propane heaters need between 7 and 35 PSI . CO2 enrichment is an added value for the Holland Heater. Since all the heat stays in the greenhouse, the CO2 produced by the unit will go directly to the crop, boosting and strengthening the growth of the plants. The heater is equipped with a fresh air intake unit. It will bring in air from outside the greenhouse to the burners to avoid reburning the air inside the greenhouse. The heater is also efficient in electrical power use. The largest unit is rated at only 4 amps.

All models have intergraded connections for both a thermostat and a computer.



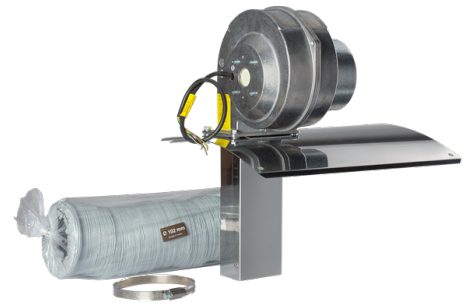
Ventilators

Our greenhouse ventilators are famous for their high levels of air movement and low levels of noise. We offer several different models. They are all equipped with adjustable speed motors. The low RPM fans are very quiet. They are specially designed to distribute the air at a low RPM. They are very efficient in power consumption. The largest unit is rated at only 1.5 Amps.

The energy-efficient CAF45 recirculation fan brings air flow to the greenhouse. This gentle air movement doesn't just have a drying effect on the crops, which reduces the risk of illness; it also leads to an even temperature distribution in the greenhouse. This creates balanced growth for your crops. The fan speed can be regulated so you can control the air flow speed.

Fresh Air Intake Unit

The fresh air intake is always supplying the heater with outside air for combustion. We supply a roof or sidewall hose connector that is connected to the duct hose. The other end of the hose connects to the heater. This unit is installed to avoid reheating the air inside the greenhouse. All models have intergraded connections for both a thermostat and a computer.



Holland Heaters are known for their economical and clean operation.

CO2 enrichment is an added feature of the Holland Heaters.

All models have integrated connections for both thermostat and computer.

The use of the latest technology guarantees extreme environmental friendliness and low noise levels.



With over 100 years of experience, Modine is one of the most trusted names in the HVAC manufacturing industry. That's because, no matter what your heating and air conditioning need is, we make it our mission to ensure that we get the solution right for you. Whether it's a custom-engineered product or service after the sale, our number one goal is to give you a heating and air conditioning partner who is easy to work with, while delivering a customer experience that is second to none.

Modine High Efficiency II Gas-Fired Unit Heaters - PDP Models

The PDP (propeller) Modine High Efficiency II gas unit heater is a new generation of product that is inexpensive to install, easy to use, and offers excellent economy. First and foremost, these heaters have a thermal efficiency of 80%, and with the use of a power exhauster the seasonal efficiency is maximized.

The power exhauster supplied on Modine's PDP heaters can be rotated 180°, venting can be either vertical or horizontal, it is certified for use with Type B double wall vent pipe and is designed to use the smallest diameter vent pipe possible (and still accomplish Category 1 on all vertical vents), thus minimizing installation costs. In addition, the BDP line of heaters is certified to operate against up to .5 inches of external static pressure.

The PDP models have standardized on a 100% shut-off, intermittent pilot ignition (IPI) system with continuous retry on all IPI ignition systems. And because this ignition type is standard, all PDP heaters can be field converted to propane if desired. Also standard is a safety pressure switch that assures proper venting conditions. Another feature of the PDP is a field adjustable level hanging mechanism offered at no extra charge.

At 65 degrees ambient and unit fired at full rated input. Mounting height is measured from floor to bottom of unit.

Available in: Natural Gas Aluminum, Natural Gas Stainless Steel, and Propane Aluminum.



Features:

- 80% Thermal Efficiency
- Rotating Power Exhauster
- Horizontal or Vertical Venting
- Field Convertible to Propane
- Field Adjustable Level Hanging

Performance Data for Model HD and PDP High Efficiency Heater Units

	Model HD Sizes						Model PDP Sizes						
	30	45	60	75	100	125	150	175	200	250	300	350	400
Btu/Hr Input .	30,000	45,000	60,000	75,000	100,000	125,000	150,000	175,000	200,000	250,000	300,000	350,000	400,000
Btu/Hr Output .	24,000	36,000	48,000	60,000	80,000	100,000	120,000	140,000	160,000	200,000	240,000	300,000	320,000
Entering Airflow (CFM) @ 70°F	505	720	990	1160	1490	1980	2180	2550	2870	3700	4460	4870	5440
Air Temp. Rise (°F)	44	46	45	48	50	47	51	51	52	50	50	53	54
Max. Mounting Height (Ft.) .	10	10	12	14	12	16	16	17	15	19	21	20	19
Heat Throw (Ft.) @ Max Mtg Ht .	25	27	36	38	42	56	55	59	51	67	74	70	69

Hot Dawg HD Models

- Certified for residential, commercial and industrial use.
- Whisper-quiet, vibration-free operation.
- Attractive low-profile design and neutral paint scheme assure that Hot Dawg will blend into any garage decor.
- Durable polyester-powder paint maintains life-long good looks.
- Power exhaust simplifies side-wall or roof venting with small-diameter vent-pipe.
- Versatile design allows for right or left-hand piping and installation.
- Lightweight, easily installs from ceiling with only 2 angle brackets (included).
- Installs quickly and easily with field wiring connections and knockouts for quick access to gas and electricity.
- Designed for natural gas or propane gas.
- Sealed, permanently-lubricated motor for trouble-free dependability.



These heaters are the most common greenhouse heaters installed. All Modine Heater Models are available from American Clay Works & Supply Company. Please contact a sales representative if you have any questions about other models.



Modine Effinity93 93% Efficient Unit Heaters

Modine's Effinity93 (model PTC) condensing unit heater line is the most efficient gas-fired, condensing unit heater in North America.

With six models available — from 135,000 to 310,000 BTU/hr — all operating at 93% efficiency, the Effinity93 will dramatically lower your energy costs through decreased fuel consumption.

What does the Effinity93 mean for you and your operation?

- Substantial energy savings each heating season
- A 'greener' greenhouse and a reduced carbon footprint
- A smart investment that produces substantially lower energy bills, providing a respectable ROI



	Model Number					
	PTC134	PTC155	PTC180	PTC215	PTC260	PTC310
BTU/hr Input	135,000	155,000	180,000	215,000	260,000	310,000
kw	39.6	45.4	52.7	63	76.2	90.8
Thermal Efficiency	93%	93%	93%	93%	93%	93%
BTU/hr Output	125,550	144,150	167,400	199,950	241,800	288,300
kw	36.8	42.2	49	58.6	70.8	84.5

Once again, Modine raises your comfort level with the new, Effinity93 high-efficiency, condensing unit heater.

- Fuel Savings — At 93% efficiency, Modine's Effinity93 line is the most efficient condensing unit heater in North America. Combined with the added benefit of separated combustion, this allows you to save those otherwise wasted energy dollars for yourself. Dependable and Consistent
- Performance — Thanks to Modine's Conservicore technology, acidic corrosion concerns are eliminated, extending the life of your investments.
- Gentle Air Circulation and Even Temperatures — The Effinity93 guards against mold and maintains uniform wall-to-wall temperatures with consistent air circulation.
- Safer Growing Environments — Harmful combustion fumes are vented outside, away from plants.
- American-Made Quality — For more than 90 years customers like you have counted on Modine to stand by its workmanship. All products are still proudly made in the USA.

Annual Gas Savings From Two Effinity93 Models Versus Comparable Power-Vented and Gravity-Vented Gas Fired Unit Heaters*

City	PTC215		PTC260	
	Power Vented	Gravity Vented	Power Vented	Gravity Vented
Boston, MA	\$1,501	\$3,362	\$1,815	\$4,066
Chicago, IL	\$1,619	\$3,627	\$1,958	\$4,386
Dallas, TX	\$452	\$1,013	\$547	\$1,225
Louisville, KY	\$1,319	\$2,954	\$1,595	\$3,572
Minneapolis, MN	\$1,301	\$2,914	\$1,573	\$3,524
Portland, OR	\$810	\$1,814	\$979	\$2,194



*Savings are realized by comparing the Effinity93 BTU/hr output to 78% seasonally efficient power-vented and 65% seasonally efficient gravity-vented unit heaters. Costs were determined by applying appropriate degree days at 65 degrees indoor design temperature under full year, 24/7 operation to each city's 2008 average price/therm of gas.

As you can see, just one Effinity93 can save you thousands of dollars in any given heating season versus a noncondensing unit. And when you factor in multiple units, it is not difficult to imagine the positive impact it can have on your bottom line. Rated with the highest average efficiency of any gasfired unit heater line in North America, Modine delivers the green in your greenhouse.



Since our 1980 inception, we have been at the forefront of heating solutions for rugged environments. From initial consultation to installation, BioTherm's staff is with you every step of the way. Whether through new construction, major upgrades, or retrofits, our systems are durable and efficient—resulting in high success rates and peak crops. You can always depend on BioTherm. Our team is committed to bringing growers innovative solutions that work as hard as they do.

Raypak Boilers

BioTherm is the exclusive dealer for Raypak® boilers in the greenhouse market. Raypak continues to contribute to the category with innovations and efficiencies. They added condensing heat exchangers to extract almost every available BTU from the fuel. They scaled the technology into industrial capacities (4,000,000 BTU/HR with the RayPak® XTherm™) and also scaled it down into a compact wall-hung unit (90,000 BTU/HR with the RayPak® XPak™).

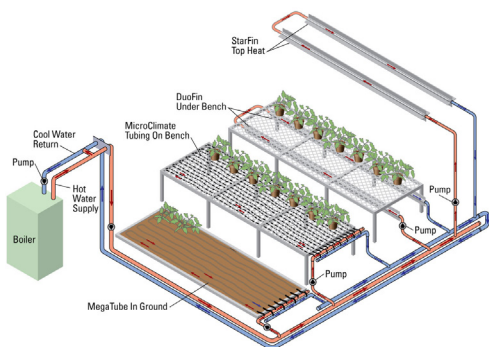
Each system includes comprehensive instructions for installation and operation and custom CAD drawings. All heating systems include two years of free support.



Custom Designed Heating Systems

Our innovative energy saving technology is designed to meet the individual needs of even the most demanding projects -- whether through new construction, major upgrades, or retrofits. Each greenhouse heating system is tailored to specific climate and growing conditions. Our systems are durable and efficient which result in high success rates and peak crops.

BioTherm is more than heating. We deliver the highest quality products with unparalleled service, saving you time and money. From initial consultation to installation, BioTherm's staff is with you every step of the way. Each system includes comprehensive instructions for installation and operation and custom CAD drawings. All heating systems include two years of free support.



DehuKing

BioTherm understands the demands of indoor gardening and greenhouse crops. A major issue is moisture control & humidity management. ChillKing has developed a line of pragmatic dehumidification solutions for agricultural applications without compromising performance: The DehuKing! A saturated atmosphere will result in moisture removal up to 2GPH per KW.

The units were developed to make sure the equipment was easily servicable, so replacement parts can be purchased at most re Fridgeration and HVAC supply stores (and other brands can be substituted with our approval if the exact part number cannot be located).



Toob

BioTherm's "the Toob" Oxygen Infuser and associated products provide a robust solution for increased dissolved oxygen levels in your irrigation water. Systems start with flow rates as low as 2 GPM and are able to scale as high as required. Our most popular unit supports up to 18 GPM. Our infusion products can be installed in any type of irrigation system and are proven to increase levels of dissolved oxygen providing a broad spectrum of plant health benefits. Installation is simple and well documented, with technical support available before, during, and after installation.





Whether you are starting seedlings, rooting cuttings or drying, humidity control is critical. Anden helps create an environment that drives transpiration at an optimal rate, while helping prevent disease outbreaks. Anden dehumidifiers are the only dehumidifiers in this space that are built specifically to achieve the cooler, drier grow room conditions that simulate fall, which are ideal during flowering stages.

Anden 210V1 Dehumidifier

210 Pints Per Day. Anden A210V1 Dehumidifier is designed and built for cultivation, with materials proven to perform in the extreme conditions of the grow room environment. Utilizing Anden Dehumidifiers for your grow facility will help ensure achieve your desired humidity balance for maximum growth potential.

Features:

- Positive pressure drain allows proper drainage without the need for a drain trap, providing for trouble free operation
- Self-sealing air filter for efficient protection of components; with easy access for replacement
- Included hanging kit doubles as lifting handles, provides easy, flexible installation
- Pre-installed electrical plug is easily removable for hard wired application, providing flexible installations
- Float switch terminals for easy set-up
- 77 remote control communicates with the dehumidifier, relaying all diagnostics from the dehumidifier to the control display; simple to monitor



Dehumidifier Model	Pints of Water Removed from Air (per day)	CFM @ 0.6"
ANDEN 210V1	210	525
ANDEN 320V1	320	830
ANDEN 320V3	320	830
ANDEN 200V1	210	400
ANDEN 300V1	300	500
ANDEN 300V3	300	500



Anden Steam Humidifier

Anden AS35FP Steam Humidifier is a grow room solution that helps you achieve ideal conditions through humidity control. Fogger, mister, steam humidifier. Whatever you call it - this ductless solution is ideal for cultivation.

Features:

- High Capacity - 11.5 and 34.6 gallons per day of moisture to the air
- Illuminates service light when canister needs to be replaced. The steam canister may build up with minerals and change color but the steam humidifier produces clean sterile steam that won't leave a mineral residue on your plants
- Designed for easy install, and are fed automatically by a simple connection to a cold water supply. No need to ever fill the tank!
- Includes a fan pack - designed for stand alone applications
- 19.49" W x 19.36" H x 30.07" D



At Autogrow we are all about you, the grower. We've worked closely with our growers and resellers for over 20 years to ensure that everything we do is aligned with your needs and supports what you, as a grower, want to achieve. Autogrow is made up of a group of dedicated software designers, engineers and horticultural technology experts who share the vision of making the best control systems in the world at a price that growers can afford.

Multigrow

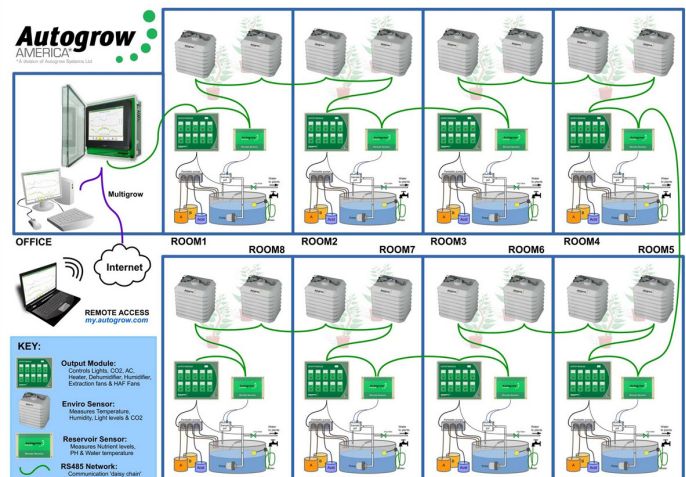
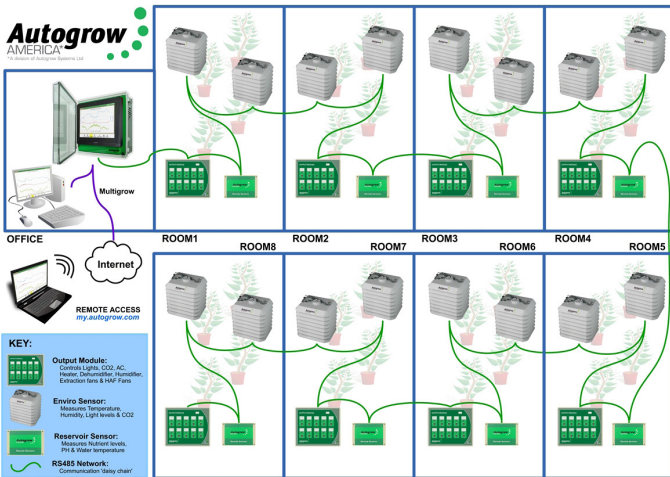
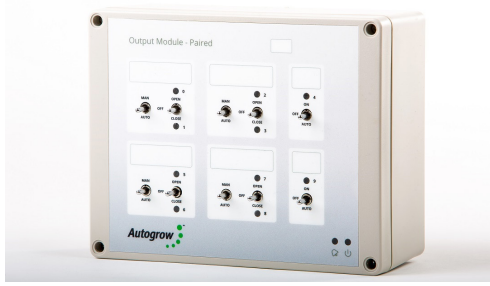
The Multigrow controller is a modular system that can control the climate of up to 8 greenhouse/warehouse compartments in addition to managing other functions like fertigation, hydroponic dosing and environment monitoring; the best part is you only pay for the functions you will be using. You can receive alarms by SMS or email and the controller has remote access using a wi-fi tablet or smart phone.

Although the climate control has a high level of functionality, many of the more complex settings are preset in the factory and you will get excellent results without changing these. They are provided for the perfectionists who would be frustrated if they were not available. Luckily, we provide "restore points" so if you change some advanced settings and don't get the results you expected it is simple to put the settings back to how they were.

The Multigrow is available in the following formats:

- A large touch screen format which is proving to be the most popular as it provides a larger, high resolution, high brightness full color touch interface. This is shown in the picture above.
- A screenless controller that is connected to a desktop LCD monitor, keyboard and mouse. This is a low cost option for situations that have a clean, office like environment in which to locate the MULTI. Alternatively, a wi-fi access point can be added to allow a tablet such as an iPad to be used as the user interface.

All of the above options can be connected to a computer network by ethernet cable or wi-fi and the controller can be accessed by any computer on the network that has a standard web browser. In larger installations it is convenient to set up an office computer with a number of screens (perhaps 3 or more) so that a different aspect can be displayed on each screen.



The Multigrow is a revolutionary control system that has been specifically designed to deliver class leading control while being built around a user friendly interface. The Multigrow features both a modular network structure and a modular software configuration. Each Multigrow System can be configured to exactly suit the client's requirements. What's more, the Multigrow network can be extended and software modules added to allow the system to grow with the client's operational requirements.

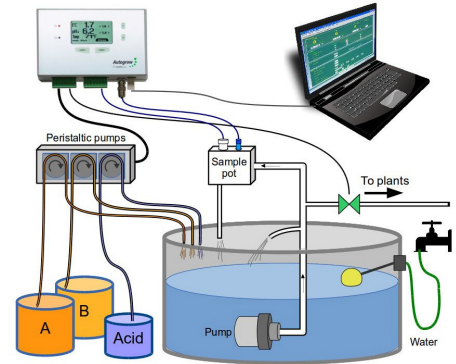


IntelliDose

Automatically manage your nutrient and pH levels, set remote alarms and data log your progress with this one simple machine! The IntelliDose set the industry standards for auto dosing! The IntelliDose will dose up to a 9 part blend (nutrients, additives, pH adjuster) while maintaining your preset EC and pH settings. Here are a few of the many features:

Specs:

- 9 outputs 24VDC
- Nutrient measurement units EC, CF or TDS (500/640/700)
- Measured range 0.00 to 9.99EC, 0.1 to 99.99CF, 0 to 7000PPM
- Nutrient resolution to .01mS/cm, 0.1CF
- Nutrient measurement accuracy +/-0.1EC, 1.0CF or 10PPM – Temp. compensated
- Nutrient dosing range 0.00 to 5.99EC, 0.1 to 59.9CF, 0 to 4200PPM
- pH resolution and accuracy – 0.1pH
- pH measurement range 2pH to 12pH
- pH dosing range 4.5 to 8 pH
- Nutrient and pH dosing times settable from 1 second to 30 minutes
- Dosing interval settable from 0 minutes (continuous dosing) to 244 minutes
- Sequential dosing to prevent power surges
- Temperature resolution and accuracy 1C/2F
- Temperature range 0-50C/32-125F
- Operating temperature range 0-50C/32-125F (not in direct sunlight)
- Power source – mains supplied 24VDC with 120V pigtail... specify if mains voltage and pin type vary
- Outputs will have the same voltage as the supplied voltage from the power pack
- Nutrient sensor using DiPulse™ technique to resist fouling



IntelliClimate

Automatically manage all aspects of your climate – from temperature to CO₂, lighting to humidity, all in one simple controller. Designed specifically for the indoor grower, the IntelliClimate controls all aspects of your growing environment. No comparable controller on the market gives you this much accuracy, efficiency and commercial grade control!

Specs:

- 8 outputs 24VDC
- RH resolution \pm 2% and accuracy
- Temperature resolution and accuracy 0.5°C/32.9°F
- Temperature sensor range 0-50°C/32-125°F
- Operating temperature range 0-50°C/32-125°F (not in direct sunlight)
- CO₂ resolution and accuracy 50ppm
- Power source – 120V/240V into 24VDC plug pack (supplied)
- Outputs will have the same voltage as the supplied voltage from the power pack
- Supplied with 3m USB cable

Aphaea

A comprehensive single-site system that combines management of your climate, irrigation and fertigation control, into a single easy-to-use system.

Aphaea continually monitors the environmental conditions, making adjustments to keep the controlled environment optimized for your plants, while using best-cost decision-making to avoid wasting energy. It can also dynamically adjust irrigation schedules based on actual light available to the plant. All this intelligence is the result of Autogrow's continuous research into growing automation for over 20 years.

It's simple – no requirement for complicated add-ons

It's flexible – can control a wide range of climate and fertigation equipment

It's accessible – anywhere, via your computer, smartphone or tablet in realtime (with my.autogrow)



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V-Flo Fan (Multifan)

Vertical ventilation for the greenhouse

Ventilation plays a vital role in modern greenhouses. Vertical ventilation results into a better and more uniform climate and energy savings. Because of several energy technical improvements in modern greenhouses and more intensive cultivation methods, the necessity of controlling humidity levels on crop level increases. With the V-FloFan, Vostermans Ventilation offers the grower the opportunity to reduce the negative impacts, due to humidity, in a simple and energy efficient way. The air is distributed over a wide surface through an aerodynamic conductor. The V-FloFan can be applied for a wide range of crops. The fan is easy to mount in greenhouses and easy to maintain.



Optimal microclimate on crop level

In modern greenhouses ventilation plays a vital role. Through circulation of air, heat distribution in the greenhouses is optimized, which enhances a uniform development of the crops. With the V-FloFan, Multifan offers the grower the opportunity to reduce the negative impacts, due to humidity, in a simple and energy efficient way. The vertical airflow results in an optimal uniform microclimate on plant level.

Why choose this fan:

- Creates an active microclimate on crop level
- Results an uniform climate in greenhouses
- Controls the humidity level
- Constant low airspeed at crop level
- Reduces the energy costs through vertical airflow
- 3-year warranty

Features:

- Special aerodynamic shaped conical outlet for optimal vertical airflow
- The V-FloFan is applicable for several cultivation systems and crops
- Reflecting white color for usage in greenhouses
- IP55 motor (water and dust resistant)
- Low noise (45/47 dB at 7 meters)

Horizontal ventilation solutions for Greenhouses:

For greenhouses with large temperature/humidity variation, we have a horizontal circulation fan available for a more uniform indoor climate. This horizontal circulation fan mixes the air faster compared with the V-FloFan, but has less effect at root level. The V-FloFan and circulation fan are not suitable to use together. Please, contact our Vostermans Ventilation team for technical details about the circulation 40 cm or 50 cm fan.





Multifan Fans

Vostermans Ventilation manufactures a wide range of Multifan axial fan products for agricultural (greenhouse, pork, poultry, dairy) and industrial applications. Axial fans of the brand Multifan are known and valued for efficiency and trustworthiness. Motors are produced in-house and the correct motor-impeller combination results in optimal performance. Multifan products are well-known for consistent high quality, durability and longevity with worldwide availability.



Benefits Multifan axial fans

- Low energy consumption
- All parts can be recycled
- Low level of maintenance and long life cycle
- Different varieties and mounting positions
- Low noise level



EMI Fans

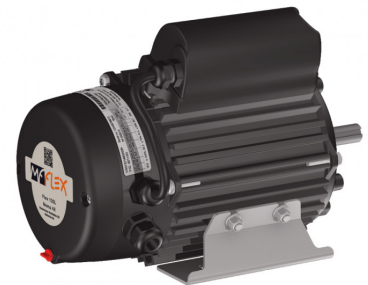
Using the brand name EMI, Vostermans Ventilation manufactures a wide range of products for ventilation in agricultural and industrial applications. An axial fan, well known on the market for its quality and as a specific ventilation solution with our own, in-house manufactured, motor and stainless steel fan blades.

Benefits EMI axial fans

- Low energy consumption
- All parts can be recycled
- Low level of maintenance and long life cycle
- Different varieties and mounting positions
- Low noise level

M-Flex Motors

Using the brand name Mf-Flex, Vostermans Ventilation manufactures a motor line with a wide application field. Because the Mf-Flex motors can be supplied with various shaft lengths and a large number of different mounting possibilities, many applications are possible. Match this flexible design motor with Vostermans Ventilation's extensive impeller program, and we can offer the perfect motor-impeller combination to meet the specifications of the customer for a custom-made fan.



Multifan Fans

The Mf-Net line is an open modular control system for various applications. By means of simply adding various modules together, you can go from stand-alone controllers to high solution, integrated control systems. The in-and output signals from main controllers and power units are easy to connect by 0-10 Volt or regular electric connections, resulting in various combinations. To choose the right combination of Mf-Net modules various criteria and specifications can be used.

- Economy: simple operation, low investment
- Endurance: robust, durable
- Energy: energy saving, speed control
- Safety: reliable alarms

