

# AIR COOLED UNITS 2 - 25 TON CAPACITIES

Spinnaker Industries vertical and horizontal duct-able self-contained air cooled air conditioning packages offer a complete line of unit options for indoor, through the wall installations.

- Ideal for tenant change or renovations
- Allows independent metering
- R410A refrigerant
- Duct-able Condensers
- Single point power connection
- Stainless steel drain pan
- 18 gauge galvalume cabinets
- Forward curve DWDI belt drive centrifugal blower
- TEFC premium efficiency motors
- Filter drier and TX valve
- High low pressure cut outs
- Factory charged and run tested
- 1 Year parts warranty (extended compressor warranty available)
- ETL compliant to ANSI/UL 1995, Can/ CSA-C22.2

Horizontal units are available in 2 to 15 Ton sizes Vertical units are available in 3 to 25 ton sizes



SPINNAKER INDUSTRIES INC

# "SPHAC" HORIZONTAL-AIR COOLED

Belt Driven Self Contained Air Conditioning Equipment Packaged or Split Size 2 thru 15 Ton Capacities

Spinnaker Industries Inc. "SPHAC" horizontal duct-able air conditioning packages offer a complete line of unit options for indoor, through-the-wall installations. These units are ideal for high rise and low rise building applications.

Spinnaker's compact, low profile indoor design protects from potential vandalism, weathering and eliminates the need for any unsightly exterior equipment.

Floor-by-floor installation provides independent zone and temperature control, eliminating many of the complications encountered with roof-top equipment. Renovation and restoration projects are simplified where roof load, cooling tower, and construction restrictions can present installation problems.

Spinnaker's SPHAC horizontal air cooled indoor air conditioning design offers a high efficiency, quality engineered, quiet and dependable option to conventional rooftop equipment. The SPHAC has been designed to provide a solid answer for "NICHE" engineering requirements.

### Spinnaker SPHAC Horizontal Features and Benefits

- Low profile cabinets are unitized for single package or split installation 2-5 Ton = 26" to 33" in depth; 8-15 Ton = 34" to 42" in depth
- Ideal for tenant change / renovations
- Duct-able ceiling mount saves valuable floor space
- Protected from extreme weather conditions and vandalism
- Allows independent metering / temperature control
- Static capability to suit various installation requirements using belt driven centrifugal blowers and adjustable pulleys
- · Sub-cooling built into draw-thru condensing coil
- · Convenient access to all components to meet service needs while unit is running in place
- Separate 18 gauge galvalume evaporator and condenser cabinets which include refrigerant self sealing couplings as a standard feature. 2 to 8 models are shipped assembled and can be field split as required 10,12 and 15 ton models are shipped as split units. All units are factory charged and test run prior to shipment. Optional interconnecting tubing kit is available if unit(s) are to be installed as split system(s).
- Filter drier and TX valve on each refrigerant system
- High efficiency scroll compressor(s); 410A refrigerant
- · Stainless steel drain pan
- · On board microprocessor control with diagnostics
- · Compressor anti short cycle timer
- 1 year parts only warranty ( from date of shipment )
- ETL compliant to ANSI/UL 1995, Can/ CSA-C22.2

# **TYPICAL MECHANICAL SPECIFICATION(S)**

#### HORIZONTAL "SPHAC" SERIES SYSTEMS

# All Models are shipped as factory-charged unitized packages and include refrigerant line couplings to allow the units to be field split. The 10, 12 and 15 ton models are shipped as separate evaporator and condensing unit modules. All packages/modules are designed for suspended mounting via integral structural steel channels.

#### CABINET

All cabinets are completely constructed of 18 Ga. corrosion resistant "Galvalume" coated steel. The entire interior of the unit (both evaporator and condensing section) is insulated with 1/2" thick, 2 lb. density insulation. Service panels are equipped with lifting handles for ease of removal and handling.

#### COMPRESSORS

All models utilize "Scroll" type 410A hermetic compressors. Compressors are mounted on rubber isolators to minimize vibration transmission. Internal overload protection is provided. External high pressure and low pressure cutout switches are included in each compressor control circuit. Crankcase heaters are standard on all models.

#### **REFRIGERANT CIRCUITS**

The 2-5 ton units have a single refrigeration circuit. The 8-15 ton units feature two independent refrigeration circuits. Each refrigeration circuit includes an adjustable thermal expansion valve (with external equalizer), liquid line filter drier, and service gauge ports.

#### EVAPORATOR AND CONDENSER COILS

The evaporator and condenser coils are constructed of internally enhanced copper tubes mechanically bonded to rippled aluminum plate fins. Both coils are employed in a draw-thru configuration. Large evaporator coil face area minimizes potential water carry-over (max. face velocity is 550 fpm at rated airflow).

#### STAINLESS STEEL DRAIN PAN

Evaporator drain pan shall be fabricated from 304 stainless steel material. The 3/4 in NPT drain connection fitting is also from 304 stainless steel.

#### INDOOR/OUTDOOR FANS

Forward curved, double inlet and double width centrifugal blowers are used for both evaporator and condenser air movement. Blower wheels are fabricated of galvanized steel. Blowers employ solid steel shafts, supported in permanently lubricated ball bearings. All blowers are belt driven and come with variable- pitch motor sheaves which allows for field adjustment of blower rpm/cfm.

#### **ELECTRICAL CONTROLS**

All units are completely factory wired with all necessary controls. Manual reset protection is provided on both evaporator and condenser motors. A manual reset circuit is also provided on each compressor control circuit in the event of high/low pressure cutout. A 24 volt control circuit, with an oversized transformer, is provided for field connection. Units include an on board microprocessor control with diagnostics. Compressor anti short cycle protection is standard.

#### FILTERS

All models are shipped with 2 inch thick medium-efficiency throwaway filters factory installed. Filter rack is internal to the cabinet.

#### **Extended Compressor Warranty**

An optional, additional four year protection plan on the compressor is available at modest cost at the time of original unit sale only. This obligates Spinnaker Industries Inc. to replace f.o.b. factory, a defective compressor of equal capacity free of charge. No responsibility is assumed by Spinnaker Industries Inc. for refrigerant, labor, or freight to and from the factory

#### **OPTIONAL ACCESSORIES**

#### FACTORY INSTALLED

#### **Oversized Evaporator Fan Motors**

Increased horsepower motors and drive components are available for those applications where external static pressure requirements exceed the capability of the standard motor.

#### **Oversized Condenser Fan Motors**

Increased horsepower motors and drive components are available for those applications where external static pressure requirements exceed the capability of the standard motor.

#### **Corrosion Resistant Coatings**

Condenser and/or evaporator coils shall have ElectroFin baked flexible polymeric coating utilizing cathodic electro coat (e-coat) technology.

#### **Hot Gas Bypass**

Adjustable hot gas regulator and all necessary piping shall be installed on lead compressor circuit. Bypass capacity shall be minimum 50% of compressor capacity. The Bypass valve opens at a preset suction pressure to prevent coil freeze-up at light evaporator load, or low airflow conditions. The use of the field installed Low Ambient Control is strongly recommended when Hot Gas Bypass is installed.

#### **Extended Compressor Warranty**

An optional, additional four year protection plan on the compressor is available at modest cost at the time of original unit sale only. This obligates Spinnaker Industries Inc. to replace f.o.b. factory, a defective compressor of equal capacity free of charge. No responsibility is assumed by Spinnaker Industries Inc. for refrigerant, labor, or freight to and from the factory.

#### FIELD INSTALLED

#### Hot Water & Steam Coils

Hydronic heating coils shall mount on return air side of the heating coil. The unit filter rack shall mount to the entering air side of the heating coil.

#### **Discharge Plenum**

Plenums shall mount on top of the evaporator section with fans arranged for vertical discharge. Double deflection grills shall allow air discharge in multiple directions

#### Air Side Economizer

Air Side Economizers are available as field supplied options. The installation of these units will provide for substantial energy savings by utilizing cool outside air in place of mechanical cooling whenever conditions permit.

#### Low Ambient Control

Units will operate reliably at an outdoor ambient down to 60 deg F. In applications requiring operation below this temperature, the field installed low ambient damper kit option is required. The effective range for this option is -30°F. This optional kit consists of a damper section, modulating actuator and a pressure transducer / control. Factory installed crankcase heaters are provided on each compressor

#### AIR SIDE ECONOMIZER

#### APPLICATION

Spinnaker Industries Inc. air side economizers are designed to meet current building and legislated codes for indoor ventilation. In addition to improving indoor air quality, economizers provide substantial energy savings by utilizing cool outside air instead of mechanical cooling whenever outside conditions permit.

The outlet of the air side economizer is fitted to the return air inlet of the packaged air conditioning unit. The two inlets to the economizer are fitted to the return air and outside air ductwork. Opposed blade dampers located in each inlet modulate the incoming air streams as they enter the mixing box. The outside air damper can be maintained at a predetermined minimum position. In this way the buildings ventilation requirements can be met at all times.

#### GENERAL

Consisting of an integrated mixing box and control assembly, the economizer mates easily to the unit. A factory installed wiring harness and jack plug assembly eliminates the need for field wiring, reducing valuable installation time. No additional controls or transformers are necessary to complete the installation.

**Mixing Box** - The mixing box is manufactured from 18 gauge steel and completely insulated with ½", 2lb density insulation. The mixing box is complete with fully modulating opposed blade dampers and linkage. Opposed blade dampers ensure the best possible mixing of indoor and outdoor air streams.

**Low Leakage** - Low leakage dampers meet the criteria of less than 10 cfm per square foot at 4" w.g. (0.5% at 2000 fpm). All damper blades are provided with neoprene seals providing a tight seal and quiet operation. The damper may be located on the left or right side of the mixing box on the vertical mixing boxes, and on the left side only on the horizontal mixing boxes.

**Honeywell W7215 Economizer Control Module** - The W7215 is a multi-functional controller capable of analyzing dry bulb, enthalpy and air quality inputs. An output from the economizer module will position the mixing box dampers to provide energy savings through the introduction of outside air for free cooling. Additionally, the air quality within a building can be improved through the introduction of outside air through the mixing box dampers when conditions are appropriate.

# SPHAC GENERAL DATA

Model	24	36	48	60
Nominal cooling (Tons)	2	3	4	5
Cooling Preformance				
Gross Cooling Capacity (BTUH)	27700	36300	48850	62342
Net Cooling (BTUH)	27600	36300	48000	61900
Design CFM	800	1200	1600	2000
EER Rating	13.9	13.5	13.4	14.0
Compressor Type		Scro	11	54
Number Used	1	1	1	1
Evaporator Air Coil-Type	Enh	anced Copper Tubes, E	nhanced Aluminum Fin	IS
Refrigerant Control		TX Va	lve	
Condensor Air Coil-Type	Enh	anced Copper Tubes, E	nhanced Aluminum Fin	IS
Evaporator Fan Type		Centrifugal, For	ward Curved	
Number Used	1	1	1	1
Drive		Adjustable	V Belt	19
Diameter x Width (in)	9x7	10x10	12x9	12x12
Motor HP (Standard / Oversized)	0.5	.50 / .75	.75 / 1.0	1.0 / 1.5
Condenser Fan Type		Centrifugal, For	ward Curved	
Number Used	1	1	1	1
Diameter x Width (in)	12x12	15x15	15x15	18x18
Drive		Adjustable	V Belt	29.
Motor HP (Standard / Oversized)	.75 / 1.0	1.0 / 1.5	1.5 / 2.0	2.0 / 3.0
Filters				
Quantity-Size (in) 2" Thick :Disposable	1-20x25	1-24x25	2-16x25	1-16x25
na vite si si				1-20x25
Condensate Drain Connection Size (in)		3/4 FI	PT	
Weight			0	
Shipping	860	898	1164	1275

Note: Cooling performance is rated at : 1) 80°F entering dry bulb / 67°F wet bulb entering air temperature ( air on evaporator ) 2) 95°F entering dry bulb / 75°F wet bulb entering air temperature ( air on condenser ) 3) At CFM listed

Model	96	120	144	180
Nominal cooling (Tons)	8	10	12	15
Cooling Performance			-	
Gross Cooling Capacity (BTUH)	97900	127140	148920	179860
Net Cooling (BTUH)	96800	125600	145000	177000
Design CFM	3200	4000	4800	6000
EER Rating	11.4	11.3	11.0	11.0
Compressor Type		Sci	roll	
Number Used	2	2	2	2
Evaporator Air Coil-Type	Enha	nced Copper Tubes,	Enhanced Aluminu	n Fins
Refrigerant Control	-	TX V	/alve	
Condensor Air Coil-Type	Enha	nced Copper Tubes,	Enhanced Aluminu	n Fins
Evaporator Fan Type		Centrifugal, Fo	orward Curved	
Number Used	1	1	1	1
Drive		Adjustab	le V Belt	0
Diameter x Width (in)	15x11	18x13	18x18	18x18
Motor HP (Standard / Oversized)	1.5 / 2.0	2.0 / 3.0	2.0 / 3.0	3.0 / 5.0
Condenser Fan Type		Centrifugal, Fo	orward Curved	
Number Used	1	1	1	1
Diameter x Width (in)	18x18	18x18	18x18	20x20
Drive		Adjustab	le V Belt	
Motor HP (Standard / Oversized)	3.0 / 5.0	5.0 / 7.5	5.0 / 7.5	7.5 / 10.0
Filters				
Quantity-Size (in) 2" Thick :Disposable	4-16x20	2-16x25	4-16x25	4-20x25
		2-16x20		
Condensate Drain Connection Size (in)	3/4 FPT		1.0 FPT	
Weight				
Shipping	1415	1460	1825	2150

Note: Cooling performance is rated at : 1) 80°F entering dry bulb / 67°F wet bulb entering air temperature ( air on evaporator ) 2) 95°F entering dry bulb / 75°F wet bulb entering air temperature ( air on condenser )

3) At CFM listed

# Nomenclature



## SPHAC-24 @ 800 CFM Cooling Performance

												Ambier	it Conde	ensing T	empera	ture									
edu/	0.0004			85	°F					ç	95°F		10			105	5°F					11	5°F		
JET I/	10024			EV	٧B					E	EWB					EV	VB					E	WB		
		62	°F	67	°F	72	°F	62	2°F	67	٣F	72	°F	62	۴F	67	°F	72	°F	62	°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	23.9	19.1	26.5	15.5	28.4	11.5	23.1	17.9	25.1	14.8	26.1	10.9	22.0	15.3	24.1	14.1	26.1	10.7	21.1	17.3	22.8	13.8	25.0	10.8
700	80°F	24.2	22.8	26.9	19.3	28.7	15.1	23.4	21.3	25.4	18.3	27.5	14.5	22.4	21.0	24.4	17.6	26.4	14.1	21.3	20.6	23.1	17.3	25.3	13.7
	85°F	24.5	26.0	27.1	23.2	29.0	18.5	23.6	24.4	25.7	21.5	27.8	17.9	22.6	23.9	24.6	21.0	26.6	17.7	21.6	23.1	23.4	20.6	25.1	15.5
	75°F	24.7	20.6	27.2	16.4	29.1	12.1	23.9	19.7	25.8	16.0	27.8	11.6	22.5	19.3	24.7	15.6	26.9	11.3	21.5	19.2	23.6	15.3	21.4	10.1
800	80°F	24.9	24.8	27.6	20.8	29.4	16.2	24.1	23.7	26.1	20.2	28.1	15.6	23.0	23.2	25.0	19.8	27.2	15.3	21.9	23.1	23.9	19.4	26.0	15.0
	85°F	25.3	26.8	27.8	25.4	29.7	20.2	24.4	25.9	26.4	24.3	28.4	19.7	23.2	24.7	25.4	23.9	28.1	19.4	22.1	23.6	24.2	23.6	26.2	16.9
	75°F	25.3	22.2	27.6	17.4	29.7	12.7	24.3	21.6	26.2	17.3	28.4	12.2	23.1	21.3	25.3	16.9	27.3	11.7	20.9	19.7	24.0	16.1	26.2	13.5
900	80°F	25.6	27.0	27.9	22.3	30.1	17.4	24.6	26.1	26.6	22.0	28.8	16.8	23.4	25.1	25.5	21.7	27.6	16.4	21.1	22.4	24.3	21.2	26.5	16.0
	85°F	25.8	27.6	28.2	27.4	30.5	22.1	24.9	26.6	27.0	26.2	29.1	21.5	23.6	25.3	25.8	26.5	28.0	21.0	21.3	22.7	24.5	25.9	26.9	17.6

### SPHAC-36 @ 1200 CFM Cooling Performance

												Ambien	it Conde	ensing T	empera	ture									
SDH (	10036			85	°F					Ģ	15°F					105	i°F					1′	15°F		
JIII	40000			EV	VB					E	EWB					EV	VВ					E	WB		
		62	°F	67	°F	72	!°F	62	°F	67	۴F	72	°F	62	°F	67	°F	72	°F	62	°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	30.6	25.9	33.9	21.0	36.2	15.6	29.6	24.3	32.1	20.1	34.8	14.9	28.2	23.9	30.8	19.1	33.4	14.5	27.0	23.4	29.2	18.7	32.0	14.7
1000	80°F	30.9	30.9	34.3	26.2	36.7	20.4	29.9	28.9	32.5	24.8	35.1	19.7	28.6	28.6	31.2	23.8	33.8	19.2	27.3	28.0	29.6	23.4	32.4	18.6
	85°F	31.3	35.4	34.7	31.5	37.1	25.1	30.3	33.1	32.9	29.2	35.6	24.3	28.9	32.4	31.6	28.5	34.1	24.0	27.7	31.4	29.9	28.0	32.8	21.0
	75°F	31.6	28.0	34.8	22.3	37.2	16.3	30.5	26.7	33.0	21.7	35.6	15.7	28.9	26.2	31.7	21.2	34.3	15.3	27.7	26.0	30.2	20.7	27.4	13.7
1200	80°F	31.9	33.8	35.5	28.0	37.7	21.9	30.8	32.1	33.4	27.5	36.0	21.2	29.4	31.5	32.0	26.8	34.8	20.9	28.0	31.4	30.6	26.4	33.2	20.3
	85°F	32.3	36.4	35.6	34.4	38.1	27.5	31.2	35.2	33.8	33.0	36.5	26.7	29.8	33.7	32.4	32.4	35.9	26.3	28.4	32.2	30.9	31.9	33.6	23.0
	75°F	32.3	30.1	35.3	23.5	38.0	17.2	31.1	29.3	33.6	23.4	36.3	16.5	29.6	28.8	32.3	22.9	34.9	15.9	26.7	26.6	30.7	21.8	33.5	18.3
1400	80°F	32.7	36.6	35.8	30.3	38.5	23.5	31.5	35.5	34.0	29.8	36.8	22.8	29.9	34.1	32.7	29.4	35.4	22.3	26.9	30.7	31.0	28.7	33.9	21.6
	85°F	33.0	37.4	36.1	37.2	38.9	30.0	31.9	36.1	34.5	35.6	37.2	29.2	30.3	34.3	33.0	36.0	35.9	28.5	27.3	31.1	31.4	35.0	34.4	23.9

# SPHAC-48 @ 1600 CFM Cooling Performance

												Ambier	nt Conde	ensing T	empera	ture									
SDH /	10048			85	°F					ç	5°F					105	5°F					11	I5°F		
OF THE	10040			EV	VB					E	EWB					EV	٧B					E	WB		
		62	r°F	67	۴F	72	!°F	62	°F	67	°F	72	!°F	62	°F	67	°F	72	°F	62	r°F	67	°F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	40.8	34.4	45.3	27.9	48.3	20.7	39.5	32.3	42.8	26.7	46.4	19.8	37.6	31.8	41.1	19.2	44.5	19.2	36.1	31.1	38.9	24.9	42.7	19.5
1450	80°F	41.2	41.2	45.7	34.9	48.9	27.1	39.9	38.4	43.3	33.0	46.8	26.1	38.1	38.0	41.6	25.6	45.0	25.6	36.4	37.2	39.5	31.1	43.1	24.8
	85°F	41.8	47.0	46.2	41.9	49.5	33.4	40.4	44.0	43.8	38.9	47.5	32.3	38.5	43.2	42.0	31.9	45.4	31.9	36.9	41.8	39.9	37.2	43.7	27.9
	75°F	42.1	37.3	46.4	29.6	49.6	21.7	40.7	35.6	44.1	28.9	47.5	20.9	38.4	34.9	42.2	20.4	45.7	20.4	36.9	34.5	40.3	27.5	36.5	18.3
1600	80°F	42.6	44.9	47.0	37.6	50.2	29.2	41.1	42.7	44.5	36.5	48.0	28.2	39.2	41.5	42.7	27.8	46.4	27.8	37.4	41.8	40.8	35.2	44.3	27.0
	85°F	43.1	48.4	47.5	45.8	50.8	36.5	41.6	46.7	45.0	43.8	48.6	35.6	39.7	44.8	43.1	35.1	47.7	35.0	37.8	42.8	41.2	42.5	44.8	30.6
	75°F	43.1	40.0	47.1	31.3	50.7	22.8	41.5	39.1	44.8	31.1	48.4	21.9	39.5	38.3	43.1	21.2	46.6	21.2	35.5	35.4	40.8	29.1	44.6	24.4
1800	80°F	43.5	48.7	47.7	40.2	51.3	31.3	42.0	47.1	45.4	39.7	49.0	30.3	39.9	45.4	43.5	29.6	47.2	29.6	35.9	40.7	41.4	38.2	45.3	28.8
	85°F	44.0	49.8	48.1	49.6	51.9	39.9	42.4	48.0	46.0	47.4	49.6	38.9	40.4	45.7	44.1	37.9	47.8	37.9	36.4	41.4	41.9	46.6	45.8	31.8

# SPHAC-60 @ 2000 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SDH /	10060			85	°F					Ş	I5°F					105	۴F					11	l5°F		
JETT	10000			EV	VB					E	EWB					EV	vВ					E	WB		
		62	°F	67	°F	72	۴F	62	۴F	67	۴F	72	°F	62	°F	67	°F	72	°F	62	°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	52.5	43.8	58.3	35.5	62.2	26.4	50.9	41.2	55.1	33.9	59.7	25.2	48.4	40.5	52.9	24.5	57.2	24.5	46.4	39.6	50.1	31.7	55.0	24.9
1800	80°F	53.1	52.4	58.8	44.4	62.9	34.4	51.4	48.9	55.8	41.9	60.3	33.3	49.1	48.4	53.5	32.6	57.9	32.6	46.9	47.4	50.9	39.6	55.6	31.5
	85°F	53.8	59.9	59.5	53.3	63.7	42.5	52.0	55.7	56.4	49.5	61.1	41.2	49.6	54.9	54.1	40.6	58.6	40.6	47.5	53.2	51.4	47.4	56.3	35.6
	75°F	54.2	47.5	59.7	37.7	63.8	27.7	52.4	45.4	56.8	36.8	61.1	26.6	49.4	44.4	54.3	25.9	58.8	25.9	47.3	44.0	51.9	35.0	47.0	23.2
2000	80°F	54.8	57.2	60.7	47.9	64.7	37.2	52.9	54.4	57.3	46.5	61.9	35.9	50.5	52.8	55.0	35.4	59.7	34.3	48.1	53.2	52.5	44.7	57.0	34.3
	85°F	55.5	61.5	61.1	58.3	65.4	46.5	53.5	59.4	57.9	55.8	62.5	45.3	51.0	56.7	55.6	44.6	61.5	44.5	48.7	54.5	53.1	54.1	57.7	38.9
	75°F	55.5	50.9	60.6	39.8	65.2	29.0	53.4	49.7	57.7	39.6	62.4	27.9	50.9	48.8	55.4	27.0	60.0	27.0	45.7	45.0	52.5	37.1	57.4	31.0
2200	80°F	56.0	62.0	61.4	51.1	66.1	39.8	54.1	60.0	58.4	50.5	63.2	38.6	51.4	56.7	56.0	37.7	60.7	37.7	46.2	50.8	53.3	48.6	58.3	36.6
	85°F	56.6	63.0	61.9	63.0	66.8	50.8	54.6	66.0	59.2	54.8	63.8	49.5	52.0	57.8	56.8	48.2	61.6	48.2	46.9	51.5	53.9	59.3	59.0	40.5

# SPHAC-96 @ 3200 CFM Cooling Performance

												Ambier	it Conde	ensing T	empera	ture									
CDUA	0006			85	۴					Ş	I5°F					105	5°F					11	15°F		
JET I/	10050			EV	٧B		0			E	EWB					EV	٧B					E	WB		
		62	°F	67	۴	72	°F	62	°F	67	۴F	72	°F	62	°F	67	۴F	72	°F	62	°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
	75°F	88.6	72.8	98.4	59.0	104.9	43.8	85.8	68.5	93.0	56.4	101.0	42.0	81.8	67.4	89.4	40.7	95.7	40.7	78.4	65.9	84.5	52.7	92.9	41.4
3000	80°F	89.7	87.2	99.4	73.8	105.9	57.3	86.8	81.4	94.2	69.7	102.0	55.3	82.9	80.5	90.3	54.1	97.7	54.1	79.2	78.8	85.8	65.9	93.8	52.4
	85°F	90.8	99.5	100.0	88.7	107.9	70.8	87.8	92.6	95.2	82.3	103.0	68.5	83.8	91.3	91.3	67.6	98.8	67.6	80.1	88.6	86.8	78.8	95.0	59.2
2	75°F	91.6	78.9	101.0	62.7	107.9	46.1	88.4	75.4	95.8	61.1	103.0	44.2	83.4	73.8	91.8	43.2	99.0	43.2	79.8	73.2	87.6	58.2	79.4	38.6
3200	80°F	92.6	95.1	102.0	79.5	108.9	61.9	89.4	90.4	96.8	77.4	104.0	59.8	85.2	87.8	92.9	58.9	101.0	57.1	81.3	88.6	88.6	74.5	96.1	57.1
	85°F	93.7	102.3	103.0	97.0	109.9	77.4	90.3	98.5	97.7	92.7	105.9	75.3	86.1	94.4	93.8	74.2	104.0	74.0	82.2	90.7	89.7	89.9	97.4	64.7
	75°F	93.7	84.7	102.0	66.2	109.9	48.3	90.2	82.6	97.4	65.9	104.9	46.4	85.8	81.2	93.5	44.9	101.0	44.9	77.1	74.9	88.7	61.6	96.9	51.5
3400	80°F	94.5	103.0	104.0	85.1	111.9	66.2	91.3	87.0	98.6	84.0	106.9	62.1	86.8	94.2	94.5	62.6	102.0	62.7	77.9	84.6	90.0	80.9	98.4	61.0
	85°F	95.5	104.7	104.9	104.8	112.9	84.6	92.2	99.7	100.0	91.2	107.9	82.3	87.8	96.1	95.8	80.1	104.0	80.2	79.2	85.5	90.9	97.9	99.0	67.4

# SPHAC-120 @ 4000 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SDH /	C120			85	۴					9	5°F					105	δ°F					11	5°F		
OF HE	0120			EV	VB					E	EWB					EV	VB			20		E	WB		
2		62	°F	67	°F	72	۴F	62	°F	67	°F	72	°F	62	°F	67	°F	72	°F	62	°F	67	°F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	115.4	88.6	127.7	71.8	136.0	53.2	111.2	83.2	120.5	69.7	130.8	51.4	106.1	82.0	116.4	49.4	124.6	49.4	101.7	80.1	109.2	64.1	120.5	42.0
3700	80°F	116.4	106.1	128.8	89.8	137.0	69.7	112.3	99.0	122.6	84.8	131.8	67.3	107.1	98.0	117.4	65.4	125.7	65.8	102.8	95.9	111.2	80.1	121.5	63.8
	85°F	117.4	117.5	129.8	108.2	140.1	86.0	114.3	112.3	123.6	100.0	133.9	83.2	108.2	111.3	118.5	82.2	127.7	82.3	104.0	103.0	112.3	95.8	123.6	72.1
	75°F	118.5	95.9	130.8	76.2	140.1	56.0	114.3	91.7	124.6	74.3	133.9	53.8	108.2	88.7	119.5	52.5	128.8	52.5	103.0	88.9	113.3	70.7	103.0	46.9
4000	80°F	120.5	115.4	131.8	96.6	141.1	75.2	116.4	110.2	125.6	94.2	134.9	72.7	110.2	107.1	120.5	71.7	130.8	98.0	105.1	104.0	115.4	90.6	124.6	69.4
	85°F	121.5	121.7	133.9	117.5	142.1	94.1	117.4	117.5	126.7	112.3	137.0	91.6	111.2	110.2	121.5	90.3	134.9	90.0	106.1	105.0	116.4	109.2	126.7	78.6
	75°F	121.5	103.0	131.8	80.5	142.1	58.7	116.4	100.5	126.7	80.1	136.0	56.5	111.2	98.7	121.5	52.8	130.8	54.6	100.1	91.0	115.4	75.0	125.7	62.6
4300	80°F	122.6	121.7	134.9	103.5	145.2	80.5	118.5	112.3	127.7	102.1	139.1	75.5	112.3	111.3	122.6	76.1	131.8	76.2	101.1	100.7	116.4	98.4	127.7	74.2
	85°F	123.6	122.7	136.0	126.9	146.3	102.9	119.5	117.5	129.8	111.3	140.1	100.0	114.3	113.4	124.6	97.4	132.9	97.6	102.8	101.9	117.4	116.5	128.8	82.0

# SPHAC-144 @ 4800 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SDH (	00144			85	°F					ç	I5°F					105	5°F					11	5°F		
ULL!	10144			EV	VB					E	EWB					EV	VB					E	WB		
		62	°F	67	۴F	72	۴F	62	°F	67	۴F	72	°F	62	۴F	67	۴F	72	°F	62	°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	133.3	102.0	146.8	82.3	156.5	61.1	128.5	95.5	139.1	80.0	150.7	58.9	122.7	94.0	134.3	56.7	143.9	56.7	116.9	91.8	125.6	73.5	139.1	48.2
4500	80°F	134.3	122.0	148.8	103.0	157.5	80.0	129.4	114.0	141.0	97.2	151.7	77.2	123.6	112.0	135.2	75.1	144.9	75.5	118.8	110.0	128.5	91.9	140.1	73.1
	85°F	135.2	135.0	149.7	124.0	161.3	98.7	131.4	129.0	142.0	115.0	154.6	95.5	124.6	128.0	136.2	94.3	146.8	94.4	119.8	118.0	129.4	110.0	142.0	82.7
	75°F	136.2	110.0	150.7	87.5	161.3	64.2	131.4	105.0	143.9	85.2	154.6	61.7	124.6	102.0	138.1	60.3	148.8	60.3	118.8	102.0	130.4	81.1	118.8	53.8
4800	80°F	139.1	132.0	151.7	111.0	162.3	86.3	134.3	126.0	145.0	108.0	155.5	83.4	126.5	123.0	139.1	82.2	150.7	60.9	120.8	119.0	132.3	104.0	143.9	79.6
	85°F	140.1	139.0	154.6	135.0	164.2	108.0	135.2	135.0	145.9	129.0	157.5	105.0	128.5	126.0	140.1	103.0	155.5	62.9	122.7	120.0	134.3	125.0	145.9	90.2
	75°F	140.1	118.0	151.7	92.3	164.2	67.3	134.3	115.0	145.9	91.9	156.5	64.8	128.5	113.0	140.1	60.6	150.7	62.6	115.0	104.0	132.3	86.0	144.9	71.8
5100	80°F	141.0	140.0	155.5	119.0	167.1	92.4	136.2	129.0	146.8	117.0	160.4	86.6	129.4	128.0	141.0	87.3	151.7	87.5	116.9	115.0	134.3	113.0	146.8	85.1
	85°F	142.0	141.0	156.5	146.0	168.1	118.0	138.1	135.0	149.7	128.0	161.3	115.0	131.4	130.0	143.9	112.0	153.6	112.0	118.8	117.0	135.2	133.0	148.8	94.0

### SPHAC-180 @ 6000 CFM Cooling Performance

												Ambier	t Conde	ensing T	empera	ture									
SDH /	VC190			85	°F					9	5°F					105	°F					11	I5°F		
JET /	10100			Ev	VB			2		E	EWB					EV	/B					E	WB		
8		62	°F	67	°F	72	۴F	62	°F	67	°F	72	°F	62	۴F	67	Ϋ́F	72	°F	62	°F	67	°F	72	۴F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	163.1	133.1	179.5	107.7	192.0	80.0	157.3	124.6	170.8	104.8	184.3	77.1	150.5	123.6	164.1	74.2	176.6	74.2	142.8	120.4	153.4	96.3	170.8	63.1
5600	80°F	164.1	159.5	182.4	135.2	193.0	104.8	158.3	148.9	172.7	127.8	185.3	103.3	151.5	146.8	166.0	98.4	177.6	98.9	145.7	143.6	157.3	120.4	171.8	95.7
	85°F	166.0	177.4	183.4	162.6	197.8	128.8	161.2	169.0	173.7	151.0	189.1	124.6	152.5	165.8	166.9	123.6	179.5	123.6	146.7	154.2	158.3	150.0	173.7	108.8
	75°F	166.9	143.6	184.3	114.0	197.8	84.1	161.2	137.3	176.6	111.9	189.1	80.8	152.5	129.9	168.9	79.0	182.4	79.0	145.7	133.1	160.2	106.7	145.7	70.4
6000	80°F	170.8	173.2	185.3	144.7	198.8	113.0	164.1	164.7	177.7	141.6	190.1	108.8	155.4	161.6	170.8	111.9	184.3	135.2	147.6	156.3	162.1	136.2	176.6	104.3
	85°F	171.8	181.6	189.1	177.4	200.7	141.5	166.0	177.4	178.5	169.0	193.0	137.3	157.3	164.7	171.8	135.2	190.1	146.8	150.5	157.3	164.1	163.7	178.5	118.3
	75°F	171.8	154.2	185.3	120.4	200.7	88.2	164.1	151.0	178.5	120.4	192.0	84.9	157.3	147.8	171.8	79.4	184.3	82.1	140.9	136.2	162.1	113.0	177.6	94.1
6400	80°F	172.7	183.7	190.1	156.3	204.6	121.4	166.9	169.0	179.5	153.1	196.9	113.0	158.3	167.9	172.7	114.0	185.3	114.0	142.8	151.0	164.1	147.8	179.5	110.9
	85°F	173.7	184.8	192.0	191.1	205.5	154.2	168.9	177.4	183.4	167.9	197.8	151.0	161.2	170.0	176.6	146.8	188.2	143.6	145.7	160.5	166.0	174.2	182.4	123.6

### SPHAC Evaporator Fan Perform-

						Externa	al Static	Pressur	e (inches	; W.C )			
Model	Supply CFM	0	.2	0	.4	0	.6	0	.8	1	.0	1	.2
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	700	691	.11	800	.14	927	.18	995	.21	1081	.25	1161	.29
24	800	790	.14	914	.18	1060	.24	1137	.28	1236	.33	1327	.38
	900	889	.18	1028	.23	1192	.30	1278	.35	1390	.42	1493	.48
2	1000	638	.13	741	.24	832	.30	912	.36	986	.43	1053	.69
36	1200	765	.26	889	.34	998	.43	1094	.52	1183	.62	1264	.72
	1400	892	.35	1037	.40	1164	.50	1276	.61	1380	.72	1475	.84
-	1400	600	.24	681	.28	755	.34	823	.39	893	.45	959	.51
48	1600	686	.31	778	.37	863	.44	941	.51	1021	.59	1096	.66
	1800	772	.39	875	.47	971	.56	1058	.65	1149	.75	1233	.84
	1800	610	.32	69	.40	769	.48	841	.56	910	.65	980	.75
60	2000	678	.40	769	.49	854	.59	934	.69	1011	.80	1089	.92
	2200	746	.48	846	.59	939	.71	1027	.83	1112	.97	1198	1.11

Note:

1. At higher evaporator airflows and wet bulb conditions, condensate carry over may occur. Adjust airflow downward as necessary.

2. Values include pressure drop from wet coil and clean filters.

3. Shaded areas indicate oversize motors

						Externa	Static	Pressur	e (inches	; w.c)			
Model	Supply CFM	0.	.2	0	.4	0	.6	0	.8	1	.0	1.	.2
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	3000	586	.76	633	.83	684	.93	741	1.05	783	1.15	830	1.28
96	3200	625	.86	675	.94	730	1.06	790	1,20	835	1.31	885	1.46
	3400	664	.97	717	1.06	776	1.20	839	1.35	871	1.48	940	1.65
	3700	518	.86	555	.97	606	1.12	647	1.25	694	1.43	736	1.54
120	4000	560	1.01	600	1.13	655	1.32	700	1.46	750	1.67	795	1.8
	4300	602	1.17	645	1.30	704	1.53	752	1.69	806	1.93	855	2.10
	4400	508	1.07	560	1.26	613	1.47	672	1.77	726	2.10	776	2.39
144	4800	542	1.22	598	1.43	654	1.67	717	2.00	774	2.36	828	2.72
	5200	576	1.38	636	1.61	695	1.88	762	2.27	822	2.66	880	3.07
	5600	518	1.56	562	1.75	606	1.94	648	2.16	690	2.39	731	2.63
180	6000	555	1.79	62	2.00	649	2.23	694	2.48	739	2.74	783	3.02
	6400	631	2.04	642	2.29	692	2.54	740	2.82	788	3.12	835	3.44

Note:

1. At higher evaporator airflows and wet bulb conditions, condensate carry over may occur. Adjust airflow downward as necessary.

2. Values include pressure drop from wet coil and clean filters.

3. Shaded areas indicate oversize motors

### SPHAC Condenser Fan Performance

						Externa	I Static	Pressure	e (inches	w.c )			
Model	Outdoor CFM	0	.2	0	.4	0	.6	0	.8	1	.0	1.	.2
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
24	2100	521	.29	628	.38	772	.47	809	.57	890	.67	967	.78
36	2800	471	.35	560	.46	638	.58	708	.71	781	.84	849	.98
48	3900	545	.72	617	.78	385	1.0	749	1.2	807	1.3	862	1.5
60	4800	394	.78	556	.95	514	1.2	562	1.3	626	1.6	687	1.9
96	5500	566	1.7	600	2.0	655	2.2	690	2.3	725	2.5	760	2.7
120	7400	525	2.4	571	2.7	613	2.9	653	3.1	692	3.4	730	3.7
144	8200	570	3.1	612	3.4	651	3.7	688	4.0	725	4.3	760	4.6
180	10000	533	3.5	568	3.9	602	4.2	635	4.6	667	5.0	699	5.4

# SPHAC 24 to 180 DIMENSIONAL DATA



UNIT	А	В	С	D	E	F	G	H	J	L	M	N	Р	R	S
24	71.0	54.0	26.0	10 7/16	9 5/16	23 1/2	21.0	15 3/4	13 5/8	42.0	29.0	23.0	18.0	38.0	25.0
36	71.0	57.0	30.0	10 1/2	13 1/4	27 1/2	21.0	18 3/4	16.0	42.0	29.0	23.0	22.0	38.0	25.0
48	84.0	65.0	30.0	13 5/8	12 3/8	27 1/2	24.0	18 3/4	16.0	48.0	36.0	23.0	30.0	44.0	32.0
60	87.0	68.0	33.0	13 5/8	13 1/4	30 1/2	24.0	22.0	19.0	51.0	36.0	23.0	34.0	47.0	32.0
96	94.0	74.0	34.0	16.0	14 7 <i>/</i> 8	31 1/2	30.0	17 1/2	19.0	50.0	44.0	30.0	38.0	46.0	40.0
120	104.0	84.0	36.0	19.0	17 1/4	33 1/2	36.0	22.0	19.0	54.0	50.0	30.0	43.0	50.0	46.0
144	122.0	90.0	36.0	19.0	22.0	33 1/2	40.0	22.0	19.0	72.0	56.0	30.0	48.0	68.0	52.0
180	126.0	94.0	42.0	19.0	22.0	39 1/2	40.0	24 7 <i>1</i> 8	24 7 <i>1</i> 8	70.0	56.0	38.0	48.0	66.0	52.0
										_				-	



# SPHAC / SPVAC

# Indoor Air Cooled Unit Louver sizing guidelines

One of the key issues in obtaining optimum performance from indoor air-conditioners is the proper selection of the condenser intake and discharge louvers or openings. Unlike outdoor air cooled units, which intake and discharge their cooling virtually unrestricted, indoor units must overcome the resistance of grilles or louvers at the outside wall - plus the restriction of any interconnecting ductwork. It is imperative that the total resistance not exceed the capacity as noted in the catalogue .

Our indoor air cooled air-conditioners are designed to accommodate the external static pressure loss associated with properly sized louvers of the **"storm proof" type**. This type of louver typically has a free area approximately 40-45% of the actual louver size. To determine the free area opening required for any given unit, adhere to the following guidelines:

-Size condenser air intakes for a maximum of 500 feet/minute nominal velocity -Size condenser air discharge for a maximum of 1000 feet/minute nominal velocity

The use of louvers or grilles with higher velocities is not recommended and will result in higher pressure drops; insufficient condenser air volume and possible water carry over thru the louver into the unit. This will cause a loss in system capacity, and may cause compressor shutdown during high ambient periods. Exceeding the static pressure capability of the condenser fan will result in insufficient condenser air volume.

Use only louver or grille sections that provide opposing deflection angles for air discharge and air intake, to ensure the unit does not short circuit. Protect the unit from weather conditions (rain, snow) entering through the condenser air intake. All outdoor air ducts should pitch away from the unit, toward the outside wall. Connect all ducts to unit with canvas section duct connectors or choose another suitable noise and vibration absorbing device.

To avoid any of the above issues the use of properly designed intake and exhaust hoods is recommended, while they are not the most aesthetically pleasing solution is some cases, the optimum performance of the unit should be the only consideration

Use only louver sections that provide opposing deflection angles for air discharge and air intake, to ensure the unit does not short circuit. Protect the unit from weather conditions (rain, snow) entering through the condenser air intake. All outdoor air ducts should pitch away from the unit, toward the outside wall. Connect all ducts to unit with canvas section duct connectors or choose another suitable noise and vibration absorbing device.

<u>NOTE</u>: The Manufacturer will not accept any liability resulting from incorrect installation of this equipment. Follow installation instructions carefully.



# SPHAC / SPVAC

# Indoor Air Cooled Unit Louver sizing guidelines



# SPHAC Optional Low Ambient Damper Kit Dimensional Data



PART NUMBER	TONNAGE	Α	В	С	TO SUIT
LADFMK-H-2	2	8"	21"	23-1/2"	SPHAC-024
LADFMK-H-3	3	8"	21"	27-1/2"	SPHAC-036
LADFMK-H-4	4	8"	24"	27-1/2"	SPHAC-048
LADFMK-H-5	5	8"	24"	30-1/2"	SPHAC-060
LADFMK-H-8	8	8"	30"	31-1/2"	SPHAC-096
LADFMK-H-10	10	8"	36"	33-1/2"	SPHAC-120
LADFMK-H-12	12	8"	40"	33-1/2"	SPHAC-144
LADFMK-H-15	15	8"	40"	39-1/2"	SPHAC-180

#### FEATURES:

- HEAVY GAUGE GALVALUM CABINET
- LOW LEAKAGE FRESH AIR AND RECIRCULATED AIR DAMPERS
- 24 VOLT AC SPRING RETURN FULLY MODULATING DAMPER ACTUATOR WITH MINIMUM POSITION POTENTIOMETER AND ELECTRONIC LOGIC CONTROL
- ELECTRONIC ENTHALPY SENSOR
- ELECTRONIC DISCHARGE TEMPERATURE CONTROL

# OPTIONAL AIR SIDE ECONOMIZER FOR

# SPHAC SERIES UNITS



SPHAC	Α	В	С	D	E	F	G	Н
024	71"	54"	26"	20"	24"	18"	14"	25"
036	71"	57"	30"	24"	28"	22"	18"	28"
048	84"	66"	30"	32"	36"	22"	26"	28"
060	87"	68"	33"	36"	40"	24"	30"	30"
096	94"	74"	34"	40"	44"	26"	34"	32"
120	104"	84"	36"	45"	48"	28"	38"	34"
144	122"	90"	36"	50"	54"	28"	44"	34"
180	126"	94"	42"	50"	54"	32"	44"	40"



# "SPVAC" VERTICAL-AIR COOLED Belt Driven Self Contained Air Conditioning Size 3 thru 25 Ton Capacities

Spinnaker Industries Inc. "SPVAC" vertical self-contained air conditioning packages offer a complete line of unit options for indoor, through-the-wall installation for high rise and single story building applications.

Spinnaker Industries Inc. compact, indoor design protects against potential vandalism, weathering and eliminates the need for any unsightly exterior equipment.

Floor-by-floor installation provides independent zone and temperature control, eliminating many of the complications encountered with roof-top equipment. Renovation and restoration projects are simplified where roof load, cooling tower, and construction restrictions can present application problems.

Spinnaker's SPVAC Air Cooled Indoor Vertical air conditioning design offers a high efficiency, quality engineered, quiet and dependable option to conventional rooftop equipment. The SPVAC has been designed to provide a solid answer for "NICHE" engineering requirements.

#### Spinnaker SPVAC Features and Benefits

- · Ideal for tenant change/renovation.
- · Protected from extreme weather conditions and vandalism.
- · Convenient access to all parts and service needs, while running in place.
- Allows independent metering / temperature control.
- · Sub-cooling built into draw thru condensing coil
- 3 to 15 models ship as unitized packages. 20 and 25 ton models are sipped as split units which include internal couplings for re-connection in field (by others). All units are fully charged and run tested prior to shipment.
- · Convertible horizontal or vertical evaporator discharge.
- Static capability to suit various installation requirements using belt driven centrifugal blowers and adjustable pulleys
- · Available in 3-25 ton capacities; multiple voltages.
- Filter Drier and TX Valve.
- · High efficiency scroll compressor(s) 410A refrigerant
- Stainless steel drain pan
- On board microprocessor control with diagnostics
- Compressor anti short cycle timer
- 1 year parts only warranty from date of shipment
- ETL compliant to ANSI/UL 1995, Can/ CSA-C22.2

# **GENERAL MECHANICAL SPECIFICATION(S)**

#### "SPVAC" VERTICAL SERIES SYSTEMS

Models, 3-15 tons ship as factory-charged unitized packages. 20 - 25 ton models are shipped as fully charged, split units which include internal couplings for re-connection in the field (by others). All packages are designed for free-standing mounting on the floor, or on a field fabricated structural steel stand. The 3, 4, 5, and 8 ton models are shipped with vertical evaporator fan discharge as standard. The 12, 15, 20 and 25 ton models are shipped with horizontal evaporator fan discharge as standard. The evaporator fan discharge configuration is field convertible on all units.

#### CABINET

All cabinets are completely constructed of 18 Ga. corrosion resistant "Galvalume" coated steel. The entire unit interior (both evaporator and condensing section) is insulated with 1/2" thick, 2 lb. density insulation. Service panels are equipped with lifting handles for ease of removal and handling. Duct flanges for condenser discharge, condenser intake, and evaporator discharge are provided with the unit for field connection and easy installation. Duct flange on evaporator return is incorporated into the filter frame.

#### COMPRESSORS

All models utilize "Scroll" type 410A hermetic compressors. Compressors are mounted on rubber isolators to minimize vibration transmission. Internal overload protection is provided. External high pressure and low pressure cutout switches are included in each compressor control circuit. Crankcase heaters are standard on all models.

#### **REFRIGERANT CIRCUITS**

The 3-5 ton units have a single refrigeration circuit and the 8-25 ton have two independent circuits. Each refrigeration circuit includes an adjustable thermal expansion valve (with external equalizer), liquid line filter drier and service gauge ports.

#### EVAPORATOR AND CONDENSER COILS

The evaporator and condenser coils are constructed of internally enhanced copper tubes mechanically bonded to rippled aluminum plate fins. Both coils are employed in a draw-thru configuration. Large evaporator coil face area minimizes potential water carry-over.

#### STAINLESS STEEL DRAIN PAN

Evaporator drain pan shall be fabricated from 304 stainless steel material. The 3/4 in NPT drain connection fitting is also from 304 stainless steel.

#### **INDOOR / OUTDOOR FANS**

Forward curved, double inlet and double width centrifugal blowers are used for both evaporator and condenser air movement. Blower wheels are fabricated of galvanized steel. Blowers employ solid steel shafts, supported in permanently lubricated ball bearings. All blowers are belt driven and come with variable-pitch motor sheaves which allows for field adjustment of blower rpm/cfm.

#### ELECTRICAL/CONTROLS

All units are completely factory wired with all necessary controls. Manual reset protection is provided on both evaporator and condenser motors. A manual reset circuit is also provided on each compressor control circuit in the event of high/low pressure cutout. A 24 volt control circuit, with an oversized transformer, is provided for field connection. Units include an on board microprocessor control with diagnostics, Compressor anti short cycle protection is standard.

#### FILTERS

All models are shipped with 2 inch thick medium-efficiency throw-away filters factory installed. Filter rack is external to the cabinet (shipped loose).

#### **Extended Compressor Warranty**

An optional, additional four year protection plan on the compressor is available at modest cost at the time of original unit sale only. This obligates Spinnaker Industries Inc. to replace f.o.b. factory, a defective compressor of equal capacity free of charge. No responsibility is assumed by Spinnaker Industries Inc. for refrigerant, labor, or freight to and from the factory.

# **OPTIONAL ACCESSORIES**

#### FACTORY INSTALLED

#### **Oversized Evaporator Fan Motors**

Increased horsepower motors and drive components are available for those applications where external static pressure requirements exceed the capability of the standard motor.

#### **Oversized Condenser Fan Motors**

Increased horsepower motors and drive components are available for those applications where external static pressure requirements exceed the capability of the standard motor.

#### **Corrosion Resistant Coatings**

Condenser and/or evaporator coils shall have ElectroFin baked flexible polymeric coating utilizing cathodic electro coat (e-coat) technology.

#### **Hot Gas Bypass**

Adjustable hot gas regulator and all necessary piping shall be installed on lead compressor circuit. Bypass capacity shall be minimum 50% of compressor capacity. The Bypass valve opens at a preset suction pressure to prevent coil freeze-up at light evaporator load, or low airflow conditions. The use of the field installed Low Ambient Control is strongly recommended when Hot Gas Bypass is installed.

#### **Extended Compressor Warranty**

An optional, additional four year protection plan on the compressor is available at modest cost at the time of original unit sale only. This obligates Spinnaker Industries Inc. to replace f.o.b. factory, a defective compressor of equal capacity free of charge. No responsibility is assumed by Spinnaker Industries Inc. for refrigerant, labor, or freight to and from the factory.

#### FIELD INSTALLED

#### Hot Water & Steam Coils

Hydronic heating coils shall mount on return air side of the heating coil. The unit filter rack shall mount to the entering air side of the heating coil.

#### **Discharge Plenum**

Plenums shall mount on top of the evaporator section with fans arranged for vertical discharge. Double deflection grills shall allow air discharge in multiple directions

#### Air Side Economizer

Air Side Economizers are available as field supplied options. The installation of these units will provide for substantial energy savings by utilizing cool outside air in place of mechanical cooling whenever conditions permit.

#### Low Ambient Control

Units will operate reliably at an outdoor ambient down to 60 deg F. In applications requiring operation below this temperature, the field installed low ambient damper kit option is required. The effective range for this option is -30°F. This optional kit consists of a damper section, modulating actuator and a pressure transducer / control. Factory installed crankcase heaters are provided on each compressor

#### AIR SIDE ECONOMIZER

#### APPLICATION

Spinnaker Industries Inc. air side economizers are designed to meet current building and legislated codes for indoor ventilation. In addition to improving indoor air quality, economizers provide substantial energy savings by utilizing cool outside air instead of mechanical cooling whenever outside conditions permit.

The outlet of the air side economizer is fitted to the return air inlet of the packaged air conditioning unit. The two inlets to the economizer are fitted to the return air and outside air ductwork. Opposed blade dampers located in each inlet modulate the incoming air streams as they enter the mixing box. The outside air damper can be maintained at a predetermined minimum position. In this way the buildings ventilation requirements can be met at all times.

#### GENERAL

Consisting of an integrated mixing box and control assembly, the economizer mates easily to the unit. A factory installed wiring harness and jack plug assembly eliminates the need for field wiring, reducing valuable installation time. No additional controls or transformers are necessary to complete the installation.

**Mixing Box** - The mixing box is manufactured from 18 gauge steel and completely insulated with ½", 2lb density insulation. The mixing box is complete with fully modulating opposed blade dampers and linkage. Opposed blade dampers ensure the best possible mixing of indoor and outdoor air streams.

**Low Leakage** - Low leakage dampers meet the criteria of less than 10 cfm per square foot at 4" w.g. (0.5% at 2000 fpm). All damper blades are provided with neoprene seals providing a tight seal and quiet operation. The damper may be located on the left or right side of the mixing box on the vertical mixing boxes, and on the left side only on the horizontal mixing boxes.

**Honeywell W7215 Economizer Control Module** - The W7215 is a multi-functional controller capable of analyzing dry bulb, enthalpy and air quality inputs. An output from the economizer module will position the mixing box dampers to provide energy savings through the introduction of outside air for free cooling. Additionally, the air quality within a building can be improved through the introduction of outside air through the mixing box dampers when conditions are appropriate.

# **SPVAC Electrical Data**

MODEL	SUPPLY		COMP	RESSOR	EVAP	FAN	COND	FAN	MIN. CCT.	MAX FUSE
Series	VOLTAGE	QTY	RLA	LRA	HP	FLA	HP	FLA	AMPACITY	CCT. BKR. AMP
	208-230/1/60	1	15.9	72.0	0.75	4.6	1.0	6.8	31.3	40
26	208-230/3/60	1	10.4	63.0	0.75	3.1	1.0	3.5	19.6	30
30	460/3/60	1	4.6	31.0	0.75	1.4	1.0	1.6	8.8	15
	575/3/60	1	4.1	28.0	0.75	1.1	1.0	1.3	7.5	15
	208-230/1/60	1	20.0	112.0	0.75	4.6	1.5	8.6	38.2	50
40	208-230/3/60	1	13.2	88.0	0.75	3.1	1.5	5.5	25.1	40
40	460/3/60	1	6.0	44.0	0.75	1.4	1.5	2.5	11.4	20
	575/3/60	1	4.6	30.0	0.75	1.1	1.5	2.0	8.9	15
	208-230/1/60	1	24.3	117.0	1.0	6.8	2.0	12.4	49.6	60
60	208-230/3/60	1	15.3	85.0	1.0	3.5	2.0	6.6	33.1	50
00	460/3/60	1	6.9	42.0	1.0	1.6	2.0	3.0	13.2	25
	575/3/60	1	54.0	35.0	1.0	1.3	2.0	2.4	10.5	20
	208-230/3/60	2	13.6	83.0	1.5	5.5	3.0	8.8	45.0	60
96	460/3/60	2	68.0	41.0	1.5	2.5	3.0	4.0	21.9	30
	575/3/60	2	4.6	33.0	1.5	2.0	3.0	3.4	15.8	25
	208-230/3/60	2	17.6	123.0	2.0	6.6	5.0	13.9	60.1	80
120	460/3/60	2	8.9	62.0	2.0	3.0	5.0	6.3	29.3	40
	575/3/60	2	6.1	40.0	2.0	2.4	5.0	5.0	21.1	30
	208-230/3/60	2	20.4	155.0	3.0	8.8	5.0	13.9	68.6	90
144	460/3/60	2	10.2	75.0	3.0	4.0	5.0	6.3	33.2	50
	575/3/60	2	8.2	54.0	3.0	3.4	5.0	5.0	26.9	40
	208-230/3/60	2	24.3	164.0	3.0	8.8	5.0	13.9	77.3	100
180	460/3/60	2	12.0	73.0	3.0	4.0	5.0	6.3	37.3	50
	575/3/60	2	6.8	42.0	3.0	3.4	5.0	5.0	23.7	35
	208-230/3/60	2	31.5	225.0	5.0	13.9	7.5	20.5	106.0	140
240	460/3/60	2	16.7	114.0	5.0	6.3	7.5	9.3	53.1	75
	575/3/60	2	12.3	80.0	5.0	5.0	7.5	7.5	40.1	55
	208-230/3/60	2	35.0	239.0	7.5	20.5	7.5	20.5	119.7	150
300	460/3/60	2	18.0	125.0	7.5	9.3	7.5	9.3	49.1	80
	575/3/60	2	14.3	80.0	7.5	7.5	7.5	7.5	47.1	60
	•								•	

# **SPVAC Nomenclature**



O= ACCESSORIES

# **SPVAC GENERAL DATA**

Model	36	48	60
Nominal cooling (Tons)	3	4	5
Cooling Performance			
Gross Cooling Capacity (BTUH)	36100	48300	62000
Net Cooling (BTUH)	35900	48000	61000
Design CFM	1200	1600	2000
EER Rating	13.1	13.1	13.3
Compressor Type		Scroll	
Number Used	1	1	1
Evaporator Air Coil-Type	Enhanced Cop	oper Tubes, Enhanced /	Aluminum Fins
Refrigerant Control		TX Valve	
Condensor Air Coil-Type	Enhanced Cop	oper Tubes, Enhanced /	Aluminum Fins
Evaporator Fan Type	Ce	entrifugal, Forward Curv	red
Number Used	1	1	1
Drive		Adjustable V Belt	
Diameter x Width (in)	10x10	12x9	12x12
Motor HP (Standard / Oversized)	.75 / 1.0	.75 / 1.0	1.0 / 1.5
Condenser Fan Type	Ce	entrifugal, Forward Curv	red
Number Used	1	1	1
Diameter x Width (in)	15x15	15x15	15x11
Drive		Adjustable V Belt	
Motor HP (Standard / Oversized)	1.0 / 1.5	1.5 / 2.0	1.5 / 2.0
Filters			
Quantity-Size (in) 2" Thick :Disposable	2-18x20	2-18x22	2-18x25
Condensate Drain Connection Size (in)		3/4 FPT	
Weight			
Shipping	795	922	940

Note: Cooling performance is rated at : 1) 80°F entering dry bulb / 67°F wet bulb entering air temperature ( air on evaporator ) 2) 95°F entering dry bulb / 75°F wet bulb entering air temperature ( air on condenser ) 3) At CFM listed

Model	96	120	144	180	240	300
Nominal cooling (Tons)	8	10	12	15	20	25
Cooling Performance						
Gross Cooling Capacity (BTUH)	97900	127500	148300	180000	252000	303200
Net Cooling (BTUH)	97000	125000	145000	177000	248000	311000
Design CFM	3200	4000	4800	6000	8000	10000
EER Rating	11.3	11.3	11.3	11.0	11.0	10.7
Compressor Type			Scr	oll		
Number Used	2	2	2	2	2	2
Evaporator Air Coil-Type		Enhanced Co	opper Tubes, E	Enhanced Al	uminum Fins	
Refrigerant Control			TX Va	alve		
Condensor Air Coil-Type	í.	Enhanced Co	opper Tubes, E	Enhanced Al	uminum Fins	(
Evaporator Fan Type		c	entrifugal, Fo	rward Curve	d	
Number Used	2	2	2	2	2	2
Drive			Adjustable	e V Belt		0
Diameter x Width (in)	12x9	12x9	12x12	15x11	15x15	15x15
Motor HP (Standard / Oversized)	1.5/2.0	2.0/3.0	3.0 / 5.0	3.0/5.0	5.0 / 7.5	7.5 / 10.0
Condenser Fan Type		C	entrifugal, Fo	rward Curve	d	
Number Used	2	2	2	2	2	2
Diameter x Width (in)	15x11	15x11	18x13	18x13	18x18	18x18
Drive			Adjustable	e V Belt		
Motor HP (Standard / Oversized)	2.0 / 5.0	5.0 / 7.5	5.0 / 7.5	5.0/7.5	7.5 / 10.0	7.5 / 10.0
Filters						
Quantity-Size (in) 2" Thick :Disposable	3-18x25	2-24x20	4-14x20	6-14x24	4-18x25	6-20x20
		1-24x24	2-14x25		2-18x24	2-20x24
Condensate Drain Connection Size (in)			1.0 F	PT		
Weight						
Shipping	1340	1360	1780	1875	1965	2235

Note: Cooling performance is rated at : 1) 80°F entering dry bulb / 67°F wet bulb entering air temperature ( air on evaporator ) 2) 95°F entering dry bulb / 75°F wet bulb entering air temperature ( air on condenser ) 3) At CFM listed

## SPVAC- 36 @ 1200 CFM Cooling Performance

												Ambier	it Conde	ensing T	empera	ture									
SDV/	10036			85	°F					ĝ	95°F					105	ΰ°F			2		11	l5°F		
UI V7	10000			Ev	VB					E	EWB					EV	VB					E	WB		
		62	?°F	67	°F	72	°F	62	!°F	67	۴F	72	°F	62	°F	67	°F	72	°F	62	°F	67	°F	72	έ°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	30.6	25.4	33.9	20.6	36.2	15.3	29.6	23.9	32.1	19.7	34.8	14.6	28.2	23.5	30.8	18.8	33.4	14.2	27.0	23.0	29.2	18.4	32.0	14.4
1000	80°F	30.9	30.3	34.3	25.7	36.7	20.0	29.9	28.4	32.5	24.3	35.1	19.3	28.6	28.1	31.2	23.4	33.8	18.9	27.3	27.4	29.6	23.0	32.4	18.3
	85°F	31.3	34.7	34.7	30.9	37.1	24.6	30.3	32.4	32.9	28.7	35.6	23.9	28.9	31.8	31.6	27.9	34.1	23.6	27.7	30.8	29.9	27.4	32.8	20.6
	75°F	31.6	27.4	34.8	21.8	37.2	16.0	30.5	26.2	33.0	21.3	35.6	15.4	28.9	25.7	31.7	20.8	34.3	15.0	27.7	25.5	30.2	20.3	27.4	13.5
1200	80°F	31.9	33.2	35.3	27.7	37.7	21.5	30.8	31.5	33.4	26.9	36.0	20.8	29.4	30.9	32.0	26.3	34.8	20.5	28.0	30.8	30.6	25.9	33.2	19.9
	85°F	32.3	35.7	35.6	33.8	38.1	26.9	31.2	34.5	33.8	32.3	36.5	26.2	29.8	33.0	32.4	31.8	35.9	25.8	28.4	31.6	30.9	31.3	33.6	22.5
	75°F	32.3	29.5	35.3	23.1	38.0	16.8	31.1	28.8	33.6	23.0	36.3	16.2	29.6	28.3	32.3	22.4	34.9	15.6	26.7	26.1	30.7	21.4	33.5	18.0
1400	80°F	32.7	35.9	35.8	29.7	38.5	23.1	31.5	34.8	34.0	29.3	36.8	22.3	29.9	33.5	32.7	28.9	35.4	21.8	26.9	30.1	31.0	28.2	33.9	21.2
	85°F	33.0	36.7	36.1	36.5	38.9	29.4	31.9	35.4	34.5	34.9	37.2	28.7	30.3	33.7	33.0	35.3	35.9	27.9	27.3	30.5	31.4	34.4	34.4	23.5

# SPVAC- 48 @ 1600 CFM Cooling Performance

												Ambier	it Conde	ensing T	empera	ture									
CDV/	C049			85	°F					ç	95°F					105	i°F					11	15°F		
5577	10040			EV	٧B					E	EWB					EV	VB					E	WB		
		62	°F	67	۴F	72	۴F	62	°F	67	۴F	72	۴F	62	°F	67	°F	72	۴F	62	۴F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
2002000000	75°F	41.0	32.8	45.5	26.6	48.6	19.7	39.7	30.8	43.0	25.4	46.6	18.9	37.8	30.3	41.3	18.3	44.8	18.3	36.3	29.6	39.1	23.7	42.9	18.6
1450	80°F	41.4	39.2	46.0	33.2	49.1	25.8	40.1	36.6	43.6	31.4	47.1	24.9	38.3	36.2	41.8	24.4	45.2	24.4	36.6	35.4	39.7	29.6	43.4	23.6
	85°F	42.0	44.8	46.4	39.9	49.8	31.8	40.6	41.9	44.0	37.0	47.7	30.8	38.8	41.1	42.3	30.4	45.7	30.4	37.1	39.8	40.1	35.4	43.9	26.6
	75°F	42.4	35.5	46.6	28.2	49.9	20.7	40.9	33.9	44.3	27.5	47.7	19.9	38.6	33.2	42.5	19.4	46.0	19.4	37.1	32.9	40.5	26.2	36.7	17.4
1600	80°F	42.8	42.8	47.1	35.7	50.5	27.8	41.3	40.7	44.8	34.8	48.3	26.9	39.4	39.5	42.9	26.5	46.6	26.5	37.6	39.8	41.0	33.5	44.5	25.7
	85°F	43.3	46.1	47.7	43.6	51.1	34.8	41.8	44.5	45.2	41.7	48.8	33.9	39.9	42.7	43.4	33.4	48.0	33.3	38.0	40.8	41.4	40.5	45.0	29.1
	75°F	43.3	38.1	47.4	29.8	51.0	21.7	41.7	37.2	45.0	29.6	48.7	20.9	39.7	36.5	43.3	20.2	46.8	20.2	35.7	33.7	41.1	27.7	44.9	23.2
1800	80°F	43.8	46.4	47.9	38.3	51.6	29.8	42.2	44.9	45.6	37.8	49.3	28.9	40.1	43.2	43.8	28.2	47.5	28.2	36.1	38.8	41.6	36.4	45.5	27.4
	85°F	44.2	47.4	48.4	47.2	52.2	38.0	42.6	45.7	46.3	45.1	49.9	37.0	40.6	43.5	44.3	36.1	48.1	36.1	36.6	39.4	42.1	44.4	46.1	30.3

# SPVAC- 60 @ 2000 CFM Cooling Performance

												Ambier	it Conde	ensing T	empera	ture									
CDVA	0900			85	°F					ç	I5°F					105	5°F					11	l5°F		
JE VA	0000			Ev	VB					E	EWB					EV	VB					E	WB		
		62	r F	67	°F	72	°F	62	۴F	67	"F	72	°F	62	r F	67	°F	72	°F	62	°F	67	۴F	72	۴F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	52.5	42.5	58.3	34.5	62.2	25.6	50.9	40.0	55.1	32.9	59.7	24.5	48.4	39.4	52.9	23.8	57.2	23.8	46.4	38.5	50.1	30.8	55.0	24.2
1800	80°F	53.1	50.9	58.8	43.1	62.9	33.5	51.4	47.5	55.8	40.7	60.3	32.3	49.1	47.0	53.5	31.6	57.9	31.6	46.9	46.0	50.9	38.5	55.6	30.6
	85°F	53.8	58.1	59.5	51.8	63.7	41.3	52.0	54.1	56.4	48.0	61.1	40.0	49.6	53.3	54.1	39.5	58.6	39.5	47.5	51.7	51.4	46.0	56.3	34.6
	75°F	54.2	46.1	59.7	36.6	63.8	26.9	52.4	44.1	56.8	35.7	61.1	25.8	49.4	43.1	54.3	25.2	58.8	25.2	47.3	42.7	51.9	34.0	47.0	22.5
2000	80°F	54.8	55.6	60.3	46.3	64.7	36.1	52.9	52.8	57.3	45.2	61.9	34.9	50.5	51.3	55.0	34.4	59.7	33.4	48.1	51.7	52.5	43.5	57.0	33.4
	85°F	55.5	59.8	61.1	56.6	65.4	45.2	53.5	57.7	57.9	54.2	62.5	44.0	51.0	55.1	55.6	43.4	61.5	43.2	48.7	52.9	53.1	52.5	57.7	37.7
	75°F	55.5	49.5	60.6	38.7	65.2	28.2	53.4	48.2	57.7	38.5	62.4	27.1	50.9	47.4	55.4	26.2	60.0	26.2	45.7	43.8	52.5	36.0	57.4	30.1
2200	80°F	56.0	60.2	61.4	49.7	66.1	38.7	54.1	50.8	58.4	49.1	63.2	37.5	51.4	55.1	56.0	36.6	60.7	36.6	46.2	49.4	53.3	47.2	58.3	35.6
	85°F	56.6	61.2	61.9	61.2	66.8	49.4	54.6	58.2	59.2	53.2	63.8	48.0	52.0	56.1	56.8	46.8	61.6	46.8	46.9	50.0	53.9	57.6	59.0	39.4

# SPVAC- 96 @ 3200 CFM Cooling Performance

												Ambien	it Conde	ensing T	empera	ture									
SDV/	2007/			85	°F					Ş	15°F					105	5°F					11	I5°F		
U VF	10030			EV	٧B					E	EWB					EV	VB			2		E	WB		
2		62	°F	67	°F	72	۴F	62	°F	67	۴F	72	°F	62	°F	67	°F	72	°F	62	°F	67	۴F	72	.°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
	75°F	88.8	70.0	98.6	56.7	105.2	42.1	86.0	65.8	93.1	54.2	101.2	40.3	81.9	64.8	89.6	39.1	95.9	39.1	78.6	63.3	84.7	50.7	93.0	39.8
3000	80°F	89.9	83.8	99.6	71.0	106.1	55.1	87.0	78.3	94.4	67.0	102.2	53.2	83.0	77.4	90.5	52.0	97.9	52.0	79.4	75.8	86.0	63.3	93.9	50.4
	85°F	91.0	95.6	100.2	85.3	108.1	68.0	88.0	89.0	95.4	79.1	103.2	65.8	83.9	87.8	91.5	65.0	99.0	65.0	80.3	85.2	87.0	75.8	95.2	57.0
	75°F	91.8	75.9	101.2	60.3	108.1	44.3	88.6	72.5	96.0	58.7	103.2	42.5	83.5	71.0	92.0	41.5	99.2	41.5	80.0	70.3	87.8	55.9	79.6	37.1
3200	80°F	92.8	91.4	102.2	76.4	109.1	59.5	89.6	86.9	97.0	74.4	104.2	57.5	85.4	84.4	93.0	56.6	101.2	54.9	81.4	85.2	88.8	71.6	96.3	54.9
	85°F	93.8	98.3	103.2	93.2	110.1	74.4	90.5	94.7	97.9	89.1	106.1	72.4	86.3	90.7	93.9	71.4	104.2	71.2	82.3	87.2	89.9	86.4	97.6	62.2
	75°F	93.8	81.4	102.2	63.6	110.1	46.4	90.4	79.4	97.6	63.3	105.2	44.6	86.0	78.1	93.6	43.2	101.2	43.2	77.3	72.0	88.9	59.3	97.1	49.5
3400	80°F	94.7	99.1	104.2	81.8	112.1	63.6	91.5	83.6	98.8	80.8	107.1	59.7	87.0	90.6	94.7	60.2	102.2	60.3	78.1	81.3	90.2	77.7	98.6	58.6
	85°F	95.7	100.6	105.2	100.7	113.1	81.3	92.4	95.8	100.2	87.7	108.1	79.1	88.0	92.4	96.0	77.0	104.2	77.1	79.4	82.2	91.1	94.2	99.2	64.8

# SPVAC- 120 @ 4000 CFM Cooling Performance

												Ambier	it Conde	ensing T	empera	ture									
CDV	VC120			85	°F					Ş	I5°F					105	۴F					11	l5°F		
01 17	10120			EV	VB					E	EWB					EV	vВ					E	WB		
		62	°F	67	°F	72	°F	62	°F	67	۴F	72	°F	62	°F	67	°F	72	°F	62	°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	114.8	89.9	127.1	72.8	135.3	54.0	110.7	84.4	119.9	70.7	130.2	52.1	105.6	83.1	115.8	50.1	124.0	50.1	101.2	81.2	108.7	65.0	119.9	42.6
3700	80°F	115.8	107.6	128.1	91.0	136.3	70.7	111.7	100.4	122.0	86.0	131.2	68.3	106.6	99.4	116.9	66.4	125.1	66.8	102.3	97.3	110.7	81.2	121.0	64.7
	85°F	116.9	119.2	129.2	109.7	139.4	87.2	113.8	113.9	123.0	101.5	133.3	84.4	107.6	112.9	117.9	83.3	127.1	83.5	103.5	104.4	111.7	97.2	123.0	73.1
	75°F	117.9	97.3	130.2	77.3	139.4	56.8	113.8	93.1	124.0	75.3	133.3	54.5	107.6	90.0	118.9	53.3	128.1	53.3	102.5	90.2	112.8	71.7	102.5	47.6
4000	80°F	119.9	117.1	131.2	98.0	140.4	76.3	115.8	111.8	125.0	95.5	134.3	73.7	109.7	108.7	119.9	72.7	130.2	99.4	104.6	105.5	114.8	91.9	124.0	70.4
	85°F	121.0	123.4	133.3	119.2	141.5	95.5	116.9	119.2	126.1	113.9	136.3	92.9	110.7	111.8	121.0	91.6	134.3	91.3	105.6	106.6	115.8	110.8	126.1	79.8
	75°F	121.0	104.4	131.2	81.7	141.5	59.5	115.8	101.9	126.1	81.2	135.3	57.3	110.7	100.1	121.0	53.6	130.2	55.4	99.6	92.3	114.8	76.1	125.1	63.5
4300	80°F	122.0	123.4	134.3	105.0	144.5	81.7	117.9	113.9	127.1	103.6	138.4	76.6	111.7	112.9	122.0	77.2	131.2	77.3	100.7	102.1	115.8	99.8	127.1	75.2
	85°F	123.0	124.5	135.3	128.7	145.6	104.3	118.9	119.2	129.2	112.9	139.4	101.5	113.8	115.0	124.0	98.9	132.2	99.0	102.3	103.4	116.9	118.2	128.1	83.1

## SPVAC-144 @ 4800 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SDV	C144			85	۴					9	5°F					105	ï۴F					11	5°F		
JF VA	IC 144			EV	VB					E	WB					EV	VB		2			E	WB		1
		62	°F	67	°F	72	۴F	62	°F	67	°F	72	°F	62	°F	67	°F	72	°F	62	°F	67	۴F	72	۴F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	133.2	104.0	146.7	83.9	156.3	62.3	128.3	97.4	139.0	81.6	150.5	60.1	122.6	95.9	134.1	57.8	143.8	57.8	116.8	93.6	125.5	75.0	139.0	49.2
4500	80°F	134.1	124.4	148.6	105.1	157.3	81.6	129.3	116.3	140.9	99.1	151.5	78.7	123.5	114.2	135.1	76.6	144.8	77.0	118.7	112.2	128.3	93.7	139.9	74.6
	85°F	135.1	137.7	149.6	126.5	161.2	100.7	131.2	131.6	141.9	117.3	154.4	97.4	124.5	130.6	136.1	96.2	146.7	96.3	119.7	120.4	129.3	112.2	141.9	84.4
	75°F	136.1	112.2	150.5	89.3	161.2	65.5	131.2	107.1	143.8	86.9	154.4	62.9	124.5	104.0	138.0	61.5	148.6	61.5	118.7	104.0	130.3	82.7	118.7	54.9
4800	80°F	139.0	134.6	151.5	113.2	162.1	88.0	134.1	128.5	145.0	110.3	155.4	85.1	126.4	125.5	139.0	83.8	150.5	78.4	120.6	121.4	132.2	106.1	143.8	81.2
	85°F	139.9	141.8	154.4	137.7	164.1	110.2	135.1	137.7	145.7	131.6	157.3	107.1	128.3	128.5	139.9	105.1	155.4	99.8	122.6	122.4	134.1	127.5	145.7	92.0
	75°F	139.9	120.4	151.5	94.1	164.1	68.6	134.1	117.3	145.7	93.7	156.3	66.1	128.3	115.3	139.9	61.8	150.5	63.9	114.8	106.1	132.2	87.7	144.8	73.2
5100	80°F	140.9	142.8	155.4	121.4	166.9	94.2	136.1	131.6	146.7	119.3	160.2	88.3	129.3	130.6	140.9	89.0	151.5	89.3	116.8	117.3	134.1	115.3	146.7	86.8
	85°F	141.9	143.8	156.3	148.9	167.9	120.4	138.0	137.7	149.6	130.6	161.2	117.3	131.2	132.6	143.8	114.2	153.4	114.2	118.7	119.3	135.1	135.7	148.6	95.9

### SPVAC- 180 @ 6000 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SDV/	C180			85	°F					9	5°F					105	5°F					11	15°F		
0.07	100			EV	VB					E	EWB					EV	VB					E	WB		
		62	۴F	67	۴	72	°F	62	۴F	67	°F	72	۴F	62	°F	67	۴	72	°F	62	°F	67	۴	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
2	75°F	164.3	128.9	180.8	104.3	193.4	77.5	158.4	120.7	172.0	101.5	185.7	74.7	151.6	119.7	165.2	71.9	177.9	71.9	143.9	116.6	154.5	93.3	172.0	61.2
5600	80°F	165.2	154.5	183.7	130.9	194.4	101.5	159.4	144.2	174.0	123.8	186.6	100.0	152.6	142.2	167.2	95.3	178.8	95.9	146.8	139.1	158.4	116.6	173.0	92.7
	85°F	167.2	171.9	184.7	157.5	199.3	124.8	162.3	163.7	175.0	146.3	190.5	120.7	153.6	160.6	168.2	119.7	180.8	119.7	147.7	149.4	159.4	145.3	175.0	105.4
	75°F	168.2	139.1	185.7	110.5	199.3	81.4	162.3	133.0	177.9	108.4	190.5	78.3	153.6	125.8	170.1	76.5	183.7	76.5	146.8	128.9	161.4	103.3	146.8	68.2
6000	80°F	172.0	167.8	186.6	140.2	200.2	109.5	165.2	159.6	179.0	137.1	191.5	105.4	156.5	156.5	172.0	108.4	185.7	130.9	148.7	151.4	163.3	132.0	177.9	101.1
	85°F	173.0	176.0	190.5	171.9	202.2	137.1	167.2	171.9	179.8	163.7	194.4	133.0	158.4	159.6	173.0	130.9	191.5	142.2	151.6	152.4	165.2	158.6	179.8	114.6
	75°F	173.0	149.4	186.6	116.6	202.2	85.4	165.2	146.3	179.8	116.6	193.4	82.2	158.4	143.2	173.0	76.9	185.7	79.5	141.9	132.0	163.3	109.5	178.8	91.1
6400	80°F	174.0	178.0	191.5	151.4	206.1	117.6	168.2	163.7	180.8	148.3	198.3	109.5	159.4	162.7	174.0	110.5	186.6	110.5	143.9	146.3	165.2	143.2	180.8	107.4
	85°F	175.0	179.0	193.4	185.2	207.0	149.4	170.1	171.9	184.7	162.7	199.3	146.3	162.3	164.7	177.9	142.2	189.5	139.1	146.8	155.5	167.2	168.8	183.7	119.7

# SPVAC- 240 @ 8000 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SDV/	00240			85	۴					9	5°F					105	5°F					1′	15°F		
JE VI	10240			EV	٧B					E	EWB					EV	VB					E	WB		
		62	۴F	67	۴F	72	۴F	62	°F	67	۴F	72	°F	62	°F	67	۴F	72	°F	62	r°F	67	۴F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	227.6	170.4	251.0	143.8	268.2	107.6	219.5	167.2	238.8	140.6	257.0	103.2	210.3	160.8	228.6	99.4	246.9	99.5	199.1	160.8	214.4	128.9	238.8	84.6
7500	80°F	228.6	213.0	255.0	181.1	269.2	140.6	220.5	199.2	240.8	170.4	259.1	138.5	211.3	192.8	231.6	132.1	247.9	132.1	203.2	192.8	219.5	160.8	239.8	127.8
	85°F	231.6	237.5	256.0	217.3	276.4	172.5	224.5	225.8	242.8	202.4	264.2	167.2	213.4	206.6	232.7	165.1	251.0	165.1	205.2	206.6	220.5	201.3	242.8	145.9
	75°F	232.7	192.8	257.0	152.3	276.4	112.9	224.5	184.2	246.9	150.2	264.2	108.6	213.4	177.9	226.6	105.8	255.0	105.9	203.2	177.9	223.5	142.7	203.2	94.4
8000	80°F	248.9	232.2	260.1	193.8	277.4	151.2	228.6	220.5	248.0	189.7	265.2	145.9	216.4	208.7	238.8	150.2	257.0	181.1	206.2	208.7	226.6	182.1	246.9	139.5
	85°F	240.8	242.8	264.2	237.5	280.4	189.6	231.6	237.5	248.9	225.8	269.2	184.2	219.5	210.9	239.8	181.1	265.2	197.0	210.3	210.9	228.6	219.4	248.9	158.7
	75°F	240.8	206.6	260.1	160.8	280.4	118.2	228.6	202.4	248.9	160.8	268.2	114.0	219.5	182.1	239.8	106.4	257.0	109.7	197.1	141.6	226.6	151.2	247.9	114.0
8500	80°F	240.8	246.0	265.2	208.7	285.5	162.9	232.7	225.8	251.0	205.5	275.3	151.2	220.5	202.4	240.8	152.3	259.1	152.3	199.1	182.1	228.6	198.1	251.0	148.0
	85°F	242.8	247.1	268.2	255.6	286.5	206.6	235.7	226.8	256.0	224.7	276.4	202.4	224.5	215.1	246.9	197.0	262.1	192.8	203.2	202.4	231.6	211.9	255.0	165.1

## SPVAC- 300 @ 10000 CFM Cooling Performance

												Ambien	t Conde	ensing T	empera	ture									
SD//4	C300			85	°F					9	5°F					105	۴F					11	5°F		
	0000			EV	VB					E	WB					EV	/B					E	WB		
		62	°F	67	۴F	72	°F	62	°F	67	°F	72	°F	62	°F	67	°F	72	°F	62	°F	67	°F	72	°F
CFM	EDB	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC								
	75°F	274.6	215.7	300.5	174.2	323.5	129.6	265.0	202.2	288.0	170.1	309.1	124.4	253.4	200.1	276.5	72.9	297.6	120.3	241.0	195.0	259.2	155.6	288.0	102.2
9000	80°F	276.5	258.2	307.2	218.8	323.5	170.1	266.9	240.6	290.9	206.4	312.0	167.0	255.4	237.5	280.3	159.7	299.5	159.7	245.8	232.3	265.0	195.0	289.9	154.5
	85°F	280.3	287.2	309.1	263.4	334.1	208.4	271.7	273.8	292.8	244.7	318.7	202.2	257.3	268.6	281.3	200.1	302.4	200.1	247.7	249.9	266.9	239.5	292.8	176.3
	75°F	281.3	232.3	311.0	184.6	334.1	135.8	271.7	221.9	297.6	181.5	318.7	130.7	257.3	210.5	285.1	127.6	307.2	127.6	245.8	215.7	269.8	172.1	245.8	114.1
10000	80°F	288.0	280.0	312.0	234.4	335.0	182.5	276.5	266.5	300.0	229.2	320.6	176.3	262.1	261.3	288.0	181.5	311.0	218.8	248.6	253.0	273.6	220.9	297.6	168.0
	85°F	289.9	293.5	318.7	287.2	338.9	229.2	280.3	287.2	301.4	273.8	325.4	221.9	265.0	266.5	289.9	218.8	320.6	237.5	253.4	255.1	276.5	265.5	301.4	191.8
	75°F	289.9	248.9	312.0	195.0	338.9	143.1	276.5	263.4	301.4	195.0	323.5	137.9	265.0	238.5	289.9	128.6	311.0	132.7	237.1	220.9	273.6	182.5	299.5	152.4
11000	80°F	290.9	297.6	320.6	253.0	344.6	197.0	281.3	273.8	302.4	247.8	331.2	182.5	266.9	271.7	290.9	184.6	312.0	184.6	241.0	244.7	276.5	239.5	302.4	179.4
	85°F	292.8	298.7	323.5	309.0	346.6	249.9	284.2	287.2	309.1	271.7	333.1	244.7	271.7	274.8	297.6	237.5	317.8	232.3	245.8	260.3	280.3	282.1	307.2	200.1

### **SPVAC Evaporator Fan Performance**

						Externa	Static	Pressure	e (inches	w.c)			
Model	Supply CFM	0.	.2	0	.4	0.	.6	0	.8	1	.0	1.	.2
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
202-2229	1000	750	.22	823	.30	928	.36	1052	.46	1085	.54	1146	.63
36	1200	820	.26	900	.35	1015	.42	1150	.53	1186	.63	1253	.73
	1400	886	.30	972	.40	1096	.46	1242	.61	1280	.72	1353	.84
	1450	659	.26	743	.31	822	.36	896	.42	982	.48	1047	.55
48	1600	701	.33	790	.38	875	.45	953	.52	1045	.59	1114	.68
	1800	876	.42	987	.48	1093	.57	1191	.66	1306	.75	1392	.87
	1800	636	.34	748	.42	826	.50	901	.59	972	.68	1038	.78
60	2000	706	.42	796	.52	879	.62	959	.73	1034	.84	1105	.96
	2200	882	.50	995	.63	1098	.75	1198	.88	1292	1.02	1381	1.16

						Externa	Static	Pressur	e (inches	w.c)			
Model	Supply CFM	0.	.2	0	.4	0.	.6	0	.8	1	.0	1.	2
	92345233 944	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	3000	694	.62	784	.74	859	.86	933	.98	1005	1.13	1073	1.26
96	3200	740	.70	836	.84	916	.98	996	1.12	1072	1.28	1145	1.44
	3400	786	.79	888	.95	973	1.10	1058	1.26	1139	1.47	1216	1.62
	3700	739	.93	813	1.07	881	1.21	946	1.54	1007	1.50	1066	1.65
120	4000	799	1.09	879	1.25	953	1.41	1023	1.58	1089	1.75	1152	1.93
	4300	859	1.27	945	1.44	1024	1.63	1099	1.82	1170	2.02	1238	2.23
	4500	746	1.16	820	1.35	888	1.55	954	1.76	1018	1.97	1080	2.21
144	4800	796	1.32	875	1.54	948	1.77	1018	2.00	1086	2.25	1152	2.52
	5100	845	1.49	930	1.73	1007	1.99	1080	2.25	1154	2.54	1224	2.84
	5600	630	1.50	676	1.68	756	1.89	807	2.09	868	2.28	905	2.49
180	6000	675	1.72	725	1.93	810	2.17	865	2.40	930	2.63	970	2.86
	6400	720	1.96	773	2.19	884	2.47	923	2.73	992	2.99	1035	3.25
2.000000	7500	679	2.00	736	2.29	789	2.57	838	2.87	886	3.20	933	3.52
240	8000	724	2.29	785	2.93	842	2.93	894	3.27	945	3.64	995	4.01
	8500	769	2.58	834	3.13	895	3.30	950	3.69	1004	4.10	1057	4.53
The second second	9000	688	2.82	736	3.86	784	3.43	839	3.73	874	4.04	915	4.36
300	10000	765	3.48	818	3.86	871	4.23	922	4.60	971	4.99	1017	5.39
	11000	842	4.21	899	4.67	958	5.12	1014	5.58	1068	6.04	1119	6.52

Note:

1. At higher evaporator airflows and wet bulb conditions, condensate carry over may occur. Adjust airflow downward as necessary.

2. Values include pressure drop from wet coil and clean filters.

3. Shaded areas indicate oversize motors

### SPVAC Condenser Fan Performance

	0					Externa	Static	Prossure	) (inches	W(C)			
Model	Outdoor CEM	0	2	0	1		6		8	1	0	1	2
Wouer		0.	. 2	0	.+	v	.0	0	.0		.0		. 2
	~	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
036	2800	520	.52	595	.63	655	.70	700	.80	770	.92	820	1.01
048	3900	600	1.06	635	1.20	695	1.33	725	1.57	800	1.73	830	1.80
060	4800	550	.97	630	1.12	690	1.29	766	1.48	830	1.72	903	1.94
096	5500	600	1.38	708	1.51	760	1.79	819	2.0	892	2.29	940	2.55
120	7400	677	2.29	714	2.58	787	2.86	824	3.15	887	3.44	924	3.72
144	8200	535	2.0	598	2.30	640	2.63	698	3.15	740	3.44	792	3.72
180	1000	582	3.0	625	3.58	660	3.72	714	4.15	745	4.94	808	5.00
240	11700	630	3.44	682	3.72	730	4.30	787	4.73	819	5.16	860	6.50
300	14300	630	5.0	688	5.59	730	6.02	760	6.59	813	7.31	840	7.74

SPVAC - 036, 048, 060 DIMENSIONAL DATA



UNIT	А	В	С	D	E	F	J	K	L	Р	Q
36	32.00	44.00	72.00	48.00	11.50	13.25	9.80	16.00	36.00	1.50	4.00
48	32.00	48.00	74.00	49.00	13.63	12.38	9.80	16.00	40.00	1.50	4.00
60	32.00	58.00	76.00	50.00	13.56	15.75	10.75	16.00	50.00	1.50	4.00

# SPVAC- 096,120,144,180,240,300 DIMENSIONAL DATA



UNIT	A	В	С	D	E	F	J	ĸ	L	P	Q
96	32.00	58.00	85.00	52.00	13.63	12.38	10.75	24.00	36.00	1.50	3.00
120	32.00	70.00	89.00	56.00	13.63	12.38	10.75	22.00	60.00	1.50	3.00
				4							
144	36.00	70.00	92.00	58.00	13.63	15.75	11.50	26.00	60.00	1.50	2.00
180	36.00	80.00	92.00	58.00	16.00	14.75	11.50	26.00	70.00	1.50	3.00
240	36.00	82.00	98.00	58.00	16.00	18.75	11.50	34.00	72.00	1.50	4.00
300	36.00	90.00	106.00	62.00	16.00	18.75	11.50	38.00	80.00	2.00	2.00



# SPHAC / SPVAC

# Indoor Air Cooled Unit Louver sizing guidelines

One of the key issues in obtaining optimum performance from indoor air-conditioners is the proper selection of the condenser intake and discharge louvers or openings. Unlike outdoor air cooled units, which intake and discharge their cooling virtually unrestricted, indoor units must overcome the resistance of grilles or louvers at the outside wall - plus the restriction of any interconnecting ductwork. It is imperative that the total resistance not exceed the capacity as noted in the catalogue .

Our indoor air cooled air-conditioners are designed to accommodate the external static pressure loss associated with properly sized louvers of the **"storm proof" type**. This type of louver typically has a free area approximately 40-45% of the actual louver size. To determine the free area opening required for any given unit, adhere to the following guidelines:

-Size condenser air intakes for a maximum of 500 feet/minute nominal velocity -Size condenser air discharge for a maximum of 1000 feet/minute nominal velocity

The use of louvers or grilles with higher velocities is not recommended and will result in higher pressure drops; insufficient condenser air volume and possible water carry over thru the louver into the unit. This will cause a loss in system capacity, and may cause compressor shutdown during high ambient periods. Exceeding the static pressure capability of the condenser fan will result in insufficient condenser air volume.

Use only louver or grille sections that provide opposing deflection angles for air discharge and air intake, to ensure the unit does not short circuit. Protect the unit from weather conditions (rain, snow) entering through the condenser air intake. All outdoor air ducts should pitch away from the unit, toward the outside wall. Connect all ducts to unit with canvas section duct connectors or choose another suitable noise and vibration absorbing device.

To avoid any of the above issues the use of properly designed intake and exhaust hoods is recommended, while they are not the most aesthetically pleasing solution is some cases, the optimum performance of the unit should be the only consideration

Use only louver sections that provide opposing deflection angles for air discharge and air intake, to ensure the unit does not short circuit. Protect the unit from weather conditions (rain, snow) entering through the condenser air intake. All outdoor air ducts should pitch away from the unit, toward the outside wall. Connect all ducts to unit with canvas section duct connectors or choose another suitable noise and vibration absorbing device.

<u>NOTE</u>: The Manufacturer will not accept any liability resulting from incorrect installation of this equipment. Follow installation instructions carefully.



# SPHAC / SPVAC

# Indoor Air Cooled Unit Louver sizing guidelines



# SPVAC Optional Low Ambient Damper Kit Dimensional Data



PART NUMBER	TONNAGE	Α	В	С	TO SUIT
LADFMK-V-3	3	12"	34"	11"	SPVAC-036
LADFMK-V-4	4	12"	34"	11"	SPVAC-048
LADFMK-V-5	5	12"	48"	12"	SPVAC-060
LADFMK-V-8	8	12"	48"	12"	SPVAC-096
LADFMK-V-10	10	12"	60"	13"	SPVAC-120
LADFMK-V-12	12	12"	60"	13"	SPVAC-144
LADFMK-V-15	15	12"	70"	13"	SPVAC-180
LADFMK-V-20	20	12"	70"	13"	SPVAC-240
LADFMK-V-25	25	12"	80"	13"	SPVAC-300





# LIMITED WARRANTY

#### COVERAGE AND TERMS

SPHAC / SPVAC Model Series units, and all related accessories as manufactured by Spinnaker Industries, are warranted to the original buyer to be free from defects in materials or workmanship provided that these units and accessories have been installed and maintained in accordance with instructions and operated under normal conditions. Spinnaker Industries sole obligation under this Limited Warranty is to repair or replace, at its opinion, free of charge to the customer (except as provided below), FOB factory, any part determined by Spinnaker Industries (in its sole discretion) to be defective. Warranty terms, from original ship date are as follows:

All components ( excluding filters and fan belts ) ..... I year from date of shipment

#### EXCLUSIONS

Spinnaker Industries Limited Warranty does not cover defects, reduced performance, or failure caused, directly or indirectly, by improper installation, abuse, misuse, misapplication, improper maintenance, lack of maintenance, negligence, accident, or normal deterioration, including wear and tear. This Limited Warranty shall not apply to items that require replacement due to normal wear i.e. fan drive belts, filters, etc., or to failures, defects, or reduced performance resulting, directly or indirectly, from use of its products exposed to corrosive gasses or liquids. **Warranty claims that are not supported with a copy of the original start up report will not be considered.** 

Spinnaker Industries Limited Warranty does not include costs for transportation (including, without limitation, freight and return freight charges, costs, and insurance), costs for removal or re-installation of parts or equipment, cranes and hoisting, premiums for overtime, labor for performing repairs or replacement made in the field, roofing contractors or any other sub trades. Spinnaker Industries is not responsible for damages occurring during transport of any product to or from its facilities.

#### **RETURN PROCEDURE**

To return defective parts under these warranty terms, please contact Spinnaker Industries at 1-800-932-6210 to confirm the ship to address. The serial number located on the rating label of the unit must be provided so that the original ship date of the unit can be verified. All defective parts must be authorized for return and shipped pre-paid to Spinnaker Industries for inspection. A purchase order must be received prior to shipment of repaired or replacement parts. Repaired or replacement parts will be invoiced and shipped collect FOB Factory. A credit will be issued only if the defective parts are deemed the responsibility of Spinnaker Industries. Spinnaker Industries is not responsible for any damage or loss occurring during shipment to or from Spinnaker Industries.

THE OBLIGATION AND LIABILITY OF Spinnaker Industries UNDER THIS LIMITED WARRANTY DOES NOT INCLUDE LOSSES, DIRECT OR INDIRECT, FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. THIS LIMITED WARRANTY IS PROVIDED EXCLUSIVELY TO THE ORIGINAL BUYER OF PRODUCTS AND MAY NOT BE ASSIGNED OR OTHERWISE TRANSFERRED.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.