

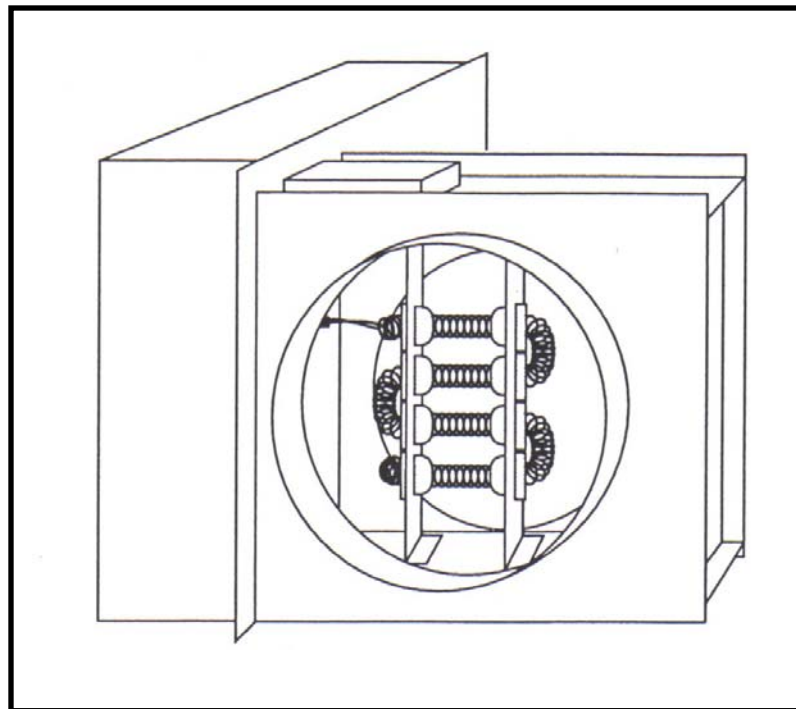


Variable Air Volume Systems Optimized!

DownstreamSolutions®

Acu-Zone™ I E

Installation, Operation, and Maintenance Manual

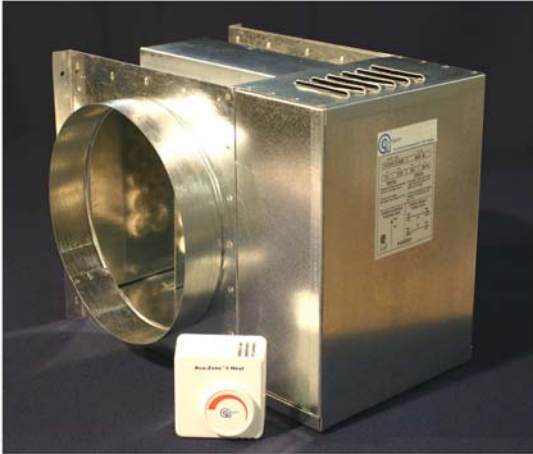


Acu-Zone™ I

Round Heating Units

Sizes: 6"Ø, 8"Ø, 10"Ø, 12"Ø

ACU-ZONE™ ELECTRIC ZONE HEATERS



Acu-Zone™ - I E

Electric Zone Heaters

Acu-Zone™ I-E

The Acutherm AZON-I-E open coil electric zone heaters with sizes to match duct sizes 6"Ø through 12"Ø, has the capacities and voltages to match your requirements. This unit can be applied anywhere supplementary or primary heating needs are needed.

The size and capacities of these smaller unit make them excellent for use with a single Therma-Fuser™ Diffuser and up to four diffusers in a slightly larger zone. This flexibility allows the application of the Acu-Zone™ heaters on a single room or office basis, on a multi-room zone ,or on a mid-sized conference room with up to four diffusers. The units are fully SCR controlled with discharge temperature control and also air flow monitoring via onboard electronic sensors.

Inspection

Damage or Shortage

All Acutherm equipment is shipped F.O.B. Factory which means that the title for the goods passes to you from Acutherm when the shipment is picked up. Therefore, inspect all equipment for shortage and damage upon receipt. Note all shortages and damage on the delivery receipt—Bill of Lading - this action notifies the carrier that YOU intend to file a claim. If there is any shortage or damage discovered when the unit (s) are unpacked, call the delivering freight carrier for a concealed damage or shortage inspection. Have all related paperwork for the inspector including the delivery receipt and

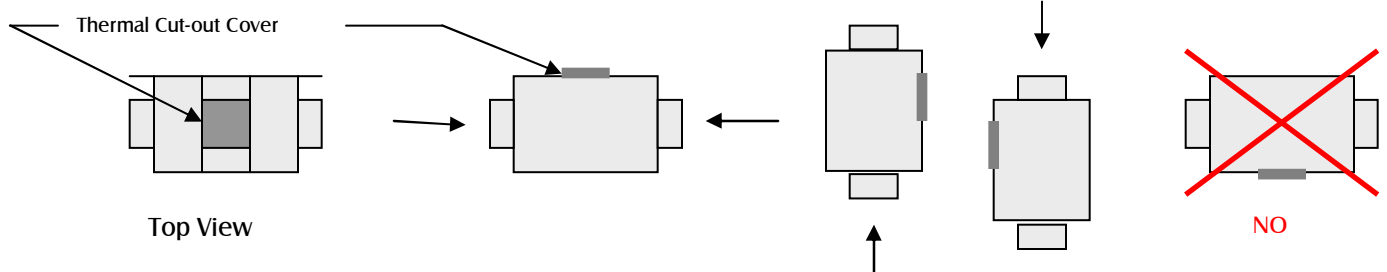
ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions:

The following Installation, Operation, and Maintenance instructions are for the Acu-Zone™ I model AZON. Please follow the instructions for a successful installation and do not discard. This document contains important information regarding the proper handling, installation, operation, wiring, troubleshooting, and maintenance.

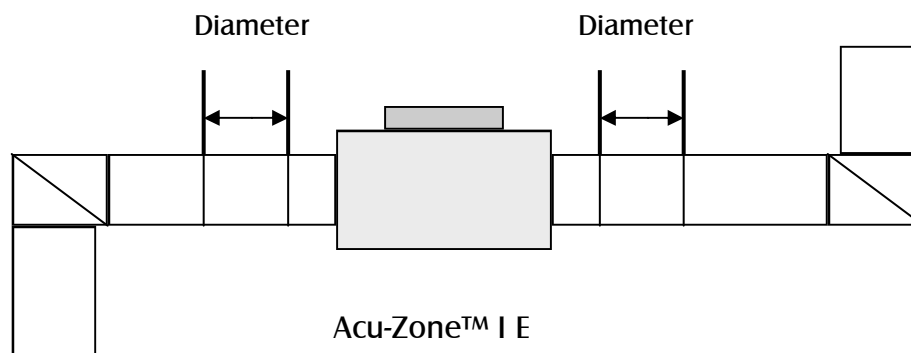
Handling

1. Remove the shipping covers just before installation
2. Inspect the heater carefully and report any damage to the freight carrier (See Inspection)
3. Do not install a damaged heater
4. See the *Minimum Velocity Chart* in these instructions for the minimum FPM through the heater to



Installation

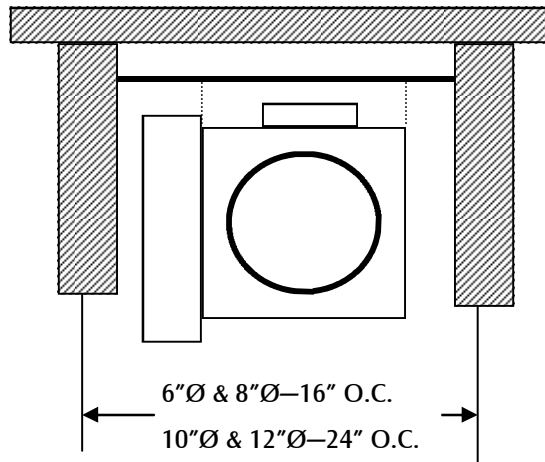
1. The air direction may be either vertical or horizontal, but when the unit is mounted horizontally, the cut-out cover must be on the top
2. Do not install elbows closer than 8 inches from the inlet or the outlet of the unit
3. Use round, square, or rectangular insulated duct (not flexible) on the inlet connection and insulated duct (not flexible) on the outlet. Minimize the use of elbows.



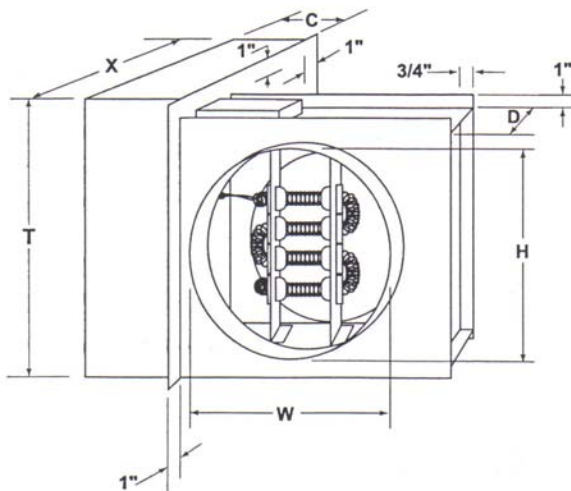
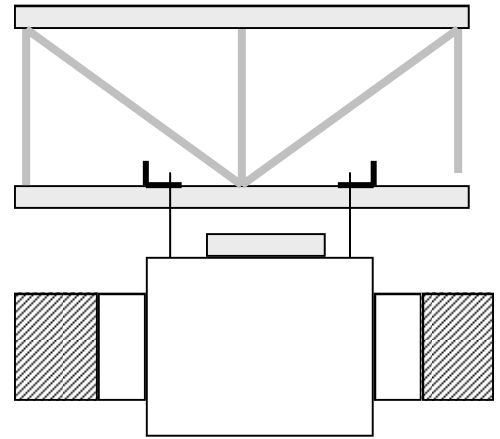
ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions

4. The electronic controller adjusts the heating capacity to the volume of air and shuts down the heater when there is no airflow. The typical minimum amount of air required (in cubic feet per minute) to operate the unit at the rated KW given in the last column in the table on the page 8 for the Acu-Zone I unit contained in Form # 70.0 IOM-001 REV 0603 – *Application, Selection, and Specification Manual*.
5. Attach the unit to a suitable support. The 6"Ø and 8"Ø models are small enough to be located between the standard 16" O.C. spaced floor joists. The 10"Ø and 12"Ø units should fit between 24" O.C. floor joists. Always allow 1/2" clearance above the heater to a combustible surface. Always allow access to the control panel.



Attach the unit using threaded rod and angle (By Others) as shown on the right.
 Do not allow the ductwork to support the unit.
 The unit can be supported from the overhead structure as shown; however, in seismic zones, please check with local authorities having jurisdiction to see if additional tie-off's or vibration



**Acu-Zone™ I
Installation Dimensions**

Unit Size	C	D	H	T	X
AZON I -06	6.5"	10"	6"	10"	14"
AZON I -08	6.5"	10"	8"	14"	11"
AZON I -10	6.5"	5"	10"	14"	14"
AZON I -12	6.5"	5"	12"	16"	14"

ACU-ZONE™ ELECTRIC ZONE HEATERS

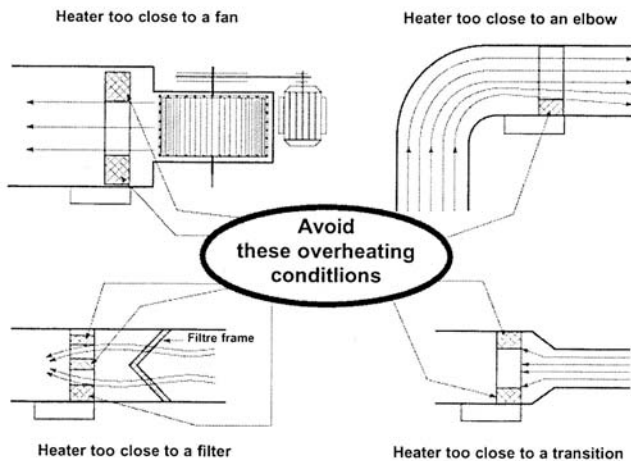
Installation Instructions:

Spacing requirements to obtain optimal operating conditions

(Figures # 3 & 4)

Item #	Clearance Distance (Inches)	Description
1	24"	Between the heater and filter frames
2	***	Between the heater and duct elbows
3	***	Between the heater and ductwork branches
4	***	Between the heater and sharp duct transitions
5	48"	Between the heater and a double fan outlet
6	24"	Between the heater and access doors or diffusers
7	1"	Between the duct at the outlet side and combustible materials for a

*** Minimum distance Equals the largest of the two duct dimensions (W or H) up to 48".



Important Installation Notes:

Do not install a duct heater in a vertical duct directly above a ceiling diffuser or an opening in the ceiling

Do not install standard heaters outdoors

Do not install spray humidifiers upstream from the heaters

Do not cover the control box with thermal insulating materials

All duct should be installed in accordance with SMACNA Standards, Local, State, and Federal Codes, and in compliance with NFPA Standards-90A and 90B

ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions:

Electrical Installation

All electrical work must conform to all electrical and national electrical codes for wiring. The heater electrical supply should be a separate cable feed of the appropriate gauge, and with appropriate protection and grounding.

Please refer to the following sample wiring diagrams for the Acu-Zone™ units. Your actual application and wiring may vary from these sample diagrams.

General Notes:

- ◆ Disconnect all power sources before opening the control box and working on the heater
- ◆ Read the NAMEPLATE carefully and consult the wiring diagram before starting to wire
- ◆ **Supply Wires** – use only wires suitable for 75°C and they should be sized according to NEC, CEC, and any and all Local, State and Federal requirements. All wires should be brought through knock-outs.
- ◆ **Disconnecting Means** – A disconnect switch is provided as standard equipment on all Acu-Zone™ heaters
- ◆ **Control Circuit Wiring** – Use Class 2 wiring for control circuit connections to the duct heater
- ◆ **Magnetic Contactors** – see additional information
- ◆ **External Control Ratings** – the rating of the external control devices shall be suitable for handling the VA ratings as marked on the NAMEPLATE
- ◆ **Air Flow Interlock** – Heaters are generally supplied with one extra terminal marked (1) for fan interlock or air sensing device connection. Remove the jumper between terminals I and C before connecting the fan interlock. Select a suitable air flow sensing device of the differential pressure sensing type with snap acting contacts. A slow make and slow break device may cause undue cycling and in some instances a chattering of the contactors.

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Wall Sensor Installation

Standard Control - # AZONT-25346

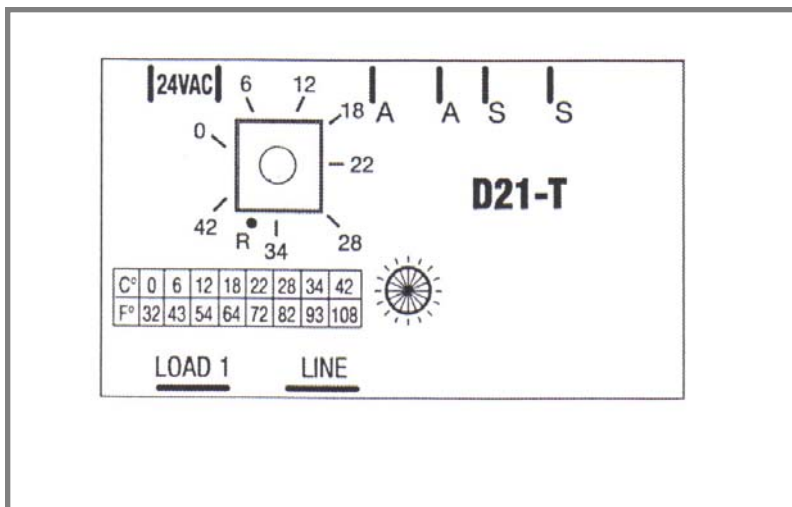
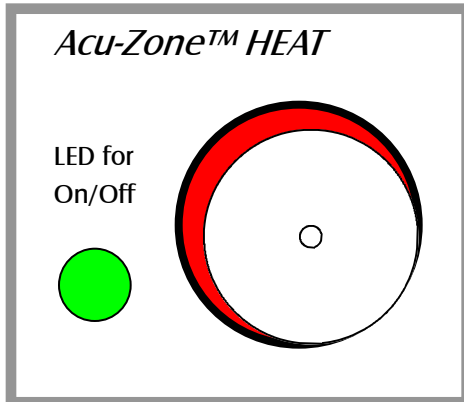
The *Acu-Zone™* Heaters are equipped with the most advanced modulating (SCR) heat controller and airflow sensor (*Acu-Sensor*) that allows the zone heater to operate at extremely low airflow conditions.

The discharge air temperature is fixed at 90°F.

The electronic, wall-mounting sensor can accurately control the temperature in each zone and can adjust the room heating set point between 70°F and 72°F – NO SETBACK. Unit has an “OFF” position. Unit will have a Green LED for “On & OFF” functions.

Each *Acu-Zone™* unit is ready to install with a single point electrical supply connection and the thermostat.

The airflow sensor detects the airflow and automatically and proportionally adjusts the heat to match the airflow; consequently, using the minimum amount of energy to meet the zone heating load.



The figure to the left shows the typical SCR Controller located inside of the control box.

The internal sensor (Acu-Sensor™) to monitor duct discharge temperature is usually connected to terminals “S S” and the wall sensor (3 wires) above is wired through the 24V circuit so that the SCR Controller is energized on a call for heat from the wall mounting mode sensor (AZON T - 25346).

The ‘arrow’ on the controller should be pointed at the 34°C or the 93°F.

DO NOT TURN THE ARROW TO “R” AS THIS WILL DISABLE THE DISCHARGE SENSOR.

ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions:

Operation

1. Make sure that the air flow noted on the NAMEPLATE is available to pass through the heater at all times. Air flow should be evenly distributed across the entire face of the heater. Use turning vanes at duct elbows and splitter dampers at branch take-off's to streamline the air flow in the heater. Insufficient airflow will result in the opening of the auto-reset thermal cut-out or damage the heating elements.
2. **Warning** – the air flowing through the duct in which the heater is installed shall not contain any combustible particles or any flammable vapor or gas.
3. **Air Temperature** – the air temperature should not exceed 27°C (81°F) at the heater inlet and 66°C (151°F) at the heater outlet
4. **Minimum Static Pressure and Air Direction** – the heater is protected with a differential pressure switch or an electronic air flow sensor. A minimum total pressure of 0.07" W.G. must be maintained to insure that the differential switch is closed. Air flow must only be present to engage the electronic air flow sensor
5. **Manual Reset Thermal Cut-out** – this protection device is standard on all heaters of less than 300V and 30KW and is optional on all other heaters. Be sure to check the auto-reset thermal cut-out BEFORE resetting the manual thermal cut-out. If the auto-reset is defective, then it must be replaced PRIOR to resetting the manual cut-out.

Maintenance

Visual Inspection – Acutherm strongly recommends that each heater is periodically inspected. This precautionary step will help to keep the heaters operating well, and will insure that the heaters are on-line when needed. Sign of problems: accumulation of dust on the electrical elements, signs of overheating on the heater frame and wrapper, traces of water or rust

Electrical Inspection – Approximately two weeks after start-up, all electrical connections to contactors should be checked and tightened up. Before each heating season, check the resistance between the heating elements and ground. It is also recommended to check the electrical connections to the heating elements, magnetic contactors, and main power lugs.

What are the Checkpoints?

- ◆ Check all fuses
- ◆ Check the resistance to ground for each circuit
- ◆ Check the resistance phase to phase for each circuit
- ◆ Check the tightening of all connections at all contactors and heating elements

ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions:

Maintenance

4. **Off –Season Maintenance** – If a heater is shut-down for an extended period of time, it is recommended that you carefully check the resistance to ground for each circuit. It is important not to power the heater when a low resistance to ground is measured. Control components such as step controllers or modulating valves (SCR) should be maintained and checked according to their respective manufacturer’s instructions. Any defective components should be replaced with identical original equipment parts.

Trouble Shooting

Type of Problem	Possible Causes
No Heat	<ol style="list-style-type: none"> 1. Main Disconnect Switch is closed 2. Blown power fuses 3. Broken or shorted wire in the control circuit 4. Control circuit improperly connected 5. Defective High Limit Switch 6. Manual reset high limit switch is in the open position 7. Discharge thermostat not properly wired 8. Incoming air is too hot 9. Air handler not operating 10. Insufficient control transformer capacity 11. Defective space mode sensor or discharge thermostat
Not Enough Heat	<ol style="list-style-type: none"> 1. Dirty filter (s) 2. Cycling of the unit 3. Blocked outlet (s) 4. Heater not sized properly – not enough capacity for demand 5. Low airflow

ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions:Trouble Shooting

Type of Problem	Possible Causes
Short Element Life	<ol style="list-style-type: none"> 1. Unit is operating at a voltage that is much different than the rated voltage (excessive amp draw) 2. Damaged or broken ceramic insulators causing a partial ground or a short 3. High temperatures due to defective electronic sensor (Acu-Sensor™), insufficient, or low air flow 4. Unit is cycling too often 5. Unit is overloaded due to amp draw
Blown Line Fuses	<ol style="list-style-type: none"> 1. Improperly Wired Unit 2. Unit voltage is improper—high amp draw 3. Fuses are too small
	<ol style="list-style-type: none"> 1.

ACU-ZONE™ ELECTRIC ZONE HEATERS

Installation Instructions:**Minimum Velocity**

KW Per Sq. Ft.	FPM Without Insulation	FPM With Insulation	KW Per Sq. Ft.	FPM Without Insulation	FPM With Insulation	KW Per Sq. Ft.	FPM Without Insulation	FPM With Insulation
1			10.75	660	880	20.5	1080	1280
1.25			11	370	890	20.75	1090	1285
1.5			11.25	685	900	21	1100	1290
1.75			11.5	700	905	21.25	1115	1300
2		200	11.75	710	910	21.5	1130	1310
2.25	200	225	12	720	920	21.75	1140	1320
2.5	215	250	12.25	735	935	22	1150	1330
2.75	230	275	12.5	750	950	22.25	1165	1340
3	250	300	12.75	755	965	22.5	1175	1350
3.25	265	320	13	760	980	22.75	1185	1360
3.5	280	340	13.25	770	990	23	1200	1375
3.75	300	360	13.5	780	1000	23.25	1215	1385
4	320	380	13.75	790	1010	23.5	1230	1395
4.25	335	410	14	800	1020	23.75	1240	1410
4.5	350	440	14.25	815	1030	25	1250	1420
4.75	365	465	14.5	830	1040	24.25	1265	1435
5	380	490	14.75	840	1055	24.5	1280	1450
5.25	390	510	15	850	1075	24.75	1290	1460
5.5	400	530	15.25	860	1080	25	1300	1475
5.75	415	545	15.5	870	1085	25.25	1310	1485
6	430	560	15.75	880	1088	25.5	1320	1490
6.25	445	580	16	890	1090	25.75	1330	1495
6.5	460	600	16.25	900	1100	26	1340	1500
6.75	475	625	16.5	905	1105	26.25	1050	1510
7	490	650	16.75	910	1112	26.5	1360	1520
7.25	505	670	17	920	1120	26.75	1370	1535
7.5	520	690	17.25	935	1130	27	1380	1550
7.75	530	710	17.5	950	1140	27.25	1390	1560
8	540	725	17.75	965	1155	27.5	1400	1565
8.25	555	745	18	980	1170	27.75	1410	1570
8.5	570	765	18.25	990	1185	28	1420	1580
8.75	580	780	18.5	1000	1200	28.25	1430	1590
9	590	790	18.75	1010	1205	28.5	1450	1600
9.25	600	810	19	1020	1210	28.75	1465	1615
9.5	610	830	19.25	1030	1220	29	1480	1630
9.75	620	840	19.5	1040	1230	29.25	1490	1635
10	630	850	19.75	1050	1245	29.5	1500	1640
10.25	640	860	20	1060	1260	29.75	1510	1645
10.5	650	870	20.25	1070	1270	30	1520	1650

ACU-ZONE™ ELECTRIC ZONE HEATERS

Acu-Zone™ I–E Electric Zone HeatersTwo Year Warranty

Acutherm warrants that the model AZON Electric Zone Heater, exclusive of any options and accessories (whether factory or field installed) shall be free from defects in material or workmanship for a period of two (2) years from the date of shipment and agrees to repair or replace, at its option, any parts that fail during said two (2) year period due to any such defects which would not have occurred had reasonable care been taken, provided that such parts have been inspected by Acutherm and found defective and provided the units have been given normal and proper usage and all parts and controls remain unaltered. Acutherm makes no WARRANTY OF MERCHANTABILITY OF PRODUCTS OR OF THEIR FITNESS FOR ANY PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY WHICH EXTENDS BEYOND THE LIMITED WARRANTY ABOVE. ACUTHERM'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES RESULTING FROM DEFECTS SHALL IN NO EVENT EXCEED THE COST OF REPAIR OR REPLACEMENT OF PARTS FOUND DEFECTIVE UPON EXAMINATION BY ACUTHERM. IN NO EVENT SHALL ACUTHERM BE LIABLE FOR INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES OR DAMAGES FOR INJURY TO PERSONS OR PROPERTY. Acutherm shall not be responsible for freight to or from its plant (s) in connection with the inspection, repair or replacements of parts under the terms of this limited warranty nor for cost of removal or installation.

For further information, please refer to the Acutherm website: www.acutherm.com or the Acutherm Catalog: Complete System Design Manual



Variable Air Volume Systems Optimized!

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