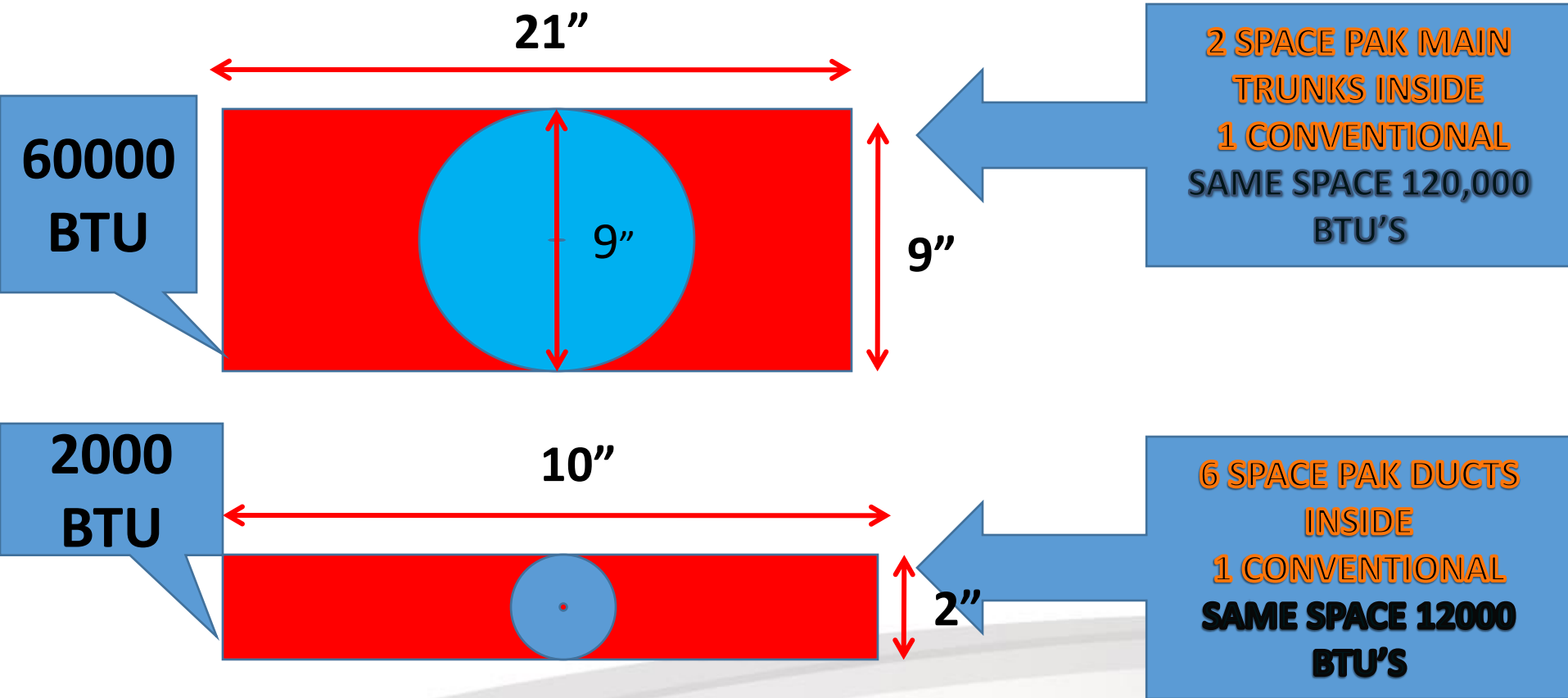


Solutions from

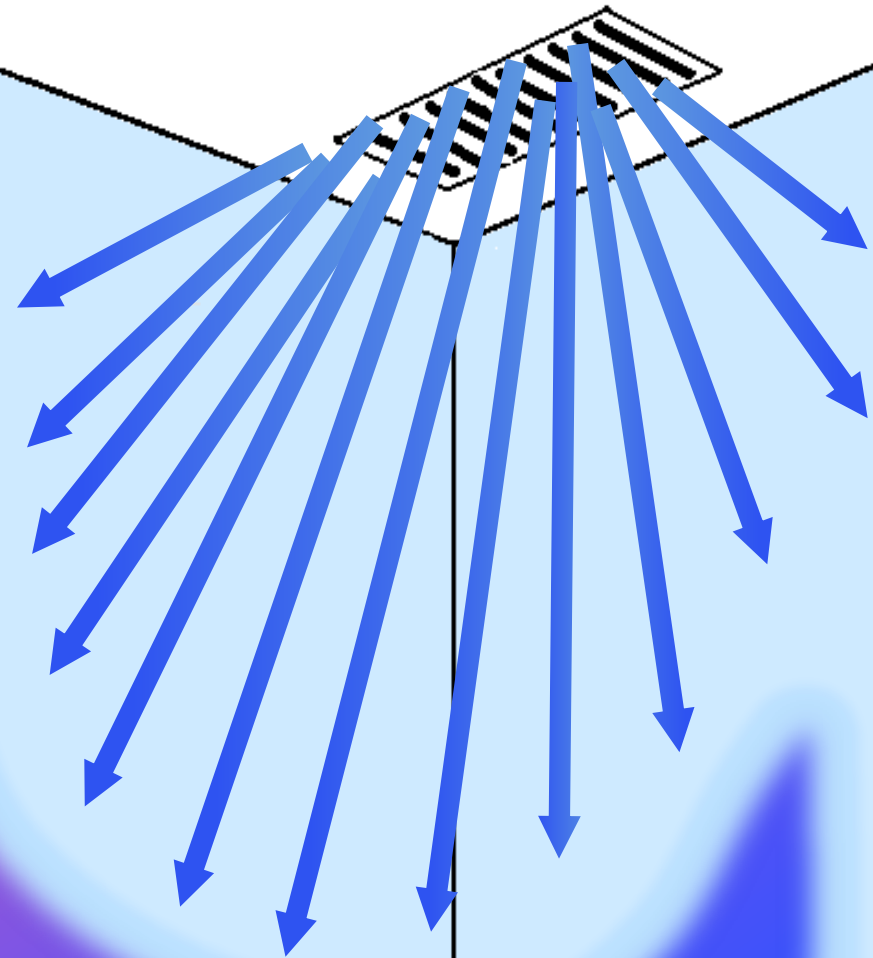
SPACE PAK ®

System Principle Of Operation Sdhv

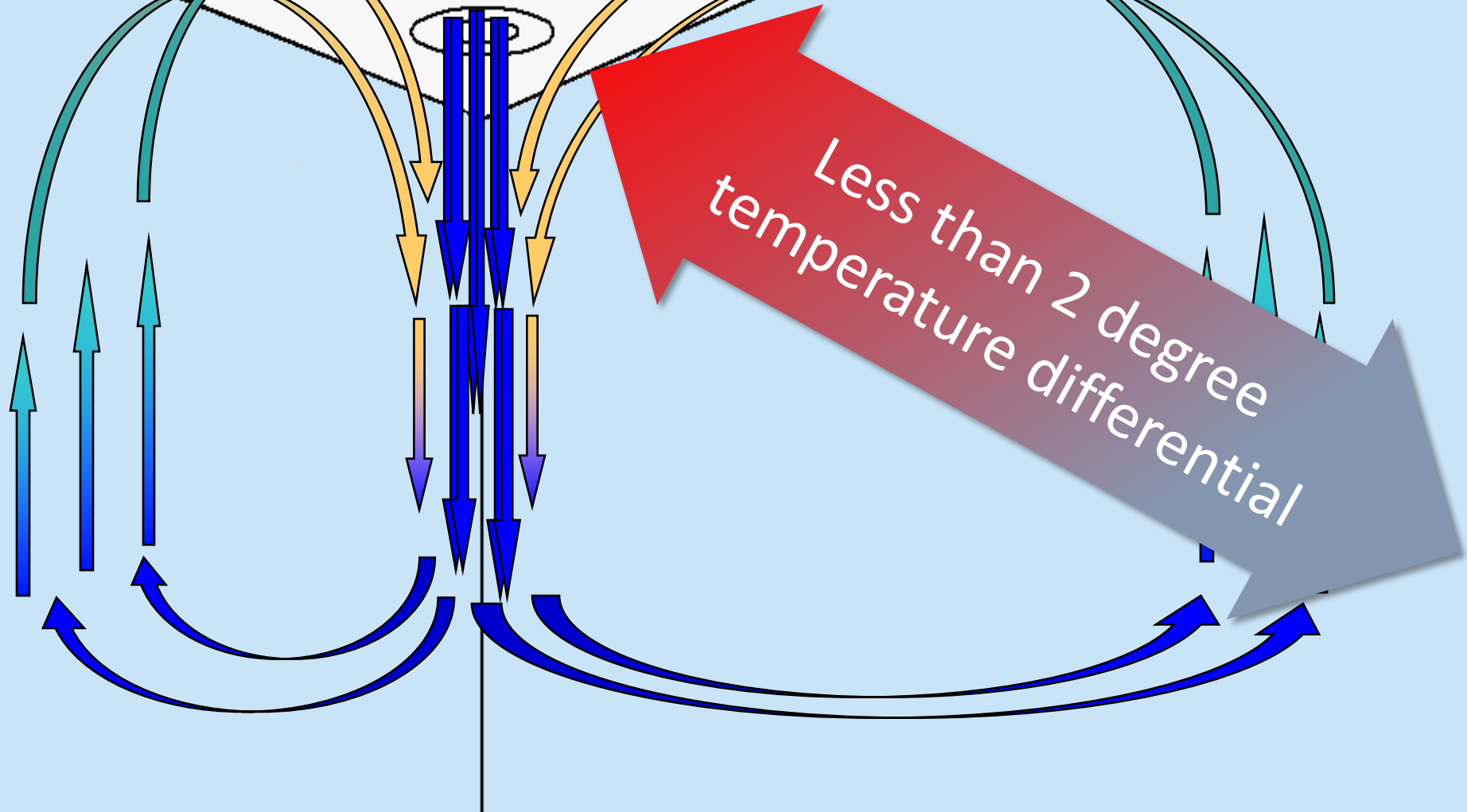


Conventional D/T/R

- Diffusion, Throw & Return.
- Air change.
- Works for heating OR cooling, NOT BOTH.



Aspiration



Static Regain

45° PLENUM ELBOW
AC-SM9-EL45

90° PLENUM ELBOW
AC-SM9-EL90

PLENUM DUCT
(6FT LENGTH)
AC-SM9-6

Pressure to Velocity
at 1500 FPM

High Pressure
Design 1.5" W.C.

SUPPLY TUBING

KWIK CONNECT
WALL ELBOW
AC-KCWE

PLENUM END CAP
AC-SM9-EC

COUPLING
AC-SM9-2

PLENUM DUCT
(6FT LENGTH)
AC-SM9-6

PLENUM ADAPTOR
AC-SM9D-PA

FAN COIL UNIT

Velocity to CFM
At 37 CFM

SHUT-OFF KIT

KWIK CONNECT

REDUCING TUBE

TERMINATOR PLATE

SUPPLY AIR SHUT-OFF

BALANCING ORIFICE

**INSTALLATION
KIT COMPONENTS**

SECONDARY DRAIN PAN

RETURN AIR DUCT

RETURN AIR BOX
OR PUREPAK

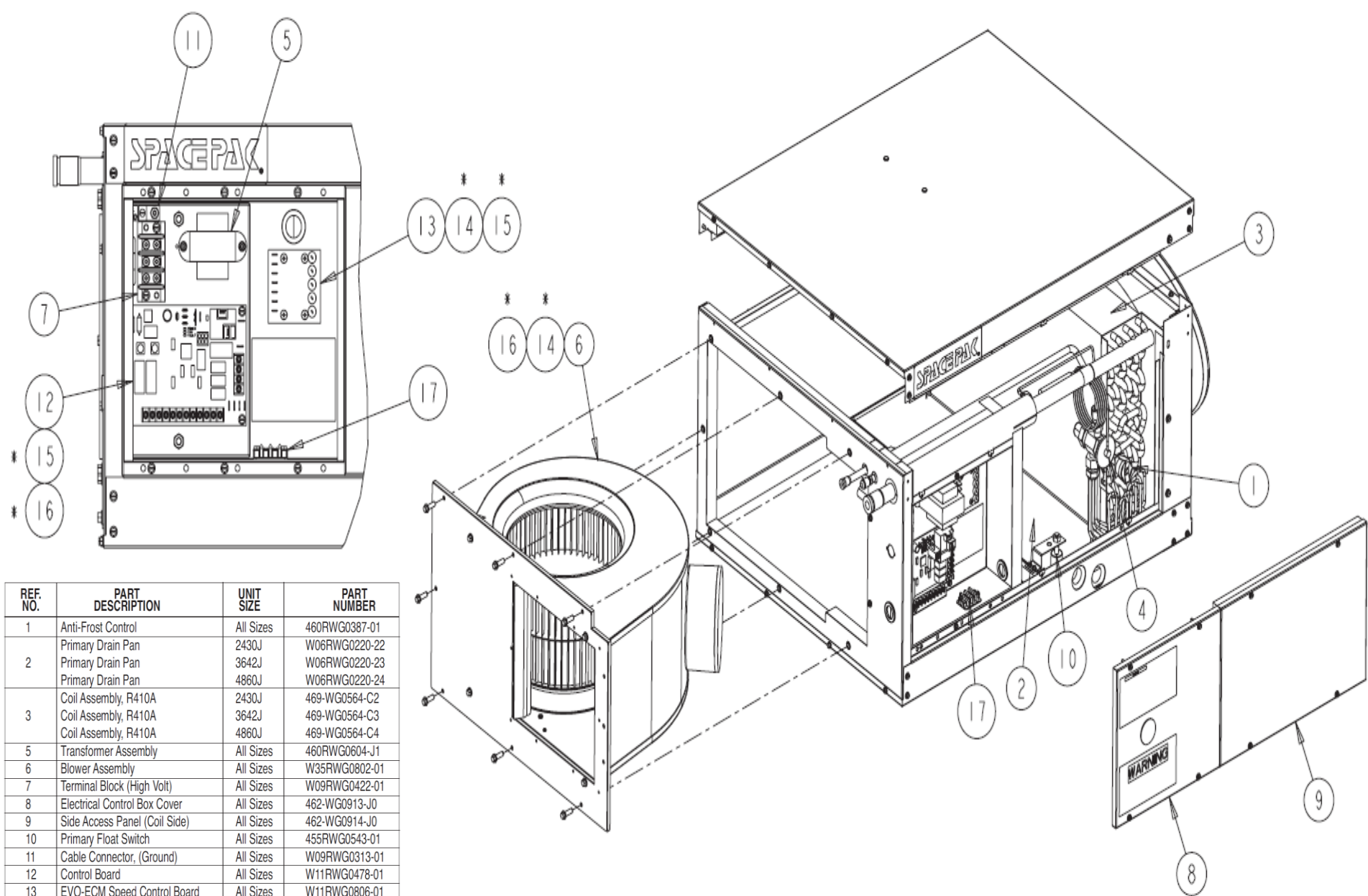
SMART SEAL SYSTEM STRAIGHT DUCT LENGTHS ARE R8.0
INSULATED AND WRAPPED IN MYLAR SLEEVE. ALL OTHER
FITTINGS ARE SUPPLIED WITH AN R8.0 INSULATED JACKETRY.
DUCT COMPONENTS SHOWN WITHOUT FACTORY SUPPLIED
R8.0 INSULATED JACKETRY.

SPL-WG0950_B



J-Series Horizontal Air Handler

Available in DX or Chilled Water



REF. NO.	PART DESCRIPTION	UNIT SIZE	PART NUMBER
1	Anti-Frost Control	All Sizes	460RWG0387-01
2	Primary Drain Pan	2430J	W06RWG0220-22
	Primary Drain Pan	3642J	W06RWG0220-23
	Primary Drain Pan	4860J	W06RWG0220-24
3	Coil Assembly, R410A	2430J	469-WG0564-C2
	Coil Assembly, R410A	3642J	469-WG0564-C3
	Coil Assembly, R410A	4860J	469-WG0564-C4
5	Transformer Assembly	All Sizes	460RWG0604-J1
6	Blower Assembly	All Sizes	W35RWG0802-01
7	Terminal Block (High Volt)	All Sizes	W09RWG0422-01
8	Electrical Control Box Cover	All Sizes	462-WG0913-J0
9	Side Access Panel (Coil Side)	All Sizes	462-WG0914-J0
10	Primary Float Switch	All Sizes	455RWG0543-01
11	Cable Connector, (Ground)	All Sizes	W09RWG0313-01
12	Control Board	All Sizes	W11RWG0478-01
13	EVO-ECM Speed Control Board	All Sizes	W11RWG0806-01
14*	Cable, EVO-ECM Control	All Sizes	W11RWG0807-01
15*	Speed Control Harness Assy	All Sizes	W11RWG0811-J1
16*	Motor Control Harness Assy	All Sizes	W11RWG0844-J1
17	Voltage Select Terminal Strip	All Sizes	W11RWG0421-01
4	Thermal Expansion Valve, Chatteff Connection	2430J	45W28-WG0641-H2
		3642J	45W28-WG0641-H3
		4860J	45W28-WG0641-H4

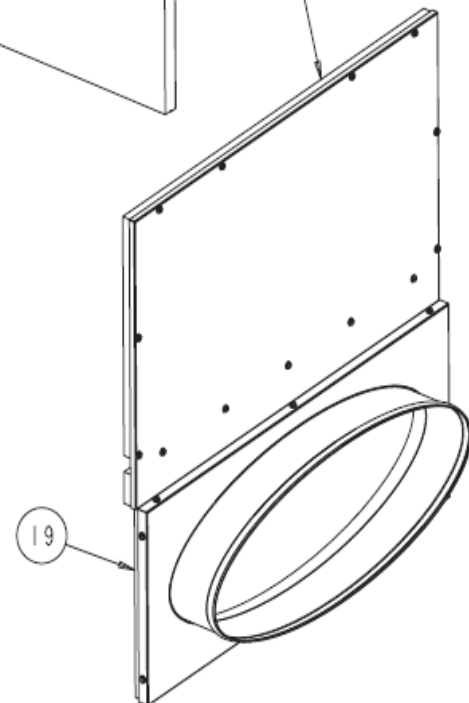
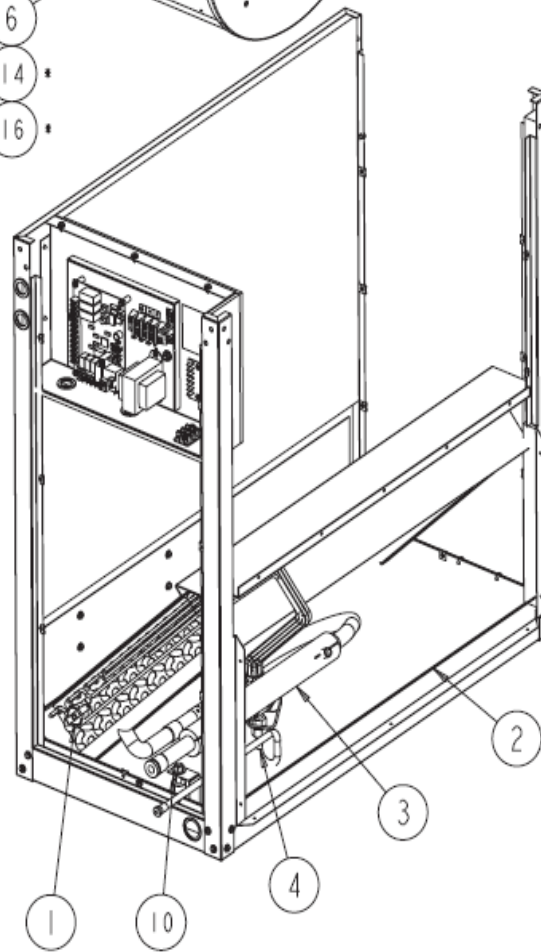
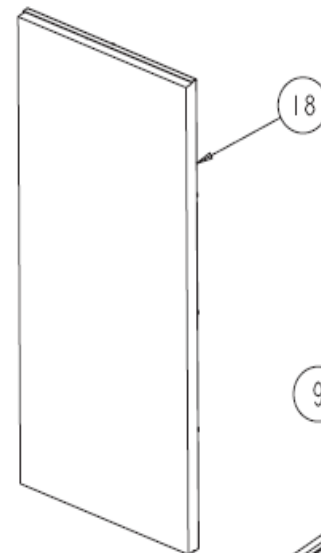
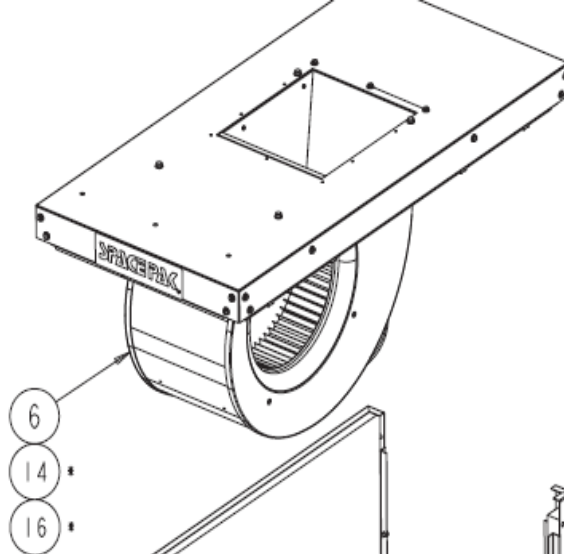
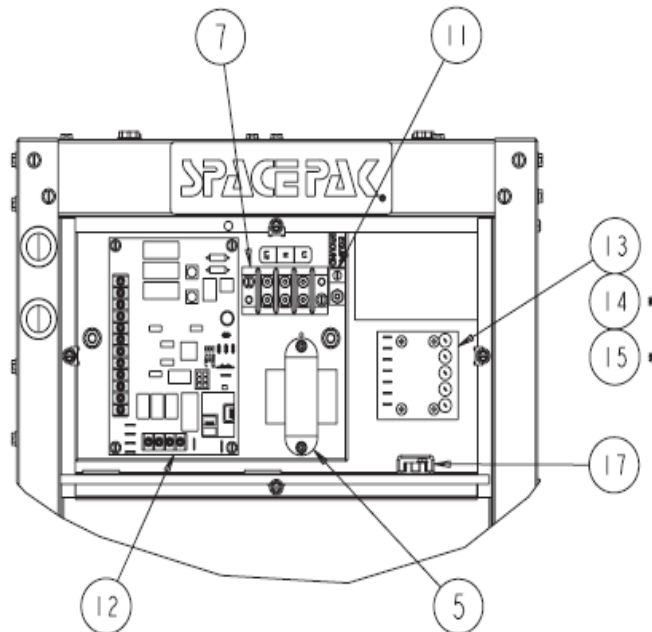
* = NOT SHOWN

SPL-WG0948_A



J-Series Vertical Air Handler

Available in DX or Chilled Water



ITEM NO.	PART DESCRIPTION	UNIT SIZE	PART NUMBER
1	ANTI-FROST CONTROL	ALL	460-WG0387-01
2	PRIMARY DRAIN PAN	2430JV	BM-2524
		3642JV	BM-2525
		4860JV	BM-2526
3	COIL ASSEMBLY (R410A)	2430JV	469RWG0698-C2
		3642JV	469RWG0698-C3
		4860JV	469RWG0698-C4
4	THERMAL EXPANSION VALVE, CHATLEFF CONNECTIONS	2430JV	W28RWG0641-H2
		3642JV	W28RWG0641-H3
		4860JV	W28RWG0641-H4
5	TRANSFORMER ASSEMBLY	ALL	460-WG0604-J1
6	BLOWER ASSEMBLY	ALL	W35-WG0802-10
7	TERMINAL BLOCK (HIGH VOLTAGE)	ALL	W09-WG0422-01
8	ELECTRICAL CONTROL BOX COVER	ALL	458-WG0974-J0
9	FRONT PANEL (BLOWER ACCESS)	2430JV	462-WG0691-02
		3642JV	462-WG0691-03
		4860JV	462-WG0691-04
10	PRIMARY FLOAT SWITCH	ALL	70-7996
11	CABLE CONNECTOR, (GROUND)	ALL	W09RWG0313-01
12	CONTROL BOARD	ALL	W11RWG0478-01
13	EVO-ECM SPEED CONTROL BOARD	ALL	W11RWG0806-01
15	SPEED CONTROL HARNESS ASSEMBLY	ALL	460RWG0811-J1
16	MOTOR CONTROL HARNESS ASSEMBLY	ALL	460RWG0844-J1
17	VOLTAGE SELECT TERMINAL STRIP	ALL	W09-RWG0421-01
18	SIDE PANEL	ALL	70-7946
19	RETURN AIR PANEL	2430JV	463RWG0708-02
		3642JV	463RWG0708-03
		4860JV	463RWG0708-04
20	CENTER ACCESS PANEL	ALL	458RWG0975-J0
21	COIL ACCESS PANEL	ALL	458RWG0725
22	WIRING DIAGRAM LABEL, 230V	ALL	W49RWG0875-23
23	WIRING DIAGRAM LABEL, 115V	ALL	W49RWG0875-12

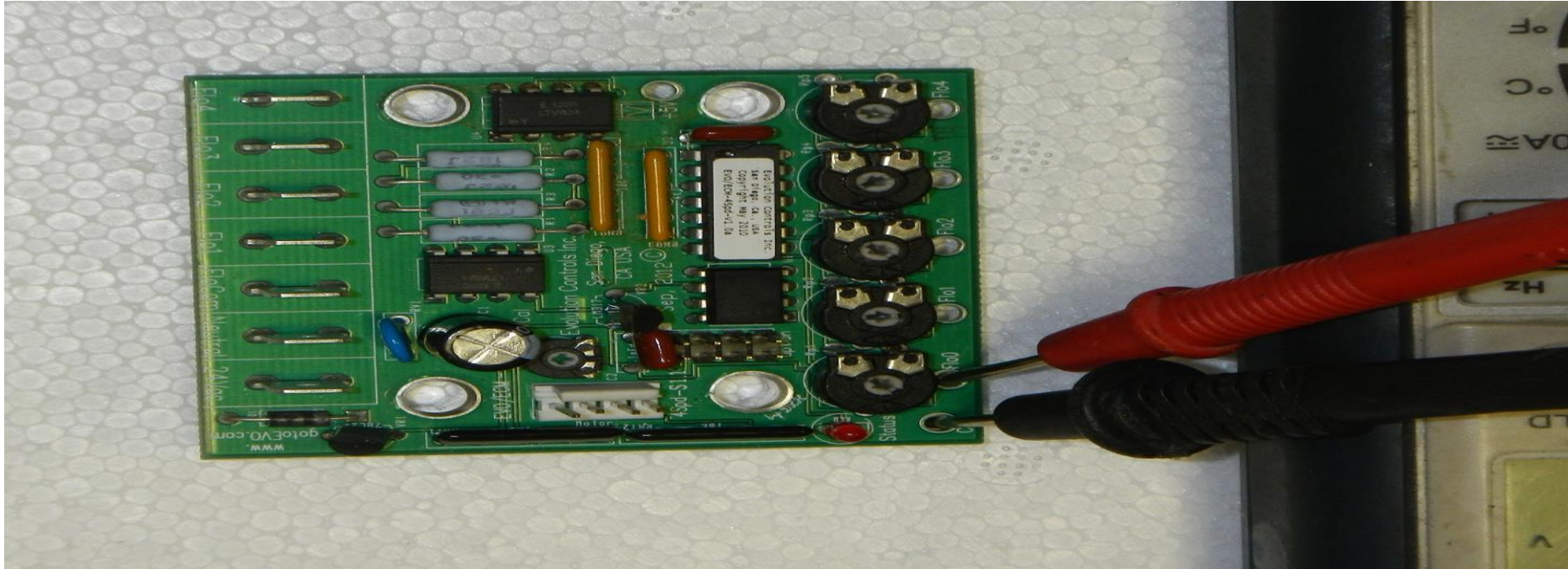
CONTROL REMOVED

ESP-3642JV SHOWN

SPL-WG0988_A

Air Handler Airflow/CFM Setup

To measure and/or adjust blower signal voltage, remove the speed adjust cover from the front of the unit, exposing the adjustment board as shown below. Place the ground/neutral probe in the lower right hole marked **"COM"** and the volt probe in the hole marked **"Flo0"** (for fan only, G call) and measure DC volts between 0 and 5V. Adjust the potentiometer adjacent to the **"Flo0"** to achieve the desired volt reading. Repeat for remaining adjustments marked Flo1 through Flo4 as indicated on the label inside the cover.



To determine unit airflow, in CFM, measure the voltage corresponding to the current conditioning call, and measure the external static pressure in the plenum, at least 18" from the unit or nearest transition point. Locate the static pressure on the left side of the accompanying chart, and read across until you reach the curve corresponding to the measured voltage. From the point where this crosses, drop a line straight down to read the airflow at the bottom of the chart.

To adjust airflow, locate the nearest system curve, and follow parallel to this curve while adjusting the signal voltage to achieve the desired airflow. If the static pressure falls above or below the desired operating range for the given airflow, then the air delivery system must be adjusted. To lower static pressure, provide additional outlets to the system, to raise the static pressure, install restrictor orifices as described in the Installation and Operations Manual.

SPACEPAK SPEED CONTROL



DECREASE / INCREASE

HEATING (W2) Flo4

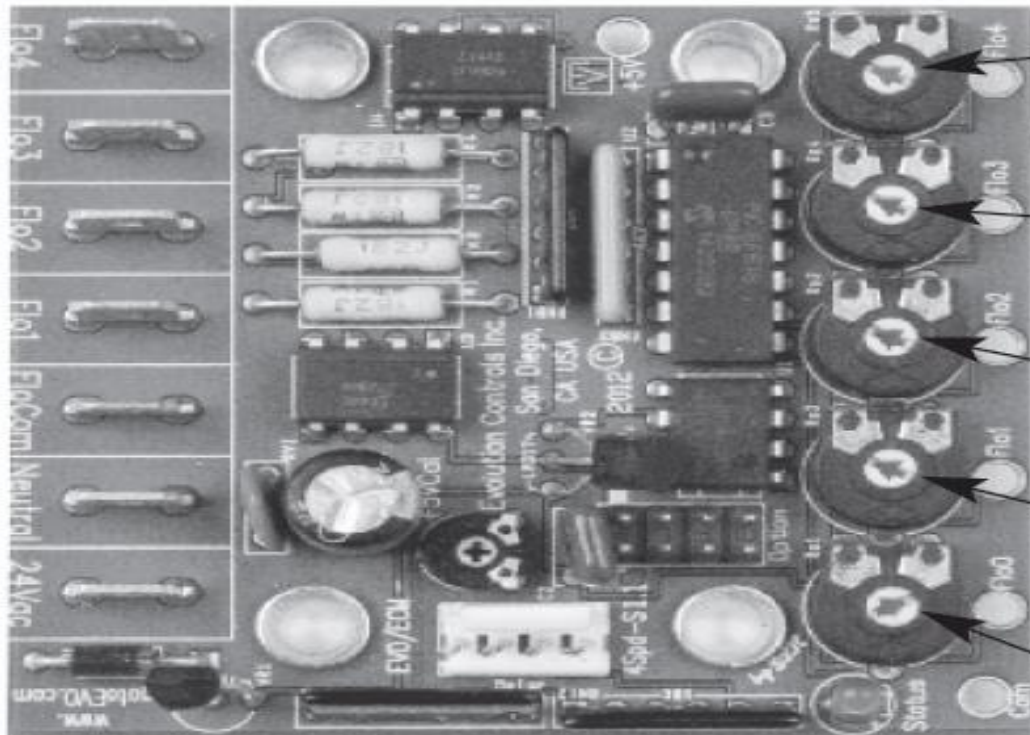
COOLING (Y2) Flo3

HEATING (W1/OB) Flo2

COOLING (Y1) Flo1

FAN ONLY (G) Flo0

W17-WG0880-01B



4

**Flo4
Stage 2
Heating**

3

**Flo3
Stage 2
Cooling**

2

**Flo2
Heating**

1

**Flo1
Cooling**

0

**Flo0
Fan Only**

Static P "WC	CFM's @ Speed Control Setting (VDC) -2430								
	5.0V	4.5V	4.0V	3.5V	3.0V	2.5V	2.0V	1.5V	1.0V
2.2	475	380							
2.0	638	547	455	260					
1.8	680	640	600	485	370				
1.6	830	770	710	633	555	420			
1.5		815	755	693	630	500	250		
1.4			800	735	670	565	440		
1.2				825	770	688	580	300	
1.0					850	765	680	460	
0.8						850	760	555	350
0.6							830	650	460

Static P "WC	CFM's @ Speed Control Setting (VDC) -3642								
	5.0V	4.5V	4.0V	3.5V	3.0V	2.5V	2.0V	1.5V	1.0V
2.2	520								
2.0	730	635	540	460	380				
1.8	860	795	730	640	550	410			
1.6	970	910	850	800	695	550	360		
1.5	1,020	965	910	830	740	610	430		
1.4	1,060	1,010	960	890	790	680	490		
1.2	1,150	1,095	1,040	980	880	755	590	340	
1.0	1,230	1,190	1,150	1,095	985	840	680	450	
0.8	1,280	1,260	1,240	1,150	1,080	915	750	580	
0.6	1,310	1,295	1,280	1,230	1,180	980	820	630	300

Static P "WC	CFM's @ Speed Control Setting (VDC) -4860								
	5.0V	4.5V	4.0V	3.5V	3.0V	2.5V	2.0V	1.5V	1.0V
2.2	520								
2.0	760	728	695	625					
1.8	920	885	850	800	630				
1.6	1,040	1,005	970	900	760	585			
1.5	1,100	1,060	1,020	950	810	650	400		
1.4	1,145	1,108	1,070	1,000	860	700	500		
1.2	1,240	1,195	1,150	1,080	940	785	640		
1.0	1,325	1,280	1,235	1,140	1,005	860	705	500	
0.8	1,410	1,355	1,300	1,215	1,070	925	775	590	300
0.6	1,470	1,420	1,370	1,275	1,120	985	840	675	450

ESP-J - MODEL NUMBER DESCRIPTION

1	2	3	4	5	6	7	8	9	10
UT			CA			SE		CT	RT

1,2,3, - Unit Type [UT]

ESP - Evaporator DX Fan Coil Unit

4,5,6,7 - Capacity [CA]

2430 - 24,000 to 30,000 BTU/Hr. (2-2½ tons)

3642 - 36,000 to 42,000 BTU/Hr. (3-3½ tons)

4860 - 48,000 to 60,000 BTU/Hr. (4-5 tons)

8 - Series [SE]

J - "J" series

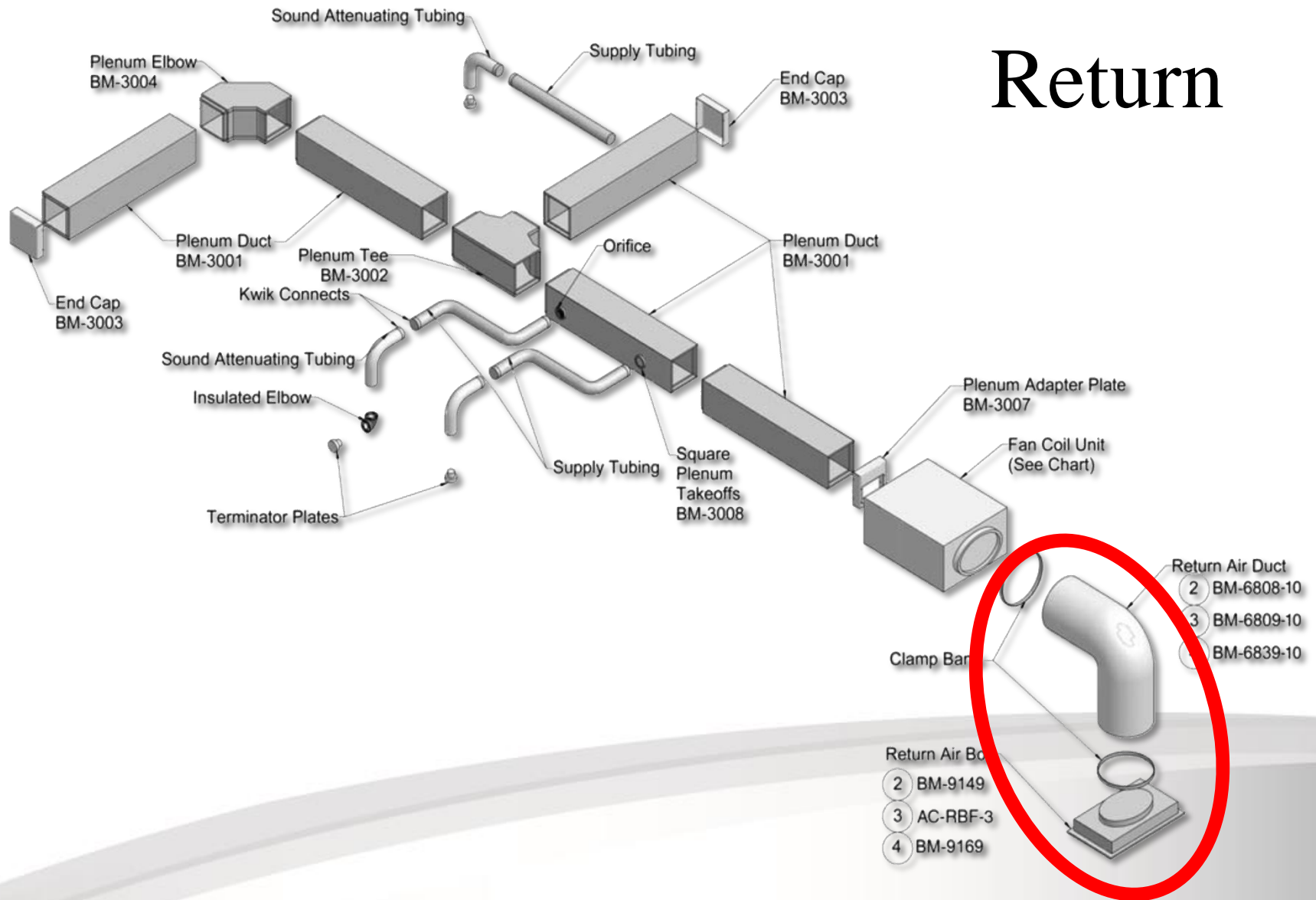
9 - Cabinet Type [CT]

H - Horizontal

10 - Refrigerant Type [RT]

4 - R410A

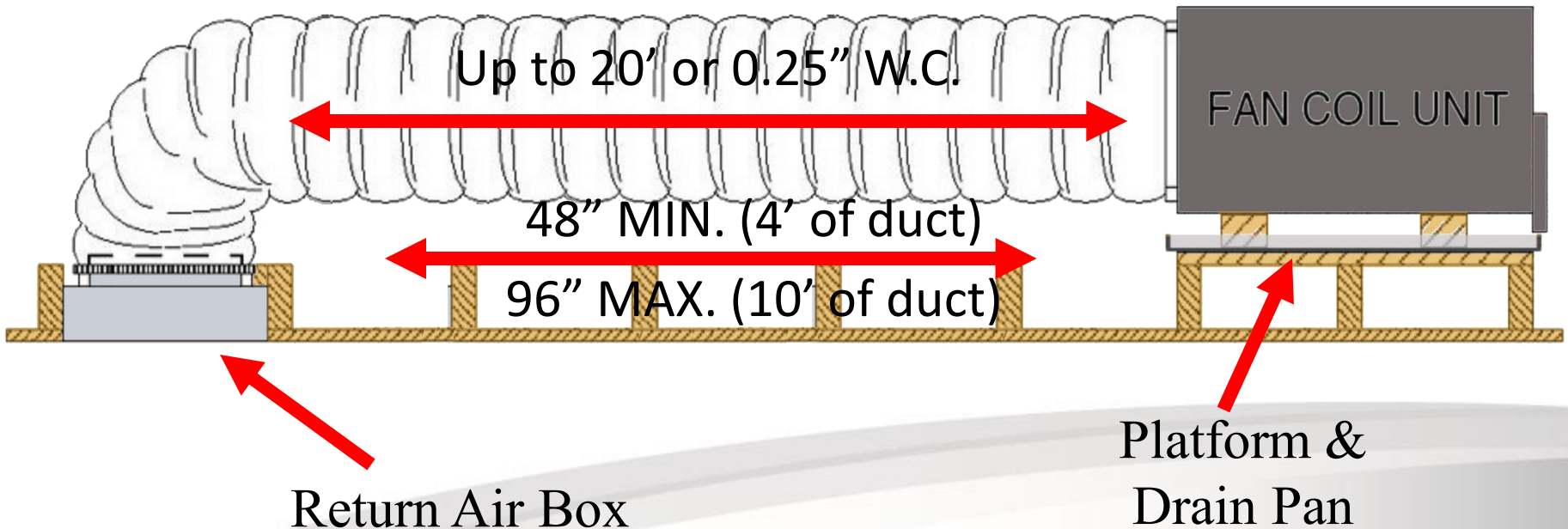
Return



Return Minimums

Model	Return Duct
ESP-2430	15"
ESP-3642	19"
ESP-4860	24"

Flexible Return Duct
(90° bend)



Rules of Install Return Noise

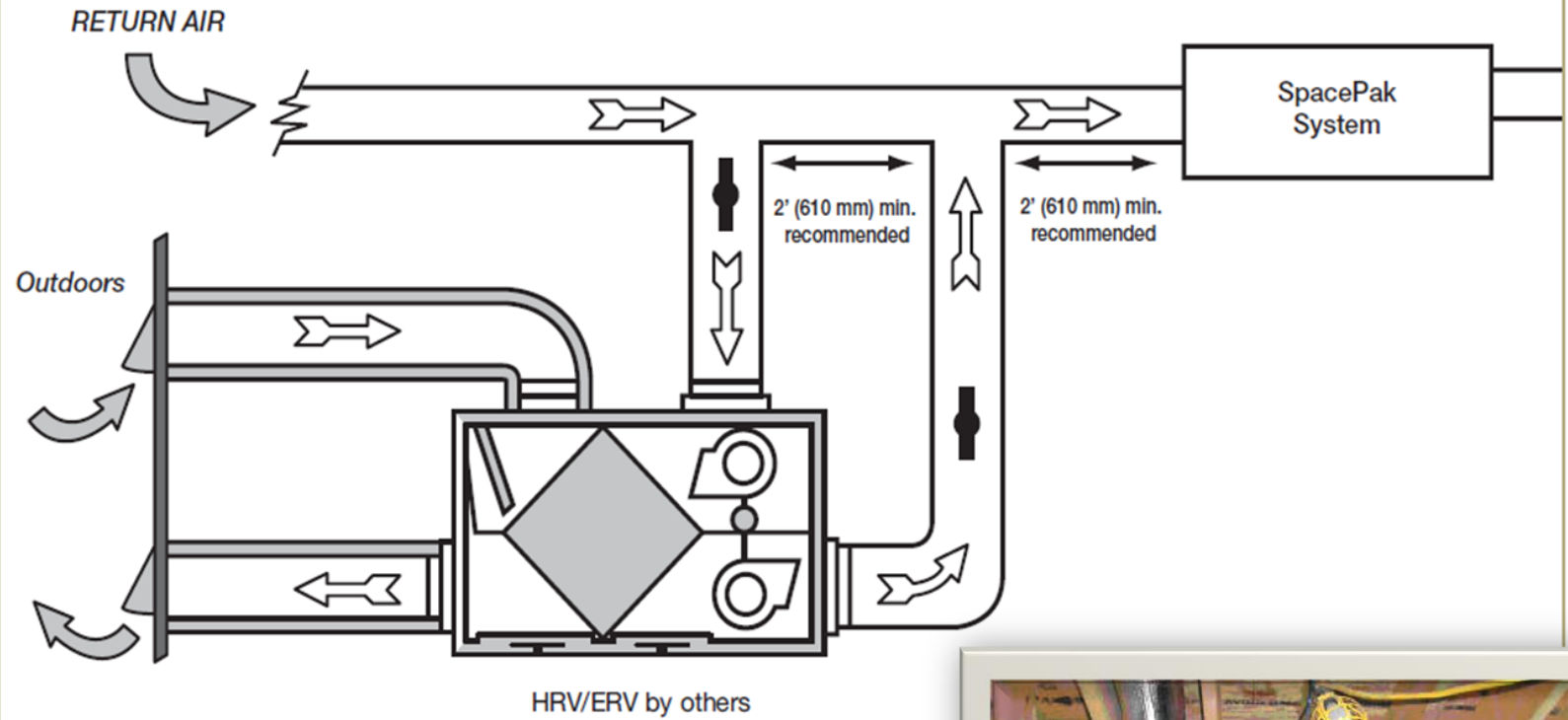
1. Size Return in each location for less than 500 FPM
2. Size Return in each location for no more than .25" static or less including the filter
3. Install at least One 90 degree elbow
4. Use at least 4' for sound attenuation material
5. Size transfer grills for the CFM and Free Area

Rules of Install Return

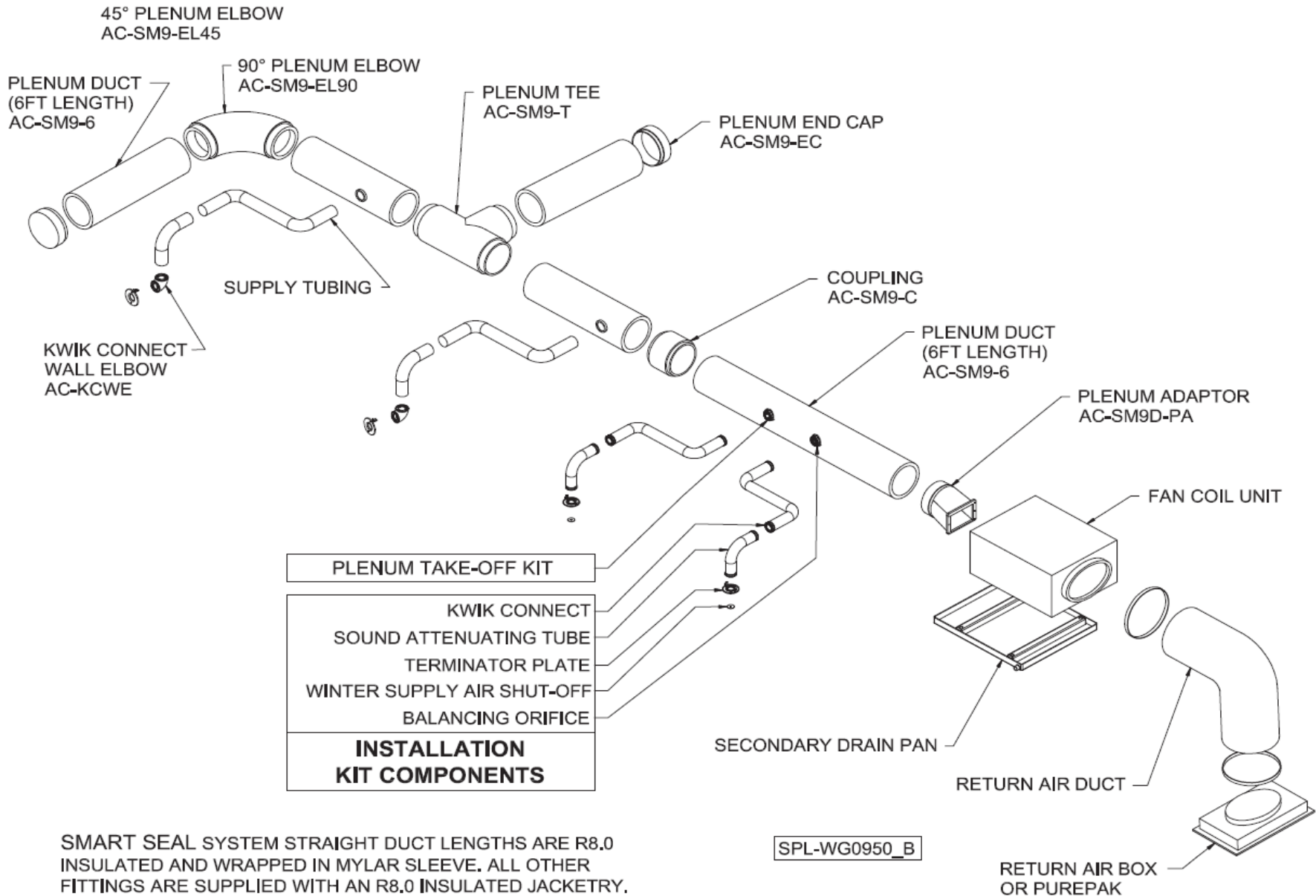
Multiple Return

MULTIPLE RETURN ACCEPTABLE DUCT SIZE BY TONNAGE						
ROUND DUCT SIZE, THESE SIZES WILL INSURE A QUIET AIR SPEED OF LESS THAN 500 FPM						
	2 TON	2.5 TON	3 TON	3.5 TON	4 TON	5 TON
AIR FLOW	440	550	660	770	880	1100
2 Returns						
10' OR LESS	9"	10"	11"	12"	13"	15"
10' TO 20'	10"	11"	12"	13"	13"	15"
30' TO 40'	11"	12"	13"	13"	14"	16"
3 Returns						
10' OR LESS	8"	9"	9"	10"	12"	12"
10' TO 20'	8"	9"	10"	11"	12"	12"
30' TO 40'	9"	10"	11"	12"	13"	13"

TYPICAL HRV/ERV SPACEPAK SYSTEM INSTALLATION



Main Trunk

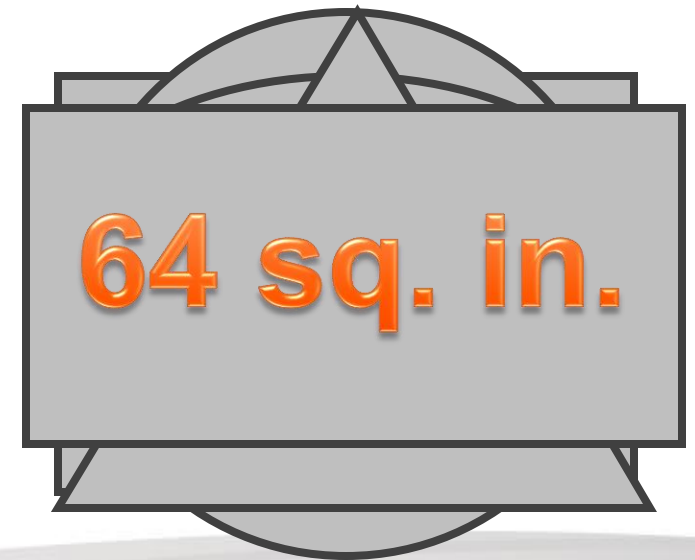


SPL-WG0950_B

SMART SEAL SYSTEM STRAIGHT DUCT LENGTHS ARE R8.0 INSULATED AND WRAPPED IN MYLAR SLEEVE. ALL OTHER FITTINGS ARE SUPPLIED WITH AN R8.0 INSULATED JACKETRY. DUCT COMPONENTS SHOWN WITHOUT FACTORY SUPPLIED R8.0 INSULATED JACKETRY.

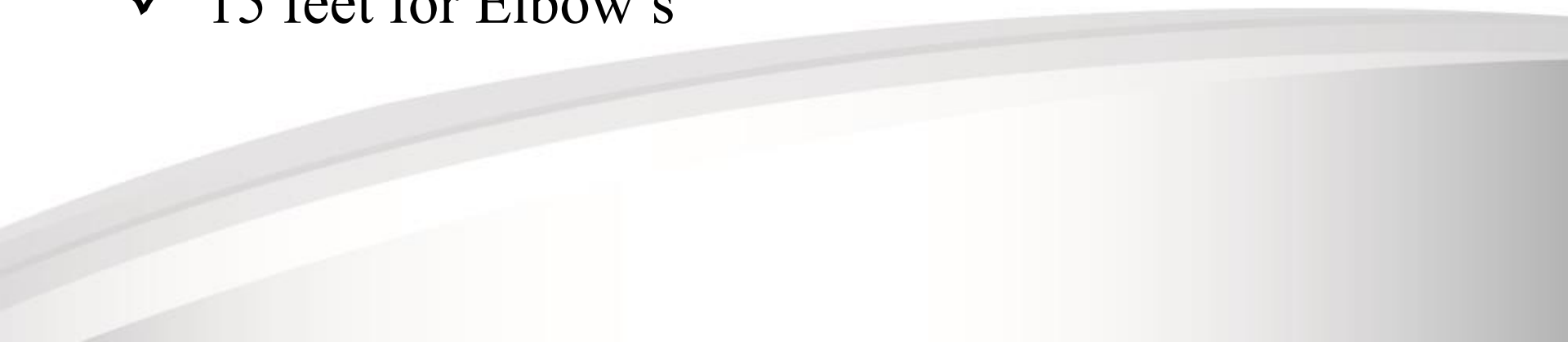
Size of Plenum

- 9 inch round = **64 square inches**
- 8 X 8 inch square
- 7 X 9 rectangular
- 6 X 11 rectangular
- 5 X 13 rectangular
- 4 X 16 rectangular
- 3 X 21 rectangular




Maximum Plenum Length

250 feet at 9 inch round IF:

- ✓ All fittings are long radius
 - ✓ The system is sealed to stop duct leakage
 - ✓ Fittings reduce the length by:
 - ✓ 30 feet for Tee's
 - ✓ 15 feet for Elbow's
- 

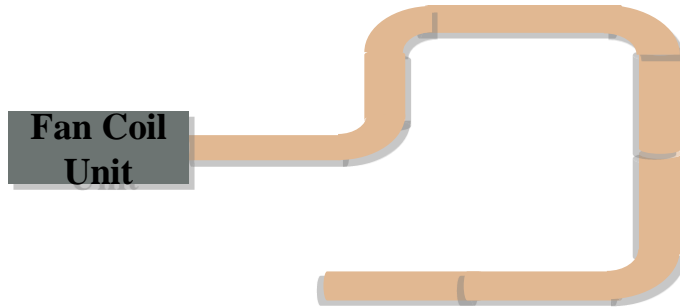
Minimum Plenum Length

Minimum plenum length is determined by minimum distance of:

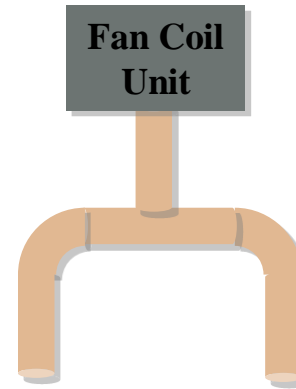
- 18 inches from outlet of the blower
 - 18 inches from a fitting
 - 18 inches from the end cap
 - 6 inches between take offs minimum
- 

Four Plenum Configurations

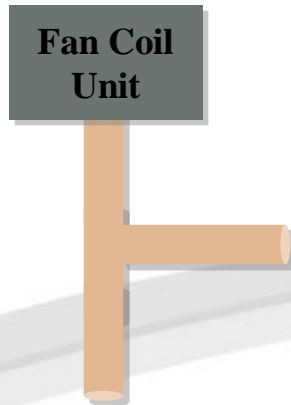
The Shotgun



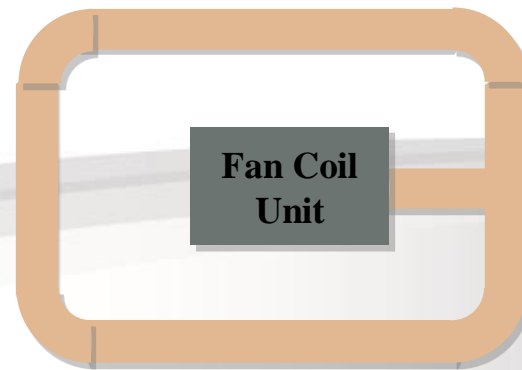
Horseshoe




Side Branch



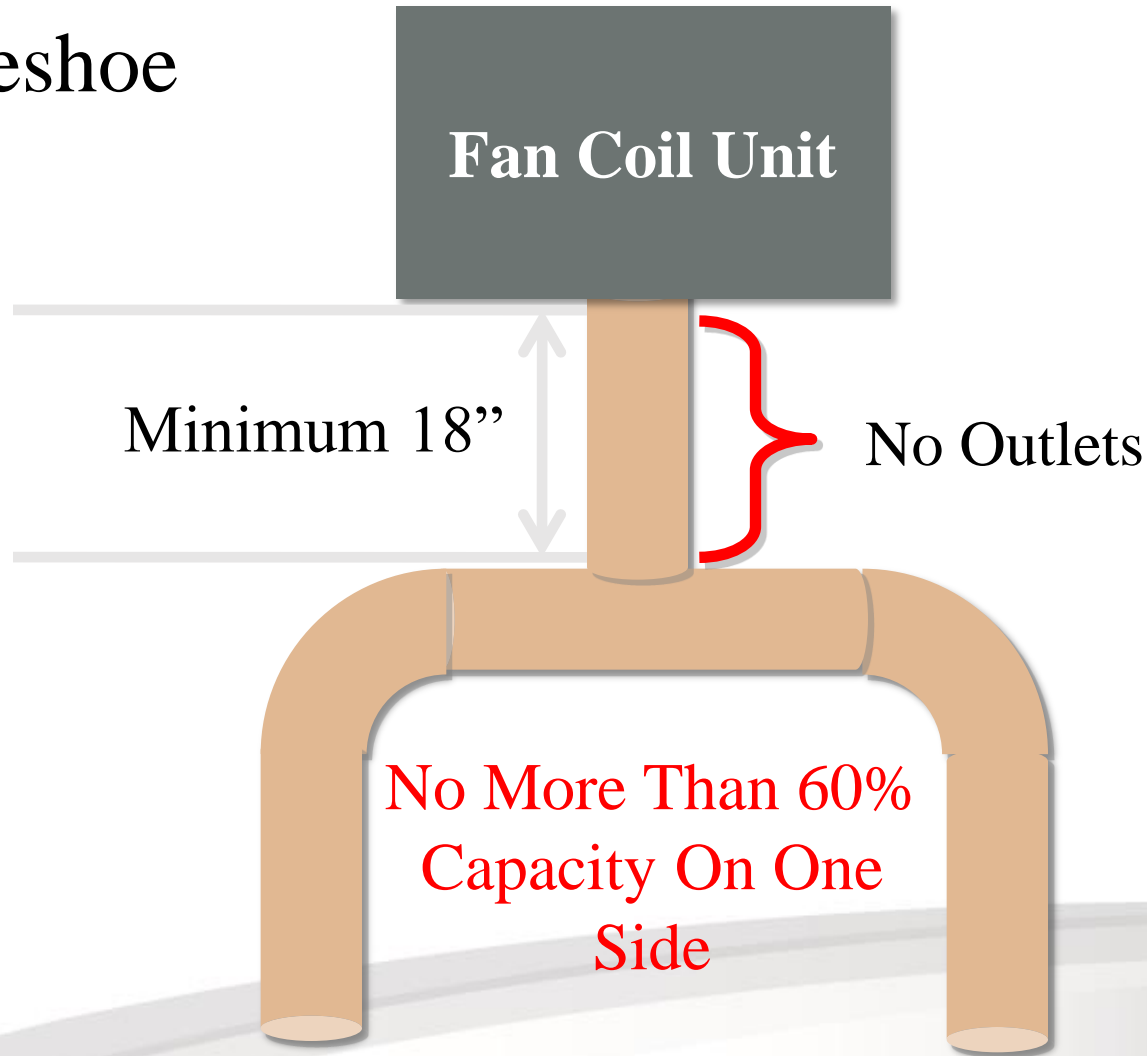
Perimeter Loop



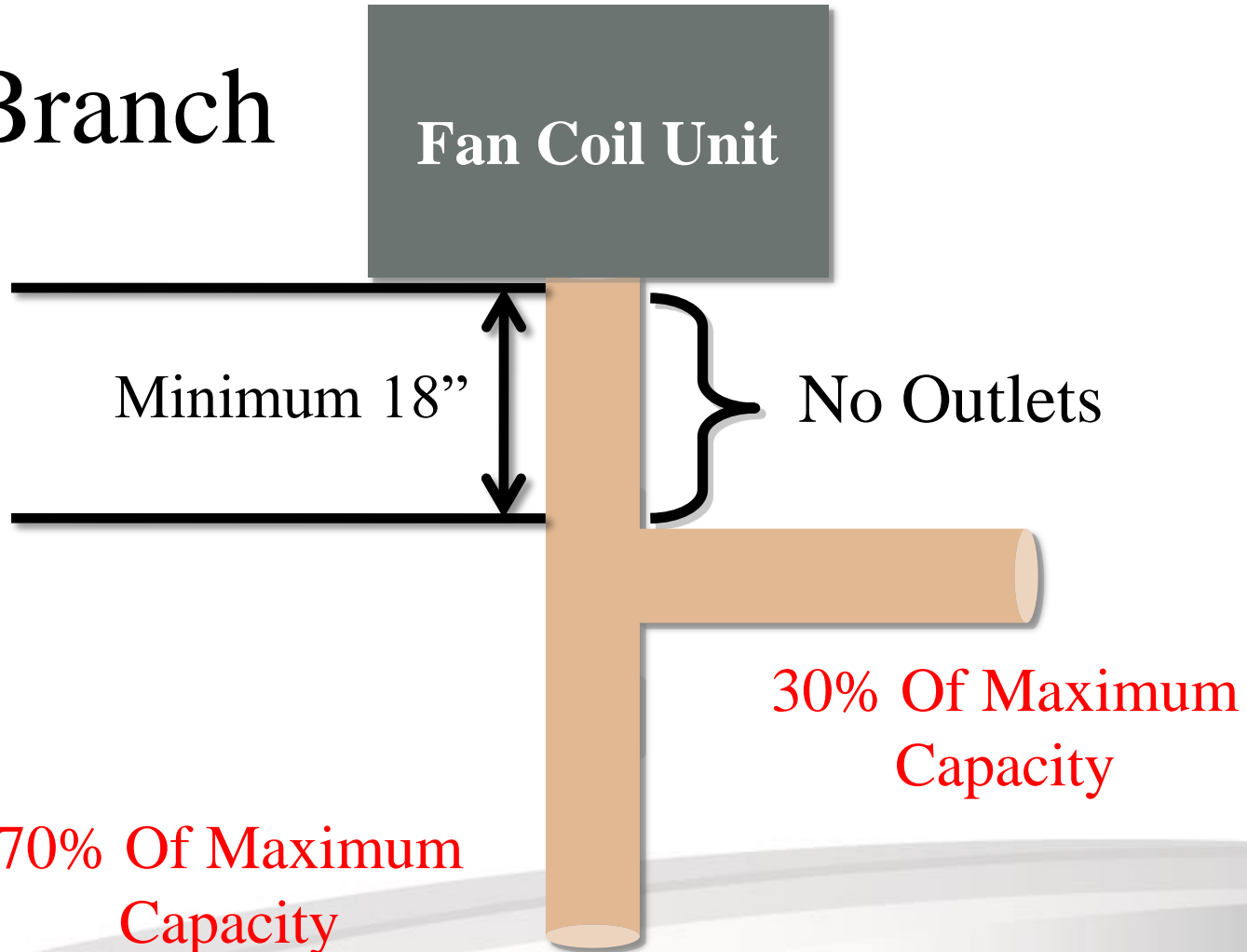
Plenum Configuration

- Always run **more** plenum and less duct.
 - Never have more than 60% of the take offs on one side of a tee.
 - Never have more than 30% of the take offs on a side branch.
 - You may reduce the size of the plenum by 1 size after a tee or side branch.
- 

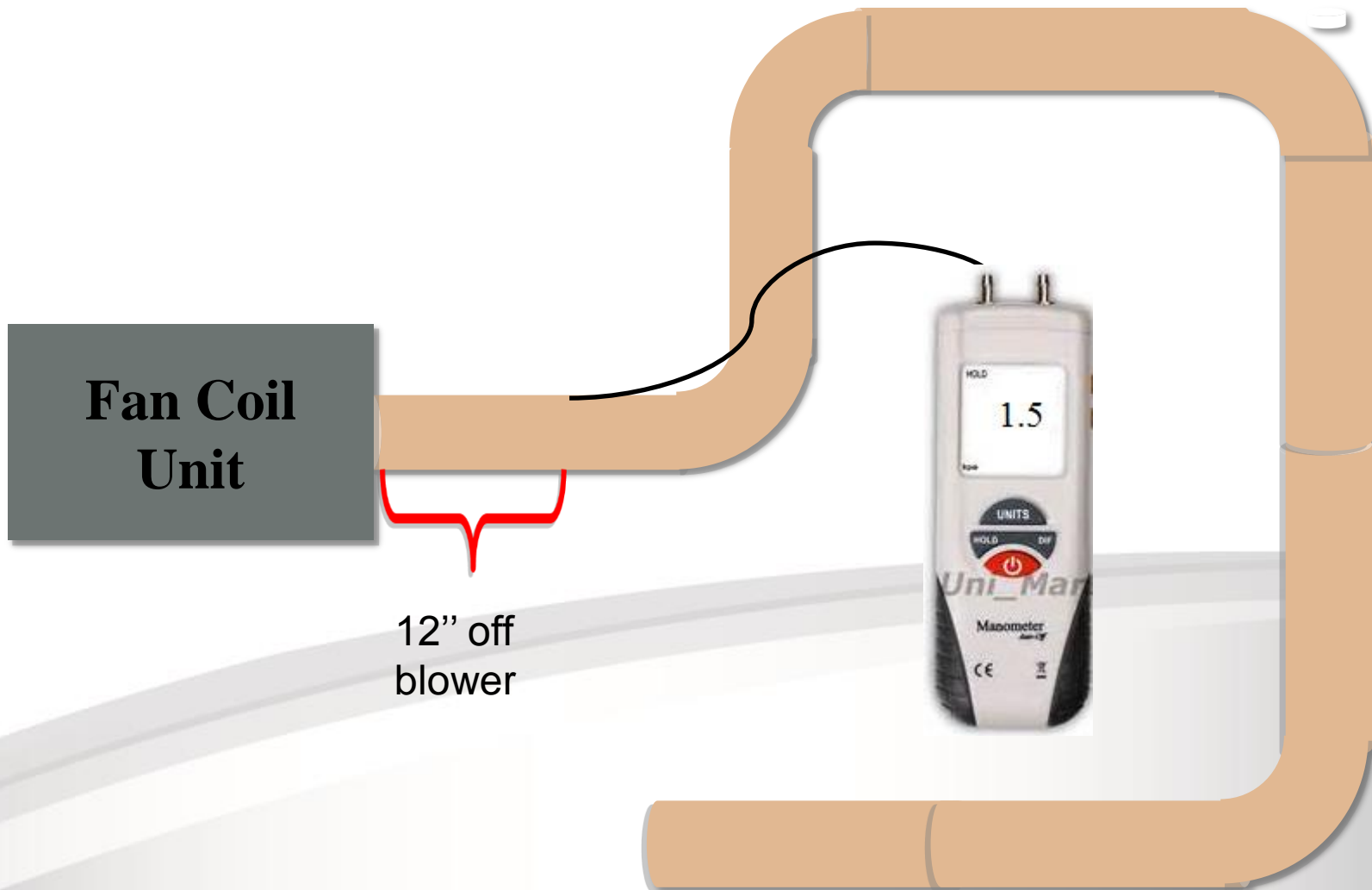
Horseshoe



Side Branch



Checking Static Pressure



How to Retrofit Old to New

Step 9: B & C Series Unit Retrofits

For retrofitting an ESP-J series unit to an existing ESP-B or C series, some modifications will need to be made to the current system. The necessary changes are below and the extent of the changes is dependent upon the model of the unit. (Refer to Figures 2.30 / 2.31 / 2.32)

ESP-2430 Retrofits

The 7" duct can still be utilized with a transition kit (Part No. BM-6918) available from SpacePak. This kit will reduce the main plenum from 9" to 7" to adapt to the existing 7" duct.

ESP-3642/4860 Retrofits

The existing plenum duct, which is typically 7", will need to be replaced with 8" X 8" duct board or field supplied 9" round duct. The return duct and return grille will also have

to be replaced with the proper parts for the replacement model. The reason for this change is the amount of air supplied by current models is 30% higher than the B & C Series models. The existing 7" duct work will reduce the air flow and cause excessive static pressures resulting in lack of performance and could possibly freeze up the coil which will result in compressor failure due to short cycling.

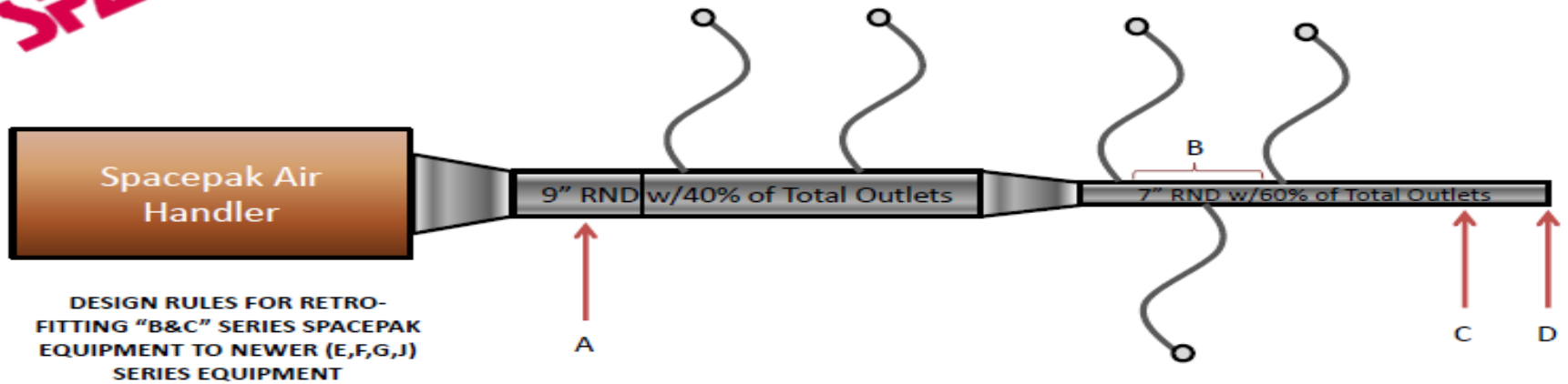
NOTICE FOR ALL RETROFITS

It may be necessary to add outlets to the system. The number of additional outlets will be dependent upon the external static pressure which should be measured with a manometer. This measurement should be between 1.2-1.5" WC. For more details on this test procedure and location for the test, refer to the System Start Up and Adjustment section in this installation manual.





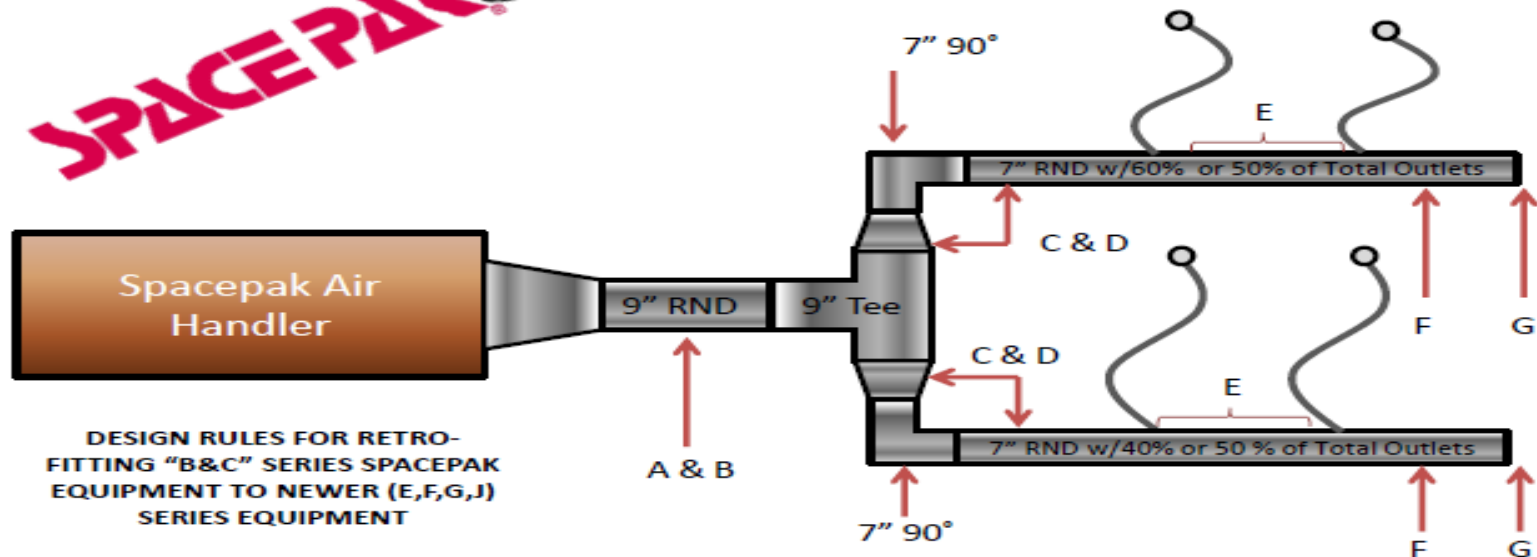
"Straight Duct" or "Shotgun Layout"



- A: No outlets in the first 18" of straight pipe coming off the Air Handler
- B: Minimum distance between outlets is 6" on center
- C: Minimum distance when placing an outlet from end cap is 12"
- D: NEVER place an outlet in the End Cap



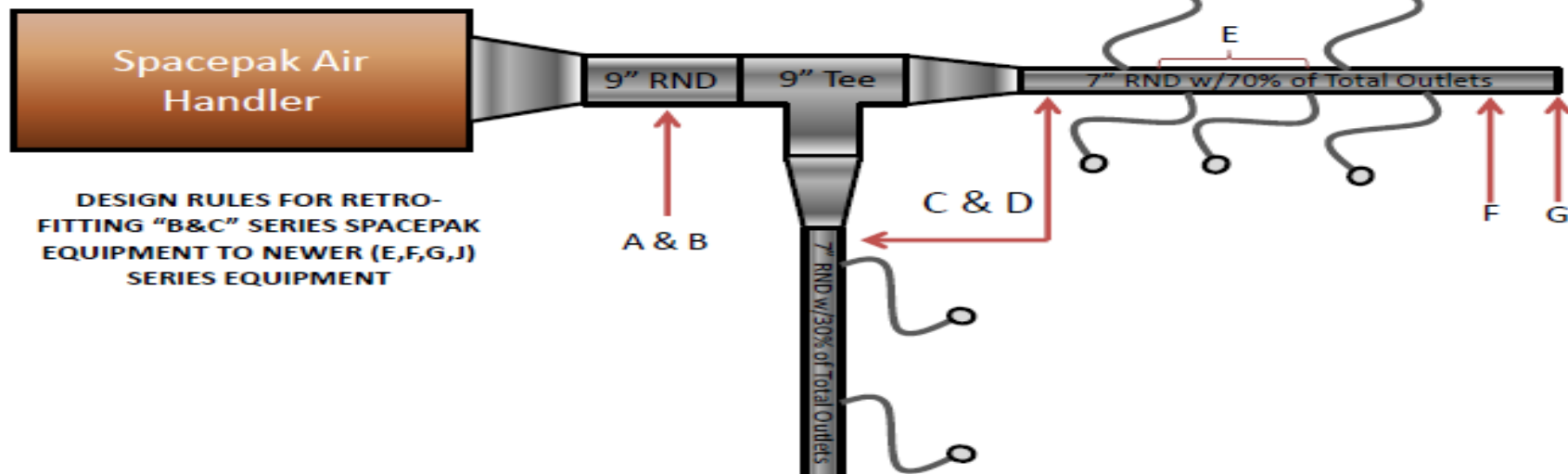
“Horseshoe Layout”



DESIGN RULES FOR RETRO-FITTING “B&C” SERIES SPACEPAK EQUIPMENT TO NEWER (E,F,G,J) SERIES EQUIPMENT

- A: Minimum distance from the air handler outlet to first tee or elbow is 18”
- B: No outlets in the first 18” of straight pipe off of the air handler
- C: Minimum distance of straight pipe after any tee or elbow is 18”
- D: Minimum distance when placing outlet after any tee or elbow is 18”
- E: Minimum distance between outlets is 6” on center
- F: Minimum distance when placing an outlet from the end cap is 12”
- G: Never place an outlet in the end cap

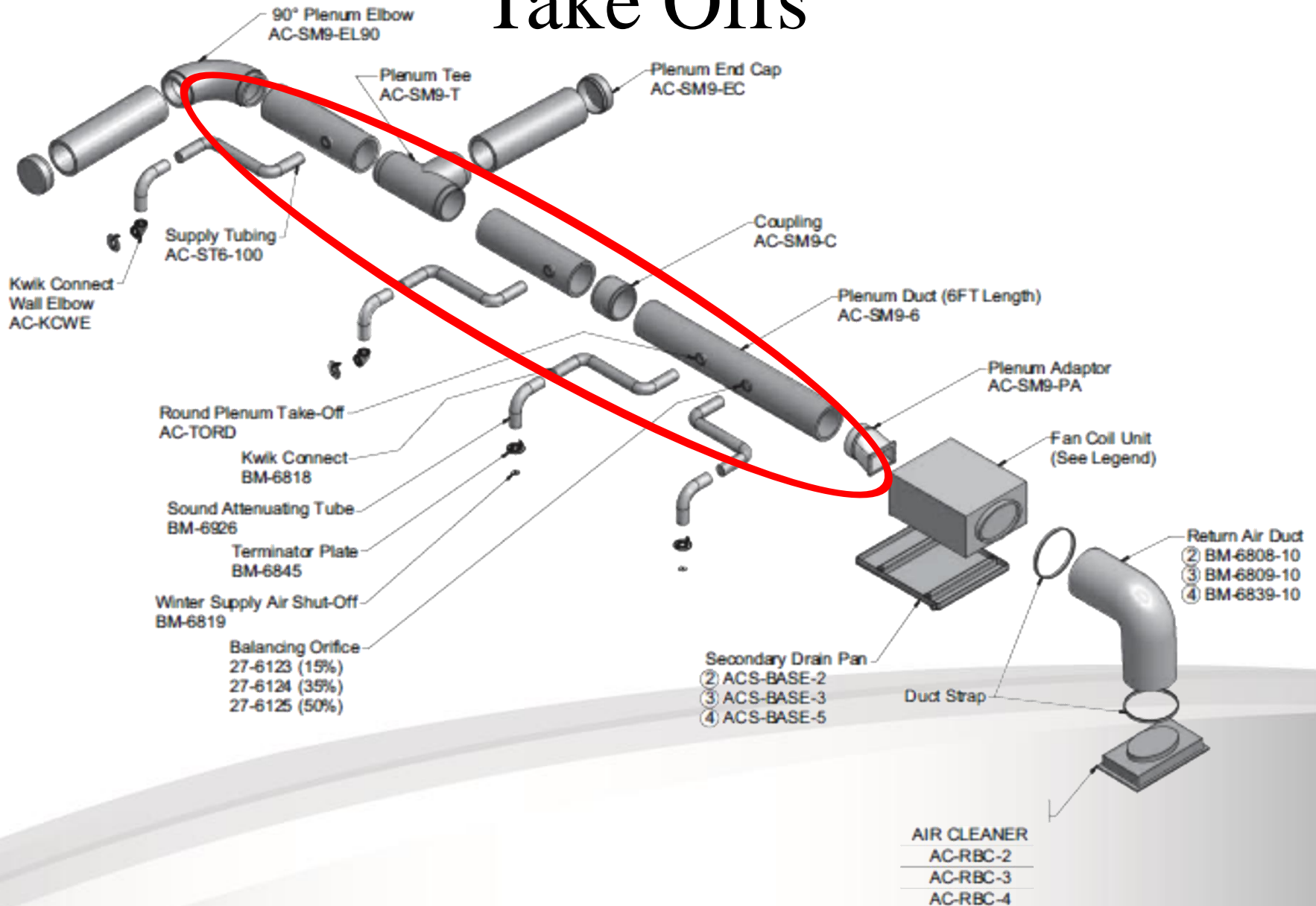
"Side Branch"



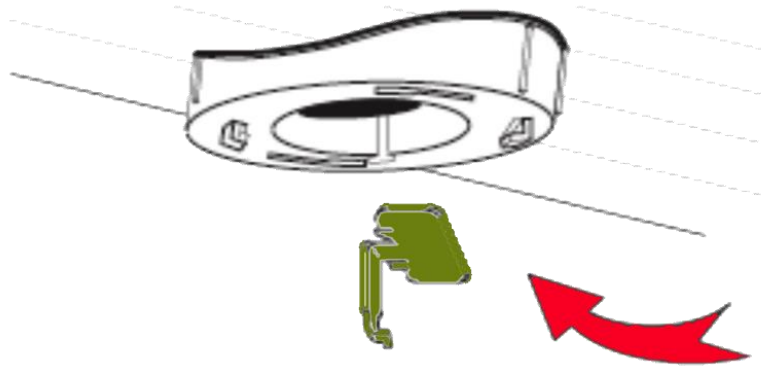
DESIGN RULES FOR RETRO-FITTING "B&C" SERIES SPACEPAK EQUIPMENT TO NEWER (E,F,G,J) SERIES EQUIPMENT

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- C: Minimum distance of straight pipe after any tee or elbow is 18"
- D: Minimum distance when placing outlet after any tee or elbow is 18"
- E: Minimum distance between outlets is 6" on center
- F: Minimum distance when placing an outlet from the end cap is 12"
- G: Never place an outlet in the end cap

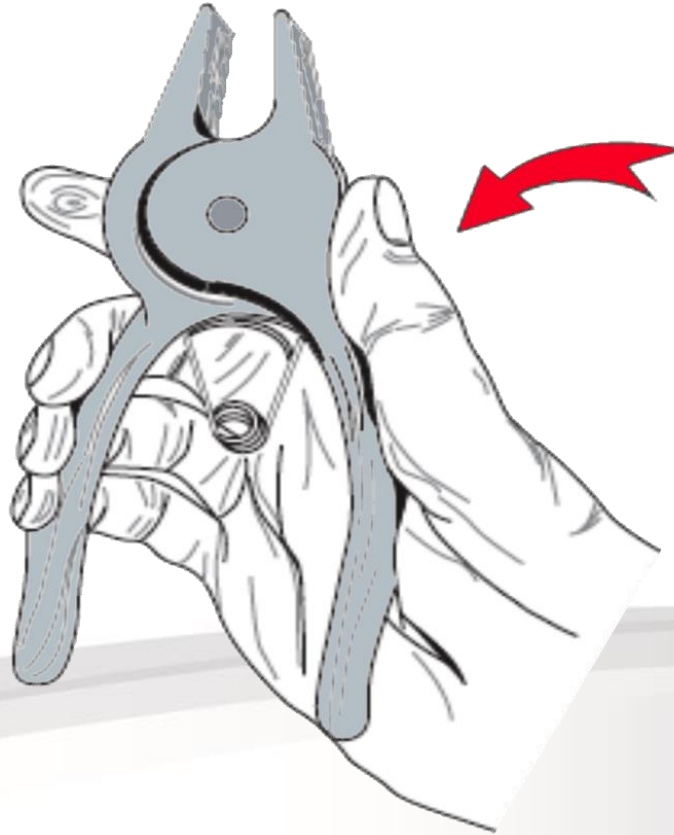
Take Offs



2 1/8" Hole saw

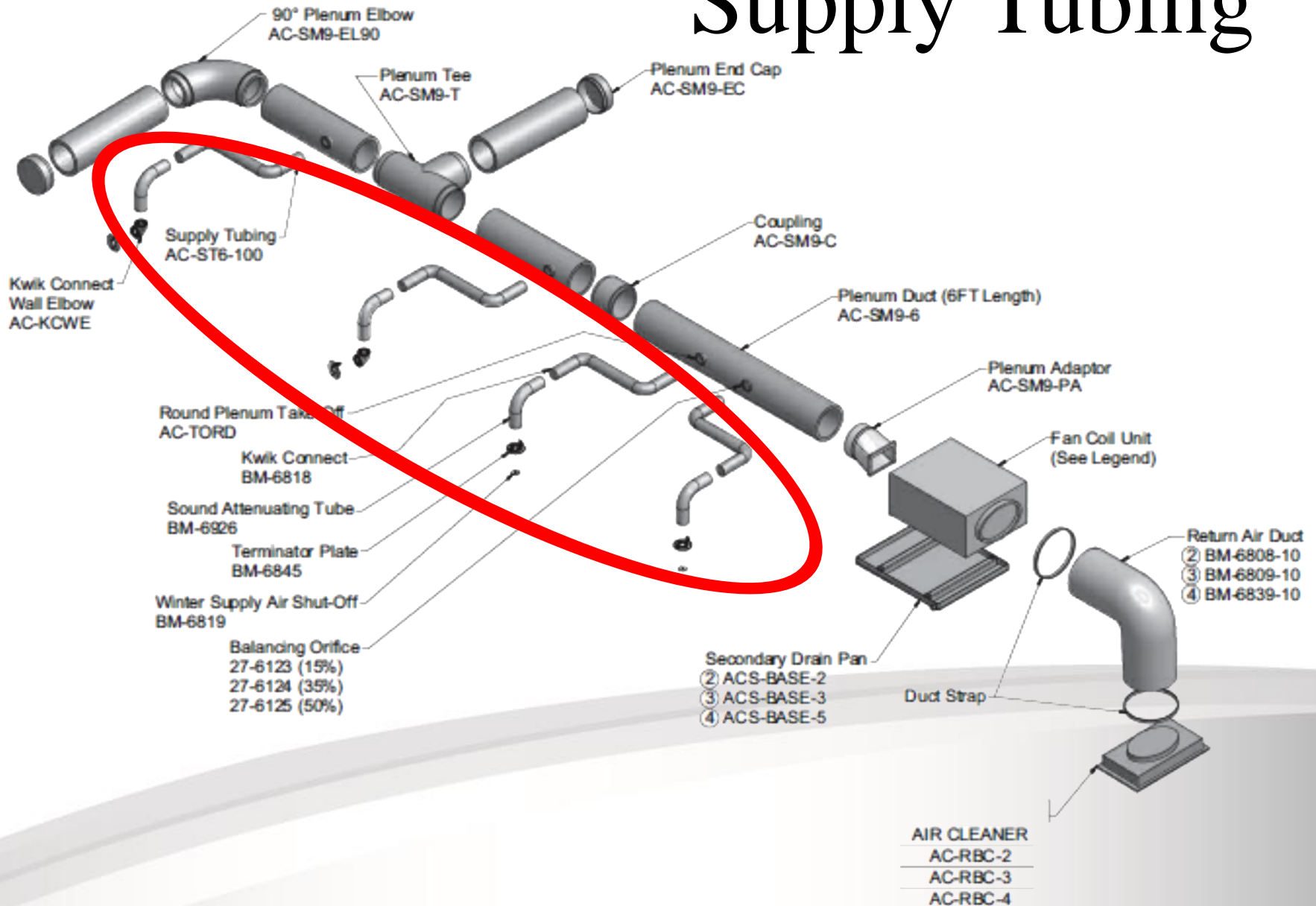


PLIERS




Pliers Part #
BM-6998

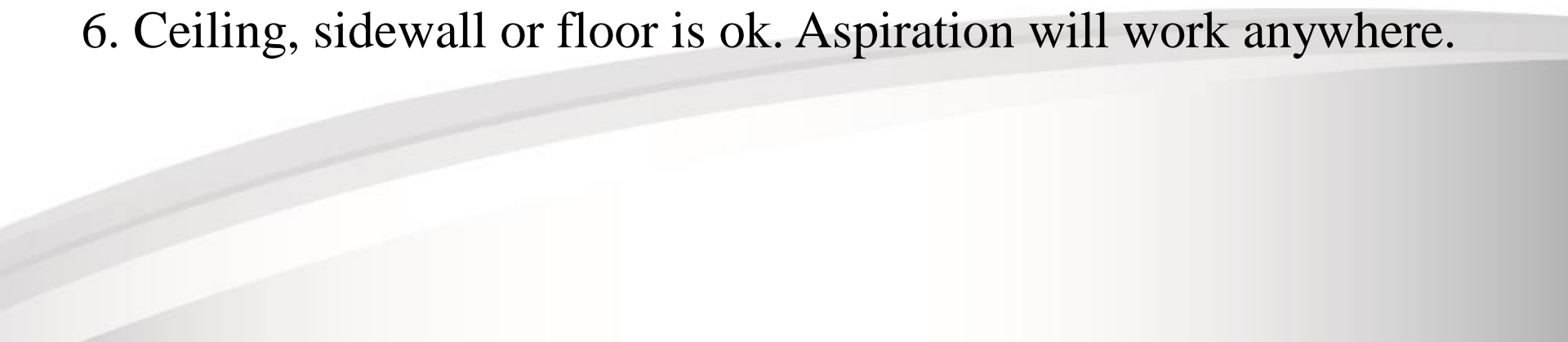
Supply Tubing



Best Length of Duct Run

- Best length to balance the outlets run: **9 to 15 feet**
 - Shorter than 9 feet works with duct orifice balancers.
 - Longer runs work if more runs are added to make up for CFM lost.
 - 10% rule (after 15' of supply run you lose 10% for every additional 5')
- 

Outlet Placement in Room

1. Place outlets out of traffic patterns.
 2. Never put an outlet where it will blow on someone.
 3. Never put an outlet where it will blow on something that will move.
 4. Never block an outlet.
 5. Have at least 5 inches from a wall
 6. Ceiling, sidewall or floor is ok. Aspiration will work anywhere.
- 

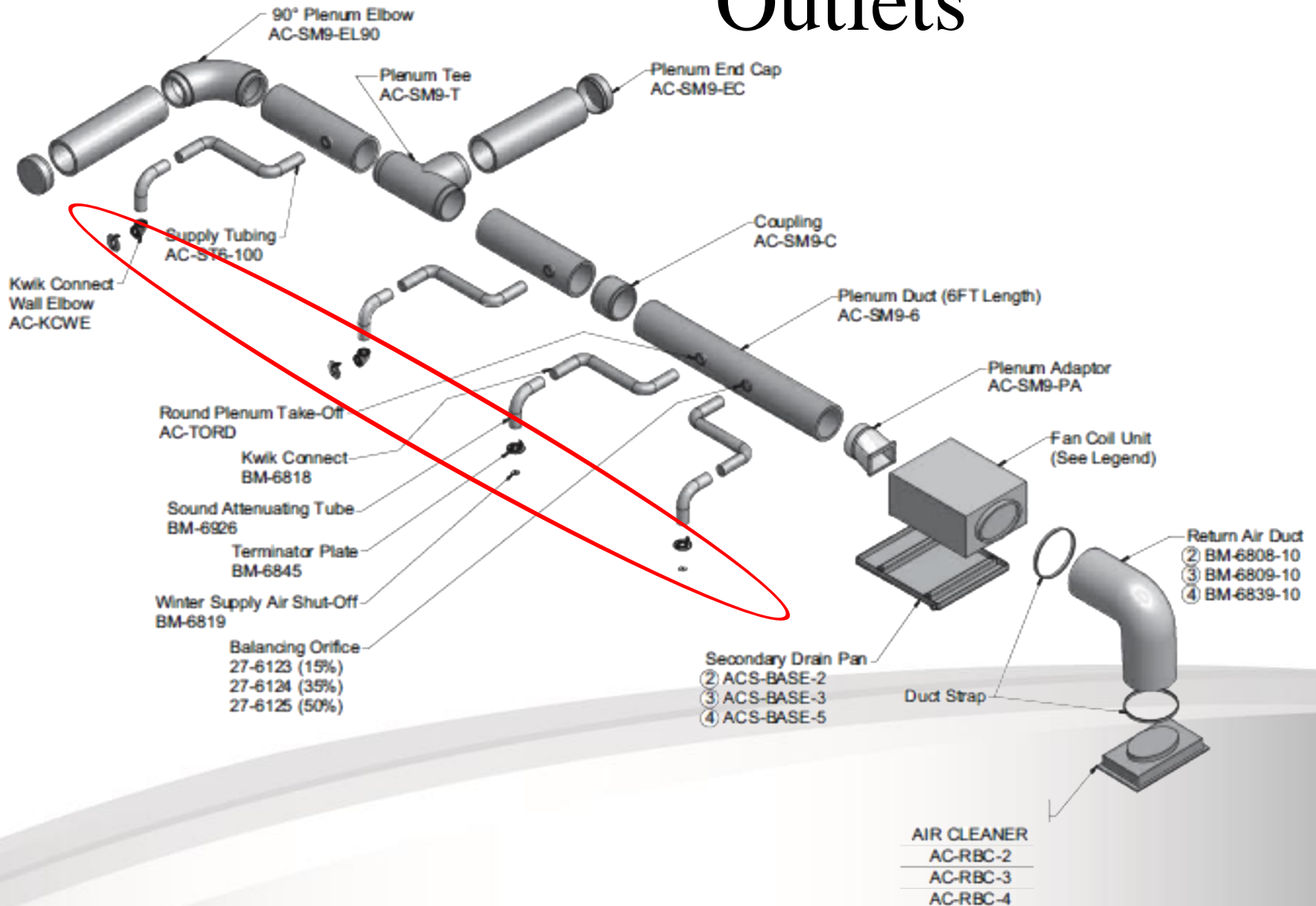
6 Outlets Per Ton Minimum

System Size	System CFM	Number Of Outlets	Average CFM	BTU's Per outlet in cooling
2 Ton	440	12	37	2000
2.5 Ton	550	15	37	2000
3 Ton	660	18	37	2000
3.5 Ton	770	21	37	2000
4 Ton	880	24	37	2000
5 Ton	1100	30	37	2000

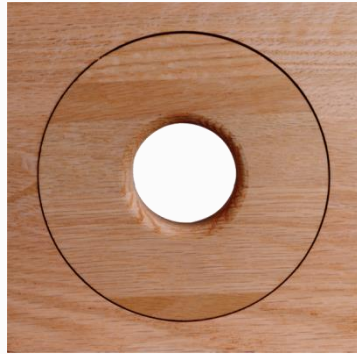
10 Outlets Per Ton Max

System Size	System CFM	Number Of Outlets	Average CFM	BTU's per outlet in cooling
2 Ton	440	20	22	1200
2.5 Ton	550	25	22	1200
3 Ton	660	30	22	1200
3.5 Ton	770	35	22	1200
4 Ton	880	40	22	1200
5 Ton	1100	50	22	1200

Outlets



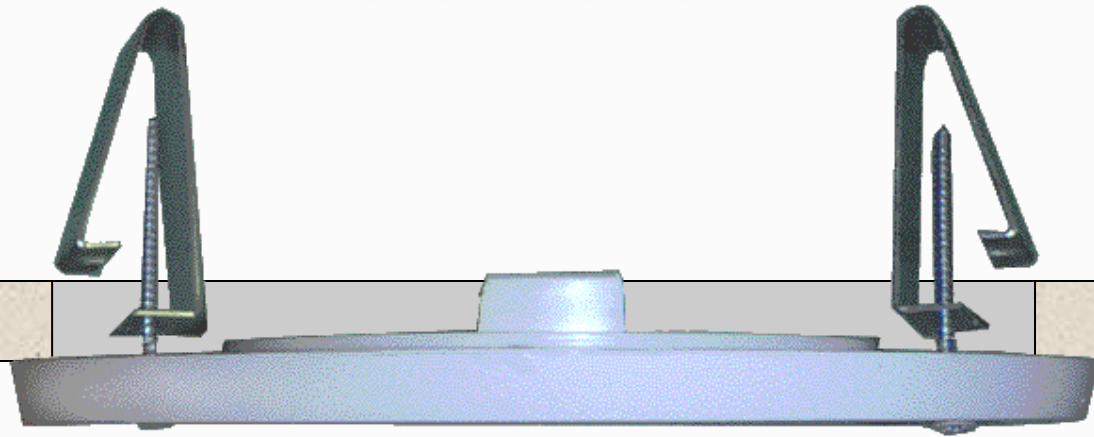
Outlets





4" Hole Saw

Outlets



#1 Screwdriver

Design Considerations for Zoning

- Design DX systems with 2 or 3 zones max and must be used with a 2 stage condenser.
 - Unlimited with Chiller applications
- All DX zones must have a minimum of 3.5 outlets per ton – (per zone)
 - 4 ton system
 - $4 \times 3.5 = 14$ outlets per zone minimum
 - 3 zones \times 14 outlets = 42 outlets total
 - 42 outlets divided by 4 tons = 10 outlets/ton
- Not recommended to use a bypass duct on DX coil systems

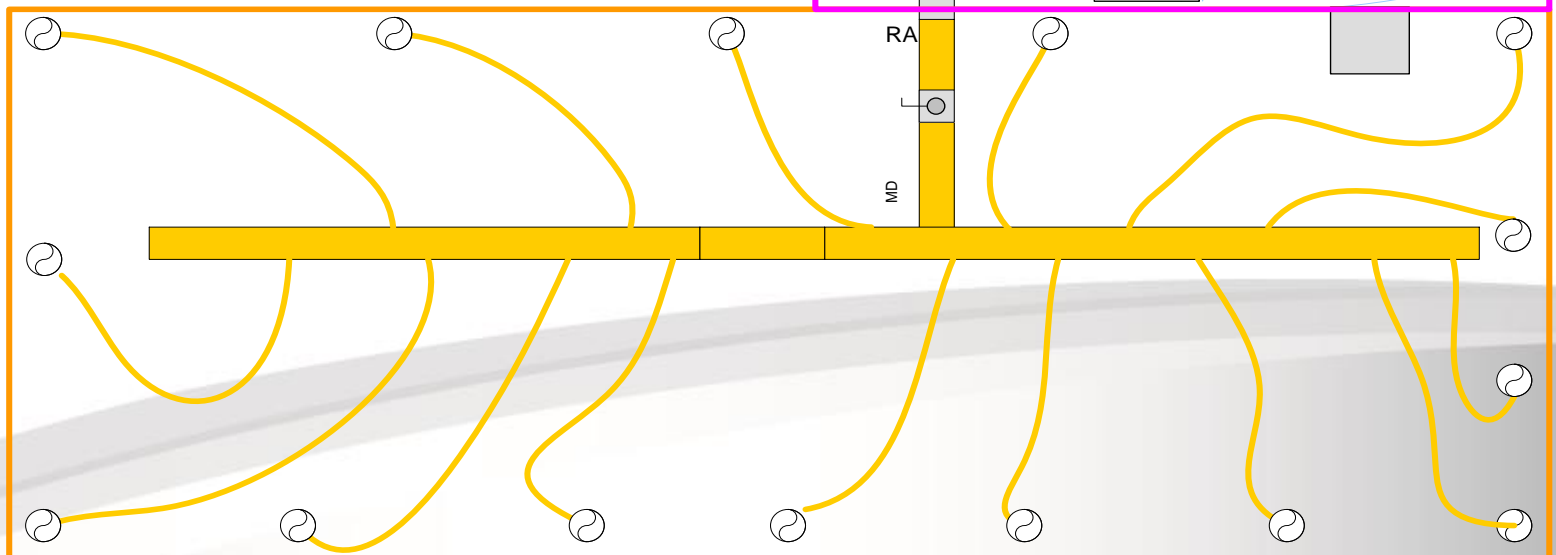
3 ton 2 Zone
(3 ton X 3.5 = 11 outlets per zone
minimum)

Z-1 = 15 Outlets

Z-2 = 11 Outlets

26 outlets Total

Zone 1 Load requires 15 Outlets



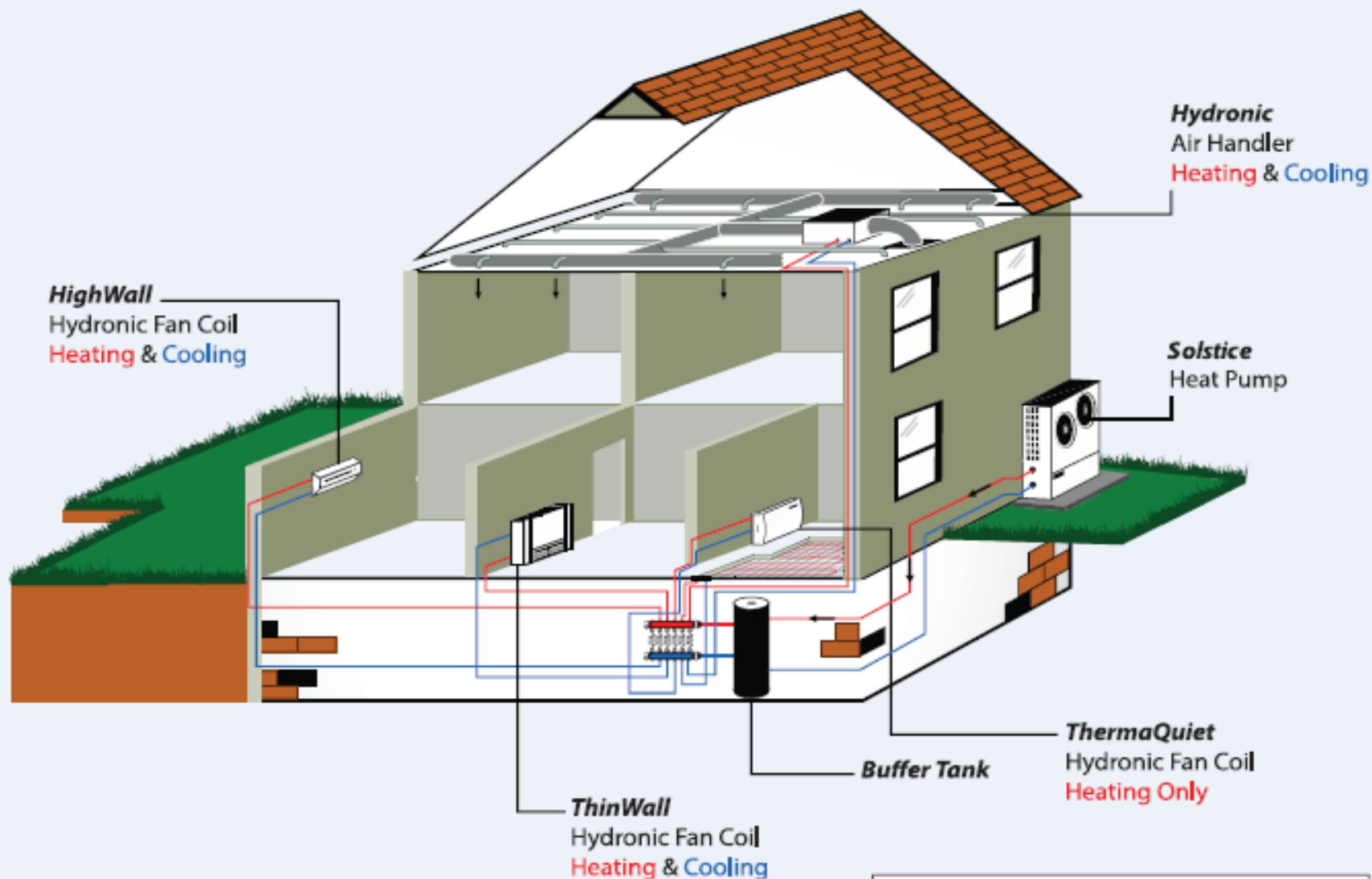
Zone 2 Load requires 6 Outlets

Basic 2 and 3 Zone System Minimum Outlet Required In Each Zone

System Tonnage	2 Zone # of Outlets in each Zone	2 Zone System Total Outlets	3 Zone Outlets in each Zone	3 Zone System Total Outlets
2	7	14	7	21
2.5	9	18	9	27
3	11	22	11	33
3.5	12-13	24	12	36
4	14	28	14	42
5	18	36	18	54

Installation Rules

SPACE PAK  [®]
HYDRONICS



Key:

— = Supply

— = Return

Illustration depicts heating application. In cooling applications chilled water replaces hot water supply lines.



Performance

SCM-036 Heating Operation at 120°F

Ambient Temp	Capacity BTU/hr	Chiller Power Watts	Chiller COP
47°F	36,840	4,070	2.7
32°F	28,500	3,790	2.2
17°F	20,160	3,710	1.6

SCM-036 Cooling Operation at 44°F Water

Ambient Temp	Capacity BTU/hr	Chiller Power Watts	Chiller COP	Chiller EER
82°F	38,500	3,208	3.6	12
95°F	36,000	3,750	2.8	9.6

SCM-060 Heating Operation at 120°F

Ambient Temp	Capacity BTU/hr	Chiller Power Watts	Chiller COP
47°F	52,200	5,768	2.7
32°F	40,350	5,371	2.2
17°F	28,500	5,249	1.6

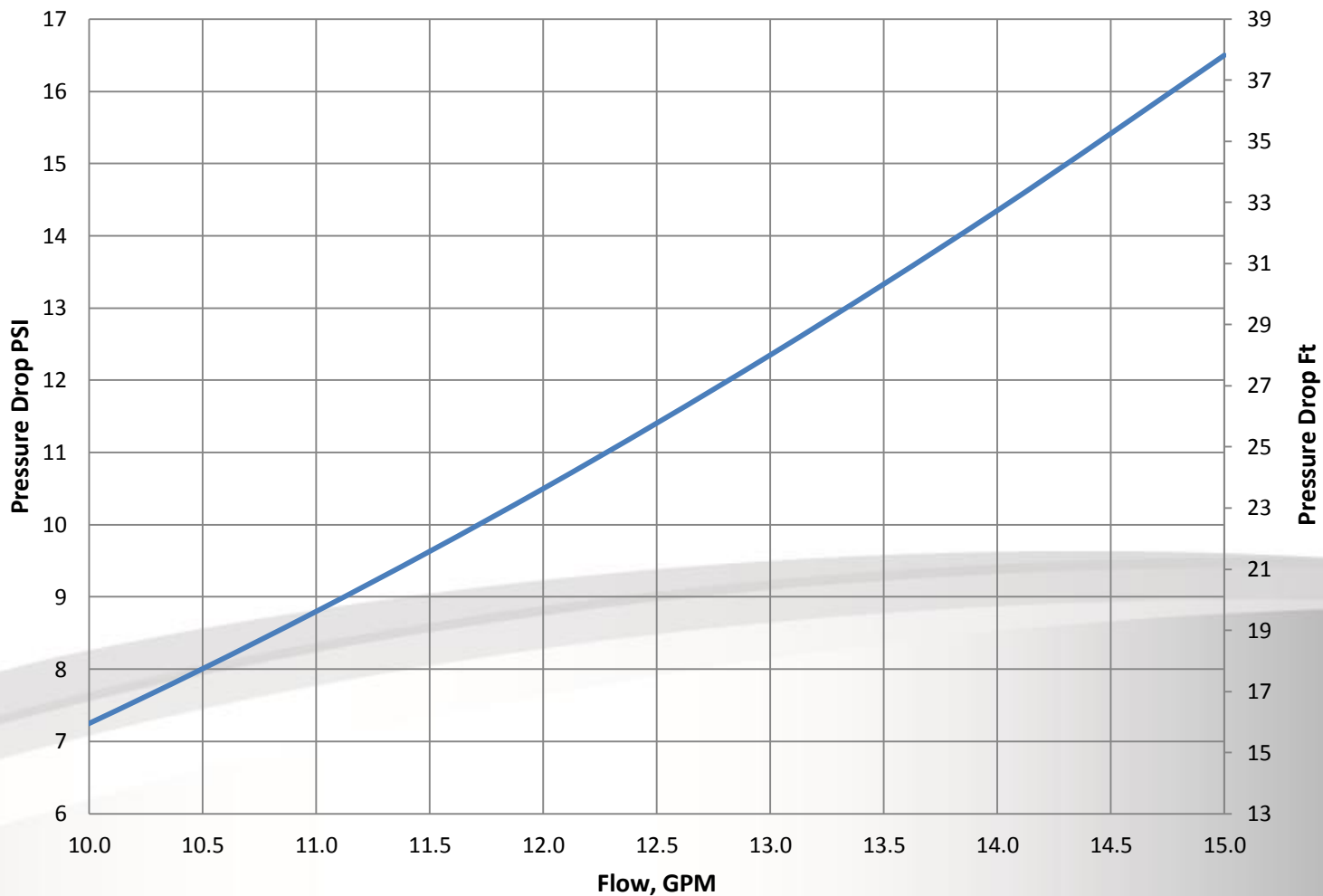
SCM-060 Cooling Operation at 44°F Water

Ambient Temp	Capacity BTU/hr	Chiller Power Watts	Chiller COP	Chiller EER
82°F	57,500	5,227	3.2	11
95°F	48,000	5,517	2.5	8.7

SCM-060

WATER HEAD LOSS

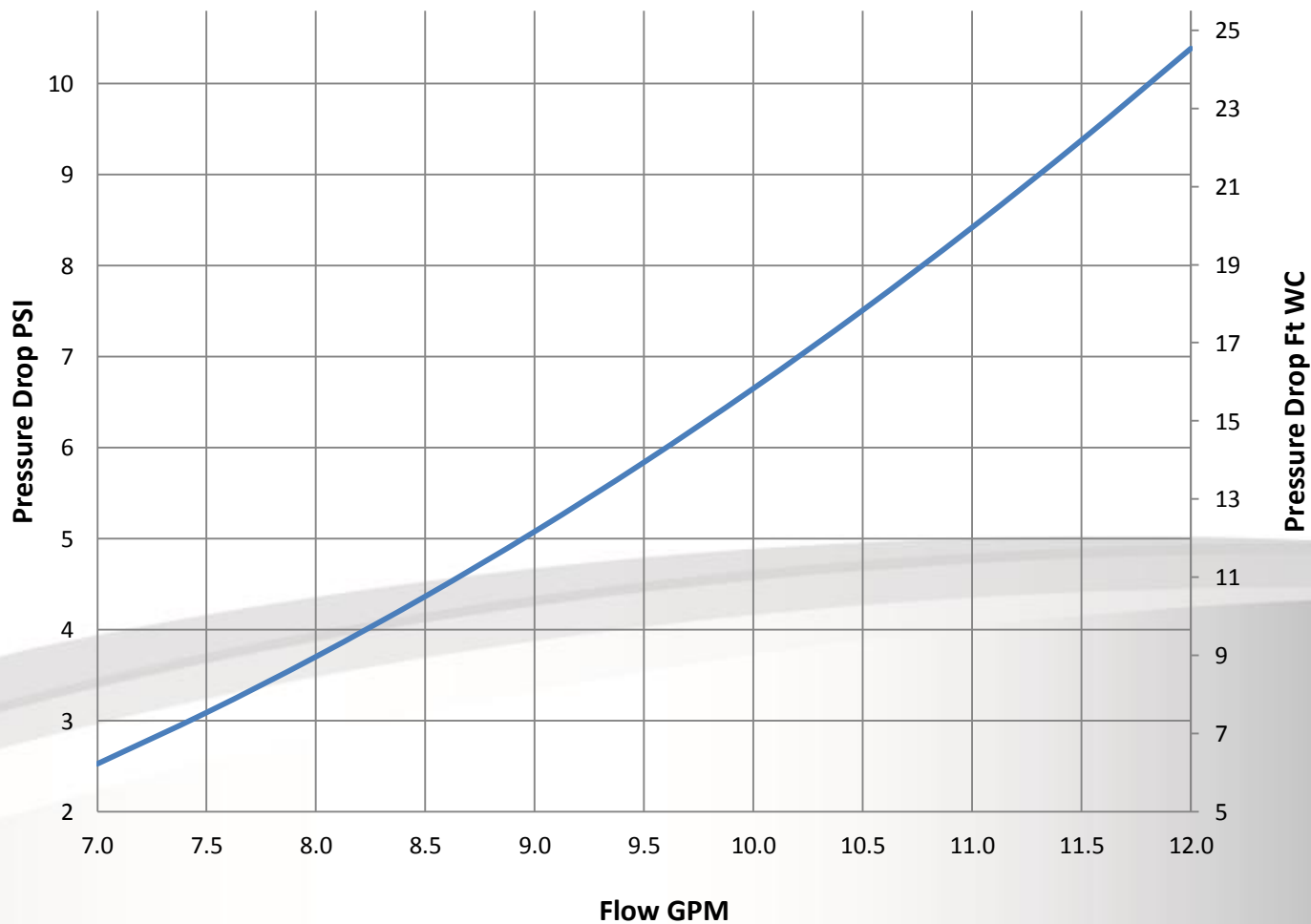
Flow Pressure Drop		
GPM	PSI	Ft WC
10.0	7.3	16.7
10.5	8.0	18.5
11.0	8.8	20.3
11.5	9.6	22.2
12.0	10.5	24.2
12.5	11.4	26.3
13.0	12.4	28.5
13.5	13.3	30.7
14.0	14.4	33.1
14.5	15.4	35.5
15.0	16.5	38.0



SCM-036

WATER HEAD LOSS

Flow		Pressure Drop	
GPM	PSI	Ft WC	
7.0	2.7	6.3	
7.5	3.3	7.6	
8.0	3.9	9.0	
8.5	4.6	10.5	
9.0	5.3	12.2	
9.5	6.0	13.9	
10.0	6.9	15.8	
10.5	7.7	17.8	
11.0	8.6	19.9	
11.5	9.6	22.1	
12.0	10.6	24.4	



Glycol/water system design

SpacePak heat pump/chiller capacity — The SCM capacity is reduced as glycol percentage increases. Multiply the rated capacity by the multiplier listed in Figure 8.

Figure 8 SCM glycol concentration (10% min, 50% max)

Ethylene glycol %	10	20	30	40	50
Min ambient temp, °F	23	14	2	−13	−36
SpacePak capacity multiplier	.98	.96	.93	.91	.89
Pressure drop multiplier (cooling)	1.06	1.12	1.16	1.25	1.36
Pressure drop multiplier (heating)	1.06	1.12	1.16	1.22	1.28

Propylene glycol %	10	20	30	40	50
Min ambient temp, °F	26	18	8	−7	−29
SpacePak capacity multiplier	.99	.98	.96	.93	.88
Pressure drop multiplier (cooling)	1.10	1.20	1.34	1.50	1.65
Pressure drop multiplier (heating)	1.10	1.20	1.34	1.46	1.50



Solstice Extreme, SpacePak's low ambient heat pump provides primary heating and cooling even in severe weather climates. Its environmentally friendly design uses EVI technology and the clean efficient characteristics of hydronics as its primary energy source to deliver perfectly conditioned air to any occupied space.

Standard Features

- Enhanced Vapor Injection
- 64,680 BTU/h at 47°F Ambient
- 3.3 Ton of Cooling at 95°F Ambient
- Simple Piping & Pumping
- Installation & Service Friendly
- Easily Zoned
- Proven Integrated Control
- Outdoor Reset
- Green Hydronic Energy – No Refrigerant in Occupied Space
- Low Ambient Freeze Protection



Specifications

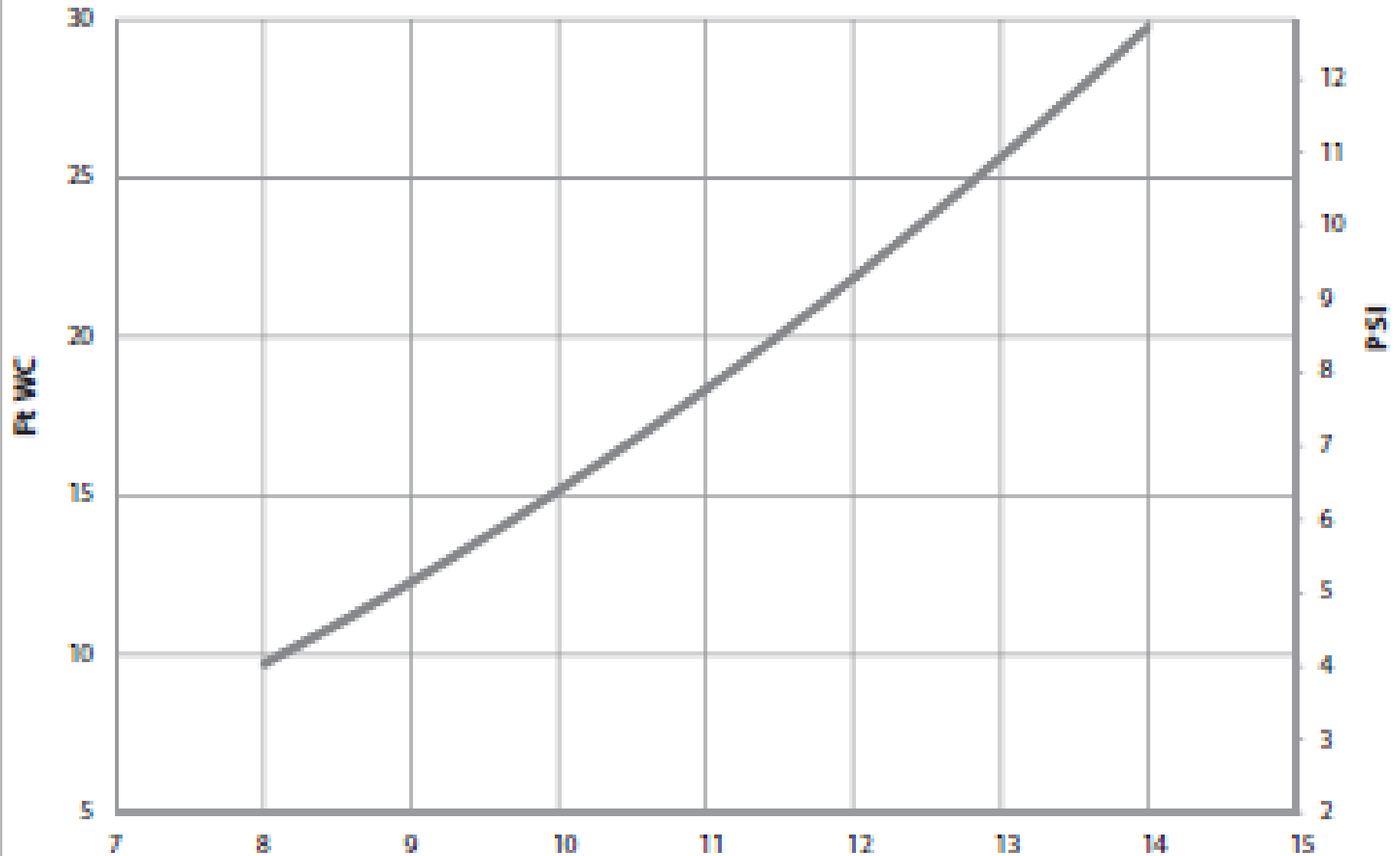
Model	LAHP - 048	COP
Heating Capacity (47°F Ambient, 120°F Supply Water)	64,680 BTUh (18.9 kW)	3.18
Heating Capacity (17°F Ambient, 120°F Supply Water)	46,440 BTUh (13.6 kW)	2.35
Heating Capacity (5°F Ambient, 120°F Supply Water)	39,240 BTUh (11.5 kW)	2.35
Cooling Capacity (95°F Ambient, 44°F Supply Water)	40,000 BTUh (11.7 kW)	2.43
Voltage	230V/1ph/60Hz	
Min Supply Temp	42°F (5.5°C)	
Max Supply Temp	125°F (52°C)	
Min Water Flow	10 GPM (37.8 l/min)	
Nominal Water Flow	12 GPM (45.4 l/min)	
dP@ Max Flow	17.2 ft (35.8 kPa)	
Heating Current	31 Amps	
Cooling Current	23.5 Amps	
Noise Level	62 dB (A)	
Compressor	Scroll	
Installed Weight	386 lbs (175 Kg)	

Glycol/Water System

LAHP Glycol Concentrations (30% Minimum, 50% Maximum)

Ethylene Glycol %	10	20	30	40	50
Min. Ambient Temp	23°F/5°C	14°F/10°C	2°F/-17°C	-13°F/-25°C	-36°F/-38°C
SpacePak Capacity Multiplier	0.98	0.96	0.93	0.91	0.89
Pressure Drop Multiplier (COOLING)	1.06	1.12	1.16	1.25	1.36
Pressure Drop Multiplier (HEATING)	1.06	1.12	1.16	1.22	1.28
Propylene Glycol %	10	20	30	40	50
Min. Ambient Temp	26°F/3°C	18°F/8°C	8°F/-13°C	-7°F/-22°C	-29°F/-34°C
SpacePak Capacity Multiplier	0.99	0.98	0.96	0.93	0.88
Pressure Drop Multiplier (COOLING)	1.10	1.20	1.34	1.50	1.65
Pressure Drop Multiplier (HEATING)	1.10	1.20	1.34	1.46	1.50

LAHP Glycol Head Loss



Liquid Flow GPM
Measured with 30% Propylene Glycol at 120 deg F

Buffer Tank



- **5 ton chiller**
- 5 ton x 5 gallons = 25 gallons minimum buffer tank
- **4 ton LAHP chiller**
- 4 tons x 10 gallons = 40 gallon minimum buffer tank
- **3 ton chiller**
- 3 ton x 5 gallons = 15 gallons minimum buffer tank

RETURN FROM TERMINAL UNIT(S)

SUPPLY TO TERMINAL UNIT(S)












AUTOFILL LOCATION IS SUGGESTED,
BUT THE FINAL LOCATION TO BE
MADE BY FIELD CONTRACTOR

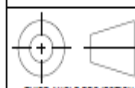
BUFFER
TANK

LAHP HEAT PUMP

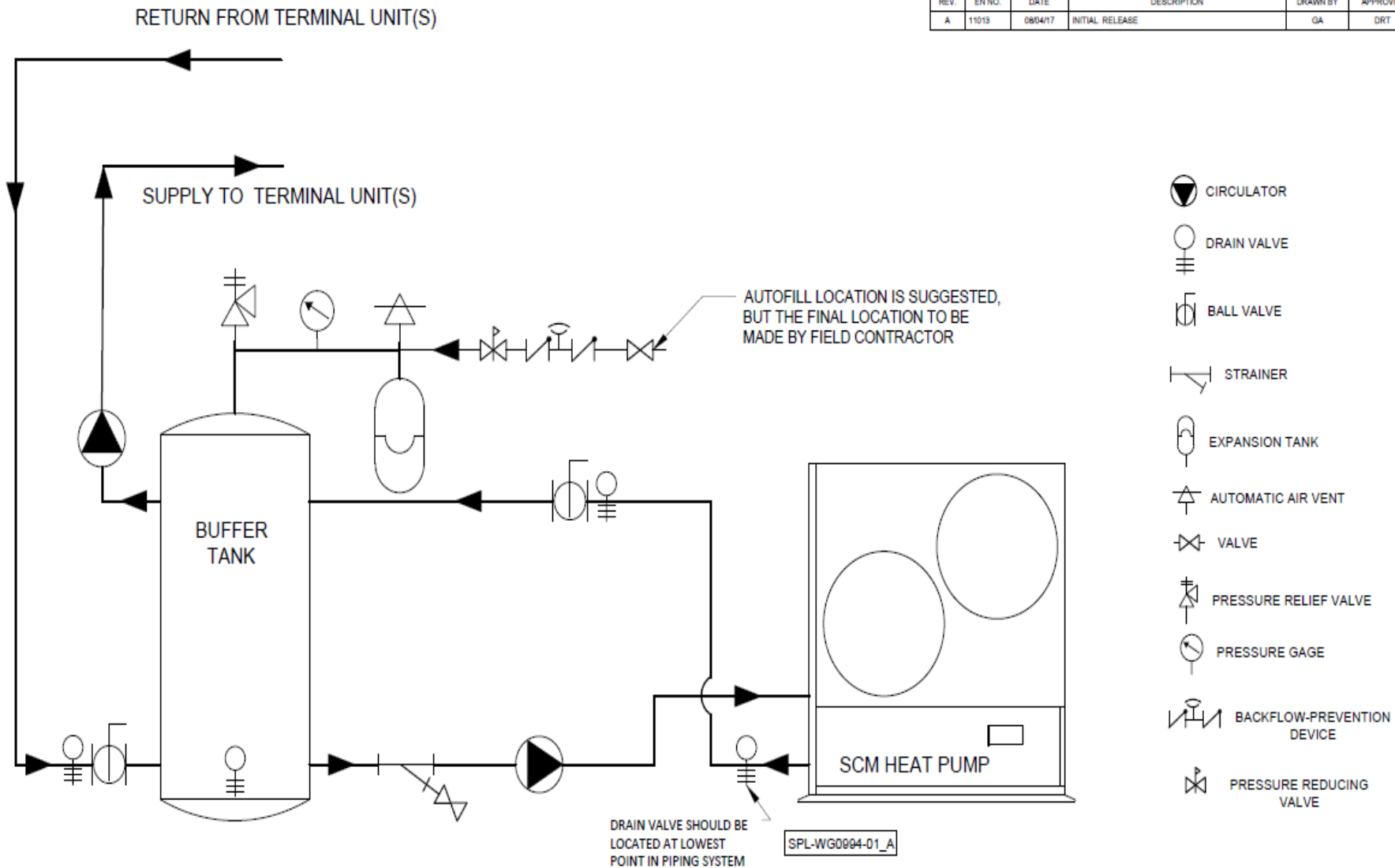
SPL-WG0995-01_A



DRAIN VALVE SHOULD BE
LOCATED AT LOWEST
POINT IN PIPING SYSTEM

-  CIRCULATOR
-  DRAIN VALVE
-  BALL VALVE
-  STRAINER
-  EXPANSION TANK
-  AUTOMATIC AIR VENT
-  VALVE
-  PRESSURE RELIEF VALVE
-  PRESSURE GAGE
-  BACKFLOW-PREVENTION
DEVICE
-  PRESSURE REDUCING
VALVE

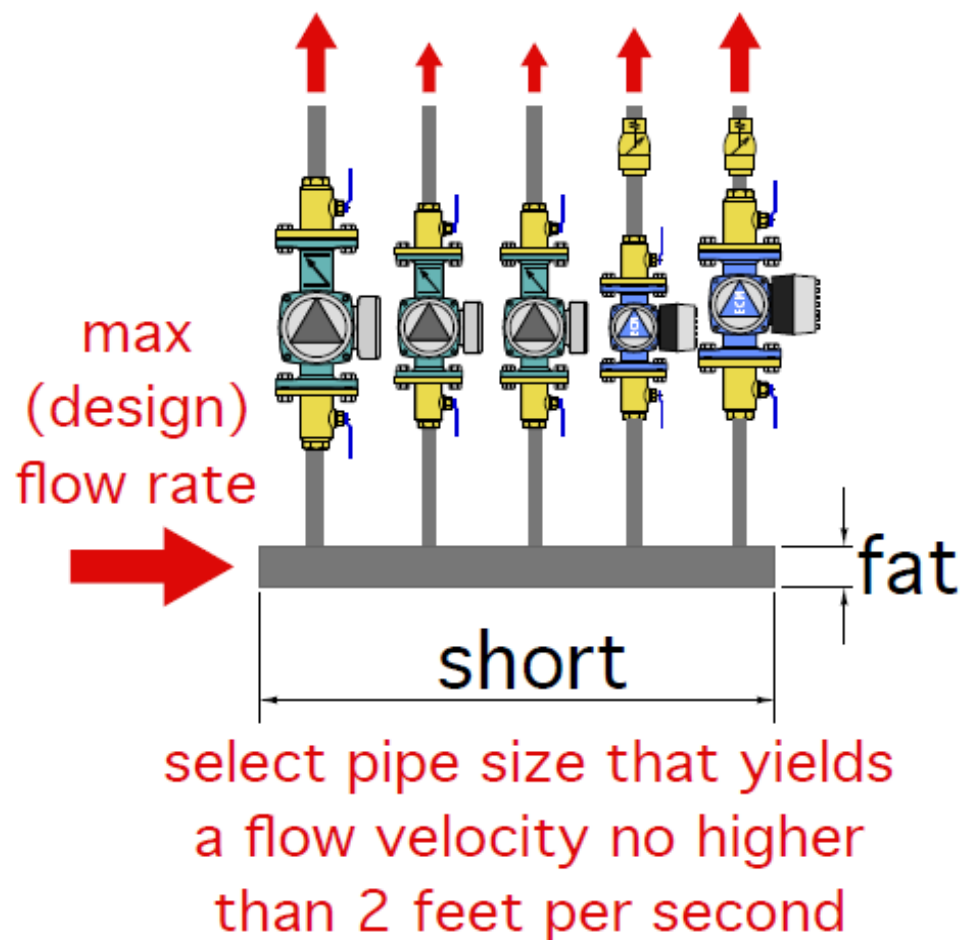
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	CHECKED BY AAP	DATE 08/04/17	PRODUCT LAHP
	APPROVED BY DRT	DATE 08/04/17	PART NUMBER SPL-WG0995-01
	DRAWING DESCRIPTION PIPING DIAGRAM, LAHP HEAT PUMP WITH BUFFER TANK		
 THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DRAWING		DRAWING NUMBER WG0995
	TOLERANCES X + .030 XX + .010 XXX + .005 XXXX + .0010		PROTOTYPE PART NUMBER N/A
	BREAK EDGE + .000 DIA RADIUS + .040 DIA ANGLE + 5°		SHEET 1 OF 1
	SURFACE FINISH + 125 RMS PERFECT FORM @MFG		SCALE NONE REVISION A

REVISIONS					
REV.	EN NO.	DATE	DESCRIPTION	DRAWN BY	APPROVED
A	11013	08/04/17	INITIAL RELEASE	GA	DRT



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	CHECKED BY	AAP	DATE	08/04/17	PRODUCT	SCM			
	APPROVED BY	DRT	DATE	08/04/17	PART NUMBER	SPL-WG0904-01			
	DRAWING DESCRIPTION								
PIPING DIAGRAM, SCM HEAT PUMP WITH BUFFER TANK									
 THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DRAWING				DRAWING NUMBER				
	TOLERANCES				WG0904				
	X .+ .000 BREAK EDGE .+ .005 / .015 XX .+ .010 RADIUS .+ .040 / .060 XXX .+ .005 ANGLE .+ .5° XXXX .+ .0010				PROTOTYPE PART NUMBER				
					N/A				
SURFACE FINISH = 125 RMS PERFECT FORM 									
SHEET		1 OF 1		SHEET SIZE	B	SCALE	NONE	REVISION	A

So what's EXACTLY is a short / fat header???



Tubing	Flow rate to establish 2 ft/sec flow velocity
1/2" type M copper	1.6 gpm
3/4" type M copper	3.2 gpm
1" type M copper	5.5 gpm
1.25" type M copper	8.2 gpm
1.5" type M copper	11.4 gpm
2" type M copper	19.8 gpm
2.5" type M copper	30.5 gpm
3" type M copper	43.6 gpm

Copper Pipe Pressure Losses (Type L)

	Pressure Drop, Ft water/100Ft					
Flow rate GPM	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
1	2.7	0.4				
2	10	1.5	0.4			
3	21	3.1	0.8	0.3		
4		5.4	1.3	0.5	0.2	
5		8	2	0.8	0.3	
6		11	2.8	1	0.5	
7		15	3.6	1.4	0.6	
8		19	4.6	1.7	0.8	
9			5.9	2.1	0.9	0.2
10			7	2.6	1.1	0.3
11			8.5	3.1	1.3	0.3
12			10	3.6	1.5	0.4
14			13	5	2	0.5
16			17	6.1	2.6	0.7
18			21	7.7	3.2	0.8
20				9.5	4	1
22				11	4.6	1.2
24				13	5.5	1.4
26				15.5	6.5	1.6
28				17.5	7.3	1.8
30				20	8.2	2
32					9.4	2.3
34					10.5	2.6
36					11.5	2.9

Pex Pipe Pressure Losses						
	Pressure Drop, Ft water/100Ft					
Flow rate GPM	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
1	3.7	0.7	0.2	0.09	0.05	0.01
2	12.7	2.5	0.7	0.2	0.14	0.05
3	26.1	5.1	1.6	0.7	0.2	0.07
4	43.8	8.5	2.5	0.9	0.5	0.1
5	65.3	12.9	3.9	1.4	0.7	0.2
6	90.7	17.8	5.3	2.1	0.9	0.2
7		23.5	7.2	2.8	1.2	0.2
8		29.8	9	3.5	1.6	0.5
9		36.9	11.1	4.2	1.8	0.5
10		44.5	13.4	5.1	2.3	0.7
11		52.8	15.9	6	2.8	0.7
12		61.8	18.7	7.2	3.2	0.9
14			24.5	9.5	4.2	1.2
16			31.1	12	5.3	1.4
18			38.5	14.8	6.7	1.8
20			46.6	17.8	8.1	2.3
22				21.2	9.5	2.5
24				24.7	11.1	3
26				28.6	12.9	3.5
28				32.8	14.8	3.9
30				36.9	16.6	4.6
32					18.7	5.1
34					20.8	5.8
36					23.1	6.2

Highlighted numbers indicate 8 f/s maximum required by some plumbing codes

SPACEPAK SYSTEM INTERFACE CONTROL - SSIC

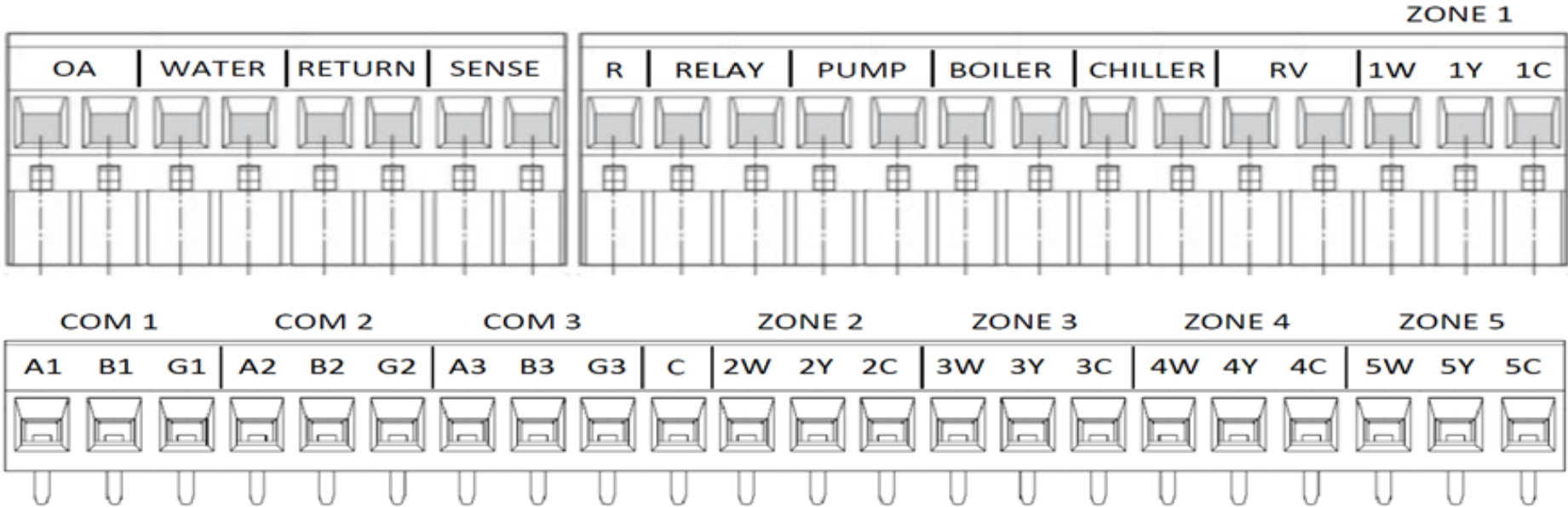
- Takes Inputs from up to 5 Air Handlers
- Outputs: Boiler, Chiller Enable, Chiller Reversing Valve, Pump
- Air Handlers Receive Calls from Tstats, Outputs Heating or Cooling Call to Interface Control
- Includes Outdoor Air Temp Sensor & Water Temp Sensor/Buffer Tank
- Firmware Updates through USB



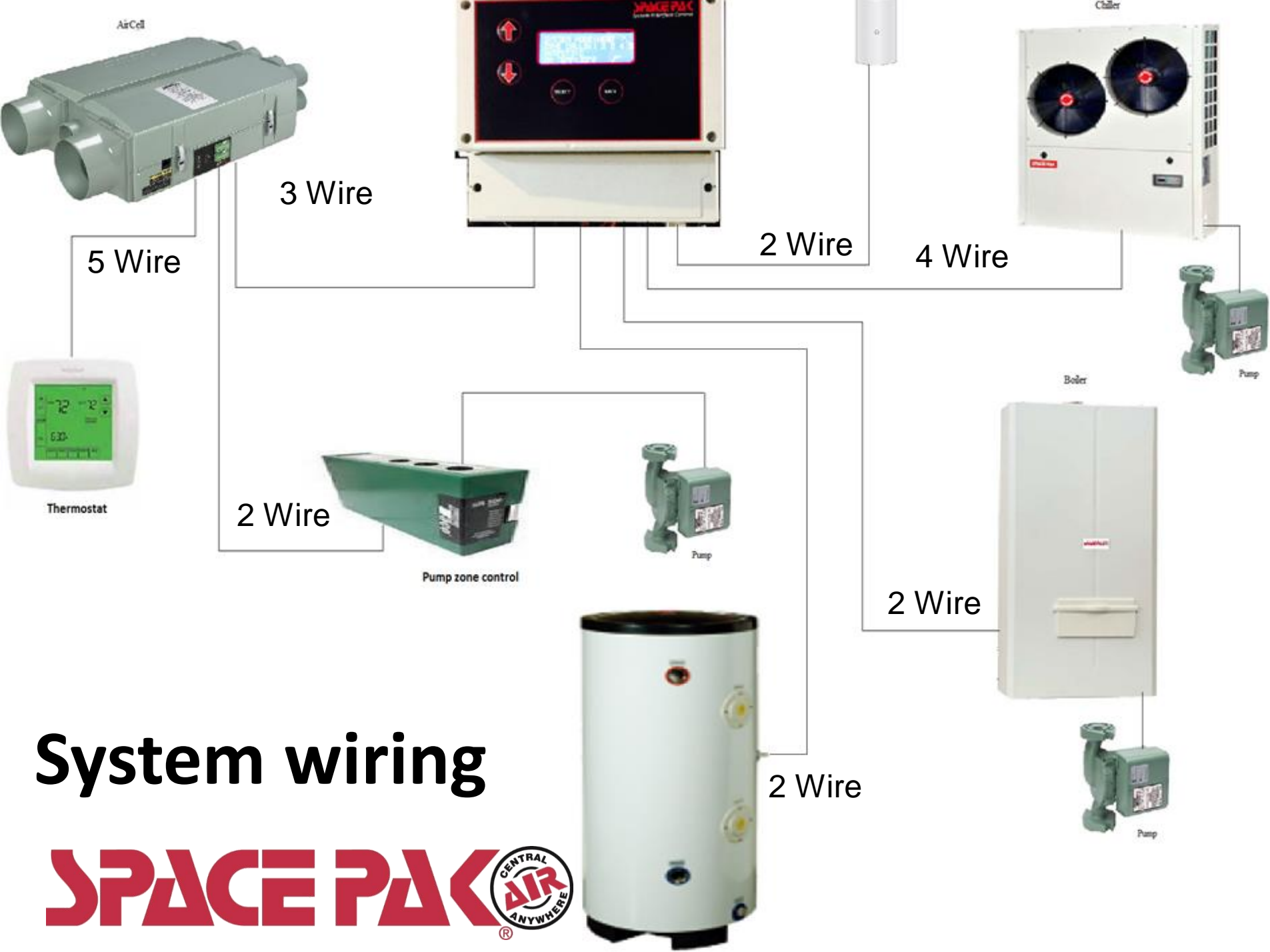
WIRING

⚠️WARNING Electrical shock hazard - Disconnect all electrical power before wiring the unit.

1. Remove the lower access panel to gain access to the wire terminals.
2. Pass the wires from the Air Handlers, Pump, Chiller, etc. through the grommets at the bottom of the unit and plug into their corresponding connector (see below or for more detailed information see the wire diagram on page 4).



OA	Outdoor Air Temperature Sensor	ZONE X	Connection from Zone X (1-5) Air Handler
WATER	Water Temperature Sensor	XW	24VAC Heating Signal from Air Handler
RETURN	Return Temperature Sensor	XY	24VAC Cooling Signal from Air Handler
SENSE	Misc. Temperature Sensor (N/A*)	XC	Ground from Air Handler
R	24VAC	COM X	Connections for Future Models (N/A*)
RELAY	Misc. Relay for Future Models (N/A*)	C	24VAC Return
PUMP	Dry Contact Relay to activate the Pump		
BOILER	Dry Contact Relay to activate the Boiler		
CHILLER	Dry Contact Relay to activate the Chiller's enable		
RV	Dry Contact Relay to activate Chiller's Reversing Valve		



System wiring



New Team Provides Pre-Sale Support

- Gain instant access to our Pre-Sales Support Team through
- PreSaleSupport@SpacePak.com. Available to representatives, wholesalers and contractors, PreSaleSupport@SpacePak.com is supported by a full team of application engineers to provide optimal turnaround in answering your questions regarding system design and layout as well as assistance in equipment selection and job quoting.
-
- Please note any questions regarding equipment already shipped should be directed to TechnicalService@SpacePak.com.



