BLOCK 253.15 LOT 6 QUALIFICATION CODE _____ ADDRESS (SITE) 40 Halsey Dr. PERMIT NO. 15-3320

CONSTRUCTION PERMIT APPLICATION

C15-004072

Applicant Completes: Sections I, II, III (optional), IV, VI, and VII

I. IDENTIFICATION

1. Proposed Work Site at: 40 Halsey Dr
2. Name of Owner in Fee: Larry Robin
   Tel. [redacted] e-mail
   Address 40 Halsey Dr (street) Brick (municipality) (zip code)
3. Ownership in Fee: Public _____ Private X
4. Principal Contractor: Royal Air Tel. (732) 409-3322
   Address 1735 Rt 9 N e-mail
   Howell
   License No. OR, if new home, Builder Reg. No. 13VH01273700 Exp. Date 3/31/16
   Home Improvement Contractor Registration No. or Exemption Reason (if applicable): _____
   Federal Emp. ID No. _____ FAX: ( ) _____
5. Architect or Engineer _____ Contact _____
   Address _____ e-mail _____
   Tel. ( ) _____ FAX: ( ) _____
6. Responsible Person in Charge once Work has Begun Ed Derwish
   Tel. (732) 409-3322 FAX: (732) 677-2776

V. FEE SUMMARY (for office use only)

		Update	Update
1. Building	$ 100 - ✓		
2. Electrical	100 - ✓		
3. Plumbing			
4. Fire Protection			
5. Elevator Devices			
6. Subtotal			
7. Less 20% for State Plan Review	$		
8. Subtotal	$		
9. State Permit Surcharge Fee	10 -		
10. Subtotal	$		
11. Cert. of Occupancy			
12. Other			
13. TOTAL	$ 210 -		

VI. BUILDING/SITE CHARACTERISTICS

	(office use only)
1. Number of Stories	
2. Height of Structure	
3. Area — Largest Floor sq. ft.	
4. New Building Area sq. ft.	
5. Volume of New Structure cu. ft.	
6. Max. Live Load	
7. Max. Occupancy Load	
8. If Industrialized Building: State Approved ____ HUD	
9. Total Land Area Disturbed sq. ft.	
10. Flood Hazard Zone	
11. Base Flood Elevation ft.	
12. Wetlands yes ____ no ____	

IIa. PROPOSED WORK

- ☐ Minor Work
- ☐ New Building
- ☐ Addition
- ☐ Demolition
- ☐ Repair
- ☐ Alteration
- ☐ Renovation
- ☐ Reconstruction
- ☐ Asbestos Abat. -Subch. 8
- ☐ Lead Hazard Abatement
- ☐ Radon Remediation
- ☐ Annual Permit

IIb. SUBCODES (Check all that apply)

FOR OFFICE USE ONLY (Optional)

	Est. Cost	Plans Rec'd by	Date Rec'd	Rejection Date	Approval Date	Re-viewer	Resubmission Dates Approval	Resubmission Dates Rejection	Re-viewer
☐ Building									
☐ Electrical					8/5/15	JO			
☐ Plumbing					8-13-15	DBS			
☐ Fire Protection									
☐ Elevator									
TOTAL COST									

VII. DESCRIPTION OF BUILDING USE

A. RESIDENTIAL (primary use)
1. State Specific Use:
2. Use Group, Proposed:
3. Change in Use Group, Indicate, Present:
4. No. of dwelling units: Total Units Income-restricted
   Gained, Sale
   Gained, Rental
   Lost, Sale
   Lost, Rental**

B. NON-RESIDENTIAL (primary use)
1. State Specific Use:
2. Use Group, Proposed:
3. Change in Use Group, Indicate Present:

C. MIXED USE -List secondary use(s):

D. Construct. Classification: Present
Proposed

III. PLAN REVIEW (optional)

DO YOU WANT:
1. ☐ Partial Releases
2. ☐ Prototype Processing

IV. DOES OR WILL YOUR BUILDING CONTAIN ANY OF THE FOLLOWING?

1. ☐ Elevators/Escalators/Lifts/ Dumbwaiters/Moving Walks
2. ☐ High Pressure Boilers
4. ☐ Refrigeration Systems
5. ☐ Cross-Connections/Backflow Preventers
6. ☐ Hazardous Uses/Places of Assembly
8. ☐ Smoke Control Systems in Open Wells
9. ☐ Underground Storage Tanks
10. ☐ Swimming Pools, Spas and Hot Tubs
12. ☐ Fire Alarm

7-29-15 @ 10:03 am GHR

Brick Township
401 Chambersbridge Rd
Brick, NJ 08723

Date Issued 4/18/2019
Control Number C-15-004072
Permit Number 15-3320
Permit Issue Date 10/1/2015
Certificate Number 15-3320

Certificate

Construction Code Division

(Certificate of Approval)

Identification

Work Site Location: 40 HALSEY DR. Brick Township, NJ Block: 253.15 Lot: 6 Qual:

Owner in Fee: ROBIN, LARRY & ANDREW

Owner Address: 5 MONTREAL WOODS CT MANALAPAN NJ 07726

Telephone: [redacted]

Contractor ROYAL AIR Heating & AC

Address 1735 ROUTE 9 NO HOWELL NJ 07731

Telephone: (732) 409-3322 Fax: (732) 409-3424

License Number or Builders Registration Number: Federal Emp. Number:

Home Warranty Number:

Type of Warranty Plan: ☐ State ☐ Private

Use Group: R-5 Construction Classification:

Maximum Live Load: 0 Maximum Occupancy Load: 0

Description of Work/Use: HVAC

Certificate Comments:

☐ **Certificate of Occupancy**
This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

☑ **Certificate of Approval**
This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.

☐ **Certificate of Continued Occupancy**
This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

☐ **Temporary Certificate of Compliance**
The following conditions must be met no later than
or the owner will be subject to fine or order to vacate:
This certificate has an expiration date of:
Conditions to be met:

☐ **Certificate of Clearance - Lead Abatement 5:17**
This serves notice that based on written certification, lead abatement was performed as per NJAC5:17 to the following extent.

☐ Total removal of lead-based paint hazards in scope of work
☐ Partial or limited time period (years); see file

☐ **Certificate of Clearance - Asbestos Abatement**
This serves notice that based on written certification, asbestos abatement was performed to the following extent.

☐ Total removal of asbestos hazards in scope of work
☐ Partial or limited time period (years); see file

☐ **Certificate of Compliance**
This serves notice that said potentially hazardous equipment has been installed and/or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until

☐ **Temporary Certificate of Occupancy**
The following conditions must be met no later than:
or the owner will be subject to fine or order to vacate:
This certificate has an expiration date of:
Conditions to be met:

David J. Newman Jr.

Construction Official

Fee: $0.00
Check Number:
Collected By:

Date Printed: 4/18/2019

U.C.C. F280 (rev. 08/05)

OFFICE USE ONLY

DATE:	COMMENTS:	INITIALS:
8-4-15	Clld and informed Royal Air that we need a Chimney Cert to complete app.	GMK
08/18/15	Ready for P/C - called contractor	ASP

CERTIFICATION IN LIEU OF OATH

I. OWNER SECTION (to be completed if the applicant is the owner in fee)

I hereby certify that I am the owner in fee of the property listed on Page 1.

Mark the following applicable boxes:

A. ( ) I further certify that a new home (private residence) will be constructed on this property for my own use and occupancy. This dwelling is to be occupied by myself and is not to be used for any purpose other than single family residential use. I attest that all construction, plumbing, or electrical work will be done, in whole or in part, by me or by subcontractors under my supervision, in accordance with all applicable laws; and, I further acknowledge that said new home is not covered under the New Home Warranty and Builders Registration Act (N.J.S.A. 46:3B-1 et seq.) and that such fact shall be disclosed to any person purchasing this property within ten years of the date of issuance of a certificate of occupancy.

I UNDERSTAND THAT IN MARKING BOX A, I ACKNOWLEDGE THAT I AM ASSUMING RESPONSIBILITY FOR THE WORK DONE ON SAID PROPERTY, THE CONDITION OF THE PROPERTY PRIOR TO, DURING, AND AFTER ANY WORK PERFORMED, AND FOR THE PERFORMANCE OF THE SUBCONTRACTORS I HIRE, EMPLOY, OR OTHERWISE CONTRACT OR WITH WHOM I MAKE AGREEMENTS TO PERFORM WORK. I AM VOLUNTARILY AND KNOWINGLY ASSUMING THIS RESPONSIBILITY.

B. ( ) I further certify the following as required by the New Jersey Uniform Construction Code, N.J.A.C. 5:23-2.15(f)1.ix:

I personally prepared the plans submitted for: 1) the new home referred to in A.; or, 2) an addition, alteration, renovation, or repair to an existing single family residence owned and occupied by myself and located on the property listed on Page 1; or, 3) a new structure that will be physically separate from, but that will be deemed part of, an existing single family residence that is owned and occupied by myself and located on the property listed on Page 1.

C. ( ) I further certify that I will perform or supervise the following work:
C.1. ( ) Building C.2. ( ) Fire Protection

I further certify that I will perform the following work:
C.3. ( ) Electrical C.4. ( ) Plumbing

D. ( ) I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I understand that if any of the above statements are willfully false, I am subject to punishment.

Signature _____ Date _____

II. AGENT SECTION (to be completed if the applicant is not the owner in fee)

I hereby certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(d): the proposed work is authorized by the owner in fee; and I have been authorized by the owner in fee to make this application as his agent.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I understand that if any of the above statements are willfully false, I am subject to punishment.

( ) Check if contractor.

Agent Name Royal Air

Address 1735 Rt 9 N
Howell

Telephone (732) 409-3322

Signature Ed Darwish

III. ( ) LEAD HAZARD ABATEMENT: Include Homeowner or Building Owner Affidavit as per N.J.A.C. 5:17.

PLUMBING SUBCODE
TECHNICAL SECTION

NEW JERSEY UNIFORM CONSTRUCTION CODE

Date Received / Control # 10/1/15

Date Issued / Permit # 15-3320

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 253.15 Lot 6 Qualification Code

Work Site Location 40 Halsey Dr Brick

Owner in Fee: Harry Robin

Tel. [redacted] e-mail

Address 40 Halsey Dr (street) Brick (municipality)

Contractor: Royal Air Tel. (732) 409-3323 (zip code)

Address 1735 Rt 9 N e-mail

Howell

Contractor License No. Exp. Date

Home Improvement Contractor Registration No. or Exemption Reason (if applicable):

Federal Emp. ID No. FAX: ( )

B. PLUMBING CHARACTERISTICS

Use Group Present Proposed

Building Sewer Size Public Sewer Private Septic

Water Service Size Public Water Private Well

Est. Cost of Plumbing Work $ 2487.50

JOB SUMMARY (Office Use Only)

PLAN REVIEW

[ ] No Plans Required

[ ] Partial -Underslab Utilities Approved

Date: Approved by:

[ ] Plumbing Plans Approved

Date: Approved by:

Joint Plan Review Required:

[ ] Bldg. [ ] Elec. [ ] Fire. [ ] Elev.

SUBCODE APPROVAL for PERMIT

Date: 8-13-15

Approved by:

SUBCODE APPROVAL for CERTIFICATE

[ ] CO [ ] CCO [ ] CA

Date: 4-9-19

Approved by:

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Slab				
Rough				
Water				
Sewer				
Fixtures				
Gas Equipment				
Gas Piping				
LPGas Tank				
Fuel Oil Piping				
Solar				
TCO				
Final	4-2-19		4-9-19	MM

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Applicant sign/Contractor sign and seal here: Ed Darwish

Print name here: Ed Darwish

[ ] Licensed Plumbing Contractor [X] Exempt Applicant

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK: Air handler + condenser replacement

QTY.	FIXTURE/EQUIPMENT	FEE (Office Use Only)
	Water Closet	$
	Urinal/Bidet	
	Bath Tub	
	Lavatory	
	Shower	
	Floor Drain	
	Sink	
	Dishwasher	
	Drinking Fountain	
	Washing Machine	
	Hose Bibb	
	Water Heater	
	Fuel Oil Piping	
	Gas Piping	
	LPGas Tank	
	Steam Boiler	
	Hot Water Boiler	
	Sewer Pump	
	Interceptor/Separator	
	Backflow Preventer	
	Greasetrap	
	Sewer Connection	
	Water Service Connection	
	Stacks	
1	Other Air handler Condensate	
1		

Administrative Surcharge $

Minimum Fee $

State Permit Surcharge Fee $

TOTAL FEE $

4-2-19 WM
RUN PAW overboard To Lowerboy Side
No Pump Needed
Secure Condenser To Platform

ELECTRICAL SUBCODE
TECHNICAL SECTION

Date Received Control # 10/1/15
Date Issued Permit # 15-3320

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 253.15 Lot 6 Qualification Code
Work Site Location 40 Halsey Dr Brick
Owner in Fee: Larry Rohin
Tel. ([redacted] e-mail
Address 40 Halsey Dr (street) Brick (municipality)
Contractor: Royal Air Tel. 7732409-3322 (zip code)
Address 1735 Rt 9 N e-mail
Howell
Contractor License No. 19HC000162700 Exp. Date 6/30/16
Home Improvement Contractor Registration No. or Exemption Reason (if applicable):
Federal Emp. ID No. FAX: ( )

B. ELECTRICAL CHARACTERISTICS

Use Group Present Proposed
[ ] Pole/Pad # [ ] Temporary [ ] Other
Building Occupied as Utility Co.
Est. Cost of Elec. Work $ 2487.50

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Applicant sign/Contractor sign and seal here: Ed Darwish
Print name here: Ed Darwish
[ ] Licensed Elec. Contractor [ ] Certif'd Landscape Irrigation Cont'r. [X] Exempt Applicant

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK: Air handler + condenser replacement

QTY.	SIZE	ITEMS	FEE (Office Use Only)
		Lighting Fixtures	
		Receptacles	
		Switches	
		Detectors	
		Light Poles	
		Motors—Fract. HP	
		Emergency & Exit Lights	
		Communications Points	
		Alarm Devices/F.A.C. Panel	
		TOTAL NUMBERS	$
		Pool Permit/with UW Lights	
		Storable Pool/Spa/Hot Tub	
		KW Elec. Range/Receptacle	
		KW Oven/Surface Unit	
		KW Elec. Water Heater	
		KW Elec. Dryer/Receptacle	
		KW Dishwasher	
		HP Garbage Disposal	
1	7	KW Central A/C Unit	
1	3	HP/KW Space Heater/Air Handler	
		KW Baseboard Heat	
		HP Motors 1/+ HP	
		KW Transformer/Generator	
		AMP Service	
		AMP Subpanels	
		AMP Motor Control Center	
		KW Elec. Sign/Outline Light	
		Air handler	

Administrative Surcharge $
Minimum Fee $
State Permit Surcharge Fee $
TOTAL FEE $

JOB SUMMARY (Office Use Only)

PLAN REVIEW
[ ] No Plans Required
[ ] Partial -Underslab Utilities Approved
Date: 9/4/15 Approved by:
[ ] Electric Plans Approved
Date: Approved by:
Joint Plan Review Required:
[ ] Bldg. [ ] Plumb. [ ] Fire. [ ] Elev.
SUBCODE APPROVAL for PERMIT
Date: 9/4/15
Approved by:
SUBCODE APPROVAL for CERTIFICATE
[ ] CO [ ] CCO [X] CA
Date: 4/9/19
Approved by:

INSPECTIONS Type:	Failure	Failure	Approval	Initial
	Dates (Month/Day)			
Rough				
Barrier-Free				
Trench				
Temp. Serv.				
Constr. Serv.				
TCO				
Other				
Service Final	4/2/1900		4/9/19	RR
Barrier-Free				

Temp. Cut-in-Card Date Issued
Final Cut-in-Card Date Issued
Annual Pool Inspection
Date of Grounding and Bonding Certification

U.C.C. F120 (rev. 11/09) 1 White = Inspector Copy 2 Canary = Office Copy 3 Pink = Office Copy 4 Gold = Applicant Copy

4/2/19

1) NEW DISCONNECT INSTALLED NEEDS LICENSED ELECTRICAL CONTRACTOR

2) NO DEAD FACE IN DISCONNECT

3) CAP OFF WHITE WIRE IN DISCONNECT

401 Chambers Bridge Road
Brick, NJ 08723
732-262-1030

Brick Township

CORRECTION NOTICE

ADDRESS 40 MOISEY

PERMIT NUMBER 15-3320 BLOCK 253.15 LOT 6

OWNER Robin

Upon inspection, violations of the ____ Building ___ Plumbing ___ Electric ✓ Fire Code were in evidence and the following orders are hereby issued for their correction:

1) NEW DISCONNECT INSTALL NEEDS LICENSED ELECTRICAL CONTRACTOR
2) NO DEAD FACE ON DISCONNECT
3) CAP OFF WHITE WIRE IN DISCONNECT

PLEASE CALL FOR INSPECTION WHEN CORRECTIONS HAVE BEEN COMPLETED. ACCEPTANCE AND APPROVAL BY AN INSPECTOR OF THIS DEPARTMENT IS REQUIRED.

DATE 4/2/19 INSPECTOR

CONSTRUCTION PERMIT

Date Issued 10/1/15
Control # C-15-004072
Permit # 15-3320

IDENTIFICATION Block: 253.15 Lot: 6 Qualifier
Work Site Location: 40 HALSEY DR, Brick Township, NJ
Contractor ROYAL AIR Heating & AC
Address 1735 ROUTE 9 NO HOWELL NJ 07731

Owner in Fee ROBIN, LARRY & ANDREW
5 MONTREAL WOODS CT MANALAPAN NJ 07726
Telephone: [redacted]

Telephone: (732) 409-3322
Lic. No. or Bldrs. Reg. No. 13VH01273700
Federal Employee. No.

Is hereby granted permission to perform the following work:

- ☐ BUILDING
- ☑ PLUMBING
- ☐ LEAD HAZARD ABATEMENT
- ☑ ELECTRICAL
- ☐ FIRE PROTECTION
- ☐ DEMOLITION
- ☐ ELEVATOR DEVICES
- ☐ ASBESTOS ABATEMENT (Subchapter 8 only)
- ☐ OTHER

DESCRIPTION OF WORK:

Note: If constuction does not commence within one (1) year of date of issuance, or if construction ceases for a period of six (6) months, this permit is void.

Estimated Cost of Work $4,874

David P. Newman Jr. — Construction Official

8/17/15 — Date

PAYMENTS (Office Use Only)

Building	$0
Electrical	$100
Plumbing	$100
Fire Protection	$0
Elevator Devices	$0
Other	$0.00
DCA Training Fee	$10
CO Fee	
Other	$0
Total	$210
Check No.	1774
Cash	$0
Credit	$0
Collected By	

U.C.C. F170
equiv (rev 7/04)

1 WHITE - INSPECTOR 2 CANARY - OFFICE 3 PINK - TAX ASSESSOR 4 GOLD - APPLICANT

REQUIRED INSPECTIONS

Construction work must be inspected in accordance with the State Uniform Construction Code Regulations N.J.A.C. 5:23-2.18. This agency will carry out such periodic inspections during the progress of work as are necessary to insure that the work installed conforms with the requirements of the Uniform Construction Code.

The owner or other responsible person in charge of work must notify this agency when work is ready for any required inspections specified below. Requests for inspections must be made at least 24 hours prior to the time the inspection is desired. Inspections will be performed within three business days of the time for which they are requested. The work must not proceed in a manner which will preclude the inspection until it has been made and approval granted.

☑ Required inspections for all subcodes for one- and two-family dwellings are as follows:

1. The bottom of footing trenches before placement of footings, except that in cases of pile foundations, inspections shall be made in accordance with the requirements of the building subcode.
2. Foundations and all walls up to grade level prior to back filling.
3. All structural framing, connections, wall and roof sheathing and insulation; electrical rough wiring, panel and service installation; rough plumbing. The framing inspection shall take place after the rough electrical and plumbing inspections and after the installation of the heating, ventilation and /or air conditioning duct system. The insulation inspection shall be performed after all other subcode rough inspections and prior to the installation of any interior finish material.
4. Installation of all finished materials, sealings of exterior joints, plumbing piping, trim and fixtures; electrical wiring, devices and fixtures; mechanical systems equipment.

Additional required inspections for all subcodes of construction, for other than one- and two-family dwellings, are fire suppression systems, heat producing devices and Barrier Free subcode accessibility, if applicable.

☐ Required special inspections. The applicant by accepting the permit will be deemed to have consented to these requirements:

☑ A final inspection is required for each applicable subcode area before a final Certificate of Occupancy or Approval may be issued. The final inspections include the installation of all interior and exterior finish materials, sealing of exterior joints, mechanical system and other required equipment; electrical wiring, devices and fixtures; plumbing pipes, trim and fixtures; tests required by any provision of the adopted subcodes, Barrier Free accessibility, if applicable; and verification of compliance with NJAC 5:23-3.5, "Posting structures".

☐ A complete copy of released plans must be kept on the job site.

If you do not understand any of this information, please ask.

FIRE PROTECTION SUBCODE
TECHNICAL SECTION

Uniform Construction Code

Date Received 10/1/15
Control #
Date Issued
Permit # 15-3320

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 253.15 Lot 6 Qualification Code

Work Site Location 40 Halsey DR

Owner in Fee: Larry Robin

Tel. ([redacted] e-mail

Address 40 Halsey DR Brick
street municipality

Contractor: Royal Air Tel. (732) 409-3322
street zip code

Address 1735 RT 9 N e-mail

Howell NJ

Fire Protection Equipment, NJ Div of Fire Safety Permit No.

Fire Protection Equipment, NJ Div of Fire Safety Installer No.

Fire Alarm Contractor No. Exp. Date

Home Improvement Contractor Registration No. or Exemption Reason (if applicable):

Federal Emp. ID No. FAX: ( )

B. FIRE PROTECTION CHARACTERISTICS

Use Group: Present Proposed

Constr. Class: Present Proposed

Heating System: [ ] New OR [ ] Modification to Existing OR [ ] Conversion OR [ ] Replacement

Fuel Type: [ ] Gas [ ] Oil [ ] Electric [ ] Solar Other

Location:

Total Cost of Fire Protection Work $ 2487.50

Fuel Storage Tanks:
Fuel Type: [ ] Flammable OR [ ] Combustible
Capacity

Fire Alarm System: [ ] New OR [ ] Existing
Location of Panel:

Fire Suppression/Standpipe System:
[ ] New OR [ ] Existing
Location of Main Control Valve:

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application.

Applicant/Contractor sign here:

Print name here:

[ ] Certified Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK:

Water Supply Source

Method of Alarm/Suppression System Supervision

	NUMBER	FEE (Office Use Only)
Flammable/Combustible Tanks		$
Alarm Systems		
[ ] System		
[ ] 110v Interconnected		
[ ] CO Detectors/110v		
Alarm Devices (i.e., smoke, heat, pulls, water/flow)		
Supervisory Devices (i.e., tampers, low/high air)		
Signaling Devices (i.e., horn/strobes, bells)		
Other Devices		
TOTAL		
Suppression Systems		
Fire Pump GPM Type		
Dry Pipe/Alarm Valves		
Pre-action Valves		
Sprinkler Heads (Dry and Wet)		
Standpipes		
Pre-engineered Systems		
Wet Chemical		
Dry Chemical		
CO_2 Suppression		
Foam Suppression		
FM200 Suppression		
Other		
Other Systems		
Kitchen Hood Exhaust System		
Smoke Control System		
Fuel-Fired Appliances [✓] Gas [ ] Oil [ ] Solid	1	
Fireplace Venting/Metal Chimney		
Other		
Administrative Surcharge $		
Minimum Fee $		
State Permit Surcharge Fee $		
TOTAL FEE $		

JOB SUMMARY (Office Use Only)

PLAN REVIEW
[ ] No Plans Required
[ ] Partial -Underslab Utilities Approved
Date: Approved by:
[ ] Fire Protection Plans Approved
Date: Approved by:
Joint Plan Review Required:
[ ] Bldg. [ ] Elec. [ ] Plumb. [ ] Elev.

SUBCODE APPROVAL for PERMIT
Date:
Approved by:

SUBCODE APPROVAL for CERTIFICATE
[ ] CO [ ] CCO [ ] CA
Date:
Approved by:

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Alarm System				
Suppression Sys.				
Standpipe				
Fire Pump				
Pre-Eng. System				
Mechanical				
Smoke Control				
TCO				
Flam/Combust Tanks				
Fireplace Venting				
Final				
Other				

U.C.C. F140 (rev. 02/11) 1 White = Inspector Copy 2 Canary = Office Copy 3 Pink = Office Copy 4 Gold = Applicant Copy

CHIMNEY VERIFICATION FOR REPLACEMENT OF FUEL-FIRED EQUIPMENT

BLOCK 253.15 LOT 6 QUALIFICATION CODE _____ PERMIT # _____

WORK SITE ADDRESS 40 Halsey Dr

Owner in Fee Larry Robin

Verifying Individual Ed Darwish Company Royal Air

Address 40 1735 Rt 9 N Howell NJ
(Street / City / State / Zip Code)

[redacted] Fax: (732) 677-2776

Check the Appropriate Box(es):

Type of Replacement:

- [ ] Oil to Gas Conversion
- [ ] Gas to Oil Conversion
- [X] Gas Appliance Replacement
- [ ] Oil to Oil Replacement
- [ ] Other _____

Existing Vent/Chimney: Size _____

- [X] "B" Label Vent
- [ ] "L" Label Vent
- [ ] Flexible Liner
- [ ] Power Vent/Exhauster

- [ ] Chimney-Interior
- [ ] Chimney-Exterior
- [ ] Masonry Chimney-Tile Lined
- [ ] Masonry Chimney-Unlined
- [ ] Other _____

	Type	Fuel Type	BTU Rating (input/hour)
Appliance 1:	_____	Oil / Gas / Other: _____	_____
Appliance 2:	_____	Oil / Gas / Other: _____	_____
Appliance 3:	_____	Oil / Gas / Other: _____	_____

CHIMNEY LINER

If a chimney liner is being installed, all documentation on the liner must accompany the Permit application.

Manufacturer: _____ Model: _____ UL Listing: _____

Material of Liner: Stainless Steel _____ Aluminum _____

Size of Appliance Vent: _____ Size of Liner: _____ Height of Chimney: _____

Length of Connector: _____ Vent Connector Rise: _____

How does the appliance vent? [ ] Natural Draft [ ] Fan-assisted [ ] Other: _____

PLEASE SIGN ONE OF THE FOLLOWING VERIFICATION STATEMENTS

For Oil or Coal to Gas Conversions:

I have verified that the chimney/vent is in good repair and clear of obstruction and is substantially clean of residue from its previous use serving an oil or coal appliance. I have verified that the chimney/vent is appropriately lined and sized for the appliance(s) being installed.

_____ Signature _____ Date

Oil to Oil or Gas to Gas Replacements or New/Additional Appliances:

I have verified that the existing chimney/vent is in good repair and clear of obstruction. I have verified that the existing chimney/vent is appropriately lined and sized for the appliance(s) being installed and/or remaining.

Ed Darwish _____ Signature _____ Date

Direct Vent Appliance:

I hereby verify that the appliance(s) being installed is a direct vent appliance. I further verify that the existing chimney/vent is appropriately lined and sized for any remaining appliances.

_____ Signature _____ Date

Verification Not Submitted:

I choose not to submit verification. I understand that I will be required to be present for the inspection to remove and reinstall the chimney vent connector.

_____ Signature _____ Date

FOR MINOR AND EMRGENCY WORK, THIS FORM MUST BE PROVIDED WITH YOUR PERMIT APPLICATION. FOR ALL OTHER WORK, THIS FORM MUST BE PRESENTED TO THE CODE OFFICIAL PRIOR TO FINAL INSPECTION.

All applicable information requested on this form must be supplied.
This form may not be submitted by a homeowner in lieu of the required inspection.

THIS DOCUMENT IS PRINTED ON WATERMARKED PAPER, WITH A MULTI-COLORED BACKGROUND AND MULTIPLE SECURITY FEATURES. PLEASE VERIFY AUTHENTICITY.

NOT AN ELECTRICIAN'S OR PLUMBER'S LICENSE

State Of New Jersey
New Jersey Office of the Attorney General
Division of Consumer Affairs

THIS IS TO CERTIFY THAT THE
Division of Consumer Affairs

HAS REGISTERED

ROYAL AIR HEATING & AC
Ehab Darwish
1735 Route 9 N
Howell NJ 07731-3783

FOR PRACTICE IN NEW JERSEY AS A(N): Home Improvement Contractor

02/09/2015 TO 03/31/2016
VALID

13VH01273700
LICENSE/REGISTRATION/CERTIFICATION #

Signature of Licensee/Registrant/Certificate Holder

ACTING DIRECTOR

New Jersey Office of the Attorney General
Division of Consumer Affairs
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02/09/2015 TO 03/31/2016
VALID

SIGNATURE

ACTING DIRECTOR

13VH01273700
License/Registration/Certificate #

PLEASE DETACH HERE

IF YOUR LICENSE/REGISTRATION/ CERTIFICATE ID CARD IS LOST PLEASE NOTIFY:
Division of Consumer Affairs
P.O. Box 46016
Newark, NJ 07101

PLEASE DETACH HERE

State Of New Jersey
New Jersey Office of the Attorney General
Division of Consumer Affairs

THIS IS TO CERTIFY THAT THE
Board of Exam. of HVACR Contractors

HAS LICENSED

Ehab A. Darwish
33 Gristmill Rd
Howell NJ 07731

FOR PRACTICE IN NEW JERSEY AS A(N): Master HVACR Contractor

07/25/2014 TO 06/30/2016
VALID

19HC00062700
LICENSE/REGISTRATION/CERTIFICATION #

Ehab Darwish
Signature of Licensee/Registrant/Certificate Holder

ACTING DIRECTOR

New Jersey Office of the Attorney General
Division of Consumer Affairs
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Master HVACR Contractor

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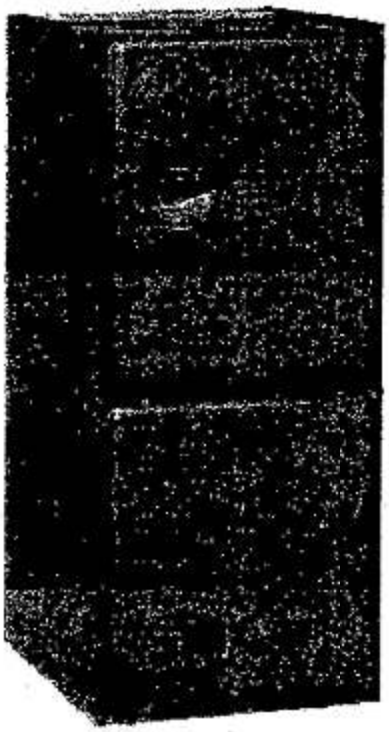
PLEASE NOTIFY:
Board of Exam. of HVACR Contractors
P.O. Box 47031
Newark, NJ 07101

PLEASE DETACH HERE

FORM NO. H22-524 REV. 5
Supersedes Form No. H22-524 Rev. 4

AIR HANDLERS



RUUD

HIGH ACHIEVER®

AIR HANDLERS

UHLA- High Efficiency
featuring Earth-Friendly R-410A Refrigerant

UHLL- High Efficiency
featuring Earth-Friendly R-410A Refrigerant

R-410A

ACHIEVER® Series

AIR HANDLERS

UHSA- Standard Efficiency
featuring R-22 Refrigerant

UHSL- Standard Efficiency
featuring Earth-Friendly R-410A Refrigerant

R-410A

Features

- UHLA/UHLL feature GE's new X-13 motor which provides enhanced SEER performance with most Ruud outdoor units.
- 1½ ton [5.3 kW] through 5 ton [17.6 kW] models are between 42½ to 55½ inches [1080 to 1410 mm] tall and 22 inches [559 mm] deep.
- Versatile 4-way convertible design for upflow, downflow, horizontal left and horizontal right applications.
- Factory-installed high efficiency indoor coil.
- All models meet or exceed 330 to 400 CFM [156 to 189 L/s] per ton at .3 inches [.7 kPa] of external static pressure.
- Enhanced airflow up to .7" external static pressure.
- Sturdy construction with 1.0 inch [.24 kPa] of reinforced foil faced jacket insulation for excellent thermal and sound insulation.
- Field-installed auxiliary electric heater kits provide exact heat for indoor comfort. Kits include circuit breakers which meet UL and cUL requirements for service disconnect.

ISO 9001:2000

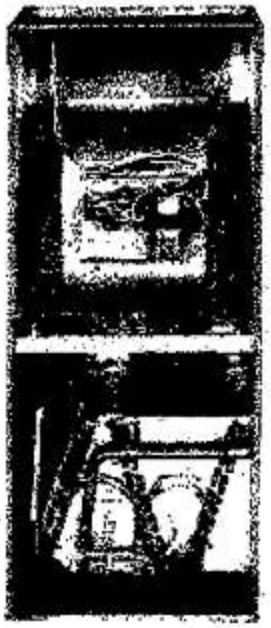
c UL us LISTED

Engineering Features

UHLA/UHLL/UHSA/UHSL- Series

- The most compact unit design available, all standard heat air handler models only 42½ to 55½ inches [1079 to 1409 mm] high.
- Attractive pre-painted cabinet exterior.
- Rugged wall steel cabinet construction, designed for added strength and versatility.
- 1.0" foil faced insulation mechanically retained in blower compartment for excellent thermal and sound performance.
- Four leg blower motor mount.
- Blower housing with controls, motor and blower. Slide out design for service and maintenance convenience.
- Traditional open wire element design for heat applications.
- Field convertible for vertical downflow, horizontal left hand or right hand air supply.
- 3 combustible floor base accessories fit all model sizes when required for downflow installations on combustible floors.
- Indoor coil design provides low air side pressure drop, high performance and extremely compact size.
- Expansion valve on indoor coil provides for operation with air conditioning or heat pump using the same coil.
- Coils are constructed of aluminum fins bonded to internally grooved copper tubing.
- Molded polymer corrosion resistant condensate drain pan is provided on all indoor coils.
- Supply duct flanges provided as standard on air handler cabinet.
- Provisions for field electrical connections available from either side or top of the air handler cabinet.
- Connection point for high voltage wiring is inside the air handler cabinet. Low voltage connection is made on the outside of the air handler cabinet.
- Concentric knockouts are provided for power connection to cabinet. Installer may pull desired hole size up to 2 inches [51 mm] for 1½ inch [38 mm] conduit.
- Front refrigerant and drain connections.

[ ] Designates Metric Conversions



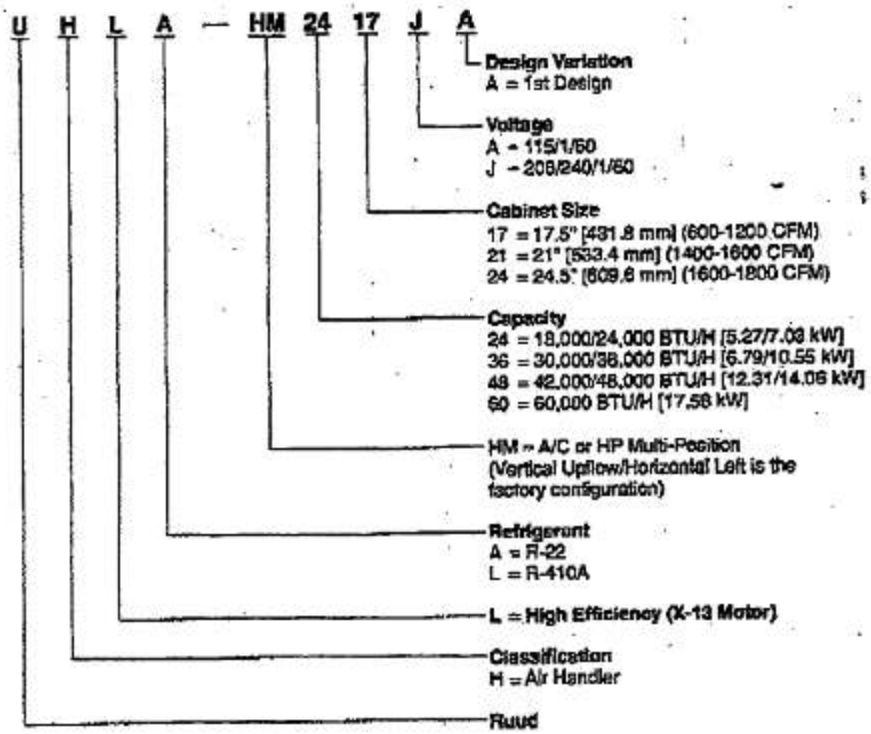
GENERAL TERMS OF LIMITED WARRANTY

Ruud will furnish a replacement for any part of this product which fails in normal use and service within the applicable periods stated, in accordance with the terms of the limited warranty.

Indoor Coil leaks caused by factory defects ..... Five (5) Years
Electric Heating Element ..... Five (5) Years
Any Other Part ..... Five (5) Years

For Complete Details of the Limited Warranty, Including Applicable Terms and Conditions, See Your Local Installer or Contact the Manufacturer for a Copy.

Model Identification



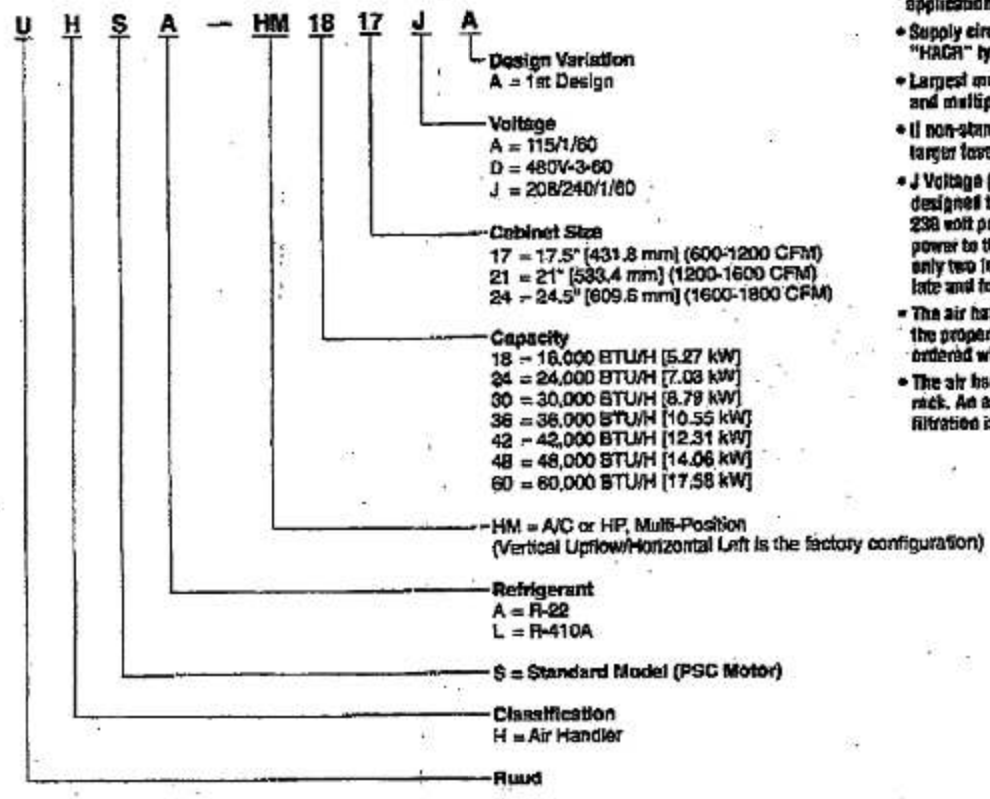
Available Models at A Voltage	
UHSA(L)-HM1817AA	UHLA(L)-HM2417AA
[redacted]	UHLA(L)-HM3617AA
[redacted]	UHLA(L)-HM4821AA
[redacted]	UHLA(L)-HM4824AA
UHSA(L)-HM4221AA	UHLA(L)-HM6024AA
UHSA(L)-HM4321AA	

Available Models at J Voltage	
UHSA(L)-HM1817JA	UHLA(L)-HM2417JA
UHSA(L)-HM2417JA	UHLA(L)-HM3617JA
UHSA(L)-HM3017JA	UHLA(L)-HM4021JA
UHSA(L)-HM3617JA	UHLA(L)-HM4824JA
UHSA(L)-HM3621JA	UHLA(L)-HM6024JA
UHSA(L)-HM4221JA	
UHSA(L)-HM4321JA	
UHSA(L)-HM4824JA	
UHSA(L)-HM6024JA*	

Available Models at D Voltage
UHSA(L)-HM3617DA
UHSA(L)-HM3821DA
UHSA(L)-HM4221DA
UHSA(L)-HM4821DA
UHSA(L)-HM4824DA
UHSA(L)-HM6024DA

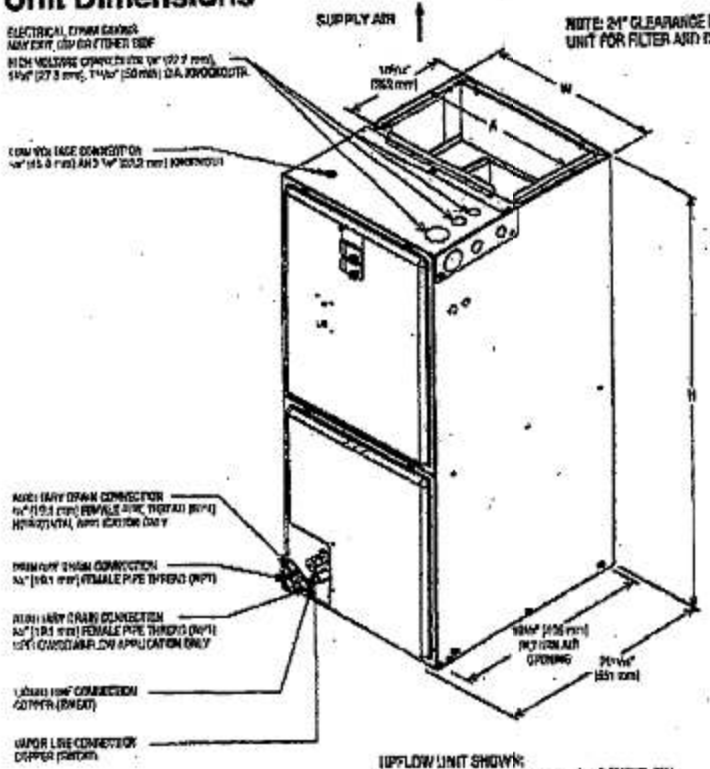
*UHSA(L)-HM6024JA is ARI rated for three phase application only.

- Supply circuit protective devices may be fuses or "HACR" type circuit breakers.
- Largest motor load is included in single circuit and multiple circuit.
- If non-standard fuse size is specified, use the next larger fuse size.
- J Voltage (230V) single-phase air handler is designed to be used with single or three phase 230 volt power. In the case of connecting 3-phase power to the air handler terminal block, bring only two leads to the terminal block. Cap, insulate and fully secure the third lead.
- The air handlers are shipped from the factory with the proper indoor coil installed, and cannot be ordered without a coil.
- The air handlers do not have an internal filter rack. An external filter rack or other means of filtration is required.



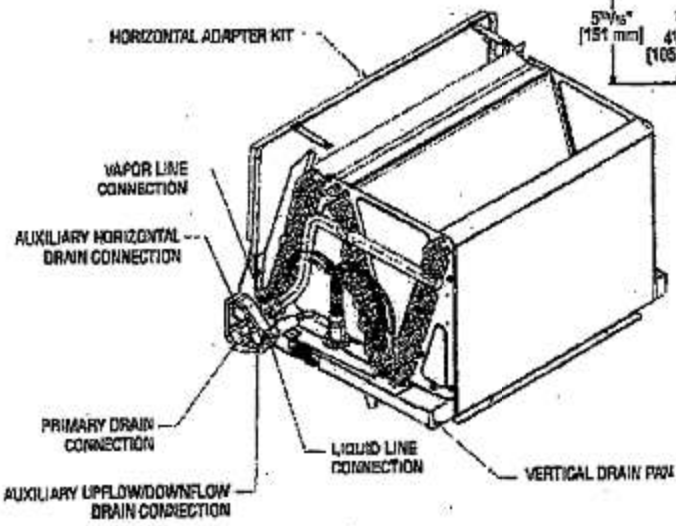
[ ] Designates Metric Conversions

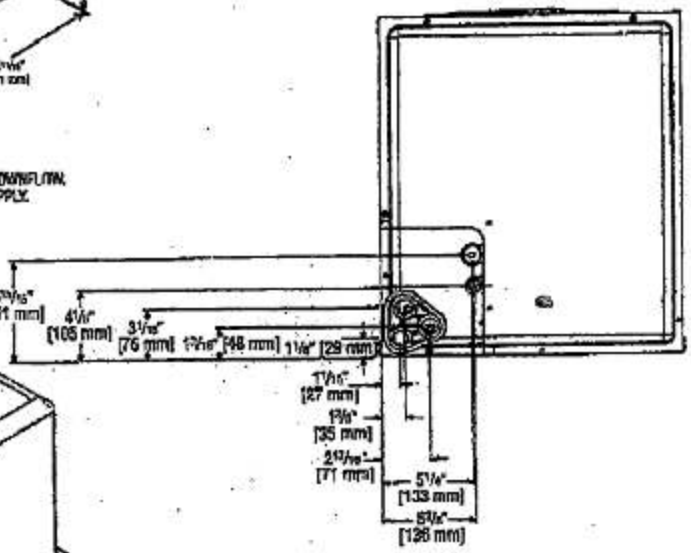
Unit Dimensions



Return Air Opening Dimensions

Model Cabinet Size	Return Air Opening Width (inches)	Return Air Opening Depth/Length (inches)
17	15⅞	19¾
21	19½	19¾
24	22⅞	19¾



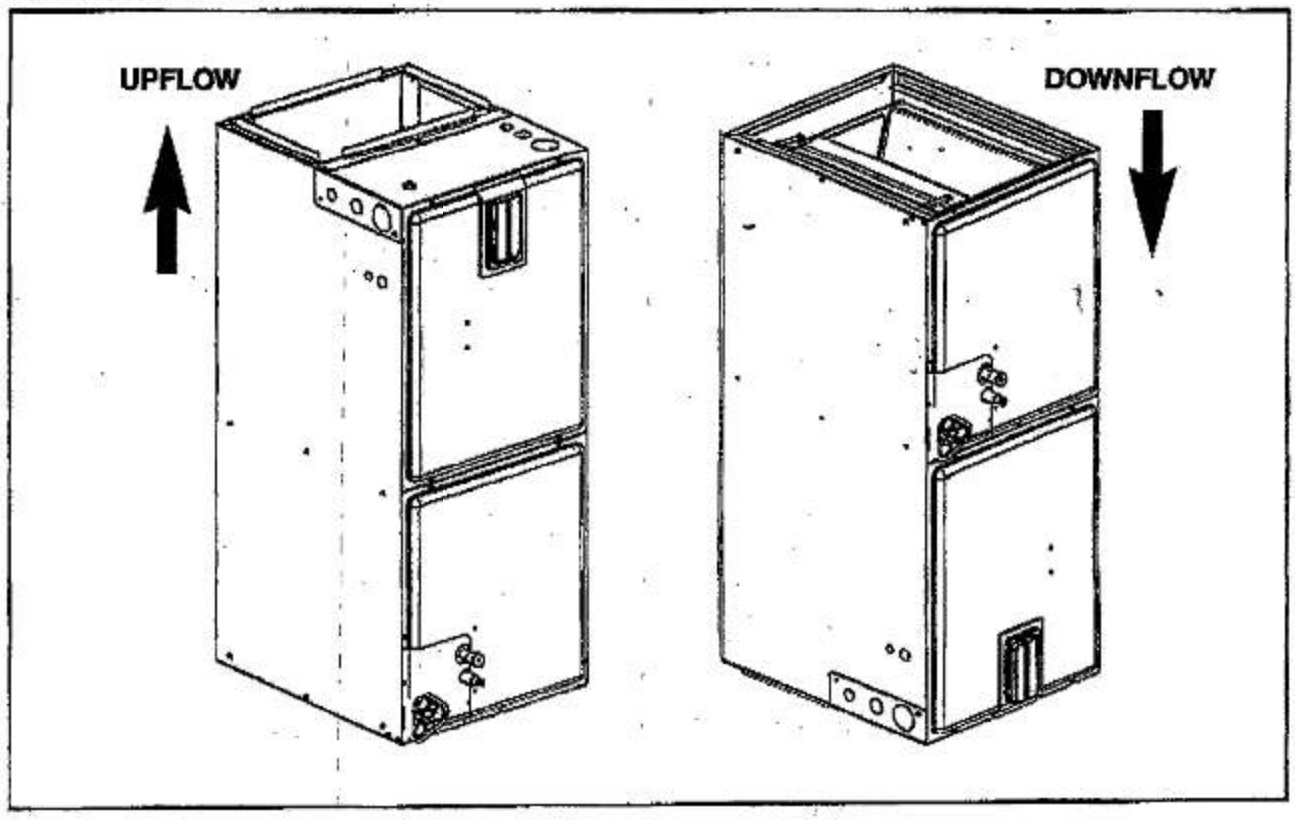


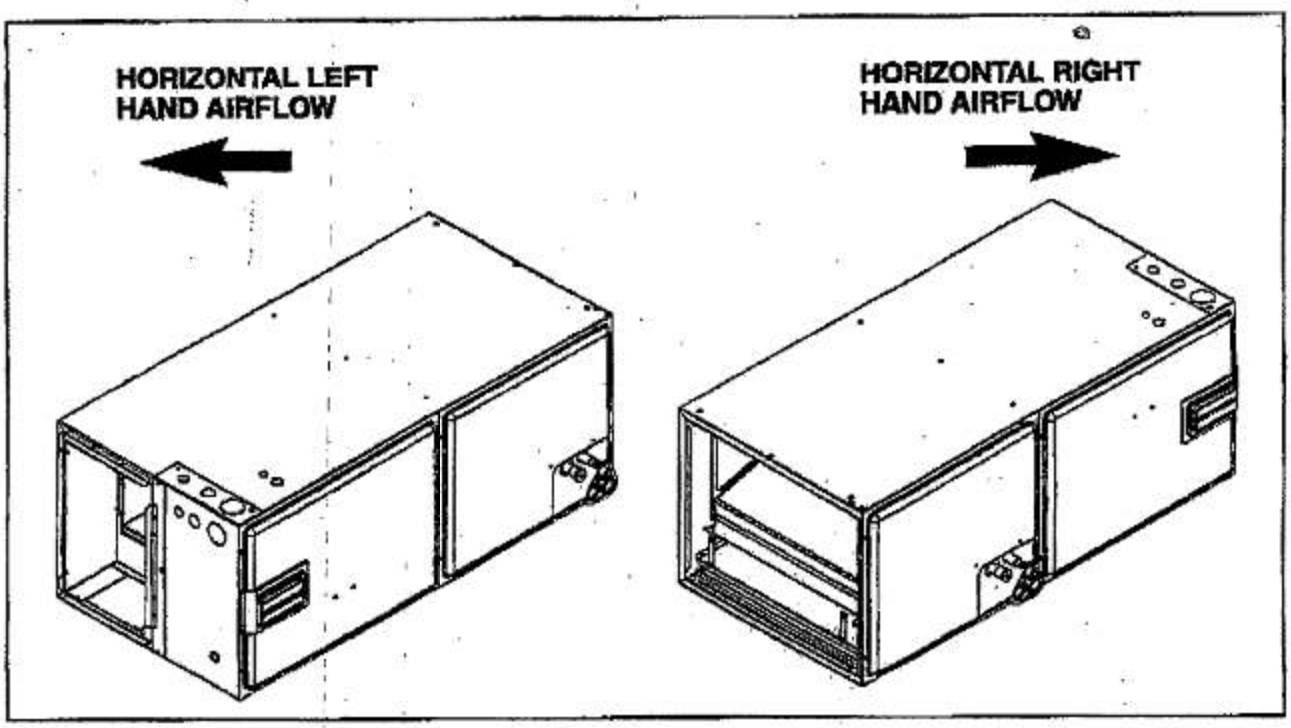
[ ] Designates Metric Conversions
( ) Designates Unit with Double Coil Cabinet

Unit Dimensions & Weights

Model Size	Unit Width "W" in. [mm]	Unit Height "H" in. [mm]	Supply Duct "A" in. [mm]	Air Flow CFM (Nom.) [L/s] Lo	Air Flow CFM (Nom.) [L/s] Hi	Unit Weight/Shipping Weight (Lbs.) [kg] Unit With Coil (Max. KW)
1817/2417	17½ [445]	42½ [1080]	16 [406]	600 [283]	800 [378]	82/96 [37/44]
3017/3617	17½ [445]	42½ [1080]	16 [406]	1000 [472]	1200 [566]	92/106 [37/48]
3621	21 [533]	42½ [1080]	19½ [495]	1200 [566]	—	97/112 [44/51]
4221/4821	21 [533]	50½ [1282]	19½ [495]	1400 [661]	1600 [755]	150/166 [68/75]
4824	24½ [622]	55½ [1410]	23 [584]	1600 [755]	—	162/180 [73/81]
6024	24½ [622]	55½ [1410]	23 [584]	—	1600 [850]	181/198 [82/90]

Airflow Directions





Airflow Performance

Airflow performance data is based on cooling performance with a coil and no filter in place. Select performance table for appropriate unit size, voltage and number of electric heaters to be used. Make sure external static applied to unit allows operation within the minimum and maximum limits shown in table below for both cooling and electric heat operation. For optimum blower performance, operate the unit in the .3 [8 mm] to .7 inches [18 mm] W.C. external static range. Units with coils should be applied with a minimum of .1 inch [3 mm] W.C. external static range.

Airflow Operating Limits

Model Cabinet Size	17		17		21		24	
Cooling BTUH x 1,000 Cooling Tons Nominal	-018 1.5	-024 2	-030 2.5	-036 3	-042 3.5	-048 4	-048 4	-060 5
Heat Pump or Air Conditioning Maximum Heat/Cool CFM [L/s] (37.5 CFM [18 L/s]/1,000 BTUH) (450 CFM [212 L/s]/Ton Nominal)	675 [319]	900 [425]	1125 [531]	1350 [637]	1575 [743]	1800 [850]	1800 [850]	1950 [911]
Heat Pump or Air Conditioning Nominal Heat/Cool CFM [L/s] (33.3 CFM [16 L/s]/1,000 BTUH) (400 CFM [189 L/s]/Ton Nominal)	600 [283]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1600 [755]	1800 [850]
Heat Pump or Air Conditioning Minimum Heat/Cool CFM [L/s] (30.0 CFM [14 L/s]/1,255 BTUH) (360 CFM [170 L/s]/Ton Nominal)	540 [255]	720 [340]	900 [425]	1080 [510]	1260 [595]	1440 [680]	1440 [680]	1620 [765]
Maximum kW Electric Heating & Minimum Electric Heat CFM [L/s]	10 500 [236]	10 650 [307]	15 865 [408]	15 1015 [400]	20 1200 [566]	20 1400 [660]	20 1400 [660]	25 1730 [821]
Maximum Electric Heat Rise °F [°C]	85 [29]	85 [29]	85 [29]	85 [29]	85 [29]	85 [29]	85 [29]	85 [29]

[ ] Designates Metric Conversions

240V Airflow Performance Data—UHSA/UHSL (PSC Motor)

Model No.	Motor Speed from Factory	Manufacturer Recommended Air-Flow Range (Min/Max) CFM	Blower Size/ Motor HP [W] # of Speed	Motor Speed		PSC CFM [L/s] Air Delivery/RPM/Watts—240 Volts External Static Pressure—Inches W.C. [kPa]						
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]
-1617 No Heater	High 240V	517/711 CFM [244/336 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	668 [315]	637 [301]	595 [281]	560 [264]	517 [244]	—	—
					RPM	541	595	657	706	761	—	—
					Watts	180	171	166	161	109	—	—
				High	CFM	—	—	—	—	711 [336]	662 [312]	614 [290]
					RPM	—	—	—	—	812	853	890
					Watts	—	—	—	—	243	227	210
-1617 with 13 kW Heater	High 240V	487/661 CFM [230/312 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	638 [301]	607 [286]	565 [267]	530 [250]	487 [230]	—	—
					RPM	571	626	697	736	791	—	—
					Watts	171	162	157	152	146	—	—
				High	CFM	—	—	—	—	661 [312]	612 [289]	564 [266]
					RPM	—	—	—	—	837	878	915
					Watts	—	—	—	—	232	216	199
-2417 No Heater	High 240V	647/888 CFM [305/419 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	817 [386]	778 [368]	757 [357]	693 [327]	647 [305]	—	—
					RPM	616	667	715	770	808	—	—
					Watts	239	230	221	206	205	—	—
				High	CFM	—	—	—	—	886 [418]	828 [391]	774 [365]
					RPM	—	—	—	—	875	908	958
					Watts	—	—	—	—	331	313	301
-2417 with 18 kW Heater	High 240V	617/838 CFM [291/395 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	787 [371]	749 [353]	727 [343]	668 [315]	617 [291]	—	—
					RPM	646	697	745	800	858	—	—
					Watts	230	221	212	197	187	—	—
				High	CFM	—	—	—	—	838 [395]	778 [367]	724 [342]
					RPM	—	—	—	—	900	933	983
					Watts	—	—	—	—	320	302	290
-3017 No Heater	High 240V	864/1004 CFM [408/474 L/s]	10x8 1/4 HP [186] 2 Speed	Low	CFM	1022 [482]	987 [466]	940 [444]	903 [426]	864 [408]	—	—
					RPM	700	754	794	833	870	—	—
					Watts	344	313	302	309	288	—	—
				High	CFM	—	—	—	—	1004 [474]	951 [449]	883 [417]
					RPM	—	—	—	—	924	953	975
					Watts	—	—	—	—	364	352	344
-3017 with 18 kW Heater	High 240V	814/994 CFM [384/427 L/s]	10x8 1/4 HP [186] 2 Speed	Low	CFM	972 [459]	937 [442]	890 [420]	853 [403]	814 [384]	—	—
					RPM	750	804	844	883	920	—	—
					Watts	326	298	282	274	268	—	—
				High	CFM	—	—	—	—	904 [427]	851 [402]	783 [370]
					RPM	—	—	—	—	949	978	1000
					Watts	—	—	—	—	334	322	314
-3617/-3621 No Heater	High 240V	1104/1248 CFM [521/589 L/s]	10x8 1/3 HP [249] 2 Speed	Low	CFM	1229 [580]	1201 [567]	1170 [552]	1141 [538]	1104 [521]	—	—
					RPM	788	833	872	909	951	—	—
					Watts	466	452	427	406	395	—	—
				High	CFM	—	—	—	—	1248 [589]	1194 [563]	1133 [535]
					RPM	—	—	—	—	1008	1028	1042
					Watts	—	—	—	—	488	475	454

Notes:
- All 208/240V PSC motors have voltage taps for 208 and 240 volts.
- All 208/240V PSC motors are shipped on high speed and 240 volts.
- If the application external static is less than 0.5" WC, adjust the motor speed to the low static speed as described below:
  - Unplug the black motor wire off the relay on the control board and plug in the red motor wire.
  - Replace the cap on the black motor wire.
- Voltage change (208/240V motors):
  - Move the orange lead to transformer 208V tap from 240V tap. Replace the wire cap on 240V tap.
  - Unplug the purple motor wire off the transformer and plug in the yellow motor wire.
  - Replace the cap on the purple motor wire.
- The above airflow table lists the airflow information for air handlers without heater and air handler with maximum heater allowed for each model.
- The following formula can be used to calculate the approximate airflow, if a smaller (N kW) than the maximum heater kit is installed.
  Approximate Airflow = Airflow without heater - (Airflow without heater - Airflow with maximum heater) x (N kW/maximum heater kW)

[ ] Designates Metric Conversions

240V Airflow Performance Data—UHSA/UHSL (PSC Motor) (con't.)

Model No.	Motor Speed from Factory	Manufacturer Recommended Air-Flow Range (Min/Max) CFM	Blower Size/ Motor HP [W] # of Speed	Motor Speed		PSC CFM (L/s) Air Delivery/RPM/Watts—240 Volts External Static Pressure—Inches W.C. (kPa)						
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4[.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]
-3617/3621 with 18 kW Heater	High 240V	1054/1148 CFM [497/542 L/s]	10x8 1/3 HP [249] 2 Speed	Low	CFM	1179 [556]	1161 [543]	1120 [529]	1091 [515]	1054 [497]	—	—
					RPM	838	883	922	959	1001	—	—
					Watts	445	442	407	366	375	—	—
				High	CFM	—	—	—	—	1148 [542]	1094 [516]	1039 [487]
					RPM	—	—	—	—	1033	1053	1067
					Watts	—	—	—	—	458	445	424
-4221 No Heater	High 240V	1241/1537 CFM [586/725 L/s]	10x10 1/2 HP [373] 2 Speed	Low	CFM	1526 [720]	1474 [696]	1427 [673]	1307 [617]	1241 [586]	—	—
					RPM	834	870	902	948	988	—	—
					Watts	560	549	535	476	462	—	—
				High	CFM	—	—	—	—	1537 [725]	1418 [669]	1334 [630]
					RPM	—	—	—	—	1072	1077	1085
					Watts	—	—	—	—	860	835	820
-4221 with 20 kW Heater	High 240V	1225/1800 CFM [553/678 L/s]	10x10 1/2 HP [373] 2 Speed	Low	CFM	1456 [687]	1404 [663]	1357 [640]	1237 [584]	1171 [553]	—	—
					RPM	886	906	925	959	992	—	—
					Watts	542	524	505	468	431	—	—
				High	CFM	—	—	—	—	1437 [678]	1318 [622]	1234 [582]
					RPM	—	—	—	—	1080	1090	1105
					Watts	—	—	—	—	840	800	785
-4821/-4824 No Heater	High 240V	1572/1824 CFM [742/861 L/s]	10x10 3/4 HP [559] 2 Speed	Low	CFM	1741 [822]	1719 [811]	1667 [787]	1628 [768]	1572 [742]	—	—
					RPM	878	920	950	981	1007	—	—
					Watts	785	757	707	667	641	—	—
				High	CFM	—	—	—	—	1824 [861]	1767 [834]	1653 [780]
					RPM	—	—	—	—	1102	1112	1121
					Watts	—	—	—	—	871	830	770
-4821/-4824 with 25 kW Heater	High 240V	1225/1500 CFM [709/814 L/s]	10x10 3/4 HP [559] 2 Speed	Low	CFM	1671 [789]	1649 [778]	1597 [754]	1558 [735]	1502 [709]	—	—
					RPM	945	955	995	1025	1050	—	—
					Watts	715	685	650	630	610	—	—
				High	CFM	—	—	—	—	1724 [814]	1667 [787]	1553 [733]
					RPM	—	—	—	—	1116	1119	1130
					Watts	—	—	—	—	810	780	730
-6024 No Heater	High 240V	1766/1965 CFM [833/927 L/s]	11x11 3/4 HP [559] 2 Speed	Low	CFM	1944 [917]	1912 [902]	1860 [878]	1813 [856]	1766 [833]	—	—
					RPM	764	809	838	865	889	—	—
					Watts	779	763	747	729	708	—	—
				High	CFM	—	—	—	—	1965 [927]	1908 [900]	1854 [875]
					RPM	—	—	—	—	943	967	977
					Watts	—	—	—	—	828	799	795
-6024 with 30 kW Heater	High 240V	1225/1500 CFM [709/814 L/s]	11x11 3/4 HP [559] 2 Speed	Low	CFM	1844 [870]	1812 [855]	1760 [831]	1713 [808]	1666 [786]	—	—
					RPM	839	866	890	913	935	—	—
					Watts	745	729	713	696	678	—	—
				High	CFM	—	—	—	—	1865 [880]	1808 [853]	1754 [828]
					RPM	—	—	—	—	987	1001	1014
					Watts	—	—	—	—	758	766	744

Notes:
- All 208/240V PSC motors have voltage taps for 208 and 240 volts.
- All 208/240V PSC motors are shipped on high speed and 240 volts.
- If the application external static is less than 0.5" WC. adjust the motor speed to the low static speed as described below:
  - Unplug the black motor wire off the relay on the control board and plug in the red motor wire.
  - Replace the cap on the black motor wire.
- Voltage change (208/240V motors):
  - Move the orange lead to transformer 208V tap from 240V tap. Replace the wire cap on 240V tap.
  - Unplug the purple motor wire off the transformer and plug in the yellow motor wire.
  - Replace the cap on the purple motor wire.
- The above airflow table lists the airflow information for air handlers without heater and air handler with maximum heater allowed for each model.
- The following formula can be used to calculate the approximate airflow, if a smaller (N kW) than the maximum heater kit is installed.
  Approximate Airflow = Airflow without heater - (Airflow without heater - Airflow with maximum heater) x (N kW/maximum heater kW)

[ ] Designates Metric Conversions

115/208/480V Airflow Performance Data—UHSA/UHSL (PSC Motor)

Model No.	Motor Speed from Factory	Manufacturer Recommended Air-Flow Range (Min/Max) CFM	Blower Size/ Motor HP [W] # of Speed	Motor Speed		PSC CFM [L/s] Air Delivery/RPM/Watts—115/208/480 Volts External Static Pressure—Inches W.C. [kPa]						
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]
-1817 No Heater	High	523/705 CFM [247/333 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	681 [321]	636 [300]	606 [286]	567 [268]	523 [247]	—	—
					RPM	541	601	670	714	768	—	—
					Watts	193	181	173	164	157	—	—
				High	CFM	—	—	—	—	705 [333]	650 [307]	599 [283]
					RPM	—	—	—	—	815	861	889
					Watts	—	—	—	—	238	227	204
-1817 with 13 kW Heater	High	467/661 CFM [220/312 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	651 [307]	606 [286]	576 [272]	537 [253]	493 [233]	—	—
					RPM	571	631	700	744	798	—	—
					Watts	184	172	164	155	148	—	—
				High	CFM	—	—	—	—	655 [309]	600 [283]	549 [259]
					RPM	—	—	—	—	840	886	1014
					Watts	—	—	—	—	228	218	193
-2417 No Heater	High	647/888 CFM [305/419 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	875 [413]	806 [380]	787 [371]	739 [349]	682 [322]	—	—
					RPM	648	700	745	794	827	—	—
					Watts	259	255	243	234	227	—	—
				High	CFM	—	—	—	—	897 [423]	851 [402]	765 [361]
					RPM	—	—	—	—	906	925	985
					Watts	—	—	—	—	332	318	306
-2417 with 13 kW Heater	High	617/838 CFM [291/395 L/s]	10x6 1/5 HP [149] 2 Speed	Low	CFM	845 [399]	776 [366]	757 [357]	709 [335]	652 [308]	—	—
					RPM	678	730	775	824	857	—	—
					Watts	250	248	234	225	218	—	—
				High	CFM	—	—	—	—	847 [400]	801 [378]	715 [337]
					RPM	—	—	—	—	931	950	960
					Watts	—	—	—	—	321	307	295
-3017 No Heater	High	864/1004 CFM [408/474 L/s]	10x8 1/4 HP [186] 2 Speed	Low	CFM	1038 [490]	1010 [477]	976 [461]	923 [437]	883 [417]	—	—
					RPM	721	771	799	848	880	—	—
					Watts	325	314	303	290	286	—	—
				High	CFM	—	—	—	—	1015 [479]	963 [454]	890 [420]
					RPM	—	—	—	—	928	955	974
					Watts	—	—	—	—	356	341	329
-3017 with 18 kW Heater	High	814/904 CFM [384/427 L/s]	10x8 1/4 HP [186] 2 Speed	Low	CFM	988 [466]	960 [453]	926 [437]	875 [413]	833 [393]	—	—
					RPM	771	821	849	898	930	—	—
					Watts	305	294	283	270	266	—	—
				High	CFM	—	—	—	—	915 [432]	863 [407]	790 [373]
					RPM	—	—	—	—	988	980	999
					Watts	—	—	—	—	326	311	299
-3617/-3621 No Heater	High	1104/1249 CFM [521/589 L/s]	10x8 1/3 HP [249] 2 Speed	Low	CFM	1201 [567]	1170 [552]	1141 [538]	1104 [521]	1062 [501]	—	—
					RPM	833	872	909	951	985	—	—
					Watts	462	427	406	396	385	—	—
				High	CFM	—	—	—	—	1194 [563]	1134 [535]	1076 [508]
					RPM	—	—	—	—	1024	1042	1060
					Watts	—	—	—	—	475	454	417

Notes:
- All 208/240V PSC motors have voltage taps for 208 and 240 volts.
  - All 208/240V PSC motors are shipped on high speed and 240 volts.
  - All 115V PSC motors are shipped on high speed.
  - If the application external static is less than 0.5" WC, adjust the motor speed to the low static speed as described below:
    - Unplug the black motor wire off the relay on the control board and plug in the red motor wire.
    - Replace the cap on the black motor wire.
  - Voltage change (208/240V motors):
    - Move the orange lead to transformer 208V tap from 240V tap. Replace the wire cap on 240V tap.
    - Unplug the purple motor wire off the transformer and plug in the yellow motor wire.
    - Replace the cap on the purple motor wire.
- All 480V PSC motors are shipped on high speed.
- If the application external static is less than 0.5" WC, adjust the motor speed to the low static speed as described below for 3-ton through 4-ton air handlers.
  - Unplug the black motor wire off the relay and remove the cap from the red motor wire.
  - Plug the red motor wire to the relay and connect the black motor wire with the yellow motor wire.
  - For 5-ton air handler, unplug the black motor wire off the relay and plug in the red motor wire, then cap the black motor wire. There is no yellow motor wire on 5-ton air handler.

WARNING: Do not connect red motor wire with yellow motor wire in any circumstance on 480V PSC motors. Connecting red motor wire with yellow motor wire will result in permanent motor damage.

- The above airflow table lists the airflow information for air handlers without heater and air handler with maximum heater allowed for each model.
- The following formula can be used to calculate the approximate airflow, if a smaller (N kW) than the maximum heater kit is installed. Approximate Airflow = Airflow without heater - (Airflow without heater - Airflow with maximum heater) x (N kW/maximum heater kW)

[ ] Designates Metric Conversions

115/208/480V Airflow Performance Data—UHSA/UHSL (PSC Motor)

Model No.	Motor Speed from Factory	Manufacturer Recommended Air-Flow Range (Min/Max) CFM	Blower Size/ Motor HP [W] # of Speed	Motor Speed		PSC CFM [L/s] Air Delivery/RPM/Watts—115/208/480V Volts External Static Pressure—Inches W.C. [kPa]						
						0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]
-3617/3621 with 15 kW Heater	High	1054/1148 CFM [497/542 L/s]	10x8 1/3 HP [249] 2 Speed	Low	CFM	1151 [543]	1120 [529]	1091 [515]	1054 [497]	1012 [478]	-	-
					RPM	883	922	959	1001	1046	—	—
					Watts	442	407	386	376	365	—	—
				High	CFM	—	—	—	—	1094 [516]	1034 [488]	978 [462]
					RPM	—	—	—	—	1049	1067	1085
					Watts	—	—	—	—	445	424	387
-4221 No Heater	High	1241/1537 CFM [580/725 L/s]	10x10 1/2 HP [373] 2 Speed	Low	CFM	1498 [705]	1449 [684]	1363 [643]	1287 [607]	1211 [571]	—	—
					RPM	822	858	886	931	958	—	—
					Watts	540	519	506	484	459	—	—
				High	CFM	—	—	—	—	1514 [714]	1411 [666]	1315 [621]
					RPM	—	—	—	—	1061	1069	1078
					Watts	—	—	—	—	710	702	677
-4221 with 20 kW Heater	High	1225/1500 CFM [578/667 L/s]	10x10 1/2 HP [373] 2 Speed	Low	CFM	1423 [672]	1379 [651]	1293 [610]	1217 [574]	1141 [538]	—	—
					RPM	870	882	925	957	992	—	—
					Watts	514	508	490	461	431	—	—
				High	CFM	—	—	—	—	1414 [667]	1311 [619]	1215 [573]
					RPM	—	—	—	—	1067	1080	1094
					Watts	—	—	—	—	700	678	665
-4821/-4824 No Heater	High	1512/1824 CFM [742/801 L/s]	10x10 3/4 HP [559] 2 Speed	Low	CFM	1711 [807]	1669 [787]	1637 [773]	1598 [754]	1542 [728]	—	—
					RPM	863	905	935	966	982	—	—
					Watts	766	737	687	647	621	—	—
				High	CFM	—	—	—	—	1787 [843]	1679 [792]	1575 [743]
					RPM	—	—	—	—	1089	1098	1110
					Watts	—	—	—	—	695	665	630
-4821/-4824 with 25 kW Heater	High	1225/1500 CFM [695/796 L/s]	10x10 3/4 HP [559] 2 Speed	Low	CFM	1641 [774]	1619 [764]	1567 [739]	1528 [721]	1472 [695]	—	—
					RPM	930	950	985	1015	1041	—	—
					Watts	700	660	630	600	560	—	—
				High	CFM	—	—	—	—	1687 [796]	1579 [745]	1475 [696]
					RPM	—	—	—	—	1098	1107	1120
					Watts	—	—	—	—	670	635	615
-6024 No Heater	High	1766/1965 CFM [833/927 L/s]	11x11 3/4 HP [559] 2 Speed	Low	CFM	1856 [861]	1833 [865]	1805 [852]	1772 [836]	1710 [807]	—	—
					RPM	764	803	824	856	886	—	—
					Watts	778	756	733	715	701	—	—
				High	CFM	—	—	—	—	1967 [928]	1916 [904]	1863 [879]
					RPM	—	—	—	—	948	959	991
					Watts	—	—	—	—	850	827	816
-6024 with 30 kW Heater	High	1225/1500 CFM [695/796 L/s]	11x11 3/4 HP [559] 2 Speed	Low	CFM	1796 [848]	1763 [832]	1736 [819]	1702 [803]	1640 [774]	—	—
					RPM	828	860	878	890	1001	—	—
					Watts	735	718	705	655	678	—	—
				High	CFM	—	—	—	—	1667 [861]	1815 [857]	1763 [832]
					RPM	—	—	—	—	989	1005	1020
					Watts	—	—	—	—	818	795	780

Notes:
- All 208/240V PSC motors have voltage taps for 208 and 240 volts.
- All 208/240V PSC motors are shipped on high speed and 240 volts.
- All 115V PSC motors are shipped on high speed.
- If the application external static is less than 0.5" WC, adjust the motor speed to the low static speed as described below:
  - Unplug the black motor wire off the relay on the control board and plug in the red motor wire.
  - Replace the cap on the black motor wire.
- Voltage change (208/240V motors):
  - Move the orange lead to transformer 208V tap from 240V tap. Replace the wire cap on 240V tap.
  - Unplug the purple motor wire off the transformer and plug in the yellow motor wire.
  - Replace the cap on the purple motor wire.
- All 480V PSC motors are shipped on high speed.
- If the application external static is less than 0.5" WC, adjust the motor speed to the low static speed as described below for 3-ton through 4-ton air handlers.
  - Unplug the black motor wire off the relay and remove the cap from the red motor wire.
  - Plug the red motor wire to the relay and connect the black motor wire with the yellow motor wire.
  - For 5-ton air handler, unplug the black motor wire off the relay and plug in the red motor wire, then cap the black motor wire. There is no yellow motor wire on 5-ton air handler.

WARNING: Do not connect red motor wire with yellow motor wire in any circumstance on 480V PSC motors. Connecting red motor wire with yellow motor wire will result in permanent motor damage.

- The above airflow table lists the airflow information for air handlers without heater and air handler with maximum heater allowed for each model.
- The following formula can be used to calculate the approximate airflow, if a smaller (N kW) than the maximum heater kit is installed. Approximate Airflow = Airflow without heater - (Airflow without heater - Airflow with maximum heater) x (N kW/maximum heater kW)

[ ] Designates Metric Conversions

115V/208V/240V Airflow Performance Data—UHLA/UHLL (X-13 Motor)

Model No.	Tonnage Application	Motor Speed From Factory	Manufacturer Recommended Air-Flow Range (Min/Max) CFM	Blower Size/ Motor HP [W] # of Speed	Motor Speed		X-13 CFM [L/s] Air Delivery/RPM/Watts—115/208/240 Volts External Static Pressure—Inches W.C. [kPa]						
							0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]
-2417 No Heater	1.5 Ton	5	509/681 CFM [240/321 L/s]	10x6 1/3 HP [249] 5 Speed	2	CFM	689 [325]	644 [304]	602 [284]	563 [266]	509 [240]	—	—
						RPM	580	633	683	728	781	—	—
						Watts	66	84	86	88	91	—	—
					3	CFM	—	—	—	—	681 [321]	644 [304]	608 [286]
						RPM	—	—	—	—	835	879	916
						Watts	—	—	—	—	136	143	152
-2417 with 13 kW Heater	1.5 Ton	5	490/666 CFM [231/314 L/s]	10x6 1/3 HP [249] 5 Speed	2	CFM	670 [316]	625 [295]	583 [275]	544 [257]	490 [231]	—	—
						RPM	609	661	711	756	809	—	—
						Watts	75	93	95	47	100	—	—
					3	CFM	—	—	—	—	666 [314]	629 [297]	588 [277]
						RPM	—	—	—	—	855	899	935
						Watts	—	—	—	—	144	151	160
-2417 No Heater	2 Ton	5	730/851 CFM [345/307 L/s]	10x6 1/3 HP [249] 5 Speed	4	CFM	875 [413]	839 [396]	804 [379]	762 [360]	730 [345]	—	—
						RPM	679	724	765	810	852	—	—
						Watts	121	131	135	142	143	—	—
					5	CFM	—	—	—	—	862 [407]	828 [391]	801 [378]
						RPM	—	—	—	—	904	940	970
						Watts	—	—	—	—	203	215	228
-2417 with 13 kW Heater	2 Ton	5	711/626CFM [336/295 L/s]	10x6 1/3 HP [249] 5 Speed	4	CFM	856 [404]	820 [387]	785 [370]	743 [351]	711 [336]	—	—
						RPM	707	752	793	838	880	—	—
						Watts	130	140	144	151	152	—	—
					5	CFM	—	—	—	—	837 [395]	803 [379]	776 [366]
						RPM	—	—	—	—	924	960	990
						Watts	—	—	—	—	211	223	238
-3617 No Heater	2.5 Ton	5	935/1084 CFM [441/512 L/s]	10x8 1/2 HP [373] 5 Speed	2	CFM	1093 [516]	1050 [496]	1017 [480]	977 [461]	935 [441]	—	—
						RPM	671	725	764	809	852	—	—
						Watts	159	168	174	180	188	—	—
					3	CFM	—	—	—	—	1084 [512]	1040 [491]	1001 [472]
						RPM	—	—	—	—	896	936	971
						Watts	—	—	—	—	249	257	261
-3617 with 18 kW Heater	2.5 Ton	5	910/1059 CFM [429/500 L/s]	10x8 1/2 HP [373] 5 Speed	2	CFM	1068 [504]	1025 [484]	992 [468]	952 [449]	910 [429]	—	—
						RPM	711	765	804	849	892	—	—
						Watts	164	179	185	191	199	—	—
					3	CFM	—	—	—	—	1059 [500]	1015 [479]	976 [461]
						RPM	—	—	—	—	936	976	1011
						Watts	—	—	—	—	260	268	272
-3617 No Heater	3 Ton	5	1130/1275 CFM [533/602 L/s]	10x8 1/2 HP [373] 5 Speed	4	CFM	1270 [599]	1237 [584]	1199 [566]	1165 [550]	1130 [533]	—	—
						RPM	775	816	848	882	926	—	—
						Watts	237	249	259	268	277	—	—
					5	CFM	—	—	—	—	1275 [602]	1244 [587]	1211 [571]
						RPM	—	—	—	—	963	998	1029
						Watts	—	—	—	—	338	348	363
-3617 with 18 kW Heater	3 Ton	5	1105/1250 CFM [521/590 L/s]	10x8 1/2 HP [373] 5 Speed	4	CFM	1245 [588]	1212 [572]	1174 [554]	1140 [538]	1105 [521]	—	—
						RPM	815	856	885	922	966	—	—
						Watts	248	260	270	279	288	—	—
					5	CFM	—	—	—	—	1250 [590]	1219 [575]	1186 [560]
						RPM	—	—	—	—	1003	1039	1069
						Watts	—	—	—	—	349	359	374

Notes: X-13 motor speed changes.
All X-13 motors have 5 speed tabs. Speed tab 1 is for continuous fan. Speed tab 2 (low static) and Speed tab 3 (high static) are for lower tonnage. Speed tab 4 (low static) and Speed tab 5 (high static) are for higher tonnage.
X-13 air handlers are always shipped from factory at Speed tab 5, except for -4824, which is set at Speed tab 3. For instance, UHLA-HM2417JA is always shipped at high static 2-ton airflow (Speed tab 5). To change to 1.5-ton airflow, move the blue wire to Speed tab 2 or 3 on the X-13 motor.
The low static Speed tab 2 (lower tonnage) and 4 (higher tonnage) are used for external static below 0.5" WC. The high static Speed tab 3 (lower tonnage) and 5 (higher tonnage) are used for external static exceeding 0.5" WC. Move the blue wire to the appropriate Speed tab as required by the application needs.

- The airflow for continuous fan (Speed tab 1) is always set at 50% of the Speed tab 4.
- The above airflow table lists the airflow information for air handlers without heater and air handler with maximum heater allowed for each model.
- The following formula can be used to calculate the approximate airflow, if a smaller (N kW) than the maximum heater kit is installed.

Approximate Airflow = Airflow without heater – (Airflow without heater – Airflow with maximum heater) x (N kW/maximum heater kW)

[ ] Designates Metric Conversions

115/208/240V Airflow Performance Data—UHLA/UHLL (X-13 Motor) (con't.)

Model No.	Tonnage Application	Motor Speed From Factory	Manufacturer Recommended Air-Flow Range (Min/Max) CFM	Blower Size/ Motor HP [W] # of Speed	Motor Speed		PSC CFM [L/s] Air Delivery/RPM/Watts—115/208/240 Volts External Static Pressure—Inches W.C. [kPa]						
							0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]
-4821 No Heater	3.5 Ton	5	1337/1447 CFM [631/683 L/s]	10x10 3/4 HP [559] 5 Speed	2	CFM	1473 [695]	1442 [681]	1401 [661]	1373 [648]	1237 [631]	—	—
						RPM	781	825	867	905	949	—	—
						Watts	257	271	303	307	316	—	—
					3	CFM	—	—	—	—	1447 [683]	1433 [676]	1402 [662]
						RPM	—	—	—	—	987	1034	1069
						Watts	—	—	—	—	394	406	405
-4821 with 20 kW Heater	3.5 Ton	5	1297/1333 CFM [612/629 L/s]	10x10 3/4 HP [559] 5 Speed	2	CFM	1433 [676]	1402 [662]	1361 [642]	1333 [629]	1297 [612]	—	—
						RPM	831	875	919	954	989	—	—
						Watts	277	295	313	319	326	—	—
					3	CFM	—	—	—	—	1333 [629]	1300 [613]	1267 [598]
						RPM	—	—	—	—	1011	1046	1080
						Watts	—	—	—	—	350	364	377
-4821 No Heater	4 Ton	5	1535/1654 CFM [724/781 L/s]	10x10 3/4 HP [559] 5 Speed	4	CFM	1665 [786]	1631 [770]	1601 [756]	1572 [742]	1535 [724]	—	—
						RPM	853	898	934	988	1,015	—	—
						Watts	351	387	401	406	422	—	—
					5	CFM	—	—	—	—	1654 [781]	1624 [766]	1563 [738]
						RPM	—	—	—	—	1036	1078	1095
						Watts	—	—	—	—	500	513	523
-4821 with 25 kW Heater	4 Ton	5	1485/1614 CFM [706/762 L/s]	10x10 3/4 HP [559] 2 Speed	4	CFM	1825 [767]	1591 [751]	1561 [737]	1532 [723]	1495 [706]	—	—
						RPM	894	932	970	1020	1052	—	—
						Watts	389	400	410	430	450	—	—
					5	CFM	—	—	—	—	1614 [762]	1584 [748]	1523 [719]
						RPM	—	—	—	—	1085	1090	1105
						Watts	—	—	—	—	514	520	530
-4824 No Heater	4 Ton	3	1545/1732 CFM [729/817 L/s]	11x11 3/4 HP [559] 5 Speed	2	CFM	1748 [825]	1665 [786]	1639 [773]	1599 [755]	1545 [729]	—	—
						RPM	680	699	734	762	795	—	—
						Watts	297	311	326	340	353	—	—
					3	CFM	—	—	—	—	1732 [817]	1683 [794]	1630 [769]
						RPM	—	—	—	—	840	872	899
						Watts	—	—	—	—	446	467	480
-4824 with 25 kW Heater	4 Ton	3	1505/1692 CFM [710/798 L/s]	11x11 3/4 HP [559] 5 Speed	2	CFM	1708 [806]	1629 [769]	1599 [755]	1559 [736]	1505 [710]	—	—
						RPM	680	736	760	790	820	—	—
						Watts	305	330	341	350	361	—	—
					3	CFM	—	—	—	—	1692 [798]	1643 [775]	1589 [750]
						RPM	—	—	—	—	835	890	1014
						Watts	—	—	—	—	460	470	481
-6024 No Heater	5 Ton	5	1739/1905 CFM [821/899 L/s]	11x11 3/4 HP [559] 5 Speed	4	CFM	1902 [898]	1862 [879]	1809 [854]	1781 [840]	1739 [821]	—	—
						RPM	712	749	787	815	856	—	—
						Watts	389	409	419	432	439	—	—
					5	CFM	—	—	—	—	1905 [899]	1866 [881]	1832 [865]
						RPM	—	—	—	—	894	924	950
						Watts	—	—	—	—	565	570	592
-6024 with 30 kW Heater	5 Ton	5	1699/1865 CFM [802/880 L/s]	11x11 3/4 HP [559] 5 Speed	4	CFM	1852 [879]	1822 [860]	1769 [835]	1741 [822]	1699 [802]	—	—
						RPM	750	790	810	850	880	—	—
						Watts	410	420	430	455	479	—	—
					5	CFM	—	—	—	—	1865 [880]	1826 [862]	1792 [846]
						RPM	—	—	—	—	920	946	970
						Watts	—	—	—	—	565	587	610

Notes: X-13 motor speed changes.
All X-13 motors have 5 speed tabs. Speed tab 1 is for continuous fan. Speed tab 2 (low static) and Speed tab 3 (high static) are for lower tonnage. Speed tab 4 (low static) and Speed tab 5 (high static) are for higher tonnage.
X-13 air handlers are always shipped from factory at Speed tab 5, except for -4824, which is set at Speed tab 3. For instance, UHLA-HM2417JA is always shipped at high static 2-ton airflow (Speed tab 5). To change to 1.5-ton airflow, move the blue wire to Speed tab 2 or 3 on the X-13 motor.
The low static Speed tab 2 (lower tonnage) and 4 (higher tonnage) are used for external static below 0.5" WC. The high static Speed tab 3 (lower tonnage) and 5 (higher tonnage) are used for external static exceeding 0.5" WC. Move the blue wire to the appropriate Speed tab as required by the application needs.

- The airflow for continuous fan (Speed tab 1) is always set at 50% of the Speed tab 4.
- The above airflow table lists the airflow information for air handlers without heater and air handler with maximum heater allowed for each model.
- The following formula can be used to calculate the approximate airflow, if a smaller (N kW) than the maximum heater kit is installed.

Approximate Airflow = Airflow without heater – (Airflow without heater – Airflow with maximum heater) x (N kW/maximum heater kW)

UHSA/UHSL Electrical Data – Blower Motor Only – No Electric Heat

Cooling Capacity Tons	Voltage	Application Phase*	Hertz	HP [W]	RPM	Speeds	Circuit Amps.	Minimum Circuit Ampacity	Maximum Circuit Protector
1½	115	1	60	1/5 [149]	1075	2	2.3	3.0	15
2				1/5 [149]	1075	2	3.8	5.0	15
2½				1/4 [186]	1075	2	4.7	6.0	15
3				1/3 [249]	1075	2	6.1	8.0	15
3½				1/2 [373]	1075	2	7.9	10.0	15
4				3/4 [559]	1075	2	8.4	11.0	15
1½	208/240	1 & 3	60	1/5 [149]	1075	2	1.7	3.0	15
2				1/5 [149]	1075	2	1.7	3.0	15
2½				1/4 [186]	1075	2	2.5	4.0	15
3				1/3 [249]	1075	2	2.5	4.0	15
3½				1/2 [373]	1075	2	5.2	7.0	15
4				3/4 [559]	1075	2	5.2	7.0	15
5	208/240	3	60	3/4 [559]	1075	2	5.2	7.0	15
3	480	3	60	1/3 [249]	1075	2	1.4	2.0	15
3½				1/3 [249]	1075	2	2.1	3.0	15
4				3/4 [559]	1075	2	2.2	3.0	15
5	480	3	60	3/4 [559]	1075	2	2.2	3.0	15

* Blower motors are all single phase motors.

UHLA/UHLL Electrical Data – Blower Motor Only – No Electric Heat

Cooling Capacity Tons	Voltage	Application Phase*	Hertz	HP [W]	RPM	Speeds	Circuit Amps.	Minimum Circuit Ampacity	Maximum Circuit Protector
1½ & 2	208/240	1 & 3	60	1/3 [249]	300-1100	4	1.6	2.0	15
2½ & 3				1/2 [373]	300-1100	4	2.7	4.0	15
3½ & 4				3/4 [559]	300-1100	4	3.8	5.0	15
5				3/4 [559]	300-1100	4	4.6	6.0	15
1½ & 2	115	1	60	1/3 [249]	300-1100	4	4.8	6.0	15
2½ & 3				1/2 [373]	300-1100	4	6.8	9.0	15
3½ & 4				3/4 [559]	300-1100	4	8.4	11.0	15
5				3/4 [559]	300-1100	4	8.4	11.0	15

* Blower motors are all single phase motors.

[ ] Designates Metric Conversions

UHSA/UHSL Electrical Data – with Electric Heat

Installation of the U.L. Listed original equipment manufacturer provided heater kits listed in the table below is recommended for all auxiliary heating requirements.

Nominal Cooling Capacity Tons/ Cabinet Size	Model No.	Heater kW (208/240V ①)	PH/Hz	No. Elements - kW Per	Circuit	Circuit Amps.	Motor Ampacity	Minimum Circuit Ampacity	Maximum Circuit Protection
1½ & 2/ 17	RXBH-17A03J	2.25/3.0	1/60	1 - 3.0	SINGLE	10.8/12.5	1.7	16/18	20/20
	RXBH-17A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	1.7	24/28	25/30
	RXBH-17A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	1.7	35/40	35/40
	RXBH-17A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	1.7	46/53	50/60
	RXBH-17A13J	9.4/12.5	1/60	3-4.17	SINGLE	45.1/52.1	1.7	59/68	60/70
	RXBH-17A13J	3.1/4.2	1/60	1-4.17	MULTIPLE CKT 1	15.0/17.4	1.7	21/24	25/25
		6.3/8.3	1/60	2-4.17	MULTIPLE CKT 2	30.1/34.7	0	38/44	40/45
	RXBH-17A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	1.7	21/24	25/25
	RXBH-17A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	1.7	28/31	30/35
	RXBH-17A13C	9.4/12.5	3/60	3 - 4.17	SINGLE	26.1/30.1	1.7	35/40	35/40
2½ & 3/ 17	RXBH-17A03J	2.25/3.0	1/60	1 - 3.0	SINGLE	10.8/12.5	2.5	17/19	20/20
	RXBH-17A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	2.5	25/29	25/30
	RXBH-17A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	2.5	36/41	40/45
	RXBH-17A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	2.5	47/54	50/60
	RXBH-17A13J	9.4/12.5	1/60	3-4.17	SINGLE	45.1/52.1	2.5	60/69	60/70
	RXBH-17A13J	3.1/4.2	1/60	1-4.17	MULTIPLE CKT 1	15.0/17.4	2.5	22/25	25/25
		6.3/8.3	1/60	2-4.17	MULTIPLE CKT 2	30.1/34.7	0	38/44	40/45
	RXBH-17A15J	10.8/14.4	1/60	3-4.8	SINGLE	51.9/60.0	2.5	68/79	70/80
	RXBH-17A15J	3.6/4.8	1/60	1 - 4.8	MULTIPLE CKT 1	17.3/20.0	2.5	25/29	25/30
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0	44/50	45/50
	RXBH-17A18J	12.8/17.0	1/60	3-5.68	SINGLE	61.6/70.8	2.5	81/92	90/100
	RXBH-17A18J	4.3/5.7	1/60	1-5.68	MULTIPLE CKT 1	20.5/23.6	2.5	29/33	30/35
		8.5/11.3	1/60	2 - 5.68	MULTIPLE CKT 2	41.1/47.2	0	52/59	60/60
	RXBH-17A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	2.5	22/25	25/25
	RXBH-17A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	2.5	29/32	30/35
	RXBH-17A13C	9.4/12.5	3/60	3 - 4.17	SINGLE	26.1/30.1	2.5	36/41	40/45
	RXBH-17A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	2.5	41/47	45/50
	RXBH-17A18C	12.8/17.0	3/60	3-5.68	SINGLE	35.5/41.0	2.5	48/55	50/60
	RXBH-17A07D	7.2	3/60	2-3.6	SINGLE	8.7	1.4	13	15
	RXBH-17A10D	9.6	3/60	3 - 3.2	SINGLE	11.6	1.4	17	20
	RXBH-17A15D	14.4	3/60	3 - 4.8	SINGLE	17.3	1.4	24	25
	RXBH-17A18D	17	3/60	3 - 5.68	SINGLE	20.4	1.4	28	30
3/ 21	RXBH-24A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	2.5	25/29	25/30
	RXBH-24A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	2.5	36/41	40/45
	RXBH-24A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	2.5	47/54	50/60
	RXBH-24A15J	10.8/14.4	1/60	3-4.8	SINGLE	51.9/60.0	2.5	68/79	70/80
	RXBH-24A15J	3.6/4.8	1/60	1 - 4.8	MULTIPLE CKT 1	17.3/20.0	2.5	25/29	25/30
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0	44/50	45/50
	RXBH-24A18J	12.8/17.0	1/60	4-4.26	SINGLE	61.6/70.8	2.5	81/92	90/100
	RXBH-24A18J	6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 1	30.8/35.4	2.5	42/48	45/50
		6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 2	30.8/35.4	0	33/45	40/45
	RXBH-24A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	2.5	22/25	25/25
	RXBH-24A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	2.5	29/32	30/35
	RXBH-24A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	2.5	41/47	45/50
	RXBH-24A18C	12.8/17.0	3/60	3-5.68	SINGLE	35.5/41.0	2.5	48/55	50/60
	RXBH-24A07D	7.2	3/60	2-3.6	SINGLE	8.7	1.4	13	15
	RXBH-24A10D	9.6	3/60	3 - 3.2	SINGLE	11.6	1.4	17	20
	RXBH-24A15D	14.4	3/60	3 - 4.8	SINGLE	17.3	1.4	24	25
	RXBH-24A18D	17	3/60	3 - 5.68	SINGLE	20.4	1.4	28	30

① This does not include "D Voltage". D Voltage = 480 Volts.

- Supply circuit protective devices may be fused or "HACR" type circuit breakers.
- If non-standard fuse size is specified, use next size larger standard fuse size.
- If the kit is listed under both single and multiple circuits, the kit is shipped from factory as multiple circuits. For single phase application, Jumper bar kit RXBJ-A21 and RXBJ-A31 can be used to convert multiple circuits to a single supply circuit. Refer to Accessory Section for details.
- Largest motor load is included in single circuit or circuit 1 of multiple circuit.
- Heater loads are balanced on 3 PH. models with 3 or 6 heaters only.
- Electric heater BTUH - (heater watts + motor watts) x 3.414 (see airflow table for motor watts.)
- No electrical heating elements are permitted to be used with A voltage (115V) air handler.
- J voltage (230V) single phase air handler is designed to be used with single or three phase 230 volt electric heaters. In the case of connecting 3 phase power to air handler terminal block without the heater, bring only two leads to terminal block. Cap, insulate and fully secure the third lead.
- Do not use 480 volts electrical heaters on 230 volts air handlers.
- Do not use 230 volts electrical heaters on 480 volts air handlers.

UHSA/UHSL Electrical Data – with Electric Heat (con't.)

Installation of the U.L. Listed original equipment manufacturer provided heater kits listed in the table below is recommended for all auxiliary heating requirements.

Nominal Cooling Capacity Tons/ Cabinet Size	Model No.	Heater kW (208/240V ①)	PH/Hz	No. Elements - kW Per	Circuit	Circuit Amps.	Motor Ampacity	Minimum Circuit Ampacity	Maximum Circuit Protection
3½ & 4/ 21 and 4/ 24	RXBH-24A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	4.0	27/30	30/30
	RXBH-24A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.8	4.0	38/43	40/45
	RXBH-24A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	4.0	49/55	50/60
	RXBH-24A15J	10.8/14.4	1/60	3-4.8	SINGLE	51.9/60.0	4.0	70/80	70/80
	RXBH-24A15J	3.6/4.8	1/60	1 - 4.8	MULTIPLE CKT 1	17.3/20.0	4.0	27/30	30/30
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0.0	44/50	45/50
	RXBH-24A18J	12.8/17	1/60	4-4.26	SINGLE	61.6/70.8	4.0	82/94	90/100
	RXBH-24A18J	6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 1	30.8/35.4	4.0	44/50	45/50
		6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 2	30.8/35.4	0.0	35/45	40/45
	RXBH-24A20J	14.4/19.2	1/60	4-4.8	SINGLE	69.2/80	4.0	92/105	100/110
	RXBH-24A20J	7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 1	34.6/40.0	4.0	49/55	50/60
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0.0	44/50	45/50
	RXBH-24A25J	18.0/24.0	1/60	6-4.0	SINGLE	86.4/99.9	4.0	113/130	125/150
	RXBH-24A25J (4-ton only)	6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 1	28.8/33.3	4.0	42/47	45/50
		6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 2	28.8/33.3	0.0	36/42	40/45
		6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 3	28.8/33.3	0.0	36/42	40/45
	RXBH-24A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	4.0	24/27	25/30
	RXBH-24A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	4.0	30/34	30/35
	RXBH-24A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	4.0	43/49	45/50
	RXBH-24A18C	12.8/17.0	3/60	3-2.84	SINGLE	35.6/41.0	4.0	50/57	50/60
	RXBH-24A20C*	14.4/19.2	3/60	3-3.2	SINGLE	40.0/46.2	4.0	56/63	60/70
	RXBH-24A20C	7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 1	20.0/23.1	4.0	30/34	30/35
		7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 2	20.0/23.1	0.0	25/29	25/30
	RXBH-24A25C*	18.0/24.0	3/60	6-4.0	SINGLE	50.0/57.8	4.0	68/78	70/80
	RXBH-24A25C (4-ton only)	9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 1	25.0/28.9	4.0	37/42	40/45
		9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 2	25.0/28.9	0.0	32/37	35/40
	RXBH-24A07D	7.2	3/60	2-3.6	SINGLE	8.7	2.2	14	15
	RXBH-24A10D	9.6	3/60	3 - 3.2	SINGLE	11.6	2.2	18	20
	RXBH-24A15D	14.4	3/60	3 - 4.8	SINGLE	17.3	2.2	25	25
	RXBH-24A18D	17	3/60	3 - 5.68	SINGLE	20.4	2.2	29	30
	RXBH-24A20D	19.2	3/60	6 - 3.2	SINGLE	23.2	2.2	32	35
	RXBH-24A25D (4-ton only)	24.0	3/60	6 - 4.0	SINGLE	28.8	2.2	39	40
5/ 24	RXBH-24A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	4.4	28/31	30/35
	RXBH-24A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	4.4	25/28	25/30
	RXBH-24A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	4.4	31/35	35/35
	RXBH-24A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	4.4	43/49	45/50
	RXBH-24A18C	12.8/17.0	3/60	3-2.84	SINGLE	35.6/41.0	4.4	50/57	50/60
	RXBH-24A20C*	14.4/19.2	3/60	3-3.2	SINGLE	40.0/46.2	4.4	56/64	60/70
	RXBH-24A20C	7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 1	20.0/23.1	4.4	31/35	35/35
		7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 2	20.0/23.1	0	25/29	25/30
	RXBH-24A25C*	18.0/24.0	3/60	6-4.0	SINGLE	50.0/57.8	4.4	68/78	70/80
	RXBH-24A25C	9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 1	25.0/28.9	4.4	37/42	40/45
		9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 2	25.0/28.9	0	32/37	35/40
	RXBH-24A30C*	21.6/28.8	3/60	6-4.8	SINGLE	60.0/69.4	4.4	81/93	90/100
	RXBH-24A30C	10.8/14.4	3/60	3 - 4.8	MULTIPLE CKT 1	30.0/34.7	4.4	43/49	45/50
		10.8/14.4	3/60	3 - 4.8	MULTIPLE CKT 2	30.0/34.7	0	38/44	40/45
	RXBH-24A07D	7.2	3/60	2-3.6	SINGLE	8.7	2.2	14	15
	RXBH-24A10D	9.6	3/60	3 - 3.2	SINGLE	11.6	2.2	18	20
	RXBH-24A15D	14.4	3/60	3 - 4.8	SINGLE	17.3	2.2	25	25
	RXBH-24A18D	17	3/60	3 - 5.68	SINGLE	20.4	2.2	29	30
	RXBH-24A20D	19.2	3/60	6 - 3.2	SINGLE	23.2	2.2	32	35
	RXBH-24A25D	24.0	3/60	6 - 4.0	SINGLE	28.8	2.2	39	40
	RXBH-24A30D*	28.8	3/60	6 - 4.8	SINGLE	34.6	2.2	46	50

① This does not include "U Voltage". D Voltage = 480 Volts.
* Values only. No single point kit available.
• Supply circuit protective devices may be fused or "HACR" type circuit breakers.
• If non-standard fuse size is specified, use next size larger standard fuse size.
• If the kit is listed under both single and multiple circuits, the kit is shipped from factory as multiple circuits. For single phase application, Jumper bar kit RXBJ-A21 and RXBJ-A31 can be used to convert multiple circuits to a single supply circuit. Refer to Accessory Section for details.
• Largest motor load is included in single circuit or circuit 1 of multiple circuit.
• Heater loads are balanced on 3 PH. models with 3 or 6 heaters only.
• Electric heater BTUH - (heater watts + motor watts) x 3.414 (see airflow table for motor watts.)
• No electrical heating elements are permitted to be used with A voltage (115V) air handler.
• J voltage (230V) single phase air handler is designed to be used with single or three phase 230 volt electric heaters. In the case of connecting 3 phase power to air handler terminal block without the heater, bring only two leads to terminal block. Cap, insulate and fully secure the third lead.
• Do not use 480 volts electrical heaters on 230 volts air handlers.
• Do not use 230 volts electrical heaters on 480 volts air handlers.

UHLA/UHLL Electrical Data – with Electric Heat

Installation of the U.L. Listed original equipment manufacturer provided heater kits listed in the table below is recommended for all auxiliary heating requirements.

Nominal Cooling Capacity Tons/ Cabinet Size	Rheem Model No.	Heater KW 208/240V	PH/HZ	No. Elements - KW Per.	Type Supply Circuit Single Circuit Multiple Circuit	Circuit Amps.	Motor Ampacity	Minimum Circuit Ampacity	Maximum Circuit Protection
1½ & 2/ 17	RXBH-17A03J	2.25/3.0	1/60	1 - 3.0	SINGLE	10.8/12.5	1.6	16/16	20/20
	RXBH-17A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	1.6	24/27	25/30
	RXBH-17A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	1.6	35/40	35/40
	RXBH-17A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	1.6	46/52	50/60
	RXBH-17A13J	9.4/12.5	1/60	3-4.17	SINGLE	45.1/52.1	1.6	59/68	60/70
	RXBH-17A13J	3.1/4.2	1/60	1-4.17	MULTIPLE CKT 1	15.0/17.4	1.6	21/24	25/25
		6.3/8.3	1/60	2-4.17	MULTIPLE CKT 2	30.1/34.7	0	38/44	40/45
	RXBH-17A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	1.6	21/24	25/25
	RXBH-17A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	1.6	27/31	30/35
	RXBH-17A13C	9.4/12.5	3/60	3 - 4.17	SINGLE	26.1/30.1	1.6	35/40	35/40
2½ & 3/ 17	RXBH-17A03J	2.25/3.0	1/60	1 - 3.0	SINGLE	10.8/12.5	2.7	17/19	20/20
	RXBH-17A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	2.7	25/29	25/30
	RXBH-17A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	2.7	36/41	40/45
	RXBH-17A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	2.7	47/54	50/60
	RXBH-17A13J	9.4/12.5	1/60	3-4.17	SINGLE	45.1/52.1	2.7	60/69	60/70
	RXBH-17A13J	3.1/4.2	1/60	1-4.17	MULTIPLE CKT 1	15.0/17.4	2.7	23/26	25/30
		6.3/8.3	1/60	2-4.17	MULTIPLE CKT 2	30.1/34.7	0	38/44	40/45
	RXBH-17A15J	10.8/14.4	1/60	3-4.8	SINGLE	51.9/60.0	2.7	69/79	70/80
	RXBH-17A15J	3.6/4.8	1/60	1 - 4.8	MULTIPLE CKT 1	17.3/20.0	2.7	25/29	25/30
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0	44/50	45/50
	RXBH-17A18J	12.8/17.0	1/60	3-5.66	SINGLE	61.6/70.8	2.7	81/92	90/100
	RXBH-17A18J	4.3/5.7	1/60	1-5.66	MULTIPLE CKT 1	20.5/23.6	2.7	29/33	30/35
		8.5/11.3	1/60	2 - 5.66	MULTIPLE CKT 2	41.1/47.2	0	52/59	60/60
	RXBH-17A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	2.7	23/25	25/25
	RXBH-17A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	2.7	29/33	30/35
	RXBH-17A13C	9.4/12.5	3/60	3 - 4.17	SINGLE	26.1/30.1	2.7	36/41	40/45
	RXBH-17A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	2.7	41/47	45/50
	RXBH-17A18C	12.8/17.0	3/60	3-5.66	SINGLE	35.5/41.0	2.7	48/55	50/60
3½ & 4/ 21	RXBH-24A05J	3.6/4.8	1/60	1 - 4.8	SINGLE	17.3/20.0	3.8	27/30	30/30
	RXBH-24A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	3.8	39/43	40/45
	RXBH-24A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	3.8	48/55	50/60
	RXBH-24A15J	10.8/14.4	1/60	3-4.8	SINGLE	51.9/60.0	3.8	70/80	70/80
	RXBH-24A15J	3.6/4.8	1/60	1 - 4.8	MULTIPLE CKT 1	17.3/20.0	3.8	27/30	30/30
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0.0	44/50	45/50
	RXBH-24A18J	12.8/17	1/60	4-4.26	SINGLE	61.6/70.8	3.8	82/94	90/100
	RXBH-24A18J	6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 1	30.8/35.4	3.8	44/49	45/50
		6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 2	30.8/35.4	0.0	39/45	40/45
	RXBH-24A20J	14.4/19.2	1/60	4-4.8	SINGLE	69.2/80	3.8	92/105	100/110
	RXBH-24A20J	7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 1	34.6/40.0	3.8	48/55	50/60
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0.0	44/50	45/50
	RXBH-24A25J	18.0/24.0	1/60	6-4.0	SINGLE	86.4/99.9	3.8	113/130	125/150
	RXBH-24A25J (4-ton only)	6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 1	28.8/33.3	3.8	41/47	45/50
		6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 2	28.8/33.3	0.0	36/42	40/45
		6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 3	28.8/33.3	0.0	36/42	40/45
	RXBH-24A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	3.8	24/27	25/30
	RXBH-24A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	3.8	30/34	30/35
	RXBH-24A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	3.8	43/48	45/50
	RXBH-24A18C	12.8/17.0	3/60	3-2.84	SINGLE	35.5/41.0	3.8	50/56	50/60
	RXBH-24A20C*	14.4/19.2	3/60	3-3.2	SINGLE	40.0/46.2	3.8	55/63	60/70
	RXBH-24A20C	7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 1	20.0/23.1	3.8	30/34	30/35
		7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 2	20.0/23.1	0.0	25/29	25/30
	RXBH-24A25C*	18.0/24.0	3/60	6-4.0	SINGLE	50.0/57.8	3.8	68/77	70/80
	RXBH-24A25C (4-ton only)	9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 1	25.0/28.9	3.8	36/41	40/45
		9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 2	25.0/28.9	0.0	32/37	35/40

* Values only. No single point kit available.
- Supply circuit protective devices may be fused or "HACR" type circuit breakers.
- If non-standard fuse size is specified, use next size larger standard fuse size.
- If the kit is listed under both single and multiple circuits, the kit is shipped from factory as multiple circuits. For single phase application, Jumper bar kit RXBJ-A21 and RXBJ-A31 can be used to convert multiple circuits to a single supply circuit. Refer to Accessory Section for details.
- Largest motor load is included in single circuit or circuit 1 of multiple circuit.
- Heater loads are balanced on 3 PH. models with 3 or 6 heaters only.
- Electric heater BTUH = (heater watts + motor watts) x 3.414 (see airflow table for motor watts.)
- No electrical heating elements are permitted to be used with A voltage (115V) air handler.
- J voltage (230V) single phase air handler is designed to be used with single or three phase 230 volt electric heaters. In the case of connecting 3 phase power to air handler terminal block without the heater, bring only two leads to terminal block. Cap, insulate and fully secure the third lead.
- Do not use 460 volts electrical heaters on 230 volts air handlers.
- Do not use 230 volts electrical heaters on 460 volts air handlers.

UHLA/UHLL Electrical Data – with Electric Heat (con't.)

Installation of the U.L. Listed original equipment manufacturer provided heater kits listed in the table below is recommended for all auxiliary heating requirements.

Nominal Cooling Capacity Tons/ Cabinet Size	Rheem Model No.	Heater KW 208/240V	PH/HZ	No. Elements - KW Per	Type Supply Circuit Single Circuit Multiple Circuit	Circuit Amps.	Motor Ampacity	Minimum Circuit Ampacity	Maximum Circuit Protection
4 & 5/ 24	RXBH-24A07J	5.4/7.2	1/60	2 - 3.6	SINGLE	26.0/30.0	4.6	39/44	40/45
	RXBH-24A10J	7.2/9.6	1/60	2 - 4.8	SINGLE	34.6/40.0	4.6	49/56	50/60
	RXBH-24A15J	10.8/14.4	1/60	3-4.8	SINGLE	51.9/60.0	4.6	71/81	80/90
	RXBH-24A15J	3.6/4.8	1/60	1 - 4.8	MULTIPLE CKT 1	17.3/20.0	4.6	28/31	30/35
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0	44/50	45/50
	RXBH-24A18J	12.8/17	1/60	4-4.26	SINGLE	61.6/70.8	4.6	83/95	90/100
	RXBH-24A18J	6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 1	30.8/35.4	4.6	45/50	45/50
		6.4/8.5	1/60	2 - 4.26	MULTIPLE CKT 2	30.8/35.4	0	39/45	40/45
	RXBH-24A20J	14.4/19.2	1/60	4-4.8	SINGLE	69.2/80	4.6	98/106	100/110
	RXBH-24A20J	7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 1	34.6/40.0	4.6	49/56	50/60
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0	44/50	45/50
	RXBH-24A25J	18.0/24.0	1/60	6-4.0	SINGLE	86.4/99.9	4.6	114/131	125/150
	RXBH-24A25J	6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 1	28.8/33.3	4.6	42/46	45/50
		6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 2	28.8/33.3	0	36/42	40/45
		6.0/8.0	1/60	2 - 4.0	MULTIPLE CKT 3	28.8/33.3	0	36/42	40/45
	RXBH-24A30J	21.6/28.8	1/60	6-4.8	SINGLE	103.8/120.	4.6	136/156	150/175
	RXBH-24A30J (5-ton only)	7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 1	34.6/40.0	4.6	49/56	50/60
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 2	34.6/40.0	0	44/50	45/60
		7.2/9.6	1/60	2 - 4.8	MULTIPLE CKT 3	34.6/40.0	0	44/50	45/60
	RXBH-24A07C	5.4/7.2	3/60	3 - 2.4	SINGLE	15.0/17.3	4.6	25/28	25/30
	RXBH-24A10C	7.2/9.6	3/60	3 - 3.2	SINGLE	20.0/23.1	4.6	31/35	35/35
	RXBH-24A15C	10.8/14.4	3/60	3 - 4.8	SINGLE	30.0/34.6	4.6	44/49	45/50
	RXBH-24A18C	12.8/17.0	3/60	3-2.84	SINGLE	35.6/41.0	4.6	51/57	60/60
	RXBH-24A20C*	14.4/19.2	3/60	3-3.2	SINGLE	40.0/46.2	4.6	56/64	60/70
	RXBH-24A20C	7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 1	20.0/23.1	4.6	31/35	35/35
		7.2/9.6	3/60	3 - 3.2	MULTIPLE CKT 2	20.0/23.1	0	25/29	25/30
	RXBH-24A25C*	18.0/24.0	3/60	6-4.0	SINGLE	50.0/57.8	4.6	69/78	70/80
	RXBH-24A25C	9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 1	25.0/28.9	4.6	37/42	40/45
		9.0/12.0	3/60	3 - 4.0	MULTIPLE CKT 2	25.0/28.9	0	32/37	35/40
	RXBH-24A30C*	21.6/28.8	3/60	6-4.8	SINGLE	60.0/69.4	4.6	81/93	90/100
	RXBH-24A30C (5-ton only)	10.8/14.4	3/60	3 - 4.8	MULTIPLE CKT 1	30.0/34.7	4.6	44/50	45/50
		10.8/14.4	3/60	3 - 4.8	MULTIPLE CKT 2	30.0/34.7	0	38/44	40/45

* Values only. No single point kit available.
- Supply circuit protective devices may be fused or "HACR" type circuit breakers.
- If non-standard fuse size is specified, use next size larger standard fuse size.
- If the kit is listed under both single and multiple circuits, the kit is shipped from factory as multiple circuits. For single phase applications, Jumper bar kit RXBJ-A21 and RXBJ-A31 can be used to convert multiple circuits to a single supply circuit. Refer to Accessory Section for details.
- Largest motor load is included in single circuit or circuit 1 of multiple circuit.
- Heater loads are balanced on 3 PH. models with 3 or 6 heaters only.
- Electric heater BTUH = (heater watts + motor watts) x 3.414 (see airflow table for motor watts.)
- No electrical heating elements are permitted to be used with A voltage (115V) air handler.
- J voltage (230V) single phase air handler is designed to be used with single or three phase 230 volt electric heaters. In the case of connecting 3 phase power to air handler terminal block without the heater, bring only two leads to terminal block. Cap, insulate and fully secure the third lead.
- Do not use 460 volts electrical heaters on 230 volts air handlers.
- Do not use 230 volts electrical heaters on 460 volts air handlers.

Electrical Wiring:

Power Wiring

- Field wiring must comply with the National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- Supply wiring must be 75°C minimum copper conductors only.
- See electrical data for product Ampacity rating and Circuit Protector requirement.

Grounding

- This product must be sufficiently grounded in accordance with National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- A grounding lug is provided.

Accessories-Kits—Parts

- **Combustible Floor Base RXHB-**

Model Cabinet Size	Combustible Floor Base Model Number
17	RXHB-17
21	RXHB-21
24	RXHB-24

- **Jumper Bar Kit 3 Ckt. to 1 Ckt. RXBJ-A31** is used to convert single phase multiple three circuit units to a single supply circuit. Kit includes cover and screw for line side terminals.
- **Jumper Bar Kit 2 Ckt. to 1 Ckt. RXBJ-A21** is used to convert single phase multiple two circuit units to a single supply circuit. Kit includes cover and screw for line side terminals.
- **Note:** No jumper bar kit is available to convert three phase multiple two circuit units to a single supply circuit.

- **Auxiliary Horizontal Overflow Pan Accessory RXBM-**

Nominal Cooling Capacity-Tons	Auxiliary Horizontal Overflow Pan Accessory Model Number
1½ - 3	RXBM-AC48
3½ - 5	RXBM-AC61

- **External Filter Rack RXHF-B17, B21, B24**

Model Cabinet Size	Filter Size in. [mm]	Part Number*	A	B
17	16 x 20 [406 x 508]	RXHF-B17	16.90	20.77
21	20 x 20 [508 x 508]	RXHF-B21	20.40	20.77
24	25 x 20 [635 x 508]	RXHF-B24	25.00	21.04

*Accommodates 1" filter

- **Auxiliary Electric Heater Kits RXBH-**
  Heater Kits include circuit breakers which meet UL and cUL requirements for service disconnect. See the Electric Heat Electrical Data in this specification sheet for specific Heater Kit Model numbers.
- **Horizontal Adapter Kit RXHH-**
  This horizontal adapter kit is used to convert Upflow/Downflow only models to horizontal flow. See the following table to order proper horizontal adapter kit.

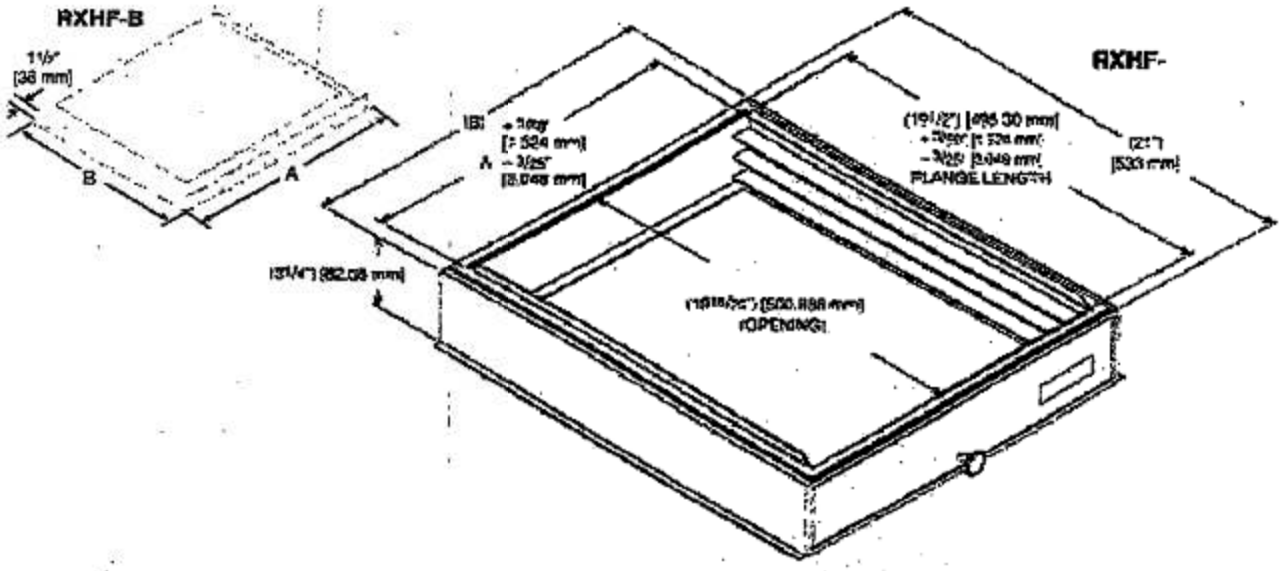
Coil Model	Horizontal Adapter Kit Model Number (Single Qty.)	Horizontal Adapter Kit Model Number (10-Pack Qty.)
2414	RXHH-A01	RXHH-A01 x 10
2417	RXHH-A02	RXHH-A02 x 10
3617/3621	RXHH-A03	RXHH-A03 x 10
4821/4824	RXHH-A04	RXHH-A04 x 10
6024	RXHH-A05	RXHH-A05 x 10

- **External Filter Base RXHF-**

Model Cabinet Size	Filter Size in. [mm]	Part Number*	A	B
17	16 x 20 [406 x 508]	RXHF-17	16.70	17.5
21	20 x 20 [508 x 508]	RXHF-21	19.20	21.0
24	25 x 20 [635 x 508]	RXHF-24	22.70	25.5

*Accommodates 1" or 2" filter

[ ] Designates Metric Conversions



LIMITED WARRANTY

Central Air Conditioning Products

The "Manufacturer" warrants to the original owner at the original installation site that the Central Air Conditioning Products (the "Product") will be free from defects in material or workmanship for a period not to exceed one (1) year from the startup or eighteen (18) months from date of shipment from the factory, whichever occurs first. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.

This limited warranty does not apply:

a) if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way.
b) to any expenses, including labor or material, incurred during removal or reinstallation of the defective Product or parts thereof.
c) to any workmanship of the installer of the Product.

This limited warranty is conditional upon:

a) shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid.
b) determination, in the reasonable opinion of the Manufacturer, that there exists a defect in material or workmanship.

Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.

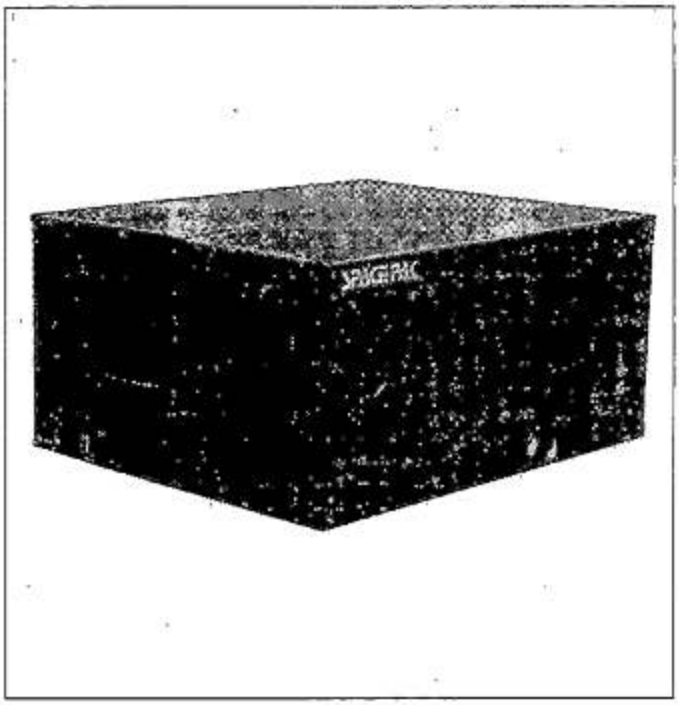
SPACE PAK CENTRAL AIR ANYWHERE®

A MESTEK COMPANY

ESPG2-711
W30-WG0482-01

SPACE PAK

MODEL ESP-G SYSTEM INSTALLATION, OPERATION & MAINTENANCE MANUAL



Central Air Conditioning Series
2 to 5 Tons
Fan Coil Unit/Air Supply Components

C ETL LISTED US
Intertek

AHRI CERTIFIED

IN UNITED STATES: 260 NORTH ELM ST. WESTFIELD, MA 01085 (413) 564-5530/FAX (413) 564-5815
IN CANADA: 7555 TRANMERE DRIVE, MISSISSAUGA, ONTARIO, L5S 1L4 (905) 672-2991/FAX (905) 672-2883

7/11

A MESTEK COMPANY

Section 1: INTRODUCTION

The following terms are used throughout this manual to bring attention to the presence of potential hazards or to important information concerning the product:

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

⚠ WARNING Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial property damage.

⚠ CAUTION Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or property damage.

NOTICE: Used to notify of special instructions on installation, operation or maintenance which are important to equipment but not related to personal injury hazards.

SPACEPAK SYSTEM DESIGN

SpacePak is a hi-velocity central air conditioning system which utilizes a conventional outdoor condensing unit matched with the indoor Model ESP-G fan coil unit to provide conditioned air through the specially-designed, pre-fabricated, pre-insulated flexible duct system. The system and its basic components operate the same as in any conventional air-to-air cooling system.

The SpacePak system is covered by the following U.S. Patents: 3,507,354; 3,575,234; 3,596,936; 3,605,797; 3,685,329; 4,045,977; 4,698,982; 926,673 and Canadian Patents: 891,292; 923,935; 923,936.

CODE COMPLIANCE

Fan coil unit installation must conform to the requirements of the local authority having jurisdiction or, in the absence of such requirements, to the National Board of Fire Underwriters regulations. Fan coil unit meets ETL listing requirements.

All electrical wiring must be in accordance with the National Electrical Code ANSI/NFPA No. 70-latest edition and any additional state or local code requirements. If an external electrical source is utilized, the fan coil unit, when installed, must be electrically grounded.

NOTICE: It is a requirement of the International Mechanical Code (307.2.3) to install a secondary drain or an auxiliary drain pan where damage to any building components will occur as a result of overflow from the equipment drain pan or stoppage in the condensate drain piping from a cooling or an evaporator coil. Follow local code requirements.

AIR DISTRIBUTION SYSTEM COMPONENT REQUIREMENTS

Air distribution components installation must conform to the requirements of local authority having jurisdiction or, in the absence of such requirements, to the National Fire Protection Association 90A or 90B.

Do not begin the installation of the system without performing a load calculation to determine heat gain, system layout and material take-off. If a layout plan is not already available and room terminator requirements determined, then refer to the SpacePak Application Manual, SP9, to complete this information. A description of air distribution system components is shown in Figure 1.1.

SpacePak - Model Number Description

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

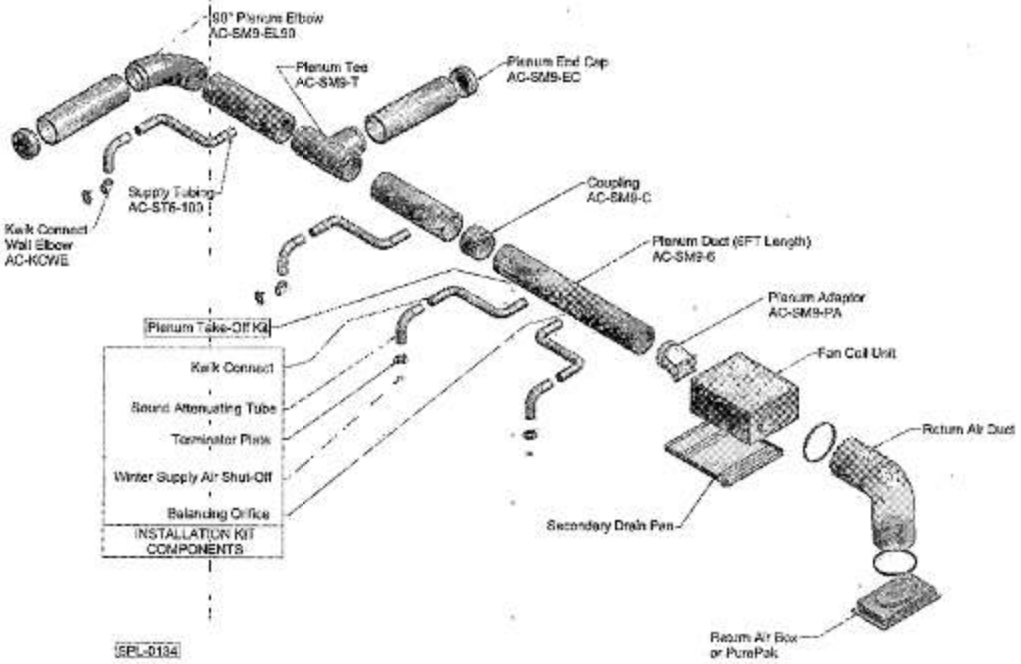
1,2,3, - Unit Type [UT]
ESP - Evaporator DX Fan Coil Unit

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]
G - "G" series

9 - Cabinet Type [CT]
H - Horizontal

10 - Refrigerant Type [RT]
4 - R410A



RETURN AIR BOX (BM-9149, AC-RBF-3, BM-9169): Each includes filter grill with metal frame, permanent filter, and 2 clamp bands. BM-9149 is for ESP-2430G. AC-RBF-3 is for ESP-3642G and BM-9169 is for ESP-4860G.

RETURN AIR DUCT (BM-6808-10, BM-6809-10, BM-6839-10): Flexible, 10 feet long with round shape. BM-6808-10 (15" dia.) for ESP-2430G. BM-6809-10 (19" dia.) for ESP-3642G and BM-6839-10 (24" dia.) is for ESP-4860G.

PLENUM ADAPTOR: 9" round OR 10" X 10" square metal component to attach plenum duct to fan coil unit.

PLENUM DUCT & COMPONENTS: May be 9" round sheet metal or 10" X 10" (O.D.) square, fiberboard duct types as specified by the installing contractor. Above layout is shown as an illustrative assembly reference only.

R6 SUPPLY TUBING (AC-ST6-100): Flexible, R6 insulated, 2" I.D. and 3-1/4" O.D. Each section is 100 feet long.

R8 SUPPLY TUBING (AC-ST8-75): Flexible, R8 insulated, 2" I.D. and 5-3/8" O.D. Each section is 75 feet long.

INSTALLATION KITS: Contains a specified amount of sound attenuating tubes, kwik-connects, terminator plates (incl. spring clips & screws), winter supply air shut-offs and a balancing orifice set to complete installation of room outlets. Supplied in (2) and (5) outlet boxed quantities.

PLENUM TAKE-OFF KIT: Contains a specific amount of plenum take-offs, gaskets and fasteners to complete installation of room outlets. Take-offs available for round sheet metal or square fiberboard duct as specified by installing contractor. Supplied in (2) and (5) outlet boxed quantities.

KWIK CONNECT 90° WALL ELBOW (AC-KCWE): To allow for wall terminations in 2" X 4" stud spaces.

SECONDARY DRAIN PAN: Specifically sized for SpacePak horizontal fan coil units. Constructed of durable polyethylene. Fan coil unit sets directly on top and can be installed with threaded rod.

PLIERS (SPC-72): To assure full setting of all clips (fasteners) in plenum take-off (not shown).

PLENUM HOLE CUTTER (SPC-71-10): To cut 2" hole in fiber board for plenum take-off installation (not shown).

FIGURE 1.1: AIR DISTRIBUTION SYSTEM COMPONENTS

Plenum Duct

The plenum duct can be run in practically any location accessible for the attachment of the supply tubing (see suggested layouts in Figure 1.2). The plenum is normally located in the attic or basement, and it is usually more economical to run the plenum where it will appreciably shorten the lengths of two or more supply runs.

In some two-story split level homes, it may be advantageous to go from one level to another with the plenum duct. Whenever necessary, either between floors or along the ceiling, the small size of the plenum makes it easy to box in.

The fan coil unit is designed to operate with a total external static pressure of 1.5 inches of water column (minimum 1.2 - maximum 1.5). Excessive static pressure increases the air flow in individual runs and may cause some or all terminators to be noisy.

For systems designed with a bullhead tee installed as on Unit No. 1 (Figure 1.3), the best results are obtained if not more than 60% of the total number of system outlets are attached to any one branch of the tee. For systems with a branch tee installed as on Unit No. 2 (Figure1.3), not more than 30% of the total number of system outlets should be attached to the perpendicular branch of the tee.

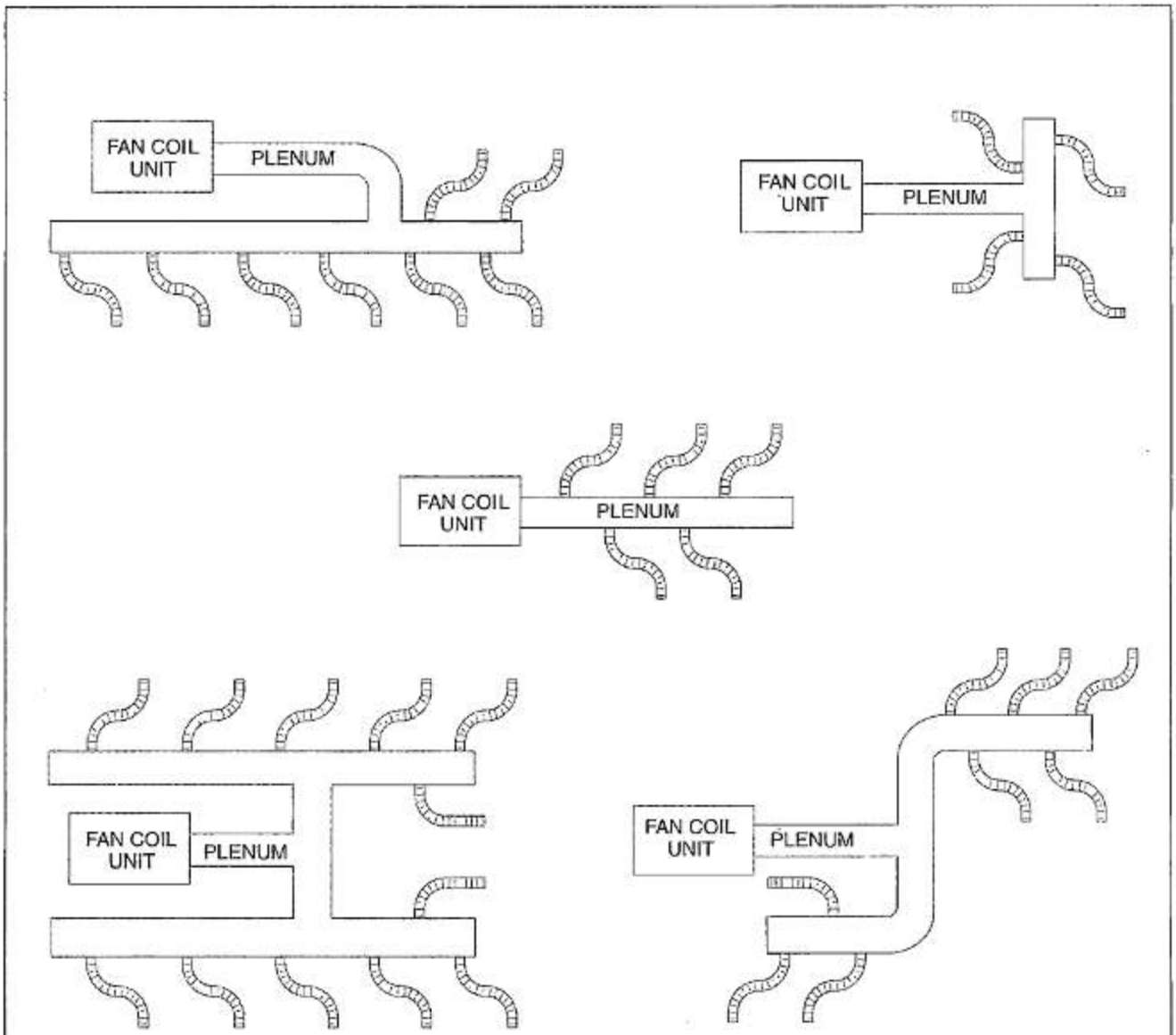


FIGURE 1.2: PLENUM/TUBING LAYOUT EXAMPLES (FOR GUIDANCE ONLY)

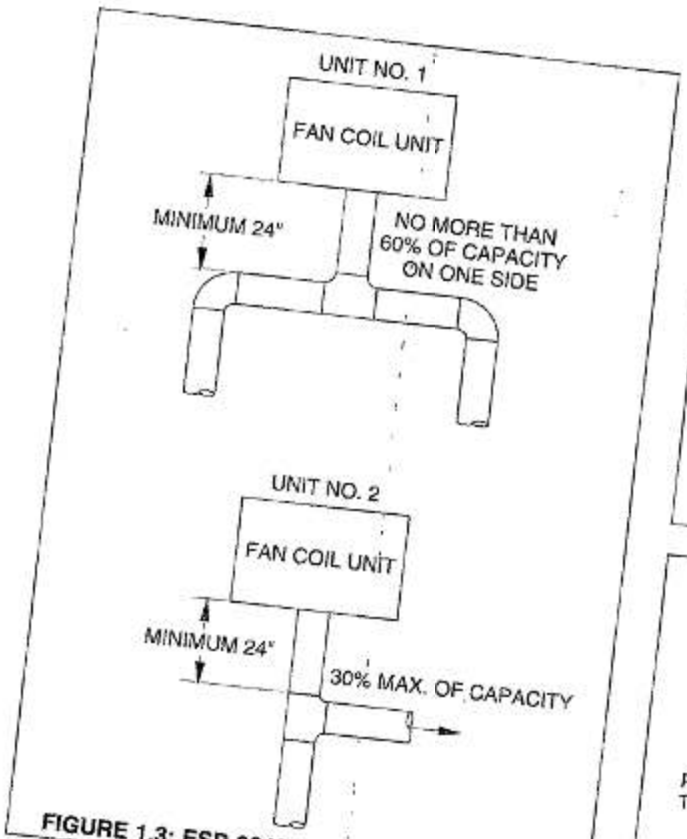


FIGURE 1.3: ESP-3642/4860G INSTALLATIONS

The larger system capacities (ESP-3642/4860G) are effected more by higher system static pressure than the smaller systems. Installation of the plenum tee closer than the minimum indicated in Fig. 1.3 will reduce performance of the system. No supply runs should be installed between unit outlet and this tee. Static readings on system should be taken before tee.

Supply Tubing

In the case of two-story or split-level applications, supply tubing may run from one story to another. It is small enough to go in stud spaces, but this is often difficult in older homes because of hidden obstructions in stud spaces. It is more common to run the supply tubing from the attic down through second story closets to the first story terminators.

Supply tubing runs in the corners of the second story rooms can be boxed in and are hardly noticeable since overall diameter is only 3-1/4".

Room Terminators

Terminators should be located primarily in the ceiling or floor for vertical discharge or high on a wall for horizontal discharge. Installation of horizontally discharged terminators is assisted with the SpacePak 90° wall elbow (see page 15). Two excellent spots for horizontal discharge are in the soffit area above kitchen cabinets (see Figure 1.4) and in the top portion of closets (see Figure 1.5).

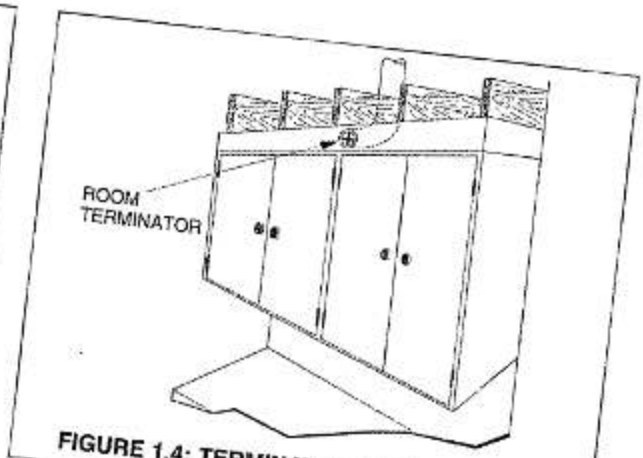


FIGURE 1.4: TERMINATOR IN SOFFIT AREA

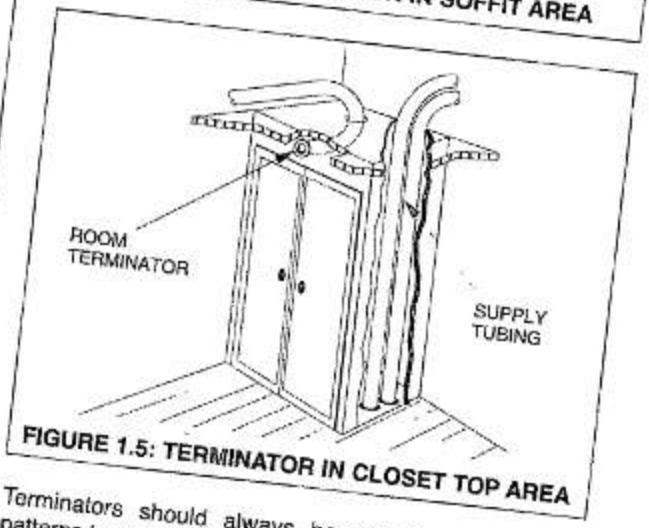


FIGURE 1.5: TERMINATOR IN CLOSET TOP AREA

Terminators should always be out of normal traffic patterns to prevent discharge air from blowing directly on occupants. And they should not be located directly above shelves or large pieces of furniture. Outside wall or corner locations are recommended if the room has more than one outside wall. Locating terminators away from interior doors prevents short cycling of air to the return air box.

SHIPMENT OF UNIT

Each fan coil unit is shipped in a single carton. Packed with the unit, there are vibration isolation pads, a condensate trap assembly and a factory installed primary float switch.

SECTION 2: SYSTEM INSTALLATION

NOTICE: Before proceeding with the installation, we recommend reading through this section of the manual for an overall understanding of the air conditioning fan coil unit and air distribution system component installation procedures.

STEP 1: LOCATING THE UNIT

The fan coil unit may be installed in an unconditioned space (as long as it is protected from the weather) such as an attic, garage or crawlspace, or a conditioned space such as a basement, closet or utility room (see dimensions in Figures 2.2 and 2.3).

The fan coil unit is shipped in a horizontal air flow arrangement, but can be easily field-converted to a vertical air flow arrangement as detailed on page 9 and Figures 2.8 and 2.9.

When selecting a location, consider the locations (as shown in Figures 2.4, 2.5 and 2.6) of the return air box; routing of the plenum duct, supply tubing, refrigerant lines, condensate drain line; and all recommended clearances (see Figures 2.2 and 2.3).

Model	System capacity (Nom. Tons)	Electrical Characteristics	Connections				Recommended Condensing Unit	
			Suction Line (O.D.)	Liquid Line (O.D.)	Cond. Drain (FPT)	Return Inlet (Dia.)	Nominal Capacity (MBH)	Min SEER
ESP-2430G	2 - 2-1/2	208-230/60/1	7/8"	3/8"	3/4"	15"	24 to 30	13+
ESP-3642G	3 - 3-1/2	208-230/60/1	7/8"	3/8"	3/4"	19"	36 to 42	13+
ESP-4860G	4 & 5	208-230/60/1	7/8"	3/8"	3/4"	24"	48 to 60	13+

Model	System capacity (Nom. Tons)	Blower					Coil			Ship. Wt. (lbs)
		Air Volume @ 1.5" W.C. (SCFM)	Wheel Dia. and Width	Motor HP	Motor Type	F.L. Amps	No. of Rows Deep	Holding Charge (Dry Nitrogen)	Flow Control Type	
ESP-2430G	2 - 2-1/2	550	9" x 5"	1/3	PSC	1.8	6	7 psi	Exp. Valve	120
ESP-3642G	3 - 3-1/2	850	9" x 5"	1/2	PSC	2.8	6	7 psi	Exp. Valve	144
ESP-4860G	4 & 5	1150	9" x 6-3/8"	1	PSC	5.3	6	7 psi	Exp. Valve	171

FIGURE 2.1: MODEL ESP-G SPECIFICATIONS

MODEL	A	B	C	D
ESP-2430G	24-1/8"	12"	18-1/2"	10-1/4"
ESP-3642G	33-1/8"	16-1/2"	25-1/2"	9-3/4"
ESP-4860G	43-1/8"	21-1/2"	33-7/8"	9-7/8"

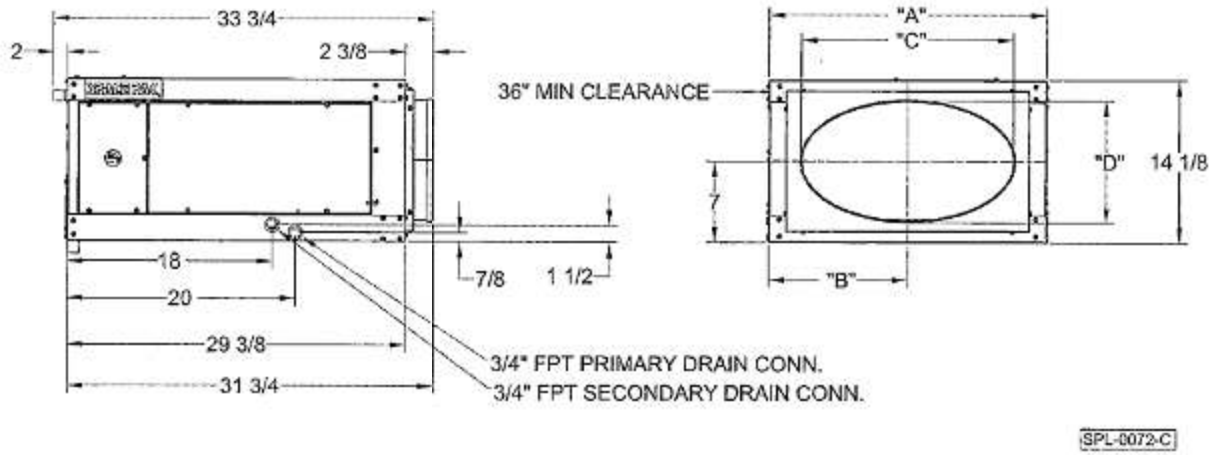
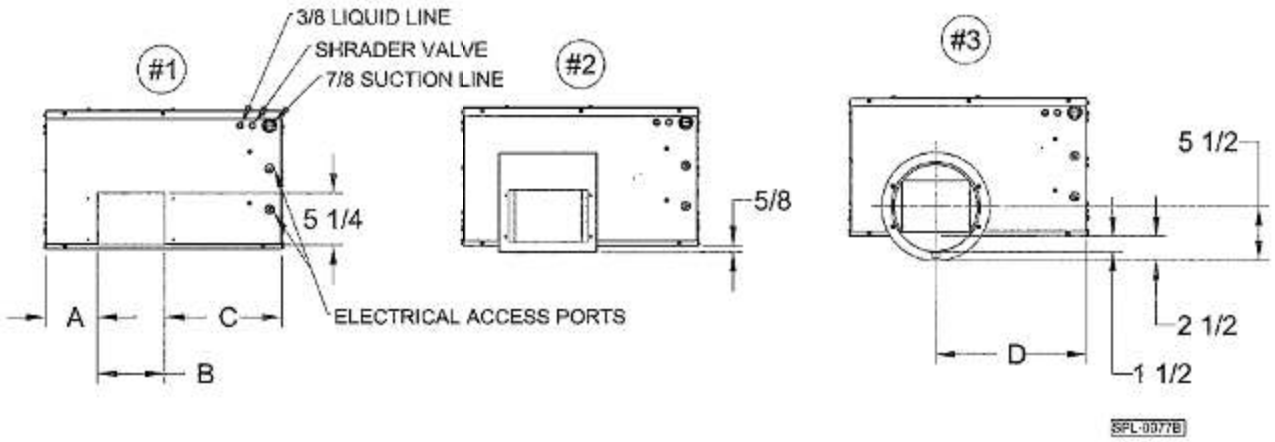


FIGURE 2.2: UNIT DIMENSIONS AND CLEARANCES (Inches)



MODEL	A	B	C	D
ESP-2430G	5-1/4	6-1/2	12-1/2	15-3/4
ESP-3642G	7-1/2	6-1/2	19	22-1/4
ESP-4860G	17-7/8	7-5/8	17-5/8	21-7/16

FIGURE 2.3: CONNECTION LOCATIONS AND ASSEMBLED PLENUM ADAPTOR DIMENSIONS

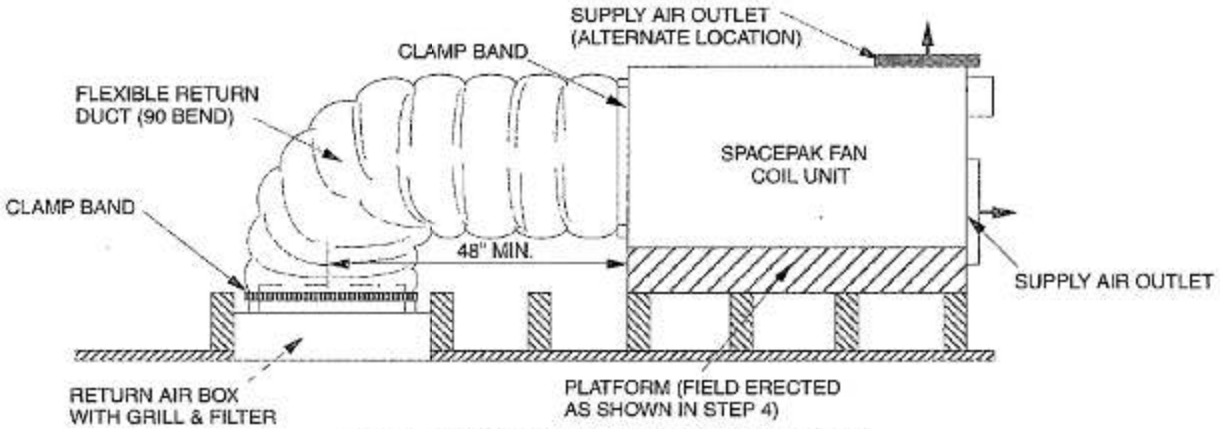


FIGURE 2.4: TYPICAL UNIT INSTALLATION

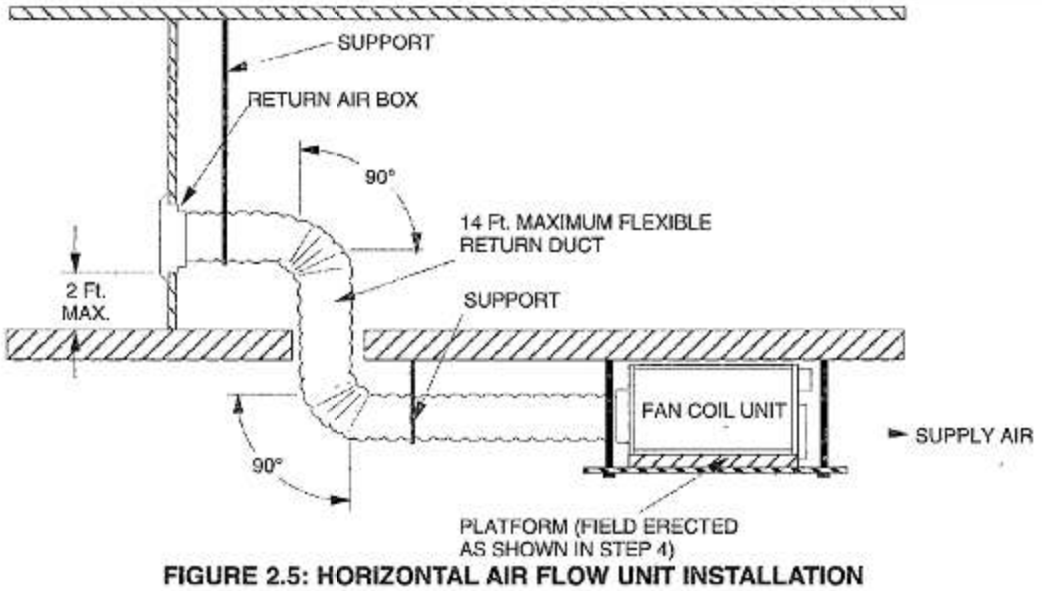


FIGURE 2.5: HORIZONTAL AIR FLOW UNIT INSTALLATION

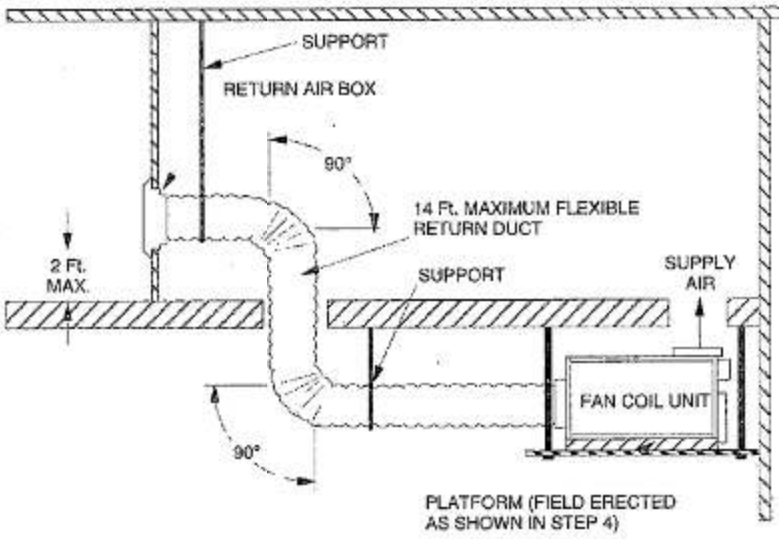


FIGURE 2.6: VERTICAL AIR FLOW UNIT INSTALLATION

STEP 2: CUTTING RETURN AIR OPENING

Select exact location for return air box. Avoid installing box in dining room, living room, kitchen, etc., unless return air duct can be installed with at least two 90° bends (accomplished by splicing two return air ducts together.)

For attic installations to raise fan coil unit up through opening, cut return air opening 14-1/2" wide by 27" long for the ESP-2430G, 14-1/2" wide by 31-1/2" long for the ESP-3642G* and 14-1/2" wide by 36-1/2" long for the ESP-4860G. These openings will accomodate the return air box with sufficient frame lip to cover the opening (see Figure 2.7).

***NOTICE: The return air panel must be removed from the ESP-3642G unit to fit through hole cut out.**

If joists are on 16" centers, the 14-1/2" width of the return air box should fit between successive joists. Where joists run in the opposite direction, or to properly center the return, it may be necessary to cut joists and install headers.

For all wall return applications, cut the return air opening to accomodate the return air box according to the same dimensions. Remember, location of opening must allow for a 90° bend in the return air duct.

Check the opening for proper fit of the return air box. Do not install the return air box until the installation of the entire SpacePak system is completed, if you want to fit materials up through this hole.

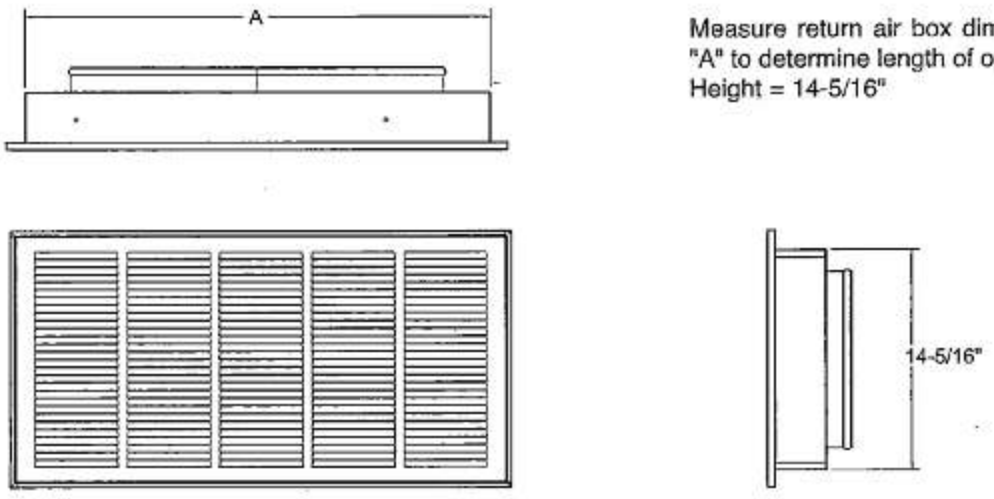


FIGURE 2.7: RETURN AIR BOX FRAME DIMENSIONS

STEP 3: ATTACHING SUPPLY AIR PLENUM ADAPTOR

NOTICE: If unit is to be located in the attic and installed through ceiling joists, attach supply plenum adaptor in attic.

A. HORIZONTAL DISCHARGE:

Refer to Figure 2.3 and duct installation instructions supplied with fan coil unit.

B. TO CONVERT TO VERTICAL DISCHARGE:

Refer to Figure 2.8 & 2.9

Tools required: 1/4", 5/16", 3/8", 7/16" box wrenches and nut drivers, 5/32" Allen wrench, utility knife & Malco S-3 offset hand seamer (3" duct-bill pliers).

Field supplied: latex caulk, UL classified duct liner adhesive (or equivalent).

NOTICE: An Electric Heat Module cannot be installed after unit has been field converted to vertical supply air discharge (due to resulting blower housing obstruction).

Refer to Figure 2.8 for Steps 2 to 8a.

1. Place unit horizontally on a flat raised surface.
2. Remove all side access panels, return air panel and cover plate from top panel.
3. Remove top panel by removing top/center screw from electric control box and panel screws.
4. Remove (4) screws securing front panel flange to blower housing.
5. Remove sealant around discharge opening.
6. Remove (3) remaining screws from electrical control box. Set box aside.
7. Remove (2) screws attaching blower housing to motor support channel flange.

8a. Remove (6) screws attaching motor mounting base to motor support channel.

Refer to Figure 2.9 for Steps 8b to 18.

8b. Shift motor mounting base (and blower housing) backtoward coil to second set of mounting lugs on motor support channel. Rotate blower housing up 90°. Reattach base with screws.

9. Cut insulation from discharge air location on top panel (opening dimensions shown in Figure 2.3). Insert cut piece into opening. Apply adhesive per manufacturer's instructions. Attach cover plate to front of unit.
10. Bend both flanges 90° into cabinet using 3" duct-bill pliers. Pliers should engage full jaw depth (1-1/4") and be centered on flange.
11. Insert blower housing into top panel. Reattach panel to unit.
12. Align hole in blower housing with lower slot in motor support channel flange. Attach housing to flange with (1) previously removed screw.
13. Align (4) holes in top panel flange with holes in blower housing. Attach with removed screws.
14. Assure blower wheel is centered in inlet and discharge of blower housing. If required, adjust by loosening (4) bolts securing motor. Shift motor and refasten. For blower wheel adjustments, loosen set screw (not shown), shift wheel and refasten.
15. Apply latex caulk to seal between blower housing and top panel.
16. Reinstall electrical control box.
17. Place supply air plenum adaptor over discharge opening. Align holes in plenum adaptor, gasket and top panel. Secure with screws provided with adaptor.

NOTICE: Check that all inside cabinet surfaces are covered with insulation, add insulation if required. An uninsulated panel will "sweat" and condensate will form on the cabinet.

18. Replace all panels and screws.

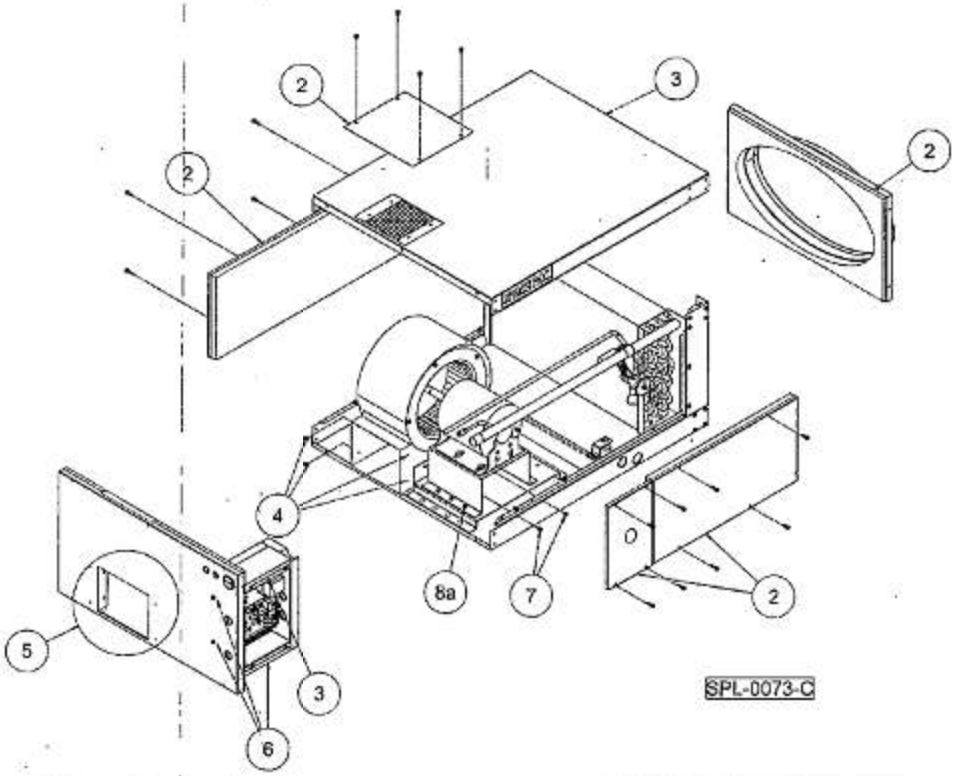


FIGURE 2.8

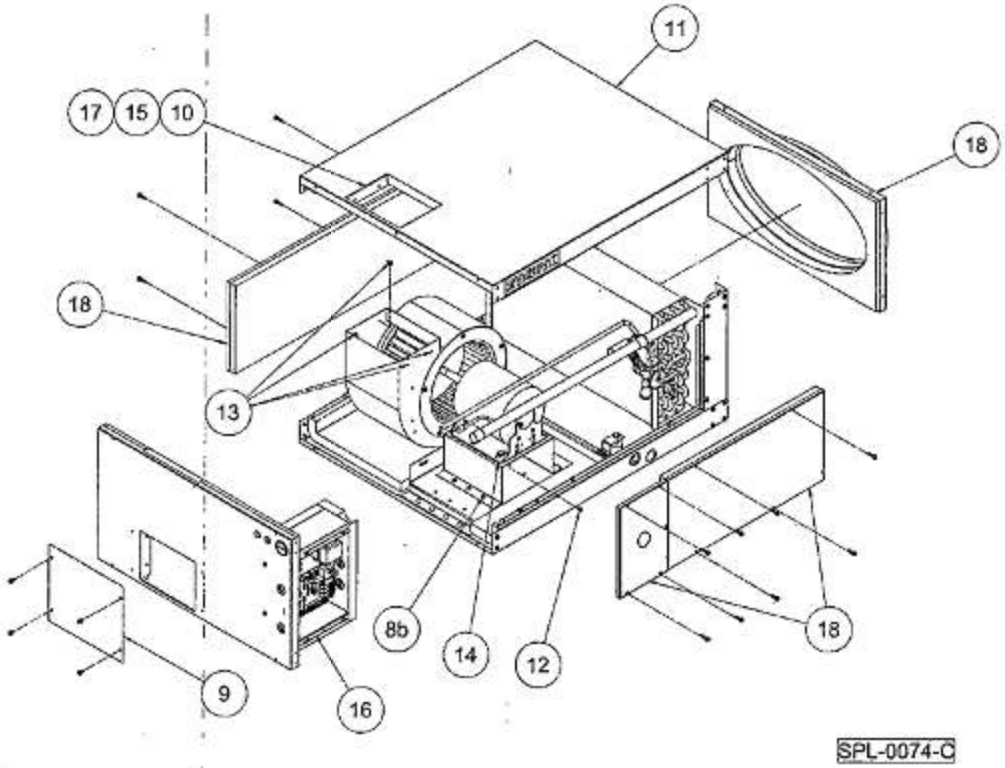


FIGURE 2.9

STEP 4: SETTING THE UNIT

Construct a platform for the fan coil unit, as shown in Figure 2.10. The platform can be constructed of 2 X 4 (minimum), 2 X 6, 2 X 8 and 2 X 10 lumber, as necessary to achieve proper pitch of 1/4" per foot for the condensate drain line. Figure 2.11 shows the approximate normal allowable run of condensate piping as a function of the framing lumber used for platform construction. The platform covering should be 1/2" plywood minimum.

Attach vibration isolation pads (supplied inside fan coil unit) to platform covering as shown in Fig. 2.10.

Secure the platform to the joist or floor, depending on location selected for the fan coil unit. Make sure platform is level.

For locations where the fan coil unit will be suspended, suspend platform from overhead by 1/4" threaded rods.

NOTICE: Allow room on sides for servicing.

For installations with a return air box and return air duct, set fan coil unit on the platform with the elliptical opening facing in the direction of the return air box. **DO NOT** let the supply air plenum adaptor support the weight of the unit.

Do not secure the unit to the platform, as the weight of the unit will hold it in position.

STEP 5: CONNECTING REFRIGERANT LINES

Connect refrigerant lines from the outdoor condensing unit to the fan coil unit in accordance with its manufacturer's sizing recommendations for the length of the piping run. Proper line sizing is critical to the operation of the system. Always use proper brazing procedures. A trickle flow (2PSI) of dry nitrogen to avoid scale or blockage in the piping system is recommended while brazing. SpacePak also recommends installing a sight glass on the liquid line outside of the unit as an aid for accurately charging the system.

LUMBER SIZE	2 X 4	2 X 6	2 X 8	2 X 10
MAXIMUM HORIZONTAL	8'	16'	24'	32'

FIGURE 2.11: CONDENSATE PIPING RUNS

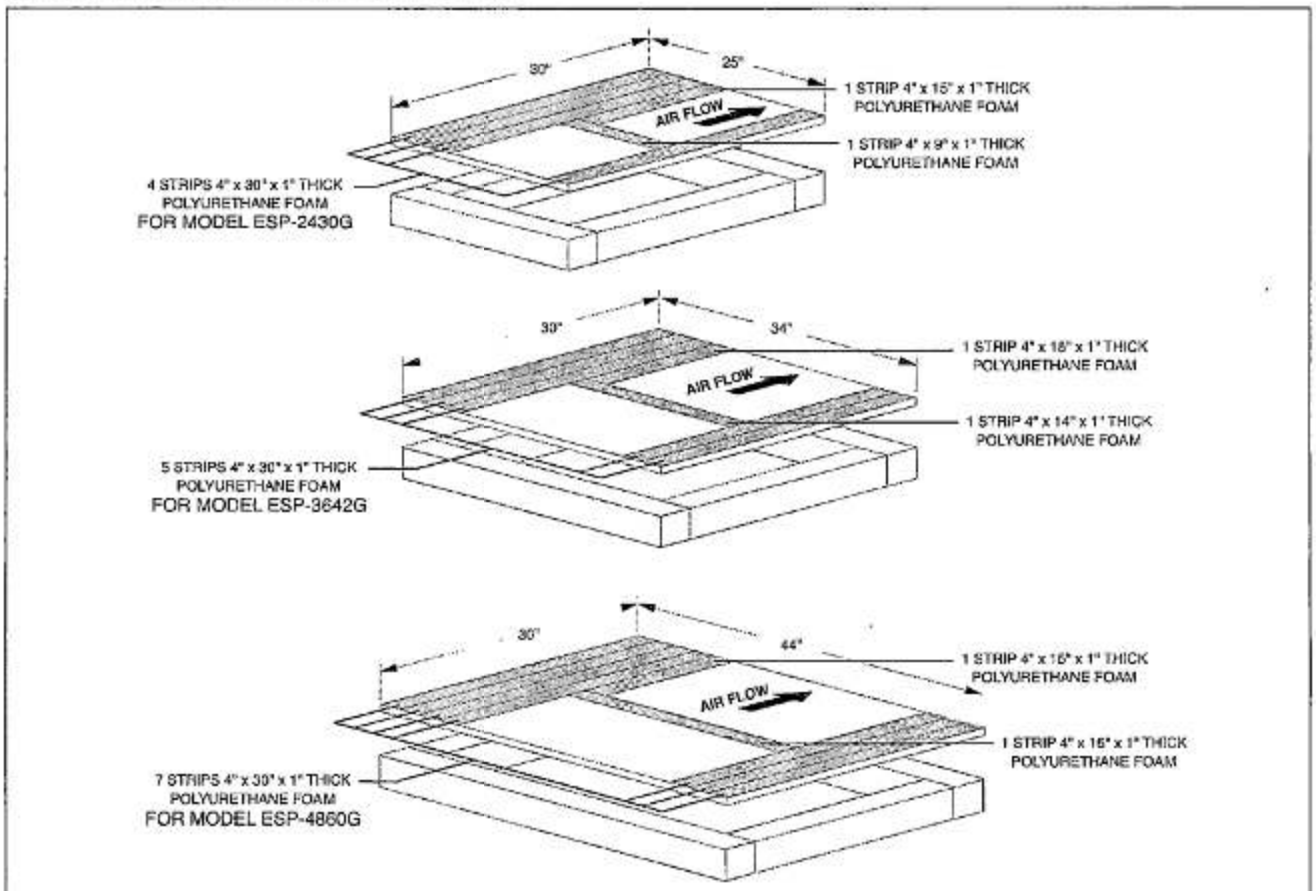


FIGURE 2.10: MOUNTING PLATFORMS SHOWN WITH VIBRATION ISOLATION STRIPS

STEP 6: INSTALLING THE CONDENSATE TRAP & LINE

NOTICE: It is a requirement of the International Mechanical Code (307.2.3) to install a secondary drain or an auxiliary drain pan where damage to any building components will occur as a result of overflow from the equipment drain pan or stoppage in the condensate drain piping from a cooling or an evaporator coil. Follow local code requirements.

Refer to Fig. 2.2 for primary and secondary condensate drain locations. Components for the PVC condensate trap are provided in a separate bag with fan coil unit (see Fig. 2.12) and should be cemented together with PVC pipe cement.

⚠ CAUTION Do not use substitute trap. Do not cut off or alter trap components.

Screw male adapter (see Fig. 2.12) into unit's primary condensate drain connection. Assemble and cement remaining components together. Then cement assembly to male adapter. The 45° elbow provides an offset from beneath unit suction line for access to clean-out plug.

Run a condensate line from the trap to a suitable drain that's in accordance with local codes. Make sure the line is pitched 1/4" per foot.

NOTICE: The secondary drain connection requires field supplied components to complete installation. Follow local code requirements.

NOTICE: Never connect condensate line to a closed drain system.

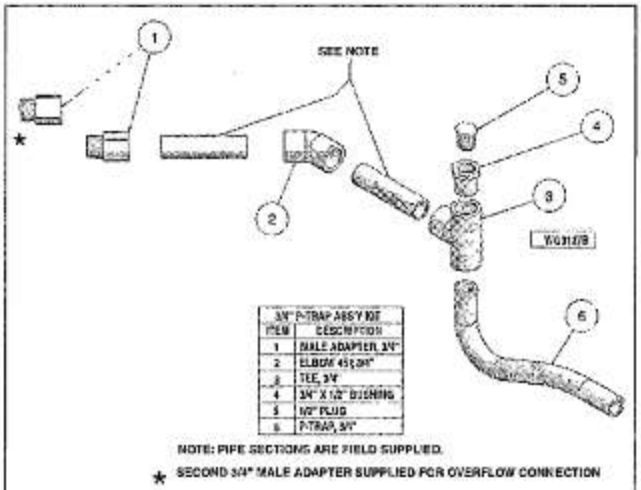


FIGURE 2.12: CONDENSATE TRAP ASSEMBLY

STEP 7: WIRING THE UNIT

⚠ WARNING Turn off electrical power supply before servicing. Contact with live electric components can cause shock or death.

All electrical and control wiring must be installed in accordance with the codes listed in Section 1 of this manual. Wiring diagram is provided in Figure 2.13. A separate 208-230/60/1 power supply is recommended for the unit. Use standard 15-amp fuse and 16-gauge wire from power supply to unit.

Connect power supply to Terminals L1 and L2 on the high voltage terminal block. Connect a ground wire to the equipment ground terminal located next to the high voltage terminal block.

The low voltage transformer in the unit has a 208 volt tap in the primary winding (color coded RED). If unit is to be operated with 208 volt electrical service, remove the 230 volt ORANGE lead from the L2 terminal and connect the 208 volt RED lead to the L2 terminal. Be sure to insulate the end of the unused ORANGE lead.

Locate the room thermostat on a wall near the return air box, between 40" to 48" from the floor. Connect the low-voltage thermostat wiring from the room thermostat to the low voltage control block in the unit.

Connect low voltage from air handler to condensing unit as shown in figure 2.13.

Set DIP switches according to application. See page 14, SpacePak G Series Control DIP switch settings.

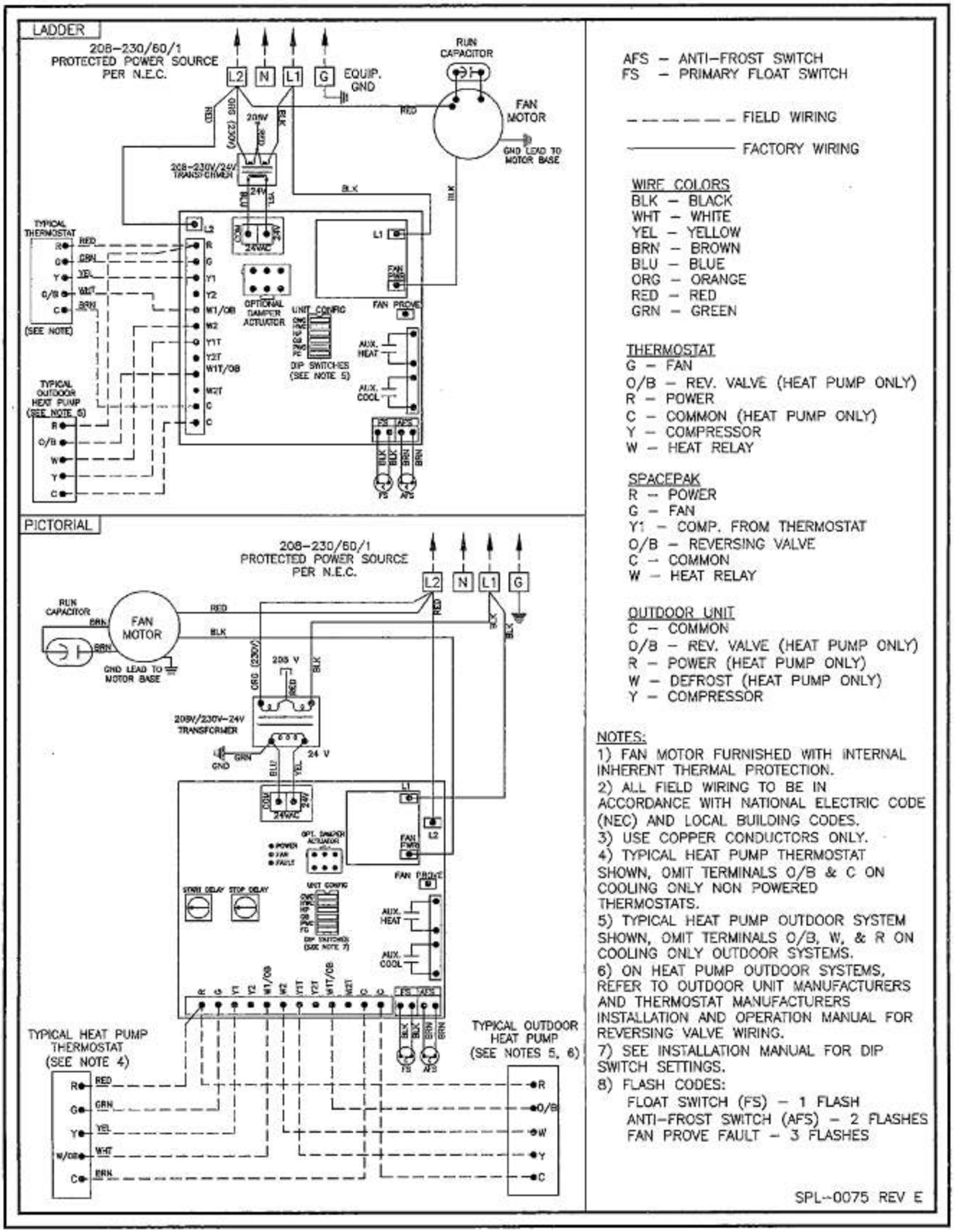
STEP 8: INSTALLING AIR DISTRIBUTION COMPONENTS

All plenum duct and supply tubing runs as well as room terminator locations must be in accordance with air distribution system requirements listed in Section 1 of this manual. Where taping of joints is required, UL181 approved tape is required.

Plenum Duct Installation

All tees, elbows and branch runs must be a minimum of 24" from the fan coil unit or any other tee, elbow or branch run. Keep all tees and elbows to a minimum to keep system pressure drop on larger layouts to a minimum.

NOTICE: Refer to duct installation instructions supplied with fan coil unit or follow manufacturers instructions supplied with other duct system types.



AFS – ANTI-FROST SWITCH
FS – PRIMARY FLOAT SWITCH

– – – – – – FIELD WIRING

———— FACTORY WIRING

WIRE COLORS
BLK – BLACK
WHT – WHITE
YEL – YELLOW
BRN – BROWN
BLU – BLUE
ORG – ORANGE
RED – RED
GRN – GREEN

THERMOSTAT
G – FAN
O/B – REV. VALVE (HEAT PUMP ONLY)
R – POWER
C – COMMON (HEAT PUMP ONLY)
Y – COMPRESSOR
W – HEAT RELAY

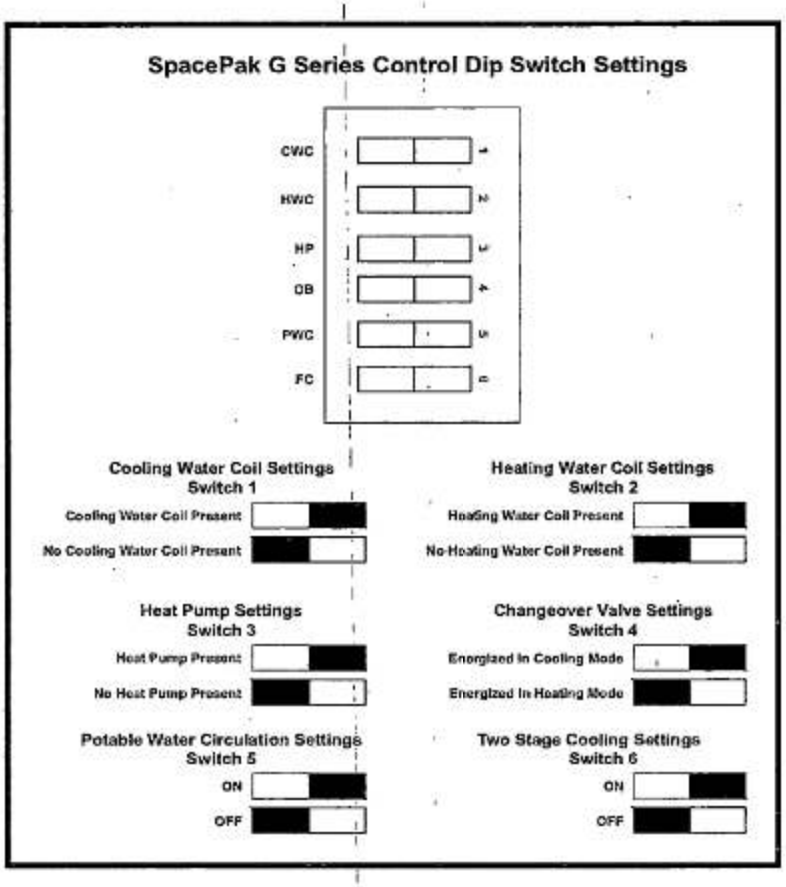
SPACEPAK
R – POWER
G – FAN
Y1 – COMP. FROM THERMOSTAT
O/B – REVERSING VALVE
C – COMMON
W – HEAT RELAY

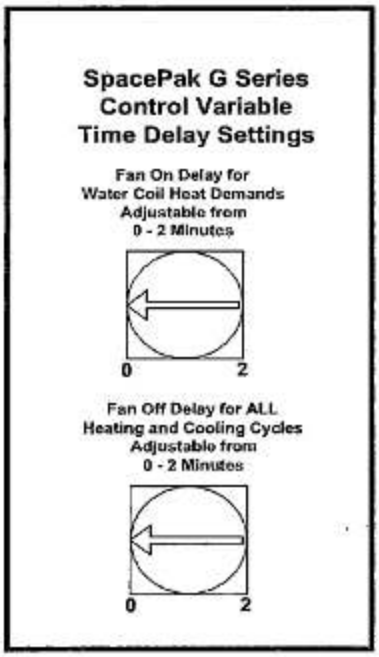
OUTDOOR UNIT
C – COMMON
O/B – REV. VALVE (HEAT PUMP ONLY)
R – POWER (HEAT PUMP ONLY)
W – DEFROST (HEAT PUMP ONLY)
Y – COMPRESSOR

NOTES:
1) FAN MOTOR FURNISHED WITH INTERNAL INHERENT THERMAL PROTECTION.
2) ALL FIELD WIRING TO BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE (NEC) AND LOCAL BUILDING CODES.
3) USE COPPER CONDUCTORS ONLY.
4) TYPICAL HEAT PUMP THERMOSTAT SHOWN, OMIT TERMINALS O/B & C ON COOLING ONLY NON POWERED THERMOSTATS.
5) TYPICAL HEAT PUMP OUTDOOR SYSTEM SHOWN, OMIT TERMINALS O/B, W, & R ON COOLING ONLY OUTDOOR SYSTEMS.
6) ON HEAT PUMP OUTDOOR SYSTEMS, REFER TO OUTDOOR UNIT MANUFACTURERS AND THERMOSTAT MANUFACTURERS INSTALLATION AND OPERATION MANUAL FOR REVERSING VALVE WIRING.
7) SEE INSTALLATION MANUAL FOR DIP SWITCH SETTINGS.
8) FLASH CODES:
FLOAT SWITCH (FS) – 1 FLASH
ANTI-FROST SWITCH (AFS) – 2 FLASHES
FAN PROVE FAULT – 3 FLASHES

SPL-0075 REV E

FIGURE 2.13: WIRING DIAGRAM





SpacePak G Series Control Indicator LEDs

Power Indicator
The Power indicator will blink to indicate that the control is operational.

Fan Prove Indicator
The Fan Prove indicator will illuminate when there is power to the fan and the optional damper is in the open position.

Note: The Fan Prove Terminal will also energize with 24VAC when the above conditions are met.

Fault Indicator
Fault Flash Codes:

Float Switch	1 Flash
Anti-Frost Switch	2 Flashes
Fan Prove Fault	3 Flashes

Note: All Flash Codes are latched until power is cycled, even if the fault is cleared. The Float Switch requires power to be cycled to resume operation.

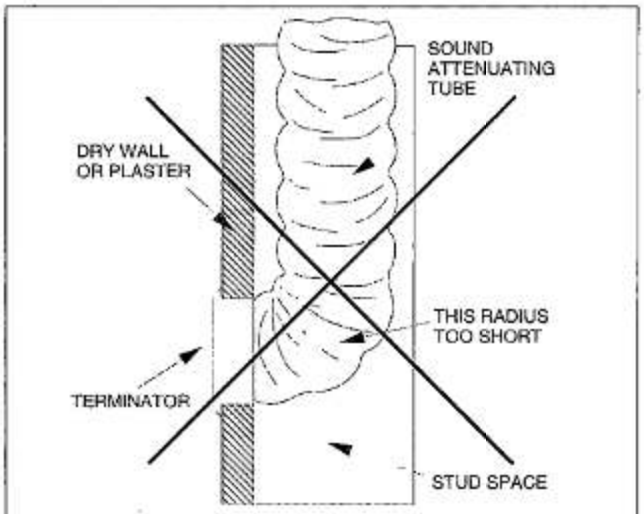


FIGURE 2.17: INCORRECT TUBING INSTALLATION

Room Terminator & Sound Attenuating Tubing Installation

Room terminators and pre-assembled sound attenuating tubes are provided in the Installation Kits.

NOTICE: Do not install terminators in a wall in which a sharp bend in the sound attenuating tube is required (see Figure 2.17). The result would be unacceptable noise.

OPTION: Using a SpacePak Kwik Connect Wall Elbow (Model Number: AC-KCWE) addresses this condition (see Figure 2.18).

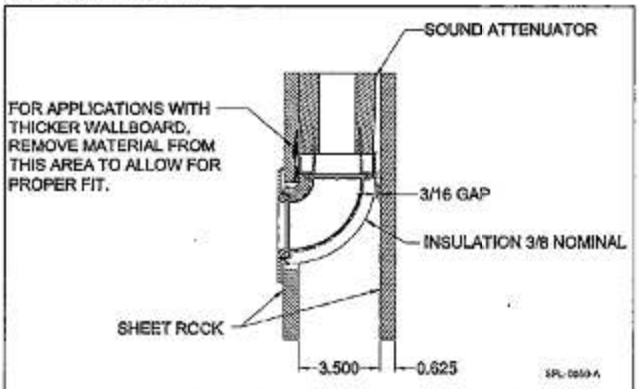
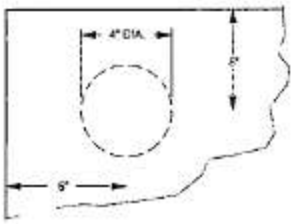


FIGURE 2.18: INSTALLATION WITH KWIK CONNECT WALL ELBOW

In marking location for room terminator (see Figure 2.19), the center of the terminator should be approximately 5" from the wall or, when installed in the corner of a room 5" from both walls.

After marking location, drill a 1/8" diameter hole for outlet. Verify there is at least 2" for tubing assembly clearance all around this hole by visual inspection or inserting a bent piece of wire to feel for obstructions. Adjust direction of hole as needed, to gain this 2" clearance. After all clearances have been checked, take a 4" diameter rotary-type hole saw and cut a hole, using the 1/8" diameter hole as a pilot.

FIGURE 2.19: TERMINATOR MEASUREMENTS



Assemble spring clips to terminator plate with screws provided in installation kit. Tighten clips until they are close to the thickness of the material they are being mounted to.

Assemble the room terminator to the sound attenuating tubing by simply fitting the two pieces together and twisting until tight (see Figure 2.20). If the terminator is to be used in a floor location, then field fabricate a small screen (1-1/2" square; 1/4 X 1/4 20-gauge galvanized wire screen) and place screen over opening on the back of the terminator prior to twisting on the kwik-connect (on the sound attenuating tube).

NOTICE: Do not shorten sound attenuating tube length. The result would be unacceptable noise.

Push the free end of the sound attenuating tube through the 4" hole until the two toggle springs on the room terminator snap into place.

Center the two spring clips on a line parallel to the direction of the tubing routing from the room terminator (see Figure 2.20). This is important since the weight of the tubing will have a tendency to cause a part of the terminator to pull away from the ceiling if the clips and tubing do not run parallel.

Then tighten the screws (attached to the terminator) until the terminator is snug against the ceiling or floor. **Do not overtighten.** For installations with floors or ceilings which are thicker than normal, longer toggle screws or special mounting plates may be required.

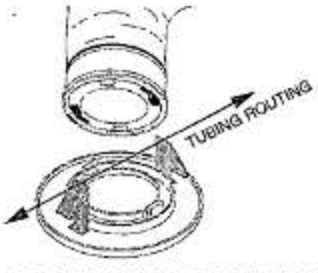


FIGURE 2.20: POSITIONING ROOM TERMINATOR

Supply Tubing Installation

Kwik-connects and balancing orifices are provided in the Installation Kits. Plenum take-offs, gaskets and fasteners are supplied in the separate plenum take-off kit.

Avoid sharp bends in the supply tubing (as well as the sound attenuating tubing). The minimum radius bend is 4" (see Figure 2.21); however, wherever possible, hold to a larger radius.

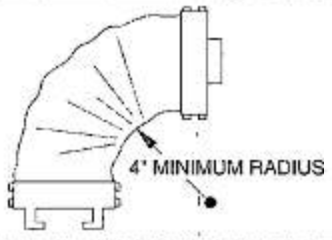


FIGURE 2.21: MINIMUM TUBING BEND

At the plenum, all supply tubing connections must be a minimum of 18" from any plenum tee, plenum elbow or the fan coil unit.

Individual supply tubing runs must be a minimum of 6-feet, even if the distance between the sound attenuating tubing and plenum is less than 6 feet.

Supply tubing comes in 100-foot sections (R8 tubing comes in 75-foot sections) and may be cut to length with a knife or fine tooth hacksaw.

For each supply tubing run, estimate and cut the length of tubing that will be needed between the plenum and sound attenuating tube. At the open end of the supply tubing a kwik-connect will be installed (see Figure 2.22). First, push back the cover and the insulation exposing approximately 4" of the inner core. Fold in any tails or frays that may be present after cutting the supply tubing. Second, hand compress the corrugations until they are densely compacted 1-1/2" to 2" from the open end of the supply tube. Third, thread kwik-connect into the inner core until snug. Fourth, pull the insulation and cover forward and tuck it into the deep groove on the back side of the kwik-connect. Fifth, wrap the connection securely with UL181 approved tape.

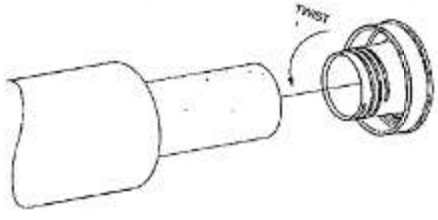


FIGURE 2.22: KWIK-CONNECT INSTALLATION

When finished, simply twist together (see Figure 2.23) the kwik-connect on the sound attenuating tube, and wrap the connection securely with tape.

After attaching the supply tubing to the sound attenuating tube, bring the open end of the tube to the plenum.

To cut a hole in the plenum, refer to duct installation instructions supplied with fan coil unit. Sheet metal duct requires a 2-1/16" hole.

Remove the hole cut-out from the plenum. Make sure there is no "flap" left inside plenum that could block hole during operation.

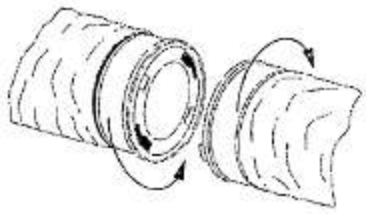


FIGURE 2.23: CONNECTING TUBING

Place the plenum take-off gasket on the back side of the plenum take-off and insert the assembly into the hole in the plenum (see Figure 2.25).

NOTICE: Gasket must be installed to seal plenum take-off to prevent air leakage.

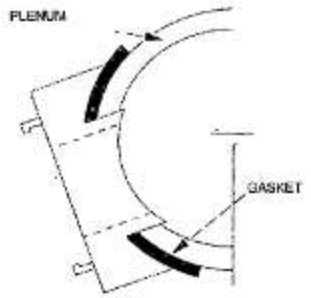


FIGURE 2.25: TAKE-OFF INSTALLATION

Position the plenum take-off to match the curvature of the plenum duct. Hand insert the four plenum take off fasteners one at a time such that each clip reaches the interior of the duct. Using the SpacePak pliers, snap the fasteners into place until they lock in place (see Figure 2.26).

NOTICE: All four fasteners must be installed to assure air tight fitting between plenum take-off and plenum.

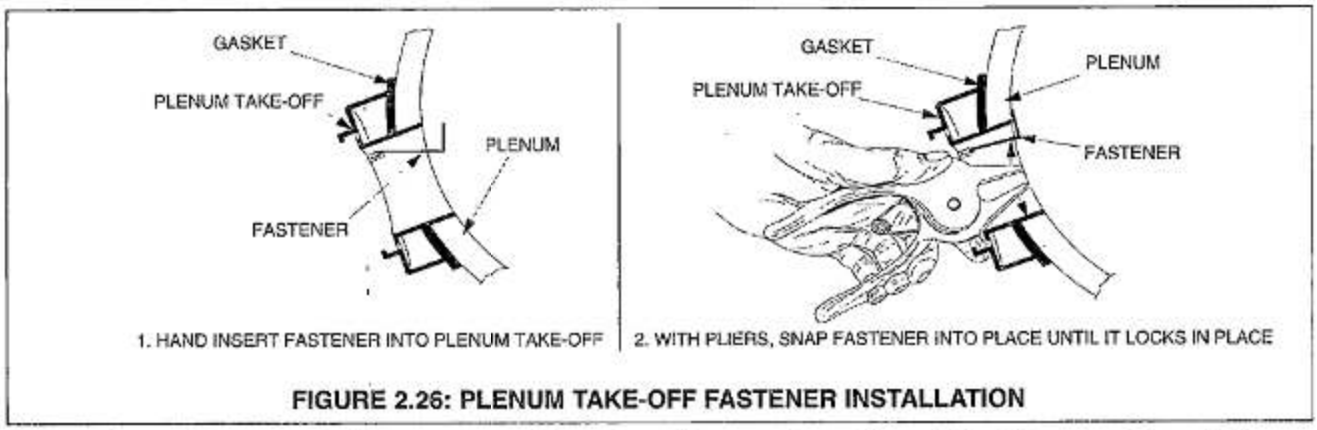


FIGURE 2.26: PLENUM TAKE-OFF FASTENER INSTALLATION

In accordance with your calculations as to requirements for balancing orifices, mount the orifice in the outlet of the plenum take-off (see Figure 2.27), prior to attaching the supply tubing.

Next, install a kwik-connect in the open end of the supply tubing, using the same procedures as before, and twist together kwik-connects on supply tubing and plenum take-off. Wrap connection securely with tape.

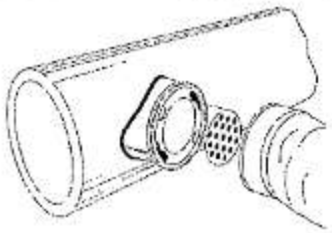


FIGURE 2.27: ORIFICE INSTALLATION

Return Air Box & Duct Installation

Remove the return air grill from the return air box and remove the air filter from the return air grill.

Insert the return box from below for ceiling installation (or from the front for wall installations) and fasten with four screws through holes provided on the long side of the box. (see Figure 2.28).

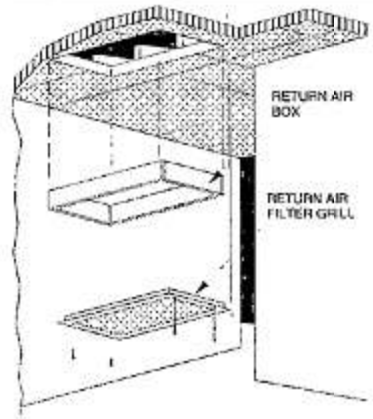


FIGURE 2.28: RETURN AIR BOX INSTALLATION

Remove the grill and the filter from the grill frame. Insert the frame into the box and mount in place with the screws provided through a hole at each corner of the frame. Finally, place the air filter into the frame and replace the grill. Turn the latches a quarter turn to lock the grill in place.

Slide a clamp band (provided with return air box) over one end of the return air duct. Place that end over the elliptical flange on the fan coil unit (see Figure 2.29). Move the clamp over the flange and tighten so the clamp holds the return air duct securely to the flange. Follow the same procedures to attach the return air duct to the return air box (see Figure 2.29).

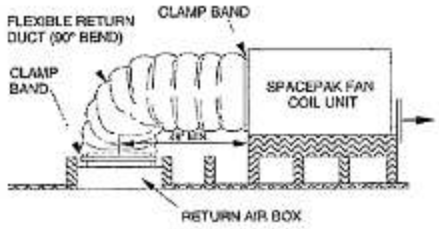


FIGURE 2.29: RETURN AIR DUCT INSTALLATION

Winter Supply Shut-Off Installation

Simply insert winter supply shut-offs into the room terminator openings (see Figure 2.30). Wrap the return air filter in a plastic bag and reinstall it to block the return air opening. Winter supply shut-offs prevent moisture from collecting in ductwork during winter months. Be sure to remove the plastic bag and all winter supply shut-offs before operating the system.

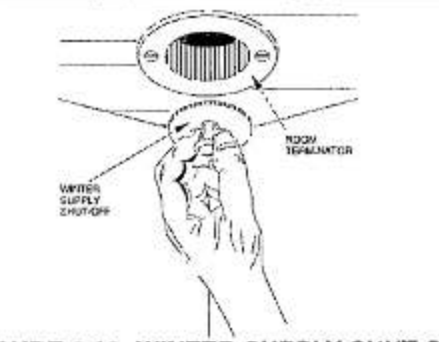


FIGURE 2.30: WINTER SUPPLY SHUT-OFF

SECTION 3: START-UP & OPERATION

SEQUENCE OF OPERATION

When power is turned on and thermostat fan switch is set to ON and the cooling indicator is set to OFF, the indoor fan motor is energized in approximately 2 minutes. The outdoor unit is off.

When power is turned on and thermostat fan switch is set to ON or AUTO and the cooling indicator to COOL the indoor and outdoor units will start.

AUTO position on the thermostat will stop and start your system when the temperature setting is satisfied. The ON position on the thermostat will stop the outdoor unit only when the temperature setting is satisfied and the indoor unit will continue to run, recirculating indoor air.

The fan coil unit is equipped with a protective device called an anti-frost control which will automatically stop the outdoor unit (while the indoor unit continues to run) if ice accumulates on the indoor unit evaporator coil causing abnormal operating conditions. When the accumulated ice has melted, the anti-frost control will restart the outdoor unit.

The fan coil unit is equipped with primary float switch, and the system will automatically shut down if the drain pan is full of water (condensate) and not draining. The system requires service.

PRIOR TO START-UP

1. Check all electrical connections for tightness.

2. Check air filter has been installed in return air box or filter box.

3. Remove all winter supply shut-offs and store them in a safe place.

SYSTEM START-UP & ADJUSTMENTS

1. Place thermostat fan switch in ON position and cooling indicator in OFF position. In about 2 minutes, indoor unit blower will start.

2. Check blower operation for excess noise or vibration.

3. Check entire distribution system for leakage and apply additional tape where necessary.

4. Check that system static pressure is within acceptable limits (minimum 1.2" W.C. - maximum 1.5" W.C.). Static readings must be taken in the plenum a minimum of 18" from the fan coil unit, plenum tees or elbows but before any supply run.
   a. If greater than 1.5" W.C. add additional supply runs.
   b. If less than 1.2" W.C. check the return air filter is clean and return duct is not collapsed or kinked.
   c. Check supply air plenum for leaks.
   d. If more supply runs than recommended are used, check that balancing orifices are in place.

5. Check that blower motor amp draw compares with fan coil unit rating plate. Amp draw shown on plate is the FLA of motor (not the actual running amps) and will vary with the pressure and voltage.

6. Place the thermostat cooling indicator in COOL position, which will start the outdoor unit. Let the system run at least 30 minutes to stabilize operating conditions.

7. For outdoor unit start-up, follow manufacturer's instructions.

8. Check that temperature drop across evaporator coil in the indoor unit is between 20°F to 28°F.

NOTICE: Do not introduce refrigerant liquid to system through suction port. Liquid in the suction line may damage the compressor.

NOTICE: Before adding refrigerant to system verify Item #4 in "System Start-up & Adjustment" section has been performed.

9. Verify that system refrigerant is correct by measuring subcooling at liquid service port. Subcooling should be 10°F to 13°F.

10. Check the super heat leaving the evaporator coil against the corresponding suction pressure from the schrader fitting at the fan coil unit. Superheat value should be between 9°F and 12°F.

11. If a sight glass has been installed on the liquid line at the air handler check for the presence of flashing. If flashing is occuring, check and adjust subcooling by adding refrigerant.

CHARGING COOLING ONLY SYSTEMS

After start-up, allow the system to operate for approximately 30 minutes in order to establish stable operating conditions. Check that the temperature drop across the evaporator coil is 20°F to 30°F. Do not attempt to adjust the charge at ambient temperatures below 65°F.

1. Check refrigerant charge by measuring liquid subcooling. Subcooling should be approximately 10°F to 13°F. If a sight glass has been installed on the liquid line at the fan coil unit check for the presence of flashing.

2. If the subcooling is below 10°F, add refrigerant gas to the suction line service port. Watch pressure gauge and thermometer for correct subcooling. It should be approximately 10°F to 13°F.

3. If subcooling is too high, slowly bleed refrigerant from suction line service port into an appropriate refrigerant recovery device. Watch pressure gauge and thermometer for correct subcooling (10°F to 13°F).

⚠ CAUTION Releasing refrigerant gas into the atmosphere is a criminal offense.

FACTORS AFFECTING THE BALANCE OF THE SYSTEM

A. Room Terminators (Outlets): Based on the equipment selected, determine the recommended number of fully open outlets from Figure 3.1.

FIGURE 3.1

NOMINAL TONNAGE	MINIMUM RECOMMENDED NUMBER OF FULLY OPEN OUTLETS		
	MODEL	A	B
2	ESP-2430G	12	14
2-1/2	ESP-2430G	15	18
3	ESP-3642G	18	21
3-1/2	ESP-3642G	21	25
4	ESP-4860G	26	28
5	ESP-4860G	30	35

1. The minimum or recommended number of outlets means fully open outlets. Any outlet having an orifice would be only a percentage of an outlet.

2. For systems with average supply tubing lengths of 15 feet or less, use column A. For systems with supply tubing lengths greater than 15 feet, use column B.

NOTICE: The number of outlets and average length of the supply tubing has a significant effect on the overall system performance. It is highly recommended that the adjustment factors outlined in the SpacePak Application Manual are accounted for prior to any installation.

B. Orifice Combinations: Should orifices be required to balance the system (installed at plenum take-off), refer to the combinations listed in Figure 3.2.

FIGURE 3.2

DESIRED NUMBER OF TERMINALS*	TERMINAL - ORIFICE COMBINATION
.5	(1) .5
.65	(1) .35
.85	(1) .15
1.00	(1)
1.15	(1) .5 + (1) .35
1.30	(2) .35
1.50	(1) .35 + (1) .15 or (1) + (1) .5 or (3) .5
1.65	(1) + (1) .35 or (2) .5 + (1) .35
1.70	(2) .15
1.80	(2) .35 + (1) .5
1.85	(1) + (1) .15
1.95	(3) .35
2.00	(2)

*For a room with more than two (2) terminals, combinations of the above may be used to achieve the desired fractional number.

C. Supply Tubing Length: An outlet with a supply tubing length of 15 feet is considered one, fully opened outlet. For other lengths refer to Figure 3.3 for adjustment factors.

FIGURE 3.3

2" SUPPLY TUBING LENGTH ADJUSTMENT FACTOR CHART								
RUN	6'	8'	10'	12'	15'	20'	25'	30'
FACTOR	.85	.88	.90	.94	1.0	1.1	1.25	1.50

SECTION 4: MAINTENANCE

The SpacePak system has been designed to provide years of trouble-free performance in normal installations. Examination by the homeowner at the beginning of each cooling season, and in mid-season should assure continued, good performance. In addition, the system should be examined by a qualified service professional at least once every year.

BEFORE EACH COOLING SEASON

1. Check and clean air filter. The air filter is permanent type. Remove and clean thoroughly with soap solution and water.

⚠ WARNING **Turn off electrical power supply before servicing. Contact with live electric components can cause shock or death.**

2. Check fan coil unit. Turn off unit power disconnect switch and remove service access panels.

   a. Inspect evaporator coil and blower wheel for build-up of dust and dirt. Clean with solvent and/ or water as necessary.

   b. Replace service access panels and turn on unit power disconnect switch.

3. Check that unit condensate drain is clear and free running, and plug is in cleanout.

4. For outdoor condensing unit, follow manufacturer's maintenance instructions.

5. Follow "System Start-Up & Adjustments" procedures in Section 3 of this manual.

IF SYSTEM FAILS TO OPERATE

1. Check that thermostat switch is set for proper mode of operation and is set below room temperature.

2. Check that outdoor unit is operating.
   a. Confirm that compressor and fan are operating properly.
   b. Confirm voltages to outdoor unit.

IF FAN AND COMPRESSOR AT OUTDOOR UNIT ARE NOT RUNNING

1. Check Fault Indicator. See Flash Codes, page 14. Float switch fault will stop fan and compressor.

2. Check for tripped circuit breaker or blown fuse at either the main fuse box or at unit disconnect box on or near the condensing unit. Replace blown fuse with same size and type.

3. Review Troubleshooting Guide beginning on page 21 of this manual.

TROUBLESHOOTING GUIDE

CONDITION: ESP-G & CONDENSING UNITS RUN, BUT COOLING INSUFFICIENT

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Low Suction Pressure	Check blower motor as described on page 25 in this manual.	If defective, replace motor.
	Check that filter in return air box is clean.	Clean air filter.
	Check system refrigerant charge.	Charge to proper subcooling according to manufacturer's instructions.
	Check for dirty evaporator coil.	Clean evaporator coil.
High Suction Pressure	Check for air bubbles in system refrigerant.	Charge to proper subcooling according to condensing unit manufacturer's instructions. Install sight glass near indoor unit and monitor.
	Check calculated heat gain to be sure that equipment is sized properly.	Take necessary action.
	Check for obstructions near condensing unit which could cause recirculation of air.	Remove obstructions.
Low Head Pressure	Check system refrigerant charge.	Charge to proper subcooling according to condensing unit manufacturer's instructions.
	Check calculated heat gain to be sure that equipment is sized properly.	Take necessary action.
High Head Pressure	Check condenser fan motor according to condensing unit manufacturer's instructions.	If defective, replace fan motor.
	Check for dirty condensing unit coil.	Clean condensing unit coil.
	Check system refrigerant charge.	Charge to proper subcooling according to condensing unit manufacturer's instructions.
	Check for dirty evaporator coil.	Clean evaporator coil.
	Check for obstructions near condensing unit which could cause recirculation of air.	Remove obstructions.
	Check for restricted liquid lines.	Remove restrictions and kinks from lines.
Distribution System Air Leaks	Check all joints in air distribution system.	Make sure all joints are air tight. Verify static pressure as described on page 25 in this manual.

CONDITION: ESP-G UNIT & CONDENSING UNIT WILL NOT START

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Thermostat Not Level	Check level of thermostat	If necessary, level thermostat.
Defective Thermostat	With volt meter, check resistance of thermostat contacts.	If resistance, thermostat is O.K. If no resistance, replace thermostat.
Loose Low Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Low Voltage Transformer	Check transformer as described on page 25 in this manual.	If defective, replace transformer.
Inadequate Electrical Service	Check electrical service against minimum requirements.	Replace electrical service with adequately sized service.
Flash Code - 1 Flash (Float Switch)	Check drain plan and condensate trap.	Clean condensate trap.

CONDITION: ESP-G UNIT WILL NOT START, BUT CONDENSING UNIT RUNS

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Shorted Or Broken Wiring	Check wiring.	If necessary, repair or replace wiring.
Loose Low or High Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Motor	Check motor as described on page 25 in this manual.	If defective, replace motor.

CONDITION: ESP-G UNIT RUNS, BUT CONDENSING UNIT WILL NOT START

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Defective Thermostat	With volt meter, check resistance of thermostat contacts.	If resistance, thermostat is O.K. If no resistance, replace thermostat.
Loose Low Or High Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Flash Code - 2 Flashes (Anti-Frost Switch)	With volt meter, check for 24v at terminal "AFS".	If no voltage, check coil for ice. If ice is present, check air filter, return air duct & blower motor for air flow. If no ice on coil, check anti-frost switch for continuity. If no continuity, replace switch. If 24v, switches are O.K.
Shorted Or Broken Wiring	Check wiring.	If necessary, repair or replace wiring.
Condensing Unit	Check according to manufacturer's instructions.	Repair or replace as directed by manufacturer.

CONDITION: ESP-G UNIT WILL NOT START, BUT CONDENSING UNIT CYCLES

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Incorrect Low Voltage Connections	Check low voltage connections against wiring diagram.	Correct low voltage connections.
Loose Low Voltage Connections	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Motor	Check motor as described on page 25 in this manual.	If defective, replace motor.

CONDITION: ESP-G UNIT CYCLES, BUT CONDENSING UNIT RUNS

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Blower Motor	Check motor as described on page 25 in this manual.	If defective, replace motor.
	Check motor amps and compare to nameplate ratings.	If excessive, motor may be overloaded. Check supply duct for breaks or leaks.

CONDITION: ESP-G UNIT RUNS, BUT CONDENSING UNIT CYCLES

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Flash Code - 2 Flashes (Anti-Frost Switch)	With volt meter, check for 24v at terminal "AFS".	If no voltage, check coil for ice. If ice is present, check air filter, return air duct & blower motor for air flow. If no ice on coil, check anti-frost switch for continuity. If no continuity, replace switch. If 24v, switches are O.K.
Thermostat in Wrong Location	Check that thermostat is in vicinity of return air box.	If necessary, relocate thermostat.
Loose Low Or High Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Motor	Check motor as described on page 25 in this manual.	If defective, replace motor.
Condensing Unit	Check according to manufacturer's instructions.	Repair or replace as directed by manufacturer.

CONDITION: SWEATING AT ESP-G UNIT SUPPLY OUTLET

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Air Leak At Supply Air Plenum Adaptor	Check taped joint at adaptor.	Tape joint properly.
Insulation at Outlet Not Installed	Check for insulation at outlet.	Install insulation.

CONDITION: EXCESSIVE NOISE AT TERMINATOR

POSSIBLE CAUSE	VERIFICATION	SOLUTION
High Supply Air Plenum Static Pressure	Check static pressure as described on page 25 in this manual.	Check for and add flow restrictors as necessary in supply runs.
		If necessary, add additional outlets.
Sound Attenuating Tube Not Installed	Check for installation of sound attenuating tube.	Where necessary, install sound attenuating tube.
Tight Radius In Sound Attenuating Tube Or In Supply Tubing	Check all tubing for tight radius.	Where necessary, correct radius.
Incorrect Supply Tubing Length	Check that all supply tubing runs are 9' minimum (includes 3 ft sound atten. tube).	Where necessary, correct supply tubing length.
Improperly Balanced System	Check that correct size orifices have been installed.	Properly orifice supply tubing runs.

CONDITION: EXCESSIVE NOISE AT RETURN AIR GRILL

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Return Air Duct Not Installed Properly	Check for minimum 90° bend in return air duct.	Correct bend in return air duct to minimum 90°.
Dirty Return Air Filter	Remove and inspect.	Clean or replace air filter.

CONDITION: EXCESSIVE VIBRATION AT ESP-G UNIT

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Noisy Blower Motor Assembly	Check blower motor assembly.	Tighten all fasteners.
	Check blower motor for bearing noise.	Replace motor.
	Check for loose or damaged blower wheel.	Tighten or replace blower wheel as necessary.

CHECKING ESP-G BLOWER MOTOR

1. With volt meter, check voltage at terminals L1 and L2 on line voltage terminal block. Voltage should be ±10% of ESP-G unit nameplate rating.
2. Disconnect power to the ESP-G unit at the disconnect switch.
3. Disconnect motor lead at terminal L2.
4. With an ohmmeter, check continuity between the disconnected motor lead and terminal "FAN PWR" on control panel.
   a. If continuity, proceed to Step 5 below.
   b. If no continuity, feel the motor to see if it is excessively warm which would indicate the internal over- load may be open. When motor has cooled, check again to make sure you did not get a false reading. If no continuity, motor is defective.
5. With an ohmmeter, check each motor lead to ground to be sure motor is not grounded.
   a. If not grounded, proceed to Step 6 below.
   b. If grounded, motor is defective.
6. Check capacitor, if capacitor is suspect, replace it with a capacitor of similar rating of motor operates normally, make a permanent capacitor replacement.
7. Reconnect all electrical leads, restore electrical services to the ESP-G unit, and place thermostat fan switch in the **ON** position.
8. With an ampmeter, check that amp draw compares with ESP-G unit rating plate. Amp draw shown on plate is the FLA of motor (not the actual running amps) and will vary with the pressure and voltage.

CHECKING ESP-G BLOWER

The ESP-G unit is equipped with a time-delayed blower. Wait two full minutes after turning on power for blower to start.

1. With a volt meter, check 24v across terminals R and C on the low voltage terminal block.
   a. If read 24v, proceed to Step 2.
   b. If no voltage, check low voltage transformer.
2. With a volt meter, check 24v across terminals G and C on the low voltage terminal block.
   a. If read 24v, proceed to Step 3.
   b. If no voltage, check thermostat fan circuit.

CHECK ESP-G LOW VOLTAGE TRANSFORMER

1. With volt meter, check for 230v across terminals L1 & L2 on the line voltage terminal block.
   a. If reading 230v, proceed to Step 2.
   b. if no voltage, check the power supply to the unit.
2. With volt meter, check for 24v across terminal R and terminal C on the low voltage terminal block.
   a. If read 24v, transformer is O.K.
   b. If no voltage, replace transformer.

CHECK EXTERNAL STATIC PRESSURE

You can use a U-tube manometer to check the external static pressure on the duct system.

1. Puncture a 1/4" hole in the plenum duct at least 18" from the fan coil unit.
2. Insert one manometer tube into the hole until the end of the tube is flush with the inside wall of the plenum duct.
3. System static pressure should be between 1.2" and 1.5" W.C.
   a. If greater than 1.5" W.C. add additional supply runs.
   b. If less than 1.2" W.C. , check:
      I. Return air filter is clean
      II. Return air duct has not been collapsed
      III. Supply air plenum for leaks
      IV. If more supply runs than recommended are used, check that flow restrictors (orifices) are in place.

SPACE PAK

Service / Troubleshooting FORM "1A"

Customer / Dealer Data:

Name: _____

Address: _____

_____

_____

Tel (day) _____ (eve) _____

Installing Dealer / Contractor:

Name: _____

Tel: _____

Equipment Data:

SPACEPAK Model # ESP / WCSP - _____

SPACEPAK Serial # _____

SPACEPAK Date of Installation: _____

Cond Unit Mfr: _____

Cond Unit Mod #: _____

Rated Capacity: _____ *BTUH*; SEER: _____

Air-side Data:

Total # of outlets: _____ ; Supply tube length: _____ Ft (avg)
(Please sketch duct layout on reverse side of this sheet, noting all fittings and distances, including return duct size / length)

Air Filter: Size (LxHxD) _____

Type (pleated, etc): _____

Is the filter clean? _____ (Y/N)

Static Pressure (Ps) in supply plenum: _____ "WG
(Measure at approximately 3 ft downstream of blower discharge)

Ps in return duct (downstream of filter, upstream of coil) _____ "WG

SpacePak Motor: Amps (measured): _____ Amps

Voltage (measured): _____ Volts

Air Temperatures:

@ Return (indoor ambient): _____ °FDB; _____ °FWB

@ Condensing unit (outdoor ambient): _____ °F

@ AHU (read 3 ft from fan discharge) _____ °F

@ last supply outlet _____ °F

Refrigeration-side Data:

Line sizes: Liquid _____ Suction _____

Total equivalent length of lines: _____ Ft; Vertical Rise: _____ Ft.

@ Condensing Unit:

Liquid: _____ psi; Temp: _____ °F; Subcool: _____ °F

Suction: _____ psi; Temp: _____ °F; Superheat: _____ °F

@ SpacePak:

Liquid: _____ psi; Temp: _____ °F; Subcool: _____ °F

Suction: _____ psi; Temp: _____ °F; Superheat: _____ °F

Approximate time running before taking readings: _____ Hrs.

Did you adjust the TXV? _____ (Y/N); (If yes, explain):

_____

_____

_____

Refrigerant Charge (If weighed-in): _____ lbs

R410a / R22 (circle one)

Installed options: (circle one)

sight glass filter/drier zone controls

Other: _____

_____

Water Data: *(where applicable)*

Line sizes: _____"; Length: _____ FT

Water temperatures:

Suppy: _____ °F; Return _____ °F

Glycol?: _____ (Y/N); % Solution: _____

NOTES: _____

_____

_____

_____

_____

REF. NO.*	PART DESCRIPTION	UNIT SIZE	PART NUMBER
1	Anti-Frost Control	All Sizes	460RWG0387-01
2	Primary Drain Pan	2430	W06RWG0220-12
	Primary Drain Pan	3642	W06RWG0220-13
	Primary Drain Pan	4860	W06RWG0220-14
3	Coil Assembly R410A	2430	469RWG0379-12
	Coil Assembly R410A	3642	469RWG0379-13
	Coil Assembly R410A	4860	469RWG0379-14
4	Expansion Valve (TXV) R410A	2430	W28RWG0242-12
	Expansion Valve (TXV) R410A	3642	W28RWG0242-13
	Expansion Valve (TXV) R410A	4860	W28RWG0242-14
5	Transformer	All Sizes	W14RWG0061-01
6	Motor	2430	27-3236
	Motor	3642	27-3237
	Motor	4860	27-3238
7	Blower Wheel	2430	27-8032
	Blower Wheel	3642	27-8032
	Blower Wheel	4860	27-8033
8	Terminal Block (high volt)	All Sizes	W09RWG0422-01
9	Electrical Control Box Cover	All Sizes	462RWG0529-01
10	Side Access Panel (coil side)	All Sizes	462RWG0527-01
11	Primary Float Switch	All Sizes	455RWG0543-01
12	Cable Connector (Ground)	All Sizes	W09RWG0313-01
13	Control Board	All Sizes	W11RWG0478-01

*Item locations within control box may vary.

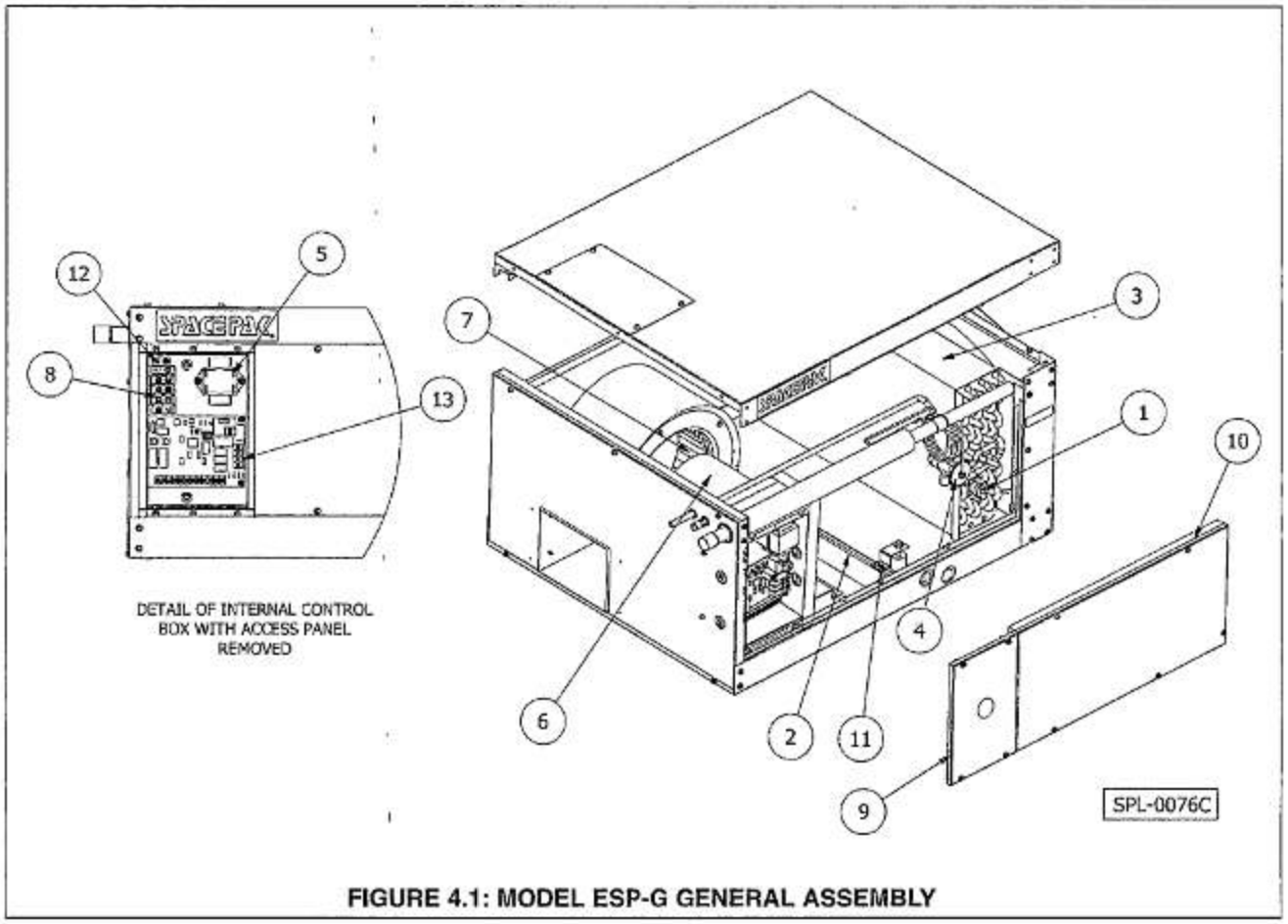


FIGURE 4.1: MODEL ESP-G GENERAL ASSEMBLY