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Air Conditioning

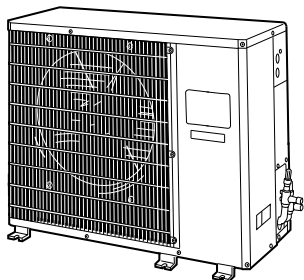
**HIGH WALL DUCT-FREE,  
SPLIT SYSTEMS**

**Model 619E**  
**Sizes 009-024**

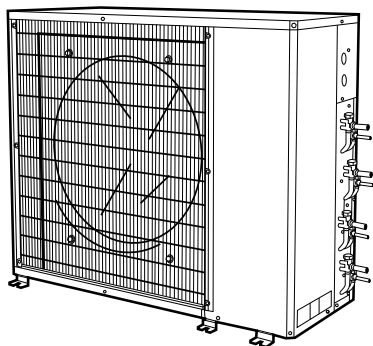
$\frac{3}{4}$  to 2 Tons

## PRELIMINARY PRODUCT DATA

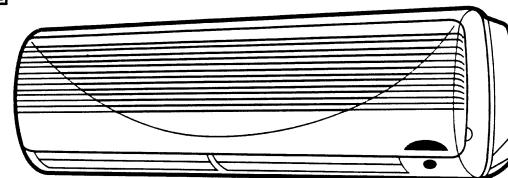
**STREAMLINE**  
DUCT-FREE SPLIT SYSTEM



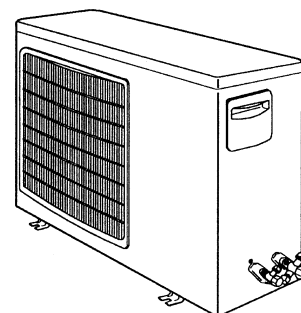
**538A**



**538S (048 Shown)**



**619E**



**538C/D009,012**

### DESCRIPTION

These duct-free split systems cool, heat (heat pump systems only) dehumidify, circulate, and filter the air — with minimum maintenance. They are the ideal complement to your ducted system when it is impractical or prohibitively expensive to use a ducted system. The outdoor units, when matched with model 619E fan coil units, offer many technological features and reliable operation.

The duct-free split systems are perfect for add-ons, such as an office or family room addition, and whenever you have special space requirements; like for a computer room. Or consider duct-free split systems when changes in the cooling load cannot be handled by the existing system; for instance, when adding heat-generating equipment to an already air-conditioned space.

Split systems can also be used when adding air conditioning to spaces that are heated by hydronic or electric heat, and no ductwork exists. Historical renovations are another application for which duct-free split systems are well suited, especially when preserving the looks of the original structure is essential.

When noise is a concern, these whisper-quiet split systems are your answer because you don't have to worry about duct design.

If security is an issue, outdoor and indoor units are connected only by refrigerant piping to prevent intruders from crawling

through ductwork. Also, since the outdoor units can be installed 6-in. away from outside walls, coils are protected from vandals and severe weather.

In addition, the compact duct-free split systems take only a few hours to install, without any major interruptions to the customers' workplace or home.

### STANDARD SYSTEM FEATURES

**HIGH-EFFICIENCY** design with SEERs (Seasonal Energy Efficiency Ratios) up to 12.0 and HSPFs (heating seasonal performance factors; heat pump systems only) of 6.8.

**MICROPROCESSOR CONTROL** for accurate control of the desired comfort level.

**EXTENSIVE DIAGNOSTICS** alert the user to the existence of problems.

**BUILT-IN RELIABILITY COMPONENTS** include a suction-line accumulator that safeguards the compressor against loss of lubrication, while start capacitors and relays (non-scroll units) assure dependable start-ups, especially during low-voltage conditions (down to 187 v). High- and low-pressure safety switches, crankcase heater (non-scroll units), liquid line filter drier (538A, 538C, 538S), bi-flow liquid line filter drier (538D), and lock-out protection are also standard on most sizes.

The indoor units include protection against freeze-up (heat pumps), high discharge temperature, and self diagnostics to ensure reliability.

**RESTART FUNCTION FOR AUTOMATIC START AFTER A POWER FAILURE** eliminates the need to reset the unit after a power failure. The unit restarts in the same mode that was operating prior to the power failure and retains the selected set point as well.

**AUTOMATIC AIR SWEEP** ensures evenly-distributed air within the conditioned space for ultimate comfort. The air sweep feature sweeps the air from side to side.

**WEATHER-PROTECTED CABINET** is protected with a heavy, galvanized steel coating, then coated again with a layer of zinc phosphate to which a coat of polyester powder is applied and baked on. This provides each unit with a hard, smooth finish that will last for many years.

All screws on the cabinet exterior are coated for long-lasting, rust-resistant, quality appearance.

**TOTALLY ENCLOSED FAN MOTOR** means greater reliability under rain conditions and dependable performance for many years. Permanent-split-capacitor-type motors provide the most economical operation.

**REFRIGERANT SYSTEM** is designed to provide dependability. Each unit leaves the factory with a refrigerant charge. Additional charge may be necessary depending on the application. Refrigerant service connections make checking operating pressures easier. For precise refrigerant control, all 538A, 538C, and 538D fan coil units feature an AccuRater® piston in the fan coil unit, and 009,012 units feature a capillary in the outdoor unit.

### FIELD-INSTALLED ACCESSORY DESCRIPTION AND USAGE

**Condensate Pump** — The pump provides condensate lift capability, and is an accessory for the fan coil units.

SUGGESTED USE:

- The condensate pump accessory is recommended when adequate drain line pitch cannot be provided.

**Winter Start Control (538A, 538S)** — This condensing unit accessory is a single-pole, single-throw delay relay which bypasses the low-pressure switch for approximately 3 minutes to permit start-up for cooling operation under low load conditions at low-ambient temperatures.

SUGGESTED USES:

- Applications where low-ambient cooling is required below 40 F outdoor-air temperature.

**Wall mount kit** — The kit includes brackets to be mounted to the outside of the structure to raise unit from ground level, or to

mount the unit on a wall adjacent to a sloping roof. The wall mount kit is also useful in areas of heavy snowfall or where space is at a premium. The wall mount kit may be used with any outdoor unit.

SUGGESTED USE:

- When application requires that outdoor unit be installed above ground level.

**Liquid solenoid valve (sizes 018 and larger)** — The valve is an electrically operated shutoff valve to be installed at the outdoor unit, and closes and opens in response to compressor operation. The valve maintains a column of refrigerant in the liquid line between compressor operation cycles and is required for certain long-line applications. The valve should be used with all long-line applications (over 100 ft).

SUGGESTED USE:

- Whenever long-line applications are used.

**Low-Ambient Temperature Controls (down to -20 F) (538A, 538C, 538D)** — The low-ambient kit is a solid-state head pressure controller designed to control outdoor fan cycling, and is activated by a pressure sensor. It is specifically designed to control fan-motor cycles in response to saturated condensing pressure. This device maintains a constant saturated condensing temperature of 100 F ± 10 F at outdoor-air temperatures between 55 F and -20 F, and may be used on all 538A, 538C, and 538D outdoor units without changing the outdoor-fan motor.

SUGGESTED USE:

- Applications where a significant amount of unit cooling operation is necessary at outdoor-air temperatures below 55 F.

**Crankcase Heater** — Crankcase heaters are only an accessory for those units with scroll compressor(s). Heaters are standard on units with reciprocating compressors.

SUGGESTED USE:

- Scroll compressor applications where an accessory low-ambient kit has been installed.

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## STANDARD FEATURES AND FIELD-INSTALLED ACCESSORIES

STANDARD FEATURE/FIELD-INSTALLED ACCESSORY	HIGH WALL SYSTEMS (619B,D)
Internal Condensate Pump	A
Mounting Brackets	S
Microprocessor Controls	S
Cleanable Filters	S
3-Speed Indoor-Fan Motor	S
Automatic Indoor-Fan Speed Control	S
Extensive Diagnostics	S
Wireless Remote Controllers	S
Fully Insulated Indoor Unit Cabinet	S
Automatic Air Sweep	S
Auto. Restart Function	S
24-Hour Automatic Start/Stop Timer	S
Refrigerant Line Turn Elbow*	S
High- and Low-Voltage Terminal Blocks (Indoor)	S
AccuRater® Refrigerant Metering Device	S†
Manual Defrost**	S
Demand Defrost**	S
Warm Start (in heating)**	S
Heating Operation to -20 F**	S
Auto. Changeover from Cooling to Heating**	S
Evaporator Coil Freeze Protection	S
Outdoor Low-Voltage Terminal Block	S
Accumulator	S
Crankcase Heater (Reciprocating Compressor Units)	S
Crankcase Heater (Scroll Compressor Units)	A
High-Pressure Switch*	S
Low-Pressure Switch*	S
5-Year Compressor Warranty	S
Compressor Start Assistance (non-scroll units)	S
Cycle-LOC™ Device*	S
Suction and Discharge Service Taps††	S
Totally Enclosed Fan Motor	S
Acoustically-Lined Compressor Compartment	S
Winter Start Control*	A
Low Ambient Temperature Controls (down to -20 F)†	A
Time Guard® Cycle Protector*	S
Liquid Solenoid Valve*	A
Condensing Unit Wall Mount Kit	A

### LEGEND

**A** — Field-Installed Accessory  
**S** — Standard from the Factory

\*For size 018 and larger.

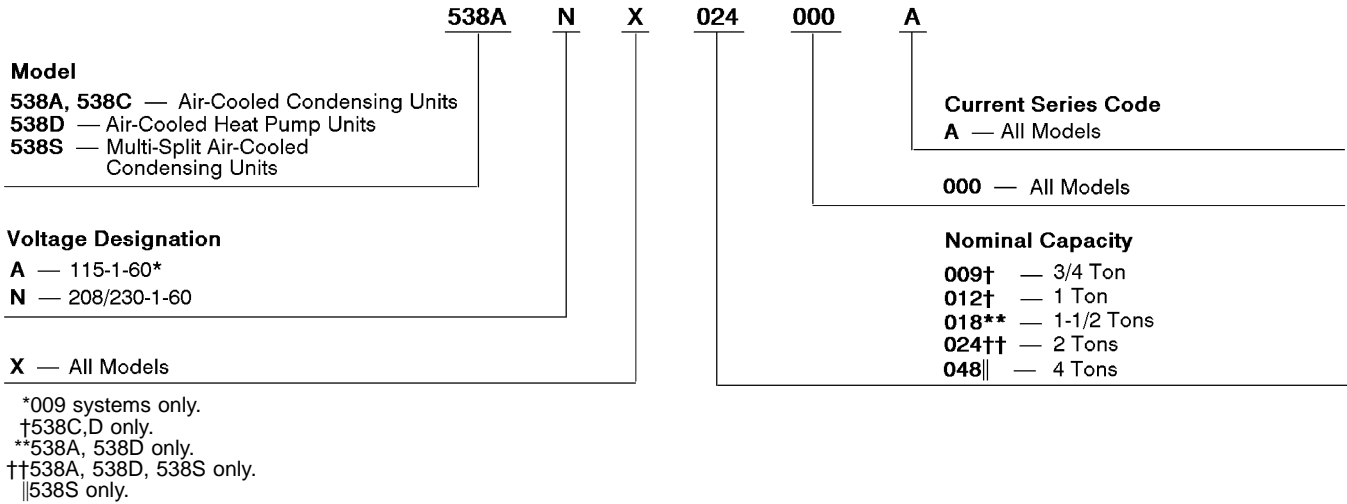
†Not used on 38HDS systems.

\*\*Heat pump systems only.

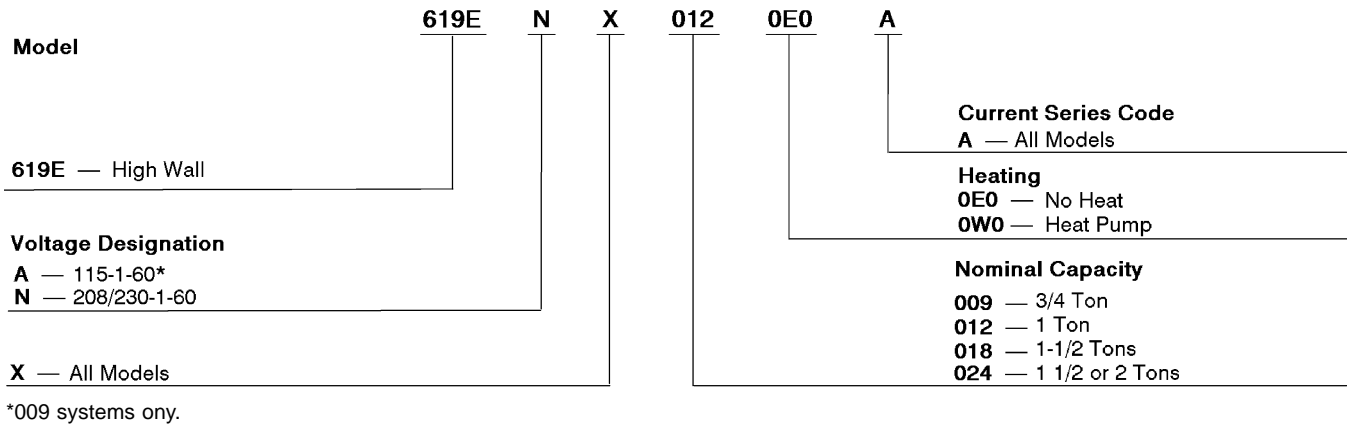
††The outdoor units are equipped with 4 taps; one for each service valve, and one each on compressor suction and discharge.

## MODEL DESCRIPTION

### OUTDOOR UNITS



### FAN COIL UNITS



## SYSTEM CAPACITIES

SYSTEM TYPE	NOMINAL SYSTEM CAPACITY (Tons)	FAN COIL TYPE(S)	INDOOR SECTIONS			OUTDOOR SECTION 538__	TOTAL STANDARD CFM (AT HIGH SPEED)	SYSTEM NET COOLING (Btuh)	SYSTEM NET HEATING (Btuh)*	SEER	HSPF*	OUTDOOR SOUND RATING (Decibels)
			Ckt	Qty	Model No. 619							
Cooling Only	¾	High Wall	—	1	E__009	A__009	286	8,500	—	10.5	—	65
	1		—	1	E__012	A__012	358	11,800	—	11.0	—	65
	1½		—	1	E__018	C__018	534	17,300	—	11.5	—	70
	2		—	1	E__024	C__024	521	22,600	—	12.0	—	68
Heat Pump	¾	High Wall	—	1	E__009	D__009	293	9,000	9,000	10.5	6.8	65
	1		—	1	E__012	D__012	350	12,500	12,500	10.5	6.8	65
	1½		—	1	E__018	D__018	502	17,300	16,900	11.5	6.8	70
	2		—	1	E__024	D__024	574	23,200	21,400	11.0	6.8	68
Multi-Split	2	High Wall	A	2	E__018	S__024	1000	23,000	—	11.0	—	68
		In-Ceiling Cassette High Wall	A	1	F__024	S__024	1059	23,000	—	11.0	—	68
		Ceiling Suspended High Wall	A	1	C__024†	S__024	1034	23,000	—	11.0	—	68
	4	High Wall	A	2	E__018	S__048	1068	46,000	—	11.0	—	72
		High Wall	A	1	E__024	S__048	1589	46,000	—	11.0	—	72
		High Wall	A	1	E__024	S__048	1042	46,000	—	11.0	—	72
		High Wall High Wall Ceiling-Suspended	A	2	E__018	S__048	2102	46,000	—	11.0	—	72
		High Wall High Wall In-Ceiling Cassette	A	2	E__018	S__048	2127	46,000	—	11.0	—	72
		High Wall Ceiling Suspended	A	2	E__018	S__048	2068	47,000	—	11.0	—	72
		High Wall In-Ceiling Cassette	A	2	E__018	S__048	2118	46,000	—	11.0	—	72
		High Wall Ceiling Suspended In-Ceiling Cassette	A	2	E__018	S__048	2059	46,000	—	11.0	—	72
		Ceiling Suspended Ceiling Suspended High Wall	A	2	C__024†	S__048	2034	47,000	—	11.0	—	72
		Ceiling Suspended In-Ceiling Cassette High Wall	A	2	C__024†	S__048	2059	47,000	—	11.0	—	72
		In-Ceiling Cassette In-Ceiling Cassette High Wall	A	2	F__024	S__048	2109	46,000	—	11.0	—	72
		In-Ceiling Cassette Ceiling Suspended High Wall	A	2	F__024	S__048	2084	46,000	—	11.0	—	72
		High Wall In-Ceiling Cassette	A	2	E__018	S__048	1983	47,000	—	11.0	—	72
		High Wall Ceiling Suspended	A	2	E__018	S__048	1668	45,800	—	11.0	—	72
		High Wall In-Ceiling Cassette	A	1	E__024	S__048	1521	46,800	—	11.0	—	72
		High Wall Ceiling Suspended	A	1	E__024	S__048	1559	45,800	—	11.0	—	72
		Ceiling Suspended High Wall	A	2	C__024†	S__048	1436	46,800	—	11.0	—	72
Ceiling Suspended In-Ceiling Cassette High Wall	A	1	C__024†	S__048	1121	45,600	—	11.0	—	72		

### LEGEND

**Decibels** — Sound Levels  
**Ckt** — Circuit  
**HSPF** — Heating Seasonal Performance Factors  
**SEER** — Seasonal Energy Efficiency Ratio

\*Heat pump systems only.

†Unit must be reconfigured for 1½ ton (18,000 Btuh) operation. Refer to installation instructions included with the fan coil unit for more details.

### NOTES:

- Rating condition is 80 F db, 67 F wb air entering indoor air section and 95 F db air entering outdoor air section.
- Total kW is for total system, including compressor and outdoor and indoor fans.
- Ratings are based on 25 ft of interconnecting refrigerant line.
- All system ratings are based on fan coil units operating at high fan speeds. Consult Specifications tables for airflows at all available fan speeds.

**SPECIFICATIONS — 538A AND 538C CONDENSING UNITS**

UNIT	538C__009	538C__012	538A__018	538A__024
<b>NOMINAL CAPACITY (Tons)</b>	¾	1	1½	2
<b>OPERATING WEIGHT (lb)</b>	55.0	62.0	150	154
<b>REFRIGERANT TYPE</b>	R-22			
<b>Control (Cooling) Factory Charge (lb)*</b>	1.5	Capillary 1.5	AccuRater® Piston at Fan Coil Unit 4.6	5.3
<b>COMPRESSOR TYPE</b>	Carlyle Rotary		Tecumseh Reciprocating	Copeland Scroll
<b>Model</b>	EAA090111A	EBB120111A	AW5517G	ZR23K1
<b>OUTDOOR FAN</b>	Propeller Type			
<b>Rpm Nominal Air Cfm (High Speed)</b>	1050 —	1050 —	850 1720	850 1720
<b>OUTDOOR COIL</b>	Copper Tube, Aluminum Fin			
<b>Face Area (sq ft)...No. of Rows Fins/in.</b>	3.5...1 18	3.5...2 18	6.1...1.5 15	6.1...2 15
<b>CONTROLS</b>				
<b>High-Pressure (psig) Cutout Cut-in</b>	— —	— —	426 ± 7 320 ± 20	
<b>Low-Pressure (psig) Cutout Cut-in</b>	— —	— —	7 ± 3 22 ± 5	
<b>Fusible Plug Control Voltage†</b>	210 F 115	210 F 230	210 F 24	
<b>REFRIGERANT LINES</b>				
<b>Connection Type</b>	Flare		Sweat	
<b>Liquid Line OD (in.)</b>	¼	¼	⅜	⅜
<b>Vapor Line OD (in.)</b>	½	½	⅝	⅝
<b>Maximum Length (ft)</b>	35	35	200	200
<b>Maximum Lift (Fan Coil Above Outdoor) (ft)</b>	16	16	65	65
<b>Maximum Lift (Fan Coil Below Outdoor) (ft)</b>	30	30	150	150
<b>EXTERNAL FINISH</b>	Grey		Alpine Mist (Beige)	

\*See System Piston Guide and Refrigerant Charges tables in Application section on page 21 for proper charge and piston with each fan coil type. Charge is based on duct-free fan coil requiring smallest amount of refrigerant and 25 ft of interconnecting line.

†24 v and a minimum of 40 va is provided in the fan coil unit.

**SPECIFICATIONS — 538D HEAT PUMP UNITS**

UNIT 538D__	009	012	018	024
<b>NOMINAL CAPACITY (Tons)</b>	¾	1	1½	2
<b>OPERATING WEIGHT (lb)</b>	60.7	66.6	154	167
<b>REFRIGERANT TYPE</b>	R-22			
<b>Control (Cooling)</b>	Fixed Orifice at Outdoor Unit		AccuRater® Piston at Fan Coil Unit	
<b>Control (Heating)</b>	Fixed Orifice at Outdoor Unit		AccuRater Piston at Outdoor Unit	
<b>Factory Charge (lb)*</b>	1.5	2.0	5.0	5.1
<b>COMPRESSOR TYPE</b>	Carlyle Rotary		Tecumseh Reciprocating	
<b>Model</b>	EBA095111H	EBB130111H	AW5519G	AW5524G
<b>OUTDOOR FAN</b>	Propeller Type		Propeller, Direct Drive	
<b>Rpm (Cooling and Heating)</b>	1050	1050	850	850
<b>Nominal Air Cfm (High Speed)</b>	—	—	1720	1720
<b>OUTDOOR COIL</b>	Copper Tube, Aluminum Fin			
<b>Face Area (sq ft)...No. of Rows</b>	3.5...1	3.5...2	6.1...1.5	6.1...2
<b>Fins/in.</b>	18	18	15	15
<b>CONTROLS</b>				
<b>High-Pressure (psig)</b>				
Cutout	—	—	320 ± 20	
Cut-in	—	—	426 ± 7	
<b>Liquid Line Low-Pressure (psig)</b>				
Cutout	—	—	7 ± 3	
Cut-in	—	—	22 ± 5	
<b>Fusible Plug</b>	210 F	210 F	210 F	
<b>Defrost Method†</b>	Time and Temperature Defrost		Time and Temperature Defrost	
<b>Accumulator</b>	Yes	Yes	Yes	
<b>Control Voltage**</b>	115	230	24	
<b>REFRIGERANT LINES</b>				
<b>Connection Type</b>	Flare		Sweat—Suction; Flare—Liquid	
<b>Mixed Phase Line OD (in.)</b>	¼	¼	⅜	⅜
<b>Suction Line OD (in.)</b>	½	½	⅝	⅝
<b>Maximum Length (ft)</b>	35	35	200	200
<b>Maximum Lift (Fan Coil Above Outdoor) (ft)</b>	16	16	65	65
<b>Maximum Lift (Fan Coil Below Outdoor) (ft)</b>	30	30	150	150
<b>EXTERNAL FINISH</b>	Grey		Alpine Mist (Beige)	

\*Units are shipped with charge listed (smallest applicable system charge). Refer to Piston Guide tables on page 21 for proper charge for your application.

†Demand defrost.

\*\*A 24-v transformer is provided in the 018, 024 fan coil unit.

**SPECIFICATIONS — 538S CONDENSING UNITS**

<b>UNIT 538S__</b>	<b>024</b>	<b>048</b>
<b>NOMINAL CAPACITY (Tons)</b>	2	4
<b>OPERATING WEIGHT (lb)</b>	159	292
<b>REFRIGERANT TYPE</b>	R-22	
<b>Control (Cooling) Factory Charge (lb)* Circuit A Circuit B</b>	TXV in Condensing Unit	
	5.0 —	5.5 5.5
<b>COMPRESSOR TYPE</b>	Copeland Scroll	
<b>Quantity...Model Oil (Recharge) (oz)</b>	1...ZR23K1 25	2...ZR23K1 25
<b>OUTDOOR FAN</b>	Propeller, Direct Drive	
<b>Rpm Nominal Air Cfm</b>	850 1720	850 3900
<b>OUTDOOR COIL</b>	Copper Tube, Aluminum Fin	
<b>Face Area (sq ft)...No. of Rows Fins/in.</b>	6.1...2 15	12.3...2 15
<b>CONTROLS</b>		
<b>High-Pressure (psig) Cut-in Cutout</b>	320 ± 20 426 ± 7	
<b>Low-Pressure (psig) Cut-in Cutout</b>	22 ± 5 7 ± 3	
<b>Fusible Plug Control Voltage</b>	210 F 24	
<b>REFRIGERANT LINES</b>		
<b>Connection Type Vapor Supply Line Quantity...OD (in.) Vapor Return Line Quantity...OD (in.) Maximum Length (ft) Maximum Lift (Fan Coil Above Outdoor) (ft) Maximum Lift (Fan Coil Below Outdoor) (ft)</b>	Sweat 2...3/8 2...5/8 50 30† 30†	4...3/8 4...5/8 50 30† 30†
<b>EXTERNAL FINISH</b>	Alpine Mist (Beige)	

**LEGEND**

**TXV** — Thermostatic Expansion Valve

\*Charges are preliminary estimates and are based on 25 ft of interconnecting line.

†Maximum system lift is 30 ft between lowest system component and highest system component.

**SPECIFICATIONS — 619E FAN COIL UNITS**

<b>UNIT 619E__</b>	<b>009*</b>	<b>012*</b>	<b>009†</b>	<b>012†</b>	<b>018</b>	<b>024</b>
<b>OPERATING WEIGHT (lb)</b>	18.7	24.2	18.7	24.2	39	43
<b>REFRIGERANT**</b>	R-22				R-22 with AccuRater® Control or TXV	
<b>FAN</b>	Centrifugal Blower					
<b>Rpm Nominal Cfm (High Speed)</b>	1250 215	1150 302	1250 252	1150 302	1300 480/455**	1505 550/525**
<b>COIL</b>						
<b>Face Area (sq ft)...Rows Fins/in.</b>	1.45...2 18	1.60...3 17	1.45...2 18	1.60...3 17	2.56...2 15.9	2.56...3 18.1
<b>CONNECTIONS (MPT)</b>						
<b>Vapor (in.) Flare Liquid (in.) Flare Condensate Drain</b>					1/2 3/8 5/8	
<b>LINE SIZES</b>						
<b>Vapor (in.) Liquid (in.) Condensate Drain</b>					1/2 3/8 5/8	

**LEGEND**

**TXV** — Thermostatic Expansion Valve (538S Systems Only)

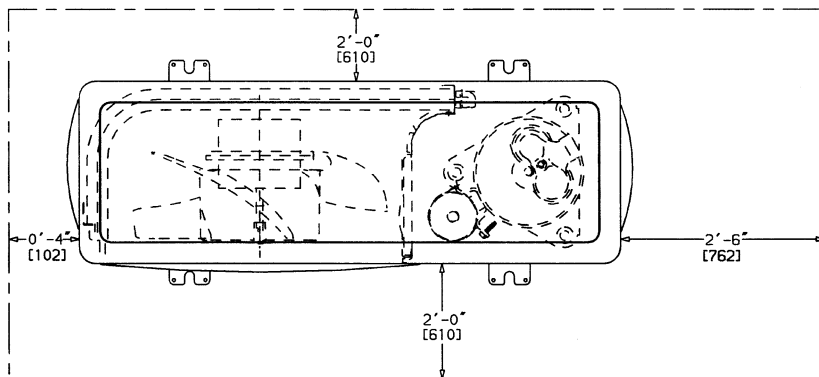
\*Cooling-only fan coil unit.

†Heat pump fan coil unit. Cooling only/Heat pump.

\*\*See outdoor unit nameplate for correct system charge.

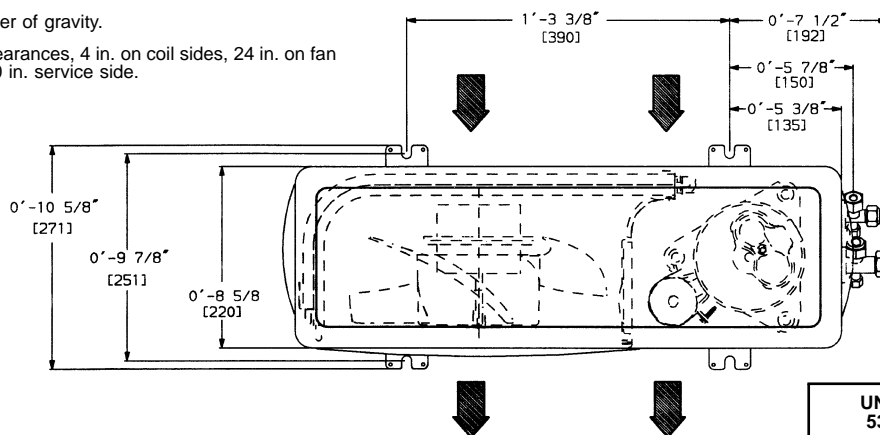


**DIMENSIONAL DRAWING, BASE UNIT — 538C/D009,012 COOLING ONLY AND HEAT PUMP UNITS**



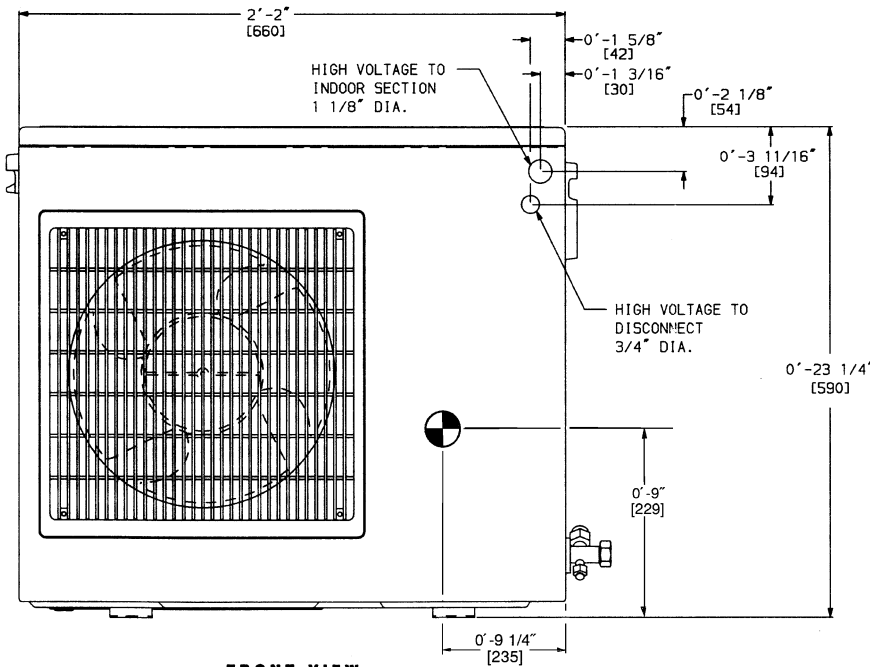
**NOTES:**

1. Dimensions in [ ] are in millimeters.
2. Direction of airflow.
3. Center of gravity.
4. Minimum clearances, 4 in. on coil sides, 24 in. on fan side, and 30 in. service side.

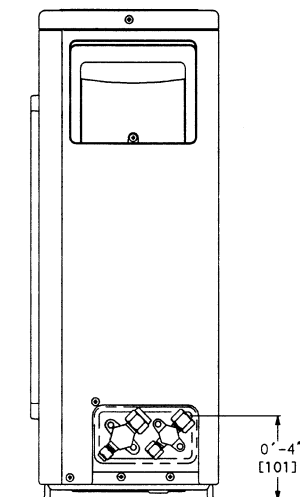


**TOP VIEW**

UNIT 538	WEIGHT	
	Lb	Kg
C_009	55.0	25.0
C_012	62.0	28.1
D_009	60.7	27.5
D_012	66.5	30.2



**FRONT VIEW**

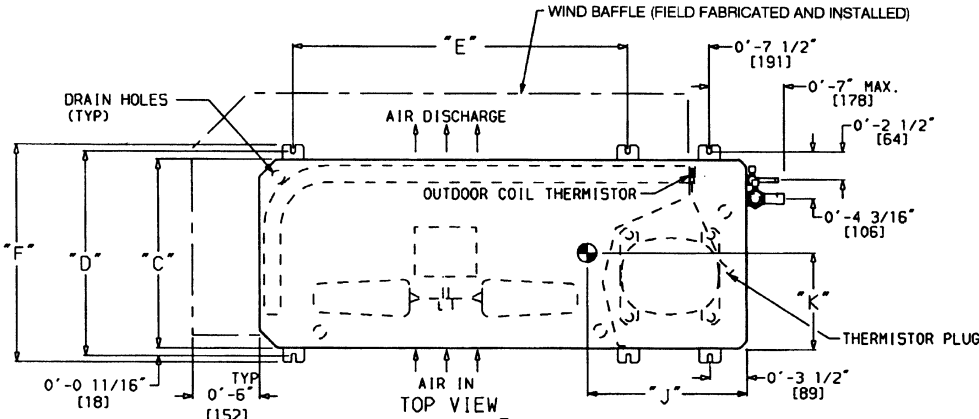


**RIGHT SIDE VIEW**

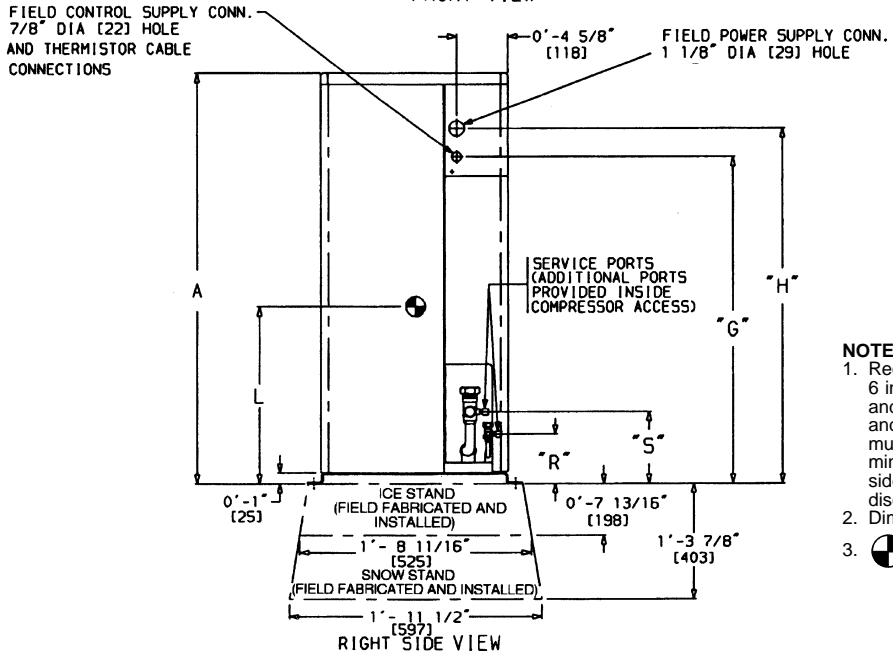
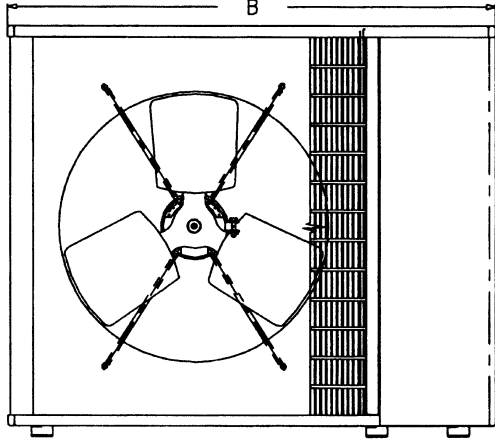
**DIMENSIONAL DRAWING — BASE UNIT — 538A018-024 CONDENSING UNITS**

UNIT 538A	A		B		C		D		E		F		G		H	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
018	2-1 <sup>1</sup> / <sub>8</sub>	638.2	3-0 <sup>15</sup> / <sub>16</sub>	938.2	1-2 <sup>9</sup> / <sub>16</sub>	369.9	1-4	406.4	1-11 <sup>7</sup> / <sub>16</sub>	595.3	1-5 <sup>3</sup> / <sub>16</sub>	436.6	1-5 <sup>1</sup> / <sub>2</sub>	444.5	1-8 <sup>1</sup> / <sub>8</sub>	511.2
024	2-1 <sup>1</sup> / <sub>8</sub>	638.2	3-0 <sup>15</sup> / <sub>16</sub>	938.2	1-2 <sup>9</sup> / <sub>16</sub>	369.9	1-4	406.4	1-11 <sup>7</sup> / <sub>16</sub>	595.3	1-5 <sup>3</sup> / <sub>16</sub>	436.6	1-5 <sup>1</sup> / <sub>2</sub>	444.5	1-8 <sup>1</sup> / <sub>8</sub>	511.2

UNIT 538A	J		K		L		M		N		R		S		OPERATING WT	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	Lb	kg
018	1-1 <sup>1</sup> / <sub>4</sub>	336.6	0-6 <sup>5</sup> / <sub>8</sub>	168.3	0-10 <sup>13</sup> / <sub>16</sub>	274.6	0-0 <sup>5</sup> / <sub>8</sub>	15.00	0-0 <sup>3</sup> / <sub>8</sub>	9.52	0-4 <sup>1</sup> / <sub>2</sub>	115.0	0-6 <sup>1</sup> / <sub>2</sub>	166.0	150	68.0
024	1-2 <sup>7</sup> / <sub>16</sub>	366.7	0-6 <sup>3</sup> / <sub>4</sub>	171.4	1- 0	304.8	0-0 <sup>5</sup> / <sub>8</sub>	15.00	0-0 <sup>3</sup> / <sub>8</sub>	9.52	0-4 <sup>1</sup> / <sub>2</sub>	115.0	0-6 <sup>1</sup> / <sub>2</sub>	166.0	154	69.0



MINIMUM MOUNTING PAD DIMENSIONS					
Support Feet		Snow Stand		Ice Stand	
ft-in.	mm	ft-in.	mm	ft-in.	mm
1-11 x 3-6	584.2 x 1066.8	2-2 x 3-6	660.4 x 1066.8	2-2 x 3-6	660.4 x 1066.8



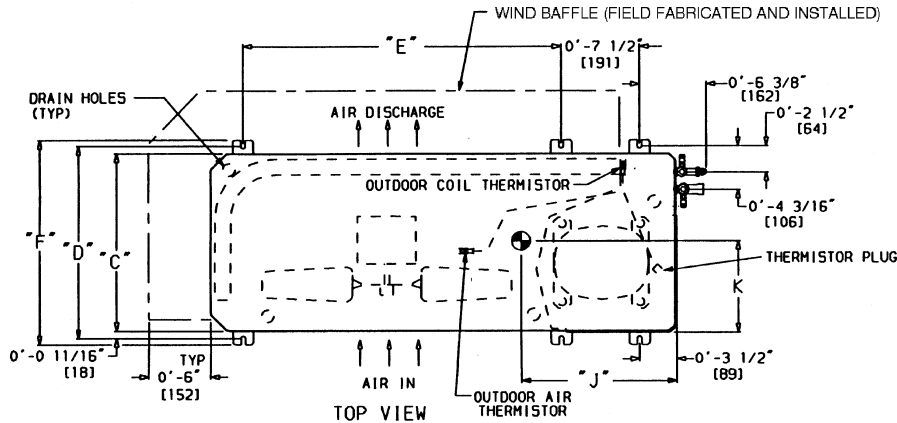
- NOTES:**
1. Required clearances, with coil facing wall, allow 6 in. minimum clearance on coil side and coil end, and 3 ft minimum clearance on compressor end and fan side. With fan facing wall, allow 8 in. minimum clearance on fan side and coil end, and 3 ft minimum clearance on compressor end and coil side. With multi-unit application, arrange units so discharge of one does not enter inlet of another.
  2. Dimensions in parenthesis are in millimeters.
  3. Center of Gravity.

# DIMENSIONAL DRAWING, BASE UNIT — 538D018,024 HEAT PUMP UNITS

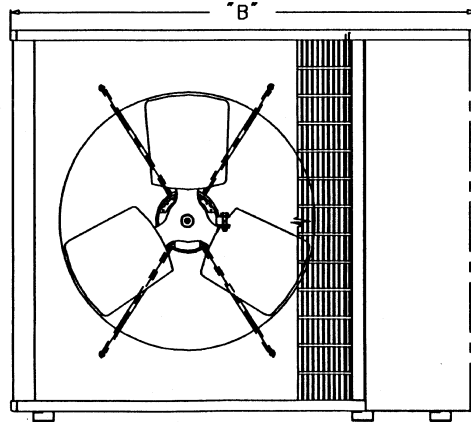
UNIT 538D__	A		B		C		D		E		F	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
018	2-1 <sup>1</sup> / <sub>8</sub>	638.2	3-0 <sup>15</sup> / <sub>16</sub>	938.2	1-2 <sup>9</sup> / <sub>16</sub>	369.9	1-4	406.4	1-11 <sup>7</sup> / <sub>16</sub>	595.3	1-5 <sup>3</sup> / <sub>16</sub>	436.6
024	2-1 <sup>1</sup> / <sub>8</sub>	638.2	3-0 <sup>15</sup> / <sub>16</sub>	938.2	1-2 <sup>9</sup> / <sub>16</sub>	369.9	1-4	406.4	1-11 <sup>7</sup> / <sub>16</sub>	595.3	1-5 <sup>3</sup> / <sub>16</sub>	436.6

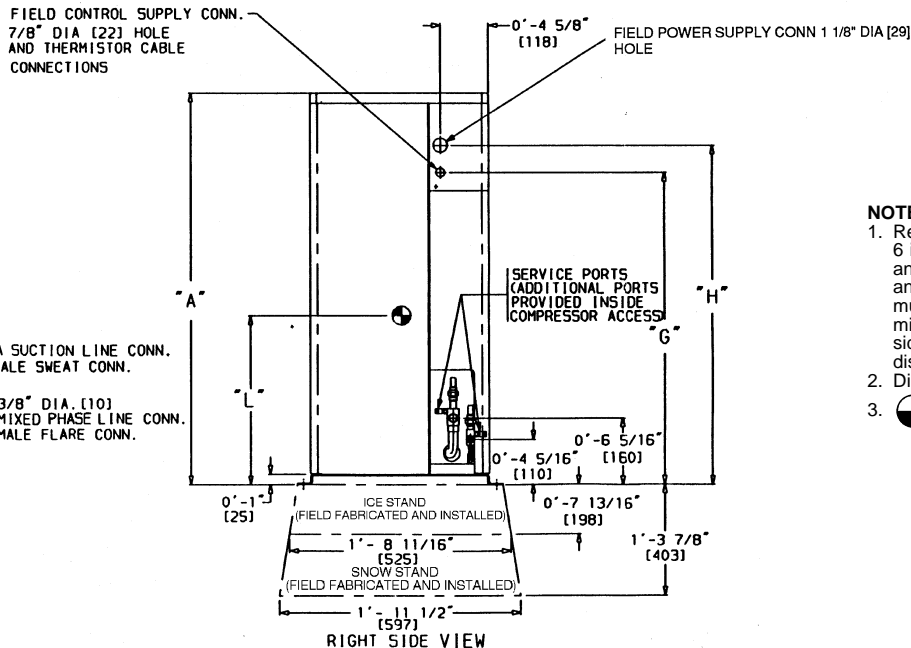
UNIT 538D__	G		H		J		K		L		M		OPERATING WEIGHT	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	lb	Kg
018	1-5 <sup>1</sup> / <sub>2</sub>	444.5	1-8 <sup>1</sup> / <sub>8</sub>	511.2	1-1	330.2	0-6 <sup>9</sup> / <sub>16</sub>	168.3	0-11 <sup>1</sup> / <sub>4</sub>	285.8	0-0 <sup>9</sup> / <sub>16</sub>	15.88	154	69.8
024	1-5 <sup>1</sup> / <sub>2</sub>	444.5	1-8 <sup>1</sup> / <sub>8</sub>	511.2	1-1	330.2	0-6 <sup>3</sup> / <sub>4</sub>	171.5	0-11 <sup>5</sup> / <sub>16</sub>	295.3	0-0 <sup>9</sup> / <sub>16</sub>	15.88	167	75.7



**LEGEND**  
CONN — Connection



MINIMUM MOUNTING PAD DIMENSIONS					
Support Feet		Snow Stand		Ice Stand	
ft-in.	mm	ft-in.	mm	ft-in.	mm
1-11 x	584.2 x	2-2 x	660.4 x	2-2 x	660.4 x
3-6	1066.8	3-6	1066.8	3-6	1066.8



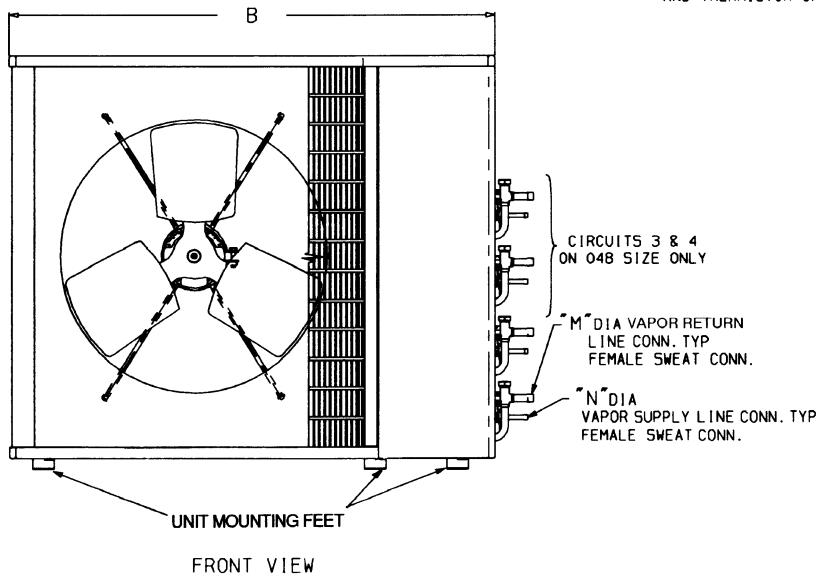
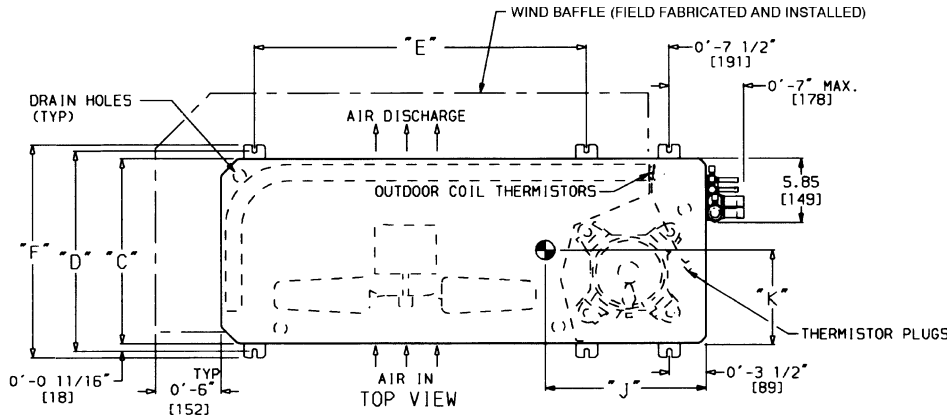
**NOTES:**

1. Required clearances, with coil facing wall; allow 6 in. minimum clearance on coil side and coil end, and 3 ft minimum clearance on compressor end and fan side. With fan facing wall; allow 8 in. minimum clearance on fan side and coil end, and 3 ft minimum clearance on compressor end and coil side. With multi-unit application; arrange units so discharge of one does not enter inlet of another.
2. Dimensions in [ ] are in millimeters.
3. Center of gravity.

# DIMENSIONAL DRAWING, BASE UNIT — 538S CONDENSING UNITS

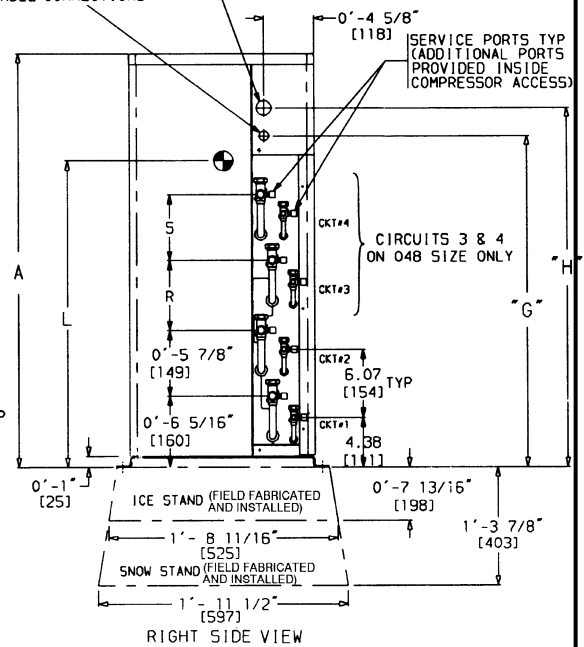
UNIT 538S	A		B		C		D		E		F		G		H	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
024	2-1 $\frac{1}{8}$	638	3-0 $\frac{15}{16}$	938	1-2 $\frac{9}{16}$	370	1-4	406	1-11 $\frac{7}{16}$	595	1-5 $\frac{3}{16}$	437	1-5 $\frac{1}{2}$	445	1-8 $\frac{1}{8}$	511
048	3-1 $\frac{1}{16}$	945	3-8 $\frac{9}{16}$	1132	1-5 $\frac{1}{16}$	433	1-6 $\frac{7}{16}$	468	2- 6 $\frac{1}{2}$	775	1-7 $\frac{3}{8}$	499	2-5 $\frac{5}{8}$	753	2-8 $\frac{3}{16}$	818

UNIT 538S	J		K		L		M		N		R		S		OPERATING WEIGHT	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Lb	Kg
024	1-2 $\frac{7}{16}$	367	0-6 $\frac{3}{4}$	171	1-0	305	0-0 $\frac{9}{8}$	16	0-0 $\frac{9}{8}$	10	—	—	—	—	159	72.0
048	1-2 $\frac{3}{4}$	375	0-7 $\frac{1}{2}$	191	1-6	457	0-0 $\frac{9}{8}$	16	0-0 $\frac{9}{8}$	10	0-6 $\frac{5}{16}$	160	0-5 $\frac{7}{8}$	149	292	132.3



FIELD CONTROL SUPPLY CONN.  
7/8" DIA [22] HOLE  
AND THERMISTOR CABLE CONNECTIONS

FIELD POWER SUPPLY CONN.  
1 1/8" DIA [29] HOLE  
FOR 024 SIZE  
1 3/8" DIA [35] HOLE  
FOR 048 SIZE



UNIT 538S	MINIMUM MOUNTING PAD DIMENSIONS					
	SUPPORT FEET		SNOW STAND		ICE STAND	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
024	1-11 x 3-6	584 x 1067	2-2 x 3-6	660 x 1067	2-2 x 3-6	660 x 1067
048	2-0 x 4-2	610 x 1270	2-4 x 4-4	711 x 1270	2-2 x 4-2	660 x 1270

**NOTES:**

- Required clearances: with coil facing wall; allow 6 in. minimum clearance on coil side and coil end, and 3 ft minimum clearance on compressor end and fan side. With fan facing wall; allow 8 in. minimum clearance on fan side and coil end, and 3 ft minimum clearance on compressor end and coil side. With multi-unit application: arrange units so discharge of one does not enter inlet of another.
- Dimensions in [ ] are in millimeters.
- Center of gravity.

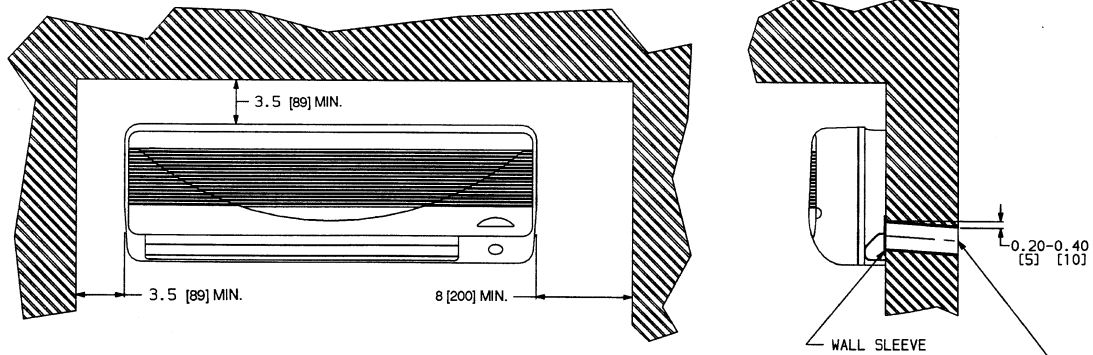
# DIMENSIONAL DRAWING, BASE UNIT — 619E009,012 FAN COIL UNITS

UNIT 619E__	WEIGHT		A		B		C	
	Lb	Kg	in.	mm	in.	mm	in.	mm
009	18.7	8.5	33.46	850	11.02	280	6.29	160
012	24.2	11.0	36.61	930	11.81	300	7.28	185

**NOTES:**

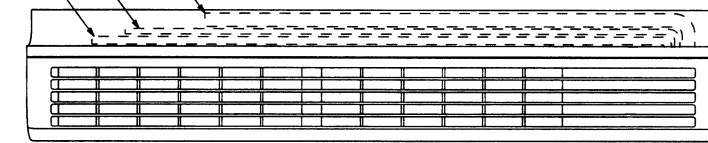
1. Dimensions are in inches. Dimensions in [ ] are in millimeters.
2. Direction of airflow.
3. Refrigerant, drain and power connections may be made rear, left side or right side.
4. Refrigerant is metered by capillary tubes in the outdoor unit. Insulate both refrigerant lines.
5. Clearances of 3 1/2" on top and to the left of the fan coil unit are absolute minimums. Clearances of 10" are recommended.

MINIMUM CLEARANCE FOR SERVICE



SUCTION LINE 0.500 [12.7] MALE FLARE CONNECTION  
 LIQUID LINE 0.250 [6.35] MALE FLARE CONNECTION  
 DRAIN 0.625 [15.8] MALE BARB CONNECTION

2.36 DIA [60]  
 FOR REFRIGERANT, DRAIN,  
 POWER AND SIGNAL LINES  
 (NOTE 3)



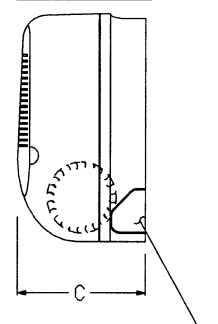
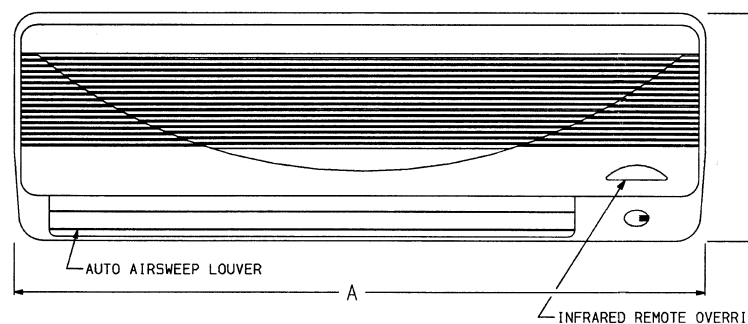
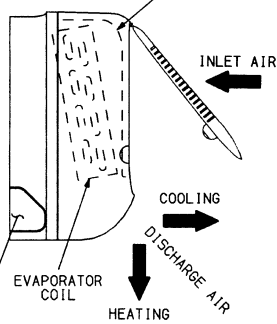
TOP VIEW

INLET AIR

LEFT SIDE VIEW AIR FILTERS (OPEN COVER FOR ACCESS)

FRONT VIEW

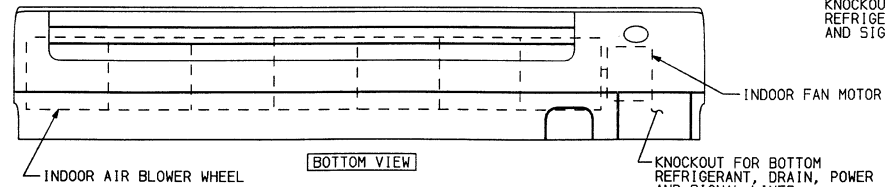
RIGHT SIDE VIEW



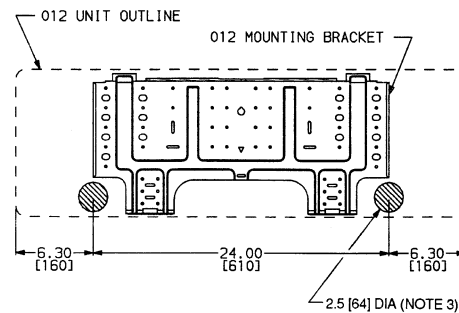
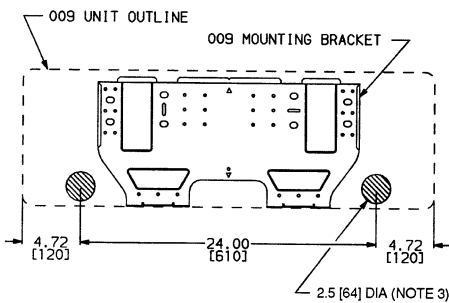
KNOCKOUT FOR LEFT SIDE REFRIGERANT, DRAIN, POWER AND SIGNAL LINES

INFRARED REMOTE OVERRIDE SWITCH (BEHIND ACCESS COVER)

KNOCKOUT FOR RIGHT SIDE REFRIGERANT, DRAIN, POWER AND SIGNAL LINES



BOTTOM VIEW

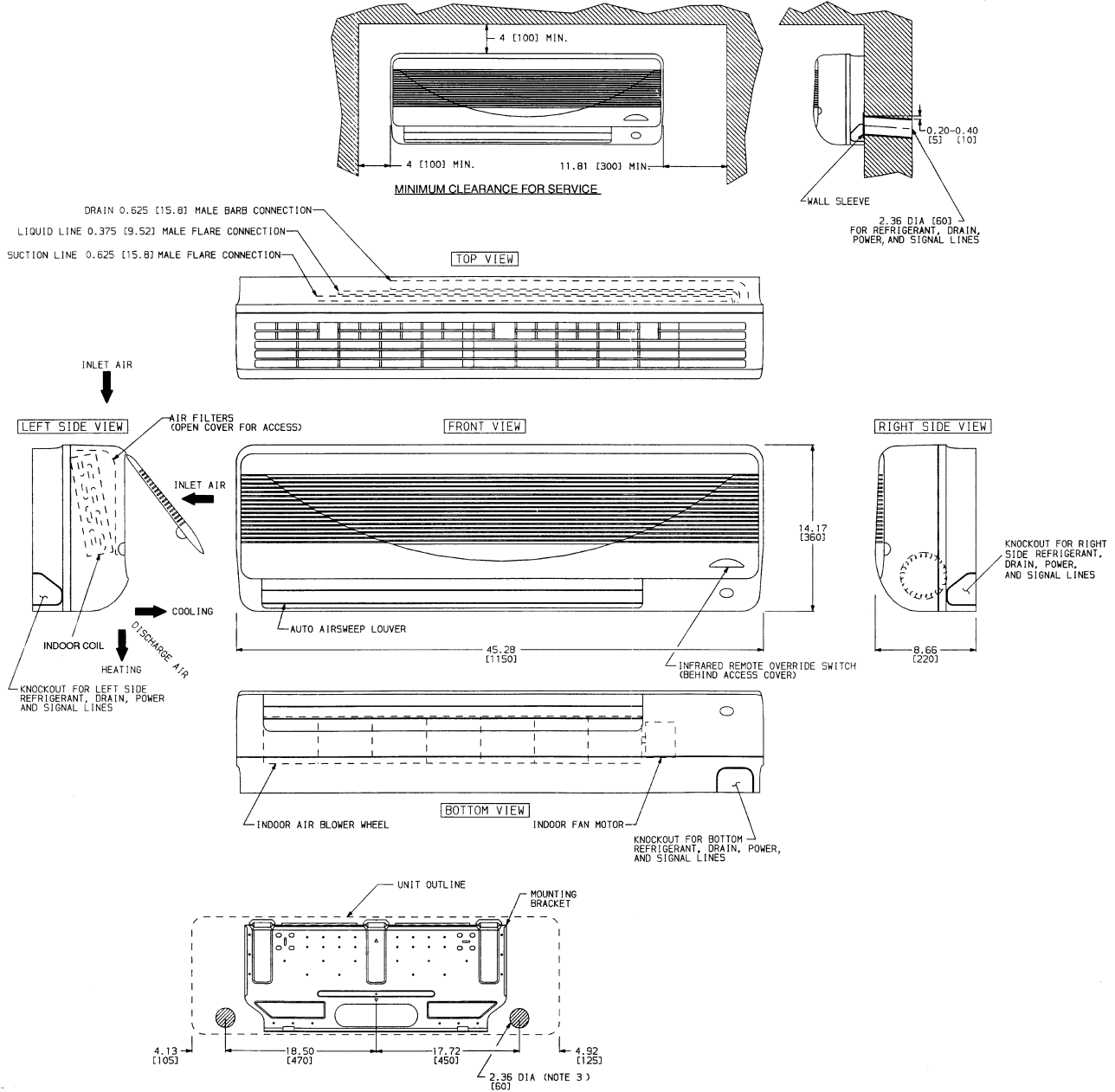


# DIMENSIONAL DRAWING, BASE UNIT — 619E018,024 FAN COIL UNITS

UNIT 619E__	WEIGHT
018	39 Lb [17.5 Kg]
024	43 Lb [19.5 Kg]

**NOTES:**

1. Dimensions in [ ] are in millimeters.
2. Direction if airflow.
3. Refrigerant, drain, and power connections may be made in unit rear, bottom, left side, or right side.
4. Refrigerant is metered by AccuRater® device at the fan coil unit on 538A and 538D018,024 applications. A thermostatic expansion valve is used in the outdoor unit on 538S applications. Insulate both refrigerant lines on 538S and 538D018,024 applications.
5. The 4" top and left clearances are absolute minimums. Clearances of 10" are recommended.



## ELECTRICAL DATA CONDENSING UNITS

UNIT	VOLTAGE (Single Ph, 60 Hz)	OPERATING VOLTAGE MINIMUM*	OPERATING VOLTAGE MAXIMUM*	COMP RLA	FAN FLA	POWER	
						MCA†	MOCP†
538A_018	208/230	187	254	8.0	0.70	10.7	15
538A_024				12.9		16.8	25
538C_009	115	104	127	7.6	0.76	12.1	15
538C_012	208/230	187	253	5.5	0.35	8.5	15

### LEGEND

**FLA** — Full Load Amps  
**HACR** — Heating, Air Conditioning, Refrigeration  
**LRA** — Locked Rotor Amps  
**MCA** — Minimum Circuit Amps per NEC Section 430-24  
**NEC** — National Electrical Code  
**RLA** — Rated Load Amps (Compressor)

\*Permissible limits of the voltage range at which unit will operate satisfactorily.

†Cooling only fan coil unit.

\*\*Heat pump fan coil unit.

### NOTES:

- The 018 and 024 outdoor units contain a 24-v transformer; additional transformers are not required. The 009, 012 outdoor units use high voltage controls.
- All motors and compressors contain internal overload protection.
- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker.
- Motor RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 1995.

## HEAT PUMP UNITS

UNIT 538D_	VOLTAGE (Single Ph, 60 Hz)	OPERATING VOLTAGE MINIMUM*	OPERATING VOLTAGE MAXIMUM*	COMP RLA	FAN FLA	POWER	
						MCA	MOCP
009	115	104	127	9.0	0.76	11.2	15
012	208/230	187	254	5.8	0.35	13.9	15
018	208/230	187	254	9.8	0.70	13.0	20
024				11.7		15.3	25

### LEGEND

**FLA** — Full Load Amps  
**HACR** — Heating, Air Conditioning, Refrigeration  
**LRA** — Locked Rotor Amps  
**MCA** — Minimum Circuit Amps per NEC Section 430-24  
**NEC** — National Electrical Code  
**RLA** — Rated Load Amps (Compressor)

\*Permissible limits of the voltage range at which unit will operate satisfactorily.

†Cooling only fan coil unit.

\*\*Heat pump fan coil unit.

### NOTES:

- The 018 and 024 outdoor units contain a 24-v transformer; additional transformers are not required. The 009, 012 outdoor units use high voltage controls.
- All motors and compressors contain internal overload protection.
- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker.
- Motor RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 1995.

## MULTI-SPLIT CONDENSING UNITS

UNIT SIZE 538S_	V-PH-Hz	OPERATING VOLTAGE MINIMUM*	OPERATING VOLTAGE MAXIMUM*	COMPRESSOR			FAN	POWER SUPPLY	
				Quantity	RLA (Ea)	LRA (Ea)	FLA	MCA	Max Fuse or HACR-Type Circuit Breaker Amps
024	208/230-1-60	187	254	1	12.9	62.5	0.70	16.8	25
048				2			1.45	30.5	40

### LEGEND

**FLA** — Full Load Amps  
**HACR** — Heating, Air Conditioning, Refrigeration  
**LRA** — Locked Rotor Amps  
**MCA** — Minimum Circuit Amps per NEC Section 430-24  
**NEC** — National Electrical Code  
**RLA** — Rated Load Amps (Compressor)

\*Permissible limits of the voltage range at which unit will operate satisfactorily.

†Cooling only fan coil unit.

\*\*Heat pump fan coil unit.

### NOTES:

- The 024 and 048 outdoor units contain a 24-v transformer; additional transformers are not required.
- All motors and compressors contain internal overload protection.
- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker.
- Motor RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 1995.

**ELECTRICAL DATA (cont)**

**FAN COIL UNITS**

INDOOR UNIT 619E__	V (Single-Ph, 60 Hz)	OPERATING VOLTAGE*		FAN
		Minimum	Maximum	FLA
009†	115	104	127	—
012†	208/230	187	253	—
009**	115	104	127	—
012**	208/230	187	253	—
018†	208/230	187	253	0.53
024†				
018**				
024**				

**LEGEND**

- FLA** — Full Load Amps
- HACR** — Heating, Air Conditioning, Refrigeration
- LRA** — Locked Rotor Amps
- MCA** — Minimum Circuit Amps per NEC Section 430-24
- NEC** — National Electrical Code
- RLA** — Rated Load Amps (Compressor)

**NOTES:**

1. The 018, 024, 048 outdoor units contain a 24-v transformer; additional transformers are not required. The 009, 012 outdoor units use 230-v (high voltage) controls.
2. All motors and compressors contain internal overload protection.
3. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker.
4. Motor RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 1995.

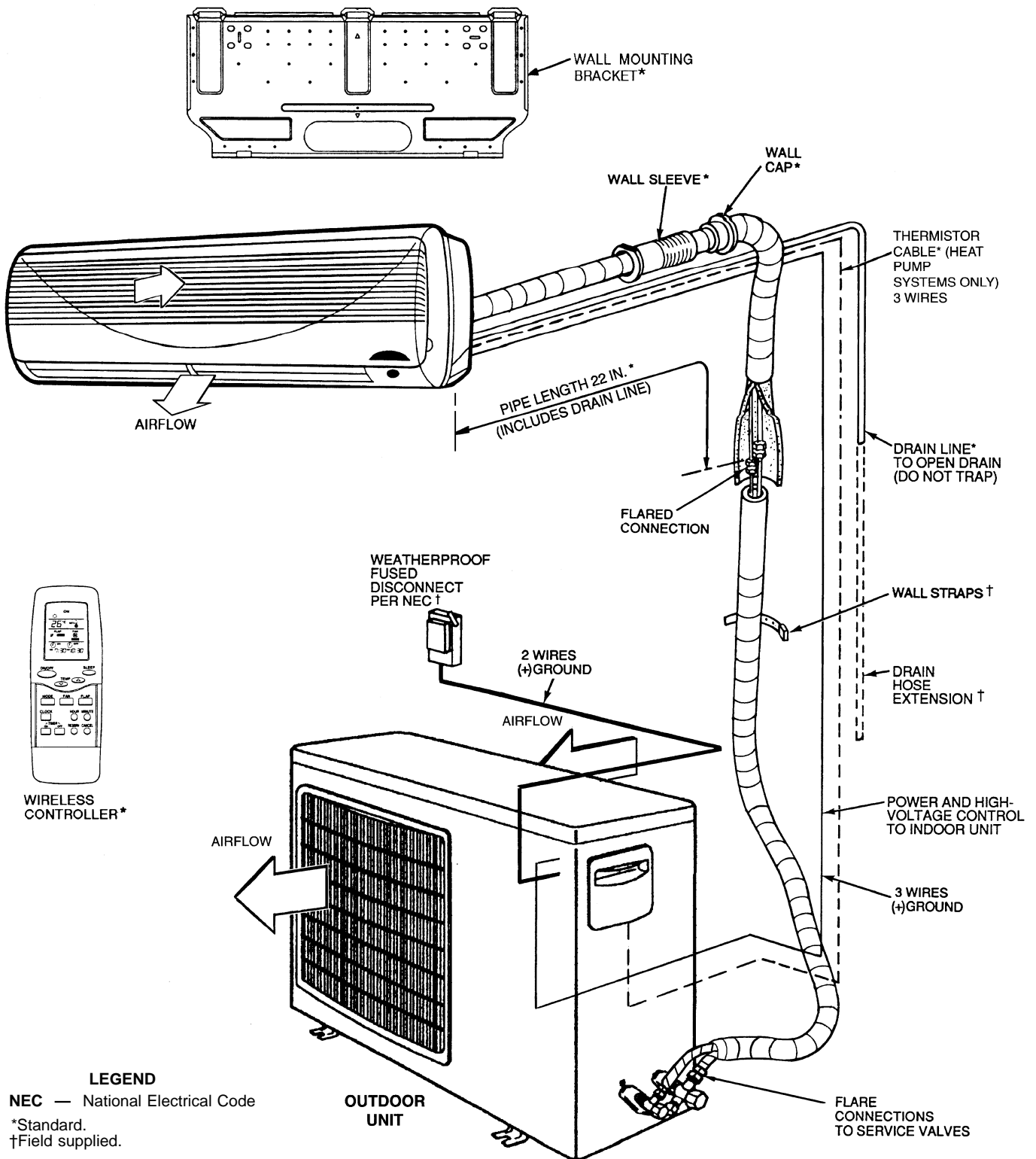
\*Permissible limits of the voltage range at which unit will operate satisfactorily.

†Cooling only fan coil unit.

\*\*Heat pump fan coil unit.



**TYPICAL INSTALLATION — HIGH-WALL SYSTEMS, 9,000 AND 12,000 BTUH  
(Cooling-Only System Shown)**



**LEGEND**

NEC — National Electrical Code

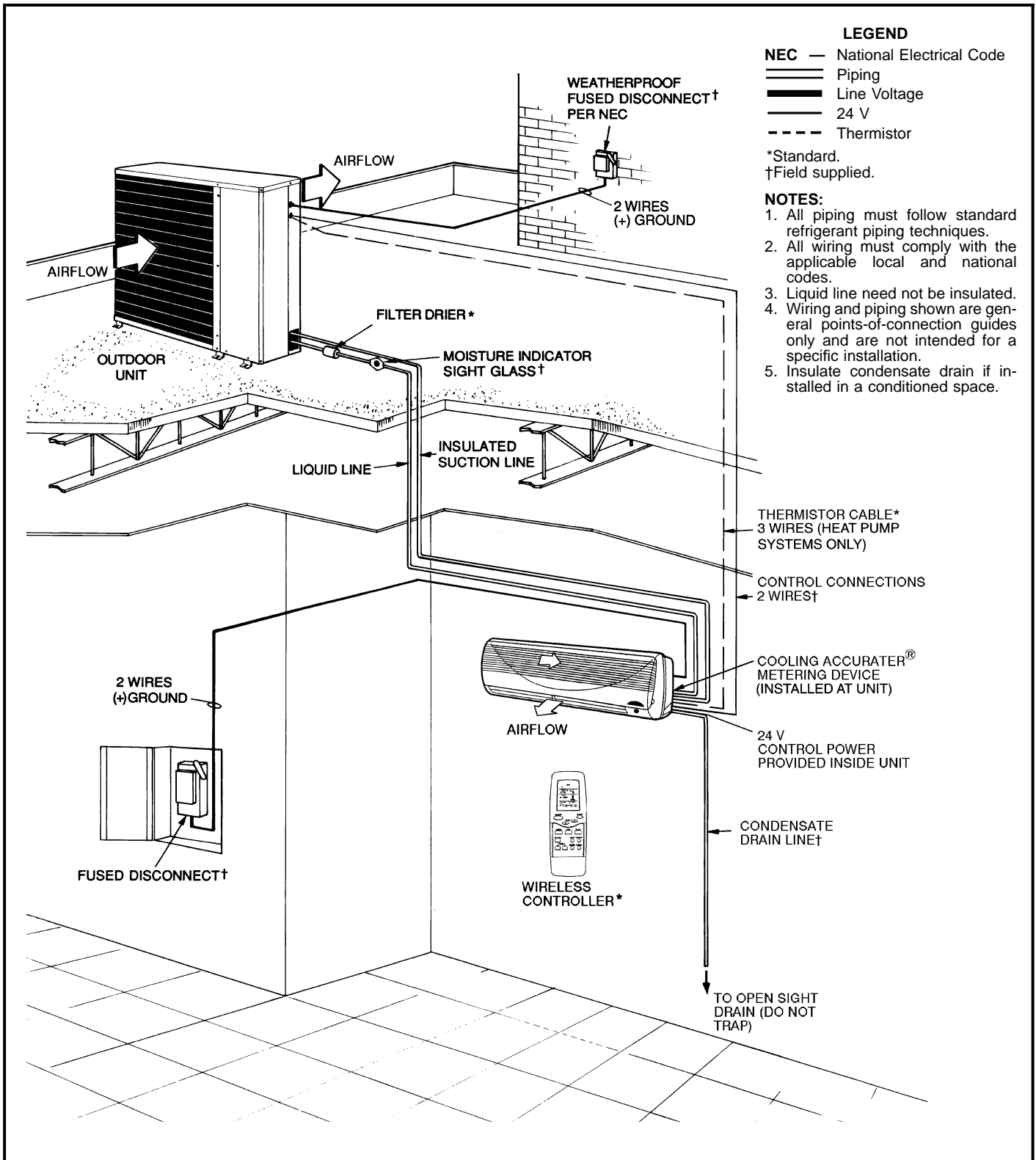
\*Standard.

†Field supplied.

**NOTES:**

1. All piping must follow standard refrigerant techniques.
2. Do not install a filter drier in mixed phase liquid line.
3. All wiring must comply with applicable local and national codes.
4. Capillary tube expansion device (cooling-only systems only) is located in the outdoor unit. Both refrigerant lines must be insulated.
5. Wiring and piping shown are general points-of-connection guides only and are not intended to include all details for a specific installation.
6. Insulate condensate line drain if installed in a conditioned space.

**TYPICAL INSTALLATION — HIGH-WALL SYSTEMS, 18,000 AND 24,000 BTUH  
(Cooling Only System Shown)**



**LEGEND**

- NEC** — National Electrical Code
- Piping
- Line Voltage
- 24 V
- - - Thermistor

\*Standard.  
†Field supplied.

**NOTES:**

1. All piping must follow standard refrigerant piping techniques.
2. All wiring must comply with the applicable local and national codes.
3. Liquid line need not be insulated.
4. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation.
5. Insulate condensate drain if installed in a conditioned space.

## APPLICATION DATA

### 1. Unit selection

Select equipment to either match or be slightly less than anticipated peak load. This provides better humidity control, fewer unit cycles, and less part-load operation.

For units used in spaces with high sensible loads, base equipment selection on unit sensible load, not on total anticipated load. Adjust for anticipated room wet bulb temperature to avoid undersizing equipment.

For heat pump systems, heating load using outdoor air must be checked in addition to cooling load. Heating load of outdoor air can greatly reduce heating capability.

For heat pump systems, heating and cooling design loads must both be checked.

When selecting equipment which has outdoor air introduced into the unit, determine the mix conditions of room air and outdoor air at design conditions. The cooling capacity tables in this literature are based on 80 F edb. Adjust for actual dry-bulb and wet-bulb conditions with the required outdoor air to select the proper equipment.

### 2. Unit combinations and coil mixed matches

The 538A, 538C, 538D, and 538S units are the only units approved for use with the 619E duct-free split systems. These outdoor units may also be used with other fan coil units.

### 3. Unit mounting (outdoor)

- a. **Unit leveling** — For reliable operation, units should be level in all planes.
- b. **Clearance** — Adequate clearance must be provided for airflow. See dimensional drawings for proper clearances. The outdoor units are designed for free-blow application. Air inlets and outlets should not be restricted. Outdoor fan external static pressure available is less than 0.1 in. wg.
- c. **Unit location** — Cooling units may be stacked 2 high. Units may be wall mounted, pad mounted at ground level, roof mounted, mounted on or under a deck, or mounted on a patio. Be sure water drainage from roof will not drain directly onto the unit.

**NOTE:** If stacking units is desired (538A, 538C, 538S only), field-fabricated and installed hardware is required. Contact your local representative for details.

If 018, 024, 048 units are being mounted near a wall, the outdoor-air section should discharge toward the wall. This will provide inherent coil protection and the best possible sound and airflow performance. The 009, 012 units should be mounted with fan discharge pointing away from the wall.

### 4. Unit mounting (indoor)

- a. **Unit leveling** — For reliable operation, units should be level in all planes.
- b. **Clearance** — Provide adequate clearance for airflow. The unit return and discharge should not be obstructed by furniture, curtains, or anything which may cause unit short cycling or air recirculation. See base unit dimensional drawings on pages 13 and 14 for required clearances.
- c. **Unit location** — When selecting unit location, select a location which will provide the best air circulation for the room.

Position units as high as possible on the wall for best air circulation. Allow adequate clearances above the unit for servicing (removing unit covers). Place the unit in the middle (horizontally) of the wall selected (if possible). Select an outside wall if available to make piping easier, and place the unit so it faces the normal location of room occupants.

### 5. Mounting template

The fan coil units are furnished with a mounting template to mark the location of the mounting brackets, wiring, and refrigeration hole locations.

### 6. Support

Adequate support must be provided to support the weight of all fan coils. Refer to the Specification tables on page 8 for fan coil weights, and the base unit dimensional drawings on pages 13 and 14 for the location of mounting brackets.

### 7. System operating conditions

**Operating limits:**

#### OUTDOOR UNITS

CONDITION	009,012	018,024,048
Maximum Cooling Ambient (F)	125	125
Minimum Cooling Ambient (F) (without accessory low-ambient kit)	55	55
Minimum Cooling Ambient (F) (with accessory low-ambient kit)	-20	-20
Minimum Cooling Return-Air Temperature (F)	55	55
Maximum Cooling Return-Air Temperature (F)	95	95
Maximum Heating Return-Air Temperature (F)*	80/71†	80/71†
Minimum Heating Return-Air Temperature (F)*	55	55
Maximum Heating Ambient Temperature (F)*	0	-20
Minimum Heating Ambient Temperature (F)	80	80
Saturated Suction Temperature Range		
Minimum (F)	-15	-15
Maximum (F)	55	55
Saturated Condensing Temperature Range		
Minimum (F)	85	80
Maximum (F)	150	150
Maximum Compressor Discharge Temperature (F)	275	275
Minimum Discharge Superheat (F)	60	60

\*Heat pump units only.  
†Dry bulb/wet bulb.

#### FAN COIL UNITS

CONDITION	ALL UNITS
Maximum Room Temperature (F)	84
Minimum Room Temperature (F)	64
Maximum Return Air (F)	
Dry-Bulb	85
Wet-Bulb	72
Maximum Saturated Suction Temperature (F)	55
Minimum Saturated Suction Temperature (F)	27

### 8. Low-ambient operation

Units can operate in cooling down to 55 F (538A, 538C, 538D) under all conditions without a low-ambient or winter start kit.

Units equipped with accessory low-ambient or winter start kits should also be equipped with field-fabricated wind baffle, field supplied crankcase heater (scroll units only) and field-supplied isolation relay.

- a. **Winter start (538C and 538S)** — The use of a winter start control may extend the unit operation range (below 40 F) without addition of the low-ambient kit. Winter start bypasses the low-pressure switch for 3 minutes.
- b. **Crankcase heater** — Scroll compressor units with low-ambient control or winter start should be equipped with crankcase heaters to prevent refrigerant migration during compressor off cycle.
- c. **Freezestat (heat pump systems only)** — Freeze up protection is provided on all fan coil units.

## APPLICATION DATA (cont)

### 9. Metering devices

- a. **009, 012 units** — The 009 and 012 units have capillary tubes for refrigerant metering located in the outdoor condensing unit.
- b. **018, 024 units** — The 018, 024 units use a piston-type metering device located in the indoor unit.

**NOTE:** All 538A, 538C, 538D (018, 024) duct-free split systems use Chattleff style AccuRater® pistons. DO NOT mix piston types. All 538D009, 012 systems use Aeroquip type pistons. See Long-Lines Applications section on page 20 for changes in piston sizes due to long lines.

### 10. Drain connections

Install drains to meet local sanitation codes. If adequate gravity drainage cannot be provided, unit should be equipped with accessory condensate pump. High wall fan coil unit condensate pumps have a 10 ft lift capability above the condensate pan level.

See base unit dimensional drawings on pages 13 and 14 for fan coil unit drain locations and sizes.

**NOTE:** High wall fan coil units have internal condensate traps.

Drain connections may be routed through alternate locations on most fan coils. See base unit dimensional drawings on pages 13 and 14 for possible alternate locations.

### 11. Refrigerant lines

#### a. General refrigerant line sizing:

- 1) All charges, line sizing, and capacities are based on runs of 25 ft. For runs over 25 ft, consult long-lines section on page 20 for proper line sizing, charge, and AccuRater refrigerant metering device sizing.

**NOTE:** For runs less than 25 ft, some of the charge may need to be removed to obtain the correct system superheat. The minimum line length should be 8 ft.

method. Since all refrigerant lines are on the low side of the system, it is not normally necessary to add or remove charge.

- 2) These units have mixed-phase refrigerant flow in the liquid line. **DO NOT install a filter drier in the liquid line. The liquid line must be insulated.**
- 3) No line size changes should be made on 009, 012 units.

#### c. 538A,D018, 024 units

- 1) These units are shipped with a charge of R-22 refrigerant. See System Piston Guide and Refrigerant Charges tables on page 21 for system charges. Add additional charge by weight as necessary and check the charge with a superheat calculator.
- 2) For these units, install the filter drier provided with the unit in the liquid line. Use of a field-supplied moisture indicator is also recommended.

#### d. 538S units

- 1) Outdoor units are shipped with the charges listed in the Specifications — 538S Condensing Units table on page 8. To determine if additional charge is required, add all charges listed in fan coil unit specifications table(s) in the Product Data literature for your system (per circuit). The sum of the charges listed is the system circuit charge required based on 25 ft of line.
- 2) For the 538S units, filter driers are provided in the unit.
- 3) Vapor supply lines on all 538S units should be 5/8 in. only. DO NOT resize vapor supply lines for additional length.
- 4) When sizing vapor return line, determine line length by finding equivalent ft of tubing. Equivalent line lengths equal the linear length (measured length) of the interconnecting vapor return tubing plus losses due to elbows (see Fitting Loss in Equivalent Ft For Elbows table on page 21). If the number of elbows is not yet known, assume 50% additional length for equivalent length. In determining line size, be sure oil can be properly returned to the compressor. Contact your local representative for oil return recommendations as necessary. For line lengths from 25 to 50 ft, no special tubing requirements are normally required. Adjust charge to required amount by adding charge per subcooling method. Refer to 538S base unit installation instructions for charging details.

#### e. Long-lines applications, 538A,D018,024 units:

- 1) Liquid lines on all 538A,D018,024 units should be 3/8 in. only. DO NOT resize liquid lines for additional length.
- 2) When sizing vapor line, determine line length by finding equivalent ft of pipe. Equivalent line lengths equal the linear length (measured length) of the interconnecting vapor tubing plus losses due to elbows (see Fitting Loss in Equivalent Ft For Elbows table on page 21). If the number of elbows is not yet known, assume 50% additional length for equivalent length. In determining line size, be sure oil can be properly returned to the compressor. Consult your local representative for proper oil return recommendations as necessary. For line lengths from 15 to 49 ft, no special piping requirements are normally required. Adjust charge to required amount by adding charge per Step 1) on page 23 and checking superheat.

### MAXIMUM LINE LENGTHS

UNIT	MAXIMUM EQUIVALENT FT	MAXIMUM LIFT— FAN COIL BELOW CONDENSING UNIT	MAXIMUM LIFT— FAN COIL ABOVE CONDENSING UNIT
<b>538A, 538D018,024</b>	200	150	65
<b>538D, 538D009</b>	35	35	16
<b>538C, 538D012</b>	49	35	16*
<b>538S</b>	50	30†	30†

\*This changes to 25 ft with addition of accessory crankcase heater.

†Maximum distance permitted is 30 ft from lowest system component to highest system component.

- 2) Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, not more than 36 in. should be buried. Provide a minimum 6-in. vertical rise to the service valves to prevent refrigerant migration.
  - 3) The vapor line must be insulated. Use a minimum of 1/2-in. thick insulation. Closed-cell insulation is recommended in all long-line (over 25 ft) applications.
  - 4) Special consideration should be given to isolating interconnecting tubing from the building structure. Isolate the tubing so that vibration or noise is not transmitted into the structure.
- b. **538C,D009,012 units**
- 1) These units are shipped with a charge of R-22 refrigerant. Check the charge using the superheat

## APPLICATION DATA (cont)

- 3) For line lengths over 50 ft (018,024 only):
- A crankcase heater should be added to scroll compressor units (all non-scroll compressor units have crankcase heaters as standard). Crankcase heaters help prevent refrigerant migration to the compressor during the off cycle.
  - Any time the equivalent line length is over 100 ft, a liquid line solenoid must be used. A liquid line solenoid may also be required for vertical lift applications over 25 ft. See Step h) on page 22.
  - The accessory wind baffle is recommended.
  - The Effective Capacity Loss table on this page provides the estimated percentage of nominal cooling capacity losses based on the standard required vapor line size versus what is selected for long-line applications.

Select the desired vapor line size from the Effective Capacity Loss table based on equivalent ft and desired vapor line size.

Subtract the nominal percentage loss from the unit cooling capacities for the given indoor and outdoor combination.

### FITTING LOSS IN EQUIVALENT FT FOR ELBOWS

TUBE SIZE O.D. (in.)	90-DEGREE SHORT RADIUS	90-DEGREE LONG RADIUS	45-DEGREE SHORT RADIUS
5/8	1.6	1.0	0.8
3/4	1.8	1.2	0.9

### CHATTLEFF COMMON PISTON SIZES

PISTON SIZE	PISTON SIZE	PISTON SIZE
32	53	80
33	55	81
35	57	82
36	59	84
37	61	86
38	62	88
39	63	89
40	65	90
41	67	92
42	68	93
43	70	96
45	71	98
47	73	101
49	74	104
51	76	—
52	78	—

### COOLING ONLY SYSTEM PISTON GUIDE AND REFRIGERANT CHARGES

INDOOR UNIT 619E__	OUTDOOR UNIT 538	PISTON REQUIRED (Size)	CHARGE (Lb)*
009	C__009	None	1.5
012	C__012	None	1.8
018	A__018	49	4.6
024	A__024	57	5.3

\*Charge based on 25 ft of interconnecting tubing. Charge may need to be added for longer tubing runs or when used with certain fan coils. Check unit nameplate for required charge.

**NOTES:**

- All 018,024 pistons are Chattleff type.
- All cooling units have a full factory charge.
- Service valves are front-seating type.

### HEAT PUMP SYSTEM PISTON GUIDE AND REFRIGERANT CHARGES

UNIT		COOLING PISTON SIZE	HEATING PISTON SIZE	REQUIRED SYSTEM CHARGE (Lb)*
Indoor 619E__	Outdoor 538D__			
009	009	30	32	1.5
012	012	42	42	2.0
018	018	51	47	5.0
024	024	49	52	5.1

\*Charge based on 25 ft of interconnecting tubing. Charge may need to be added for longer tubing runs or when used with certain fan coils. Check unit nameplate for required charge.

**NOTES:**

- All 009,012 pistons are Aeroquip type. All 018,024 pistons are Chattleff type.
- The 538D\_\_ heat pumps have a holding charge only as shipped from the factory.

### EFFECTIVE CAPACITY LOSS

NOMINAL UNIT SIZE*	STANDARD VAPOR LINE (in.)	LONG-LINE VAPOR LINE (in.)†	PERCENT COOLING CAPACITY LOSS						
			50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
18,000	5/8	5/8	1	3	4	5	7	9	10
	5/8	3/4	0	0	1	1	2	2	3
24,000	5/8	5/8	2	5	8	10	13	**	**
	5/8	3/4	0	0	1	2	3	4	5

\*Nominal cooling capacity of the unit being specified.

†The vapor line diameter that may be selected for long-line application. If smaller vapor lines than are specified in the table are selected, a larger capacity loss will occur. If larger vapor lines are selected, refrigerant oil return will be impaired due to velocity loss.

\*\*Not recommended due to excessive loss of capacity.

**NOTE:** Long-line applications (50 ft and longer) are not permitted on 009, 012 systems.

## APPLICATION DATA (cont)

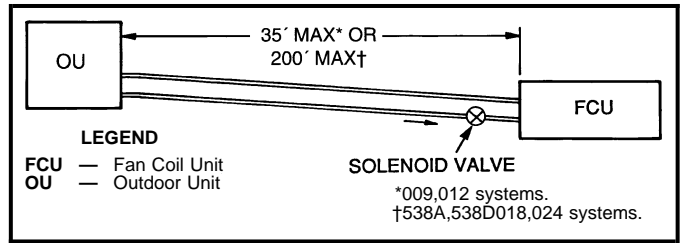
- e) Changes in piston size — The metering device for a long-line application must be adjusted to compensate for the frictional losses due to the long refrigerant lines, refrigerant line accessories, and indoor coil above or below the outdoor unit. The AccuRater® refrigerant metering device piston may need to be changed to provide this adjustment. The AccuRater piston should be changed for the indoor unit depending upon system configuration and line length. Use the Change in Indoor Unit Piston Size Elevation table on next page to determine correct AccuRater piston size. The standard piston size is shown in the System Piston Guide and Refrigerant Charges tables on page 21.
- f) Horizontal configuration — If the total equivalent horizontal length is 100 ft or longer, the indoor piston must be increased one full piston size, in addition to the charge change in Step I), page 23. If exact size is not available, use next smaller size per Chattleff Common Piston Sizes table.
- g) Elevated configuration — After finding the appropriate change in piston size, add or subtract the change from the original piston size number. If the piston size is decreased, round down to the next common piston size. If the piston size is increased, round the new piston size up to the next common piston size.
- h) Liquid line solenoid and tubing configuration — The solenoid has a flow arrow stamped on the valve body. When the valve is closed (not energized), the pressure is applied in the direction of the flow arrow, complete shut off will occur. If pressure is applied against the direction of the arrow, leakage through the valve will occur. When determining the proper location for a solenoid in a system liquid line, consider both flow direction and location of the valve in the system. See the diagram below for proper location, and install per sections i), j), and k) below.
- i) Horizontal configuration (see figure below) — Install a biflow (538D only or standard) liquid line solenoid valve within 2 ft of the fan coil with the flow arrow pointing toward the indoor unit if equivalent ft of piping is 100 ft or more.

Slope the vapor line toward the indoor unit to provide for refrigerant migration protection during the off cycle due to temperature differences caused by slight elevation changes between indoor and outdoor units.

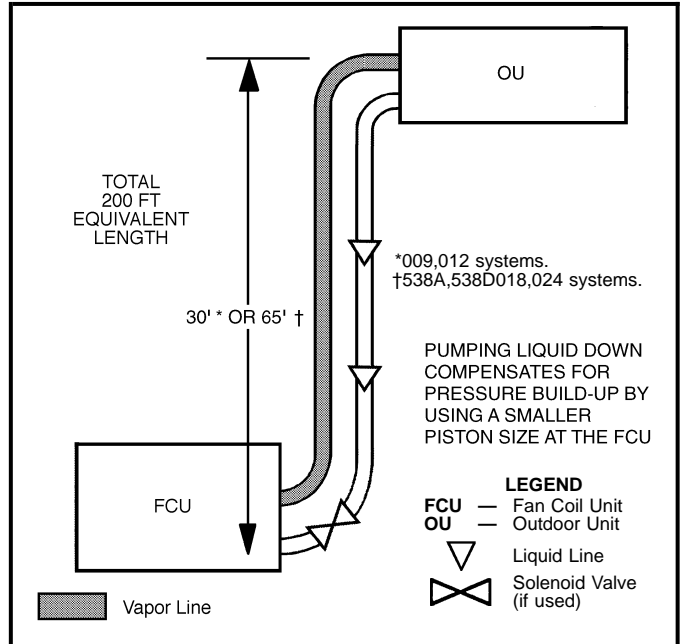
**NOTE:** When installing a liquid line solenoid, a low-voltage transformer may be required.

### CHANGE IN INDOOR UNIT PISTON SIZE FOR ELEVATION

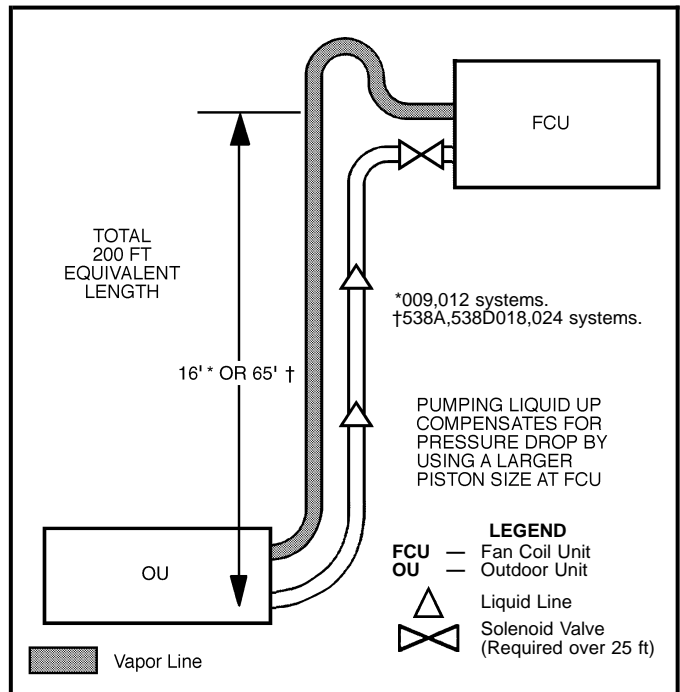
OUTDOOR UNIT ABOVE INDOOR UNIT	
Ft	Piston Change
0- 25	0
26- 50	-3
51- 75	-5
76-100	-7
101-125	-9
126-150	-10
INDOOR UNIT ABOVE OUTDOOR UNIT	
Ft	Piston Change
0-25	0
26-65	+4



**Horizontal Configuration**



**Lowered Configuration — Indoor Unit Installed Below the Outdoor Unit**



**Elevated Configuration — Indoor Unit Installed Above the Outdoor Unit**

## APPLICATION DATA (cont)

- j) Elevated configuration — Indoor unit installed above the outdoor unit (see figure at right):
- If there is over 25 ft of lift, a biflow (538D only) or standard solenoid valve is required in the liquid line.
  - The maximum elevation difference is 65 ft, and the maximum equivalent ft of piping is 200.
  - Install an inverted trap in the vapor line. The top of the trap must be above the top of the fan coil. This prevents the refrigerant from collecting in the vapor line.
- k) Lowered configuration — Indoor unit installed below the outdoor unit (see figure at right):
- For lines shorter than 100 ft, no solenoid valve is required in the liquid line. For lines over 100 ft, install a biflow (538D only) or standard solenoid valve in the liquid line.
  - The maximum elevation difference is 150 ft, and the maximum equivalent ft is 200.
- l) Additional charge — The unit should be charged by weighing in the appropriate charge. Add charge based on the actual length of line which is over 25 ft of **liquid line**. Add .58 oz of refrigerant per 1 ft increase over the 25 ft line to the charge listed in System Piston Guide and Refrigerant Charges table on page 21.

**NOTE:** This only applies to systems where the piston is located at the indoor unit (538A018,024 and 538D018,024).

### 12. Group control

The 619E fan coil units may be group controlled from a single timeclock or energy management system by interrupting the 24-v power to the control board.

### 13. Thermistors (Heat Pump Systems Only)

Thermistors are used on both indoor and outdoor units to determine operating conditions. Proper thermistor location is critical to unit operation. All thermistors have identical resistance values. See Thermistor Equivalence charts on typical system wiring schematics (pages 24-27).

Thermistor cable assemblies are provided with fan coil units to run between indoor and outdoor units. High-voltage

and thermistor cable assemblies should not touch each other, and cable runs may be extended up to 200 ft.

### 14. Wiring

Use only copper wires from the disconnect to the unit terminal block. Aluminum and copper-clad aluminum wires are not acceptable.

All duct-free split systems (except the 009,012 outdoor units) provide 24-v power for the outdoor unit in the duct-free fan coil. The 009,012 outdoor units systems use high-voltage controls.

The 009,012 outdoor units system fan coil units must have power wires run from the outdoor condensing unit to the indoor unit to prevent out-of-phase wiring.

### 15. Air throw

Refer to Air Throw Data table below for system air throw capabilities.

#### AIR THROW DATA\*

FAN COIL SIZE	HIGH SPEED CFM	APPROXIMATE AIR THROW (FT)
009	215/252*	16
012	302	24
018	480/455*	30
024	550/525*	35

\*Cooling only unit/Heat pump unit.

**NOTE:** Air throw is with unit mounted with typical clearances in a 10-ft high room.

### 16. Sound data

#### CONDENSING UNIT SOUND RATINGS

UNIT SIZE	SOUND RATING (Decibels)	FREE FIELD dBA*
009	66	55.7
012	66	55.7
018	68	57.7
024	68	57.7

#### LEGEND

**Decibels** — Sound levels  
**dBA** — Decibels on the A Scale

\*Free field is a rating with no reflective surfaces near the unit. Data sound pressure is measured at 3.2 ft (1 m) from the unit. See Sound Power Data Octave Bands table for more information.

### SOUND POWER DATA OCTAVE BANDS — A WEIGHTED (Fan Coil Units Only)

UNIT	FAN SPEED	OCTAVE BAND DATA (dBA)						
		125	250	500	1000	2000	4000	8000
619F_009 Cooling Only	High	36.5	40.3	45.2	48.2	42.3	33.2	31.2
	Medium	32.8	37.9	43.6	44.9	39.1	29.8	31.2
	Low	31.7	36.6	41.6	41.6	35.4	27.7	31.2
619F_009 Heat Pump	High	38.2	41.1	46.2	47.9	43.0	33.6	31.2
	Medium	31.7	39.8	45.0	45.3	42.0	36.8	36.8
	Low	29.2	38.4	43.9	41.9	38.6	28.1	31.2
619F_012 Cooling Only	High	36.7	43.5	50.2	51.1	46.5	38.6	31.7
	Medium	33.6	42.5	47.1	48.8	43.4	36.2	33.4
	Low	33.5	41.6	43.8	45.6	39.8	33.0	32.7
619F_012 Heat Pump	High	35.1	43.8	50.3	51.1	46.4	38.0	31.2
	Medium	31.7	43.3	46.3	48.6	42.9	34.2	31.2
	Low	29.1	42.2	42.9	45.6	39.1	30.3	31.2
619F_018 Cooling Only	High	40.8	49.1	53.7	55.2	49.1	41.3	32.3
	Medium	38.0	46.7	50.6	51.7	44.9	35.8	31.6
	Low	37.3	44.4	47.5	48.6	40.4	32.0	31.6
619F_018 Heat Pump	High	37.0	44.4	49.3	50.4	43.4	35.6	31.9
	Medium	39.8	46.9	52.2	53.7	47.4	40.1	32.7
	Low	43.2	49.1	54.0	56.0	50.7	44.0	34.0
619F_024 Cooling Only	High	44.9	51.9	59.1	59.5	54.8	48.0	36.7
	Medium	43.7	50.5	57.2	57.0	51.8	44.4	33.6
	Low	40.7	47.7	55.1	54.7	49.0	40.5	32.2
619F_024 Heat Pump	High	43.8	51.5	58.5	58.8	53.5	46.2	36.0
	Medium	41.4	49.5	56.5	56.2	50.4	42.5	36.0
	Low	38.9	47.3	54.4	53.7	47.4	39.0	36.0

#### LEGEND

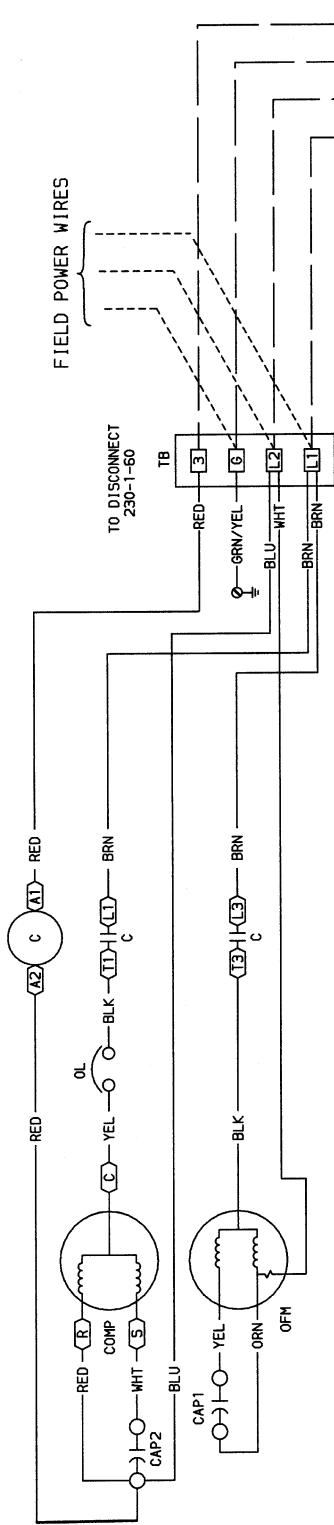
**ARI** — Air Conditioning & Refrigeration Institute  
**dBA** — Decibels on the A scale

#### NOTES:

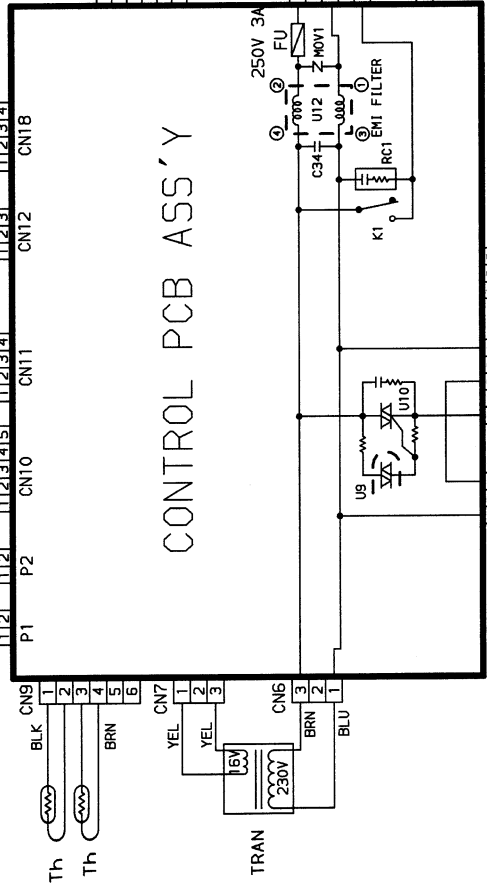
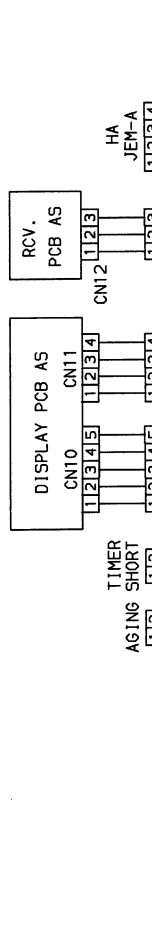
1. Outdoor sound levels are tone corrected values taken in accordance with ARI Sound Standard 270.
2. Indoor sound levels are tone corrected values taken in accordance with ARI Sound Standard 350.

TYPICAL WIRING SCHEMATIC — 538C009,012 COOLING ONLY SYSTEM (012 Shown)

538C-OUTDOOR SECTION



619E COOLING ONLY FAN COIL



RELAY CHART	
Compressor	K1

(See Legend and Notes, page 28.)

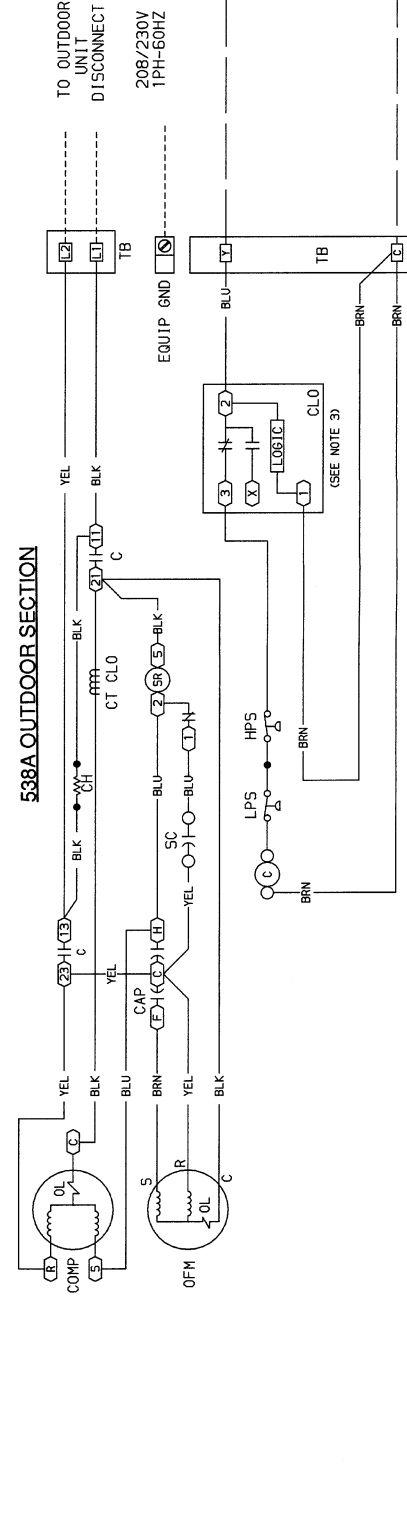
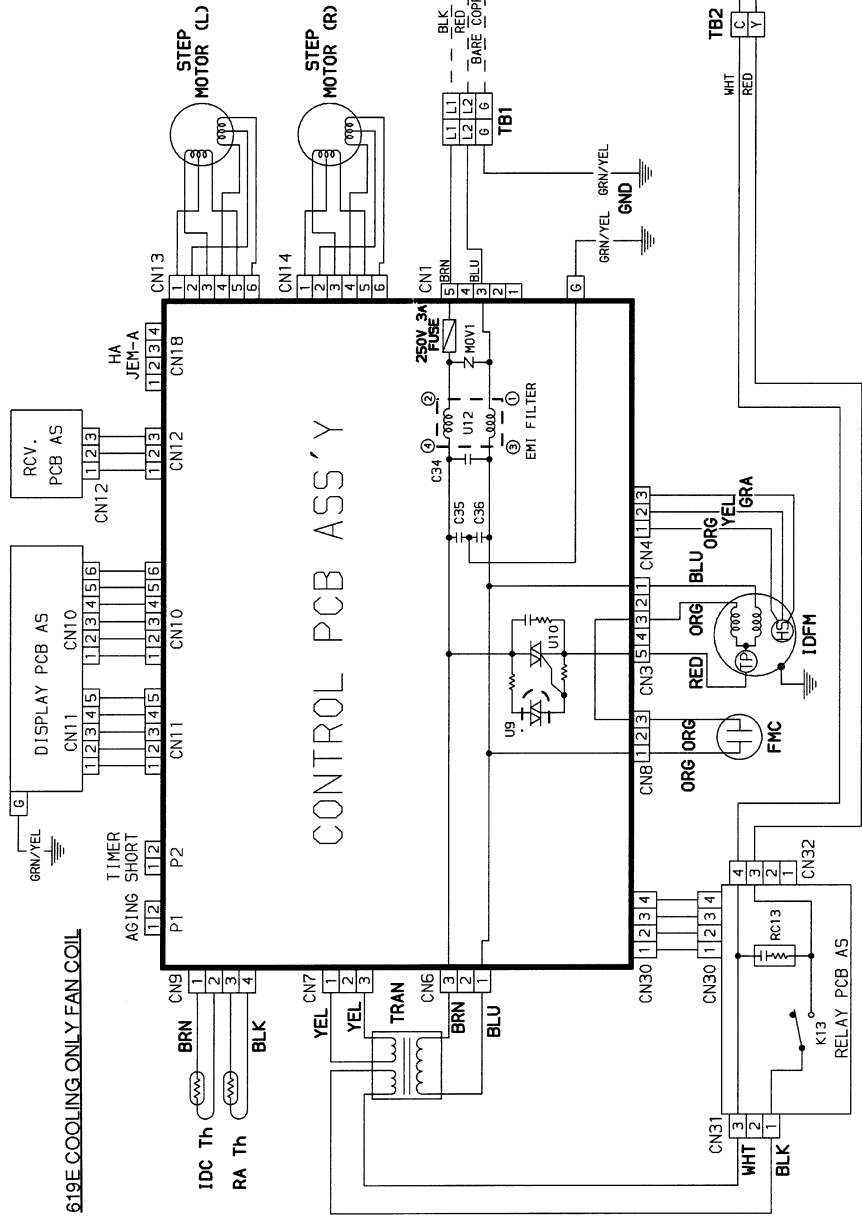


TYPICAL WIRING SCHEMATIC — 538A018,024 COOLING-ONLY SYSTEM

RELAY CHART	
Compressor	K13

THERMISTOR EQUIVALENCE		
Temperature	°C	Resistance
95	35	6,500
72	22	11,400
32	0	32,500

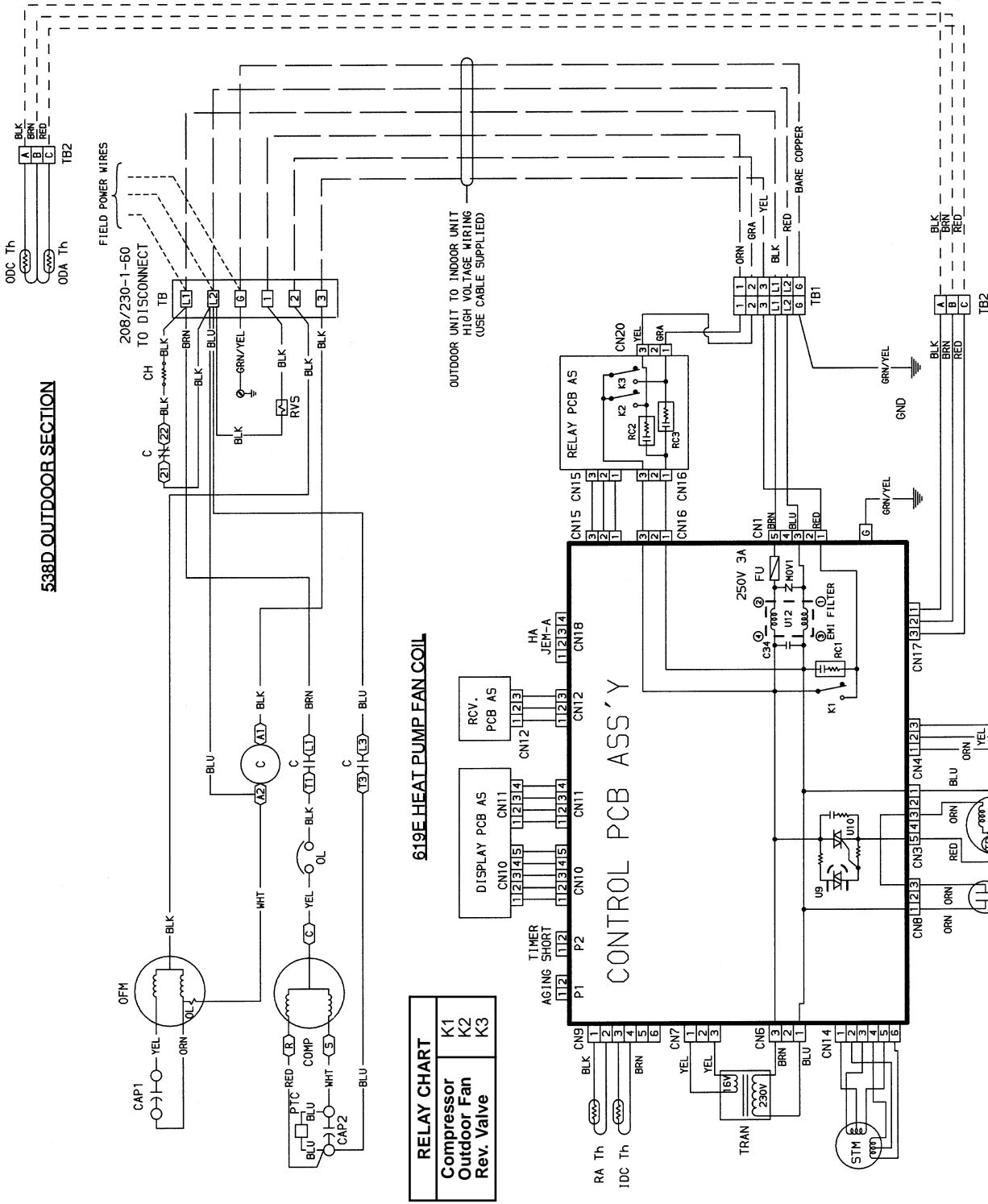
All thermistors in the 619E systems are identical to each other



(See Legend and Notes, page 28.)

TYPICAL WIRING SCHEMATIC, 538D009.012 HEAT PUMP SYSTEM (012 Shown)

538D\_OUTDOOR\_SECTION

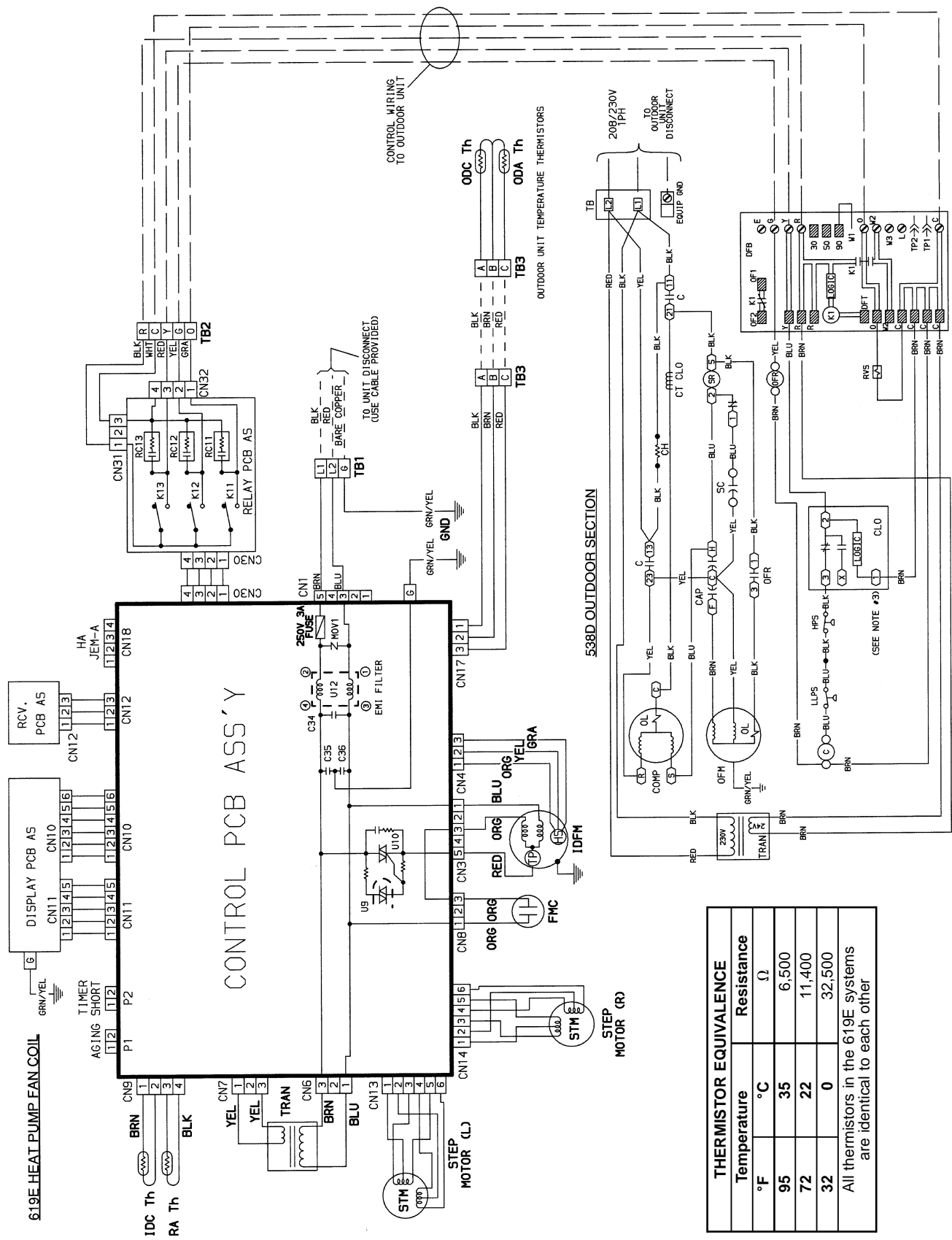


**RELAY CHART**

Compressor	K1
Outdoor Fan	K2
Rev. Valve	K3

(See Legend and Notes, page 28.)

TYPICAL WIRING SCHEMATIC — 538D018,024 HEAT PUMP SYSTEM











THERMISTOR EQUIVALENCE	
Temperature	Resistance
°F	Ω
95	6,500
72	11,400
32	32,500
All thermistors in the 619E systems are identical to each other	

(See Legend and Notes, page 28.)

## LEGEND AND NOTES FOR TYPICAL WIRING SCHEMATICS

<b>AGING</b>	— For Burn-In Test (short terminals)
<b>AS</b>	— Assembly
<b>C</b>	— Contactor
<b>CAP</b>	— Capacitor
<b>CH</b>	— Crankcase Heater
<b>CLO</b>	— Compressor Lockout
<b>CN</b>	— Connector
<b>COMP</b>	— Compressor
<b>CT CLO</b>	— Current Sensing Loop (Lockout)
<b>DFB</b>	— Defrost Board
<b>DFT</b>	— Defrost Thermostat
<b>EMI</b>	— Electromagnetic Interference
<b>FMC</b>	— Fan Motor Capacitor
<b>FU</b>	— Fuse
<b>GND</b>	— Ground
<b>HA</b>	— Home Automation
<b>HPS</b>	— High-Pressure Switch
<b>IDC TH</b>	— Indoor-Coil Thermistor
<b>IDFM</b>	— Indoor-Fan Motor
<b>JEM-A</b>	— Japan Electric Manufacturing Industry Association
<b>K</b>	— Relay
<b>LLPS</b>	— Liquid Low Pressure Switch
<b>LPS</b>	— Low-Pressure Switch
<b>ODA TH</b>	— Outdoor-Air Thermistor
<b>ODC TH</b>	— Outdoor-Coil Thermistor
<b>OFM</b>	— Outdoor-Fan Motor

### LEGEND

<b>OFR</b>	— Outdoor-Fan Relay
<b>OL</b>	— Overload
<b>PCB</b>	— Printed Circuit Board
<b>PTC</b>	— Start Thermistor
<b>RA TH</b>	— Return-Air Thermistor
<b>RC</b>	— Resistor Capacitor
<b>RCV</b>	— Receiver
<b>RVS</b>	— Reversing Valve Solenoid
<b>SC</b>	— Start Capacitor
<b>SR</b>	— Start Relay
<b>STM</b>	— Step Motor
<b>TB</b>	— Terminal Block
<b>TP</b>	— Thermal Protector
<b>TRAN</b>	— Transformer
	Terminal (Marked)
	Terminal (Unmarked)
	Splice
	Terminal Block
	Factory Wiring
	Field Control Wiring
	Field Power Wiring
	Accessory or Optional Wiring

### NOTES:

1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
2. Wire in accordance with National Electrical Code (NEC) and local codes.
3. The CLO locks out the compressor to prevent short cycling on compressor overloads and safety devices. Before replacing CLO, check these other devices. A minimum 1 amp turn is required to hold contacts closed.
4. A thermistor wiring cable is provided with the fan coil unit.
5. Compressor and fan motors are protected by internal thermal overloads.
6. Transformer has an internal 2 amp thermal fuse on the primary side.

## OPERATING SEQUENCE

**619E CONTROL SYSTEM** — The 619E unit is equipped with a microprocessor control which operates the system. This control is located in the control box of the fan coil unit, with thermistors located in the fan coil inlet and on the indoor coil. The 619E heat pump fan coil units also have thermistors located on the outdoor coil and in the outdoor air inlet. These thermistors monitor system operation and control the operating mode. To change settings or modes of operation, use the factory-supplied infrared wireless remote controller. This controller allows the fan coil unit to be operated from within the same room without any wire connections to the unit.

The remote controller includes a wall-mounted bracket. To install the bracket, attach bracket to the wall using factory-supplied, double-sided tape. Install factory-supplied batteries into the remote controller, and place the controller into the bracket so that it will be ready for use.

**OPERATING MODE MEMORY** — After the system is turned off or after a power failure, the system remains in the last operating mode selected. When the system is turned back on, or when power is automatically restored, operation continues in the same operating mode as when power shut down.

**AUTOMATIC OPERATION (AUTO.) MODE** — If auto. mode is selected, the system automatically switches the operating mode from heating (heat pump system only) to cooling, or from cooling to heating (heat pump system only) depending on the selected temperature.

**NOTE:** Between the cooling cycle and the heating cycle there is a neutral zone of approximately 2° F above and 2° F below the selected temperature when only the fan is operating.

**OPERATING FAULT DIAGNOSIS** — The system includes an automatic diagnosis feature which is activated under difficult or unacceptable operating conditions. If such conditions occur, the system stops automatically, the operating fault signal appears (green “UNIT ON” light on the front of the fan coil unit flashes), and an analysis of the system operating conditions is initiated. The system will then be restarted automatically, as soon as normal conditions have been restored, or it will remain off. If the

system does not start again, the green “UNIT ON” light will flash an error code.

**MICROPROCESSOR CONTROL OPERATION** — This system is controlled by a microprocessor designed to give optimum levels of comfort and operating efficiency. The control is located in the 619E unit. To operate the unit, the factory-supplied remote controller is required.

There are 8 (619E cooling-only systems) or 10 (619E heat pump systems) operating modes (including the off mode) for the unit. Each mode operates as follows:

- **Off Mode** — When the unit is in the off mode, all functions (compressor, outdoor fan, indoor fan, and air sweep) are off, except the reversing valve (619E heat pump units only), which will stay energized if the unit was last operated in the cooling mode.
- **Air Circulation Mode (Fan Operation Only)** — When air circulation mode is selected, the indoor fan will operate continuously in the selected speed (high, medium, low, or auto.). If the auto. mode is selected, the indoor fan will operate at low speed. The compressor and outdoor fan are off. The reversing valve (619E heat pump units only) will remain in the last operating mode.
- **Cooling Mode** — When the cooling mode is selected, the indoor fan will operate continuously at the selected speed if the speed is high, medium, or low. If the indoor fan is in auto. mode, the fan will change operating speeds depending on the difference between the room temperature and the set point. The reversing valve (619E heat pump units only) will be on. The compressor cannot run for 3 minutes from the time the system starts up or for 3 minutes from the time the compressor last operated. When the temperature of the room is equal to or greater than the selected temperature, the compressor and outdoor fan will operate until the room temperature is 2° F below the set point, and then shut off. When the room temperature is less than the selected temperature, the compressor and outdoor fan remain off.

## OPERATING SEQUENCE (cont)

- **Maximum Dehumidification Mode** — When the dehumidification mode is selected, the indoor fan will operate continuously at the selected speed if the speed is high, medium, or low. If the indoor fan is in auto. mode, the fan will change operating speeds depending on the room temperature. If the room temperature is below the set point, the indoor fan will run at ultra-low speed, and the compressor could run for up to 4 minutes. (Ultra-low speed is a control-driven speed [not user configurable] used to sample the space when the fan would normally be off.) The reversing valve (619E heat pump units only) will be on. The compressor cannot run for 3 minutes from the time the system starts up or for 3 minutes from the time the compressor last operated.

**Initial Operation** — When the mode is first selected, one of the following occurs:

1. If the room temperature is above or equal to the selected temperature, the unit will operate for 16 minutes, and the compressor and outdoor fan will operate. The indoor fan will operate as in the cooling mode. After 16 minutes of operation (or when the room reaches 2° F below set point), the unit switches to normal dehumidification operation.
2. If the room temperature is below the selected temperature, the unit will operate for 8 minutes as follows: the compressor and outdoor fan will operate for 3 minutes. The indoor fan will operate in low speed, and 30 seconds after the compressor stops, the indoor fan stops. The unit remains off for 1 minute, and then the indoor fan starts in ultra-low speed for 30 seconds. The unit then switches to normal dehumidification operation.

**Normal Operation** — One of the following will take place:

1. When the temperature of the room is equal to or greater than the selected temperature (by not more than 3° F), the unit will operate for 8 minutes as follows: the compressor and outdoor fan will operate for 3 minutes. The indoor fan will operate in low speed, and 30 seconds after the compressor stops, the indoor fan stops. The unit remains off for 1 minute, and then the indoor fan starts in ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature.
  2. If the room temperature is equal to or greater than the selected temperature, but not by more than between 4° F and 6° F, the compressor and outdoor fan operate for 4 minutes. The indoor fan will run at ultra-low speed and will stop 30 seconds after the compressor stops. After 3 minutes, the indoor fan runs at ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature.
  3. When the room temperature is equal to or greater than 4° F below the selected temperature, the system operates as follows: The compressor and outdoor fan operate for 3 minutes. The indoor fan will operate at ultra-low speed and will stop 30 seconds after the compressor stops. After 4 or 5 minutes, the indoor fan starts in ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature. If the room temperature is still 4° F below the selected temperature, the compressor, outdoor fan, and indoor fan remain off. After 7½ minutes, the indoor fan operates at ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature.
- **Heat Pump Heating Mode (Heat Pump Systems Only)** — When the heat pump mode is selected, the indoor fan will operate at the selected speed if the speed is high, medium, or low, unless overridden by the coil temperature (to prevent cold drafts). If the indoor fan is in auto. mode, the fan will

change operating speeds depending on the difference between the room temperature, the set point, and the coil temperature. The reversing valve will be off. The compressor cannot run for 3 minutes from the time the system starts up or for 3 minutes from the time it last operated. When the temperature of the room is 8° F below the selected temperature, the unit will operate in heat pump mode until the temperature is 6° F above the selected temperature, or the compressor runs for 40 minutes (whichever comes first). If the temperature of the room is less than 7° F below or equal to the selected temperature, the unit operates in heat pump mode until the selected set point temperature plus 2° F is reached.

- **Demand Defrost Mode (Heat Pump Systems Only)** — This unit uses a demand defrost system to remove frost from the outdoor coil during heating operation. The indoor and outdoor fans are shut off during defrost mode. See Electronic Control Defrost Regions map on page 30 for defrost region details.
- **Sleep Mode** — The sleep mode timer will turn the unit off when the timer reaches zero minutes. During the first 1½ hours from the time the sleep mode timer starts, the room temperature is set back from the selected temperature a total of 4° F in cooling and 6° F in heating (538D only).
- **Awake Mode** — The awake timer will turn the unit on when the timer reaches zero minutes. The unit will start in the same mode and at the same selected temperature as when the system shut off.
- **Automatic Operation Mode for Cooling Only Systems** — The unit samples the air in the room. Based on the room temperature, the unit selects one of the following modes:

1. **Cooling Mode** — If the room temperature is more than 82.4 F with a preset temperature of 78.8 F.
2. **Dry Mode** — If the room temperature is more than 75.2 F and less than 82.4 F with a preset temperature of 77 F.
3. **Fan Only Mode** — If the room temperature is less than 75.2 F.

The preset temperature can be changed by ±4 F using the remote control.

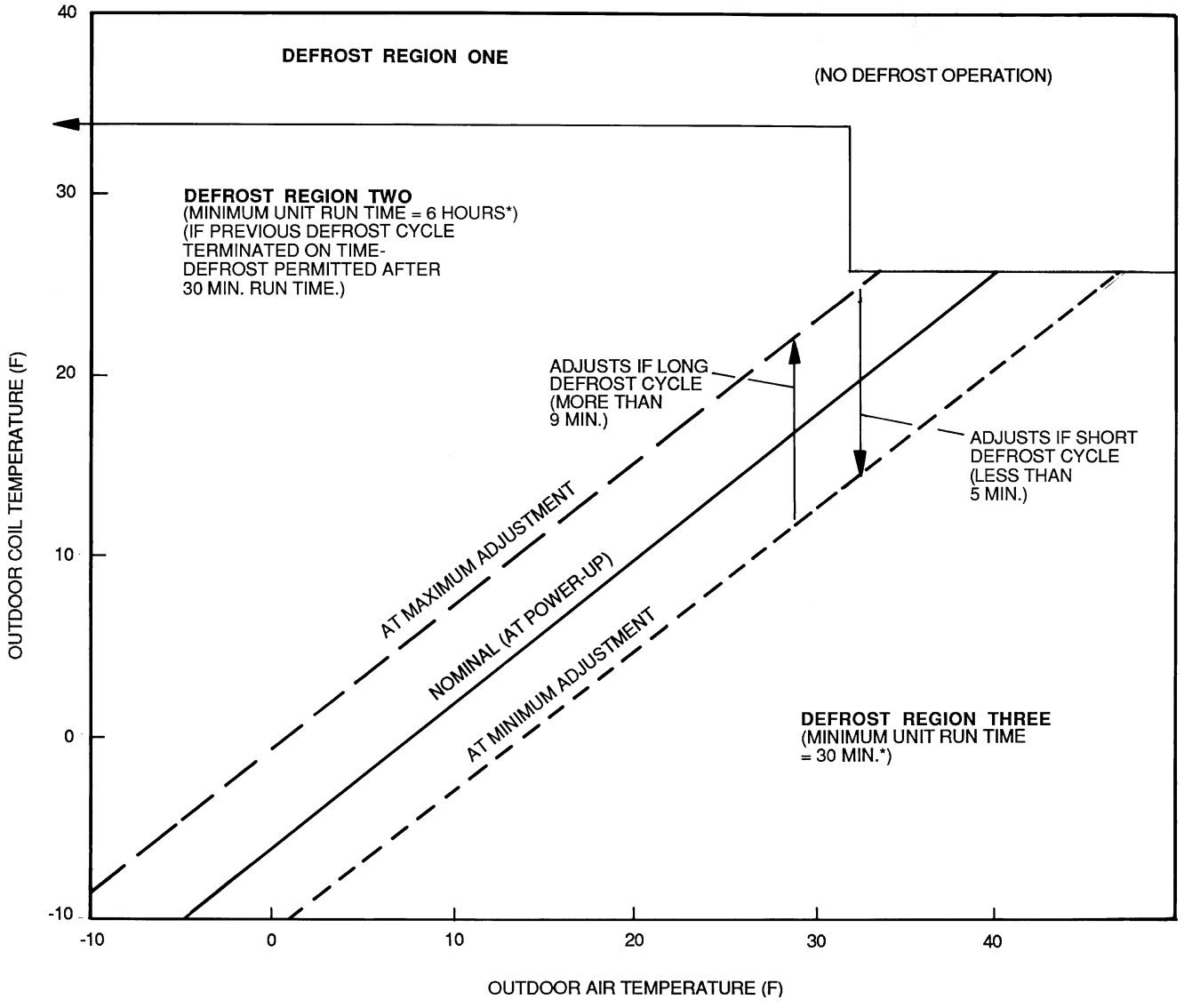
- **Automatic Operation Mode for Heat Pump Systems (538B)** — The operation mode will be determined after 20 seconds of room monitoring (to determine the room temperature and the outdoor air temperature).
- **Test Mode** — The test mode can be selected by setting the slide switch on the fan coil unit to TEST position. The slide switch is located on the front of the unit. The fan coil unit will start immediately (there is no compressor time delay when using test mode) in cooling mode with an infinitely low set point. The indoor fan speed will be at the high setting, and the swing louvers will be on (moving up and down).

**NOTE:** The unit cannot be controlled by the remote controller until the slide switch is returned to the REMOTE position.

- **Emergency Mode** — This mode is only to be used if the remote controller is lost, damaged, or the batteries are discharged. To initiate emergency mode, manually move the slide switch on the fan coil unit to the EMER position. The unit is automatically operated in cooling or heating (538D units only) mode according to room temperature. Emergency operation settings are as follows:

1. Operation mode: AUTO.
2. Fan Speed: AUTO.
3. Cooling set point: 77 F
4. Timer mode: Continuous

**NOTE:** The unit cannot be controlled by the remote controller until the slide switch is returned to the REMOTE position.



\*Minimum unit run time starts when outdoor coil temperature drops below 34 F, then accumulates run time regardless of coil temperature.

**Electronic Control Defrost Regions Map**

## ENGINEER'S SPECIFICATION GUIDE — OUTDOOR UNITS (Models 538A, 538C, 538D, and 538S )

**GENERAL:** Furnish and install a Model 538A, 538C, 538D, or 538S air-to-air outdoor unit in combination with a fan coil unit in the location and manner shown on the plan drawings. The unit shall be designed and tested for use with Refrigerant R-22 and shall be equipped with refrigerant line fittings which permit sweat or flare connections.

Nominal system electrical characteristics shall be \_\_\_\_\_ v, single phase, 60 Hz. Each unit shall be capable of satisfactory operation within voltage range of \_\_\_\_\_ v to \_\_\_\_\_ v.

**MAXIMUM DIMENSIONS:** Outdoor unit — width \_\_\_\_\_ in., depth \_\_\_\_\_ in., height \_\_\_\_\_ inches.

**COOLING CAPACITY:** Total system cooling capacity shall not be less than \_\_\_\_\_ Btuh with indoor air quantity of \_\_\_\_\_ cfm at \_\_\_\_\_ F wet bulb temperature of air entering outdoor unit. Sensible heat capacity shall not be less than \_\_\_\_\_ Btuh with \_\_\_\_\_ F dry bulb temperature. Compressor power input shall be \_\_\_\_\_ v or less at these conditions.

**HEATING CAPACITY (Heat Pump Systems Only):** Total heating capacity shall be \_\_\_\_\_ Btuh or greater (integrated rating) when rated at \_\_\_\_\_ F dry-bulb outdoor ambient with \_\_\_\_\_ cfm and \_\_\_\_\_ F entering (heating) coil. The equipment must have a minimum HSPF of \_\_\_\_\_. Compressor shall be capable of operation in heating duty down to -20 F outdoor ambient air temperature (with accessory low-ambient kit). Unit shall be capable of simultaneous heating duty and defrost cycle operation.

**OUTDOOR SECTION:** The coil shall be constructed of aluminum plate fins mechanically bonded to copper tubing with all joints brazed. Coil shall be \_\_\_\_\_ rows deep with a nominal fin spacing of \_\_\_\_\_ fins per in., and shall have a face area of not less than \_\_\_\_\_ square ft.

Outdoor unit shall contain a fully hermetic compressor with a crankcase heater (non-scroll units), oil system, operating oil charge, internal motor protection, and spring isolation. Outdoor fans shall be direct-drive propeller type, shall discharge air horizontally, shall be totally enclosed, and shall have permanently lubricated sleeve bearings.

**CONTROL CIRCUIT:** Controls and protective devices shall include time-delay restart, automatic restart on power failure, 3-pole contactors (3 phase units), safety lockout if any safety is open, high-pressure and loss-of-pressure switches, automatic outdoor-fan motor protection, start capacitor and relay (single-phase units without scroll compressors), system diagnostics and high condensing temperature protection, compressor motor current and temperature overload protection, high pressure relief, and outdoor fan failure protection. A 24-v transformer shall be factory installed and wired on outdoor units for external control circuit (size 018 and 024 only).

**APPROVALS:** Unit shall be constructed in accordance with ASHRAE 15 (latest revision), NEC, and CSA. Unit shall carry the UL listing label.

**FIELD-INSTALLED ACCESSORIES:** Low-ambient kit (538A, 538C, 538D), liquid solenoid valve, wall mount kit, crankcase heater (reciprocating-compressor units only) and winter start kit (538C, 538S).

## ENGINEER'S SPECIFICATION GUIDE — HIGH WALL FAN COIL UNITS (Model 619E)

**GENERAL:** Furnish and install indoor, wall-mounted, draw-thru, direct expansion, indoor cooling only or heat pump fan coil unit to be used without ductwork. Unit shall consist of tangential, direct-drive fan, fan motor, cooling coil, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be capable of being used in a refrigerant circuit with a matching air-cooled outdoor condensing unit.

Nominal unit electrical characteristics shall be \_\_\_\_\_ v, single phase, 60 Hz. The unit shall be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.

Unit shall be capable of providing a constant volume of air at a specified external static pressure within the unit nominal operating range.

**MAXIMUM DIMENSIONS:** Indoor unit — width \_\_\_\_\_ in., depth \_\_\_\_\_ in., height \_\_\_\_\_ inches.

**CABINET:** Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.

**FAN SECTION:** Fan shall be tangential direct-drive blower type with air intake at the upper front face of the unit and discharge at the bottom front. Automatic, motor-driven horizontal air sweep shall be provided standard.

Air sweep operation shall be user selectable. Vertical direction may be manually adjusted and horizontal air sweep may be manually set.

**COIL SECTION:** Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap and auxiliary drip pan under coil header.

**NOTE:** The 009 and 012 units use capillary tubes in the OUTDOOR unit for refrigerant control, and the 018,024 units use the accessory AccuRater® piston refrigerant metering device in the INDOOR unit except systems using 538S outdoor units. These systems have a thermostatic expansion valve in the outdoor unit.

**CONTROLS:** Controls shall consist of a microprocessor-based control system which shall provide the following functions as a minimum: automatic restart, a timer function, temperature-sensing controls, evaporator coil freeze protection, wireless infrared remote control, auto. stop features, automatic air sweep control, dehumidification mode, fan-only operation, diagnostics, a 25-ft indoor-to-outdoor thermistor connection cable, user-selectable fan speed control, compressor restart time delay, and condenser high-temperature protection.

**ACCESSORIES:** Condensate pump.



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE  
UNIT MUST BE INSTALLED IN ACCORDANCE  
WITH INSTALLATION INSTRUCTIONS