HS29 SERIES UNITS

The HS29 is a residential split-system condensing unit. Condensing coil size, circuiting and air volume result in a minimum SEER rating of 10.0. The series is designed for use with an expansion valve or RFCIV system in the indoor unit. However, the HS29-651 and -060 use only the TXV system.

The HS29-141 and -012 utilizes a rotary compressor. Other HS29 units (-018, -024-2 and -211 through -653) utilize a reciprocating compressor. All compressors are hermetically sealed for trouble-free operation and long service life. Compressor components are spring-mounted within the sealed housing. The compressor is installed in the unit on resilient rubber mounts to assure quiet, vibration-free operation. A built-in protection device assures protection from excessive current and temperatures.

HS29-460 through HS29-650 models are furnished with crankcase heaters to assure proper compressor lubrication at all times. The heater is temperature-actuated and operates only when required. HS29-024-3 and HS29-030 through -060 units utilize a scroll compressor. The scroll operates like a standard compressor but it is unique in the way it compresses refrigerant.

Several models are available in sizes ranging from 1 through 5 tons.

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

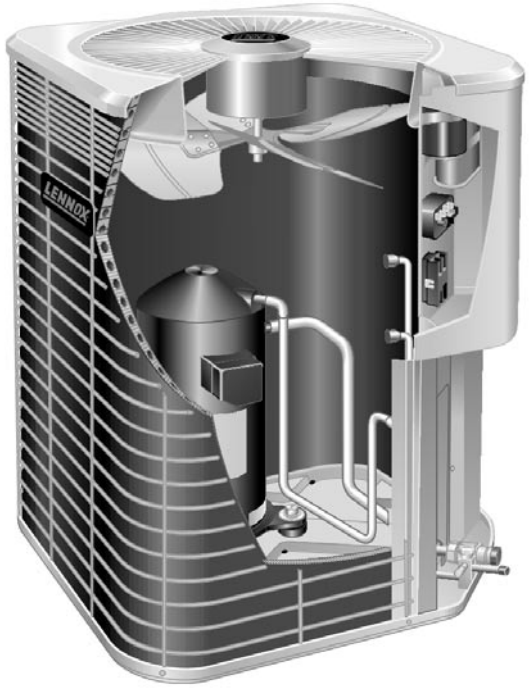
Failure to follow this warning may result in personal injury or death.

⚠ IMPORTANT

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

This manual is divided into sections which discuss the major components, refrigerant system, charging procedure, maintenance and operation sequence.

All specifications in this manual are subject to change.



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SPECIFICATIONS

Model No.			HS29-141	HS29-211	HS29-261	HS29-311
Condenser Coil	Net face area - sq. ft. (m^2)	Outer coil	7.56 (0.70)	11.33 (1.05)	11.33 (1.05)	13.22 (1.23)
		Inner coil	- - - -	- - - -	- - - -	- - - -
	Tube diameter — in. (mm) & no. of rows		5/16 (7.9) — 1	5/16 (7.9) — 1	5/16 (7.9) — 1	5/16 (7.9) — 1
	Fins per inch (m)		22 (866)	22 (866)	22 (866)	22 (866)
Condenser Fan	Diameter — in. (mm) & no. of blades		18 (457) — 3	18 (457) — 3	18 (457) — 3	18 (457) — 3
	Motor hp (W)		1/6 (124)	1/6 (124)	1/6 (124)	1/6 (124)
	Cfm (L/s)		2400 (1135)	2400 (1135)	2400 (1135)	2460 (1160)
	Rpm		1105	1105	1105	1125
	Watts		180	180	180	170
*Refrigerant charge furnished (HCFC-22)			2 lbs. 12 oz. (1.25 kg)	3 lbs. 10 oz. (1.64 kg))	3 lbs. 13 oz. (1.73 kg))	4 lbs. 5 oz. (1.96 kg)
Liquid line — in. (mm) o.d. connection (sweat)			†3/8 (9.5)	†3/8 (9.5)	†3/8 (9.5)	†3/8 (9.5)
Suction line — in. (mm) o.d. connection (sweat)			5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	3/4 (19.1)
Shipping weight — lbs. (kg) 1 package			146 (66)	146 (66)	148 (67)	157 (71)

*Refrigerant charge sufficient for 20 ft. (6.1 m) length of refrigerant lines.
†3/8x5/16 in. (9.5x7.9mm) adaptor furnished for liquid line connection.

SPECIFICATIONS (contd.)

Model No.			HS29-411 HS29-413	HS29-461 HS29-463	HS29-511 HS29-513	HS29-651 HS29-653	HS29-681 HS29-683
Condenser Coil	Net face area - sq. ft. (m^2)	Outer coil	15.11 (1.40)	15.11 (1.40)	15.11 (1.40)	15.21 (1.41)	21.11 (1.96)
		Inner coil	- - - -	5.40 (0.50)	5.44 (0.50)	14.0 (13.4)	20.3 (1.89)
	Tube diameter — in. (mm) & no. of rows		5/16 (7.9) — 1	5/16 (7.9) — 1.37	5/16 (7.9) — 1.37	5/16 (7.9) — 2	5/16 (7.9) — 2
	Fins per inch (m)		22 (866)	22 (866)	22 (866)	22 (866)	22 (866)
Condenser Fan	Diameter — in. (mm) & no. of blades		18 (457) — 4	18 (457) — 4	18 (457) — 4	18 (457) — 4	18 (457) — 4
	Motor hp (W)		1/6 (124)	1/6 (124)	1/3 (249)	1/3 (249)	1/3 (249)
	Cfm (L/s)		2520 (1190)	2500 (1180)	2950 (1390)	2930 (1385)	2930 (1385)
	Rpm		1100	1100	1100	1100	1100
	Watts		200	200	310	310	310
*Refrigerant charge furnished (HCFC-22)			5 lbs. 0 oz. (2.26 kg)	5 lbs. 9 oz. (2.52 kg)	6 lbs. 3 oz. (2.81 kg)	7 lbs. 10 oz. (3.46 kg)	12 lbs. 0 oz. (5.44 kg)
Liquid line — in. (mm) o.d. connection (sweat)			3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)
Suction line — in. (mm) o.d. connection (sweat)			3/4 (19.1)	7/8 (22.2)	7/8 (22.2)	1-1/8 (28.6)	1-1/8 (28.6)
Shipping weight — lbs. (kg) 1 package			165 (75)	191 (87)	196 (89)	212 (96)	254 (115)

*Refrigerant charge sufficient for 20 ft. (6.0 m) length of refrigerant lines.

SPECIFICATIONS (contd.)

Model No.			HS29-012	HS29-018	HS29-024	HS29-030
Condenser Coil	Net face area - sq. ft. (m^2)	Outer coil	7.56 (0.70)	11.33 (1.05)	11.33 (1.05)	13.22 (1.23)
		Inner coil	- - - -	- - - -	- - - -	- - - -
	Tube diameter — in. (mm) & no. of rows		5/16 (7.9) — 1	5/16 (7.9) — 1	5/16 (7.9) — 1	5/16 (7.9) — 1
	Fins per inch (m)		22 (866)	22 (866)	22 (866)	18 (748)
Condenser Fan	Diameter — in. (mm) & no. of blades		18 (457) — 3	18 (457) — 3	18 (457) — 3	18 (457) — 3
	Motor hp (W)		1/6 (124)	1/6 (124)	1/6 (124)	1/6 (124)
	Cfm (L/s)		2400 (1135)	2400 (1135)	2400 (1135)	2545 (1201)
	Rpm		1105	1105	1105	1110
	Watts		180	180	180	195
*Refrigerant charge furnished (HCFC-22)			3 lbs. 1 oz. (1.38 kg)	3 lbs. 7 oz. (1.55 kg)	3 lbs. 10 oz. (1.64 kg)	4 lbs. 1 oz. (1.83 kg)
Liquid line — in. (mm) o.d. connection (sweat)			†3/8 (9.5)	†3/8 (9.5)	†3/8 (9.5)	†3/8 (9.5)
Suction line — in. (mm) o.d. connection (sweat)			5/8 (15.9)	5/8 (15.9)	5/8 (15.9) -1, -2 units 3/4 (19) -3 units	3/4 (19.1)
Shipping weight — lbs. (kg) 1 package			146 (66)	146 (66)	148 (67)	140 (64)

*Refrigerant charge sufficient for 15 ft. (4.5 m) length of refrigerant lines. †3/8 x 5/16 in. (9.5 x 7.9 mm) adaptor furnished for liquid line connection.

SPECIFICATIONS (contd.)

Model No.			HS29-036	HS29-042	HS29-048	HS29-060
Condenser Coil	Net face area - sq. ft. (m^2)	Outer coil	15.11 (1.40)	15.11 (1.40)	15.11 (1.40)	15.11 (1.40)
		Inner coil	- - - -	5.40 (0.50)	5.40 (0.50)	14.40 (1.34)
	Tube diameter — in. (mm) & no. of rows		5/16 (7.9) — 1	5/16 (7.9) — 1.37	5/16 (7.9) — 1.37	5/16 (7.9) — 2
	Fins per inch (m)		22 (866)	18 (748)		18 (748)
Condenser Fan	Diameter — in. (mm) & no. of blades		18 (457) — 4	18 (457) — 4	18 (457) — 4	18 (457) — 4
	Motor hp (W)		1/6 (124)	1/6 (124)	1/3 (249)	1/3 (249)
	Cfm (L/s)		2520 (1190)	2610 (1232)	3115 (1470)	3010 (1420)
	Rpm		1100	1105	1125	1125
	Watts		200	200	325	315
*Refrigerant charge furnished (HCFC-22)			1 ph-4 lbs. 6 oz. (1.98 kg) 3 ph-4 lbs 13 oz. (2.17 kg)	1 ph-5 lbs. 7 oz. (2.45 kg) 3 ph-5 lbs 6 oz. (2.43	1ph 5 lbs. 8 oz. (2.48 kg) 3ph 6 lbs 0 oz. (2.72)	1 ph 8 lbs. 0 oz. (3.62 kg) 3 ph 7 lbs 7 oz. (3.36)
Liquid line — in. (mm) o.d. connection (sweat)			3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)
Suction line — in. (mm) o.d. connection (sweat)			3/4 (19.1)	7/8 (22.2)	7/8 (22.2)	1-1/8 (28.6)
Shipping weight — lbs. (kg) 1 package			145 (66)	158 (72)	191 (87)	207 (94)

*Refrigerant charge sufficient for 15 ft. (4.5 m) length of refrigerant lines.

ELECTRICAL DATA

Model No.		HS29-141	HS29-211	HS29-261	HS29-311	HS29-411	HS29-413	
Line voltage data — 60 hz		208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 3ph	460v 3ph
Compressor	Rated load amps	4.9	8.6	10.1	11.8	17.5	10.3	4.3
	Power factor	.97	.97	.96	.92	.90	.83	.83
	Locked rotor amps	26.3	48.3	60.0	69.4	96.0	75.0	40.0
Condenser Coil Fan Motor	Full load amps	1.1	1.1	1.1	1.1	1.1	1.1	0.55
	Locked rotor amps	1.9	1.9	1.9	1.9	1.9	1.9	1.0
Rec. maximum fuse or circuit breaker size (amps)		15	15	20	25	40	20	10
*Minimum circuit ampacity		7.3	11.0	13.8	15.9	23.8	14.0	6.5

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus 10% and minus 5% of line voltage.

ELECTRICAL DATA

Model No.		HS29-461	HS29-463		HS29-511	HS29-513		
Line voltage data — 60 hz		208/230v 1ph	208/230v 3ph	460v 3ph	208/230v 1ph	208/230v 3ph	460v 3ph	575v 3ph
Compressor	Rated load amps	17.5	12.8	6.4	23.4	14.0	7.1	5.8
	Power factor	.98	.93	.93	.98	.88	.88	.88
	Locked rotor amps	92.0	87.0	44.0	110.0	91.0	46.0	37.0
Condenser Coil Fan Motor	Full load amps	1.1	1.1	0.55	1.9	1.9	0.90	0.90
	Locked rotor amps	1.9	1.9	1.0	4.1	4.1	2.1	2.1
Rec. maximum fuse or circuit breaker size (amps)		40	25	15	50	30	15	10
*Minimum circuit ampacity		23.0	17.1	8.6	31.2	19.4	9.8	8.2

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus 10% and minus 5% of line voltage.

ELECTRICAL DATA

Model No.		HS29-651	HS29-653			HS29-681	HS29-683	
Line voltage data — 60 hz		208/230v 1ph	208/230v 3ph	460v 3ph	575v 3ph	208/230v 1ph	208/230v 3ph	460v 3ph
Compressor	Rated load amps	26.9	17.3	9.0	7.1	27.1	18.6	7.9
	Power factor	.98	.86	.86	.86	.97	.86	.86
	Locked rotor amps	123.0	128.0	64.0	51.0	175.0	128.0	63.0
Condenser Coil Fan Motor	Full load amps	1.9	1.9	0.90	0.90	1.9	1.9	0.90
	Locked rotor amps	4.1	4.1	2.1	2.1	4.1	2.1	2.1
Rec. maximum fuse or circuit breaker size (amps)		60	40	20	15	60	40	15
*Minimum circuit ampacity		35.5	23.5	12.2	9.8	35.8	24.2	10.8

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus 10% and minus 5% of line voltage.

ELECTRICAL DATA

Model No.		HS29-012	HS29-018	HS29-024-2	HS29-024-3	HS29-030	HS29-036		
Line voltage data — 60 hz		208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 1ph	208/230v 3ph	460v 3ph
Compressor	Rated load amps	4.9	8.6	7.9	12.2	14.7	16.0	10.3	5.1
	Power factor	.97	.97	.97	.96	.90	.91	.83	.83
	Locked rotor amps	26.3	48.3	48.3	61.0	84.0	100.0	77.0	39.0
Condenser Coil Fan Motor	Full load amps	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.55
	Locked rotor amps	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.0
Rec. maximum fuse or circuit breaker size (amps)		15	20	15	25	30	35	20	10
*Minimum circuit ampacity		7.3	11.9	11.0	16.4	19.5	21.1	14.0	6.9

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus 10% and minus 5% of line voltage.

ELECTRICAL DATA

Model No.		HS29-042			HS29-048				HS29-060			
Line voltage data — 60 hz		208/230v 1ph	208/230v 3ph	460v 3ph	208/230v 1ph	208/230v 3ph	460v 3ph	575v 3ph	208/230v 1ph	208/230v 3ph	460v 3ph	575v 3ph
Compressor	Rated load amps	20.3	12.4	6.4	23.7	12.8	6.4	5.1	28.8	15.4	7.6	5.9
	Power factor	.84	.93	.93	.98	.88	.88	.88	.95	0.86	0.86	0.86
	Locked rotor amps	127.0	88.0	44.0	129.0	91.0	46.0	37.0	169.0	124.0	59.6	49.4
Condenser Coil Fan Motor	Full load amps	1.1	1.1	.55	1.9	1.9	0.9	0.9	1.9	1.9	0.90	0.90
	Locked rotor amps	1.9	1.9	1.0	4.1	4.1	2.1	2.1	4.1	4.1	2.1	2.1
Rec. maximum fuse or circuit breaker size (amps)		40	25	15	50	30	15	10	60	35	15	10
*Minimum circuit ampacity		26.4	16.6	8.6	31.5	17.9	8.9	7.3	37.9	21.2	10.4	8.3

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus 10% and minus 5% of line voltage.

I - UNIT INFORMATION

HS29 condensing units are available in 1, 1 -1/2, 2, 2 -1/2, 3, 3 -1/2, 4 and 5 ton capacities.

All major components (indoor blower/coil) must be matched according to Lennox recommendations for the compressor to be covered under warranty. Refer to the Engineering Handbook for approved system matchups. A misapplied system will cause erratic operation and can result in early compressor failure.

II - UNIT COMPONENTS

Unit components are illustrated in figure 3.

⚠ DANGER

Electric Shock Hazard.
May cause injury or death.

Disconnect all remote electrical power supplies berore opening unit panel. Unit may have multiple power supplies.

Some units are equipped with single-pole contactors. When unit is equipped with a single-pole contactor, line voltage is present at all components (even when unit is not in operation).

A - Control Box (Figure 1 and Figure 2)

Electrical openings are provided under the control box cover. Field thermostat wiring is made to color-coded pigtail connections.

1 - Compressor Contactor K1

The compressor is energized by a contactor located in the control box. See figure 1 and figure 2. Single-pole and two-pole contactors are used in single-phase units. See wiring diagrms for specific unit. Three-pole contactors are used in three-phase units. K1 is energized by the indoor thermostat terminal Y1 (24V) when thermostat demand is present.

HS29 units are not equipped with a 24V transformer. All 24 VAC controls are powered by the indoor unit. Refer to wiring diagram.

2 - Dual Capacitor C12

The compressor (scroll, rotary or reciprocating) and fan in single-phase units use permanent split capacitor motors. The capacitor is located inside the unit control box (see figure 1 and figure 2). A single “dual” capacitor (C12) is used for both the fan motor and the compressor (see unit wiring diagram). The fan side and the compressor side of the capacitor have different MFD ratings and must be exact when replacing. See side of capacitor for ratings.

3 - Transformer T5

Transformer T5 is used on all “J” voltage units. T5 is used as a step-down transformer for the outdoor fan motor. The transformer is located inside the unit control box (see figure 1). The transformer is rated at 3.4 VA with a 575 volt primary and a 460 volt secondary.

4 - Start Capacitor C7

All HS29-461, 511, 651, 012, 018 and 024-2 units use a start capacitor (C7) wired in parallel with the compressor side of the dual capacitor. The capacitor is located inside the unit control box (see figure 1). C7 is switched off by potential relay (K31) when the compressor nears full speed. See side of capacitor for MFD ratings.

5 - Fan Capacitor C1

The fans in three-phase HS29-413, -463, -513, -653, -683, -036, -042, -048 and -060 units use permanent split capacitor motors. A single capacitor C1 is used for the fan motor. The capacitor is located inside the unit control box (see figure 1). See side of capacitor for MFD ratings.

6 - Potential (Start) Relay K31

All HS29-461, 511, 651, 012, 018 and 024-2 units use a potential relay which controls the operation of the starting circuit. The potential relay is located inside the unit control box (see figure 1). The relay is normally closed when contactor K1 is de-energized. When K1 energizes, the compressor immediately begins start-up. K31 remains closed during compressor start-up and the start capacitor C7 remains in the circuit. When the compressor reaches 75% of its speed, K31 is energized. When K31 energizes, the contacts open and the start capacitor C7 is taken out of the circuit.

B - Compressor (Rotary, Reciprocating and Scroll)

HS29-141 and -012 units utilize a rotary compressor. HS29-018,-024-2, and -211 through -653 units utilize a conventional reciprocating compressor. See ELECTRICAL DATA tables or compressor nameplate for compressor specifications.

HS29-024-3 and HS29-030 through -060 units utilize a scroll compressor. The scroll compressor design is simple, efficient and requires few moving parts. A cutaway diagram of the scroll compressor is shown in figure 4. The scrolls are located in the top of the compressor can and the motor is located just below. The oil level is immediately below the motor.

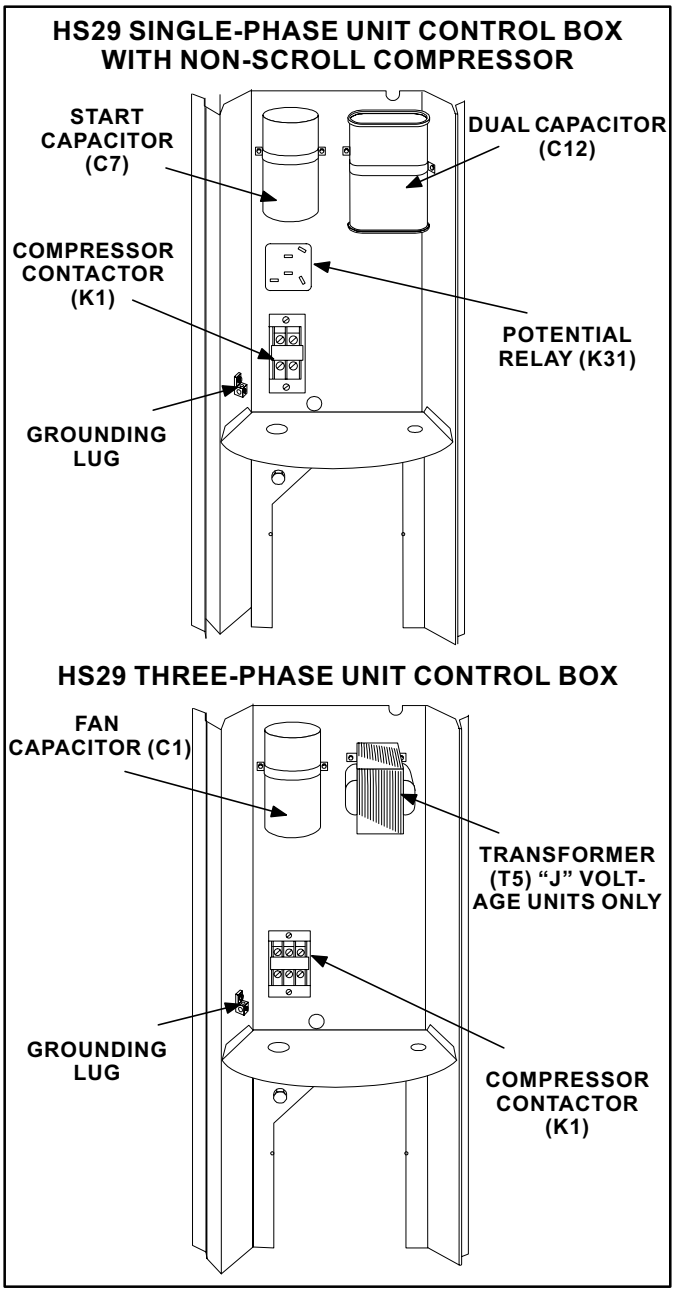


FIGURE 1

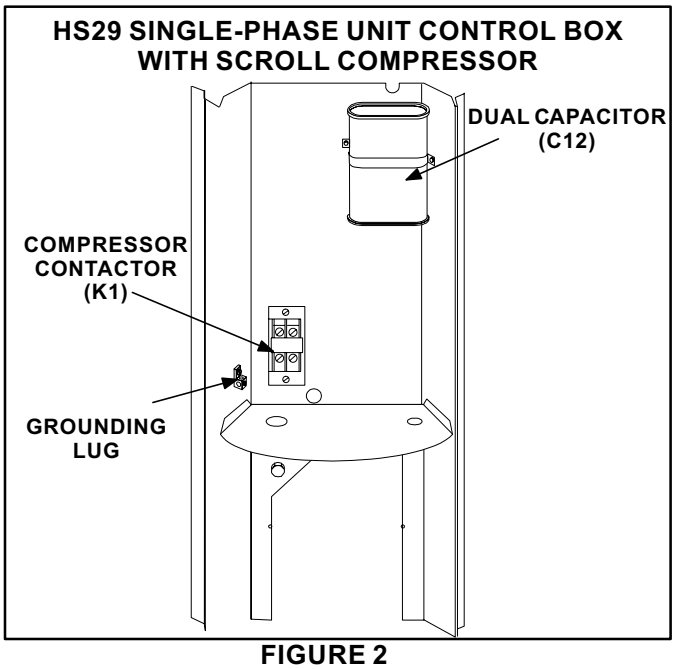


FIGURE 2

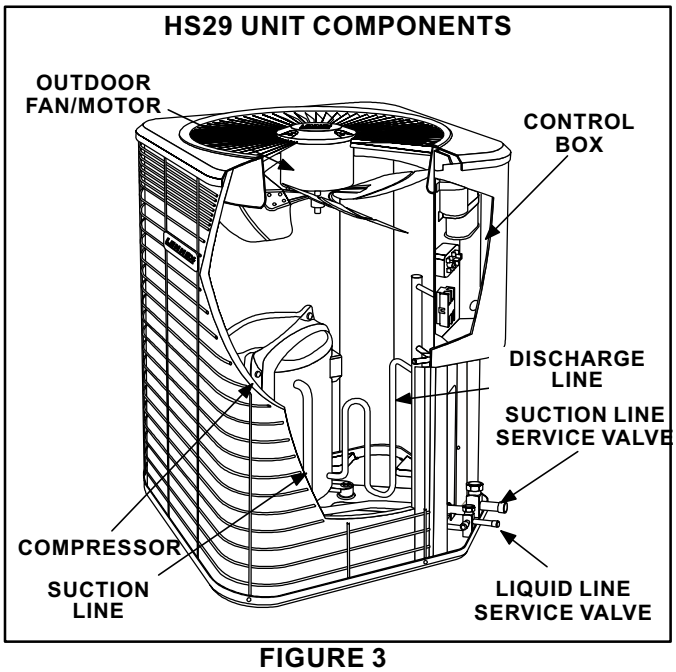


FIGURE 3

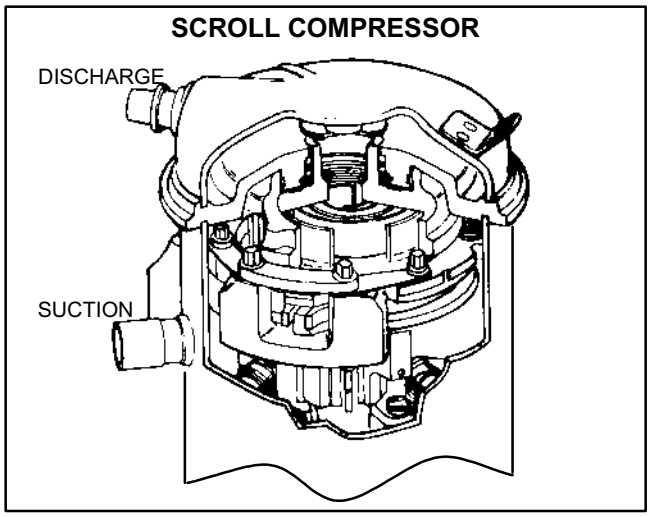


FIGURE 4

The scroll is a simple compression concept centered around the unique spiral shape of the scroll and its inherent properties. Two identical scrolls are mated together forming concentric spiral shapes. One scroll remains stationary, while the other is allowed to "orbit." The orbiting scroll does not rotate or turn but merely orbits the stationary scroll. Due to its efficiency, the scroll compressor is capable of drawing a much deeper vacuum than reciprocating compressors. Deep vacuum operation can cause internal fusite arcing resulting in damaged internal parts and will result in compressor failure. Never use a scroll compressor for evacuating or for deep vacuum operation (operating compressor at 0 psig or lower) on the system.

Three-Phase Compressor Rotation

Three-phase scroll compressors must be phased sequentially to ensure correct compressor rotation and operation. At compressor start-up, a rise in discharge and drop in suction pressures indicates proper compressor phasing and operation. If discharge and suction pressures do not perform normally, follow the steps below to correctly phase the unit.

1 - Disconnect power to the unit.
2 - Reverse any two field power leads to the unit. (Prefer L1 and L3).
3 - Reapply power to the unit.

Discharge and suction pressures should operate within their normal start-up ranges.

NOTE - Compressor noise level may be significantly higher when phasing is incorrect and the unit will not provide cooling when compressor is operating backwards. Continued backward operation will cause the compressor to cycle on internal protector.

1 - Crankcase Heater

A crankcase heater is used on all HS29-460 through HS29-650 models and an option on all others. Some heaters will be insertion-type and self-regulating while others will be the band type. The heater is temperature-actuated and operates only when required.

2 - Compressor Cover (Figure 5)

A compressor cover constructed of vinyl-faced fiberglass is an option on all HS29 units. The cover provides an acoustic barrier. The cover slides over the compressor and is held secure with snap buttons. Slits are provided for installation around the discharge and suction lines.

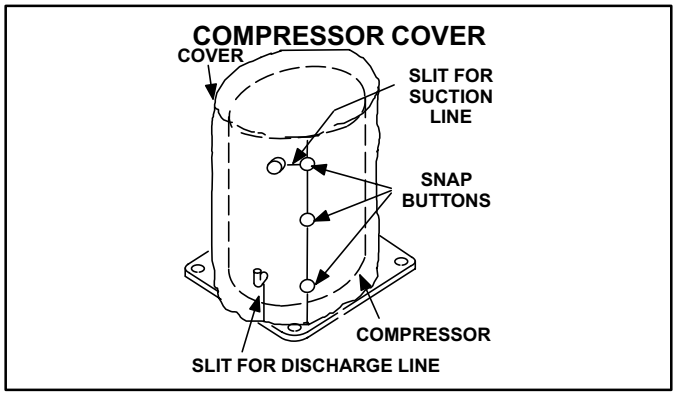


FIGURE 5

C - Condenser Fan Motor

⚠ DANGER

Make sure all power is disconnected before beginning electrical service procedures.

All units use single-phase PSC fan motors which require a run capacitor. In all units, the condenser fan is controlled by the compressor contactor.

ELECTRICAL DATA tables in this manual show specifications for condenser fans used in HS29s.

Access to the condenser fan motor on all units is gained by removing the seven screws securing the fan assembly. See figure 6. The condenser fan motor is removed from the fan guard by removing the four nuts found on the top panel. See figure 7 if condenser fan motor replacment is necessary.

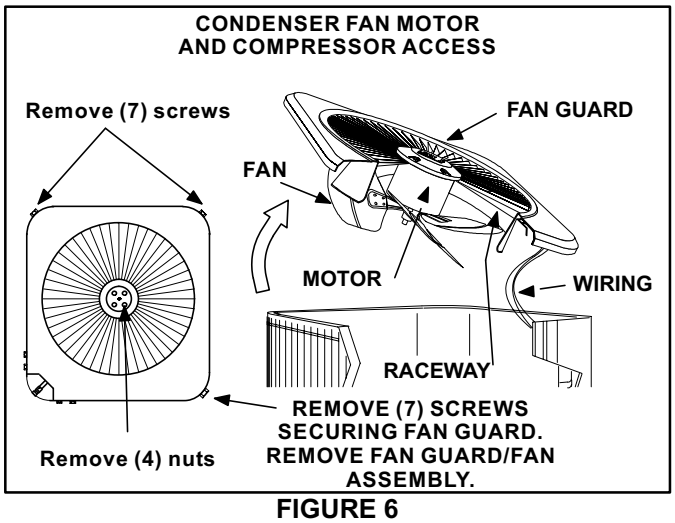


FIGURE 6

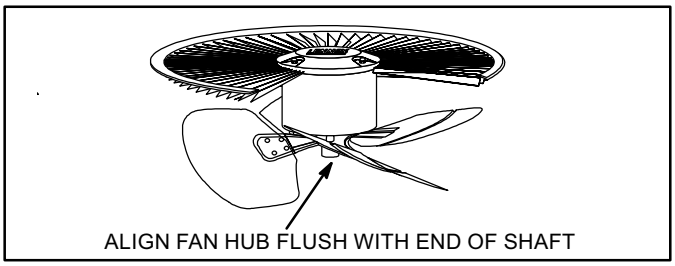


FIGURE 7

III - REFRIGERANT SYSTEM
A - Plumbing

Field refrigerant piping consists of liquid and suction lines from the condensing unit (sweat connections) to the indoor evaporator coil (flare or sweat connections). Use Lennox L10 (flare) or L15 (sweat, non-flare) series line sets as shown in table 1 or table 2 or use field-fabricated refrigerant lines.

Separate discharge and suction service ports are provided outside the unit for connection of gauge manifold during charging procedure.

TABLE 1

Condensing Unit Model No.	Line Set Model No. (L10 or L15)	Length of Lines		Liquid Line Outside Dia.		Suction Line Outside Dia.	
		ft.	m	in.	mm	in.	mm
HS29-141 HS29-211 HS29-261	L10/15-21-20	20	6	5/16	7.9	5/8	15.9
	L10/15-21-25	25	8				
	L10/15-21-35	35	11				
	L10/15-21-50	50	15				
HS29-311	L15-31-20	20	6	5/16	7.9	3/4	19
	L15-31-30	30	9				
	L15-31-40	40	12				
	L15-31-50	50	15				
HS29-410	L10/15-41-20	20	6	3/8	9.5	3/4	19
	L10/15-41-30	30	9				
	L10/15-41-40	40	12				
	L10/15-41-50	50	15				
HS29-460 HS29-510	L10/15-65-30	30	9	3/8	9.5	7/8	22.2
	L10/15-65-40	40	12				
	L10/15-65-50	50	15				
HS29-651 HS29-681	*Field fabricate			3/8	9.5	1-1/8	28.5

*Field fabricate.

TABLE 2

Condensing Unit Model No.	Line Set Model No. (L10 or L15)	Length of Lines		Liquid Line Outside Dia.		Suction Line Outside Dia.	
		ft.	m	in.	mm	in.	mm
HS29-012 HS29-018 HS29-024-2	L15-21-20	20	6	5/16	7.9	5/8	15.9
	L15-21-25	25	8				
	L15-21-35	35	11				
	L15-21-50	50	15				
HS29-030 HS29-024-3	L15-31-20	20	6	5/16	7.9	3/4	19
	L15-31-30	30	9				
	L15-31-40	40	12				
	L15-31-50	50	15				
HS29-036	L15-41-20	20	6	3/8	9.5	3/4	19
	L15-41-30	30	9				
	L15-41-40	40	12				
	L15-41-50	50	15				
HS29-042 HS29-048	L15-65-30	30	9	3/8	9.5	7/8	22.2
	L15-65-40	40	12				
	L15-65-50	50	15				
HS29-060	*Field fabricate			3/8	9.5	1-1/8	28.5

*Field fabricate.

B - Service Valves

The liquid and suction line service valves (figures 8 and 9) and gauge ports are accessible from outside the unit.

The valve is equipped with a service port. The service ports are used for leak testing, evacuating, charging and checking charge. A schrader valve is factory installed. A service port cap is supplied to protect the schrader valve from contamination and serve as the primary leak seal.

NOTE-Always keep valve stem caps clean.

To Access Schrader Port:

1 - Remove service port cap with an adjustable wrench.
2 - Connect gauge to the service port.
3 - When testing is completed, replace service port cap. Tighten finger tight, then an additional 1/6 turn.

To Open Liquid or Suction Line Service Valve:

1 - Remove stem cap with an adjustable wrench.
2 - Using service wrench and hex head extension (3/16" for liquid line and 5/16" for suction line) back the stem out counterclockwise until the valve stem just touches the retaining ring. For 5 ton unit with ball type suction line valve, use adjustable wrench and back stem out counterclockwise 1/4 turn.
3 - Replace stem cap tighten firmly. Tighten finger tight, then tighten an additional 1/6 turn.

⚠ DANGER

Do not attempt to backseat the service valves past the retaining ring. Attempts to backseat the service valves past the retaining ring will cause snap ring to explode from valve body under pressure of refrigerant. Personal injury and unit damage will result.

To Close Liquid or Suction Line Service Valve:

1 - Remove stem cap with an adjustable wrench.
2 - Using service wrench and hex head extension (3/16" for liquid line and 5/16" for suction line), turn stem clockwise to seat the valve. Tighten firmly. For 5 ton unit with ball type suction line valve, use adjustable wrench and turn stem clockwise 1/4 turn.
3 - Replace stem cap. Tighten finger tight, then tighten an additional 1/6 turn.

Suction Line (Ball Type) Service Valve (5 Ton Only)

A ball-type full service valve is used on HS29 5 ton units. These suction line service valves function the same way, differences are in construction. Valves are not rebuildable. If a valve has failed it must be replaced. A ball valve is illustrated in figure 10.

The ball valve is equipped with a service port. A schrader valve is factory installed. A service port cap is supplied to protect the schrader valve from contamination and assure a leak free seal.

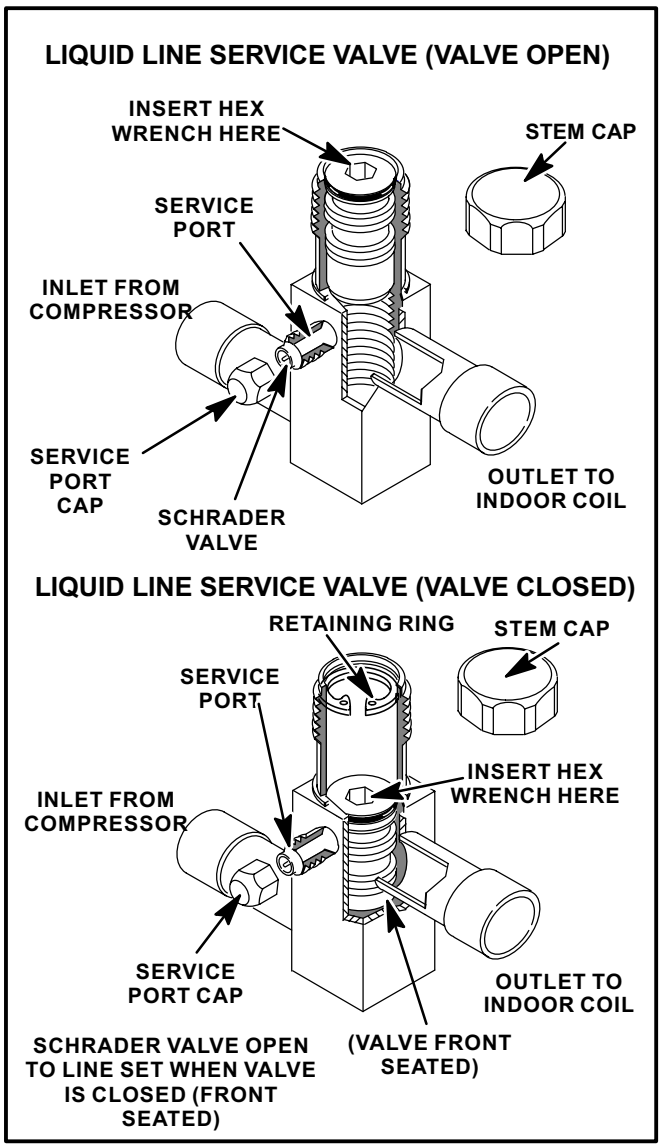


FIGURE 8

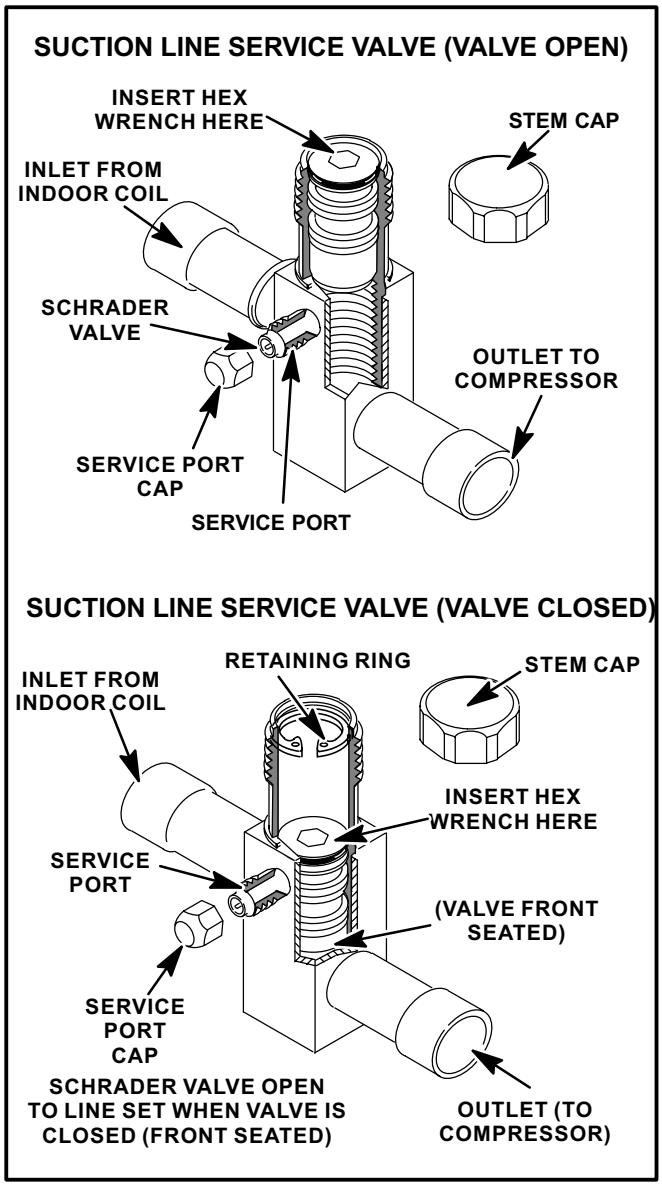


FIGURE 9

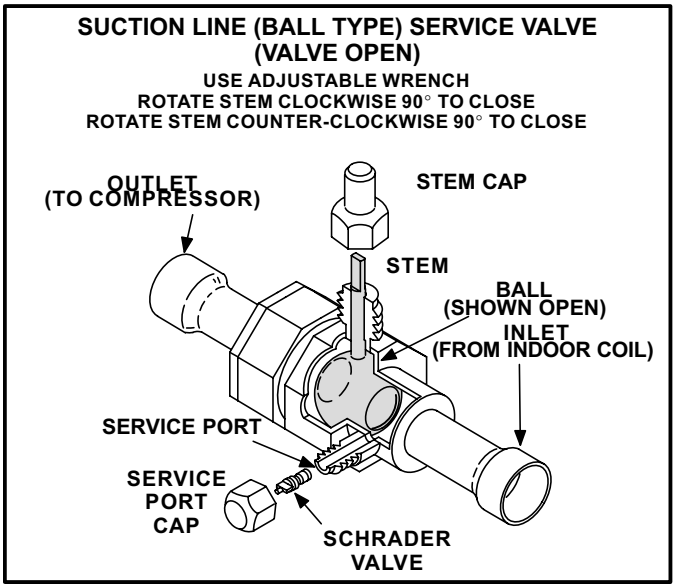


FIGURE 10

IV - CHARGING

The unit is factory-charged with the amount of HCFC-22 refrigerant indicated on the unit rating plate. This charge is based on a matching indoor coil and outdoor coil with a 15 foot (4.5 m) line set. For varying lengths of line set, refer to table 3 for refrigerant charge adjustment. A blank space is provided on the unit rating plate to list actual field charge.

TABLE 3

LIQUID LINE SET DIAMETER	Ounce per 5 ft. (ml per mm) adjust line set*
1/4 in. (6mm)	1 ounce per 5 ft. (30 ml per 1524 mm)
5/16 in. (8mm)	2 ounce per 5ft. (60 ml per 1524 mm)
3/8 in. (10 mm)	3 ounce per 5 ft. (90 ml per 1524 mm)

**If line set is greater than 15 ft. (4.5 m) add this amount. If line set is less than 15 ft. (4.5 m) subtract this amount.*

Units are designed for line sets up to 50 ft (15.2 m). Consult Lennox Refrigerant Piping Manual for line sets over 50 ft (15.2 m).

⚠ IMPORTANT

If line length is greater than 20 feet (6.1 m) add this amount. If line length is less than 20 feet (6.1 m), subtract this amount.

A - Pumping Down System

⚠ CAUTION

Vacuum operation (operating compressor at 0 psig or lower) can cause internal fusite arcing resulting in a damaged or failed compressor. This type of damage will result in denial of warranty claim.

The system may be pumped down when leak checking the line set and indoor coil or making repairs to the line set or indoor coil.

1- Attach gauge manifold.
2- Front seat (close) liquid line valve.
3- Start outdoor unit.
4- Monitor suction gauge. Stop unit when 0 psig is reached.
5- Front seat (close) suction line valve.

B - Leak Testing (To Be Done Before Evacuating)

1- Attach gauge manifold and connect a drum of dry nitrogen to center port of gauge manifold.
2- Open high pressure valve on gauge manifold and pressurize line set and indoor coil to 150 psig (1034 kPa).
3- Check lines and connections for leaks.

NOTE-If electronic leak or Halide detector is used, add a small amount of HCFC-22 (3 to 5 psig (20kPa to 34kPa)) then pressurize with nitrogen to 150 psig.

4- Release nitrogen pressure from the system, correct any leaks and recheck.

⚠ CAUTION

When using dry nitrogen, a pressure reducing regulator must be used to prevent excessive pressure in gauge manifold, connecting hoses, and within the system. Regulator setting must not exceed 150 psig (1034 kpa). Failure to use a regulator can cause equipment failure resulting in injury.

C - Evacuating the System

1- Attach gauge manifold. Connect vacuum pump (with vacuum gauge) to center port of gauge manifold. With both manifold service valves open, start pump and evacuate indoor coil and refrigerant lines.

⚠ IMPORTANT

A temperature vacuum gauge, mercury vacuum (U-tube), or thermocouple gauge should be used. The usual Bourdon tube gauges are not accurate enough in the vacuum range.

⚠ IMPORTANT

The compressor should never be used to evacuate a refrigeration or air conditioning system.

2- Evacuate the system to 29 inches (737mm) vacuum. During the early stages of evacuation, it is desirable to stop the vacuum pump at least once to determine if there is a rapid loss of vacuum. A rapid loss of vacuum would indicate a leak in the system and a repeat of the leak testing section would be necessary.
3- After system has been evacuated to 29 inches (737mm), close gauge manifold valves to center port, stop vacuum pump and disconnect from gauge manifold. Attach an upright nitrogen drum to center port of gauge manifold and open drum valve slightly to purge line at manifold. Break vacuum in system with nitrogen pressure by opening manifold high pressure valve. Close manifold high pressure valve to center port.
4- Close nitrogen drum valve and disconnect from gauge manifold center port. Release nitrogen pressure from system.
5- Connect vacuum pump to gauge manifold center port. Evacuate system through manifold service valves until vacuum in system does not rise above .5mm of mercury absolute pressure or 500 microns within a 20-minute period after stopping vacuum pump.
6- After evacuation is complete, close manifold center port, and connect refrigerant drum. Pressurize system slightly with refrigerant to break vacuum.

D - Charging

If the system is completely void of refrigerant, the recommended and most accurate method of charging is to weigh the refrigerant into the unit according to the total amount shown on the unit nameplate. Also refer to the SPECIFICATIONS tables on pages 1 and 2.

If weighing facilities are not available or if unit is just low on charge, the following procedure applies.

1 - Expansion Valve Systems

The following procedures are intended as a general guide for use with expansion valve systems only. For best results, indoor temperature should be between 70°F and 80°F (21.1°C and 26.7°C). Outdoor temperature should be 60°F (15.6°C) or above. Slight variations in charging temperature and pressure should be expected. Large variations may indicate need for further servicing.

⚠ IMPORTANT

The following procedure requires accurate readings of ambient (outdoor) temperature, liquid temperature and liquid pressure for proper charging. Use a thermometer with accuracy of ±2 °F (± 1.1°C) and a pressure gauge with accuracy of ±5 PSIG (±34.5 kPa).

APPROACH METHOD (TXV SYSTEMS)
(Ambient Temperature of 60°F [16°C] or Above)

1 - Connect gauge manifold. Connect an upright HCFC-22 drum to center port of gauge manifold.
2 - Record outdoor air (ambient) temperature.
3 - Operate indoor and outdoor units in cooling mode. Allow outdoor unit to run until system pressures stabilize.
4 - Make sure thermometer well is filled with mineral oil before checking liquid line temperature.
5 - Place thermometer in well and read liquid line temperature. Liquid line temperature should be warmer than the outdoor air temperature. Table 4 shows how many degrees warmer the liquid line temperature should be.
Add refrigerant to lower the liquid line temperature.
Recover refrigerant to raise the liquid line temperature.
Add refrigerant slowly as the unit approaches the correct temperature. This will allow refrigerant to stabilize allowing the correct temperature to be read.
6 - When unit is properly charged, liquid line pressures should approximate those in table 6.

TABLE 4

HS29 MODEL NO.	Approach Temperature Liquid Line - Outdoor Ambient °F (°C)
-141, -012	7 (3.6)
-211, -018	4 (2.2)
-261, -024-2	5 (2.8)
-024-3, -030	11 (6.1)
-311	10 (5.6)
-410, -460, -048	12 (6.7)
-036	14 (7.8)
-510, -650	13 (7.2)
-042	17 (9.5)
-060	12 (6.7)

⚠ IMPORTANT

Use tables 6 and 7 as a general guide for performing maintenance checks. Tables 6 and 7 are not a procedure for charging the system. Minor variations in these pressures may be expected due to differences in installations. Significant deviations could mean that the system is not properly charged or that a problem exists with some component in the system. Used prudently, tables 6 and 7 could serve as a useful service guide.

2 - RFCIV Systems

The following procedures are intended as a general guide for use with RFCIV systems only. For best results, indoor temperature should be between 70°F and 80°F (21.1°C and 26.7°C). Outdoor temperature should be 60°F (15.6°C) or above. Slight variations in charging temperature and pressure should be expected. Large variations may indicate a need for further servicing.

1 - Connect gauge manifold. Connect an upright HCFC-22 drum to center port of gauge manifold.
2 - Operate indoor and outdoor units. Allow outdoor unit to run until system pressures stabilize.
3 - Make sure thermometer well is filled with mineral oil before checking liquid line temperature.
4 - Read liquid line pressure and convert to condensing temperature using temperature/ pressure conversion chart.
Condensing temperature (read from gauges) should be warmer than liquid line temperature.
5 - Place thermometer in well and read liquid line temperature. Table 5 and table 8 show how much warmer the condensing temperature should be.
6 - Subtract liquid line temperature from condensing temperature to determine subcooling. Compare with table 6.
Add refrigerant to lower liquid line temperature.
Recover refrigerant to raise liquid line temp.
7 - When unit is properly charged liquid line pressures should approximate table 6 .

E - Oil Charge

See compressor nameplate.

V - MAINTENANCE

At the beginning of each heating or cooling season, the system should be cleaned as follows:

⚠WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

A - Outdoor Unit

1 - Clean and inspect condenser coil. (Coil may be flushed with a water hose).

2 - Visually inspect all connecting lines, joints and coils for evidence of oil leaks.

B - Indoor Coil

1 - Clean coil if necessary.

2 - Check connecting lines and coil for evidence of oil leaks.

3 - Check condensate line and clean if necessary.

C - Indoor Unit

1 - Clean or change filters.

2 - Bearings are pre-lubricated and need no further oiling.

3 - Check all wiring for loose connections.

4 - Check for correct voltage at unit.

5 - Check amp-draw on blower motor.
Unit nameplate_____Actual_____.

TABLE 5
SUBCOOLING FOR RFC SYSTEMS

OUTDOOR TEMP. °F (°C)	LIQUID SUBCOOLING [± 1°F (.6°C)]						
	-141	-211	-261	-311	-411	-461	-511
60 (16)	14 (7.8)	17 (9.5)	18 (10)	18 (10)	14 (7.8)	16 (8.9)	15 (8.3)
65 (18)	13 (7.2)	16 (8.9)	16 (8.9)	17 (9.5)	13 (7.2)	15 (8.3)	14 (7.8)
70 (21)	12 (6.7)	15 (8.3)	14 (7.8)	16 (809)	12 (6.7)	14 (7.8)	13 (7.2)
75 (24)	10 (5.6)	14 (7.8)	12 (6.7)	15 (8.3)	10 (5.6)	13 (7.2)	11 (6.1)
80 (27)	9 (5)	13 (7.2)	11 (6.1)	14 (7.8)	9 (5)	12 (6.7)	10 (5.6)
85 (29)	8 (4.5)	12 (6.7)	10 (5.6)	13 (7.2)	8 (4.5)	11 (6.1)	8 (4.5)
90 (32)	7 (3.9)	11 (6.1)	9 (5)	12 (6.7)	7 (3.9)	10 (5.6)	7 (3.9)
95 (35)	6 (3.3)	9 (5)	8 (4.5)	11 (6.1)	6 (3.3)	9 (5)	7 (3.9)
100 (38)	4 (2.2)	8 (4.5)	7 (3.9)	10 (5.6)	5 (2.8)	8 (4.5)	6 (3.3)
105 (41)	2 (1.1)	7 (3.9)	6 (3.3)	9 (5)	4 (2.2)	6 (3.3)	4 (2.2)
110 (43)	2 (1.1)	6 (3.3)	6 (3.3)	7 (3.9)	3 (1.7)	5 (2.8)	3 (1.7)
115 (45)	1 (0.6)	5 (2.8)	5 (2.8)	5 (2.8)	2 (1.1)	3 (1.7)	2 (1.1)

TABLE 6

NORMAL OPERATING PRESSURES*																
OUTDOOR ENTERING AIR TEMPERATURE °F (°C)	HS29-141		HS29-211		HS29-261		HS29-311		HS29-411		HS29-461		HS29-511		HS29-651	
	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG	LIQ. ±1 0 PSIG	SUC. ±1 0 PSIG
65 (18.3) (RFCIV)	-	-	155	65	160	65	168	63	176	62	174	64	181	65	-	-
75 (24) (RFCIV)	-	-	181	70	188	70	197	68	203	66	205	69	208	70	-	-
85 (29.4) (RFCIV)	-	-	208	75	216	74	227	73	233	70	236	73	239	75	-	-
95 (35) (RFCIV)	-	-	238	80	247	78	258	77	266	74	271	77	271	79	-	-
105 (40.6) (RFCIV)	-	-	270	84	280	82	292	80	299	77	305	80	306	82	-	-
65 (18.3) (TXV)	150	70	159	73	164	71	173	71	179	68	180	71	187	73	150	70
75 (24) (TXV)	179	71	183	75	189	73	199	73	205	70	208	73	212	75	179	71
85 (29.4) (TXV)	211	73	209	77	217	75	228	75	235	72	238	75	241	77	211	73
95 (31.2) (TXV)	269	76	238	80	247	78	258	77	266	74	271	77	271	79	269	76
105 (40.6) (TXV)	286	75	269	82	279	80	292	79	299	77	305	79	305	80	286	75

*** These are typical pressures only. Indoor evaporator match up, indoor air quantity and evaporator load will cause the pressures to vary.**

TABLE 7

NORMAL OPERATING PRESSURES*																		
OUTDOOR ENTERING AIR TEMPERATURE °F (°C)	HS29-012		HS29-018		HS29-024-3[1] (HS29-024-2)		HS29-030		HS29-036		HS29-042		HS29-048		HS29-060		HS29-060-3	
	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ±10 PSIG	LIQ. ±10 PSIG	SUC. ± 5 PSIG
65 (18.3) **(RFCIV)**)	145	71	155	65	147 (160)	58 (65)	160	64	165	62	166	67	160	66	159	64	158	67
75 (24) **(RFCIV)**	167	77	181	70	174 (188)	63 (70)	185	67	192	66	194	70	187	69	188	68	185	71
85 (29.4) **(RFCIV)**	192	81	208	75	204 (216)	68 (74)	216	71	223	69	223	72	208	71	219	72	216	74
95 (35) (RFCIV)	221	84	238	80	234 (247)	75 (78)	248	73	257	71	257	75	249	75	253	75	247	77
105 (40.6) **(RFCIV)**	253	87	270	84	272 (280)	77 (82)	284	76	292	73	291	76	284	77	287	76	283	79
65 (18.3) **(TXV)**	140	79	159	73	143 (164)	71 (71)	154	68	162	66	156	70	158	71	151	69	154	75
75 (24) **(TXV)**	161	80	183	75	170 (189)	73 (73)	174	70	190	67	184	71	188	73	179	71	181	77
85 (29.4) **(TXV)**	189	81	209	77	202 (217)	75 (73)	204	70	224	68	214	72	210	73	211	73	213	79
95 (31.2) **(TXV)**	220	83	238	80	236 (247)	78 (75)	246	72	257	71	261	74	253	75	249	74	249	80
105 (40.6) **(TXV)**	254	84	269	82	271 (279)	76 (80)	276	74	296	72	291	75	291	76	286	75	285	82

*** These are typical pressures only. Indoor evaporator match up, indoor air quantity and evaporator load will cause the pressures to vary.**

[1] HS29-024-03 units use scroll compressors. HS29-024-2 units use reciprocating compressors.

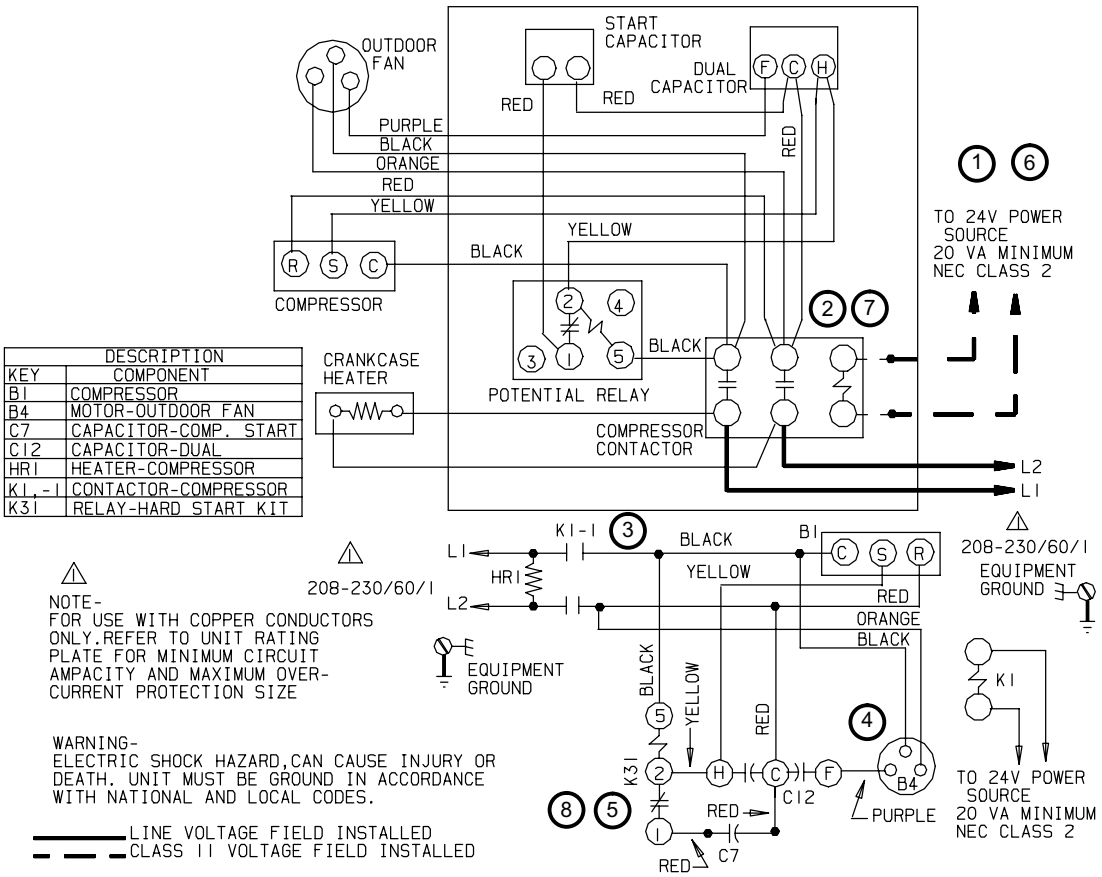
TABLE 8
SUBCOOLING FOR RFC SYSTEMS

OUT-DOOR TEMP. °F (°C)	LIQUID SUBCOOLING [± 1°F (.6°C)]									
	-012	-018	024-3	-024-2	-030	-036	-042	-048	-060	-060-3
60 (16)	14 (7.8)	17 (9.5)	14 (7.8)	18 (10)	14 (7.8)	13 (7.2)	12 (6.7)	11 (6.1)	13 (7.2)	15 (8.3)
65 (18)	13 (7.2)	16 (8.9)	13 (7.2)	16 (8.9)	14 (7.8)	13 (7.2)	11 (6.1)	10 (5.6)	12 (6.7)	15 (8.3)
70 (21)	12 (6.7)	15 (8.3)	13 (7.2)	14 (7.8)	13 (7.2)	12 (6.7)	11 (6.1)	10 (5.6)	12 (6.7)	14 (7.8)
75 (24)	10 (5.6)	14 (7.8)	12 (6.7)	12 (6.7)	13 (7.2)	12 (6.7)	10 (5.6)	10 (5.6)	12 (6.7)	14 (7.8)
80 (27)	9 (5)	13 (7.2)	11 (6.1)	11 (6.1)	13 (7.2)	12 (6.7)	10 (5.6)	10 (5.6)	12 (6.7)	13 (7.2)
85 (29)	8 (4.5)	12 (6.7)	10 (5.6)	10 (5.6)	13 (7.2)	11 (6.1)	10 (5.6)	9 (5)	11 (6.1)	13 (7.2)
90 (32)	7 (3.9)	11 (6.1)	9 (5)	9 (5)	13 (7.2)	11 (6.1)	9 (5)	9 (5)	11 (6.1)	12 (6.7)
95 (35)	6 (3.3)	9 (5)	8 (4.5)	8 (4.5)	12 (6.7)	11 (6.1)	9 (5)	9 (5)	11 (6.1)	11 (6.1)
100 (38)	4 (2.2)	8 (4.5)	7 (3.9)	7 (3.9)	12 (6.7)	10 (5.6)	8 (4.5)	8 (4.5)	10 (5.6)	10 (5.6)
105 (41)	2 (1.1)	7 (3.9)	6 (3.3)	6 (3.3)	11 (6.1)	10 (5.6)	7 (3.9)	8 (4.5)	10 (5.6)	10 (5.6)
110 (43)	2 (1.1)	6 (3.3)	6 (3.3)	6 (3.3)	11 (6.1)	9 (5)	6 (3.3)	7 (3.9)	9 (5)	9 (5)
115 (45)	1 (0.6)	5 (2.8)	4 (2.2)	5 (2.8)	10 (5.6)	9 (5)	5 (2.8)	6 (3.3)	8 (4.5)	9 (5)

VI - WIRING DIAGRAMS AND SEQUENCE OF OPERATION

HS29-1 SINGLE-PHASE OPERATING SEQUENCE

(RECIPROCATING OR ROTARY COMPRESSOR)



DESCRIPTION	
KEY	COMPONENT
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C7	CAPACITOR-COMP. START
C12	CAPACITOR-DUAL
HR1	HEATER-COMPRESSOR
K1,-1	CONTACTOR-COMPRESSOR
K31	RELAY-HARD START KIT

a-HS29 "P" Voltage Operation Sequence

This is the sequence of operation for HS29-461/511/651 and HS29-012/018/024 "P" voltage units. The HS29-141/211/261/311/411/681 "P" voltage units are similar; however, these units are not equipped with the hard start kit. The sequence is outlined by numbered steps which correspond to circled numbers on the adjacent diagram.

NOTE- The thermostat used may be electromechanical or electronic.

NOTE- Transformer in indoor unit supplies power (24 VAC) to the thermostat and outdoor unit controls.

COOLING:

2Cooling demand initiates at Y1 in the thermostat.

324VAC from indoor unit energizes compressor contactor K1.

4K1-1 N.O. closes, energizing terminal "C" of compressor (B1) and outdoor fan motor (B4).

5Outdoor fan motor (B4) begins immediate operation.

6Compressor (B1) begins start-up. Hard start contactor K31 remains closed during start-up and start capacitor C7 remains in the circuit. As the compressor gains speed, K31 is energized. When K31 is energized, the contacts open and start capacitor C7 is taken out of the circuit.

END OF COOLING DEMAND:

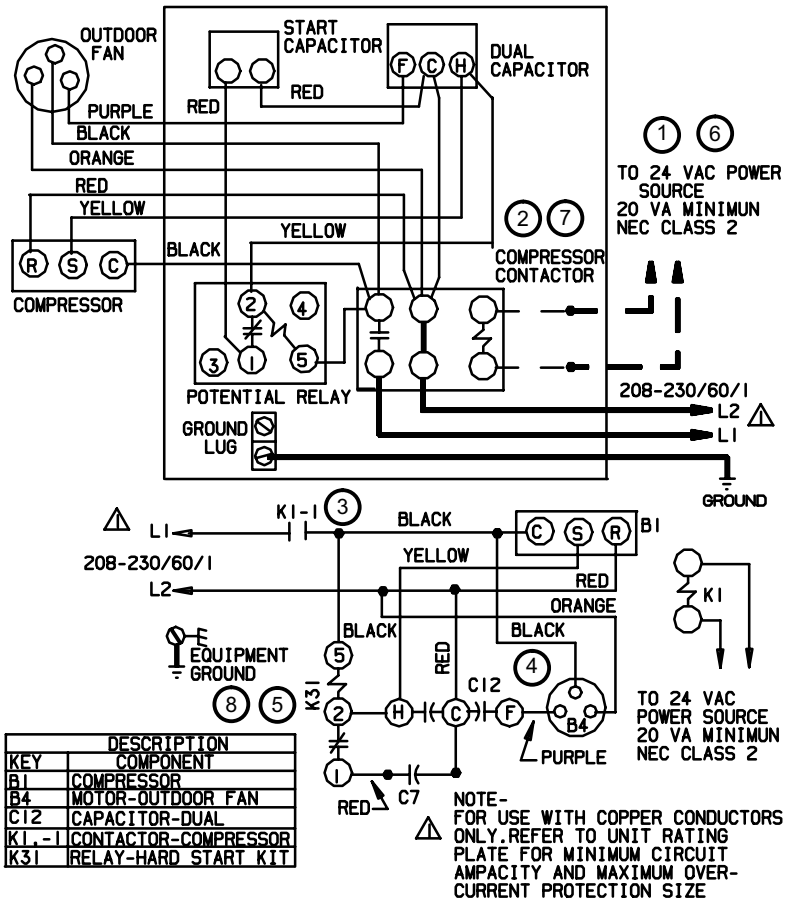
7Cooling demand is satisfied. Terminal Y1 is de-energized.

8Compressor contactor K1 is de-energized.

9K1-1 opens and compressor (B1) and outdoor fan motor (B4) are de-energized and stop immediately.

HS29-2 & -3 SINGLE-PHASE OPERATING SEQUENCE

(RECIPROCATING OR ROTARY COMPRESSOR)



DESCRIPTION	
KEY	COMPONENT
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C12	CAPACITOR-DUAL
K1.-1	CONTACTOR-COMPRESSOR
K31	RELAY-HARD START KIT

LENNOX®	COOLING UNITS- CONDENSING UNITS
	HS29-012-3-P HS29-018-2-P HS29-024-2-P
0801	Supersedes Form No. 533,507W
	New Form No. 533,842W

WARNING-
ELECTRIC SHOCK HAZARD,CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUND IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

LINE VOLTAGE FIELD INSTALLED
CLASS II VOLTAGE FIELD INSTALLED

NOTE- The thermostat used may be electromechanical or electronic.

NOTE- Transformer in indoor unit supplies power (24 VAC) to the thermostat and outdoor unit controls.

COOLING:

2Cooling demand initiates at Y1 in the thermostat.

324VAC from indoor unit energizes compressor contactor K1.

4K1-1 N.O. closes, energizing terminal “C” of compressor (B1) and outdoor fan motor (B4).

5Outdoor fan motor (B4) begins immediate operation.

6Compressor (B1) begins start-up. Hard start contactor K31 remains closed during start-up and start capacitor C7 remains in the circuit. As the compressor gains speed, K31 is energized. When K31 is energized, the contacts open and start capacitor C7 is taken out of the circuit.

END OF COOLING DEMAND:

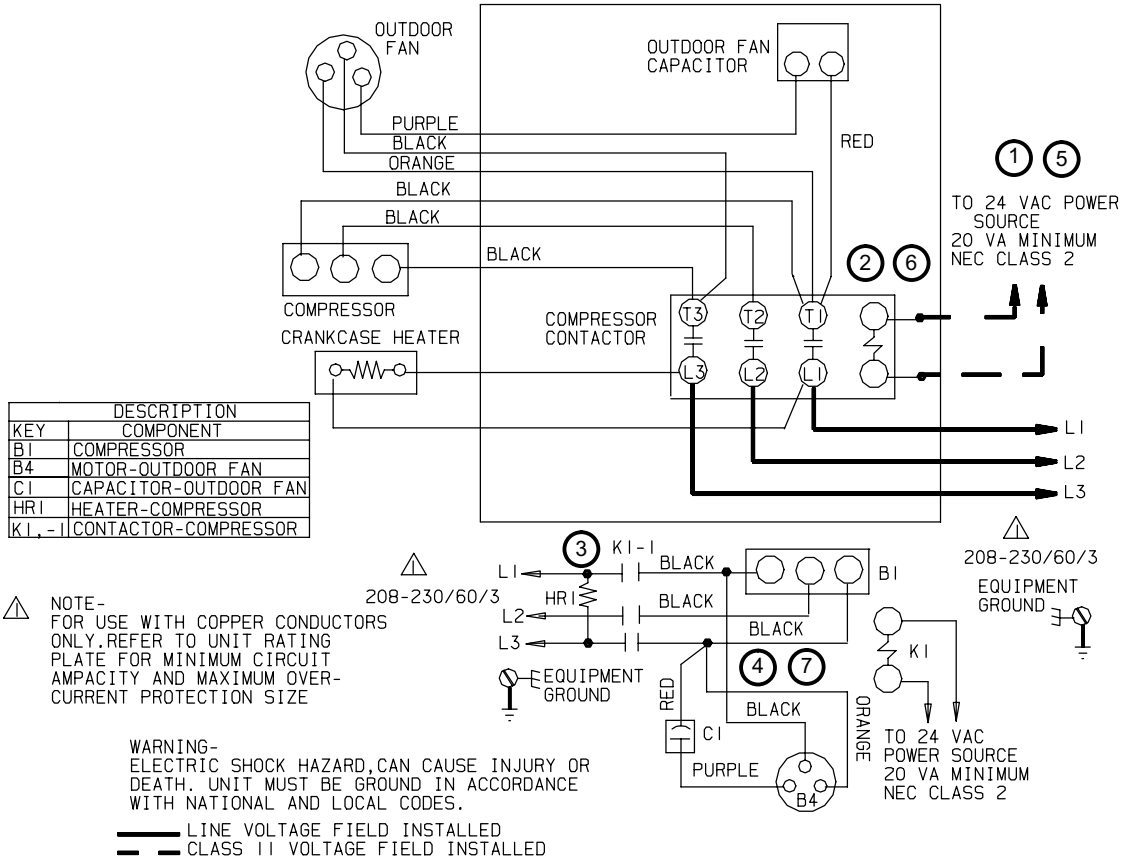
7Cooling demand is satisfied. Terminal Y1 is de-energized.

8Compressor contactor K1 is de-energized.

9K1-1 opens and compressor (B1) and outdoor fan motor (B4) are de-energized and stop immediately.

HS29 THREE-PHASE OPERATING SEQUENCE

(ALL COMPRESSORS)



DESCRIPTION	
KEY	COMPONENT
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C1	CAPACITOR-OUTDOOR FAN
HR1	HEATER-COMPRESSOR
K1,-1	CONTACTOR-COMPRESSOR

a-HS29 "Y", "G", and "J" Voltage Operation Sequence

This is the sequence of operation for HS29 "Y" voltage units. The HS29 "G"voltage sequence is the same; however the "J" voltage units have an outdoor fan transformer. The sequence is outlined by numbered steps which correspond to circled numbers on the adjacent diagram.

NOTE- The thermostat used may be electromechanical or electronic.

NOTE- Transformer in indoor unit supplies power (24 VAC) to the thermostat and outdoor unit controls.

COOLING:

2Cooling demand initiates at Y1 in the thermostat.

324VAC energizes compressor contactor K1.

4K1-1 N.O. closes energizing compressor (B1) and outdoor fan motor (B4).

5Compressor (B1) and outdoor fan motor (B4) begin immediate operation.

END OF COOLING DEMAND:

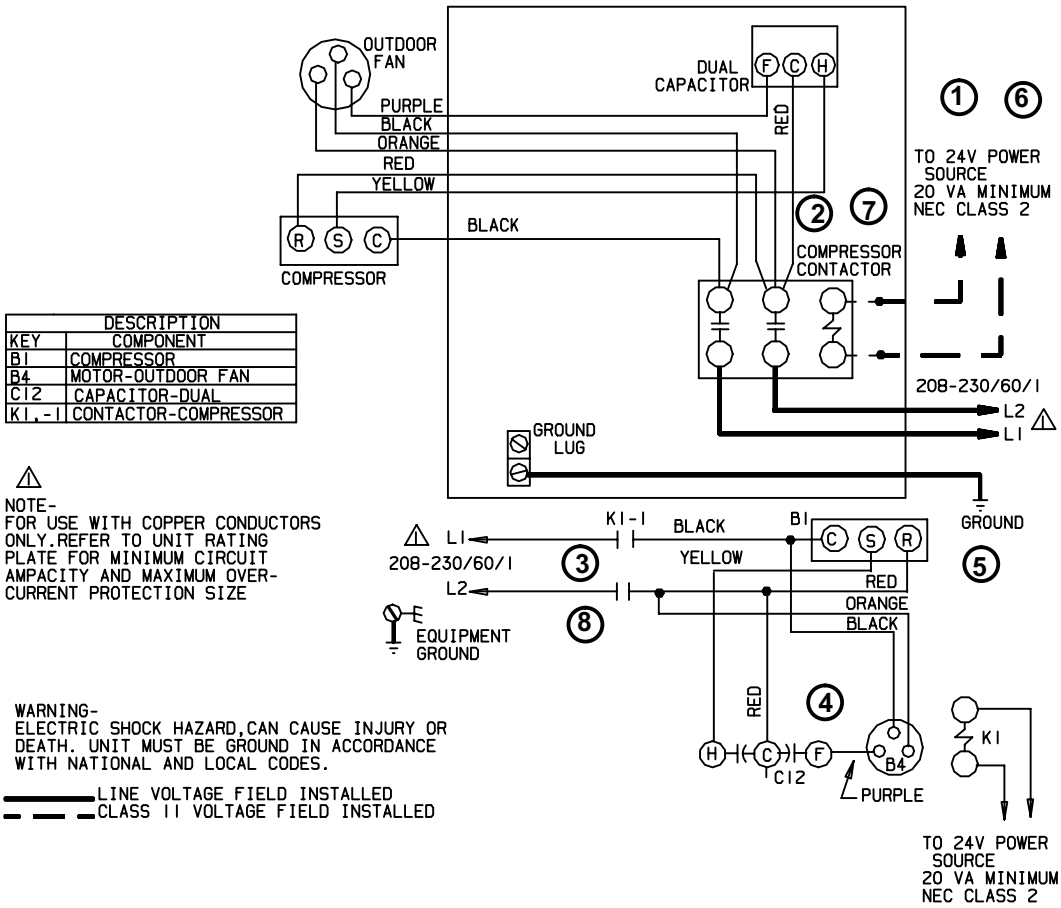
6Cooling demand is satisfied. Terminal Y1 is de-energized.

7Compressor contactor K1 is de-energized.

8K1-1 opens and compressor (B1) and outdoor fan motor (B4) are de-energized and stop immediately.

HS29-1 SINGLE-PHASE OPERATING SEQUENCE

(SCROLL COMPRESSORS)



a-HS29 “P” Voltage Operation Sequence

This is the sequence of operation for HS29-030/036/042/048/060 “P” voltage units. The sequence is outlined by numbered steps which correspond to circled numbers on the adjacent diagram.

NOTE- The thermostat used may be electromechanical or electronic.

NOTE- Transformer in indoor unit supplies power (24 VAC) to the thermostat and outdoor unit controls.

COOLING:

2Cooling demand initiates at Y1 in the thermostat.

324VAC from indoor unit energizes compressor contactor K1.

4K1-1 N.O. closes, energizing terminal “C” of compressor (B1) and outdoor fan motor (B4).

5Outdoor fan motor (B4) begins immediate operation.

6Compressor (B1) begins operation.

END OF COOLING DEMAND:

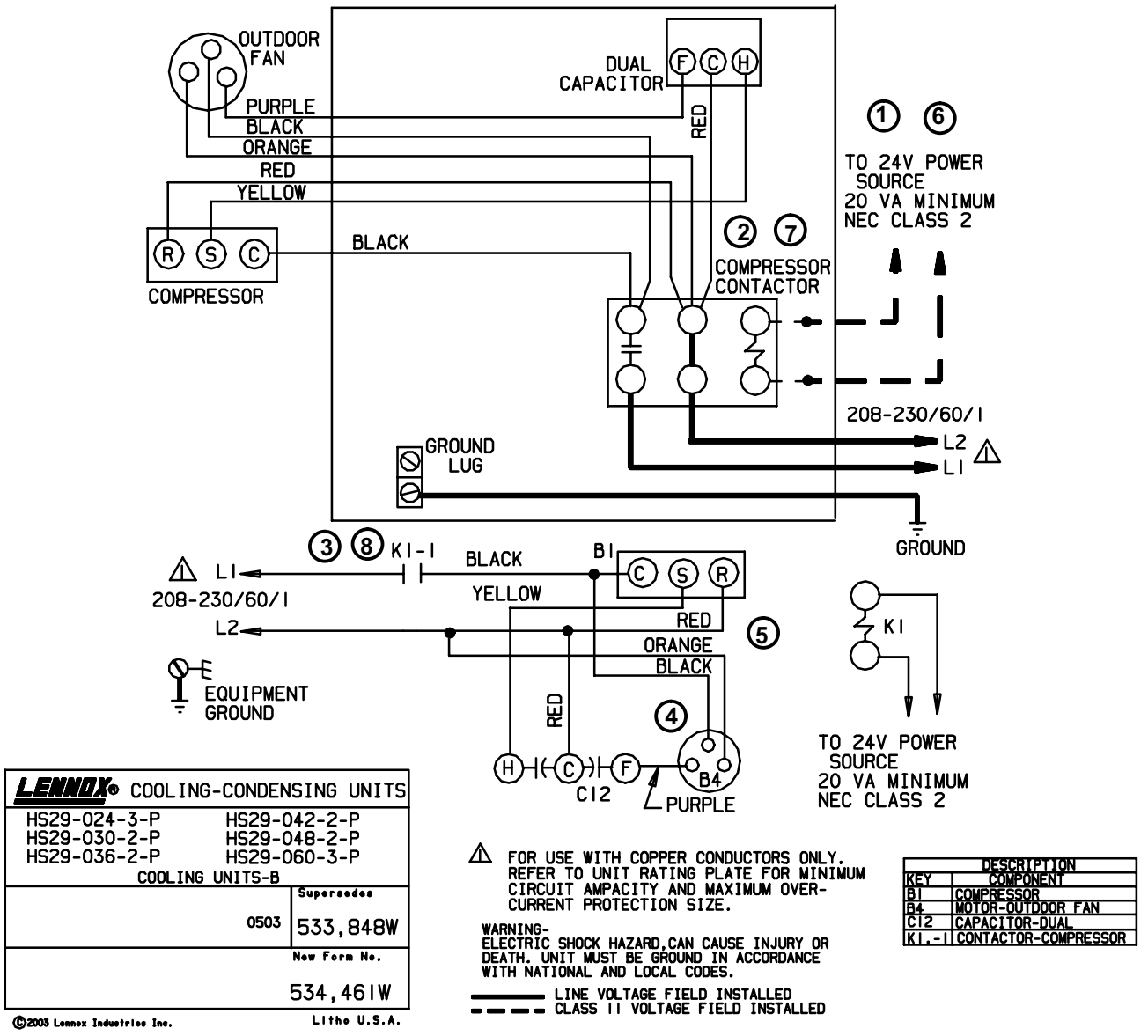
7Cooling demand is satisfied. Terminal Y1 is de-energized.

8Compressor contactor K1 is de-energized.

9K1-1 opens and compressor (B1) and outdoor fan motor (B4) are de-energized and stop immediately.

HS29-2 & -3 SINGLE-PHASE OPERATING SEQUENCE

(SCROLL COMPRESSORS)



LENNOX® COOLING-CONDENSING UNITS

HS29-024-3-P	HS29-042-2-P
HS29-030-2-P	HS29-048-2-P
HS29-036-2-P	HS29-060-3-P

COOLING UNITS-B

	Supersedes
0503	533,848W
	New Form No.
	534,461W

Litho U.S.A.

⚠ FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVER-CURRENT PROTECTION SIZE.

WARNING-
ELECTRIC SHOCK HAZARD,CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUND IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

LINE VOLTAGE FIELD INSTALLED
CLASS II VOLTAGE FIELD INSTALLED

DESCRIPTION	
KEY	COMPONENT
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C12	CAPACITOR-DUAL
K1.-1	CONTACTOR-COMPRESSOR

NOTE- The thermostat used may be electromechanical or electronic.

NOTE- Transformer in indoor unit supplies power (24 VAC) to the thermostat and outdoor unit controls.

COOLING:

2Cooling demand initiates at Y1 in the thermostat.

324VAC from indoor unit energizes compressor contactor K1.

4K1-1 N.O. closes, energizing terminal “C” of compressor (B1) and outdoor fan motor (B4).

5Outdoor fan motor (B4) begins immediate operation.

6Compressor (B1) begins operation.

END OF COOLING DEMAND:

7Cooling demand is satisfied. Terminal Y1 is de-energized.

8Compressor contactor K1 is de-energized.

9K1-1 opens and compressor (B1) and outdoor fan motor (B4) are de-energized and stop immediately.

SERVICE NOTES