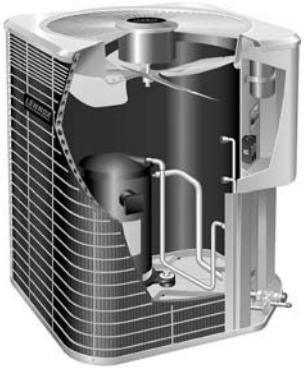
LENNOX
Service Literature

INSTALLATION AND SERVICE PROCEDURE

13ACX

Corp. 0612-L2
Revised May 2017

LOUVERED



NON-LOUVERED

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

⚠ IMPORTANT

This unit must be matched with an indoor coil as specified in Lennox Product Specification bulletin. Coils previously charged with HCFC-22 must be flushed.

⚠ WARNING

Electric Shock Hazard. Can cause injury or death. Unit must be grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

TABLE OF CONTENTS

13ACX Air Conditioners, which will also be referred to in this instruction as the outdoor unit, uses HFC-410A refrigerant. This outdoor unit must be installed with a matching indoor unit and line set as outlined in the *Lennox 13ACX Product Specification bulletin*.

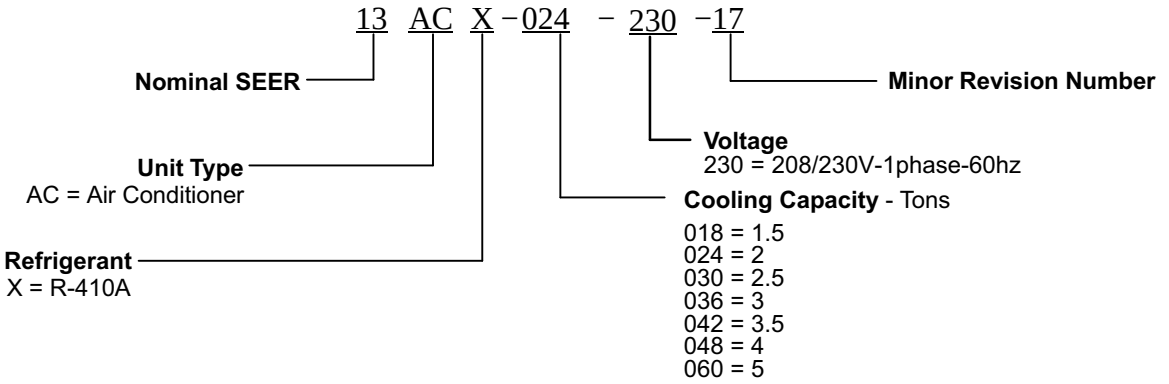
This outdoor unit is designed for use in systems that use one of the following refrigerant metering devices:

- Thermal expansion valve (TXV)
- Fixed orifice

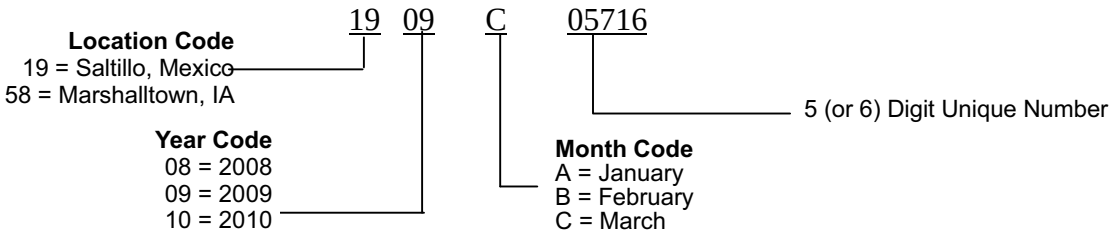
⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFCs, HCFCs and HFCs) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

Model Number Identification



Typical Serial Number Identification



Specifications

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-018-230-01	76	4 lbs. 7 oz.	3	18
13ACX-018-230-02	76	3 lbs. 13 oz.	3	18
13ACX-018-230-03	76	5 lbs. 7 oz.	3	18
13ACX-018-230-10 through -15	76	3 lbs. 13 oz.	3	18
13ACX-018-230-17, -18	76	3 lbs. 15 oz.	3	18

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-024-230-01	76	4 lbs. 14 oz.	3	18
13ACX-024-230-02	76	4 lbs. 6 oz.	3	18
13ACX-024-230-03	76	5 lbs. 12 oz.	3	18
13ACX-024-230-10 through -13, -15, -17	76	4 lbs. 6 oz.	3	18
13ACX-024-230-18	76	3 lbs. 15 oz.	3	18
13ACX-024-230-19	76	4 lbs. 6 oz.	3	18

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-030-230-01	76	6 lbs. 3 oz.	4	18
13ACX-030-230-02	76	4 lbs. 4 oz.	4	18
13ACX-030-230-03	76	5 lbs. 13 oz.	4	18
13ACX-030-230-10 through -13, -15	76	4 lbs. 4 oz.	4	18
13ACX-030-230-17, -18, -19	76	5 lbs. 2 oz.	4	18

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-036-230-01	76	6 lbs. 7 oz.	4	18
13ACX-036-230-02 through -16	76	5 lbs. 9 oz.	4	18
13ACX-036-230-17, -18	76	5 lbs. 4 oz.	4	18

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-042-230-01	79	8 lbs. 3 oz.	4	22
13ACX-042-230-03	79	7 lbs. 6 oz.	4	22
13ACX-042-230-10 through -16	79	6 lbs. 6 oz.	4	22
13ACX-042-230-17, -18	79	6 lbs. 8 oz.	4	22

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-048-230-01	79	8 lbs. 4 oz.	4	22
13ACX-048-230-03	79	8 lbs. 12 oz.	4	22
13ACX-048-230-10 through -16	79	7 lbs. 8 oz.	4	22
13ACX-048-230-17, -18, -19	79	7 lbs. 12 oz.	4	22

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Model Number	Unit		Outdoor Fan	
	Sound Rating Number (dB)[1]	Factory Refrigerant Charge[2]	Number of Blades	Diameter - inches.
13ACX-060-230-01	79	11 lbs. 2 oz.	4	22
13ACX-060-230-02	79	10 lbs. 0 oz.	4	22
13ACX-060-230-05	79	11 lbs. 6 oz.	4	22
13ACX-060-230-10 through -16	79	10 lbs. 0 oz.	4	22
13ACX-060-230-17, -18	79	9 lbs. 0 oz.	4	22

[1] Tested according to AHRI Standard 270-2008 test conditions.

[2] Refrigerant charge sufficient for 15 feet length of refrigerant lines.

Electrical Data

208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-018-230-01	1.0, 2.0 & 3.0	20	12.3	9.0	48.0	1/5	1075	1.1	2.0
13ACX-018-230-02	1.0	20	12.0	9.0	48.0	1/10	1075	0.7	1.4
13ACX-018-230-03	1.0	20	13.0	9.0	48.0	1/4	1080	1.7	3.4
13ACX-018-230-10	1.0	20	12.0	9.0	48.0	1/10	1075	0.7	1.4
13ACX-018-230-11	1.0	20	10.9	8.1	39.0	1/10	1075	0.7	1.4
	2.0	15	9.8	7.3	39.0	1/10	1075	0.7	1.4
	3.0	20	12.0	9.0	39.0	1/10	1075	0.7	1.4
13ACX-018-230-12	1.0	20	12.0	9.0	48.0	1/10	1075	0.7	1.4
13ACX-018-230-13	1.0	15	9.8	7.3	39.0	1/10	1075	0.7	1.4
	2.0	20	12.0	9.0	39.0	1/10	1075	0.7	1.4
13ACX-018-230-14	1.0 & 2.0	20	12.0	9.0	39.0	1/10	1075	0.7	1.4
13ACX-018-230-15	1.0 & 2.0	20	12.0	9.0	39.0	1/10	1075	0.7	1.4
13ACX-018-230-17	1.0	15	10.9	8.1	39.0	1/10	1075	0.7	1.4
	2.0	20	12.0	9.0	39.0	1/10	1075	0.7	1.4
13ACX-018-230-18	1.0	20	12.0	9.0	48.0	1/10	1075	0.7	1.4

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-024-230-01	1.0, 2.0 and 3.0	30	17.9	13.4	58.3	1/5	1075	1.1	2.0
13ACX-024-230-02	1.0	30	17.5	13.4	58.3	1/10	1075	0.7	1.4
13ACX-024-230-03	1.0	30	18.5	13.4	58.3	1/4	1080	1.7	3.4
13ACX-024-230-10	1.0	30	17.5	13.4	58.3	1/10	1075	0.7	1.4
13ACX-024-230-11	1.0	30	17.5	13.4	53.3	1/10	1075	0.7	1.4
	2.0	20	14.1	10.7	53.0	1/10	1075	0.7	1.4
	3.0	20	13.1	9.9	53.0	1/10	1075	0.7	1.4
	4.0	30	17.5	13.4	53.3	1/10	1075	0.7	1.4
13ACX-024-230-12	1.0	30	17.5	13.4	58.3	1/10	1075	0.7	1.4
	2.0	30	17.5	13.46	58.3	1/10	1075	0.7	1.4
13ACX-024-230-13	1.0	20	13.1	9.9	53.0	1/10	1075	0.7	1.4
	2.0	30	17.5	13.4	53.0	1/10	1075	0.7	1.4
13ACX-024-230-15	1.0 & 2.0	30	17.5	13.4	53.0	1/10	1075	0.7	1.4
13ACX-024-230-17	1.0	20	14.1	10.7	53.0	1/10	1075	0.7	1.4
	2.0	30	17.5	13.46	53.0	1/10	1075	0.7	1.4
13ACX-024-230-18	1.0	30	17.6	13.5	58.3	1/10	1075	0.7	1.4
13ACX-024-230-19	1.0	30	17.5	13.46	58.0	1/10	1075	0.7	1.4

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-030-230-01	1.0, 2.0 & 3.0	30	18.7	14.1	73.0	1/5	1075	1.1	2.0
13ACX-030-230-02	1.0	30	18.7	14.1	73.0	1/5	1075	1.1	2.0
13ACX-030-230-03	1.0	30	19.3	14.1	73.0	1/4	1080	1.7	3.4
13ACX-030-230-10	1.0	30	18.7	14.1	73.0	1/5	1075	1.1	2.0
13ACX-030-230-11	1.0	30	29.3	12.9	59.0	1/5	1075	1.1	2.0
	2.0	30	15.6	11.6	59.0	1/5	1075	1.1	2.0
	3.0	25	16.3	12.2	59.0	1/5	1075	1.1	2.0
	4.0	30	18.7	14.1	59.0	1/5	1075	1.1	2.0
13ACX-030-230-12	1.0	30	18.7	14.1	73.0	1/5	1075	1.1	2.0
13ACX-030-230-13	1.0	25	16.3	12.2	59.0	1/5	1075	1.1	2.0
	2.0	30	18.7	14.1	59.0	1/5	1075	1.1	2.0
13ACX-030-230-15	1.0 & 2.0	30	18.7	14.1	59.0	1/5	1075	1.1	2.0
13ACX-030-230-17	1.0	25	15.6	11.6	59.0	1/5	1075	1.1	2.0
	2.0	30	18.7	14.1	59.0	1/5	1075	1.1	2.0
13ACX-030-230-18	1.0	30	18.7	14.1	73.0	1/5	1075	1.1	2.0
13ACX-030-230-19	1.0	25	17.1	12.8	64.0	1/5	1075	1.1	2.0
	2.0	30	18.7	14.1	64.0	1/5	1075	1.1	2.0

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[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-036-230-01	1.0, 2.0 & 3.0	35	21.9	16.6	79.0	1/5	1075	1.1	2.0
13ACX-036-230-02	1.0	35	21.9	16.6	79.0	1/5	1075	1.1	2.0
13ACX-036-230-04	1.0	35	22.5	16.6	79.0	1/5	1075	1.7	2.0
13ACX-036-230-10	1.0	35	21.9	16.6	79.0	1/5	1075	1.1	2.0
13ACX-036-230-11	1.0	35	21.9	16.6	70.0	1/5	1075	1.1	2.0
	2.0	35	20.2	15.3	70.0	1/5	1075	1.1	2.0
	3.0	35	21.9	16.6	70.0	1/5	1075	1.1	2.0
13ACX-036-230-12	1.0	35	21.8	16.7	79.0	1/5	1075	1.1	2.0
	2.0	35	22.0	16.7	79.0	1/5	1075	1.1	2.0
13ACX-036-230-13	1.0	35	21.9	16.6	70.0	1/5	1075	1.1	2.0
13ACX-036-230-14	1.0	35	21.9	16.6	70.0	1/5	1075	1.1	2.0
13ACX-036-230-15	1.0 & 2.0	35	21.9	16.6	70.0	1/5	1075	1.1	2.0
13ACX-036-230-16	1.0	35	21.8	16.7	79.0	1/5	1075	1.1	2.0
13ACX-036-230-17	1.0	35	20.1	15.2	70.0	1/5	1075	1.1	2.0
	2.0	35	22.0	16.7	70.0	1/5	1075	1.1	2.0
13ACX-036-230-18	1.0	35	21.9	16.7	79.0	1/5	1075	1.1	2.0
	2.0	35	22.0	16.7	79.0	1/5	1075	1.1	2.0

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-042-230-01	1.0, 2.0 & 3.0	40	24.1	17.9	112.0	1/3	1075	1.7	4.1
13ACX-042-230-03	1.0	40	25.2	17.9	112.0	1/2	1075	2.8	No Data
13ACX-042-230-10	1.0	40	24.1	17.9	112.0	1/4	825	1.7	3.1
	2.0	40	25.3	18.8	112.0	1/4	825	1.7	3.1
13ACX-042-230-11	1.0	50	28.1	21.1	90.0	1/4	825	1.7	3.1
	2.0	40	25.3	18.8	90.0	1/4	825	1.7	3.1
13ACX-042-230-12	1.0	40	24.1	17.9	112.0	1/4	825	1.7	3.1
	2.0	40	25.3	18.8	112.0	1/4	825	1.7	3.1
	3.0	45	28.1	21.2	112.0	1/4	825	1.7	3.1
13ACX-042-230-13	1.0	40	25.3	18.8	90.0	1/4	825	1.7	3.1
13ACX-042-230-14	1.0	40	25.3	18.8	90.0	1/4	825	1.7	3.1
13ACX-042-230-15	1.0 & 2.0	40	25.3	18.8	90.0	1/4	825	1.7	3.1
13ACX-042-230-16	1.0	40	25.3	18.8	112.0	1/4	825	1.7	3.1
13ACX-042-230-17	1.0 & 2.0	45	28.1	21.2	90.0	1/4	825	1.7	3.1
13ACX-042-230-18	1.0	40	24.1	18.0	112.0	1/4	825	1.7	3.1
	2.0 & 3.0	45	28.1	21.2	112.0	1/4	825	1.7	3.1

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-048-230-01	1.0, 2.0 & 3.0	50	28.9	21.8	117.0	1/4	825	1.7	3.1
13ACX-048-230-10	1.0	50	28.9	21.8	117.0	1/4	825	1.7	3.1
13ACX-048-230-11	1.0	50	28.9	21.8	117.0	1/4	825	1.7	3.1
	2.0	45	27.7	20.8	100.0	1/4	825	1.7	3.1
	3.0	50	28.9	21.8	100.0	1/4	825	1.7	3.1
13ACX-048-230-12	1.0	50	28.9	21.8	117.0	1/4	825	1.7	3.1
	2.0	50	31.9	24.2	117.0	1/4	825	1.7	3.1
13ACX-048-230-13	1.0	50	28.9	21.8	100.0	1/4	825	1.7	3.1
13ACX-048-230-14	1.0	50	28.9	21.8	100.0	1/4	825	1.7	3.1
13ACX-048-230-15	1.0 & 2.0	50	28.9	21.8	100.0	1/4	825	1.7	3.1
13ACX-048-230-16	1.0	50	28.9	21.8	117.0	1/4	825	1.7	3.1
13ACX-048-230-17	1.0	50	31.9	24.1	100.0	1/4	825	1.7	3.1
	2.0	50	31.9	24.2	100.0	1/4	825	1.7	3.1
13ACX-048-230-18	1.0	50	28.9	21.8	117.0	1/4	825	1.7	3.1
13ACX-048-230-19	1.0	50	31.9	24.2	100.0	1/4	825	1.7	3.1

[1] HACR type circuit breaker or fuse.

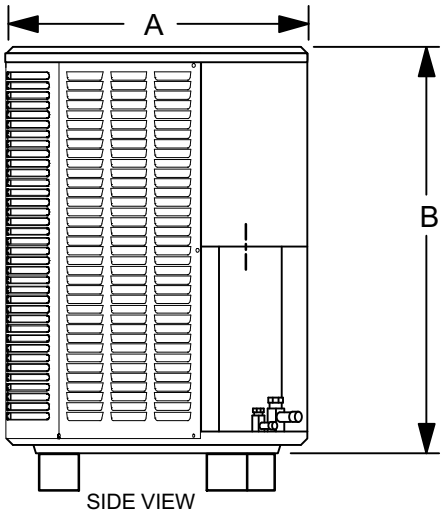
[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

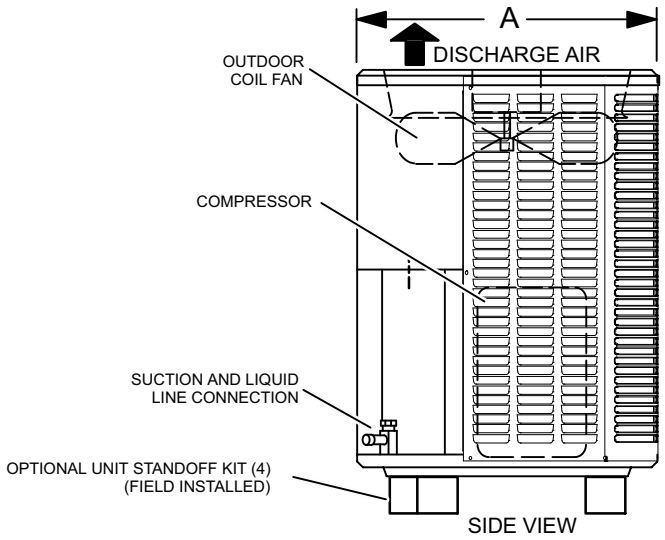
208/230V-60 Hz-1 Ph									
Model Number	Label Rev.	Unit		Compressor		Condenser Fan			
		Maximum Over-current Protection (amps)[1]	Minimum Circuity Ampacity[2]	Rated Load Amps (RLA)	Locked Rotor Amps (LRA)	Motor HP	Nominal RPM	Full Load Amps (FLA)	Locked Rotor Amps (LRA)
13ACX-060-230-01	1.0 & 2.0	60	34.5	26.2	134.0	1/4	825	1.7	3.1
13ACX-060-230-02	1.0 & 2.0	60	34.5	26.2	134.0	1/4	825	1.7	3.1
13ACX-060-230-05	1.0	60	35.6	26.2	134.0	1/2	1075	2.8	No Data
13ACX-060-230-10	1.0	60	34.5	26.2	134.0	1/4	825	1.7	3.1
13ACX-060-230-11	1.0	60	34.5	26.2	134.0	1/4	825	1.7	3.1
	2.0	50	33.0	25.1	120.0	1/4	825	1.7	3.1
	3.0	60	34.6	26.3	120.0	1/4	825	1.7	3.1
13ACX-060-230-12	1.0	60	34.6	26.3	134.0	1/4	825	1.7	3.1
13ACX-060-230-13	1.0	50	33.1	25.1	120.0	1/4	825	1.7	3.1
	2.0	60	34.6	26.3	120.0	1/4	825	1.7	3.1
13ACX-060-230-14	1.0	60	34.6	26.3	120.0	1/4	825	1.7	3.1
13ACX-060-230-15	1.0 & 2.0	60	34.6	26.3	120.0	1/4	825	1.7	3.1
13ACX-060-230-16	1.0	60	34.6	26.3	134.0	1/4	825	1.7	3.1
13ACX-060-230-17	1.0	50	29.4	22.1	125.0	1/4	825	1.7	3.1
	2.0	60	34.6	26.3	125.0	1/4	825	1.7	3.1
13ACX-060-230-18	1.0	60	34.7	26.4	134.0	1/4	825	1.7	3.1

[1] HACR type circuit breaker or fuse.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

Unit Dimensions - Inches (mm)



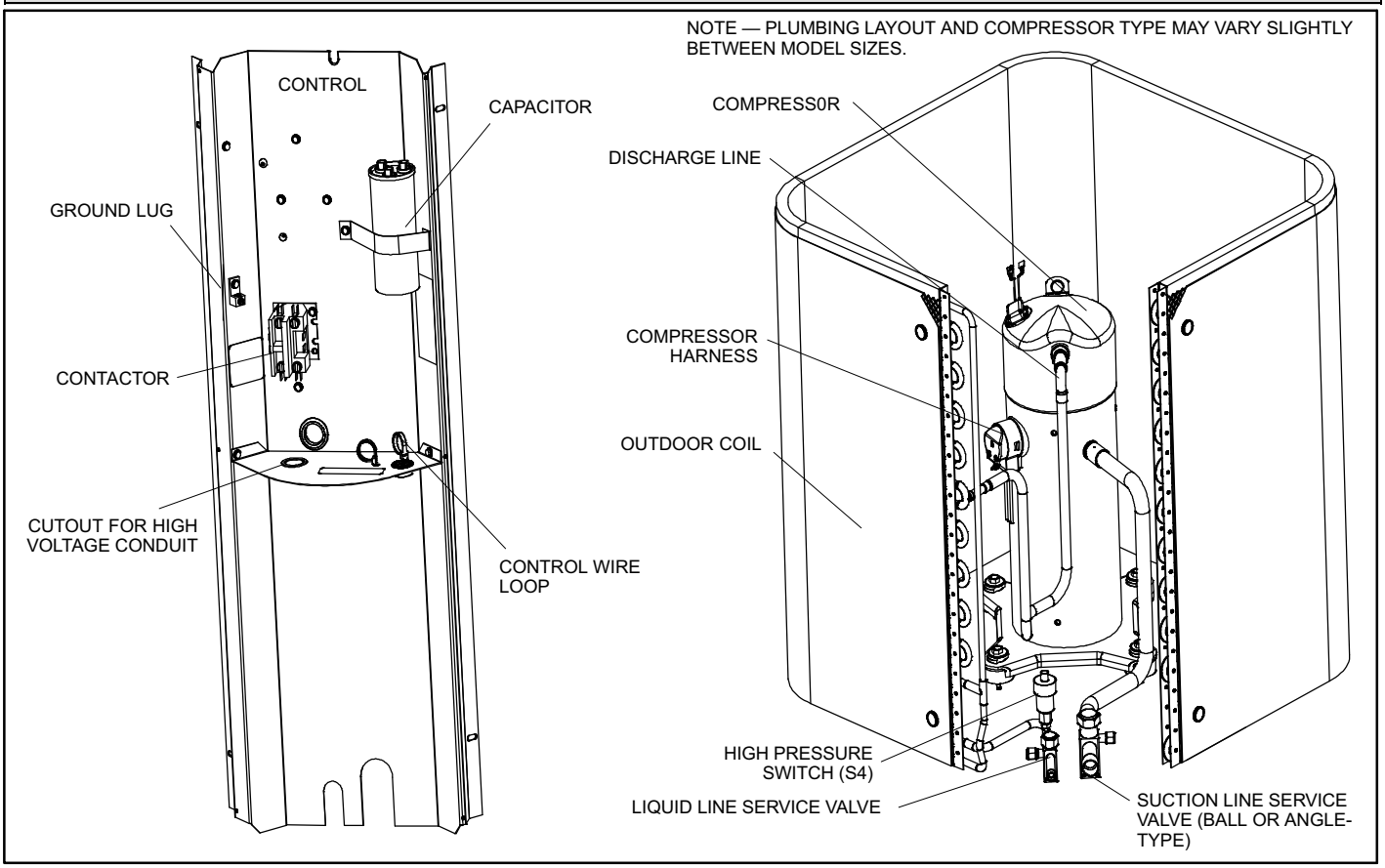


Model Numbers	A	B
13ACX-018-230-01	24-1/4 (616)	29-1/4 (743)
13ACX-018-230-02 and later	24-1/4 (616)	25-1/4 (641)
13ACX-024-230-01	24-1/4 (616)	33-1/4 (845)
13ACX-024-230-02 and later	24-1/4 (616)	25-1/4 (641)
13ACX-030-230-XX (All)	24-1/4 (616)	29-1/4 (743)
13ACX-036-230-XX (All)	24-1/4 (616)	29-1/4 (743)
13ACX-042-230-01	28-1/4 (718)	33-1/4 (845)
13ACX-042-230-02 and later	28-1/4 (718)	29-1/4 (743)
13ACX-048-230-01	28-1/4 (718)	29-1/4 (743)
13ACX-048-230-02 through -16	28-1/4 (718)	37-1/4 (946)
13ACX-048-230-17	28-1/4 (718)	33-1/4 (845)
13ACX-060-230-01	28-1/4 (718)	43-1/4 (1099)
13ACX-060-230-02	28-1/4 (718)	37-1/4 (946)
13ACX-060-230-03 through -16	28-1/4 (718)	33-1/4 (845)
13ACX-060-230-17	28-1/4 (718)	29-1/4 (743)

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

Typical Unit Parts Arrangement



Operating Gauge Set and Service Valves

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities who have jurisdiction before installation.

⚠ IMPORTANT

Only use Allen wrenches of sufficient hardness (50Rc - Rockwell Harness Scale minimum). Fully insert the wrench into the valve stem recess.

Service valve stems are factory-torqued (from 9 ft-lbs for small valves, to 25 ft-lbs for large valves) to prevent refrigerant loss during shipping and handling. Using an Allen wrench rated at less than 50Rc risks rounding or breaking off the wrench, or stripping the valve stem recess.

See the Lennox Service and Application Notes #C-08-1 for further details and information.

TORQUE REQUIREMENTS

When servicing or repairing heating, ventilating, and air conditioning components, ensure the fasteners are appropriately tightened. Table 1 lists torque values for fasteners.

⚠ IMPORTANT

To prevent stripping of the various caps used, the appropriately sized wrench should be used and fitted snugly over the cap before tightening.

When servicing or repairing HVAC components, ensure the fasteners are appropriately tightened. Table 1 provides torque values for fasteners.

Table 1. Torque Requirements

Parts	Recommended Torque	
Service valve cap	8 ft.- lb.	11 NM
Sheet metal screws	16 in.- lb.	2 NM
Machine screws #10	28 in.- lb.	3 NM
Compressor bolts	90 in.- lb.	10 NM
Gauge port seal cap	8 ft.- lb.	11 NM

USING MANIFOLD GAUGE SET

When checking the system charge, only use a manifold gauge set that features low loss anti-blow back fittings. Manifold gauge set used with HFC-410A refrigerant systems must be capable of handling the higher system operating pressures. The gauges should be rated for use with pressures of 0 - 800 psig on the high side and a low side of 30” vacuum to 250 psig with dampened speed to

500 psi. Gauge hoses must be rated for use at up to 800 psig of pressure with a 4000 psig burst rating.

OPERATING SERVICE VALVES

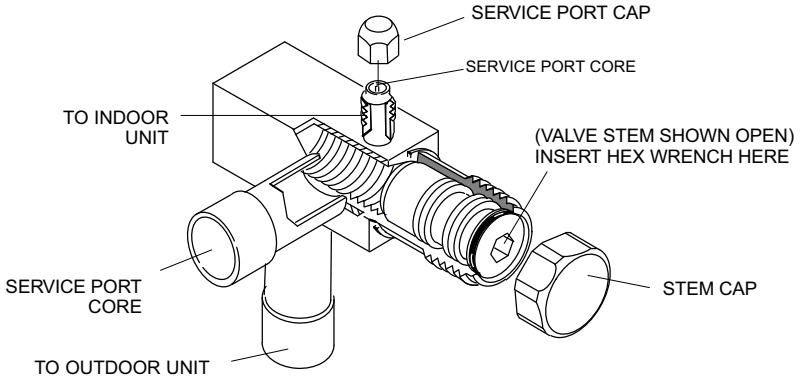
The liquid and vapor line service valves are used for removing refrigerant, flushing, leak testing, evacuating, checking charge and charging.

Each valve is equipped with a service port which has a factory-installed valve stem. Figure 1 provides information on how to access and operating both angle and ball service valves.

SERVICE VALVES ANGLE AND BALL

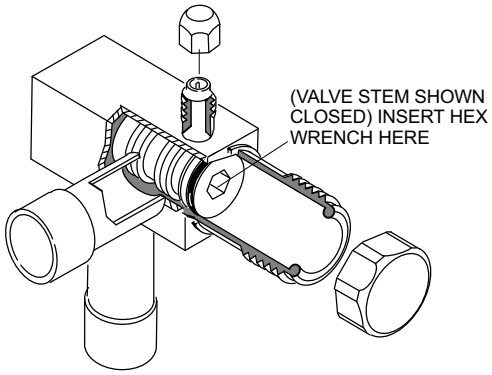
Operating Angle Type Service Valve:

1. Remove stem cap with an appropriately sized wrench.
2. Use a service wrench with a hex-head extension (3/16" for liquid line valve sizes and 5/16" for vapor line valve sizes) to back the stem out counterclockwise as far as it will go.



ANGLE-TYPE SERVICE VALVE (BACK-SEATED OPENED)

When service valve is **OPEN**, the service port is open to linE set, indoor and outdoor unit.

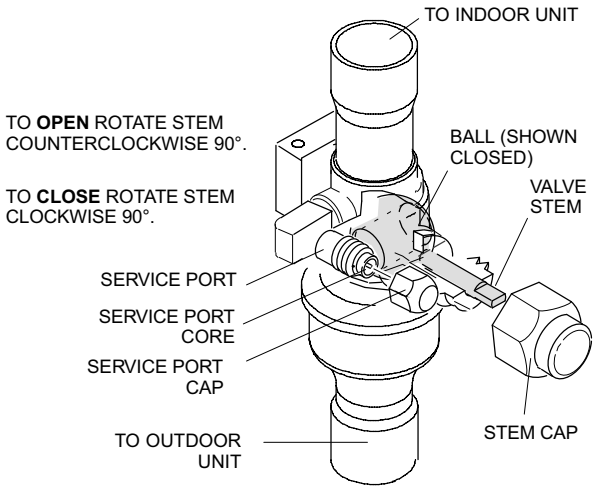


ANGLE-TYPE SERVICE VALVE (FRONT-SEATED CLOSED)

WHEN SERVICE VALVE IS **CLOSED**, THE SERVICE PORT IS OPEN TO THE LINE SET AND INDOOR UNIT.

Operating Ball Type Service Valve:

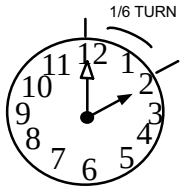
1. Remove stem cap with an appropriately sized wrench.
2. Use an appropriately sized wrenched to open. To open valve, roate stem counterclockwise 90°. To close rotate stem clockwise 90°.



To Access Service Port:

A service port cap protects the service port core from contamination and serves as the primary leak seal.

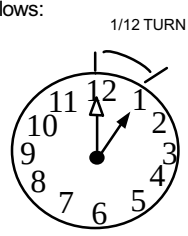
1. Remove service port cap with an appropriately sized wrench.
2. Connect gauge set to service port.
3. When testing is completed, replace service port cap and tighten as follows:
   - With torque wrench: Finger tighten and torque cap per table 1.
   - Without torque wrench: Finger tighten and use an appropriately sized wrench to turn an additional 1/6 turn clockwise.



Reinstall Stem Cap:

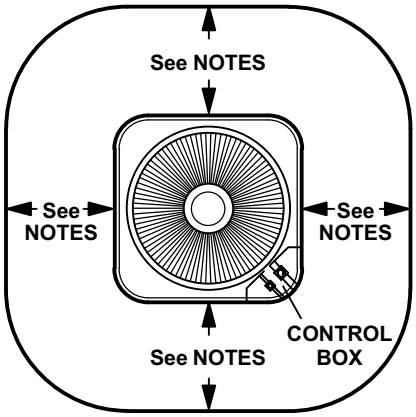
Stem cap protects the valve stem from damage and serves as the primary seal. Replace the stem cap and tighten as follows:

- With Torque Wrench: Finger tighten and then torque cap per table 1.
- Without Torque Wrench: Finger tighten and use an appropriately sized wrench to turn an additional 1/12 turn clockwise.



NOTE — A label with specific torque requirements may be affixed to the stem cap. If the label is present, use the specified torque.

Figure 1. Angle and Ball Service Valves



NOTES:
Service clearance of 30 in. (762 mm) must be maintained on one of the sides adjacent to the control box.

Clearance to one of the other three sides must be 36 in. (914 mm)

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).

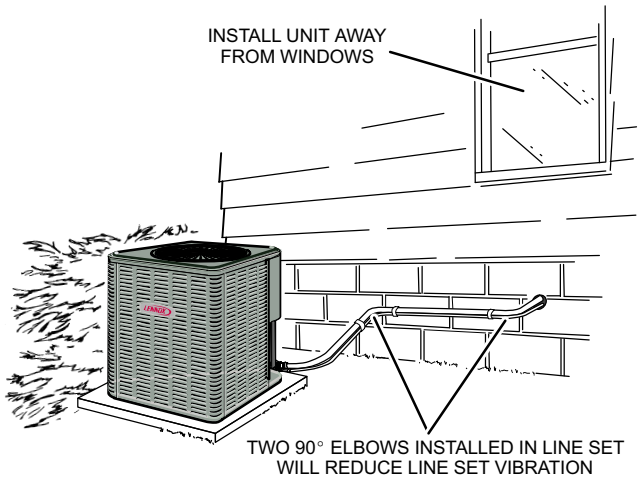
A clearance of 24 in. must be maintained between two units.

48 in. (1219 mm) clearance required on top of unit.

NOTICE: Specific applications may require adjustment of the listed installation clearances to provide protection for the unit from physical damage or to avoid conditions which limit operating efficiency. (Example: Clearances may have to be increased to prevent snow or ice from falling on the top of the unit. Additional clearances may also be required to prevent air recirculation when the unit is installed under a deck or in another tight space.)

Figure 2. Installation Clearances

DETAIL A



DETAIL B

Install unit level or, if on a slope, maintain slope tolerance of 2 degrees (or 2 inches per 5 feet [50 mm per 1.5 m]) away from building structure.

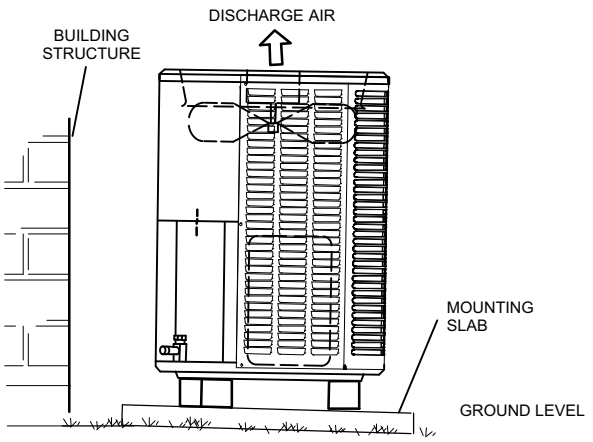


Figure 3. Placement, and Slab Mounting

Unit Placement

See *Unit Dimensions* on page 8 for sizing mounting slab, platforms or supports. Refer to figure 2 for mandatory installation clearance requirements.

⚠ CAUTION

In order to avoid injury, take proper precaution when lifting heavy objects.

POSITIONING CONSIDERATIONS

Consider the following when positioning the unit:

- Some localities are adopting sound ordinances based on the unit's sound level registered from the adjacent property, not from the installation property. Install the unit as far as possible from the property line.
- When possible, do not install the unit directly outside a window. Glass has a very high level of sound transmission. For proper placement of unit in relation to a window see the provided illustration in figure 3, Detail A.

PLACING UNIT ON SLAB

When installing unit at grade level, the top of the slab should be high enough above grade so that water from higher ground will not collect around the unit. The slab should have a slope tolerance as described in figure 3, Detail B.

ROOF MOUNTING

Install the unit a minimum of 6 inches (152 mm) above the roof surface to avoid ice build-up around the unit. Locate the unit above a load bearing wall or area of the roof that can adequately support the unit. Consult local codes for rooftop applications.

If unit coil cannot be mounted away from prevailing winter winds, a wind barrier should be constructed. Size barrier at least the same height and width as outdoor unit. Mount barrier 24 inches (610 mm) from the sides of the unit in the direction of prevailing winds.

NOTICE

Roof Damage!

This system contains both refrigerant and oil. Some rubber roofing material may absorb oil and cause the rubber to swell when it comes into contact with oil. The rubber will then bubble and could cause leaks. Protect the roof surface to avoid exposure to refrigerant and oil during service and installation. Failure to follow this notice could result in damage to roof surface.

Removing and Installing Louvered Panels – Initial Builds

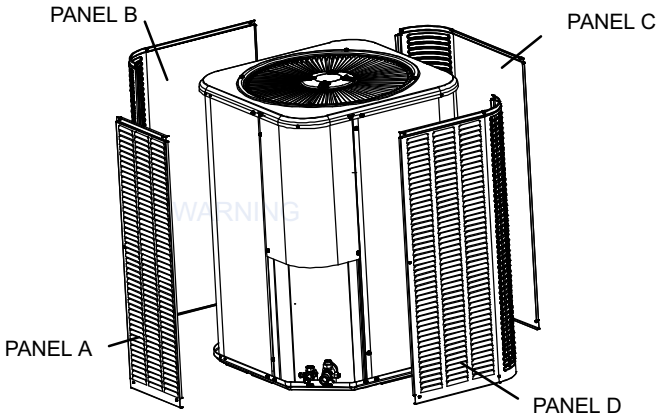
WARNING

To prevent personal injury, or damage to panels, unit or structure, be sure to observe the following:

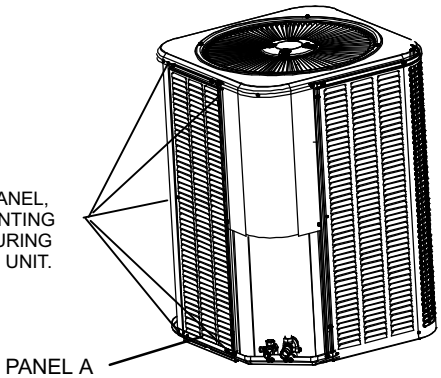
While installing or servicing this unit, carefully stow all removed panels out of the way, so that the panels will not cause injury to personnel, nor cause damage to objects or structures nearby, nor will the panels be subjected to damage (e.g., being bent or scratched).

While handling or stowing the panels, consider any weather conditions, especially windy conditions, that may cause panels to be blown around and battered.

When removing the unit panels. Remove panel **A** first, then **B**, **C** and finally **D**. When reinstalling panels, reverse that order starting with panel **D**, **C**, **B** and finally **A**.



REMOVAL



STEP 1

TO REMOVE PANEL, REMOVE MOUNTING SCREWS SECURING PANEL TO THE UNIT.

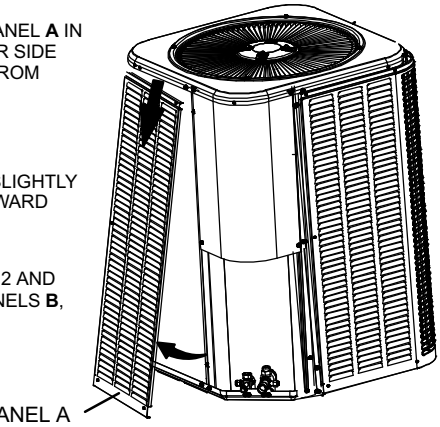
STEP 2

SLIGHTLY LIFT PANEL **A** IN ORDER TO CLEAR SIDE LIPS OF PANEL FROM BASE OF UNIT.

STEP 3

TILT PANEL OUT SLIGHTLY AND PULL DOWNWARD TO REMOVE.

REPEAT STEPS 1, 2 AND 3 TO REMOVE PANELS **B**, **C** AND FINALLY **D**.



INSTALLATION

STEP 1

STARTING WITH PANEL **D**, INSERT PANEL UNDER UNIT TOP CAP LIP AND LIFT SLIGHTLY TO CLEAR SIDE LIP OF PANEL FROM BASE.

STEP 2

MOVE PANEL IN TOWARDS UNIT. ALIGN LEFT/RIGHT SIDE LIPS OF PANEL WITH GROOVE INSERTS ALONG LEFT/RIGHT SIDE OF UNIT.

STEP 3

SECURE PANEL, WITH MOUNTING SCREWS.

REPEAT STEPS 1 AND 2 TO INSTALL PANELS **C**, **B** AND FINALLY **A**.

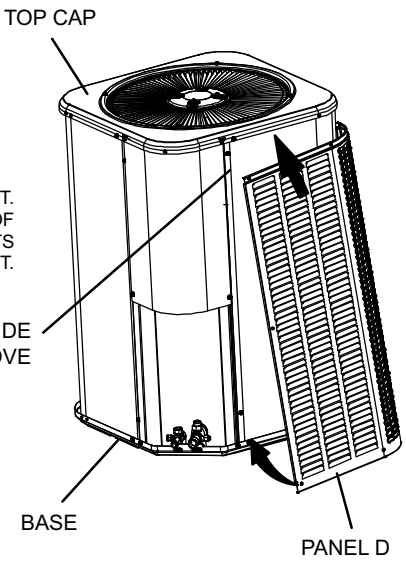


Figure 4. Louvered Panels

Removing and Installing Louvered Panels – Later Builds

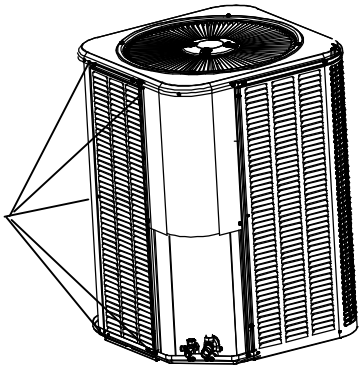
WARNING

To prevent personal injury, or damage to panels, unit or structure, be sure to observe the following:

While installing or servicing this unit, carefully stow all removed panels out of the way, so that the panels will not cause injury to personnel, nor cause damage to objects or structures nearby, nor will the panels be subjected to damage (e.g., being bent or scratched).

While handling or stowing the panels, consider any weather conditions, especially windy conditions, that may cause panels to be blown around and battered.

REMOVAL



STEP 1

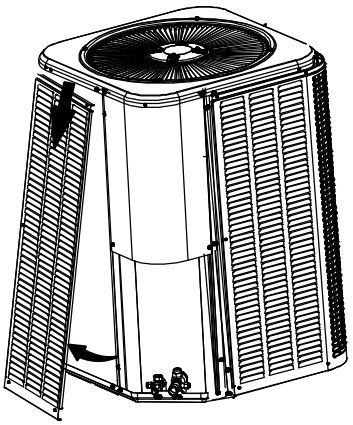
TO REMOVE PANEL, REMOVE MOUNTING SCREWS SECURING PANEL TO THE UNIT.

STEP 2

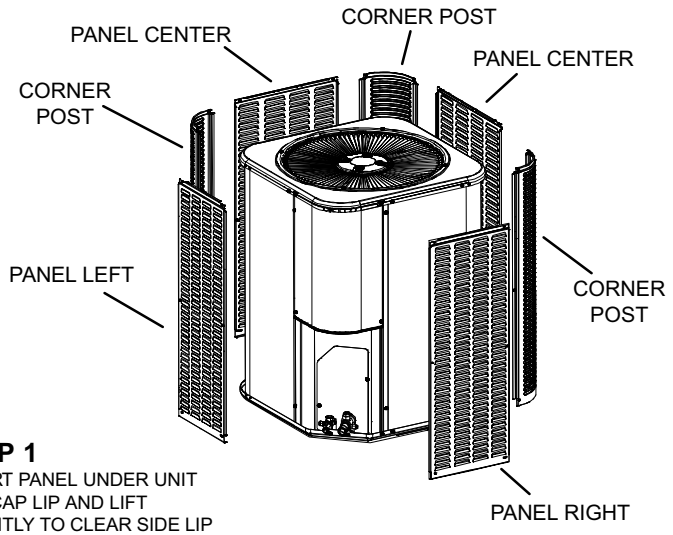
SLIGHTLY LIFT PANEL IN ORDER TO CLEAR SIDE LIPS OF PANEL FROM BASE OF UNIT.

STEP 3

TILT PANEL OUT SLIGHTLY AND PULL DOWNWARD TO REMOVE.



PANEL INSTALLATION



STEP 1

INSERT PANEL UNDER UNIT TOP CAP LIP AND LIFT SLIGHTLY TO CLEAR SIDE LIP OF PANEL FROM BASE.

STEP 2

MOVE PANEL IN TOWARDS UNIT. ALIGN LEFT/RIGHT SIDE LIPS OF PANEL WITH GROOVE INSERTS ALONG LEFT/RIGHT SIDE OF UNIT.

STEP 3

SECURE PANEL, WITH MOUNTING SCREWS.

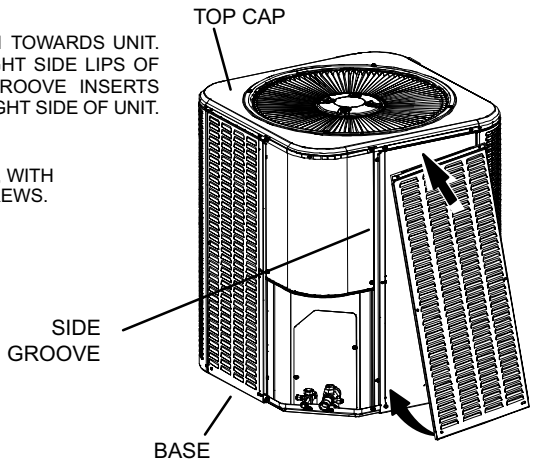


Figure 5. Louvered Panels

New or Replacement Line Set

Table 2. Refrigerant Line Set

Model Number (-xx*)	Valve Size Connections		Recommended Line Sets		
	Liquid Line	Suction Line	L15 Line Set Model	Line Set Length	Catalog Number
13ACX-018-230-17 13ACX-024-230-17	3/8" (10 mm)	5/8" (16 mm)	L15-26-20	20 feet (6.1 m)	89J52
			L15-26-25	25 feet (9.1 m)	89J53
			L15-26-35	35 feet (12.2 m)	89J54
			L15-26-50	50 feet (15.2 m)	89J55
13ACX-018-230-XX 13ACX-024-230-XX 13ACX-030-230-XX 13ACX-036-230-17 13ACX-042-230-17	3/8" (10 mm)	3/4" (19 mm)	L15-41-20	20 feet (6.1 m)	89J56
			L15-41-30	30 feet (9.1 m)	89J57
			L15-41-40	40 feet (12.2 m)	89J58
			L15-41-50	50 feet (15.2 m)	89J59
13ACX-036-230-XX 13ACX-042-230-XX 13ACX-048-230-XX 13ACX-060-230-17	3/8" (10 mm)	7/8" (22 mm)	L15-65-30	30 feet (9.1 m)	89J60
			L15-65-40	40 feet (12.2 m)	89J61
			L15-65-50	50 feet (15.2 m)	89J62
13ACX-060-230-XX	3/8" (10 mm)	1-1/8" (29 mm) **	Field-fabricated	N/A	N/A

* Applicable to all minor revision numbers unless otherwise specified.
** Some applications may required a field-provided 1-1/8" to 7/8" adapter.

This section provides information on new installation or replacement of existing line set. If a new or replacement line set is not required, then proceed to *Brazing Connections* on page 16.

NOTE - When installing refrigerant lines longer than 50 feet, see the Lennox Refrigerant Piping Design and Fabrication Guidelines, CORP. 9351-L9, or contact Lennox Technical Support Product Applications for assistance.

If refrigerant lines are routed through a wall, seal and isolate the opening so vibration is not transmitted to the building. Pay close attention to line set isolation during installation of any HVAC system. When properly isolated from building structures (walls, ceilings. floors), the refrigerant lines will not create unnecessary vibration and subsequent sounds.

Also, consider the following when placing and installing a high-efficiency air conditioner:

Field refrigerant piping consists of liquid and suction lines from the outdoor unit (braze connections) to the indoor unit coil (flare or braze connections). Use Lennox L15 (braze, non-flare) series line set, or use field-fabricated refrigerant lines as listed in Table 2.

⚠ IMPORTANT

Mineral oils are not compatible with HFC-410A If oil must be added, it must be a Polyol ester oil.

The compressor is charged with sufficient Polyol ester oil for line set lengths up to 50 feet. Recommend adding oil to system based on the amount of refrigerant charge in the system. No need to add oil in system with 20 pounds of refrigerant or less. For systems over 20 pounds - add one ounce of every five pounds of refrigerant.

Recommended topping-off POE oils are Mobil EAL ARCTIC 22 CC or ICI EMKARATE™ RL32CF.

To obtain the correct information from Lennox, be sure to communicate the following points:

- Model (13ACX) and size of unit (e.g. -060).
- Line set diameters for the unit being installed as listed in table 2 and total length of installation.
- Number of elbows and if there is a rise or drop of the piping.

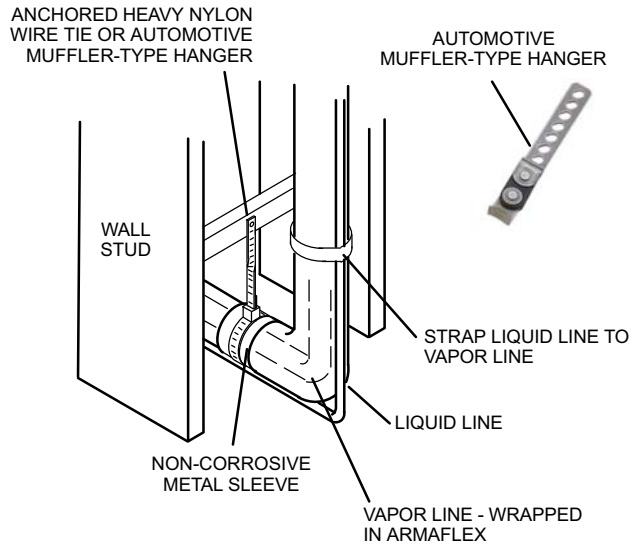
MATCHING WITH NEW OR EXISTING INDOOR COIL AND LINE SET

The RFC1-metering line consisted of a small bore copper line that ran from condenser to evaporator coil. Refrigerant was metered into the evaporator by utilizing temperature/pressure evaporation effects on refrigerant in the small RFC line. The length and bore of the RFC line corresponded to the size of cooling unit.

If the 13ACX is being used with either a new or existing indoor coil which is equipped with a liquid line which served as a metering device (RFCI), the liquid line must be replaced prior to the installation of the 13ACX unit. Typically a liquid line used to meter flow is 1/4" in diameter and copper.

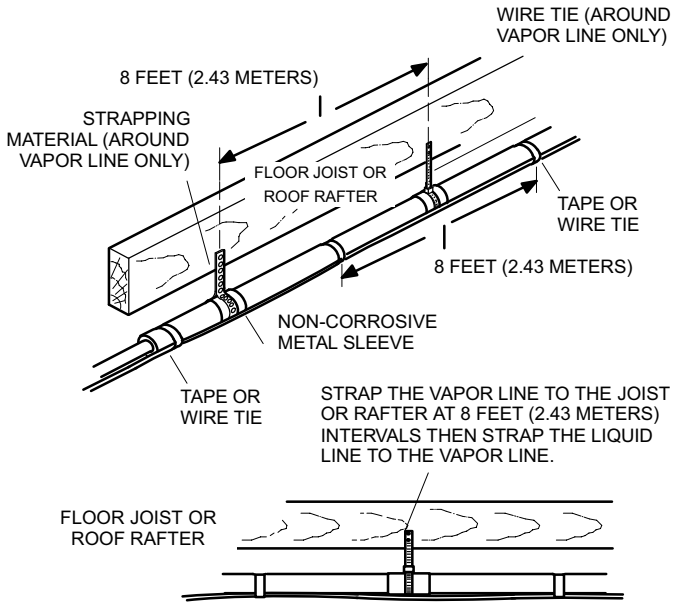
Line Set Isolation — The following illustrations are examples of proper refrigerant line set isolation:

REFRIGERANT LINE SET — TRANSITION FROM VERTICAL TO HORIZONTAL



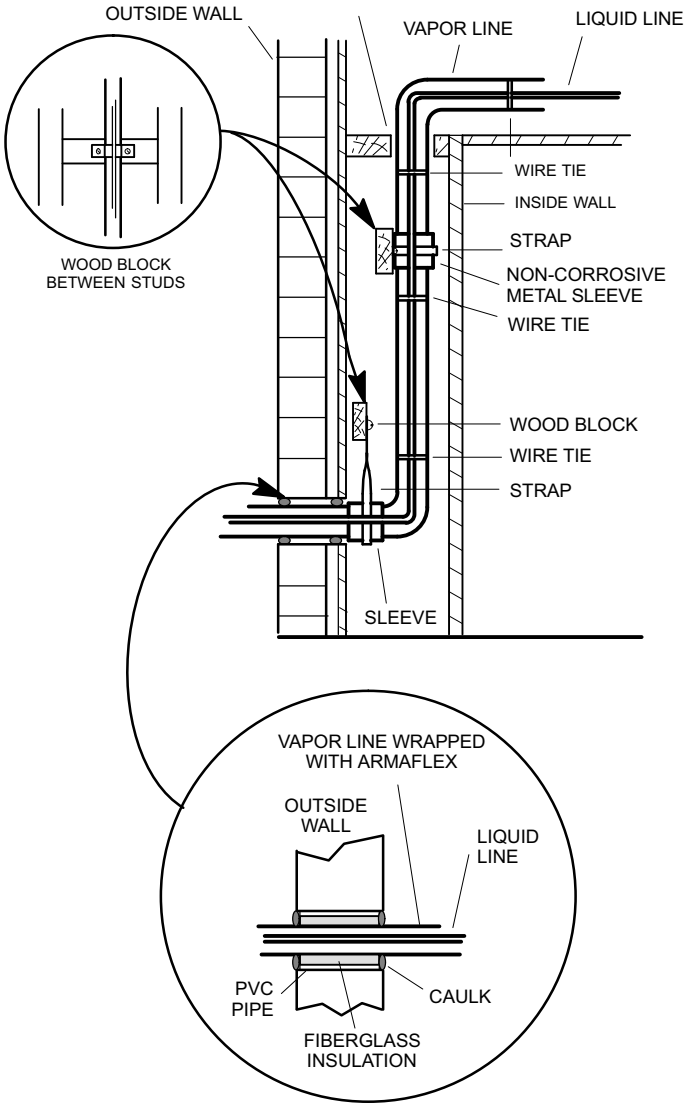
REFRIGERANT LINE SET — INSTALLING HORIZONTAL RUNS

To hang line set from joist or rafter, use either metal strapping material or anchored heavy nylon wire ties.



REFRIGERANT LINE SET — INSTALLING VERTICAL RUNS (NEW CONSTRUCTION SHOWN)

NOTE — Insulate liquid line when it is routed through areas where the surrounding ambient temperature could become higher than the temperature of the liquid line or when pressure drop is equal to or greater than 20 psig.



NOTE — Similar installation practices should be used if line set is to be installed on exterior of outside wall.

Figure 6. Line Set Installation

LIQUID LINE FILTER DRIER INSTALLATION

The filter drier (one is shipped with each 13ACX unit) must be field installed in the liquid line between the outdoor unit's liquid line service valve and the indoor coil's metering device (fixed orifice or TXV) as illustrated in figure 7. This filter drier must be installed to ensure a clean, moisture-free system. Failure to install the filter drier will void the warranty. A replacement filter drier is available from Lennox. See *Brazing Connections* on page 16 for special procedures on brazing filter drier connections to the liquid line.

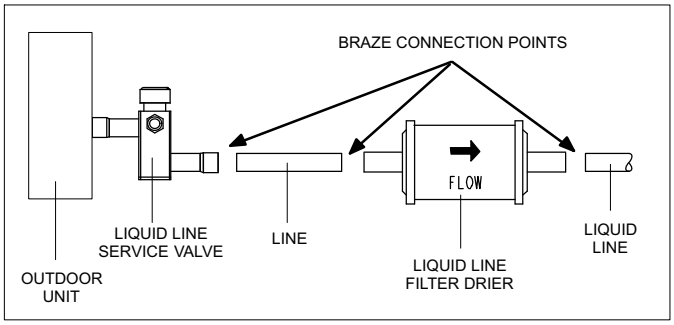


Figure 7. Typical Liquid Line Filter Drier Installation

⚠ IMPORTANT

If this unit is being matched with an approved line set or indoor unit coil which was previously charged with mineral oil, or if it is being matched with a coil which was manufactured before January of 1999, the coil and line set must be flushed prior to installation. Take care to empty all existing traps. Polyol ester (POE) oils are used in Lennox units charged with HFC-410A refrigerant. Residual mineral oil can act as an insulator, preventing proper heat transfer. It can also clog the expansion device, and reduce the system performance and capacity.

Failure to properly flush the system per the instructions below will void the warranty.

Brazing Connections

Use the procedures outline in figures 8 and 9 for brazing line set connections to service valves.

⚠ WARNING

Danger of fire. Bleeding the refrigerant charge from only the high side may result in pressurization of the low side shell and suction tubing. Application of a brazing torch to a pressurized system may result in ignition of the refrigerant and oil mixture - Check the high and low pressures before applying heat.

⚠ WARNING

When using a high pressure gas such as dry nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

⚠ CAUTION

Brazing alloys and flux contain materials which are hazardous to your health.

Avoid breathing vapors or fumes from brazing operations. Perform operations only in well-ventilated areas.

Wear gloves and protective goggles or face shield to protect against burns.

Wash hands with soap and water after handling brazing alloys and flux.

⚠ IMPORTANT

Connect gauge set low pressure side to vapor line service valve and repeat procedure starting at paragraph 4 for brazing the liquid line to service port valve.

⚠ IMPORTANT

Allow braze joint to cool before removing the wet rag from the service valve. Temperatures above 250ºF can damage valve seals.

⚠ IMPORTANT

Use silver alloy brazing rods with 5% minimum silver alloy for copper-to-copper brazing. Use 45% minimum alloy for copper-to-brass and copper-to-steel brazing.

⚠ WARNING

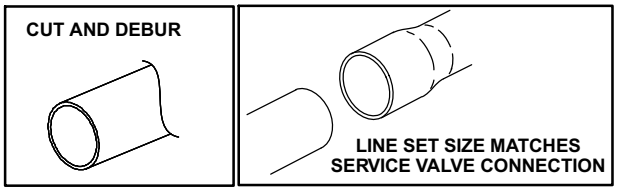
Fire, Explosion and Personal Safety Hazard.

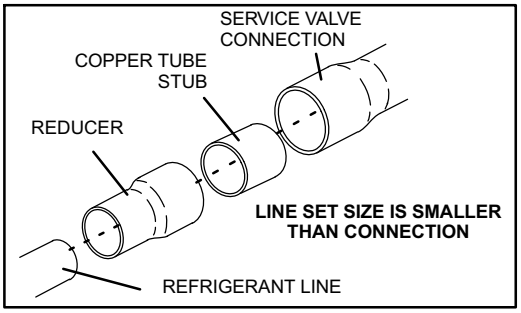
Failure to follow this warning could result in damage, personal injury or death.

Never use oxygen to pressurize or purge refrigeration lines. Oxygen, when exposed to a spark or open flame, can cause fire and/or an explosion, that could result in property damage, personal injury or death.

1 CUT AND DEBUR

Cut ends of the refrigerant lines square (free from nicks or dents) and debur the ends. The pipe must remain round. Do not crimp end of the line.

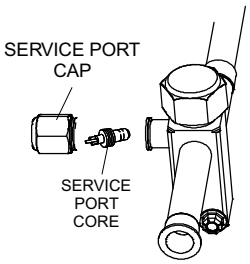




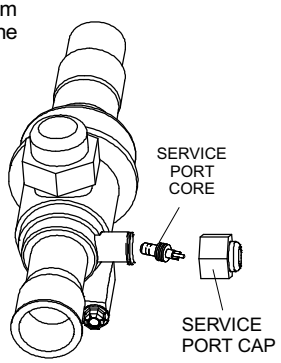
DO NOT CRIMP SERVICE VALVE CONNECTOR WHEN PIPE IS SMALLER THAN CONNECTION

2 CAP AND CORE REMOVAL

Remove service cap and core from both the suction / vapor and liquid line service ports.



LIQUID LINE SERVICE VALVE



SUCTION / VAPOR LINE SERVICE VALVE

3 ATTACH THE MANIFOLD GAUGE SET FOR BRAZING LIQUID AND SUCTION / VAPOR LINE SERVICE VALVES

Flow regulated nitrogen (at 1 to 2 psig) through the low-side refrigeration gauge set into the liquid line service port valve, and out of the suction / vapor line service port valve.

A Connect gauge set low pressure side to liquid line service valve (service port).

B Connect gauge set center port to bottle of nitrogen with regulator.

C Remove core from valve in suction / vapor line service port to allow nitrogen to escape.

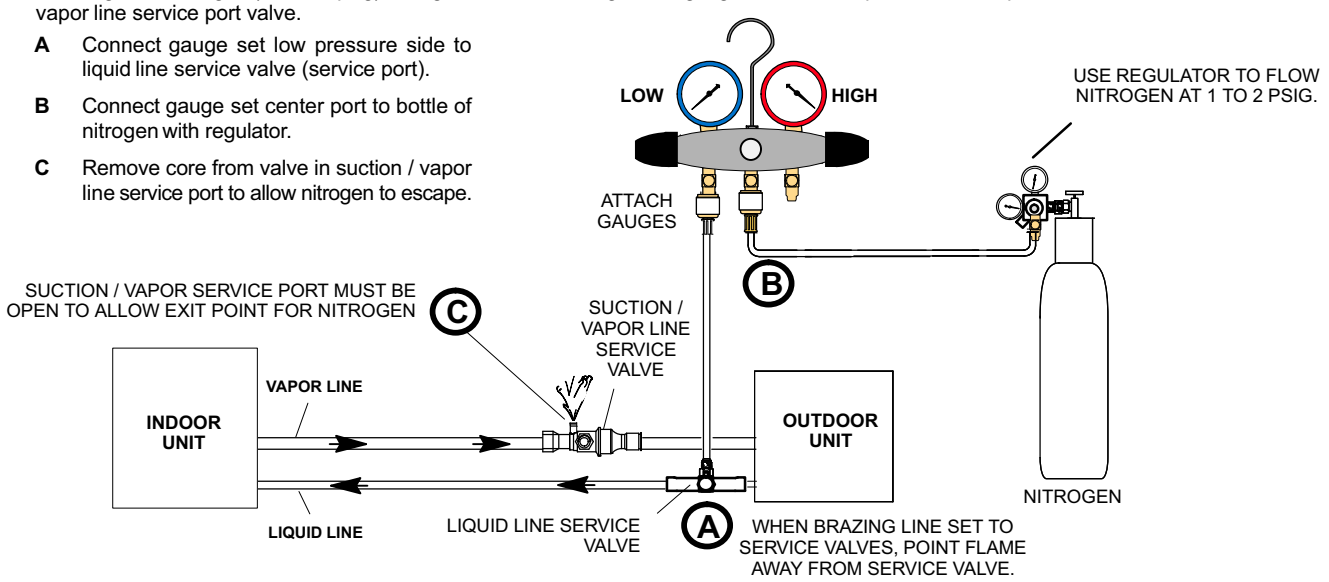


Figure 8. Brazing Procedures

4 WRAP SERVICE VALVES

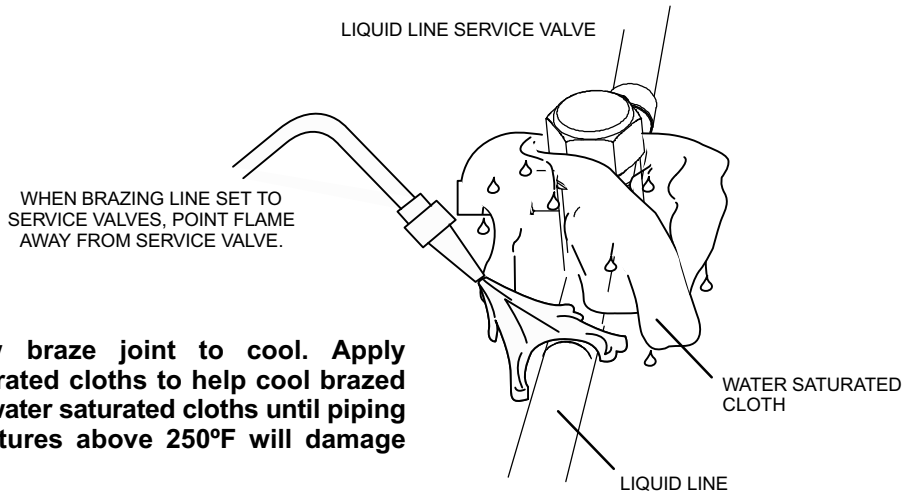
To help protect service valve seals during brazing, wrap water saturated cloths around service valve bodies and copper tube stubs. Use additional water saturated cloths underneath the valve body to protect the base paint.

5 FLOW NITROGEN

Flow regulated nitrogen (at 1 to 2 psig) through the refrigeration gauge set into the valve stem port connection on the liquid service valve and out of the suction / vapor valve stem port. See steps **3A, 3B** and **3C** on manifold gauge set connections

6 BRAZE LINE SET

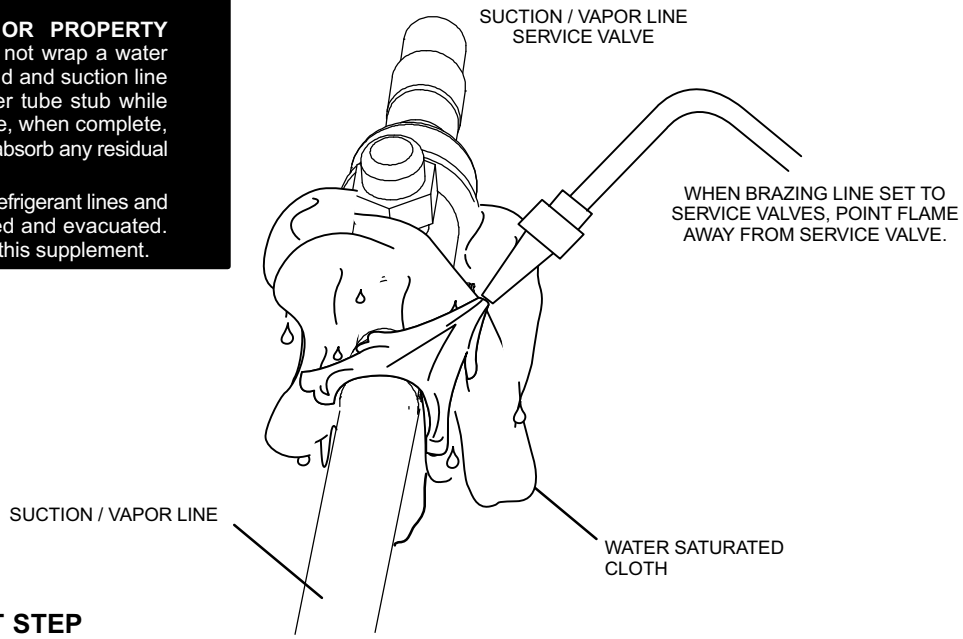
Wrap both service valves with water saturated cloths as illustrated here and as mentioned in step 4, before brazing to line set. Water saturated cloths must remain water saturated throughout the brazing and cool-down process.



IMPORTANT — Allow braze joint to cool. Apply additional water saturated cloths to help cool brazed joint. Do not remove water saturated cloths until piping has cooled. Temperatures above 250ºF will damage valve seals.

WARNING

1. **FIRE, PERSONAL INJURY, OR PROPERTY DAMAGE** may result if you do not wrap a water saturated cloth around both liquid and suction line service valve bodies and copper tube stub while brazing in the line set! The braze, when complete, must be quenched with water to absorb any residual heat.
2. Do not open service valves until refrigerant lines and indoor coil have been leak-tested and evacuated. Refer to procedures provided in this supplement.



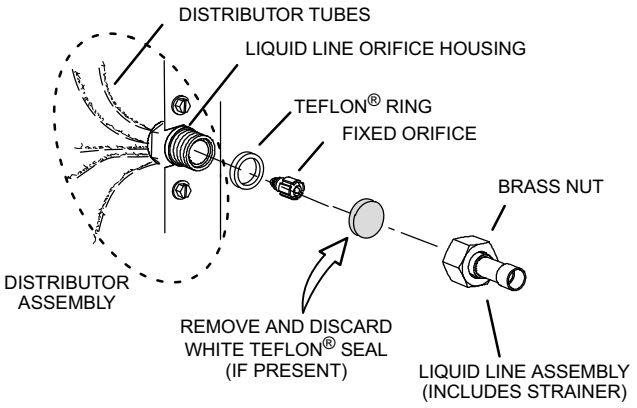
7 PREPARATION FOR NEXT STEP

After all connections have been brazed, disconnect manifold gauge set from service ports. Apply additional water saturated cloths to both services valves to cool piping. Once piping is cool, remove all water saturated cloths. Refer to the unit installation instructions for the next step in preparing the unit.

Figure 9. Brazing Procedures (continued)

Flushing Line Set and Indoor Coil

1A TYPICAL EXISTING FIXED ORIFICE REMOVAL PROCEDURE (UNCASED COIL SHOWN)



A On fully cased coils, remove the coil access and plumbing panels.

B Remove any shipping clamps holding the liquid line and distributor assembly.

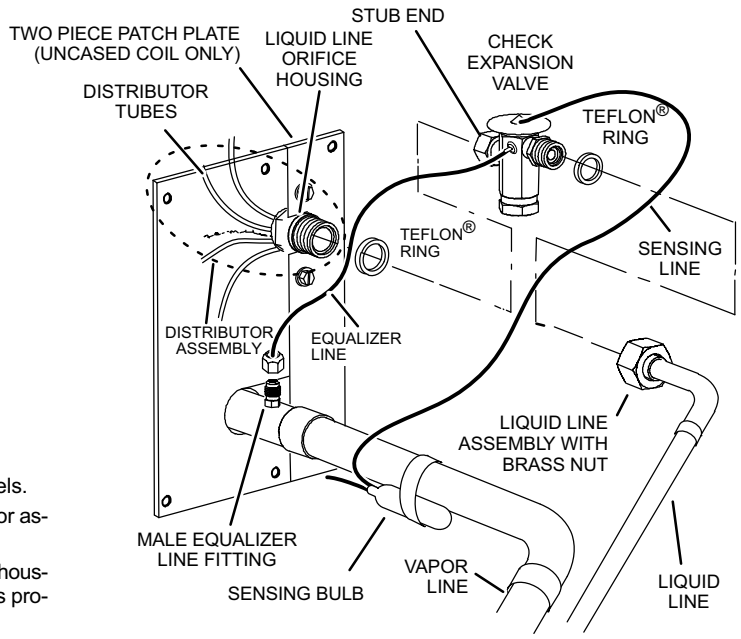
C Using two wrenches, disconnect liquid line from liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.

D Remove and discard fixed orifice, valve stem assembly if present and Teflon® washer as illustrated above.

E Use a field-provided fitting to temporary reconnect the liquid line to the indoor unit's liquid line orifice housing.

OR

1B TYPICAL EXISTING EXPANSION VALVE REMOVAL PROCEDURE (UNCASED COIL SHOWN)



A On fully cased coils, remove the coil access and plumbing panels.

B Remove any shipping clamps holding the liquid line and distributor assembly.

C Disconnect the equalizer line from the check expansion valve equalizer line fitting on the vapor line.

D Remove the vapor line sensing bulb.

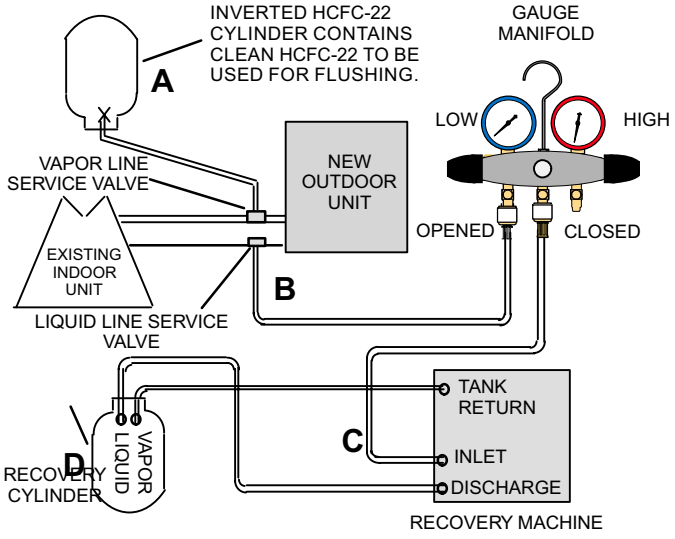
E Disconnect the liquid line from the check expansion valve at the liquid line assembly.

F Disconnect the check expansion valve from the liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.

G Remove and discard check expansion valve and the two Teflon® rings.

H Use a field-provided fitting to temporary reconnect the liquid line to the indoor unit's liquid line orifice housing.

2 CONNECT GAUGES AND EQUIPMENT FOR FLUSHING PROCEDURE



A Inverted HCFC-22 cylinder with clean refrigerant to the vapor service valve.

B HCFC-22 gauge set (low side) to the liquid line valve.

C HCFC-22 gauge set center port to inlet on the recovery machine with an empty recovery tank to the gauge set.

D Connect recovery tank to recovery machines per machine instructions.

3 FLUSHING LINE SET

The line set and indoor unit coil must be flushed with at least the same amount of clean refrigerant that previously charged the system. Check the charge in the flushing cylinder before proceeding.

A Set the recovery machine for liquid recovery and start the recovery machine. Open the gauge set valves to allow the recovery machine to pull a vacuum on the existing system line set and indoor unit coil.

B Invert the cylinder of clean HCFC-22 and open its valve to allow liquid refrigerant to flow into the system through the vapor line valve. Allow the refrigerant to pass from the cylinder and through the line set and the indoor unit coil before it enters the recovery machine.

C After all of the liquid refrigerant has been recovered, switch the recovery machine to vapor recovery so that all of the HCFC-22 vapor is recovered. Allow the recovery machine to pull down to 0 the system.

D Close the valve on the inverted HCFC-22 drum and the gauge set valves. Pump the remaining refrigerant out of the recovery machine and turn the machine off.

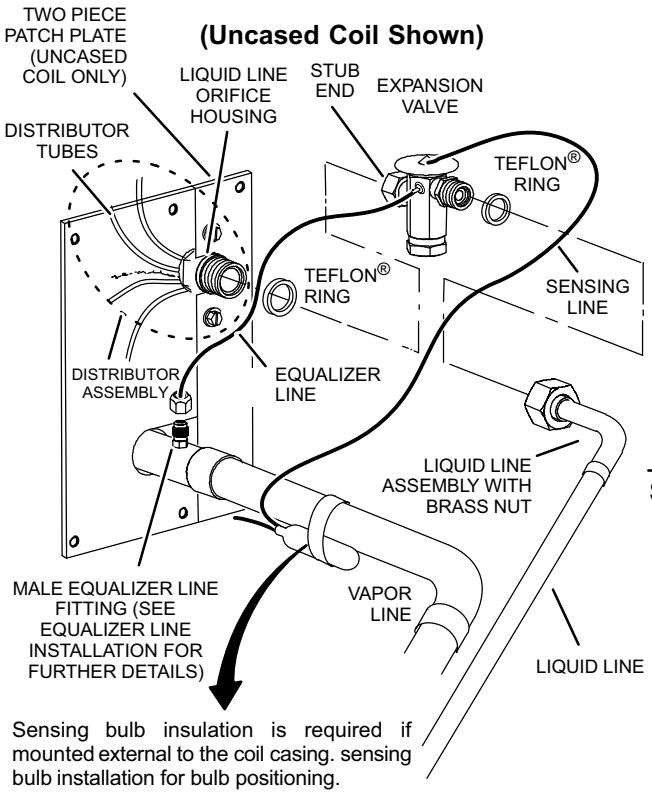
Figure 10. Removing Metering Device and Flushing

Installing Indoor Metering Device

This outdoor unit is designed for use in systems that use either an fixed orifice (RFC), or expansion valve metering devices at the indoor coil.

See the *Lennox 13ACX Product Specification bulletin* for approved expansion valve kit match-ups. The expansion valve unit can be installed internal or external to the indoor coil. In applications where an uncased coil is being installed in a field-provided plenum, install the expansion valve in a manner that will provide access for field servicing of the expansion valve. Refer to below illustration for reference during installation of expansion valve unit.

INDOOR EXPANSION VALVE INSTALLATION



Sensing bulb insulation is required if mounted external to the coil casing. sensing bulb installation for bulb positioning.

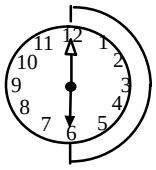
A Remove the field-provided fitting that temporary reconnected the liquid line to the indoor unit's distributor assembly.

B Install one of the provided Teflon® rings around the stubbed end of the expansion valve and lightly lubricate the connector threads and expose surface of the Teflon® ring with refrigerant oil.

C Attach the stubbed end of the expansion valve to the liquid line orifice housing. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in the figure above, or 20 ft-lb.

D Place the remaining Teflon® washer around the other end of the expansion valve. Lightly lubricate connector threads and expose surface of the Teflon® ring with refrigerant oil.

E Attach the liquid line assembly to the expansion valve. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in the figure above or 20 ft-lb.

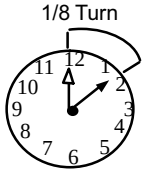


SENSING BULB INSTALLATION

A Attach the vapor line sensing bulb in the proper orientation as illustrated to the right using the clamp and screws provided.

NOTE — Confirm proper thermal contact between vapor line and expansion bulb before insulating the sensing bulb once installed.

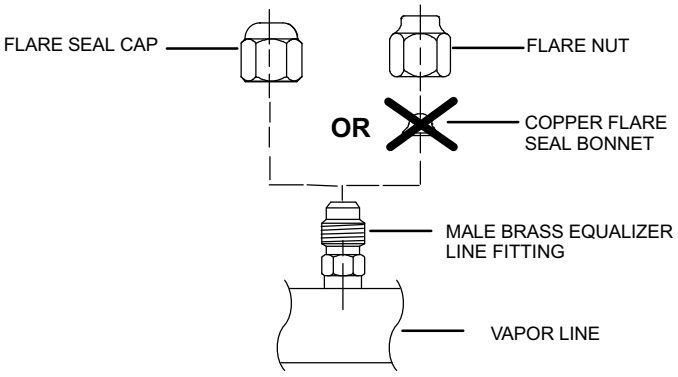
B Connect the equalizer line from the expansion valve to the equalizer vapor port on the vapor line. Finger tighten the flare nut plus 1/8 turn (7 ft-lbs) as illustrated below.

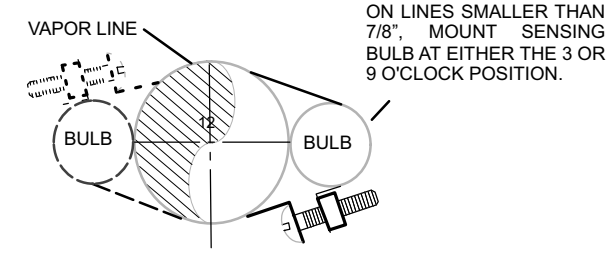


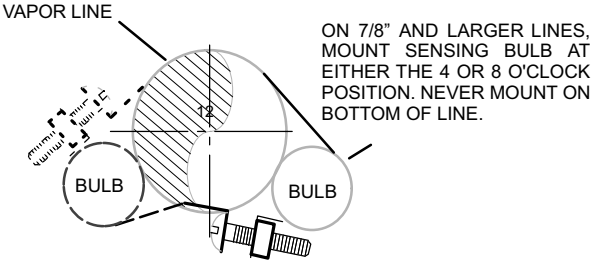
EQUALIZER LINE INSTALLATION

A Remove and discard either the flare seal cap or flare nut with copper flare seal bonnet from the equalizer line port on the vapor line as illustrated in the figure to the right.

B Remove and discard either the flare seal cap or flare nut with copper flare seal bonnet from the equalizer line port on the vapor line as illustrated in the figure to the right.







NOTE — NEVER MOUNT ON BOTTOM OF LINE.

Figure 11. Installing Indoor Expansion Valve

⚠ IMPORTANT

The Environmental Protection Agency (EPA) prohibits the intentional venting of HFC refrigerants during maintenance, service, repair and disposal of appliance. Approved methods of recovery, recycling or reclaiming must be followed.

⚠ IMPORTANT

If this unit is being matched with an approved line set or indoor unit coil which was previously charged with mineral oil, or if it is being matched with a coil which was manufactured before January of 1999, the coil and line set must be flushed prior to installation. Take care to empty all existing traps. Polyol ester (POE) oils are used in Lennox units charged with HFC-410A refrigerant. Residual mineral oil can act as an insulator, preventing proper heat transfer. It can also clog the expansion device, and reduce the system performance and capacity.

Failure to properly flush the system per the instructions below will void the warranty.

Leak Test Line Set and Indoor Coil

⚠ WARNING

When using a high pressure gas such as dry nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

⚠ IMPORTANT

Leak detector must be capable of sensing HFC refrigerant.

⚠ 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.

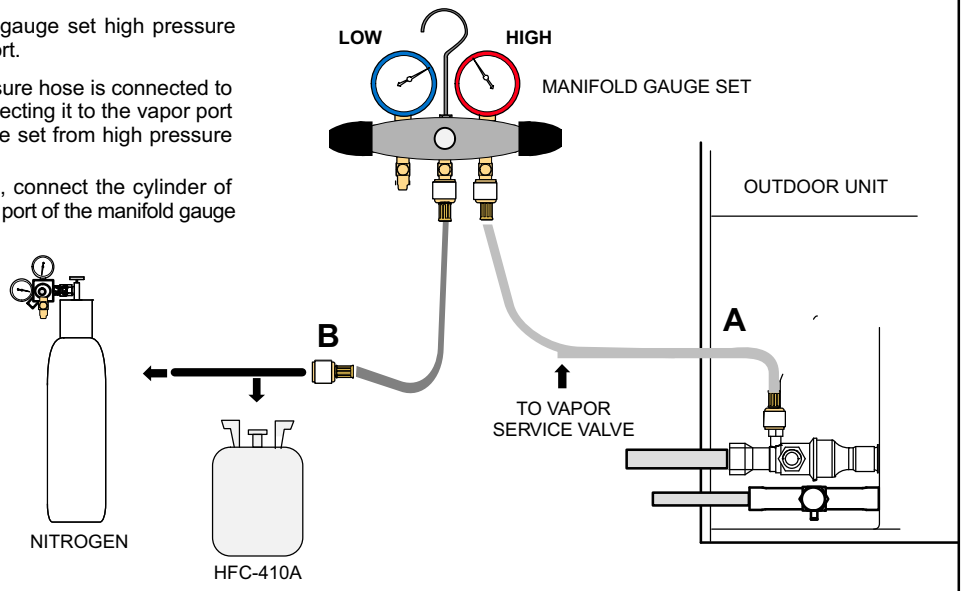
1 CONNECT GAUGE SET

A Connect an HFC-410A manifold gauge set high pressure hose to the vapor valve service port.

NOTE — Normally, the high pressure hose is connected to the liquid line port. However, connecting it to the vapor port better protects the manifold gauge set from high pressure damage.

B With both manifold valves closed, connect the cylinder of HFC-410A refrigerant to the center port of the manifold gauge set.

NOTE — Later in the procedure, the HFC-410A container will be replaced by the nitrogen container.



2 TEST FOR LEAKS

After the line set has been connected to the indoor and outdoor units, check the line set connections and indoor unit for leaks. Use the following procedure to test for leaks:

A With both manifold valves closed, connect the cylinder of HFC-410A refrigerant to the center port of the manifold gauge set. Open the valve on the HFC-410A cylinder (vapor only).

B Open the high pressure side of the manifold to allow HFC-410A into the line set and indoor unit. Weigh in a trace amount of HFC-410A. *[A trace amount is a maximum of two ounces (57 g) refrigerant or three pounds (31 kPa) pressure].* Close the valve on the HFC-410A cylinder and the valve on the high pressure side of the manifold gauge set. Disconnect the HFC-410A cylinder.

C Connect a cylinder of dry nitrogen with a pressure regulating valve to the center port of the manifold gauge set.

D Adjust dry nitrogen pressure to 150 psig (1034 kPa). Open the valve on the high side of the manifold gauge set in order to pressurize the line set and the indoor unit.

E After a few minutes, open one of the service valve ports and verify that the refrigerant added to the system earlier is measurable with a leak detector.

F After leak testing disconnect gauges from service ports.

Figure 12. Leak Test

Evacuating Line Set and Indoor Coil

1 CONNECT GAUGE SET

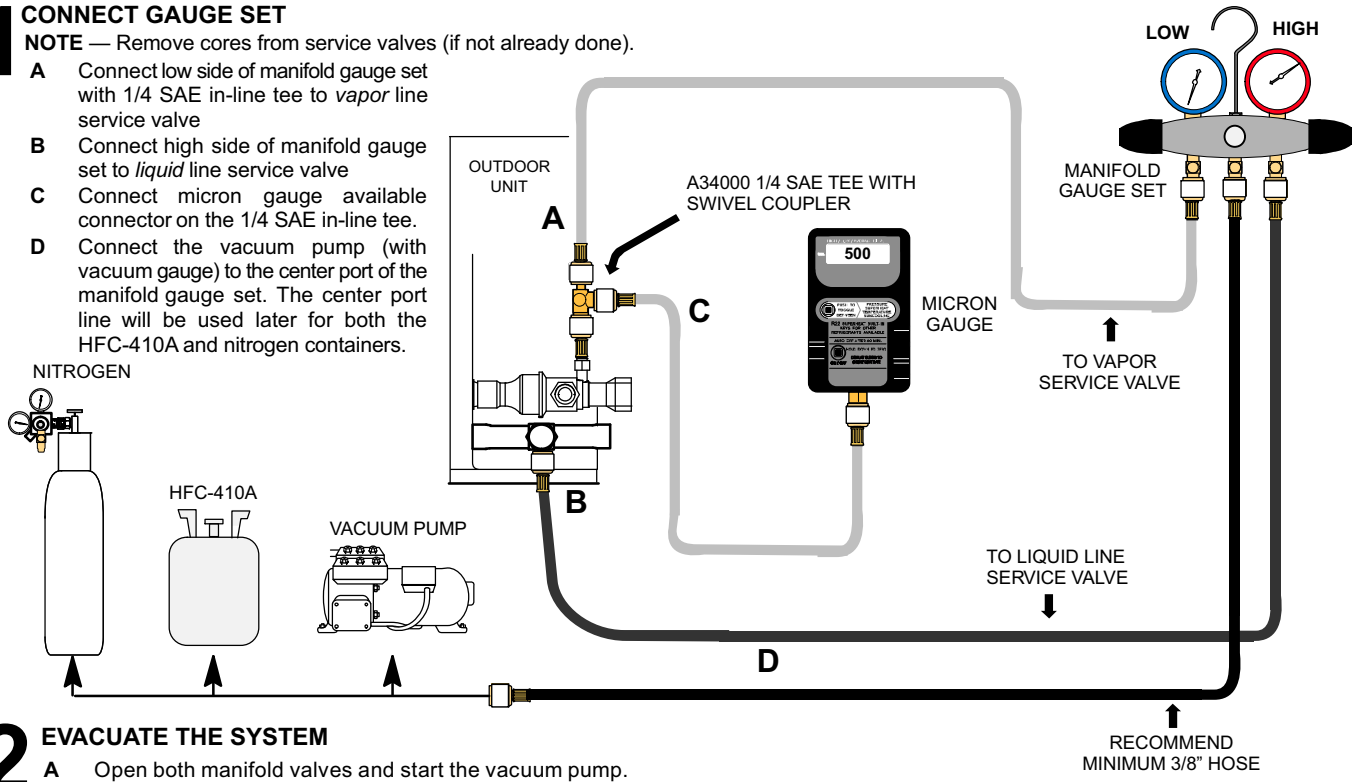
NOTE — Remove cores from service valves (if not already done).

A Connect low side of manifold gauge set with 1/4 SAE in-line tee to *vapor* line service valve

B Connect high side of manifold gauge set to *liquid* line service valve

C Connect micron gauge available connector on the 1/4 SAE in-line tee.

D Connect the vacuum pump (with vacuum gauge) to the center port of the manifold gauge set. The center port line will be used later for both the HFC-410A and nitrogen containers.



2 EVACUATE THE SYSTEM

A Open both manifold valves and start the vacuum pump.

B Evacuate the line set and indoor unit to an **absolute pressure** of 23,000 microns (29.01 inches of mercury).

NOTE *— During the early stages of evacuation, it is desirable to close the manifold gauge valve at least once. A rapid rise in pressure indicates a relatively large leak. If this occurs,* ***repeat the leak testing procedure****.*

NOTE *— The term* ***absolute pressure*** *means the total actual pressure within a given volume or system, above the absolute zero of pressure. Absolute pressure in a vacuum is equal to atmospheric pressure minus vacuum pressure.*

C When the absolute pressure reaches 23,000 microns (29.01 inches of mercury), perform the following:

- Close manifold gauge valves
- Close valve on vacuum pump
- Turn off vacuum pump
- Disconnect manifold gauge center port hose from vacuum pump
- Attach manifold center port hose to a dry nitrogen cylinder with pressure regulator set to 150 psig (1034 kPa) and purge the hose.
- Open manifold gauge valves to break the vacuum in the line set and indoor unit.
- Close manifold gauge valves.

D Shut off the dry nitrogen cylinder and remove the manifold gauge hose from the cylinder. Open the manifold gauge valves to release the dry nitrogen from the line set and indoor unit.

E Reconnect the manifold gauge to the vacuum pump, turn the pump on, and continue to evacuate the line set and indoor unit until the absolute pressure does not rise above 500 microns (29.9 inches of mercury) within a 20-minute period after shutting off the vacuum pump and closing the manifold gauge valves.

F When the absolute pressure requirement above has been met, disconnect the manifold hose from the vacuum pump and connect it to an upright cylinder of HFC-410A refrigerant. Open the manifold gauge valve 1 to 2 psig in order to release the vacuum in the line set and indoor unit.

G Perform the following:

- Close manifold gauge valves.
- Shut off HFC-410A cylinder.
- Reinstall service valve cores by removing manifold hose from service valve. Quickly install cores with core tool while maintaining a positive system pressure.
- Replace stem caps and secure finger tight, then tighten an additional one-sixth (1/6) of a turn as illustrated.

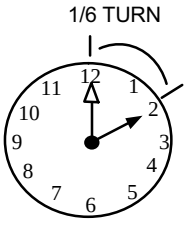


Figure 13. Evacuating System

⚠ WARNING

Danger of Equipment Damage. Avoid deep vacuum operation. Do not use compressors to evacuate a system. Extremely low vacuums can cause internal arcing and compressor failure. Damage caused by deep vacuum operation will void warranty.

⚠ CAUTION

Brazing alloys and flux contain materials which are hazardous to your health.

Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas.

Wear gloves and protective goggles or face shield to protect against burns.

Wash hands with soap and water after handling brazing alloys and flux.

Evacuating the system of non-condensables is critical for proper operation of the unit. Non-condensables are defined as any gas that will not condense under temperatures and pressures present during operation of an air conditioning system. Non-condensables and water suction combine with refrigerant to produce substances that corrode copper piping and compressor parts.

⚠ IMPORTANT

Use a thermocouple or thermistor electronic vacuum gauge that is calibrated in microns. Use an instrument capable of accurately measuring down to 50 microns.

Electrical

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

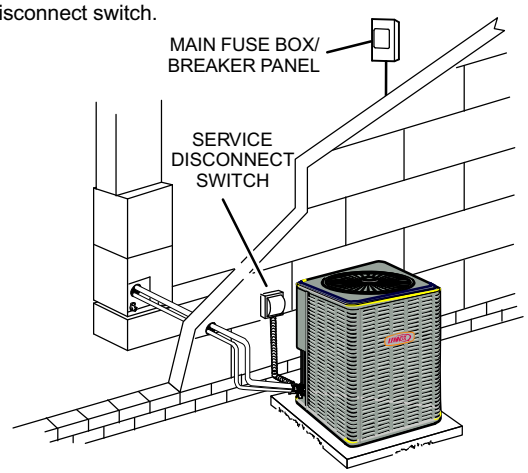
Refer to the furnace or air handler installation instructions for additional wiring application diagrams and refer to unit nameplate for minimum circuit ampacity and maximum overcurrent protection size.

24VAC TRANSFORMER

Use the transformer provided with the furnace or air handler for low-voltage control power (24VAC - 40 VA minimum)

SIZE CIRCUIT AND INSTALL SERVICE DISCONNECT SWITCH

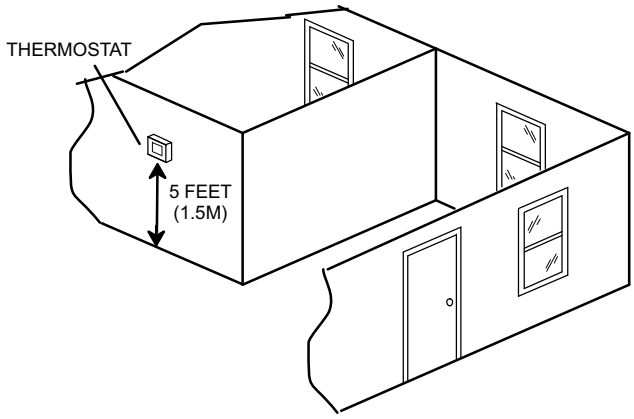
Refer to the unit nameplate for minimum circuit ampacity, and maximum fuse or circuit breaker (HACR per NEC). Install power wiring and properly sized disconnect switch.



NOTE — Units are approved for use only with copper conductors. Ground unit at disconnect switch or to an earth ground.

INSTALL THERMOSTAT

Install room thermostat (ordered separately) on an inside wall approximately in the center of the conditioned area and 5 feet (1.5m) from the floor. It should not be installed on an outside wall or where it can be affected by sunlight or drafts.



NOTE — 24VAC, Class II circuit connections are made in the control panel.

⚠ WARNING

Electric Shock Hazard. Can cause injury or death. Unit must be grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

ROUTING HIGH VOLTAGE/ GROUND AND CONTROL WIRING

HIGH VOLTAGE / GROUND WIRES

Any excess high voltage field wiring should be trimmed and secured away from any low voltage field wiring. To facilitate a conduit, a cutout is located in the bottom of the control panel. Connect conduit to the control panel using a proper conduit fitting.

CONTROL WIRING

NOTE — Wire tie provides low voltage control wire strain relief and to maintain separation of field installed low and high voltage circuits.

NOTE — For proper voltages, select thermostat wire (control wires) gauge per table above.

NOTE — Do not bundle any excess 24VAC control wires inside control panel.

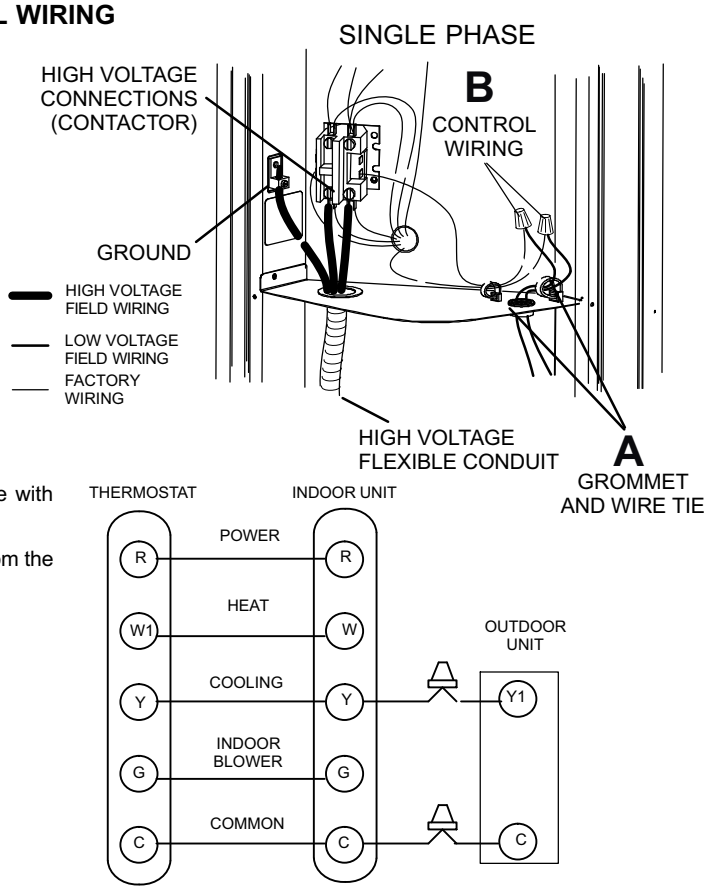
Install low voltage wiring from outdoor to indoor unit and from thermostat to indoor unit as illustrated.

A Run 24VAC control wires through hole with grommet and secure with provided wire tie.

B Make 24VAC thermostat wire connections. Locate the two wires from the contactor and make connection using field provided wire nuts:

- Yellow to Y1
- Black to C (common)

WIRE RUN LENGTH	AWG#	INSULATION TYPE
LESS THAN 100' (30 METERS)	18	TEMPERATURE RATING
MORE THAN 100' (30 METERS)	16	35ºC MINIMUM.



System Operation

⚠ IMPORTANT

Some scroll compressor have internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system is raised above 40 psig. DO NOT REPLACE COMPRESSOR.

The outdoor unit and indoor blower will cycle on and off as dictated by demands from the room thermostat. When the thermostat's blower switch is in the **ON** position, the indoor blower will operate continuously.

MANUAL HIGH PRESSURE SWITCH (S4) - USED ON MODELS 13ACX-XXX-230-01 THROUGH -09

Some 13ACX units are equipped with a manual high-pressure switch that is located in the liquid line of the compressor as illustrated in figure on page 2 and figure 14 for the location of the manual reset button.

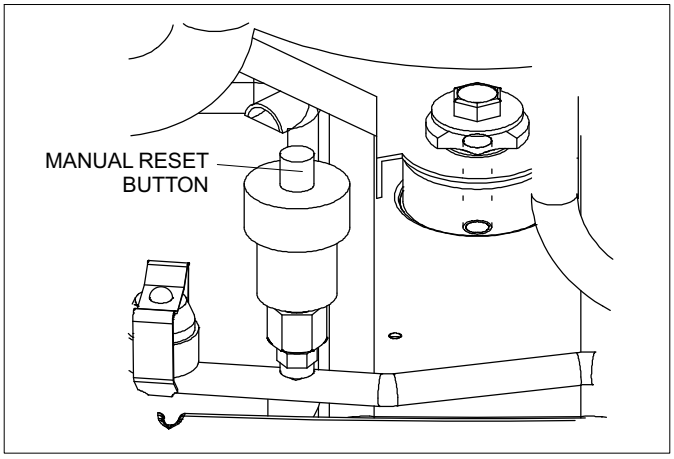


Figure 14. High Pressure Switch (S4) Manual Reset

The switch is a Single Pole, Single Throw (SPST), manual-reset switch which is normally closed and removes power from the compressor when discharge pressure rises above factory setting at 590 ± 10 psi. The manual-reset button can be identified by a red cap that is press to preform the reset function.

AUTOMATIC HIGH PRESSURE SWITCH (S4) - USED ON MODELS 13ACX-XXX-230-10 AND LATER

The 13ACX is equipped with an auto-reset high pressure switch (single-pole, single-throw) which is located on the liquid line. The switch shuts off the compressor when discharge pressure rises above the factory setting. The switch is normally closed and is permanently adjusted to trip (open) at 590 + 15 psig (4068 + 103 kPa).

Maintenance

⚠ 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.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

Maintenance and service must be performed by a qualified installer or service agency. At the beginning of each cooling season, the system should be checked as follows:

Outdoor Unit

1. Outdoor unit fan motor is pre-lubricated and sealed. No further lubrication is needed.
2. Visually inspect all connecting lines, joints and coils for evidence of oil leaks.
3. Check all wiring for loose connections.
4. Check for correct voltage at unit (unit operating).
5. Check amp draw on outdoor fan motor.

   Motor Nameplate:_____ **Actual**:_____.
6. Inspect drain holes in coil compartment base and clean if necessary.

NOTE - If insufficient cooling occurs, the unit should be gauged and refrigerant charge should be checked.

Outdoor Coil

Clean and inspect outdoor coil (may be flushed with a water hose). Ensure power is off before cleaning.

NOTE — It may be necessary to flush the outdoor coil more frequently if it is exposed to substances which are corrosive or which block airflow across the coil (e.g., pet urine, cottonwood seeds, fertilizers, fluids that may contain high levels of corrosive chemicals such as salts)

Sea Coast — Moist air in ocean locations can carry salt, which is corrosive to most metal. Units that are located near the ocean require frequent inspections and maintenance. These inspections will determine the necessary need to wash the unit including the outdoor coil. Consult your installing contractor for proper intervals/procedures for your geographic area or service contract.

Indoor Unit

1. Clean or change filters.
2. Lennox blower motors are prelubricated and permanently sealed. No more lubrication is needed.
3. Adjust blower speed for cooling. Measure the pressure drop over the coil to determine the correct blower CFM. Refer to the unit information service manual for pressure drop tables and procedure.
4. *Belt Drive Blowers* - Check belt for wear and proper tension.
5. Check all wiring for loose connections.
6. Check for correct voltage at unit. (blower operating)
7. Check amp draw on blower motor.

   Motor Nameplate:_____ **Actual**:_____.

Indoor Coil

1. Clean coil if necessary.
2. Check connecting lines, joints and coil for evidence of oil leaks.
3. Check condensate line and clean if necessary.

Start-Up and Performance Checklist

Job Name _____ Job no. _____ Date _____

Job Location _____ City _____ State _____

Installer _____ City _____ State _____

Unit Model No. _____ Serial No. _____ Service Technician _____

Nameplate Voltage _____

Rated Load Ampacity _____ Compressor _____ Outdoor Fan _____

Maximum Fuse or Circuit Breaker _____

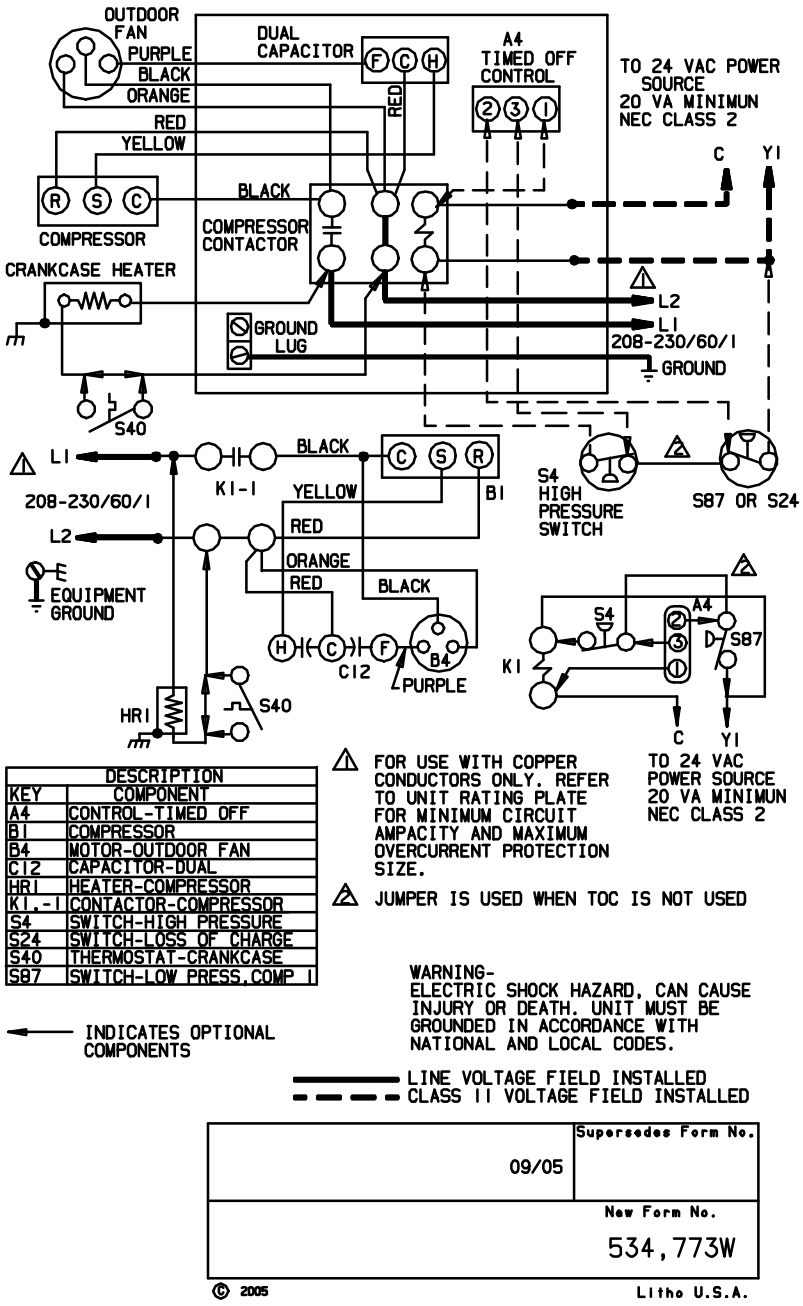
Electrical Connections Tight? ❑ Indoor Filter clean? ❑ Supply Voltage (Unit Off) _____

Indoor Blower RPM _____ S.P. Drop Over Indoor (Dry) _____ Outdoor Coil Entering Air Temp. _____

Discharge Pressure _____ Suction Pressure _____ Refrigerant Charge Checked? ❑

Refrigerant Lines: - Leak Checked? ❑ Properly Insulated? ❑	Outdoor Fan Checked? ❑
Service Valves: --- Fully Opened? ❑ Caps Tight? ❑	**Thermostat**
Voltage With Compressor Operating _____	Calibrated? ❑ Properly Set? ❑ Level? ❑

Sequence of Operations



DESCRIPTION	
KEY	COMPONENT
A4	CONTROL-TIMED OFF
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C12	CAPACITOR-DUAL
HR1	HEATER-COMPRESSOR
K1,-1	CONTACTOR-COMPRESSOR
S4	SWITCH-HIGH PRESSURE
S24	SWITCH-LOSS OF CHARGE
S40	THERMOSTAT-CRANKCASE
S87	SWITCH-LOW PRESS.COMP I

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:

1- Cooling demand initiates at Y1 in the thermostat.

2- 24VAC from indoor unit (Y1) energizes the TOC timed off control (if used) which energizes contactor K1 (provided S4 high pressure switch is closed).

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

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

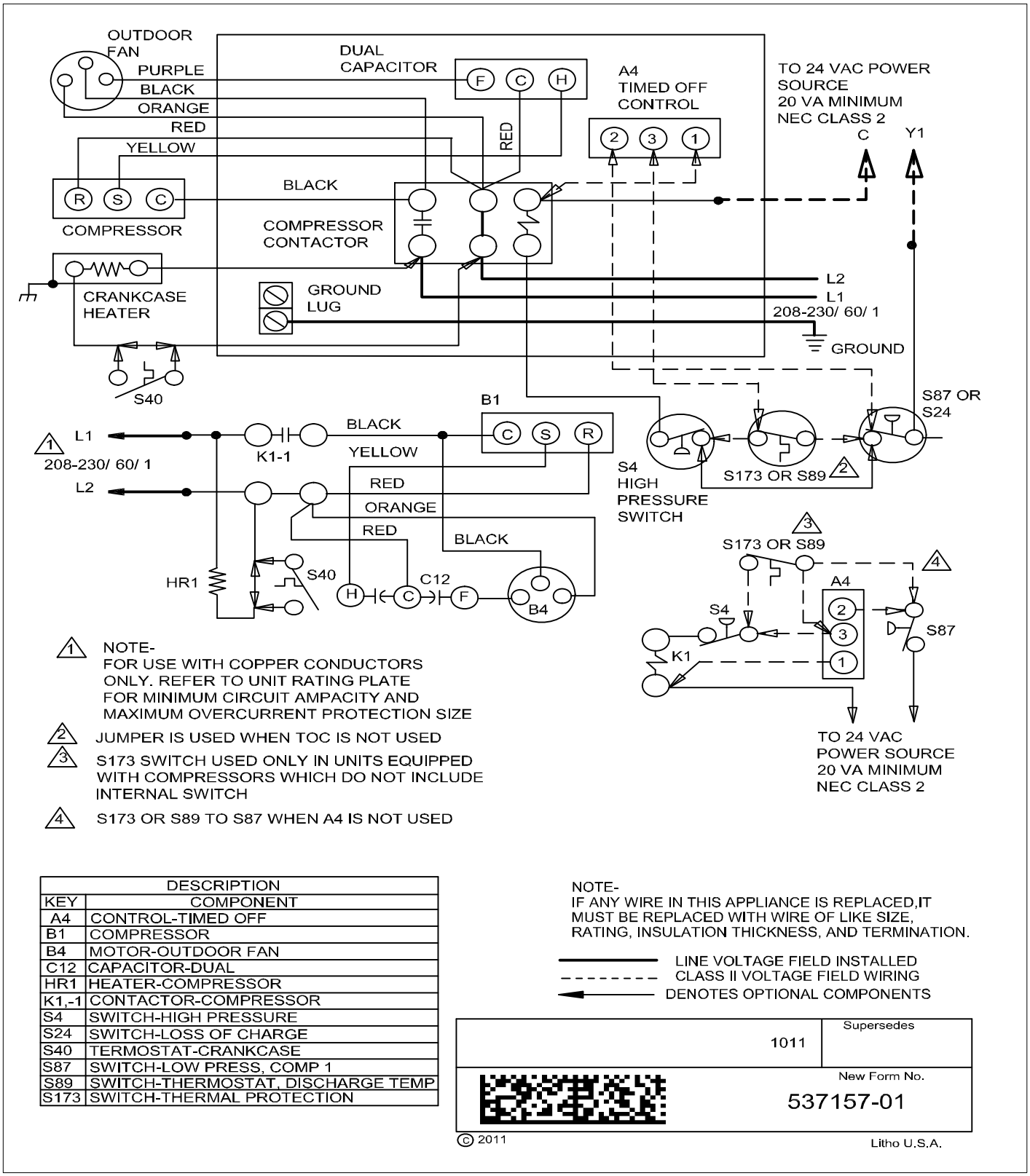
END OF COOLING DEMAND:

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

6- Compressor contactor K1 is de-energized.

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

Figure 15. Use for 13ACX-XXX-230-01 through -10



1 NOTE-
FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE

2 JUMPER IS USED WHEN TOC IS NOT USED

3 S173 SWITCH USED ONLY IN UNITS EQUIPPED WITH COMPRESSORS WHICH DO NOT INCLUDE INTERNAL SWITCH

4 S173 OR S89 TO S87 WHEN A4 IS NOT USED

DESCRIPTION	
KEY	COMPONENT
A4	CONTROL-TIMED OFF
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C12	CAPACITOR-DUAL
HR1	HEATER-COMPRESSOR
K1,-1	CONTACTOR-COMPRESSOR
S4	SWITCH-HIGH PRESSURE
S24	SWITCH-LOSS OF CHARGE
S40	TERMOSTAT-CRANKCASE
S87	SWITCH-LOW PRESS, COMP 1
S89	SWITCH-THERMOSTAT, DISCHARGE TEMP
S173	SWITCH-THERMAL PROTECTION

NOTE-
IF ANY WIRE IN THIS APPLIANCE IS REPLACED,IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, INSULATION THICKNESS, AND TERMINATION.

LINE VOLTAGE FIELD INSTALLED
CLASS II VOLTAGE FIELD WIRING
DENOTES OPTIONAL COMPONENTS

1011	Supersedes
	New Form No. 537157-01

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Figure 16. Use for 13ACX-XXX-230-11 or later

Servicing Units Void of Charge

If the outdoor unit is void of refrigerant, clean the system using the procedure described below.

1. Leak check system using procedure outlined in figure 12.
2. Evacuate the system using procedure outlined in figure 13.
3. Use nitrogen to break the vacuum and install a new filter drier in the system.
4. Evacuate the system again using procedure outlined on figure 13.
5. Weigh in refrigerant using procedure outlined under *figure 20.*

Unit Start-Up

⚠ IMPORTANT

If unit is equipped with a crankcase heater, it should be energized 24 hours before unit start-up to prevent compressor damage as a result of slugging.

1. Rotate fan to check for binding.
2. Inspect all factory- and field-installed wiring for loose connections.
3. After evacuation is complete, open the liquid line and suction line service valves to release the refrigerant charge (contained in outdoor unit) into the system.
4. Replace the stem caps and tighten as specified in *Operating Service Valves* on page 9.
5. Check voltage supply at the disconnect switch. The voltage must be within the range listed on the unit's nameplate. If not, do not start the equipment until you have consulted with the power company and the voltage condition has been corrected.
6. Set the thermostat for a cooling demand. Turn on power to the indoor indoor unit and close the outdoor unit disconnect switch to start the unit.
7. Recheck voltage while the unit is running. Power must be within range shown on the nameplate.
8. Check system for sufficient refrigerate using the procedures that follow.

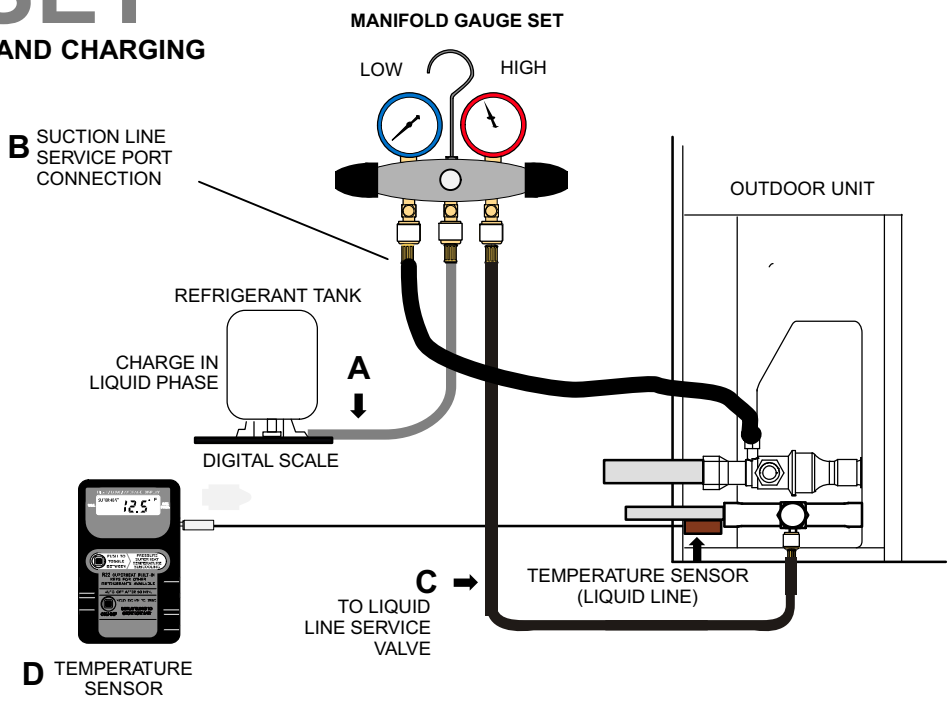
System Refrigerant

This section outlines procedures for:

1. Connecting gauge set for testing and charging;
2. Checking and adjusting indoor airflow;
3. Adding or removing refrigerant.

GAUGE SET

CONNECTIONS FOR TESTING AND CHARGING



A Close manifold gauge set valves and connect the center hose to a cylinder of HFC-410A. Set for liquid phase charging.

B Connect the manifold gauge set's low pressure side to the suction line service port.

C Connect the manifold gauge set's high pressure side to the liquid line service port.

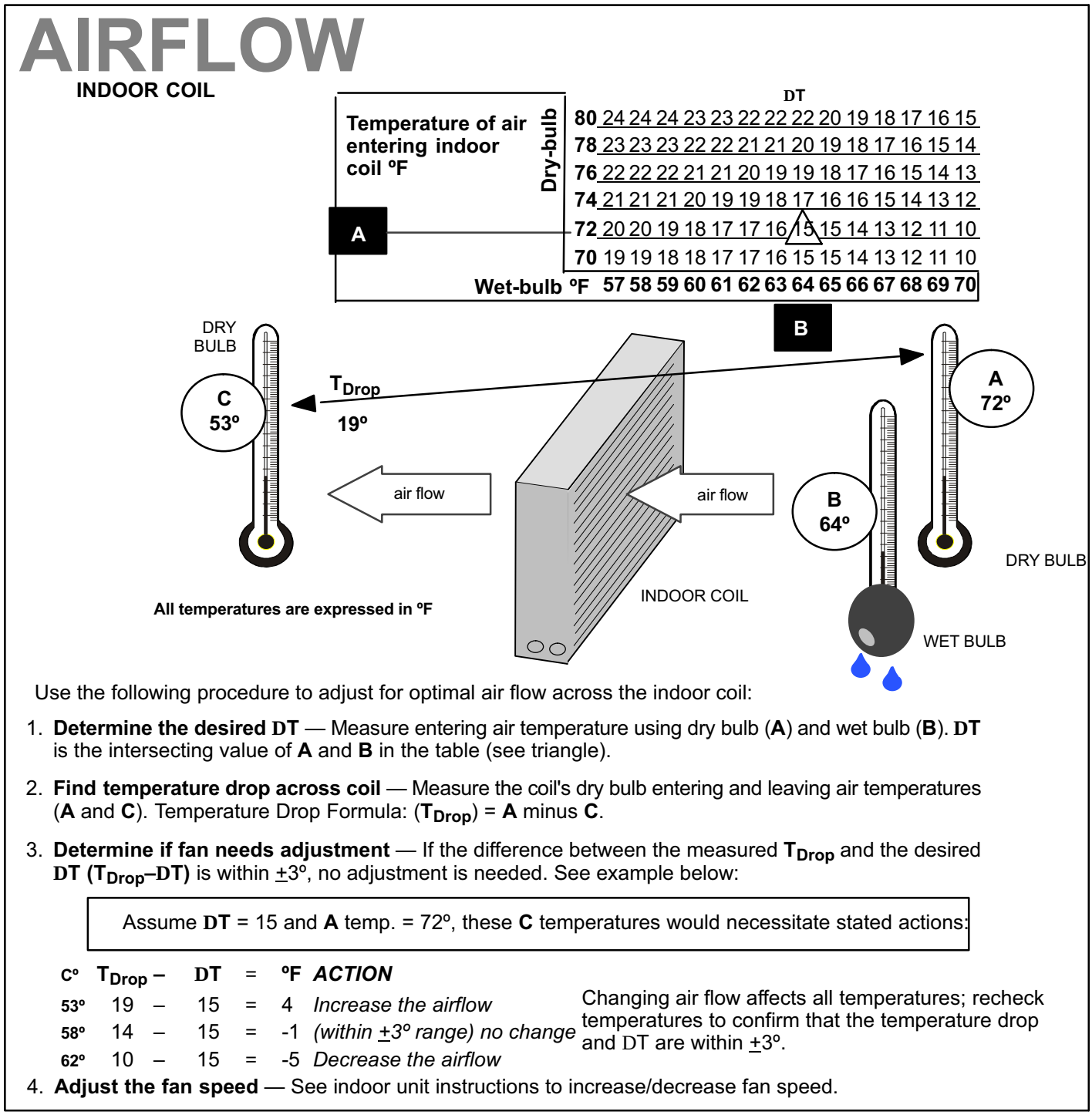
D Position temperature sensor on liquid line near liquid line service port.

Figure 17. Gauge Set Setup and Connections

ADDING OR REMOVING REFRIGERANT

This system uses HFC-410A refrigerant which operates at much higher pressures than HCFC-22. The pre-installed liquid line filter drier is approved for use with HFC-410A only. Do not replace it with components designed for use with HCFC-22. This unit is NOT approved for use with coils which use capillary tubes or fixed orifices as a refrigerant metering device.

Check airflow using the Delta-T (DT) process using the illustration in figure 18.



Use the following procedure to adjust for optimal air flow across the indoor coil:

1. **Determine the desired DT** — Measure entering air temperature using dry bulb (**A**) and wet bulb (**B**). **DT** is the intersecting value of **A** and **B** in the table (see triangle).
2. **Find temperature drop across coil** — Measure the coil's dry bulb entering and leaving air temperatures (**A** and **C**). Temperature Drop Formula: (T_{Drop}) = **A** minus **C**.
3. **Determine if fan needs adjustment** — If the difference between the measured T_{Drop} and the desired **DT** (T_{Drop}–**DT**) is within ±3º, no adjustment is needed. See example below:

Assume **DT** = 15 and **A** temp. = 72º, these **C** temperatures would necessitate stated actions:

Cº	T_{Drop} –	DT	=	ºF	*ACTION*
53º	19 –	15	=	4	*Increase the airflow*
58º	14 –	15	=	-1	*(within ±3º range) no change*
62º	10 –	15	=	-5	*Decrease the airflow*

Changing air flow affects all temperatures; recheck temperatures to confirm that the temperature drop and DT are within ±3º.

4. **Adjust the fan speed** — See indoor unit instructions to increase/decrease fan speed.

Figure 18. Checking Indoor Airflow over Evaporator Coil using Delta-T Chart

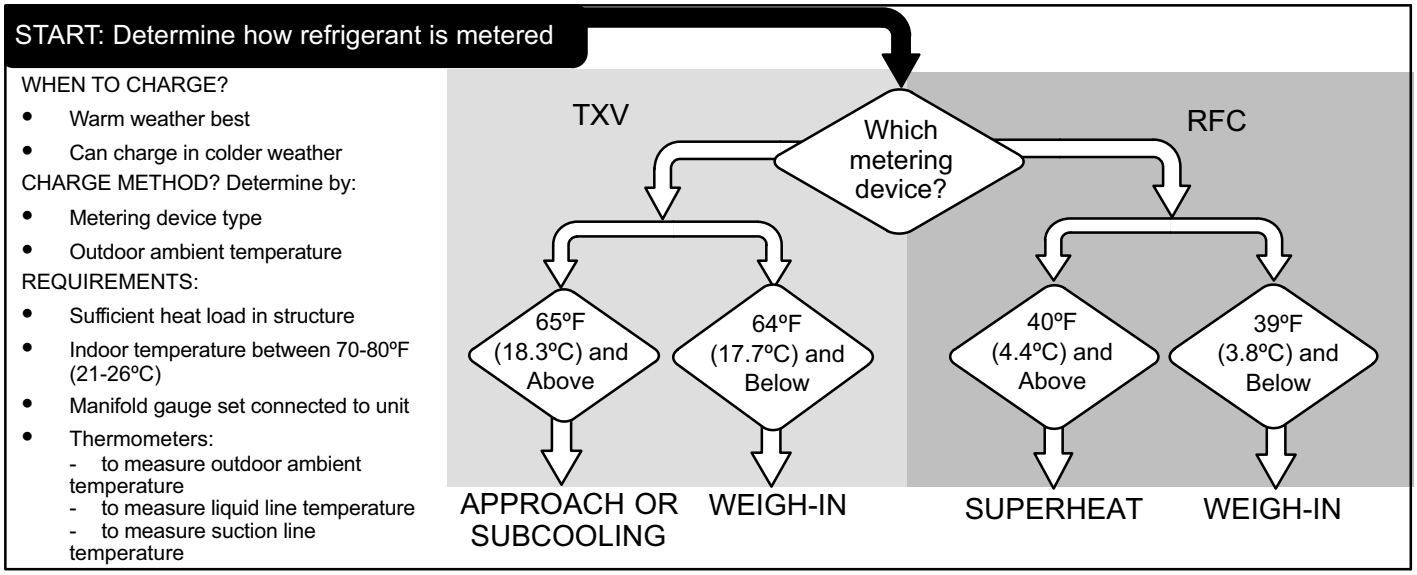


Figure 19. Determining Charge Method

WEIGH IN (RFC AND TXV)

CALCULATING SYSTEM CHARGE FOR OUTDOOR UNIT VOID OF CHARGE

If the system is void of refrigerant, first, locate and repair any leaks and then weigh in the refrigerant charge into the unit. To calculate the total refrigerant charge:

Amount specified on nameplate _____ ± Adjust amount. for variation in line set length listed on line set length table below. _____ = Total charge _____

NOTE — The above nameplate is for illustration purposes only. Go to actual nameplate on outdoor unit for charge information.

Refrigerant Charge per Line Set Length

Liquid Line Set Diameter	Ounces per 5 feet (g per 1.5 m) adjust from 15 feet (4.6 m) line set*
3/8” (9.5 mm)	3 ounce per 5' (85 g per 1.5 m)

NOTE — Insulate liquid line when it is routed through areas where the surrounding ambient temperature could become higher than the temperature of the liquid line or when pressure drop is equal to or greater than 20 psig.

Figure 20. Using HFC-410A Weigh In Method

START: Measure outdoor ambient temperature

65ºF (18.3ºC) and Above

ABOVE or BELOW

64ºF (17.7ºC) and Below

USE WEIGH-IN METHOD
Weigh-in or remove refrigerant based upon line length

APPROACH TXV

1. Confirm proper airflow across coil using figure 18.
2. Compare unit pressures with normal operating pressures provided on applicable charging sticker as reference in table 4..
3. Set thermostat to call for heat (must have a cooling load between 70-80ºF (21-26ºC).
4. Connect gauge set.
5. When heat demand is satisfied, set thermostat to call for cooling.
6. Allow temperatures and pressures to stabilize.
7. Record outdoor ambient temperature:
   AMBº =_____
8. Record liquid line temperature:
   LIQº = _____
9. Subtract to determine approach (APPº):
   LIQº_____ - AMBº _____ = APPº_____
10. Compare results with table below.

See Table 4 on page 34 to determine which charging sticker to use.

If value is greater than shown (high approach), add refrigerant; if less than shown (liquid temperature too close to ambient temperature, low approach), remove refrigerant.

If refrigerant is added or removed, retest to confirm that unit is properly charged.

Figure 21. HFC-410A Approach TXV Charge

START: Measure outdoor ambient temperature

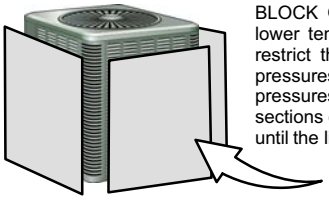
65ºF (18.3ºC) and Above

ABOVE or BELOW

64ºF (17.7ºC) and Below

USE WEIGH-IN METHOD
Weigh-in or remove refrigerant based upon line length

SUBCOOLING TXV



BLOCK OUTDOOR COIL: [sometimes necessary with lower temperatures] Use cardboard or plastic sheet to restrict the airflow through the outdoor coil to achieve pressures from 325-375 psig (2240-2585 kPa). Higher pressures are needed to check charge. Block equal sections of air intake panels and move coverings sideways until the liquid pressure is in the above noted ranges.

CARDBOARD OR PLASTIC SHEET

1. Confirm proper airflow across coil using figure 18.
2. Compare unit pressures with normal operating pressures provided on applicable charging sticker as reference in table 4.
3. Set thermostat to call for heat (must have a cooling load between 70-80ºF (21-26ºC)
4. Connect gauge set
5. Measure outdoor ambient temperature
6. When heat demand is satisfied, set thermostat to call for cooling
7. Allow temperatures and pressures to stabilize.
   NOTE - If necessary, block outdoor coil to maintain 325 - 375 psig.
8. Record liquid line temperature:
   LIQº = _____
9. Measure liquid line pressure and use the value to determine saturation temperature (see table 3):
   SATº = _____
10. Subtract to determine subcooling (SCº):
    SATº_____ - LIQº _____ = SCº _____
11. Compare results with table below.

See Table 4 on page 34 to determine which charging sticker to use.

If refrigerant is added or removed, verify charge using the **Approach Method**.

If value is **MORE** than shown, remove refrigerant.

If value is **LESS** than shown, add refrigerant.

MORE or **LESS**

Figure 22. HFC-410A Subcooling TXV Charge

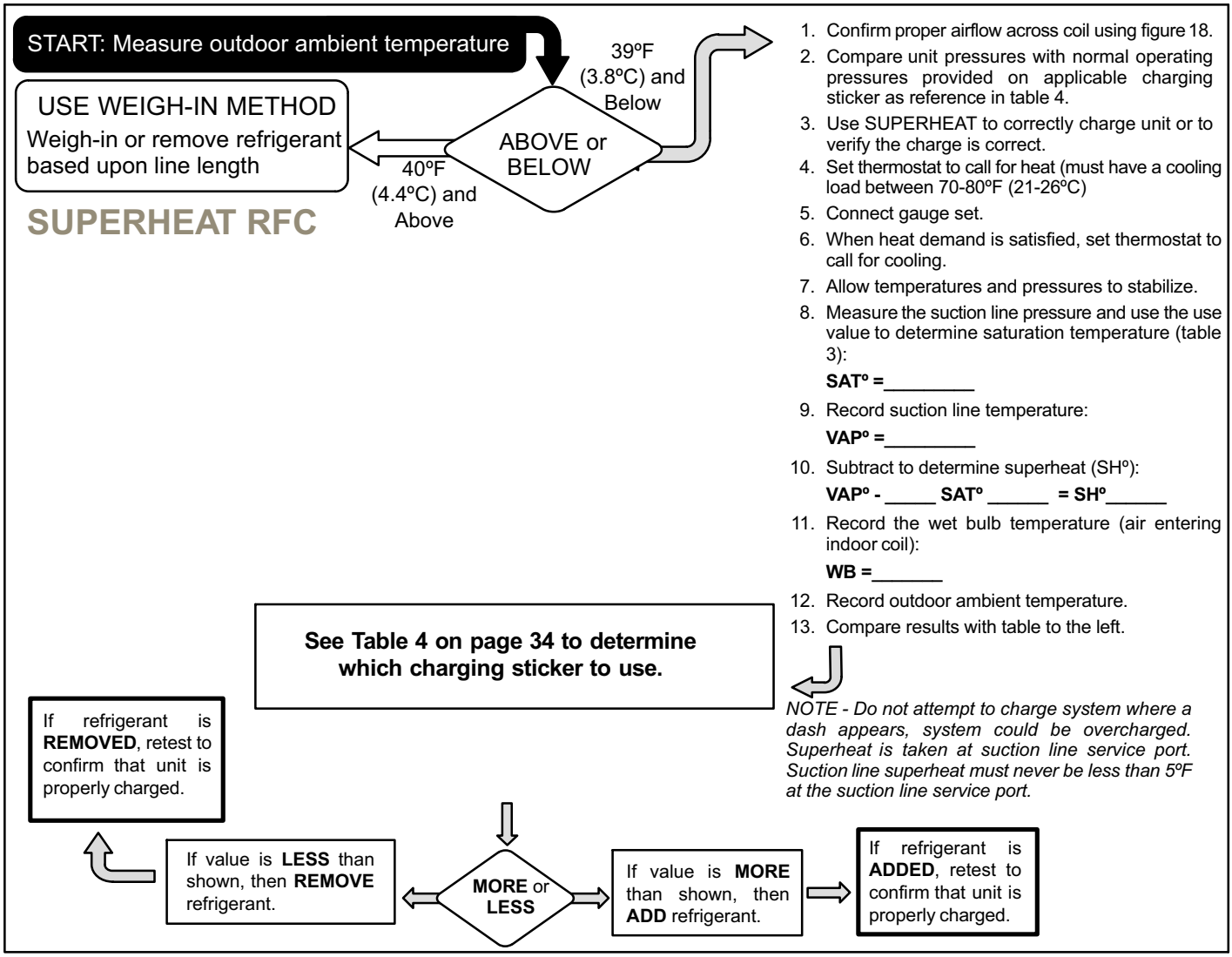


Figure 23. HFC-410A Superheat RFC Method

Table 3. HFC-410A Temperature — Pressure (Psig)

°F	°C	Psig	°F	°C	Psig
-40	-40.0	11.6	**60**	15.6	170
-35	-37.2	14.9	**65**	18.3	185
-30	-34.4	18.5	**70**	21.1	201
-25	-31.7	22.5	**75**	23.9	217
-20	-28.9	26.9	**80**	26.7	235
-15	-26.1	31.7	**85**	29.4	254
-10	-23.3	36.8	**90**	32.2	274
-5	-20.6	42.5	**95**	35.0	295
0	-17.8	48.6	**100**	37.8	317
5	-15.0	55.2	**105**	40.6	340
10	-12.2	62.3	**110**	43.3	365
15	-9.4	70.0	**115**	46.1	391
20	-6.7	78.3	**120**	48.9	418
25	-3.9	87.3	**125**	51.7	446
30	-1.1	96.8	**130**	54.4	476
35	1.7	107	**135**	57.2	507
40	4.4	118	**140**	60.0	539
45	7.2	130	**145**	62.8	573
50	10.0	142	**150**	65.6	608
55	12.8	155			

Table 4. Applicable Charging Sticker by Unit Model Number

Unit Model Number	Unit Charging Sticker Numbers			
	401238S	401288S	580052-01	580450-01
	Reference charging stickers above are located at the end of this manual.			
13ACX-018-230-XX		-01	-02. -10, -11, -12, -13, -14, -15	-17, -18
13ACX-024-230-XX		-01	-02. -10, -11, -12, -13, -15	-17, -18, -19, -20
13ACX-030-230-XX	-01		-02. -10, -11, -12, -13, -15	-17, -18, -19
13ACX-036-230-XX			-02, -03, -10, -11, -12, -13, -14, -15	-17, -18
13ACX-042-230-XX		-01	-02, -10, -11, -12, -13, -14, -15	-17, -18
13ACX-048-230-XX		-01	-02, -10, -11, -12, -13, -14, -15	-17, -18, -19, -20, -21
13ACX-060-230-XX		-02	-03, -10, -11, -12, -13, -14, -15	-16, -17, -18

CHARGING INFORMATION

FOR COMPLETE CHARGING DETAILS, REFER TO THE OUTDOOR UNIT INSTALLATION INSTRUCTIONS.

AIRFLOW CHECK - Both airflow and refrigerant charge must be monitored for a proper system set-up. It may be necessary to alternately check and adjust the airflow and the refrigerant charge.

NOTE - Be sure that filters and indoor and outdoor coils are clean before testing.

To determine temperature drop across indoor coil (Delta-T), measure the entering air dry bulb (DB) and wet bulb (WB) temperatures at the indoor coil. Find Delta-T in table 1.. Measure coil's leaving air DB and subtract that value from entering air DB. The measured difference should be within ±3ºF (±1.8ºC) of table value; if too low, decrease the indoor fan speed (refer to indoor unit for information). If the Delta-T is too high, increase the indoor fan speed. Repeat charging procedure and Delta-T (air flow adjustment) procedure until both are correct.

Example: *assume entering air DB - 72, WB - 64, leaving DB - 53. Therefore, Delta-T should be 15 (per table); delta across coil is 72 - 53 or 19 (which is 4ºF higher than table value); action necessary: increase fan speed.*

Table 1. Evaporator Coil Delta-T

Dry bulb temperature of air entering indoor coil (ºF)															
	80	24	24	24	23	23	22	22	22	20	19	18	17	16	15
	78	23	23	23	22	22	21	21	20	19	18	17	16	15	14
	76	22	22	22	21	21	20	19	19	18	17	16	15	14	13
	74	21	21	21	20	19	19	18	17	16	16	15	14	13	12
	72	20	20	19	18	17	17	16	15	15	14	13	12	11	10
	70	19	19	18	18	17	17	16	15	15	14	13	12	11	10
	ºF	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
	[Wet bulb temperature of air entering indoor coil]														

Table 2. Superheat (SH) Value RFC System - ±5ºF

Dry bulb temperature of ambient air entering outdoor unit (ºF)															
	40	15	18	20	23	26	29	32	34	38	41	43	46	48	51
	45	13	16	18	21	24	27	30	33	36	39	41	44	46	49
	50	11	14	16	19	22	25	28	31	34	37	39	42	44	47
	55	9	12	14	17	20	23	27	30	33	36	38	40	42	44
	66	7	10	12	15	18	21	24	27	30	33	35	38	40	43
	65	-	6	10	13	16	19	21	24	27	30	33	36	38	41
	70	-	-	7	10	13	16	19	21	24	27	30	33	36	39
	75	-	-	-	6	9	12	15	18	21	24	28	31	34	37
	80	-	-	-	-	5	8	12	15	18	21	25	28	31	35
	85	-	-	-	-	-	-	8	11	15	19	22	26	30	33
	90	-	-	-	-	-	-	5	9	13	16	20	24	27	31
	95	-	-	-	-	-	-	-	6	10	14	18	22	25	29
	100	-	-	-	-	-	-	-	-	8	12	16	21	24	28
	105	-	-	-	-	-	-	-	-	5	9	13	17	22	26
	110	-	-	-	-	-	-	-	-	-	6	11	15	20	25
	115	-	-	-	-	-	-	-	-	-	-	8	14	18	24
	ºF	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	**70**	**72**	**74**	**76**
	[Wet bulb temperature of air entering indoor coil]														

Table 3. Normal Operating Pressures[1]

Model	-18	-24	-30	-36	-42	-48	-60
°F(°C)[2]	**TXV System** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	244 / 135	249 / 137	241 / 134	253 / 134	250 / 135	240 / 130	242 / 130
70 (21)	262 / 136	268 / 138	259 / 135	274 / 135	268 / 137	257 / 131	266 / 131
75 (24)	281 / 137	288 / 138	279 / 136	293 / 136	288 / 138	278 / 132	286 / 132
80 (27)	302 / 138	309 / 140	300 / 137	315 / 137	310 / 139	299 / 133	309 / 133
85 (29)	323 / 139	331 / 140	322 / 138	338 / 139	332 / 140	323 / 134	332 / 134
90 (32)	346 / 141	355 / 142	345 / 140	361 / 139	356 / 140	344 / 135	357 / 135
95 (35)	369 / 142	379 / 143	369 / 141	385 / 141	381 / 141	369 / 136	381 / 136
100 (38)	394 / 143	402 / 144	393 / 142	410 / 142	406 / 143	394 / 137	407 / 137
105 (41)	417 / 145	430 / 145	418 / 143	436 / 143	432 / 143	418 / 139	433 / 138
110 (43)	445 / 146	457 / 146	445 / 144	463 / 145	459 / 145	446 / 140	459 / 140
115 (45)	476 / 148	485 / 147	474 / 145	491 / 146	490 / 145	477 / 141	488 / 141
	RFC System - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	244 / 135	244 / 125	243 / 116	252 / 129	250 / 135	248 / 127	255 / 126
70 (21)	262 / 136	263 / 128	262 / 120	271 / 131	268 / 137	266 / 130	274 / 128
75 (24)	281 / 137	282 / 131	283 / 124	290 / 133	288 / 138	284 / 132	294 / 131
80 (27)	302 / 138	303 / 134	305 / 128	312 / 136	310 / 139	305 / 134	317 / 134
85 (29)	323 / 139	326 / 137	328 / 132	334 / 139	332 / 140	325 / 137	339 / 136
90 (32)	346 / 141	347 / 138	351 / 135	356 / 141	356 / 140	347 / 139	362 / 138
95 (35)	369 / 142	372 / 141	376 / 139	380 / 143	381 / 141	371 / 141	386 / 140
100 (38)	394 / 143	396 / 143	401 / 142	405 / 145	406 / 143	394 / 143	413 / 142
105 (41)	417 / 145	421 / 145	427 / 145	429 / 147	432 / 143	418 / 144	435 / 144
110 (43)	445 / 146	449 / 147	454 / 147	456 / 148	459 / 145	445 / 146	462 / 146
115 (46)	476 / 148	479 / 149	482 / 149	483 / 151	490 / 145	472 / 147	490 / 148

Table 4. Approach (APP) Values[3] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	8 (4.5)	8 (4.5)	9 (5.0)	10 (5.6)	10 (5.6)	6 (3.3)	9 (5.0)

Table 5. Subcooling (SC) Values[4] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	8 (4.1)	8 (4.1)	7 (3.8)	4 (2.2)	8 (4.4)	10 (5.6)	8 (4.4)

1 Typical pressures; indoor evaporator match up, indoor air quantity, and evaporator load will cause the pressures to vary.
2 Temperature of air entering outside coil.
3 Approach = Liquid Line Temp. minus Outdoor Ambient Temperature
4 Subcooling = Saturation Temp. minus Liquid Line Temp Temperature

CHARGING INFORMATION

FOR COMPLETE CHARGING DETAILS, REFER TO THE OUTDOOR UNIT INSTALLATION INSTUCTION.

AIRFLOW CHECK - Both airflow and refrigerant charge must be monitored for a proper system set-up. It may be necessary to alternately check and adjust the airflow and the refrigerant charge.

NOTE - Be sure that filters and indoor and outdoor coils are clean before testing.

To determine temperature drop across indoor coil (Delta-T), measure the entering air dry bulb (DB) and wet bulb (WB) temperatures at the indoor coil. Find Delta-T in table 1. Measure coil's leaving air DB and subtract that value from entering air DB. The measured difference should be within ±3ºF (±1.8ºC) of table value; if too low, decrease the indoor fan speed (refer to indoor unit for information). If the Delta-T is too high, increase the indoor fan speed. Repeat charging procedure and Delta-T (air flow adjustment) procedure until both are correct.

Example: *assume entering air DB - 72, WB - 64, leaving DB - 53. Therefore, Delta-T should be 15 (per table); delta across coil is 72 - 53 or 19 (which is 4ºF higher than table value); action necessary: increase fan speed.*

Table 1. Evaporator Coil Delta-T

Dry bulb temperature of air entering indoor coil (ºF)															
	80	24	24	24	23	23	22	22	22	20	19	18	17	16	15
	78	23	23	23	22	22	21	21	20	19	18	17	16	15	14
	76	22	22	22	21	21	20	19	19	18	17	16	15	14	13
	74	21	21	21	20	19	19	18	17	16	16	15	14	13	12
	72	20	20	19	18	17	17	16	15	15	14	13	12	11	10
	70	19	19	18	18	17	17	16	15	15	14	13	12	11	10
	ºF	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**

[Wet bulb temperature of air entering indoor coil]

Table 2. Superheat (SH) Value RFC System - ±5ºF

Dry bulb temperature of ambient air entering outdoor unit (ºF)															
	40	15	18	20	23	26	29	32	34	38	41	43	46	48	51
	45	13	16	18	21	24	27	30	33	36	39	41	44	46	49
	50	11	14	16	19	22	25	28	31	34	37	39	42	44	47
	55	9	12	14	17	20	23	27	30	33	36	38	40	42	44
	66	7	10	12	15	18	21	24	27	30	33	35	38	40	43
	65	-	6	10	13	16	19	21	24	27	30	33	36	38	41
	70	-	-	7	10	13	16	19	21	24	27	30	33	36	39
	75	-	-	-	6	9	12	15	18	21	24	28	31	34	37
	80	-	-	-	-	5	8	12	15	18	21	25	28	31	35
	85	-	-	-	-	-	-	8	11	15	19	22	26	30	33
	90	-	-	-	-	-	-	5	9	13	16	20	24	27	31
	95	-	-	-	-	-	-	-	6	10	14	18	22	25	29
	100	-	-	-	-	-	-	-	-	8	12	16	21	24	28
	105	-	-	-	-	-	-	-	-	5	9	13	17	22	26
	110	-	-	-	-	-	-	-	-	-	6	11	15	20	25
	115	-	-	-	-	-	-	-	-	-	-	8	14	18	24
	ºF	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	**70**	**72**	**74**	**76**

[Wet bulb temperature of air entering indoor coil]

Table 3. Normal Operating Pressures[1]

Model	-18	-24	-30	-36	-42	-48	-60
°F(°C)[2]	**TXV System** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 132	244 / 137	248 / 127	263 / 135	250 / 135	240 / 130	242 / 130
70 (21)	251 / 133	263 / 138	263 / 131	281 / 138	268 / 137	257 / 131	266 / 131
75 (24)	265 / 133	285 / 139	284 / 132	302 / 140	288 / 138	278 / 132	286 / 132
80 (27)	292 / 135	307 / 140	307 / 134	325 / 142	310 / 139	299 / 133	309 / 133
85 (29)	314 / 136	329 / 141	330 / 135	349 / 142	332 / 140	323 / 134	332 / 134
90 (32)	338 / 137	354 / 142	355 / 136	375 / 143	356 / 140	344 / 135	357 / 135
95 (35)	362 / 138	379 / 143	380 / 137	404 / 144	381 / 141	369 / 136	381 / 136
100 (38)	388 / 140	404 / 144	407 / 138	433 / 145	406 / 143	394 / 137	407 / 137
105 (41)	415 / 141	438 / 145	434 / 139	462 / 147	432 / 143	418 / 139	433 / 138
110 (43)	444 / 142	464 / 147	465 / 141	494 / 149	459 / 145	446 / 140	459 / 140
115 (45)	475 / 143	495 / 148	497 / 142	527 / 150	490 / 145	477 / 141	488 / 141
°F(°C)[2]	**Fixed Orifice (RFC)** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 121	246 / 126	245 / 123	261 / 134	250 / 135	248 / 127	255 / 126
70 (21)	250 / 124	265 / 129	265 / 126	281 / 136	268 / 137	266 / 130	274 / 128
75 (24)	270 / 128	286 / 132	286 / 129	301 / 138	288 / 138	284 / 132	294 / 131
80 (27)	291 / 131	307 /135	308 / 132	324 / 140	310 / 139	305 / 134	317 / 134
85 (29)	313 / 134	330 / 137	331 / 135	346 / 142	332 / 140	325 / 137	339 / 136
90 (32)	335 / 136	353 / 140	355 / 138	371 / 144	356 / 140	347 / 139	362 / 138
95 (35)	359 / 138	378 / 142	380 / 140	396 / 146	381 / 141	371 / 141	386 / 140
100 (38)	383 / 140	402 / 143	405 / 142	422 / 148	406 / 143	394 / 143	413 / 142
105 (41)	409 / 142	428 / 145	431 / 144	448 / 150	432 / 143	418 / 144	435 / 144
110 (43)	436 / 145	456 / 147	458 / 146	477 / 151	459 / 145	445 / 146	462 / 146
115 (46)	464 / 147	486 / 149	487 / 148	506 / 153	490 / 145	472 / 147	490 / 148

Table 4. Approach (APP) Values[3] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	4 (2.2)	8 (4.4)	8 (4.4)	11 (6.1)	10 (5.6)	6 (3.3)	9 (5.0)

Table 5. Subcooling (SC) Values[4] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	10 (5.6)	10 (5.6)	9 (5.0)	12 (6.7)	8 (4.4)	10 (5.6)	7 (3.9)

1 Typical pressures; indoor evaporator match up, indoor air quantity, and evaporator load will cause the pressures to vary.
2 Temperature of air entering outside coil.
3 Approach = Liquid Line Temp. minus Outdoor Ambient Temperature
4 Subcooling = Saturation Temp. minus Liquid Line Temp Temperature

CHARGING INFORMATION

FOR COMPLETE CHARGING DETAILS, REFER TO THE OUTDOOR UNIT INSTALLATION INSTRUCTION.

AIRFLOW CHECK - Both airflow and refrigerant charge must be monitored for a proper system set-up. It may be necessary to alternately check and adjust the airflow and the refrigerant charge.

NOTE - Be sure that filters and indoor and outdoor coils are clean before testing.

To determine temperature drop across indoor coil (Delta-T), measure the entering air dry bulb (DB) and wet bulb (WB) temperatures at the indoor coil. Find Delta-T in table 1. Measure coil's leaving air DB and subtract that value from entering air DB. The measured difference should be within ±3ºF (±1.8ºC) of table value; if too low, decrease the indoor fan speed (refer to indoor unit for information). If the Delta-T is too high, increase the indoor fan speed. Repeat charging procedure and Delta-T (air flow adjustment) procedure until both are correct.

Example: *assume entering air DB - 72, WB - 64, leaving DB - 53. Therefore, Delta-T should be 15 (per table); delta across coil is 72 - 53 or 19 (which is 4ºF higher than table value); action necessary: increase fan speed.*

Table 1. Evaporator Coil Delta-T

Dry bulb temperature of air entering indoor coil (ºF)															
	80	24	24	24	23	23	22	22	22	20	19	18	17	16	15
	78	23	23	23	22	22	21	21	20	19	18	17	16	15	14
	76	22	22	22	21	21	20	19	19	18	17	16	15	14	13
	74	21	21	21	20	19	19	18	17	16	16	15	14	13	12
	72	20	20	19	18	17	17	16	15	15	14	13	12	11	10
	70	19	19	18	18	17	17	16	15	15	14	13	12	11	10
	ºF	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
	[Wet bulb temperature of air entering indoor coil]														

Table 2. Superheat (SH) Value RFC System - ±5ºF

Dry bulb temperature of ambient air entering outdoor unit (ºF)															
	40	15	18	20	23	26	29	32	34	38	41	43	46	48	51
	45	13	16	18	21	24	27	30	33	36	39	41	44	46	49
	50	11	14	16	19	22	25	28	31	34	37	39	42	44	47
	55	9	12	14	17	20	23	27	30	33	36	38	40	42	44
	66	7	10	12	15	18	21	24	27	30	33	35	38	40	43
	65	-	6	10	13	16	19	21	24	27	30	33	36	38	41
	70	-	-	7	10	13	16	19	21	24	27	30	33	36	39
	75	-	-	-	6	9	12	15	18	21	24	28	31	34	37
	80	-	-	-	-	5	8	12	15	18	21	25	28	31	35
	85	-	-	-	-	-	-	8	11	15	19	22	26	30	33
	90	-	-	-	-	-	-	5	9	13	16	20	24	27	31
	95	-	-	-	-	-	-	-	6	10	14	18	22	25	29
	100	-	-	-	-	-	-	-	-	8	12	16	21	24	28
	105	-	-	-	-	-	-	-	-	5	9	13	17	22	26
	110	-	-	-	-	-	-	-	-	-	6	11	15	20	25
	115	-	-	-	-	-	-	-	-	-	-	8	14	18	24
	ºF	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	**70**	**72**	**74**	**76**
	[Wet bulb temperature of air entering indoor coil]														

Size	**-18**	**-24**	**-30**	**-36**	**-42**	**-48**	**-60**
Table 3. Normal Operating Pressures[1]							
°F(°C)[2]	**TXV System** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 132	244 / 137	248 / 127	263 / 135	238 / 132	235 / 132	241 / 130
70 (21)	251 / 133	263 / 138	263 / 131	281 / 138	262 / 133	254 / 132	260 / 130
75 (24)	265 / 133	285 / 139	284 / 132	302 / 140	280 / 134	276 / 134	280 / 132
80 (27)	292 / 135	307 / 140	307 / 134	325 / 142	301 / 136	298 / 134	299 / 134
85 (29)	314 / 136	329 / 141	330 / 135	349 / 142	327 / 137	323 / 135	321 / 135
90 (32)	338 / 137	354 / 142	355 / 136	375 / 143	353 / 138	350 / 137	344 / 134
95 (35)	362 / 138	379 / 143	380 / 137	404 / 144	377 / 140	377 / 138	371 / 135
100 (38)	388 / 140	404 / 144	407 / 138	433 / 145	404 / 141	406 / 140	400 / 137
105 (41)	415 / 141	438 / 145	434 / 139	462 / 147	435 / 142	430 / 141	428 / 139
110 (43)	444 / 142	464 / 147	465 / 141	494 / 149	465 / 143	464 / 142	458 / 141
115 (45)	475 / 143	495 / 148	497 / 142	527 / 150	499 / 144	495 / 143	484 / 142
°F(°C)[2]	**Fixed Orifice (RFC)** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 121	246 / 126	245 / 123	261 / 134	246 / 126	247 / 125	248 / 124
70 (21)	250 / 124	265 / 129	265 / 126	281 / 136	263 / 128	266 / 128	266 / 126
75 (24)	270 / 128	286 / 132	286 / 129	301 / 138	284 / 131	286 / 131	288 / 130
80 (27)	291 / 131	307 /135	308 / 132	324 / 140	305 / 133	307 / 133	309 / 133
85 (29)	313 / 134	330 / 137	331 / 135	346 / 142	327 / 135	329 / 135	330 / 135
90 (32)	335 / 136	353 / 140	355 / 138	371 / 144	350 / 138	353 / 138	354 / 138
95 (35)	359 / 138	378 / 142	380 / 140	396 / 146	374 / 140	377 / 140	377 / 140
100 (38)	383 / 140	402 / 143	405 / 142	422 / 148	399 / 142	403 / 142	406 / 142
105 (41)	409 / 142	428 / 145	431 / 144	448 / 150	424 / 144	428 / 144	431 / 144
110 (43)	436 / 145	456 / 147	458 / 146	477 / 151	452 / 146	455 / 146	457 / 146
115 (46)	464 / 147	486 / 149	487 / 148	506 / 153	481 / 148	483 / 147	484 / 148

Table 4. Approach (APP) Values[3] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	4 (2.2)	8 (4.4)	8 (4.4)	11 (6.1)	9 (5.0)	8 (4.4)	9 (5.0)

Table 5. Subcooling (SC) Values[4] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	10 (5.6)	10 (5.6)	9 (5.0)	12 (6.7)	9 (5.0)	9 (5.0)	7 (3.9)

1 Typical pressures; indoor evaporator match up, indoor air quantity, and evaporator load will cause the pressures to vary.
2 Temperature of air entering outside coil.
3 Approach = Liquid Line Temp. minus Outdoor Ambient Temperature
4 Subcooling = Saturation Temp. minus Liquid Line Temp Temperature

13ACX CHARGING INFORMATION

AIRFLOW CHECK - Both airflow and refrigerant charge must be monitored for a proper system set-up. It may be necessary to alternately check and adjust the airflow and the refrigerant charge.

NOTE - Be sure that filters and indoor and outdoor coils are clean before testing.

To determine temperature drop across indoor coil (Delta-T), measure the entering air dry bulb (DB) and wet bulb (WB) temperatures at the indoor coil. Find Delta-T in table 1.. Measure coil's leaving air DB and subtract that value from entering air DB. The measured difference should be within ±3ºF (±1.8ºC) of table value; if too low, decrease the indoor fan speed (refer to indoor unit for information). If the Delta-T is too high, increase the indoor fan speed. Repeat charging procedure and Delta-T (air flow adjustment) procedure until both are correct.

Example: *assume entering air DB - 72, WB - 64, leaving DB - 53. Therefore, Delta-T should be 15 (per table); delta across coil is 72 - 53 or 19 (which is 4ºF higher than table value); action necessary: increase fan speed.*

Table 1. Evaporator Coil Delta-T

Dry bulb temperature of air entering indoor coil (ºF)															
	80	24	24	24	23	23	22	22	22	20	19	18	17	16	15
	78	23	23	23	22	22	21	21	20	19	18	17	16	15	14
	76	22	22	22	21	21	20	19	19	18	17	16	15	14	13
	74	21	21	21	20	19	19	18	17	16	16	15	14	13	12
	72	20	20	19	18	17	17	16	15	15	14	13	12	11	10
	70	19	19	18	18	17	17	16	15	15	14	13	12	11	10
	ºF	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**

[Wet bulb temperature of air entering indoor coil]

Table 2. Superheat (SH) Value (RFC)

Suction line saturation temperature minus suction line temperature.									
Outdoor Temp (ºF)	65	70	75	80	85	90	95	100	105
Superheat (ºF)	35	30	25	22	18	12	8	5	5
All measurements are at the service valves and are based on 80db / 67wb indoor temperature.									

Table 3. RFC Sizes

Unit Size	-18	-24	-30	-36	-42	-48	-60
RFC Size	0.053	0.057	0.063	0.072	0.074	0.082	0.090

Table 4. Normal Operating Pressures[1]

Size	-18	-24	-30	-36	-42	-48	-60
°F(°C)[2]	**Fixed Orifice (RFC)** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 121	246 / 126	245 / 123	261 / 134	246 / 126	247 / 125	248 / 124
70 (21)	250 / 124	265 / 129	265 / 126	281 / 136	263 / 128	266 / 128	266 / 126
75 (24)	270 / 128	286 / 132	286 / 129	301 / 138	284 / 131	286 / 131	288 / 130
80 (27)	291 / 131	307 /135	308 / 132	324 / 140	305 / 133	307 / 133	309 / 133
85 (29)	313 / 134	330 / 137	331 / 135	346 / 142	327 / 135	329 / 135	330 / 135
90 (32)	335 / 136	353 / 140	355 / 138	371 / 144	350 / 138	353 / 138	354 / 138
95 (35)	359 / 138	378 / 142	380 / 140	396 / 146	374 / 140	377 / 140	377 / 140
100 (38)	383 / 140	402 / 143	405 / 142	422 / 148	399 / 142	403 / 142	406 / 142
105 (41)	409 / 142	428 / 145	431 / 144	448 / 150	424 / 144	428 / 144	431 / 144
110 (43)	436 / 145	456 / 147	458 / 146	477 / 151	452 / 146	455 / 146	457 / 146
115 (46)	464 / 147	486 / 149	487 / 148	506 / 153	481 / 148	483 / 147	484 / 148
°F(°C)[2]	**TXV System** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 132	244 / 137	248 / 127	263 / 135	238 / 132	235 / 132	241 / 130
70 (21)	251 / 133	263 / 138	263 / 131	281 / 138	262 / 133	254 / 132	260 / 130
75 (24)	265 / 133	285 / 139	284 / 132	302 / 140	280 / 134	276 / 134	280 / 132
80 (27)	292 / 135	307 / 140	307 / 134	325 / 142	301 / 136	298 / 134	299 / 134
85 (29)	314 / 136	329 / 141	330 / 135	349 / 142	327 / 137	323 / 135	321 / 135
90 (32)	338 / 137	354 / 142	355 / 136	375 / 143	353 / 138	350 / 137	344 / 134
95 (35)	362 / 138	379 / 143	380 / 137	404 / 144	377 / 140	377 / 138	371 / 135
100 (38)	388 / 140	404 / 144	407 / 138	433 / 145	404 / 141	406 / 140	400 / 137
105 (41)	415 / 141	438 / 145	434 / 139	462 / 147	435 / 142	430 / 141	428 / 139
110 (43)	444 / 142	464 / 147	465 / 141	494 / 149	465 / 143	464 / 142	458 / 141
115 (45)	475 / 143	495 / 148	497 / 142	527 / 150	499 / 144	495 / 143	484 / 142
Table 5. Approach (APP) Values[3] - TXV System - ºF (ºC) ±1ºF (0.5ºC)							
All	8 (4.4)	11 (6.1)	10 (5.5)	13 (7.2)	7 (3.9)	7 (3.9)	13 (7.2)
Table 6. Subcooling (SC) Values[4] - TXV System - ºF (ºC) ±1ºF (0.5ºC)							
65	5 (2.8)	8 (4.4)	5 (2.8)	3 (1.7)	8 (4.4)	6 (3.3)	4 (2.2)
75	5 (2.8)	8 (4.4)	6 (3.3)	3 (1.7)	9 (5.0)	7 (3.9)	4 (2.2)
85	5 (2.8)	8 (4.4)	6 (3.3)	4 (2.2)	9 (5.0)	7 (3.9)	5 (2.8)
95	6 (3.3)	9 (5.0)	7 (3.9)	4 (2.2)	10 (5.5)	8 (4.4)	5 (2.8)
105	7 (3.9)	9 (5.0)	8 (4.4)	5 (2.8)	11 (6.1)	9 (5.0)	5 (2.8)
115	9 (5.0)	10 (5.5)	8 (4.4)	5 (2.8)	11 (6.1)	9 (5.0)	4 (2.2)

1 Typical pressures; indoor evaporator match up, indoor air quantity, and evaporator load will cause the pressures to vary.
2 Temperature of air entering outside coil.
3 Approach = Liquid Line Temp. minus Outdoor Ambient Temperature
4 Subcooling = Saturation Temp. minus Liquid Line Temp Temperature

13ACX HFC-410A CHARGING INFORMATION – FOR COMPLETE CHARGING PROCEDURES, REFER TO THE APPLICABLE INSTALLATION AND SERVICE MANUAL

AIRFLOW CHECK - Both airflow and refrigerant charge must be monitored for a proper system set-up. It may be necessary to alternately check and adjust the airflow and the refrigerant charge.

NOTE - Be sure that filters and indoor and outdoor coils are clean before testing.

To determine temperature drop across indoor coil (Delta-T), measure the entering air dry bulb (DB) and wet bulb (WB) temperatures at the indoor coil. Find Delta-T in table 5. Measure coil's leaving air DB and subtract that value from entering air DB. The measured difference should be within ±3ºF (±1.8ºC) of table value; if too low, decrease the indoor fan speed (refer to indoor unit for information). If the Delta-T is too high, increase the indoor fan speed. Repeat charging procedure and Delta-T (air flow adjustment) procedure until both are correct.

Example: *assume entering air DB - 72, WB - 64, leaving DB - 53. Therefore, Delta-T should be 15 (per table); delta across coil is 72 - 53 or 19 (which is 4ºF higher than table value); action necessary: increase fan speed.*

Table 5. Evaporator Coil Delta-T

Dry bulb temperature of air entering indoor coil (ºF)															
	80	24	24	24	23	23	22	22	22	20	19	18	17	16	15
	78	23	23	23	22	22	21	21	20	19	18	17	16	15	14
	76	22	22	22	21	21	20	19	19	18	17	16	15	14	13
	74	21	21	21	20	19	19	18	17	16	16	15	14	13	12
	72	20	20	19	18	17	17	16	15	15	14	13	12	11	10
	70	19	19	18	18	17	17	16	15	15	14	13	12	11	10
	ºF	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**

[Wet bulb temperature of air entering indoor coil]

Table 6. Superheat (SH) Value (RFC)

Suction line saturation temperature minus suction line temperature.									
Outdoor Temp (ºF)	65	70	75	80	85	90	95	100	105
Superheat (ºF)	35	30	25	22	18	12	8	5	5
All measurements are at the service valves and are based on 80db / 67wb indoor temperature.									

Table 7. RFC Sizes

Unit Size	-18	-24	-30	-36	-42	-48	-60
RFC Size	0.051	0.057	0.065	0.072	0.076	0.082	0.090

Table 8- Normal Operating Pressures[1]

Size	-18	-24	-30	-36	-42	-48	-60
°F(°C)[2]	**Fixed Orifice (RFC)** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 121	246 / 126	245 / 123	261 / 134	246 / 126	247 / 125	248 / 124
70 (21)	250 / 124	265 / 129	265 / 126	281 / 136	263 / 128	266 / 128	266 / 126
75 (24)	270 / 128	286 / 132	286 / 129	301 / 138	284 / 131	286 / 131	288 / 130
80 (27)	291 / 131	307 /135	308 / 132	324 / 140	305 / 133	307 / 133	309 / 133
85 (29)	313 / 134	330 / 137	331 / 135	346 / 142	327 / 135	329 / 135	330 / 135
90 (32)	335 / 136	353 / 140	355 / 138	371 / 144	350 / 138	353 / 138	354 / 138
95 (35)	359 / 138	378 / 142	380 / 140	396 / 146	374 / 140	377 / 140	377 / 140
100 (38)	383 / 140	402 / 143	405 / 142	422 / 148	399 / 142	403 / 142	406 / 142
105 (41)	409 / 142	428 / 145	431 / 144	448 / 150	424 / 144	428 / 144	431 / 144
110 (43)	436 / 145	456 / 147	458 / 146	477 / 151	452 / 146	455 / 146	457 / 146
115 (46)	464 / 147	486 / 149	487 / 148	506 / 153	481 / 148	483 / 147	484 / 148
°F(°C)[2]	**TXV System** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	233 / 132	244 / 137	248 / 127	263 / 135	238 / 132	235 / 132	241 / 130
70 (21)	251 / 133	263 / 138	263 / 131	281 / 138	262 / 133	254 / 132	260 / 130
75 (24)	265 / 133	285 / 139	284 / 132	302 / 140	280 / 134	276 / 134	280 / 132
80 (27)	292 / 135	307 / 140	307 / 134	325 / 142	301 / 136	298 / 134	299 / 134
85 (29)	314 / 136	329 / 141	330 / 135	349 / 142	327 / 137	323 / 135	321 / 135
90 (32)	338 / 137	354 / 142	355 / 136	375 / 143	353 / 138	350 / 137	344 / 134
95 (35)	362 / 138	379 / 143	380 / 137	404 / 144	377 / 140	377 / 138	371 / 135
100 (38)	388 / 140	404 / 144	407 / 138	433 / 145	404 / 141	406 / 140	400 / 137
105 (41)	415 / 141	438 / 145	434 / 139	462 / 147	435 / 142	430 / 141	428 / 139
110 (43)	444 / 142	464 / 147	465 / 141	494 / 149	465 / 143	464 / 142	458 / 141
115 (45)	475 / 143	495 / 148	497 / 142	527 / 150	499 / 144	495 / 143	484 / 142
Table 9- Approach (APP) Values[3] - TXV System - ºF (ºC) ±1ºF (0.5ºC)							
All	8 (4.4)	11 (6.1)	10 (5.5)	13 (7.2)	7 (3.9)	7 (3.9)	13 (7.2)
Table 10- Subcooling (SC) Values[4] - TXV System - ºF (ºC) ±1ºF (0.5ºC)							
65	5 (2.8)	8 (4.4)	5 (2.8)	3 (1.7)	8 (4.4)	6 (3.3)	4 (2.2)
75	5 (2.8)	8 (4.4)	6 (3.3)	3 (1.7)	9 (5.0)	7 (3.9)	4 (2.2)
85	5 (2.8)	8 (4.4)	6 (3.3)	4 (2.2)	9 (5.0)	7 (3.9)	5 (2.8)
95	6 (3.3)	9 (5.0)	7 (3.9)	4 (2.2)	10 (5.5)	8 (4.4)	5 (2.8)
105	7 (3.9)	9 (5.0)	8 (4.4)	5 (2.8)	11 (6.1)	9 (5.0)	5 (2.8)
115	9 (5.0)	10 (5.5)	8 (4.4)	5 (2.8)	11 (6.1)	9 (5.0)	4 (2.2)

1 Typical pressures; indoor evaporator match up, indoor air quantity, and evaporator load will cause the pressures to vary.
2 Temperature of air entering outside coil.
3 Approach = Liquid Line Temp. minus Outdoor Ambient Temperature
4 Subcooling = Saturation Temp. minus Liquid Line Temp Temperature

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13ACX HFC-410A CHARGING INFORMATION – FOR COMPLETE CHARGING PROCEDURES, REFER TO THE APPLICABLE INSTALLATION AND SERVICE MANUAL

AIRFLOW CHECK - Both airflow and refrigerant charge must be monitored for a proper system set-up. It may be necessary to alternately check and adjust the airflow and the refrigerant charge.

NOTE - Be sure that filters and indoor and outdoor coils are clean before testing.

To determine temperature drop across indoor coil (Delta-T), measure the entering air dry bulb (DB) and wet bulb (WB) temperatures at the indoor coil. Find Delta-T in table 11. Measure coil's leaving air DB and subtract that value from entering air DB. The measured difference should be within ±3ºF (±1.8ºC) of table value; if too low, decrease the indoor fan speed (refer to indoor unit for information). If the Delta-T is too high, increase the indoor fan speed. Repeat charging procedure and Delta-T (air flow adjustment) procedure until both are correct.

Example: *assume entering air DB - 72, WB - 64, leaving DB - 53. Therefore, Delta-T should be 15 (per table); delta across coil is 72 - 53 or 19 (which is 4ºF higher than table value); action necessary: increase fan speed.*

Table 11. Evaporator Coil Delta-T

Dry bulb temperature of air entering indoor coil (ºF)															
	80	24	24	24	23	23	22	22	22	20	19	18	17	16	15
	78	23	23	23	22	22	21	21	20	19	18	17	16	15	14
	76	22	22	22	21	21	20	19	19	18	17	16	15	14	13
	74	21	21	21	20	19	19	18	17	16	16	15	14	13	12
	72	20	20	19	18	17	17	16	15	15	14	13	12	11	10
	70	19	19	18	18	17	17	16	15	15	14	13	12	11	10
	ºF	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
	[Wet bulb temperature of air entering indoor coil]														

Table 12. Superheat (SH) Value - Fixed Orifice (RFC) - ºF (ºC) ± 1ºF (0.5ºC)

Suction line saturation temperature minus suction line temperature.									
Outdoor Temp (ºF)	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**	**105**
-018	24	23	21	20	18	15	13	11	7
-024	23	21	19	17	15	13	10	7	5
-030	35	30	25	22	18	12	8	5	5
-036	35	30	25	22	18	12	8	5	5
-042	35	30	25	22	18	12	8	5	5
-048	35	30	25	22	18	12	8	5	5
-060	35	30	25	22	18	12	8	5	5
All measurements are at the service valves and are based on 80db / 67wb indoor temperature.									

Table 13. RFC Sizes

Unit Size	-18	-24	-30	-36	-42	-48	-60
RFC Size	0.051	0.057	0.065	0.072	0.076	0.082	0.090

Table 14- Normal Operating Pressures[1]

Size	-18	-24	-30	-36	-42	-48	-60
°F(°C)[2]	**Fixed Orifice (RFC)** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	236 / 127	247 / 128	245 / 123	261 / 134	246 / 126	247 / 125	248 / 124
70 (21)	252 / 130	267 / 131	265 / 126	281 / 136	263 / 128	266 / 128	266 / 126
75 (24)	273 / 133	288 / 134	286 / 129	301 / 138	284 / 131	286 / 131	288 / 130
80 (27)	293 / 136	310 /137	308 / 132	324 / 140	305 / 133	307 / 133	309 / 133
85 (29)	316 / 139	332 / 140	331 / 135	346 / 142	327 / 135	329 / 135	330 / 135
90 (32)	338 / 142	356 / 143	355 / 138	371 / 144	350 / 138	353 / 138	354 / 138
95 (35)	366 / 145	380 / 145	380 / 140	396 / 146	374 / 140	377 / 140	377 / 140
100 (38)	388 / 147	406 / 147	405 / 142	422 / 148	399 / 142	403 / 142	406 / 142
105 (41)	418 / 150	432 / 149	431 / 144	448 / 150	424 / 144	428 / 144	431 / 144
110 (43)	443 / 152	461 / 151	458 / 146	477 / 151	452 / 146	455 / 146	457 / 146
115 (46)	476 / 154	490 / 153	487 / 148	506 / 153	481 / 148	483 / 147	484 / 148
°F(°C)[2]	**TXV System** - Liquid Line (±10 psig) / Vapor Line (±5 psig)						
65 (18)	235 / 135	240 / 136	248 / 127	263 / 135	238 / 132	235 / 132	241 / 130
70 (21)	253 / 136	260 / 137	263 / 131	281 / 138	262 / 133	254 / 132	260 / 130
75 (24)	274 / 138	281 / 138	284 / 132	302 / 140	280 / 134	276 / 134	280 / 132
80 (27)	295 / 139	303 / 139	307 / 134	325 / 142	301 / 136	298 / 134	299 / 134
85 (29)	318 / 141	326 / 140	330 / 135	349 / 142	327 / 137	323 / 135	321 / 135
90 (32)	341 / 142	350 / 141	355 / 136	375 / 143	353 / 138	350 / 137	344 / 134
95 (35)	366 / 143	375 / 143	380 / 137	404 / 144	377 / 140	377 / 138	371 / 135
100 (38)	391 / 145	402 / 144	407 / 138	433 / 145	404 / 141	406 / 140	400 / 137
105 (41)	423 / 146	429 / 145	434 / 139	462 / 147	435 / 142	430 / 141	428 / 139
110 (43)	449 / 147	457 / 146	465 / 141	494 / 149	465 / 143	464 / 142	458 / 141
115 (45)	479 / 149	488 / 147	497 / 142	527 / 150	499 / 144	495 / 143	484 / 142

Table 15- Approach (APP) Values[3] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

All	6 (3.3)	15 (8.3)	10 (5.5)	13 (7.2)	7 (3.9)	7 (3.9)	13 (7.2)

Table 16- Subcooling (SC) Values[4] - TXV System - ºF (ºC) ±1ºF (0.5ºC)

65	11 (6.1)	12 (6.7)	5 (2.8)	3 (1.7)	8 (4.4)	6 (3.3)	4 (2.2)
75	10 (5.6)	10 (5.6)	6 (3.3)	3 (1.7)	9 (5.0)	7 (3.9)	4 (2.2)
85	8 (4.4)	8 (4.4)	6 (3.3)	4 (2.2)	9 (5.0)	7 (3.9)	5 (2.8)
95	7 (3.9)	5 (2.8)	7 (3.9)	4 (2.2)	10 (5.5)	8 (4.4)	5 (2.8)
105	6 (3.3)	5 (2.8)	8 (4.4)	5 (2.8)	11 (6.1)	9 (5.0)	5 (2.8)
115	5 (2.8)	5 (2.8)	8 (4.4)	5 (2.8)	11 (6.1)	9 (5.0)	4 (2.2)

1 Typical pressures; indoor evaporator match up, indoor air quantity, and evaporator load will cause the pressures to vary.
2 Temperature of air entering outside coil.
3 Approach = Liquid Line Temp. minus Outdoor Ambient Temperature
4 Subcooling = Saturation Temp. minus Liquid Line Temp Temperature

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