Service Literature

UNIT INFORMATION

100067

February 14, 2023

ELXC

6 - 20 TON

ELXC SERIES UNITS

The ELXC units are designed for light commercial applications, with a remotely located blower-coil unit or a furnace with an add-on evaporator coil. Capacities for the series are 6, 7.5, 10, 12.5, 15 and 20 tons (21, 26, 35, 44, 53, and 70 kW). EL072XC, EL090XC, and EL120XCSST models have one dual-speed scroll compressor. EL120XCSDT, EL150XC, EL180XC, and EL240XC models have two dual-speed scroll compressors. ELXC units match with the ELXA blower-coil units. All ELXC units are three phase and use HFC-410A refrigerant.

This manual covers EL072XCSST, EL090XCSST, EL120XCSST, EL120XCSDT, EL180XCSDT, and EL240XCSST units. It is divided into sections which discuss the major components, refrigerant system, charging procedure, maintenance and operation sequence.

Information in this manual is intended for qualified service technicians only. All specifications are subject to change. Procedures in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

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⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier.

⚠ 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.

⚠ WARNING

Electric shock hazard! - Disconnect all power supplies before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

⚠ CAUTION

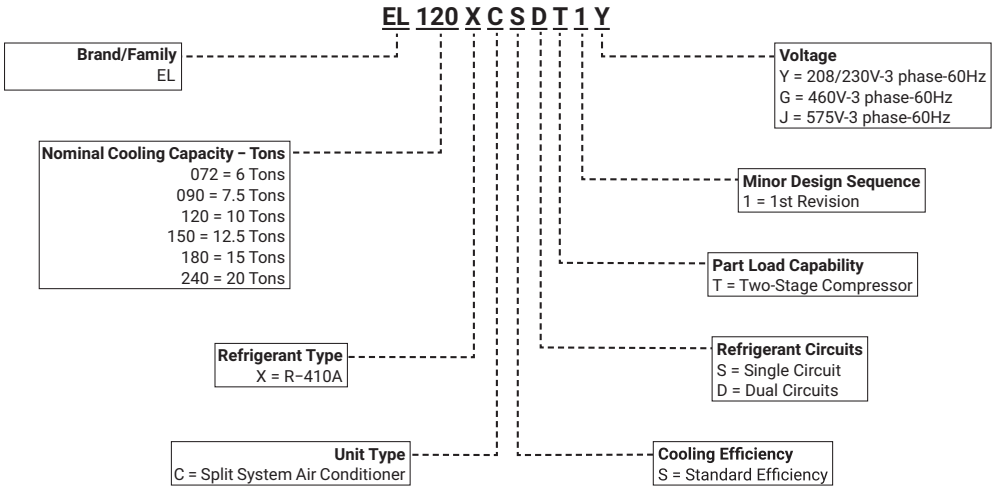
As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

⚠ WARNING

To prevent serious injury or death:

1. Lock-out/tag-out before performing maintenance.
2. If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the “OFF” position before performing maintenance.
3. Always keep hands, hair, clothing, jewelry, tools, etc. away from moving parts.

Model Number Identification



Specifications — 6 TON | 7.5 TON

		Model No.	EL072XCSS	EL090XCSS
General Data		**Nominal Size - Tons**	**6**	**7.5**
Connections (sweat)		Liquid line - in. (o.d)	(1) 3/8	(1) 5/8
		Suction line - in. (o.d)	(1) 1-1/8	(1) 1-1/8
Refrigerant (R-410A)		Factory Charge	R-410A holding charge (2 lbs. per circuit)	
		No. of Circuits	1	1
		[1] Field charge (25 ft. line set)	18 lbs. 0 oz. (includes holding charge)	20 lbs. 0 oz. (includes holding charge)
Compressor			(1) Two Stage Scroll	(1) Two Stage Scroll
Condenser Coil		Net face area - sq. ft. Outer coil	29.3	29.3
		Inner coil	14.2	28.4
		Tube diameter - in. & no. of rows	3/8 - 1.5	3/8 - 2
		Fins per inch	20	20
Condenser Fan(s)		Diameter - in. & no. of blades	(1) 24 - 3	(1) 24 - 4
		Motor hp	(1) 1/3	(1) 1/2
		Total air volume - cfm	4700	5600
		Rpm	1075	1075
		Watts	400	580

ELECTRICAL DATA

		Line voltage data - 60 hz - 3 phase	208/230V	460V	575V	208/230V	460V	575V
		[2] Maximum Overcurrent Protection (amps)	40	20	15	60	25	20
		[3] Minimum circuit ampacity	25	12	9	37	17	13
Compressor		No. of Compressors	1	1	1	1	1	1
		Rated load amps	17.6	8.5	6.3	26.9	12	9
		Locked rotor amps	136	66.1	55.3	165	94	65
Condenser Fan Motor (1 phase)		No. of motors	1	1	1	1	1	1
		Full load amps	2.4	1.3	1	3	1.5	1.2
		Locked rotor amps	4.3	2.4	1.9	6	3	2.9

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

[1] Approximate field provided charge with 25 ft. line set. Refer to unit installation instructions for detailed charging information. Refer to the Lennox Refrigerant Piping Manual to determine refrigerant charge required with longer length refrigerant lines.

[2] HACR type circuit breaker or fuse.

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

Specifications — 10 TON

General Data	**Model No.**		**EL120XCSS**	**EL120XCSD**
	Nominal Size - Tons		**10**	**10**
Connections (sweat)	Liquid line - in. (o.d)		(1) 5/8	(2) 3/8
	Suction line - in. (o.d)		(1) 1-1/8	(2) 1-1/8
Refrigerant (R-410A)	Factory Charge		R-410A holding charge (2 lbs. per circuit)	
	No. of Circuits		1	2
	[1] Field charge (25 ft. line set)	Circuit 1	23 lbs. 0 oz. (includes holding charge)	12 lbs. 0 oz. (includes holding charge)
		Circuit 2	- - -	12 lbs. 0 oz. (includes holding charge)
Compressor			(1) Two Stage Scroll	(2) Two Stage Scroll
Condenser Coil	Net face area - sq. ft. Outer coil		29.3	29.3
	Inner coil		28.4	28.4
	Tube diameter - in. & no. of rows		3/8 - 2	3/8 - 2
	Fins per inch		20	20
Condenser Fan(s)	Diameter - in. & no. of blades		(2) 24 - 3	(2) 24 - 3
	Motor hp		(2) 1/3	(2) 1/3
	Total air volume - cfm		8300	8300
	Rpm		1075	1075
	Watts		830	830

ELECTRICAL DATA

	Line voltage data - 60 hz - 3 phase	**208/230V**	**460V**	**575V**	**208/230V**	**460V**	**575V**
	[2] Maximum Overcurrent Protection (amps)	80	35	25	50	20	15
	[3] Minimum circuit ampacity	49	22	16	37	18	14
Compressor	No. of Compressors	1	1	1	2	2	2
	Rated load amps (total)	34.6	14.8	11.1	14 (28)	6.5 (13)	4.9 (9.8)
	Locked rotor amps (total)	240	130	93.7	93 (186)	60 (120)	41 (82)
Condenser Fan Motor (1 phase)	No. of motors	2	2	2	2	2	2
	Full load amps (total)	2.4 (4.8)	1.3 (2.6)	1 (2)	2.4 (4.8)	1.3 (2.6)	1 (2)
	Locked rotor amps (total)	4.3 (8.6)	2.4 (4.8)	1.9 (3.8)	4.3 (8.6)	2.4 (4.8)	1.9 (3.8)

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

[1] Approximate field provided charge with 25 ft. line set. Refer to unit installation instructions for detailed charging information. Refer to the Lennox Refrigerant Piping Manual to determine refrigerant charge required with longer length refrigerant lines.

[2] HACR type circuit breaker or fuse.

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

SPECIFICATIONS — 12.5 TON | 20 TON

			EL150XCSD	EL180XCSD	EL240XCSD
General Data		**Model No.**			
		Nominal Size - Tons	**12.5**	**15**	**20**
Connections (sweat)		Liquid line - in. (o.d)	(2) 3/8	(2) 5/8	(2) 5/8
		Suction line - in. (o.d)	(2) 1-1/8	(2) 1-1/8	(2) 1-1/8
Refrigerant (R-410A)		Factory Charge	R-410A holding charge (2 lbs. per circuit)		
		No. of Circuits	2	2	2
	[1] Field charge (25 ft. line set)	Circuit 1	15 lbs. 0 oz. (includes holding charge)	24 lbs. 0 oz. (includes holding charge)	22 lbs. 4 oz. (includes holding charge)
		Circuit 2	15 lbs. 0 oz. (includes holding charge)	24 lbs. 0 oz. (includes holding charge)	23 lbs. 3 oz. (includes holding charge)
Compressor			(2) Two Stage Scroll	(2) Two Stage Scroll	(2) Two Stage Scroll
Condenser Coil		Net face area - sq. ft. Outer coil	34.2	58.7	58.7
		Inner coil	33.3	57.7	57.7
		Tube diameter - in. & no. of rows	3/8 - 2	3/8 - 2	3/8 - 2
		Fins per inch	20	20	20
Condenser Fan(s)		Diameter - in. & no. of blades	(2) 24 - 4	(4) 24 - 3	(4) 24 - 3
		Motor hp	(2) 1/2	(4) 1/3	(4) 1/3
		Total air volume - cfm	10,300	16,600	16,600
		Rpm	1075	1075	1075
		Watts	1130	1660	1660

ELECTRICAL DATA

	Line voltage data - 60 hz - 3 phase	**208/230V**	**460V**	**575V**	**208/230V**	**460V**	**575V**	**208/230V**	**460V**	**575V**
	[2] Maximum Overcurrent Protection (amps)	60	30	20	90	40	30	110	50	40
	[3] Minimum circuit ampacity	46	23	17	71	33	25	88	39	29
Compressor	No. of Compressors	2	2	2	2	2	2	2	2	2
	Rated load amps (total)	17.6 (35.2)	8.5 (17)	6.3 (12.6)	26.9 (53.8)	12 (24)	9 (18)	34.6 (69.2)	14.8 (29.6)	11.1 (22.2)
	Locked rotor amps (total)	136 (272)	66.1 (132.2)	55.3 (110.6)	164 (328)	100 (200)	78 (156)	240 (480)	130 (260)	93.7 (187.4)
Condenser Fan Motor (1 phase)	No. of motors	2	2	2	4	4	4	4	4	4
	Full load amps (total)	3 (6)	1.5 (3)	1.2 (2.4)	2.4 (9.6)	1.3 (5.2)	1 (4)	2.4 (9.6)	1.3 (5.2)	1 (4)
	Locked rotor amps (total)	6 (12)	3 (6)	2.9 (5.8)	4.3 (17.2)	2.4 (9.6)	1.9 (7.6)	4.3 (17.2)	2.4 (9.6)	1.9 (7.6)

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

[1] Approximate field provided charge with 25 ft. line set. Refer to unit installation instructions for detailed charging information. Refer to the Lennox Refrigerant Piping Manual to determine refrigerant charge required with longer length refrigerant lines.

[2] HACR type circuit breaker or fuse.

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

OPTIONS / ACCESSORIES

Item Description	Catalog No.	EL 072 XCSS	EL 090 XCSS	EL 120 XCSS	EL 120 XCSD	EL 150 XCSD	EL 180 XCSD	EL 240 XCSD
CABINET								
Combined Coil/Hail Guards	**13T29**	X	X					
	13T30			X	X			
	13T32					X		
	13T37						X	X
Corrosion Protection	Factory	O	O	O	O	O	O	O
CONTROLS								
BACnet® Module	**17A08**	X	X	X				
BACnet® Sensor with Display	**97W23**	X	X	X				
BACnet® Sensor without Display	**97W24**	X	X	X				
Low Ambient Control (0ºF)	**16F18**	X	X					
	16F26			X				
	16F24				X			
	24K11					X		
	16F25						X	X
Furnace Twinning Panel	**Y3653**	X	X	X				
ELECTRICAL								
GFI Service Outlets — 15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	X	X	X	X	X	X	X
GFI Service Outlets — 20 amp non-powered, field-wired (575V only)	**67E01**	X	X	X	X	X	X	X
INDOOR AIR QUALITY								
Sensor - Wall-mount, off-white plastic cover with LCD display	**77N39**	X	X	X	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display	**87N53**	X	X	X	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting	**87N52**	X	X	X	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	**87N54**	X	X	X	X	X	X	X
CO2Sensor Duct Mounting Kit	**85L43**	X	X	X	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO2sensor (**77N39**)	**90N43**	X	X	X	X	X	X	X

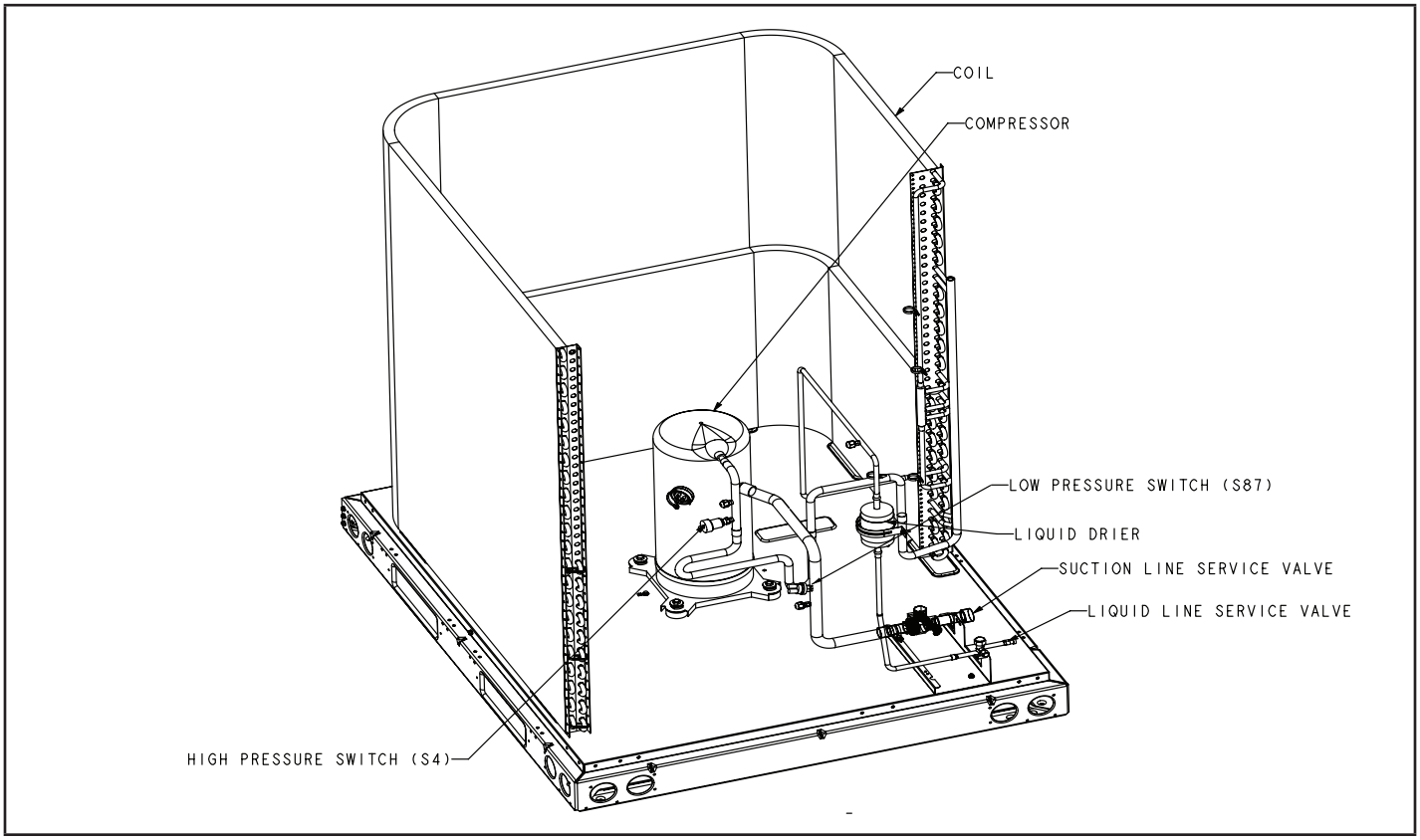
NOTE - The catalog and model numbers that appear here are for ordering field installed accessories only.

O - Factory Installed with extended lead time.

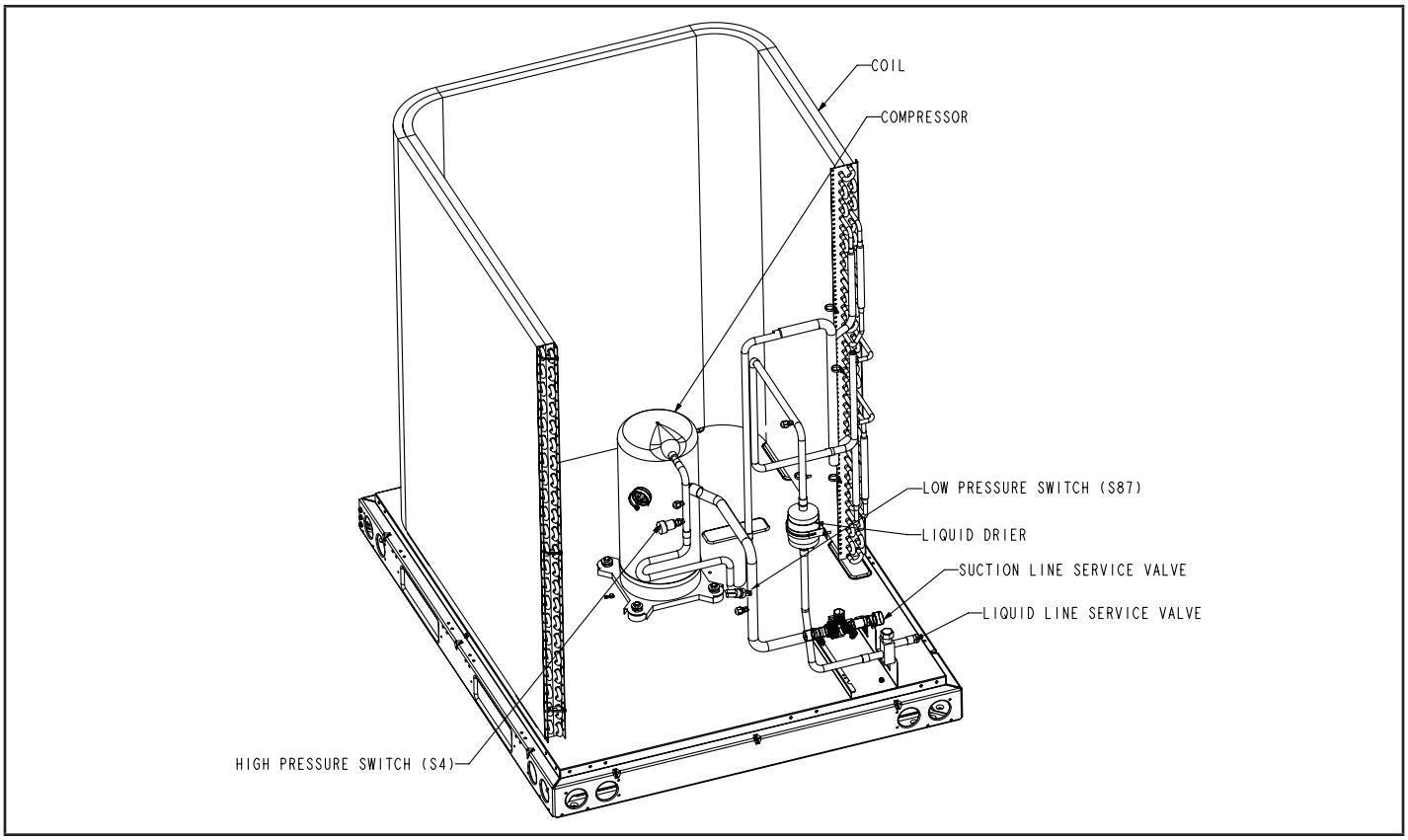
X - Field Installed

Unit Plumbing Parts Arrangement

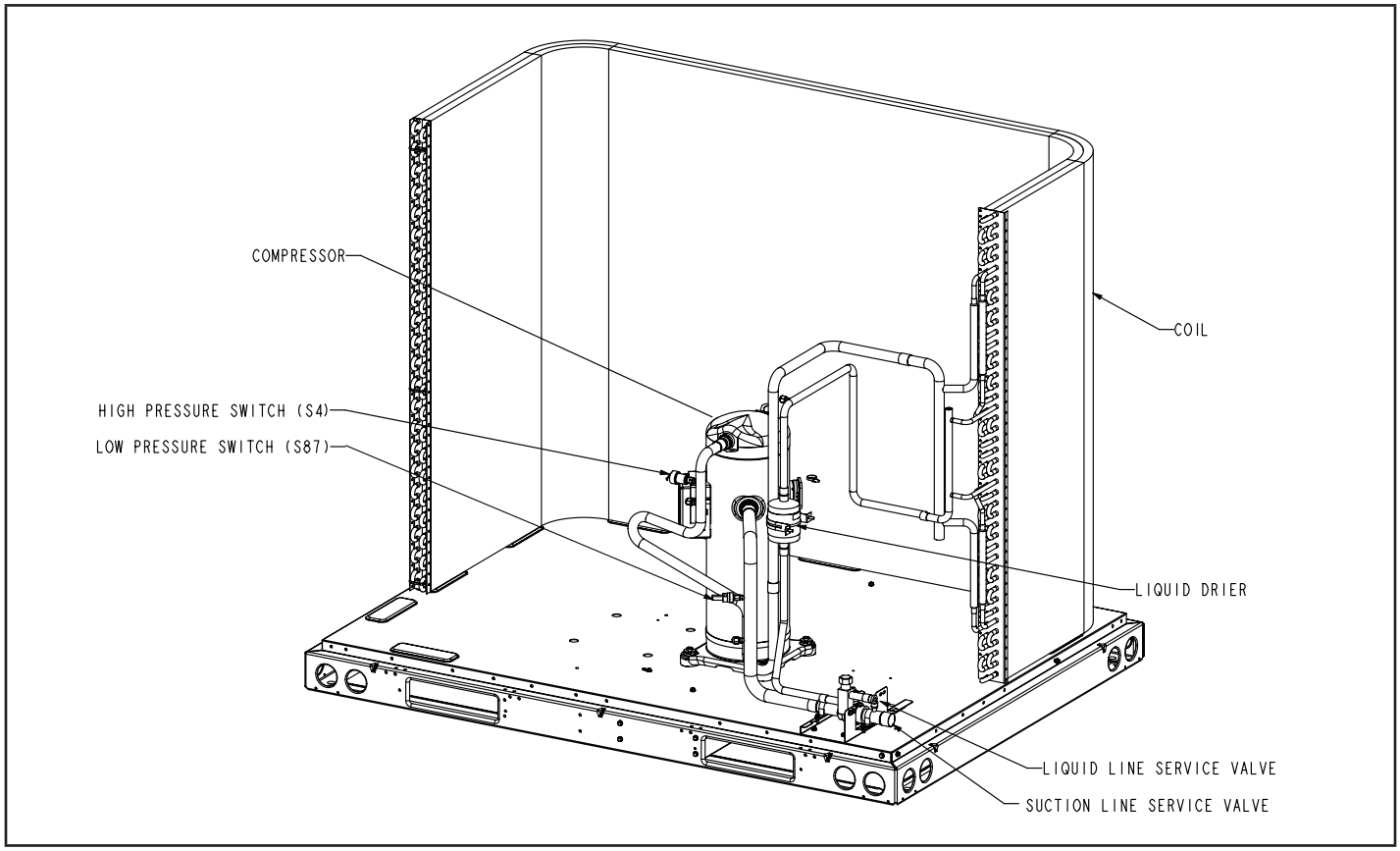
EL072XCSST



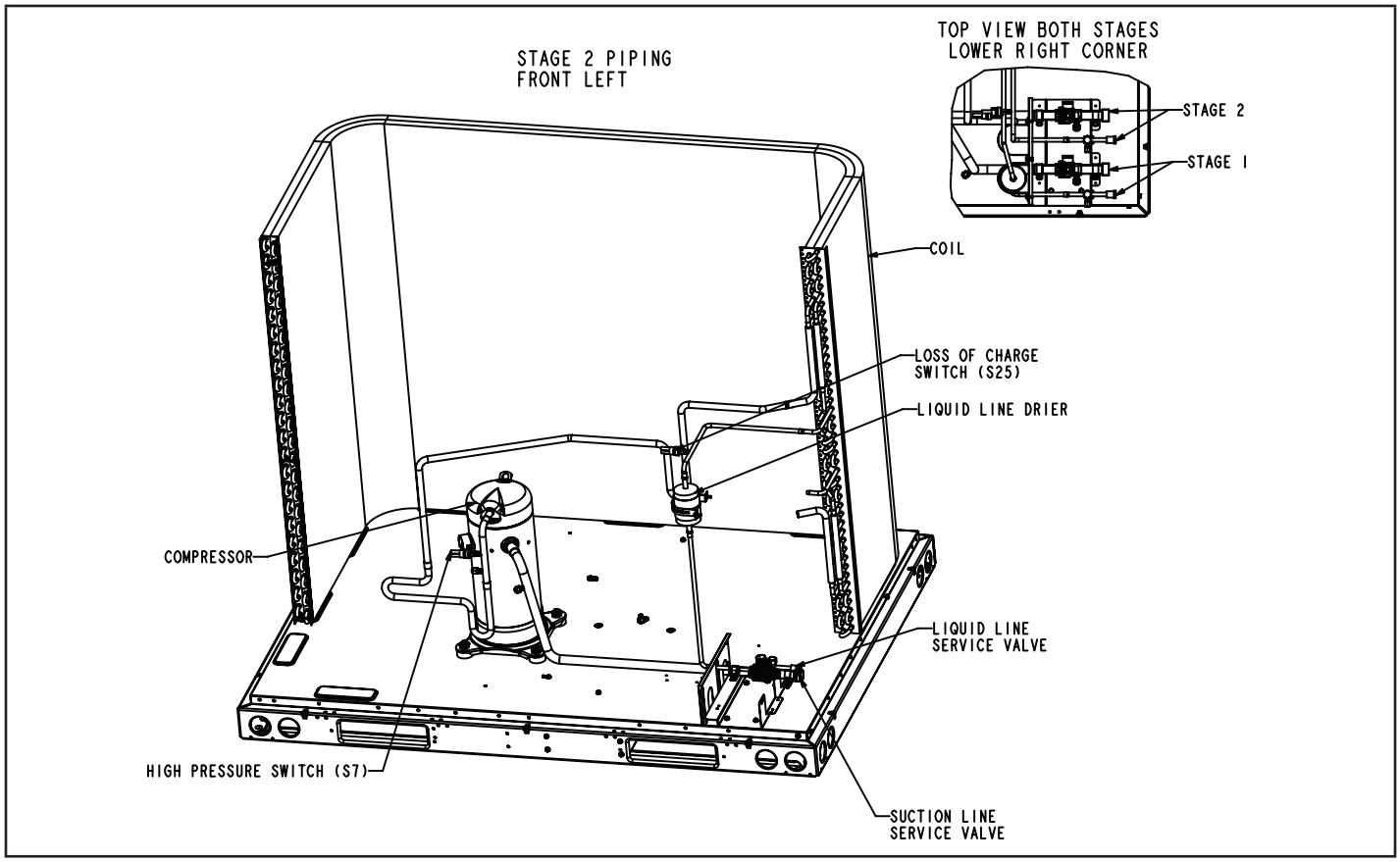
EL090XCSST



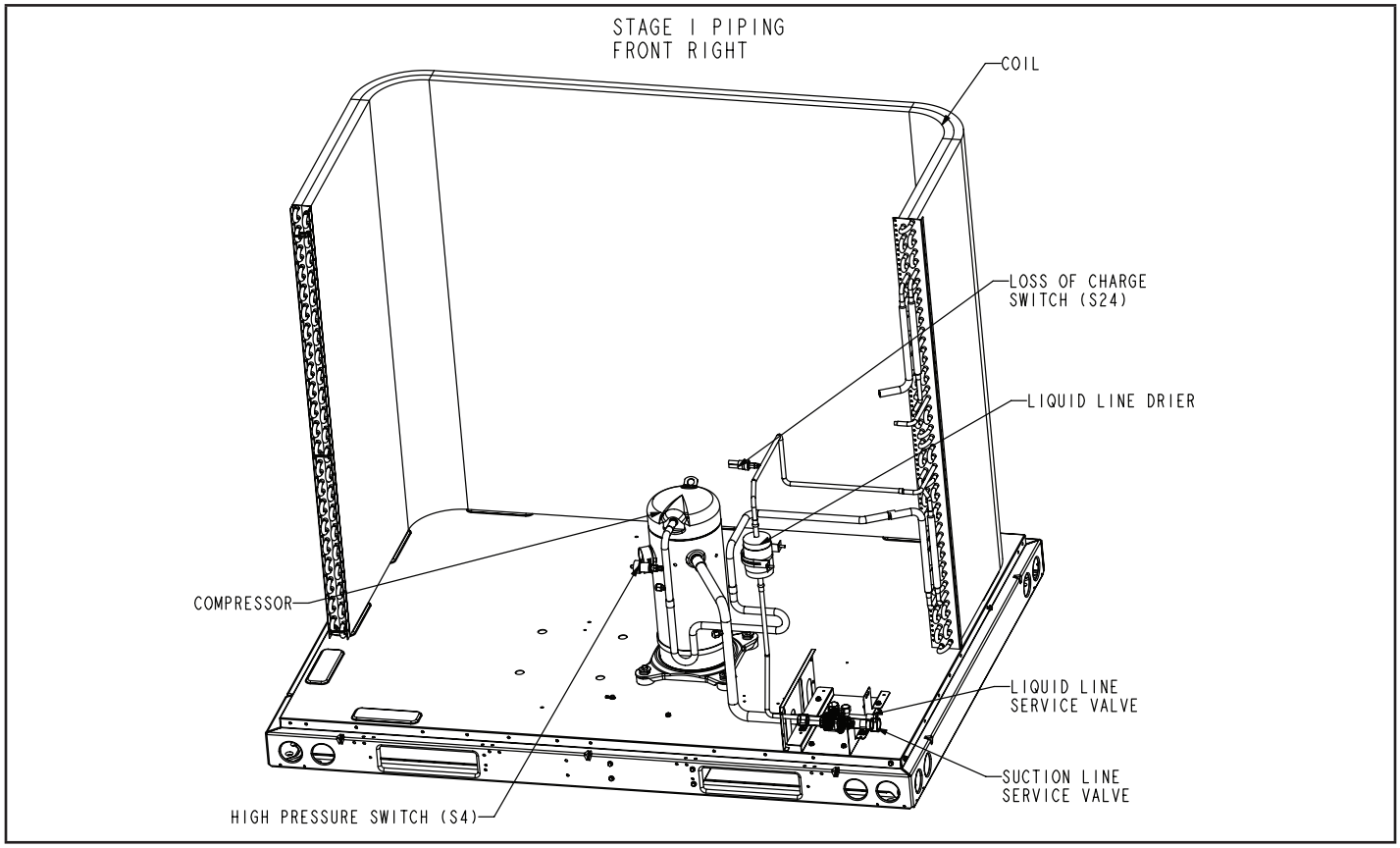
EL120XCSST



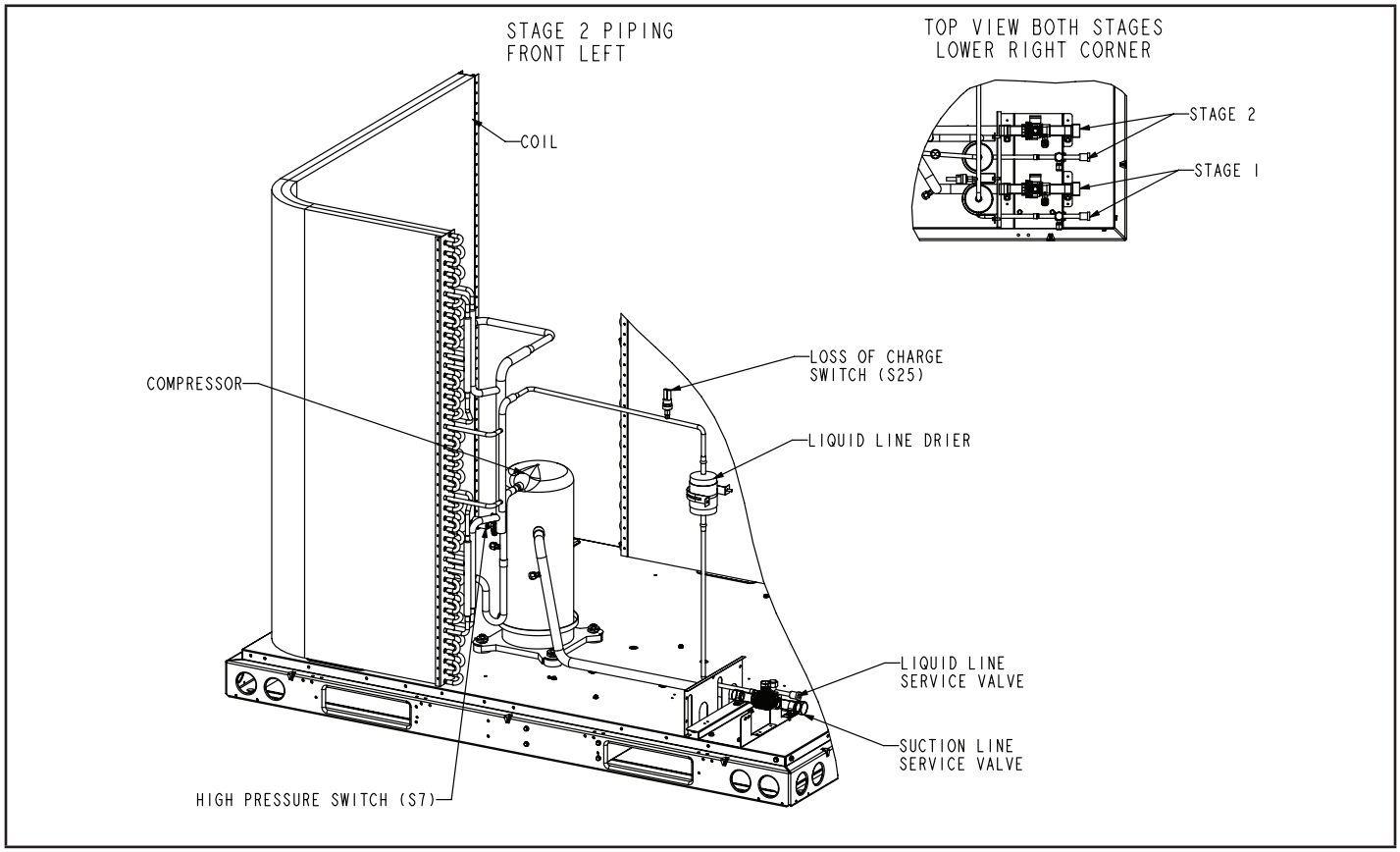
EL120XCSDT – STAGE 2



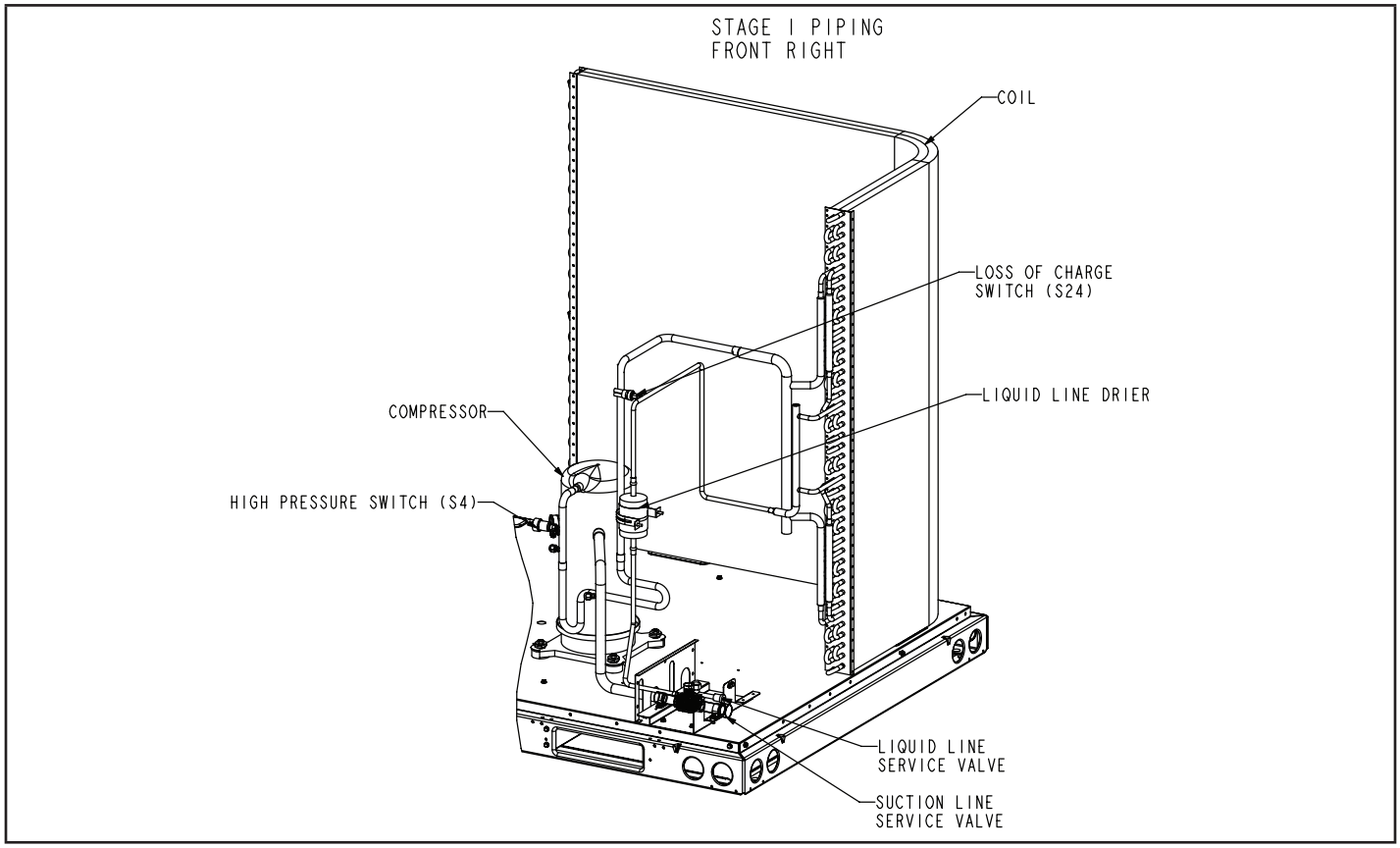
EL120XCSDT – STAGE 1



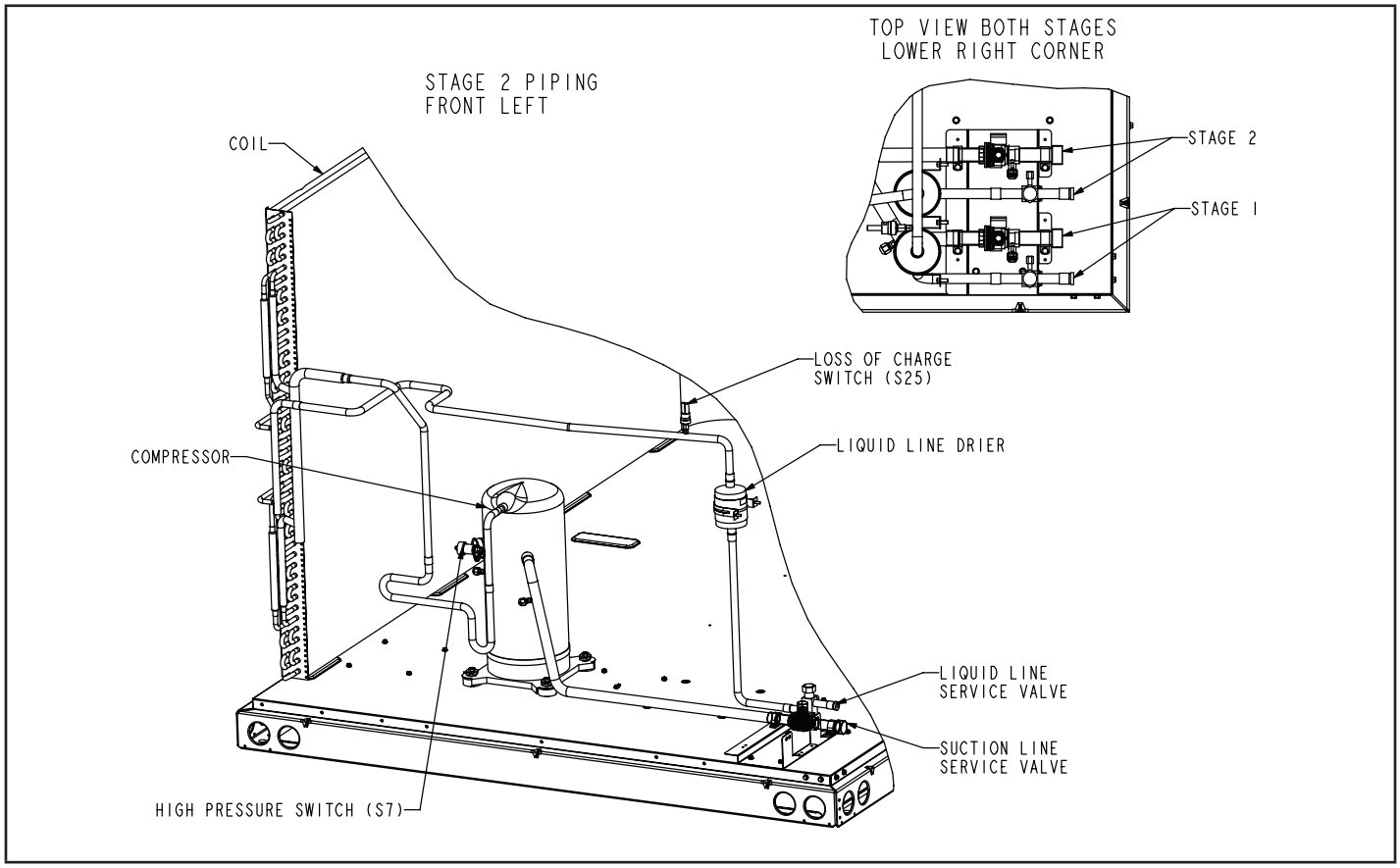
EL150XCSDT – STAGE 2



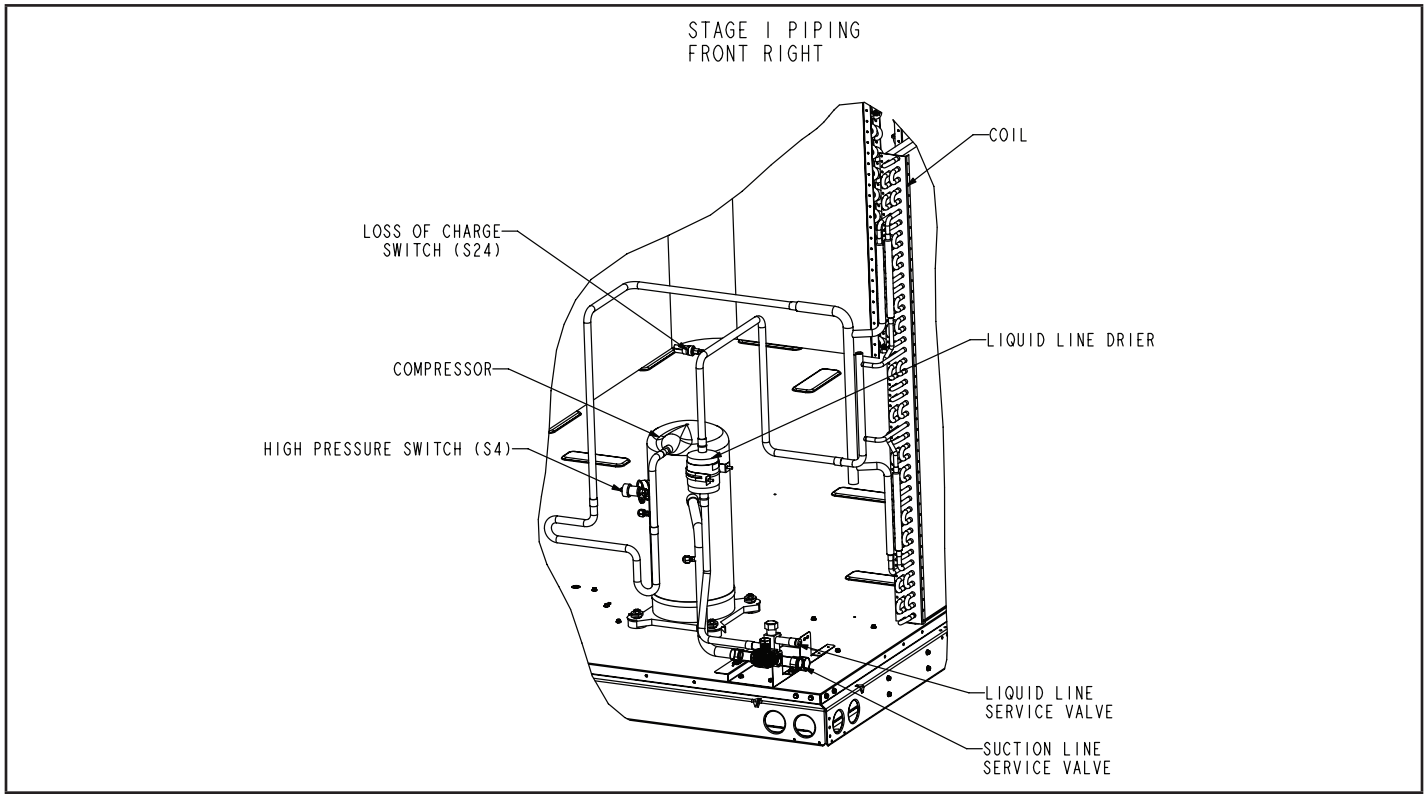
EL150XCSDT – STAGE 1



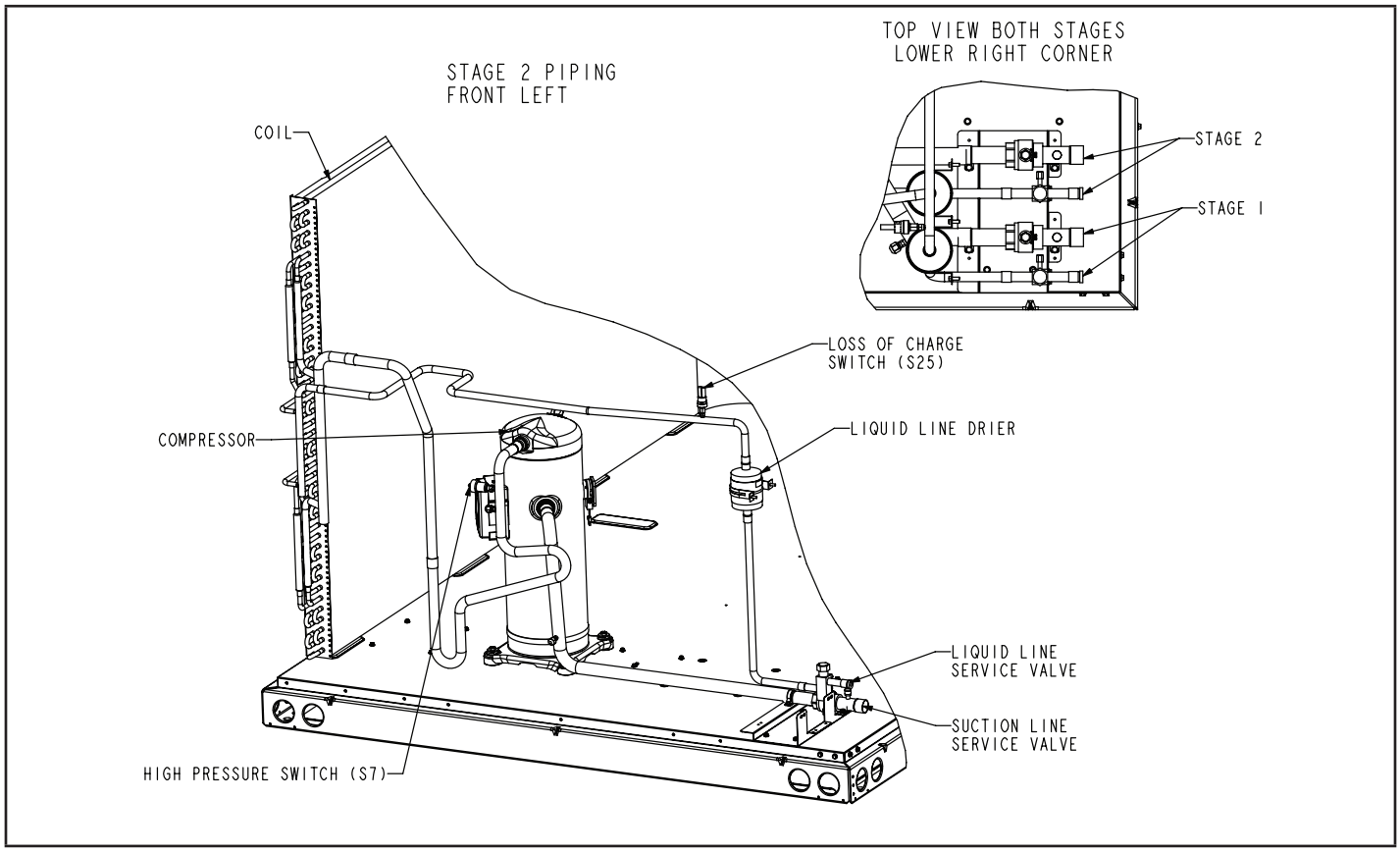
EL180XCSDT – STAGE 2



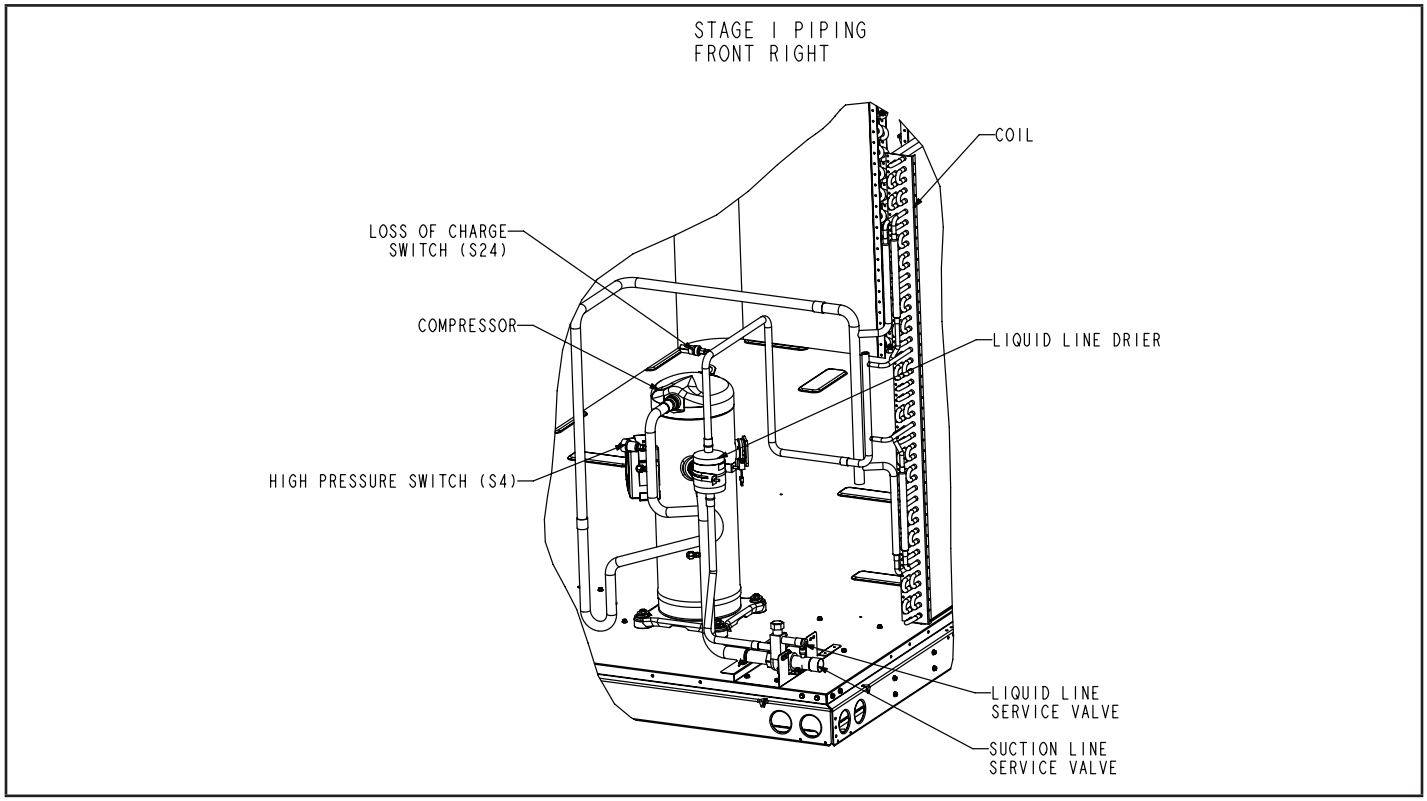
EL180XCSDT – STAGE 1



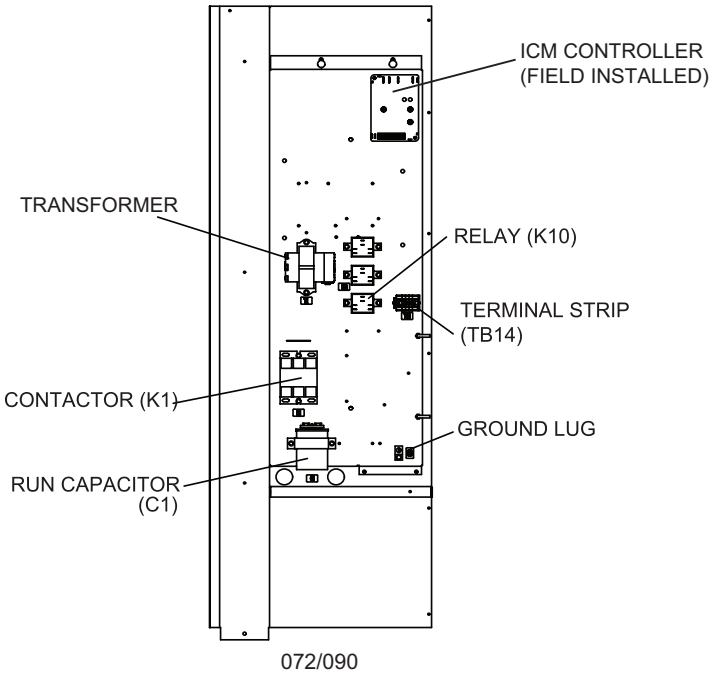
EL240XCSDT – STAGE 2



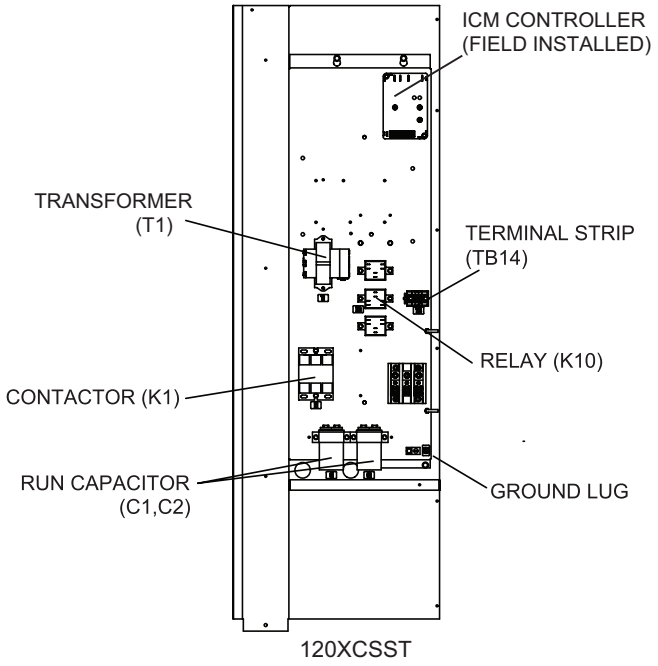
EL240XCSDT – STAGE 1



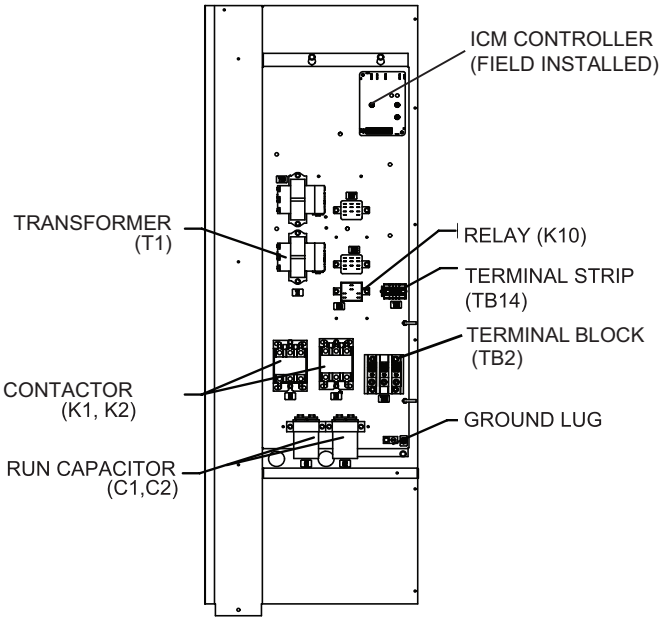
Unit Control Box Components Arrangement



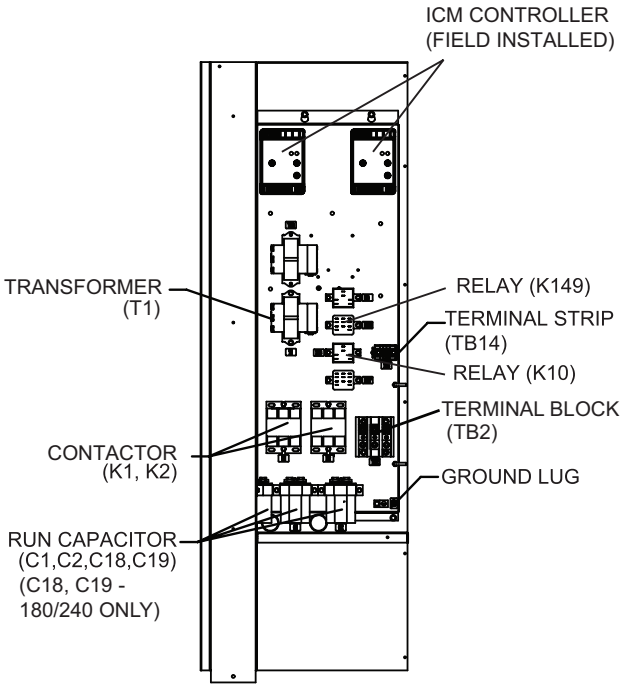
072/090



120XCSST



EL120XCSDT



EL150/180/240XCSDT

I-UNIT COMPONENTS

The parts arrangements are shown on pages 6 - 11 and control boxes on page 12.

⚠ WARNING	
ELECTROSTATIC DISCHARGE (ESD) Precautions and Procedures	Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

A-CONTROL BOX COMPONENTS

1 - Transformer T1

All models use a single line voltage to 24VAC transformer mounted in the control box. Transformer T1 supplies power to control circuits in the unit. The transformer is rated at 90VA and is protected by a 6.0 amp circuit breaker (CB8). CB8 is internal to the transformer. The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 1, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

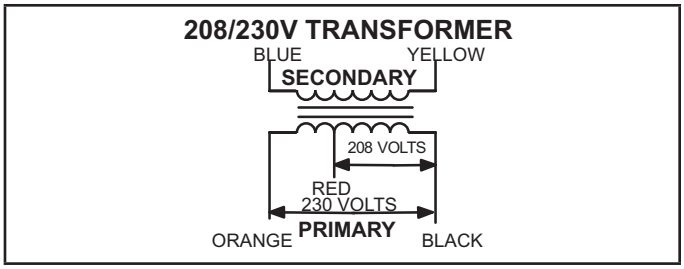


FIGURE 1

***NOTE** – 208 volt units are field wired with the red wire connected to control transformer. 230 volt units are factory wired with the orange wire connected to control transfomer primary.*

2 - Terminal Strip TB14 & TB2

Terminal strip TB14 used in all units distributes 24V power and common from the transformer T1 to the indoor mating air handler unit. TB14 distributes 24V thermostat signals to the low voltage components. Terminal block TB2 used in the 120, 150, 180 and 240 units, distributes line voltage to line voltage components.

3 - Condenser Fan Capacitors C1, C2, C18, C19

All units use single-phase condenser fan motors. Motors are equipped with a fan run capacitor to maximize motor efficiency. Condenser fan capacitors C1, C2, C18 and C19 assist in the start up of condenser fan motors B4, B5, B21 and B22. Capacitor ratings will be on condenser fan motor nameplate.

4 - Compressor Contactor K1 (all units) K2 (120XCSD, 150, 180, 240)

All compressor contactors are three-pole double-break contactors with auxiliary switch with a 24V coil. In all units, K1 energizes compressor B1. In EL120XCSD, 150, 180 and 240 units, K2 energizes compressor B2.

5 - Condenser Fan Relay K10 (all units) K149 (180, 240)

K10 energizes condenser fan B4 (fan 1) in EL072 /090/150XC and fans B4,B5 (fan 1, 2) in EL120/180/240XC units in response to thermostat demand. K149 energizes condenser fan B5 (fan 2) in EL150XC and fans B21, B22 (fan 3, 4) in EL180/240XC in response to thermostat demand.

B-COOLING COMPONENTS

⚠ 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 - Compressor

All units use scroll compressors. 072, 090 and 120XCSS models have one two-stage scroll compressor. 120XCSD, 150, 180, and 240models have two two-stage scroll compressors.

Compressor consists of two involute spiral scrolls matched together to generate a series of crescent shaped gas pockets between them.

During compression, one scroll remains stationary while the other scroll orbits around it.

Gas is drawn into the outer pocket, the pocket is sealed as the scroll rotates.

As the spiral movement continues, gas pockets are pushed to the center of the scrolls. Volume between the pockets is simultaneously reduced.

When pocket reaches the center, gas is now high pressure and is forced out of a port located in the center of the fixed scrolls.

During compression, several pockets are compressed simultaneously resulting in a smooth continuous compression cycle.

Continuous flank contact, maintained by centrifugal force, minimizes gas leakage and maximizes efficiency.

Scroll compressor is tolerant to the effects of slugging and contaminants. If this occurs, scrolls separate, allowing liquid or contaminants to be worked toward the center and discharged.

Low gas pulses during compression reduces operational sound levels.

Compressor motor is internally protected from excessive current and temperature.

Compressor is installed in the unit on resilient rubber mounts for vibration-free operation.

See ELECTRICAL section or compressor nameplate for compressor specifications.

All Compressors are Two Stage Models

A 24-volt DC solenoid valve inside the compressor controls staging. When the 3-way solenoid is energized it moves the lift ring assembly to block the ports and the compressor operates at full-load or 100% capacity. When the solenoid is de-energized the lift ring assembly moves to unblock the compressor ports and the compressor operates at part-load or approximately 67% of its full-load capacity.

The “loading” and “unloading” of the two stage scroll is done “on the fly” without shutting off the single-speed compressor motor between stages.

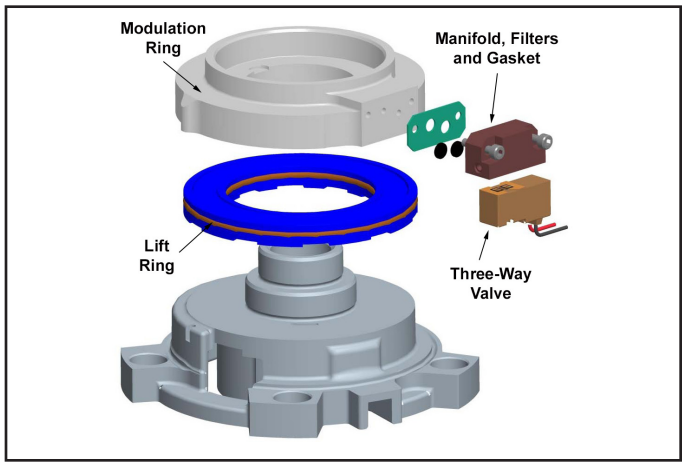


FIGURE 2. Two-Stage Scroll Compressor

2 - Two Stage Compressor Solenoid (L34) Resistance Check

Resistance check: Measure the resistance from the end of one molded plug lead to either of the two female connectors in the plug. One of the connectors should read close to zero ohms while the other should read infinity. Repeat with other wire. The same female connector as before should read zero while the other connector again reads infinity. Reverse polarity on the ohmmeter leads and repeat. The female connector that read infinity previously should now read close to zero ohms. Replace plug if either of these test methods don't show the desired results.

3 - Crankcase Heaters HR1 (all units) and HR2 (120XCSD, 150, 180, 240)

All units use a belly-band type crankcase heater. Heater HR1 is wrapped around compressor B1 and heater HR2 is wrapped around compressor B2. HR1 and HR2 assure proper compressor lubrication at all times.

4 - High Pressure Switch S4 (all units) & S7 (120XCSD, 150, 180, 240)

The high pressure switch is a manual-reset SPST N.C. switch which opens on a pressure rise. The switch is located in the compressor discharge line and is wired in series with the compressor contactor coil. When discharge pressure rises to 640 + 10 psig (4413 + 69 kP) the switch opens and the compressor is de-energized.

5 - Filter Drier (all units)

All units have a filter drier that is located in the liquid line of each refrigerant circuit at the exit of each condenser coil. The drier removes contaminants and moisture from the system.

6 - Condenser Fan Motor B4 (all units) B5 (120, 150, 180, 240) B21 & B22 (180, 240)

See pages 2 and 3 for the specifications on the condenser fans used in the units. All condenser fans have single- phase motors. The 072 and 090 units are equipped with a single condenser fan motor. The 120 and 150 are equipped with two fan motors and the 180 and 240 have four fan motors. The fan assembly may be removed for servicing by removing the fan grill, unplugging the motor then loosening the motor bracket. The assembly will lift out.

7 - Loss of Charge Switch S24 & S25

The loss of charge switch is an auto-reset SPST N.C. switch which opens on a pressure drop (almost a complete loss of charge). All units have S24 and the 120XCSD through 240 have S25. The switch is located in the liquid line and wired in series with compressor contactor and high pressure switch. S24 is wired in series with first stage cool and S25 is wired in series with second stage cool. When pressure drops below 40+ 5 psig (indicating loss of charge in the system) the switch opens and compressor is de-energized. The switch automatically resets when refrigerant is added and pressure in the discharge line rises above 90+ 5 psig.

8 - Head Pressure Control A190 & A191 and Pressure Transducer A188 & A189

The low ambient kit is designed to maintain the head pressure across the liquid line by varying the condenser speed fan.

Head pressure Control A190 (all units) and A191 (150, 180, 240) is used to set the desired liquid line pressure (315 psig). The pressure transducer A190 (all units) A191 (120XCSD through 240) measures the liquid line pressure sending an analog signal to the head pressure controller. If pressure falls below set point, the head pressure controller reduces the fan speed to increase the liquid line pressure to the set point.

9 - Low Pressure Switch S87 (072, 090, 120XCSS).

The low pressure switch is an auto-reset SPST N.C. switch which opens on a pressure drop. The switch is located on the suction line and wired in series with compressor contactor and high pressure switch. When pressure drops below 40 ± 5 psig the switch opens and compressor is de-energized. The switch automatically resets when pressure rises above 90 ± 5 psig.

II- REFRIGERANT SYSTEM

A-Line Set

Field refrigerant piping consists of liquid and suction lines connecting the condensing unit and the indoor unit. Liquid and suction service valves are located in a compartment at the corner of the unit below the control box.

Piping can be routed directly from the service valves or field supplied elbows can be added to divert the piping as required.

Refer to table 1 for field-fabricated refrigerant line sizes for runs up to 50 linear feet (15 m).

TABLE 1. Refrigerant Line Sizes for Runs Up to 50 Linear Feet

Unit	Liquid Line	Suction Line
EL072XCSS	3/8" (10mm)	1-1/8" (29mm)
EL090XCSS	5/8" (16mm)	1-1/8" (29mm)
EL120XCSS	5/8" (16mm)	1-1/8" (29mm)
EL120XCSD	3/8" (10mm)	1-1/8" (29mm)
EL150XCSD	3/8" (10mm)	1-1/8" (29mm)
EL180XCSD	5/8" (16mm)	1-1/8" (29mm)
EL240XCSD	5/8" (16mm)	1-1/8" (29mm)

Refrigerant Line Limitations

You may install the unit in applications that have line set lengths of up to 50 linear feet (15 m) with refrigerant line sizes as outlined in table 1 (excluding equivalent length of fittings). Size refrigerant lines longer than 50 linear feet (15m or greater) according to the Refrigerant Piping Design and Fabrication Guidelines (Corp. 9351-L9) or latest version.

B-Service Valves

USING MANIFOLD GAUGE SETS

When checking the system charge, use a manifold gauge set that features low-loss anti-blow back fittings. See figure 3 for a typical manifold gauge connection setup.

Manifold gauge sets 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 on the high side and a low side of 30" vacuum to 250 psi with dampened speed to 500 psi.

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

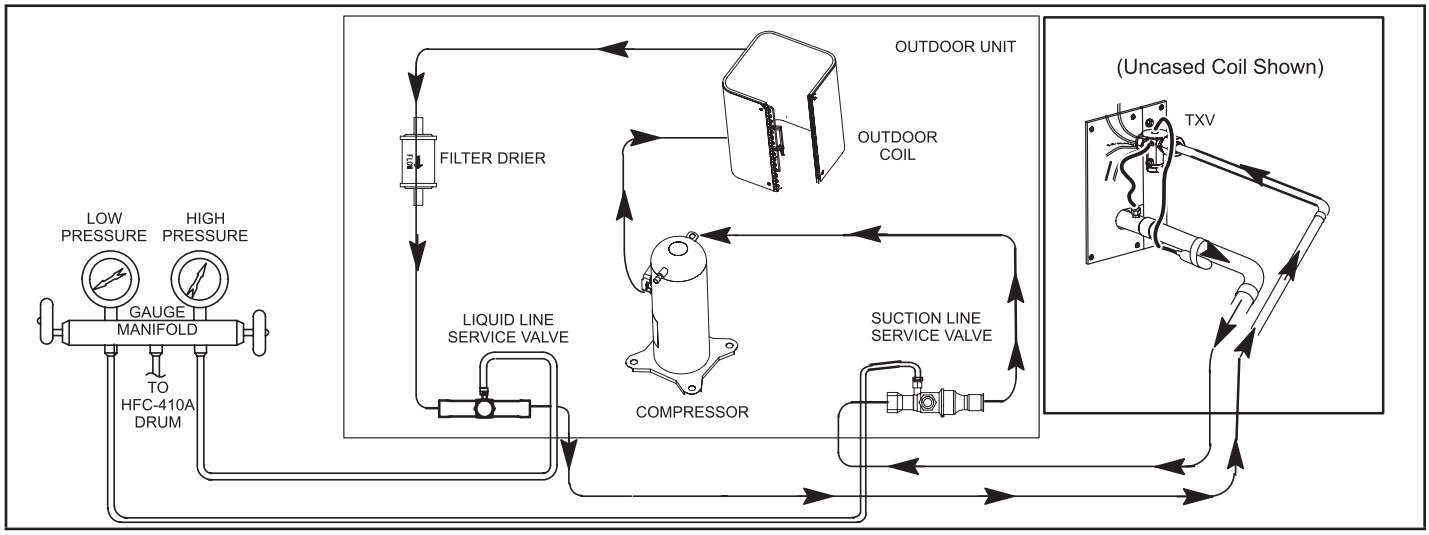


FIGURE 3

OPERATING SERVICE VALVES

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

⚠ 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.

Each valve is equipped with a service port which has a factory-installed valve stem.

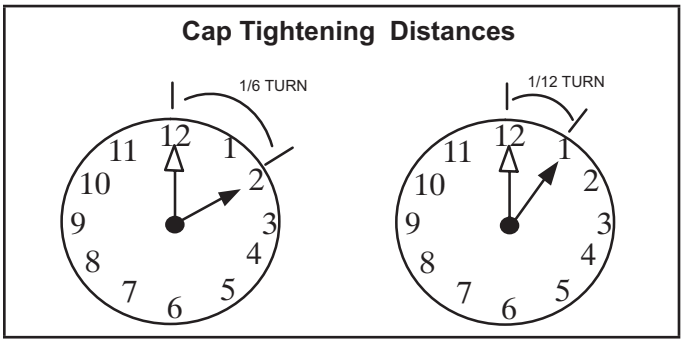


FIGURE 4

⚠ IMPORTANT

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

TABLE 2
Torque Requirements

Part	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	80 in.-lb.	9 NM
Gauge port seal cap	8 ft.-lb.	11 NM

To Access Angle-Type 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 to the service port.

3 - When testing is completed, replace service port cap and tighten as follows:

- *With Torque Wrench*: Finger tighten and then tighten per table 2.
- *Without Torque Wrench*: Finger tighten and use an appropriately sized wrench to turn an additional 1/6 turn clockwise as illustrated in figure 4.

To Open Liquid Line Service Valve:

1 - Remove stem cap with an adjustable wrench.

2 - Using service wrench and 5/16" hex head extension if needed (part #49A71) back the stem out counterclockwise until the valve stem just touches the retaining ring.

3 - Replace stem cap. Tighten finger tight, then tighten an additional 1/6 turn. Do not over torque.

To Close Liquid Line Service Valve:

1 - Remove stem cap with an adjustable wrench.

2 - Using service wrench and 5/16" hex head extension if needed (part #49A71), turn stem clockwise to seat the valve. Tighten firmly.

3 - Replace stem cap. Tighten finger tight, then tighten an additional 1/6 turn. Do not over torque.

Service (Ball) Valve

Some air conditioner units are equipped with a full service ball valve, as shown in figure 6. One service port that contains a valve core is present in this valve. A cap is also provided to seal off the service port. The valve is not rebuildable so it must always be replaced if failure has occurred.

Opening the Suction Line Service Valve

1 - Remove the stem cap with an adjustable wrench.

2 - Using a service wrench, turn the stem counterclockwise for 1/4 of a turn.

3 - Replace the stem cap and tighten it firmly.

Closing the Suction Line Service Valve

1 - Remove the stem cap with an adjustable wrench.

2 - Using a service wrench, turn the stem clockwise for 1/4 of a turn.

3 - Replace the stem cap and tighten firmly.

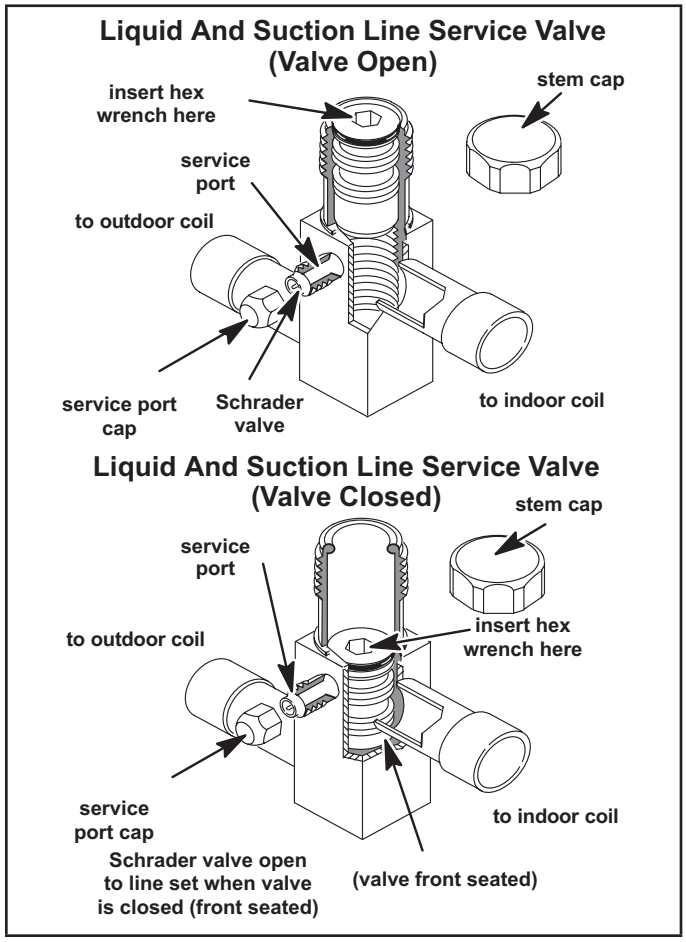


FIGURE 5

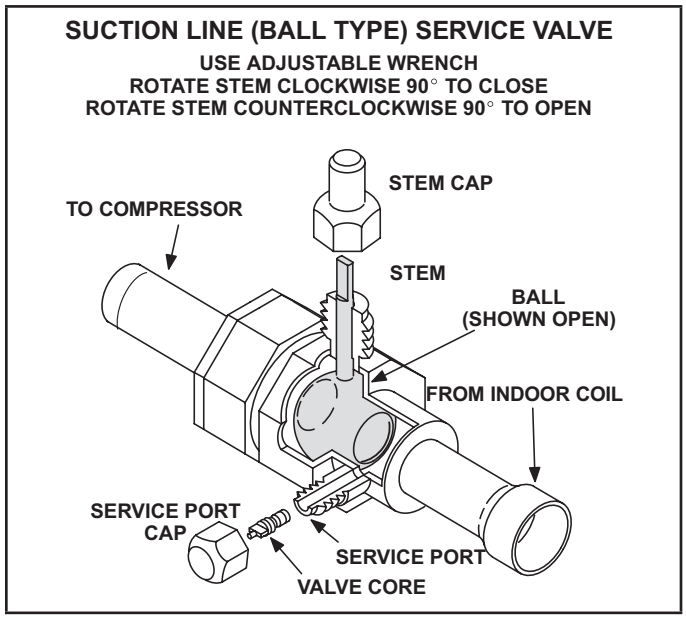


FIGURE 6

III-START-UP

The following is a general procedure and does not apply to all thermostat control systems. Refer to sequence of operation in this manual for more information.

⚠ IMPORTANT

If unit is equipped with a crankcase heater and the outdoor ambient air is 50ºF (10ºC) or below, it should be energized 24 hours before unit start-up to prevent compressor damage as a result of slugging.

1 - Set fan switch to AUTO or ON and move the system selection switch to COOL. Adjust the thermostat to a setting far enough below room temperature to bring on compressors. Compressors will start and cycle on demand from the thermostat (allowing for unit and thermostat time delays).

2 - Each circuit is field charged with HCFC-410A refrigerant.

3 - Refer to Charging section for proper method of checking and charging the system.

⚠ IMPORTANT

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

1 - Disconnect power to the unit.

2 - Reverse any two field power leads (L1 and L3 preferred) to the unit.

3 - Reapply power to the unit.

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

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

IV-CHARGING

A-Leak Testing

⚠ 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.

⚠ 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 - Connect an HFC-410A manifold gauge set as illustrated in figure 7.

2 - Open the valve on the HFC-410A cylinder (suction only).

3 - 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].

4 - Close the valve on the HFC-410A cylinder and the valve on the high pressure side of the manifold gauge set.

5 - Disconnect the HFC-410A cylinder.

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

7 - 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.

8 - 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.

NOTE *- Amounts of refrigerant will vary with line lengths*.

9 - Check all joints for leaks.

10 - Purge dry nitrogen and HFC-410A mixture.

11 - Correct any leaks and recheck.

12 - After leak testing, disconnect gauges from service ports.

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

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

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

NOTE - LATER IN THE PROCEDURE, THE HFC-410A CONTAINER WILL BE REPLACE BY THE NITROGEN CONTAINER.

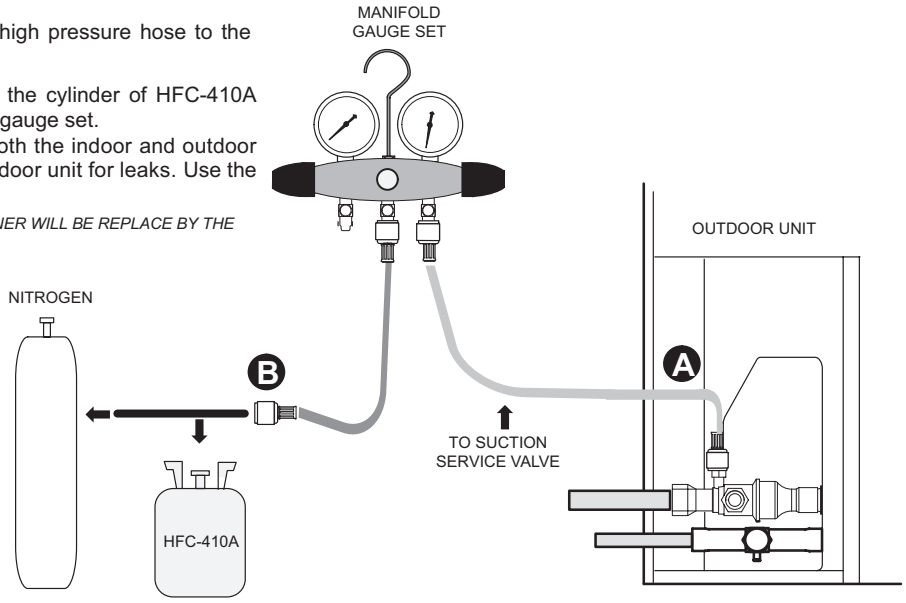
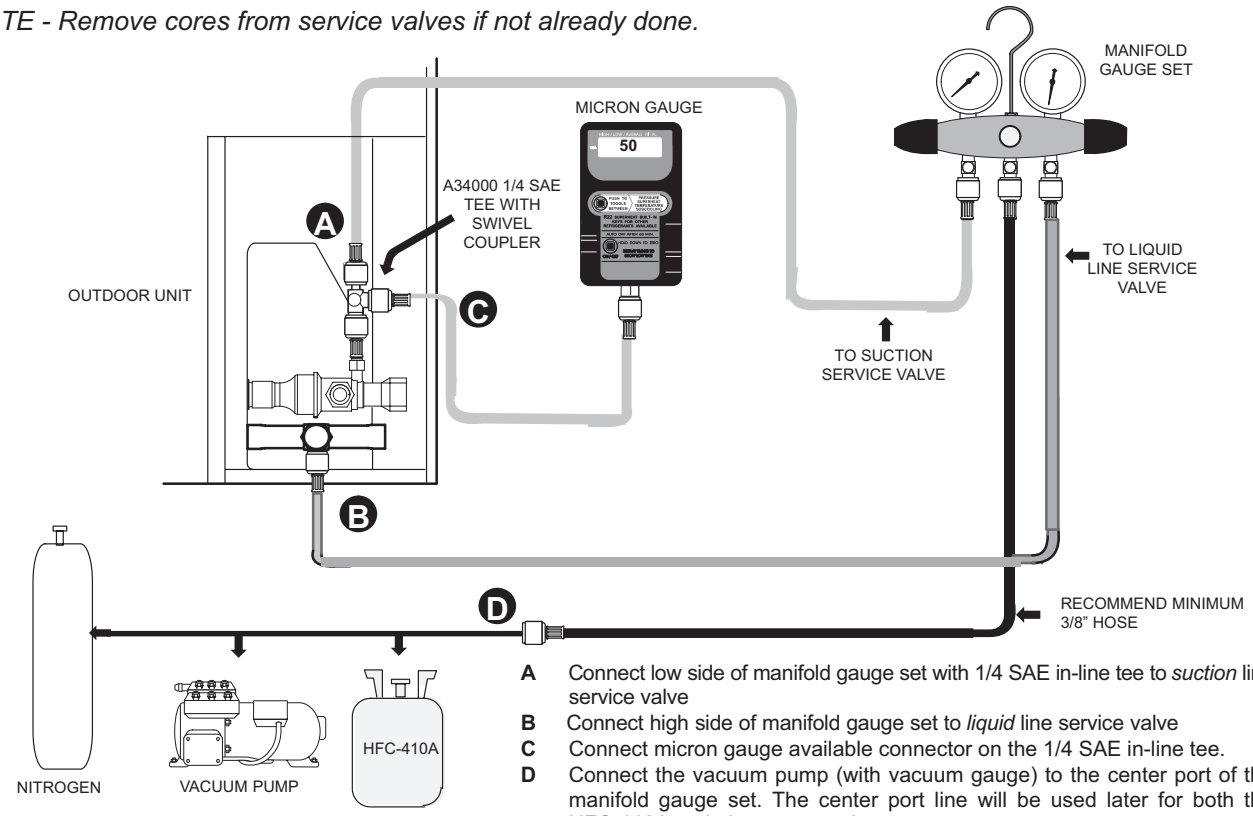


FIGURE 7

B-Evacuating the System

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 *suction* 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.

FIGURE 8

⚠ WARNING

Possible equipment damage.

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

⚠ 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.

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.

***NOTE** - Remove cores from service valves if not already done.*

1 - Connect an HFC-410A manifold gauge set as illustrated in figure 8.

2 - Open both manifold valves and start the vacuum pump.

3 - Evacuate the line set and indoor unit to an **absolute pressure** of 23,000 microns (29 inches of mercury).

NOTE** - During the early stages of evacuation, it is desirable to close the manifold gauge valve at least once to determine if there is a rapid rise in pressure this 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.*

4 - When the absolute pressure reaches 23,000 microns (29 inches of mercury), close the manifold gauge valves, turn off the vacuum pump and disconnect the manifold gauge center port hose from vacuum pump. Attach the manifold center port hose to a dry nitrogen cylinder with pressure regulator set to 150 psig (1034 kPa) and purge the hose. Open the manifold gauge valves to break the vacuum in the line set and indoor unit. Close the manifold gauge valves.

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

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

7 - 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 pressure line set to break vacuum with 2 to 5 psi.

8 - Perform the following:

A - Close manifold gauge valves

B - Shut off HFC-410A cylinder

C - Reinstall service valve cores by removing manifold hose from service valve. Quickly install cores with core tool while maintaining a positive system pressure.

D - Replace the stem caps and secure finger tight, then tighten an additional one-sixth (1/6) of a turn as illustrated in figure 4.

C-Refrigerant Charge

The ELXC units have a factory holding charge of 2 pounds of HFC-410A in each circuit. Additional refrigerant will need to be added during installation. Charge using the HFC-410A charging information label provided in the unit. The HFC-410A charging information label in the unit applies to Indoor and Outdoor unit with same full load capacity, see table below. For all other unit matches, please contact Commercial Application department for Charging Procedure Information (form # 508349-01).

Split System Matches		
Cooling Unit	**Air Handler**	**Air Handler SCFM**
EL072XC	EL072XA	2600
EL090XC	EL090XA	2630
EL120XCSS	EL120XA	3770
EL120XCSD	EL120XA	4000
EL150XC	EL150XA	4425
EL180XC	EL180XA	5275
EL240XC	EL240XA	7120

ELXC Sequence of Operations

Models – 072; 090; 120XCSS

First Stage Cooling Call

Y1 thermostat demand from Air handler energizes 24VAC signal to TB14-C1 connection.

TB14-C1 signal passes though along parallel paths energizing K10 Fan Relay and K1 Compressor Contactor (assuming both S87 low pressure switch and S4 high pressure switch remain closed).

K1-1 closes, energizing B1 compressor on low speed.

K1-2 opens to de-energize HR1 crankcase heater.

K10-1 closes, energizing outdoor fan B4 (and B5 on 120XCSS only).

Note: *When high voltage power is applied to unit, K1-2 N.C. energizes HR1 crankcase heater*.

Second Stage Cooling Call

Y2 thermostat demand from Air handler energizes 24VAC signal to TB14-C2 connection.

TB14-C2 signal passes though energizing L34 Solenoid shifting B1 compressor to high speed.

Models – 120XCSD; 150

First Stage Cooling Call

Y1 thermostat demand from Air handler energizes 24VAC signal to TB14-C1 connection.

TB14-C1 signal passes though along parallel paths energizing K10 Fan Relay and K1 Compressor Contactor (assuming both S24 loss of charge switch and S4 high pressure switch remain closed).

K1-1 closes, energizing B1 compressor on low speed.

K1-2 opens to de-energize HR1 crankcase heater.

K10-1 closes, energizing B4 outdoor fan (and B5 outdoor fan on 120XCSD only).

Note: *When high voltage power is applied to unit, K1-2 N.C. energizes HR1 crankcase heater.*

Second Stage Cooling Call

Y2 thermostat demand from Air handler energizes 24VAC signal to TB14-C2 connection.

TB14-C2 signal passes though along parallel paths energizing K149 Fan Relay (150 only) and K2 Compressor Contactor (assuming both S25 loss of charge switch and S7 high pressure switch remain closed).

K2-1 closes, energizing B2 compressor on low speed.

K2-2 opens to de-energize HR2 crankcase heater.

K149-1 closes, energizing B5 outdoor fan (150 only).

Note: *When high voltage power is applied to unit, K2-2 N.C. energizes HR2 crankcase heater*.

Third Stage Cooling Call

Y3 thermostat demand from Air handler energizes 24VAC signal to TB14-C3 connection.

TB14-C3 signal passes though energizing L34, L44 Solenoids shifting B1, B2 compressors to high speed.

First Stage Cooling Call

Y1 thermostat demand from Air handler energizes 24VAC signal to TB14-C1 connection.

TB14-C1 signal passes though along parallel paths energizing K10 Fan Relay and K1 Compressor Contactor (assuming both S24 loss of charge switch and S4 high pressure switch remain closed).

K1-1 closes, energizing B1 compressor on low speed.

K1-2 opens to de-energize HR1 crankcase heater.

K10-1 closes, energizing B4, B5 outdoor fans.

Note: *When high voltage power is applied to unit, K1-2 N.C. energizes HR1 crankcase heater.*

Second Stage Cooling Call

Y2 thermostat demand from Air handler energizes 24VAC signal to TB14-C2 connection.

TB14-C2 signal passes though along parallel paths energizing K149 Fan Relay and K2 Compressor Contactor (assuming both S25 loss of charge switch and S7 high pressure switch remain closed).

K2-1 closes, energizing B2 compressor on low speed.

K2-2 opens to de-energize HR2 crankcase heater.

K149-1 closes, energizing B21, B22 outdoor fans.

Note: *When high voltage power is applied to unit, K2-2 N.C. energizes HR2 crankcase heater.*

Third Stage Cooling Call

Y3 thermostat demand from Air handler energizes 24VAC signal to TB14-C3 connection.

TB14-C3 signal passes though energizing L34, L44 Solenoids shifting B1, B2 compressors to high speed.

V-MAINTENANCE

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency. At the beginning of each cooling season, the system should be checked as follows:

⚠ WARNING

Electric Shock Hazard. Can cause injury or death. Unit must be properly 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.

OUTDOOR UNIT

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

2 - Outdoor unit fan motor is pre-lubricated and sealed. No further lubrication is needed.

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

4 - Check all wiring for loose connections.

5 - Check for correct voltage at unit (unit operating).

6 - Check amp draw on outdoor fan motor.

UNIT NAMEPLATE: _____ ACTUAL: _____

NOTE *– If insufficient heating or cooling occurs, the unit should be gauged and refrigerant charge should be checked.*

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.

INDOOR UNIT

1 - Clean or change filters.

2 - 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.

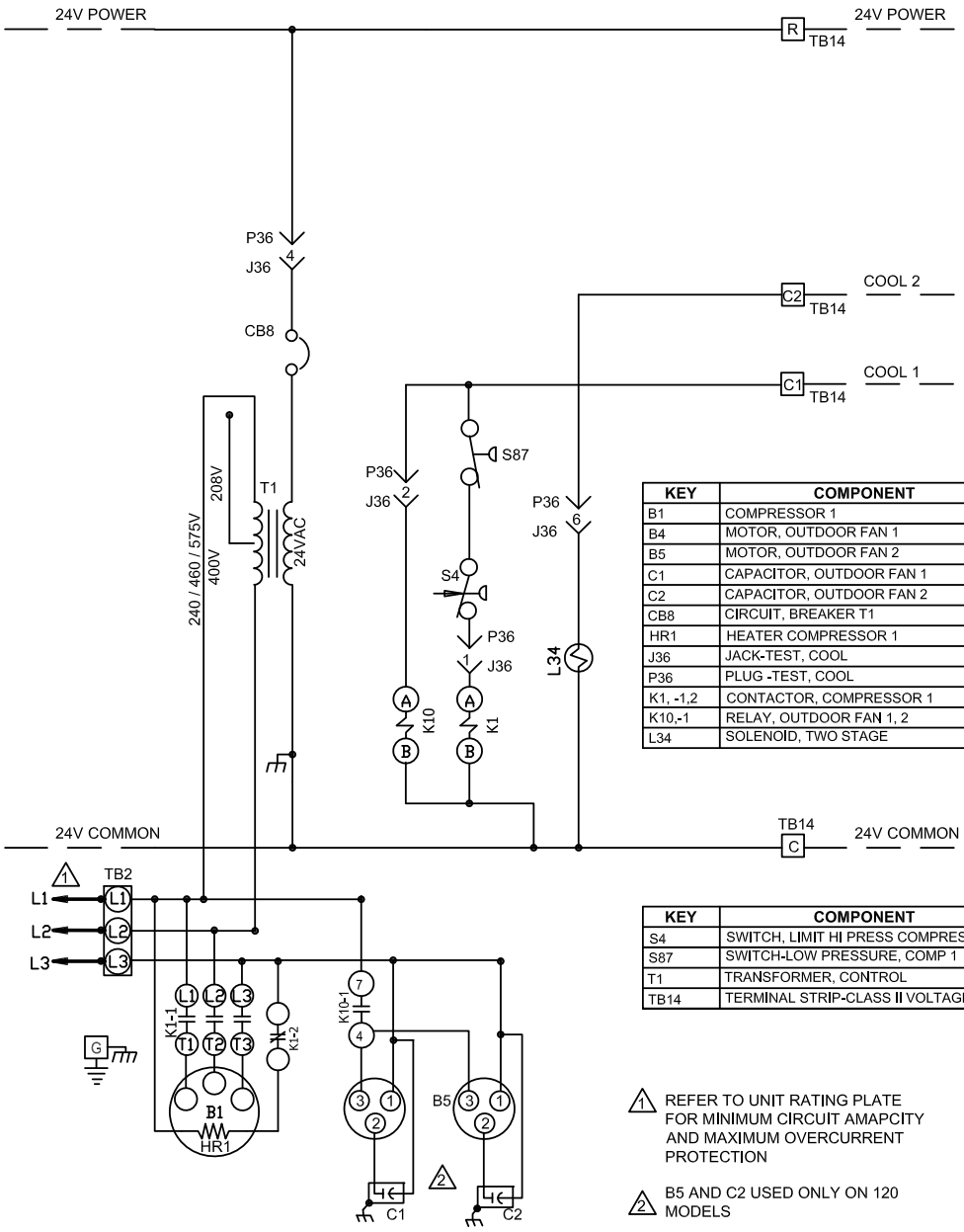
6 - Check for correct voltage at unit. (blower operating)

7 - Check amp draw on blower motor.

UNIT NAMEPLATE: _____ ACTUAL: _____

VI-Wiring Diagrams

EL072/090/120XCSS



KEY	COMPONENT
B1	COMPRESSOR 1
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
CB8	CIRCUIT, BREAKER T1
HR1	HEATER COMPRESSOR 1
J36	JACK-TEST, COOL
P36	PLUG -TEST, COOL
K1, -1,2	CONTACTOR, COMPRESSOR 1
K10,-1	RELAY, OUTDOOR FAN 1, 2
L34	SOLENOID, TWO STAGE

KEY	COMPONENT
S4	SWITCH, LIMIT HI PRESS COMPRESS 1
S87	SWITCH-LOW PRESSURE, COMP 1
T1	TRANSFORMER, CONTROL
TB14	TERMINAL STRIP-CLASS II VOLTAGE

1. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMAPCITY AND MAXIMUM OVERCURRENT PROTECTION

2. B5 AND C2 USED ONLY ON 120 MODELS

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

FOR USE WITH COPPER CONDUCTORS ONLY

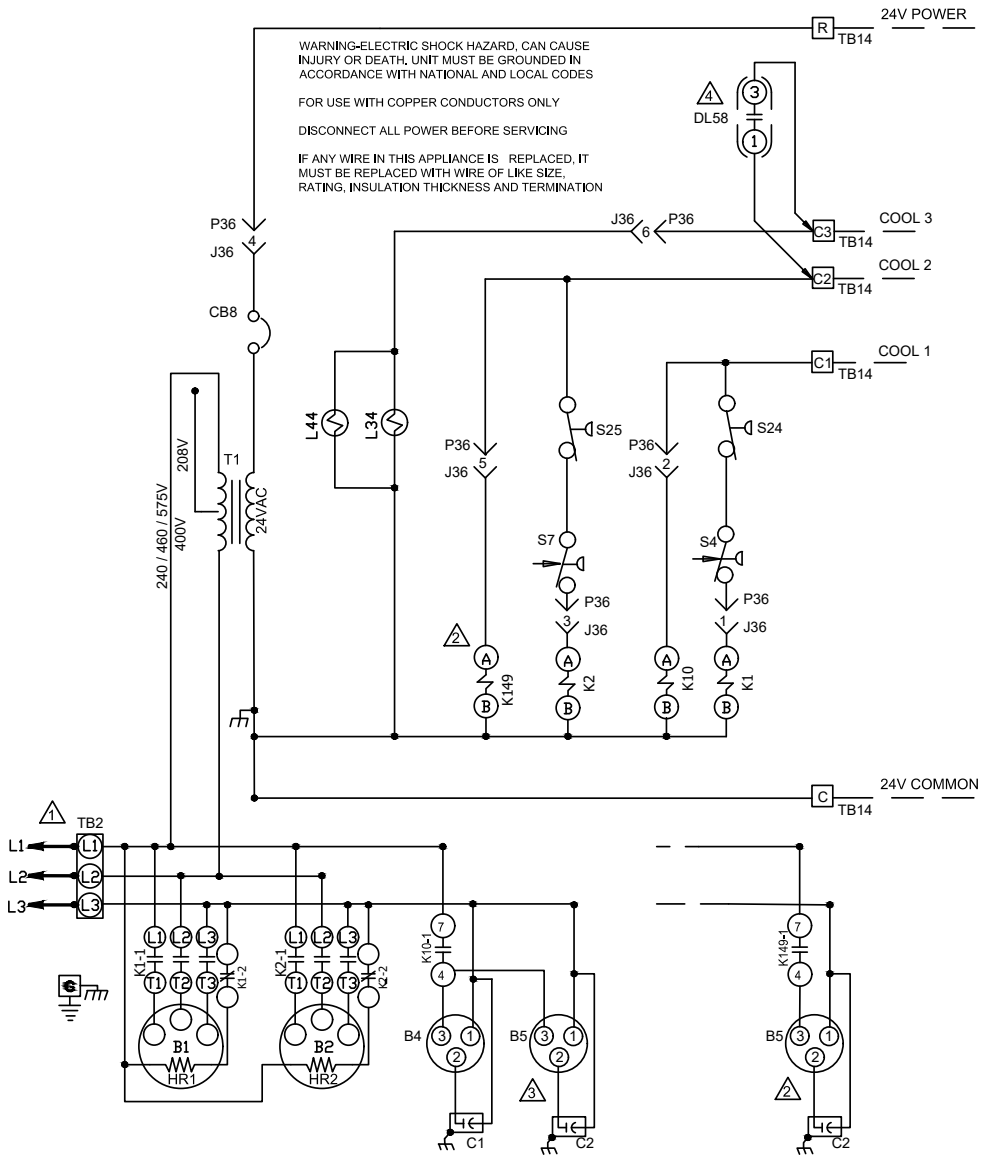
DISCONNECT ALL POWER BEFORE SERVICING

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

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED
CLASS II FIELD WIRING

2022/03	WIRING DIAGRAM 537903-05	03/22
DUAL SPEED COMPRESSOR		
EL072-120XCSST - G,J,Y		
SECTION A 2		REV. 0
Supersedes 537903-04	New Form No. 537903-05	

120XCSD/150



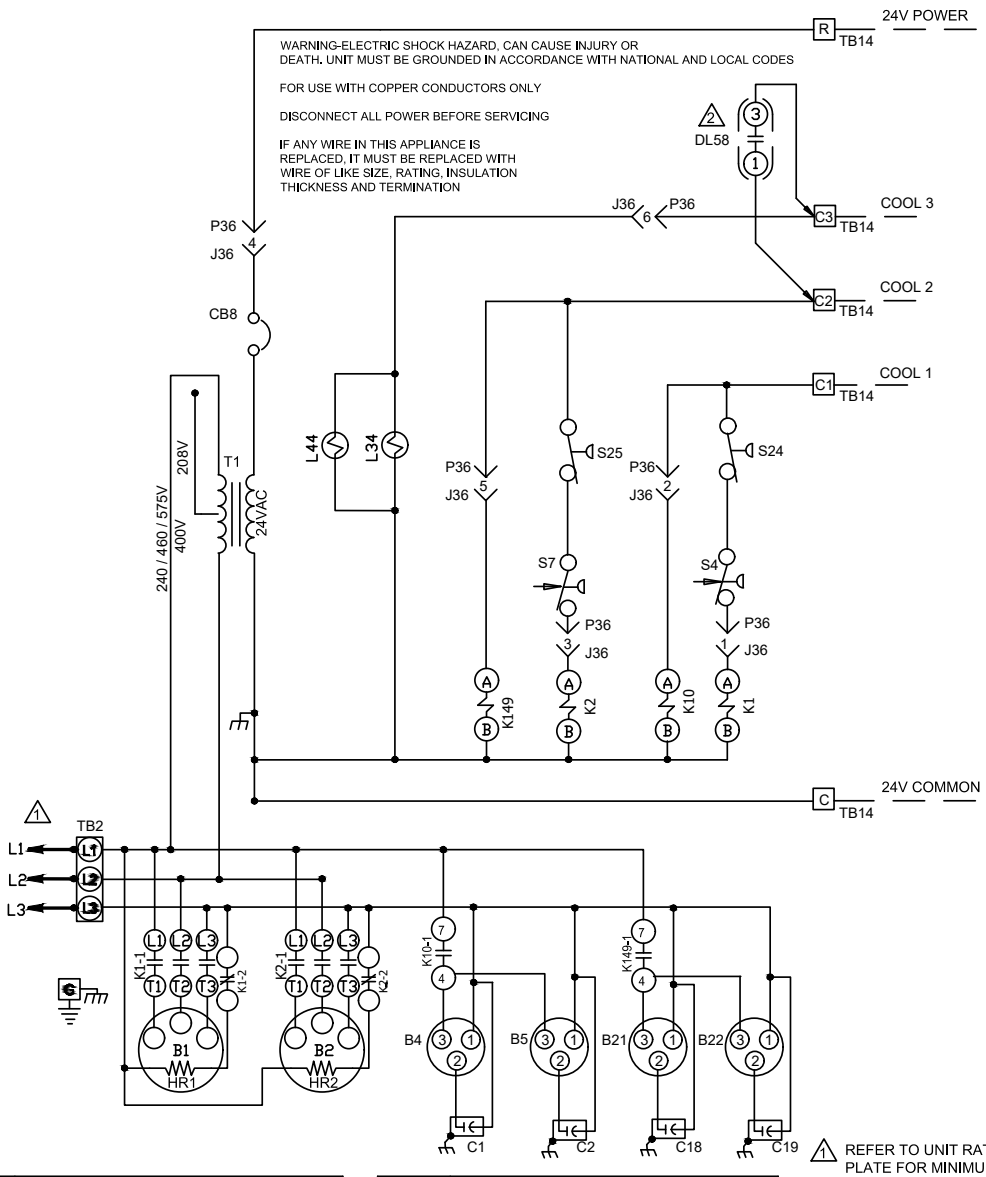
KEY	COMPONENT
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
CB8	CIRCUIT, BREAKER T1
DL58	DELAY, ADJUSTABLE, ON MAKE
HR1	HEATER COMPRESSOR 1
HR2	HEATER COMPRESSOR 2
J36	JACK-TEST, COOL
P36	PLUG -TEST, COOL
K1, -1,2	CONTACTOR, COMPRESSOR 1
K2, -1,2	CONTACTOR, COMPRESSOR 2
K10,-1	RELAY, OUTDOOR FAN 1, 2
K149,-1	RELAY, OUTDOOR FAN 2
L34	SOLENOID, TWO STAGE, COMP. 1

KEY	COMPONENT
L44	SOLENOID, TWO STAGE, COMP. 2
S4	SWITCH, LIMIT HI PRESS COMPRESS 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S24	SWITCH, LOSS OF CHARGE COMPRESS 1
S25	SWITCH, LOSS OF CHARGE COMPRESS 2
T1	TRANSFORMER, CONTROL
TB2	TERMINAL STRIP, UNIT
TB14	TERMINAL STRIP-CLASS II VOLTAGE

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED
CLASS II FIELD WIRING

1. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMAPCITY AND MAXIMUM OVERCURRENT PROTECTION
2. 150 ONLY
3. 120 ONLY
4. DL58 DELAY MAY BE FIELD SUPPLIED OR USE AVAILABLE KIT

2022/10	WIRING DIAGRAM 537904-03	10/22
DUAL SPEED COMPRESSOR		
EL120-150XCSDT - G,J,Y		
SECTION A 3		REV. 1
Supersedes 537904-02	New Form No. 537904-03	



KEY	COMPONENT
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B21	MOTOR, OUTDOOR FAN 3
B22	MOTOR, OUTDOOR FAN 4
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C18	CAPACITOR, OUTDOOR FAN 3
C19	CAPACITOR, OUTDOOR FAN 4
CB8	CIRCUIT, BREAKER T1
DL58	DELAY, ADJUSTABLE, ON MAKE
HR1	HEATER COMPRESSOR 1
HR2	HEATER COMPRESSOR 2
J36	JACK-TEST, COOL
P36	PLUG -TEST, COOL
K1, -1,2	CONTACTOR, COMPRESSOR 1
K2, -1,2	CONTACTOR, COMPRESSOR 2
K10,-1	RELAY, OUTDOOR FAN 1, 2
K149,-1	RELAY, OUTDOOR FAN 3, 4
L34	SOLENOID, TWO STAGE, COMP. 1

KEY	COMPONENT
L44	SOLENOID, TWO STAGE, COMP. 2
S4	SWITCH, LIMIT HI PRESS COMPRESS 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S24	SWITCH, LOSS OF CHARGE COMPRESS 1
S25	SWITCH, LOSS OF CHARGE COMPRESS 2
T1	TRANSFORMER, CONTROL
TB2	TERMINAL STRIP, UNIT
TB14	TERMINAL STRIP-CLASS II VOLTAGE

1 REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMAPCITY AND MAXIMUM OVERCURRENT PROTECTION

2 DL58 DELAY MAY BE FIELD SUPPLIED OR USE AVAILABLE KIT

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED
CLASS II FIELD WIRING

2022/10	WIRING DIAGRAM 537905-03	10/22
	DUAL SPEED COMPRESSOR	
	EL180-240XC - G,J,Y	
	SECTION A 4	REV. 1
Supersedes 537905-02	New Form No. 537905-03	