

THIS MANUAL MUST BE LEFT WITH THE BUILDING OWNER FOR FUTURE REFERENCE

A 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, or service agency.

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.

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.

INSTALLATION INSTRUCTIONS

Elite[®] ELS Series 6 – 20 Ton

AIR CONDITIONERS 6 - 20 TONS 507743-02 5/2019

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Shipping and Packing List

Check the unit for shipping damage. If damaged or parts are missing, immediately contact the last shipping carrier.

- 1 Assembled outdoor unit
- 1 Installation instructions

Outdoor Unit

ELS Series air conditioners, which will also be referred to in this instruction as the outdoor unit, use HFC-410A refrigerant. This outdoor unit must be installed with a matching indoor unit and line set as outlined in the ELS Series Engineering Handbook.

This outdoor unit is designed for use in thermal expansion valve (TXV) systems only.



Unit Dimensions, Corner Weights and Centers of Gravity

			ELS	072 EL	S090								
	CORNER	CORNER WEIGHTS CENTER OF GRAVITY											
Model No.	A	Α	В	в	CC DD		D	EE		FF			
110.	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm	
ELS072S4S	66	30	73	33	97	44	82	37	23-1/4	591	19-1/4	489	
ELS090S4S	75	34	89	40	112	51	88	40	25	635	20-1/4	514	







ELS120 | ELS150 **CORNER WEIGHTS CENTER OF GRAVITY** Model AA BB СС DD EE FF No. lbs. kg lbs. kg lbs. kg lbs. kg in. mm in. mm 20-1/2 ELS120S4S 130 59 124 56 107 49 111 50 521 33-1/2 851 ELS120S4D 122 55 119 54 127 58 131 59 21 533 28-1/2 724 ELS150S4D 144 66 132 60 133 60 145 66 19 483 30 762



REFRIGERANT LINE CONNECTIONS DETAIL



TOP VIEW



ELS180 | ELS240

Model No.	CORNE		rs		CENTER OF GRAVITY							
	AA		BB		СС		DD		EE		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
ELS180S4D	181	82	177	81	215	98	221	100	29	737	38	965
ELS240S4D	192	87	189	86	232	105	238	108	29	737	37-1/2	953





Unit Plumbing Parts Arrangement

ELS072S4S



ELS090S4S











ELS150S4D - STAGE 2





ELS180S4D – STAGE 2





ELS240S4D – STAGE 2





Model Number Identification



Unit Control Box Components Arrangement



Rigging the Unit for Lifting

Rig the unit for lifting by attaching four cables to the holes in the base rail of the unit. See figures 1 through 3.

- 1 Remove protective packaging before rigging the unit for lifting.
- 2 Connect the rigging to the holes in each corner of the unit's base.
- 3 All panels must be in place for rigging.
- 4 Place a field-provided H-style frame just above the top edge of the unit. The frame must be of adequate strength and length. (An H-style frame will prevent the top of the unit from being damaged.)



FIGURE 1. ELS072S4S and ELS090S4S

Caution - do not walk on unit. Important - all panels must be in place for rigging. FIGURE 2. ELS120S4S, ELS120S4D and ELS150S4D Lifting point should be directly above the center of gravity. Caution - do not walk on unit. Important - all panels must be in place for rigging.

Lifting point should be directly above the center of gravity.

FIGURE 3. ELS180S4D and ELS240S4D

Installation Clearances

See Unit Dimensions on page 2 for sizing mounting slab, platforms or supports. Refer to figures 4 through 6 for mandatory installation clearance requirements.

NOTES:

- 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. (610 mm) must be maintained between two units.
- 48 in. (1219 mm) clearance required on top of unit.



FIGURE 4. ELS072 and ELS090 Installation Clearances



FIGURE 5. ELS120S4S, ELS120S4D and ELS150 Installation Clearances



FIGURE 6. ELS180 and ELS240 Installation Clearances

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		
ELS072	3/8" (10mm)	1-1/8" (29mm)		
ELS090	5/8" (16mm)	1-1/8" (29mm)		
ELS120S4S	5/8" (16mm)	1-1/8" (29mm)		
ELS120S4D	3/8" (10mm)	1-1/8" (29mm)		
ELS150	3/8" (10mm)	1-1/8" (29mm)		
ELS180	5/8" (16mm)	1-1/8" (29mm)		
ELS240	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 greater than 50 linear feet (15m or greater) according to the Lennox Refrigerant Piping Design and Fabrication Guidelines (Corp. 9351-L9) or latest version.

Electrical Connections

In the United States, 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).

TRANSFORMER – 24V

Use the transformer provided with the air conditioning unit for low-voltage control power (24V, 70VA)

NOTE – The addition of accessories to the system could exceed the 70VA power requirement of the factory-provided transformer. Measure the system's current and voltage after installation is complete to determine transformer loading. If loading exceeds the factory-provided transformer capacity, a larger field-provided transformer will need to be installed in the system.



3 INSTALL THERMOSTAT
THERMOSTAT
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, drafts or vibrations.

4 TYPICAL CONTROL WIRING ELS THERMOSTAT R -24VAC R 6 Cì CI © H1 Õ Æ -C2 H2 R <u>e & & & </u> ₪ G ര 1 C - C] Y1 Y2 MS-

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

A 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.



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.



FIGURE 7. Typical Wiring Diagram – ELS072S4S, ELS090S4S and ELS120S4S (G, J, M, Y Voltages)



FIGURE 8. Typical Wiring Diagram – ELS120S4D and ELS150S4D (G, J, M, Y Voltages)



FIGURE 9. Typical Wiring Diagram – ELS180S4D and ELS240S4D (G, J, M, Y Voltages)

Refrigerant Charge

ELS units have a factory holding charge of 2 pounds of HFC-410A in each circuit. Additional refrigerant will need to be added during installation.

To charge the system, use the following procedure:

- 1 Measure actual length of liquid and vapor lines for each circuit.
- 2 Add refrigerant to each circuit based on measured liquid and suction line lengths.
- A If the measured line length is greater than 25 feet, add refrigerant (refer to table 2).
- B If the measured line length is less than 25 feet, remove refrigerant (refer to table 2).

TABLE 2. Adding Refrigerant

Models	Total lbs – Stage 1 with 25ft line set	Total lbs – Stage 2 with 25ft line set	Liquid Line Diameter	Ounces Adjustment per foot of liquid line	Suction Line Diameter	Ounces Adjustment per foot of suction line
ELS072S4S	18.5	N/A	3/8	0.5	1-1/8	0.2
ELS090S4S	21.75	N/A	5/8	1.5	1-1/8	0.2
ELS120S4S	23	N/A	5/8	1.5	1-1/8	0.2
ELS120S4D	12	12	3/8	1.5	1-1/8	0.2
ELS150S4D	15	15.5	3/8	0.5	1-1/8	0.2
ELS180S4D	23.75	23.5	5/8	1.5	1-1/8	0.2
ELS240S4D	22.5	23.5	5/8	1.5	1-1/8	0.2

3 - Check normal operating pressures:

A - Connect a manifold gauge set to the service valves:

- Low pressure gauge to vapor valve service port
- High pressure gauge to liquid valve service port
- B Operate the system until pressures and temperatures stabilize (5 minutes minimum).
- C Use a thermometer to measure the outdoor ambient temperature.
- D If the outdoor temperature is greater than 65°F (18°C):
- Apply the outdoor ambient temperature to tables 4, 5, or 7 to determine normal operating pressures. Compare the normal operating pressures to the pressures obtained from the connected gauges. If liquid pressure is high, remove refrigerant from the system. If liquid pressure is low, add refrigerant to the system.
- Add or remove charge in increments.
- Allow the system to stabilize at least 5 minutes each time refrigerant is added or removed.
- Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system.
- 4 If the outdoor ambient temperature is below 65°F (18°C) it may be necessary to restrict the air flow through the outdoor coil to achieve liquid pressures in the 325-375 psig (2240-2585 kPa) range. These higher pressures are necessary for checking the charge. Block equal sections of the outdoor coil on all coil sides until the liquid pressure is in the 325-375 psig range (figure 10).



FIGURE 10. Blocking Outdoor Coil

- A Charge the unit using the approach method in the next section:
- Using the same thermometer, compare liquid temperature at service valve to outdoor ambient temperature.

Approach Temperature = Liquid temperature minus ambient temperature

- Approach temperature should be as indicated in tables 3 or 6 for each stage. An approach temperature greater than this value indicates an undercharge. An approach temperature less than this value indicates an overcharge.
- · Add or remove charge in increments.
- Allow system to stabilize at least 5 minutes each time refrigerant is added or removed.
- Do not use the approach method if system pressures do not match pressures in table 4, 5, or 7 except when the outdoor ambient temperature is below 65°F (18°C).
- The approach method is not valid for grossly over or undercharged systems.

TABLE 5. Approach remperatures – commercial Matchup	TABLE 3. Approac	h Temperatures –	Commercial Matchups
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	Models	Approach Temperature				
Outdoor	Indoor	Stage	(°F) (+/- 1)	(°C) (+/- 0.5)		
ELS072S4S	ELA072S4S	1	4	2.2		
ELS090S4S	ELA090S4D	1	7	3.9		
ELS120S4S	ELA120S4D	1	4	2.2		
ELS120S4D		1	5	2.8		
	ELA 12054D	2	5	2.8		
		1	7	3.9		
EL315034D	ELA 15054D	2	5	2.8		
		1	4	2.2		
EL310034D	ELATOUS4D	2	4	2.2		
EL \$240\$4D		1	7	3.9		
EL324034D	ELAZ4054D	2	8	4.4		

TABLE 4. Normal Operating Pressures – Cooling – Single Stage – Commercial*

Entering Outdoor	ELS072 + ELA072		ELS072 + ELA090		ELS090 + ELA090		ELS090 -	+ ELA120	ELS120S4S + ELA120	
Air Temp	STAGE 1		STAGE 1		STAGE 1		STAGE 1		STAGE 1	
°F (°C)	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction
65 (18)	245	137	252	144	240	128	251	130	243	135
75 (24)	283	141	292	146	294	130	292	132	285	136
85 (29)	327	143	336	148	338	131	336	134	332	138
95 (35)	377	145	385	150	385	133	384	136	378	139
105 (41)	426	148	438	152	435	135	436	139	434	141
115 (46)	484	150	495	154	489	136	492	141	491	142
125 (52)	540	155	558	157	545	140	553	144	548	146
SCFM	26	2600 2750		2725		27	50	3850		

*pressures at 80F dry bulb and 67F wet bulb entering indoor air temperatures.

TABLE 5. Normal Operating Pressures – Cooling – Two Stage – Commercial*

Entering Outdoor Air Temp °F (°C)		(2) ELS090	+ ELA180		ELS120S4D + ELA120			
	STA	GE 1	STAGE 2		STA	GE 1	STA	GE 2
	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction
65 (18)	248	122	247	120	244	133	240	133
75 (24)	288	125	287	122	282	136	278	135
85 (29)	332	127	331	125	326	139	322	137
95 (35)	379	129	378	127	373	141	372	138
105 (41)	432	132	430	130	423	142	420	141
115 (46)	488	135	487	133	477	144	476	143
125 (52)	550	138	548	136	537	147	539	145
SCFM		51	50			40	00	

Entering		(2) ELS120S	4S + ELA240		ELS150 + ELA150				
Outdoor Air	STA	GE 1	STAGE 2		STA	GE 1	STAGE 2		
°F (°C)	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	
65 (18)	241	130	237	130	254	132	254	130	
75 (24)	284	134	280	134	291	135	289	133	
85 (29)	331	136	327	135	337	138	336	134	
95 (35)	380	138	376	137	381	140	382	136	
105 (41)	434	141	429	140	432	142	433	139	
115 (46)	491	143	490	142	487	144	489	141	
125 (52)	540	145	540	145	543	147	550	145	
SCFM		74	00			43	95		

Entering		ELS150 +	+ ELA180		ELS180 + ELA180					
Outdoor Air	STA	GE 1	STA	GE 2	STA	GE 1	STA	GE 2		
°F (°C)	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction		
65 (18)	258	135	260	135	233	110	236	110		
75 (24)	298	137	300	137	274	120	276	119		
85 (29)	343	139	346	139	317	128	319	125		
95 (35)	390	141	395	141	364	134	366	131		
105 (41)	444	144	448	144	418	138	416	132		
115 (46)	501	146	508	146	475	141	468	134		
125 (52)	563	149	571	149	536	143	529	136		
SCFM		51	50			51	50			
Entering		ELS180 +	(2) ELA090			ELS180 -	ELA240			
Outdoor Air	STA	GE 1	STA	GE 2	STA	GE 1	STA	GE 2		
lemp °F (°C)	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction		
65 (18)	229	118	230	129	239	139	238	140		
75 (24)	266	129	267	134	279	141	277	141		
85 (29)	310	136	311	137	322	143	320	143		
95 (35)	359	136	358	137	370	145	367	145		
105 (41)	407	137	408	141	423	147	420	147		
115 (46)	465	138	463	142	480	149	477	150		
125 (52)	526	139	522	143	544	152	541	152		
SCFM		54	00			71	25			
Entering		ELS240 -	+ ELA240			ELS240 +	(2) ELA120			
Outdoor Air	STA	GE 1	STA	GE 2	STA	GE 1	STA	GE 2		
°F (°C)	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction		
65 (18)	236	129	236	128	243	133	244	133		
75 (24)	275	132	275	129	283	135	284	135		
85 (29)	321	134	322	131	327	137	328	137		
95 (35)	370	137	368	133	374	139	377	139		
105 (41)	420	139	425	136	427	141	430	141		
115 (46)	477	142	478	139	484	144	486	144		
125 (52)	539	146	534	144	545	146	548	146		
SCFM		70	75			80	00			
*pressures at	80F dry bulb a	nd 67F wet bul	b entering indo	or air temperat	ures.					

TABLE 6. Approach Temperatures – Residential Matchups

	Models	Approach Temperature			
Outdoor	Indoor	Stage	(°F) (+/- 1)	(°C) (+/- 0.5)	
ELS120S4D	(2) CBA25UH-060 or (2) CBA27UHE-060 or (2) CBA38MV-060	1	4	2.2	
		2	4	2.2	
ELS120S4D	(2) CH22 62D	1	4	2.2	
	(2) CH33-62D	2	4	2.2	
ELS120S4D		1	4	2.2	
	(2) 0023-000	2	4	2.2	
ELS120S4D	(2) CX25 60C	1	4	2.2	
	(2) CA35-60C	2	4	2.2	
ELS120S4D	(2) CY25 60D	1	4	2.2	
	(2) CA35-60D	2	4	2.2	

Entering Outdoor		ELS090 + (2) CX35-060C					ELS090 + (2) CX35-060D						
Air Temp ºF (ºC)			STAGE 1					STAGE 1					
°F (°C))	l	Liquid		Su	ction		Liquid			Suction		
65 (18)		255			139		25	253		134		
75 (24	75 (24) 2		295	1		142	29		33		137		
85 (29	5 (29) 340		340		145			338		140			
95 (35)		389	147			386		143				
105 (41)		442	142		150 43		39		146			
115 (46	115 (46)		498		153			496		149			
125 (52	2)		559	9 156			558			153			
SCFM				3000						3000			
Entering Outdoor Air	ELS12	0S4D + (2) CBA27UHE-060 or (2) CBA38MV-060) ELS120S4D + (2) (8-62D	ELS120S4D + (2) CH23-068		3-068		
Temp °F (°C)	ST	AGE 1	STA	GE 2	STA	GE 1	STA	GE 2	STAGE 1 STAGE 2		GE 2		
°F (°C)	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	
65 (18)	251	133	250	131	240	125	241	125	241	128	242	128	
75 (24)	292	135	287	134	280	129	282	128	281	131	283	131	
85 (29)	340	137	333	136	324	132	326	131	325	134	326	133	
95 (35)	391	140	384	139	372	135	374	134	373	137	375	136	
105 (41)	446	143	441	142	425	139	427	137	427	141	428	139	
115 (46)	505	145	501	144	483	143	484	141	484	144	486	142	
125 (52)	569	148	566	147	545	146	548	145	547	147	550	146	
SCFM		36	3615 3200 3200										
Entering		ELS120S4D + (2)			CX35-60C			ELS120S4D + (2) CX35-60D					
Outdoor Air		STAGE 1			STAGE 2			STAGE 1 STAGE 2			2		
		Liquid				Suction		Liquid		Suction Lig		uid Suction	
65 (18)		2/1	130		<u>4414</u>	120		400	127	2/		127	
75 (24)		282	133		282	132	2	81	130	29	2	130	
85 (29)		326	136		327	135	3	25	134	32	7	133	
95 (35)		374	139		375	138	3	73	137	37	'4	136	
105 (41)		427	142	4	28	141	4	27	141	42	28	139	
115 (46)		485	145	4	186	144	4	84	145	48	36	143	
125 (52)		548	148	5	550	147	5	48	148	55	50	146	
SCFM				3200				3200					
Entering		ELS120S4D + (2) CBA25UH-060											
Outdoor Air		STAGE 1		Ť	STAGE 2		1						
Temp °F (°C)													
°F (°C)		Liquid	Suction	<u>Li</u>	quid	Suction	_						
65 (18)		253	127	2	255	127	_						
75 (24)		292	129	2	284	129	4						
85 (29)		326	132		326	132	_						
95 (35)		375	135		377	135	_						
105 (41)		425	141	4	133	141	_						
115 (46)	1	479	144	4	189	144							

TABLE 7. Normal Operating Pressures* – Single and Two Stage – Residential

*Pressures at 80°F dry bulb and 67°F wet bulb entering indoor air temperatures.

542

125 (52)

SCFM

146

3500

548

146

System Operation

The outdoor unit and indoor blower cycle on demand from the room thermostat. When the thermostat blower switch is in the ON position, the indoor blower operates continuously.

HIGH PRESSURE SWITCHES (S4 AND S7)

These units are equipped with a manual reset high pressure switch (single-pole, single-throw) which is located on the discharge line. The switch shuts off the compressor when discharge pressure rises above the factory setting. High Pressure (auto reset) – trip at 640 psig; reset at 512 psig.

LOSS OF CHARGE SWITCHES (S24 AND S25)

NOTE – Used on units with two single-speed compressors.

These units are equipped with a loss-of-charge switch that is located in the liquid line. The switch is a SPST, auto-reset switch that is normally closed. The switch opens at 40 psi and closes at 90 psi.

LOW PRESSURE SWITCH (S87)

NOTE – Used on units with one two-stage compressor.

These units are equipped with a loss-of-charge switch that is located in the liquid line. The switch is a SPST, auto-reset switch that is normally closed. The switch opens at 40 psi and closes at 90 psi.

Maintenance

At the beginning of each cooling season, the system should be checked as follows:

OUTDOOR UNIT

- 1 Clean and inspect the condenser coil. You can flush the coil with a water hose.
- 2 The outdoor fan motor is prelubricated and sealed. No further lubrication is necessary.

- 3 Visually inspect connecting lines and coils for evidence of oil leaks.
- 4 Check wiring for loose connections.
- 5 Check for correct voltage at the unit while the unit is operating and while it is off.
- 6 Check amp-draw of the outdoor fan motor. Unit nameplate _____ Actual _____
- 7 Check amp-draw of the compressor. Unit nameplate _____ Actual _____

NOTE – If the owner complains of insufficient cooling, gauge the unit and check the refrigerant charge. Refer to section on refrigerant charging in this instruction.

INDOOR COIL

- 1 If necessary, clean the coil.
- 2 Check connecting lines and coils for evidence of oil leaks.
- 3 If necessary, check the condensate line and clean it.

INDOOR UNIT

- 1 Clean or change filters.
- 2 Adjust the 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.
- 3 On belt drive blowers, check the belt for wear and proper tension.
- 4 Check all wiring for loose connections.
- 5 Check for correct voltage at the unit (blower operating).
- 6 Check amp-draw on blower motor. Unit nameplate _____ Actual _____

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 Amperage:						
Maximum Fuse or Circuit Breaker						
Electrical Connections Tight?	clean? 🗋	Supply Voltage (Unit Off)				
Indoor Blower RPM S.P. Drop Over Indoor (Dr	Outdoor Coil Entering Air Temp.					
Vapor Pressure;						
Refrigerant Lines: - Leak Checked? 🗋 Properly Ins	sulated?	Outdoor Fan Checked?				
Service Valves: Fully Opened? Caps Tight?	° 🗆	Voltage With Compressor Oper	ating			
SEQUENCE OF OPERATION	THERMOSTAT					
Heating Correct? Cooling Correct?		Calibrated? Properly Set?	Level?			