CB/CC Series
Condensers & Condensing Units
Engineering Catalog

Table of Contents

Index of Tables and Figures

Tables:

Figures:

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Features and Options

AAON CB and CC Series condensers and condensing units, for residential and commercial applications, boast the same benefits that customers have come to expect from other AAON equipment: serviceability, quiet operation, reliability, high efficiency, durable construction, and a number of premier options which provide the equipment with the flexibility to suit a wide variety of job requirements.

Non-ozone depleting R-410A refrigerant is standard on the both the CB and CC Series units, making them both environmentally friendly and maintainable.

Convenience and Serviceability
Each CB/CC Series condensing unit is delivered to the jobsite ready for connection, charging, and startup. All components are labeled and connected with color-coded wiring to match the included color-coded wiring diagram. The CC Series features as standard hinged controls and compressor cabinet access doors and coil and fan access doors with lockable handles, while the CB Series has easily removable paneling that provides convenient access to the unit controls. The CB Series upright coil design featuring single row, enhanced fin, bent coil construction and CC Series upright coil design featuring multiple row, enhanced fin, unbent slab coil construction improve cleanability and long lasting performance.

Reliability
Cabinet construction, including standard louvered coil protection, is entirely G-90 galvanized steel to provide strength and durability. Corrosion resistant external paint surpasses 1,000 hour salt spray testing, per ASTM B 117-95 requirements. AAON integrates the latest in scroll compressor technology into all of its products for greater operational reliability than comparable reciprocating compressors.

Quiet Operation
In addition to being dependable, the hermetic scroll compressors included in each CB and CC Series condensing unit offer quieter operation than comparable reciprocating compressors. Noise reduction is enhanced by vibration minimizing rubber isolation mounts included standard. Compressor sound blanket option is available for maximum compressor sound attenuation.

Efficiency
While being both reliable and quiet, scroll compressors also reduce frictional losses and improve system efficiencies. The CB Series condensing unit, with standard two step scroll compressor, matches with the AAON F1 Series indoor air handler that employs the latest in ultra-high efficiency, variable speed ECM technology to dramatically increase SEER ratings.

Modulating Humidity Control Option - Humidity control option that minimizes temperature swings during dehumidification. Moisture related indoor air quality issues are minimized by reducing space humidity without sacrificing occupant comfort.

Split System Heat Pump Option - Energy efficient heating option that allows split system to be able to provide on demand heating and cooling with the refrigeration circuit. Option is available as a matched split system.

Low Ambient Options – Multiple head pressure control options allow unit cooling operation down to 35°F. Flooded condenser option allows unit cooling operation down to 0°F.

CB Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	MJREV	UNIT SIZE	VLT	COMP	CKTS	1	2	3	4	5	6	7
CB	- B -	060	- 3 -	B	- 1 :	A	D	0	0	0	A	0

BASE MODEL

SERIES AND GENERATION
CB

REVISION
B = Design Sequence

UNIT SIZE
024 = 24 MBH - 2 Ton - Vertical Discharge
036 = 36 MBH - 3 Ton - Vertical Discharge
048 = 48 MBH - 4 Ton - Vertical Discharge
060 = 60 MBH - 5 Ton - Vertical Discharge

VOLTAGE
1 = 230V/1Φ/60Hz
2 = 230V/3Φ/60Hz
3 = 460V/3Φ/60Hz
4 = 575V/3Φ/60Hz
8 = 208V/3Φ/60Hz
9 = 208V/1Φ/60Hz

COMPRESSOR TYPE
B = R-410A Two Step Scroll Compressor
D = R-410A Variable Capacity Scroll Compressor
F = R-410A Two Step Scroll Compressor with Sound Blanket
H = R-410A Variable Capacity Scroll Compressor with Sound Blanket

NUMBER OF CIRCUITS
1 = One Circuit

FEATURE 1: AMBIENT CONTROL
0 = Standard (55°F Ambient)
B = Adjustable Fan Cycling (35°F Ambient)
D = ECM Condenser Fan Head Pressure Control (35°F Ambient)
F = Flooded Condenser Low Ambient Controls - 0°F + Adjustable Fan Cycling (35°F Ambient)
G = Flooded Condenser Low Ambient Controls - 0°F + ECM Condenser Fan Head Pressure Control (35°F Ambient)

FEATURE 2: REFRIGERATION OPTIONS
0 = Standard - Split System Air Conditioner
A = External Hot Gas Bypass
B = Split System Heat Pump
D = Modulating Hot Gas Reheat
F = Options A + D
G = Options B + D

FEATURE 3: CONTROLS
0 = Standard - Terminal Block
A = Suction Pressure Transducer (F1- Wattmaster Reheat)
H = Control Circuit Transformer
J = Variable Capacity Compressor Integrated Controls
S = Suction Pressure Transducer (Not F1 - Wattmaster Controls)
T = Control Circuit Transformer w/ Suction Pressure Transducer

FEATURE 4: COIL PROTECTION
0 = Standard
A = Polymer E-Coated Coil

FEATURE 5: CABINET OPTIONS
0 = Standard – Louvered Panels
A = Wire Grille
D = Exterior Corrosion Protection
G = Options A + D

FEATURE 6: WARRANTY
0 = Standard
A = Second to Fifth Year Extended Compressor Warranty

FEATURE 7: TYPE
0 = Standard
X = Special Pricing Authorization

CC Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	MJREV	UNIT SIZE	VLT	COMP	CKTS	1	2	3	4	5	6	7
CC	- C -	010	- 3 -	B	- 2 :	B	D	0	0	0	A	0

BASE MODEL

SERIES AND GENERATION
CC

REVISION
C = Design Sequence

UNIT SIZE
002 = 2 Ton Capacity - Horizontal Discharge
003 = 3 Ton Capacity - Horizontal Discharge
004 = 4 Ton Capacity - Horizontal Discharge
005 = 5 Ton Capacity - Horizontal Discharge
006 = 6 Ton Capacity
007 = 7 Ton Capacity
008 = 8 Ton Capacity
010 = 10 Ton Capacity
014 = 14 Ton Capacity
017 = 17 Ton Capacity
022 = 22 Ton Capacity
025 = 25 Ton Capacity
030 = 30 Ton Capacity
031 = 31 Ton Capacity
034 = 34 Ton Capacity
040 = 40 Ton Capacity
045 = 45 Ton Capacity
050 = 50 Ton Capacity
055 = 55 Ton Capacity
063 = 63 Ton Capacity

VOLTAGE
1 = 230V/1Φ/60Hz
2 = 230V/3Φ/60Hz
3 = 460V/3Φ/60Hz
4 = 575V/3Φ/60Hz
8 = 208V/3Φ/60Hz
9 = 208V/1Φ/60Hz

COMPRESSOR TYPE
0 = No Compressor - Condenser Only
A = R-410A Single Step Scroll Compressor
B = R-410A Two Step Scroll Compressor
C = R-410A Tandem Scroll Compressors
D = R-410A Variable Capacity Scroll Compressor
9 = R-410A Variable Capacity Scroll Compressor - Each Circuit

NUMBER OF CIRCUITS
1 = One Circuit
2 = Two Circuits
4 = Four Circuits

CC Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	MJREV	UNIT SIZE	VLT	COMP	CKTS	1	2	3	4	5	6	7
CC	C	010	3	B	2	: B	D	0	0	0	A	0

FEATURE 1: AMBIENT CONTROL

0 = Standard - 55°F Ambient
B = Adjustable Fan Cycling - 35°F Ambient
D = Modulating Fan Pressure Control - 35°F Ambient
F = Flooded Condenser Low Ambient Controls + Option B
G = Flooded Condenser Low Ambient Controls + Option D

FEATURE 2: REFRIGERATION OPTIONS

0 = Standard - Split System Air Conditioner
A = External Hot Gas Bypass
B = Split System Heat Pump
D = Modulating Hot Gas Reheat
F = Options A + D
G = Options B + D

FEATURE 3: CONTROLS

0 = Standard - Terminal Block with Control Transformer
A = Suction Pressure Transducer
B = Phase and Brown Out Protection
C = Factory Wired 115V Outlet
D = Options A + B
E = Options A + C
F = Options B + C
G = Options A + B + C
J = Variable Capacity Compressor Integrated Controls

FEATURE 4: COIL PROTECTION

0 = Standard,
A = Polymer E-Coated Coil

FEATURE 5: CABINET OPTIONS

0 = Standard
B = Compressor Sound Blanket
D = Exterior Corrosion Protection
E = Options B + D
R = California OSHPD Certified
S = Shake Table Cert. (ASHE 7-05/ICC-ES AC 156)
T = Seismic Construction (Non-Certified)
U = Options D + R
W = Options D + S
Z = Options D + T

FEATURE 6: WARRANTY

0 = Standard
A = Second to Fifth Year Extended Compressor Warranty

FEATURE 7: TYPE

0 = Standard
X = Special Price Authorization

Model Number
Unit Size

Example: CC-C-**010**-3-B-2:BD000A0

Unit size designates nominal MBH cooling/nominal gross tons cooling at AHRI conditions for CB and CC Series condensing units. Actual capacities will vary with conditions. Refer to AAON Ecat32 for performance and cooling capacities at design conditions.

Table 1 - Unit Sizes

Model	Compressors/ Circuits	Discharge	Nominal	
			MBH	Tons
CB-B-**024**	1/1	Vertical	24	2
CB-B-**036**			36	3
CB-B-**048**			48	4
CB-B-**060**			60	5
CC-C-**002**		Horizontal	24	2
CC-C-**003**			36	3
CC-C-**004**			48	4
CC-C-**005**			60	5
CC-C-**006**	2/2	Vertical	72	6
CC-C-**007**			84	7
CC-C-**008**			96	8
CC-C-**010**			120	10
CC-C-**014**			168	14
CC-C-**017**			204	17
CC-C-**022**			264	22
CC-C-**025**			300	25
CC-C-**030**			360	30
CC-C-**031**	4/2 or 4/4		372	31
CC-C-**034**			408	34
CC-C-**040**			480	40
CC-C-**045**			540	45
CC-C-**050**			600	50
CC-C-**055**			660	55
CC-C-**063**			756	63

Model Number
Voltage

Example: CC-C-010-**3**-B-2:BD000A0

All units have single point power connections with grounding lugs, 24 VAC control circuits, and branch circuit fusing.

1 = 230V/1Φ/60Hz
2 = 230V/3Φ/60Hz
3 = 460V/3Φ/60Hz
4 = 575V/3Φ/60Hz
8 = 208V/3Φ/60Hz
9 = 208V/1Φ/60Hz

Model Number
Compressor Type

Example: CC-C-010-3-**B-**2:BD000A0

0 = *No Compressor - Condenser Only* - Air-cooled condenser, without compressors, which is used with an air handler which includes the refrigeration systems' compressors, thermal expansion valves (TXVs), and evaporator coils. Option is enabled on 6-63 ton CC Series units.
A = *R-410A Single Step Scroll Compressor* - Standard R-410A scroll compressors that provide only one stage of capacity, 100%. Compressors include crankcase heaters. Option is enabled on 14-30 ton CC Series units, which include two compressors and are factory wired for two stage cooling.
B = *R-410A Two Step Scroll Compressor* - R-410A two step scroll compressors that provide two stages of capacity, 67% and 100%, for more energy efficient part load operation. Compressors include crankcase heaters. Option is enabled on all CB Series units and 2-10 ton CC Series units. CB Series units and 2-5 ton CC Series units include a single compressor and are factory wired for two stage cooling. 6-10 ton CC Series units include two compressors and are factory wired for two stage cooling, with an adjustable time delay relay for the second step of each compressor, and can be field rewired for four stage cooling.
C = *R-410A Tandem Scroll Compressors* - Two standard R-410A scroll compressors that each provide only one stage of capacity, 100%, connected in tandem to provide two stages of capacity, for more energy efficient part load operation. Compressors include crankcase heaters. Option is enabled on 31-63 ton CC Series units, which include a pair of tandem compressors and are factory wired for two stage cooling, with an adjustable time delay relay for the second compressor in each tandem circuit and can be field rewired for four stage cooling.

Model Number - Compressor Type Continued

D = *R-410A Variable Capacity Scroll Compressor* - R-410A variable capacity scroll compressors that provide 10-100% modulating capacity for load matching cooling and heating and more energy efficient part load operation. Option is enabled on 3-5 ton CB Series units and 3-63 ton CC Series units. 3-5 ton CB and CC Series units include a single variable capacity compressor. 6-10 ton CC Series units include one variable capacity compressor and one two step compressor. 14-30 ton CC Series units include one variable capacity compressor and one single step compressor. 31-63 ton CC Series units include one variable capacity compressor and three single step compressors. Compressors include crankcase heaters. Option requires a factory installed controls option or a 1-5 VDC control signal to control compressor capacity modulation. See Feature 3 and matching air handler's controls features for controls options.

F = *R-410A Two Step Scroll Compressor with Sound Blanket* - Two step R-410A scroll compressors that provide two stages of capacity, 67% and 100%, for more energy efficient part load operation. Option includes a high density foam sound suppression blanket covering the compressor to dampen radiated sound. Compressors include crankcase heaters. Option is enabled on CB Series and CC Series 2-10 ton units which include a single compressor and are factory wired for two stage cooling.

H = *R-410A Variable Capacity Scroll Compressor with Sound Blanket* – R-410A variable capacity scroll compressors that provide 10-100% modulating capacity for load matching cooling and heating and more energy efficient part load operation. Option includes a high density foam sound suppression blanket covering the compressor to dampen radiated sound. Compressors include crankcase heaters. Option is enabled on 3-5 ton CB Series units and 3-63 ton CC Series units. 3-5 ton CB and CC Series units include a single variable capacity compressor. 6-10 ton CC Series units include one variable capacity compressor and one two step compressor. 14-30 ton CC Series units include one variable capacity compressor and one single step compressor. 31-63 ton CC Series units include one variable capacity compressor and three single step compressors. Option requires a factory installed controls option or a 1-5 VDC control signal to control compressor capacity modulation. See Feature 3 and matching air handler's controls features for controls options.

9 = *R-410A Variable Capacity Scroll Compressor – Each Circuit* – R-410A variable capacity scroll compressors that provide 10-100% modulating capacity for load matching cooling and heating and more energy efficient part load operation. Option is available on 6-63 ton CC series units. 6-30 ton CC series units include two variable capacity scroll compressors. 31-63 ton CC series units include two variable capacity scroll compressors and two single step scroll compressors. Compressors include crankcase heaters. Option requires a factory installed controls option or a 1-5 VDC control signal to control compressor capacity modulation.

Model Number
Number of Circuits

Example: CC-C-010-3-B-**2**:BD000A0

1 = *One Circuit* - Single refrigeration circuit. Option is enabled on CB Series units and 2-5 ton CC Series units.
2 = *Two Circuits* - Two refrigeration circuits. Option is enabled on 6-63 ton CC Series units.
4 = *Four Circuits* - Four refrigeration circuits. Option is enabled on 31-63 ton CC Series units.

Feature 1
Ambient Control

Example: CC-C-010-3-B-2:**B**D000A0

0 = *Standard - 55°F Ambient* - 55°F fixed compressor lockout for the cooling operation.
B = *Adjustable Fan Cycling - 35°F Ambient* - Low ambient head pressure control option that cycles the condenser fans to maintain refrigerant circuit head pressures at acceptable levels during cooling operation. The head pressure control setpoint is field adjustable. Minimum allowable ambient temperature for cooling operation is 35°F.
D = *ECM Condenser Fan Head Pressure Control - 35°F Ambient* – Low ambient refrigerant head pressure control option using electronically commutated motors (ECM). The motors either speed up or slow down to adjust air flow accordingly in order to maintain the head pressure setpoint. For units with nominal capacities of 2-5 tons, the head pressure setpoint is field adjustable from 240-600 psi with a default setting of 340 psi with a JCI proportional pressure control module. For units with nominal capacities of 6-63 tons, the head pressure setpoint is field adjustable from 260-400 psi with a default setting of 340 psi with a WattMaster Head Pressure Control Module. Option includes ECMs, condenser head pressure controller and pressure transducers. Minimum allowable ambient temperature for cooling operation is 35°F.
F = *Adjustable Fan Cycling + Flooded Condenser Low Ambient Controls* – Options B + E. Factory installed, flooded condenser, head pressure control option which allows cooling operation down to 0°F ambient. When the ambient temperature drops, the condensing pressure drops. A 3-way pressure activated valve then allows discharge gas to bypass around the condenser. Mixing of the discharge gas with liquid creates a high pressure at the condenser outlet, reducing the flow and causing liquid to back up into the condenser. Flooding the condenser reduces the area available for condensing, resulting in a rise in condensing pressure. Option includes adjustable fan cycling head pressure controls. Option includes LAC valve and liquid receiver. Receivers will not be factory insulated. Insulation is recommended for any operation of -20°F or below and is available via special pricing authorization.

Feature 1 – Ambient Control Continued

G = *ECM Condenser Fan Head Pressure Control + Flooded Condenser Low Ambient Controls* – Factory installed, flooded condenser, head pressure control option which allows cooling operation down to 0°F ambient. When the ambient temperature drops, the condensing pressure drops. A 3-way pressure activated valve then allows discharge gas to bypass around the condenser. Mixing of the discharge gas with liquid creates a high pressure at the condenser outlet, reducing the flow and causing liquid to back up into the condenser. Flooding the condenser reduces the area available for condensing, resulting in a rise in condensing pressure. Option includes ECM condenser fan head pressure control. Option includes LAC valve and liquid receiver. Receivers will not be factory insulated. Insulation is recommended for any operation of -20°F or below and is available via special pricing authorization.

Feature 2
Refrigeration Options

Example: CC-C-010-3-B-2:B**D**000A0

0 = *Standard - Split System Air Conditioner* - Each condensing unit refrigeration circuit includes a manual reset high pressure cutout, an automatic reset low pressure cutout, and compressor overload protection. A 5 minute off compressor time delay relay is included on all compressors, except variable capacity scroll compressors. Liquid line filter dryer is factory provided and field installed with CB Series units and 2-5 ton CC Series units. Liquid line filter dryer is factory installed in 6-63 ton CC Series units.

A = *External Hot Gas Bypass* - Field adjustable pressure activated bypass valve on each refrigeration circuit factory setup to divert hot compressor discharge gas to the evaporator coil if pressure on the evaporator side of the valve drops below 105 psi (34°F at sea level). The bypass valve is at full capacity after six degrees of differential (28°F at sea level). This option is used to prevent coil freeze-up during periods of low air flow or cold entering coil conditions without cycling of the compressors on and off. This option is used for refrigeration system protection only and cannot be used for cooling capacity modulation. Requires additional field piped hot gas bypass line, with drip line, from the condensing unit to the air handler. When this option is ordered with variable capacity scroll compressors (reference Model Number, Compressor Type), only the refrigeration circuits without variable capacity scroll compressors will have factory installed hot gas bypass piping.

B = *Split System Heat Pump* - Energy efficient heating and cooling option available only with selection of a matching heat pump air handler. Option includes factory installed reversing valve and suction line accumulator. CB Series units and 2-5 ton CC Series units include factory installed heat pump TXVs and factory provided, field installed heat pump liquid line filter dryers and receiver tanks. 6-10 ton CC Series units include factory heat pump TXVs, liquid line filter driers, and liquid line receiver tanks. 14-63 ton CC series units include factory installed liquid line filter dryers and check valves, in parallel with the TXVs, and factory liquid line receiver tanks.

Feature 2 – Refrigeration Options Continued

D = *Modulating Hot Gas Reheat* - Option provides a split system with energy efficient humidity control, independent of temperature control, without temperature swings. Option is available with selection of matching air handler with the modulating hot gas reheat option and is factory installed on the first refrigeration circuit. During dehumidification, the controller uses modulating valves to control the flow of discharge refrigerant gas to the reheat coil, mounted downstream of the evaporator coil in the air handler, to maintain a precise supply air temperature. A humidistat is required and available as an accessory. Condenser and reheat modulating valves are factory installed with this option. Liquid line filter dryer and receiver tank are factory provided and field installed with CB Series units and 2-5 ton CC Series units. Liquid line filter dryer and receiver tank are factory installed in 6-63 ton CC Series units. Reheat coil check valve and liquid line check valve are factory installed in the air handler. Requires additional field piped hot gas line, with drip line, from the condensing unit to the air handler. Field installed suction line accumulator/subcooler is recommended.
F = *External Hot Gas Bypass + Modulating Hot Gas Reheat* - Options A + D. A humidistat is required, and available as an accessory. Condenser and reheat modulating valves are factory installed. Liquid line filter dryer and receiver tank are factory provided and field installed with CB Series units and 2-5 ton CC Series units. Liquid line filter dryer and receiver tank are factory installed in 6-63 ton CC Series units. Reheat coil check valve and liquid line check valve are factory installed. Requires additional field piped hot gas line from condensing unit to air handler. Field installed suction line accumulator is recommended. Option available only with selection of matching air handler with the external hot gas bypass and modulating hot gas reheat option. Option requires separate field piping for hot gas bypass and modulating hot gas reheat refrigeration lines if the unit is selected with more than one refrigeration circuit.
G = *Split System Heat Pump + Modulating Hot Gas Reheat* - Options B + D. A humidistat is required, and available as an accessory. Includes factory installed reversing valve, suction line accumulator, heat pump TXV valve, liquid line receiver, reheat coil check valve, and heat pump filter dryer. Requires additional field piped hot gas line from condensing unit to air handler. Option is available with selection of matching heat pump air handler with the modulating hot gas reheat option.

Feature 3
Controls

Example: CC-C-010-3-B-2:BD**0**00A0

0 = *Standard - Terminal Block* - Power and starting components include fan motor contactors, 5 minute off compressor time delay relays, internal fan motor overload protection, and power terminal block for connection to remote disconnect switch. Safety and operating controls include manual reset high pressure switches, and automatic reset low pressure switches. CB Series units do not include a control circuit transformer. CC Series units include a 24 VAC control circuit transformer.

Feature 3 – Controls Continued

A = *Suction Pressure Transducer* - Option is for use with variable capacity scroll compressor and modulating hot gas reheat options. This option is required with CB Series units matched with F1 Series air handlers with modulating hot gas reheat.
B = *Phase and Brown Out Protection* - Three phase voltage monitor that shuts down the unit if the supplied power phases are out of balance or over/under voltage, or in case of a phase loss. Option is used to protect motors and compressors from electrical phase loss or low voltage brownout. Reset is automatic. Option is enabled on CC Series units.
C = *Factory Wired 115V Convenience Outlet* - Factory wired 2x4 electrical box with ground fault interrupter receptacle, located inside the unit controls cabinet. The circuit is rated at 15 amps and is factory wired to a step-down transformer, fuse block, and outlet disconnect. The circuit is wired to the line side of the unit power block, permitting use of the outlet while power to the unit is shut off. Option is enabled on CC Series units. **Caution: When the power to the unit is disconnected at the factory installed unit power switch, the convenience outlet will remain live.**
D = *Suction Pressure Transducer + Phase and Brown Out Protection* - Options A + B. Option is enabled on CC Series units.
E = *Suction Pressure Transducer + Factory Wired 115V Convenience Outlet* - Options A + C. Option is enabled on CC Series units.
F = *Phase and Brown Out Protection + Factory Wired 115V Convenience Outlet* - Options B + C. Option is enabled on CC Series units.
G = *Suction Pressure Transducer + Phase and Brown Out Protection + Factory Wired 115V Convenience Outlet* - Options A + B + C. Option is enabled on CC Series units.
H = *Control Circuit Transformer* - 24 VAC control circuit transformer. Option is enabled on CB Series units. CC Series units include a control circuit transformer as standard.
J = *Variable Capacity Compressor Integrated Controls* - Option allows the use of a variable capacity scroll compressor with standard thermostat control. On a call for Y1 cooling, the compressor will modulate its capacity based on the outside air temperature. Subsequent calls for cooling (Y2, Y3, …) will result in the staging up of the additional compressors. Option is available on units with variable capacity scroll compressors.
S = *Suction Pressure Transducer (Non F1 – Watmaster reheat)* - Option is enabled for use with variable capacity scroll compressor CB Series units.
T = *Suction Pressure Transducer + Control Circuit Transformer* – Options A + H. Option is enabled on CB Series units.

Feature 4
Coil Protection

Example: CC-C-010-3-B-2:BD0**0**0A0

0 = *Standard* - Condenser coils are constructed of copper tubing mechanically bonded to enhanced aluminum fins with aluminum casing. CB Series units utilize single row, bent coil construction for ease of cleaning. CC Series units utilize multiple row, unbent slab coil construction for ease of cleaning.

Feature 4 – Coil Protection Continued

A = *Polymer E-Coated Coil* - Polymer e-coating applied to the condenser coils and casings. Coating surpasses a 6,000 hour salt spray test per ASTM B117-90, yet is only 0.8-1.2 mils thick and has excellent flexibility. Option may be used in coastal saltwater conditions under the stress of heat, salt, sand, and wind and is applicable to all corrosive environments where a polymer coating is acceptable. Coating includes a 5 year non-prorated warranty.

Feature 5
Cabinet Options

Example: CC-C-010-3-B-2:BD00**0**A0

0 = *Standard* - CB Series units and 6-63 ton CC Series units include louvered panels fabricated from galvanized G90 steel are painted and factory mounted to protect the condenser coil face. Paint finish exceeds 1,000 hour salt spray test when tested under ASTM B 117-95 requirements. 2-5 ton CC Series units include a wire grille condenser coil guard to protect the coil face.
A = *Wire Grille* - Wire grille condenser coil guard option. With less air flow restriction this option can improve unit efficiency. Option is enabled on CB Series units.
B = *Compressor Sound Blanket* - Option includes a high density foam sound suppression blanket covering the compressor to dampen radiated sound and is factory installed on each compressor in the unit. Option is available on all CC series units.
D = *Exterior Corrosion Protection* - Cabinet is primer washed and then spray coated with a two part polyurethane, heat-baked coating. Polyurethane coating exceeds 2,500 hours when tested under ASTM B 117-95 requirements. Option is intended for use in coastal saltwater conditions under the stress of heat, salt, sand, and wind and is applicable to all corrosive environments where a polyurethane coating is acceptable. See Feature 4 for cooling coil corrosion protection options.
E = *Compressor Sound Blanket + Exterior Corrosion Protection* – Options B + D. Option is available only on CC series units.
G = *Wire Coil Guard + Exterior Corrosion Protection* - Options A + D. Option is enabled on CB Series units.
R = *California OSHPD Certified* – Option includes cabinet construction that has been approved for applications where special seismic certification is required for California Office of Statewide Health Planning and Development. Any additional, non-selectable features will void the OSPHD certification. Option is available on CC series units. Certified units are listed under approval number OSP-0181-10.
S = *Shake Table Certified (ASCE 7-05 / ICC-ES AC 156)* – Option includes cabinet construction that has been IBC 2009 seismically certified through seismic analysis and shake table testing in accordance with ASCE/SEI 7-05 and ICC-ES AC 156. Additional, non-selectable equipment features can be added only with a licensed engineer's approval. Option does not include OSHPD certification. Option is available on CC series units.

Feature 5 – Cabinet Options Continued

T = *Seismic Construction (Non-Certified)* – Option includes cabinet construction with reinforcements for additional structural integrity for seismic applications. Option does not include OSHPD certification and has not been shake table certified but does include the same cabinet construction. Option is available for applications that may benefit from seismic construction but does not require seismic certification. Option is available on CC series units.
U = *Exterior Corrosion Protection + California OSHPD Certified* – Options D + R. Option is available on CC series units.
W = *Exterior Corrosion Protection + Shake Table Certified (ASCE 7-05 / ICC-ES AC 156)* – Options D + S. Option is available on CC series units.
Z = *Exterior Corrosion Protection + Seismic Construction (Non-Certified)* – Options D + T. Option is available on CC series units.

Feature 6
Warranty Options

Example: CC-C-010-3-B-2:BDA000**A**0

0 = *Standard* - For commercial applications, each CB and CC series condensing unit purchased comes with a one year manufacturer's warranty effective from the startup date, not to exceed 18 months from date of shipment. The warranty covers material and workmanship defects. For residential applications, each CB and F1 or CB and AU matched split system comes with a 5 (optional 10) year manufacturer's warranty effective the date of original installation or three months after date of shipment from the factory. The warranty covers material and workmanship defects. Refer to residential Limited Warranty Certificate for details.
A = *Second to Fifth Year Extended Compressor Warranty* - Extends commercial warranty coverage of compressors for the second to fifth years of unit operation.

Feature 7
Type

Example: CC-C-010-3-B-2:BDA000A**0**

0 = *Standard* - Standard cabinet features.
X = *Special Price Authorization* - The Applications Department must issue a Special Pricing Authorization (SPA) to include a non-standard option.

General Data

Unit Information

Table 2 - CB Unit Information

	Model			
	CB-024	CB-036	CB-048	CB-060
Compressor				
Quantity/Nominal tons				
R-410A Two Step Scroll	1/2 Two Step	1/3 Two Step	1/4 Two Step	1/5 Two Step
R-410A Variable Capacity Scroll		1/3 Var.	1/4 Var.	1/5 Var.
Capacity Steps (%)	100/67 with two step compressor or 10-100 with variable capacity scroll compressor			
Number of Circuits	1			
Condenser Fan				
Quantity/Diameter	1/22”		1/26”	
hp	1/3			
Liquid Line Connection	3/8”		1/2”	
Suction Line Connection	3/4”		7/8”	
Hot Gas Line Connection	3/8”	1/2”		
Nominal Unit Weight (lbs.)	237		260	281

Table 3 - Matching F1 Unit Information

	Model			
	F1-024	F1-036	F1-048	F1-060
Supply Fan				
Type/Diameter	FC (Forward Curved)/9”		FC/10”	
Standard Motor	1/2 hp		3/4 hp	
High Static Application Motor	3/4 hp		1 hp	
Nominal cfm	800	1,200	1,600	2,000
Evaporator A-Coil				
Refrigerant	R-410A			
Coil Face Area	4.89 ft^2		6.07 ft^2	
Rows/FPI	3/15		3/12	
Electric Heat				
kW Capacity - 230 V	5, 10	5, 10, 15	5, 10, 15, 20	5, 10, 15, 20, 25
kW Capacity - 208V	3.75, 7.5	3.75, 7.5, 11.25	3.75, 7.5, 11.25, 15	3.75, 7.5, 11.25, 15, 18.75
Stages	5, 10 kW - 1 stage / 15, 20 - 2 stage / 25 kW - 3 stage			
Hot Water Coil				
Coil Face Area	1.56 ft^2		2.07 ft^2	
Rows/FPI	4/14		2/10	
Condensate Drain	3/4” Connection			
Air Filter	20” x 20” x 1”			

Table 4 - 2-5 Ton CC Unit Information

	Model			
	CC-002	CC-003	CC-004	CC-005
Compressor				
Quantity/Nominal tons				
R-410A Two Step Scroll	1/2 Two Step	1/3 Two Step	1/4 Two Step	1/5 Two Step
R-410A Variable Capacity Scroll		1/3 Var.	1/4 Var.	1/5 Var.
Capacity Steps (%)	100/67 with two step compressor or 10-100 with variable capacity scroll compressor			
Number of Circuits	1			
Condenser Fan				
Quantity/Diameter	1/22”		1/26”	
hp	1/2			
Liquid Line Connections	3/8”		1/2”	
Suction Line Connections	3/4”		7/8”	
Hot Gas Line Connections	3/8”	1/2”		
Discharge Line Connections	1/2”			5/8”
Nominal Unit Weight (lbs.)	237		260	281

Table 5 – 6-10 Ton CC Unit Information

	Model			
	CC-006	CC-007	CC-008	CC-010
Compressors				
Quantity/Nominal tons				
R-410A Two Step Scroll	2/3 Two Step	2/4 Two Step	2/4 Two Step	2/5 Two Step
R-410A Variable Capacity Scroll	1/3 Two Step, 1/3 Var.	1/4 Two Step, 1/4 Var.	1/4 Two Step, 1/4 Var.	1/5 Two Step, 1/5 Var.
Capacity Steps (%)	100/67 with two step compressor or 10-100 with variable capacity scroll compressor			
Number of Circuits	2			
Condenser Fans				
Quantity/Diameter	1/30”			
hp	3/4			
Liquid Line Connections	3/8”	1/2”		
Suction Line Connections	3/4”	7/8”		
Hot Gas Line Connections	3/8”	1/2”		
Discharge Line Connections	1/2”			5/8”
Nominal Unit Weight (lbs.)	534		844	854

Table 6 - 14-22 Ton CC Unit Information

	CC-014	CC-017	CC-022
Compressors			
Quantity/Nominal tons			
R-410A Single Stage Scroll	2/6	2/8	2/10
R-410A Variable Capacity Scroll	1/6, 1/6 Var.	1/8, 1/8 Var.	1/10, 1/10 Var.
Capacity Steps (%)	100/50 or 10-100 with variable capacity scroll compressor		
Number of Circuits	2		
Condenser Fans			
Number/Diameter	2/30”		
hp	3/4		
Liquid Line Connections	5/8”		3/4”
Suction Line Connections	1 1/8”		1 3/8”
Hot Gas Line Connections	1/2”	5/8”	
Discharge Line Connections	5/8”	3/4”	
Nominal Unit Weight (lbs.)	980	1,054	1,074

Table 7 - 25-31 Ton CC Unit Information

	CC-025	CC-030	CC-031	
Compressors				
Quantity/Nominal tons				
R-410A Single Stage Scroll	2/13	2/15	4/7	
R-410A Variable Capacity Scroll	1/13, 1/13 Var.	1/15, 1/15 Var.	3/7, 1/13 Var.	3/7, 1/7 Var.
Capacity Steps (%)	100/50 or 10-100 with variable capacity scroll compressor			
Number of Circuits	2		2	4
Condenser Fans				
Number/Diameter	2/30”		4/30”	
hp	3/4			
Liquid Line Connections	3/4”	7/8”		5/8”
Suction Line Connections	1 3/8”			1 1/8”
Hot Gas Line Connections	3/4”			5/8”
Discharge Line Connections	7/8”			5/8”
Nominal Unit Weight (lbs.)	1,100	1,160	2,065	

Table 8 - 34-40 Ton CC Unit Information

	CC-034		CC-040	
Compressors				
Quantity/Nominal tons				
R-410A Single Stage Scroll	4/8	4/8	4/9	4/9
R-410A Variable Capacity Scroll	2/8, 1/15 Var.	3/8, 1/8 Var.	3/9, 1/9 Var.	3/9, 1/9 Var.
Capacity Steps (%)	100/50 or 10-100 with variable capacity scroll compressor			
Number of Circuits	2	4	2	4
Condenser Fans				
Number/Diameter	4/30"			
hp	3/4			
Liquid Line Connections	7/8"	5/8"	1 1/8"	5/8"
Suction Line Connections	1 5/8"	1 1/8"	1 5/8"	1 3/8"
Hot Gas Line Connections	3/4"	5/8"	7/8"	5/8"
Discharge Line Connections	7/8"	3/4"	1 1/8"	3/4"
Nominal Unit Weight (lbs.)	2,095		2,283	

Table 9 – 45-50 Ton CC Unit Information

	CC-045		CC-050	
Compressors				
Quantity/Nominal tons				
R-410A Single Stage Scroll	4/10	4/10	4/11	4/11
R-410A Variable Capacity Scroll	3/10, 1/10 Var.	3/10, 1/10 Var.	3/11, 1/11 Var.	3/11, 1/11 Var.
Capacity Steps (%)	100/50 or 10-100 with variable capacity scroll compressor			
Number of Circuits	2	4	2	4
Condenser Fans				
Number/Diameter	4/30"		6/30"	
hp	3/4			
Liquid Line Connections	1 1/8"	3/4"	1 1/8"	3/4"
Suction Line Connections	1 5/8"	1 3/8"	1 5/8"	1 3/8"
Hot Gas Line Connections	7/8"	5/8"	7/8"	5/8"
Discharge Line Connections	1 1/8"	3/4"	1 1/8"	3/4"
Nominal Unit Weight (lbs.)	2,283		2,853	

Table 10 – 55-63 Ton CC Unit Information

	CC-055		CC-063	
Compressors				
Quantity/Nominal tons				
R-410A Single Stage Scroll	4/13	4/13	4/15	4/15
R-410A Variable Capacity Scroll	3/13, 1/13 Var.	3/13, 1/13 Var.	3/15, 1/15 Var.	3/15, 1/15 Var.
Capacity Steps (%)	100/50 or 10-100 with variable capacity scroll compressor			
Number of Circuits	2	4	2	4
Condenser Fans				
Number/Diameter	6/30"			
hp	3/4			
Liquid Line Connections	1 1/8"	3/4"	1 1/8"	7/8"
Suction Line Connections	1 5/8"	1 3/8"	1 5/8"	1 3/8"
Hot Gas Line Connections	7/8"	3/4"	7/8"	3/4"
Discharge Line Connections	1 1/8"	7/8"	1 1/8"	7/8"
Nominal Unit Weight (lbs.)	2,853		2,903	

Electrical Service Sizing Data

Use the following equations to correctly size the electrical service wiring and disconnect switch for the unit. Electrical data for a specific unit configuration can be found with the AAONEcat32™ software. For further assistance in determining the electrical ratings, contact the Applications Department, or consult U.L. 1995.

The Minimum Circuit Ampacity (MCA) and Maximum Overcurrent Protection (MOP) must be calculated for all modes of operation which include the cooling mode of operation, the heating mode of operation, and if the unit is a heat pump the emergency heating mode of operation and auxiliary heating mode of operation. The emergency or backup heating mode of operation is when the secondary heater is in operation and heat pump or compressor heating is not in operation. The auxiliary or supplemental heating mode of operation is when heat pump or compressor heating is in operation and the secondary heater is also in operation.

To calculate the MCA and MOP, the number of motors and other current drawing devices in operation must be known for each mode of operation. The largest MCA and MOP values calculated from all the modes operation are the correct values and are also on the unit nameplate.

For example, during the cooling mode of operation of an air-cooled DX unit or an air-source heat pump the supply fans, compressors, and condenser fans are all in operation. During the heating mode of operation of an air-cooled DX unit or the emergency heating mode of operation of an air-source heat pump only the supply fans and heater are in operation. During the auxiliary heating mode of operation of an air-source heat pump the supply fans, compressors, condenser fans, and secondary heater are all in operation.

Once it is determined what current drawing devices are operating during each mode of operation use the equations shown below to calculate the MCA and MOP.

Use Rated Load Amps (RLA) for compressors and Full Load Amps (FLA) for all other motors and electric heaters.

Load 1 = Current of the largest motor/compressor in operation
Load 2 = Sum of the currents of the remaining motors/compressors in operation
Load 3 = Current of electric heaters in operation
Load 4 = Any remaining loads greater than or equal to 1 amp

Electric Heat FLA Calculation

Single Phase

$$FLA = \frac{(Heating\ Element\ kW)\ x\ 1000}{Rated\ Voltage}$$

Three Phase

$$FLA = \frac{(Heating\ Element\ kW)\ x\ 1000}{(Rated\ Voltage)\ x\ \sqrt{3}}$$

Electrical Service Sizing Data Continued

Cooling Mode Equations

MCA = 1.25(Load 1) + Load 2 + Load 4
MOP = 2.25(Load 1) + Load 2 + Load 4

Heating Mode or Emergency/Backup Heating Mode without Electric Heat Equations

MCA = 1.25(Load 1) + Load 2 + Load 4
MOP = 2.25(Load 1) + Load 2 + Load 4

Heating Mode or Emergency/Backup Heating Mode with Less than 50 kW of Electric Heat Equations

MCA = 1.25(Load 1 + Load 2 + Load 3 + Load 4)
MOP = 2.25(Load 1) + Load 2 + Load 3 + Load 4

Heating Mode or Emergency/Backup Heating Mode with Greater than or Equal to 50 kW of Electric Heat Equations

MCA = 1.25(Load 1 + Load 2) + Load 3 + 1.25(Load 4)
MOP = 2.25(Load 1) + Load 2 + Load 3 + Load 4

Auxiliary/Supplemental Heating Mode without Electric Heat Equations

MCA = 1.25(Load 1) + Load 2 + Load 4
MOP = 2.25(Load 1) + Load 2 + Load 4

Auxiliary/Supplemental Heating Mode with Less than 50 kW of Electric Heat Equations

MCA = 1.25(Load 1) + Load 2 + 1.25(Load 3) + Load 4
MOP = 2.25(Load 1) + Load 2 + Load 3 + Load 4

Auxiliary/Supplemental Heating Mode with Greater than or Equal to 50 kW of Electric Heat Equations

MCA = 1.25(Load 1) + Load 2 + Load 3 + Load 4
MOP = 2.25(Load 1) + Load 2 + Load 3 + Load 4

Electrical Service Sizing Data Continued

Fuse Selection

Select a fuse rating equal to the MOP value. If the MOP does not equal a standard fuse rating select the next lower standard fuse rating. If the MOP is less than the MCA then select the fuse rating equal to or greater than the MCA.

The standard ampere ratings for fuses, from the *NEC Handbook, 240-6*, shall be considered 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800 and 1000 amperes.

Disconnect (Power) Switch Size

DSS ≥ MOP

Select the standard switch size equal to the calculated MOP value. If this value is not a standard size, select the next larger size.

Table 11 - 208/230V, 460V, and 575V CB Electrical Data

Model	Voltage	Unit			Compressor	Condenser Fan
		FLA	MCA	MOP	Quantity / RLA	Quantity / hp / FLA
CB-024	208-230V/1Φ	13	16	25	1 / 10.3	1 / 0.33 / 2.8
CB-036		20	24	40	1 / 16.7	
CB-048		24	29	50	1 / 21.2	
CB-060		28	35	60	1 / 25.6	
CB-036	208-230V/3Φ	14	17	25	1 / 11.2	
CB-048		16	20	30	1 / 13.5	
CB-060		20	25	40	1 / 17.6	
CB-036	460V/3Φ	7	8	15	1 / 4.5	
CB-048		9	11	15	1 / 6.4	
CB-060		12	14	20	1 / 9.0	
CB-036	575V/3Φ	7	7	15	1 / 3.7	
CB-048		8	9	15	1 / 5.0	
CB-060		10	12	15	1 / 7.4	

Table 12 - Matching F1 Supply Fan and Unit Electrical Data

Unit Voltage	Supply Fan		Unit		
	hp	FLA	FLA	MCA	MOP
208-230V/1Φ	0.5	4.2	4.2	5.0	15.0
	0.75	5.4	5.4	7.0	15.0
	1.0	8.0	8.0	10.0	15.0
115V/1Φ	0.5	7.7	7.7	9.6	15.0
	0.75	9.6	9.6	12.0	15.0
	1.0	12.8	12.8	16.0	20.0

Table 13 - Matching F1 Electric Heat Electrical Data

Unit Voltage	kW	Circuit #	Amps	MCA	MOP
208-230V/1Φ	5	1	21	26.0	30
	10	1	42	52.1	60
	15	1	42	52.1	60
		2	21	26.0	30
	20	1	42	52.1	60
		2	42	52.1	60
	25	1	42	52.1	60
		2	42	52.1	60
		3	21	26.0	30

Note: Electric heat is not available on 115V/1Φ F1 Series air handler

Performance Data

Table 14 - Matching CB and F1, Air Conditioner Performance Data

Condensing Unit	Air Handler	Nominal Capacity	SEER/EER
CB-024	F1-024	24 MBH / 2 Tons	Up to 17.3 SEER/ 13.8 EER
CB-036	F1-036	36 MBH / 3 Tons	
CB-048	F1-048	48 MBH / 4 Tons	
CB-060	F1-060	60 MBH / 5 Tons	

Table 15 - Matching CB and F1, Heat Pump Performance Data

Condensing Unit	Air Handler	Nominal Capacity	SEER/EER	HSPF
CB-024	F1-024	24 MBH / 2 Tons	Up to 15.8 SEER/ 13.0 EER	Up to 9.7
CB-036	F1-036	36 MBH / 3 Tons		
CB-048	F1-048	48 MBH / 4 Tons		
CB-060	F1-060	60 MBH / 5 Tons		

Table 16 - Matching CB and AU, Air Conditioner Performance Data

Condensing Unit	A-Coil	Nominal Capacity	SEER/EER
CB-024	AU-024	24 MBH / 2 Tons	Up to 14.8 SEER/ 12.2 EER
CB-036	AU-036	36 MBH / 3 Tons	
CB-048	AU-048	48 MBH / 4 Tons	
CB-060	AU-060	60 MBH / 5 Tons	

Table 17 - Matching CB and AU, Heat Pump Performance Data

Condensing Unit	Air Handler	Nominal Capacity	SEER/EER	HSPF
CB-024	F1-024	24 MBH / 2 Tons	Up to 13.9 SEER/ 11.8 EER	Up to 9.7
CB-036	F1-036	36 MBH / 3 Tons		
CB-048	F1-048	48 MBH / 4 Tons		
CB-060	F1-060	60 MBH / 5 Tons		

Unit Drawings

CLEARANCES	
LOCATION	CB-B 2-3 TON
BACK	12″
FRONT	36″
LEFT SIDE	36″
RIGHT SIDE	36″
TOP	UNOBSTRUCTED

Note: Back and Left Side unit clearances are interchangeable with the 12" clearance on the wall facing side.

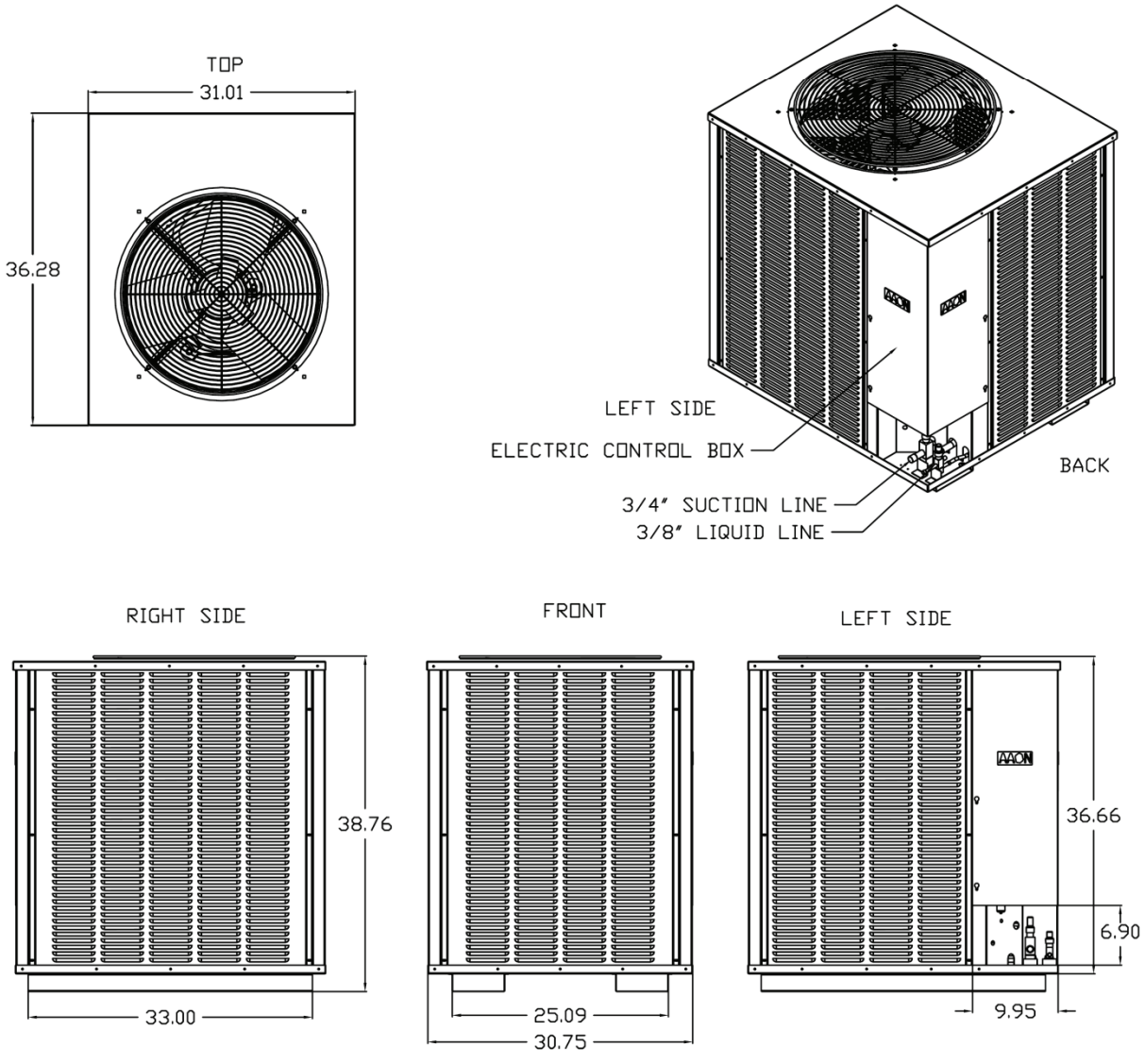

Figure 1 - CB-024 and CB-036

CLEARANCES	
LOCATION	CB-B 4-5 TON
BACK	12″
FRONT	36″
LEFT SIDE	36″
RIGHT SIDE	36″
TOP	UNOBSTRUCTED

Note: Back and Left Side unit clearances are interchangeable with the 12" clearance on the wall facing side.

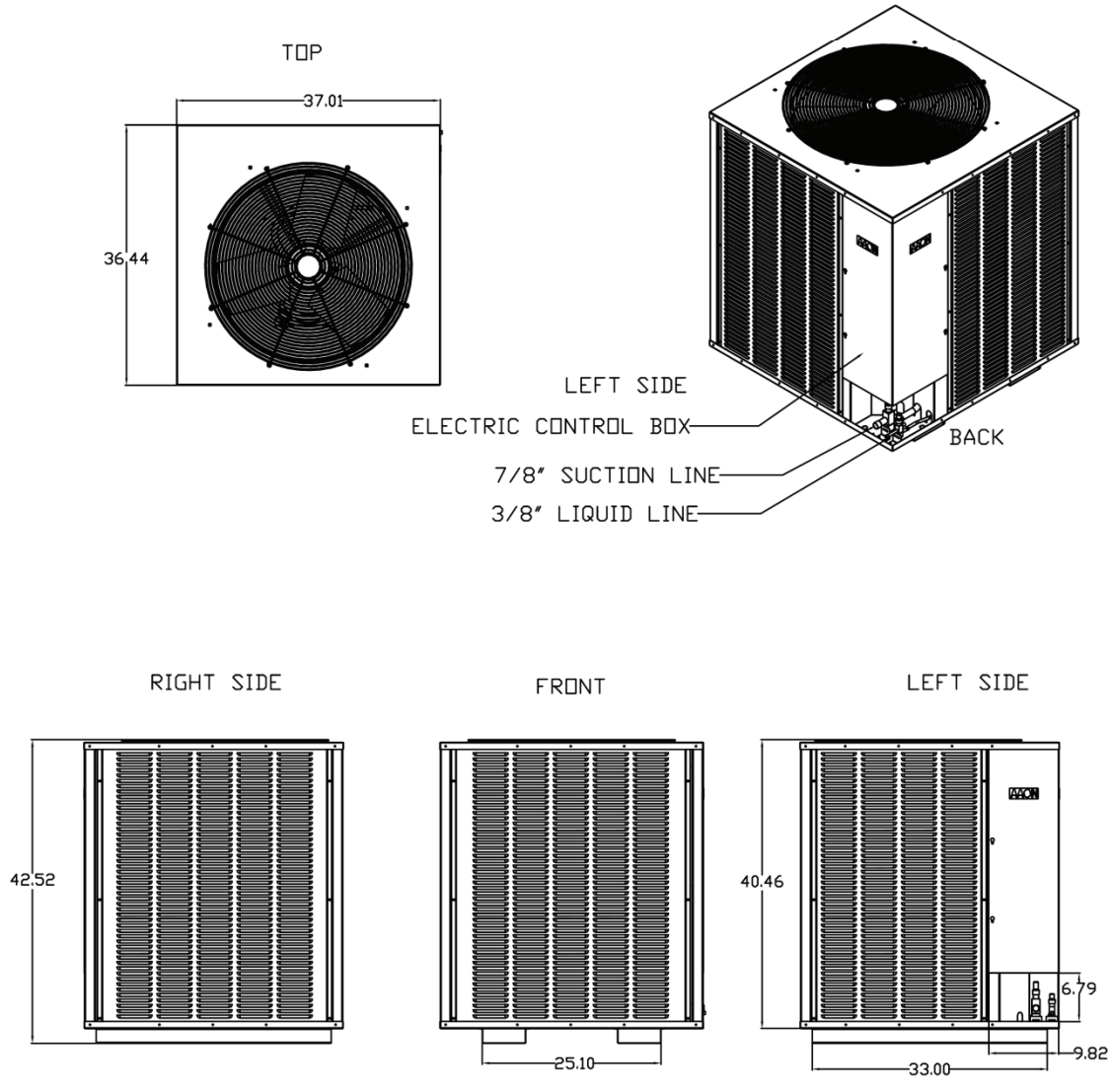

Figure 2 - CB-048 and CB-060

Literature Change History

June 2008
Update of catalog, revising the drawings, clearances, adding the 575V/3Φ/60Hz, adding the CC Series R-22 options, and adding the CC-024 and CC-028.

October 2008
Update of catalog adding R-22 information and revising unit drawings.

March 2009
Update of catalog revising the model numbers and unit drawings and adding variable capacity scroll compressor information.

October 2009
Update of catalog adding 2-5 ton CC Series unit information and removing R-22 information

December 2011
Update of compressor type option D - R-410A Variable Capacity Scroll Compressor description from one to two variable capacity compressors on 31-63 ton units.

July 2012
Update of table of contents. Removal of unit specifications from catalog.

July 2013
Updated CC design revision from B to C, pipe sizing on CB/CC unit information, revised verbiage on refrigeration options for MHGR and HGBP design changes, added additional low ambient options, and added additional cabinet options.

November 2013
Updated CB performance data.

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