Product Data

Dedicated Outdoor Air Units

3 to 55 Nominal Tons

62X 03-55
Dedicated Outdoor Air Unit
Air Cooled Cooling/Dehumidification
Optional Heat, Energy Recovery

Features/Benefits

Carrier's 62X commercial packaged, dedicated, outdoor air unit offers efficiency, application flexibility, quality, reliability and easy maintenance.

Carrier's 62X Series commercial dedicated outdoor air units offer:

- Capacities up to 55 nominal tons
- Vertical or horizontal supply configurations
- Puron® environmentally balanced refrigerant (R-410A) as standard
- Double wall construction with 2 in. R-13 closed cell insulation
- Optional AHRI (Air-Conditioning, Heating, and Refrigeration Institute) listed energy recovery wheel
- Multiple heating options
- Multiple fan and motor options, including ODP, TEFC, and ECM motors, and direct drive airfoil or backward incline fans.
- Direct digital control (DDC) control with available (factory-installed) touchscreen interface.
- Multiple reheat options, including modulating HGRH and liquid subcooling reheat with modulating HGRH
- Stand alone or networked operation
- Lead circuit variable capacity compressor
- 100% outdoor air operation

High efficiency

The Carrier 62X dedicated outdoor air system (DOAS) uses highly efficient, scroll compressors that are optimally designed for use with Puron® refrigerant (R-410A).

Operating efficiency of the unit may be increased by adding the optional high efficiency condenser, liquid subcooling reheat, or energy recovery system.

The energy recovery system uses an AHRI-listed energy recovery wheel to transfer sensible and latent heat between the incoming air and the exhaust air, reducing energy consumption and improving indoor conditions.

Flexibility to suit many applications

The Carrier 62X dedicated outdoor air unit is designed to provide conditioned ventilation air in a wide range of geographic locations.

Cooling and dehumidification capacities from 3-55 tons are available to meet the application supply air dew point based on the application airflow and geographic location. All 62X units feature a lead circuit variable capacity scroll compressor (digital on unit sizes 03-18 only for 575-v or variable speed on unit sizes 03-55) for capacity modulation at part load.

All 62X units are available in 208V-3Ph-60Hz, 230V-3Ph-60Hz, 460V-3Ph-60Hz or 575V-3Ph-60Hz with a short circuit current rating (SCCR) of 5kA.

Cooling and dehumidification capacity enhancing options, such as liquid sub-cooling reheat, high efficiency condenser, and energy recovery wheels are available to improve application capacity or efficiency and may allow for downsizing the compressor capacity.

The 62X unit is available in a wide range of heat options, including no heat, up to 1200 MBH of gas heat, up to 120 kW of electric heat, or a high capacity hot water coil. Modulating heat control is available to provide precise supply air temperature control.

Units are available in vertical or horizontal supply to meet a variety of installations. Vertical supply units can be curb mounted (accessory curbs available) or structure mounted. Horizontal supply units can be curb, structure, or slab mounted.

The 62X is also available with a vertical exhaust air intake that can be used for barometric relief, power exhaust, or energy recovery with power exhaust to meet project requirements.

All 62X units feature direct drive supply fans for efficient operation. Multiple sizes of airfoil and backward incline fans are available to meet application airflow and static requirements. A wide variety of supply fan motor sizes are available to meet fan power requirements.

Durable construction

Cabinets are constructed of heavy gauge galvanized steel with a pre-painted exterior finish to protect the cabinet and preserve the appearance through a long operating life.

The cabinet features a double wall design with a galvanized inner liner. The double wall design is insulated with 2 in., R-13 closed-cell foam insulation, which adds rigidity to the structure and resists moisture intrusion.

Quality and reliability

All units are run tested prior to leaving the factory to help ensure proper operation and enhance life expectancy of key components. Components undergo numerous checks and inspections throughout the manufacturing process to eliminate components that do not meet Carrier's high quality standards.

Reliable, variable and fixed capacity scroll compressors are mounted on rubber isolation mounts for quiet operation.

Mechanically and electrically independent dual refrigeration circuits (size 10 and larger) provide redundancy in the event that one circuit should require service. All refrigerant circuits use a thermostatic expansion valve (TXV) to ensure proper refrigerant metering throughout the unit's broad operating envelope. The refrigeration circuits are protected by filter driers specifically designed for Puron® refrigerant (R-410A).

Standard warranty coverage provides a limited one-year parts warranty and a 5-year limited warranty on the stainless steel gas heat exchanger.

Easy to install, maintain and service

Maintaining and servicing a dedicated outdoor air unit is critical in maximizing the life expectancy and efficient operation of the unit. The Carrier unit

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Features/Benefits (cont)

has been designed for easy access with simple maintenance procedures.

Hinged access panels provide easy access to controls, fans, coils and filters. The optional factory-installed energy recovery wheel shall slide out of the cabinet for service.

A dedicated vertical or horizontal design does not require conversion time during the unit installation. The curb power connection minimizes roof penetrations.

Power connections are in a protected area, away from harsh environmental conditions. All units feature heavy gauge formed galvanized steel base rails with rigging openings to simplify handling and lifting at the job site.

Indoor air quality

The Carrier 62X is standard with a 2 in. filter track with MERV 8 filter. Units selected with a 4 in. MERV 8, 11, or 13 filters include a 4 in. filter track (see Dimensions section).

The condensate drain pan is double sloped to eliminate standing water per ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) Standard 62-1089R. The drain pan is fabricated of heavy gauge stainless steel to help resist corrosion and is insulated on the bottom with closed cell insulation.

The double wall design of the unit with galvanized interior liners allows easy cleaning of the interior surfaces.

Energy recovery

The Carrier dedicated outdoor air unit may be optionally equipped with an energy recovery (enthalpy) wheel. The enthalpy wheel meets the requirements of AHRI standard 1060 and is certified by AHRI. This energy recovery wheel is sized to provide increased energy recovery and humidity control based on the application requirements. The energy wheel is mounted in a slide-out cassette for simplified maintenance and also includes 2 in. filters on the outdoor air and exhaust air intakes.

Heating systems

Carrier dedicated outdoor air units may be equipped with a variety of heat system types: gas heat (natural gas standard, propane via special order), electric, or hot water. Precise leaving air temperature control is provided via staged or modulating heat control systems.

The gas heating systems are of the induced-draft design that draws hot combustion gases through the heat exchanger at the ideal rate for maximum heat transfer. Induced-draft systems are an inherently safer design than forced draft, positive pressure designs.

Induced-draft designs operate the heat exchanger under negative pressure, helping to prevent leakage of flue gases into the supply airstream. The gas heat system uses a direct-spark ignition and is protected by numerous safety circuits.

The 62X gas heaters are available from 75 up to 1200 MBtuh. The units also have XL cabinets available. The larger heat capacities on these cabinets facilitate applications that require a higher temperature rise. Standard cabinets with vertical supply heaters can achieve a 100°F maximum temperature rise and a 80°F maximum temperature rise on horizontal supply configurations. However, XL cabinets can achieve a maximum temperature rise of 160°F for vertical supply and 130°F for horizontal supply configurations.

Direct Digital Control (DDC)

The factory-installed and programmed DDC controller provides complete system control of unit operation. The controller monitors all system sensors and makes operating decisions based upon the user's configuration inputs.

Local access to the controller may be accomplished via the Equipment Touch™ touchscreen display. The Equipment Touch is a unit-mounted user interface with a 4.3 in. touchscreen display. The Equipment Touch will be standard factory installed on all Rev H control units. Interface can also be accomplished through the Android Equipment App on the Google Play store.

In addition, the 62X controller has the following features:

- simple access to set points, time schedules, status values, and unit configuration parameters
- supports communications with BACnet™[1] and building automation protocols
- alarm history is recorded and may be accessed via the Equipment Touch display
- password protection
- compressor minimum off time (5 minutes) feature
- service test and a service Diagnostic mode

Harsh environment coating

Carrier dedicated outdoor air units may be equipped with optional harsh environment protection through a factory-applied coating. This coating, consisting of aluminum-impregnated polyurethane and rated for a 10,000 hour salt spray, will cover all exposed areas of the unit, including all of the coils (evaporator, condenser, hot gas reheat, and liquid subcooling), compressors, interior and exterior panels, piping, and gas heaters.

Reheat options

Carrier dedicated outdoor air units may be equipped with multiple reheat options. Reheat options include hot gas reheat and liquid subcooling. Hot gas reheat includes modulating control to help rewarm dehumidified air to neutral temperatures to help offset space relative humidity. The hot gas from the compressor is directed into a full faced Al/Cu coil after the evaporator to help lower the relative humidity of the supply air. Liquid subcooling is also a reheat option, but instead of using hot gas from the compressor, it uses warm liquid refrigerant after it passes through the condenser and sends it to a full faced Al/Cu coil after the evaporator for additional subcooling. In this process, while helping reheat the supply air, liquid subcooling also reduces the temperature of the refrigerant entering the evaporator coil which can increase overall unit capacity. Liquid subcooling is used in conjunction with hot gas reheat to ensure that the supply air is reheated to neutral conditions.

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Model number nomenclature

62X B 07 E H K C - E H R B R AE

62X – Dedicated Outdoor Air Unit

Cabinet, Supply, Discharge

A – 100% OA / Cabinet A / Vertical Supply / No Exhaust
B – 100% OA / Cabinet B / Vertical Supply / No Exhaust
C – 100% OA / Cabinet C / Vertical Supply / No Exhaust
D – 100% OA / Cabinet D / Vertical Supply / No Exhaust
E – 100% OA / Cabinet A / Horizontal Supply / No Exhaust
F – 100% OA / Cabinet B / Horizontal Supply / No Exhaust
G – 100% OA / Cabinet C / Horizontal Supply / No Exhaust
H – 100% OA / Cabinet D / Horizontal Supply / No Exhaust
J – 100% OA / Cabinet A / Vertical Supply / Vertical Exhaust
K – 100% OA / Cabinet B / Vertical Supply / Vertical Exhaust
M – 100% OA / Cabinet C / Vertical Supply / Vertical Exhaust
N – 100% OA / Cabinet D / Vertical Supply / Vertical Exhaust
P – 100% OA / Cabinet A / Horizontal Supply / Vertical Exhaust
Q – 100% OA / Cabinet B / Horizontal Supply / Vertical Exhaust
R – 100% OA / Cabinet C / Horizontal Supply / Vertical Exhaust
S – 100% OA / Cabinet D / Horizontal Supply / Vertical Exhaust
U – 100% OA / Cabinet CXL / Vertical Supply / No Exhaust
V – 100% OA / Cabinet DXL / Vertical Supply / No Exhaust
X – 100% OA / Cabinet CXL / Horizontal Supply / No Exhaust
Y – 100% OA / Cabinet DXL / Horizontal Supply / No Exhaust
2 – 100% OA / Cabinet CXL / Vertical Supply / Vertical Exhaust
3 – 100% OA / Cabinet DXL / Vertical Supply / Vertical Exhaust
5 – 100% OA / Cabinet CXL / Horizontal Supply / Vertical Exhaust
6 – 100% OA / Cabinet DXL / Horizontal Supply / Vertical Exhaust
7 – 100% OA / Cabinet CL / Vertical Supply / No Exhaust
8 – 100% OA / Cabinet CL / Horizontal Supply / No Exhaust
L – 100% OA / Cabinet CL / Vertical Supply / Vertical Exhaust
9 – 100% OA / Cabinet CL / Horizontal Supply / Vertical Exhaust

Unit Size – Nominal Capacity (MBH)

03 – 36	12 – 150	40 – 480
04 – 48	15 – 180	45 – 540
05 – 60	18 – 210	50 – 600
06 – 72	20 – 240	55 – 660
07 – 84	25 – 300	
08 – 96	30 – 360	
10 – 120	35 – 420	

Energy Recovery Ventilator (ERV) Wheel

	Wheel #	Diameter	Thickness	Bypass
–	– None			
B	– 324	32	4	Yes
C	– 364	36	4	Yes
D	– 424	42	4	Yes
E	– 484	48	4	Yes
F	– 486	48	6	Yes
G	– 544	54	4	Yes
H	– 604	60	4	Yes
J	– 606	60	6	Yes
K	– 664	66	4	Yes
M	– 666	66	6	Yes
P	– 324	32	4	No
Q	– 364	36	4	No
R	– 424	42	4	No
S	– 484	48	4	No
T	– 486	48	6	No
U	– 544	54	4	No
V	– 604	60	4	No
W	– 606	60	6	No
X	– 664	66	4	No
Y	– 666	66	6	No

SEE NEXT PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

Supply Fan Motor Options

A – 1 HP ODP with VFD
B – 1-1/2 HP ODP with VFD
C – 2 HP ODP with VFD
D – 3 HP ODP with VFD
E – 5 HP ODP with VFD
F – 7-1/2 HP ODP with VFD
G – 10 HP ODP with VFD
H – 15 HP ODP with VFD
J – 1 HP TEFC with VFD
K – 1-1/2 HP TEFC with VFD
M – 2 HP TEFC with VFD
N – 3 HP TEFC with VFD
P – 5 HP TEFC with VFD
Q – 7-1/2 HP TEFC with VFD
R – 10 HP TEFC with VFD
S – 15 HP TEFC with VFD
T – ECM[a]
U – Dual ECM[a]

Coil and Reheat Options

	Evaporator Coil Rows	HGRH	HGRH Circuit	Sub-Cooling	Condenser Fans
J	– 6	Mod	Lead	—	Var Speed
K	– 6	Mod	Dual	—	Var Speed
M	– 6	Mod	Lead	SubCooling	Var Speed

Heat Options

	MBtuh input	Temperature Rise[b]	E-Heat kW
–	– None		
A	– 75	Standard	N/A
B	– 100	Standard	N/A
C	– 150	Standard	N/A
D	– 200	Standard	N/A
E	– 250	Standard	N/A
F	– 300	Standard	N/A
G	– 350	Standard	N/A
H	– 400	Standard	N/A
K	– 400	High (XL)	N/A
L	– 500	High (XL)	N/A
M	– 600	High (XL)	N/A
N	– 700	High (XL)	N/A
O	– 800	High (XL)	N/A
P	– 1000	High (XL)	N/A
Q	– 1200	High (XL)	N/A
S	– N/A	N/A	5
T	– N/A	N/A	10
U	– N/A	N/A	15
V	– N/A	N/A	20
W	– N/A	N/A	25
X	– N/A	N/A	30
Y	– N/A	N/A	35
Z	– N/A	N/A	40
1	– N/A	N/A	50
2	– N/A	N/A	60
3	– N/A	N/A	70
4	– N/A	N/A	80
5	– N/A	N/A	100
6	– N/A	N/A	110
7	– N/A	N/A	120
8	– Hot Water Coil		

[a] ECM supply and exhaust fan motors are not available in 575-v. See physical data tables for ECM motor availability per cabinet size.
[b] Standard Temperature rise is 80/100°F for horizontal/vertical supply. High Temperature rise is 130/160°F for horizontal/vertical supply and requires an XL cabinet.

NOTE: See latest version of Carrier's Dedicated Outdoor Air Systems Builder program for any size and option restrictions.

Model number nomenclature (cont)

62X B 07 E H K C - E H R B R AE

SEE PREVIOUS PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

Factory Installed Options
Refer to tables on page 6 for available options codes.

Exhaust Fan

-	– None	H	– 16 in., BI
2	– 350 mm (208/230V only), BI	J	– 18 in., BI
4	– 450 mm (High), BI	K	– 20 in., BI
5	– 500 mm (Low), BI	M	– 22 in., BI
6	– 500 mm (High) 460V only, BI	N	– 25 in., BI
7	– 560 mm 208,230V only, BI	P	– 12 in., AF
8	– 355 mm (Low) 460V only, BI	Q	– 14 in., AF
9	– 500 mm (Low) 460V only, BI	R	– 16 in., AF
D	– 10 in., BI	S	– 18 in., AF
E	– 11 in., BI	T	– 20 in., AF
F	– 12 in., BI	U	– 22 in., AF
G	– 14 in., BI	V	– 25 in., AF

Power Exhaust Fan Motor Options

- – None
- A – 1 HP ODP with VFD
- B – 1 1/2 HP ODP with VFD
- C – 2 HP ODP with VFD
- D – 3 HP ODP with VFD
- E – 5 HP ODP with VFD
- F – 7 1/2 HP ODP with VFD
- G – 10 HP ODP with VFD
- H – 15 HP ODP with VFD
- J – 1 HP TEFC with VFD
- K – 1 1/2 HP TEFC with VFD
- M – 2 HP TEFC with VFD
- N – 3 HP TEFC with VFD
- P – 5 HP TEFC with VFD
- Q – 7 1/2 HP TEFC with VFD
- R – 10 HP TEFC with VFD
- S – 15 HP TEFC with VFD
- T – ECM[a]
- U – Dual ECM[a]

Supply Fan

2	– 350 mm (208/230V only), BI	J	– 18 in., BI
4	– 450 mm (High), BI	K	– 20 in., BI
5	– 500 mm (Low), BI	M	– 22 in., BI
6	– 500 mm (High) 460V only, BI	N	– 25 in., BI
7	– 560 mm 208,230V only, BI	P	– 12 in., AF
8	– 355 mm (Low) 460V only, BI	Q	– 14 in., AF
9	– 500 mm (Low) 460V only, BI	R	– 16 in., AF
D	– 10 in., BI	S	– 18 in., AF
E	– 11 in., BI	T	– 20 in., AF
F	– 12 in., BI	U	– 22 in., AF
G	– 14 in., BI	V	– 25 in., AF
H	– 16 in., BI		

Control Options and Filters

	Control Option	Filter Thickness	MERV
–	– None	2 in.	MERV 8
A	– None	4 in.	MERV 8
B	– None	4 in.	MERV 11
C	– None	4 in.	MERV 13
D	– Smoke detector	2 in.	MERV 8
E	– Smoke detector	4 in.	MERV 8
F	– Smoke detector	4 in.	MERV 11
G	– Smoke detector	4 in.	MERV 13

Voltage Options, Compressor and Condenser Fans

	Voltage	Compressor	Condenser Efficiency
A	– 208-3-60	VCC Lead Circuit	Standard Efficiency
C	– 208-3-60	VCC Lead Circuit	High Efficiency
E	– 230-3-60	VCC Lead Circuit	Standard Efficiency
G	– 230-3-60	VCC Lead Circuit	High Efficiency
J	– 460-3-60	VCC Lead Circuit	Standard Efficiency
M	– 460-3-60	VCC Lead Circuit	High Efficiency
P	– 575-3-60	VCC Lead Circuit	Standard Efficiency
R	– 575-3-60	VCC Lead Circuit	High Efficiency

Design Series

H – Revision H Controls

[a] ECM supply and exhaust fan motors are not available in 575-v. See physical data tables for ECM motor availability per cabinet size.
NOTE: See latest version of Carrier's Dedicated Outdoor Air Systems Builder program for any size and option restrictions.

LEGEND

AF — Airfoil
BI — Backward Inclined
ECM — Electronically Commutated Motor
N/A — Not Applicable
ODP — Open Drip Proof
TEFC — Totally Enclosed Fan Cooled
VCC — Variable Capacity Compressor
VFD — Variable Frequency Drive

Model number nomenclature (cont)

FIOP Table

Option	Description
1	Air flow monitor control (supply only or supply and exhaust)
2	Spring type vibration isolation on Supply fan and Exhaust Fan (if exhaust fan selected)
3	Non-fused disconnect
4	Pressure control (supply duct pressure, exhaust space pressure)
5	115V GFI Convenience outlet w/15A breaker - Unit-Powered Type
6	5:1 turndown modulating gas heat or SCR controlled electric heat
7	10:1 turndown modulating gas heat
8	ERV VFD Defrost
9	Harsh environment coating- cabinet, evap coil, cond coil, reheat coil, sub-cooling coil (if installed)

Limitations

Option	Description
1	Not available with duct pressure control.
2	Spring vibration isolation not available on ECM.
3	Not applicable.
4	Not available with airflow monitor.
5	Not applicable.
6	5:1 not available on CXL or DXL. SCR not available on 5kW.
7	10:1 Modulating not available on A Cabinet or on 75MBH.
8	Not applicable.
9	Not available with ODP motors or ECM motors except on A Cabinet.

Digits 17 and 18

17 and 18	FIOPs	17 and 18	FIOPs	17 and 18	FIOPs	17 and 18	FIOPs	17 and 18	FIOPs
AA	1	BV	1,5,7	DN	1,7,8	FH	5,9	HP	2,3,5,9
AB	1,2	BW	1,7	DO	2,3,4,5,7,8	FI	6,8,9	HQ	1,2,3,5,9
AC	2	BX	2,3,4,5,7	DP	2,4,5,7,8	FJ	6,9	HR	4,5,9
AD	1,2,3	BY	2,4,5,7	DQ	2,5,7,8	FK	8,9	HT	2,4,5,9
AE	2,3	BZ	2,5,7	DR	2,7,8	FL	9	HV	3,4,5,9
AF	1,3	CC	2,7	DS	3,4,5,7,8	FP	1,5,7,8,9	HX	2,3,4,5,9
AG	3	CD	3,4,5,7	DT	3,5,7,8	FQ	1,7,8,9	HZ	1,2,8
AH	1,3,5	CE	3,5,7	DU	3,7,8	FS	2,3,4,5,7,8,9	II	1,3,8
AJ	2,3,4	CF	3,7	DV	4,5,7,8	FT	2,4,5,7,8,9	IJ	2,3,8
AL	2,4	CG	4,5,7	DX	4,7,8	FU	2,5,7,8,9	IK	1,2,3,8
AM	3,4	CH	4,7	DY	5,7,8	FV	2,7,8,9	IM	2,4,8
AN	4	CI	5,7	DZ	7,8	FX	3,4,5,7,8,9	IO	3,4,8
AS	1,5	CJ	7	EH	1,5,6,8,9	FY	3,5,7,8,9	IQ	2,3,4,8
AT	2,3,4,5	CN	1,5,6,8	EI	1,6,8,9	FZ	3,7,8,9	IS	1,5,8
AU	2,3,5	CO	1,6,8	EJ	1,8,9	GH	4,5,7,8,9	IT	2,5,8
AV	2,4,5	CP	1,8	EK	1,9	GI	4,7,8,9	IU	1,2,5,8
AW	2,5	CQ	2,3,4,5,6,8	EL	2,3,4,5,6,8,9	GK	5,7,8,9	IV	3,5,8
AX	3,4,5	CR	2,4,5,6,8	EM	2,4,5,6,8,9	GM	7,8,9	IW	1,3,5,8
AZ	3,5	CS	2,5,6,8	EN	2,5,6,8,9	GN	7,9	IX	2,3,5,8
BB	4,5	CT	2,6,8	EO	2,6,8,9	GP	1,2,5	IY	1,2,3,5,8
BC	5	CU	2,8	EP	2,8,9	GQ	1,2,3,5	IZ	4,5,8
BG	1,5,6	CV	3,4,5,6,8	EQ	2,9	GS	1,2,9	JK	2,4,5,8
BH	1,6	CW	3,5,6,8	ER	3,4,5,6,8,9	GT	1,3,9	JM	3,4,5,8
BI	2,3,4,5,6	CX	3,6,8	ES	3,5,6,8,9	GU	2,3,9	JO	2,3,4,5,8
BJ	2,4,5,6	CY	3,8	ET	3,6,8,9	GV	1,2,3,9	JQ	1,2,8,9
BK	2,5,6	CZ	4,5,6,8	EU	3,8,9	GX	2,4,9	JR	1,3,8,9
BL	2,6	DD	4,6,8	EV	3,9	GZ	3,4,9	JS	2,3,8,9
BM	3,4,5,6	DE	4,8	EW	4,5,6,8,9	HI	2,3,4,9	JT	1,2,3,8,9
BN	3,5,6	DF	5,6,8	EX	4,6,8,9	HK	1,5,9	JV	2,4,8,9
BO	3,6	DG	5,8	EY	4,8,9	HL	2,5,9	JX	3,4,8,9
BP	4,5,6	DH	6,8	EZ	4,9	HM	1,2,5,9	JZ	2,3,4,8,9
BQ	4,6	DI	8	FF	5,6,8,9	HN	3,5,9	KL	1,5,8,9
BR	6	DM	1,5,7,8	FG	5,8,9	HO	1,3,5,9	KM	2,5,8,9

Model number nomenclature (cont)

Digits 17 and 18 (cont)

17 and 18	FIOPs	17 and 18	FIOPs	17 and 18	FIOPs	17 and 18	FIOPs
KN	1,2,5,8,9	NZ	1,5,6,9	SX	1,3,7	YS	1,2,7,8
KO	3,5,8,9	OO	2,5,6,9	SY	2,3,7	YT	1,3,7,8
KP	1,3,5,8,9	OP	1,2,5,6,9	SZ	1,2,3,7	YU	2,3,7,8
KQ	2,3,5,8,9	OQ	3,5,6,9	TU	2,4,7	YV	1,2,3,7,8
KR	1,2,3,5,8,9	OR	1,3,5,6,9	TW	3,4,7	YX	2,4,7,8
KS	4,5,8,9	OS	2,3,5,6,9	TY	2,3,4,7	YZ	3,4,7,8
KU	2,4,5,8,9	OT	1,2,3,5,6,9	UU	1,2,5,7	ZB	2,3,4,7,8
KW	3,4,5,8,9	OU	4,5,6,9	UV	1,3,5,7	ZD	1,2,5,7,8
KY	2,3,4,5,8,9	OW	2,4,5,6,9	UW	2,3,5,7	ZE	1,3,5,7,8
LL	1,2,6	OY	3,4,5,6,9	UX	1,2,3,5,7	ZF	2,3,5,7,8
LM	1,3,6	PP	2,3,4,5,6,9	UZ	1,7,9	ZG	1,2,3,5,7,8
LN	2,3,6	PR	1,2,6,8	VV	2,7,9	ZI	1,2,7,8,9
LO	1,2,3,6	PS	1,3,6,8	VW	1,2,7,9	ZJ	1,3,7,8,9
LQ	2,4,6	PT	2,3,6,8	VX	3,7,9	ZK	2,3,7,8,9
LS	3,4,6	PU	1,2,3,6,8	VY	1,3,7,9	ZL	1,2,3,7,8,9
LU	2,3,4,6	PW	2,4,6,8	VZ	2,3,7,9	ZO	2,4,7,8,9
LW	5,6	PY	3,4,6,8	WW	1,2,3,7,9	ZQ	3,4,7,8,9
LX	1,2,5,6	QQ	2,3,4,6,8	WX	4,7,9	ZS	2,3,4,7,8,9
LY	1,3,5,6	QS	1,2,5,6,8	WZ	2,4,7,9	ZU	1,2,5,7,8,9
LZ	2,3,5,6	QT	1,3,5,6,8	XY	3,4,7,9	ZV	1,3,5,7,8,9
MM	1,2,3,5,6	QU	2,3,5,6,8	YA	2,3,4,7,9	ZW	2,3,5,7,8,9
MW	1,6,9	QV	1,2,3,5,6,8	YC	5,7,9	ZX	1,2,3,5,7,8,9
MX	2,6,9	QX	1,2,6,8,9	YD	1,5,7,9	ZZ	—
MY	1,2,6,9	QY	1,3,6,8,9	YE	2,5,7,9		
MZ	3,6,9	QZ	2,3,6,8,9	YF	1,2,5,7,9		
NN	1,3,6,9	RR	1,2,3,6,8,9	YG	3,5,7,9		
NO	2,3,6,9	RV	3,4,6,8,9	YH	1,3,5,7,9		
NP	1,2,3,6,9	RX	2,3,4,6,8,9	YI	2,3,5,7,9		
NQ	4,6,9	RZ	1,2,5,6,8,9	YJ	1,2,3,5,7,9		
NS	2,4,6,9	SS	1,3,5,6,8,9	YK	4,5,7,9		
NU	3,4,6,9	ST	2,3,5,6,8,9	YM	2,4,5,7,9		
NW	2,3,4,6,9	SU	1,2,3,5,6,8,9	YO	3,4,5,7,9		
NY	5,6,9	SW	1,2,7	YQ	2,3,4,5,7,9		

DOAS application guide

Overview

Dedicated Outdoor Air Systems (DOAS) are a special type of heating, ventilation, and air conditioning (HVAC) unit that conditions and supplies 100% outdoor air to provide ventilation to one or more zones in a building. The ventilation air can be distributed directly to the zone or to an ancillary cooling and heating device.

The Carrier 62X unit is a direct expansion (DX) DOAS unit with optional auxiliary heating and optional energy recovery. The 62X unit is designed and built for optimal performance in ventilation applications. While the 62X unit may look like a typical packaged HVAC unit, the application, operation and selection is vastly different. The guide below is intended to provide assistance with applying, sizing, and selecting direct expansion (DX) based DOAS units.

Application overview

Maintaining high indoor air quality or IAQ is important to a building's performance. Poor IAQ can have a negative impact on building occupants, which can in turn have a negative impact on the building user or building owner. A critical component to maintaining high IAQ is ventilation, or the process of replacing low quality or contaminated air with higher quality air.

Building materials and building activity will contaminate the indoor air with odors, debris, chemicals, or bacteria. Occupant activity in the building will also deplete oxygen levels. By replacing contaminated indoor air with air that has a higher concentration of oxygen and lower contamination levels, building occupants can live, work, and play more comfortably.

A common source of high quality air is outdoor air, which typically only requires minor filtration to improve its quality above typical indoor air levels. The problem with outdoor air is, it can have qualities that negatively impact occupant comfort, such as high humidity, extreme cold or extreme heat. To combat these negative qualities, the outdoor air is conditioned through cooling, heating, or dehumidification. The processes of conditioning outdoor air can consume a lot of energy. A balance must be met to minimize energy consumption while maintaining high indoor air quality.

In traditional heating, ventilation, and air conditioning (HVAC) systems, a single HVAC unit will provide zone air conditioning and zone ventilation. For systems with a single zone, the ventilation air is mixed with return air from the zone, heated, cooled or dehumidified by the HVAC unit, and supplied to the zone. Since the HVAC unit is only providing ventilation air to one zone, it is easy to maintain the proper amount of zone ventilation, helping to minimize energy consumption while maintaining high IAQ.

However, most HVAC units are not designed to handle high quantities or the high extreme conditions of outdoor air. During winter months, the outdoor air can be very cold and requires a high amount of heat. During summer months when the outdoor air is humid, a lot of energy is required to cool and dehumidify. During some periods of the year, the outdoor air may not require much conditioning at all.

Oversizing a traditional HVAC unit to handle the high heating and dehumidification loads of outdoor air can result in poor control of zone air temperature and humidity, leading to poor occupant comfort. By separating the conditioning of ventilation air and zone air to different systems, each system can be optimally sized for the appropriate load condition to ensure proper system comfort.

For systems with multiple zones, using a single HVAC unit to provide both zone air conditioning and zone ventilation and conditioning can be more complex. In a multi-zone system, the ventilation air is mixed with return air from the zones, conditioned by the HVAC unit, and supplied to the zones. Unless each zone is identical, the zones will all have a different ventilation airflow requirement and a different zone conditioning airflow requirement. Since the ventilation air is now a part of the HVAC unit supply airflow and zone conditioning airflow, it is very difficult to ensure each zone is getting enough ventilation air to ensure high IAQ and meet required ventilation rates.

One method of ensuring proper ventilation in a multi-zone system is to calculate the percentage of ventilation air to conditioning air for each zone. After identifying which zone in the system has the highest ventilation air percentage, the HVAC unit must deliver that percentage of ventilation air to the entire system. This results in over ventilation of most zones, which wastes energy. Again, the solution is to separate the ventilation and zone conditioning into separate systems.

To provide zone ventilation air, the DOAS unit will intake 100% outdoor air, and filter it to improve the air quality. The filtered outdoor air will typically have to be conditioned, through cooling, dehumidification, or heating. The now conditioned ventilation air is sent from the DOAS unit to a duct distribution system. The duct distribution system can lead directly to the zones or it can be directed to an ancillary cooling and heating device for further conditioning and distribution to the zone.

Having a dedicated system for ventilation ensures that the exact amount of prescribed ventilation air is delivered to each zone. This helps to maintain high IAQ while minimizing energy consumption. Separating the conditioning of ventilation air and the conditioning of the zone air also simplifies sizing and selection of each unit, helping to ensure proper zone comfort. The DOAS unit is sized to handle the outdoor air loads, leaving the ancillary heating and cooling unit to handle the space load. This separation of loads can also help reduce overall system capacity, which saves on first costs and energy costs.

Using a DOAS can also allow for the zone latent and sensible loads to be separated, or decoupled. In a traditional system, the zone HVAC unit maintains both zone temperature and zone humidity. To maintain zone temperature, the zone HVAC unit must deliver air that is cold enough to offset the zone sensible load generation (heat). To maintain zone humidity levels, the HVAC unit must deliver air that has a low enough dew point temperature to offset the space humidity generation. Because zone loads fluctuate, it can be very difficult for the HVAC unit to maintain both conditions. It also becomes very difficult to control the HVAC unit. In typical systems, the HVAC unit will be controlled to the zone air temperature (sensible load). After the zone air temperature is achieved, the HVAC unit will disable its cooling system. When the cooling system is disabled, the HVAC unit is also stopping its ability to dehumidify.

By sizing the DOAS unit to deliver dry ventilation air to the zone, the DOAS unit will counter the latent load in the zone. This leaves the space sensible load to be handled by the now ancillary cooling and heating unit. By decoupling the system latent and sensible loads, the system sizing can be further minimized, while simplifying system control and operation.

DOAS application guide (cont)

Along with zone ventilation and dehumidification, DOAS units may also be tasked with maintaining zone or building pressure. Since DOAS units supply 100% outdoor air to the zones, the building pressure will start to rise. To prevent over pressurizing the building, an equivalent amount of air must be removed or exhausted from the building. To accomplish this, the DOAS unit can be equipped with a dedicated exhaust fan, allowing both the ventilation air stream and exhaust air stream to pass through the DOAS unit.

Since the exhaust air stream contains air that has previously been conditioned, it will have more neutral energy content than the outdoor air the DOAS unit is attempting to condition. By using an energy recovery device between the ventilation and exhaust air streams, it becomes possible to recover some of the energy that the DOAS unit has already expended to precondition the outdoor air. Using energy recovery can save on DOAS unit energy costs, since it is no longer required to work as hard to condition the outdoor air. Energy recovery also reduces the required capacity of the DOAS unit, saving on initial costs.

As shown above, DOAS units are used differently from traditional HVAC units. While traditional HVAC units are focused on maintaining zone temperature, DOAS units are tasked with providing zone ventilation and dehumidification. The DOAS unit will operate to prioritize zone ventilation and dehumidification over zone conditioning.

Operation overview

To maintain zone indoor air quality, the DOAS unit must deliver ventilation air whenever the zone is occupied and in need of ventilation. To accomplish this, the DOAS unit is typically controlled based on an occupancy schedule or occupancy input from a building automation system (BAS). When the zone is planned to be empty or unoccupied, the DOAS unit is typically shut off. When the zone is occupied, the DOAS unit is enabled and will introduce ventilation air to the space.

In Occupied mode, a DOAS unit will enable the intake of outdoor air (typically through an outdoor air damper). The DOAS unit supply fan will also be enabled to draw in the outdoor air and discharge it to the zones through a common duct distribution system. If the DOAS unit contains an exhaust fan, that will also be enabled to control building pressure while the DOAS unit is supplying outdoor air to the zones.

Before the outdoor air is supplied to the zones, it likely will need to be cooled, dehumidified, or heated. Otherwise, the ancillary heating and cooling unit would be required to handle the loads of both the outdoor air and zone, eliminating one of the benefits of DOAS. The DOAS units can not rely on a standard thermostat to determine how to condition the outdoor air. Instead, most DOAS units will have a digital controller, controlling multiple aspects of the DOAS units. To enable cooling, dehumidification, or heating, the digital controller will typically reference an outdoor air condition, such as temperature, humidity, or enthalpy. To control the output of the heating, cooling, or dehumidification systems, the microprocessor will typically reference a supply air condition, such as dry bulb temperature or humidity. Most DX based DOAS units will operate to maintain a supply air dry bulb temperature, allowing the DOAS unit to control how the ventilation air will impact space sensible loads.

During heating operation, most DOAS units are set to maintain a zone neutral supply air dry bulb temperature, typically between 65°F and 75°F. This is accomplished by cycling or modulating the output of the DOAS heat source to maintain the supply air temperature set point. During cold weather, most buildings will have a mix of zones requiring cooling and zones requiring heating. By discharging a zone neutral supply air temperature, the DOAS unit will not add to or take away from the zone sensible cooling load. This helps prevent overheating of the zones and prevents the DOAS unit fighting with the ancillary cooling and heating units, which wastes energy.

The neutral DOAS heating supply air temperature also helps improve the effectiveness of the zone ventilation. If warm or hot ventilation air were provided to the zone through an overhead distribution system, the ventilation air would likely not mix with the zone air. Instead, the warm ventilation air would stay near the ceiling of the zone. To ensure the warm ventilation air is properly mixed throughout the zone, the amount of ventilation air provided to the zone would need to be increased or the distribution or return of zone air would have to be moved closer to the zone floor area. Using a neutral DOAS supply air temperature improves ventilation air mixing, ensuring proper ventilation effectiveness.

During cooling and dehumidification operation, determining the DOAS supply air dry bulb temperature can be more complex. In order to dehumidify the outdoor air, it must be cooled beyond saturation to a low dew point temperature. The corresponding dry bulb temperature may be too cold to discharge directly to the space. To prevent overcooling the space or creating drafts, a reheat system is used to raise the dry bulb temperature of the cooled and dehumidified air. The reheat system will then operate to maintain the supply air dry bulb temperature.

In most DOAS applications, the reheat will operate to maintain a zone neutral supply air dry bulb temperature, typically 65°F to 75°F. This prevents overcooling or overheating the zones and prevents the DOAS unit from fighting with the ancillary cooling and heating units. While this method is the best for ensuring proper system operation, it may not be the most energy efficient choice.

In some buildings, there is a constant requirement for cooling in the zones. In this type of application, allowing the DOAS unit to discharge a cool supply air dry bulb temperature, typically 55°F to 60°F, may be beneficial. The cool ventilation air will reduce the space sensible load, allowing the ancillary cooling units to operate less frequently or to possibly be downsized. This can result in lower overall energy consumption for the HVAC system. Even though the discharge air is cool, a reheat system is still typically required to prevent cold air from being discharged to the space, which can cause drafts. The downside to a cool air discharge is that it can cause overcooling of zones with low loads, causing the ancillary units to enter Heating mode, which could end up consuming more overall energy than the neutral air discharge. Cool air discharge also can result in a higher DOAS supply air relative humidity, which if not properly monitored, could lead to issues with microbial growth.

Rather than a constant cool supply air dry bulb temperature, some DOAS units will employ a variable supply air temperature, often known as space temperature reset. When the zone loads are neutral or mixed between cooling and heating, the DOAS will supply a zone neutral dry bulb temperature. When the zone loads are higher or are all cooling, the DOAS can then switch to a cool supply air dry bulb temperature. This method of switching or resetting the DOAS supply air dry bulb temperature can be accomplished by referencing some condition that is indicative of space load, such as average zone temperature, average zone return air temperature, Average Auxiliary Unit mode, or possibly outdoor air temperature. This method can help reduce the risks associated with a constant cool DOAS supply air temperature.

In some climates, there may be periods where the outdoor air is dry and cool, but not cold. In this instance, the DOAS unit would typically be allowed to supply the outdoor air without any conditioning. This is what is commonly known as a Fan Only mode, and is similar to a Free Cooling mode or Airside Economizer mode of a traditional HVAC unit.

Below are simplified examples of typical operating sequences for DX-based DOAS units.

Occupied mode

When the zones are occupied with people, the DOAS unit will enter Occupied mode. The outdoor air damper is opened, the supply fan is enabled, and the exhaust fan (if equipped) or energy recovery device (if equipped) are enabled. The above devices will remain in operation as long as the unit is in Occupied mode.

Cooling Mode

If the outdoor air is hot but the dew point is low, the DOAS unit will enter cooling mode. The DOAS cooling system will be enabled to cool the hot air to a neutral dry bulb temperature set point, typically 65°F to 75°F.

Dehumidification Mode

If the outdoor air is humid, the DOAS unit will enter dehumidification mode. The cooling system will be enabled to dehumidify the ventilation air based on a dew point or supply air relative humidity set point. The DOAS unit reheat system will then be used to reheat the dehumidified ventilation air to a neutral supply air dry bulb temperature (65°F to 75°F).

Cooling/Dehumidification mode

When the outdoor air is hot or humid, the DOAS unit will enter Cooling mode or Dehumidification mode. The DOAS unit cooling system is enabled and will operate to maintain an evaporator leaving air temperature or refrigeration system suction line temperature, to approximate the supply air dew point temperature. The reheat system will then be controlled to maintain the supply air temperature set point, typically 65°F to 75°F.

Fan Only mode

When the outdoor air is not humid, cold, or hot, the unit will disable the sources of cooling, dehumidification, and heating, and supply unconditioned, filtered, outdoor air.

Unoccupied mode

When the zones are not occupied with people, the DOAS unit will enter Unoccupied mode. The heating and cooling sources, energy recovery device (if equipped), exhaust fan (if equipped) and supply fan are disabled. The outdoor air damper will also close. The DOAS unit will typically remain off until the space is occupied again. An exception may be made for systems that require the DOAS to operate in Unoccupied Fan Only mode for space heating or cooling.

As shown by the operating examples above, DOAS units operate to ensure proper conditioning on the ventilation air. This ensures the ventilation air does not have a negative impact of the zone or the ancillary cooling and heating units in the space. While the operation is important to ensuring proper DOAS conditioning, the most important factor in ensuring proper operation is the DOAS sizing.

DOAS sizing

Sizing a DOAS unit is vastly different than selecting a packaged rooftop or WSHP system. Different considerations need to be given to unit airflow, unit capacity, and unit design conditions. The conditioning of 100% outdoor air varies greatly based on geographic location and local climate. Below are guidelines for sizing a typical DOAS unit.

DOAS supply airflow

Since DOAS units condition and supply 100% outdoor air for space ventilation, the unit airflow is typically sized based on the total ventilation airflow requirement for each of the zones. The DOAS supply airflow may also be slightly up-sized to make-up for zone direct exhaust, help maintain, building pressure, or offset the space latent load.

A typical calculation for the DOAS supply airflow is as follows:

$$V_{OT} = \sum_{\text{all zones}} V_{OZ}$$

WHERE:

V_{OT} = System Outdoor Air Intake/System Required Ventilation Airflow/DOAS Supply Airflow (cfm)

V_{OZ} = Zone Ventilation Airflow (cfm)

The zone ventilation requirement is typically set by local code or guidelines such as LEED or ASHRAE 62.1. The zone ventilation rate will typically be based on zone occupancy, zone activity, and zone area.

The most commonly referenced guide for sizing zone ventilation is ASHRAE 62.1-2013, which prescribes minimum zone ventilation rates based on zone occupancy, floor area, and zone type or activity type. ASHRAE 62.1 also provides correction factors for ventilation air distribution effectiveness, based on ventilation air distribution location and dry bulb temperature. Following is an example calculation of zone minimum ventilation air flow using ASHRAE 62.1-2013.

Zone ventilation calculation example:

Elementary classroom (5-8 years of age)

25 zone occupants

20 ft x 50 ft floor area

Overhead distribution system

Zone neutral supply air dry bulb temperature (<15°F above space temperature)

(Reference Equation: 6.2.2.1; Reference Table: 6.2.2.1)

$V_{BZ} = (R_P * P_Z) + (R_A * A_Z)$

V_{BZ} = (10 cfm/Person * 25 People) + (1000ft^2 *.12 cfm/ft^2)

V_{BZ} = (10 * 25) + (1000 *.12) = 370 cfm

WHERE:

V_{BZ} = Zone Breathing Zone Airflow (cfm)
R_A = Floor Area Ventilation Rate (cfm per square foot of zone floor area from Table 6.2.2.1)
R_P = Occupancy Ventilation Rate Airflow (cfm per person from Table 6.2.2.1)
A_Z = Zone Floor Area (Square foot)
P_Z = Zone Occupancy (no. of people)

(Reference Equation: 6.2.2.3; Reference Table: 6.2.2.3)

$$V_{OZ} = V_{BZ}/E_Z$$

$$V_{OZ} = 370 \text{ cfm}/1 = 370 \text{ cfm}$$

WHERE:

V_{BZ} = Zone Breathing Zone Airflow (cfm)
V_{OZ} = Zone Ventilation Airflow (cfm)
E_Z = Ventilation System Efficiency (Table 6.2.2.1)

In the example above, the classroom would require a minimum of 370 cfm of ventilation air during Occupied mode.

DOAS Exhaust Airflow (Optional)

Because DOAS units introduce 100% outdoor air to the zone, an equivalent amount of air must be removed or exhausted from the space, to prevent from over pressurizing the building. The amount of exhaust air through the DOAS unit is typically equivalent to the following:

$$V_{EA} = \sum_{\text{all zones}} (V_{ZA} - V_{DE}) - V_{PO}$$

WHERE:

V_{EA} = DOAS Exhaust Airflow (cfm)
V_{ZA} = Zone Supply Airflow (cfm)
V_{DE} = Zone Direct Exhaust Airflow (cfm)
V_{PO} = Building Pressure Offset (cfm)

DOAS cooling/dehumidification capacity

Selecting the DOAS dehumidification capacity is a critical process for ensuring proper system operation. Selecting the DOAS capacity is a two-step process that involves selecting the design DOAS supply air dew point temperature and design outdoor conditions.

The DOAS supply air dew point temperature will determine how the DOAS unit will impact the space latent load. Selecting the dew point temperature too high will result in the DOAS unit adding to the space latent load, which can have a negative impact on space comfort. Selecting the dew point temperature too low can result in an unnecessary oversizing of equipment and wasted energy consumptions. The DOAS supply air dew point requirement is typically driven by the system design and the latent capability of the ancillary cooling and heating equipment.

For systems without latent capability (such as chilled beam systems) or for systems sized where the DOAS unit is sized to offset the space latent load, the DOAS supply air dew point temperature must be calculated for each zone to offset the space latent load generation. The calculation is as follows:

$$W_{OZ} = W_{ZD} - \frac{Q_Z}{.68^* V_{OZ}}$$

WHERE:

W_{OZ} = DOAS Supply Air Grains of Moisture per lb
W_{ZD} = Zone Desired Air Grains of Moisture per lb
Q_Z = Zone Latent Load Generation (Btu/hr)
V_{OZ} = Zone Ventilation Airflow (cfm)

In order for the DOAS unit to maintain the zone dew point temperature or zone absolute humidity (W_{ZD}), the DOAS supply air dew point temperature or absolute humidity (W_{OZ}) and supply airflow (V_{OZ}) must overcome the zone latent load generation (Q_Z). If the DOAS unit is serving multiple zones, the required dew point temperature for each zone needs to be calculated. The DOAS unit must deliver a dew point temperature to the entire system that matches the zone requiring the lowest dew point temperature. Alternatively, if one zone requires a much lower dew point than all other zones, the ventilation airflow to the worst case zone could be increased. Below is an example of the DOAS supply air dew point calculation.

DOAS supply air dew point calculation example:

Elementary classroom (5-8 years of age)

25 zone occupants

Zone latent load: 198 Btu/hr per person

370 cfm zone ventilation airflow

Zone humidity level: 64 gr/lb (55°F dew point temperature)

$$W_{OZ} = W_{ZD} - \frac{Q_Z}{.68^* V_{OZ}}$$

$$W_{OZ} = 64 \text{ gr/lb} - \frac{(198 \text{ Btu/hr} * 25 \text{ People})}{(.68 * 370 \text{ cfm})}$$

$$W_{OZ} = 64 - \frac{(198 * 25)}{(.68 * 370)} = 44.32 \text{gr/lb}$$

DOAS application guide (cont)

The DOAS supply air would have to contain 44.32 grains of moisture per pound of dry air, which is approximately a 45°F dew point temperature. If the zone ventilation rate were increased by 20% to 444 cfm, the resulting required supply air dew point temperature would be approximately 47°F.

For systems where the ancillary cooling unit has latent capability (such as a variable refrigerant flow system or water source heat pump system) and the ancillary device is sized for the zone latent load, the DOAS may not be required to offset the zone latent load. In this instance, the DOAS supply air dew point temperature should match the zone dew point temperature set point, typically between 54°F and 56°F. A higher DOAS supply air dew point would result in the DOAS unit adding to the zone latent load, requiring an increase in the sizing of the ancillary unit.

Once the DOAS supply air dew point has been decided, the DOAS refrigeration system capacity must be sized to be able to produce the required dew point temperature at design conditions and the required unit airflow. While most traditional HVAC systems are selected at peak outdoor air sensible load or a design cooling day, DOAS unit capacity is typically driven by peak outdoor air latent load or an evaporation day for the project location. The latent load of the outdoor air requires more energy to remove than the sensible load of the outdoor air. Most DOAS units will typically require 1 ton of refrigeration system capacity per every 150 cfm (without energy recovery) to 250 cfm (with energy recovery) of supply air flow.

If the DOAS unit is to be equipped with an energy recovery device, such as a rotary energy recovery wheel or fixed plate heat exchanger, then the DOAS refrigeration system capacity will be sized based on the energy recovery device leaving air conditions.

DOAS reheat capacity

Most DOAS units are equipped with some form of reheat device; whether it is a DX-based reheat system or a form of energy recovery device. The purpose of the reheat is to raise the temperature of the cooled and dehumidified ventilation air to a higher dry bulb temperature. The reheat systems should be sized to provide an adequate temperature rise to meet the design DOAS supply air dry bulb temperature at the given reheat entering air conditions and airflow. Consideration must also be given to reheat performance at part load conditions.

DOAS heating capacity

The DOAS heating system capacity is driven by the supply airflow, the required supply air dry bulb temperature, and the design heating day for the project location. The heat system should be sized to provide an appropriate temperature rise in the outdoor air to maintain a zone neutral supply air temperature.

If the DOAS unit is equipped with an energy recovery device, the DOAS heat source will typically be sized based on the energy recovery device leaving air temperature. However, special consideration must be given if the project is located in cold climates and the DOAS unit is equipped with an energy recovery device, such as a rotary energy recovery wheel. Some energy recovery systems risk frosting at low ambient conditions, which can cause damage to the energy recovery device. To combat this, most energy recovery systems are equipped with a defrost system, such as a preheater or speed drive. Some defrost systems will reduce the heat transfer capability of the energy recovery device, to prevent frosting. In this instance, the heater should be sized as if the energy recovery device did not exist.

Properly sizing a DOAS will ensure performance at design conditions for a given application. Consideration must also be given to how the DOAS is configured, to help optimize DOAS part load performance, energy consumption, and application specifics.

Ventilation air distribution

The type of ventilation air distribution system has an effect on both the configuration of the DOAS unit, as well as the operation of the ancillary cooling and heating units. The two main types of distribution are series and parallel ventilation air distribution.

In a series ventilation air distribution system, the ventilation air from the DOAS unit is sent through a duct distribution system to the return of an ancillary device. The ventilation air is then mixed with zone return air and reconditioned by the ancillary unit. The ancillary unit will then distribute the ventilation air to the zone.

When selecting a DOAS unit for a series distribution system, the reheat system is not as critical. In this instance, a lower amount of reheat can be used. Since the ventilation air is mixed with return air from the space, adding additional reheat would just add to the sensible load of the ancillary unit. The reheat operation also does not have to be very precise, since the ventilation air is being mixed with return air from the space and being reconditioned by the ancillary unit.

However, since the ancillary unit is supplying the ventilation air to the zone, the ancillary unit fan must operate whenever the zone is occupied, which is a waste of energy consumption. A series ventilation distribution system is a better fit for applications with low occupant density or low occupancy hours.

In a parallel ventilation air distribution system, the ventilation air from the DOAS unit is sent through a duct distribution system to the zone. The ventilation air can either be sent directly to the zone or it can be mixed with supply air from the ancillary unit and then sent to the zone.

When selecting a DOAS unit for a parallel distribution system, the reheat system performance is critical. Since the DOAS unit is supplying air directly to the zone, having an accurate supply air temperature is important. It is also important to be able to maintain a neutral supply air temperature, if the application requires it. Having ventilation air that is too cold or too warm could cause drafts or comfort issues in the space.

In a parallel system, since the ancillary unit is not maintaining zone ventilation, the ancillary unit fan can be operated intermittently, saving energy. However, greater attention must be paid in a parallel system to the distribution or mixing in the zone of the ventilation air. A parallel ventilation air distribution system is a better fit for zones with high occupant densities or high occupancy operating hours.

Quick selection guide

A DOAS unit should always be used in conjunction with ancillary HVAC equipment, serving the same space. The DOAS unit will provide the conditioned ventilation air, but will not maintain space temperature nor space relative humidity set points. Instead, the ancillary HVAC equipment will maintain space temperature and space relative humidity set points. If no ancillary equipment exists, contact application engineering.

DOAS application guide (cont)

Note (or enter into DOAS Builder selection software) the DOAS unit supply airflow and external static pressure. This may be listed as *Supply Air CFM* or *Outdoor Air CFM* on the schedule.

If the DOAS unit will have an exhaust fan, note/enter the listed exhaust fan airflow and external static pressure. If no exhaust fan airflow exists on the DOAS equipment schedule, you can typically assume it will match the supply fan airflow and static pressure.

If the DOAS unit will have an energy recovery wheel, note/enter the specified exhaust air conditions. If no exhaust air conditions exist, assume a summer exhaust air-condition of 75°F/63°F dry bulb/wet bulb and a winter exhaust air condition of 70°F/50°F dry bulb/wet bulb.

Select the DOAS cooling capacity based on the listed evaporator leaving air condition (dry bulb/ wet bulb/ dew point) and the design dehumidification conditions for the project location as follows:

1. Base the design of the dry bulb and wet bulb temperatures upon the design evaporation day (max latent load) for the project location. The DOAS unit must be sized based on the design evaporation day. If the conditions listed on the schedule are not the design evaporation conditions for your area, please consult with the project engineer or contractor. If no design dehumidification data is listed, refer to the ASHRAE website for the latest data.
2. Review the evaporator leaving air conditions, specifically the dew point temperature and maintain this value at or below 55°F to ensure proper latent removal of the DOAS unit.
3. For systems with ancillary equipment without latent capacity or ancillary units that are not sized to handle the space latent load, the DOAS supply air dew point must be calculated with space conditions in mind to ensure proper system operation. In these situations, the supply air dewpoint temperature of the DOAS unit must be low enough to offset or completely handle the space latent load.
4. If the DOAS unit has an energy recovery wheel, ensure DOAS cooling capacity is selected based on the wheel leaving air temperature and the ambient air temperature.

Select the DOAS reheat capacity based upon the listed cooling/dehumidification supply air temperature. If no cooling/dehumidification supply air temperature is specified, select enough reheat capacity to produce a supply air dry bulb temperature (when reheat is active) of 68°F to 75°F to ensure the supply air does not negatively affect space conditions (supply air neutral). Follow these additional precautions:

1. If the cooling/dehumidification supply air temperature is listed lower than recommended, but above the recommended supply air dew point temperature, as 55°F to 65°F, a reheat system is still recommended.
2. If the DOAS unit will be installed in a humid location and set for a neutral cooling/dehumidification supply air temperature (68°F to 75°F), then select liquid subcooling in addition to the hot gas reheat package. The liquid subcooling reheat will enhance unit dehumidification performance.

Select DOAS heating capacity based upon the listed heating supply air temperature and the design heating conditions for the project location. If no design heating data is listed, refer to the ASHRAE website for the latest information. If no heating leaving air temperature is specified, select enough heating capacity to produce 70°F to 85°F heating supply air during design conditions.

If the DOAS unit has an energy recovery wheel in conjunction to a heating element and the outdoor air temperature is likely to drop below 15°F, select enough heating capacity as if the energy recovery wheel does not exist. If the ambient temperature will not fall below 15°F, select enough heating capacity based on the winter energy recovery wheel leaving air temperature.

Selecting DOAS unit options

Most DOAS units are constant volume, so the supply fan operates at a fixed speed. The 62X units are equipped with a direct drive supply fan with either an ECM motor or an induction motor with VFD. The VFD is intended to be used for air balancing and soft starting purposes.

If variable air volume airflow from the DOAS unit is required, a duct static pressure transducer must be added and the unit control configured for duct static pressure operation.

Most (if not all) DOAS exhaust fans are used as variable air volume fans and must have variable frequency drive (VFD) control. The VFD will modulate the exhaust airflow to maintain space static pressure. If the exhaust fan is constant air volume, a VFD can still be used for easy system balancing, soft starting and easy adjustment to airflow. If constant air volume, the VFD will be set for fixed speed operation in the field.

- If the DOAS unit has an energy recovery wheel and the project is located in a mild climate, select a wheel with bypass. When the outdoor air temperature is within 3°F of the return air temperature, the wheel bypass will open, reducing the fan airside pressure drop and saving energy.
- If the DOAS unit has an energy recovery wheel with defrost and a heat source, the heat source should be selected as if the energy wheel does not exist. The energy recovery wheel will enter into a defrost cycle when the exhaust air leaving the wheel is saturated or supersaturated. The exhaust air is considered saturated or supersaturated when the calculated exhaust air dry bulb temperature leaving the wheel is equal to or higher than the wet bulb temperature.

If the DOAS unit will be discharging directly to the space (parallel application), modulating reheat control is recommended for precise supply air temperature control. On the 62X only Modulating HGRH is available.

A DOAS unit should have at least one variable capacity compressor on the lead circuit, due to the wide load range of outdoor air conditions. The variable capacity compressor should have the ability to turn-down to 58% of the nominal compressor capacity.

For DOAS units with high heat capacity, modulating heat control (modulating gas or SCR electric) is recommended. For units with high capacity gas heat, a high turndown (10:1) heater is recommended.

For applications requiring a 55°F or lower supply air dew point temperature, liquid subcooling reheat can be used to improve unit dehumidification performance. Liquid sub-cooling is always and only active when the unit is in dehumidification mode. Liquid sub-cooling is only recommended for applications that require neutral air delivery. Liquid sub-cooling should not be equipped for applications where supply air temperature reset is required.

Ratings and capacities

Gas Heat Capacities

62X UNIT CABINET SIZE[a]	UNIT CAPACITY (tons)[a]	INPUT (Btuh)	OUTPUT (Btuh)	NO. OF GAS HEAT SECTIONS	NO. OF STAGES	MODULATION RANGE (%)[b]	MAXIMUM TEMP. RISE (°F) (HORIZONTAL/ VERTICAL SUPPLY)[c]
A	3-8	75,000	60,750	1	2	5:1	80/100
	3-8	100,000	81,000	1	2	5:1	80/100
B	3-18	75,000	60,750	1	2	5:1	80/100
	3-18	100,000	81,000	1	2	5:1, 10:1	80/100
	3-18	150,000	121,500	1	2	5:1, 10:1	80/100
	3-18	200,000	162,000	1	2	5:1, 10:1	80/100
C	7-35	75,000	60,750	1	2	5:1	80/100
	7-35	100,000	81,000	1	2	5:1, 10:1	80/100
	7-35	150,000	121,500	1	2	5:1, 10:1	80/100
	7-35	200,000	162,000	1	2	5:1, 10:1	80/100
	7-35	250,000	202,500	1	2	5:1, 10:1	80/100
	7-35	300,000	243,000	1	2	5:1, 10:1	80/100
CL	10-35	350,000	283,500	1	2	5:1, 10:1	80/100
	10-35	400,000	324,000	1	2	5:1, 10:1	80/100
C XL	7-35	400,000	324,000	2	4	10:1	130/160
	7-35	500,000	405,000	2	4	10:1	130/160
	7-35	600,000	486,000	2	4	10:1	130/160
	7-35	700,000	567,000	2	4	10:1	130/160
	7-35	800,000	648,000	2	4	10:1	130/160
D	20-40	100,000	81,000	1	2	5:1, 10:1	80/100
	20-40	150,000	121,500	1	2	5:1, 10:1	80/100
	20-40	200,000	162,000	1	2	5:1, 10:1	80/100
	20-40	250,000	202,500	1	2	5:1, 10:1	80/100
	20-40	300,000	243,000	1	2	5:1, 10:1	80/100
	20-40	350,000	283,500	1	2	5:1, 10:1	80/100
	20-40	400,000	324,000	1	2	5:1, 10:1	80/100
D XL	20-55	400,000	324,000	2	4	10:1	130/160
	20-55	500,000	405,000	2	4	10:1	130/160
	20-55	600,000	486,000	2	4	10:1	130/160
	20-55	700,000	567,000	2	4	10:1	130/160
	20-55	800,000	648,000	2	4	10:1	130/160
	20-55	1,000,000	810,000	2	4	10:1	130/160
	20-55	1,200,000	972,000	2	4	10:1	130/160

NOTE(S):

a. Unit cabinet and tonnage matches are dependent on presence of ERV.
b. Standard gas heaters are 2 stage heaters. 5:1 and 10:1 (certain heater sizes and cabinets) modulation turn down is optional.
c. Maximum temperature rise dependent on unit supply configuration.

Ratings and capacities (cont)

Multiple Cabinet Options

TONS	62X CABINETS			
	A	B	C/CL/CXL	D/DXL
3	X	X		
4	X	X		
5	X	X		
6	Not Available with ERV	X		
7	Not Available with ERV	X	ERV Required	
8	Not Available with ERV	X	ERV Required	
10		X	X	
12		X	X	
15		Not Available with ERV	X	
17.5			X	
20			X	X
25			X	X
30			Not Available with ERV	X
35			Not Available with ERV	X
40				Not Available with ERV
45				Not Available with ERV
50				Not Available with ERV
55				Not Available with ERV

Energy Conservation Wheel Capacities[a]

62X CABINET SIZE	WHEEL DIAMETER (in.)	WHEEL THICKNESS (in.)
A	32	4
	36	4
B	32	4
	36	4
	42	4
C CL CXL	32	4
	36	4
	42	4
	48	4
		6
D DXL	48	4
		6
	54	4
	60	4
		6
	66	4
		6

NOTE(S):

a. For ERV performance data (Maximum Airflow and Air Pressure Drop), refer to the latest version of Carrier's Dedicated Outdoor Air Systems Builder Software.

Ratings and capacities (cont)

Electric Heat Capacities [a,b,c,d,e,f,g,h,i]

62X CABINET AND SIZE	ELECTRIC HEAT kW (240,480-v)	ELECTRIC HEAT kW (208-v)	STAGES	AMPS		
				240-v	480-v	208-v
A Cabinet 03-08	5.0	3.8	1	12.0	6.0	10.4
	10.0	7.5	2, SCR	24.1	12.0	20.8
	15.0	11.3	2, SCR	36.1	18.0	31.2
	20.0	15.0	2, SCR	48.1	24.1	41.6
	25.0	18.8	2, SCR	60.1	30.1	52.0
	30.0	22.5	2, SCR	72.2	36.1	62.5
B Cabinet 03-18 C Cabinet 07-35	5.0	3.8	1	12.0	6.0	10.4
	10.0	7.5	2, SCR	24.1	12.0	20.8
	15.0	11.3	2, SCR	36.1	18.0	31.2
	20.0	15.0	2, SCR	48.1	24.1	41.6
	25.0	18.8	2, SCR	60.1	30.1	52.0
	30.0	22.5	2, SCR	72.2	36.1	62.5
	35.0	26.3	2, SCR	84.2	42.1	72.9
	40.0	30.0	2, SCR	96.2	48.1	83.3
	50.0	37.5	4, SCR	120.3	60.1	104.1
	60.0	45.0	4, SCR	144.3	72.2	124.9
	70.0	52.5	4, SCR	168.4	84.2	145.7
	80.0	60.0	4, SCR	192.5	96.2	166.5
	100.0	75.0	4, SCR	240.6	120.3	208.2
D/DXL Cabinet 20-55	5.0	3.8	1	12.0	6.0	10.4
	10.0	7.5	2, SCR	24.1	12.0	20.8
	15.0	11.3	2, SCR	36.1	18.0	31.2
	20.0	15.0	2, SCR	48.1	24.1	41.6
	25.0	18.8	2, SCR	60.1	30.1	52.0
	30.0	22.5	2, SCR	72.2	36.1	62.5
	35.0	26.3	2, SCR	84.2	42.1	72.9
	40.0	30.0	2, SCR	96.2	48.1	83.3
	50.0	37.5	4, SCR	120.3	60.1	104.1
	60.0	45.0	4, SCR	144.3	72.2	124.9
	70.0	52.5	4, SCR	168.4	84.2	145.7
	80.0	60.0	4, SCR	192.5	96.2	166.5
	100.0	75.0	4, SCR	240.6	120.3	208.2
	110.0	82.5	4, SCR	264.6	132.3	229.0
	120.0	90.0	4, SCR	288.7	144.3	249.8

NOTE(S):

a. Minimum entering air temperature is -30°F.
b. Maximum entering air temperature is 104°F.
c. Minimum temperature rise is 12°F.
d. Maximum temperature rise is 75°F (with Standard Heaters).
e. Minimum leaving air temperature is N/A.
f. Maximum leaving air temperature is 180°F.
g. SCR optional on all sizes except 5 kW.
h. Minimum airflow of 50 cfm per kW of heat across the electric heating coil.
i. Unit cabinet and tonnage matches are dependent on presence of ERV.

LEGEND

SCR — Silicon-Controlled Rectifier

Physical data - 62X, A cabinet

Physical Data — 62X A Cabinet[a]

UNIT 62X A CABINET	03	04	05	06	07	08
NOMINAL CAPACITY (TONS)	3	4	5	6	7	8
COMPRESSOR						
Unit without ERV						
Quantity...Unit/Model (208/230-v)	1...DNB36FAGMT			1...ANB52FKKMT		
Quantity...Unit/Model (460-v)	1...DNB36FAVMT			1...ANB52FVRMT		
Quantity...Unit/Model (575-v)	1...ZPD34	1...ZPD42	1...ZPD51	1...ZPD54	1...ZPD72	1...ZPD83
Unit with ERV						
Quantity...Unit Model (208/230-v)	1...DNB36FAGMT			1...ANB52FKKMT		
Quantity...Unit Model (460-v)	1...DNB36FAVMT			1...ANB52FVRMT		
Quantity...Unit Model (575-v)	1...ZPD34	1...ZPD42	1...ZPD51	1...ZPD61	1...ZPD72	1...ZPD83
No. of Refrigerant Circuits	1					
Oil	Pre-Charged					
REFRIGERANT TYPE	R-410A					
CONDENSER COIL						
Standard Efficiency Condenser (sq ft)	10.0	10.0	10.0	13.5	13.5	13.5
High-Efficiency Condenser (sq ft)	—	—	—	—	27	27
CONDENSER FAN						
Standard Capacity Condenser						
Nominal cfm (total)	4,000	4,000	4,000	5,200	5,200	5,200
Quantity…Diameter (mm)	1...630					
Motor Hp	1.3	1.3	1.3	1.3	1.3	1.3
High Capacity Condenser						
Nominal cfm (total)	—	—	—	—	11,200	11,200
Quantity…Diameter (mm)	—	—	—	—	2...630	2...630
Motor Hp	—	—	—	—	1.3	1.3
HIGH-PRESSURE SWITCH (psig)						
Cutout	640					
Reset (Manual)	595					
EVAPORATOR COIL						
Face Area without ERV (sq ft)	2.8	2.8	2.8	4.7	4.7	4.7
Face Area with ERV (sq ft)	7	7	7	Use B Cabinet		
SUPPLY FAN						
Backward Curved ECM (mm)	350-208/230V only, 355 (Low) 460V only					
Airfoil (in.)	—					
Backward Inclined (in.)	—					
Nominal cfm 100% OA	450	600	750	900	1,050	1,200
OPTIONAL HOT GAS REHEAT AND LIQUID SUBCOOLING COIL						
Face Area without ERV (sq ft)	2.8	2.8	2.8	4.7	4.7	4.7
Face Area with ERV (sq ft)	7	7	7	Use B Cabinet		
LOW-PRESSURE SWITCH (psig)						
Cutout	35					
Reset (Auto)	55					
CONDENSATE DRAIN CONNECTION (NPT) (in.)	0.75					
OPTIONAL GAS HEAT SECTION						
Gas Input Sizes (Btuh x 1000)	75,100					
Control Type						
Stages (no. of stages)	2					
Modulating (% range)[b]	5:1, 10:1[b]					
Efficiency (Steady State) (%)	81					
Supply Line Pressure Range (in. wg)	5.0 min. - 13.5 max					
Rollout Switch Cutout Temp (°F)	350					
Gas Valve Quantity	1 Std - 2 with modulating option					
Manifold Pressure (in. wg)						
Natural Gas Std	3.5					
LP Gas Special Order	10					

Physical data - 62X, A cabinet (cont)

Physical Data — 62X A Cabinet[a] (cont)

UNIT 62X A CABINET	03	04	05	06	07	08
NOMINAL CAPACITY (TONS)	3	4	5	6	7	8
OPTIONAL ELECTRIC HEAT						
Size Range (kW)	5, 10, 15, 20, 25, 30					
Control Type						
Stages (no. of stages)	1, 2, 4					
SCR (% range)[b]	0-100					
OPTIONAL HOT WATER HEAT COIL WITH ERV	Use B Cabinet			Use B Cabinet		
OPTIONAL HOT WATER HEAT COIL WITHOUT ERV	Use B Cabinet			Use B Cabinet		
OUTDOOR AIR FILTERS						
Quantity…Size (in.) with ERV						
Standard 2 in. MERV 8	2...24x24			Use B Cabinet		
Optional 4 in.						
MERV 8	2...24x24			Use B Cabinet		
MERV 11	2...24x24			Use B Cabinet		
MERV 13	2...24x24			Use B Cabinet		
Quantity…Size (in.) without ERV						
Standard 2 in. MERV 8	1...24x24			2...24x24		
Optional 4 in.						
MERV 8	1...24x24			2...24x24		
MERV 11	1...24x24			2...24x24		
MERV 13	1...24x24			2...24x24		
OPTIONAL ERV						
Type	Molecular Sieve			Use B Cabinet		
Diameter...depth (in.)	32...4, 36...4			Use B Cabinet		
OPTIONAL ERV FILTERS						
Quantity…Size (in.)						
with 32 in. ERV	6...18x20			Use B Cabinet		
with 36 in. ERV	2...20x20 2...20x24			Use B Cabinet		
OPTIONAL EXHAUST FAN						
Backward Curved ECM (mm)	350-208/230V only, 355 (Low) 460V only					
Airfoil (in.)	—					
Backward Inclined (in.)	—					
Nominal cfm	450	600	750	900	1,050	1,200

NOTE(S):

a. For unit and component weights, refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder. 10:1 gas heat not available for 75 MBH heater.
b. Optional.

LEGEND

ECM — Electronically Commutated Motor
ERV — Energy Recovery Ventilator
FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air
SCR — Silicon-Controlled Rectifier

Physical data - 62X, B cabinet

Physical Data — 62X B Cabinet[a]

UNIT 62X B CABINET	03	04	05	06	07	08	10	12	15	18
NOMINAL CAPACITY (TONS)	3	4	5	6	7	8	10	12	15	17.5
COMPRESSOR										
Unit without ERV										
Quantity...Unit/Model (208/230-v)	1...DNB36FAGMT			1...ANB52FKKMT			1...ANB52FKKMT 1...BN52TEPMT		1...ANB52FKKMT 1...AN66TQEMT	1...ANB66FVQMT 1...AN66TQEMT
Quantity...Unit/Model (460-v)	1...DNB36FAVMT			1...ANB52FVRMT			1...ANB52FVRMT 1...AN47YBUMT		1...ANB52FVRMT 1...AN66YQEMT	1...ANB66FVCMT 1...AN66YQEMT
Quantity...Unit/Model (575-v)	1...ZPD34	1...ZPD42	1...ZPD51	1...ZPD54	1...ZPD72	1...ZPD83	1...ZPD51, 1...ZP51	1...ZPD61, 1...ZP61	1...ZPD72, 1...ZP72	1...ZPD91, 1...ZP91
Unit with ERV										
Quantity...Unit/Model (208/230-v)	1...DNB36FAGMT			1...ANB52FKKMT			1...ANB52FKKMT 1...BN52TEPMT		1...ANB66FVQMT 1...AN66TQEMT	
Quantity...Unit/Model (460-v)	1...DNB36FAVMT			1...ANB52FVRMT			1...ANB52FVRMT 1...AN47YBUMT		1...ANB66FVCMT 1...AN66YQEMT	
Quantity...Unit/Model (575-v)	1...ZPD34	1...ZPD42	1...ZPD51	1...ZPD61	1...ZPD72	1...ZPD83	1...ZPD51, 1...ZP51	1...ZPD61, 1...ZP61	1...ZPD83, 1...ZP83	1...ZPD91, 1...ZP91
Number of Refrigerant Circuits	1						2			
Oil	Pre-Charged									
REFRIGERANT TYPE	R-410A									
CONDENSER COIL										
Standard Efficiency Condenser (sq ft)	10.0	10.0	10.0	13.5	13.5	13.5	27	27	27	27
High-Efficiency Condenser (sq ft)	—	—	—	—	27.0	27.0	—	—	40	40
CONDENSER FAN										
Standard Capacity Condenser										
Nominal cfm (total)	4000	4000	4000	5200	5200	5200	11,200	11,200	10,600	10,600
Quantity...Diameter (mm)	1...630	1...630	1...630	1...630	1...630	1...630	2...630	2...630	2...630	2...630
Motor Hp	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
High Capacity Condenser										
Nominal cfm (total)	—	—	—	—	11,200	11,200	—	—	—	—
Quantity...Diameter (in.)	—	—	—	—	2...630	2...630	—	—	—	—
Motor Hp	—	—	—	—	1.3	1.3	—	—	—	—
HIGH-PRESSURE SWITCH (psig)										
Cutout	640									
Reset (Manual)	595									
EVAPORATOR COIL										
Face Area without ERV (sq ft)	2.8	2.8	2.8	4.7	4.7	4.7	7	7	7	10
Face Area with ERV (sq ft)	7	7	7	10	10	10	12	12	Use C Cabinet	
SUPPLY FAN										
Backward Curved ECM (mm)	350-208/230V only, 355 (Low) 460V only, 450 (High), 500 (Low) 460V only									
Airfoil (in.)	12, 14, 16									
Backward Inclined (in.)	10, 11, 12, 14, 16									
Nominal cfm 100% OA	450	600	750	900	1050	1200	1500	1800	2250	2700
Motor Hp Range	ECM, 1, 1.5, 2, 3, 5									
Maximum airflow for horizontal supply configuration (cfm)	5700									
OPTIONAL HOT GAS REHEAT AND LIQUID SUBCOOLING COIL										
Face Area without ERV (sq ft)	2.8	2.8	2.8	4.7	4.7	4.7	7	7	7	10
Face Area with ERV (sq ft)	7	7	7	10	10	10	12	12	Use C Cabinet	
LOW-PRESSURE SWITCH (psig)										
Cutout	35									
Reset (Auto)	55									
CONDENSATE DRAIN CONNECTION (NPT) (in.)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Physical data - 62X, B cabinet (cont)

Physical Data — 62X B Cabinet[a] (cont)

UNIT 62X B CABINET	03	04	05	06	07	08	10	12	15	18
NOMINAL CAPACITY (TONS)	3	4	5	6	7	8	10	12	15	17.5
OPTIONAL GAS HEAT SECTION										
Gas Input Sizes (Btuh x 1000)	75, 100, 150, 200									
Control Type										
Stages (no. of stages)	2									
Modulating (% range)	5:1, 10:1									
Efficiency (Steady State) (%)	81									
Supply Line Pressure Range (in. wg)	5.0 min. - 13.5 max									
Rollout Switch Cutout Temp (°F)	350									
Gas Valve Quantity	1 Std - 2 with modulating option									
Manifold Pressure (in. wg)										
Natural Gas Std	3.5									
LP Gas Special Order	10									
OPTIONAL ELECTRIC HEAT										
Size Range (kW)	5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100									
Control Type										
Stages (no. of stages)	1, 2, 4									
SCR (% range)	0-100									
OPTIONAL HOT WATER HEAT COIL WITH ERV (in.)	27.5 x 27.5, 4 row, 8 FPI. See Hot Water Coil Drawings.								Use C Cabinet	
OPTIONAL HOT WATER HEAT COIL WITHOUT ERV (in.)	27.5 x 27.5, 4 row, 8 FPI. See Hot Water Coil Drawings.									
OUTDOOR AIR FILTERS										
Quantity…Size (in.) with ERV										
Standard 2 in. MERV 8	2...24x24			4...16 x 25			2...16x25, 2...20x25		Use C Cabinet	
Optional 4 in.										
MERV 8	2...24x24			4...16 x 25			2...16x25, 2...20x25		Use C Cabinet	
MERV 11	2...24x24			4...16 x 25			2...16x25, 2...20x25		Use C Cabinet	
MERV 13	2...24x24			4...16 x 25			2...16x25, 2...20x25		Use C Cabinet	
Quantity…Size (in.) without ERV										
Standard 2 in. MERV 8	1...24x24			2...24x24			4...16x24			
Optional 4 in.										
MERV 8	1...24x24			2...24x24			4...16x24			
MERV 11	1...24x24			2...24x24			4...16x24			
MERV 13	1...24x24			2...24x24			4...16x24			
OPTIONAL ERV										
Type	Molecular Sieve								Use C Cabinet	
Diameter...depth (in.)	32...4, 36...4, 42...4								Use C Cabinet	
OPTIONAL ERV FILTERS										
Quantity…Size (in.)										
with 24 in. ERV	4...12 x 24									
with 32 in. ERV	6...18x20									
with 36 in. ERV	2...20x20, 2...20x24									
with 42 in. ERV	2...12x24, 4...20x24									
OPTIONAL EXHAUST FAN										
Backward Curved ECM (mm)	350-208/230V only, 355 (Low) 460V only, 450 (High), 500 (Low) 460V only									
Airfoil (in.)	12, 14, 16									
Backward Inclined - (in.)	10, 11, 12, 14, 16									
Nominal cfm 100%	450	600	750	900	1050	1200	1500	1800	2250	2700
Motor Hp Range	ECM, 1,1.5,2,3,5									
Maximum airflow for horizontal supply configuration (cfm)	3300									

NOTE(S):

a. For unit and component weights, refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder. 10:1 gas heat not available for 75 MBH heater.

LEGEND

ECM — Electronically Commutated Motor
ERV — Energy Recovery Ventilator
FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air

Physical data - 62X, C-CL-CXL cabinet

Physical Data — 62X, C-CL-CXL Cabinet[a]

UNIT 62X C CABINET	07	08	10	12	15	18	20	25	30	35
NOMINAL CAPACITY (TONS)	7	8	10	12	15	17.5	20	25	30	35
COMPRESSOR										
Unit without ERV										
Quantity...Unit/Model (208/230-v)	1...ANB52FKKMT		1...ANB52FKKMT 1...BN52TEPMT		1...ANB52FKKMT 1...AN66TQEMT	1...ANB66FVQMT 1...AN66TQEMT	2...GSD60120	2...GSD60120	2...GSD60137	2...GSD60182
Quantity...Unit/Model (460-v)	1...ANB52FVRMT		1...ANB52FVRMT 1...AN47YBUMT		1...ANB52FVRMT 1...AN66YQEMT	1...ANB66FVCMT 1...AN66YQEMT				
Quantity...Unit/Model (575-v)	1...ZPD72	1...ZPD83	1..ZPD51, 1...ZP51	1..ZPD61, 1...ZP61	1...ZPD72, 1...ZP72	1...ZPD91, 1...ZP91				
Unit with ERV										
Quantity...Unit/Model (208/230-v)	1...ANB52FKKMT		1...ANB52FKKMT 1...BN52TEPMT		1...ANB66FVQMT 1...AN66TQEMT		2...GSD60120	2...GSD60137	2...GSD60154	2...GSD60182
Quantity...Unit/Model (460-v)	1...ANB52FVRMT		1...ANB52FVRMT 1...AN47YBUMT		1...ANB66FVCMT 1...AN66YQEMT					
Quantity...Unit/Model (575-v)	1...ZPD72	1...ZPD83	1..ZPD51, 1...ZP51	1..ZPD61, 1...ZP61	1...ZPD83, 1...ZP83	1...ZPD91, 1...ZP91				
No. of Refrigerant Circuits	1	1	2	2	2	2	2	2	2	2
Oil	Pre-Charged									
REFRIGERANT TYPE	R-410A									
CONDENSER COIL										
Standard Efficiency Condenser (sq ft)	—	—	27	27	27	27	—	54	54	54
High-Efficiency Condenser (sq ft)	27	27	—	—	40	40	54	80	80	80
CONDENSER FAN										
Standard Capacity Condenser										
Nominal cfm (total)	—	—	10,600	10,600	10,600	10,600	—	20,800	20,800	20,800
Quantity … Diameter (mm)	—	—	2...630	2...630	2...630	2...630	—	4...630	4...630	4...630
Motor Hp	—	—	1.3	1.3	1.3	1.3	—	1.3	1.3	1.3
High Capacity Condenser										
Nominal cfm (total)	11,200	11,200	—	—	—	—	20,800	31,200	31,200	31,200
Quantity … Diameter (mm)	2...630	2...630	—	—	—	—	4...630	6...630	6...630	6...630
Motor Hp	1.3	1.3	—	—	—	—	1.3	1.3	1.3	1.3
HIGH-PRESSURE SWITCH (psig)										
Cutout	640									
Reset (Manual)	595									
EVAPORATOR COIL										
Face Area without ERV (sq ft)	Use B Cabinet		7	7	7	10	12	12	16	16
Face Area with ERV (sq ft)	10	10	12	12	16	16	16	Use D Cabinet		
SUPPLY FAN										
Backward Curved ECM (mm)	350-208/230V only, 355 (Low) 460V only, 450 (High), 500 (Low), 500 (Low) 460V only, 500 (High) 460V only									
Airfoil (in.)	14, 16, 18, 20									
Backward Inclined (in.)	14, 16, 18, 20									
Nominal cfm 100% OA	1,050	1,200	1,500	1,800	2,250	2,700	3,000	3,750	4,500	5,250
Motor Hp Range	ECM, 1, 1.5, 2, 3, 5, 7, 5, 10									
OPTIONAL HOT GAS REHEAT AND LIQUID SUBCOOLING COIL										
Face Area w/o Wheel (sq ft)	Use B Cabinet		7	7	7	10	12	12	16	16
Face Area w/ Wheel (sq ft)	10	10	12	12	16	16	16	Use D Cabinet		
LOW-PRESSURE SWITCH (psig)										
Cutout	35									
Reset (Auto)	55									
CONDENSATE DRAIN CONNECTION (NPT) (in.)	.75									

Physical data - 62X, C-CL-CXL cabinet (cont)

Physical Data — 62X, C-CL-CXL Cabinet[a] (cont)

UNIT 62X C CABINET	07	08	10	12	15	18	20	25	30	35
NOMINAL CAPACITY (TONS)	7	8	10	12	15	17.5	20	25	30	35
OPTIONAL GAS HEAT SECTION										
Gas Input Sizes (Btuh x 1000)	75, 100, 150, 200, 250, 300									
Gas Input Sizes (Btuh x 1000) XL Cabinet	200, 300, 400, 600, 700, 800									
Control Type										
Stages (no. of stages)	2									
Stages XL Cabinet (no. of stages)	4									
Modulating (% range)	5:1, 10:1[b]									
Efficiency (Steady State) (%)	81									
Supply Line Pressure Range (in. wg)	5.0 min. - 13.5 max									
Manifold Pressure (in. wg)										
Natural Gas Std	3.5									
LP Gas Special Order	10									
OPTIONAL ELECTRIC HEAT										
Size Range (kW)	5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100									
Control Type										
Stages (no. of stages)	1,2,4									
SCR (% range)	0-100									
OPTIONAL HOT WATER HEAT COIL WITH ERV (in.)	27.5 x 36.25, 4 row, 8 FPI (See Hot Water Coil Drawings)								Use D Cabinet	
OPTIONAL HOT WATER HEAT COIL WITHOUT ERV (in.)	Use B Cabinet	27.5 x 36.25, 4 row, 8 FPI (See Hot Water Coil Drawings)								
OUTDOOR AIR FILTERS										
Quantity … Size (in.) with ERV										
Standard 2 in.MERV 8	4...16x25		2...16x25, 2...20x25		3...16x16, 6...16x20				Use D Cabinet	
Optional 4 in.										
MERV 8	4...16x25		2...16x25, 2...20x25		3...16x16, 6...16x20				Use D Cabinet	
MERV 11	4...16x25		2...16x25, 2...20x25		3...16x16, 6...16x20				Use D Cabinet	
MERV 13	4...16x25		2...16x25, 2...20x25		3...16x16, 6...16x20				Use D Cabinet	
Quantity … Size (in.) without ERV										
Standard 2 in. MERV 8	Use B Cabinet		2...24x24			4...16x25	2,,,16x25, 2...20x25		3...16x16, 6...20x20	
Optional 4 in.										
MERV 8	Use B Cabinet		2...24x24			4...16x25	2,,,16x25, 2...20x25		3...16x16, 6...20x20	
MERV 11	Use B Cabinet		2...24x24			4...16x25	2,,,16x25, 2...20x25		3...16x16, 6...20x20	
MERV 13	Use B Cabinet		2...24x24			4...16x25	2,,,16x25, 2...20x25		3...16x16, 6...20x20	
OPTIONAL ERV										
Type	Molecular Sieve									
Diameter ... depth (in.)	32...4, 36...4, 42...4, 48...4, 48...6								Use D Cabinet	
OPTIONAL ERV FILTERS										
Quantity…Size (in.)										
with 32 in. ERV	6...18x20								Use D Cabinet	
with 36 in. ERV	2...20x20, 2...20x24								Use D Cabinet	
with 42 in. ERV	2...12x24, 4...20x24								Use D Cabinet	
with 48 in. ERV	6...18x25								Use D Cabinet	
OPTIONAL EXHAUST FAN										
Backward Curved ECM (mm)	350-208/230V only, 355 (Low) 460V only, 450 (High), 500 (Low), 500 (Low) 460V only, 500 (High) 460V only									
Airfoil (in.)	14, 16, 18, 20									
Backward Inclined (in.)	14, 16, 18, 20									
Nominal cfm 100%	1050	1200	1500	1800	2250	2700	3000	3750	4500	5250
Motor Hp Range	ECM, 1, 1.5, 2, 3, 5, 7.5, 10									

NOTE(S):

a. For unit and component weights, refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder.
b. XL gas heater only available in 10:1 modulation.

LEGEND

ECM — Electronically Commutated Motor
ERV — Energy Recovery Ventilator
FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air
SCR — Silicon-Controlled Rectifier

Physical data - 62X, D-DXL cabinet

Physical Data — 62X, D-DXL Cabinet Sizes 20-35[a]

UNIT 62X, D CABINET	20	25	30	35
NOMINAL CAPACITY (TONS)	20	25	30	35
COMPRESSOR				
Unit without ERV				
Quantity...Unit /Model	2...GSD60120	2...GSD60120	2...GSD60137	2...GSD60182
Unit with ERV				
Quantity...Unit /Model	2...GSD60120	2...GSD60137	2...GSD60154	2...GSD60182
Number of Refrigerant Circuits	2			
Oil	Pre-charged			
REFRIGERANT TYPE	R-410A			
CONDENSER COIL				
Standard Efficiency Condenser (sq ft)	—	54	54	54
High-Efficiency Condenser (sq ft)	54	80	80	80
CONDENSER FAN				
Standard Capacity Condenser				
Nominal cfm (total)	—	20,800	20,800	20,800
Quantity…Diameter (mm)	—	4...630	4...630	4...630
Motor Hp	1.3			
High Capacity Condenser				
Nominal cfm (total)	20,800	31,200	31,200	31,200
Quantity...Diameter (mm)	4...630	6...630	6...630	6...630
Motor Hp	1.3			
HIGH-PRESSURE SWITCH (psig)				
Cutout	640			
Reset (Manual)	595			
EVAPORATOR COIL				
Face Area without ERV (sq ft)	12	12	16	16
Face Area with ERV (sq ft)	16	28.9	28.9	28.9
SUPPLY FAN				
Backward Curved ECM (mm)	450 (High), 500 (Low), 500 (Low) 460V only, 500 (High) 460V only, 560-208/230V only, Dual 450 (High), Dual 500 (Low), Dual 500 (High)			
Airfoil (in.)	18, 20, 22, 25			
Backward Inclined (in.)	18, 20, 22, 25			
Nominal cfm 100% OA	3000	3750	4500	5250
Motor Hp Range	ECM, 1.5, 2, 3, 5, 7.5, 10, 15			
OPTIONAL HOT GAS REHEAT AND LIQUID SUBCOOLING COIL				
Face Area without ERV (sq ft)	12	12	16	16
Tube Size with ERV (in.)	16	28.9	28.9	28.9
LOW-PRESSURE SWITCH (psig)				
Cutout	35			
Reset (Auto)	55			
CONDENSATE DRAIN CONNECTION (NPT) (in.)	1			

Physical data - 62X, D-DXL cabinet (cont)

Physical Data — 62X, D-DXL Cabinet Sizes 20-35[a] (cont)

UNIT 62X, D CABINET	20	25	30	35
NOMINAL CAPACITY (TONS)	20	25	30	35
OPTIONAL GAS HEAT SECTION				
Gas Input Sizes (Btuh x 1000)	100, 150, 200, 250, 300, 350, 400			
Gas Input Sizes (Btuh x 1000) XL Cabinet	400, 500, 600, 700, 800, 1000, 1200			
Control Type				
Stages (no. of stages)	2			
Stages XL Cabinet (no. of stages)	4			
Modulating (% range)	5:1, 10:1[b]			
Efficiency (Steady State) (%)	81			
Supply Line Pressure Range (in. wg)	5.0 min. - 13.5 max			
Rollout Switch Cutout Temp (°F)	350			
Gas Valve Quantity	1 Std - 2 with modulating option			
Manifold Pressure (in. wg)				
Natural Gas Std	3.5			
LP Gas Special Order	10			
OPTIONAL ELECTRIC HEAT				
Size Range (kW)	5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100, 110, 120			
Control Type				
Stages (no. of stages)	1,2,4			
SCR (% range)	0-100			
OPTIONAL HOT WATER HEAT COIL WITH ERV (in.)	40.5 x 47.5, 4 row, 8 FPI (See Hot Water Coil Drawings)			
OPTIONAL HOT WATER HEAT COIL WITHOUT ERV (in.)	40.5 x 47.5, 4 row, 8 FPI (See Hot Water Coil Drawings)			
OUTDOOR AIR FILTERS				
Quantity…Size (in.) with ERV				
Standard 2 in. MERV 8	3...16x16, 6...16x20	6...20x25, 3...25x25		
Optional 4 in.				
MERV 8	3...16x16, 6...16x20	6...20x25, 3...25x25		
MERV 11	3...16x16, 6...16x20	6...20x25, 3...25x25		
MERV 13	3...16x16, 6...16x20	6...20x25, 3...25x25		
Quantity…Size (in.) without ERV				
Standard 2 in. MERV 8	2...16x25, 2...20x25		3...16x16, 6...20x20	
Optional 4 in.				
MERV 8	2...16x25, 2...20x25		3...16x16, 6...20x20	
MERV 11	2...16x25, 2...20x25		3...16x16, 6...20x20	
MERV 13	2...16x25, 2...20x25		3...16x16, 6...20x20	
OPTIONAL ERV				
Type	Molecular Sieve			
Diameter...depth (in.)	48…4, 48…6, 54…4, 60…4, 60…6, 66…4, 66…6			
OPTIONAL ERV FILTERS				
Quantity…Size (in.)				
with 48 in. ECW	6...18x25			
with 54 in. ECW	6...20x30			
with 60 in. ECW	10...16x36			
with 66 in. ECW	8...36x20			
OPTIONAL EXHAUST FAN				
Backward Curved ECM (mm)	450 (High), 500 (Low), 500 (Low) 460V only, 500 (High) 460V only, 560-208/230V only, Dual 450 (High), Dual 500 (Low), Dual 500 (High)			
Airfoil (in.)	18, 20, 22, 25			
Backward Inclined (in.)	18, 20, 22, 25			
Nominal cfm 100%	3000	3750	4500	5250
Motor Hp Range	ECM, 1.5, 2, 3, 5, 7.5, 10, 15			

NOTE(S):

a. For unit and component weights, refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder.
b. 10:1 modulating control available on DXL Cabinet (400-1200 MBtuh only). 5 kW SCR electric heater not available.

LEGEND

ECM — Electronically Commutated Motor
ERV — Energy Recovery Ventilator
FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air
SCR — Silicon-Controlled Rectifier

Physical data - 62X, D-DXL cabinet (cont)

Physical Data — 62X, D-DXL Cabinet, Sizes 40-55[a]

UNIT 62X, D CABINET	40	45	50	55
NOMINAL CAPACITY (TONS)	40	45	50	55
COMPRESSOR				
Unit without ERV				
Quantity...Unit/Model	2...GSD60182	2...GSD60120/2...GSD60120 (TANDEM)	2...GSD60137/2...GSD60137 (TANDEM)	2...GSD60154/2...GSD60154 (TANDEM)
Unit with ERV				
Quantity...Unit/Model	2...GSD60182	2...GSD60120/2...GSD60120 (TANDEM)	2...GSD60137/2...GSD60137 (TANDEM)	2...GSD60154/2...GSD60154 (TANDEM)
Number of Refrigerant Circuits	2			
Oil	Pre-charged			
REFRIGERANT TYPE	R-410A			
CONDENSER COIL				
Standard Efficiency Condenser (sq ft)	54	80	80	80
High-Efficiency Condenser (sq ft)	80	121	121	121
CONDENSER FAN				
Standard Capacity Condenser				
Nominal cfm (total)	20,800	31,200	31,200	31,200
Quantity…Diameter (mm)	4...630	6...630	6...630	6...630
Motor Hp	1.3			
High Capacity Condenser				
Nominal cfm (total)	31,200	52,800	52,800	52,800
Quantity...Diameter (mm)	6...630	6...710	6...710	6...710
Motor Hp	1.3			
HIGH-PRESSURE SWITCH (psig)				
Cutout	640			
Reset (Manual)	595			
EVAPORATOR COIL				
Face Area without ERV (sq ft)	28.9	28.9	28.9	28.9
Face Area with ERV (sq ft)	—	—	—	—
SUPPLY FAN				
Backward Curved ECM (mm)	450 (High), 500 (Low), 500 (Low) 460V only, 500 (High) 460V only, 560-208/230V only, Dual 450 (High), Dual 500 (Low), Dual 500 (High)			
Airfoil (in.)	18, 20, 22, 25			
Backward Inclined (in.)	18, 20, 22, 25			
Nominal cfm 100% OA	6000	6750	7500	8250
Motor Hp Range	ECM, 1.5, 2, 3, 5, 7.5, 10, 15			
OPTIONAL HOT GAS REHEAT AND LIQUID SUBCOOLING COIL				
Face Area without ERV (sq ft)	28.9	28.9	28.9	28.9
Face Area with ERV (in.)	—	—	—	—
LOW-PRESSURE SWITCH (psig)				
Cutout	35			
Reset (Auto)	55			
CONDENSATE DRAIN CONNECTION (NPT) (in.)	1			
OPTIONAL GAS HEAT SECTION				
Gas Input Sizes (Btuh x 1000)	100, 150, 200, 250, 300, 350, 400			
Gas Input Sizes (Btuh x 1000) XL Cabinet	400, 500, 600, 700, 800, 1000, 1200			
Control Type				
Stages (no. of stages)	2			
Stages XL Cabinet (no. of stages)	4			
Modulating (% range)	5:1, 10:1[b]			
Efficiency (Steady State) (%)	81			
Supply Line Pressure Range (in. wg)	5.0 min. - 13.5 max			
Rollout Switch Cutout Temp (°F)	350			
Gas Valve Quantity	1 Std - 2 with modulating option			
Manifold Pressure (in. wg)				
Natural Gas Std	3.5			
LP Gas Special Order	10			
OPTIONAL ELECTRIC HEAT				
Size Range (kW)	5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100, 110, 120			
Control Type				
Stages (no. of stages)	1,2,4			

Physical data - 62X, D-DXL cabinet (cont)

Physical Data — 62X, D-DXL Cabinet, Sizes 40-55[a] (cont)

UNIT 62X, D CABINET	40	45	50	55
NOMINAL CAPACITY (TONS)	40	45	50	55
SCR (% range)	0-100			
OPTIONAL HOT WATER HEAT COIL WITH ERV	—			
OPTIONAL HOT WATER HEAT COIL WITHOUT ERV (in.)	40.5 x 47.5, 4 row, 8 FPI. See Hot Water Coil Drawings.			
OUTDOOR AIR FILTERS				
Quantity…Size (in.) with ERV				
Standard 2 in. MERV 8	—			
Optional 4 in.	—			
MERV 8	—			
MERV 11	—			
MERV 13	—			
Quantity…Size (in.) without ERV				
Standard 2 in. MERV 8	6...20x25, 3...25x25			
Optional 4 in.				
MERV 8	6...20x25, 3...25x25			
MERV 11	6...20x25, 3...25x25			
MERV 13	6...20x25, 3...25x25			
OPTIONAL ERV				
Type	—			
Diameter...depth (in.)	—			
OPTIONAL ERV FILTERS				
Quantity … Size (in.)				
with 48 in. ECW	—			
with 54 in. ECW	—			
with 60 in. ECW	—			
with 66 in. ECW	—			
OPTIONAL EXHAUST FAN				
Backward Curved ECM (mm)	450 (High), 500 (Low), 500 (Low) 460V only, 500 (High) 460V only, 560-208/230V only, Dual 450 (High), Dual 500 (Low), Dual 500 (High)			
Airfoil (in.)	18, 20, 22, 25			
Backward Inclined (in.)	18, 20, 22, 25			
Nominal cfm 100%	6000	6750	7500	8250
Motor Hp Range	ECM, 1.5, 2, 3, 5, 7.5, 10, 15			

NOTE(S):

a. For unit and component weights, refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder.
b. 10:1 modulating control available on DXL Cabinet (400-1200 MBtuh only). 5 kW SCR electric heater not available.

LEGEND

ECM — Electronically Commutated Motor
ERV — Energy Recovery Ventilator
FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air
SCR — Silicon-Controlled Rectifier

Options and accessories

ITEM	STANDARD	OPTION[a]	ACCESSORY[b]
Heat Options			
Staged Gas Heat (NG)		X	
Modulating Gas Heat (10:1 or 5:1 Turndown)		X	
Staged Electric Heat		X	
SCR Controlled Electric Heat		X	
Hot Water Heating Coil (Except Cabinet A)		X	
Energy Recovery Ventilator (ERV)		X	
Wheel VFD Defrost Control		X	
Wheel Bypass Dampers		X	
Control Options			
Filter Status Switch	X		
Exhaust Air Smoke Detector		X	
Unit-Powered Type Convenience Outlet		X	
Non-fused Disconnect Switch		X	
Lead Circuit Digital Compressor (575 V only)	X (3-18 ton)		
Lead Circuit Variable Speed Compressor	X (3-55 ton)		
DDC Controls	X		
Equipment Touch Keypad/Display	X		
Condensate Overflow Switch	X		
Variable Speed Condenser Fans	X		
Coil Options			
Modulating Hot Gas Reheat	X		
Liquid Subcooling Coil		X	
Corrosion Protection Coating		X	
Filter Options			
2 in. MERV 8 Filters		X	X
4 in. MERV 8 Filters		X	X
4 in. MERV 11 Filters		X	X
4 in. MERV 13 Filters		X	X
Supply Fan Options			
Airfoil Fan		X	
Backward Inclined Fan		X	
ECM		X	
VFD Control (Not on ECM)	X		
Exhaust Fan Options			
Airfoil Fan		X	
Backward Inclined Fan		X	
ECM		X	
VFD Control (Not on ECM)	X		
14 in. Knock Down/Field-Assembled Roof Curb			X
Spring Type Fan Isolation		X	
OA 2 Position Motorized Damper	X		
Airflow Monitoring Station		X	
Supply/Exhaust Pressure Control		X	

NOTE(S):

a. See DOAS Builder software for availability.
b. Field-installed.

LEGEND

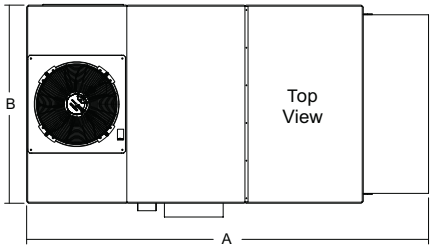
DDC — Direct Digital Controls
ECM — Electronically Commutated Motor
ERV — Energy Recovery Ventilator
NG — Natural Gas
OA — Outdoor Air
SCR — Silicon Controlled Rectifier
VFD — Variable Frequency Drive

Dimensions

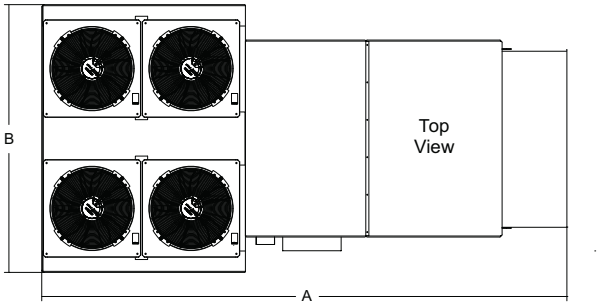
Refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder for unit dimensions.

Cabinet Dimensions

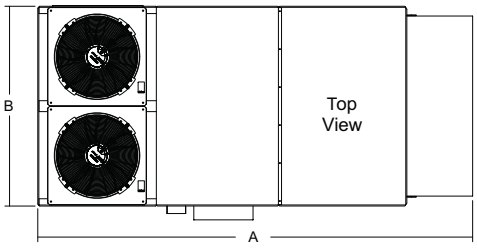
Cabinet A



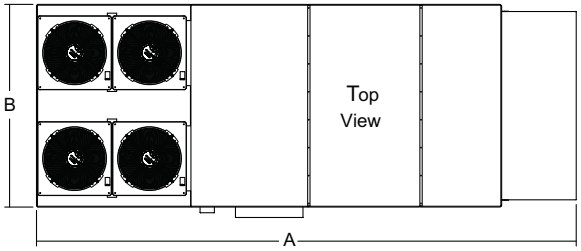
Cabinet C



Cabinet B



Cabinet D



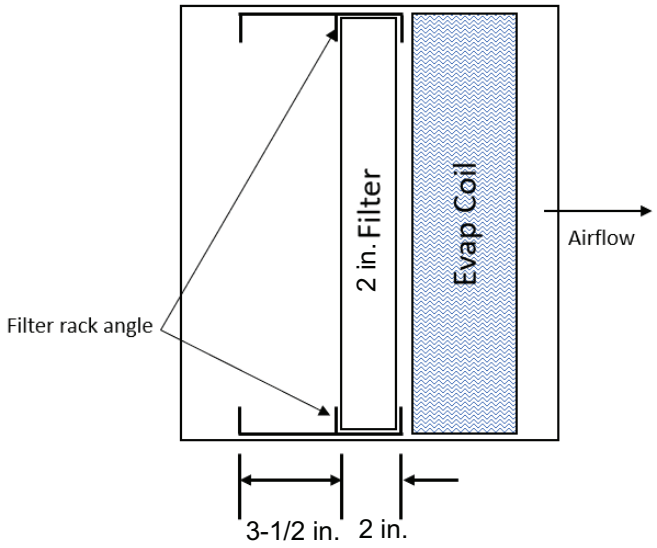
CABINET[a,b,c,d]	CONDENSER FAN[e]	WITHOUT EXHAUST		WITH EXHAUST		WIDTH (B)	HEIGHT (C)
		LENGTH (A)	XL LENGTH (A)	LENGTH (A)	XL LENGTH (A)		
A	1	115.375	—	150.50	—	64.000	61.000
	2	133.625	—	169.00	—	64.000	61.000
B	1	130.000	164.750	168.00	202.875	64.000	66.125
	2	148.125	183.000	186.25	221.125	64.000	66.125
	4	169.875	204.750	208.00	242.875	87.125	81.500
C	2	150.375	202.500	194.75	246.750	64.125	70.250
	4	184.750	236.750	229.00	281.000	87.125	81.500
	6	210.750	262.750	255.00	307.000	87.125	81.625
D	4	237.875	306.375	305.00	373.500	87.125	90.750
	6	263.750	332.250	331.00	399.380	87.125	90.875
	6+[f]	284.750	353.250	351.75	420.380	87.125	91.750

NOTE(S):

a. Dimensions will be dependent on unit model number nomenclature configuration, option content and other field added features.
b. Consult final selection drawings for more details and exact dimensions from the DOAS Builder software.
c. Dimensions are given in inches.
d. Base rail details and exact dimensions are not shown in the certified drawing from the DOAS Builder software.
e. Drawings above are representative, the different condenser fan configurations are listed on the table
f. The D6+ refers to the high efficiency condenser configuration for this cabinet size.

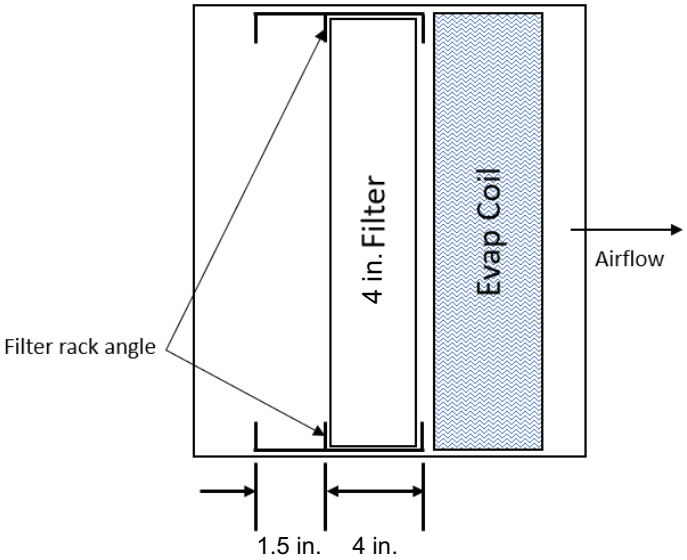
Dimensions (cont)

Filter Rack Arrangement - Evaporator Section
Typical Filter Rack Arrangement with a 2 in. MERV 8 Filter Option



NOTE(S):
1. For additional filtration, a 4 in. filter could be field installed upstream the 2 in. filter by removing the filter rack angle divider.
2. If additional filtration is installed, this will impact the total static pressure of the unit. Verify the impacts of this additional filtration with the DOAS Builder software and adjust as needed.
3. Units selected with an ERV will receive an additional filtration section for the ERV (see next page).

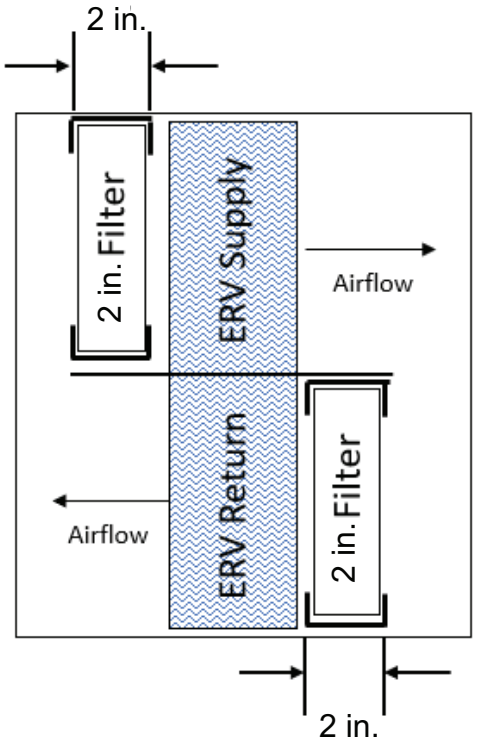
Filter Rack Arrangement - Evaporator Section
Typical Filter Rack Arrangement with a 4 in. MERV 8,11 or 13 Filter Option



NOTE(S):
1. For additional filtration a 2 in. filter could be field installed upstream the 4 in. filter by removing the filter rack angle divider.
2. If additional filtration is installed, this will impact the total static pressure of the unit. Verify the impacts of this additional filtration with the DOAS Builder software and adjust as needed.
3. Units selected with an ERV will receive an additional filtration section for the ERV (see next page).

Dimensions (cont)

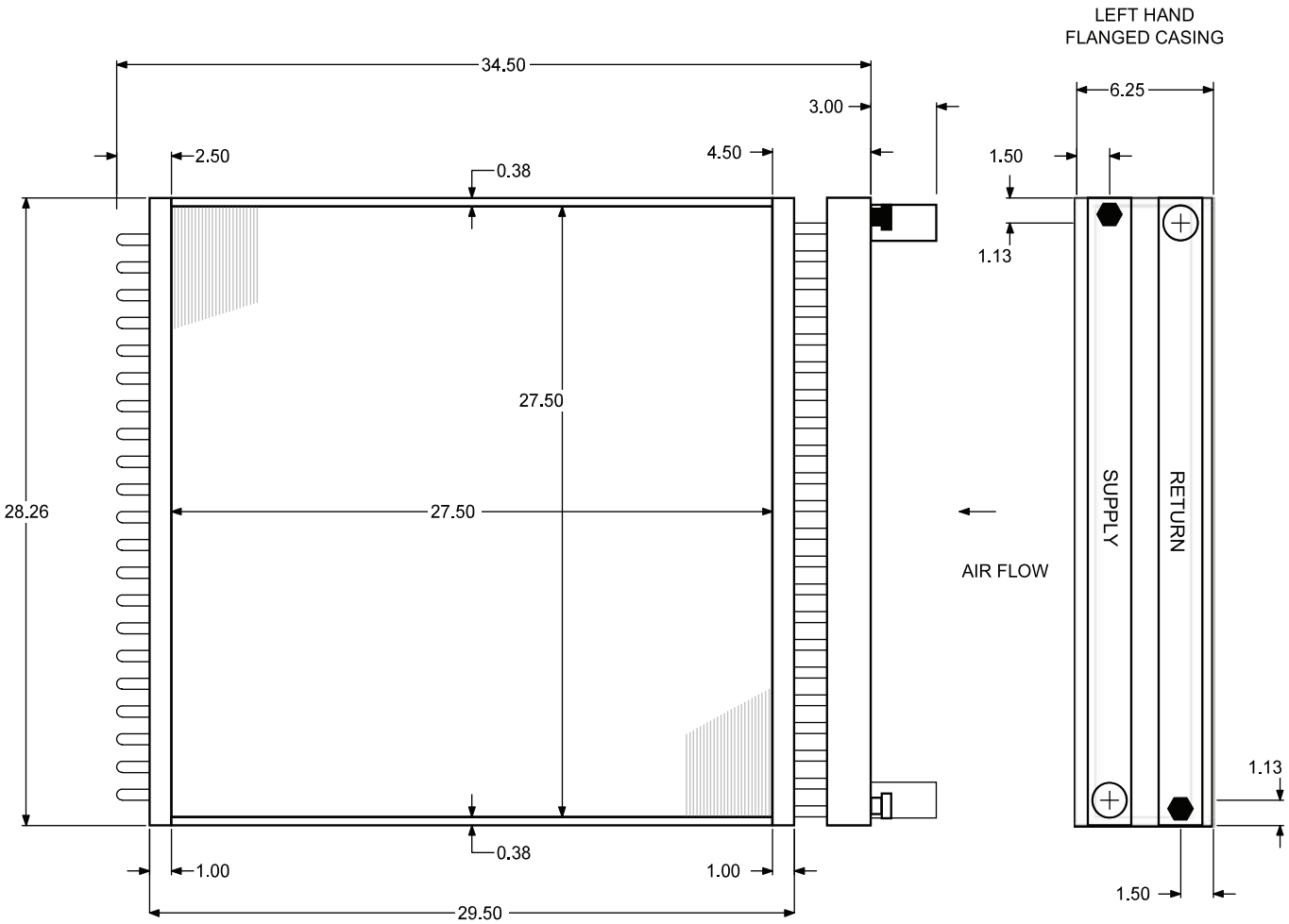
Filter Rack Arrangement - ERV Section
Typical ERV Filter Rack Section Arrangement for Unit with ERV Option Only



NOTE(S):
1. Units selected with an ERV will receive an additional 2 in. MERV 8 filtration section on the supply and exhaust air stream.
2. The ERV filtration section comes standard with 2 in. MERV filter media. There are no filtration options available to change the filter media type on the ERV.

Dimensions (cont)

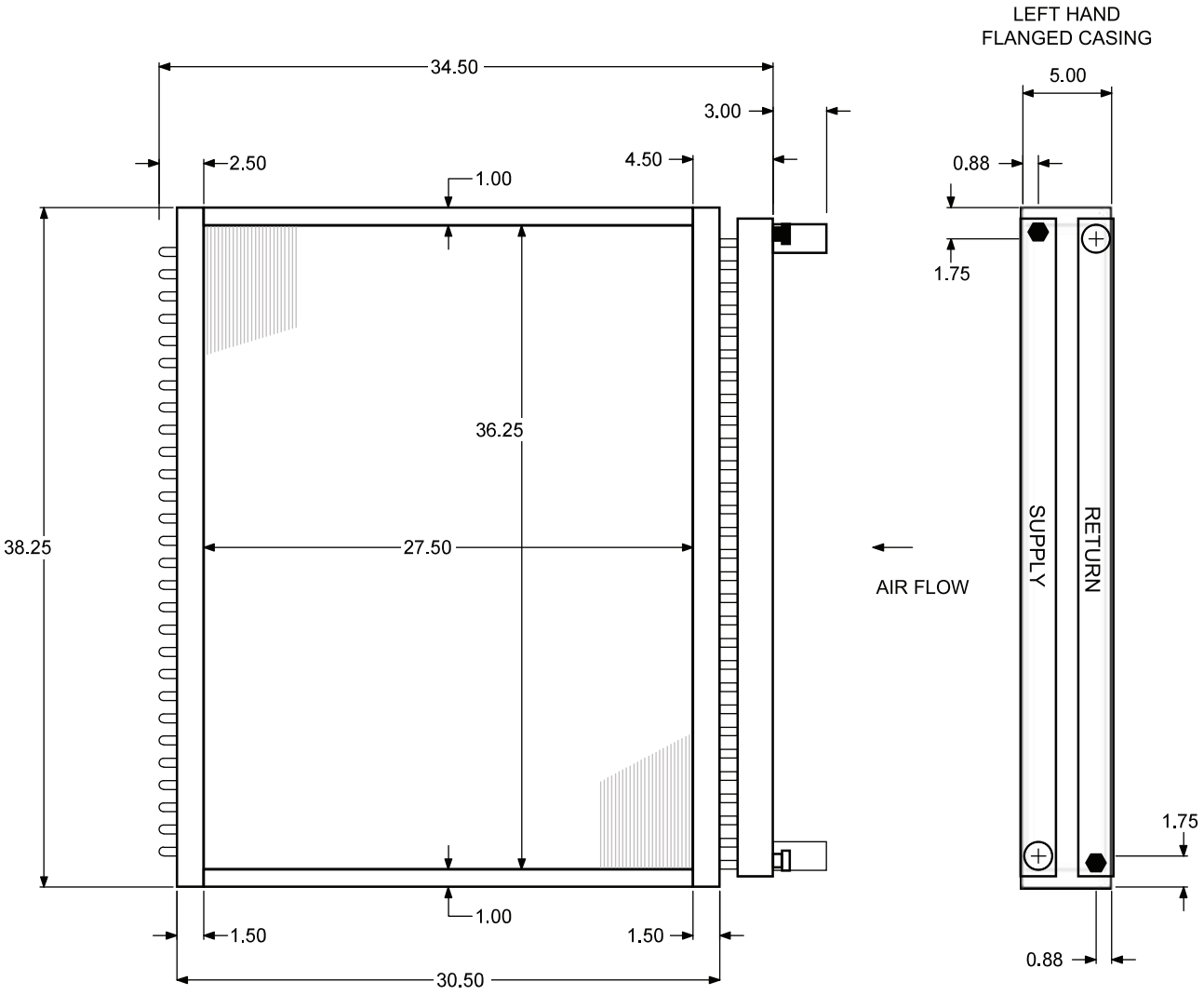
Optional Hot Water Heat Coil - B Cabinet



NOTE(S):
1. All dimensions are in inches.
2. Manually verifying dimensions is highly recommended.
3. The supply line should be connected to the lower connection on the leaving air side of counterflow operation.
4. Coils will vent and drain through factory-installed vent and drain fittings when mounted level for horizontal flow.
5. Connection location other than standard could affect vent and drain locations. Consult factory.
6. Connection Size =1-5/8 in. Sweat
7. Vent and Drain Size = 1/2 in. FPT

Dimensions (cont)

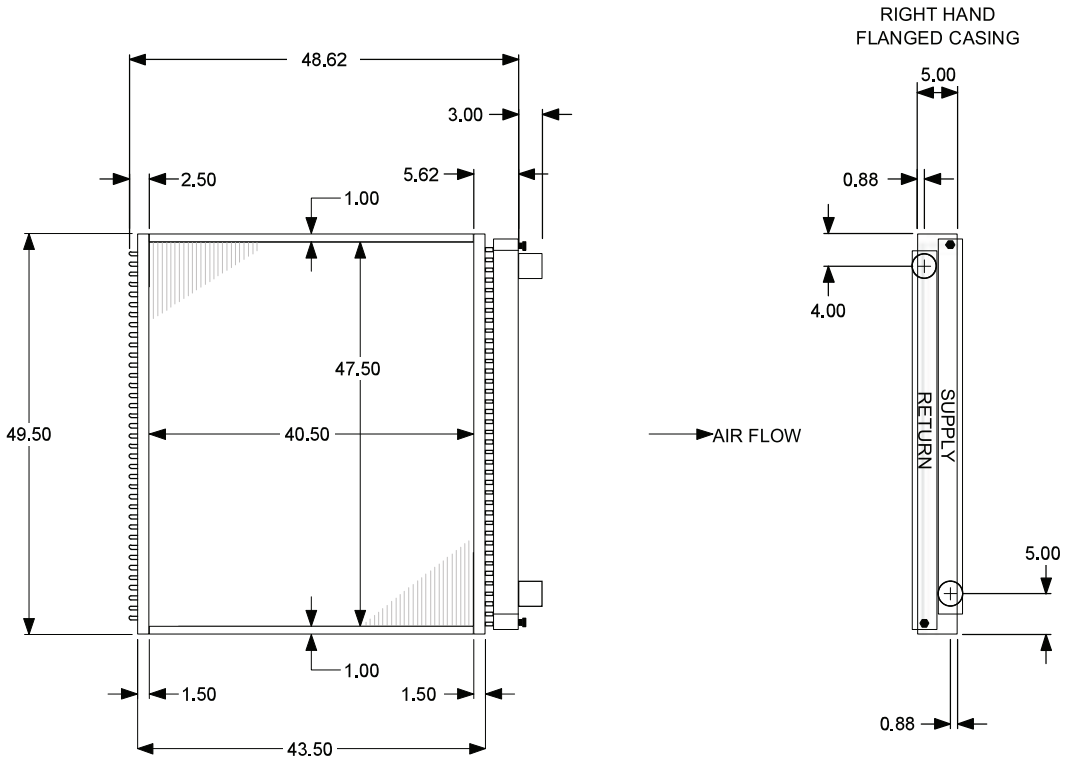
Optional Hot Water Heat Coil - C Cabinet



NOTE(S):
1. All dimensions are in inches.
2. Manually verifying dimensions is highly recommended.
3. The supply line should be connected to the lower connection on the leaving air side of counterflow operation.
4. Coils will vent and drain through factory-installed vent and drain fittings when mounted level for horizontal flow.
5. Connection location other than standard could affect vent and drain locations. Consult factory.
6. Connection Size =1-5/8 in. Sweat
7. Vent and Drain Size = 1/2 in. FPT.

Dimensions (cont)

Optional Hot Water Heat Coil - D / DXL Cabinet



NOTE(S):
1. All dimensions are in inches.
2. Manually verifying dimensions is highly recommended.
3. The supply line should be connected to the lower connection on the leaving air side of counterflow operation.
4. Coils will vent and drain through factory-installed vent and drain fittings when mounted level for horizontal flow.
5. Connection location other than standard could affect vent and drain locations. Consult factory.
6. Connection Size =3-1/8 in. Sweat
7. Vent and Drain Size = 1/2 in. FPT

Performance data

Refer to the latest edition of Carrier's Dedicated Outdoor Air Systems Builder for performance data.

Control components

The 62X Series of dedicated outdoor air units use a direct digital controller that has been specifically designed for Carrier dedicated outdoor air units. The controller monitors the operating conditions in the outdoor air unit and controls the compressors, fans, heating systems, and optional devices. The controller has the capability of communicating with major building automation protocols including BACnet MS/TP.

NOTE: The temperatures listed in this section are default values and may be adjusted to meet the needs of the application.

Sequence of operation — 100% outdoor air units — 62X

The 62X unit is designed to condition 100% outdoor air to room neutral conditions for ventilation purposes. As such, the 62X unit is not designed to, nor will the 62X unit maintain space cooling, heating or relative humidity conditions. A separate ancillary device must be installed to provide primary space heating, cooling, and humidity control.

The controller is turned on by a switch located on its front, upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the Equipment Touch™ display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the Equipment Touch display pad on the Schedules screen (requires user password).

NOTE: All temperature-related events have an additional 10-second (fixed) “delay on make” to allow temperatures to settle.

Occupied mode

When the Unit Controller Schedule calls for the start of the Occupied mode, and the controller has verified that there are no faults or shutdown conditions, after a 30-second (fixed) delay the unit goes into Occupied mode.

Outdoor air damper (OD)

After the unit goes into Occupied mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close. The OA damper stays open until the system reaches the end of the Occupied mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

Supply fan (SF)

As the OA damper opens, the OADA auxiliary switch (adjustable) will close and the SF will turn on. The SF shall operate continuously while the unit is in the Occupied mode. When the system reaches the end of the Occupied mode period, the SF will continue to run for an additional 2 minutes before turning off.

The SF will operate based on one of four control methods, depending on the unit and control configuration.

Constant Volume (CV)

The unit will operate the SF at full speed or the commanded manual override speed.

Duct Pressure Control (VAV-DPT)

The unit will operate the SF to maintain the supply duct pressure set point.

Air Monitor Control (VAV-AMS)

The unit will operate the SF to maintain the SF airflow set point.

Space Pressure Control (VAV-SPT)

The unit will operate the SF to maintain the space pressure set point (special order).

Exhaust fan (EF)

At the same time the SF turns on, the EF will be enabled to run. The EF shall be enabled to run continuously while the unit is in the Occupied mode. When the system reaches the end of the Occupied mode period, the EF will be enabled to run for an additional 2 minutes before turning off.

The EF will operate based on one of three control methods, depending on the unit and control configuration.

Constant Volume (CV)

The unit will operate the EF at full speed or the commanded manual over-ride speed.

Space Pressure Control (VAV-SPT)

The unit will operate the EF to maintain the space pressure set point.

Air Monitor Control (VAV-AMS)

The unit will operate the EF to maintain the EF airflow set point.

Energy conservation wheel (ECW)

After the OA damper opens and the SF turns on, the ECW turns on. The ECW Bypass Damper (if equipped) will open when the ECW is off and it will close when the ECW is on.

ECW Standard Operation

When the OAT is 3°F (adjustable) or more above or below the RAT, the ECW will be on, otherwise it is off.

ECW with VFD Controlled Defrost (WM-VFD)

When the OAT is 3°F (adjustable) or more above or below the RAT, the ECW will be on. It will be off, if the OAT is less than 3°F (adjustable) above or below the RAT. It will decrease speed or stop as the wheel exhaust air temperature (WExAT) goes below 25°F (adjustable) to allow for wheel defrosting. It will start back up and increase speed when the WExAT rises toward 25°F (adjustable) or more.

Cooling mode

Cooling mode is available when the Entering Coil Air Temperature (ECAT) is above the ECAT cooling lower limit (55°F, adjustable) and there is a demand for cooling. When the Entering Coil Air Temperature (ECAT) is 1°F (adjustable) or more above the Supply Air Temperature (SAT) cooling set point (70°F, adjustable), compressor no. 1 turns on. When the SAT is 2°F (adjustable) or more above the SAT cooling set point (70°F, adjustable), compressor no. 2 turns on — not less than 10 minutes (adjustable) after compressor no. 1 turned on. When the SAT is 2°F (adjustable) or more below the SAT cooling set point (70°F, adjustable), compressor no. 2 turns off. When the ECAT is 1°F (adjustable) or more below the Supply Air Temperature (SAT) cooling set point (70°F, adjustable), compressor no. 1 turns off.

Variable Speed Compressors (Size 03-55)

The controller regulates the capacity of the variable speed lead compressor with a 0-10 vdc output signal that controls the VFD's output to the compressor, resulting in an increase or decrease of the compressors motor speed. The variable speed compressor will modulate based upon the Supply Air Temperature (SAT) sensor and set point (70°F, adjustable). The compressor will ramp up to 100% once an hour, for 60 seconds, to push oil back to the compressor. The hot gas reheat circuit and subcooling circuits (if present), will be enabled for the duration of the oil purge. If the DX LAT drops to 38°F or less for 10 minutes, the controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55°F or more, the compressor turns back on. If there is a current call for first stage cooling and compressor no. 1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor no. 2 will be turned on to take its place until it returns.

Digital Compressor (Size 03-18 on 575-v only)

The controller regulates the capacity of the digital compressors by rapidly loading and unloading the compressors in 15-second intervals. The digital compressor will modulate based upon the Supply Air Temperature (SAT) sensor and set point (70°F, adjustable). If the DX LAT drops to 38°F or less, the controller will fix the compressor at 10% (adjustable). If the DX LAT drops to 35°F or less for 10 minutes, the controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55°F or more, the compressor turns back on. If there is a current call for first stage cooling and compressor no. 1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor no. 2 will be turned on to take its place until it returns.

The compressor will ramp to 100% once an hour, for 60 seconds, to push oil back to the compressor. The hot gas reheat circuit and subcooling circuits, if present, will be enabled for the duration of the oil purge.

Hot Gas Reheat (HGRH) – Modulating

When the SAT is 1°F (adjustable) or more below the SAT cooling set point, HGRH turns on and modulates to maintain the SAT cooling set point. When the SAT is 2°F (adjustable) or more above the SAT cooling set point, HGRH turns off.

Dehumidification mode

Dehumidification Mode is available if the ECAT is 1°F (fixed) above the dehumidification lower limit of 60°F (adjustable) and there is no call for heating.

When the Entering Coil Air Dew Point (ECDP) is 1°F (adjustable) or more above the Supply Air Dew Point (SADP) set point (55°F, adjustable), dehumidification mode is enabled. After the minimum time-off delay, compressor no. 1 turns on.

When the SADP is 2°F (adjustable) or more above the SADP set point, and after minimum time-off delay, compressor No. 2 turns on — not less than 10 minutes (adjustable) after compressor No. 1 turns on.

When the SADP is 1°F (adjustable) or more below the SADP set point, compressor No. 2 turns off.

When ECDP is 2°F (adjustable or more below the SADP set point), compressor no. 1 turns off and dehumidification mode is disabled.

Variable Speed Compressor (Size 03-55)

The variable speed compressor will modulate based upon the DX Leaving Air Temperature (DX LAT) sensor and set point (55°F, adjustable). See Variable Speed. Freeze protection, oil purge, and back-up sequence are also in effect. See Cooling sequence for details.

Digital Compressor (Size 03-18 on 575-v only)

The digital compressor will modulate based upon the DX Leaving Air Temperature (DX LAT) sensor and set point (55°F, adjustable). Freeze protection, oil purge, and backup sequence are also in effect. See Cooling sequence for details.

Hot Gas Reheat (HGRH) – Modulating

When the SAT is 1°F (adjustable) or more below the SAT cooling set point, HGRH turns on and modulates to maintain the SAT cooling set point. When the SAT is 2°F (adjustable) or more above the SAT cooling set point, HGRH turns off.

Liquid Subcooling Reheat (LSRH) - if equipped

When either of the compressor are enabled during dehumidification mode, the subcooling coil is enabled. When the compressors are disabled, the subcooling coil is disabled.

Zone Air Temperature Reset (Optional)

ZAT/SAT Set Point Reset is selectable using the Equipment Touch display pad or Building Automation System (BAS) (default is "OFF"). As the ZAT goes above the ZAT cooling set point, the SAT cooling set point will decrease by a ratio (adjustable) in order to lower the ZAT. As the ZAT goes below the ZAT cooling set point, the SAT cooling set point will increase by a ratio (adjustable) in order to raise the ZAT. When the ZAT equals the ZAT cooling set point, the SAT cooling set point will return to the original value. As the ZAT goes below the ZAT heating set point, the SAT heating set point will increase by a ratio (adjustable) in order to raise the ZAT. As the ZAT goes above the ZAT heating set point, the SAT heating set point will decrease by a ratio (adjustable) in order to lower the ZAT. When the ZAT equals the ZAT heating set point, the SAT heating set point will return to the original value.

Example: A ZAT:SAT ratio of 1:3 means for every 1°F of ZAT increase the SAT set point will decrease by 3°F; maximum -15°F (ZAT = 73°F, SAT = 69°F; ZAT = 74°F, SAT = 66°F; ZAT = 75°F, SAT = 63°F; etc.).

Heating mode

Heating mode is available when the OAT is below the OAT heating upper limit (60°F, adjustable) and there is a demand to temper outdoor air to room neutral conditions. When the ECAT is 1°F (adjustable) or more below the ECAT heating set point (50°F, adjustable), heating is enabled and operates to maintain SAT heating set point (70°F, adjustable). When ECAT is 1°F (adjustable) or more above ECAT heating set point (50°F, adjustable), heating is disabled.

Staged Heat (Electric Heat) 2-Stage Heat

Terminal W1 turning on enables first-stage heating. As SAT goes further below the SAT heating set point (70°F, adjustable), terminal W2 energizes and second-stage heating is enabled. As SAT rises, terminal W2 turns off and second-stage heating turns off. As the SAT goes 1°F (adjustable) or more above the SAT heating set point

(70°F, adjustable), terminal W1 turns off and first-stage heating turns off.

Staged Heat (Electric heat) 4-Stage

Terminal W1 turning on enables the Heating Analog Relay Module (HARM) on the control panel which activates the different stages of heating. As the SAT goes further below the SAT heating set point (70°F, adjustable), the different stages will turn on. As the SAT goes further above the SAT heating set point (70°F, adjustable), the different stages will turn off.

Staged Heat (Gas heater) 2-Stage

Terminal W1 turning on enables first-stage heating. As SAT goes further below the SAT heating set point (70°F, adjustable), terminal W2 energizes and second-stage heating is enabled. As SAT rises, terminal W2 turns off and second-stage heating turns off. As the SAT goes 1°F (adjustable) or more above the SAT heating set point (70°F, adjustable), terminal W1 turns off and first-stage auxiliary heating turns off.

Staged Heat (Gas heater) 4-Stage

Terminal W1 turning on enables the Heating Analog Relay Module (HARM) on the control panel which activates the different stages of heating. As the SAT goes further below the SAT heating set point (70°F, adjustable), the different stages will turn on. As the SAT goes further above the SAT heating set point (70°F, adjustable), the different stages will turn off.

Gas heater

Terminal W1 turning on energizes the gas heater controller and first-stage axillary heating is enabled. If the SAT is 1°F (adjustable) or more above the SAT heating set point (70°F, adjustable) terminal W1 turns off, which de-energizes the gas heater controller, and first-stage axillary heating is turned off. All other stages operate as above.

Modulated Heat

SCR Electric Heat:

On demand to temper outdoor air to room neutral conditions, the controller modulates the electric heating SCR in order to maintain the SAT heating set point (70°F, adjustable).

Modulating Gas heater:

On demand to temper outdoor air to room neutral conditions, the controller modulates the gas heater controller to control the gas flow in order to maintain the SAT heating set point (70°F, adjustable).

Modulating Hot Water Heat:

On demand to temper outdoor air to room neutral conditions, the controller modulates the hot water valve to control the hot water flow in order to maintain the SAT heating set point (70°F, adjustable).

Unoccupied mode

When the Occupancy Control indicates the end of the Occupied mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time) or the heating system will turn off. The SF and EF will continue to run for 2 minutes before turning off. After this, the ECW will turn off and the OA damper will close. The unit is now off.

Safety Switches

High Pressure Switch (HPS1)

If HPS1 is open, compressor no. 1 will turn off and the controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor no. 1 will turn on. If the controller records 3 high pressure start/restart failure incidents within 1 hour, compressor no. 1 is locked out and the controller will issue an alarm. The compressor lockout can be reset in the Equipment Touch display pad or by cycling the power of the controller. This sequence is the same for compressor no. 2, Y2, and HPS2.

Low Pressure Switch (LPS1)

If LPS1 is open after the LPS1 bypass time, the controller will issue an alarm and compressor no. 1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor no. 1 will turn on. If the controller records 3 low pressure start/restart failure incidents within 1 hour, compressor no. 1 is locked out and the controller will issue an alarm. The compressor lockout can be reset in the Equipment Touch display pad or by cycling the power of the controller. This sequence is the same for compressor no. 2, Y2, and LPS2.

Condensate Overflow Switch

When the condensate overflow switch (COFS) detects an overflow condition at the drain pan, the contact closes at the unit controller and the unit will disable the cooling system and issue an alarm.

Safety Shutdown

Smoke Detector

When a smoke detector (SD) is provided, it is wired directly to the controller. If smoke is detected, the controller will shut down the unit. Other instances where shutdown will occur are as follows. If a compressor fails to start 3 times in an hour due to high pressure switch lock out; If a compressor fails to start 3 times in an hour due to low pressure switch lock out; If a compressor fails to start 3 times in an hour due to DX leaving air temperature lock out; and if the controller detects an SAT sensor failure.

Energy Management Relay

The energy management relay (EMR) can be configured to force unoccupied mode or to force an emergency shutdown. When the EMR contact is open, the EMR signal is triggered and the unit will shutdown or go into unoccupied mode (depending on the configuration).

Typical Controller Inputs and Outputs

Inputs

NUMBER	NAME	SENSOR TYPE	DESCRIPTION
OptiCORE™[a] LS-1628u CONTROLLER — UNIVERSAL INPUTS WITH ERV			
UI-01	ECA-T	Thermistor	Entering Coil Air Temperature
UI-02	ECA-RH	0-10 vdc	Entering Coil Relative Humidity
UI-03	SAT	Thermistor	Supply Air Temperature
UI-04	SA-RH	0-10 vdc	Supply Air Relative Humidity
UI-05	OAT	Thermistor	Outside Air Temperature
UI-06	RAT	Thermistor	Return Air Temperature
UI-07	WExAT	Thermistor	Wheel Exhaust Air Temperature
UI-08	DxLAT1	Thermistor	DX Coil Leaving Air Temperature 1
UI-09	DxLAT2	Thermistor	DX Coil Leaving Air Temperature 2
UI-10	SF-DPT or AMS	0-10 vdc	Supply Fan Duct Pressure Transducer or Airflow Monitoring Station
UI-11	ZN-DPT or AMS	0-10 vdc	Zone (Building)/Exhaust Pressure Transducer or Airflow Monitoring Station
UI-12	S/S contact	Normally Open Contact	Start/Stop Contact, (By Others) Occupancy Control must be set to “S/S SWITCH” in the controls screen of the Equipment Touch
UI-13	OADA-A	Normally Open Contact	Two Position Outdoor Air Damper
UI-14	WM-CS	Normally Open Contact	Wheel Motor Current Sensor
UI-15	EF-CS	Normally Open Contact	Exhaust Fan Current Sensor
UI-16	SF-CS	Normally Open Contact	Supply Fan Current Sensor
UI-17	CC1-CS	Normally Open Contact	Cooling Circuit 1 Current Sensor
UI-18	LPS1	Normally Open Contact	Low Pressure Switch Cooling Circuit 1
UI-19	HPS1	Normally Open Contact	High Pressure Switch Cooling Circuit 1
UI-20	CC2-CS	Normally Open Contact	Cooling Circuit 2 Current Senosr
UI-21	LPS2	Normally Open Contact	Low Pressure Switch Cooling Circuit 2
UI-22	HPS2	Normally Open Contact	High Pressure Switch Cooling Circuit 2
UI-23	—	—	—
UI-24	—	—	—
UI-25	CFI	Normally Open Contact	Clogged Filter Indicator
UI-26	COS	Normally Closed Contact	Condensate Overflow Switch
UI-27	EMR	Normally Closed Contact	Energy Management Relay
UI-28	SD	Normally Closed Contact	Smoke Detector
OptiCORE™ LS-1628u CONTROLLER — UNIVERSAL INPUTS WITHOUT ERV			
UI-01	OAT	Thermistor	Outside Air Temperature
UI-02	OA-RH	0-10 vdc	Outside Air Relative Humidity
UI-03	SAT	Thermistor	Supply Air Temperature
UI-04	SA-RH	0-10 vdc	Supply Air Relative Humidity
UI-05	—	—	—
UI-06	—	—	—
UI-07	—	—	—
UI-08	DxLAT1	Thermistor	DX Coil Leaving Air Temperature 1
UI-09	DxLAT2	Thermistor	DX Coil Leaving Air Temperature 2
UI-10	SF-DPT or AFS	0-10 vdc	Supply Fan Duct Pressure Transducer or Airflow Monitoring Station
UI-11	ZN-DPT or AFS	0-10 vdc	Zone / Exhaust Pressure Transducer or Airflow Monitoring Station
UI-12	S/S contact	Normally Open Contact	Start/Stop Contact, (By Others) Occupancy Control must be set to “S/S SWITCH” in the controls screen of the Equipment Touch
UI-13	OADA-A	Normally Open Contact	Two Position Outdoor Air Damper
UI-14	WM-CS	Normally Open Contact	Wheel Motor Current Sensor
UI-15	EF-CS	Normally Open Contact	Exhaust Fan Current Sensor
UI-16	SF-CS	Normally Open Contact	Supply Fan Current Sensor
UI-17	CC1-CS	Normally Open Contact	Cooling Circuit 1 Current Sensor
UI-18	LPS1	Normally Open Contact	Low Pressure Switch Cooling Circuit 1
UI-19	HPS1	Normally Open Contact	High Pressure Switch Cooling Circuit 1
UI-20	CC2-CS	Normally Open Contact	Cooling Circuit 2 Current Sensor
UI-21	LPS2	Normally Open Contact	Low Pressure Switch Cooling Circuit 2
UI-22	HPS2	Normally Open Contact	High Pressure Switch Cooling Circuit 2
UI-23	—	—	—
UI-24	—	—	—
UI-25	CFI	Normally Open Contact	Clogged Filter Indicator
UI-26	COS	Normally Closed Contact	Condensate Overflow Switch
UI-27	EMR	Normally Closed Contact	Energy Management Relay
UI-28	SD	Normally Closed Contact	Smoke Detector

NOTE(S):

a. Third-party trademarks and logos are the property of their respective owners.

LEGEND

UI — Universal Input

Controls (cont)

Outputs

NUMBER	NAME	SENSOR TYPE	DESCRIPTION
OptiCORE LS-1628u CONTROLLER — UNIVERSAL OUTPUTS (LEAD CIRCUIT VARIABLE SPEED COMPRESSOR 3-55 TONS)			
UO-01	SF1VFD	0-10 vdc	Supply Fan VFD
UO-02	EF1VFD	0-10 vdc	Exhaust Fan VFD
UO-03	—	—	—
UO-04	MRC (RH)	0-10 vdc	Modulating Reheat Controller
UO-05	WMVFD	0-10 vdc	Wheel Motor VFD
UO-06	Mod. Heat / Staged Heat	0-10 vdc	Modulating / 2nd Stage Heat (Gas, Electric, Hot Water)
UO-07	CM1VFD	0-10 vdc	Lead Circuit Variable speed compressor VFD
UO-08	—	—	—
UO-09	SF Enable	Relay/Triac	Supply Fan / Exhaust Fan Enable
UO-10	Comp. No. 1 Enable	Relay/Triac	Compressor 1 Enable
UO-11	Comp. No. 2 Enable	Relay/Triac	Compressor 2 Enable
UO-12	HGRH Enable	Relay/Triac	Hot Gas Reheat Enable
UO-13	Heating Enable	Relay/Triac	Heating Enable
UO-14	OA Damper Enable	Relay/Triac	Outside Air Damper / ECW By-Pass Enable
UO-15	ERV Enable	Relay/Triac	ERV Enable
UO-16	Sub-Cooling Coil Enable	Relay/Triac	Sub-Cooling Coil Enable
OptiCORE LS-1628u CONTROLLER — UNIVERSAL OUTPUTS (LEAD CIRCUIT DIGITAL COMPRESSOR 3-18 TONS) 575-v ONLY			
UO-01	SF1VFD	0-10 vdc	Supply Fan VFD
UO-02	EF1VFD	0-10 vdc	Exhaust Fan VFD
UO-03	—	—	—
UO-04	MRC (RH)	0-10 vdc	Modulating Reheat Controller
UO-05	WMVFD	0-10 vdc	Wheel Motor VFD
UO-06	Mod. Heat / Staged Heat	0-10 vdc	Modulating / 2nd Stage Heat (Gas, Electric, Hot Water)
UO-07	Unloader No. 1 (Binary)	24 vdc to Relay	Digital Compressor Unloading Solenoid 1
UO-08	—	—	—
UO-09	SF Enable	Relay/Triac	Supply Fan / Exhaust Fan Enable
UO-10	Comp. No. 1 Enable	Relay/Triac	Compressor 1 Enable
UO-11	Comp. No. 2 Enable	Relay/Triac	Compressor 2 Enable
UO-12	HGRH Enable	Relay/Triac	Hot Gas Reheat Enable
UO-13	Heating Enable	Relay/Triac	Heating Enable
UO-14	OA Damper Enable	Relay/Triac	Outside Air Damper / ECW By-Pass Enable
UO-15	ERV Enable	Relay/Triac	ERV Enable
UO-16	Sub-Cooling Coil Enable	Relay/Triac	Sub-Cooling Coil Enable

LEGEND

UO — Universal Output
VFD — Variable Frequency Drive

Dedicated Outdoor Air Unit with DX Cooling or DX Cooling and Heating

HVAC Guide Specifications — Section 62X

Size Range: **3 to 55 Tons Nominal**

Carrier Model Number: **62X**

Part 1 — General

1.01 SYSTEM DESCRIPTION:

Outdoor roof curb or slab mounted, electronically controlled, cooling or cooling/heating unit utilizing hermetic scroll compressors with crankcase heaters for cooling duty and gas combustion or electric resistance heaters for heating duty. Units shall discharge supply air vertically or horizontally as shown on contract drawings.

1.02 QUALITY ASSURANCE

A. Unit shall be designed to conform to ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 15 (latest edition), ASHRAE 62, and UL (Underwriters Laboratories) Standard 1995.

B. Unit shall be listed as a total package by ETL and ETL, Canada.

C. Gas heat equipped units shall be designed to conform to ANSI Standard Z83.8, Gas-Fired heaters (U.S.A.) / CSA Standard 2.6-2013 (Canada).

D. Roof curb shall be designed to NRCA (National Roofing Contractors Association) criteria per Bulletin B-1986.

E. Insulation and adhesive shall meet NFPA (National Fire Protection Association) 90A requirements for flame spread and smoke generation.

1.03 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

A. General:

The unit shall be a packaged, factory-assembled direct expansion cooling unit for outdoor installation. The unit shall consist of all factory wiring with a single point power connection, refrigerant piping and charge (R-410A), operating oil charge, single refrigerant circuit (sizes 03-08) or dual refrigerant circuits (sizes 10-55), with a factory-installed and programmed digital control system. The unit shall, based on project requirements, include all special features necessary to provide fully conditioned ventilation air at neutral conditions to the building.

B. Unit Cabinet:

1. Double wall design, constructed of G-90 galvanized steel, bonderized and pre-coated with a polyester pre-coat finish.
   a. Top cover shall be a minimum of 18-gauge sheet metal for D Cabinet and a minimum of 20-gauge sheet metal for A, B, and C Cabinet, with 2.0 in. thick, closed cell polyisocyanurate foam insulation with an R-13 rating and a 24-gauge sheet metal interior liner.
   b. Access panels and doors shall be a minimum of 20-gauge sheet metal with 2.0 in. thick, closed cell polyisocyanurate foam insulation with an R-13 rating with a 24-gauge sheet metal interior liner. Access doors shall be equipped with stainless steel hinges and quarter turn, adjustable, draw tight cam-action latches.
   c. Corner and center posts shall be 16 or 18-gauge galvanized steel.
   d. Basepans shall be 16 or 18-gauge galvanized steel. All openings through the basepan shall have upturned flanges at least 0.5 in. in height.
   e. Basepans shall be insulated with 0.375 in. thick closed cell foam insulation.
   f. Condensate pan shall be 20-gauge stainless steel insulated with closed cell neoprene insulation.
   g. Base rail shall be double flanged 12-gauge galvanized steel (16-gauge for A cabinet) or welded closed section structural steel tubing.
   h. Roof sections shall be sloped for proper drainage.
2. Unit casing shall be capable of withstanding 2500-hour salt spray exposure per ASTM (American Society for Testing and Material) B117 (scribed specimen).
3. Unit shall have insulated access doors, hinged for easy access to the controls compartment and all other areas requiring servicing. Each door shall seal against a triple-edge, co-extruded EPDM gasket to help prevent air and water leakage and for ease and safety during servicing.
4. Interior cabinet surfaces shall be lined with 24-gauge galvanized steel.
5. Unit shall have a factory-installed, sloped condensate drain connection fabricated of stainless steel with welded corners and drain connection.
6. Unit shall be equipped with fittings in frame rails to facilitate overhead rigging.
7. Filters shall be accessible through a hinged access panel.
8. The outdoor air opening shall have a factory-provided hood with bird screen.

C. Fans:

1. Indoor Evaporator Fans:
   a. Direct drive plenum fan shall be provided and all axial and radial clearances must be

equal to or greater than fan manufacturer's recommendations for full-rated fan performance and efficiency.

b. Fan shall be airfoil or backward curve type and will be selected to meet the application airflow and total static pressure.

c. The supply fan shall be capable of either constant volume or modulating control. Supply fan motor shall be induction motor with variable frequency drive (VFD) or EC motor.

d. The exhaust fan (when equipped) shall be capable of either constant volume or modulating control. Exhaust fan motor shall be induction motor with variable frequency drive (VFD) or EC motor.

e. Fan Status Switch: The unit shall be equipped with a current sensing switch to provide proof of airflow.

2. Condenser Fans:

a. Fans shall be external rotor, direct-driven axial fans with a minimum 5-1/2 in. spun venturi for high efficiency and low noise, with formed and profiled blades.

b. The fan motor assembly shall be end mounted to a structurally rigid welded finger guard.

c. Fans shall discharge air vertically upward and the finger guard shall be powder coated.

d. Fans shall be statically and dynamically balanced as an assembly to a quality level of G=6.3 in accordance with DIN ISO 1940-1.

D. Compressors:

1. Fully hermetic, scroll type compressors with overload protection and short cycle protection with minimum on and off cycle timers.

2. Compressor shall be installed in a compartment accessible through hinged access doors, isolated from the treated air stream.

3. Line voltage controls, operating controls, refrigerant circuit access points, refrigerant flow control devices and compressors shall be accessible from a single location behind opposed hinged access doors for ease of service.

4. Compressors shall be mounted on rubber in shear isolators and refrigerant lines to include loops to absorb reaction torque.

5. Reverse rotation protection shall be provided for all compressors.

6. Lead circuit compressors shall be digital modulation (size 03-18) on 575-v only or variable speed modulation (size 3-55) with HGBP.

7. Lead circuit digital compressor (size 03-18 tons), on 575-v only, is capable of modulating its output from 100% down to 20%. Lead circuit variable speed compressor (size 3-55 tons) is capable of modulating its output from 100% to 58%.

8. Lag circuit compressors (10-55 tons) shall be fixed speed scroll with hot gas bypass.

E. Coils:

1. Standard evaporator coil shall have enhanced surface aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with brazed tube joints.

2. Standard condenser coil shall be microchannel heat exchanger (MCHX).

3. Coils shall be vendor certified for 650 psig prior to unit assembly; leak tested at 300 psig, with a final test at 475 psig.

4. Optional coil coatings for corrosion protection shall be available.

F. Refrigerant Components:

1. Unit shall be equipped with single refrigerant circuit (sizes 03-08) or dual refrigerant circuits (sizes 10-55), with each circuit containing:

a. Solid core filter drier.

b. Field-adjustable, externally equalized thermostatic expansion valve.

c. Minimum load valve (hot gas bypass) on lead circuit with variable speed compressors and the lag circuit with fixed speed compressors.

d. Service access ports.

2. Unit shall be equipped with condenser fan speed VFD to maintain head pressure. In the Recirculating mode, fan speed control will allow operation of compressors down to 55°F.

G. Filter Section:

1. Standard filter section shall be supplied with 2 in. thick MERV-8 pleated media filters.

2. Dirty Filter Status Switch: The manual reset filter status switch shall be a pressure differential switch and will indicate a dirty filter. The switch shall be factory installed.

H. Controls and Safeties:

1. Direct Digital Controller (DDC):

a. BACnet™[1] protocol capable.

b. Control program options shall include multiple variations for control priority, night set back (optional) and selectable overrides for field selection.

c. Shall provide a 5°F temperature difference between cooling and heating set points to meet ASHRAE Standard 90.1-2016.

d. Unit shall include factory-supplied supply air temperature and R.H. sensor (field install), entering coil or outdoor air temperature and R.H. sensor, and evaporator leaving air temperature sensor.

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e. Shall provide and display a current alarm list and an alarm history list.
f. Compressor minimum run time (5 minutes) and minimum off time (5 minutes) shall be provided.
g. Shall have service run test capability.
h. Shall have a service Diagnostic mode.
i. Single circuit systems shall have a mechanical method of capacity modulation and dual circuit system shall have at least (1) compressor with a mechanical method of capacity modulation controlled with system logic to maintain supply-air temperature set point.
j. Unit shall be complete with self-contained low voltage control circuit.

2. Safeties:
a. Unit shall incorporate an electronic compressor lockout which provides optional reset capability should any of the following safety devices trip and shut off compressor:
1) Compressor lockout protection provided for either internal or external overload.
2) Low-pressure protection.
3) Freeze protection (evaporator coil).
4) High-pressure protection.
5) Loss of charge protection.
6) Condensate overflow switch
b. Unit supply air temperature shall be monitored to detect abnormally high or low temperatures and disable the unit if a supply air fault condition exists.
c. Unit shall be equipped with a supply fan status switch to protect the system in the event of a fan drive failure.
d. Induced draft heating section shall be provided with the following minimum protections:
1) High-temperature limit switch.
2) Differential pressure switch to prove induced draft.
3) Flame rollout switch.
4) Flame proving controls.
5) Redundant style gas valve.

I. Operating Characteristics:
1. Unit shall be capable of starting and running at 115°F outdoor ambient air temperature.
2. Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 55°F.
3. Units shall be equipped with a motorized two position Class 1A rated outdoor air (OA) damper for 100% OA operation. Control and isolation dampers to have a leakage rate of less than 3 cfm per sq ft at 1 in. pressure differential.

J. Electrical Requirements:
1. All unit power wiring shall enter unit cabinet at a single location with a single power point connection.
2. All units shall have a touch-safe control panel with separate high and low voltage sections.
3. Phase/Voltage Monitor:
A factory-installed under-voltage and phase loss sensor shall stop the unit whenever voltage is too low, phases are out of sequence, or a phase is dropped. The unit will restart automatically within five minutes after the correct power is supplied.

K. Motors:
1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.
2. All condenser fan motors shall be totally enclosed air-over (IP54) with permanently lubricated ball bearings, class F insulation and manual reset overload protection.
3. All indoor-fan motors shall meet the standard efficiency requirements as established by the Energy Independence and Security Act of 2007 (EISA), effective December 10, 2010.
4. Standard supply and exhaust fan motor shall be open drip proof (ODP) with variable speed drive (VFD) or EC motor.

L. Optional Features and Accessories:
1. Hot Gas Reheat:
A factory-installed hot gas reheat (HGRH) coil shall be available. The HGRH coil shall be available on the lead circuit only or on both refrigerant circuits. Units with HGRH will have variable speed low ambient head pressure control. Modulating HGRH shall be available.
2. Energy Recovery:
a. The factory-installed enthalpy wheel shall be certified to meet the requirements of AHRI Standard 1060 and shall be AHRI listed.
b. The enthalpy wheel shall be constructed of corrugated synthetic fibrous media with a desiccant intimately bound and uniformly and permanently dispersed throughout the matrix structure of the media.
c. The desiccant material shall be molecular sieve, 4 angstrom or smaller.
d. The rotor shall be constructed of alternating layers of flat and corrugated media.
e. Wheel construction shall be fluted or formed honeycomb geometry so as to eliminate internal wheel bypass.

f. The wheel frames shall be evenly spaced steel spokes with a galvanized steel outer band and rigid center hub.
g. The wheel seals shall be full contact nylon brush type.
h. The wheel shall slide out of the cabinet side for service.
i. Wheel cassettes shall be constructed of galvanized steel. Cassettes shall have integral purge section.
j. The wheel bearings shall be inboard mounted permanently sealed roller bearings or externally flanged bearings.
k. The wheel shall be driven by a fractional horsepower AC motor via multi-link drive belts.
l. Energy wheel defrost control and air bypass shall be available.

3. Gas Heating:
   a. Gas heat shall be induced-draft combustion type with energy saving direct spark ignition systems and redundant main gas valves.
   b. The heat exchanger shall be of the tubular section type constructed of a minimum of 20-gauge 409 stainless steel.
   c. Burners shall be of the in-shot type constructed of aluminum coated steel.
   d. All gas piping shall enter the unit cabinet at a single location.
   e. Gas heat shall be available in staged (2 or 4 stages) or modulating (5:1 or 10:1 turndown) control, depending on the capacity.
4. Induced-Draft Fans:
   a. Shall be direct-driven, single inlet, forward-curved centrifugal type.
   b. Shall be statically and dynamically balanced.
   c. Shall be made from steel with a corrosion-resistant finish.
   d. High-corrosion areas such as flue gas collection and exhaust areas shall be lined with corrosion resistant material.
   e. Gas heat control shall be staged (2 or 4 stages) or optional modulating control with 5:1 or 10:1 minimum effective turn-down.
5. Electric Heat:
   a. Electric resistance heaters shall be factory-installed, nichrome element type, open wire coils with 0.375 in. inside diameter, insulated with ceramic bushings, and include operating and safety controls. Coil ends shall be staked and welded to terminal screw slots.
   b. Factory-installed electric heat shall have staged heat control (1, 2, or 4 stages) or SCR (silicon controlled rectifier) control providing infinite capacity adjustment.
6. Hot Water Heat:
   Unit shall have a 4-row hot water coil, aluminum fin construction, installed downstream of the evaporator coil. Coil connection stubs will be located inside the unit cabinet. Hot water control valve to be field provided and installed. Unit controller shall provide valve modulation signal.
7. Liquid Subcooling Coil:
   The unit can be equipped with a factory-installed liquid subcooling coil on all circuits.
8. Convenience Outlet:
   Shall be factory-installed and externally mounted with a 115-v, 15 amp female GFI receptacle with hinged cover. The outlet shall be factory wired from a transformer and shall include a 15A breaker. The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect (if equipped).
9. Non-Fused Disconnect Switch:
   Shall be factory-installed, externally mounted rotary or externally mounted blade type disconnect that is UL registered. Non-fused switch shall provide unit power shutoff and shall be accessible from outside the unit. The switch shall provide power off lockout capability.
10. 4 Inch Filters:
    Optional filter section shall be supplied with 4 in. thick MERV-8, 11, or 13 pleated media filters.
11. Commissioning User Interface:
    The commissioning display unit shall be Equipment Touch™, Field Assistant, or the Equipment Touch app.
12. Roof Curb with Sleeper Rail:
    Curb shall be formed of 14-gauge galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
13. Exhaust Air Smoke Detector:
    A factory-installed smoke detector shall be mounted in the unit exhaust air intake.
14. Harsh Environment Coating:
    Unit shall be equipped with a factory-applied "Harsh Environment Protection" designed to combat the corrosive effects of industrial and commercial atmospheric conditions including: salt air, salt water, acid rain, chlorine and chlorides, hydrochloric, nitric, hydrofluoric, sulfuric and uric acid fumes, hydrogen sulfide gas, lye, sulfur dioxide, methane gas, hydrocarbons, chlorinated solvents and aromatic solvents. The Harsh Environment Protection shall include the following features, where applicable, to provide

Guide specifications (cont)

extra protection against corrosive atmospheric conditions:

a. Vinyl-coated condenser fan guards.

b. Non-corroding condenser fan motor mounts.

c. Totally enclosed, single-speed, three-phase condenser fan motors.

d. Coated, refrigerant-to-air condenser with corrosion-resistant coil coating, composed of aluminum-impregnated polyurethane, rated for 10,000 hour salt spray.

e. Coated, refrigerant-to-air evaporator with corrosion-resistant coil-coating, composed of aluminum-impregnated polyurethane, rated for 10,000 hour salt spray.

f. Coated, refrigerant-to-air hot gas reheat coil with corrosion-resistant coil coating, composed of polyurethane, rated for 10,000 hour salt spray.

g. Coated, refrigerant-to-air subcooling coil with corrosion-resistant coil coating, composed of aluminum impregnated polyurethane, rated for 10,000 hour salt spray.

h. All interior (un-insulated) cabinet panels coated with corrosion-resistant cabinet coating, composed of polyurethane, rated for 10,000 hour salt spray.

i. All exterior surfaces of the cabinet coated with corrosion-resistant cabinet coating, composed of polyurethane, rated for 10,000 hour salt spray.

j. All compressors, accumulators, factory-installed receivers, control device covers and refrigerant piping coated with corrosion-resistant cabinet coating, composed of polyurethane, rated for 10,000 hour salt spray. (Excludes dampers and blower fan blades.)

15. High Efficiency Condenser:

    Unit shall include condenser assembly with at least one additional condenser fan or at least one additional condenser fan with additional condenser surface area to provide improved unit efficiency and performance.

16. Airflow Monitor Control:

    Unit shall include a factory installed airflow monitor on the supply fan or the supply and exhaust fan. Unit control shall modulate the supply and exhaust fan to maintain the airflow set points.

17. Pressure Control:

    Unit shall include a supply duct pressure transducer (factory-supplied, field-installed). Control shall modulate the supply fan to maintain the supply duct pressure set point. Units with an exhaust fan will also include an building pressure transducer (factory-supplied, field-installed). Unit shall modulate the exhaust fan to maintain the building pressure set point.

18. TEFC Fan Motor:

    Unit shall include a totally enclosed supply or supply and exhaust fan motor.

19. Spring Vibration Isolation:

    Unit supply or supply and exhaust fan shall be mounted on spring vibration isolation (ODP or TEFC motors only).

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