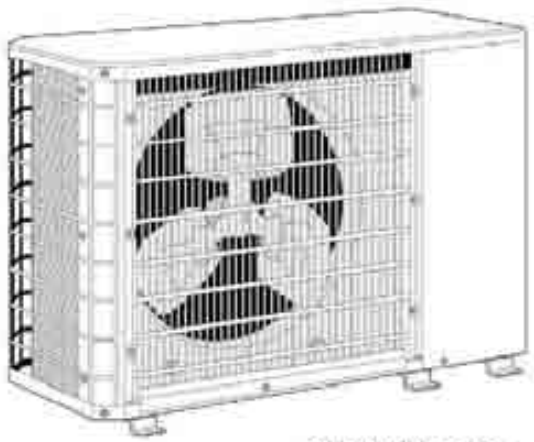
38HK18-70
38HQ18-24
Condensing Units - 50Hz
1 to 6 Nominal Tons

Product Data

The 38H Series Energy-Efficient Split condensing units incorporate innovative technology to provide reliable cooling performance. Built into these units are features most desired by the industry.



38HK 48k - 70k

38HK18k - 36k

Features/Benefits

• Designed especially for high ambient environment.

• EER (Energy Efficiency Ratio) ratings of up to 10.0.

• The small footprint coupled with the horizontal airflow design means that the 38H Series units can be installed within 200 mm (8 in). of an outside wall, on a roof, balcony, or deck.

Electrical Range

— All units are offered in 220-240v single phase. Three-phase units are available from 048 through 060 sizes in 400v.

Wide Range of Sizes

— The 38H Series is available in 7 nominal sizes from 1.5 to 6 Ton to meet the needs of residential and light commercial applications.

Application Versatility

— The unit can be combined with a wide variety of evaporator coils and blower packages to provide quiet, dependable comfort. Unit can be installed on a roof or at ground level.

Easy access for service and maintenance

A single panel provides immediate access to the isolated compressor and control compartment, allowing a service technician access to check unit operation without losing condenser airflow. Coils can be cleaned quickly from the outside.

Secure operation

If security is an issue, outdoor and indoor units are connected only by refrigerant piping and wiring to prevent intruders from crawling through ductwork. The 38H Series units can be installed 8 in. away from outside walls, protecting coils from vandals and severe weather.

Fast installation
Carrier's compact systems take only a few hours to install — only wire and piping need to be run. The fast and easy installation ensures minimal disruption to customers in the home or workplace. This Carrier advantage is especially beneficial in retrofit situations.

External Service Valves
— Service valves are brass, front seating type. The 38H Series has flare connections, sweat adapter kit is provided for 7/8" tube size. Valves are externally located so refrigerant tube connections can be made quickly and easily. Each valve has a service port for ease of checking operating refrigerant pressures.

Built-in reliability
Carrier split system outdoor units are designed to provide years of trouble-free operation. The 38H Series condensing units are the only dedicated commercial units with all safety features standard to ensure high performance and lasting reliability under the most demanding situations. For example, start capacitors ensure dependable start-ups, especially during low voltage conditions (down to 187 v). High-pressure and low-pressure safety switches are standard

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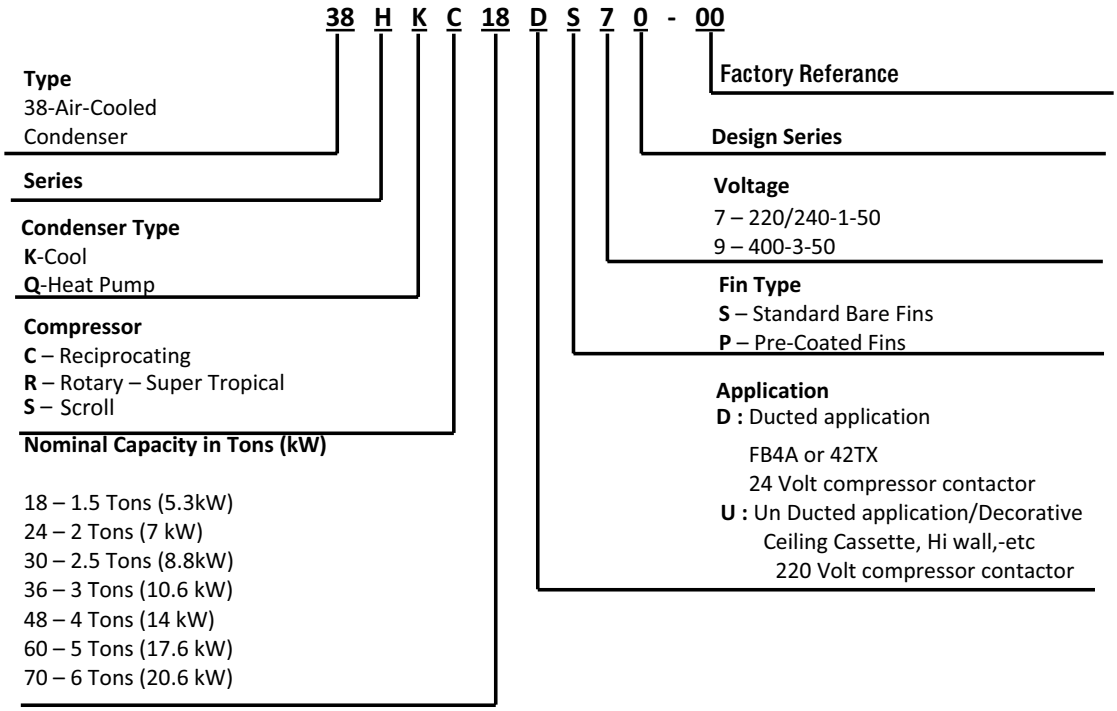
QUALITY ASSURANCE
APPROVALS
ISO 9001:2008
EN ISO 9001:2008
ANSI/ASQC Q9001:2008
#0410019950420

Model number nomenclature



Physical Data

UNIT 38H	18	24	30	36	48	60	70
NOMINAL CAPACITY (Tons)	1.5	2	2.5	3	4.0	5.0	6.0
OPERATING WEIGHT (lb)	123	139	154	161	211	227	253
SHIPPING DIMENSIONS (in) (W X H X D)	37 x 29.7 x 16.1				50.4 X 40.2 X 30		
COMPRESSOR							
Cool Only	Reciprocating						Scroll
Heat Pump	Rotary		--				
REFRIGERANT TYPE	R22						
METERING DEVICE							
Ducted Application	Nozzle, in the indoor unit						
Un-ducted Application	Capillary Tube				Nozzle, in the indoor unit		
FINISH	Gray						
OUTDOOR FAN	Propeller Type						
RPM/CFM	1100/2000				860/3,000		
Diameter, No. Blades	18 in, 3				24 in, 3		
Motor Horsepower,	1/12				1/2		
COIL DATA							
Face Area (sq ft)	6.3				12.05		
Tubes	Smooth		Helical grooved				
Fins	Aluminium, Double Wavy						
FPI	15	17	17	15	12	14	
REFRIGERANT LINES							
Connection Type	Flare						
Liquid Line	3/8 inch						
Vapour Line	5/8 in.			3/4 in.	7/8 inch*		
Max Length	50 ft						
Max Lift	30 ft						
Max Drop	30 ft						

* Sweat adapter kit is provided for 7/8" tube size

Combination ratings

COOLING ONLY

Nominal Cap. MBtuh	INDOOR TYPE	INDOOR MODEL	OUTDOOR MODEL	AHRI CAP. (Btuh)	AHRI* CFM	TOTAL (kW)	EER
18	Cassette	40GKX0187	38HKC018US70	17700	425	2.36	7.5
	Cassette	40KMC0187	38HKC018US70	17700	425	2.36	7.5
	Console	42VMC187C	38HKR018US70	18000	440	2.25	8.0
	Ducted Split - 42TX	42TX-018-701R	38HKC018DS70	19400	650	2.4	8.1
	Ducted Split -FB4A	FB4ASSF018	38HKC018DS70	20000	1150	2.5	8.0
	High Wall	42KPC018703	38HKC018US70	18000	550	2.2	8.2
	High Wall	42KHC0187	38HKC018US70	18000	550	2.2	8.2
	High Wall	42EGC018-7	38HKR018US70	18000	550	2.15	8.4
24	Cassette	40GKX0247	38HKC024US70	21700	450	2.89	7.5
	Cassette	40KMC0247	38HKC024US70	21700	450	2.89	7.5
	Console	42VMC247C	38HKR024US70	24000	530	2.95	8.1
	Ducted Split - 42TX	42TX-024-701R	38HKC024DS70	24900	650	3.1	8.0
	Ducted Split -FB4A	FB4ASSF024	38HKC024DS70	24300	1200	3.1	7.8
	High Wall	42KPD024703	38HKC024US70	24000	650	3.0	8.0
	High Wall	42KHD0247	38HKC024US70	24000	650	3.0	8.0
	High Wall	42EGC024-7	38HKR024US70	24000	650	2.9	8.3
30	Cassette	40GKX0367	38HKC030US70	28600	750	3.25	8.8
	Cassette	40KMC0367	38HKC030US70	28600	750	3.25	8.8
	Ducted Split - 42TX	42TX-030-701R	38HKC030DS70	29500	800	3.2	9.2
	Ducted Split -FB4A	FB4ASSF030	38HKC030DS70	30100	1500	3.3	9.1
	High Wall	42XP090C3	38HKC030US70	28500	730	3.1	9.2
36	Cassette	40GKX0367	38HKC036US70	30900	750	3.5	9.0
	Cassette	40KMC0367	38HKC036US70	30900	750	3.5	9.0
	Cassette	40GKX0487	38HKC036US70	35100	975	3.7	9.5
	Cassette	40KMC0487	38HKC036US70	35100	975	3.7	9.5
	Ducted Split - 42TX	42TX-036-701R	38HKC036DS70	35000	1100	4.0	8.8
	Ducted Split -FB4A	FB4ASSF036	38HKC036DS70	34500	1500	4.0	8.6
	Free Stand	42SM5C	38HKC036US70	35000	800	3.8	9.2
	High Wall	42XP100C3	38HKC036US70	34000	830	3.7	9.2
48	Cassette	40GKX0487	38HKC048US90	40700	975	4.2	9.7
	Cassette	40KMC0487	38HKC048US90	40700	975	4.2	9.7
	Ducted Split - 42TX	42TX-048-701R	38HKC048DS90	45000	1400	4.5	10.0
	Ducted Split -FB4A	FB4ASSF048	38HKC048DS90	46000	1650	4.6	10.0
	Free Stand	42SD6C	38HKC048US90	45000	900	4.5	10.0
60	Ducted Split - 42TX	42TX-060-701R	38HKC060DS90	59000	1600	6.0	9.8
	Ducted Split -FB4A	FB4ASSF060	38HKC060DS90	59000	1850	5.9	10.0
	Free Stand	42SD7C	38HKC060US90	59000	1500	5.9	10.0
70	Ducted Split -FB4A	FB4ASSF070	38HKS070DS90	65700	2000	6.1	10.8

HEAT PUMP

Nominal Cap. MBtuh	INDOOR TYPE	INDOOR MODEL	OUTDOOR MODEL	COOLING MODE				HEATING MODE			
				AHRI CAP. (Btuh)	AHRI* CFM	EER	kW	AHRI CAP. (Btuh)	AHRI* CFM	EER	kW
18	High Wall	42QPC018703	38HQR018US70	18000	550	8.2	2.2	18000	550	9.0	2.0
	High Wall	42QHC0187	38HQR018US70	18000	550	8.2	2.2	18000	550	9.0	2.0
	High Wall	42EGQ018-7	38HQR018US70	18000	550	8.2	2.2	18000	550	9.0	2.0
24	High Wall	42QPD022703	38HQR024US70	24000	650	8.1	2.95	24000	650	9.2	2.6
	High Wall	42QHD024-7	38HQR024US70	24000	650	8.1	2.95	24000	650	9.2	2.6
	High Wall	42EGQ024-7	38HQR024US70	24000	650	8.1	2.95	24000	650	9.2	2.6

LEGEND
CFM — Cubic Feet Per Minute
EER — Energy Efficiency Ratio
* Air Conditioning, Heating and Refrigeration Institute.

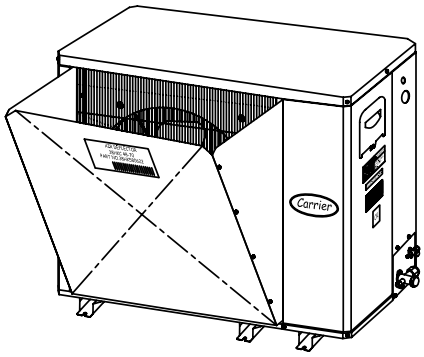
NOTES:
Cooling Standard: 80 F db, 67 F wb indoor entering-air temperature and 95 F db air entering outdoor unit.
Heating Standard: 70 F db, 60 F wb indoor entering-air temperature and 47 F db air entering outdoor unit.

Optional Deflector Accessory
38H 48-70

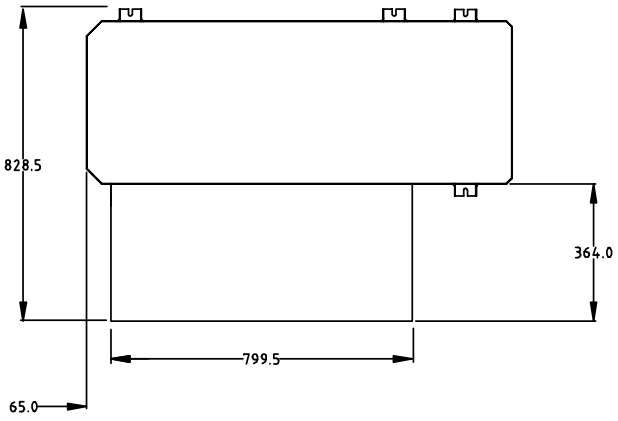
Part No. 38HK580622

The air deflector accessory converts the direction of air flow in the side discharge outdoor condensing units from horizontal direction to vertical direction to make the unit more flexible and suitable for top discharge applications.

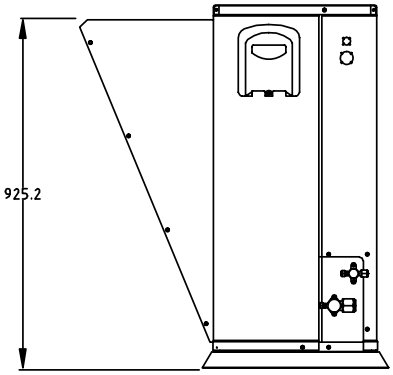
The air deflector accessory consists of three pieces of painted galvanized sheet metal parts assembled at site.



TOP VIEW



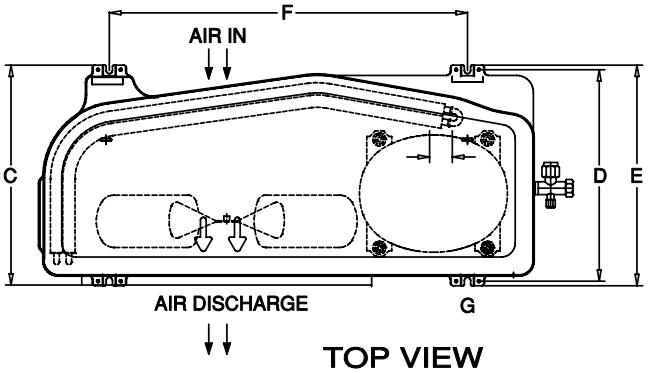
SIDE VIEW



Note:
This accessory is used only with 38HK048-070

Base Unit Dimensions
38H 018-036

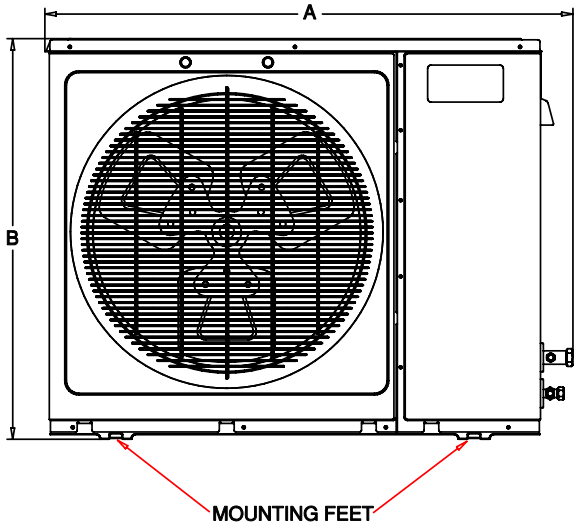
A		B		C		D		E		F		G		H	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
36.14	918	27.76	705	15.24	387	14.65	372	15.28	388	24.80	630	1.57	40	2.49	63.2



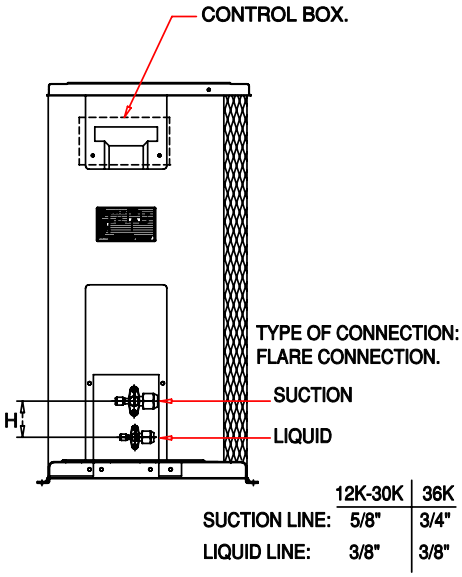
TOP VIEW

NOTES:

1. FREE DISTANCE AROUND THE UNIT FROM THE WALL.
   FRONT: 59 in. (1500 mm) min.
   REAR & SIDES: 20in (500 mm) min.
2. SIZE OF WIRE: 12AWG.



FRONT VIEW

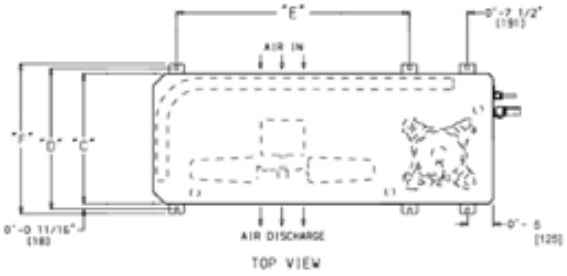


	12K-30K	36K
SUCTION LINE:	5/8"	3/4"
LIQUID LINE:	3/8"	3/8"

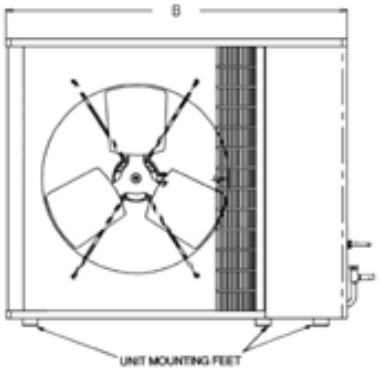
SIDE VIEW

Base Unit Dimensions
38H 048-070

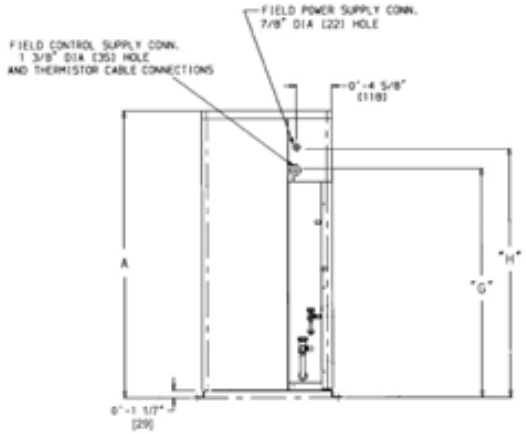
UNIT 38H	A		B		C		D		E		F		G		H	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
048-070	3-13⁄16	944.6	3-89⁄16	1131.9	1-51⁄16	433.4	1-67⁄16	468.3	2-61⁄2	774.7	1-75⁄8	498.5	1-75⁄8	498.5	2-55⁄8	752.5



TOP VIEW



FRONT VIEW



NOTES:
1. Required clearances: with coil facing wall allow 8 in. minimum clearance on coil side and coil end, and 3 ft minimum clearance on compressor end and fan side.
2. Dimensions in [ ] are in millimeters.

Electrical Data

COOL ONLY MODELS

Nominal Cap. MBtuh	OUTDOOR MODEL	Power Supply	Compressor		Fan
			FLA	LRA	FLA
18	38HKC018US70	220-240/1/50	9.7	51.0	1.0
	38HKR018US70	220-240/1/50	9.7	51.0	1.0
	38HKC018DS70	220-240/1/50	9.7	51.0	1.0
	38HKC018US70	220-240/1/50	9.7	51.0	1.0
	38HKR018US70	220-240/1/50	9.7	51.0	1.0
24	38HKC024US70	220-240/1/50	14.0	58.0	1.0
	38HKR024US70	220-240/1/50	14.0	58.0	1.0
	38HKC024DS70	220-240/1/50	14.0	58.0	1.0
30	38HKC030US70	220-240/1/50	13.4	85.0	1.0
	38HKC030DS70	220-240/1/50	13.4	85.0	1.0
36	38HKC36US70	220-240/1/50	13.4	85.0	1.0
	38HKC36DS70	220-240/1/50	17.0	90.0	1.0
48	38HKC48US90	400/3/50	6.7	53.0	2.3
	38HKC48DS90	400/3/50	6.7	53.0	2.3
60	38HKC60DS90	400/3/50	9.1	82.0	2.3
	38HKC60US90	400/3/50	9.1	82.0	2.3
70	38HKS70DS90	400/3/50	9.6	82.0	2.3

HEAT PUMP MODELS

Nominal Cap. MBtuh	OUTDOOR MODEL	Power Supply	Compressor		Fan
			FLA	LRA	FLA
18	38HQR018US70	220-240/1/50	9.7	51.0	1.0
24	38HQR024US70	220-240/1/50	14.0	58.0	1.0

LEGEND
FLA — Full Load Amps
LRA — Locked Rotor Amps
RLA — Rated Load Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Over current Protection Amps

Controls

Unit operation

NOTE: AUTO fan mode is used as the unit operation example for ALL fan coil units in this section. Contact your local Carrier dealer for operation information in other fan modes.

Fan coil units — Duct free fan coil units have a self-contained control system that determines the set point for fan coil operation, fan mode operation, and heating mode operation (if provided). The un-ducted fan coil and ducted fan coil units are equipped with a thermostat. For ducted fan coils the field installed thermostat determines the set point for fan mode operation, and electric heat operation (if provided).

On a call for cooling operation by a single fan coil unit, a signal is sent to the 38H outdoor unit and energizes a control relay.

The indoor blower starts according to the normal fan coil unit sequence of operation.

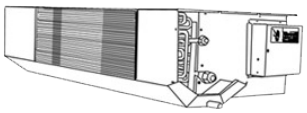
The control relay (in the outdoor unit) initiates operation of a cooling cycle for the compressor. As the set point at the fan coil is satisfied, its individual signal to the 38HK unit stops.

38 Series outdoor condensing unit — The outdoor unit is equipped with a control that monitors the indoor fan coil cooling request.

Unit malfunction — Each unit is equipped with a high-pressure switch (HPS), a low pressure switch (LPS),

Compressor over current protection is achieved by an internal line break overload, which automatically resets when the motor temperature cools to a satisfactory level.

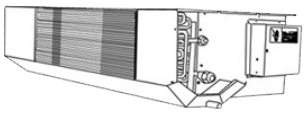
Detailed Performance Data –
Matching 38HK with 42TX



Nom Cap. Mbtuh	Evaporator Air		CONDENSER AIR ENTERING Deg F																		
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
18	450	72	22.6	11.2	2.07	21.8	11.0	2.23	20.7	10.6	2.38	19.6	10.2	2.55	18.3	9.8	2.72	17.4	9.3	2.82
		67	20.9	13.9	2.02	19.9	13.6	2.17	18.7	13.1	2.31	17.4	12.6	2.46	16.1	12.1	2.58	15.3	11.5	2.66
		62	18.9	16.4	1.97	17.8	15.9	2.09	16.7	15.3	2.21	15.5	14.7	2.33	14.4	13.9	2.46	13.7	13.2	2.54
		57	18.0	17.3	1.94	17.2	16.5	2.07	16.3	15.6	2.19	15.4	14.8	2.33	14.4	13.9	2.46	13.7	13.2	2.55
	550	72	22.9	11.6	2.12	22.1	11.4	2.28	21.1	11.1	2.43	19.9	10.8	2.60	18.6	10.3	2.77	17.7	9.8	2.87
		67	21.3	14.7	2.07	20.3	14.4	2.22	19.1	14.0	2.37	17.8	13.5	2.53	16.4	13.0	2.65	15.6	12.3	2.72
		62	19.3	17.5	2.02	18.3	17.0	2.16	17.1	16.4	2.28	16.1	15.4	2.41	15.1	14.5	2.55	14.3	13.8	2.63
		57	18.8	18.1	2.00	17.9	17.2	2.14	17.0	16.4	2.28	16.1	15.5	2.41	15.1	14.5	2.55	14.3	13.8	2.63
	650	72	23.1	11.9	2.17	22.3	11.8	2.33	21.3	11.5	2.48	20.2	11.2	2.65	18.8	10.8	2.82	17.9	10.3	2.93
		67	21.5	15.4	2.12	20.6	15.2	2.26	**19.4**	**14.8**	**2.42**	18.1	14.3	2.57	16.7	13.8	2.71	15.8	13.1	2.79
		62	19.7	18.5	2.07	18.7	18.0	2.21	17.7	17.0	2.36	16.7	16.0	2.49	15.7	15.0	2.63	14.9	14.3	2.72
		57	19.5	18.7	2.05	18.6	17.9	2.21	17.7	17.0	2.36	16.7	16.0	2.49	15.7	15.0	2.63	14.9	14.3	2.72
24	450	72	29.0	14.4	2.67	27.9	14.1	2.87	26.6	13.7	3.07	25.1	13.2	3.28	23.4	12.6	3.50	22.3	12.0	3.63
		67	26.8	17.9	2.60	25.5	17.4	2.79	24.0	16.9	2.98	22.4	16.2	3.16	20.7	15.6	3.33	19.7	14.8	3.42
		62	24.2	21.1	2.53	22.8	20.4	2.69	21.4	19.7	2.85	19.9	18.9	3.00	18.5	17.8	3.17	17.6	16.9	3.27
		57	23.0	22.2	2.50	22.0	21.2	2.66	20.9	20.1	2.81	19.8	19.0	2.99	18.5	17.8	3.17	17.6	16.9	3.28
	550	72	29.3	14.9	2.73	28.3	14.6	2.93	27.0	14.3	3.13	25.6	13.8	3.35	23.8	13.3	3.56	22.6	12.6	3.69
		67	27.3	18.9	2.67	26.0	18.5	2.86	24.5	18.0	3.05	22.8	17.4	3.25	21.1	16.7	3.41	20.0	15.8	3.50
		62	24.8	22.5	2.60	23.4	21.8	2.77	21.9	21.1	2.93	20.6	19.9	3.10	19.4	18.6	3.28	18.4	17.7	3.38
		57	24.1	23.2	2.57	23.0	22.2	2.76	21.9	21.1	2.93	20.6	19.9	3.10	19.4	18.7	3.28	18.4	17.7	3.38
	650	72	29.6	15.3	2.80	28.6	15.1	2.99	27.3	14.8	3.20	25.9	14.4	3.42	24.1	13.9	3.63	22.9	13.2	3.77
		67	27.6	19.8	2.73	26.4	19.5	2.91	**24.9**	**19.1**	**3.11**	23.2	18.4	3.31	21.4	17.7	3.49	20.3	16.8	3.60
		62	25.3	23.7	2.66	24.0	23.1	2.84	22.6	21.8	3.03	21.4	20.6	3.20	20.1	19.3	3.39	19.1	18.4	3.50
		57	25.0	24.0	2.64	23.9	23.0	2.84	22.7	21.8	3.03	21.4	20.6	3.20	20.1	19.3	3.39	19.1	18.4	3.50
30	600	72	34.3	16.0	2.71	33.1	15.7	2.92	31.5	15.2	3.12	29.7	14.6	3.33	27.8	14.0	3.55	26.4	13.3	3.69
		67	31.7	19.9	2.65	30.2	19.4	2.84	28.4	18.7	3.03	26.5	18.0	3.22	24.5	17.3	3.38	23.3	16.4	3.48
		62	28.7	23.4	2.57	27.0	22.7	2.74	25.3	21.9	2.89	23.6	21.0	3.05	21.9	19.8	3.22	20.8	18.8	3.33
		57	27.3	24.7	2.54	26.1	23.5	2.70	24.7	22.4	2.86	23.4	21.1	3.04	21.9	19.8	3.22	20.8	18.8	3.33
	700	72	34.7	16.6	2.78	33.5	16.3	2.98	32.0	15.8	3.18	30.3	15.4	3.41	28.2	14.7	3.62	26.8	14.0	3.75
		67	32.3	21.0	2.71	30.8	20.6	2.90	29.0	20.0	3.10	27.0	19.3	3.31	25.0	18.5	3.46	23.7	17.6	3.56
		62	29.4	25.0	2.64	27.7	24.3	2.82	26.0	23.5	2.98	24.4	22.1	3.15	22.9	20.7	3.33	21.8	19.7	3.44
		57	28.6	25.8	2.61	27.2	24.6	2.80	25.9	23.4	2.98	24.4	22.1	3.15	22.9	20.7	3.33	21.8	19.7	3.44
	800	72	35.1	17.0	2.84	33.9	16.8	3.04	32.4	16.5	3.25	30.7	16.0	3.47	28.6	15.4	3.69	27.2	14.7	3.83
		67	32.7	22.0	2.78	31.2	21.7	2.96	**29.5**	**21.2**	**3.17**	27.4	20.5	3.36	25.3	19.7	3.55	24.1	18.7	3.65
		62	30.0	26.4	2.70	28.4	25.7	2.89	26.8	24.2	3.08	25.3	22.9	3.26	23.8	21.5	3.45	22.6	20.4	3.56
		57	29.6	26.7	2.69	28.3	25.6	2.89	26.8	24.2	3.08	25.3	22.9	3.26	23.8	21.5	3.45	22.6	20.4	3.56
36	800	72	40.7	20.4	3.43	39.2	20.0	3.69	37.4	19.4	3.94	35.3	18.6	4.21	33.0	17.8	4.49	31.3	16.9	4.66
		67	37.6	25.4	3.35	35.8	24.7	3.59	33.7	23.9	3.83	31.4	23.0	4.07	29.1	22.1	4.27	27.6	21.0	4.40
		62	34.0	29.9	3.25	32.0	28.9	3.46	30.0	27.9	3.66	28.0	26.8	3.86	26.0	25.3	4.08	24.7	24.0	4.21
		57	32.4	31.4	3.21	30.9	30.0	3.42	29.3	28.5	3.62	27.8	27.0	3.85	26.0	25.3	4.08	24.7	24.0	4.21
	950	72	41.2	21.1	3.51	39.8	20.8	3.76	38.0	20.2	4.02	35.9	19.6	4.31	33.5	18.8	4.58	31.8	17.8	4.74
		67	38.3	26.8	3.43	36.5	26.2	3.67	34.4	25.5	3.92	32.1	24.6	4.18	29.6	23.6	4.38	28.1	22.4	4.50
		62	34.9	31.9	3.34	32.9	30.9	3.57	30.8	29.9	3.76	29.0	28.1	3.98	27.2	26.4	4.21	25.8	25.1	4.35
		57	33.9	32.9	3.30	32.3	31.4	3.54	30.7	29.8	3.76	29.0	28.2	3.98	27.2	26.4	4.21	25.9	25.1	4.35
	1100	72	41.6	21.7	3.60	40.2	21.4	3.85	38.4	21.0	4.11	36.4	20.5	4.39	33.9	19.7	4.67	32.2	18.7	4.84
		67	38.8	28.0	3.51	37.1	27.6	3.74	**35.0**	**27.0**	**4.00**	32.6	26.1	4.25	30.0	25.1	4.48	28.5	23.8	4.62
		62	35.6	33.6	3.42	33.7	32.7	3.65	31.8	30.9	3.90	30.0	29.2	4.12	28.2	27.4	4.36	26.8	26.0	4.50
		57	35.1	34.1	3.40	33.6	32.6	3.65	31.8	30.9	3.90	30.0	29.2	4.12	28.2	27.4	4.36	26.8	26.0	4.50

Detailed Performance Data – cont.

Matching 38HK with 42TX



Nom Cap. Mbtuh	Evaporator Air		CONDENSER AIR ENTERING Deg. F																			
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
48	1100	72	52.3	25.6	3.86	50.5	25.1	4.15	48.0	24.3	4.43	45.4	23.4	4.74	42.4	22.4	5.06	40.3	21.2	5.25
		67	48.4	31.8	3.76	46.0	31.0	4.03	43.3	30.0	4.30	40.4	28.8	4.57	37.4	27.7	4.81	35.5	26.3	4.95
		62	43.8	37.5	3.66	41.2	36.3	3.89	38.6	35.1	4.12	36.0	33.7	4.34	33.4	31.7	4.59	31.8	30.1	4.73
		57	41.6	39.4	3.61	39.8	37.7	3.85	37.7	35.8	4.07	35.7	33.8	4.33	33.5	31.7	4.59	31.8	30.1	4.74
	1250	72	53.0	26.5	3.95	51.2	26.0	4.23	48.8	25.4	4.53	46.2	24.6	4.84	43.1	23.6	5.15	40.9	22.4	5.33
		67	49.3	33.6	3.86	47.0	32.9	4.13	44.3	32.0	4.41	41.3	30.9	4.70	38.1	29.7	4.93	36.2	28.2	5.06
		62	44.8	40.0	3.75	42.3	38.8	4.01	39.6	37.6	4.23	37.3	35.3	4.48	35.0	33.2	4.74	33.2	31.5	4.89
		57	43.6	41.3	3.72	41.6	39.4	3.99	39.5	37.4	4.23	37.3	35.3	4.48	35.0	33.2	4.74	33.2	31.5	4.89
	1400	72	53.5	27.3	4.05	51.6	26.9	4.33	49.4	26.3	4.62	46.8	25.7	4.94	43.6	24.7	5.25	41.4	23.5	5.44
		67	49.9	35.2	3.95	47.6	34.6	4.21	**45.0**	**33.9**	**4.50**	41.9	32.8	4.79	38.6	31.5	5.04	36.7	29.9	5.20
		62	45.7	42.2	3.85	43.3	41.1	4.11	40.9	38.8	4.39	38.6	36.6	4.63	36.3	34.4	4.90	34.5	32.7	5.06
		57	45.1	42.7	3.82	43.2	40.9	4.11	40.9	38.8	4.39	38.6	36.6	4.63	36.3	34.4	4.90	34.5	32.7	5.06
60	1300	72	68.5	34.9	5.15	66.1	34.1	5.55	62.9	33.0	5.92	59.4	31.8	6.33	55.5	30.4	6.75	52.7	28.9	7.01
		67	63.4	43.3	5.03	60.3	42.2	5.39	56.7	40.8	5.75	53.0	39.2	6.11	49.0	37.6	6.42	46.6	35.8	6.61
		62	57.3	51.0	4.89	54.0	49.4	5.20	50.6	47.7	5.50	47.2	45.8	5.80	43.8	43.1	6.12	41.6	40.9	6.32
		57	54.5	53.6	4.82	52.1	51.2	5.14	49.4	48.6	5.44	46.8	46.0	5.78	43.8	43.1	6.12	41.6	40.9	6.33
	1450	72	69.4	36.0	5.28	67.0	35.4	5.66	64.0	34.5	6.05	60.5	33.4	6.47	56.4	32.0	6.88	53.6	30.4	7.12
		67	64.6	45.7	5.15	61.5	44.7	5.51	58.0	43.5	5.89	54.1	42.0	6.28	49.9	40.3	6.58	47.4	38.3	6.76
		62	58.7	54.4	5.01	55.4	52.8	5.36	51.9	51.1	5.66	48.8	48.0	5.98	45.8	45.1	6.33	43.5	42.8	6.54
		57	57.1	56.2	4.97	54.4	53.5	5.33	51.8	50.9	5.66	48.8	48.0	5.98	45.9	45.1	6.33	43.6	42.8	6.54
	1600	72	70.1	37.1	5.40	67.7	36.6	5.78	64.7	35.8	6.17	61.3	34.9	6.59	57.1	33.6	7.02	54.3	31.9	7.27
		67	65.4	47.8	5.28	62.4	47.1	5.62	**59.0**	**46.0**	**6.02**	54.8	44.6	6.39	50.6	42.8	6.74	48.1	40.7	6.94
		62	59.9	57.4	5.14	56.8	55.8	5.48	53.6	52.7	5.86	50.6	49.8	6.19	47.5	46.7	6.55	45.2	44.4	6.76
		57	59.1	58.1	5.11	56.6	55.6	5.48	53.6	52.7	5.86	50.6	49.8	6.19	47.5	46.8	6.55	45.2	44.4	6.76

Notes:

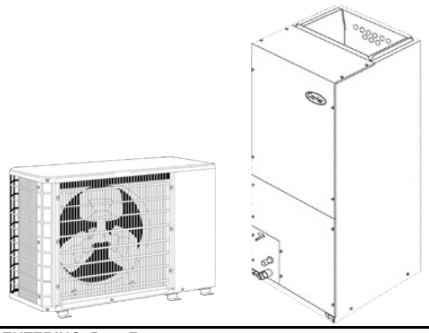
1. Net Capacities shown include a deduction for evaporator fan motor heat.
2. Formulas:

Leaving db= Entering - Sensible Heat Cap./(1.09 x CFM)

Leaving wb= wb corresponding to air leaving coil (hwb)
h wb leaving = hwb entering - Total Cap(Btuh)/(4.5 X CFM)

3. Direct Interpolation Permissible. Do not extrapolate.

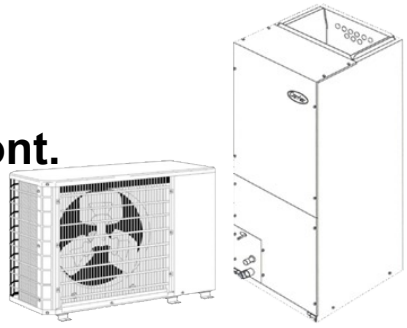
Detailed Performance Data –
Matching 38HK with FB4A



Nom Cap. MBtuh	Evaporator Air		CONDENSER AIR ENTERING Deg. F																	
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
18	525	72	23.6	11.2	2.19	22.8	11.0	2.35	21.7	10.6	2.51	20.5	10.2	2.69	19.1	9.8	2.87	18.1	9.4	2.97
		67	21.9	13.9	2.13	20.8	13.6	2.29	19.6	13.1	2.44	18.3	12.6	2.59	16.9	12.1	2.73	15.9	11.7	2.81
		62	19.8	16.4	2.07	18.6	15.9	2.21	17.4	15.3	2.33	16.3	14.7	2.46	15.1	13.9	2.60	14.4	13.2	2.68
		57	18.8	17.3	2.05	18.0	16.5	2.18	17.0	15.6	2.31	16.1	14.8	2.45	15.1	13.9	2.60	14.4	13.2	2.69
	600	72	23.9	11.6	2.24	23.1	11.4	2.40	22.1	11.1	2.99	20.9	10.8	2.75	19.5	10.3	2.92	18.4	10.0	3.02
		67	22.3	14.7	2.19	21.2	14.4	2.34	**20.0**	**14.0**	**2.50**	18.6	13.5	2.67	17.2	13.0	2.79	16.2	12.6	2.87
		62	20.3	17.5	2.13	19.1	17.0	2.27	17.9	16.4	2.40	16.8	15.4	2.54	15.8	14.5	2.69	15.1	13.8	2.77
		57	19.7	18.1	2.11	18.8	17.2	2.26	17.8	16.4	2.40	16.8	15.4	2.54	15.8	14.5	2.69	15.1	13.8	2.77
	675	72	24.2	11.9	2.29	23.3	11.8	2.45	22.3	11.5	2.62	21.1	11.2	2.80	19.7	10.8	2.98	18.7	10.5	3.09
		67	22.6	15.4	2.24	21.5	15.2	2.39	20.3	14.8	2.55	18.9	14.3	2.71	17.4	13.8	2.86	16.4	13.4	2.95
		62	20.7	18.5	2.18	19.6	18.0	2.33	18.5	17.0	2.49	17.4	16.0	2.63	16.4	15.0	2.78	15.6	14.3	2.87
		57	20.4	18.7	2.17	19.5	17.9	2.33	18.5	17.0	2.49	17.4	16.0	2.63	16.4	15.0	2.78	15.6	14.3	2.87
24	550	72	28.7	13.3	2.67	27.7	13.0	2.87	26.4	12.6	3.07	24.9	12.1	3.28	23.3	11.6	3.50	22.0	11.2	3.63
		67	26.6	16.5	2.60	25.3	16.1	2.79	23.8	15.6	2.98	22.2	15.0	3.16	20.5	14.4	3.33	19.3	13.9	3.42
		62	24.0	19.5	2.53	22.6	18.8	2.69	21.2	18.2	2.85	19.8	17.5	3.00	18.4	16.4	3.17	17.5	15.7	3.27
		57	22.8	20.5	2.50	21.8	19.5	2.66	20.7	18.6	2.81	19.6	17.6	2.99	18.4	16.4	3.17	17.5	15.7	3.28
	625	72	29.1	13.8	2.73	28.1	13.5	2.93	26.8	13.2	3.13	25.4	12.7	3.35	23.6	12.2	3.56	22.4	11.8	3.69
		67	27.1	17.4	2.67	25.8	17.1	2.86	**24.3**	**16.6**	**3.05**	22.6	16.0	3.25	20.9	15.4	3.41	19.7	14.9	3.50
		62	24.6	20.8	2.60	23.2	20.1	2.77	21.8	19.5	2.93	20.5	18.3	3.10	19.2	17.2	3.28	18.3	16.4	3.38
		57	23.9	21.4	2.57	22.8	20.4	2.76	21.7	19.4	2.93	20.4	18.3	3.10	19.2	17.2	3.28	18.3	16.4	3.38
	700	72	29.4	14.1	2.80	28.3	14.0	2.99	27.1	13.7	3.20	25.7	13.3	3.42	23.9	12.8	3.63	22.7	12.4	3.77
		67	27.4	18.3	2.73	26.2	18.0	2.91	24.7	17.6	3.11	23.0	17.0	3.31	21.2	16.3	3.49	20.0	15.9	3.60
		62	25.1	21.9	2.66	23.8	21.3	2.84	22.5	20.1	3.03	21.2	19.0	3.20	19.9	17.8	3.39	19.0	17.0	3.50
		57	24.8	22.2	2.64	23.7	21.2	2.84	22.5	20.1	3.03	21.2	19.0	3.20	19.9	17.8	3.39	19.0	17.0	3.50
30	1000	72	35.6	18.4	2.89	34.3	18.0	3.11	32.7	17.5	3.32	30.8	16.8	3.55	28.8	16.1	3.78	27.3	15.5	3.92
		67	32.9	22.9	2.82	31.3	22.3	3.02	29.4	21.6	3.22	27.5	20.7	3.42	25.4	19.9	3.60	24.0	19.3	3.70
		62	29.8	27.0	2.74	28.0	26.1	2.91	26.3	25.2	3.08	24.5	24.2	3.25	22.7	22.8	3.43	21.7	21.7	3.54
		57	28.3	28.4	2.70	27.0	27.1	2.88	25.7	25.7	3.05	24.3	24.3	3.24	22.7	22.8	3.43	21.7	21.7	3.55
	1150	72	36.0	19.1	2.96	34.8	18.7	3.17	33.2	18.2	3.39	31.4	17.7	3.62	29.3	16.9	3.85	27.8	16.4	3.99
		67	33.5	24.1	2.89	31.9	23.6	3.09	**30.1**	**23.0**	**3.30**	28.1	22.2	3.52	25.9	21.3	3.69	24.4	20.7	3.79
		62	30.5	28.8	2.81	28.8	27.9	3.00	27.0	27.0	3.17	25.3	25.4	3.35	23.8	23.8	3.55	22.7	22.7	3.66
		57	29.6	29.7	2.78	28.3	28.3	2.98	26.9	26.9	3.17	25.3	25.4	3.35	23.8	23.8	3.55	22.7	22.7	3.66
	1300	72	36.4	19.6	3.03	35.1	19.3	3.24	33.6	18.9	3.46	31.8	18.4	3.69	29.6	17.8	3.93	28.1	17.2	4.07
		67	33.9	25.3	2.96	32.4	24.9	3.15	30.6	24.3	3.37	28.5	23.6	3.58	26.3	22.6	3.77	24.7	22.0	3.89
		62	31.1	30.3	2.88	29.5	29.5	3.07	27.8	27.9	3.28	26.3	26.3	3.47	24.7	24.7	3.67	23.5	23.5	3.79
		57	30.7	30.7	2.86	29.4	29.4	3.07	27.8	27.9	3.28	26.2	26.3	3.47	24.7	24.7	3.67	23.5	23.5	3.79
36	1050	72	40.8	20.8	3.50	39.3	20.4	3.77	37.4	19.7	4.02	35.3	19.0	4.30	33.0	18.2	4.59	31.3	17.5	4.76
		67	37.7	25.9	3.41	35.9	25.2	3.66	33.7	24.4	3.90	31.5	23.4	4.15	29.2	22.5	4.36	27.5	21.8	4.49
		62	34.1	30.5	3.32	32.1	29.5	3.53	30.1	28.5	3.73	28.1	27.4	3.94	26.1	25.7	4.16	24.9	24.6	4.29
		57	32.4	32.1	3.28	31.0	30.6	3.49	29.4	29.1	3.69	27.8	27.5	3.93	26.1	25.8	4.16	24.9	24.6	4.30
	1200	72	41.3	21.5	3.59	39.9	21.2	3.84	38.1	20.6	4.11	36.0	20.0	4.39	33.6	19.2	4.67	31.8	18.5	4.84
		67	38.4	27.3	3.50	36.6	26.7	3.74	**34.5**	**26.0**	**4.00**	32.2	25.1	4.27	29.7	24.1	4.47	28.0	23.4	4.59
		62	34.9	32.5	3.40	33.0	31.5	3.64	30.9	30.5	3.84	29.0	28.7	4.06	27.3	26.9	4.30	26.0	25.7	4.44
		57	34.0	33.6	3.37	32.4	32.0	3.62	30.8	30.4	3.84	29.0	28.7	4.06	27.3	26.9	4.30	26.0	25.7	4.44
	1350	72	41.7	22.1	3.67	40.2	21.9	3.93	38.5	21.4	4.19	36.4	20.9	4.48	34.0	20.1	4.77	32.2	19.5	4.94
		67	38.9	28.6	3.59	37.1	28.1	3.82	35.1	27.5	4.09	32.6	26.6	4.34	30.1	25.6	4.57	28.4	24.9	4.71
		62	35.6	34.3	3.49	33.8	33.4	3.72	31.9	31.5	3.98	30.1	29.7	4.20	28.3	27.9	4.45	26.9	26.6	4.59
		57	35.2	34.7	3.47	33.6	33.2	3.72	31.9	31.5	3.98	30.1	29.7	4.20	28.3	27.9	4.45	26.9	26.6	4.59

Detailed Performance Data – cont.

Matching 38HK with FB4A



Nom Cap. Mbtuh	Evaporator Air		CONDENSER AIR ENTERING Deg. F																	
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
48	1300	72	54.4	26.5	4.03	52.4	25.9	4.33	49.9	25.1	4.62	47.1	24.2	4.94	44.0	23.1	5.27	41.7	22.3	5.47
		67	50.3	32.9	3.93	47.8	32.1	4.21	45.0	31.0	4.49	42.0	29.8	4.77	38.9	28.6	5.02	36.6	27.8	5.16
		62	45.5	38.8	3.82	42.8	37.6	4.06	40.1	36.3	4.29	37.4	34.8	4.53	34.7	32.8	4.78	33.2	31.3	4.94
		57	43.3	40.8	3.77	41.3	39.0	4.01	39.2	37.0	4.25	37.1	35.0	4.51	34.8	32.8	4.78	33.2	31.3	4.95
	1500	72	55.1	27.4	4.12	53.2	26.9	4.42	50.7	26.2	4.72	48.0	25.4	5.05	44.8	24.4	5.37	42.4	23.6	5.56
		67	51.2	34.7	4.03	48.8	34.0	4.31	**46.0**	**33.1**	**4.60**	42.9	31.9	4.91	39.6	30.7	5.14	37.3	29.8	5.28
		62	46.6	41.4	3.91	44.0	40.1	4.18	41.2	38.9	4.42	38.7	36.5	4.67	36.4	34.3	4.94	34.7	32.7	5.10
		57	45.3	42.7	3.88	43.2	40.7	4.16	41.0	38.7	4.42	38.7	36.5	4.67	36.3	34.3	4.94	34.7	32.7	5.10
	1700	72	55.6	28.2	4.22	53.7	27.8	4.51	51.3	27.2	4.82	48.6	26.6	5.15	45.3	25.6	5.48	43.0	24.8	5.68
		67	51.9	36.4	4.12	49.5	35.8	4.39	46.8	35.0	4.70	43.5	33.9	4.99	40.1	32.6	5.26	37.8	31.7	5.42
		62	47.5	43.7	4.01	45.0	42.5	4.28	42.5	40.1	4.58	40.1	37.9	4.83	37.7	35.6	5.11	35.9	33.9	5.28
		57	46.9	44.2	3.99	44.9	42.3	4.28	42.5	40.1	4.58	40.1	37.9	4.83	37.7	35.6	5.11	35.9	33.9	5.28
60	1450	72	69.7	34.1	5.16	67.3	33.3	5.55	64.0	32.3	5.93	60.4	31.1	6.34	56.5	29.7	6.76	53.5	28.6	7.02
		67	64.5	42.3	5.04	61.4	41.2	5.40	57.7	39.8	5.76	53.9	38.3	6.12	49.9	36.8	6.43	47.0	35.7	6.62
		62	58.3	49.8	4.90	54.9	48.2	5.21	51.5	46.6	5.51	48.0	44.7	5.81	44.6	42.1	6.14	42.5	40.2	6.33
		57	55.5	52.4	4.83	53.0	50.0	5.15	50.3	47.5	5.44	47.6	44.9	5.79	44.6	42.1	6.14	42.5	40.2	6.34
	1650	72	70.6	35.2	5.29	68.2	34.6	5.66	65.1	33.7	6.06	61.6	32.6	6.48	57.4	31.3	6.89	54.4	30.3	7.13
		67	65.7	44.6	5.16	62.6	43.7	5.52	**59.0**	**42.5**	**5.90**	55.0	41.0	6.29	50.8	39.4	6.59	47.8	38.3	6.77
		62	59.8	53.2	5.02	56.4	51.6	5.37	52.8	49.9	5.66	49.7	46.9	5.99	46.6	44.0	6.34	44.5	42.0	6.55
		57	58.1	54.9	4.97	55.4	52.3	5.34	52.6	49.7	5.66	49.6	46.9	5.99	46.6	44.0	6.34	44.5	42.0	6.55
	1850	72	71.3	36.2	5.41	68.8	35.7	5.79	65.8	35.0	6.18	62.3	34.1	6.61	58.1	32.8	7.03	55.1	31.9	7.28
		67	66.5	46.7	5.29	63.5	46.0	5.63	60.0	45.0	6.03	55.8	43.5	6.40	51.5	41.8	6.75	48.5	40.7	6.95
		62	60.9	56.1	5.15	57.7	54.5	5.49	54.5	51.5	5.87	51.5	48.6	6.20	48.4	45.7	6.56	46.1	43.5	6.78
		57	60.1	56.8	5.12	57.5	54.3	5.49	54.5	51.5	5.87	51.4	48.6	6.20	48.4	45.6	6.56	46.1	43.5	6.78
70	1600	72	76.3	35.4	5.3	73.6	34.6	5.6	70.1	33.6	6.0	66.2	32.3	6.4	61.8	30.9	6.9	58.6	29.8	7.1
		67	70.6	44.0	5.1	67.2	42.8	5.5	63.2	41.4	5.9	59.0	39.8	6.2	54.6	38.3	6.5	51.4	37.1	6.7
		62	63.9	51.8	5.0	60.1	50.1	5.3	56.4	48.4	5.6	52.6	46.5	5.9	48.8	43.8	6.2	46.6	41.8	6.4
		57	60.7	54.5	4.9	58.0	52.0	5.2	55.1	49.4	5.5	52.1	46.7	5.9	48.8	43.8	6.2	46.6	41.8	6.5
	1800	72	77.3	36.6	5.4	74.7	36.0	5.8	71.3	35.0	6.2	67.4	33.9	6.6	62.9	32.6	7.0	59.6	31.5	7.3
		67	71.9	46.4	5.3	68.5	45.4	5.6	64.6	44.2	6.0	60.2	42.6	6.4	55.6	41.0	6.7	52.4	39.8	6.9
		62	65.4	55.3	5.1	61.7	53.6	5.5	57.9	51.9	5.8	54.4	48.8	6.1	51.0	45.8	6.4	48.7	43.7	6.7
		57	63.6	57.1	5.1	60.6	54.4	5.4	57.6	51.7	5.8	54.4	48.8	6.1	51.0	45.8	6.4	48.7	43.7	6.7
	2000	72	78.0	37.7	5.5	75.4	37.2	5.9	72.0	36.4	6.3	68.3	35.5	6.7	63.6	34.1	7.1	60.3	33.1	7.4
		67	72.8	48.6	5.4	69.5	47.9	5.7	65.7	46.8	6.1	61.1	45.3	6.5	56.4	43.5	6.9	53.1	42.3	7.1
		62	66.7	58.3	5.2	63.2	56.7	5.6	59.7	53.6	6.0	56.4	50.6	6.3	52.9	47.5	6.7	50.4	45.2	6.9
		57	65.8	59.0	5.2	63.0	56.5	5.6	59.7	53.6	6.0	56.3	50.5	6.3	52.9	47.5	6.7	50.4	45.2	6.9

Multipliers to Determine the Performance With Other Indoor Coils

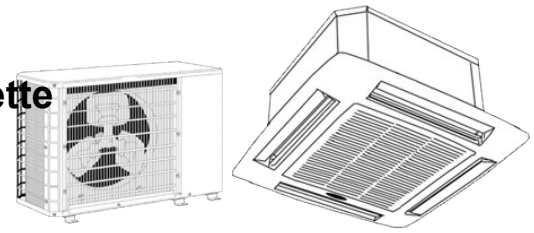
Condenser	Evaporator	Cooling Cap.	Power
N. Cap. MBtuh	N. Cap. MBtuh		
18	24	1.10	1.07
24	30	1.05	1.05
30	36	1.03	1.05
36	42	1.04	1.05
48	60	1.05	1.05
60	70	1.02	1.03

Notes:

1. Net Capacities shown include a deduction for evaporator fan motor heat.
2. Formulas:
Leaving db= Entering - Sensible Heat Cap./(1.09 x CFM)

Leaving wb= wb corresponding to air leaving coil (hwb)
h wb leaving = hwb entering - Total Cap(Btuh)/(4.5 X CFM)
3. Direct Interpolation Permissible. Do not extrapolate.

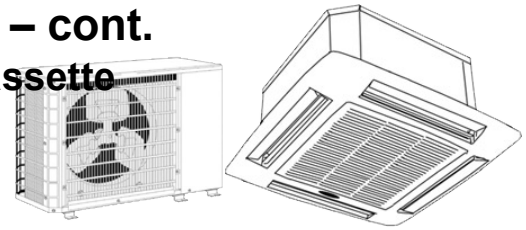
Detailed Performance Data –
Matching 38HK with Ceiling Cassette



Nom Cap. Mbtuh	Evaporator Air		CONDENSER AIR ENTERING Deg. F																	
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
18	300	72	20.6	11.2	2.02	19.9	11.0	2.17	18.9	10.6	2.32	17.9	10.2	2.48	16.7	9.8	2.65	15.9	9.3	2.75
		67	19.1	13.9	1.97	18.1	13.6	2.11	17.1	13.1	2.25	15.9	12.6	2.40	14.7	12.1	2.52	14.0	11.5	2.59
		62	17.2	16.4	1.92	16.2	15.9	2.04	15.2	15.3	2.16	14.2	14.7	2.27	13.2	13.9	2.40	12.5	13.2	2.48
		57	16.4	17.3	1.89	15.7	16.5	2.02	14.9	15.6	2.13	14.1	14.8	2.27	13.2	13.9	2.40	12.5	13.2	2.48
	375	72	20.9	11.6	2.07	20.2	11.4	2.22	19.2	11.1	2.99	18.2	10.8	2.54	17.0	10.3	2.70	16.1	9.8	2.79
		67	19.4	14.7	2.02	18.5	14.4	2.16	17.5	14.0	2.31	16.3	13.5	2.46	15.0	13.0	2.58	14.3	12.3	2.65
		62	17.7	17.5	1.97	16.7	17.0	2.10	15.6	16.4	2.22	14.7	15.4	2.35	13.8	14.5	2.48	13.1	13.8	2.56
		57	17.2	18.1	1.95	16.4	17.2	2.09	15.6	16.4	2.22	14.7	15.5	2.35	13.8	14.5	2.48	13.1	13.8	2.56
	425	72	21.1	11.9	2.12	20.4	11.8	2.27	19.5	11.5	2.42	18.4	11.2	2.59	17.2	10.8	2.75	16.3	10.3	2.85
		67	19.7	15.4	2.07	18.8	15.2	2.21	**17.7**	**14.8**	**2.36**	16.5	14.3	2.51	15.2	13.8	2.64	14.5	13.1	2.72
		62	18.0	18.5	2.02	17.1	18.0	2.15	16.1	17.0	2.30	15.2	16.0	2.43	14.3	15.0	2.57	13.6	14.3	2.65
		57	17.8	18.7	2.00	17.0	17.9	2.15	16.1	17.0	2.30	15.2	16.0	2.43	14.3	15.0	2.57	13.6	14.3	2.65
24	325	72	25.2	12.3	2.48	24.3	12.0	2.66	23.1	11.6	2.85	21.8	11.2	3.04	20.4	10.7	3.24	19.4	10.2	3.37
		67	23.3	15.2	2.42	22.2	14.8	2.59	20.8	14.3	2.76	19.4	13.8	2.94	18.0	13.2	3.09	17.1	12.6	3.18
		62	21.1	17.9	2.35	19.8	17.4	2.50	18.6	16.8	2.64	17.3	16.1	2.78	16.1	15.2	2.94	15.3	14.4	3.04
		57	20.0	18.9	2.32	19.1	18.0	2.47	18.2	17.1	2.61	17.2	16.2	2.78	16.1	15.2	2.94	15.3	14.4	3.04
	400	72	25.5	12.7	2.54	24.6	12.5	2.72	23.5	12.1	2.91	22.2	11.8	3.11	20.7	11.3	3.30	19.7	10.7	3.42
		67	23.7	16.1	2.48	22.6	15.7	2.65	21.3	15.3	2.83	19.9	14.8	3.02	18.3	14.2	3.16	17.4	13.5	3.25
		62	21.6	19.1	2.41	20.4	18.6	2.57	19.1	18.0	2.72	17.9	16.9	2.88	16.8	15.9	3.04	16.0	15.1	3.14
		57	21.0	19.8	2.39	20.0	18.8	2.56	19.0	17.9	2.72	17.9	16.9	2.88	16.8	15.9	3.04	16.0	15.1	3.14
	450	72	25.7	13.0	2.60	24.8	12.9	2.78	23.8	12.6	2.97	22.5	12.3	3.17	21.0	11.8	3.37	19.9	11.2	3.49
		67	24.0	16.8	2.54	22.9	16.6	2.70	**21.7**	**16.2**	**2.89**	20.1	15.7	3.07	18.6	15.1	3.24	17.7	14.3	3.34
		62	22.0	20.2	2.47	20.8	19.6	2.63	19.7	18.5	2.81	18.6	17.5	2.97	17.5	16.4	3.15	16.6	15.6	3.25
		57	21.7	20.4	2.45	20.8	19.6	2.63	19.7	18.5	2.81	18.6	17.5	2.97	17.5	16.4	3.15	16.6	15.6	3.25
36 Evap & 30 Cond	570	72	33.2	15.2	2.78	32.0	14.9	2.99	30.5	14.4	3.20	28.8	13.9	3.42	26.9	13.3	3.65	25.5	12.6	3.78
		67	30.7	18.9	2.71	29.2	18.4	2.91	27.5	17.8	3.10	25.7	17.1	3.30	23.7	16.4	3.47	22.6	15.6	3.57
		62	27.8	22.3	2.64	26.1	21.6	2.81	24.5	20.8	2.97	22.9	20.0	3.13	21.2	18.8	3.31	20.2	17.9	3.41
		57	26.4	23.4	2.60	25.2	22.4	2.77	24.0	21.2	2.93	22.7	20.1	3.12	21.2	18.8	3.31	20.2	17.9	3.42
	650	72	33.6	15.7	2.85	32.5	15.5	3.05	31.0	15.1	3.26	29.3	14.6	3.49	27.3	14.0	3.71	26.0	13.3	3.84
		67	31.3	19.9	2.78	29.8	19.5	2.98	28.1	19.0	3.18	26.2	18.3	3.39	24.2	17.6	3.55	23.0	16.7	3.65
		62	28.5	23.8	2.71	26.9	23.0	2.89	25.2	22.3	3.05	23.7	21.0	3.23	22.2	19.7	3.42	21.1	18.7	3.53
		57	27.7	24.5	2.68	26.4	23.4	2.88	25.1	22.2	3.05	23.7	21.0	3.23	22.2	19.7	3.42	21.1	18.7	3.53
	750	72	33.9	16.2	2.92	32.8	16.0	3.12	31.3	15.6	3.33	29.7	15.2	3.56	27.7	14.7	3.79	26.3	13.9	3.93
		67	31.7	20.9	2.85	30.2	20.6	3.04	**28.6**	**20.1**	**3.25**	26.6	19.5	3.45	24.5	18.7	3.64	23.3	17.8	3.75
		62	29.0	25.1	2.77	27.5	24.4	2.96	26.0	23.0	3.16	24.5	21.7	3.34	23.0	20.4	3.54	21.9	19.4	3.65
		57	28.6	25.4	2.76	27.4	24.3	2.96	26.0	23.0	3.16	24.5	21.7	3.34	23.0	20.4	3.54	21.9	19.4	3.65
36	570	72	36.0	16.8	3.0	34.7	16.5	3.2	33.0	15.9	3.4	31.2	15.3	3.6	29.1	14.7	3.9	27.7	13.9	4.0
		67	33.3	20.9	2.9	31.6	20.3	3.1	29.8	19.7	3.3	27.8	18.9	3.5	25.7	18.2	3.7	24.4	17.3	3.8
		62	30.1	24.6	2.8	28.3	23.8	3.0	26.5	23.0	3.2	24.8	22.1	3.3	23.0	20.8	3.5	21.8	19.8	3.6
		57	28.6	25.9	2.8	27.3	24.7	2.9	25.9	23.5	3.1	24.5	22.2	3.3	23.0	20.8	3.5	21.8	19.8	3.6
	650	72	36.4	17.4	3.0	35.2	17.1	3.2	33.6	16.6	3.5	31.7	16.1	3.7	29.6	15.5	3.9	28.1	14.7	4.1
		67	33.9	22.0	3.0	32.3	21.6	3.2	30.4	21.0	3.4	28.4	20.3	3.6	26.2	19.5	3.8	24.9	18.5	3.9
		62	30.8	26.3	2.9	29.1	25.5	3.1	27.2	24.7	3.2	25.6	23.2	3.4	24.0	21.8	3.6	22.8	20.7	3.8
		57	30.0	27.1	2.8	28.6	25.8	3.1	27.1	24.6	3.2	25.6	23.2	3.4	24.1	21.8	3.6	22.8	20.7	3.8
	750	72	36.8	17.9	3.1	35.5	17.7	3.3	33.9	17.3	3.5	32.1	16.8	3.8	30.0	16.2	4.0	28.5	15.4	4.2
		67	34.3	23.1	3.0	32.7	22.7	3.2	**30.9**	**22.2**	**3.5**	28.8	21.5	3.7	26.5	20.7	3.9	25.2	19.6	4.0
		62	31.4	27.7	2.9	29.8	26.9	3.1	28.1	25.4	3.4	26.5	24.0	3.6	24.9	22.6	3.8	23.7	21.4	3.9
		57	31.0	28.1	2.9	29.7	26.8	3.1	28.1	25.5	3.4	26.6	24.0	3.6	24.9	22.6	3.8	23.7	21.4	3.9
48 Evap & 36 Cond	680	72	38.7	18.4	3.13	37.3	18.0	3.37	35.5	17.5	3.60	33.6	16.8	3.85	31.3	16.1	4.10	29.8	15.3	4.26
		67	35.8	22.9	3.06	34.1	22.3	3.28	32.0	21.6	3.49	29.9	20.7	3.71	27.7	19.9	3.90	26.3	18.9	4.02
		62	32.4	27.0	2.97	30.5	26.1	3.16	28.6	25.2	3.34	26.6	24.2	3.52	24.7	22.8	3.72	23.5	21.6	3.84
		57	30.8	28.4	2.93	29.4	27.1	3.12	27.9	25.7	3.30	26.4	24.3	3.51	24.7	22.8	3.72	23.5	21.6	3.85
	830	72	39.2	19.1	3.21	37.9	18.7	3.44	36.1	18.2	3.68	34.2	17.7	3.93	31.9	16.9	4.18	30.3	16.1	4.33
		67	36.5	24.1	3.13	34.7	23.6	3.35	32.8	23.0	3.58	30.5	22.2	3.82	28.2	21.3	4.00	26.8	20.2	4.11
		62	33.2	28.8	3.05	31.3	27.9	3.26	29.3	27.0	3.44	27.6	25.4	3.64	25.9	23.8	3.85	24.6	22.6	3.97
		57	32.2	29.7	3.02	30.7	28.3	3.24	29.2	26.9	3.44	27.6	25.4	3.64	25.9	23.8	3.85	24.6	22.6	3.97
	975	72	39.6	19.6	3.28	38.2	19.3	3.51	36.5	18.9	3.75	34.6	18.4	4.01	32.3	17.8	4.27	30.6	16.9	4.42
		67	36.9	25.3	3.21	35.2	24.9	3.42	**33.3**	**24.3**	**3.66**	31.0	23.6	3.88	28.6	22.6	4.09	27.1	21.5	4.22
		62	33.8	30.3	3.12	32.1	29.5	3.33	30.3	27.9	3.56	28.6	26.3	3.76	26.8	24.7	3.98	25.5	23.5	4.11
		57	33.4	30.7	3.10	31.9	29.4	3.33	30.3	27.9	3.56	28.6	26.3	3.76	26.8	24.7	3.98	25.5	23.5	4.11

Detailed Performance Data – cont.

Matching 38HK with Ceiling Cassette

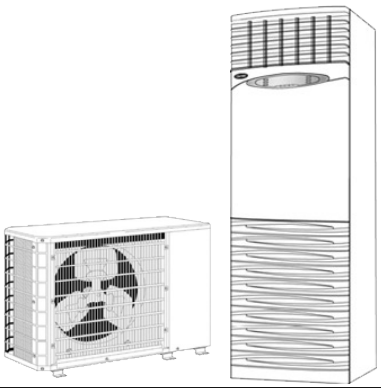


Nom Cap. Mbtuh	Evaporator Air		CONDENSER AIR ENTERING Deg. F																		
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
48	680	72	47.3	20.8	3.63	45.6	20.4	3.91	43.4	19.7	4.17	41.0	19.0	4.46	38.3	18.2	4.76	36.4	17.3	4.94
		67	43.7	25.9	3.54	41.6	25.2	3.80	39.1	24.4	4.05	36.5	23.4	4.30	33.8	22.5	4.53	32.1	21.4	4.66
		62	39.5	30.5	3.44	37.2	29.5	3.66	34.9	28.5	3.87	32.5	27.4	4.08	30.2	25.7	4.32	28.7	24.5	4.45
		57	37.6	32.1	3.40	35.9	30.6	3.62	34.1	29.1	3.83	32.3	27.5	4.07	30.2	25.8	4.32	28.7	24.5	4.46
	830	72	47.9	21.5	3.72	46.2	21.2	3.98	44.1	20.6	4.26	41.7	20.0	4.56	38.9	19.2	4.85	37.0	18.2	5.02
		67	44.5	27.3	3.63	42.4	26.7	3.89	40.0	26.0	4.15	37.3	25.1	4.43	34.4	24.1	4.64	32.7	22.9	4.76
		62	40.5	32.5	3.53	38.2	31.5	3.77	35.8	30.5	3.98	33.7	28.7	4.22	31.6	26.9	4.46	30.0	25.6	4.60
		57	39.4	33.6	3.50	37.6	32.0	3.75	35.7	30.4	3.98	33.7	28.7	4.22	31.6	26.9	4.46	30.0	25.6	4.60
	975	72	48.3	22.1	3.81	46.7	21.9	4.07	44.6	21.4	4.35	42.3	20.9	4.65	39.4	20.1	4.94	37.4	19.1	5.12
		67	45.1	28.6	3.72	43.1	28.1	3.96	**40.7**	**27.5**	**4.24**	37.8	26.6	4.50	34.9	25.6	4.75	33.2	24.3	4.89
		62	41.3	34.3	3.62	39.1	33.4	3.86	37.0	31.5	4.13	34.9	29.7	4.36	32.8	27.9	4.61	31.1	26.5	4.77
		57	40.8	34.7	3.60	39.0	33.2	3.86	37.0	31.5	4.13	34.9	29.8	4.36	32.8	27.9	4.61	31.2	26.5	4.77

Notes:
1. Net Capacities shown include a deduction for evaporator fan motor heat.
2. Formulas:
Leaving db= Entering - Sensible Heat Cap./(1.09 x CFM)

Leaving wb= wb corresponding to air leaving coil (hwb)
h wb leaving = hwb entering - Total Cap(Btuh)/(4.5 X CFM)
3. Direct Interpolation Permissible. Do not extrapolate.

Detailed Performance Data –
Matching 38HK with Free Stand



Nom Cap. Mbtuh	Evaporator Air		CONDENSER AIR ENTERING Deg. F																	
			75			85			95			105			115			120		
	CFM	EWB	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw	Cap. MBtuh		Tot Sys Kw
			Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen		Tot	Sen	
36	600	72	40.7	20.8	3.29	39.3	20.4	3.54	37.4	19.7	3.78	35.3	19.0	4.04	33.0	18.2	4.31	16.5	9.1	4.47
		67	37.7	25.9	3.21	35.8	25.2	3.44	33.7	24.4	3.67	31.5	23.4	3.90	29.1	22.5	4.10	14.6	11.3	4.22
		62	34.1	30.5	3.12	32.1	29.5	3.32	30.1	28.5	3.51	28.0	27.4	3.70	26.0	25.7	3.91	13.0	12.9	4.04
		57	32.4	32.1	3.08	30.9	30.6	3.28	29.4	29.1	3.47	27.8	27.5	3.69	26.0	25.8	3.91	13.0	12.9	4.04
	700	72	41.2	21.5	3.37	39.8	21.2	3.61	38.0	20.6	3.86	35.9	20.0	4.13	33.5	19.2	4.39	16.8	9.6	4.55
		67	38.4	27.3	3.29	36.5	26.7	3.52	34.5	26.0	3.76	32.1	25.1	4.01	29.6	24.1	4.20	14.8	12.0	4.31
		62	34.9	32.5	3.20	32.9	31.5	3.42	30.9	30.5	3.61	29.0	28.7	3.82	27.2	26.9	4.04	13.6	13.5	4.17
		57	33.9	33.6	3.17	32.3	32.0	3.40	30.7	30.4	3.61	29.0	28.7	3.82	27.2	26.9	4.04	13.6	13.5	4.17
	800	72	41.6	22.1	3.45	40.2	21.9	3.69	38.4	21.4	3.94	36.4	20.9	4.21	33.9	20.1	4.48	17.0	10.0	4.64
		67	38.8	28.6	3.37	37.1	28.1	3.59	**35.0**	**27.5**	**3.84**	32.6	26.6	4.08	30.1	25.6	4.30	15.0	12.8	4.43
		62	35.6	34.3	3.28	33.7	33.4	3.50	31.8	31.5	3.74	30.1	29.7	3.95	28.2	27.9	4.18	14.1	14.0	4.32
		57	35.1	34.7	3.26	33.6	33.2	3.50	31.9	31.5	3.74	30.1	29.8	3.95	28.2	27.9	4.18	14.1	14.0	4.32
48	700	72	52.3	23.2	3.87	50.5	22.7	4.16	48.1	22.0	4.44	45.4	21.2	4.75	42.4	20.3	5.07	21.2	10.1	5.26
		67	48.4	28.8	3.77	46.1	28.1	4.04	43.3	27.2	4.31	40.4	26.1	4.58	37.4	25.1	4.82	18.7	12.5	4.96
		62	43.8	34.0	3.67	41.2	32.9	3.90	38.7	31.8	4.13	36.0	30.5	4.35	33.5	28.7	4.60	16.7	14.4	4.74
		57	41.7	35.7	3.62	39.8	34.1	3.86	37.8	32.4	4.08	35.7	30.7	4.34	33.5	28.7	4.60	16.7	14.4	4.75
	800	72	53.0	24.0	3.96	51.2	23.6	4.24	48.9	23.0	4.54	46.2	22.3	4.85	43.1	21.4	5.16	21.6	10.7	5.34
		67	49.3	30.4	3.87	47.0	29.8	4.14	44.3	29.0	4.42	41.3	28.0	4.71	38.1	26.9	4.94	19.1	13.4	5.07
		62	44.9	36.3	3.76	42.3	35.2	4.02	39.7	34.1	4.24	37.3	32.0	4.49	35.0	30.0	4.75	17.5	15.0	4.90
		57	43.6	37.4	3.73	41.6	35.7	4.00	39.5	33.9	4.24	37.3	32.0	4.49	35.0	30.1	4.75	17.5	15.0	4.90
	900	72	53.5	24.7	4.06	51.7	24.4	4.34	49.4	23.9	4.63	46.8	23.3	4.95	43.6	22.4	5.27	21.8	11.2	5.46
		67	49.9	31.9	3.96	47.7	31.4	4.22	**45.0**	**30.7**	**4.51**	41.9	29.7	4.80	38.7	28.6	5.05	19.3	14.3	5.21
		62	45.8	38.3	3.86	43.4	37.2	4.11	40.9	35.1	4.40	38.7	33.2	4.64	36.3	31.2	4.91	18.2	15.6	5.08
		57	45.1	38.7	3.83	43.2	37.1	4.11	41.0	35.2	4.40	38.7	33.2	4.64	36.3	31.2	4.91	18.2	15.6	5.08
60	1000	72	68.5	34.1	5.03	66.1	33.3	5.41	62.9	32.3	5.78	59.4	31.1	6.18	55.5	29.7	6.59	27.8	14.9	6.84
		67	63.4	42.3	4.91	60.3	41.2	5.26	56.7	39.8	5.61	53.0	38.3	5.96	49.0	36.8	6.27	24.5	18.4	6.45
		62	57.3	49.8	4.77	54.0	48.2	5.08	50.6	46.6	5.37	47.2	44.7	5.66	43.8	42.1	5.98	21.9	21.0	6.17
		57	54.5	52.4	4.71	52.1	50.0	5.02	49.4	47.5	5.31	46.8	44.9	5.64	43.8	42.1	5.98	21.9	21.1	6.18
	1250	72	69.4	35.2	5.15	67.0	34.6	5.52	64.0	33.7	5.90	60.5	32.6	6.32	56.4	31.3	6.71	28.2	15.7	6.95
		67	64.6	44.6	5.03	61.5	43.7	5.38	58.0	42.5	5.75	54.1	41.0	6.13	49.9	39.4	6.42	25.0	19.7	6.60
		62	58.7	53.2	4.89	55.4	51.6	5.23	51.9	49.9	5.52	48.8	46.9	5.84	45.8	44.0	6.18	22.9	22.0	6.38
		57	57.1	54.9	4.85	54.4	52.3	5.20	51.8	49.7	5.52	48.8	46.9	5.84	45.9	44.0	6.18	22.9	22.0	6.38
	1500	72	70.1	36.2	5.28	67.7	35.7	5.64	64.7	35.0	6.03	61.3	34.1	6.44	57.1	32.8	6.85	28.6	16.4	7.10
		67	65.4	46.7	5.15	62.4	46.0	5.49	**59.0**	**45.0**	**5.87**	54.8	43.5	6.24	50.6	41.8	6.58	25.3	20.9	6.78
		62	59.9	56.1	5.02	56.8	54.5	5.35	53.6	51.5	5.72	50.6	48.6	6.04	47.5	45.7	6.39	23.8	22.8	6.60
		57	59.1	56.8	4.99	56.6	54.3	5.35	53.6	51.5	5.72	50.6	48.6	6.04	47.5	45.7	6.39	23.8	22.8	6.60

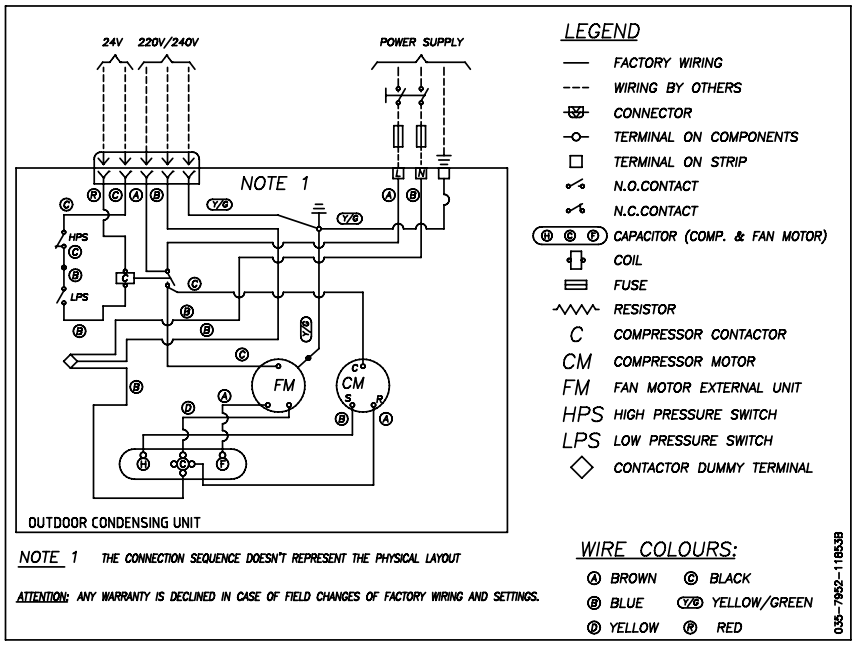
Notes:

1. Net Capacities shown include a deduction for evaporator fan motor heat.
2. Formulas:
Leaving db= Entering - Sensible Heat Cap./(1.09 x CFM)

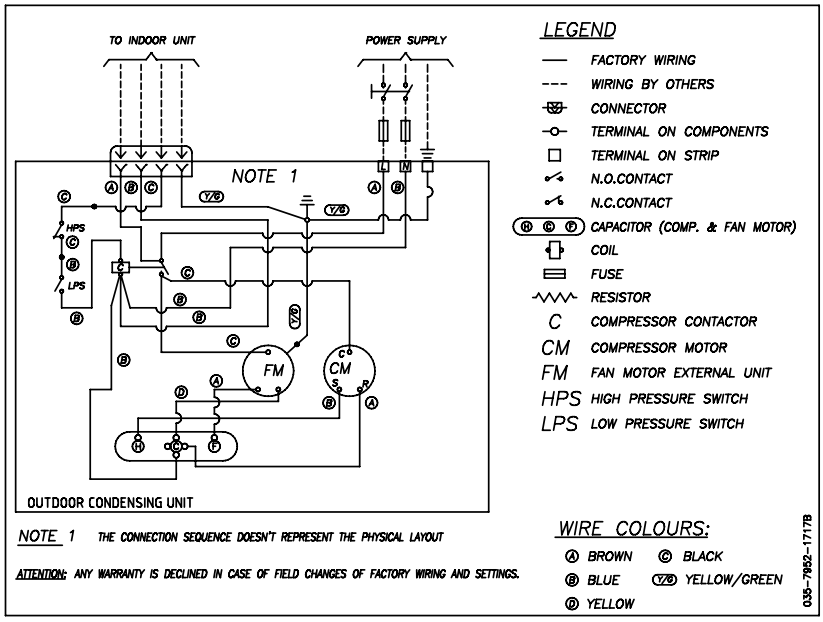
Leaving wb= wb corresponding to air leaving coil (hwb)
h wb leaving = hwb entering - Total Cap(Btuh)/(4.5 X CFM)
3. Direct Interpolation Permissible. Do not extrapolate.

Typical Wiring Schematic
38HK 18-36- 50Hz

220-240V/1Ph 24V Control

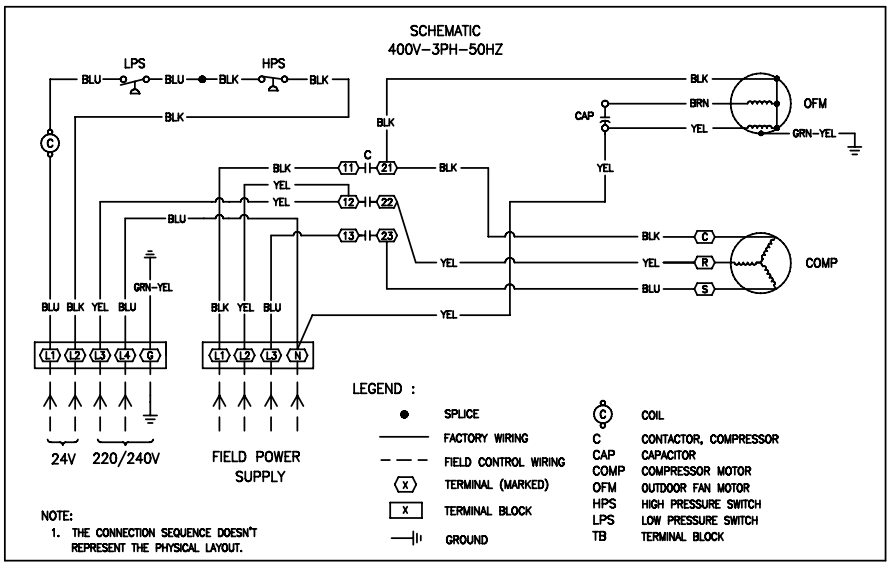


220-240V/1Ph 220V Control

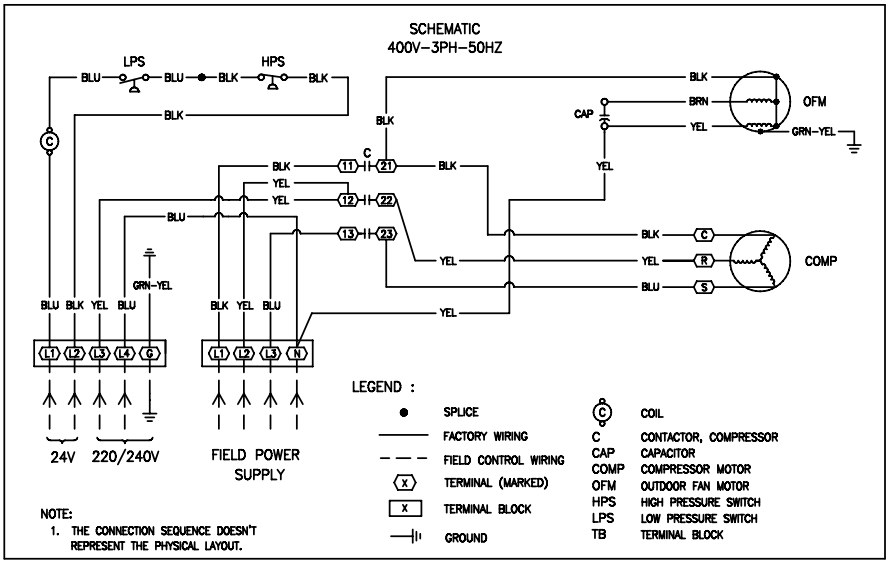


Typical Wiring Schematic
38HK- 48-60 50Hz

400V/3Ph 24V Control



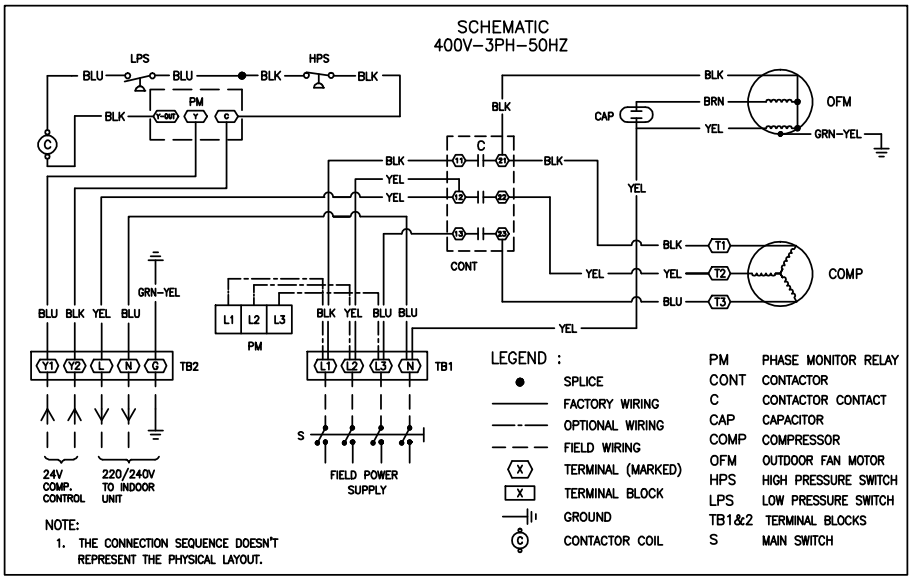
400V/3Ph 220V Control



Typical Wiring Schematic

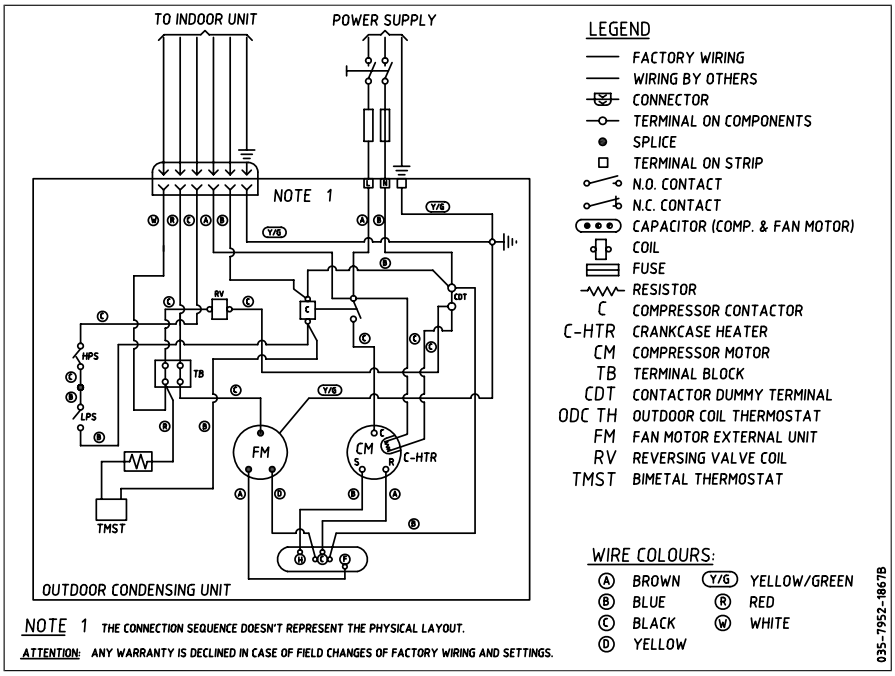
38HK- 70 50Hz

400V/3Ph 24V Control



Typical Wiring Schematic
Heat Pump 38HQ18-24

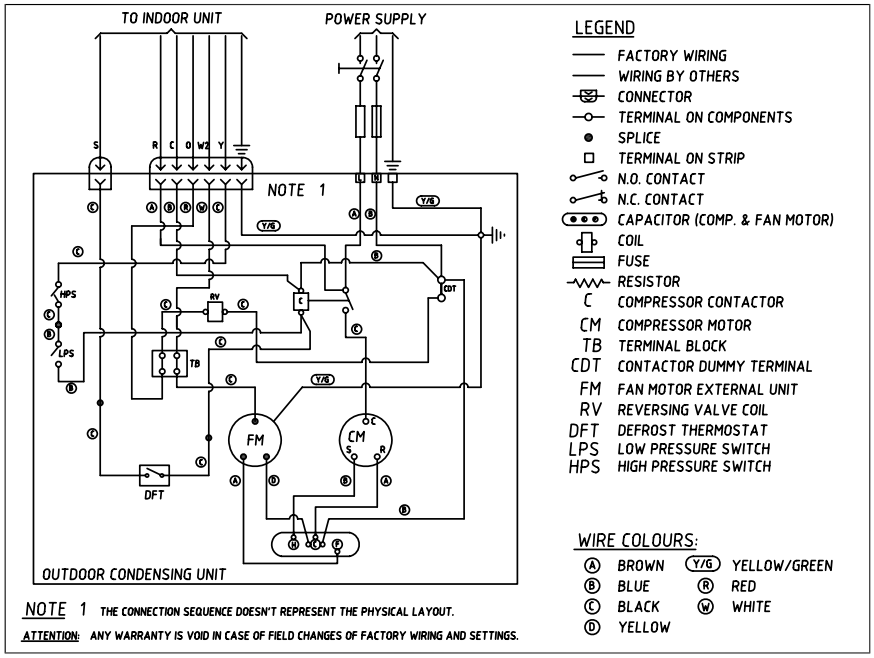
Models	
38HQR18US70–03	38HQR24US70–03



NOTE 1 THE CONNECTION SEQUENCE DOESN'T REPRESENT THE PHYSICAL LAYOUT.

ATTENTION: ANY WARRANTY IS DECLINED IN CASE OF FIELD CHANGES OF FACTORY WIRING AND SETTINGS.

Models	
38HQR18US71–03	38HQR24US71–03



NOTE 1 THE CONNECTION SEQUENCE DOESN'T REPRESENT THE PHYSICAL LAYOUT.

ATTENTION: ANY WARRANTY IS VOID IN CASE OF FIELD CHANGES OF FACTORY WIRING AND SETTINGS.

Application data

Unit selection

Select equipment to match or be slightly less than anticipated peak load. This provides better humidity control, fewer unit cycles, and less part-load operation.

For units used in spaces with high sensible loads, base equipment selection on unit sensible load, not on total anticipated load. Adjust for anticipated room wet bulb temperature to avoid under sizing equipment.

When selecting equipment that has outdoor air introduced into the unit, determine the mix conditions of room air and outdoor air at design conditions. The cooling capacity tables in this literature are based on 80 F edb. To select the proper equipment, adjust for actual dry-bulb and wet-bulb conditions with the required outdoor air.

Unit mounting

Unit leveling — For reliable operation, units should be level in all planes.

Clearance — Provide adequate clearance for airflow. See dimensional drawings for proper clearances. The condensing units are designed for free-blow application. Air inlets and outlets should not be restricted. Outdoor fan external static pressure available is less than 0.1 in. wg.

Unit location —Units may be wall mounted, pad mounted at ground level, roof mounted, or mounted on or under a deck or patio. Be sure that water from roof does not drain directly onto the unit. If 38 Series condensing units are mounted near a wall, the condenser air should discharge away from the wall. This will provide inherent coil protection and the best possible sound and airflow performance.

Crankcase heater — crankcase heaters used to prevent refrigerant migration during compressor off cycle (at very low ambient).

Refrigerant lines

General refrigerant line sizing:

1. All charges, line sizing, and capacities are based on runs of 25 ft. For runs over 25 ft, consult the appendix A.

NOTE: The minimum line length should be 10 ft.

MAXIMUM LINE LENGTHS

UNIT	MAXIMUM EQUIVALENT FT	MAXIMUM LIFT — FAN COIL BELOW CONDENSING UNIT	MAXIMUM LIFT — FAN COIL ABOVE CONDENSING UNIT
38HK	50	30*	30*

*Maximum distance permitted is 30 ft from lowest system component to highest system component. For longer line application please refer to appendix A.

2. Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, not more than 36 in. should be buried. Provide a minimum 6 in. vertical rise to the service valves to prevent refrigerant migration.

3. The refrigerant lines must be insulated. Use a minimum of 1/2-in. thick insulation. Closed-cell insulation is recommended in all applications.

4. Special consideration should be given to isolating interconnecting tubing from the building structure. Isolate the tubing so that vibration or noise is not transmitted into the structure.

5. The 38 Series system charge is based on rated performance and 25 ft of line.

6. For the supply and return lines, check physical data.

SYSTEM OPERATING CONDITIONS
OPERATING LIMITS

TEMPERATURE CONDITIONS	LIMITS
Maximum Cooling Ambient (F)	125
Minimum Cooling Ambient (F) (without accessory low-ambient kit)	55
Minimum Cooling ambient (F) (with accessory low-ambient kit)	35
Saturated Suction Temperature Range Minimum (F) Maximum (F)	20 55
Saturated Condensing Temperature Range Minimum (F) Maximum (F)	60 150
Maximum Compressor Discharge Temperature (F)	275
Minimum Discharge Superheat (F)	60

NOTE: For system controls see Electrical Data.

Appendix

Long-Line Guideline.

Reference:
Catalog No. 513-868

LONG-LINE GUIDELINE

Table 1 – REQUIRED FIELD INSTALLED ACCESSORIES FOR AIR CONDITIONERS AND HEAT PUMP

ACCESSORY	REQUIRED FOR LOW-AMBIENT APPLICATIONS (BELOW 55°F)	REQUIRED FOR LONG-LINE APPLICATIONS* (OVER 50 FT)	REQUIRED FOR SEA COAST APPLICATIONS (WITHIN 2 MILES)
Crankcase Heater	Yes	Yes	No
Evaporator Freeze Thermostat	Yes	No	No
Winter Start Control	Yes†	No	No
Accumulator	No	No	No
Compressor Start Assist Capacitor and Relay	Yes	Yes	No
Low Ambient Controller, MotorMaster™ Control, or Low-Ambient Pressure Switch	Yes	No	No
Wind Baffle	See Low-Ambient Instructions	No	No
Coastal Filter	No	No	Yes
Support Feet	Recommended	No	Recommended
Liquid-Line Solenoid Valve or Hard-Shutoff TXV	No	See Long-Line Application Guideline	No
Ball-Bearing Fan Motor	Yes‡	No	No
Isolation Relay	Yes**	No	No

*For tubing line sets between 50 and 175 ft, refer to Residential Split-System Long-Line Application Guideline.
†Only when low-pressure switch is used.
‡Required for Low-Ambient Controller (full modulation feature) and MotorMaster™ control only.
** Required on Heat Pumps only.

This Long-Line Application Guideline applies to all Carrier residential air conditioner and heat pump split systems that have a nominal capacity of 18,000 to 60,000 Btuh. This guideline provides required system changes and accessories necessary for any residential product having piping requirements greater than 50 ft or installations where indoor unit is located above outdoor unit.

This guideline is intended to cover applications outside the standard Installation Instructions. This guideline is for standard, single-speed products. For applications involving 2-speed products, refer to Step 6 first.

NOTE: The presale literature for outdoor unit must be referred to in conjunction with this guideline.

Step 1—Approved Systems

Any residential indoor/outdoor unit combination listed in the outdoor unit presale literature is an approved system, EXCEPT the following:

- Indoor coils with capillary-metering devices
- All equipment less than nominal 18,000 Btuh
- All 1/4-in. and 3/16–in. liquid-line applications
- Any indoor furnace coil/fan coil not listed in outdoor unit presale literature
- Any application which has interconnecting tubing with an equivalent length greater than 175 ft

Step 2—Interconnecting Tubing Sizing

Table 2 lists recommended interconnecting vapor-line diameters for equivalent total-line lengths. All residential split systems installed in long-line applications must use **only 3/8-in. liquid lines**. Equivalent line length equals the linear length (measured) of interconnecting vapor tubing plus losses due to elbows. (See Table 3 and Fig. 3.) Liquid lines larger than 3/8-in. OD greatly increase charge quantity of the system. Excessive charge increases risk of migration and compressor damage. Table 2 provides the estimated percentage of nominal cooling-capacity losses based on the standard, required vapor line size versus what is selected for the long-line application. Since the vapor line is the discharge line in heating mode, losses are minimal.

Calculate the linear length of vapor tube required, adding any losses for the total number of elbows for application. (See Table 6.) Using this equivalent length, select desired vapor-line size from Table 2. Subtract the nominal percentage loss from outdoor-unit presale-literature Detailed Cooling Capacities data for the given indoor/outdoor combination. Reference all notes of Table 2.

NOTE: When specifying vapor-line insulation, be aware of the following standard practice:

All standard accessory-tubing kits are supplied with 3/8-in. insulation on vapor line.

For minimal capacity loss in long-line application, 1/2-in. insulation should be specified.

For reference only, the close cell insulation material specified for accessory tubing kits is a compound of vinyl, neoprene, or nitrile blends of these polymers. Performance requirements include thermal range of 0° F to 200°F (-17.8° C to 93° C) and a maximum thermal conductivity of 0.28.

NOTE: Special consideration must be given to isolating interconnecting tubing from building structure. Isolate tubing so that vibration or noise is not transmitted into structure.

Step 3—Metering Device Sizing

The metering device for a long-line application must be flexible enough to compensate for frictional losses due to long refrigerant lines and installed system design (indoor coil above or below outdoor unit.) The piston or TXV provides such flexibility.

The piston should be changed for both indoor coil and outdoor heat pump unit, depending on system configuration and line length. Tables 4 and 5 provide necessary changes for a given application.

Use Tables 4 and 5 when selecting correct piston size. Outdoor unit presale literature must be consulted to determine metering devices specified for standard applications. After determining standard application piston size(s), refer to Tables 4 and 5 as they relate to system design (outdoor unit above or below indoor unit) per equivalent length of tubing.

NOTE: If total equivalent horizontal length is **100 ft or longer**, both indoor and outdoor pistons must be **increased** 1 full piston **size**, in addition to changes required by Tables 4 and 5. After finding appropriate **change** in piston size, add or subtract the **change** from original piston **number**. If piston size is **decreased**, round new piston number **down** to nearest common piston number found in Table 6. If piston size is **increased**, round new piston number **up** to nearest common piston number found in Table 6.

EXAMPLE:
An 042 size heat pump is 75 ft above an 042 size fan coil. The 042 size heat-pump presale literature specifies a size 80 indoor piston and size 63 outdoor piston. To establish correct indoor piston size for a 75 ft vertical separation, refer to Table 4. For a 75 ft equivalent line length, the piston change is -5. Therefore subtract 5 from the original indoor piston size of 80: 80 – 5 = 75
Table 6 provides common piston sizes. In this instance, 75 is not listed, therefore round DOWN to next piston size, which would be 74. To establish correct outdoor piston size for a 75 ft vertical separation, refer to Table 5. For a 75 ft equivalent line length, the piston change is +4. Therefore add 4 to the original outdoor piston size of 63: 63 + 4 = 67
Since 67 is listed in Table 6, that is the piston which should be used. If a 67 size piston were not listed, it would be necessary to round UP to next piston size.

Step 4—Liquid-Line Solenoid And Tubing Configuration

There are 2 types of liquid-line solenoids: 1 for single-flow applications and the other for bi-flow applications. The purpose of having 2 solenoids is to minimize the valve internal-pressure drop in accordance with refrigerant flow direction and liquid migration to the compressor. The bi-flow solenoid is designed to have minimal refrigerant-pressure drop in either flow direction, which makes it suitable for heat pump usage. Refer to Table 7 for liquid-line solenoid kit part numbers.

NOTE: When installing a liquid-line solenoid, the system may require a minimum 60-va low-voltage transformer.

Each type of solenoid has an indicator flow arrow stamped on the valve body. When solenoid is closed (not energized) and pressure is applied in direction of flow arrow, complete shutoff occurs. If pressure is applied against direction of flow arrow, leakage through valve occurs. When determining proper installation of valve within liquid line, 2 considerations must be made:

1. Direction of flow arrow
2. Where solenoid is installed in system.

TXVs can only be substituted for liquid-line solenoids in singleflow air conditioning systems. Bi-flow TXVs allow liquid migration to coldest point during off cycles, which could allow liquid into compressor. Fig. 2 through 5 detail proper installation of liquid-line solenoid and provide applications where TXVs may be substituted. Reference all notes of the appropriate figures.

Step 5—Charging Information

Weigh in appropriate refrigerant charge, then use the standard practices of superheat-charging method for piston applications and subcooling-charging method for TXV applications to confirm correct charge. The standard charging methods can be found on outdoor unit-information plate, in unit Installation Instructions, or in the Service Manual. Since total system charge is increased for long-line applications, it may be necessary to calculate the additional refrigerant charge. Since long-line applications only involve 3/8-in. liquid lines, the additional refrigerant charge required is 0.6 oz of Refrigerant 22 (R-22) per ft of 3/8-in. liquid line over 15 ft.

EXAMPLE:
To calculate additional charge required for a 25–ft line set: 25 ft – 15 ft
= 10 ft X 0.6 oz/ft = 6 oz of additional charge

The rating-plate charge of a given outdoor unit is for a standard application of 15 ft of interconnecting tubing. The rating-plate charge can be found on outdoor unit-rating plate or in outdoor unit-presale literature. Long-line applications do not require additional oil charge.

Table 2 —Estimated Percentage of Nominal Cooling-Capacity Losses*

UNIT NOMINAL SIZE (BTUH)	LONG-LINE VAPOR-LINE DIAMETER (IN.)**	EQUIVALENT LINE LENGTH (FT)					
		50	75	100	125	150	175
18,000	5/8	5	7	9	12	12	14
	3/4	1	3	4	5	5	7
24,000	5/8	6	9	13	16	19	22
	3/4	0	1	1	2	3	4
30,000	5/8	6	8	10	13	15	17
	3/4	2	3	4	5	6	7
36,000	3/4	7	10	14	17	21	NR
	7/8	2	4	6	8	10	11
42,000	3/4	7	10	13	17	20	23
	7/8	3	4	6	7	8	10
	1-1/8	0	0	1	1	2	2
48,000	3/4	10	14	18	22	NR	NR
	7/8	4	6	7	9	11	13
	1-1/8	0	0	1	1	2	2
60,000	7/8	7	9	11	14	16	19
	1-1/8	1	2	2	3	3	4
70,000	7/8	7	9	11	14	16	19
	1-1/8	1	2	2	3	3	4

*The estimated percentage of cooling capacity that must be subtracted from the Detailed Cooling Capacities data specified in outdoor unit-presale literature for any given indoor/outdoor combination.
**Vapor-line diameter that may be selected for a long-line application. If smaller vapor lines are selected but not specified within the table, large capacity losses will occur and defrost capabilities will be reduced. If larger vapor lines are selected but not specified within the table, refrigerant oil return will be impaired due to velocity losses.
N/R—Not recommended due to excessive loss of capacity.

Step 6—2–Speed Applications

Outdoor units may be connected to indoor section using accessory tubing package or field-supplied refrigerant grade tubing or correct size and condition. In long-line applications, 2–speed units are handled basically the same way as the single-speed units. There are 2 major differences:

1. For tubing up to 100 ft: Liquid tube diameters and refrigerant connection diameters for all sizes are 3/8 in.

Vapor tube diameter for the 036 and 048 is 7/8 in.; 060 is 1–1/8

Vapor refrigerant connection diameter for all sizes is 7/8 in.

DO NOT INSTALL EQUIVALENT INTERCONNECTING TUBING LENGTHS GREATER THAN 100 FT.

2. Do not increase or decrease tubing sizes.

For other applications see the previous sections under Long-Line Guidelines.

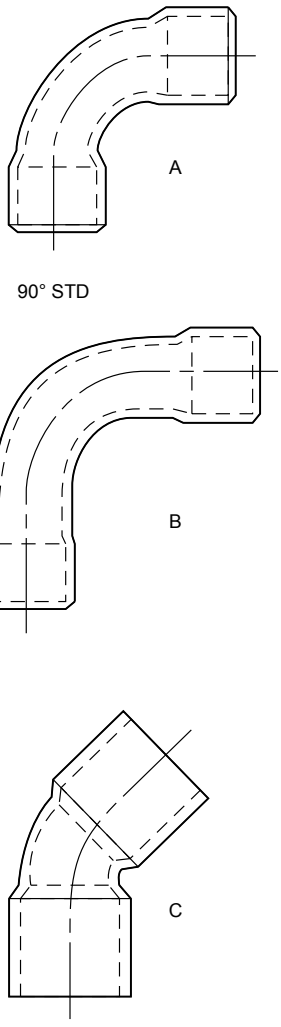


Fig.1—Tube Bend Losses

Table 3—Fitting Losses in Equivalent Ft

TUBE SIZE OD (IN.)	REFERENCE DIAGRAM IN FIG. 1		
	A	B	C
5/8	1.6	1.0	0.8
3/4	1.8	1.2	0.9
7/8	2.0	1.4	1.0
1-1/8	2.6	1.7	1.3

Table 4 - Calculation of Indoor Piston No.

OUTDOOR UNIT ABOVE INDOOR	
FT	**PISTON CHANGE**
0-25	0
26-50	-3
51-75	-5
76-100	-7
101-125	-9
126-150	-10
OUTDOOR UNIT BELOW INDOOR	
FT	**PISTON CHANGE**
0-25	0
26-50	+4

Table 5 — Calculation of Outdoor Piston No.

OUTDOOR UNIT ABOVE INDOOR	
FT	**PISTON CHANGE**
0-50	0
51-75	+4
76-100	+6
101-125	+8
126-150	+10
OUTDOOR UNIT BELOW INDOOR	
FT	**PISTON CHANGE**
0-50	0

Table 6 — Common Piston Sizes

ACCURATER™	CHATLEFF	ACCURATER™	CHATLEFF
—	32	65	65
—	33	67	67
35	35	—	68
—	36	70	70
—	37	—	71
38	38	73	73
—	39	—	74
40	40	76	76
—	41	78	78
42	42	80	80
—	43	—	81
—	45	82	82
46	—	84	84
—	47	86	86
49	49	88	88
51	51	—	89
52	52	90	90
—	53	—	92
55	55	93	93
57	57	96	96
59	59	98	98
61	61	101	101
—	62	104	104
63	63	109	—

Table 7—Liquid-Line Solenoid Kit Part Numbers

TYPE OF VALVE	PART NO.
Single Flow	KAALS0101LLS
Bi-Flow	KHALS0101LLS

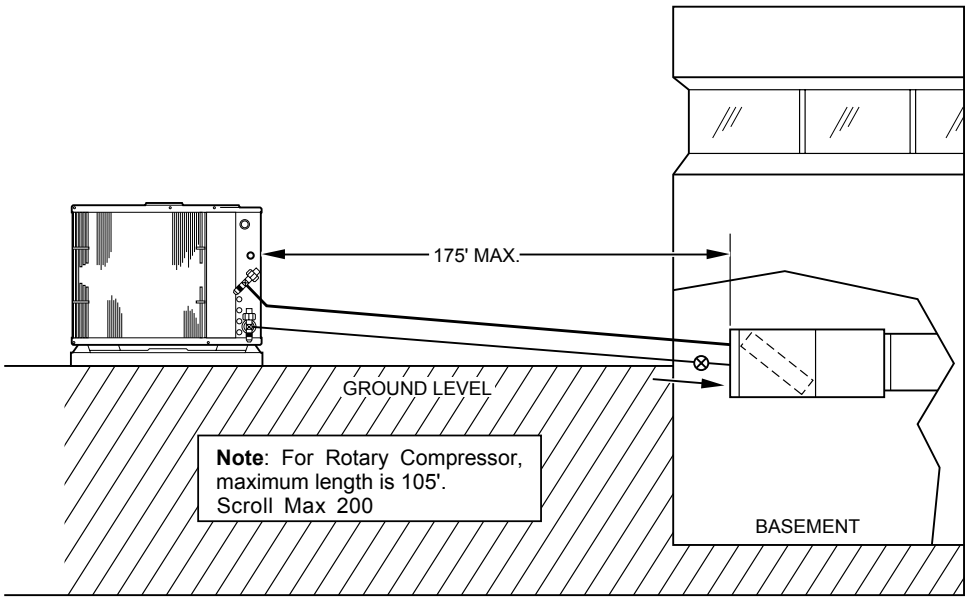


Fig. 2—Application with Air Conditioner Installed in a Horizontal Configuration

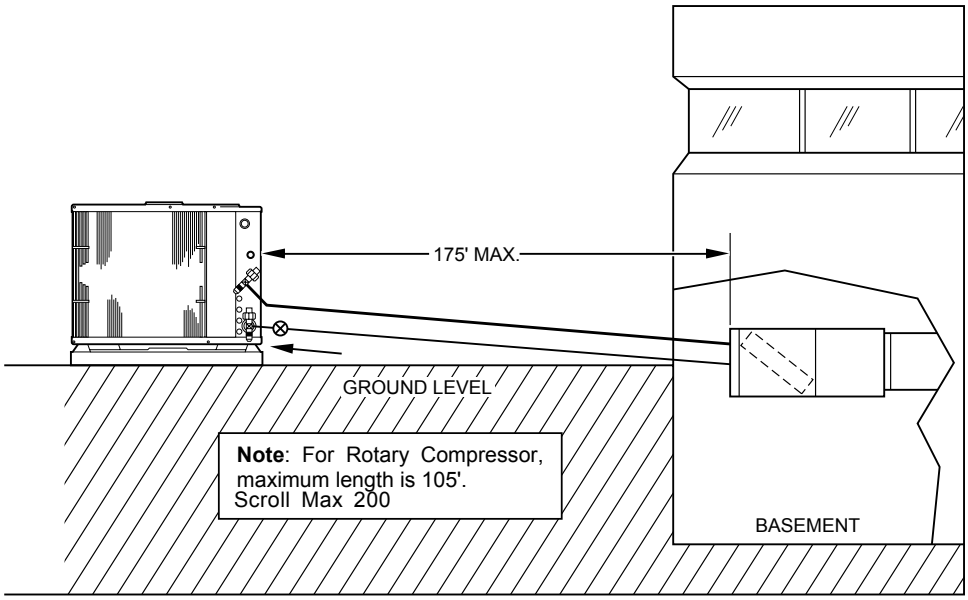


Fig. 3—Application with Heat Pump Installed in a Horizontal Configuration

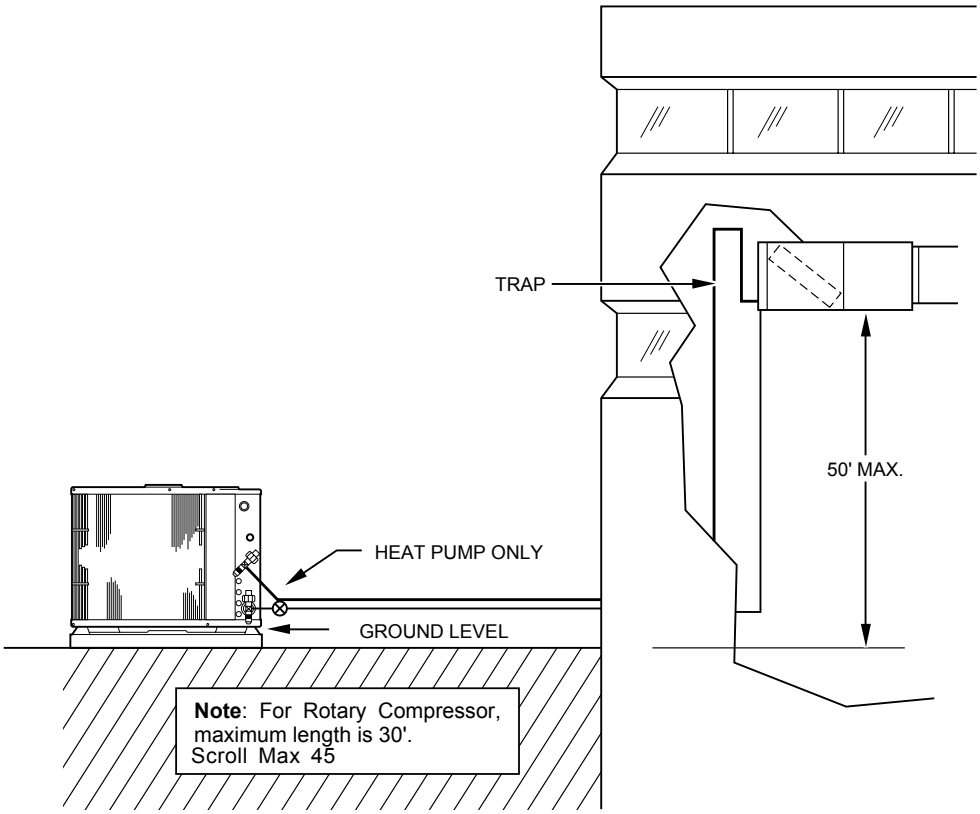


Fig. 4-Application with Air Conditioner or Heat Pump Installed with Indoor Unit above Outdoor Unit

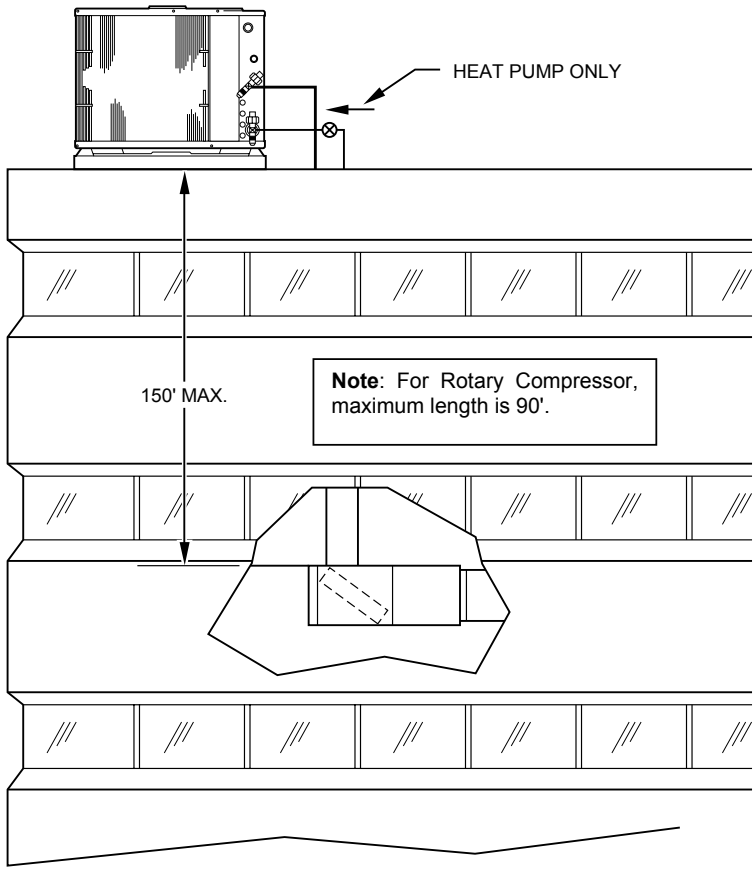


Fig. 5—Application with Air Conditioner or Heat Pump Installed Above Indoor Unit

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Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations