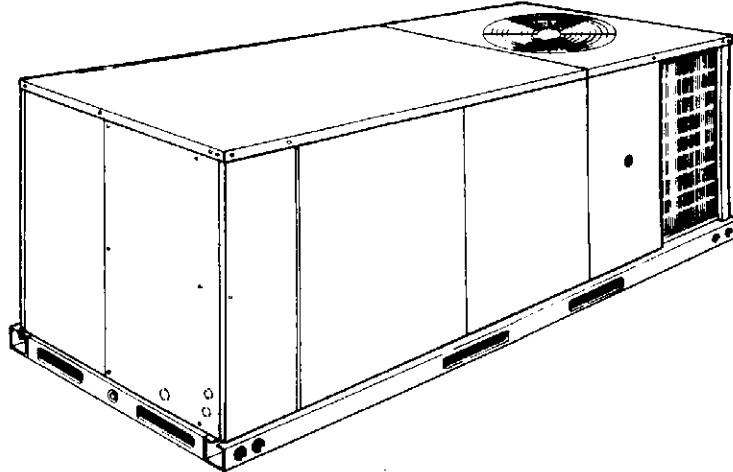


MODELS B3CH 048 AND 060 (WORLD 50 HZ)



GENERAL

YORK Model BCH units are single package heat pumps designed for outdoor installation on a rooftop or a slab. Supplemental electric heaters are available as field-installed accessories. The units are manufactured under ISO 9002 Quality System Certification.

Units are completely assembled on rigid, permanently attached base rails. All piping, refrigerant charge, and electrical wiring is factory-installed and tested. The units require only electric power and duct connections at the point of installation.

The supplemental electric heaters have nickel-chrome elements and utilize single point power connection.

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. See local distributor for additional information.

REFERENCE

Additional information on the design, installation, operation and service of this equipment is available in the following reference forms:

- 55.70-N1 -General Installation
- 55.70-N2 -Pre-start & Post-start Check List
- 530.18-N1.2V -Economizer Accessory
- 530.18-N1.4V -Fixed Outdoor Air Damper Accessory
- 530.18-N1.6V -Motorized Outdoor Air Damper Accy.

- 530.18-N7.1V -Electric Heater Accessory
- 530.18-N7.2V -Fuse Block Accessory

Renewal Parts:

- Refer to Parts Manual for complete listing of replacement parts on this equipment.

All forms referenced in this instruction may be ordered from:

Standard Register
Toll Free Tel: (405) 691-1126
Toll Free Fax: (405) 799-7746

APPROVALS

These units are designed and manufactured as follows:

1. For use as a heat pump only unit or a heat pump unit with supplemental electric heat.
2. For outdoor installation only.

CAUTION

THIS PRODUCT MUST BE INSTALLED IN STRICT COMPLIANCE WITH THE ENCLOSED INSTALLATION INSTRUCTIONS AND ANY APPLICABLE LOCAL, STATE, AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO, BUILDING, ELECTRICAL, AND MECHANICAL CODES.

WARNING

INCORRECT INSTALLATION MAY CREATE A CONDITION WHERE THE OPERATION OF THE PRODUCT COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

Installer should pay particular attention to the words: *NOTE*, *CAUTION* and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

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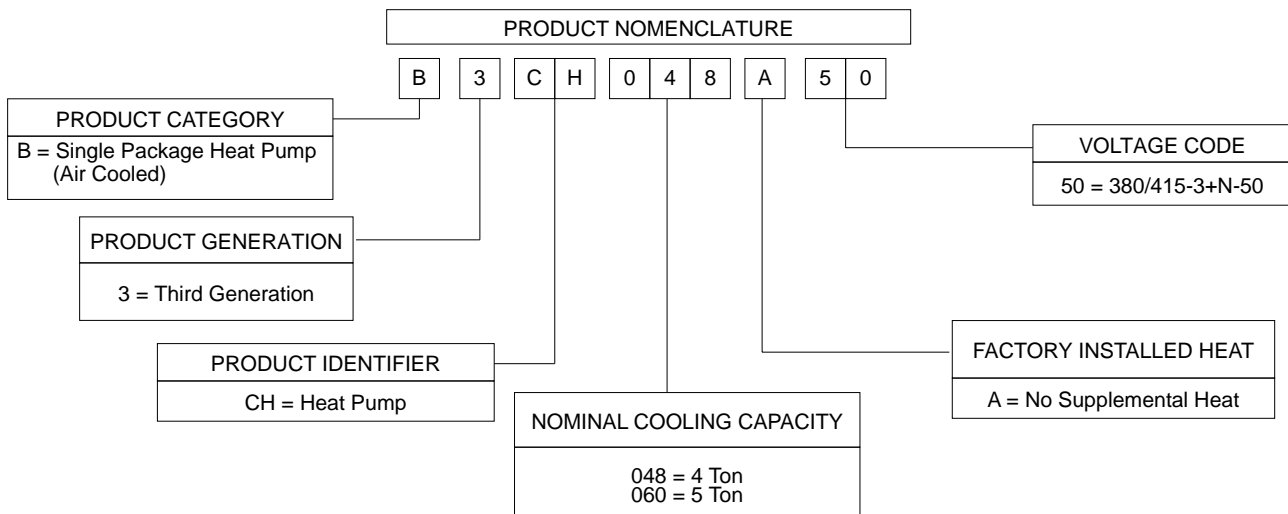
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INSTALLATION

LIMITATIONS

These units must be installed in accordance with national and local or municipal safety codes: Refer to Table 1 for Unit Application Data.

If components are to be added to a unit to meet local codes, they

TABLE 1 - UNIT APPLICATION DATA

Voltage Variation Min. / Max.		342 / 457	
Cooling	Wet Bulb Temperature of Air on Indoor Coil, Min./Max.	°C	14 / 22
		°F	57 / 72
	Dry Bulb Temperature of Air on Outdoor Coil, Min./Max.	°C	7 / 49
		°F	45 / 120
Heating	Minimum Dry Bulb Temperature of Air on Outdoor Coil	°C	-23
		°F	-10

are to be installed at the dealer's and / or the customer's expense.

LOCATION

Use the following guidelines to select a suitable location for these units.

- Unit is designed for outdoor installation only.
- Outdoor coil must have an unlimited supply of air.
- For ground level installation, use a level concrete slab with a minimum thickness of 102mm (4 in.). The length and width should be at least 152mm (6 in.) greater than the unit base rails. Do not tie slab to the building foundation.
- Roof structures must be able to support the weight of the unit and its options and / or accessories. Unit must be installed on a solid level roof curb or appropriate angle iron frame.

CAUTION: If a unit is to be installed on a roof curb or special frame other than a YORK roof curb, gasketing must be applied to all surfaces that come in contact with the unit underside.

- Maintain level tolerance to 13mm (½ in.) maximum across the entire length or width of the unit.
- Elevate the unit sufficiently to prevent any blockage of the air entrances by snow in areas where there will be snow accumulation. Check the local weather bureau for the expected snow accumulation in your area.

OUTDOOR COIL CONDENSATE DRAINAGE PRECAUTION

Condensate drains from the outdoor coil during the heating and defrost cycles. Normally this condensate may be allowed to drain directly onto the ground/roof. A gravel bed is recommended to prevent mud splashing.

WARNING: The unit should not be installed in an area where mud or ice could cause personal injury. Remember that condensate drips from the outdoor coil during heat and defrost cycles and that this condensate freezes when the temperature of the outdoor air is below 0°C (32°F).

RIGGING AND HANDLING

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails. Spreaders, whose length exceeds the largest dimension across the unit, **MUST** be used across the top of the unit.

BEFORE LIFTING A UNIT, MAKE SURE THAT ITS WEIGHT IS DISTRIBUTED EQUALLY ON THE CABLES SO THAT IT WILL LIFT EVENLY.

Units may also be moved or lifted with a forklift. Slotted openings in the base rails are provided for this purpose.

LENGTH OF FORKS MUST BE A MINIMUM OF 1067mm (42 in.).

Remove the nesting brackets from the four corners on top of the unit. All screws that are removed when taking these brackets off must be re-attached to the unit.

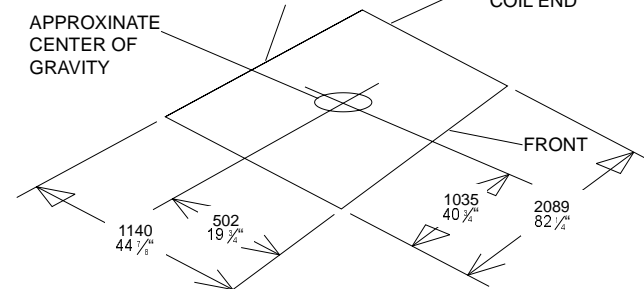


FIG. 1 - CENTER OF GRAVITY

Refer to Table 3 for unit weights and to Figure 1 for approximate center of gravity.

CLEARANCES

All units require certain clearances for proper operation and service. Refer to Figure 6 for the clearances required for combustible construction, servicing, and proper unit operation.

WARNING: Do not permit overhanging structures or shrubs to obstruct outdoor air discharge outlet.

DUCTWORK

A closed return duct system shall be used. This does not preclude use of economizers or outdoor fresh air intake. The supply and return air duct connections at the unit should be made with flexible joints to minimize the transmission of noise.

The supply and return air duct systems should be designed for the airflow and static requirements of the job. They should **NOT** be sized to match the dimensions of the duct connections on the unit.

CAUTION: When fastening ductwork to the side duct flanges on the unit, insert the screws through the duct flanges only. DO NOT insert the screws through the casing. Outdoor ductwork must be insulated and water-proofed.

Refer to Figure 6 for information concerning side and bottom supply and return air duct openings.

FILTERS

Each unit is supplied with 25mm (1 in.) filters. Replacement 51mm (2 in.) filters may be used without modification to the filter racks. Filters must always be installed ahead of the evaporator coil and must be kept clean or replaced with same

size and type. Dirty filters reduce the capacity of the unit and result in frosted coils or safety shutdown. Minimum filter area and required sizes are shown in Table 3.

CONDENSATE DRAIN

Plumbing must conform to local codes. Use a sealing compound on male pipe threads. Install a condensate drain line from the 19mm ($\frac{3}{4}$ in.) PVC female connection on the unit to

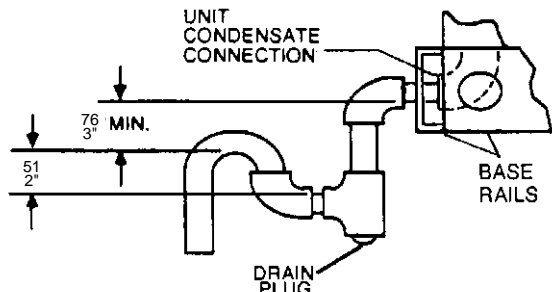


FIG. 2 - RECOMMENDED DRAIN PIPING

spill into an open drain.

NOTE: The condensate drain line **MUST** be trapped to provide proper drainage. See Figure 2.

SERVICE ACCESS

Access to all serviceable components is provided by the following removable panels:

- Compressor compartment
- Heater compartment
- Blower compartment
- Main control box
- Filter compartment
- Motor Access (on units w/belt-drive option)

Refer to Figure 6 for location of these access panels.

BLOWER SPEED SELECTION

Three blower motor speeds are available on the BCH048 units. The speed selection is determined by the airflow and ESP requirements of the applications. BCH060 units have an adjustable motor pulley to achieve the above conditions.

BCH048 units are shipped with the black wire (labeled #8) connected to the high speed tap on the blower motor. If a lower blower speed is desired, this wire should be moved to the medium or low speed tap on the motor.

DISCONNECT SWITCH BRACKET FOR UNITS WITH OPTIONAL BELT-DRIVE BRACKET

A special bracket for mounting a field-supplied disconnect switch is provided in each BCH060. The bracket is shipped inside the blower compartment taped to the top of the blower housing. Install the bracket on the left hand side of the unit as shown in Figure 6. Several existing screws at the top of the unit and one approximately midway down from the top will be used for mounting the bracket. Screws should be loosened only - NOT REMOVED. Mounting holes in the bracket have elongated keyways allowing easy installation. Re-tighten screws after bracket is in place to ensure panels will remain leak tight.

COMPRESSORS

On some units the compressor is mounted on springs which have been tightened down for shipment only.

After this unit is installed, back out the compressor bolts until the sleeve clears the top grommet.

CAUTION: Do *Not* loosen compressor mounting bolts.

THERMOSTAT

The room thermostat should be located on an inside wall approximately 1422mm (56 in.) above the floor where it is not subjected to drafts, sun exposure, or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with thermostat for general installation procedure. Color coded insulated wires (#18 AWG) should be used to connect thermostat to unit. See Figure 3 for wiring details.

NOTE: On units with economizer, remove jumper "J1" from terminals 8 and 10 on plug connector J3/P7 on the relay board in the unit control box. Refer to the unit wiring labels located on the inside of the control box access panel.

An "Emergency Heat" position is provided with the thermostat. In the "Emergency Heat" position, the thermostat allows electric resistance heat only. The compressor is locked out. A pilot light on the thermostat indicates that the switch is on "EM HT".

POWER AND CONTROL WIRING

Voltage tolerances which must be maintained at the compressor terminals during starting and running conditions are indicated on the unit Rating Plate and Table 1.

The wiring harness furnished with this unit is an integral part of the unit. Field alteration to comply with electrical codes should not be required.

A disconnect switch should be field provided for the unit. The switch must be separate from all other circuits. Refer to Figure 6 for installation location. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram.

Electrical lines must be sized properly to carry the load. USE COPPER CONDUCTORS ONLY. Each unit must be wired with a separate branch circuit fed directly from the meter panel and properly protected.

CAUTION: When connecting electrical power and control wiring to the unit, waterproof type connectors **MUST BE USED** so that water or moisture cannot be drawn into the unit during normal operation. The above waterproofing conditions also apply when installing a field-supplied disconnect switch.

Refer to Figure 3 for typical field wiring and to the appropriate unit wiring diagram for control circuit and power wiring information. Refer to Tables 8 and 9 for electrical data.

ELECTRIC HEATERS

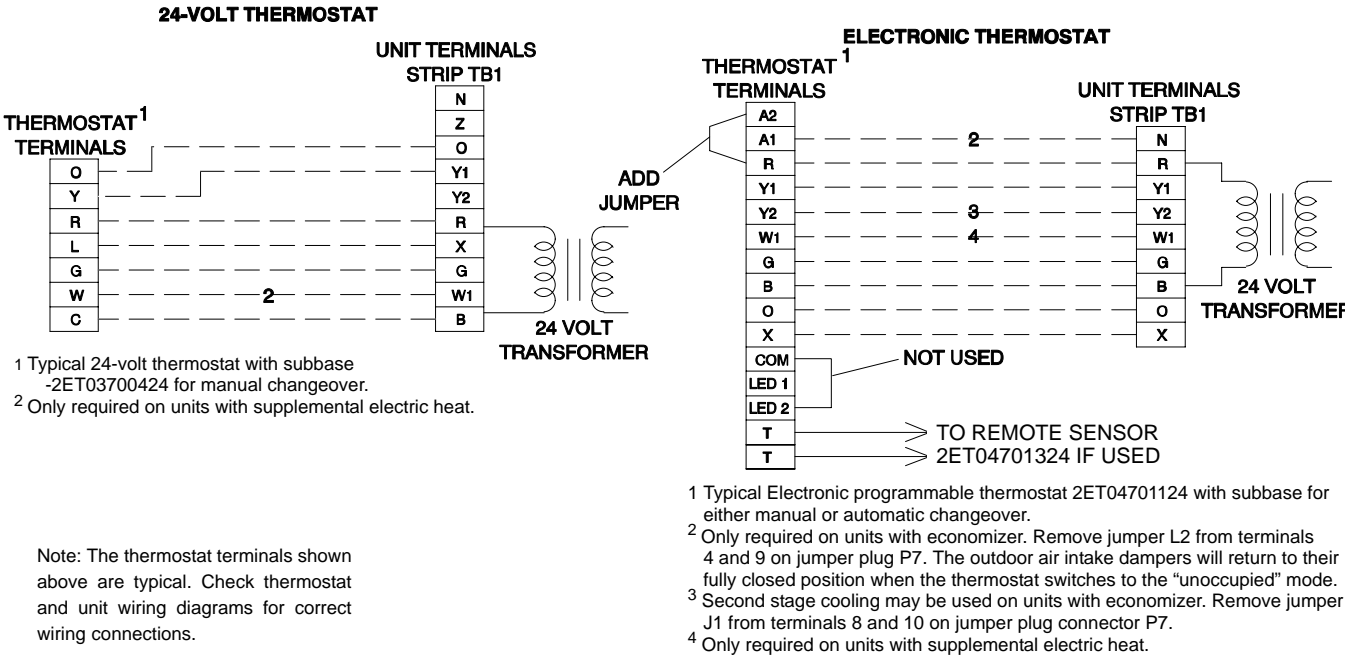
Supplemental electric heaters may be ordered as a field-installed accessory. Refer to Form 530.18-N7.1V for installation instruction. These approved heaters are located within the central compartment of the unit (see Figure 6 for access panel) with the heating elements extending into the supply air chamber.

Fuses are supplied, where required, by the factory. Some kW sizes require fuses and others do not. Refer to the electric

TABLE 2 - AIR FLOW LIMITATIONS

NOMINAL HEATER SIZE KW	VOLTAGE	UNIT MODEL SIZE, NOMINAL TONS	
		4	5
MINIMUM SUPPLY AIR CFM			
7	380/415-3+N-50	1,300	1,600
10		1,300	1,600
15		1,300	1,600
20		1,300	1,600
30		—	1,600

CONTROL WIRING



POWER WIRING

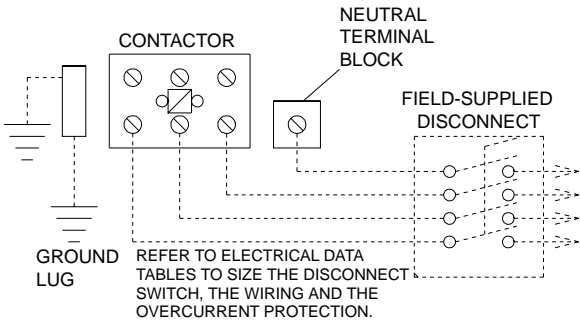


FIG. 3 - TYPICAL FIELD WIRING

heater accessory installation instruction for the heater electrical data.

The minimum air flow limitations across these heaters are listed in Table 2.

OPTIONAL ECONOMIZER RAIN HOOD

The following procedure should be used when assembling an economizer rain hood onto a unit. Refer to Figure 4. The outdoor and return air dampers, damper actuator, the linkage and all the controls are factory mounted as part of the economizer option.

All of the hood components, including the filters, the gasketing and the hardware for assembling are located above the top filter racks within the filter section. The outdoor air sensor is in the bag of parts located at the bottom of the return air section.

1. With filter section access panel removed, take out hood components, filters and sensor described above. Remove and discard outdoor air opening cover on back unit (Upper right hand corner).
2. Remove the 13mm ($\frac{1}{2}$ in.) knockout (A) in the units rear panel (located to the right side of the outdoor air opening). Insert the two loose wires from inside the unit, into the 13mm ($\frac{1}{2}$ in.) bushing provided. Insert wires and bushing into knockout. Snap bushing into place.
3. Mount the outdoor air sensor to the rear panel, just below the knockout described in Step 2. Secure with two self-drilling screws at dimples (B) provided in the panel.

NOTE: Sensor must be positioned so that the sensing ports are at the top (louvers pointing downward) and terminal connections to the right.

4. Connect the two wires, indicated in Step 2, to the sensor as follows:

- Wire #73 to terminal (+)
- Wire #74 to terminal (S)

5. Assemble the LH and RH side plates to the top cover (2 screws each side) to form the hood. Apply gasketing to the

flange surface on each side plate. Extend gasketing 6mm ($\frac{1}{4}$ in.) beyond top and bottom of each flange to insure adequate corner sealing. Secure this assembly to the unit back panel (upper right hand corner). First, remove screw (C) on unit top cover. Then slip flange of hood cover in under flange of unit top cover, replace screw (C), engaging hole (E) in hood flange and tighten. Attach the two side plates to the unit panel by using two self-drilling screws for each side plate at dimples (D) provided in the panel.

6. Position fillpiece at bottom of hood, between the two side plates but do not secure at this time. (Slotted openings MUST be downward for drainage). After fillpiece is properly positioned, note where contact is made with the unit panel. Remove fillpiece and apply gasket material to this area to provide a seal. Reposition fillpiece and secure with 2 screws.
7. Install the two filters into the hood assembly, sliding down along retainers on side plates, into fillpiece at bottom of hood.

NOTE: Install filters so that "Air Flow" arrows point toward the unit.

8. Install filter cover over the end of the hood with one screw (center of hood), securing filters into position.

CAUTION: When proceeding with steps 9 and 10, extreme care must be exercised while turning both the set point and minimum position adjusting screws to prevent twisting them off.

9. The enthalpy set point for the dampers may now be set by selecting the desired set-point from graph in Figure 5. For a single enthalpy economizer, carefully turn the set-point adjusting screw to the "A", "B", "C" or "D" setting corresponding to the lettered curve. For a dual enthalpy economizer, carefully turn the set-point adjusting screw fully clockwise past the "D" setting.

10. To check that the damper blades move smoothly without binding, carefully turn the minimum position adjusting

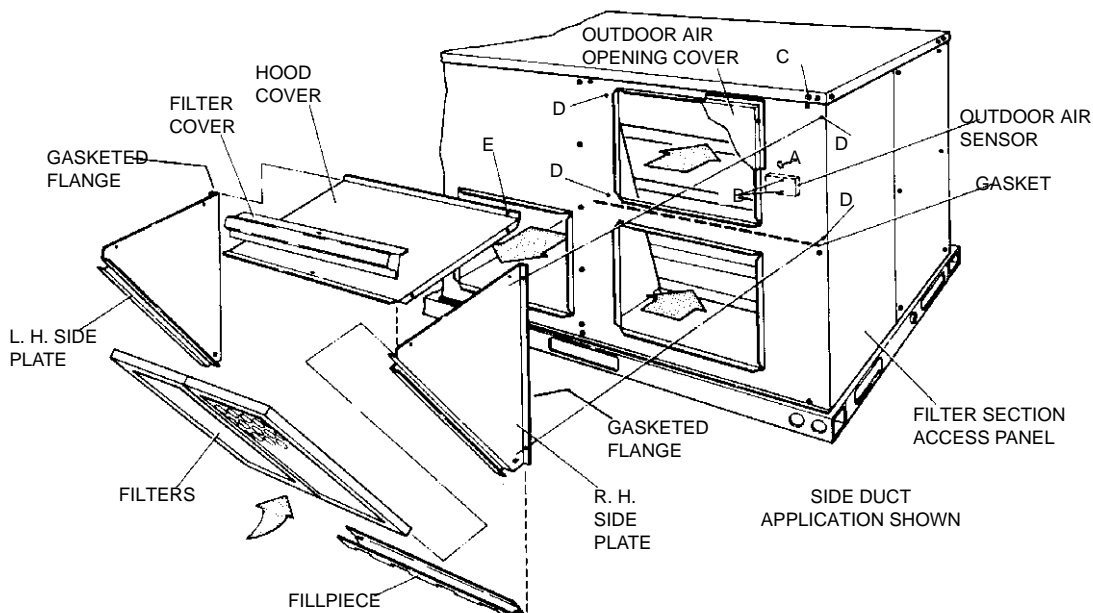


FIG. 4 - ECONOMIZER RAIN HOOD ASSEMBLY (OPTION)

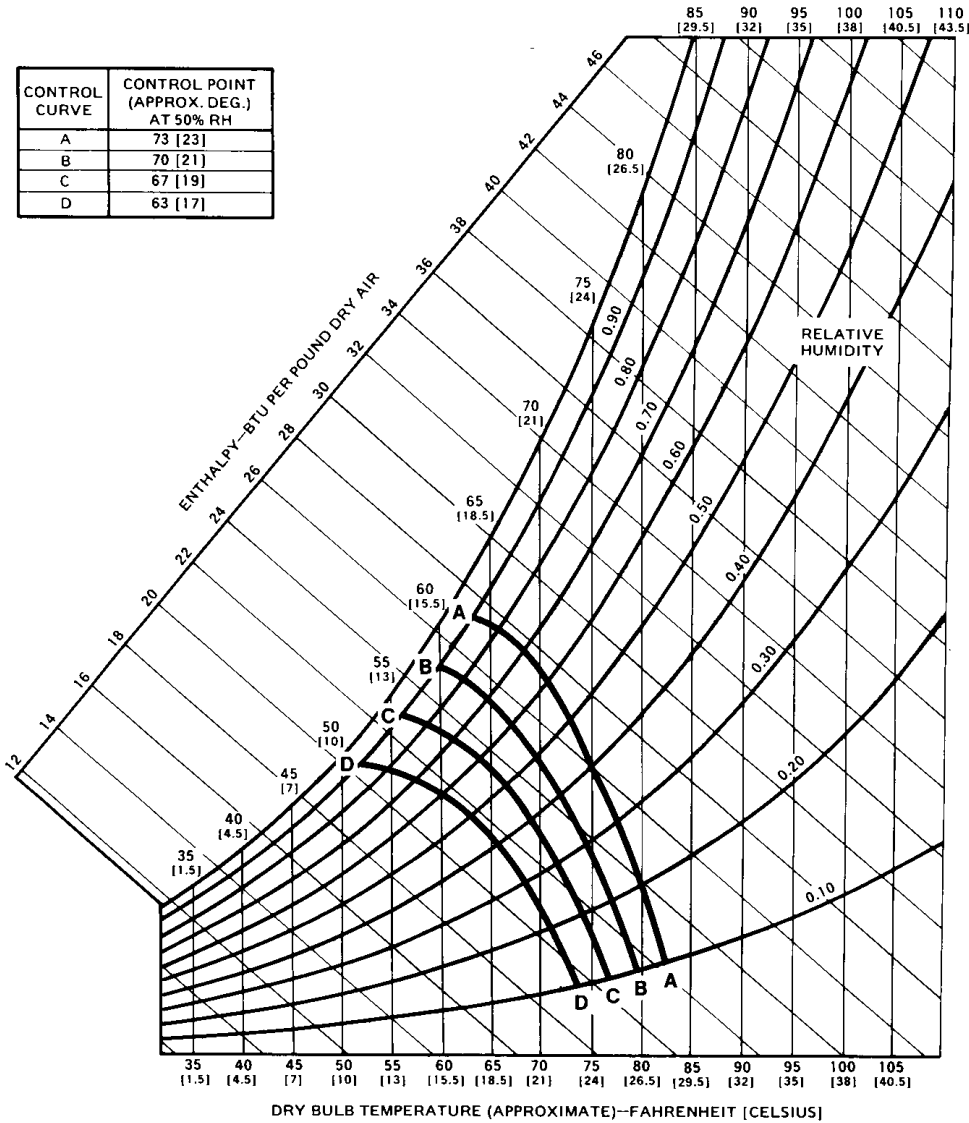


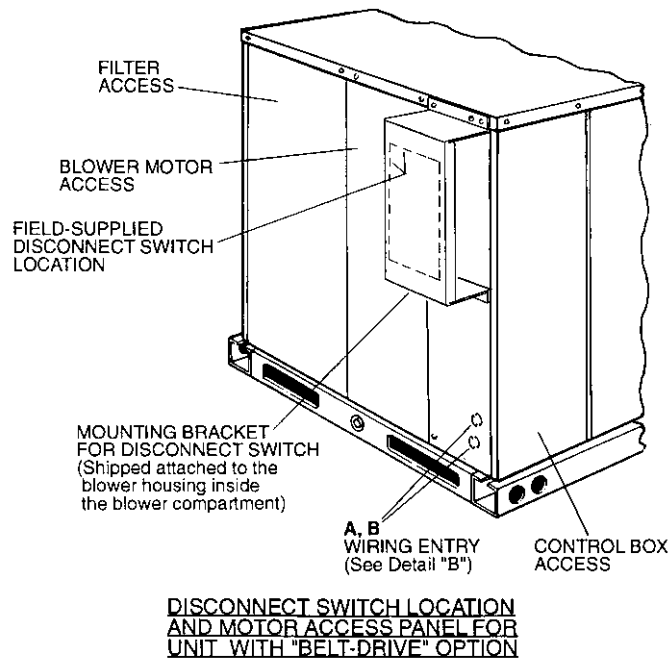
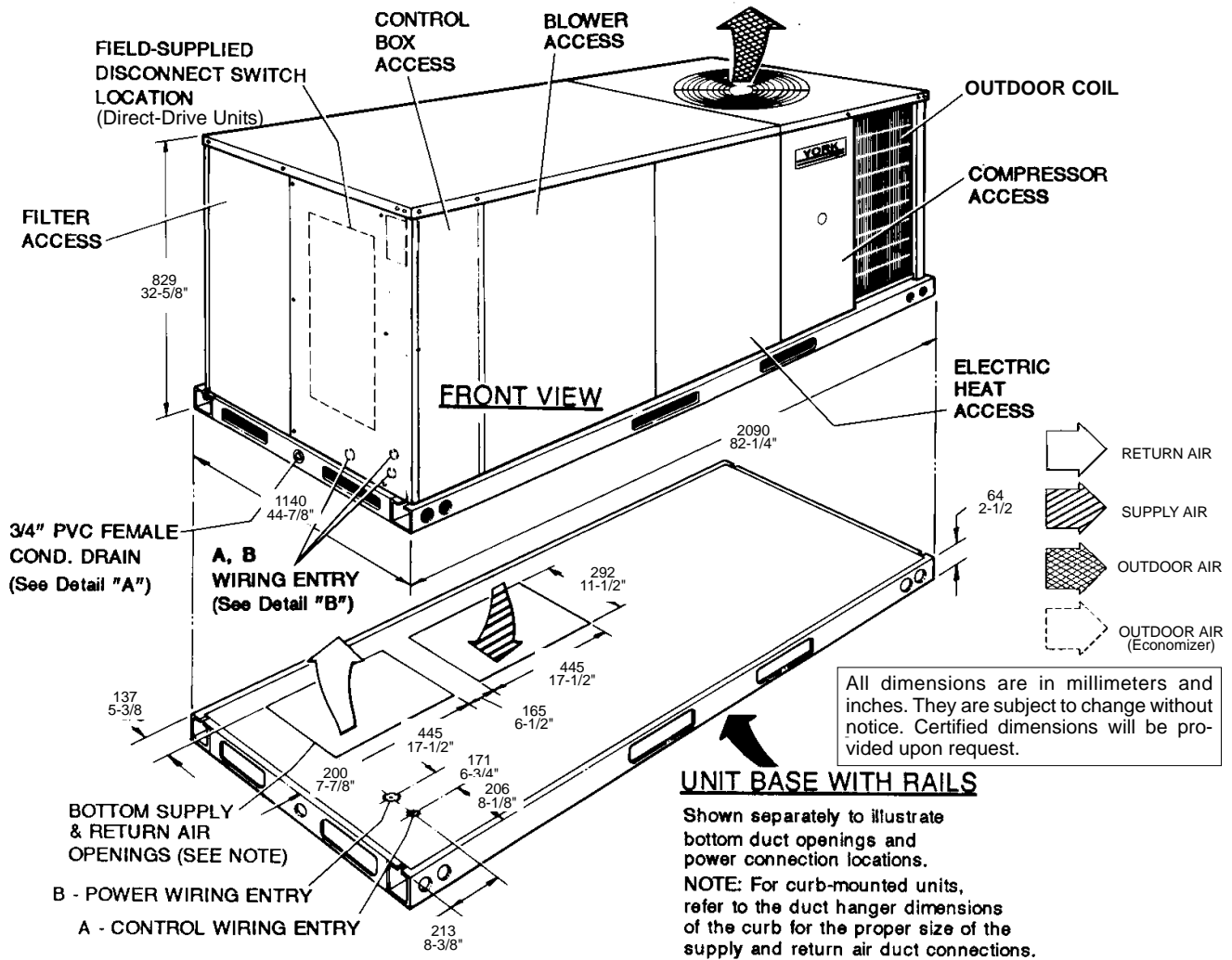
FIG. 5 - ENTHALPY SET POINT ADJUSTMENT

TABLE 3 - PHYSICAL DATA

MODELS		BCH	
		048	060
SUPPLY AIR BLOWER	CENTRIFUGAL BLOWER (Dia. x Wd.,mm/in.)	305 x254 12 x 10	305 x 254 12 x 10
	FAN MOTOR HP (Direct-Drive Units)	0.75	NA
	FAN MOTOR HP (Belt-Drive Units)	NA	1.5
INDOOR COIL	ROWS DEEP	3	3
	FINS PER 25mm (1 inch)	15	15
	FACE AREA (m ² /ft ²)	0.47 / 5.1	0.47 / 5.1
OUTDOOR FAN	PROPELLER DIA. (mm/in.)	610 / 24	610 / 24
	FAN MOTOR kW/HP	0.37 / 0.5	0.37 / 0.5
	NOM. CFM TOTAL	4,200	4,500
OUTDOOR COIL	ROWS DEEP	1	1
	FINS PER 25mm (1 inch)	20	20
	FACE AREA (m ² /ft ²)	17.1	17.1
AIR FILTERS (SEE NOTE)	QUANTITY PER UNIT (14" x 20" x 1")	2	2
	QUANTITY PER UNIT (14" X 25" X 1")	1	1
	TOTAL FACE AREA (m ² / ft ² .)	6.3	6.3
CHARGE	REFRIGERANT 22 (kg / lbs./oz.)	4.2 / 9.2	3.7 / 8/4

NOTE: Filter racks are adapted for 1" or 2" thick filters.

WEIGHTS (kg/lbs)		
Basic Unit	048	270 / 595
	060	281 / 620
OPTIONS / ACCESSORIES		
Electric Heat (Nominal Kw)	5 - 7 kW	8.2 / 18
	10 - 15 kW	10.4 / 23
	20 - 30 kW	12.7 / 28
Economizer		22.7 / 50
Motorized Outdoor Air Damper		21.8 / 48
Barometric Relief/Fixed Outdoor Air Intake Damper		4.5 / 10
Roof Mounting Curb		41.7 / 92
Belt-Drive Blower		2.3 / 5



All dimensions are in millimeters and inches. They are subject to change without notice. Certified dimensions will be provided upon request.

UTILITIES ENTRY DATA

HOLE	KNOCKOUT SIZE (DIA.)	USED FOR
A	5mm (7/8") *	Control Wiring (Side or Bottom)**
B	51mm (2") *	Power Wiring (Side or Bottom)

*Knockouts in the bottom of the unit can be located by the slice in the insulation.

**Do not remove the 2" knockout ring.

Front	610mm (24")
Back	25mm (12") (Less Economizer) 914mm (36") (With Economizer)
Left Side (Filter Access)	610mm (24") (Less Economizer) 914mm (36") (With Economizer)
Right Side (OD Coil)	610mm (24")
Below Unit ¹	0mm (0")
Above Unit ²	1829mm (72") (For Outdoor Air Discharge)

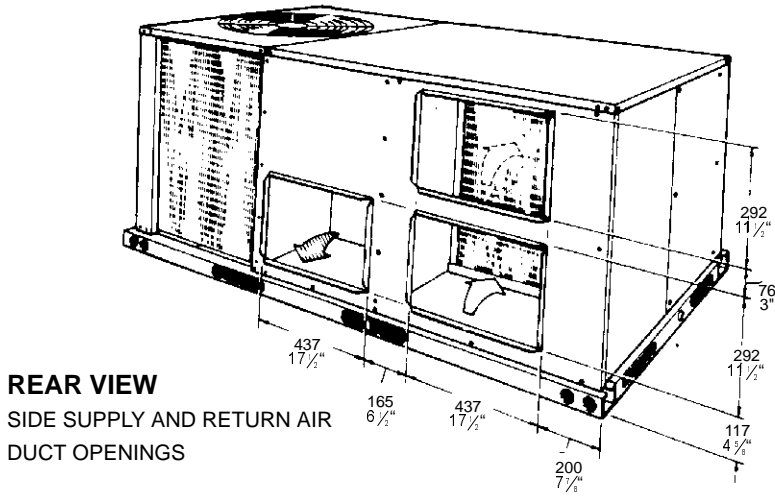
NOTE:

Units and ductwork are approved for zero clearance to combustible materials when equipped with electric heaters.

¹Units may be installed on combustible floors made from wood or class A, B or C roof covering material.

²Units must be installed outdoors. Overhanging structures or shrubs should not obstruct outdoor air discharge outlet.

FIGURE 6 - DIMENSIONS & CLEARANCES



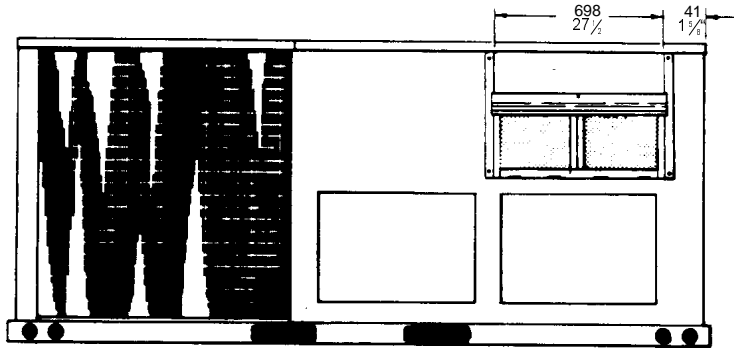
DUCT COVERS - Units are shipped with all air duct openings covered.

For **side** duct applications;

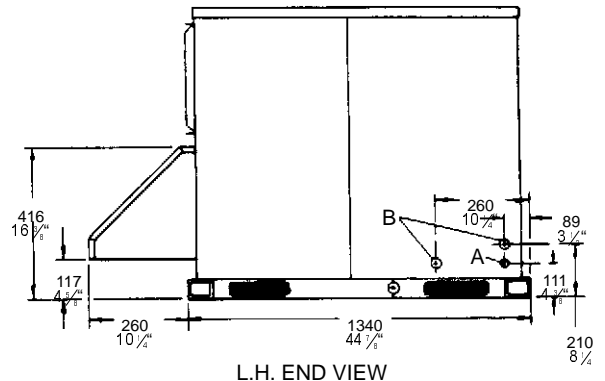
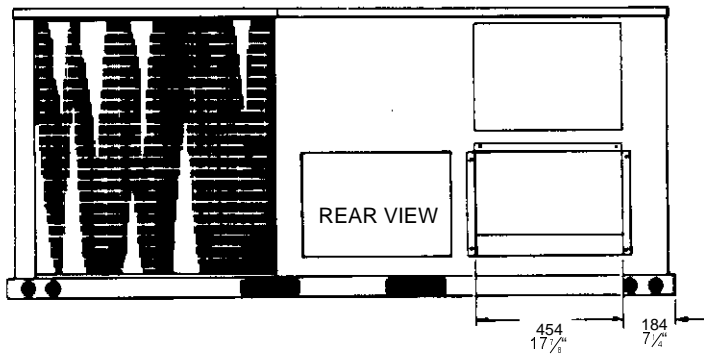
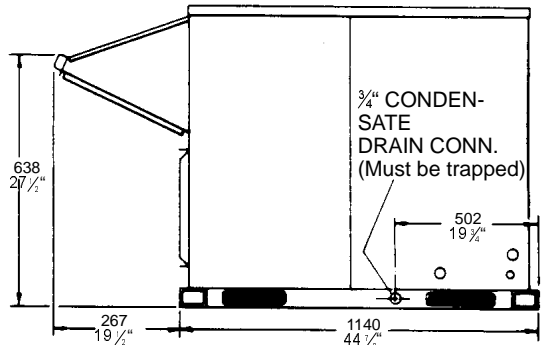
1. Remove and discard the supply and return air duct covers.
2. Connect ductwork to duct flanges on the rear of the unit.

For **bottom** duct applications;

1. Remove the side supply air duct cover to gain access to the bottom supply air knockout panel.
2. Remove and discard the bottom knockout panel.
3. Replace the side duct cover.
4. With filter section access panel removed from the unit, remove and discard the bottom return air knockout panel.



DETAIL "A"
UNIT WITH ECONOMIZER RAINHOOD



DETAIL "B"
UNIT WITH FIXED OUTDOOR AIR / BAROMETRIC RELIEF RAINHOOD

FIGURE 6 - DIMENSIONS & CLEARANCES (continued)

TABLE 4 - SUPPLY AIR PERFORMANCE - BCH048

380 / 415 VOLTS - SIDE DUCT APPLICATIONS

MODEL	MOTOR SPEED	Available External Static Pressure - Pa*																	
		m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts	m ³ /s	Watts
048	HI	-	-	-	-	0.94	1010	0.92	975	0.90	945	0.87	910	0.83	825	0.78	825	0.72	775
	MED	0.85	910	0.84	880	0.82	850	0.80	825	0.79	800	0.76	775	0.74	740	0.70	700	0.66	660
	LOW	0.77	810	0.76	780	0.75	760	0.73	740	0.73	730	0.71	715	0.69	690	0.66	660	0.61	615

MODEL	MOTOR SPEED	Available External Static Pressure - IWG*																	
		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.00	
CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts
048	HI	-	-	-	-	2000	1010	1950	975	1905	945	1840	910	1770	825	1660	825	1530	775
	MED	1810	910	1780	880	1740	850	1700	825	1665	800	1620	775	1560	740	1480	700	1390	660
	LOW	1635	810	1610	780	1580	760	1555	740	1540	730	1510	715	1460	690	1400	660	1300	615

*INCLUDES ALLOWANCES FOR A WET INDOOR COIL AND 1" FILTERS. REFER TO THE STATIC RESISTANCES TABLE FOR RESISTANCE VALUES ON APPLICATIONS OTHER THAN HEAT PUMP UNITS WITH SIDE DUCT AIRFLOWS.

TABLE 5 - SUPPLY BLOWER PERFORMANCE - BCH060

MODEL	AIR FLOW m ³ /s / CFM	Available External Static Pressure -Pa/ IWG*															
		223 / 0.90		248 / 1.00		273 / 1.10		298 / 1.20		322 / 1.30		347 / 1.40		372 / 1.50			
RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts		
060	1.18 / 2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	1.13 / 2400	1193	1665	-	-	-	-	-	-	-	-	-	-	-	-		
	1.08 / 2300	1170	1580	1202	1620	-	-	-	-	-	-	-	-	-	-		
	1.04 / 2200	1148	1480	1180	1530	-	-	-	-	-	-	-	-	-	-		
	0.99 / 2100	1121	1385	1155	1425	1190	1475	-	-	-	-	-	-	-	-		
	0.94 / 2000	1100	1285	1133	1340	1169	1385	1205	1445	-	-	-	-	-	-		
	0.90 / 1900	1079	1180	1110	1240	1143	1280	1178	1330	1222	1375	-	-	-	-		
	0.85 / 1800	1058	1060	1090	1135	1122	1190	1158	1240	1196	1295	-	-	-	-		
	0.80 / 1700	1035	960	1071	1030	1103	1100	1134	1140	1164	1175	1197	1205	-	-		
	0.75 / 1600	1020	900	1056	965	1088	1035	1118	1065	1145	1105	1170	1130	1198	1150		
	0.71 / 1500	1004	860	1038	880	1070	925	1101	980	1130	1045	1158	1075	1184	1110		

*INCLUDES ALLOWANCES FOR A WET INDOOR COIL AND 1" FILTERS. REFER TO THE STATIC RESISTANCES TABLE FOR RESISTANCE VALUES ON APPLICATIONS OTHER THAN HEAT PUMP UNITS WITH SIDE DUCT AIRFLOWS.

TABLE 6 - MOTOR AND DRIVE DATA - Belt-Drive Blower

MODEL	BLOWER RANGE (RPM)	MOTOR*				ADJUSTABLE MOTOR PULLEY		FIXED BLOWER PULLEY		BELT	
		kw/HP	RPM	FRAME SIZE	SERVICE FACTOR	PITCH DIA. mm (in.)	BORE mm (in.)	PITCH DIA. mm (in.)	BORE mm (in.)	PITCH LENGTH (mm in.)	DESIG-NATION
BCH060	850 - 1180	0.75/1.0	1450	56	1.15	71 - 97 (2.8 - 3.8)	22	127 (5.0)	25 (1)	947 (37.3)	A36

*All motors have solid bases and are inherently protected. These motors can be selected to operate into their service factor because they are located in the moving air, upstream of any heating device.

TABLE 7 - STATIC RESISTANCES*

EXTERNAL STATIC PRESSURE DROP

DESCRIPTION	RESISTANCE, Pa/IWG									
	m ³ /s/CFM									
	0.47/1000	0.57/1200	0.66/1400	0.75/1600	0.85/1800	0.94/2000	1.04/2200	1.13/2400	1.23/2600	
Economizer/Motorized Damper ^{1, 2}	17 / 0.07	20 / 0.08	22 / 0.09	27 / 0.11	32 / 0.13	37 / 0.15	42 / 0.17	50 / 0.20	57 / 0.23	
Electric Heaters ¹	5 - 15 KW	10 / 0.04	12 / 0.05	15 / 0.06	17 / 0.07	20 / 0.08	25 / 0.10	30 / 0.12	35 / 0.14	40 / 0.16
	20 - 30 KW	15 / 0.06	17 / 0.07	20 / 0.08	22 / 0.09	27 / 0.11	32 / 0.13	37 / 0.15	42 / 0.17	50 / 0.20
Bottom Duct Connections ¹	15 / 0.06	17 / 0.07	20 / 0.08	22 / 0.09	25 / 0.10	27 / 0.11	30 / 0.12	35 / 0.14	40 / 0.16	

¹Deduct these resistance values from the available external static pressure shown in the respective Blower Performance Table.

²The pressure thru the economizer is greater for 100% outdoor air than for 100% return air. If the resistance of the return air duct system is less than 0.25 IWG, the unit will deliver less CFM during full economizer operation.

TABLE 8 - ELECTRICAL DATA - Basic Unit

MODEL BCH	POWER SUPPLY	VOLTAGE LIMITATIONS		COMPRESSOR		OUTDOOR FAN MOTOR, FLA	SUPPLY AIR BLOWER MOTOR, FLA	TOTAL UNIT AMPACITY, AMPS	MAX. FUZE SIZE, AMPS (SEE NOTE 1)	MAX. HACR BREAKER SIZE, AMPS	MIN. WIRE SIZE, AWG (SEE NOTE 2)
		MIN.	MAX.	RLA	LRA						
048	380/415-3+N-50	342	457	9.6	66	1.8	4.0	18.3	25	25	10 (6MM ²)
060	380/415-3+N-50	342	457	10.0	75	1.8	2.6	16.9	25	25	10 (6MM ²)

NOTES: 1. Dual element, time delay type.
2. Based on 75°C copper conductors.

TABLE 9 - ELECTRICAL DATA - Heat Pump with Supplemental Electric Heat

MODEL BCH	POWER SUPPLY	HEATER ACCESSORY MODEL NUMBER	SUPPLY AIR BLOWE R MOTOR FLA	ELECTRIC HEATERS			TOTAL UNIT AMPACITY AMPS	MAX. FUZE SIZE, AMPS (SEE NOTE 1)	MAX. HACR BREAKER SIZE, AMPS	MIN. WIRE SIZE, AWG (SEE NOTE 2)
				KW	STAGES	TOTAL AMPS				
048	380/415-3+N-50	2CE04510746*	4.0	4.3 / 5.1	1	7.1	26.5	30	30	10 (6mm ²)
		2CE04511046*		6.3 / 7.5	1	10.5	30.3	35	35	8 (10mm ²)
		2CE04511546*		8.5 /	1	14.1	34.5	40	40	8 (10mm ²)
		2CE04512046*		10.2 12 / 14.6	2	20.3	41.1	45	45	8 (10mm ²)
060	380/415-3+N-50	2CE04510746*	2.6	4.3 / 5.1	1	7.1	25.7	30	30	10 (6mm ²)
		2CE04511046*		6.3 / 7.5	1	10.5	30.0	35	35	8 (10mm ²)
		2CE04511546*		8.5 /	1	14.1	34.6	40	40	8 (10mm ²)
		2CE04512046*		10.2 12 / 14.6	2	20.3	42.2	45	45	8 (10mm ²)
		2CE04513046*		18 / 22	2	30.0	54.3	60	60	6 (16mm ²)

OPERATION

screw fully clockwise and then energize and de-energize terminals "R" to "G". With terminals "R" to "G" energized, turn the minimum position screw counterclockwise until the desired minimum position has been attained.

11. Replace the filter section access panel.

COOLING SYSTEM

The unit has an air-cooled condenser and is factory-charged with Refrigerant-22.

The compressor is hermetically sealed, internally sprung, mounted on spring isolators and inherently (internally) protected. If there is an abnormal temperature rise in the compressor, the protector opens to shut down the compressor.

PRELIMINARY OPERATION COOLING

After the installation has been completed, the crankcase heater of the compressor must be energized for at least 4 hours before starting the unit. After this initial warm-up, the compressor should be given three false starts (energized just long enough to make a few revolutions) with a 5 minute delay between each start before being put into full time service.

NOTE: Prior to each cooling season, the crankcase heater must be energized at least 10 hours before the system is put into operation.

COOLING SEQUENCE OF OPERATION

When the thermostat calls for cooling, the compressor and the outdoor fan motor will be energized through terminal "Y1" and the supply air blower motor will be energized through terminal "G" (if the fan switch on the subbase is set in the "AUTO" position). The supply air blower motor will run continuously if the fan switch is set in the "ON" position.

The reversing valve is energized thru the "O" circuit when the subbase is in the cooling mode.

HEATING SEQUENCE OF OPERATION

The following sequence of operation is based on using a standard YORK heat pump thermostat with two heating stages.

FIRST STAGE HEAT

When the thermostat calls for heating, the compressor and the outdoor fan motor will be energized through terminal "Y1" and the supply air blower motor will be energized through terminal "G" (if the fan switch on the subbase is set in the "AUTO" position). The supply air blower motor will run continuously if the fan switch is set in the "ON" position.

SECOND STAGE HEAT

If compressor operation can not satisfy the heating requirements, second stage heat will energize supplemental electric heat (if supplied) thru the "W1" circuit.

DEFROST SEQUENCE OF OPERATION

The BCH has a unique "ambient modified" time-temperature defrost control that automatically adjusts to changes in the outdoor temperature. The defrost control will shorten the defrost initiation time periods above 2°C (35°F) and will extend the defrost initiation time periods below 2°C (35°F). The control is factory set to defrost at 110 minutes (T3), but it can be field

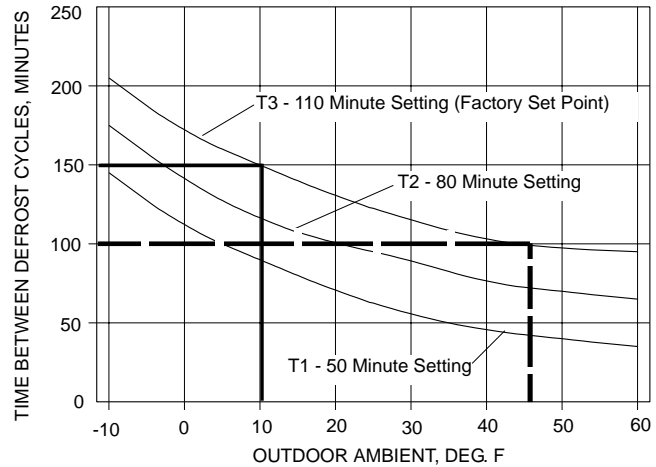


FIG. 7 - DEFROST INITIATION TIMES

adjusted to defrost at 80 minutes (T2) or 50 minutes (T1) in areas with high humidity.

The curve in Figure 7 shows how defrost initiation times are automatically compensated for changes in outdoor temperature.

EXAMPLE: If the time is factory set on pin T-3 (110 minutes at 2°C (35°F) outdoor) and the outdoor temperature climbs to 7°C (45°F), the time initiation cycle decreases to 100 minutes.

If the outdoor temperature drops to -12°C (10°F) where ice is less likely to form, the 110 minute interval increases to 150 minutes.

Two requirements must be met before a defrost cycle can be initiated.

1. The defrost time cycle must be complete.
2. The liquid line temperature must be less than -2°C (28°F).

Defrost terminates when the liquid line sensor reaches 13°C (55°F) or after 10 minutes.

The defrost time cycle restarts 10 minutes after the start of the defrost cycle even though the liquid sensor terminated defrost after 3 minutes.

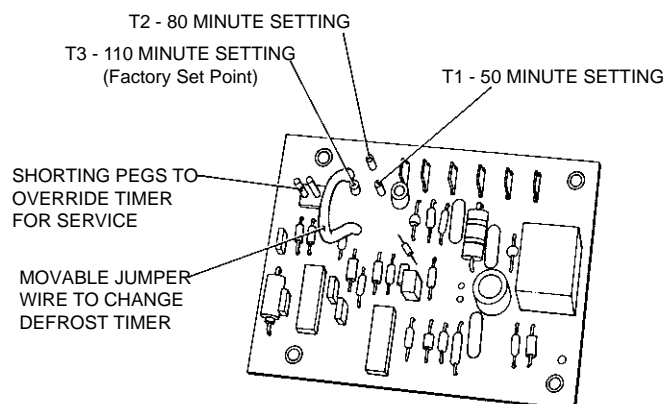


FIG. 8 - AMBIENT MODIFIED TIME/TEMPERATURE CONTROL

During troubleshooting, the defrost time can be reduced to 20 seconds by shorting out the SW1 test pegs on the module. The pegs are 13mm ($\frac{1}{2}$ in.) long, 1mm ($\frac{3}{16}$ in.) apart and are mounted on a white base. See Figure 8.

LOCKOUT CONTROL

Any one of four conditions will put the system into a lock-out condition during the heating or cooling mode:

1. The discharge line temperature reaches 124°C (255°F) (102°C [215°F] reset) or,
2. The discharge pressure reaches 2770 kPa (398 PSIG) (2158 kPa [310 PSIG] reset) or,
3. The suction line freezestat equals -3°C (26°F) (3°C [38°F] reset) or,
4. The low-pressure cut-out equals 49 kPa (7 PSIG) (153 kPa [22 PSIG] reset).

A lock-out energizes the emergency heat light on the thermostat and the red LED light on the unit relay board. Turning the thermostat switch to "Off" then back to "On", will reset the system.

NOTICE TO OWNER:

If a lockout occurs, check for the following problems before calling a serviceman:

1. Dirty filters.
2. Snow accumulation.
3. Leaf or debris blockage.

After eliminating the problem, attempt to restart the system as follows:

- turn the system switch on the thermostat to its "OFF" position for 10 seconds.
- turn it back to its original position.

If the unit doesn't start, call a serviceman.

NOTE: Models with an anti-recycle accessory will have a 5-minute delay before starting.

CHECKING SUPPLY AIRFLOW

The speed of the supply air blower will depend on the required airflow, the unit accessories and the static resistances of both the supply and the return air duct systems. With this information, the speed for the supply air blower can be determined from **TABLE 10 - BELT-DRIVE SUPPLY AIR MOTOR PULLEY ADJUSTMENT**

TURNS OPEN*	BLOWER DRIVE RANGE (RPM)	
		060
5	850	
4	916	
3	982	
2	1048	
1	1114	
0	1180	

*Pulley can be adjusted in half-turn increments.

determined from the blower performance and static resistance data on Tables 4, 5 and 7.

Knowing the required blower RPM and the blower motor kW (HP), the speed setting for the supply air motor can be determined.

The setting (turns open) for the optional belt-drive supply air pulley can be determined from Table 10.

OPTIONAL BELT-DRIVE BLOWER

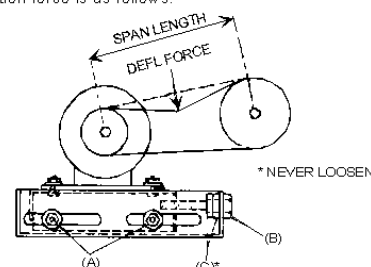
All units with belt-drive blowers have single speed motors. The variable pitch pulley on the blower motor can be adjusted to

CAUTION

Procedure for adjusting belt tension:

1. Loosen four nuts (top and bottom) (A).
2. Adjust by turning (B).
3. Never loosen nuts (C).
4. Use a belt tension checker to apply a perpendicular force to one belt at the midpoint of the span as shown. The deflection force should be applied until a specific deflection distance of 4mm ($\frac{5}{32}$ ") is obtained.

To determine the deflection distance from normal position, use a straight edge from sheave to sheave as a reference line. The recommended deflection force is as follows:



Tension new belts at the max. deflection force recommended for the belt section. Check the belt tension at least two times during the first 24 hours of operation. Any re-tensioning should fall between the min. and max. deflection force values.

5. After adjusting, re-tighten nuts (A).

FIG. 9 - BELT ADJUSTMENT

obtain the desired supply airflow. Refer to Table 6 for blower motor drive data. The tension on the belts should be adjusted as shown in Figure 9.

Start the supply air blower motor. Adjust the resistances in both the supply and the return air duct systems to balance the air distribution throughout the conditioned space. The job specifications may require that this balancing be done by someone other than the equipment installer.

To check the supply airflow after the initial balancing has been completed:

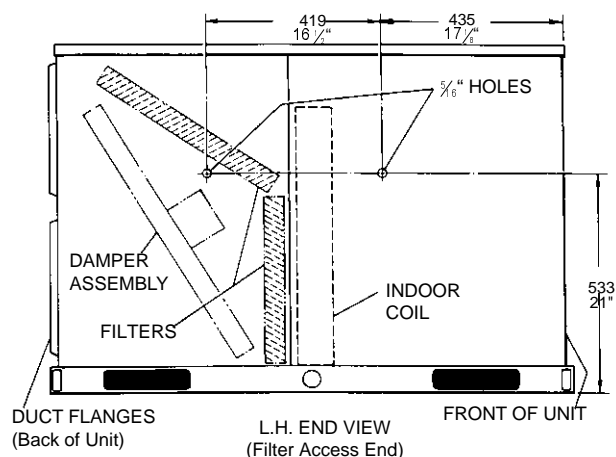


FIG. 10 - HOLE LOCATIONS (PRESS. DROP READING)

1. Drill two 8mm ($\frac{5}{16}$ in.) holes in the side panels as shown in Figure 10.
2. Insert at least 203mm (8 in.) of 6mm ($\frac{1}{4}$ in.) tubing into each of these holes for sufficient penetration into the air flow on both sides of the indoor coil.

NOTE: The tubes must be inserted and held in a position perpendicular to the air flow so that velocity pressure does not affect the static pressure readings.

3. Using an inclined manometer, determine the pressure drop across a dry indoor coil. Since the moisture on an indoor coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To ensure a dry coil, the compressors should be de-energized while the test is being run.
4. Knowing the pressure drop across a dry coil, the actual airflow through the unit can be determined from the curve in Figure 11.

WARNING: Failure to properly adjust the total system air quantity can result in poor system performance.

After readings have been obtained, remove the tubes and seal the drilled holes in the side panels. 8mm (5/16 in.) dot plugs (P/N 029-13880) are available through normal parts ordering procedures.

NOTE: DE-ENERGIZE THE COMPRESSORS BEFORE TAKING ANY TEST MEASUREMENTS TO ENSURE A DRY INDOOR COIL.

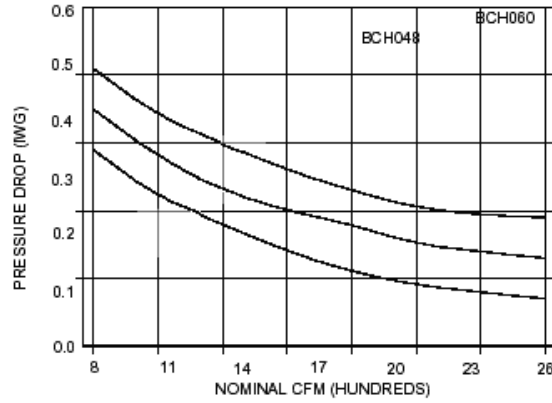


FIG. 11 - PRESSURE DROP ACROSS A DRY INDOOR COIL VS. SUPPLY AIR CFM

SECURE OWNER'S APPROVAL: When the system is functioning properly, secure the owner's approval. Show him the location of all disconnect switches and the thermostat. Teach him how to start and stop the unit and how to adjust temperature settings within the limitations of the system.

MAINTENANCE

NORMAL MAINTENANCE

CAUTION: Prior to any of the following maintenance procedures, shut off all power to the unit to prevent personal injury.

FILTERS - Inspect once a month. Replace disposable or clean permanent type as necessary. DO NOT replace permanent type with disposable.

MOTORS - Indoor fan and outdoor fan motors are permanently lubricated and require no maintenance.

OUTDOOR COIL - Dirt should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean coil, be sure power to the unit is shut off prior to cleaning.

NOTE: Exercise care when cleaning the coil so that the coil fins are not damaged.

Do not permit the outdoor air discharge to be obstructed by overhanging structures of shrubs.



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