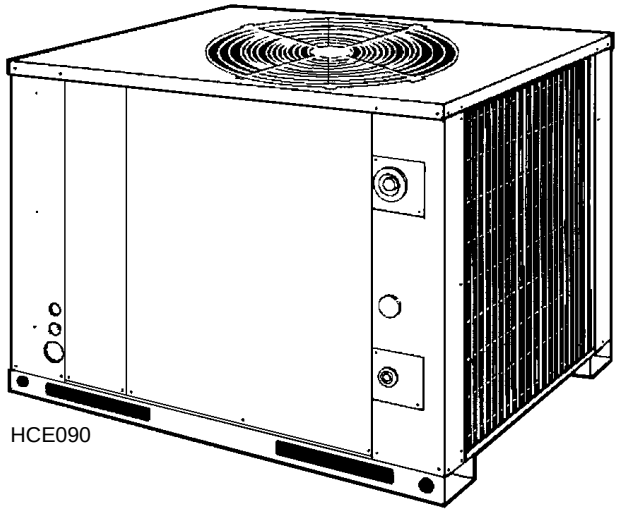
SUNLINE 2000™ SPLIT-SYSTEM CONDENSING UNITS (AIR COOLED)

INSTALLATION INSTRUCTION

Supersedes: Nothing

MODELS H*CE090 & H*CE120
(WORLD) 50 HZ)



HCE090

GENERAL

These condensing units are designed for outdoor installation on a roof or at ground level.

Every unit is completely piped and wired at the factory and is shipped read for immediate installation. Only the liquid and suction lines to the evaporator coil, the control wiring and the main power wiring are required to complete the installation. Each unit is dehydrated, evacuated, leak tested and pressure tested at 350 psig (2400 kPa) before being pressurized with a holding charge of refrigerant-22 for shipent and/or storage.

All controls are located in the front of the unit and are readily accessible for maintenance, adjustment and service. All wirring (power and control) can be done through the front of the unit.

Refer to Tables 7 and 8 for condenser cooling capacities and power requirements.

REFERENCE

This instruction covers the installation and operation of the basic condening unit. For information on the installation and operation of the evaporator blower units, refer to separate instruction.

Renewwal Parts:

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

All forms may be ordered from York local sale office.

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 delivery receipt. A separate request for inspection by the carrier 's agent should be made in writing. See Local Distributor for additional information.

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 in not handled properly.

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FIGURES

PRODUCT NOMENCLATURE

H • C E 0 9 0 A 5 0

PRODUCT CATEGORY
H = Split-System Condensing Unit

PRODUCT GENERATION
• = Current Generation

PRODUCT IDENTIFIER
CE = Condensing Section

NOMINAL COOLING CAPACITY
090 = 90 MBH (26.4 kW)
120 = 120 MBH (35.2 kW)

FACTORY INSTALLED HEAT
A = Not Applicable

VOLTAGE CODE
50 = 380/415-3-50

INSTALLATION

LIMITATIONS

These units must be installed in accordance with applicable national, local and 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 are to be installed at the dealer's and/or the customer's expense.

TABLE 1 – UNIT APPLICATION DATA

MODEL		HCE090 & 120
Voltage Variation Min./Max.	380 / 415 V	342 / 456 V
Ambient Air on Condenser Coil Min./Max.	°F	45 / 125
	°C	7 / 5
Suction Pressure at Compressor and Corresponding Temp. at Saturation Min. / max.	psig / kPa	57.5 / 403 - 90.0 / 630
	°F	32 / 54
	°C	0 / 12

Note: Refer to page 7 for refrigerant piping limitations.

LOCATION

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

1. The condensing unit is designed for outdoor installation only. The condenser fans are the propeller type and are not suitable for use with ductwork.

2. The condensing unit and the evaporator blower should be installed as close together as possible and with a minimum number of bends in the refrigerant piping. Refer to “REFRIGERANT PIPING” for additional information.

3. The condensing unit should not be installed where normal operating sounds may be objectionable. On either rooftop or ground level installations. Rubber padding can be applied between the base rails and their supports to lesson any transmission of vibration.

ROOF-TOP LOCATIONS

Be careful not to damage the roof. Consult the building contractor or architect if the roof is bonded. Choose a location with adequate structural strength to support the unit.

The condensing unit must be mounted on solid level supports. The supports can be channel iron beams or wooden beams treated to reduce deterioration.

A minimum of two (2) beams are required to support each unit. The beams should: (1) Be positioned perpendicular to the roof joists. (2) Extend beyond the dimensions of the unit to distribute the load on the roof. (3) Be capable of adequately supporting the entire unit weight. Refer to Figure 1 and Table 2 for load distribution and weights.

These beans can usually be set directly on the roof. Flashing is not required.

NOTE: On bonded roofs, check for special installation requirements.

GROUND LEVEL LOCATIONS

The units must be installed on a one-piece level concrete slab with a minimum thickness of 4 inches (100mm). The length and width should be at least 6 inches (150mm) greater than the units overall base dimensions. Refer to Figure 4.

Footers under the slab that extend below the frost line are recommended. Any strain on the refrigerant lines may cause a refrigerant leak. The slab should not be tied to the building foundation because noise and vibration will telegraph.

A unit can also be supported by concrete piers. These piers should (1) extend below the frost line, (2) be located under the unit’s four corners, and (3) be sized to carry the entire unit weight. Refer to Figure 1 and Table 2 for the center of gravity and unit weight.

CAUTION: Care should be taken to protect the unit from tampering and unauthorized persons from injury. Screws on access panels will prevent casual tampering. Additional safety precautions such as fences around the unit or locking devices on the panels may be advisable. Check local authorities for safety regulations.

Unit Size (MBH)	Dimension - in. / mm			
	A	B	C	D
090	42 3/4 / 1085	31 3/4 / 806	19 3/4 / 502	11 1/2 / 292
120	70 1/8 / 1085	32 / 813	29 1/8 / 752	16 1/2 / 419

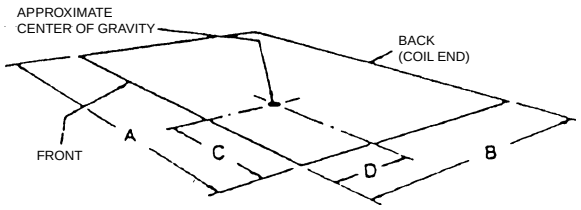


FIG. 1 – CENTER OF GRAVITY

RIGGING AND HANDLING

Exercise care when moving the unit. Do not remove any packaging unit the unit is near the place of installation.

Rig the unit by attaching nylon straps with hooks 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 if the rigging height above the top of the unit is less than 5 feet (1.5m.). See Figure 2.

WARNNIG: Do not use straps under the unit or through the fork lift slots for lifting purposes. Sharp metal edges can damage the straps and could result in personal injury or equipment damage.

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

Unit may also be moved or lifted with a forklift. Slotted opening in the base rails are provided for this purpose. The 090 MBH unit may be lifted from either the LH or RH side - under the unit.

LENGTH OF FORKS MUST BE A MINIMUM OF 42" (1060mm) for 090 MBH units or a MINIMUM OF 54 "(1372mm) for 120MBH units when lifting across the long dimension.

Remove the nesting brackets from the four corners on top of the unit. All screws that are removed to take these brackets off must be replaced on the unit.

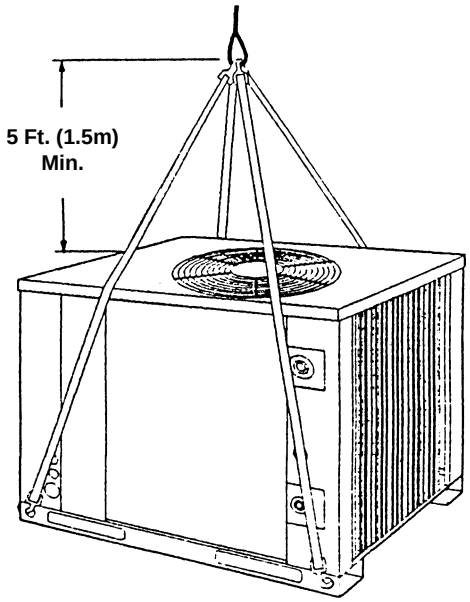


FIG. 2 – TYPICAL RIGGING (090 MBH Unit Show)

CLEARANCE

All units require certain minimum clearances for proper operation and service. Refer to Figure 4 for these clearances.

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

Additional height may be required for snow clearance if winter operation is expected.

POWER AND CONTROL WIRING

Install electrical wiring in accordance with the applicable national, local and municipal codes. The unit should be grounded in accordance with these codes.

POWER WIRING

Check the voltage of the power supply against the data on the unit nameplate. Check the size of the power wire, the disconnect switch and the fuses against the data in Table 3.

NOTE: Copper conductors must be installed between the disconnect switch and the unit.

Refer to Figure 4 for the location of the power wire access opening through the front of the unit. This opening will require a field-supplied conduit fitting.

The field-supplied disconnect switch must be suitable for an outdoor location. Although it should be installed near the unit, do NOT secure it to the unit cabinet.

Refer to Figure 3 for typical field wiring.

CONTROL WIRING

Refer to Figure 4 for the location of the control wire access opening through the front of the unit.

Route the necessary low voltage control wires from the TB1 terminal block inside of the unit control box throught this access opening to the room thermostat and to the evaporator blower motor controller. Wires # 18 AWG (1.0mm^2) should be used.

The room thermostat should be located on an inside wall approximately 56" (1420mm) above the floor where it will not be subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacture's instructions enclosed with thermostat for general installation procedure.

Refer to Figure 3 for typical fieid wiring.

COMPRESSOR

Units are shipped with compressor mountings factory-adjusted and ready for operation.

CAUTION: Do not loosen compressor mounting bolts.

COMPRESSOR CRANKCASE HEATER

The compressor is equipped with a crankcase heater to prevent refrigerant from mixing with crankcase oil during the "OFF" cycle. The heaters wil be energized when the compressor is not running providing the unit disconnect switch is closed.

CAUTION: Do not attempt to start the compressor without at least eight hours of crankcase heat or compressor damage will occur.

If a unit has just been installed or the unit disconnect switch has been open for a long period of time, move the system switch on the room thermostat to the “OFF” position before closing the unit disconnect switch. Eight hours of crankcase heat are required to drive the liquid refrigerant out of the compressor before the compressor can be started.

TABLE 2 – PHYSICAL DATA

Unit size (MBH)	Compressor (Tandem)		Condenser										Unit Weight (lbs. / kg.)		Charge. (lbs./ Kg.) (Refncerant-22)	
			Fan (Propeller)					Fan Motor[1]			Coil[3]					
	Rating (Tons / kW)	Cap. (Stages)	Qty.	Dia. (in / mm)	Nom. Airflow (CFM / m^{3}s)	Blades		Qty.	HP / kW Each	RPM Rotation[2]	Face Area (Ft^2/ M^2)	Rows High	Ship. Oper.		Holding	Oper.[4]
						Qty.	Pitch (Deg.)									
090	7.5 / 25.6	1	1	24 / 610	4036 / 2.69	3	29	1	1.0 / 0.75	920 CW	18.7/ 1.7	30	375 / 170	370 / 167	1.75 / .79	11.0 / 5.00
120	10.0 / 34.2	1	2	24 / 610	6584 / 3.58	3	27	2	0.75/0.56	920 CW	23.8 / 2.2	36	510 / 231	505 / 229	2.75 / 1.25	16.4 / 7.44

[1]These PSC motors are directly connected to the condenser fans and have inherant protection, ball bearings and a 48 frame.
[2]When viewing the shaft and of the motor.
[3]These condenser coils are 2 rows of 9.5 mm ($^3/_8$") OD copper tubes and 16 aluminum fins per 25 mm (1").

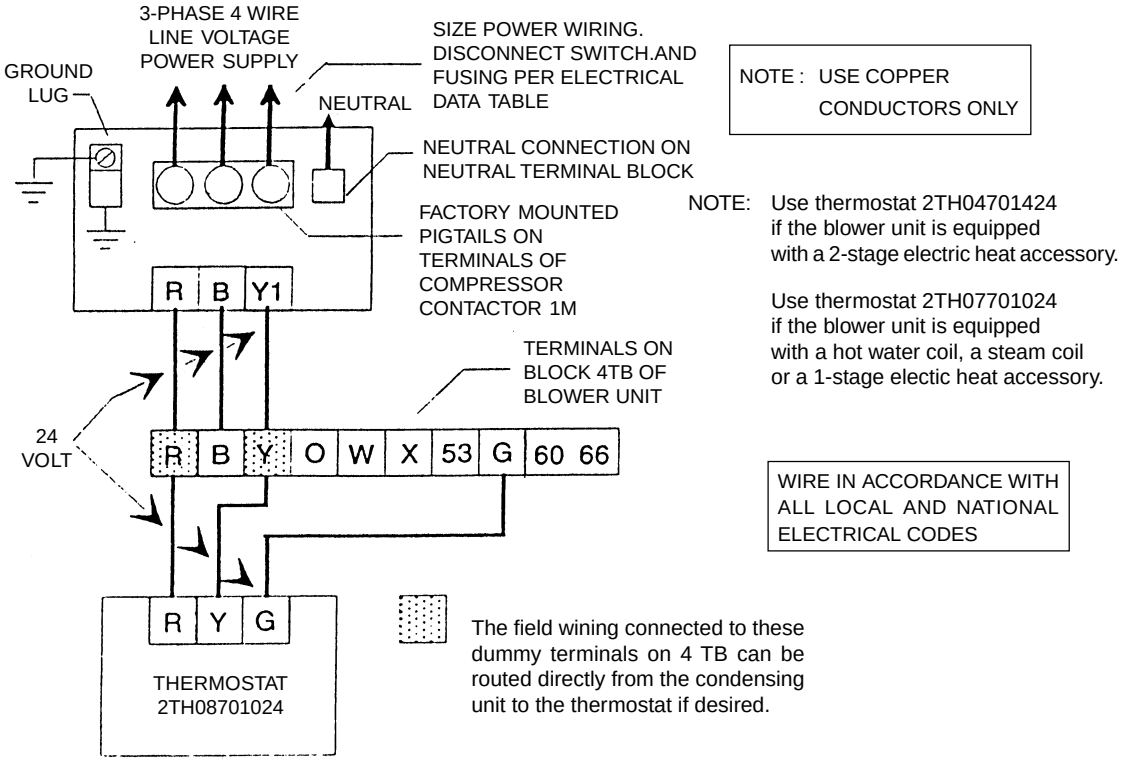
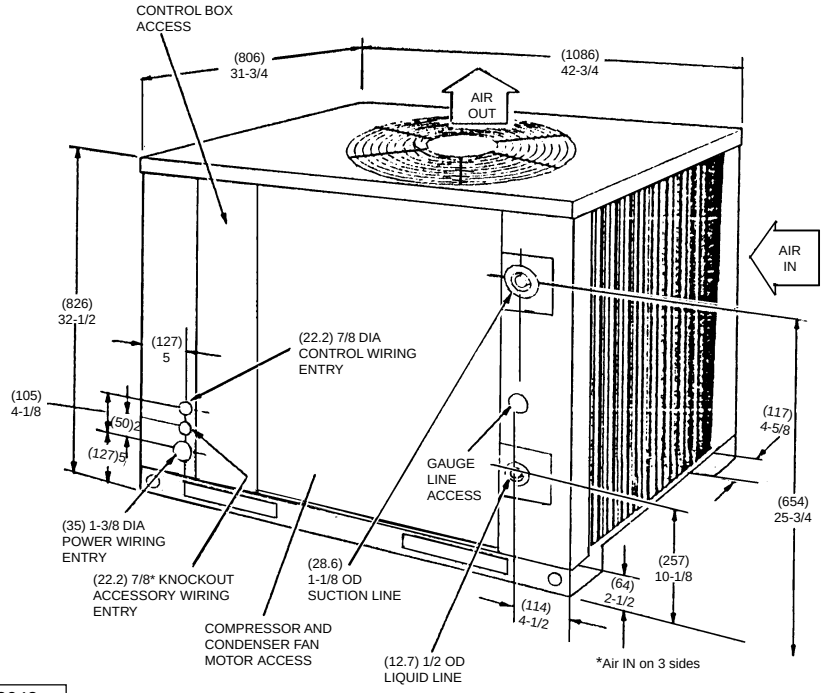


FIG. 3 – TYPICAL FIELD WIRING

TABLE 3 – ELECTRICAL DATA

Unit Size (MBH)	Compressor			Condenser Fan Motor				Total Unit Ampacity (Amps)	Max. Fuse Size[1] (Amps)
	Power Supply	RLA	LRA	Power Supply	HP (kW) Each	Qty.	FLA Each		
090	380/415-3-50	16.7	138	220/240-1-50	1 (0.75)	1	3.4	20.7	25
120	380/415-3-50	20.5	158	220/240-1-50	0.75 (0.56)	2	2.6	26.7	35

[1]Dual element.
[2]Based on three, 60°C insulated copper conductors in steel conduit.



CLEARANCES (in. / mm)

Overhead (Top)[1]	120" / 3048
Front (Piping and Access Panels)	30" / 762
Left Side	24" / 610
Right Side	24" / 610
Rear	24" / 610
Bottom[2]	0" / 0

[1]Unit must be installed outdoors. Overhanging structures or shrubs should not obstruct condenser air discharge.
[2]Adequate snow clearance must be provided if winter operation is expected.

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

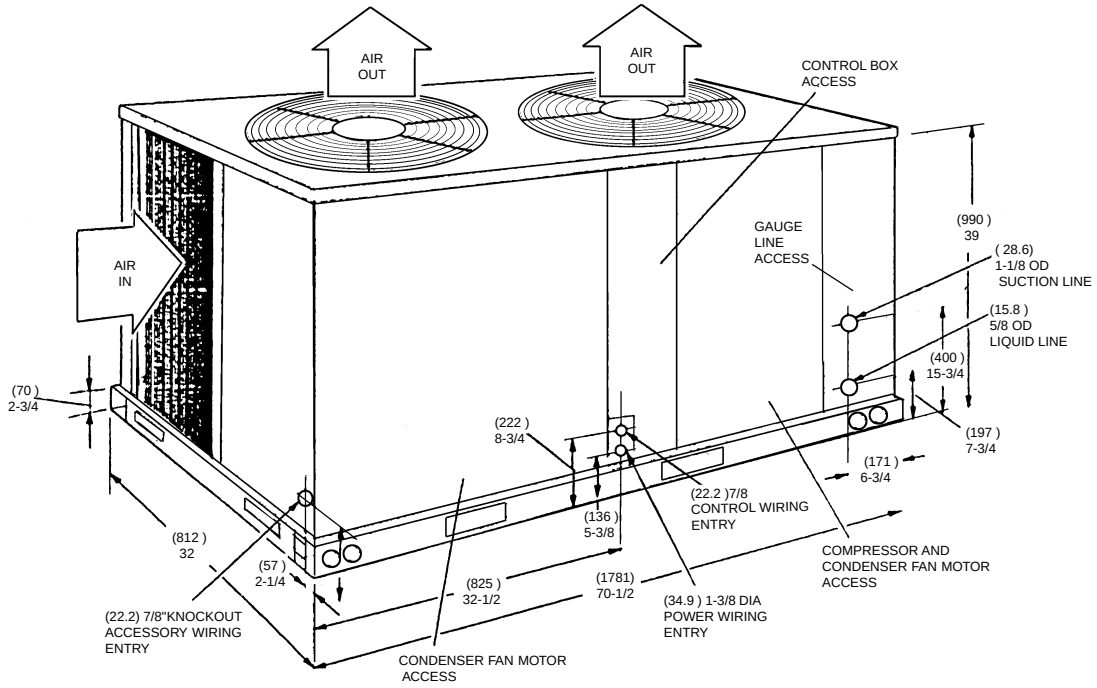


FIG. 4 – UNIT DIMENSIONS AND CLEARANCES

REFRIGERANT PIPING

GENERAL GUIDELINES

Many service problems can be avoided by taking adequate precautions to provide an internally clean and dry system and by using procedures and materials that conform with established standards.

Use hard drawn copper tubing where no appreciable amount of bending around pipes or other obstructions is necessary.
Use long radius ells wherever possible with one exception—short radius ells for the traps in all suction risers. If soft copper is used, care should be taken to avoid sharp bends which may cause a restriction.

Pack fiber glass insulation and a sealing material such as Permagum around refrigerant lines where they penetrate a wall to reduce vibrations and to retain some flexibility.

Support all refrigerant lines at minimum intervals with suitable hangers, brackets or clamps.

Braze all copper to copper joints with Silfos-5 or equivalent brazing material. **Do not use soft solder.**

Insulate all suction lines with a minimum of 1/2" (12mm) ARMAFLEX or equal. Liquid lines exposed to direct sunlight and/or high temperatures must also be insulated.

Never solder suction and liquid lines together. They can be taped together for convenience and support purposes, but they must be completely insulated from each other.

A filter-drier MUST be installed in the liquid line of every system to prevent dirt and moisture from damaging the system. A properly- sized filter-drier is shipped with each condensing unit for field installation near the evaporator coil. The pressure drop across each of these filter- driers is approximately 2 psig (14 kPa) at the nominal capacity of the unit.

NOTE: Installing a filter-drier does not eliminate the need for the proper evacuation of a system before it is charged.

A moisture indicating sight glass is also shipped with each condensing unit for field installation in the liquid line between the filter-drier and the evaporator coil.

Both the filter-drier and the sight glass are taped to the top of the compressor.

LINE SIZING

When sizing refrigerant lines for a split-system air conditioner, check the following:

1. Suction line pressure drop due to friction,
2. Liquid line pressure drop due to friction,
3. Suction line velocity for oil return, and
4. Liquid line pressure drop due to static head.

NOTE: Never base refrigerant line sizes on the OD of the suction and liquid connections on the unit.

Tables 4 and 5 list friction losses for both the suction and liquid lines on the system. Table 6 shows the amount of refrigerant charge required per foot of refrigerant line.

When the evaporator coil is below the condensing unit. The suction line must be sized for both pressure drop and for oil retum. For certain piping arrangements, different suction line sizes may have to be used. The velocity of the suction gas must always be great enough to carry oil back to the compressor.

When the condensing unit is below the evaporator coil, the liquid line must be designed for the pressure drop due to both friction loss and vertical rise. It the total pressure drop exceeds 40 psig (278 kPa), some refrigerant may flash before it reaches the thermal expansion valve. This flashing will not only cause erratic valve operation and poor system performance, but could also damage the expansion valve.

SERVICE VALVES

These condensing units have service valves on both the compressor suction connection and the liquid line leaving the condenser coil.

The liquid and suction line service valves are shipped from the factory front-seated and closed with the valve stem in the maximum clockwise position.

Both of the service valves have a 1/4" (6mm) male flare access port for evacuating, charging and pressure checking the system.

WARNING: Never remove a cap from an access port unless the valve is fully back-seated with its valve stem in the maximum counter-clockwise position because the refrigerant charge will be lost. ALWAYS USE A REFRIGERATION VALVE WRENCH TO OPEN AND CLOSE THESE SERVICE VALVES.

TABLE 4 – SUCTION LINES [1,2]

Unit Size (MBH)	Refrigerant Flow Rate[3] (lbs./ kg. per min.)	Type L Copper Tubing (in. / mm O.D.)	Refrigerant Gas Velocity (ft. / m per min.)	Friction Loss [4,5]	
				(PSI/100 Ft.)	(kPa / 30.5m)
090	22.5 /10.2	1-1/8 / 28.5 1-3/8 / 35.0 1-5/8 / 41.3	2450 / 745 1680 / 511 1140 / 346	4.3 1.6 0.7	30 11 5
120	30.0 / 13.6	1-1/8 / 28.5 1-3/8 / 35.0 1-5/8 / 41.3	3500 / 1064 2280 / 693 1560 / 474	8.0 2.8 1.2	56 20 8

[1] All horizontal suction lines should be pitched at least 1 inch (25 mm) every 20 feet (6m) in the direction of the refrigerant flow to aid the return of oil to the compressor.
[2] Every vertical suction riser greater than 3 feet (1m) in height should have a “P” trap at the bottom to facilitate the return of oil to the compressor. Use short radius fittings for these traps
[3] Based on Refrigerant-22 at the nominal capacity of the condensing unit, a suction temperature of 40°F (5°C) and a liquid temperature of 105°F (40°C).
[4] Although suction lines should be sized for a friction loss equivalent to a 2°F (1.1°C) change in saturation temperature (or approximately 3 psi (21 kPal), sizing the lines for the proper return of oil is more important.
[5] These friction losses de not include any allowances for valves or fittings.

TABLE 5 – LIQUID LINES

Unit Size (MBH)	Refrigerant Flow Rate[1] (lbs./ kg. per min.)	Type L Copper Tubing (in. / mm O.D.)	Refrigerant Gas Velocity (ft. / m per min.)	Pressure Drop [3]			
				Friction[2]		Vertical Rise	
				(PSI/100 Ft.)	(kPa / 30.5m)	(PSI/Ft.)	(kPa / 30.5m)
090	22.5 /10.2	1/2 / 12.7 5/8 / 15.8	300 / 91 190 / 58	11.0 3.5	77 22	0.5	3.5
120	30.0 / 13.6	5/8 15.8 3/4 / 19.0	250 / 76 170 / 52	5.8 2.3	40 16	0.5	3.5

[1] Based on Refrigerant-22 at the nominal capacity of the condensing unit, a liquid temperature of 105 °F (40°C) and a suction temperature of 40°F (5°C).
[2] These friction losses de not include any allowances for a strainer, filter-drier, solenoid valve, isotation valves or fittings.
[3] The tatal pressure drop of the liquid line for both friction and vertical rise must not exceed 40 PSI(278 kPa). If the pressure drop exceeds 40 PSI (278 kPa) the liquid refrigerant could flash before it reaches the expansion valve. This flashing will not only cause erratic valve operation and poor system performance but could also damage the expension valve.

TABLE 6 – REFRIGERANT-22 LINE CHARGE[1]

Refrigerant Circuit	Outside Diameter (in. / mm)	Line Charge (lbs. / ft. -kg / m)
Liquid Line[2]	1/2 / 13 5/8 / 16 3/4 / 19	1/2 / 13 5/8 / 16 3/4 / 19
Suction Line[2]	1-1/8 / 29 1-3/8 / 35 1-5/8 / 41	1-1/8 / 29 1-3/8 / 35 1-5/8 / 41

NOTE: Add the operating charge of the condensing unit, the evaporator coil and the refrigerant lines to detemine the total refrigerant charge of the system

[1] Charges are based on 40°F (5°C) suction temperature and a 105 °F (40°C) liquid temperature
[2] Type “L” copper tubing

TABLE 7 – COOLING CAPACITIES AND POWER REQUIREMENTS - w/Fahrenheit Temperature Values

Unit Size (MBH)	Suction press. & Corresponding Temp. @ Saturation		Temperature of air on Condenser Coil °F											
			65		75		85		95		105		115	
	PSIG	°F	MBH	KW*	MBH	KW*	MBH	KW*	MBH	KW*	MBH	KW*	MBH	KW*
090	54.9	6	102	6.6	98	6.9	94	7.3	89	7.6	85	7.9	81	8.1
	61.6	35	112	6.9	107	7.2	102	7.6	98	7.9	93	8.3	88	8.6
	68.5	40	121	7.1	116	7.5	112	7.9	106	8.3	102	8.7	97	9.0
	76.0	45	131	7.4	126	7.8	121	8.2	116	8.6	110	9.1	106	9.4
	84.0	50	141	7.6	136	8.1	131	8.6	125	9.1	120	9.5	114	10.0
120	54.9	30	140	8.4	135	8.8	129	9.3	123	9.8	116	10.1	110	10.6
	61.6	35	153	8.6	147	9.1	141	9.6	135	10.1	129	10.6	122	11.1
	68.5	40	166	8.9	160	9.4	154	10.0	147	10.5	141	11.0	134	11.6
	76.0	45	180	9.1	173	9.7	167	10.3	160	10.9	154	11.5	147	12.1
	84.0	50	193	9.4	187	10.0	180	10.7	173	11.4	166	12.0	160	12.6

*Includes compressor and condenser fan motor (s)

TABLE 8 – COOLING CAPACITIES AND POWER REQUIREMENTS - w/Celcius Temperature Values

Unit Size (MBH)	Suction press. & Corresponding Temp. @ Saturation		Temperature of air on Condenser Coil °F											
			20		25		30		35		40		45	
	kPa	°C	kw (Thermal)	kw* (Input)	kw (Thermal)	kw* (Input)	kw (Thermal)	kw* (Input)	kw (Thermal)	kw* (Input)	kw (Thermal)	kw* (Input)	kw (Thermal)	kw* (Input)
090	365	-2	29	6.6	28	6.9	27	7.2	25	7.5	24	7.7	23	7.9
	413	1	32	6.9	31	7.2	29	7.5	28	7.5	27	8.1	26	8.4
	465	4	35	7.2	33	7.5	32	7.9	31	8.2	29	8.6	28	8.8
	520	7	38	7.5	36	7.9	35	8.2	34	8.6	32	9.0	31	9.3
	580	10	41	7.8	39	8.2	38	8.6	37	9.1	35	9.5	34	9.9
120	365	-2	40	8.4	38	8.8	36	9.2	35	9.6	33	10.0	32	10.4
	413	1	43	8.7	42	9.1	40	9.6	39	10.0	37	10.5	35	10.9
	465	4	47	9.0	46	9.5	44	10.0	43	10.5	41	10.9	39	11.4
	520	7	52	9.3	50	9.8	48	10.4	47	10.9	45	11.4	43	11.9
	580	10	56	9.6	54	10.2	53	10.7	51	11.4	49	12.0	47	12.5

*These input values include compressor and condenser fan motor (s)

INSTALLATION

Since the condensing units are shipped with a holding charge of refrigerant-22, they can be checked for a refrigerant leak by opening the access port on the liquid line service valve as follows:

1. Open the valve by turning the stem to its maximum counterclockwise position.

2. Remove the cap from the access port.

WARNING: Provisions for recovering refrigerant releases must be available during all phases of installation leak testing and charging. DO NOT release refrigerant into the atmosphere.

3. Turn the stem in (or clockwise) between 1/4 and 1/2 turn to open the access port.

As soon as some internal pressure is relieved close the access port. DO NOT release the entire holding charge.

If the unit has already lost its holding charge. It should be leak tested and the necessary repairs should be made. If the unit has maintained its holding charge. You can assume that it has no leaks and proceed with the installation.

CAUTION: Dry nitrogen should always be supplied through a connection while it is being brazed or unbrazed because the temperature required to make or break a brazed joint is sufficiently high to cause oxidation of the copper unless an inert atmosphere is provided. The flow of nitrogen should be continued until the joint has cooled.

WARNING: The dry nitrogen should always be supplied through a pressure regulating valve.

On 090 MBH models only, remove the 4-1/2" (114 mm) square patch plates from the piping access panel on the front of the unit to expose the refrigerant connections.

Before installing the liquid line between the condensing unit and the evaporator coil, prepare as follows:

1. Burnish the external surfaces of the liquid connection on the condensing unit and the end of the field-supplied piping for the liquid line.

NOTE: Clean surfaces are essential for a well-brazed connection.

2. Carefully clean the internal surfaces of the above. Any particles left on these surfaces may lead to a future system malfunction.

NOTE: Use only copper tubing that has been especially cleaned and dehydrated for refrigerant use. If the tubing has been open for an extended period of time, it should be cleaned before being used.

The liquid line connections can now be brazed while maintaining a minimum flow of dry nitrogen through the piping as follows:

1. Remove the cap from the 1/4" (6mm) access port on the liquid line service valve.

2. Connect a supply of dry nitrogen to this access port.

NOTE: The filter-drier and the moisture indicating sight glass should be installed in the liquid line as close to the evaporator coil as possible.

Do not allow the filter-drier to be exposed to the atmosphere for an extended period of time. Once it absorbs

Moisture from the atmosphere, it loses its effectiveness.

Recover the holding charge in the evaporator coil and then remove the sealing caps or discs from both the liquid and suction connections on the evaporator coil per the following procedure:

1. Make sure the refrigerant in the lines has been recovered, then drill a small hole through both the liquid disc and the suction disc. If the holding charge has already been lost, the coil should be leak-tested and the necessary repairs should be made.

2. Move the dry nitrogen supply from the access port on the liquid line service valve of the condensing unit to the hole through the suction disc on the evaporator coil.

3. Unbraze the coil's liquid line disc while maintaining a flow of dry nitrogen across the connection and through the hole in the liquid line disc.

   NOTE: If the liquid line has a solenoid valve, the valve should be opened manually to permit the nitrogen to flow freely.

4. After the disc has been removed, burnish the external surfaces and clean the internal surfaces as outlined above.

5. Move the dry nitrogen supply back to the access port on the liquid line service valve,

6. Braze the liquid line to the liquid connection on the evaporator coil while maintaining a minimum flow of dry nitrogen through the liquid line, the evaporator coil and the hole in the suction disc.

7. Unbraze the disc on the suction connection of the evaporator coil while maintaining the flow of dry nitrogen

8. After the disc has been removed, burnish the external surfaces and clean the internal surfaces as outlined above.

The suction piping can now be brazed to the suction connection on the evaporator coil while maintaining a minimum flow of dry nitrogen

Before brazing the suction line to the condensing unit:

1. Move the dry nitrogen supply to the access port on the suction service valve of the condensing unit.

2. Burnish the external surfaces and clean the internal surfaces of both the suction connection and the suction piping.

The suction line can now be brazed to the suction connection on the condensing unit while maintaining the flow of dry nitrogen.

After the liquid and suction lines have been installed, the system should be evacuated and charged.

EXTENDING THE SERVICE PORTS

1. Loosen the screws securing the service ports in shipping position. (See FIG 5).

2. Push the service ports through the corner post.

3. Tighten the screws to secure the service ports for installation.

EVACUATION AND CHARGING

With the liquid and suction line service valves closed, connect a vacuum pump through a charging manifold to the access ports on both the liquid and suction line service valves.

NOTE: The vacuum pump connection should be short and no smaller than 3/8" (9.5 mm) O. D.

The refrigerant lines and the evaporator coil can now be evacuated to 500 microns without disturbing the condenser coil or the compressor.

After proper evacuation and dehydration, charge liquid refrigerant through the access port on the liquid line service valve.

CAUTION: Do not charge liquid refrigerant through the compressor suction connection.

If the required amount of refrigerant cannot be added in this manner, open the liquid and the suction line service valves fully. Turn the stem of the liquid service valve clockwise 1/4 turn to open its access port for reading pressure.

Start the compressor (after 8 hours of crankcase heat) and continue to charge refrigerant gas through the access portt on the suction service valve until the moisture indicating sight glass is clear. Add approximately 1 extra pound (.50 kg) of refrigerant to assure a liquid refrigerant seal at the expansion valve under all operating conditions.

If necessary, block the flow of condenser air to assure a head pressure of approximately 280 psig (1950 kPa) during the charging operation.

Open the liquid service valve fully to close its access port after the system is charged.

CAUTION: Never operate the compressor while under a deep vacuum.

DO NOT ATTEMPT TO START THE COMPRESSOR WITHOUT AT LEAST 8 HOURS OF CRANKCASE HEAT OR COMPRESSOR DAMAGE WILL OCCUR.

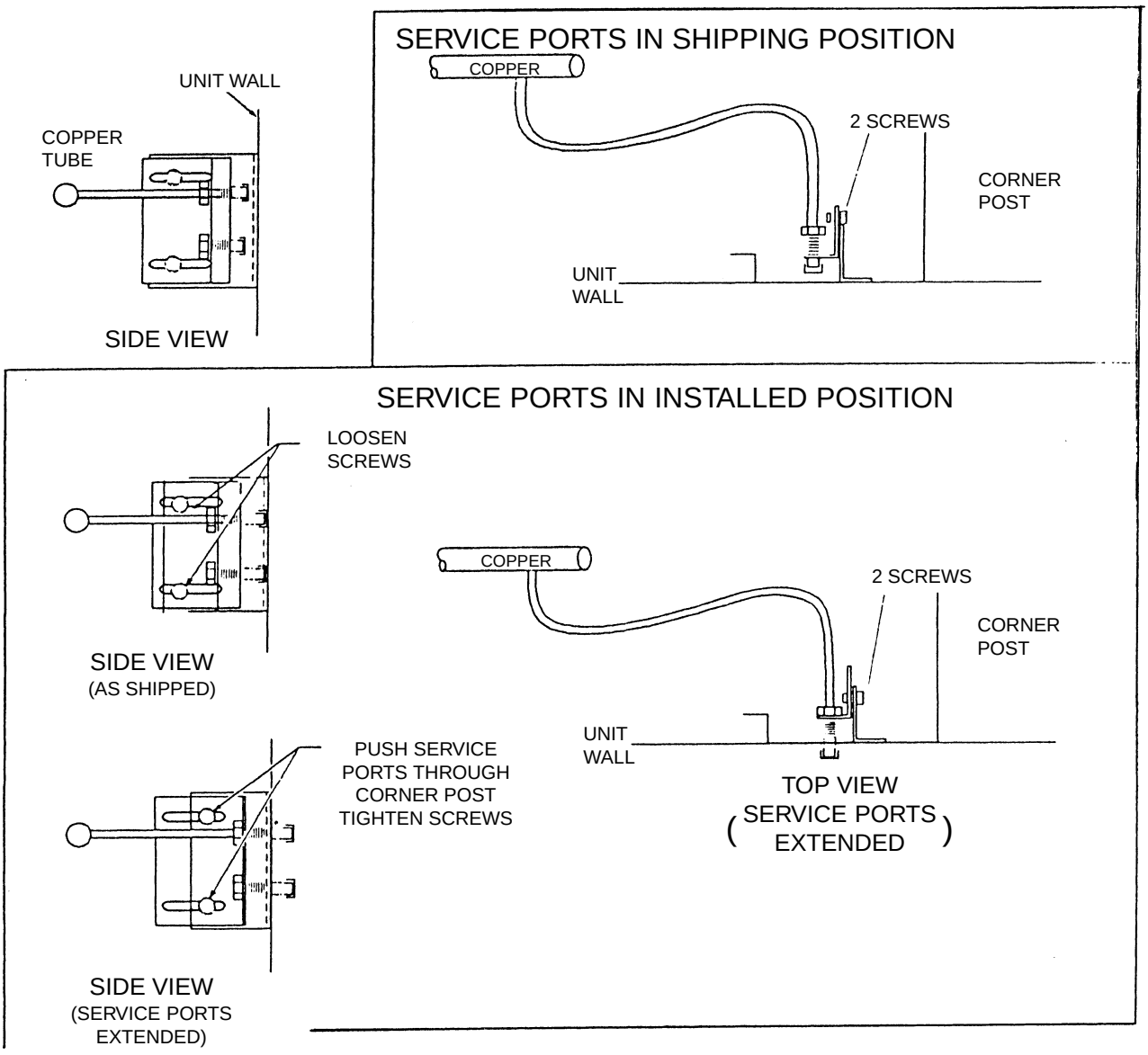


FIG. 5 – EXTENDING THE SERVICE PORTS

START-UP

CRANKCASE HEATER

The crankcase heaters must be energized at least 8 hours before starting the compressor. To energize the crankcase heaters, the main disconnect switch must be closed. During this 8 hour period, the system switch on the room thermostat must be "OFF" to prevent the compressor from starting.

CAUTION: DO NOT ATTEMPT TO START THE COMPRESSOR WITHOUT AT LEAST 8 HOURS OF CRANKCASE HEAT OR COMPRESSOR DAMAGE WILL OCCUR.

Make sure that the bottom of the compressor is warn to the touch to prove crankcase heater operation.

PRE-START CHECK

Before starting the unit, complete the following check list:

1. Have sufficient clearances been provided?
2. Has all foreign matter been removed from the interior of the unit (tools, construction or shipping materials, etc.)?
3. Have the condenser fans been rotated manually to check for free rotation?
4. Are all wiring connections tight?
5. Does the available power supply agree with the nameplate data on the unit?
6. Is the control circuit transformer set for the proper voltage?
7. Have the fuses, disconnect switch and power wire been sized properly?
8. Are all compressor hold-down nuts properly secured?
9. Are any refrigerant lines touching each other or any sheet metal surface? Rubbing due to vibration could cause a refrigerant leak.
10. Are there any visible signs of a refrigerant leak, such as oil residue?
11. Is any electrical wire laying against hot refrigerant line?

INITIAL START-UP

1. Supply power to the unit through the disconnect switch at least 8 hours prior to starting the compressor.
2. Move the system switch on the thermostat to the AUTO or COOL position.
3. Reduce the setting of the room thermostat to energize the compressor.
4. Check the operation of the evaporator unit per the manufacturer's recommendations.
5. With an ammeter, check the compressor amps against the unit data plate.
6. Check for refrigerant leaks.
7. Check for any abnormal noises and/or vibrations, and make the necessary adjustments to correct (e.g. fan blade (s) touching shroud, refrigerant lines hitting on sheet metal, etc.)
8. After the unit has been operating for several minutes, shut off the main power supply at the disconnect switch and inspect all factory wiring connections and bolted surfaces for tightness.

OPERATION

UNIT OPERATION-090 & 120 MBH

When the external control calls for cooling at terminal Y1:

1. The system controller (SC) is energized. The system controller starts the tandem compressors and enables the condenser fans by energizing contactor 1 M.

   The single condenser fan is energized with the compressors on the 7-1/2 ton models.

   Condenser fan motor # 1 is energized with the compressors on the 10 and 12-1/2 ton models while fan #2 is enabled with compressor operation. Fan motor #2 operation is controlled through the Ambient Temperature Switch (ATS) which will deenergize the motor when the ambient temperature falls below70°F.

2. Safety Lockout: The system controller (SC) has a lockout circuit to prevent compressor short-cycling on a safety control with automatic reset. If the high or low refrigerant pressure switches (HP or LP) open, the SC will enter lockout mode.

   SC provides a 90 second bypass of the low pressure switch LP to prevent nuisance lockouts during unit start-up.

   A malfunction light (24V. 2 A max. resistive load) can be energized through SC. by connection the light between terminals X and B on TB1. Terminal X willenergize when SC locks out.

NOTE: To reset the unit after a lockout:

A. Turn the system switch on the thermostat to the "OFF" position and back to the "COOL" position.

OR

B. Increase the set point of the room thermostat above the temperature in the conditioned space and return it to its original setting.

It the unit continues to be shut down by one of its safety controls, service should be called to determine the cause of the problem. Repeated resetting of the lockout circuit may damage the unit.

The following accessories are available to provide low ambient operation to 0°F.

SAFETY FEATURES

1. All condenser fan motors have inherent protection with automatic reset.

2. Every compressor is internally protected against over current, excessive temperature and primary single phasing.

   This protection is provided by a line break motor protector that is mounted inside the compressor housing and is connected between each winding and the common terminal.

3. Every compressor is protected by crankcase heaters to prevent refrigerant from accumulating in the crankcases of the compressor during an "OFF" cycle.

CAUTION:
DO NOT ATTEMPT TO START THE COMPRESSOR WITHOUT AT LEAST 8 HOURS OF CRANKCASE HEAT OR COMPRESSOR DAMAGE WILL OCCUR.

4. All condenser fan motors and the secondary of every transformer is grounded.

5. Every unit is protected by both a high and a low pressure control, and these controls are self- contained. Since they are mounted directly on the access connections and wired back to the control panel, there are no capillary lines to be damaged.

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

CLEANING CONDENSER SURFACE

Dirt should not be allowed to accumulate on the condenser coils or other parts in the condenser air circuit. Clean as often as necessary with a brush, vacuum cleaner attachment or other suitable means.

LUBRICATION

The fan motors for these condensing units are equipped with factory lubricated and sealed ball bearings. They do not require any maintenance.

COMPRESSOR REPLACEMENT

Contact the local York Sales Office for compressor or parts.