

AIR-COOLED CONDENSING UNIT

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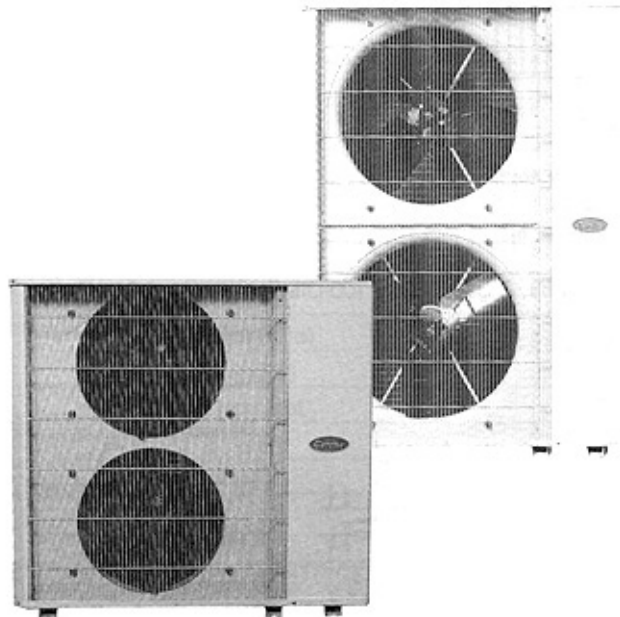


FIG. 1 38HDS085-120

SAFETY CONSIDERATIONS

Installation and servicing of air conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair or service air conditioning equipment. Observe precautions in the literature, tags and labels attached to the unit and other safety codes.

Wear safety glasses and gloves. Use quenching cloth and have fire extinguisher available for all brazing operations.

RECEIVING

38HDS condensing units (Fig. 1) are shipped individually packed in carton boxes. When cartons are individually off loaded from truck, do not roll, nor throw, or drop the carton, to avoid damages to the content. Store boxes upright as the symbols or the boxes indicate. Do not stack units more than 2 high.

INSPECTION

Check the shipment received against the shipping list to make sure that shipment is complete. Remove the unit from the carton and take off protective covering. If the unit has been damaged in transit, file a claim with the transportation company.

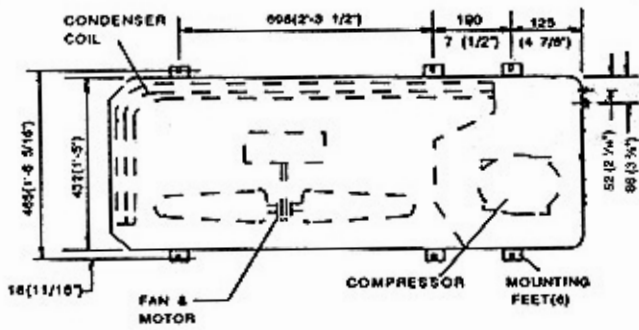
PROTECTION

Protect unit from damage caused by job site debris. Do not allow dust and debris from being deposited on coil, fins, motor or other unit interior surfaces, unit efficiency will reduce.

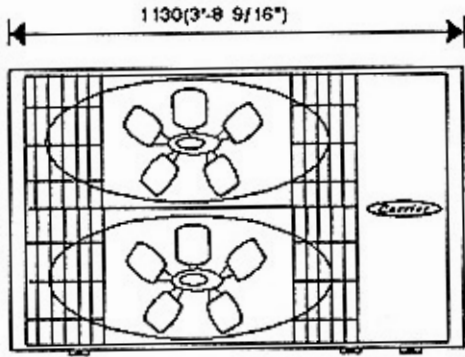
WARNING

Before installing or servicing system always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Electrical shock can cause personal injury.





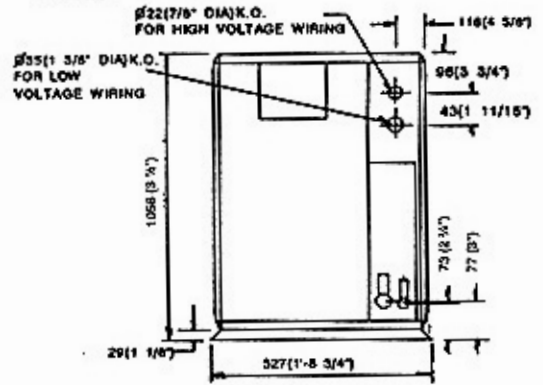
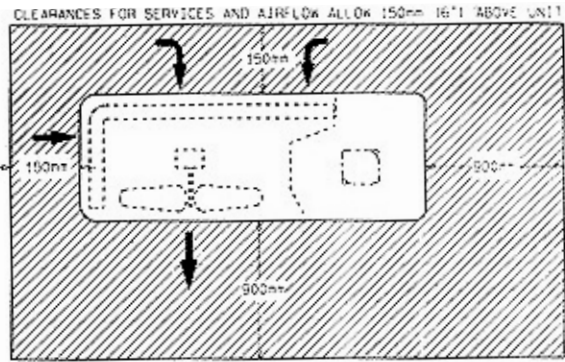
TOP VIEW



FRONT VIEW

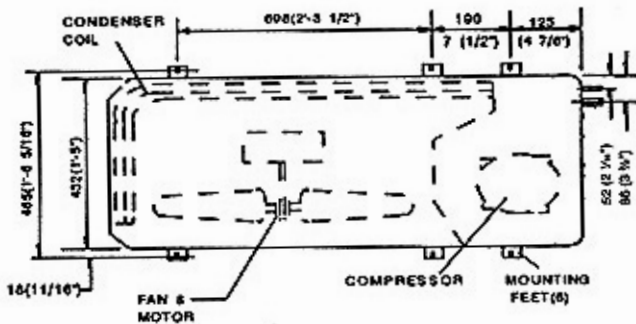
NOTES:

1. DIMENSIONS IN () ARE IN FEET-INCH
2. AIR DIRECTION →
3. FOOT-PRINT 0.56m (6.02 sq ft)

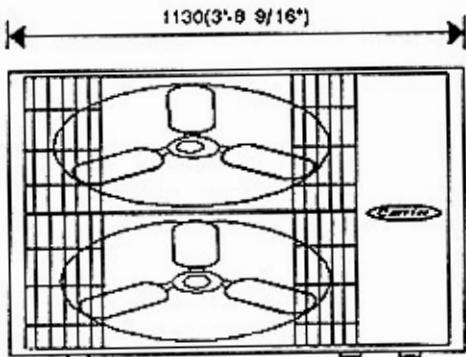


RIGHT SIDE VIEW

FIG. 2 38HDS085-100 DIMENSIONAL DRAWING



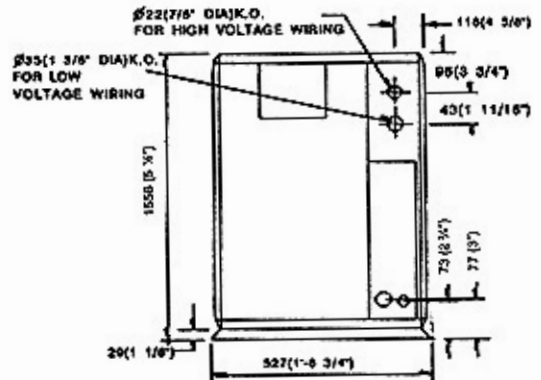
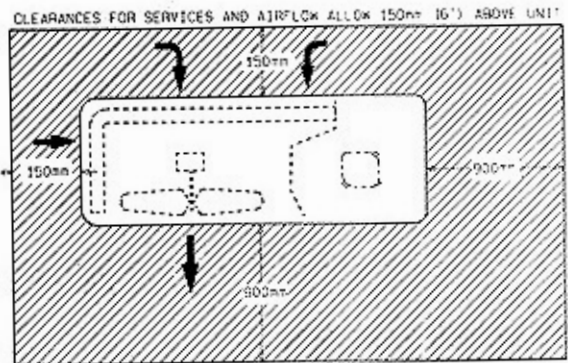
TOP VIEW



FRONT VIEW

NOTES:

1. DIMENSIONS IN () ARE IN FEET-INCH
2. AIR DIRECTION →
3. FOOT-PRINT 0.56m (6.02 sq ft)



RIGHT SIDE VIEW

FIG. 3 38HDS120 DIMENSIONAL DRAWING

TABLE 1 SPECIFICATIONS

MODEL		38HDS		
		085	100	120
OPERATING WEIGHT	(kg)	156	156	174
REFRIGERANT	Type	R-22		
	Factory Charged (kg)	1.0	1.0	1.0
COMPRESSORS	Type	Hermetic		
	Oil Charged (l)	3.12	3.12	3.12
	LRA (A) Nominal	96.5	143.0	135.0
	Running Amps (A)*	15.4	20.3	20.4
	Power Supply	400-3-50/60		
CRANKCASE HEATER	(W)	70	70	70
CONDENSER FAN	Type	Propeller		
	Number	2		
	BladeDia. (mm)	457	610	
FAN MOTOR	Speed (rpm)	907	710	
	Drive	Direct Drive		
	Type	Permanent Split Capacitor		
	Power Supply	230-1-50		
	Running Amps (A)*	2 x 1.28	2 x 1.24	2 x 1.29
CONDENSER COIL	Rows - Fins/m	3 - 591		
	Face Area (m ²)	1.26	1.26	1.88
CONNECTIONS	Type	Sweat		
	Liquid, (mm)	12.7	15.88	
	Suction, (mm)	28.58		
CONTROLS PRESSURESTAT SETTINGS	High Cut Out (kPa)	2940 ± 50		
	Cut In (kPa)	2210 ± 140		
	Low Cut Out (kPa)	50 ± 20		
	Cut In (kPa)	150 ± 20		
POWER SOURCE	(V-Ph-Hz) Nominal	400 - 3 - 50		
ABSOLUTE MIN. VOLTAGE	(V)	342		
ABSOLUTE MAX. VOLTAGE	(V)	462		

LRA : Locked Rotor Amps

* Data rated to JIS standard at 35°C (95°F) Ambient, 26.7°C/19.4°C(80°F/67°F) Indoor Condition, Condenser Unit Running Amps At Maximum Capacity Test

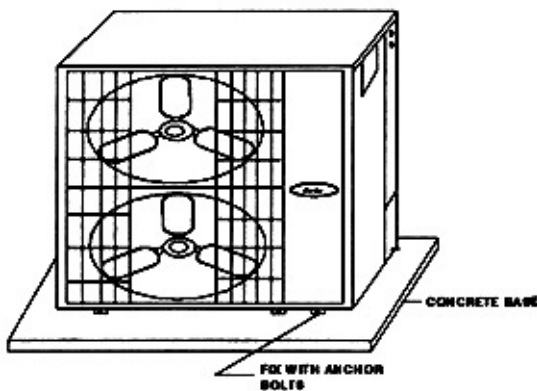


FIG. 4 GROUND MOUNTING

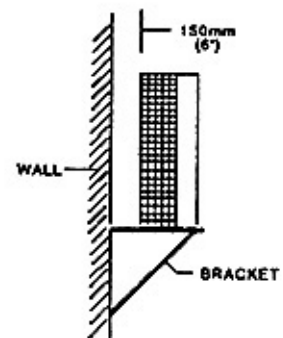


FIG. 5 WALL MOUNTING

INSTALLATION

SELECTION OF MOUNTING POSITION

- 1) The unit should be installed outdoors.
- 2) A place where air will not be stagnant.
- 3) A place where the exhausted air will not be recirculated in for the second time.
- 4) Allow sufficient space for airflow clearance, wiring, refrigerant piping and servicing unit. See Fig. 2 & 3.
- 5) Avoid positioning unit in such a manner that water will pour directly onto the unit.
- 6) Do not install the unit near a source of heat, steam or flammable gas.
- 7) Ducting of the fan inlet or discharge is not permitted.

UNIT MOUNTING

1) MOUNTING ON GROUND: Mount on a solid, level concrete base. If conditions or local building codes require unit to be fastened to base, tie down bolts should be used and fastened through slots provided in unit's mounting feet. (Fig. 4). Do not install unit directly on ground.

2) MOUNTING ON WALL: The bracket is to be locally procured (Fig. 5) and with orientation as per Fig. 2 or Fig. 3.

3) MOUNTING ON ROOF - Mount on a level platform or frame. When multiple unit are installed, the air outlet side should be opened as shown in Fig. 6. When installation base is used, secure the following space as per (Fig. 7). Manufacture the stand so that it will have sufficient strength.

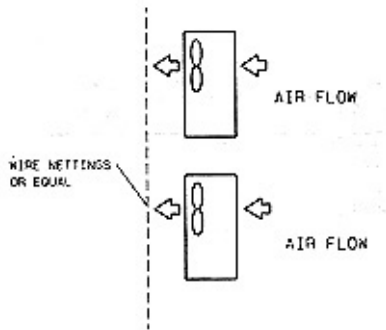


FIG. 6 ROOF MOUNTING

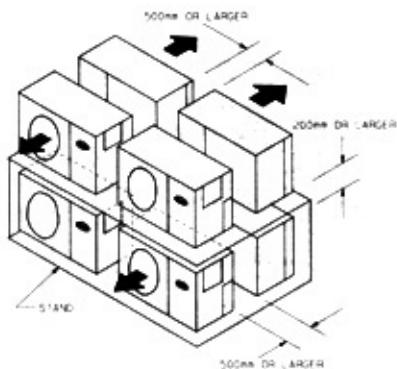


FIG. 7 MINIMUM SPACING REQUIREMENT

REFRIGERANT PIPING

Size Refrigerant Lines. Consider length of piping required between condensing unit and evaporator, amount of liquid lift and compressor oil return (Table 3).

Run refrigerant tubes as directly as possible, avoiding unnecessary turns and bends. Condensing unit may be connected to evaporator sections using field-supplied tubing of refrigerant grade, correct size and condition. Suspend refrigerant tubes so they do not transmit vibration to structure. Also when passing refrigerant tubes through walls, seal opening so vibration is not transmitted to structure. Leave some slack in refrigerant tubes between structure and unit to absorb vibration. The longer the piping, the lower the cooling capacity of the air cooled condensing unit. See table 2.

TABLE 2 - REDUCTION IN CAPACITY VS INCREASE IN PIPE LENGTH

MODEL	PIPING LENGTH (ONE WAY)							
	5m	10m	15m	20m	25m	30m	35m	40m
38HDS								
085	0%	1.7%	2.5%	3.3%	4.3%	5.0%	5.8%	6.6%
100	0%	2.2%	3.3%	4.3%	5.4%	6.5%	7.6%	8.7%
120	0%	3.1%	4.7%	6.3%	7.8%	9.4%	11.0%	12.5%

As such the following are the operating limits. Refer to Table 3 and Fig. 8.

TABLE 3 - VERTICAL AND HORIZONTAL SEPARATION BETWEEN INDOOR AND OUTDOOR UNIT

MODEL	MAX. HEIGHT, H(m)	MAX. LENGTH, L(m)	LIQUID LINE	
			MAX. ALLOWABLE PRESSURE DROP (kPa)	MAX. ALLOWABLE TEMPERATURE LOSS (°C)
085	30(15)	40	151	5
100	30(15)	40		
120	30(15)	40		

- Note: 1) Values shown are for units operating at 7.2°C saturated suction and 35°C entering air.
 2) Values in () indicate a case when the outdoor unit is located at a lower height than the indoor unit.

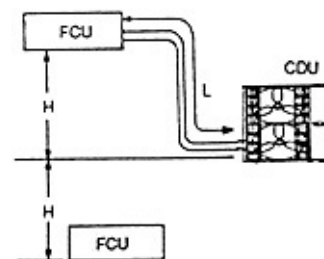


FIG 8 MAXIMUM ALLOWABLE PIPING LENGTH AND ELEVATION DIFFERENCE

Do not bury any section of line set underground. If any section is buried, refrigerant may migrate to cooler buried section during extended periods of unit shutdown. This causes refrigerant slugging and possible compressor damage at start-up.

If either refrigerant tubing or indoor coil is exposed to atmospheric conditions for longer than 5 minutes, it must be evacuated to 1000 microns to eliminate contamination and moisture in the system.

FILTER DRIER

Filter drier is field supplied and must be field installed. **Warranty will be void if filter drier is not field installed.**

PIPING CONNECTIONS

Complete all installation and piping work required for indoor and outdoor units. If brazing is required pass nitrogen or other inert gas through piping to prevent formation of copper oxide. Unit contains R-22 holding charge do not open Schraeder valve at this time. Allow minimal time between releasing charge can be released through suction line Schraeder valve. Leak test field piping by pressure method. Use R-22 at approximately 170kPa backed up with dry nitrogen to a total pressure not to exceed 1690kPa.

PIPING INSULATION

No refrigerant control device is shipped with the unit. It is to be field supplied & installed. Insulate suction line adequately (Fig. 9).

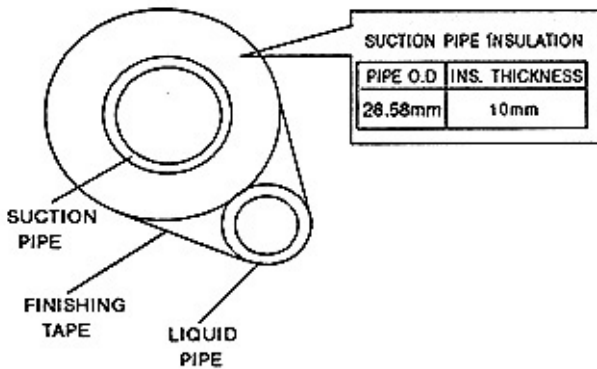


FIG. 9 PIPING INSULATION

COMPLETE ELECTRICAL CONNECTIONS

CAUTION

THE CONTROL VOLTAGE FROM THE FAN COIL UNIT MUST BE OF 230V. DO NOT CONNECT THE POWER SUPPLY TO THE SIGNAL.

POWER - Unit is factory wired for voltage shown on name plate. Provide adequate fused disconnect switch within sight of unit, readily accessible, but out of reach of children.

Provision for locking switch open (off) is advisable to prevent power from being turned on while unit is being serviced.

Route power wires through opening in unit side panel and connect in unit control box (Fig. 10). Unit must be grounded.

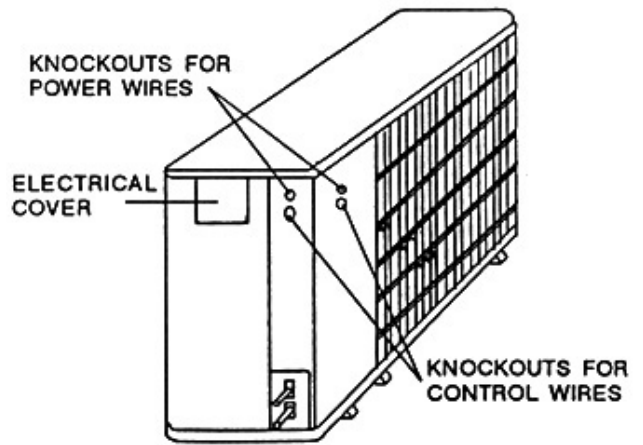


FIG. 10 POWER WIRES TO THE SIDE OF UNIT

CONTROL CIRCUIT WIRING

Refer to wiring diagram for field supplied wiring details. (Fig.13 & 14).

Note:- Operation of unit on improper line voltage constitutes abuse and could void Carrier Warranty. Do not install unit in system where voltage may fluctuate above or below permissible limits.

START-UP

PRELIMINARY CHECKS:

- 1) Check that all internal wiring connections are tight and that crankcase heater is properly installed.
- 2) Field electrical power source must agree with unit name plate rating.
- 3) All covers, barriers, and panels should be in place.

INITIAL CHARGE

1. Have charging manifold and refrigerant bottle properly connected to Schraeder valve.
2. Add charge to approximately 448kPa back pressure. This not full charge, but it is enough to start the system.

START SYSTEM

1. Check that field disconnect is closed.
2. **Ensure that crankcase heater has been energized for 24 hours.**
3. Set room thermostat to below room temperature, and unit compressor will start after 5 minutes delay.
4. Check back pressure when compressor runs. Add charge to keep back pressure at approximately 448kPa.

CRANKCASE HEATER

Crankcase heater prevents refrigerant migration and compressor oil dilution during shutdown when compressor is not operating.

REFRIGERANT CHARGING

CAUTION

TO PREVENT PERSONAL INJURY, WEAR SAFETY GLASSES AND GLOVES WHEN HANDLING REFRIGERANT. DO NOT OVERCHARGE SYSTEM. THIS CAN CAUSE COMPRESSOR FAILURE.

The 38HDS units are factory charged with holding refrigerant gas. Charge adjustment is required on system with an addition of 15 grams per meter. This value is

REFRIGERANT CHARGING (cont.)

approximate only when charged by weight. Charging by superheat method is strictly recommended.

For accurate system performance, charge by superheat method as shown in Tables 4 and 5. To check and adjust charge, follow the following procedures:-

- 1) Operate unit for a minimum of 15 minutes before checking charge.
- 2) Measure suction pressure by attaching a gauge to suction Schreder valve.
- 3) Measure suction line temperature by attaching a service thermometer to unit suction line near suction Schreder valve. Insulate thermometer for accurate readings.
- 4) Measure outdoor coil inlet air dry-bulb temperature with a second thermometer.
- 5) Measure indoor coil air inlet wet-bulb temperature with a sling psychrometer.
- 6) Refer to Table 4. Find air temperature entering outdoor coil & wet-bulb temperature entering indoor coil. At this intersection, note the superheat.
- 7) Refer to Table 5. Find superheat temperature and suction pressure, note suction line temperature.
- 8) If unit has higher suction line temperature than charted temperature, add refrigerant until charted temperature is reached.
- 9) If unit has lower suction line temperature than charted temperature, bleed refrigerant until charted temperature is reached.
- 10) If air temperature entering outdoor coil or pressure at suction line changes, charge to new suction line temperature indicated on chart.
- 11) This procedure is valid independent of indoor air quantity.

SERVICE AND MAINTENANCE

CAUTION

BEFORE PERFORMING RECOMMENDED MAINTENANCE AND SERVICE, BE SURE UNIT MAIN POWER SWITCH IS TURNED OFF. FAILURE TO DO SO MAY RESULT IN ELECTRIC SHOCK OR INJURY FROM ROTATING FAN BLADE.

CLEANING COIL: Coil can be cleaned out with vacuum cleaner, washed out with water. The draw thru design causes dirt and debris to build up on the outside of the coils.

Clean coil as follows:-

- 1) Turn off unit power.
- 2) Using a compressed air or water blow through coil from inside condenser fan towards condenser coil (Fig. 11). Be sure to flush all dirt and debris from drain holes in base unit.

Clean coil annually or as required. Fins are not continuous through coil sections. Dirt and debris may pass between the row of fins and become trapped between the row of fins and restrict condenser air flow. Use a flashlight to determine if dirt or debris has collected between coil section.

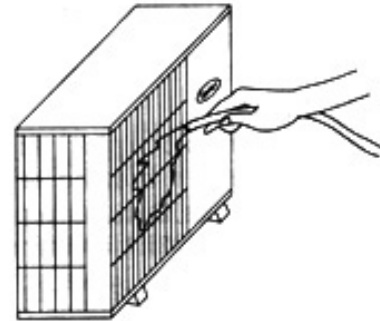
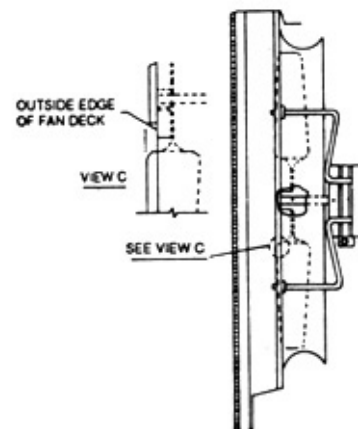


FIG. 11 CLEANING COIL WITH WATER

LUBRICATION

Fan Motor is permanently sealed lubricated bearings. Do not oil. Compressor is supplied charged with oil. Replace oil when lost. See Table 1 for oil recharge.

FAN ADJUSTMENT - Shut off unit main power supply. Remove condenser fan grille, and loosen fan hub setscrews. Adjust fan depth as shown in Fig. 12. Tighten setscrew and replace fan grille.

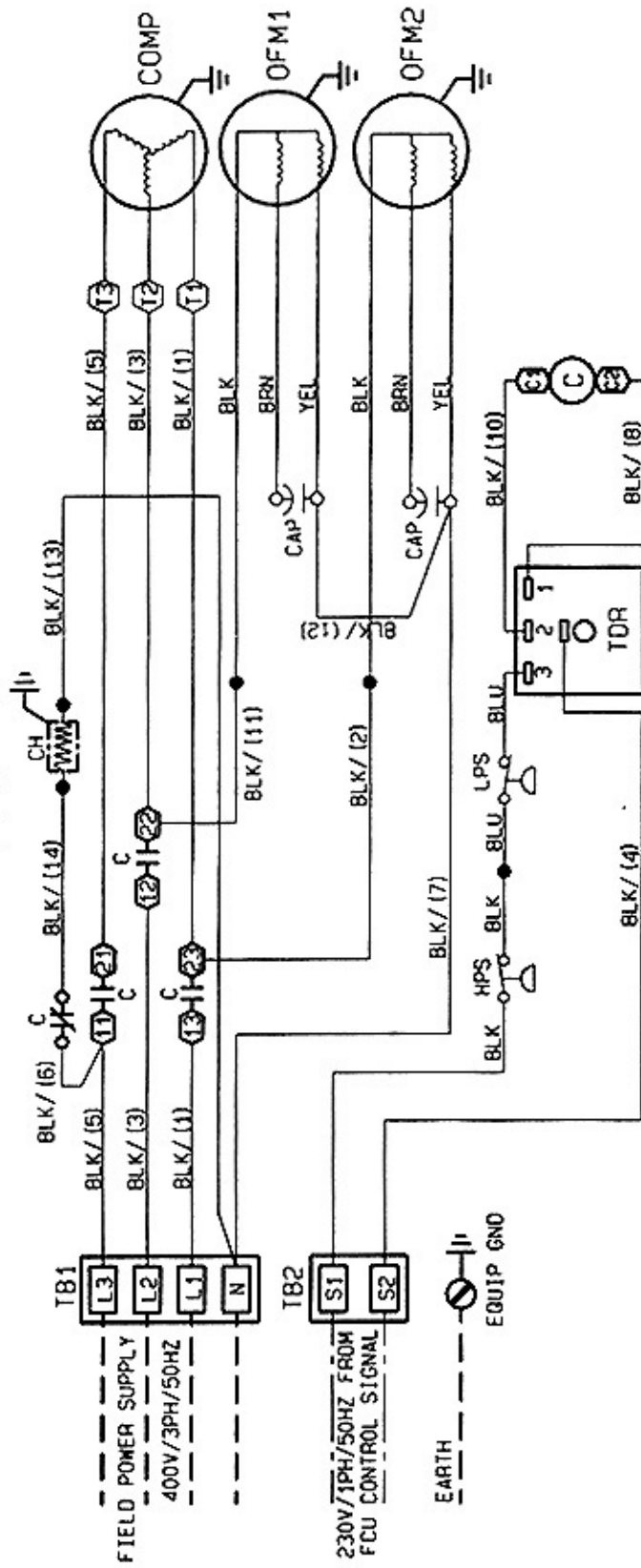


Note:

- x = 30mm (38HDS085/100)
- x = 20-25mm (38HDS120)

FIG. 12 FAN POSITION MOUNTING

SCHEMATIC



NOTES:

1. COMPRESSOR AND FAN MOTOR ARE THERMALLY PROTECTED - THREE PHASE MOTOR PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITION

LEGEND

- SPLICE
- FACTORY WIRING
- - - FIELD CONTROL WIRING
- - - FIELD POWER WIRING
- C CONTACTOR, COMPRESSOR
- CAP CAPACITOR

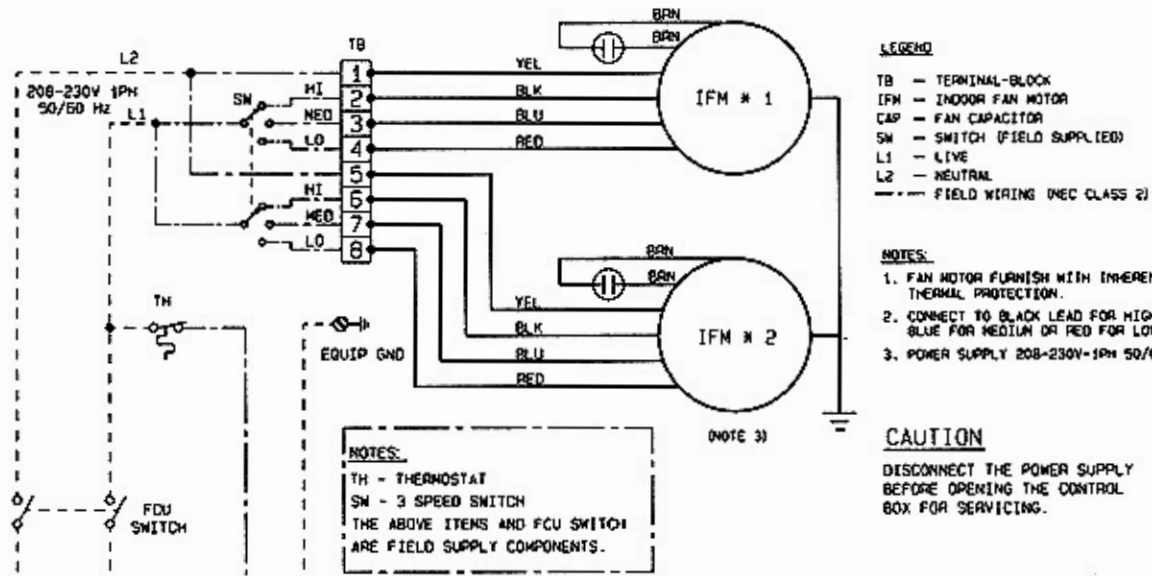
- CH CRANKCASE HEATER
- COMP COMPRESSOR MOTOR
- EQUIP GND EQUIPMENT GROUND
- OFM OUTDOOR FAN MOTOR
- HPS HIGH PRESSURE SWITCH
- LPS LOW PRESSURE SWITCH
- TB TERMINAL BLOCK
- TDR TIME DELAY RELAY

38HD580-888

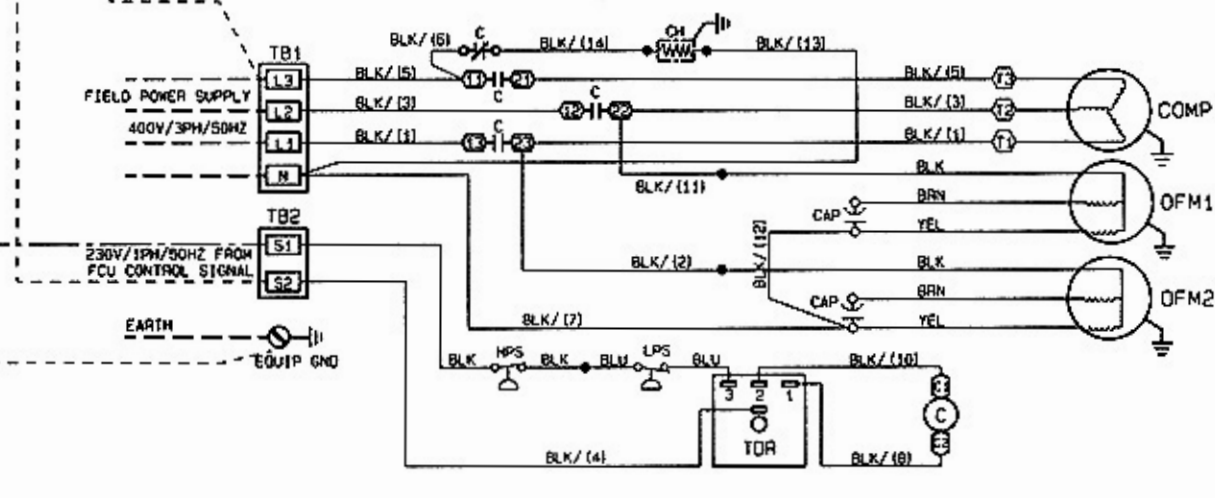
FIG. 13 38 HDS 085, 38 HDS 100 & 38 HDS 120
SCHEMATIC WIRING DIAGRAM

38HDS085 C/W 40LC - 009
 38HDS100 C/W 40LC - 009

INDOOR UNIT



OUTDOOR UNIT



NOTES:
 1. COMPRESSOR AND FAN MOTOR ARE THERMALLY PROTECTED -THREE PHASE MOTOR PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITION

LEGEND

●	SPLICE	CH	CRANKCASE HEATER
—	FACTORY WIRING	COMP	COMPRESSOR MOTOR
---	FIELD CONTROL WIRING	EQUIP GND	EQUIPMENT GROUND
---	FIELD POWER WIRING	OFM	OUTDOOR FAN MOTOR
C	CONTACTOR COMPRESSOR	HPS	HIGH PRESSURE SWITCH
CAP	CAPACITOR	LPS	LOW PRESSURE SWITCH
		TB	TERMINAL BLOCK
		TOR	TIME DELAY RELAY

FIG. 14 SCHEMATIC SYSTEM WIRING DIAGRAM

TABLE 4

SUPERHEAT CHARGING TABLE
(SUPERHEAT ENTERING SUCTION SERVICE VALVE)

OUTDOOR TEMP (°F)	INDOOR COIL ENTERING AIR (°F) WET_BULB													
	50	52	54	56	58	60	62	64	66	68	70	72	74	76
55	9	12	14	17	20	23	26	29	32	35	37	40	42	45
60	7	10	12	15	18	21	24	27	30	33	35	38	40	43
65	-	6	10	13	16	19	21	24	27	30	33	36	38	41
70	-	-	7	10	13	16	19	21	24	27	30	33	36	39
75	-	-	-	6	9	12	15	18	21	24	28	31	34	37
80	-	-	-	-	5	8	12	15	18	21	26	28	31	35
85	-	-	-	-	-	-	8	11	15	19	22	26	30	33
90	-	-	-	-	-	-	5	9	13	16	20	24	27	31
95	-	-	-	-	-	-	-	6	10	14	18	22	25	29
100	-	-	-	-	-	-	-	-	8	12	15	20	23	27
105	-	-	-	-	-	-	-	-	5	9	13	17	22	26
110	-	-	-	-	-	-	-	-	-	6	11	15	20	25
115	-	-	-	-	-	-	-	-	-	-	8	14	18	23

- DO NOT ATTEMPT TO CHARGE SYSTEM UNDER THESE CONDITIONS OR REFRIGERANT SLUGGING MAY OCCUR.

SUPERHEAT CHARGING TABLE
(SUPERHEAT ENTERING SUCTION SERVICE VALVE)

OUTDOOR TEMP(°C)	INDOOR COIL ENTERING AIR (°C) WET-BULB														
	10	11.1	12.2	13.3	14.4	15.6	16.7	17.8	18.9	20	21.1	22.2	23.3	24.4	
12.8	5	6.7	7.8	8.4	11.1	12.8	14.4	16.1	17.8	19.4	20.6	22.2	23.3	25	
15.5	3.9	5.6	6.7	8.3	10	11.7	13.3	15	16.7	18.3	19.4	21.1	22.2	23.9	
18.3	-	3.3	5.8	7.2	8.9	10.6	11.7	13.3	15	16.7	18.3	20	21.1	22.8	
21.1	-	-	3.9	5.6	7.2	8.9	10.6	11.7	13.3	15	16.7	18.3	20	21.7	
23.9	-	-	-	3.3	5	6.7	8.3	10	11.7	13.3	15.6	17.2	18.9	20.6	
26.7	-	-	-	-	2.8	4.4	6.7	8.3	10	11.7	13.9	15.6	17.2	19.4	
29.4	-	-	-	-	-	-	4.4	6.1	8.3	10.6	12.2	14.4	16.7	18.3	
32.2	-	-	-	-	-	-	2.8	5	7.2	8.9	11.1	13.3	15	17.2	
36.0	-	-	-	-	-	-	-	4.4	5.6	7.8	10	12.2	13.9	16.1	
37.8	-	-	-	-	-	-	-	-	3.3	6.7	8.3	11.1	12.8	15	
40.6	-	-	-	-	-	-	-	-	-	2.8	5	7.2	9.4	12.2	14.4
43.3	-	-	-	-	-	-	-	-	-	-	3.3	6.1	8.3	11.1	13.9
46.1	-	-	-	-	-	-	-	-	-	-	-	4.4	7.8	10	12.8

- DO NOT ATTEMPT TO CHARGE SYSTEM UNDER THESE CONDITIONS OR REFRIGERANT SLUGGING MAY OCCUR.

TABLE 5

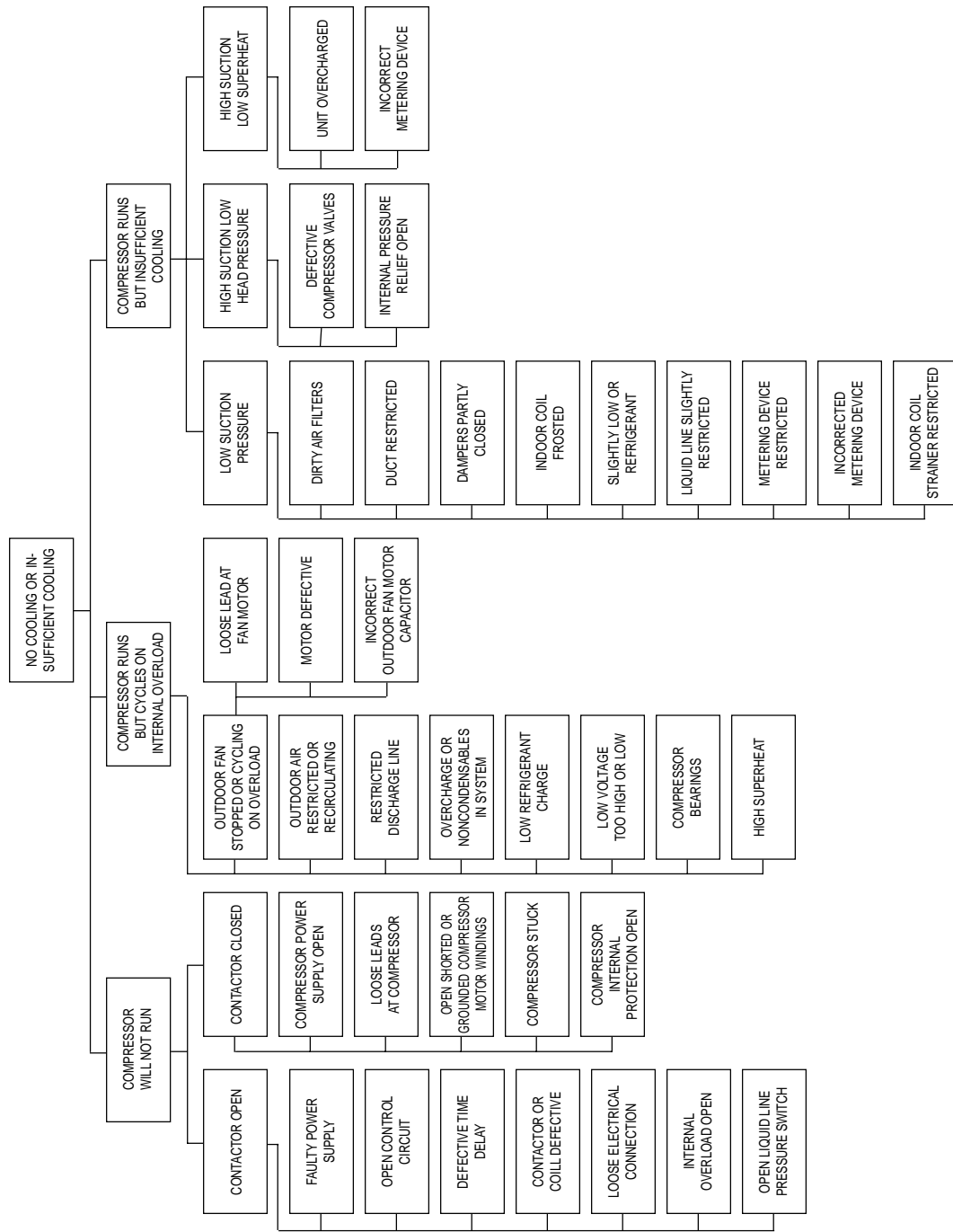
Required Suction Tube Temperature (°F)
(Entering Suction Service Valve)

SUPERHEAT TEMP (°F)	SUCTION PRESSURE AT SERVICE PORT (psig)									
	61.5	64.2	67.1	70	73	76	79.2	82.4	85.7	
0	35	37	39	41	43	45	47	49	51	
2	37	39	41	43	45	47	49	51	53	
4	39	41	43	45	47	49	51	53	55	
6	41	43	45	47	49	51	53	55	57	
8	43	45	47	49	51	53	55	57	59	
10	45	47	49	51	53	55	57	59	61	
12	47	49	51	53	55	57	59	61	63	
14	49	51	53	55	57	59	61	63	65	
16	51	53	55	57	59	61	63	65	67	
18	53	55	57	59	61	63	65	67	69	
20	55	57	59	61	63	65	67	69	71	
22	57	59	61	63	65	67	69	71	73	
24	59	61	63	65	67	69	71	73	75	
26	61	63	65	67	68	71	73	75	77	
28	63	65	67	69	71	73	75	77	79	
30	65	67	69	71	73	75	77	79	81	
32	67	69	71	73	75	77	79	81	83	
34	69	71	73	75	77	79	81	83	85	
36	71	73	75	77	79	81	83	85	87	
38	73	75	77	79	81	83	85	87	89	
40	75	77	79	81	83	85	87	89	91	

Required Suction Tube Temperature (°C)
(Entering Suction Service Valve)

SUPERHEAT TEMP (°K)	SUCTION PRESSURE AT SERVICE PORT (KPaG)									
	424	443	463	483	503	524	546	568	591	
0	1.7	2.8	3.9	5	6.1	7.2	8.3	9.4	10.6	
1.1	2.8	3.9	5	6.1	7.2	8.3	9.4	10.6	11.7	
2.2	3.9	5	6.1	7.2	8.3	9.4	10.6	11.7	12.8	
3.3	5	6.1	7.2	8.3	9.4	10.6	11.7	12.8	13.9	
4.4	6.1	7.2	8.3	9.4	10.6	11.7	12.8	13.9	15	
5.6	7.2	8.3	9.4	10.6	11.7	12.8	13.9	15	16.1	
6.7	8.3	9.4	10.6	11.7	12.8	13.9	15	16.1	17.2	
7.8	9.4	10.6	11.7	12.8	13.9	15	16.1	17.2	18.3	
8.9	10.6	11.7	12.8	13.9	15	16.1	17.2	18.3	19.4	
10.0	11.7	12.8	13.9	15	16.1	17.2	18.3	19.4	20.6	
11.1	12.8	13.9	15	16.1	17.2	18.3	19.4	20.6	21.7	
12.2	13.9	15	16.1	17.2	18.3	19.4	20.6	21.7	22.8	
13.3	15	16.1	17.2	18.3	19.4	20.6	21.7	22.8	23.9	
14.4	16.1	17.2	18.3	19.4	20.6	21.7	22.8	23.9	25	
15.6	17.2	18.3	19.4	20.6	21.7	22.8	23.9	25	26.1	
16.7	18.3	19.4	20.6	21.7	22.8	23.9	25	26.1	27.2	
17.8	19.4	20.6	21.7	22.8	23.9	25	26.1	27.2	28.3	
18.9	20.6	21.7	22.8	23.9	25	26.1	27.2	28.3	29.4	
20.0	21.7	22.8	23.9	25	26.1	27.2	28.3	29.4	30.6	
21.2	22.8	23.9	25	26.1	27.2	28.3	29.4	30.6	31.7	
22.2	23.9	25	26.1	27.2	28.3	29.4	30.6	31.7	32.8	

TROUBLE-SHOOTING CHART - COOLING CYCLE



MEMO



IMPORTANT

**PLACE ATTACHED WARNING LABEL
ON THE MAIN SWITCH BOARD**



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