DESIGN DATA
ACCOMMODATION
HVAC

	MAIN SYSTEM S1 & S2	WH S3	CONTROL ROOM	RADIO ROOM
CFM AIR	4000	2120	ADJUST TO SUIT	ADJUST TO SUIT
SP	5"	2½"	ADJUST TO SUIT	ADJUST TO SUIT
COOLING CAPACITY	30 TON NOM	5RT NOM	CHANGES WITH AIR QUANTITY	CHANGES WITH AIR QUANTITY
HEATING CAPACITY		102390BTV/HR	-	-
POWER SUPPLY	600V-3-60	600V-3-60	600V-3-60	600V-3-60
CONTROL	115V-1-60	115V-1-60	230V-160	230-1-60
COOLING WATER (FRESH WATER)	32°C	AIR	32°C	32°C
REFRIGERANT	R-22	R-22	R-22	R-22
MATERIALS				
CONDENSER TUBES	CUNI 9010	-	CUNI 9010	CUNI 9010
TUBE SHEET	CUNI 9010 CLAD	-		
WATER HEAD	STEEL	BRONZE	BRONZE	
DX COIL	CU TUBE CU FIN	CU TUBE CU FIN	CU TUBE ALU FIN	CU TUBE ALU FIN
STEAM COIL	CU TUBE CU FIN	CU TUBE CU FIN	-	-
CONDENSER (AIR COOLED)	-	CU TUBE CU FIN	-	-

NORMAL VALVE POSITIONS

Port and Starboard Mainsystem S1 and S2 (Dwg 1047-24 R-22 Flow, and Dwg 1047-26 Steam Flow)

All manual valves must be open except the following:

1. Freon 22 charge valve on drier.
2. Compressor oil drain valve, if supplied (below crankcase oil level).
3. Steam supply bypass valve
4. Steam condensate drain valve (if supplied).
5. Gauge valves except for gauge reading.
6. Throttling Valve - in the bypass of the 3-way water regulating valve is a throttling valve, which should be adjusted so that pressure drop through bypass equals pressure drop through condenser.

Wheelhouse Demister Unit S3 (Dwg 1047-19 R-22 and Steam Flow)

All manual valves must be open except the following:

1. Freon 22 (item 6) charging valve.
2. Steam supply bypass valve (item 22).
3. Steam condensate drain valve (item 23).

Galley Supply Unit (Dwg 1047-15)

All manual steam valves must be open except the following:

1. Steam supply bypass valve (item 9).
2. Steam condensate drain valve (item 15).

Control Room/Radio and Electronic Equipment Room (Dwg NSN5 Flow)

All manual valves must be open.

NORMAL CONTROL SETTINGS

DWG 1047-22 Pneumatic Diagram
1047-24 R-22 Flow
1047-25 Electric Diagram
1047-26 Steam Flow

PORT AND STARBOARD MAINSYSTEM S1 AND S2

High Pressure Switch Compressor: opens on discharge pressure rise at 22 kg/cm3 gauge pressure. Manual reset required after opening (observe high pressure gauge).

Low Pressure Switch Compressor: Opens on suction pressure drop at 2 kg/cm2 gauge pressure. Closes on suction pressure rise at 3.3 kg/cm2 gauge pressure. (Observe low pressure gauge.)

Oil Failure Control: This control is factory set. Differential switch 2-1 remains closed if no oil pressure develops within 60 seconds after compressor start-up. (Oil pressure is net pressure between luboil pump and suction pressure.) If differential switch stays closed after start-up, an internal resistor creates enough heat to trigger a second bimetallic switch, which in turn shuts down the compressor.

Manual reset is required after shutdown. Reset only once before investigating cause of shutdown.

The differential switch is factory set to open at 1.3 kg/cm2 differential and close at .85 kg/cm2 differential.

Summer/Winter Thermostat (DPDT): This thermostat senses ambient temperature. It selects cooling or heating mode. First stage controls heating, second state controls cooling. Differential between stages is adjustable from 1.1 to 3.9°C. Switch differential is 2.8°C non-adjustable.

Heating goes off on temperature rise at 17.8°C and comes on again on temperature drop at 15°C.

Cooling can start on temperature rise at 16.1°C and is locked out on temperature drop at 13.3°C. Actual compressor cycling is controlled by cooling return air thermostat.

Cooling Thermostat (DPST): Thermostat closes on return air temperature rise at 24°C, which in turn opens liquid solenoid valve. As liquid enters evaporator, suction pressure rises to set point of low pressure switch which starts compressor.

NORMAL CONTROL SETTINGS

When cooling thermostat is satisfied liquid solenoid valve closes and suction pressure drops. Compressor keeps running until cut-out point of low pressure switch is reached.

This arrangement is called a "pumpdown cycle" because it allows the compressor to pumpdown the evaporator preventing liquid slugging on start-up.

Thermostatic Expansion Valve: This valve must be set to maintain 4 to 6°C superheat. Too high a superheat reduces cooling capacity, whereas too low a superheat could damage the compressor by allowing liquid slugs to reach suction intake. The superheat is the difference between saturated gas temperature and actual gas temperature at DX coil outlet.

To measure the superheat, install an access tee with service gauge into the thermovalve equalizer line and strap a thermometer to the suction line beside the thermovalve bulb. On the R-22 table, read the saturated temperature corresponding to the service gauge pressure and deduct this temperature from the actual temperature shown on the service thermometer. This difference is the superheat. If no access tee can be installed, an approximate superheat valve is established by reading low pressure gauge and adding .15 kg/cm2 for suction line pressure drop. This pressure is then substituted for the service gauge pressure mentioned above.

Non-Electric Controls (Dwg 1047-24)

Water Regulating Valves: Condensing pressure is kept at a preset minimum by a pair of water regulating valves. This minimum pressure must be high enough to overcome combined pressure drop in liquid line, liquid solenoid valve, thermostatic expansion valve and distributor. The three-way regulator has a lower set point and allows water to flow via bypass so that some water always runs through the condenser pump. On discharge pressure rise to 12 kg/cm2, bypass of three-way regulator starts to close and simultaneously water starts to flow through the condenser. If discharge pressure keeps on rising to 13 kg/cm2, the two-way regulator starts opening allowing additional water to reach the condenser.

Compressor Unloader: (See "Compressor Start-up" and "Service Instructions" for adjustments.)

Unloading set point is approximately 4 kg/cm2 gauge pressure. With this set point, the compressor is 66% unloaded at 3.5 kg/cm2 and fully loaded at 4.3 kg/cm2, as read on low pressure gauge.

NORMAL CONTROL SETTINGS

Mixed Air Dampers: The normal position of the dampers is to provide 40% fresh air and 60% return air. The steam coils have enough capacity to maintain that ratio.

The cooling capacity, however, is limited. To provide adequate cooling during a hot weather spell, an automatic damper operator reduces fresh air intake to 10% and increases return air to 90% when coil inlet temperature exceeds 31°C, as sensed by pneumatic controller (item 64 and 91).

Steamheat Coil: This is an air preheat coil. A pneumatic temperature controller with sensor in the supply air controls the pneumatic steam feed valve (item 35). The controller is set that air leaves the air handler at approximately 27°C and any additional heat required is provided by local cabin heaters which can be adjusted to suit individual needs.

Humidifier: During the hot season, moisture must be added to the air to prevent a too low relative humidity (RH). The moisture is introduced into the warm supply air in the form of steam. A pneumatic humidistat (item 85) is located in the captains dayroom and set for approximately 30% R.H. A high limit switch (item 31) located in the supply plenum, prevents air from picking up too much moisture. This limit switch must be set to prevent saturated air (100% R.H.) anywhere in the system or condensation would occur. When setting this control, take into account that air holds less moisture as it cools down. A typical setting is 85 to 90% R.H.

These two pneumatic controls open and close the pneumatic steam supply valve (item 30a) located on the steam humidifier.