User Manual
for
Amron International, Inc.

Model 9000-ECS
External Conditioning System

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1. INTRODUCTION AND SPECIFICATIONS

1.1 INTRODUCTION

The AMRON INTERNATIONAL Model 9000-ECS, Environmental Control System is designed to provide chilled or heated fluid for temperature control of Deck Decompression Chambers. The Model 9000-ECS is used in conjunction with an internal conditioning (heat exchanger) located inside the DDC.

The Model 9000-ECS is a self-contained unit, using a sealed R-404A refrigeration unit, fluid reservoir, circulation pump and heater. The system can supply cooled or heated fluid, operator selected, to provide heat or cooling for the DDC as required. A small circulation pump circulates fluid (50% propylene glycol, 50% water) through an internal reservoir, where the fluid is heated or cooled, and on to the chamber where heat is extracted or added as desired, via the internal conditioning unit.

The Model 9000-ECS is suitable for use on most all double lock decompression chambers. This includes units ranging in size from 54 inch through 72 inch diameters. There are certain conditions where the heat load may exceed the capacity of the unit. These conditions may occur when the chamber is being pressed to depth, when the chamber is located in direct sunlight, when the chamber is being operated in a very high or very low ambient temperature, with a high number of personnel within the chamber, or a combination of these factors.

Most of these conditions can be overcome by operating procedures. During initial press down of the chamber the amount of heat added to the chamber (compression of the air) will cause a rise in the temperature of the chamber. To compensate for this heat load, the chamber can be pre-cooled. Sun shades or other temporary structures can be erected for operating conditions outdoors or under extreme conditions.

1.2 ELECTRICAL SPECIFICATIONS

Cooling	4000 BTU/HR
Heating	3000 WATT
Voltage	220 VAC 50/60 HZ
Fluid Flow Rate	3 G.P.M. @5 PSI
Fluid Media	50% Ethylene or Propylene Glycol, 50% Water
Capacity	Approx. 7 Gallons
Power Requirements	15 AMP Disconnect
Voltage	220 VAC, 50/60 Hz, Single Phase
Input/output Connections	1/2" Female NPT
Location	Front or Rear

Temperature Cut-Off Point	Automatic
Cool Set Point	Approx. 20° F
Heat Set Point	Approx. 110° F
Temperature Gauge	Supply & Return
Range	0 TO 250° F (-20 TO 120° C)
Accuracy	+/- 1% of Full Scale
Refrigerant Compressor	Sealed Unit
Refrigerant	Freon, R-404A
Protection	Internal Thermal Overload
Locked Rotor Current	45 Amps
Nominal Current Draw	6.4 Amps
Restart Interlock	Approx. 45 Seconds
Mechanical	
Enclosure	300 Series Stainless Steel
Size - Width	27.0 in. (685.8 mm)
Depth	19.5 in. (495.3 mm)
Height	30.25 in. (768.35 mm)
Weight	175 Lbs. (79.38 kg)
With Cooling Fluid	215 Lbs.

1.3 **MODEL 9000-ECS**

2. OPTIONS

2.1 MODEL 9000-RCS REMOTE CONTROL SWITCH

Allows remote control of the Model 9000-ECS. The 25-foot remote control cable connects to the remote-control connector on the Model 9000-ECS, and permits the unit to be turned "ON - HEAT", "OFF", or "ON - COOL".

3. CONTROLS AND CONNECTIONS

3.1 POWER SWITCH

Three-position switch, "ON" turns the power on, "OFF" turns the power off. "Remote Control" permits the unit to be controlled remotely. Selecting the "ON" or "OFF" positions overrides the remote control. Turning the unit "ON" turns on the circulating pump.

3.2 HEAT/COOL SWITCH

Three-position switch, "Heat" turns on the heater. "OFF" turns off cooling and heat, but allows the circulating pump to run. "Cool" turns on the refrigeration system.

3.3 SUPPLY THERMOMETER

Three-inch dial, dual scale thermometer reads fluid temperature leaving the system. Temperature range 0° to 250° F, (-20° to 120° C).

3.4 RETURN THERMOMETER

Three-inch dial, dual scale thermometer reads fluid temperature returning to the system. Temperature range 0° to 250° F, (-20° to 120° C).

3.5 FLUID LEVEL INDICATOR

Slight glass allows checking the fluid level from the front panel.

3.6 SUPPLY & RETURN CONNECTIONS

Sub panel mounted to allow the connections to be moved from the rear to the front of the unit. Connections are 1/2" FNPT.

3.7 POWER CONNECTIONS

Sub panel mounted to allow the connections to be moved from the rear of the unit to the front. Power cord is supplied with a 20 Amp 220 VAC, Twist-Lock plug, NEMA part number L6-20P. Mating part number is L6-20R. Power cord is approximately 12 feet long. Power connection panel also contains the remote control connector, use with P/N 9000-RCS, and remote control switch assembly.

3.8 FLUID FILLER COVER

Remove for access to reservoir fill cap.

4. THEORY OF OPERATION

4.1 GENERAL

The Model 9000-ECS is one part of a system designed to provide temperature and humidity control of a decompression chamber. The complete system consist of an internal conditioning system (the Amron Model 9100-ICS2), the external conditioning system (the Amron Model 9000-ECS), and the associated plumbing.

Temperature control is provided by circulating heated/chilled water through a set of coils inside the chamber (inside conditioning unit), where a fan blows chamber air across the coils picking up the heat/chill of the circulating fluid.

The temperature of the chamber can be raised or lowered depending upon the temperature of the circulating fluid. Circulating hot water will cause heated air to be exhausted from the internal conditioning system. Cold water will cause the temperature of the air exhausted from the internal conditioning system to be cooled. Temperature control is accomplished by turning the internal conditioning system off upon reaching the desired temperature.

Humidity removal is accomplished by circulating cold water through the internal conditioning system that causes moisture in the air to condense on the coils, lowering the humidity within the chamber.

The Model 9000-ECS, External Conditioning System, consists of a fluid system (reservoir/pump) to store and circulate the water, a refrigeration unit to cool the water, a heater to heat the water, and controls to select the mode of operation.

Internal temperature controllers limit the temperature range of the circulating water to 20^{o} F (minimum) to 110^{o} F (maximum). Within the capacity of the system, the unit will chill the water until the system reaches 20^{o} F, upon reaching a reservoir temperature of 20^{o} F the refrigeration system will shut down. The circulation pump will continue to operate, providing chilled water. When the temperature of the reservoir raises approximately 5^{o} F, the refrigeration system will start automatically. The same control system is provided for the heat cycle with the control point set at 110^{o} F.

Refer to block diagram or schematic (Section 10) while reading this section.

4.2 REFRIGERATION

The refrigeration system removes heat from the internal reservoir and exhausts the heat to the ambient air circulating through the unit. The refrigeration system is a closed circuit R-404A Freon vapor refrigeration system. The refrigeration system consist of the standard refrigeration components; compressor, condenser, accumulator, filter/drier, sight glass, expansion valve, and evaporator.

Freon gas is drawn into the suction side of the compressor at a low pressure, compressed to a high pressure. The output of the compressor is connected to the condenser. The Freon gas is cooled in the condenser, by a fan blowing ambient air over the coils of the condenser. The resulting temperature drop causes the Freon gas to change from a gaseous state to a liquid form.

The Freon liquid/gas from the output of the condenser is collected in the accumulator. The accumulator buffers the pressure pulses from the compressor and provides a collection point (reservoir) to draw off liquid Freon. The Freon then goes through a filter/drier to remove any foreign particles, and ensure no particles reach the expansion valve. A sight gauge is provided on the output of the filter/drier as a visual indication of the status of the system.

If you watch the sight glass during normal operation of the system you will see the Freon flowing through the system. At normal room temperatures 70° F (21° C) you will see a small amount of bubbles in the liquid. This is normal, if the operating temperature goes up the amount of bubbles will increase and if the temperature goes down the amount of bubbles will decrease to the point where there will be none.

The expansion valve controls the flow of liquid Freon into the evaporator, where the Freon under a lower pressure expands and changes to a gas. This change from liquid to gas absorbs heat providing the cooling desired. The expansion valve is controlled by a temp bulb sensing the temperature on the output of the evaporator. If the temperature is high (or equal to the temperature of the expansion valve) the valve opens allowing more Freon into the evaporator. This continues until the temperature at the output of the evaporator drops, and the valve throttles the flow of Freon.

The Freon circuit achieves a balanced condition when the spring force of the expansion valve, refrigerant pressure/temperature, and evaporator pressure/temperature results in the proper flow of Freon achieving the desired cooling. The design of the system determines proper operation as opposed to adjustments. Expansion valves are adjustable; however, this is set by the manufacture of the valves and is not a field procedure.

The evaporator is a two-circuit system and uses a Freon distributor to feed the two circuits of the evaporator coil. The expansion valve, distributor, evaporator coil, and compressor system are sized to achieve the desired end result. It is not recommended that part substitutions be made. The Freon vapor returns to the compressor (suction side) completing the refrigerant cycle.

4.3 FLUID SYSTEM

The fluid system might be considered the heart of the system. This is where heat is added to, or subtracted from the system. The fluid, heated or cooled is then pumped to the chamber inside conditioning unit. The chamber inside conditioning system consists of a set of coils, where a fan blows air across the coils producing heat or cooling.

The fluid system consists of a reservoir, pump, temperature meters, and associated plumbing. The reservoir contains a fluid that is heated or cooled, (depending on the mode selected), which is then pumped to the chamber heat exchanger where heat is extracted or added to achieve the desired end result.

Because of the low temperature range of the unit (20o F), it is necessary to extend the operating range of the fluid by adding antifreeze to the water. Use either ethylene glycol or propylene glycol, in the ratio of 50% glycol to 50% water. The reservoir holds approximately 7 gallons of fluid; therefore it will be necessary to add approximately 3.5 gallons of glycol.

The pump draws fluid from the bottom side of the reservoir. The pump output is routed to the supply thermometer, which indicates the output temperature of the fluid. From the

thermometer the fluid is plumbed to the fluid connection panel. This is the connection for the chamber supply line. The chamber return line attaches to the other connector on the fluid connections panel. This is routed to the return thermometer, and back to the top of the reservoir to complete the cycle.

The fluid connection panel is factory fitted to the rear side of the unit. It is possible to move this connection to the front of the unit if desired. Remove front and rear side covers from the unit, and the top cover to gain access to the internal plumbing. Remove blank panel from front, remove fluid connection panel from rear and route hoses to front side of unit and install fluid connection panel. Install blank panel on rear, install covers to complete the change.

The reservoir also contains the heater, temperature bulbs, and sight glass. The heater is an immersion type, 220 VAC 3000 watt. Only heat or cool can be selected and operated at one time, not both.

4.4 ELECTRICAL SYSTEM

The electrical system operates from 220 VAC, single phase, 50/60 Hz. The unit requires a 15 amp fused circuit, preferably from a separate disconnect box located close to the system. The heater and pump have separate internal fuses. The heater is fused at 15 amp, and the pump at 5 amps.

The unit is controlled by internal contactors for the switching of AC power. This also provides the facility to control the unit remotely. The power for the contactors is supplied via a small internal step down transformer that provides 24 VAC. There are three contactors; one for the refrigeration system, one for the heater and one for the pump. Control is via a front panel toggle switch that turns the unit on, activates the pump contactor. This same switch passes control to the remote control connector, and disables local control. The second switch selects heat or cool or neither. The heat position activates the heat circuit if the power switch is on. The cool position activates the cool contactor when the power switch is on.

The cool circuit has a time delay, which controls the energizing of the compressor contactor. Upon first actuation the delay is from 0 to 10 seconds before the compressor will turn on. After the first actuation the delay is approximately 45 seconds, which allows time for the compressor pressure to bleed down. This prevents a locked rotor condition and nuisance blowing of fuses or circuit breakers.

The remote control Model 9000-RCS has one switch that turns the unit on in either the heat or cool position.

5. INSTALLATION

5.1 LOCATION

Select a site for the unit which is level, provides clearance for air circulation, and is convenient for plumbing and electrical connections. It is recommended the unit be mounted at the same elevation as the chamber; do not exceed a difference in elevation of greater than 25 feet.

Ventilation requirements, the unit circulates air for cooling of the refrigeration unit. Air is drawn in from one end of the unit and exhausts air from the other end. The unit should have two feet of clear space on each end for air circulation, plus sufficient volume of air to dissipate the heat generated.

Preferably the unit should be located close to the chamber. The unit is quiet, clean, and suitable for an indoor location.

If the unit is to be mounted outside, it should be protected from the environment, particularly rain, heat and direct sun. While the unit is constructed of stainless steel, exposure to the elements will accelerate the aging process. Exposure to heat will decrease the efficiency of the cooling system. Outdoor locations generally require longer plumbing runs, which also will decrease the efficiency of the unit.

5.2 ELECTRICAL

The unit must be connected via a quick disconnect box, with 15 amp fuses. Power requirements are 220 VAC, 50/60 Hz single phase. Voltage limits are 187 to 250 VAC; this allows the unit to operate on either a 220 or 208 VAC configuration. When operating at 208 VAC or 50 Hz expect a 10% lower capacity.

Supply and return connections are routed to the chamber connections for the inside-conditioning unit. Supply and return connections are 1/2" NPT (female); tubing runs should be 3/4" tube. All tubing runs should be insulated with a closed cell pipe insulation material, with a wall thickness of 3/4". Pressure rating of the tubing runs OUTSIDE OF THE CHAMBER should be 50 PSI or greater, with a minimum temperature rating of 0 to 125° F. Amron's recommendation is 3/4" soft copper tubing, for runs of up 50 ft. (25 ft. supply and 25 ft. return). For longer runs increase the tubing size to 1".

Connect the supply and return lines to the chamber inside conditioning unit connections on the outside of the chamber. It does not matter which line is connected to which inside condition unit connection.

Fill the unit with fluid, use 50% ethylene or propylene glycol and 50% water; fill to middle of fluid sight glass. Turn unit on, check for leaks, and replenish fluid level when the system has filled the tubing runs and the inside-conditioning unit. NOTE: Do not operate the system without fluid, as the circulating pump requires fluid for lubrication and cooling.

6. OPERATION

6.1 TURN THE UNIT ON

Selecting either local or remote control. When operating in the local mode select either heat or cool as required. If you wish to use the remote control, select the remote control position on the power switch. Control of the system is then passed to remote switch. The system will not start until either heat or cool is selected on the remote switch.

6.2 LOCAL MODE OF OPERATION

Turning on the power will start the circulating pump; the pump will run regardless of the position of the Heat/Cool switch position. Heat or cooling is selected by moving the Heat/Cool switch to the desired position. On the initial selection of cool there may be a slight delay in the starting of the refrigeration compressor, 0-10 seconds. If the cooling is turned off and back on there will be a delay of approximately 45 seconds before the compressor starts. This allows the pressures within the compressor to bleed off, permitting easier starting and eliminates nuisance blowing of fuses or circuit breakers.

6.3 TEMPERATURE CONTROL

The temperature control of the fluid is determined by system heat load and two internal limit controllers. The system runs at maximum capacity, exchanging as much heat as possible. If the unit exceeds the heat (heat/cooling) exchange requirement of the chamber, the unit will shut off the refrigeration compressor or heater, upon reaching preset limits. The limit controller for cooling is factory set at 20° F (-3° C). The high temperature limit controller is factory set at 110° F (43° C). Upon reaching the limit the system will continue circulating fluid through the chamber, when the temperature of the fluid changes by approximately 5-10° the system will automatically start.

6.4 LIMIT CONTROLLERS

Limit controllers can be adjusted in the field by removing the covers and setting the temperature control to the desired temperature.

7. MAINTENANCE AND TROUBLESHOOTING

7.1 GENERAL

Trained personnel should perform maintenance. A refrigeration technician should be used for any servicing of the refrigeration system. An electrician can service the electrical system. The balance of the system can most likely be serviced by either.

To gain access to the system, remove the side covers by removing the screws at the bottom of the panels. After removing the screws on the side, slide the panels downward and remove. To charge the system with Freon, remove both front and rear panels. The suction service valve is located on the front side, on compressor. The discharge service valve is located on the rear side, on the accumulator.

To charge or check Freon pressure, remove service valve covers, attach refrigerant gauges, crack service valves. To add Freon, attach Freon bottle and use standard charging procedures.

To check or set the high temperature limit controller, operate the unit in the heat mode with the chamber internal conditioning unit shut off. Monitor supply thermometer on front panel or place a calibrated thermometer in the reservoir and monitor the fluid temperature. Unit should shut off at approximately 110° F. If unit does not shut off at the correct temperature adjust the high temperature limit controller, (located on the upper level, front left side of the reservoir). An easy way to adjust the controller is to note the present setting of the controller and the point at which the heater did shut off and adjust accordingly. Example: The unit shut off at 100° F and the controller is set at 105° F, the difference between the actual and the desired is 10° F, therefore it will be necessary to raise the actual set point by 10° F. Set temperature controller to 115° F and check the results.

The low temperature limit controller is set in the same manner. Allow the unit to operate until the compressor shuts off and check the temperature. Adjust the controller, heat the unit up slightly and run another test to check the set point.

The cool circuit has a second controller to stop the system in the event of loss of Freon. This is the low-pressure controller mounted on top of the compressor electrical junction box. This controller will also act as a low limit controller.

To adjust the time delay for the compressor, remove the cover from the electrical control box. NOTE: Removing the cover exposes voltages that are hazards to life, this should only be attempted by personnel qualified to work on electrical equipment. The time delay is located in the upper left corner of the box.

Turn clockwise to increase delay time. Check by starting a cycle and timing the time for the cool contactor to pull in.

To check internal fuses, disconnect power from system, remove cover from power control box, remove fuses one at a time and check continuity. Replace blown fuses with fuse of same value. If fuse blows a second time remove power and determine cause.

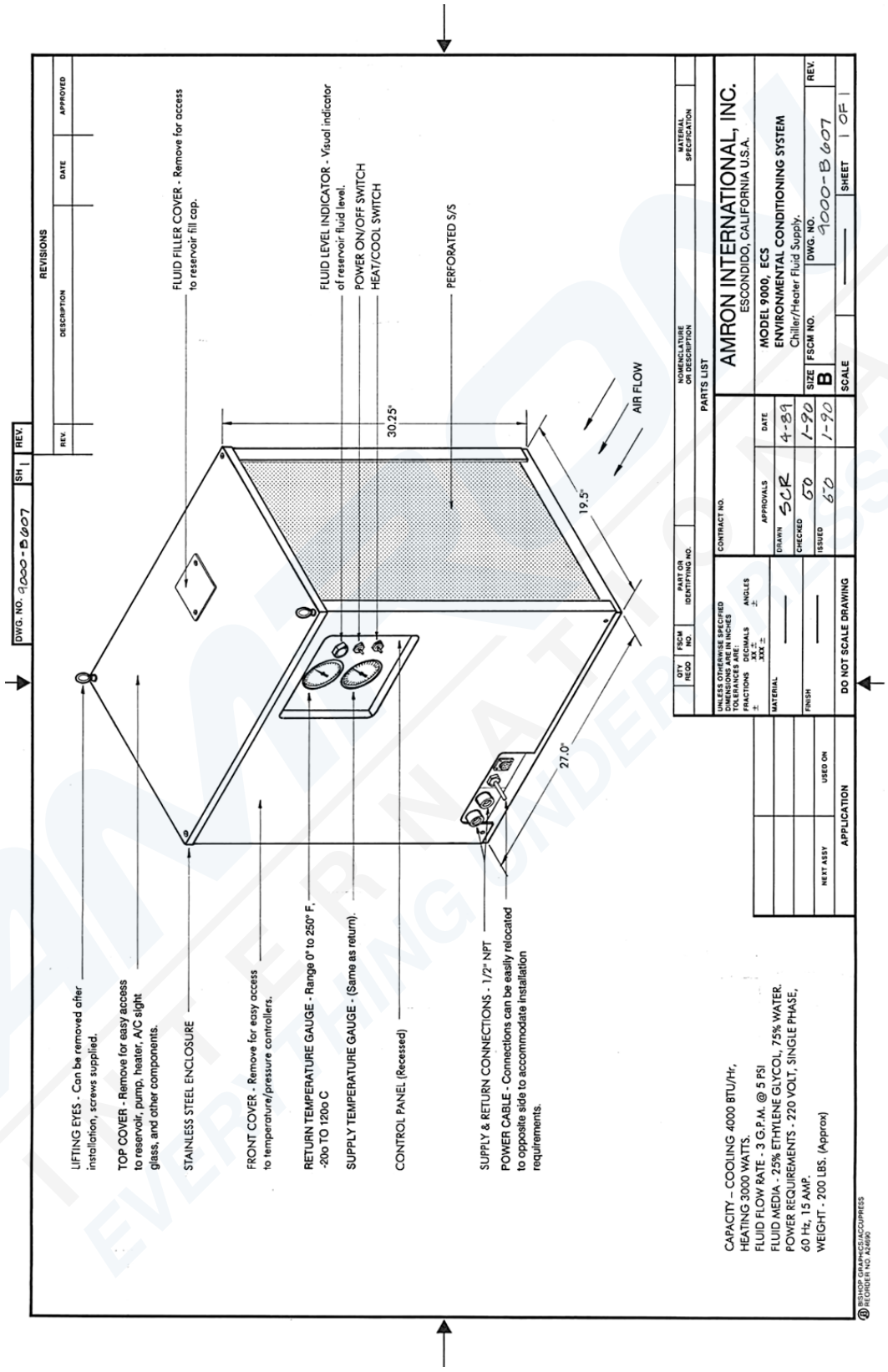
7.2 TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE
Unit does not cool	Check Freon charge
Unit does not run	Check power to unit
Unit does not run; power OK	Check fuses to pump
Unit does not run, power OK; fuses OK	Check for 24 VAC
Unit will not heat	Check fuse; heater circuit.
Compressor will not start	Check Freon charge; delay circuit.

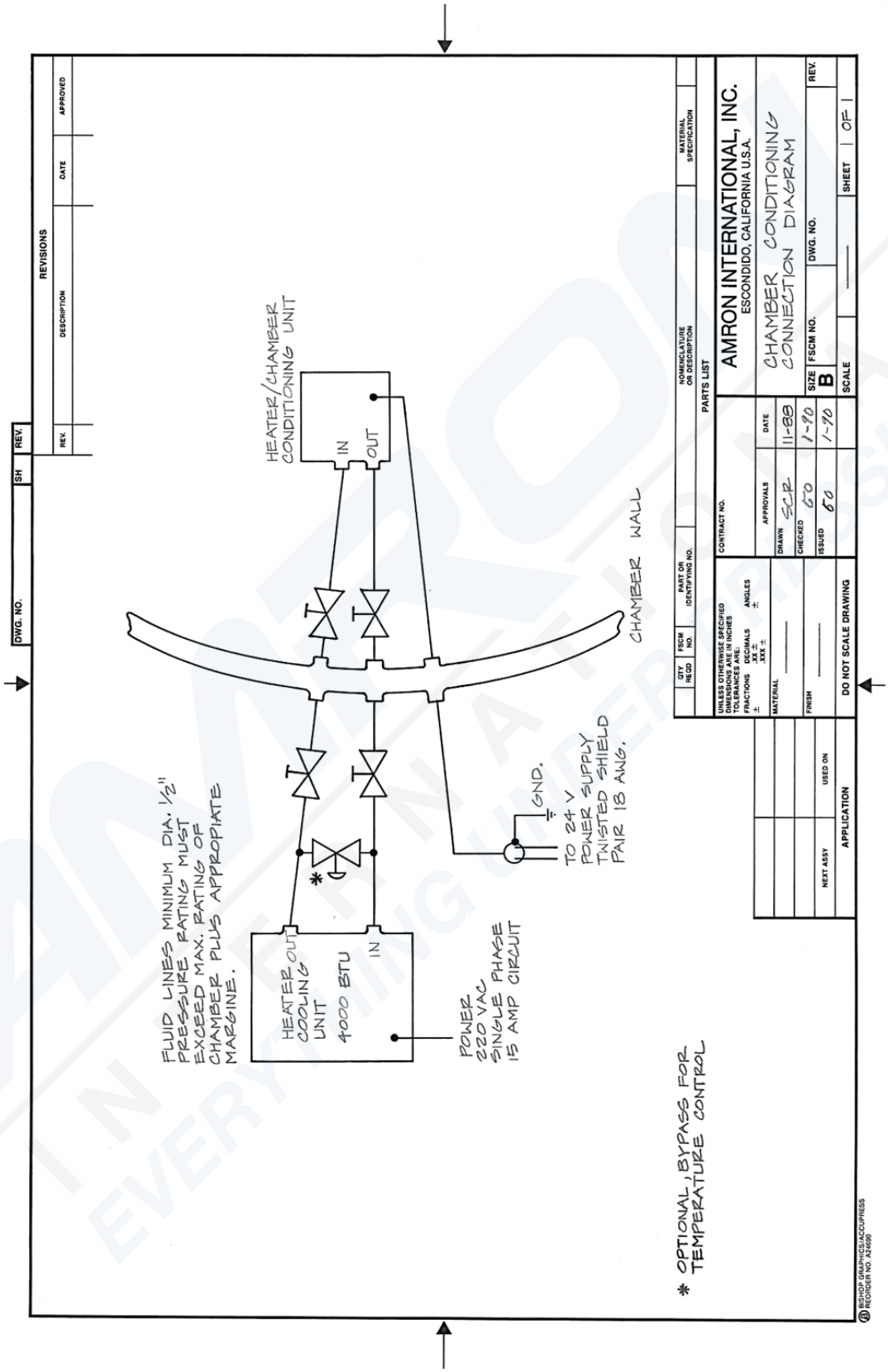
8. DRAWINGS

The following drawings illustrate the electrical and mechanical details of the External Conditioning System unit. The drawings reference identifier numbers correspond to the parts list identifier numbers to aid in the identification of parts used in the Model 9000-ECS.

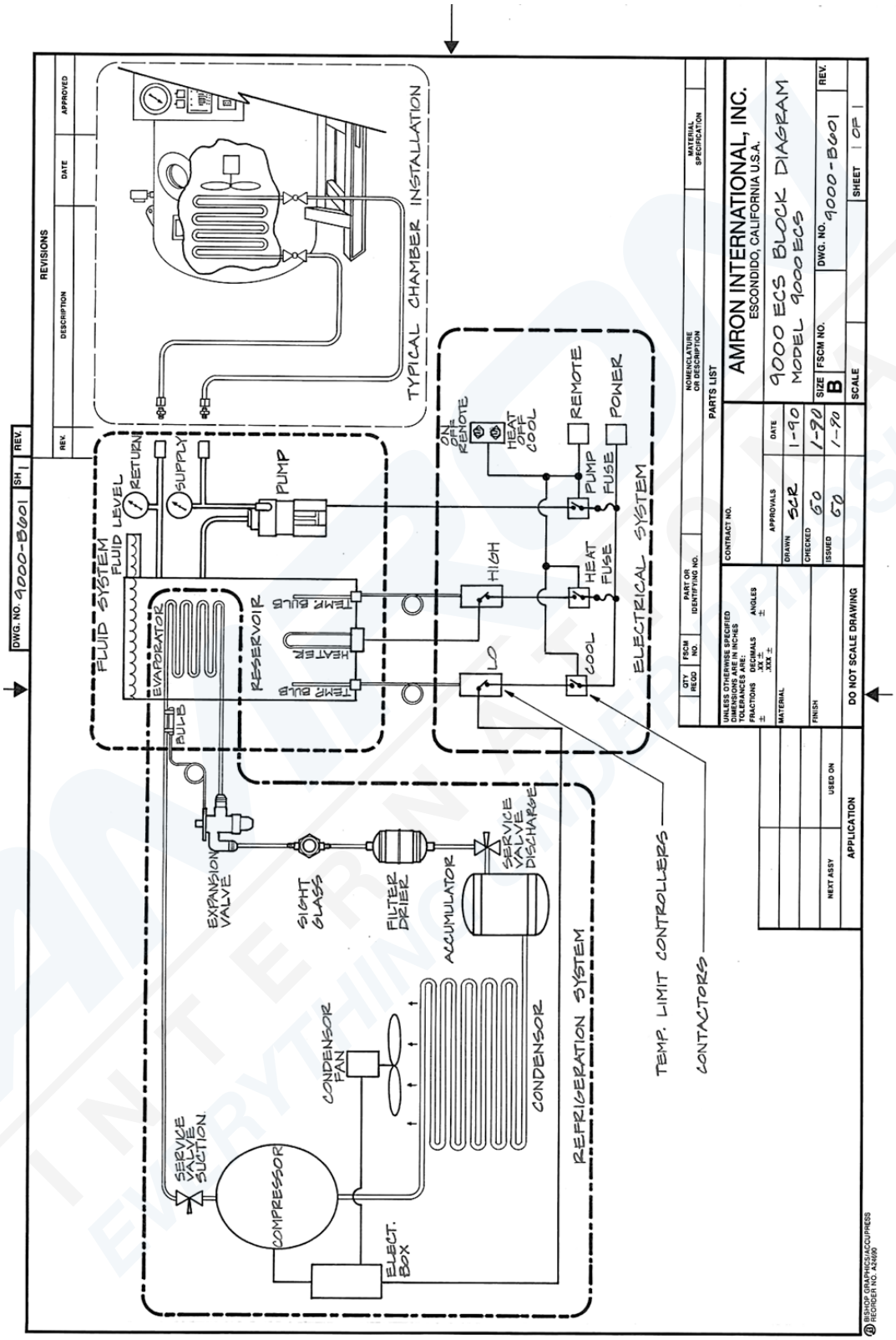
8.1 MODEL 9000-ECS, SPECIFICATIONS



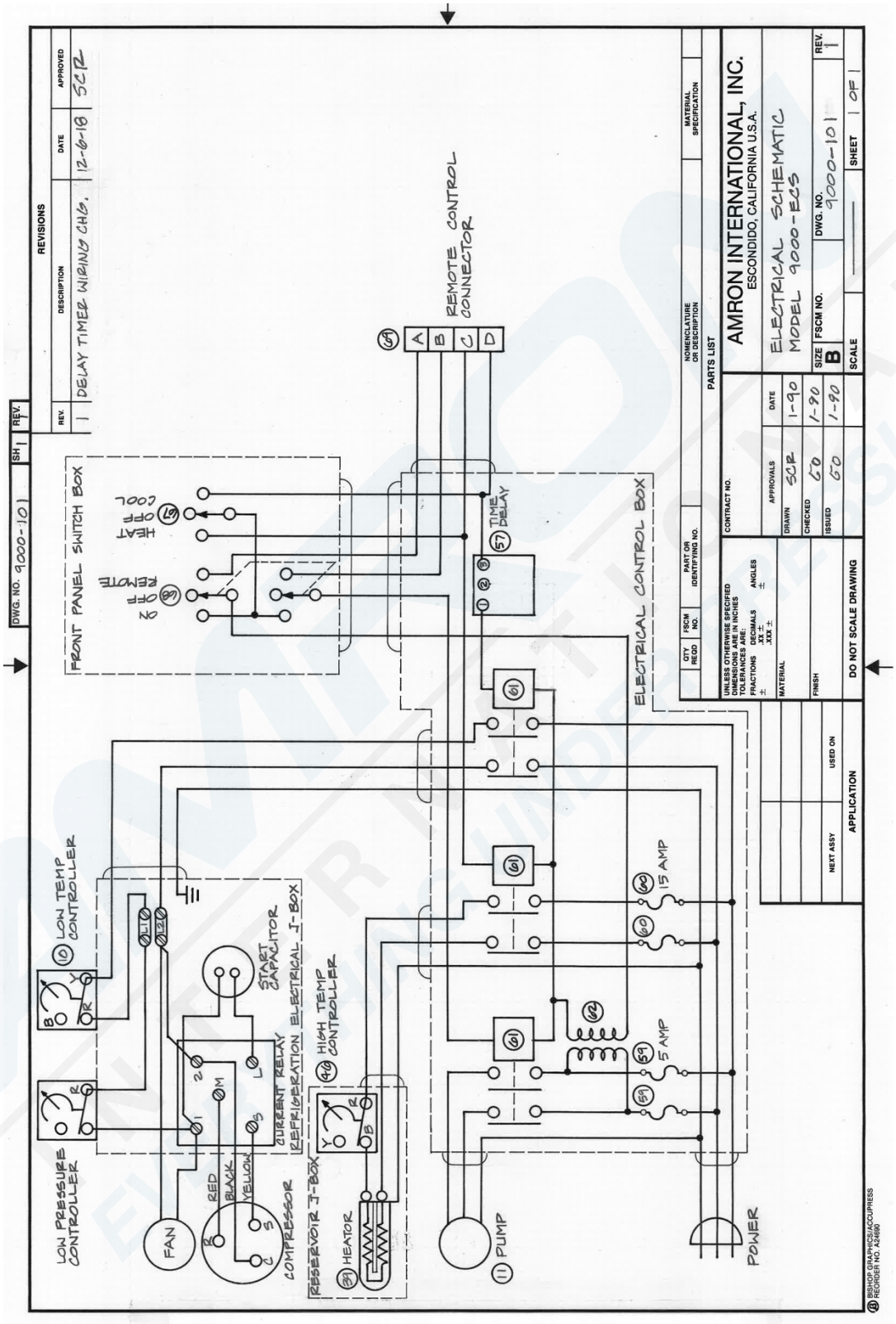
8.2 CHAMBER CONDITIONING CONNECTION DIAGRAM



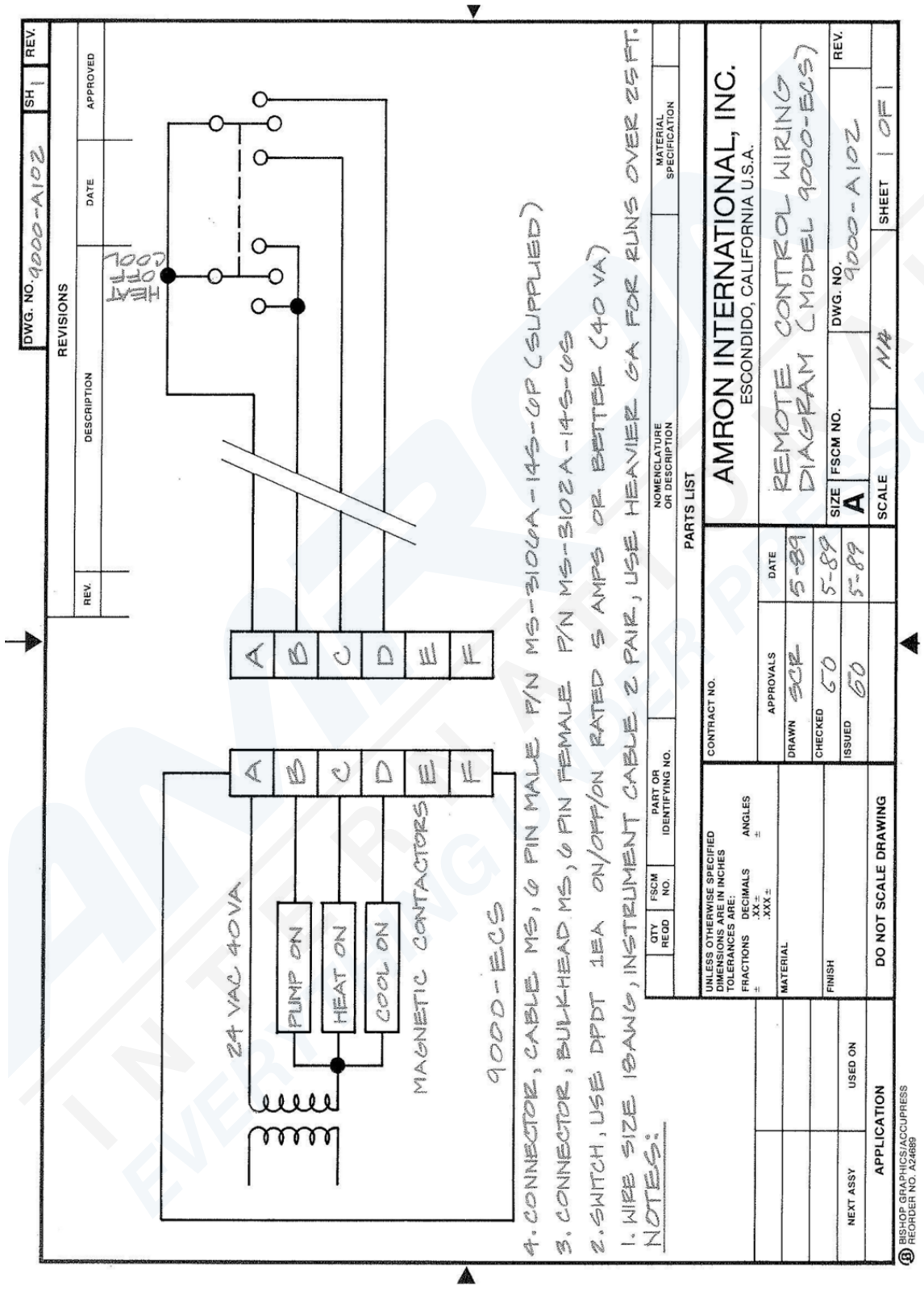
8.3 9000-ECS BLOCK DIAGRAM



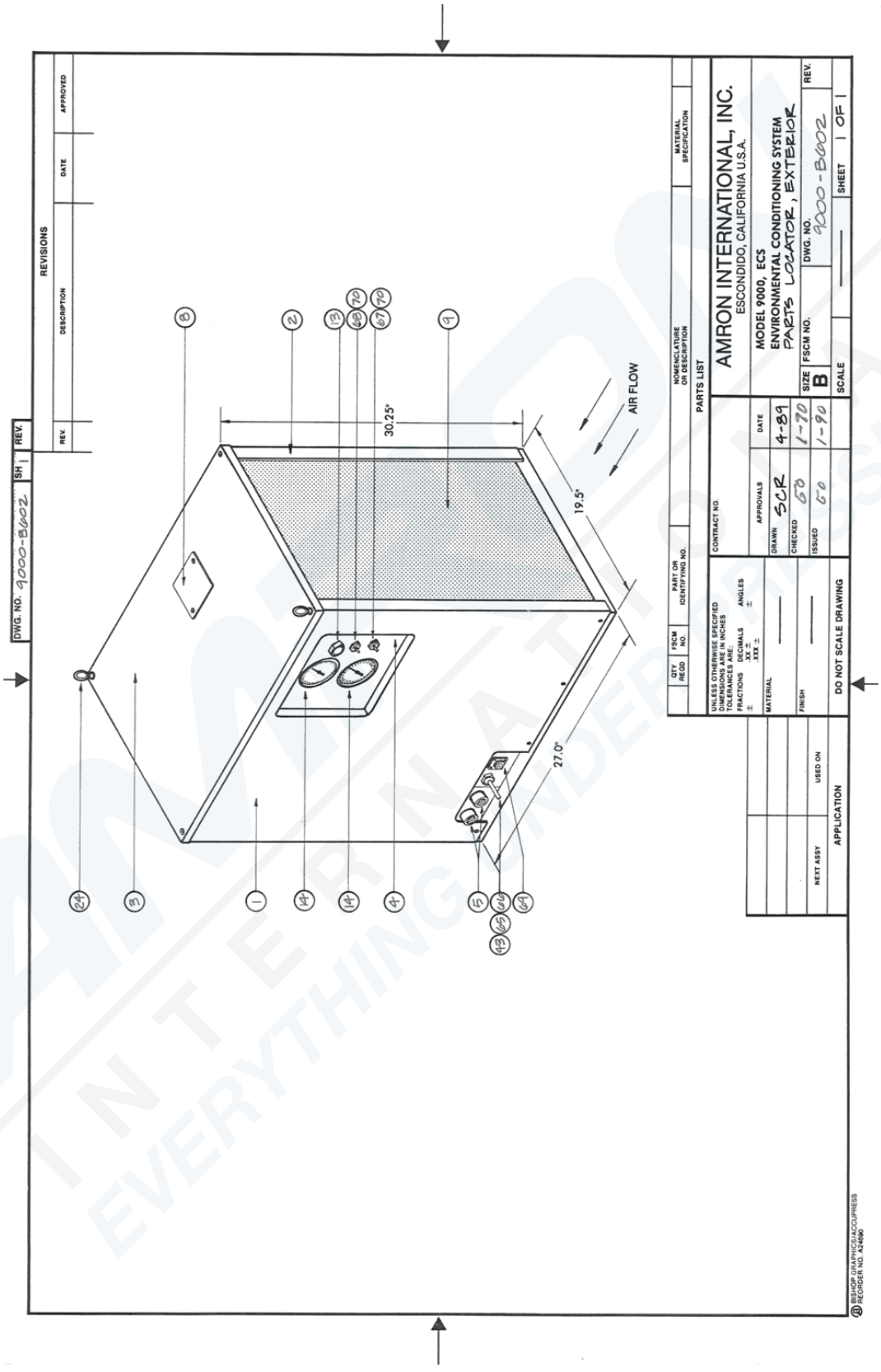
8.4 ELECTRICAL SCHEMATIC



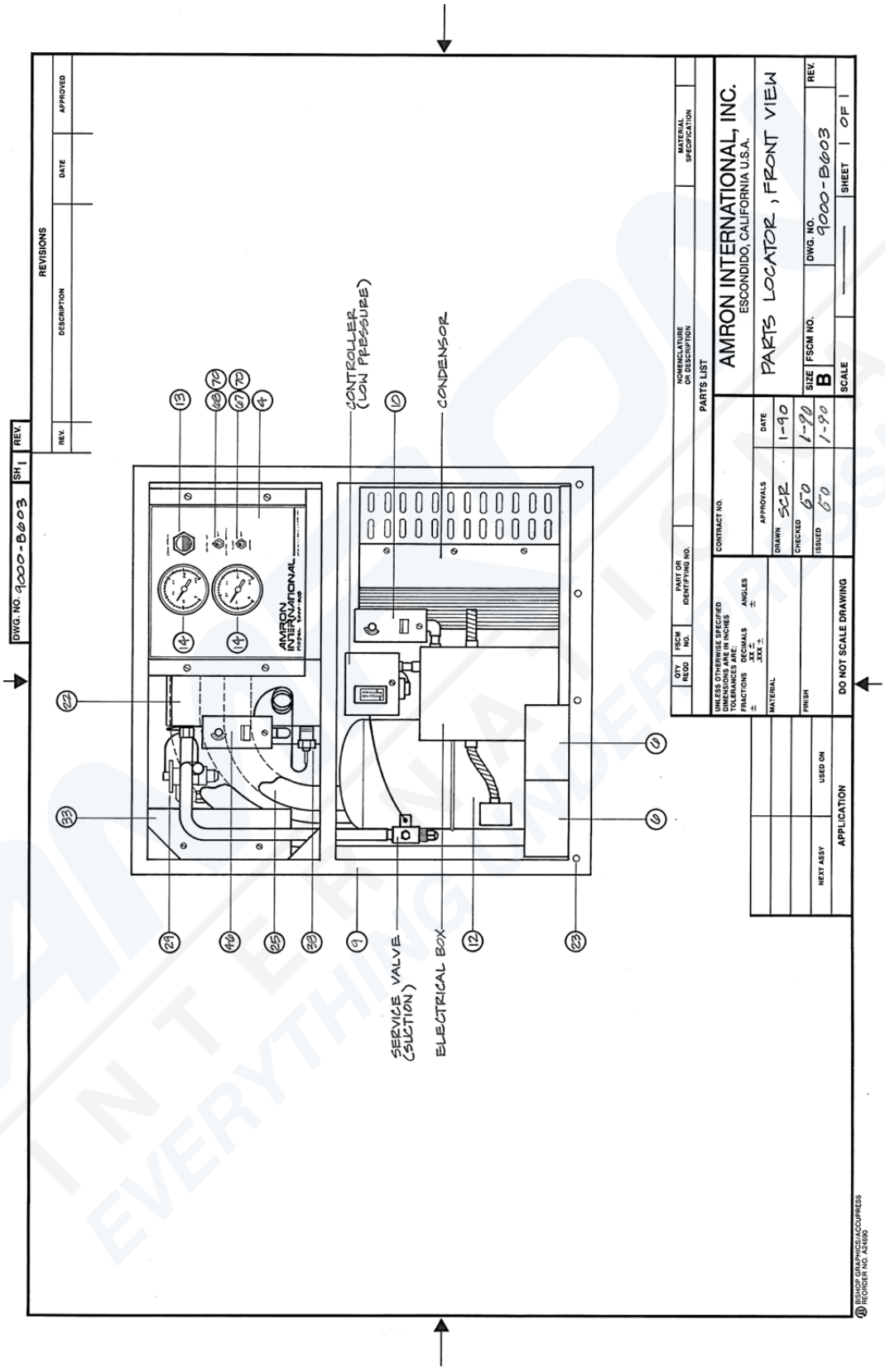
8.5 REMOTE CONTROL WIRING DIAGRAM



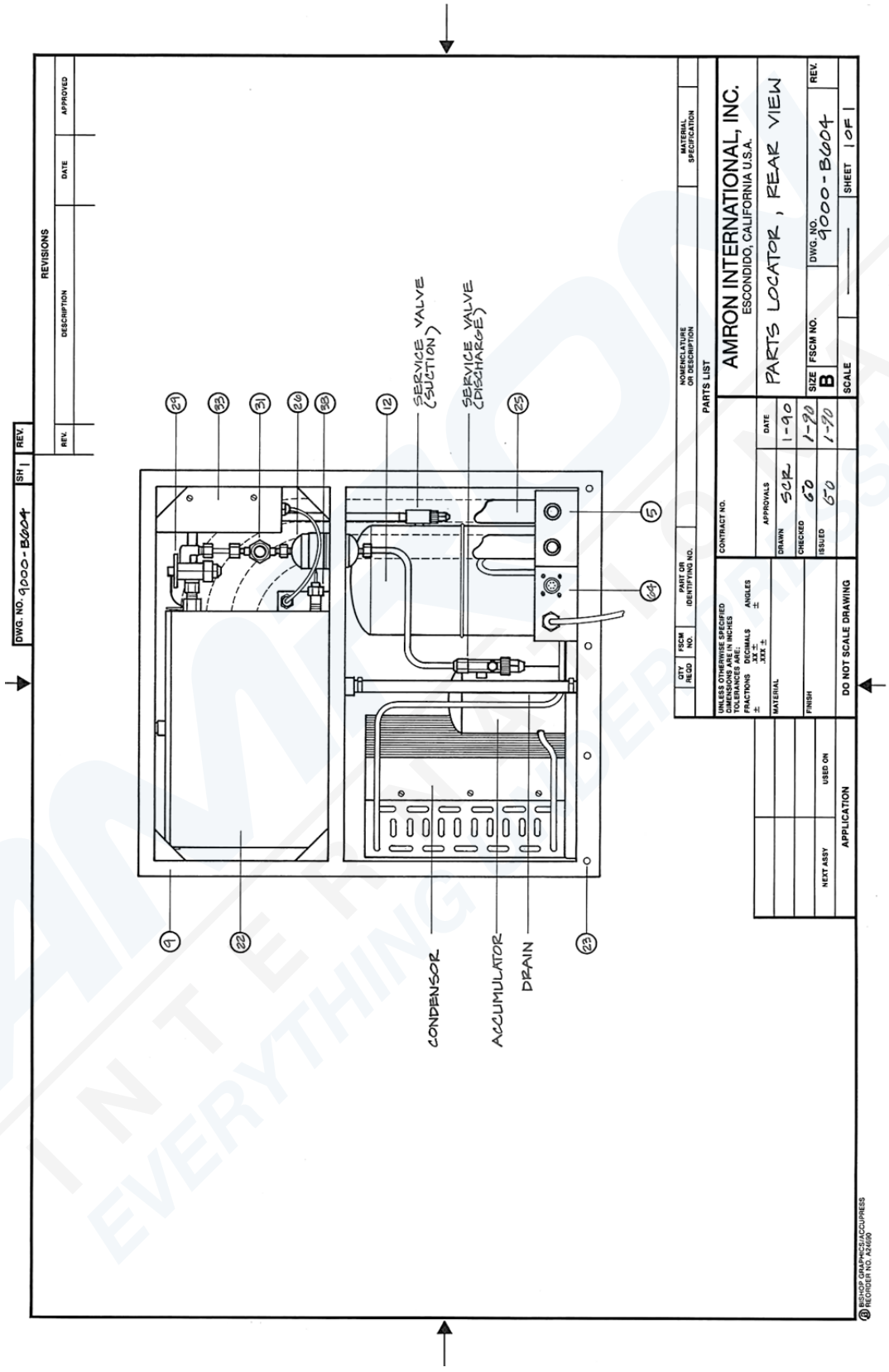
8.6 PARTS LOCATOR, EXTERIOR



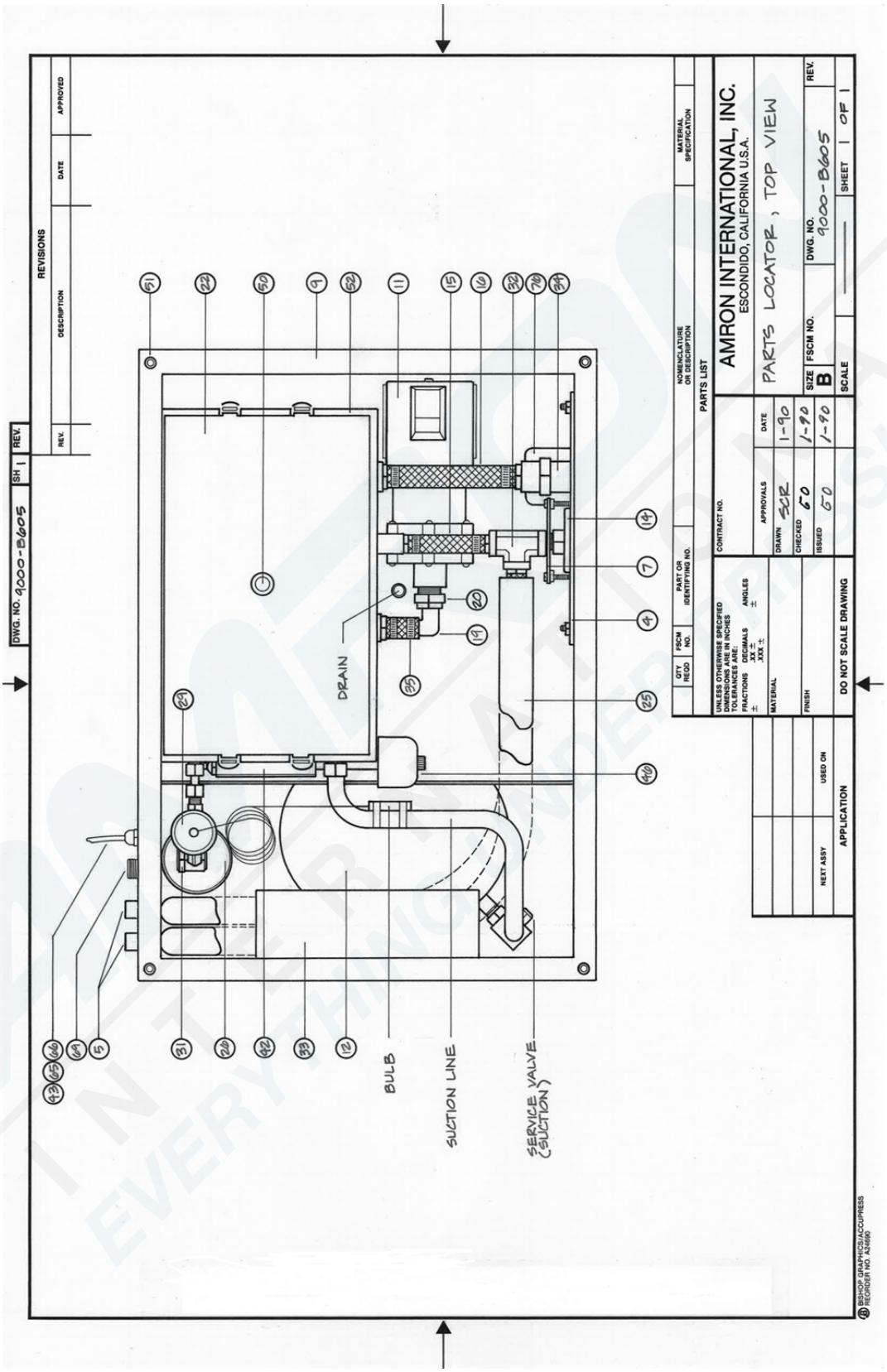
8.7 PARTS LOCATOR, FRONT VIEW



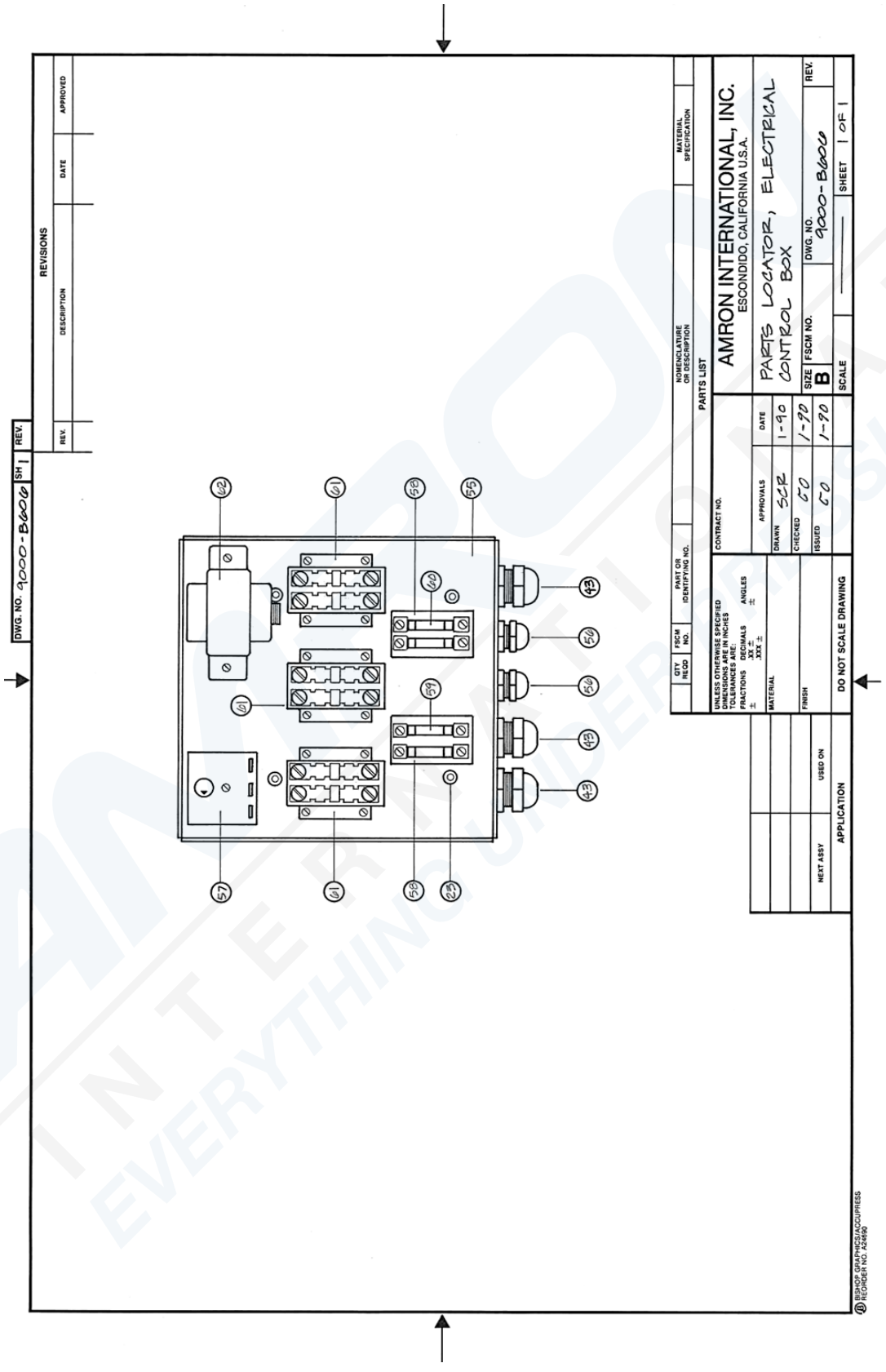
8.8 PARTS LOCATOR, REAR VIEW



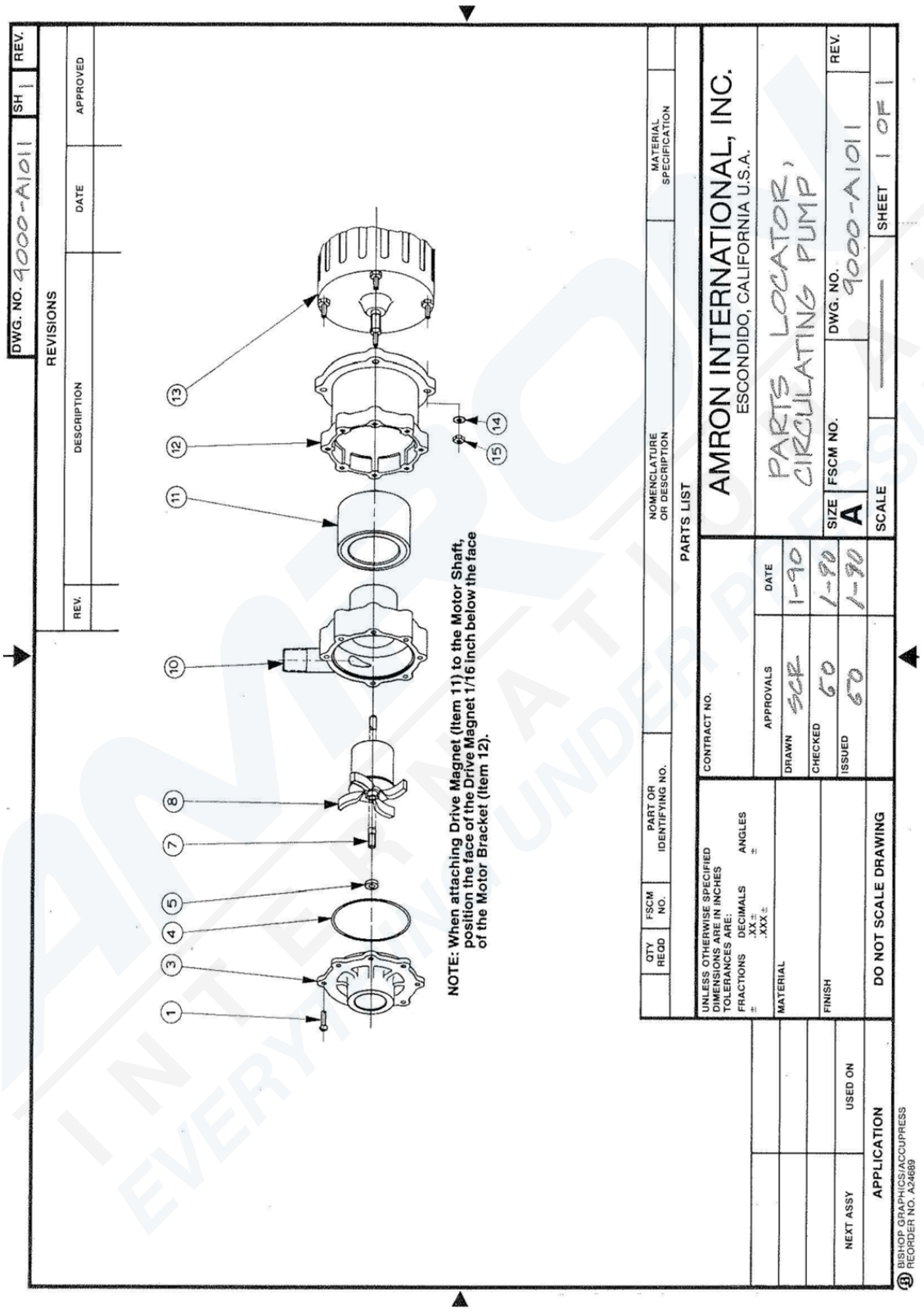
8.9 PARTS LOCATOR, TOP VIEW



8.10 PARTS LOCATOR, ELECTRICAL CONTROL BOX



8.11 PARTS LOCATOR, CIRCULATING PUMP P/N AC-5M-MD-230V



9. PARTS LIST GENERAL

The parts lists include both mechanical and electrical parts. The following information will be useful in interpreting data which is not self-explanatory.

REVISIONS

The parts lists in this manual are for the current model of diver communicator as of the printing date.

To Order Replacement Parts Contact:

Amron International, Inc.
1380 Aspen Way, Vista, California, 92081 U.S.A.
Telephone: (760) 208-6500 Fax: (760) 599-3857
Email: sales@amronintl.com
Web: www.amronintl.com

When ordering replacement parts, you should give as much information as possible to enable us to supply the correct part. This information should include the part number, description, reference designator, value, radio model number, and serial number. Failure to provide sufficient information may hinder our ability to fill your parts orders promptly and correctly.

9.1 9000-ECS ENVIRONMENTAL CONDITIONING SYSTEMS

IDENTIFIER	PART NUMBER	DESCRIPTION
1	9000-001	Cover, Front
2	9000-002	Cover, Rear
3	9000-003	Cover, Top
4	9000-004	Panel, Control
5	9000-009	Bracket, Fluid Connections
6	9000-010	Bracket, Connections Blank
7	9000-011	Bracket, Temp Gauge
8	9000-012	Cover, Fluid Filler
9	9000-020	Frame Assembly
10	A19ABC-24	Thermostat, -30 to 100 °F
11	AC-5M-MD-230V	Pump, 1/8 Hp, 230V
12	520-0020-01	Condensing Unit
13	1322-K33	Sight Check, Pressure, 3/4"Pipe
14	520-0021-01	Thermometer, Bi-Metal, 0/250, 3"Dial
15	0512-090	Tubing, braid, reinforced, 5/8"I.D.
16	0512-100	Tubing, Braid, reinforced, 3/4"I.D.
NS	125HBL-10-8	Hose Barb to male pipe, brass
NS	125HBL-12-12	Hose Barb to male pipe, brass
19	129HB-12-12	Hose Barb, 90 elbow, to male pipe
20	PTR-B-1 X 3/4	Pipe Thread Reducer, Brass
NS	2200P-8-8	Elbow, Female Pipe, 1/2"
22	9000-400	Sub Assembly, Reservoir
23	AKB2-1032-130	Insert, AK Series, Brass, 10-32
24	2350-0200	Bolt, Shoulder Eye, 1/4-20
25	RUBATEX 7/8X1/2	Insulation tube 7/8 X 1/2
29	EBFS-A-C-3/8X1/2	Expansion Valve 1 Ton R-404A
NS	R-404A-24	Freon, R-404A
32	2203P-8	Union Tee, Female 1/2" Brass
33	9000-500	Sub-Assembly, Electrical Control Box
34	GG-B-3/4	Pipe Connector-3/4" Brass
NS	269HB-10-8	Hose Barb, 90 elbow, brass beaded
35	5416K33	Hose Clamp, S/S 9/16 X 1 1/16
56	3210	Grommet, .25" (.6" Mtg. Hole)
NS	61210	Ring Terminal, #10 - 22-18 GA
70	5168	Switch, Seal Toggle Shaft

NS = Not Shown

9.2 9000-400 RESERVOIR, SUB-ASSEMBLY

IDENTIFIER	PART NUMBER	DESCRIPTION
NS	9000-007	Reservoir
NS	9000-008	Cover, Reservoir
38	WEL14A-603R	Well, Bulb, 1/2 NPT,
39	2E758	Heater 3000W 240 VAC 1IN NPSM
NS	9000-400-08	Bulkhead Union, 1/2" Brass
NS	9000-400-10	Bulkhead Union, 5/8" Brass
42	ECEB4X1. 5	Elect Conduit Ext. Box 4 X 1.5
43	3219	Grommet.230-.546 dia. Hole
NS	ECNP1/2X4	Elect Conduit, Nipple 1/2 X 4
NS	ECEL1/2	Elect Conduit Ell 1/2M-1/2F
46	A19ABC-4	Thermostat, 50 TO 130F
NS	9000-017	Copper Coil, Refrigerant
50	P-48B	Cap Plug, 1/2" Male NPT
51	AKB2-420-165	Insert, AK Series, brass,1/4-20
52	MFCCA-1/2	Foam Insulation for Reservoir
NS	8772	Cover, Electrical Quad
NS	125HBL-10-8	Hose Barb to Male Pipe
NS	125HBL-12-12	Hose Barb to Male Pipe
NS	HB1BL	Elect Box Cover 4" X 4" Hubbel

9.3 9000-500 ELECTRICAL, SUB-ASSEMBLY

IDENTIFIER	PART NUMBER	DESCRIPTION
56	3210	Grommet, .25" (.6" Mtg. Hole)
NS	3231	Bushing, Strain Relief
43	3219	Grommet.230-.546 dia. Hole
57	9000-5057	Delay Timer, Solid State
58	740-5313	Fuse Block, Screw Terminal
59	504-ABC-5	Fuse, 5 AMP Ceramic
60	504-ABC-15	Fuse, 15 AMP Ceramic
61	45EA20AJ	Contactor, DPDT 24 VAC
62	S84Z-401	Transformer, 24 VAC 40VA
NS	9000-021	Cover, Junction Box
64	9000-019	Bracket, Electrical Connection
55	9000-018	Plate, Junction Box Mounting
65	SO-14/3	Cableso-Type14 AWG3 Cond.
66	L6-20P	Plug, L6-20P
67	9000-5067	Switch, SPDT, ON-OFF-ON
68	9000-5068	Switch, DPDT, ON-OFF-ON
69	MS-3102A-14S-6S	MS Connector Bulkhead, 6 PIN F
NS	708-8195	Cable, 6 Conductor 18 AWG.
NS	68302	Slide Terminal, 1/4" 18/14 GA
NS	61310	Ring Terminal, #10 - 16/14 GA.
NS	61210	Ring Terminal, #10 - 22-18 GA
NS	61306	Ring Terminal, #6 -16/14 GA
76	4A238	Box, Electrical Duplex

NS = Not Shown

9.4 AC-5M-MD-230V CIRCULATING PUMP, 1/8 HP, 230V

IDENTIFIER	DESCRIPTION
1	Screw, #8 x 1 3/4 long
3	Cover
4	O-ring, Buna-N
4A	O-Ring, Vito
5	Ceramic Thrust Washer
7	Spindle
8	Impeller-magnet Assembly
8A	Impeller-Magnet Assembly W/Stainless Cover
8B	Impeller-Magnet Assembly W/Bronze Bushing
8C	Impeller-Magnet Assembly W/Cover & Bushing
10	Pump Housing
11	Drive Magnet Assembly
12	Motor Bracket
13	Motor, 220 Volt AC
14	Bracket Washer
15	Bracket Nuts

10. LIMITED WARRANTY AND SERVICE POLICY

Amron International, Inc.

LIMITED WARRANTY & SERVICE POLICY

LIMITED WARRANTY

AMRON INTERNATIONAL, INC., (Amron) warrants that its manufactured products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment as described in Amron's literature covering this product. Oxygen Treatment Hoods and accessories are excluded and limited to 90 days. Amron's obligation under this warranty is limited to the repair of or replacement, at Amron's option, of defective material. This warranty shall not cover defects which are the result of misuse, negligence, accident, repair or alterations.

SERVICE POLICY

For technical assistance or to request a repair, please complete one of the following:

- *Amron Communicator Repair* : https://www.amronintl.com/communicator-repair-form
- *Repair Request* (all other products): https://www.amronintl.com/repair-form
- Call (760) 208-6500, Monday – Friday, 8 a.m. to 5 p.m. PST.

Both MODEL NO. and SERIAL NO. are required fields to be entered on the *Amron Communicator Repair Request* form and can be found on the products identification label as shown below.

"Sample" Product Identification Label

Do not return any product without obtaining a RMR (Return Materials Request). Detailed return instructions will be provided at the time of request.

1380 Aspen Way, Vista California 92081-8349 U.S.A
Phone: (760) 208-6500 Fax (760) 599-3857
Email: sales@amronintl.com Web: www.amronintl.com