JOB AID
FOR THE
9,000 BTU/HR
ENVIRONMENTAL CONTROL UNIT

Expeditionary Power Systems

TAMCN

B0074

MODELS

GSQ346ZABNW00G1

GSQ346ZABNW00T1

NSN

4120-01-588-5664

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Table of Contents

Purpose....1
Description....2
Technical Characteristics....3
Safety Features....4
Setup/Installation....6
Operating Procedures....11
Troubleshooting....13
Associated Weapons Systems and Equipment....18
The Family of ECU....19
Pressure Temperature Chart....23
Environmental Control Unit Sizes....27

PURPOSE AND SCOPE

Expeditionary Power Systems

This Job Aid provides basic operating and troubleshooting instructions for the 9,000 BTU/Hr ECU TAMCN B0074. It includes description and procedures to employ the unit.

Use this job aid as a quick reference guide to assist you in operating the 9,000 ECU or training other personnel to operate the system.

NOTICE TO USER

This job aid does not replace the Operations/Maintenance Technical Manual (TM 11453A-OI/1). Refer to the technical manual for additional operating, testing procedures, maintenance instructions and general and specific safety precautions.

DESCRIPTION

Expeditionary Power Systems

9K BTU ECU Description:

The 9K BTU ECU (B0074) will replace the current 9K ECU (B0001) Shelter Mounted Air Conditioner.

The B0074 is capable of providing complete environmental control, to include cooling, heating, dehumidification, ventilation, and filtering for various types of portable military shelters or tactical vehicles.

The B0074 addresses a specialize need that certain units in the Marine Corp have for a highly mobile power and environmental control source.

9K BTU ECU (B0001)

9K BTU ECU (B0074)

TECHNICAL CHARACTERISTICS

Expeditionary Power Systems

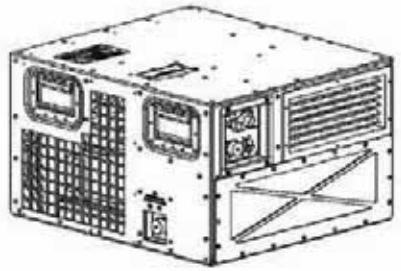
Power Requirements

Voltage:	110 – 130VAC
Phase:	Single
Frequency:	50/60 Hz
Power Consumption:	2,160 watts

Physical Characteristics

Height:	16.00 in.
Width:	23.75 in.
Depth:	26.67 in.
Weight:	187 Lbs

Capacity:	9,000 BTU/Hr
Refrigerant:	R-22
Refrigerant Charge:	1LB 14OZ
Air Flow:	370 CFM
Heating Capacity:	4,300 BTU/Hr, 120VAC
Design Maximum Ambient Temperature:	135°F
Minimum Ambient Cooling:	to 45°F
Minimum Ambient Heating:	to -25°F



SAFETY FEATURES

Expeditionary Power Systems

High Pressure Switch: The high pressure switch will shut off the compressor if the discharge pressure rises above a specific pressure.

Low/High Pressure Switch: The low pressure switch will disengage control power to the compressor contactor if suction pressure drops below a specific pressure.

NOTE: These pressure switches are installed as safety devices they are factory set and will help prevent compressor failure or other serious damage to the system components.

WARNING: *If the ECU begins to cycle on high or low pressure, the unit should be removed from service and have appropriate maintenance performed.*

SAFETY FEATURES Cont.

Pressure Relief Valve: The ECU is fitted with a relief valve that will discharge refrigerant should internal pressure exceed designed parameters.

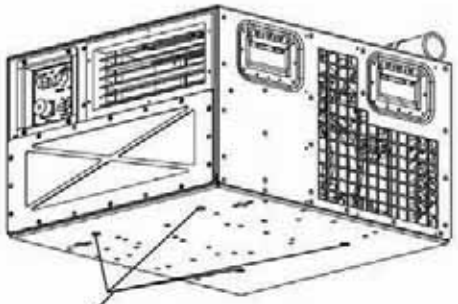
Overtemp Safety Switch: The ECU heater section is equipped with dual over-temp safety switches. If the temperature in the heater cabinet exceeds the set point of the switch (140°F), power to the heater elements will be interrupted.

SETUP/INSTALLATION

Expeditionary Power Systems

Unit Setup: The unit is to be installed through the side wall of a shelter with a minimum opening size of 16.25" high by 24.00" wide. The ECU should be supported from underneath on the outer side of the shelter. Four 3/8-24 threaded mounting holes are provided for securing the ECU. The ECU should be set in a level location for best operation, and should not be on an incline of greater than 10° in any direction.

WARNING: *This unit weighs 187 pounds. Injury can result if inadequate personnel or handling equipment is used for positioning, installation or transportation of the unit.*



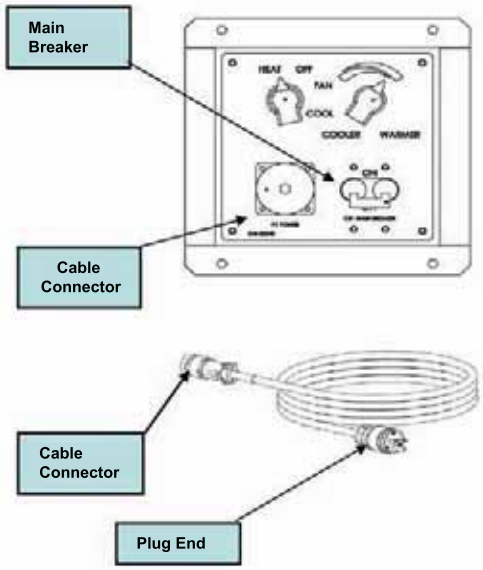
3/8-24X3/4 DP(4X) Mounting Holes

SETUP/INSTALLATION Cont.

Expeditionary Power Systems

Cable Installation:

Step	Action
1	Put the Main Circuit Breaker, found on the control panel, in the OFF position.
2	Attach the power cable connector to the external power connector located on the front of the ECU. Ensure the connector is securely tightened.
3	Connect the opposite end the plug end, to a 20 amp 120 VAC 50 or 60 Hz power source.

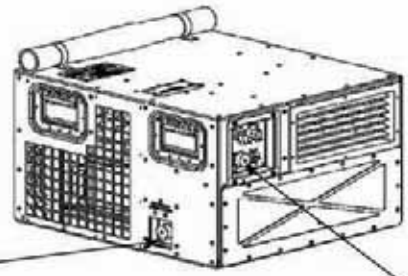


SETUP/INSTALLATION Cont.

Expeditionary Power Systems

Power Source Selection: The main power can be supplied to the unit from P1 on the front of the ECU or from P2 on the side of the ECU. (Unit delivered with P1 wired active).

DANGER: *This ECU operates on high voltage. DEATH or SERIOUS INJURY can result if proper safety procedures are not observed. Always disconnect the ECU from its power source prior to servicing.*



To use power from P2 (Side Power Plug) make sure the wires from the circuit breaker (CB1) are arranged so L1 is connected to terminal 2 on the power block (PB1) and N is connected to terminal 3. (Unit delivered with P2 disabled).

To use power from P1 (Front Power Plug) make sure the wires from the circuit breaker (CB1) are arranged so L1 is connected to terminal 6 on the power block (PB1) and N is connected to terminal 7. (Unit delivered with P1 wired active).

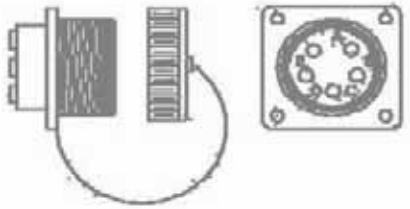
SETUP/INSTALLATION Cont.

Expeditionary Power Systems

Power Source Voltage: Main power can be supplied from 208Y service (3 power wires, 1 neutral wire, 1 ground wire) by:

Step	Action
1	Wire one power leg of the 208 to PIN (A) on the power connector.
2	Wire the neutral wire of the 208 to PIN (E) on the power connector.
3	Wire the ground wire of the 208 to PIN (D) on the power connector.

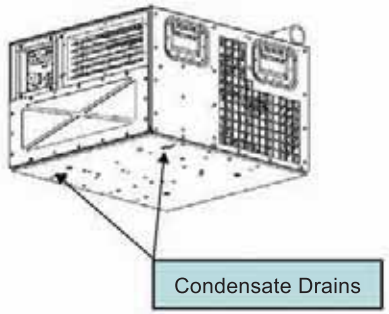
WARNING: *Connecting the ECU to a power source should only be done by qualified personnel.*

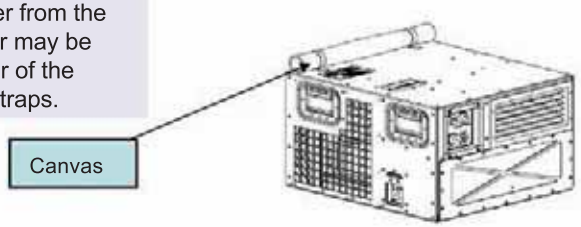


SETUP/INSTALLATION Cont.

Other Preparations:

Step	Action
1	Ensure that the condensate drains, found in the bottom of the ECU are unobstructed. A hose with a ½" NPT fitting may be attached to each drain coupling to route the water to a desired discharge location. P-traps should be installed on each drain line to insure proper condensate drainage.
2	Remove the protective canvas cover from the condenser fan discharge. The cover may be rolled up and secured to the exterior of the ECU with provided hook and loop straps.



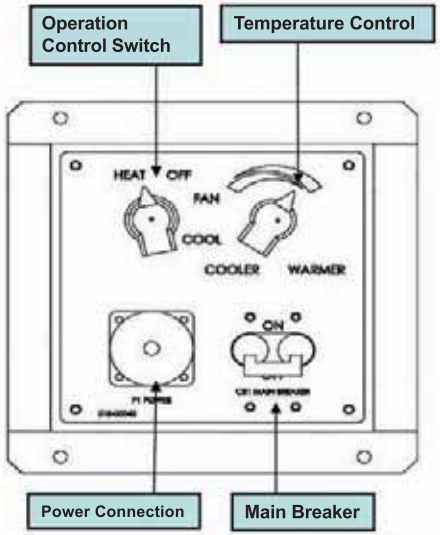


OPERATING PROCEDURES

Expeditionary Power Systems

Start-up Procedures:

Step	Action
1	Verify that the Operation Control Switch is in the OFF position.
2	Verify that 120 VAC, 1 Phase, 50/60 HZ power to has been properly connected to the ECU.
3	Turn the Main Circuit Breaker to “ON”.
4	Turn the Operation Control Switch to select mode option for ECU. a) The “COOL” mode selects cooling as required by the thermostat. The compressor will run continually. b) The “HEAT” mode furnishes heat controlled by the thermostat. c) The “FAN” mode circulates air without heating or cooling.
5	For Heat or Cool modes, adjust Temperature Control Knob to desired setting.



WARNING: *Make certain that the operation control switch is in the OFF position prior to turning the main circuit breaker ON.*

OPERATING PROCEDURES Cont.

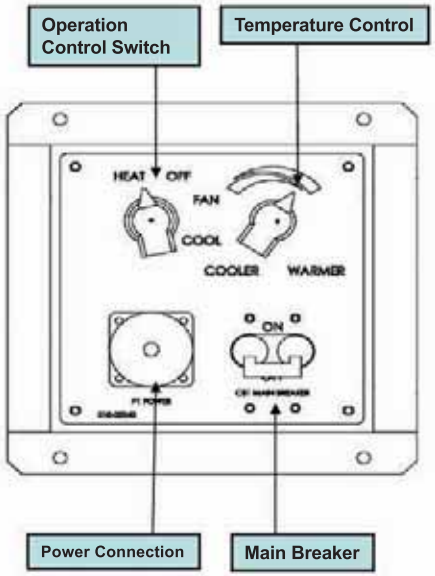
Expeditionary Power Systems

Shutdown Procedures:

Step	Action
1	Turn the Operation Control Switch to OFF.
2	Verify the unit's fan and compressor stops.
3	Turn Main Circuit Breaker to OFF.

Emergency Shutdown Procedures:

Step	Action
1	Turn Main Circuit Breaker to OFF.
2	Interrupt incoming power by disconnecting the power cord from the power source.
3	Disconnect the power cable from the ECU.



TROUBLESHOOTING

Expeditionary Power Systems

General: The following table provides a service technician with a basic guide to troubleshoot common problems with the ECU. While this table is not intended to be all encompassing, it does list the more common problems that may be encountered along with the possible causes and the suggested remedies.

DANGER: Troubleshooting must only be performed by qualified technicians. DEATH or SERIOUS INJURY can occur.

ECU Fails to Start:

Possible Cause	Remedy
Incorrect voltage.	Correct voltage.
Power failure.	Check power source, power input and circuit breaker. Check control cables and connections.
Correct power connection not selected.	Check that the attached Power connection is active (P1A/P1B).

TROUBLESHOOTING Cont.

Compressor Fails to Start:

Possible Cause	Remedy
Defective contactor.	Repair or replace. Check For overload.
Head pressure too high (high pressure switch open).	Check for condenser blockage. Check fan motor contactor.
Loss of refrigerant (low pressure switch open).	Repair leak, recharge system.
Defective thermostat control board (TST).	Replace board.
Defective compressor.	Replace compressor.

TROUBLESHOOTING Cont.

Expeditionary Power Systems

Noisy Compressor:

Possible Cause	Remedy
Worn or failed Compressor bearings (indicated by excessive knocking).	Replace compressor.

No Condenser Air Flow:

Possible Cause	Remedy
Overload trip.	Determine cause and repair.
Defective condenser fan control switch.	Replace switch.

TROUBLESHOOTING Cont.

Expeditionary Power Systems

Suction Pressor Too Low:

Possible Cause	Remedy
Expansion valve stuck in the open position (indicated by abnormally cold suction line).	Repair or replace valve.
Low charge, flash gas in liquid line (indicated by bubbles in sight glass).	Repair leak and recharge system.
Clogged filter/drier.	Replace filter/drier.
Obstructed expansion valve (indicated by loss of capacity).	Replace valve.
Loss of control fluid from expansion valve control head (indicated by bubbles in the sight glass).	Replace valve or control head.

TROUBLESHOOTING Cont.

Heater Fails to Operate:

Possible Cause	Remedy
Overload trip.	Determine cause and repair.
Defective over-temp switch.	Replace switch.
Defective contactor.	Replace contactor.

ASSOCIATED WEAPONS SYSTEMS AND EQUIPMENT

Expeditionary Power Systems

TAMCN	Model Number	Item Name
A0812	AN/TSC-85D(V1)	Tactical Satellite, Ground Mobile
A0814	AN/TSC-93b(V)	Satellite Com Term, Ground Mobile
C7007	COMMON 21	Shop Equipment, Contact Mobile

THE FAMILY OF ENVIRONMENTAL CONTROL UNITS

Expeditionary Power Systems

1.5 TON 18K BTU Environmental Control Unit

TAMCN: B0003

ID: 11080A

NSN: 4120-01-526-1588

MODEL: GS1H43ZAANWY001

POWER: 208 VAC, 3 Phase, 50/60 Hz

Power Consumption: 3Kw/5Kw

HEIGHT: 20.00 in

WIDTH: 30.00 in

DEPTH: 28.25 in

WEIGHT: 236 lbs

Technical Manual: TM 11082A-OI

Supply Instruction: SI 4120-OI/3A

THE FAMILY OF ENVIRONMENTAL CONTROL UNITS

Expeditionary Power Systems

3 TON 36K BTU Environmental Control Unit

TAMCN: B0014

ID: 11082A

NSN: 4120-01-526-2397

MODEL: GL0343ZAADWYX01

POWER: 208 VAC, 3 Phase, 50/60 Hz

Power Consumption: 9.6 Kw

HEIGHT: 42.44 in

WIDTH: 47.62 in

DEPTH: 37.00 in

WEIGHT: 485 lbs

Technical Manual: TM 11082A-OI

Supply Instruction: SI 4120-OI/3A

THE FAMILY OF ENVIRONMENTAL CONTROL UNITS

Expeditionary Power Systems

5 TON 60K BTU Environmental Control Unit

TAMCN: B0008

ID: 11084A

NSN: 4120-01-526-1060

MODEL: GL0543ZAADWYX01

POWER: 208 VAC, 3 Phase, 50/60 Hz

Power Consumption: 11 Kw

HEIGHT: 47.44 in

WIDTH: 47.62 in

DEPTH: 37.00 in

WEIGHT: 575 lbs

Technical Manual: TM 11084A-OI

Supply Instruction: SI 4120-OI/3A

THE FAMILY OF ENVIRONMENTAL CONTROL UNITS

Expeditionary Power Systems

10 TON 120K BTU Environmental Control Unit

TAMCN: B0010

ID: 11079A

NSN: TBD

MODEL: GL1043ZAADWYXGO

POWER: 208 VAC, 3 Phase, 50/60 Hz

Power Consumption: 14 Kw

HEIGHT: 39.25 in

WIDTH: 34.00 in

DEPTH: 75.00 in

WEIGHT: 715 lbs

Technical Manual: TBD

Supply Instruction: SI 4120-OI/3A

PRESSURE TEMPERATURE CHART

Expeditionary Power Systems

Tools of the Refrigeration Trade

The pressure/temperature chart is a tool which is used by HVACR technicians when they are checking the refrigeration circuit. Refrigeration circuits can be found in air conditioners, heat pumps, refrigerators, freezers, walk-in coolers, walk-in freezers, chillers, process cooling systems, and transport refrigerated trailers. It is necessary to know the corresponding temperature to pressure or the corresponding pressure to the temperature of the systems. These readings, using the PT chart, a set of manifold refrigeration gages, and temperature sensors are used to determine if the unit is properly charge or if there is a problem with the refrigeration circuit.

A good HVAC technician can determine if the refrigeration circuit has the proper charge, if there is a problem with the compressor, or if there is a problem with migrating oil in the refrigeration circuit just to name a few of the problems which can be found using the tools of the refrigeration trade. Using proven methods such as the superheat method or sub-cooling method a problem with the refrigeration system can be determined and action taken to correct the problem. To determine superheat or sub-cooling, a set of refrigeration gages, a temperature sensing device, and a PT chart is needed. In the hands of a good technician these tools are invaluable at ensuring the system is trouble free and working at optimum levels.

PRESSURE TEMPERATURE CHART

Expeditionary Power Systems

PSIG corresponds to refrigeration temperature. Pressure Temperature Chart represents the most common refrigerants used today.

PSIG	R-22	R-134A	R-410A		PSIG	R-22	R-134A	R-410A
0	-41	-15	-60		**78**	46	75	20
2	-37	-10	-58		**80**	48	76	21
4	-32	-5	-54		**85**	51	79	24
6	-28	-1	-50		**90**	54	82	26
8	-24	3	-46		**95**	56	85	29
10	-20	7	-42		**100**	59	88	32
12	-17	10	-39		**105**	62	90	34
14	-14	13	-36		**110**	64	93	36
16	-11	16	-33		**115**	67	96	39
18	-8	19	-30		**120**	69	98	41
20	-5	22	-28		**125**	72	100	43
22	-3	25	-26		**130**	74	103	45
24	0	27	-24		**135**	76	105	47
26	2	30	-20		**140**	78	107	49

PRESSURE TEMPERATURE CHART Cont.

Expeditionary Power Systems

PSIG	R-22	R-134A	R-410A		PSIG	R-22	R-134A	R-410A
28	5	32	-18		**145**	81	109	51
30	7	35	-16		**150**	83	112	53
32	9	37	-14		**160**	87	116	57
34	11	39	-12		**170**	91	120	60
36	13	41	-10		**180**	94	128	64
38	15	43	-8		**190**	98	127	67
40	17	45	-6		**200**	101	131	70
42	19	47	-4		**210**	105	134	73
44	21	49	-3		**220**	108	137	76
46	23	51	-2		**225**	110	139	78
48	24	52	0		**235**	113	142	80
50	26	54	1		**245**	116	145	83

PRESSURE TEMPERATURE CHART Cont.

Expeditionary Power Systems

PSIG	R-22	R-134A	R-410A		PSIG	R-22	R-134A	R-410A
52	28	56	3		**255**	119	148	85
54	29	57	4		**265**	121	151	88
56	31	59	6		**275**	124	153	90
58	32	60	7		**285**	127	155	92
60	34	62	8		**295**	130	158	95
62	35	64	10		**305**	133	161	97
64	37	65	11		**325**	137	167	101
66	38	66	13		**355**	144	173	108
68	40	68	14		**375**	148	177	112
70	41	69	15		**405**	155	182	118
72	42	71	16		**500**	173	202	134
74	44	72	17		**600**	X	X	149
76	45	73	19		**700**	X	X	159

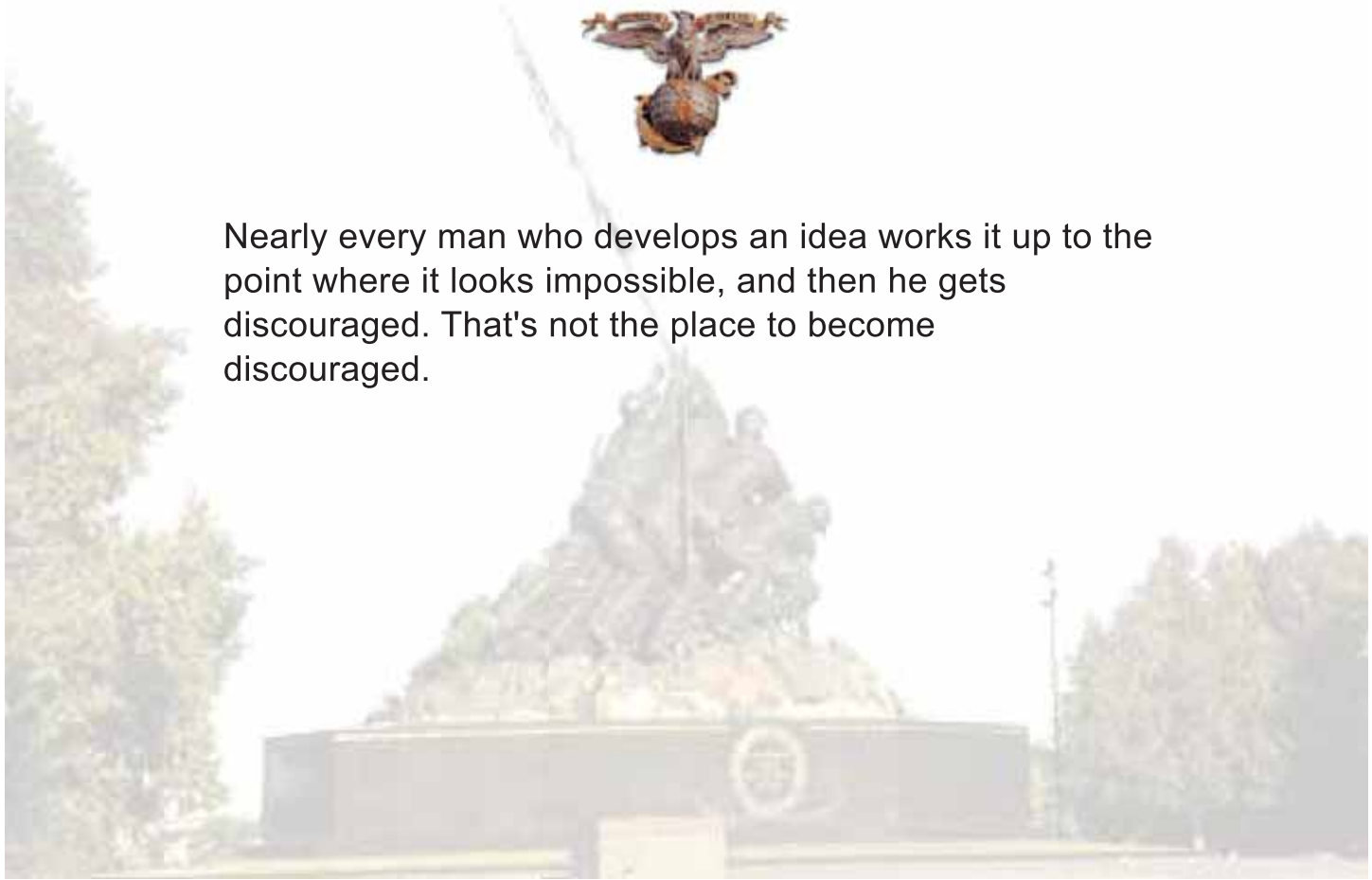
ENVIRONMENTAL CONTROL UNIT SIZES

Expeditionary Power Systems

TONS	BTU
1.5 ton	18,000 BTU
2 ton	24,000 BTU
2.5 ton	30,000 BTU
3 ton	36,000 BTU
3.5 ton	42,000 BTU
4 ton	48,000 BTU
5 ton	60,000 BTU
10 ton	120,000 BTU

For more information on the family of ECU's

Refer to the current version of TM12359A-OD/A



Nearly every man who develops an idea works it up to the point where it looks impossible, and then he gets discouraged. That's not the place to become discouraged.