EDH™–4
Air Dehydrator

Part Number: Rack Mounted 18021
Wall Mounted 17982
NEMA 18250
Manual 18063
April, 2010

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SAFETY INFORMATION AND WARNING SUMMARY

Read and become familiar with the safety information below.

Abnormal Odor or Smoke

In the event of smoke or an abnormal odor, immediately interrupt power to the EDH-4 with the POWER switch at the rear of the unit, unplug the unit, or trip the circuit breaker controlling the outlet.

Lethal Voltages Present

There are lethal voltages present inside the case of the EDH-4. Service should be performed by qualified personnel only. There are no user serviceable components inside the chassis.

Pneumatic

The air pumps in the EDH-4 Air Dehydrator are capable of generating as much as 1.2 psig (82.7 mbar). Proper safety practice requires treating all pneumatic components with care. Always vent the system to atmospheric pressure before servicing pneumatic components.

Rack Mounting

Before rack mounting the EDH-4 ensure that rack is stable. Verify adequate air flow and power supply capacity is available to the unit. Ensure that EDH-4 maximum operating temperature of 130°F(55°C) will not be compromised by other components in rack. Ensure reliable grounding of EDH-4.

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INTRODUCTION

Purpose

Unpressurized dielectric transmission lines allow the entry of moist ambient air through leaking seals, penetrations and cracks. When the line passes from one environment to another (such as when entering a shelter from the antenna outside) or when there is a change in existing environmental conditions (such as a weather front, or nightfall) the pressure and/or temperature changes in the air will result in the collection of water. This is normally the result of the ambient temperature dropping below the dew point. Water in transmission lines causes corrosion, voltage arcing and increased VSWR. These conditions reduce system performance.

The EDH-4 Low Cost Air Dehydrator prevents the accumulation of moisture in dielectric lines by maintaining the pressure and humidity of the air in the line. Supplying low pressure dry air, the EDH-4 keeps waveguides, air dielectric coaxial cable and other related components used in earth stations, terrestrial UHF and microwave communication systems dry. The EDH-4 is intended for use in small volume C, X, Ku, and Ka band applications. For larger applications, please contact Customer Service for information on the ADH NETCOM family of automatic air dehydrators.

Description

The EDH-4 is a nonregenerative air dehydrator. Air is pressurized by a twin piston type pump and then dehydrated by passing it through an absorption unit containing a drying agent. The dried air is then delivered to the communications equipment through a 1/4" hose barb fitting on rack and wall mount units and through a 1/8" NPT female fitting on the NEMA unit. The moisture is removed from the drying agent manually (see Renewing the Desiccant in the Maintenance section of this manual). The EDH-4 provides dry air regulated between 0.3 psig (20.7 mbar) to 0.5 psig (34.5 mbar) and is capable of delivering 6 cubic feet of air per hour (2.8 l/m). Under normal conditions, the maximum dew point of the air is -40°C and nominally -70°C.

Physically, the EDH-4 occupies three spaces of a standard relay rack. No other peripheral equipment is required on rack mount units. Wall mount units include “Z” brackets to attach the rack panel to the wall. NEMA units ship mounted in a NEMA 3R enclosure.

INTRODUCTION (continued)

Pressure display is user selectable to SI or English customary units. Both pressure and alarm information are shown on a wide viewing angle LED digital display. The EDH-4 makes use of two alarm relays. The first alarm relay is a renew desiccant alarm; the second alarm relay indicates one or more summary alarms. The desiccant contains an orange coating which turns white when the desiccant requires renewal.

Users must manually renew or replace the desiccant as required - typically every six months to two years depending on system leakage and environmental conditions.

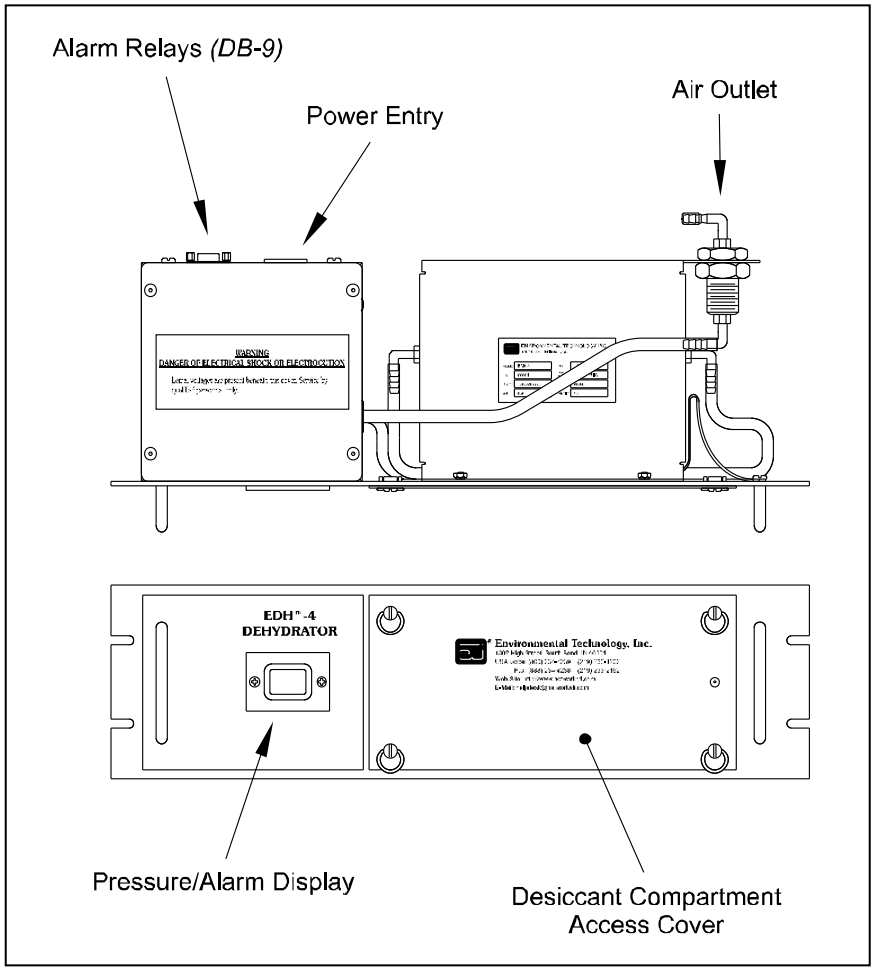

Figure 1. EDH-4 COMPONENTS

INSTALLATION

Unpacking/Packing

Immediately inspect the shipping container and packing material for damage. Unpack the EDH-4, taking care not to damage the cushioning materials. Save the shipping container and related materials until normal operation has been established.

Inventory List

Verify the package contains the parts listed for EDH-4 version ordered.

Rack Mount

QUANTITY	PART NUMBER	DESCRIPTION
1	18021	EDH-4 Dehydrator
1	18063	EDH-4 Instruction Manual (this document)

Wall Mount

QUANTITY	PART NUMBER	DESCRIPTION
1	18021	EDH-4 Dehydrator
1	17982	EDH-4 Wall Mount Adapters
1	18063	EDH-4 Instruction Manual (this document)

NEMA

QUANTITY	PART NUMBER	DESCRIPTION
1	18250	EDH-4 NEMA Dehydrator
1	18063	EDH-4 Instruction Manual (this document)

INSTALLATION (continued)

Additional equipment required for installation

Tubing and Fittings - The EDH-4 comes equipped standard with a 1/4" hose barbed fitting which accepts 1/4" I.D. flexible tubing. On NEMA units, a 1/8" NPT female fitting is used. Special fittings and tubing can be purchased from ETI. Contact Customer Service for details.

Initial Inspection

Inspect the EDH-4 for electrical and mechanical damage. If any of the following problems is found, contact the Customer Service Department.

- Contents incomplete or incorrect
- Internal or external mechanical damage
- Defective operation

Customer Service is available between 8:00 a.m. and 5:00 p.m. EST (UTC minus 5 hours) at (574) 233-1202 or (800) 234-4239. In the event of shipping damage, keep the packing materials for inspection by the carrier.

Location

The rack mounted EDH-4 requires a relay rack panel space of 19 inches by 5-1/4 inches (see Figure 2). As the EDH-4 seldom requires operator attention, a location in the lower portion or extreme upper portion of the relay rack should be considered.

The wall mount version requires an area of approximately 6 inches high by 24 inches wide (15 cm by 61 cm) and will project almost 10 inches (25.4 cm) from the wall. The NEMA version requires an area of approximately 13 inches high by 24.5 inches wide (33 cm by 62.2 cm) and will project about 12.5 inches (31.8 cm) from the wall. Plan your installation so that the EDH-4 will not interfere with normal traffic patterns at your site. Ensure the mounted unit will have sufficient clearance around the unit to facilitate access to the power, alarm relay and pneumatic connections.

INSTALLATION (continued)

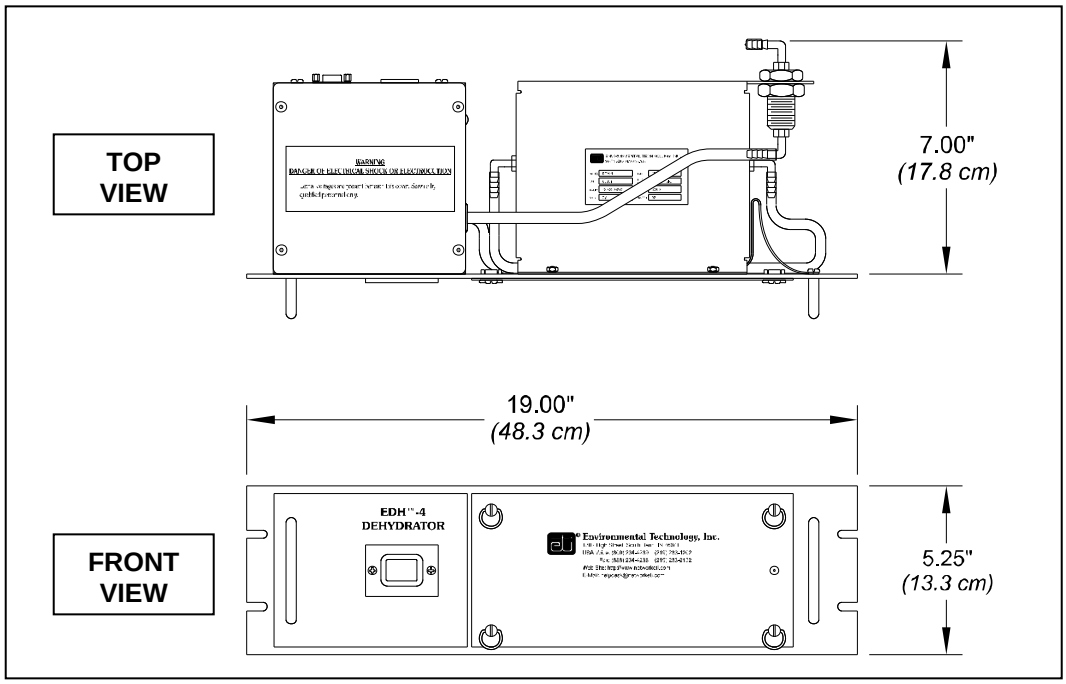

Figure 2. RACK MOUNTING DIMENSIONS.

The mounting brackets will accommodate fasteners up to 1/4 inch (6.3 mm) in diameter. The choice of anchors and companion hardware should be appropriate for the mounting surface. At least four anchors should be used and each should be capable of supporting a combined load of at least 5 pounds (2.4 kg) for a wall mounted unit. Mounting anchors for a NEMA unit should be capable of supporting a combined load of at least 48 pounds (24 kg). The location of the mounting points is shown in Figure 3.

Note: This unit produces a slight vibration due to rotating components. This may lead to fatigue and possible failure of the mounting system or wall material. Please consider this when planning your installation.

Note: The EDH-4 NEMA is permanently connected equipment and does not have a quick disconnect device. A readily accessible disconnect device and a short circuit / overcurrent device rated 20 amps maximum should be provided in the building.

INSTALLATION (continued)

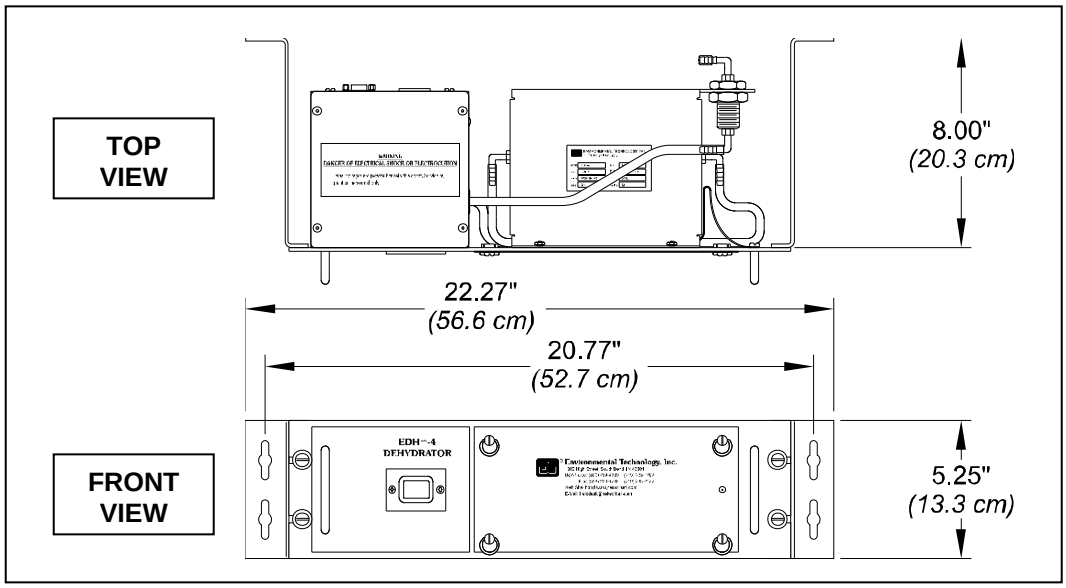

Figure 3. WALL MOUNTING DIMENSIONS.

Principal Considerations

The EDH-4 works best supplying dry air in a flowing system, where the dehydrator completely replaces the air on a regular basis. Consequently, the equipment being supplied dry air should be slightly leaky. For a waveguide, this is best accomplished by slightly opening a purge valve at the window end of the system. Likewise, air dielectric coaxial cable should be equipped with a valve at the far end which can be set to allow a small leak. Many systems will have sufficient normal leakage that such actions will be unnecessary.

The EDH-4 also has check valves in the air path. A tightly sealed system may experience a pressure increase, such as from solar gain, with a rise in ambient temperature. The unit has no way to reduce such a pressure buildup.

INSTALLATION (continued)

Power Connection

The EDH-4 operates from either 120 VAC or 230 VAC at 50/60 Hz. An internal line operated relay sets circuitry to operate from the proper supply voltage. This eliminates the need to set voltage during the installation or having to purchase different units for different power requirements.

The EDH-4 rack and wall mount units require a standard outlet (North American: NEMA 5-15R) no further than 6 feet (1.8 m) from the power entry point at the back of the unit. The EDH-4 NEMA unit requires a permanent connection and requires a quick disconnect device. A readily accessible disconnect device and a short circuit and overcurrent device rated 20 amps maximum should be provided in the building. A 0.875 inch (22.2 mm) hole is provided in the bottom of the NEMA enclosure for a conduit connection for supplying electrical power. See Figure 4. Ensure conduit connection is suitable for preventing the accumulation of water and dust within the enclosure. The EDH-4 does not incorporate a power switch and the unit will be energized as soon as power is connected to the unit. The power cord contains a ground lead, but it is recommended that the unit also be connected to true earth ground using the lug next to power entry module.

Pneumatic Connection

Rack and wall units are supplied with a 1/4" barbed male fitting. Slip the supply tubing over the outlet barb engaging all the ridges. The fit should be tight enough that a clamp or cable tie is not required although its use is recommended. The NEMA unit provides a 1/8" NPT female fitting at the bottom of the unit. Special accessories including distribution manifolds, a variety of pressure fittings and tubing are available from Customer Service.

INSTALLATION (continued)

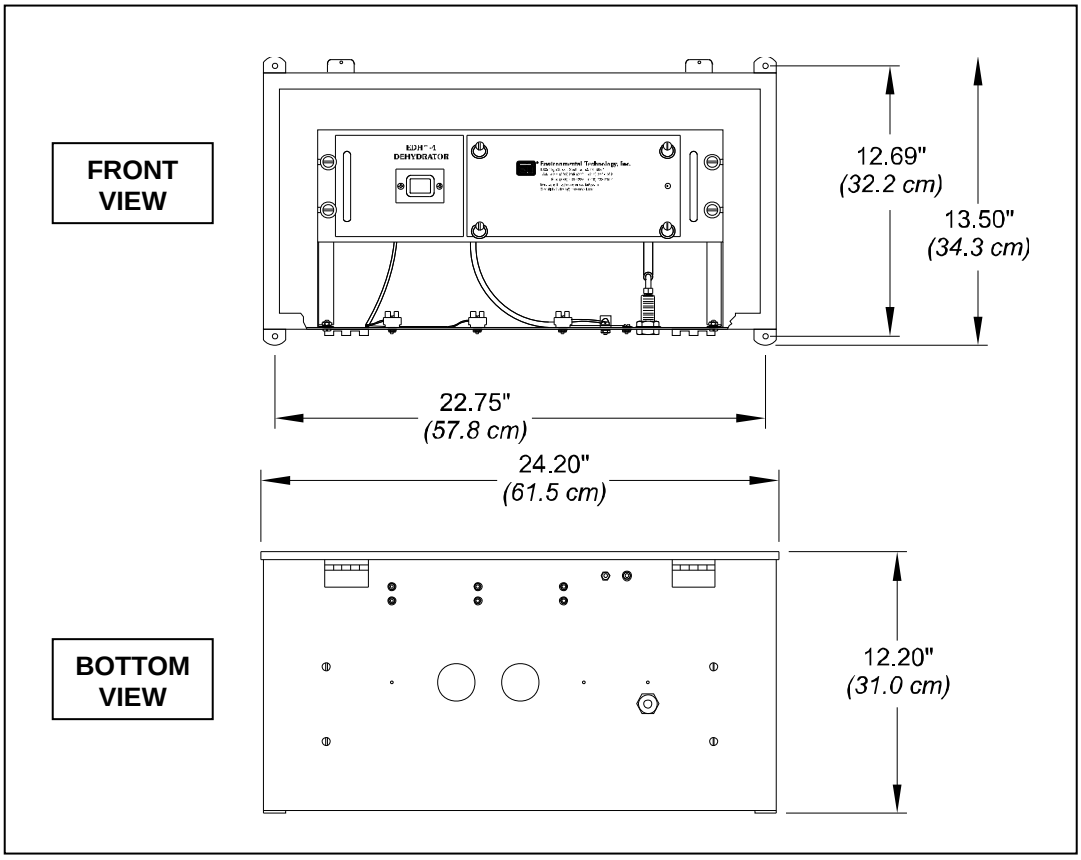

Figure 4. NEMA BOTTOM MOUNTING DIMENSIONS.

OPERATION

Controls

The EDH-4 makes use of only a single switch. The switch is located inside the desiccant bottle enclosure. This switch allows the user to change display units, to display percentage of time left until the desiccant should be renewed, and to reset the time for the renew desiccant timer.

Indicators

The front panel display is comprised of two digits that show pressure and status information. Pressure may be displayed in either English customary units or SI units, with English being the default. The display units may be switched by depressing the pushbutton switch just inside the desiccant enclosure when applying power to the unit. While units are set to English, usually no decimal point is displayed. In other words, the unit will display 99 for 0.99 psig, the maximum displayable pressure in English customary units. The maximum displayable pressure while in SI units is 99 mbar.

In the event of an alarm condition, an alarm code will be displayed. See Table 1. If no alarm conditions exist, only the system pressure will be displayed.

The front panel display may also be used to display percent of time until the desiccant regeneration timer will trigger an alarm condition. To display the timer, momentarily depress the pushbutton just inside the desiccant enclosure while unit power is on. To reset the timer, hold pushbutton in for more than five seconds.

Display	Alarm
CC	Desiccant Renewal
HF	Low Temperature
FF	Leaky System
F1	Low Pressure
un	Initialization Error

Table 1. ALARM CODES.

OPERATING PROCEDURES

Automatic Operation

The EDH-4 will commence operation when power is applied. The unit will automatically regulate the system pressure between 0.3 psig (20.7 mbar) and 0.5 psig (37.5 mbar).

Alarm Relays

Two alarm relays are available through a DB-9 female connector located on the rear of the EDH-4. See Table 2 for pin out definition. One of the alarm relays is a summary alarm and closes when any of the following conditions is met:

1. Low temperature within electronics housing; internal temperature falls below 0°C.
2. Excessive run time; the pump runs continuously for more than four hours.
3. Low pressure; the system pressure falls below 0.20 psig (13.8 mbar) for 25 continuous seconds.

Pin	Description
1	Desiccant Alarm Relay Normally Open
2	Desiccant Alarm Relay Normally Closed
3	Not used
4	Summary Alarm Relay Normally Open
5	Summary Alarm Relay Normally Closed
6	Desiccant Alarm Relay Common
7	Not used
8	Not used
9	Summary Alarm Relay Common

Table 2. ALARM RELAY CONNECTOR PIN ASSIGNMENTS.

The summary alarm will continue as long as any of these conditions exists. When all conditions have been cleared, the alarm will reset. The second alarm relay closes when the renew desiccant timer signals a need to replace or regenerate the desiccant. This alarm is reset by depressing the pushbutton inside the desiccant enclosure and holding for more than five seconds. Both relays close at power off.

EMERGENCY PROCEDURES

Abnormal Smoke or Odor

Immediately interrupt the power to the unit by unplugging the unit or by tripping the breaker on the power circuit. The transformer contains fuse links that operate in the event of excessive current or temperature.

Ruptured feed window

A ruptured feed window makes it impossible to maintain pressure in the system. In addition, this condition makes it possible for water to flow into the dehydrator in the event of heavy rain. If this problem occurs, immediately remove power from the unit. The outlet check valve will prevent back flow into the unit.

The EDH-4 will stop trying to pressurize a system if the compressor runs for four hours continuously. To restore normal operation, momentarily interrupt power to the unit.

TECHNICAL DESCRIPTION

Electronic

The power supply in the EDH-4 makes use of an automatic voltage sensing relay. This internal line operated relay sets circuitry to operate at the proper supply voltage.

The EDH-4 processor consists of a single integrated circuit that requires almost no support circuitry. The processor controls pump operation to regulate system pressure, monitors electronics enclosure temperature, and monitors compressor run time. The device carries the control software in onboard ROM. The front panel LED display is controlled by a device driver which receives display information from the processor. An onboard EEROM is used to accumulate compressor run time and to store display mode.

Pneumatic

The pneumatic system from the pump to the unit's outlet operates at the system pressure. The air pump is a twin piston type compressor. Air is drawn into the pumps, compressed, and delivered to the system. After passing through the absorption unit, the air passes through a check valve. The check valve prevents reverse flow through the pump and ensures that pressure is maintained even in the event power is lost. The dried air is then delivered to the outlet.

Theory of Operation

The EDH-4 consists of a control loop controlling system pressure and a second loop monitoring run time since the last desiccant replacement or regeneration. The pressure control loop is composed of the air pump, the pressure transducer, and the main microprocessor. The outlet pressure is monitored. When the pressure drops to the low limit, the air pump is started and system pressure increases until the processor obtains a high limit reading from the transducer. At this point, the pump is stopped and the loop is complete.

The running time for the compressor is accumulated and stored in the EEROM. When 1,000 hours have been recorded, a Renew Desiccant (CC) alarm is issued to indicate a need to regenerate or replace the desiccant.

MAINTENANCE

Periodic Maintenance

The EDH-4 uses a granular desiccant consisting of Amorphous Alumino silica gel coated with an orange iron compound indicator. The silica gel granules turn white when spent to indicate the need to renew the desiccant. The renew desiccant alarm appears when 1,000 hours have accumulated on the pump. Normally, the desiccant requires renewal every 12 to 18 months. The exact interval depends on system tightness and environmental conditions. Monthly visual inspection of the desiccant is recommended.

The EDH-4 requires no preventive maintenance.

Renewing the Desiccant

Safety Note: Servicing should be performed by qualified personnel. The desiccant used in the EDH-4 Dehydrator is an Amorphous Alumino silica gel. Care should be taken to prevent the dust from entering the respiratory tract or the eyes. Utilize proper eye protection, suitable gloves, and use approved respiratory protection and general ventilation while servicing. The unit may produce pressures as high as 1.2 psig (82.7 mbar) under worst case failure. Vent the system to atmosphere before servicing pneumatic components.

The desiccant bottle on the EDH-4 is accessible through the front panel. To access the desiccant, turn each of the four D-rings a quarter turn counterclockwise (CCW) and remove the access cover. Slide bottle forward until tubing can be removed and remove tubing before completely removing the bottle from the unit. After hosing is removed, remove the desiccant bottle from the unit and remove bottle cap. This may require some force. Remove the grey foam filter from the bottle, taking care not to tear or otherwise damage the filter. If necessary, dry the filter. Save the filter for reinstallation.

If replacing the desiccant, properly dispose of the old desiccant. If regenerating desiccant, empty desiccant into clean baking dish. Bake desiccant at 250°F in a conventional oven for two hours, stirring every 30 minutes, or until silica gel particles turn orange. Do not use a microwave oven. After silica gel particles have turned orange, remove desiccant from oven and allow desiccant to cool to room temperature. Desiccant should either be returned to the desiccant bottle or placed in another airtight container as soon as it reaches room temperature to prevent the collection of moisture from surrounding air.

MAINTENANCE (continued)

Fill the bottle with the new or regenerated desiccant. Reinstall grey foam filter. Reinstall the original bottle cap taking care not to disturb the adapter fitting. Both adapter fitting and bottle top should be secured tightly to prevent leakage which may lead to reduced desiccant service life. Slide bottle slightly back into compartment and reattach tubing. Slide remainder of bottle into the compartment. Reset the Renew Desiccant timer by depressing the pushbutton just inside the compartment and holding for more than five seconds while power is on to the unit. Reinstall access cover.

Returns and Replacement Parts Purchases

Prior to removing equipment for return, please contact ETI at (800) 234-4239 for troubleshooting assistance.

Before returning the unit to Environmental Technology, Inc., obtain a return authorization number from our Customer Service Department between 8:00 a.m. and 5:00 p.m. Eastern Time (UTC minus five hours) at (574) 233-1202 or (800) 234-4239.

Replacement Parts List

PART NUMBER	DESCRIPTION
18138	Replacement Desiccant

TROUBLESHOOTING

Troubleshoot the EDH-4 Air Dehydrator using the information below.

PROBLEM (ALARM CONDITION)	ACTION	COMMENTS
Nothing works	Verify the unit has power.	Ensure supply power is available to the unit.
Low Pressure (Alarm F1)	Disconnect feed tube from air outlet.	Pump should operate continuously.
	If no pump operation, check pump electrical connections.	Pump has failed or circuit board has failed.
	Block the air outlet and verify whether the unit reaches the correct operating pressure. If continued no or low pressure with air outlet blocked, check internal air path for leaks or blockage.	If no blockage or leakage is detected, the pump or the circuit board has failed.
	Check customer equipment for leakage.	
	Check air flow through pump inlet filter.	
Leaky System (Alarm FF)	If unit pressure reads less than 0.2 psig (16.8 mbar), check internal air path for leakage.	If no blockage or leakage is detected, the pump or the circuit board has failed.
	Check customer equipment for leakage.	
	If pressure reads more than 0.5 psig (37.5 mbar), check the air path inside the unit for blockage.	

TROUBLESHOOTING (continued)

PROBLEM (ALARM CONDITION)	ACTION	COMMENTS
Low Temperature (Alarm HF)	Verify that the electronic enclosure temperature is above 0°C. If the equipment room temperature is below 0°C, allow the unit to run for 30 to 60 minutes to allow the enclosure heaters to raise the internal temperature.	Should clear alarm condition unless circuit board has failed.
Desiccant renewal required (Alarm CC)	Visually inspect desiccant bottle. If the silica particles are orange, reset the desiccant alarm by pressing and holding the pushbutton for at least five seconds. Note that resetting the desiccant alarm will restart the counter to 1,000 hours. Monthly inspections are suggested.	Pushbutton is located just inside the desiccant compartment.
	If the silica particles are white, renew the desiccant.	Refer to the Maintenance section of this manual.
Initialization Error (Alarm un)	Re-try initialization.	Circuit board has failed.

APPENDIX A – SPECIFICATIONS

Designation

EDH-4 Low Cost Air Dehydrator

Part Number

Rack Mount - 18021
Wall Mount - 17982
NEMA - 18250

Maximum dew point	Below –40˚F (–40˚C)
Pressure range	0.3 psig to 0.5 psig (20.7 to 34.5 mbar)
Air discharge pressure	0.5 psig (34.5 mbar)
Air discharge flow rate (max.)	6.0 scfh (2.8 l/min)
Supply voltage	120/230 VAC, 50 or 60 Hz
Power requirements	92 V A maximum
Regeneration method	Manual drying agent replacement
Low pressure alarm relay	SPDT (low voltage)
Desiccant replacement alarm relay	SPDT (low voltage)
Operating temperature range	–40˚F to 130˚F (–40˚C to 55˚C)
Storage temperature range	–40˚F to 150˚F (–40˚C to 60˚C)
Dimensions (rack mount)	19" x 5.25" x 7" (48.3 cm x 13.3 cm x 17.8 cm)
Dimensions (wall mount)	22.27" x 5.25" x 8" (55.6 cm x 13.3 cm x 20.3 cm)
Dimensions (NEMA mount)	24.2" x 13.5" x 12.2" (61.5 cm x 34.3 cm x 31 cm)
Weight (rack and wall mount)	Approximately 5 pounds (2.4 kg)
Weight (NEMA mount)	Approximately 48 pounds (24 kg)
Discharge Port	1/8 inch (3.2mm) NPT female fitting (NEMA), 1/4 inch (6.4mm) hose barb (rack and wall mount)
Data displays	Pressure, Error Codes
Alarm relay capacity	2 Amp @ 30V dc
Mounting method	Standard relay rack mount (3U) or wall mount
Number of discharge ports	1
Air pressure indication	Digital display (psig SI)
Relay connection	DB-9 female connector
Reliability	MTBF − 100,000 hours

APPENDIX B – ALARMS

DISPLAY	MEANING
CC	Desiccant Renewal: Compressor timer has accumulated 1,000 hours.
HF	Low Temperature: Electronic enclosure internal temperature below 0°C.
FF	Leaky System: Compressor runs continuously for more than four hours.
F1	Low Pressure: Unit pressure below 0.2 psig (13.8 mbar).
un	Initialization Error: Failed memory check during initialization.

QUESTIONS AND COMMENTS

For technical help, questions or comments concerning this product or any of Environmental Technology, Inc. products, contact the Customer Service Department between 8:00 a.m. and 5:00 p.m. Eastern Time at:

Voice: (800) 234-4239 (USA and Canada) or (574) 233-1202 (elsewhere)
Fax: (888) 234-4238 (USA and Canada) or (574) 233-2152 (elsewhere)
E-mail: info@networketi.com

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Printed in USA P/N 18063 Rev. A 04/2010