READ AND SAVE THESE INSTRUCTIONS

CRU SERIES HUMIDIFIERS

ELECTRIC STEAM HUMIDIFIERS

INSTALLATION INSTRUCTIONS & MAINTENANCE OPERATIONS MANUAL

UL Recognized Component



TO THE PURCHASER AND THE INSTALLER

We have tried to do our best to provide a product that will give many years of satisfactory service. Please spend a few moments to familiarize yourself with these installation and maintenance instructions. Doing so will result in better performance and easier maintenance in the years to come.

TABLE OF CONTENTS

INSTALLATION	2-3
DESCRIPTION	4
OPERATION	5
MECHANICAL SPECIFICATIONS	6
ELECTRICAL DIAGRAMS	7
ELECTRICAL SUB-PANEL	8
PARTS LIST	9-10
MAINTENANCE PROCEDURES	11
MAINTENANCE AND SERVICE RECORD	12
WARRANTY	12

PLEASE NOTE: The standard CRU Series unit requires water conductivity of 100 micromhos/centimeter (2 grains/gallon) to operate. It will not operate with water treated by reverse osmosis or deionization processes. However, if you plan to use either of these water types, a specially designed deionized unit is available (Model DI CRUV)—consult factory.



INSTALLATION

SELECTING THE LOCATION

The CRU Series humidifier system typically includes three separate assemblies, a vaporizing tank, electric sub-panel and vapor dispersion tube with vapor hose and clamps.

A suitable location will offer access to electric power, water make-up piping and drain piping.

When choosing the location for the humidifier inside of the air conditioning unit, several factors should be considered: there should be adequate support for the humidifier, reasonably easy access for removal of the vaporizing chamber for service and clearance for routing of the vapor hose and tube.

The placement of the dispersion tube should allow for pitching of the vapor hose back to the vaporizing chamber or the use of a water seal and drain. (Figure 3-2).

The electrical sub-panel should be placed within a grounded protective metal enclosure and mounted in a dry and conveniently accessible location.

If drainage of the vaporizing chamber by gravity is not possible, a small condensate lift pump should be considered.

When gravity drainage is not feasible (for structural reasons), the CRU Series can be modified to operate without drainage. However, the evaporation chamber will require more frequent cleaning or replacement.

PIPING AND WIRING

Water make-up piping may be of any code-approved material (copper, steel, or plastic). The final connection size is ¼" NPT. In cases where water hammer may be a possibility, a shock arrestor should be considered. Drain piping may be of any code approved material (copper, steel, or plastic rated for 212° minimum). The final connection size is ¾" O.D. copper sweat and should not be reduced in size.

In the event that there is no sewer available for drainage, the unit can be piped for manual drainage. Consult factory for instructions (1-800-328-4447).

The CRU is designed for a single source electric power supply. All wiring must meet all electrical codes.

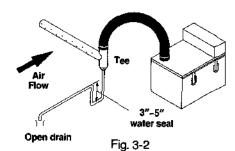
EXAMPLES OF INSTALLATION IN AN AIRSTREAM

Fig. 3-1

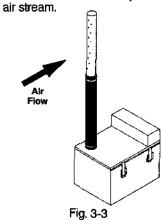
tube in a duct, connected via vapor hose to a wall mounted CRU unit. 1½[∞] vapor hose Vapor hose and dispersion tube should be pitched back to the humidifier with a gradual slope of 2" per foot (minimum).

Horizontal mounting of dispersion

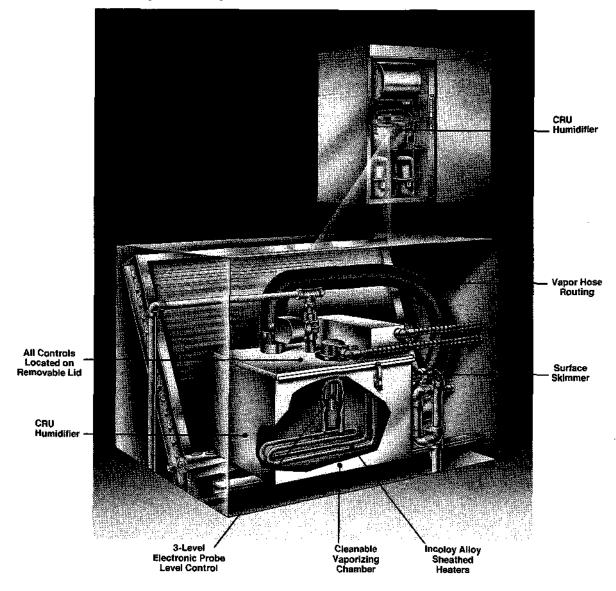
Horizontal mounting of dispersion tube in an air stream that is located lower than the CRU unit. A water seal (to prevent steam from escaping at the open drain) must be provided in drain line and line extended to open drain, as shown, to drain the condensate.



OPTIONAL: The dispersion tube can be mounted vertically in the

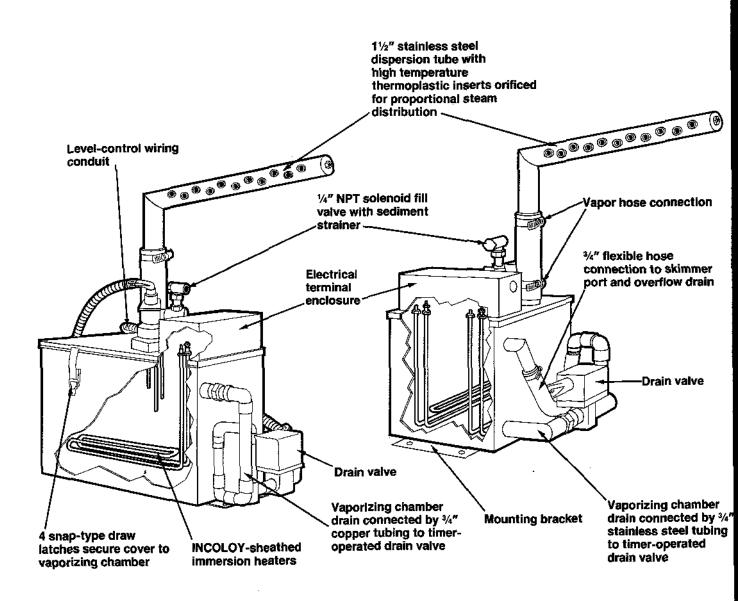


EXAMPLE RETROFIT INSTALLATION



DRI-STEEM CRU SERIES

Low-maintenance, cleanable electric steam humidifiers.

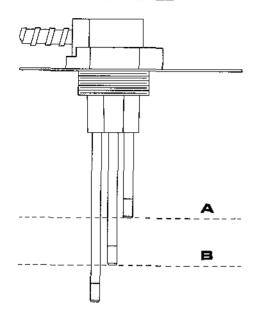


MODEL CRU (end mounted drain valve)

MODEL CRUV (side mounted drain valve)

OPERATION

RELIABLE, ELECTRONIC PROBE CONTROL MAINTAINS WATER LEVEL



A simple 3-probe conductivity sensor cycles a solenoid operated water fill valve to maintain the proper water levels.

INITIAL STARTUP

When the power is first turned on, the solenoid operated water fill valve opens and begins filling the vaporizing chamber. When the water reaches level "A", the fill valve closes. A call for humidity will then energize the heating element.

LOW WATER PROTECTION

During operation, the water line eventually drops to level "B". At this time the heater is de-energized and the water fill valve opens. The heater will remain "OFF" until the water line has been restored to level "A". Which provides amounts to low water protection in the event of water supply failure. This "idle during refill" feature results in the heating element being inactive for only about 3% of the humidifier's "ON" time.

SURFACE SKIMMING

Each time the vaporizing chamber refills, the upper ¼" of water is immediately drained off through the "skimmer". This carries away the floating mineral residue that was formed during the previous evaporating cycle. This skimming action very effectively removes most of the mineral concentration in much the same way as the surface blowdown does in a steam boiler.

This simple device greatly reduces the frequency of cleaning the vaporizing chamber.

DRAIN/FLUSH FEATURE

The control module contains an integral adjustable electronic timer which accumulates the "ON" or "humidifying" time of the unit. When this accumulated time reaches what has been pre-set in the timer, the drain/flush cycle is activated.

Upon activation, the following sequence occurs:

- 1. The drain valve opens and the mineral-rich water in the vaporizing chamber begins draining.
- When this water drops to the "REFILL" level, the fill valve opens.
- 3. The drain valve and fill valves remain open for ten more minutes, thus flushing the chamber.
- 4. The drain valve then closes . . . the chamber refills . . . the fill valve closes . . . and the unit resumes normal operation. The timer begins accumulating time again upon a call for humidity.

The electronic timer comes factory set for drainage at 40 hours of accumulated time. Alternate times of 20 hours and 80 hours can be made. See wiring diagrams on page 7 for timer board location and instructions for changing the timer setting.

TEST CYCLING THE DRAIN/FLUSH SYSTEM

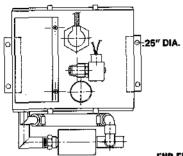
The timer board contains four pairs of terminal pins which are marked 20, 40, 80 and "T" (TEST).

To test:

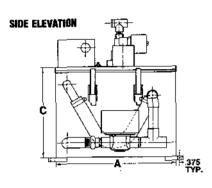
- 1. Pull the pin block off which ever pair of pins is in use, move it to the "T" pair and push it in.
- Set the humidistat high enough so the unit will remain "on call" for at least one hour.
- After about 35 minutes of running time, activation will take place, causing the "drain" valve to open. The water level will then drop and cause the "fill" valve to open. The drain valve will remain open for about 10 minutes.
- 4. The "drain" valve wil then close and the water level will rise, causing the "fill" valve to close.
- Once the test cycle is completed, move the pin block back to the appropriate hourly pair of pins.
 Failure to do so will result in a drain/flush cycle every 35 minutes.

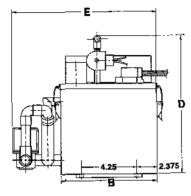
MECHANICAL/ELECTRICAL SPECIFICATIONS

PLAN VIEW



END ELEVATION





CRUV SERIES

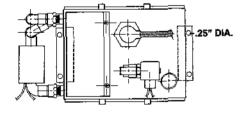
	ADIMI A	CRUY-4	CRUV-6	CRUV-8	CRUV-10
	CHUY-Z	CRUT-4	56014	ChOT-6	CHUTTO
Shipping Weight (Lbs/Kg)* Operating Weight	32/14.5 39.5/18	33/15 40.5/18.4	36.5/16.6 54.5/24.8	37.5/17 55.5/25.2	38.5/17.5 56.5/25.7
Amps 120/10/ at 208/10/ 240/10/ 480/10/ 208/30/ 240/30/ 480/30/	17 9.6 8.3 4.2 	 19.2 16.7 8.3 16.7** 14.4** 7.2**	28.8 25.0 12.5 25.0** 21.7** 10.8**	38.5 33.3 16.7 33.3** 28.9**	41.7 20.8 29.2** 25.3** 12.7**
KW	2	4	6	8	10
Output/Hour (Lbs/Gal/Kg)	6/.7/2.7	12/1.4/5.4	18/22/82	24/2.9/10.9	30/3.6/13.6

- * Subtract 9 lbs. (4Kg) from total weight for models without pre-wired subpanel.
 ** For wire sizing. Highest leg draw is shown due to current unbalance in some cases.

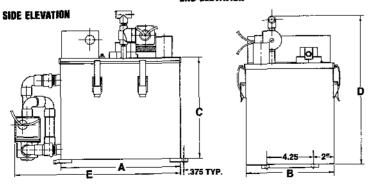
MODEL	Α	B	¢	٥	E
CRUV-2 & 4	11.250	9.000	8.500	13.000	13.500
CRUV-6, 8 & 10	14.250	10.375	9.500	14.000	14.875

NOTE: Charts shown here can also be used for DI-CRU (V) SIZING.

PLAN VIEW



END ELEVATION



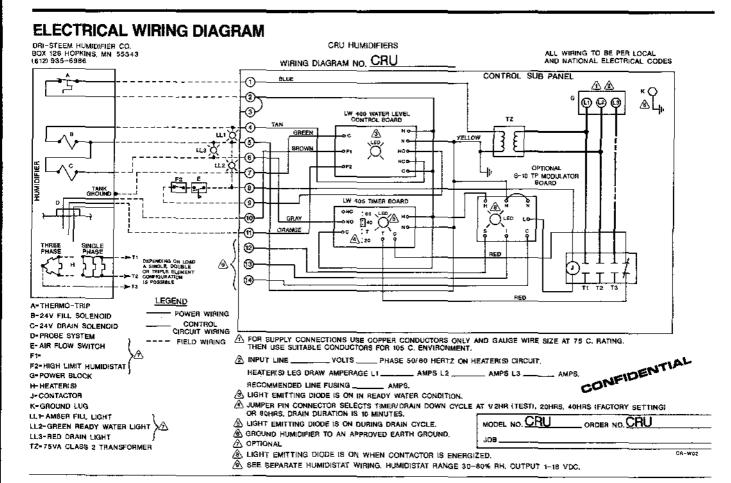
CRU SERIES

	CRU-2	CRU-4	CRU-6	CRU-8	CRU-9
Shipping Weight (Lbs/Kg)* Operating Weight	31/14.1 38.5/17.5	32/14.5 39.5/18	35/15.9 53/24.1	35/15.9 53/24.1	36/16.4 54/24.5
Amps 120/10/ at 208/10/ 240/10/ 480/10/ 208/30/ 240/30/ 480/30/	17 9.6 8.3 4.2 —		28.8 25.0 12.5 16.7 14.4 7.2	38.5 33.3 16.7 33.3** 28.9** 14.4**	43.3 37.5 18.8 25.0 21.7 10.8
kw	2	4	6	8	9
Output/Hour (Lbs/Gal/Kg)	6/.7/2.7	12/1.4/5.4	18/2.2/8.2	24/2.9/10.9	27/32/122

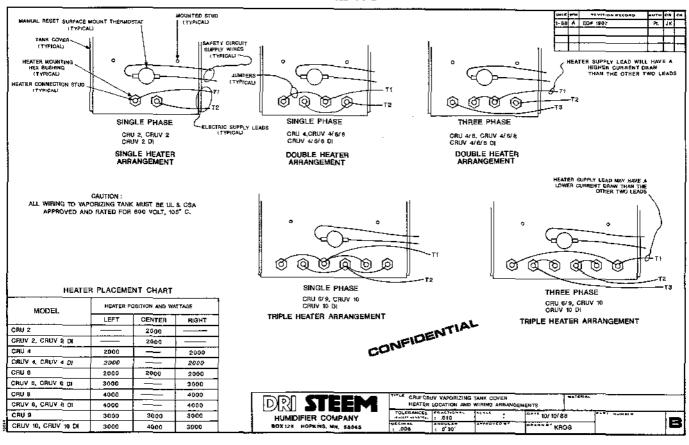
- * Subtract 9 lbs. (4Kg) from total weight for models without pre-wired subpanel.

 ** For wire sizing. Highest leg draw is shown due to current unbalance in some cases.

MODEL	A	В	C	D	E
CRU-2 & 4	11.250	8.25	8.500	13.000	15.500
CRU-6, 8 & 9	14.250	8.25	9,500	14.000	18.500



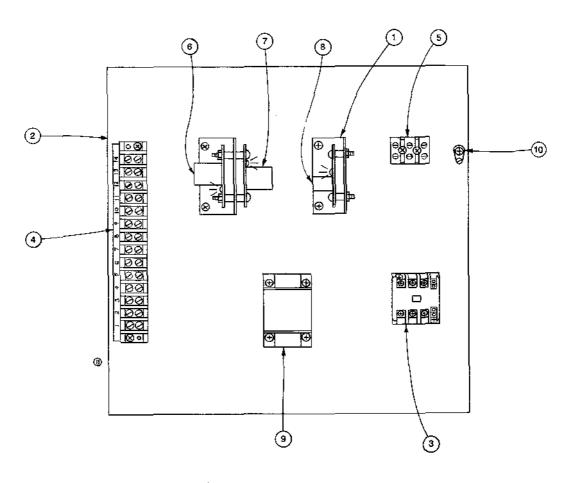
HEATER LOCATION AND WIRING ARRANGEMENTS



CRU-CRUV SERIES HUMIDIFIERS

TYPICAL LAYOUT OF ELECTRICAL SUB-PANEL

CONFIDENTIAL



	NO.	DESCRIPTION	QTY.	PART NUMBER
	10	GROUND LUG	1	409250-017
	9	TRANSFORMER	_ 1	SEE NOTE 4
_	₹ 8	S10 TP MODULATOR BOARD	1	408680
SEE NOTE 3	7	LW405 TIMER BOARD	1	408620_
(OPTIONAL)	6	LW400 LEVEL CONTROL BD.	. 1	408600
	5	POWER BLOCK	_1	408300
	4	TERMINAL STRIP + BLOCK	1	408250
	3	CONTACTOR SEE NOTE 2	1	407000
	2	11" x 11" SUB PANEL	1	165720-001
	1	PC BOARD BRACKET	1	165616

NOTES:

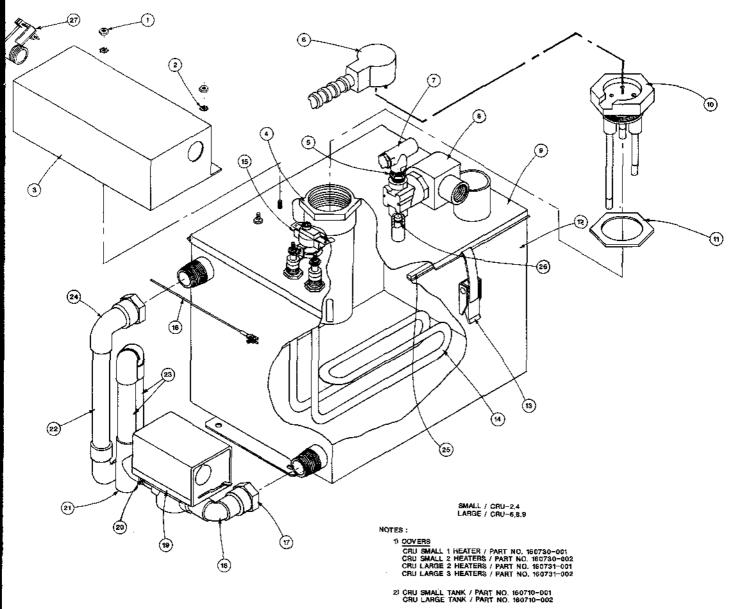
- 1) SPECIFY HUMIDIFIER MODEL AND SERIAL NUMBERS WHEN ORDERING.
- 2) SPECIFY CURRENT RATING
- 3) SPECIFY TYPE OF INPUT SIGNAL
- 4) SPECIFY PRIMARY VOLTAGE 208/240/480 -408965

18/240/480 -408960 120 -408960

It is recommended that the electrical sub-panels be placed inside an approved metal enclosure and wired per local electrical codes.

CRU SERIES PARTS LIST

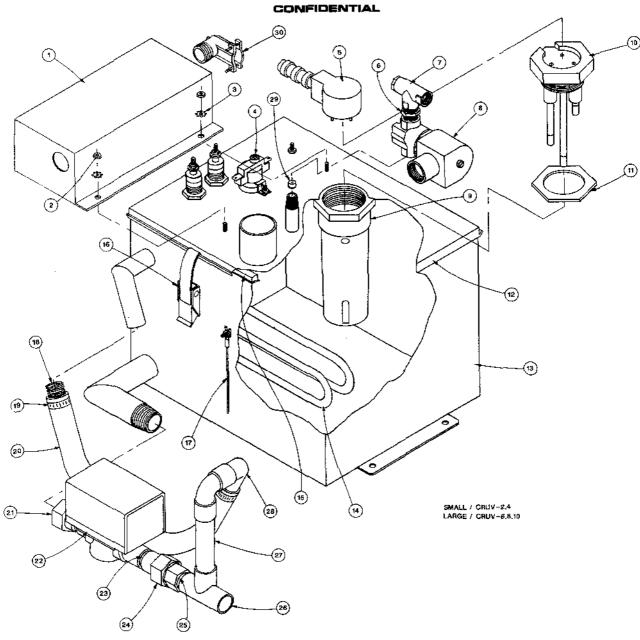
CONFIDENTIAL



NO.	DESCRIPTION	QTY.	PART NUMBER
27	1/2"-90" BOX CONNECTOR	1	497120-002
26	1/16" FILL VALVE ORIFICE	1	160225-002
25	THE FOLLOWING GASKETS ARE VF/VM	STYLE	(CUT TO FIT)
	GRU 2-4	0-1	309950-001
	CAU 6-8-9	0-1	309950-002
24	3/4" 90 ELBOW	3	204860
23	(SMALL) 3/4" x 3-1/2" COPPER TUBE	0-2	204900-003
	(LARGE) 3/4" x 4" COPPER TUBE	0-2	204900-007
22	(SMALL) 3/4" x 5" COPPER TUBE	0-1	204900-008
4	(LARGE 3/4" x 5-1/2" COPPER TUBE	0-1	204900-009
21	3/4" COPPER TEE	1	204100
20	3/4".x-1-1/2" COPPER TUBE	1	204900-001
19	3/4" ELECTRIC DRAIN	. 1	505400-001
18	3/4" 90" STREET ELBOW	3	204400
17	3/4" FTG x FEM ADAPTOR	2	204800
16	GROUND WIRE	1	
15	THERMO-TRIP	1	409560

NO.	DESCRIPTION	QTY.	PART NUMBER
14	HEATING ELEMENT		409600
ta	DRAW LATCH	4	700455
12	TANK -WELD	1	SEE NOTE 2
11	PROBE GASKET	1	309750-003
10	PROBE HOLDER	1	406220
9	COVER -WELD	1	SEE NOTE 1
. 8	1/4" NPT FILL VALVE	1	505080
7	1/4" NPT SEDIMENT STRAINER	1	300050
6	PLUG CAP WIRE - 12" LONG CONDUIT	1 1	40605D-001
5	1/4" NPT BRASS NIPPLE	1	203560
4	PROBE HOUSING	1	308500
3	HEATER TERMINAL COVER	1	160750-001
2	SERRATED WASHER	6	700200-003
1	8-32 HEX NUT	16	700200-002

CRUV SERIES PARTS LIST



NO.	PESCRIPTION	QTY.	PART NUMBER
36	#2"-90" BOX CONNECTOR	1	407120-002
29	1/16" FILL VALVE ORIFICE	1	160225-002
28	3/4" 90" STREET ELBOW	2	204400
27	(SMALL) 3/4" x 3-1/2" COPPER TUBE	0-1	204900-003
	(LARGE) 3/4" x 4-1/4" COPPER TUBE	0-1	204900-007
26	3/4" COPPER TEE	1	204100
25	3/4" x 1-1/2" COPPER TUBE	1	204900-001
24	3/4" COPPER SWEAT UNION	1	204200
23	(SMALL) 3/4" x 1-1/2" COPPER TUBE	0-1	204900-001
	(LARGE) 3/4" x 3-1/2" COPPER TUBE	0-1	204900-003
22	SIA" ELECTRIC DRAIN	1	505400-001
21	3/4" FTG x FEM ADAPTOR	1	204800
20	(SMALL) 3/4"x 13-1/4" OVERFLOW HOSE	0-1	307020-002
	(LARGE) 3/4"× 16-3/4" OVERFLOW HOSE	0-1	307020-002
19	#10 GLAMP	2	700560-002
18	OVERFLOW HOSE SPRING	1	307025
17	GROUND WIRE	1	
16	DRAW LATCH	4	700455
15	SMALL COVER GASKET	0-1	309950-001
<u> </u>	LARGE COVER GASKET	0-1	309950-002
14	HEATING ELEMENT	Ţ	409603

NO.	DESCRIPTION	QTY.	PART NUMBER
13	SMALL TANK	0-1	160700-001
-	LARGE TANK	0-1	160700-002
12	SMALL 1 HEATER COVER	0-1	160720-001
	SMALL 2 HEATER COVER	0-1	160720-002
	LARGE 2 HEATER COVER	0-1	160721-001
	LARGE 3 HEATER COVER	0-1	160721-002
77	PROBE GASKET	1	309750-003
10	PROBE HOLDER	1	406220
9	PROBE HOUSING	1	308500
8	1/4" NPT FILL VALVE	1	505080
7	1/4' NPT SEDIMENT STRAINER	1	300050
6	1/4" NPT BRASS NIPPLE	1	203560
5	PLUG CAP WIRE - 12" LONG CONDUIT	t	405060-001
4	THERMO-TRIP	1	409560
3	SERRATED WASHER	6	700200-003
2	8-32 HEX NUT	16	700200-002
1	HEATER TERMINAL COVER (SMALL)	0-1	160750-001
	HEATER TERMINAL COVER (LARGE)	0-1	160750-002

MAINTENANCE PROCEDURE

Long heater element life can be expected when some observations are made for a few weeks following initial startup. By observing the rate of mineral buildup, the frequency of drain/flush can be determined as well as the needed frequency of manual cleaning.

MINERALS PRECIPITATE

As evaporation takes place in the CRU humidifier, some of the minerals dissolved in the water precipitate (come out of solution) and float on the water surface. If not removed, this precipitated mineral will eventually form a sludge and settle to the bottom of the vaporizing chamber.

SKIMMER REMOVES FLOATING MINERAL

Each time the make-up valve opens, the unit refills to a point just above the skimmer opening. A portion of the make-up water is then "skimmed" (flows to drain), carrying the floating mineral with it. This action reduces the mineral concentration in the CRU unit, which in turn reduces the frequency of cleaning.

Cleaning once or twice a season is usually adequate, assuming the water has a hardness of up to 15 grains of dissolved mineral per gallon.

DRAIN AND FLUSH REMOVES SETTLED MINERAL

In addition to the skimmer, a timer and drain/flush system is incorporated into the operating system (see page 5 for operation description). The timer is field adjustable for 20, 40 or 80 hours of humidifier accumulated "ON" time between drain/flush operations.

Drian/flush duration is 10 minutes.

CLEANING THE VAPORIZING CHAMBER

The heating element itself is usually self cleaning. The mineral buildup on the element flakes off after reaching a thickness of about 1/16″, and settles to the bottom of the chamber.

Before this scale accumulation builds up to the underside of the heating element, it must be removed. Failure to do so may result in premature heater burn-out.

The CRU humidifier is designed to make regular cleaning and maintenance reasonably easy and quick.

To Service:

- Shut off all electrical power to the humidifier. Drain the vaporizing chamber by manually opening the "DRAIN" valve. Do this by pushing open the lever on the valve to the "MANUAL" position and lock in place.
- Disconnect the flexible vapor hose on top of the vaporizing chamber. Close drain valve, (return lever to auto position.) Disconnect drain hose from vaporizing chamber.
- 3. Unlatch tank clamps and remove cover.
- Remove the soiled vaporizing chamber and clean.
- Unscrew the probe housing(s) and remove any mineral buildup that may have accumulated.
- Check the probe-rod assembly. Since it is completely TEFLON® coated except for the tips, scale flakes off easily. Buildup on tips should be scraped off, then tips brushed to remove any mineral residue.
- Replace the chamber cover, making sure the chamber is sealed tight.
- Reconnect the flexible vapor hose and the drain hose.
- 9. Make sure drain valve lever is in "AUTO" position.
- The CRU humidifier is now again ready to humidify when power is restored.

OFF SEASON SHUT DOWN

- 1. Switch off power.
- Turn off water supply to make-up valve.
- Drain vaporizing chamber and clean if necessary (see above, steps 1-8).
- Leave chamber dry, the power "OFF" and the water shutoff valve closed until the next humidification season.

MAINTENANCE SERVICE RECORD

DATE INSPECTED	PERSONNEL	OBSERVATION	ACTIONS PERFORME	
	1			

D.I. CRUV SERIES HUMIDIFIER WARRANTY

- 1. Warranty. Dri-Steem Humidifier Company (the "Company") guarantees its products to be free of defects in materials and workmanship under the service for which they are intended. The Company will repair or replace—without charge except for labor charges—products or parts which are found to be defective within one year from the date of shipment or, at the option of the Company, will refund the purchase price.
- 2. Exclusion of other warranties. The warranty described in the previous paragraph shall be IN LIEU OF any other warranty, express or implied, including but not limited to any implied warranty of MERCHANTABILITY or fitness for a particular purpose.
- 3. Limitation of Remedies. By purchasing the Company's products, the purchaser agrees with the Company that the purchaser's sole and exclusive remedy shall be for the repair or replacement of defective parts or products, without charge except for labor charges, as described in paragraph 1. The purchaser agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available to him.



DRI-STEEM HUMIDIFIER COMPANY BOX 128, 11300 WEST 47TH STREET HOPKINS, MINNESOTA 55343

> TELEPHONE 1-800-328-4447 In MN, call (612) 935-6986

> > TELEX: 290675 FAX: (612) 935-4831