

DH Series

Desiccant Dehumidification System



Model DH100

**Installation, Operation
& Maintenance Manual**

STULZ
Air Technology Systems, Inc.

Notice

This document contains information protected by copyright. All rights are reserved. The owner of the equipment for which this manual is written may photocopy the contents of this manual for internal use only. No part of this document may be photocopied, reproduced, or translated into another language for use by anyone other than the owner of the equipment for which this manual is written without the prior written consent of Stulz Air Technology Systems, Inc. (SATS).

This document contains confidential and proprietary information of Stulz Air Technology Systems, Inc. Distributing or photocopying this document for external distribution is in direct violation of U.S. copyright laws and is strictly prohibited without the express written consent of SATS.

Unpublished — rights reserved under the copyright laws of the United States and of other countries. Other brands and tradenames are trademarks of their respective owners.

Copyright by Stulz Air Technology Systems, Inc.
Printed in the United States of America.
All rights reserved.

Stulz Air Technology Systems, Inc.
1572 Tilco Drive
Frederick, MD 21704
USA

ODU0018 Rev A; 06/08

(Revised 06/08)



Table of Contents

DESICAiR® DH Series Desiccant Dehumidifier Technical Manual

<i>1.0 Description.....</i>	<i>1</i>
<i>1.1 Principle of Operation.....</i>	<i>1</i>
<i>1.2 Design.....</i>	<i>2</i>
<i>2.0 Installation.....</i>	<i>3</i>
<i>2.1 Examples.....</i>	<i>3</i>
<i>3.0 Operation and Control</i>	<i>4</i>
<i>3.1 Automatic Control.....</i>	<i>4</i>
<i>3.2 Manual Operation.....</i>	<i>4</i>
<i>3.2.1 First Time Startup.....</i>	<i>5</i>
<i>3.2.2 Normal Operation.....</i>	<i>5</i>
<i>3.2.3 Maintenance.....</i>	<i>5</i>
<i>3.3 Troubleshooting.....</i>	<i>6</i>
<i>3.4 Technical Support and Service.....</i>	<i>7</i>
<i>4.0 Technical Information.....</i>	<i>7</i>
<i>4.1 Physical Data.....</i>	<i>7</i>
<i>4.2 Capacity Diagram (DH100).....</i>	<i>8</i>
<i>4.3 Fan Curve (DH100).....</i>	<i>8</i>

1.0 DESCRIPTION

The DESICAiR DH Series Desiccant Dehumidifier was developed specifically for military storage applications. The unit produces dry air in the storage space to increase readiness, prevent corrosion, reduce maintenance, and improve Mean Time Between Failure (MTBF) for electronic systems. With a process air flow of 100 SCFM and a dehumidification capacity of up to two pounds per hour moisture removal, this unit is suited to a broad range of other industrial applications as well.

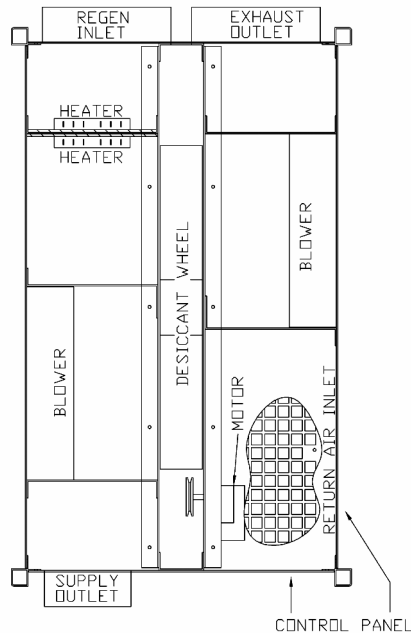


Figure 1 – DH100 Interior Layout

The major components of this dehumidification package are the desiccant dehumidification wheel, two PTC electric resistance regeneration heaters, and a compact radial blower for each of the two air streams. Other elements include a small drive motor and belt (to rotate the wheel through the two air streams), and a control panel based on a standardized humidistat and a customized printed circuit board.

1.1 PRINCIPLE OF OPERATION

The operation of a desiccant dehumidification system is driven by two counter current air streams (Process and Regeneration) flowing through the wheel. Air from the conditioned space is drawn through the desiccant wheel by the Process Blower. The desiccant adsorbs moisture from the air stream and the blowers return the dry Supply Air to the conditioned space. The moisture containing portion of the wheel is rotated into a separate air stream to be regenerated. Fresh air for the Regeneration Air stream is drawn through a pair of electric resistance heaters in series. The heated air is then drawn through the wheel before being discharged outside of the conditioned space by the Exhaust Regen Blower. The desiccant releases the adsorbed moisture (desorbs) into the heated Regeneration Air stream, leaving a reactivated desiccant to be rotated back into the Process Air stream. Wheel rotation is continuous between the two air streams, alternately adsorbing moisture from the conditioned space and desorbing moisture into the Exhaust Air stream outside of the conditioned space.

1.2 DESIGN

The housing of the DH100 and all of the components used in the design are constructed of solid materials selected to withstand rugged use in a wide variety of applications. The interior of the DH100 is laid out to minimize pressure drop through the wheel and to reduce the overall unit size. The low speed, low noise, slimline blowers have a backward inclined design for high pressure, high flow output. The PTC type regeneration heaters in the DH100 are UL approved and operate with a maximum surface temperature of 400°F. The heart of the DH100 control system is a printed circuit board interfaced with a standard commercial humidistat.

The internal housing for the desiccant wheel is a rigid, twin plate design which allows easy access to the wheel and also serves to enhance the structural integrity of the entire unit. The desiccant wheel is split 50/50 between the process and regeneration air streams in order to allow for low temperature operation. The drive system consists of a miniature gear motor with ball bearings and a self tensioning urethane belt. For the lowest possible maintenance, the twin-plate wheel housing is designed to operate without contact seals on the face of the wheel.

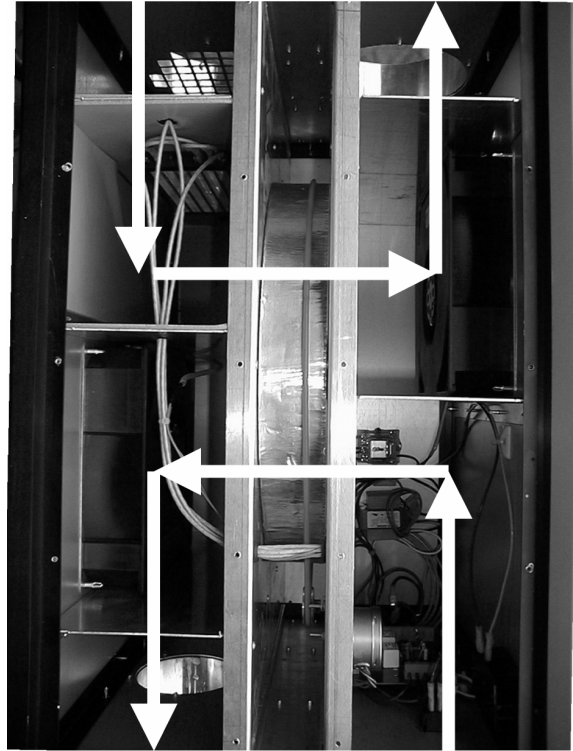


Photo 1 – Interior Layout of DH100 showing Regen Air Flow (top) and Process Air Flow (bottom).

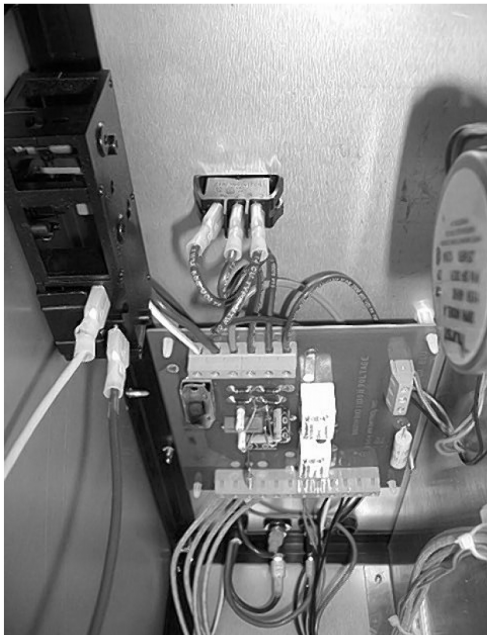


Photo 2 – DH100 Circuit Board (center) and standard Humidistat (top left)

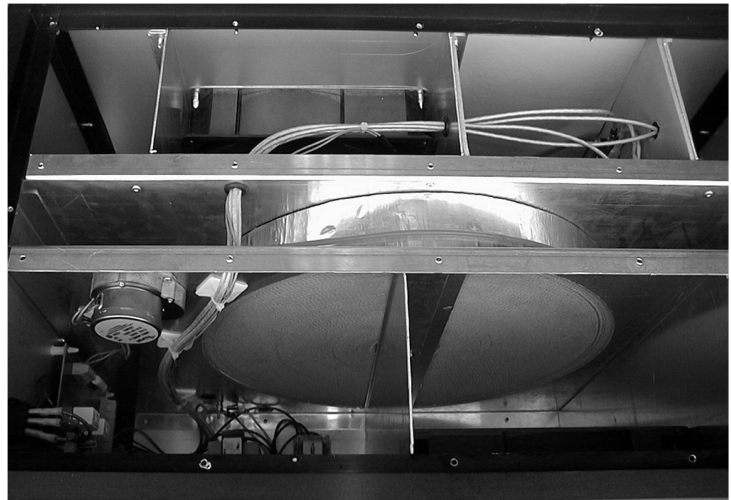


Photo 3 – DH100 Twin Plate Wheel Housing

2.0 INSTALLATION

The DH100 Desiccant Dehumidifier is designed to be a free-standing, stand-alone unit. While the DH100 is normally installed to operate inside the space to be conditioned, with proper ducting, the unit can also be installed to operate outside the space. Whatever installation location is selected, it is recommended that the DH100 be installed so that the front control panel and the power connection are easily accessible.

IMPORTANT - In any installation, the wheel is designed to operate in the vertical orientation.

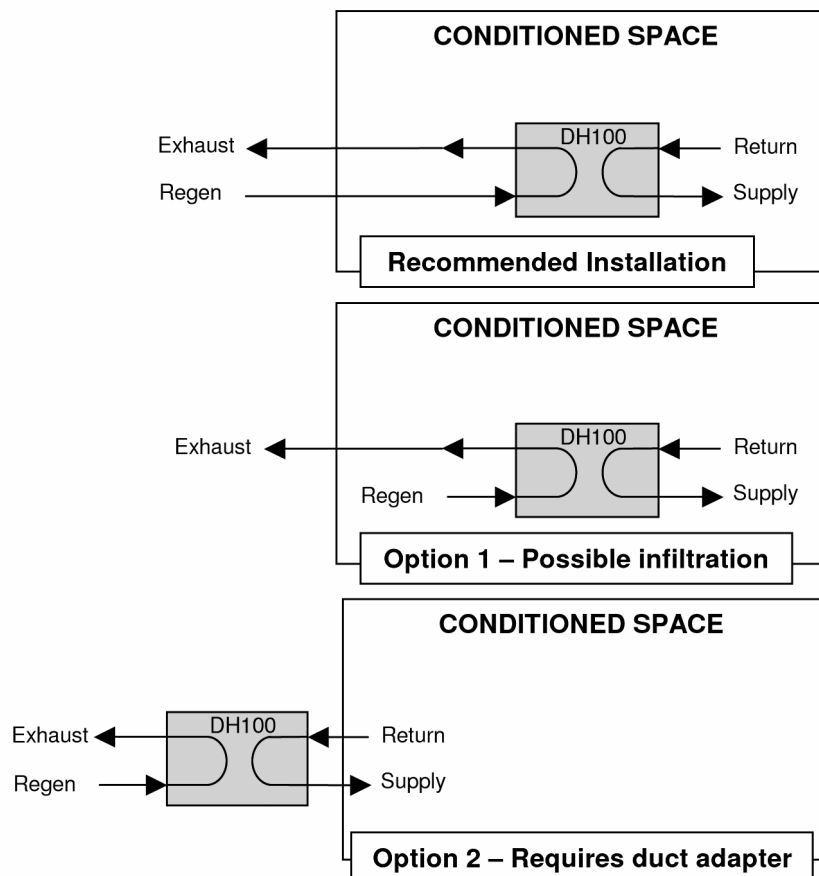
IMPORTANT - To achieve proper operation of the unit, the Supply Air must always be connected to discharge into the conditioned space, and the Exhaust Air must always be connected to discharge outside the conditioned space.

IMPORTANT - With or without duct connections, it is important that the air flow in and out of the unit be unimpeded. For optimum operation, it is recommended that there be 12 inches clearance in front of both inlet and outlet air streams of the DH100.

2.1 EXAMPLES

Shown are several examples of the DH100 as it might be installed for different applications. Note that the Exhaust is outside the Conditioned Space in each example and the Supply Air always discharges into the Conditioned Space. Best performance will be obtained using the Recommended Installation. Care should be exercised with optional installations.

NOTE: As Option 2 indicates, if the DH100 is installed outside the conditioned space, a duct adapter needs to be fashioned for the top of the unit to duct the Return Air.

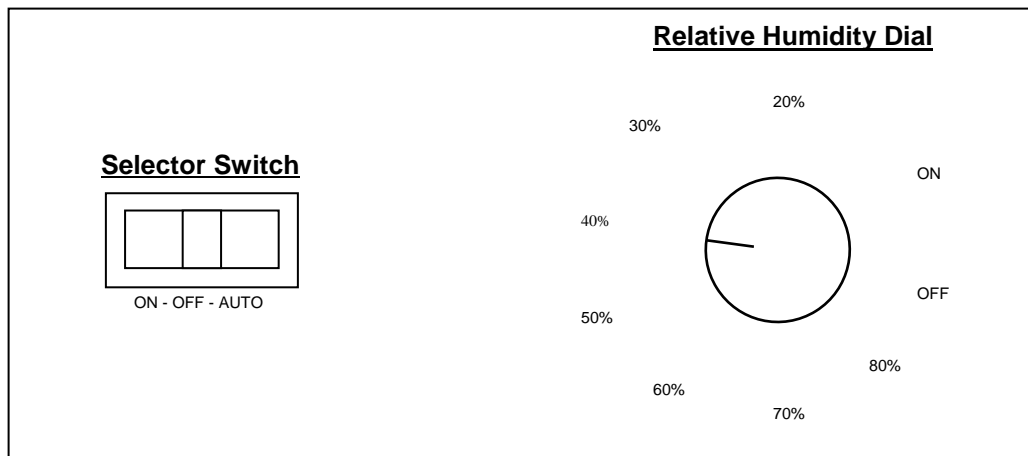


3.0 OPERATION AND CONTROL

The controls for the DH unit are all located at the front of the unit. Also, the power cord for the unit is attached through the front panel. Once the dehumidifier is connected to the proper power source, it is ready to run. The DH unit can be run in a manual or an automatic mode.

3.1 AUTOMATIC CONTROL

The controlling humidistat is wired directly to the DH unit printed circuit board. For operation in the automatic mode, turn the selector switch to "AUTO" and set the %RH to the desired percent relative humidity on the dial. The "standard" %RH setting for the DH unit in "AUTO" is 40%, however, the unit is designed to control at whatever %RH is set, up to the maximum capacity of the system.



3.2 MANUAL OPERATION

For manual operation, place the selector switch in the "ON" position. In the manual mode the humidistat is bypassed and the unit will run continuously, dehumidifying to the maximum capacity based on the conditions of the inlet air.

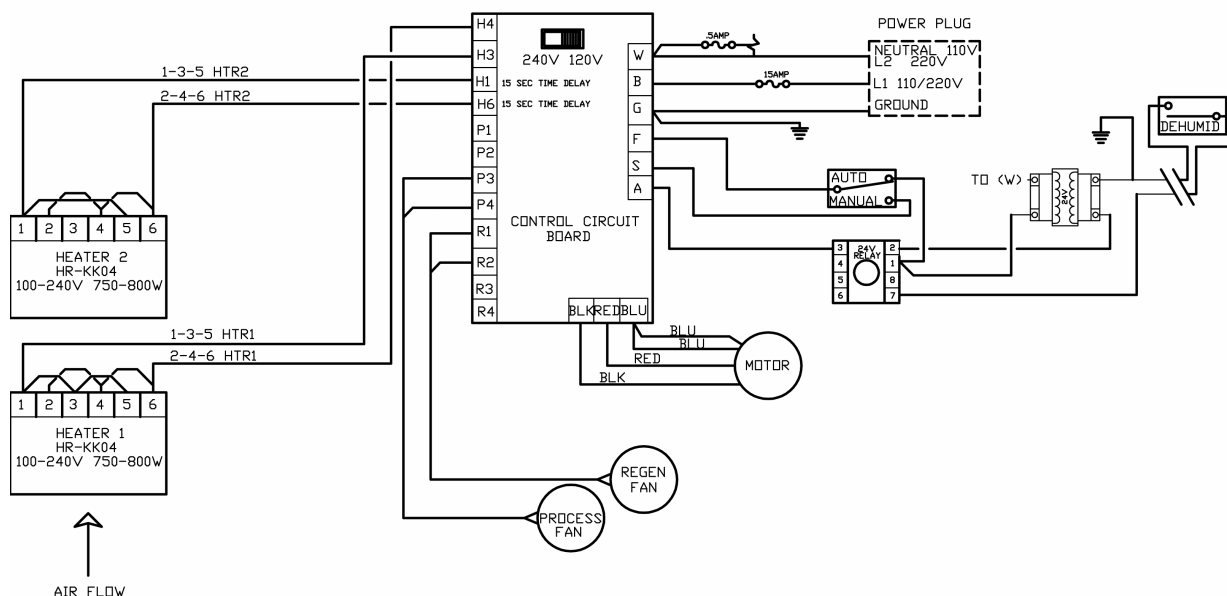


Figure 2 – DH100 Wiring Diagram

DH Series Installation, Operation & Maintenance

3.2.1 First Time Start Up of the DH100

1. Be sure that there are no obstructions to the free flow of air in and out of the unit.
2. Set the Selector Switch to “OFF” and plug the DH unit into an appropriate electrical outlet.
3. Turn the Selector Switch to “ON” and confirm rotation of the desiccant wheel visually by removing the inlet filter and looking through the grill of the Return Air inlet. Replace the inlet filter.
4. Confirm operation of the Process Blower by feeling air flow at the Supply Air Outlet on the end of the unit near the power cord. Confirm operation of the Regen Blowers by feeling air flow at the Exhaust Air Outlet at the opposite end of the unit.
5. The unit is now ready for routine operation.

3.2.2 Normal Operation of the DH100

1. For continuous, manual operation - Set Selector Switch to “ON”.
2. For automatic operation, with humidistat control - Set Selector Switch to “AUTO” and Set RH Dial to 40% (standard) or other desired setting.
3. To turn the unit off – Set the Selector Switch to “OFF”.

3.2.3 Maintenance

The only routine maintenance required for the DH unit is the cleaning and/or replacement of the inlet air filter pads.

Return Air Inlet -	Clean every 3 months; Replace every 12 months
Regen Air Inlet -	Clean every 3 months; Replace every 12 months

NOTE: Maintenance intervals can vary significantly based on the environment. When operating the unit under extreme or unusual conditions, such as a very dusty or sandy location, it may be necessary to reduce the maintenance intervals indicated.

3.3 TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTIONS
Entire unit is not running	Unit is in "AUTO" and the humidistat control has turned unit off	Check operation of unit by switching to manual "ON". If unit comes on, switch back to "AUTO" to resume normal operation.
	No power to unit	Check main power supply. Check fuse on front panel. Replace if necessary.
Unit running, but not dehumidifying	Heater not operating	Check for warm air at Exhaust Air Outlet; if not warm, consult factory.
	One or more fans not operating	Confirm balanced high volume air flow from both Supply and Exhaust Air Outlets. - See Section 3.2.1.4. If low flow or unbalanced flow, consult factory.
	Wheel not rotating	Confirm rotation of wheel. - See Section 3.2.1.3. If wheel is not rotating, consult factory.
	Air flow blocked	Remove any obstructions at all air inlets and outlets and allow unobstructed air flows to and from unit. Check and clean both air inlet filters, as required.
	Exhaust Air Duct leaking or improperly returning moist exhaust to conditioned space.	Ensure all Exhaust Air is ducted outside of the conditioned space.

DH Series Installation, Operation & Maintenance

3.4 TECHNICAL SUPPORT AND SERVICE

Factory Stulz Air Technology Systems, Inc
Address: 1572 Tilco Drive
 Frederick, Maryland, USA 21704
Telephone: (301) 620-2033

Fax: (301) 662-5487
E-mail: info@stulz-ats.com

4.0 TECHNICAL INFORMATION

Process Volume:	100 CFM
Moisture Removal (lbs/hr):	2.0*
Heater Watts:	1350
ESP Process (in wc):	0.3"
ESP Regen. (in wc):	0.3"
Utilities:	115V/60 Hz/, 1 ph
Full Load Amps:	13.0

* @ 90°F/75% RH inlet conditions. See the Capacity Diagram, Section 4.2, to determine the moisture removal rate for your particular application.

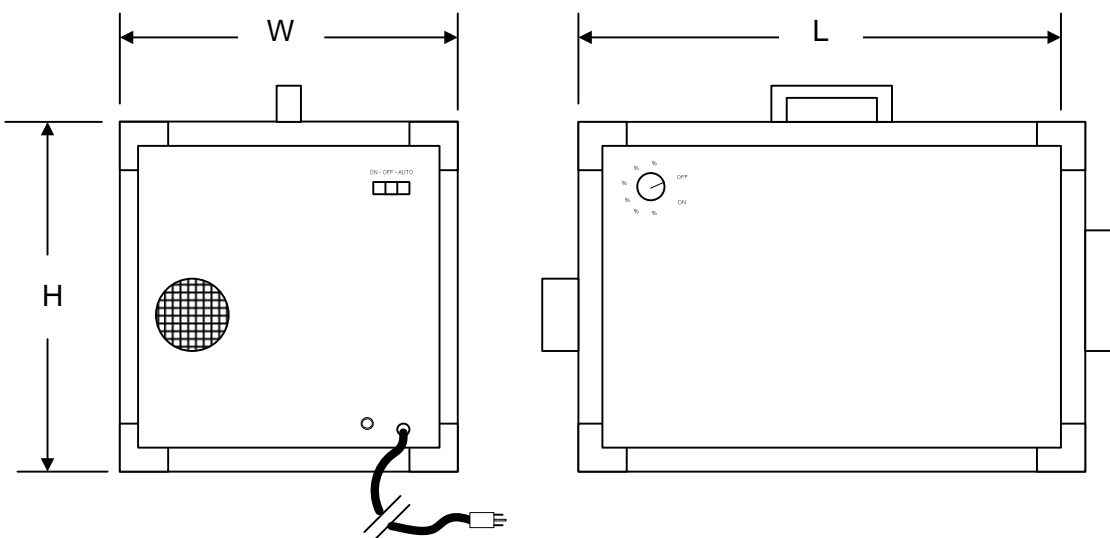
4.1 PHYSICAL DATA

Size:

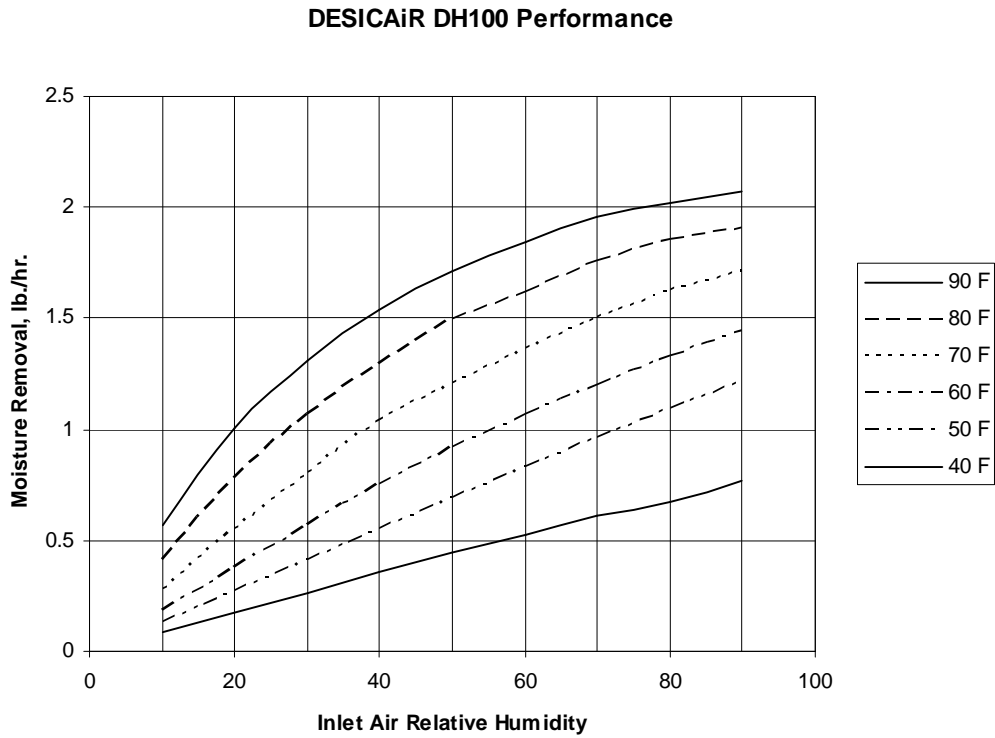
L 25.25" x W 15.94" x H 17.07"

Weight:

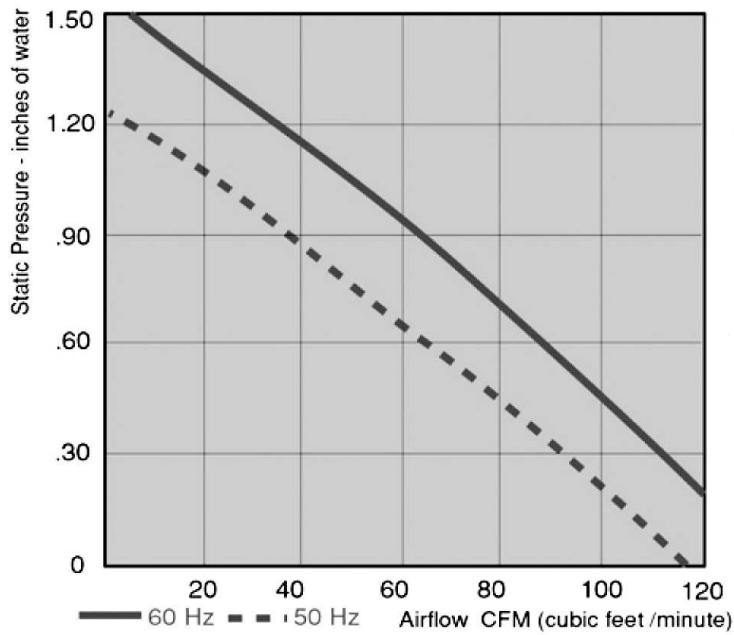
42 lbs.



4.2 CAPACITY DIAGRAM- DH100



4.3 FAN CURVE (DH100)



DWG NO. DH-100

REV 1

REV A

ZONE REV EDD NO.

DESCRIPTION

RELEASED TO PRODUCTION

DATE

APPROVED

1

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

6

7

8

D

C

B

A

1

2

3

4

5

DH Series Installation, Operation & Maintenance

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Globally close to you

Stulz-ATS, located in Frederick, MD USA, is part of The STULZ Group with Headquarters in Hamburg, Germany and production facilities world wide. Our network of manufacturer's representatives and sales partners span the globe, providing innovative solutions to your unique environmental control needs.

www.stulz-ats.com



Stulz Air Technology Systems, Inc.
1572 Tilco Drive, Frederick, Maryland 21704
Phone: (301) 620-2033, Fax: (301) 662-5487
Email: info@stulz-ats.com
www.stulz-ats.com



ISO-9001:2001 Quality Registered