Bernhard Cx Group

Bernhard

Commissioning Review of Submittal Data for Construction

This submittal has been reviewed by the Commissioning Provider for general conformance related to the commissioning requirements in the contract documents and Owner's Project Requirements document. This review is not intended to verify overall equipment compliance of the design intent and no design direction shall be inferred or implied.
The Designer of Record shall verify overall compliance of the design intent according to the contract documents.

[X] Reviewed with Comments 12/18/24

[ ] Reviewed with No Comments

Commissioning review comments are enclosed.

[ ] REVIEWED [ ] REVIEWED AND NOTED

[X] REVISE AND RESUBMIT [ ] REJECTED

Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication process and techniques of construction; coordinating their work with that of all other trades; and performing their work in a safe and satisfactory manner.

CLARK & ENERSEN

By csharp Date 01/08/2025

CLARK & ENERSEN:

1. INCLUDE FACTORY INSTALLED SS DRAIN PANS ON BOTH UNITS PER HRU COIL SECTION REMARKS

2. ADJUST UNIT PERFORMANCE TO 300' ELEVATION

3. PROVIDE SUMMER AND WINTER HEAT RECOVERY COIL PERFORMANCE DATA, FOR BOTH HRU AND AHU HEAT RECOVERY COILS.

USE THE FOLLOWING CFMS FOR HEAT RECOVERY PERFORMANCE:
AH-2: 26,000 CFM SUPPLY
HRU-2: 25,500 CFM EXHAUST

AH-5A/5B: 3,225 CFM SUPPLY
HRU-5: 3,320 CFM EXHAUST

4. HRU-2 COIL WPD TOO HIGH PER HRU SCHEDULE.

5. CONFIRMED HRU WEIGHTS.

6. CONFIRM COIL CONNECTION HANDING PER PLAN.

CDI CONTRACTORS

CDI Contractors, LLC
3000 Cantrell Road
Little Rock, Arkansas 72202
501 / 666-4300

Transmittal

No 2024.11.25-3

PROJECT: UAMS- CAMID

DATE: Nov 25, 2024

To: UAMS
4301 W MARKHAM ST. SLOT 545
LITTLE ROCK AR 72205
US

RE: 23 73 13 - Air Handling Units

ATTN: TAMARA BARRON

JOB: 240147

WE ARE SENDING:		SUBMITTED FOR:		ACTION TAKEN:	
☐	Shop Drawings	☑	Approval	☐	Approved as Submitted
☐	Letter	☐	Your Use	☐	Approved as Noted
☐	Prints	☐	As Requested	☐	Returned After Loan
☐	Change Order	☐	Review and Comment	☐	Resubmit
☐	Plans			☐	Submit
☐	Samples	SENT VIA:		☐	Returned
☐	Specifications	☐	Attached ☐ Separate Cover	☐	Returned for Corrections
☐	Other:			☑	Due Dec 09, 2024
☑	Submittal:			☐	Other:

Line	Item	Package	Code	Rev.	QTY	Date	Description	Status
1	Submittal		237313-04	1		Nov 25, 2024	PD:HRU-2	Submitted
2	Submittal		237313-06	1		Nov 25, 2024	PD:HRU-5	Submitted

REMARKS:

CC:
CLARK & ENERSEN, Mark Huettner

Signed: _____
MATTHEW HUGHES

CDI CONTRACTORS, LLC

☑ **APPROVED AS NOTED** ☐ **REJECTED**
☐ **APPROVED** ☐ **REVISE**

BY hughem **DATE** 11/25/2024

SUBMITTAL# 237313-01 **SPEC** 237313

This submittal has been reviewed for compliance with the contract documents. Approval does not relieve the subcontractor/supplier of the responsibility for conformance to the quality standards as set forth in the contract document, nor does it relieve the responsibility for field verification of all conditions relating to this contract.

Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
Fax 501-834-5416

Date: 11/20/2024
Return Request: 11/30/2024
Project: UAMS (CAMID)
Supplier: Harrison Energy
Manufacturer: Climate Craft
Submittal: Air Handling Units
Submittal Number: 23 73 13-02
Drawing # and Installation: Mechanical Drawings

ARCHITECT
Clark Kenersen
2020 Baltimore Avenue, Suite 300
Kansas City, MO 64108
816-474-8237

ENGINEER
Clark Kenersen
2020 Baltimore Avenue, Suite 300
Kansas City, MO 64108
816-474-8237

GENERAL CONTRACTOR
CDI Contractirs
3000 Cantrell Rd.
Little Rock, AR 72202
501-666-4300

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

CSUSA PROJECT NO.
22-6069
sean@comfortar.com

Submittal

Harrison
Energy Partners

Prepared For:
Clark & Enerson

Date:
November 1, 2024

Sold To:
Comfort Systems USA

Job Name:
UAMS CAMID

Harrison Energy Partners is pleased to provide the enclosed submittal for your review and approval.

Qty.	Product Summary
2	ClimateCraft Air Handling Units

Josh Robinson | Sales Engineer
Harrison Energy Partners
1501 Westpark Drive, Suite 9
Little Rock, AR 72204-2457
Ph. 501-539-0633

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Heat Recovery Units

Tag	Qty.	Description	Model Number
HRU-2	1	Indoor Air Handling Unit	ClimateCraft CAH60
HRU-5	1	Indoor Air Handling Unit	ClimateCraft CAH30

- Double wall construction with 2” R13 insulation
- ASHRAE leakage class 6
- Access sections with view ports and lights as required
- Stainless steel drain pans in humidifier and cooling coil sections
- 8” base rail
    - Stainless steel interior liner – HRU-5 only
    - Intake section
    - Filter section – HRU-2 only
    - Heat recovery coil section
    - Discharge plenum

ClimateCraft
1427 NW 3rd St
Oklahoma City. OK 73106
Ph: (405) 415-9230 Fax: (405) 415-9231

Date: 10/18/2024

To: Harrison Energy Partners

Attention: Jake Skinner

Job Name: UAMS - Center for Animal Models of Infection and Disease

SERIAL NO	UNIT TAG	MODEL NO
300036	HRU-2	CAH60X120E
300037	HRU-5	CAH30X48E

Issue Level: A	10/18/2024
Initial Submittal	

Please see below submittal for the referenced job.

X	**For Approval. One set of approved submittals must be returned prior to fabrication.**
	For Record Only.

Please call if you have any questions.

Sincerely,
Jeremy Faszold
Application Engineer
ClimateCraft - Ext 50168

ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

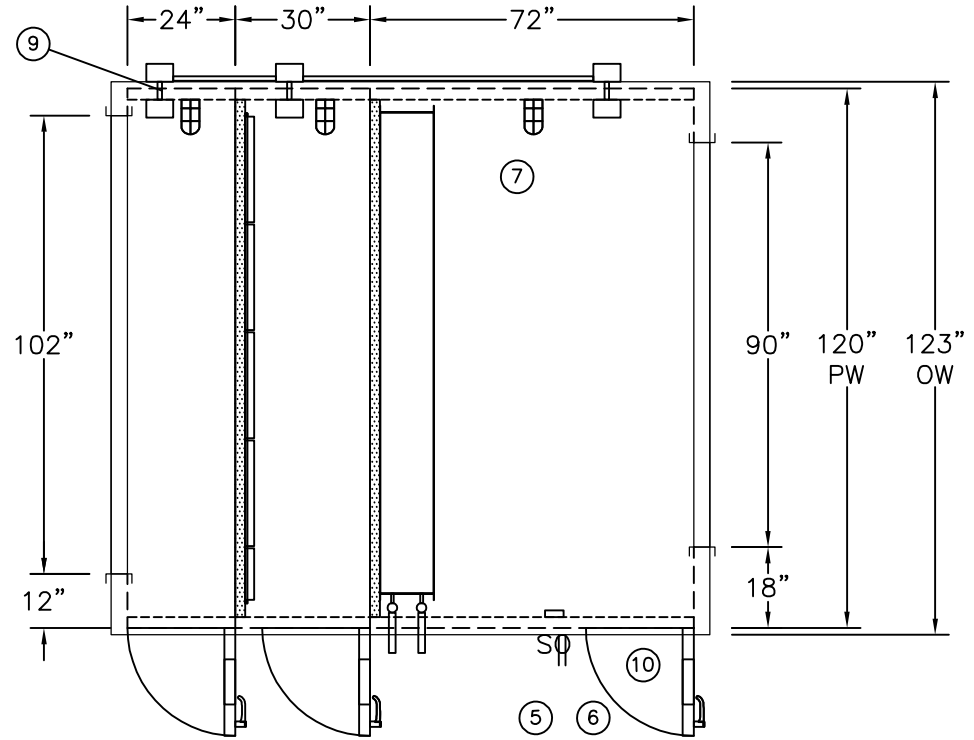
JOB	TAG	SHEET #	SN	DATE	BY	MODEL NO.	REV
UAMS – Center for Animal Models of Infection and Disease	HRU–2		300036	10/08/2024	JF	CAH60X120E	A

1. O.A. OPENING
2. FILTERS, 2" – MERV8
3. H.W. COILS – HW01
4. S.A. OPENING
5. LIGHT SWITCH
6. GFI OUTLET
7. SERVICE LIGHT (TYP OF 3)
8. MAGNEHELIC GAUGE
9. 6" X 6" J–BOX INSIDE & OUTSIDE EACH ACCESS SECTION WITH 1" CONNECTING CONDUIT ON THE OUTSIDE OF THE UNIT
10. ACCESS DOOR 60" X 24" W/SAFETY CATCH (TYP OF 3)

LH coil connections is shown on plans. Submitted is RH. Consider swapping the access doors to LH also for ease of accessibility.

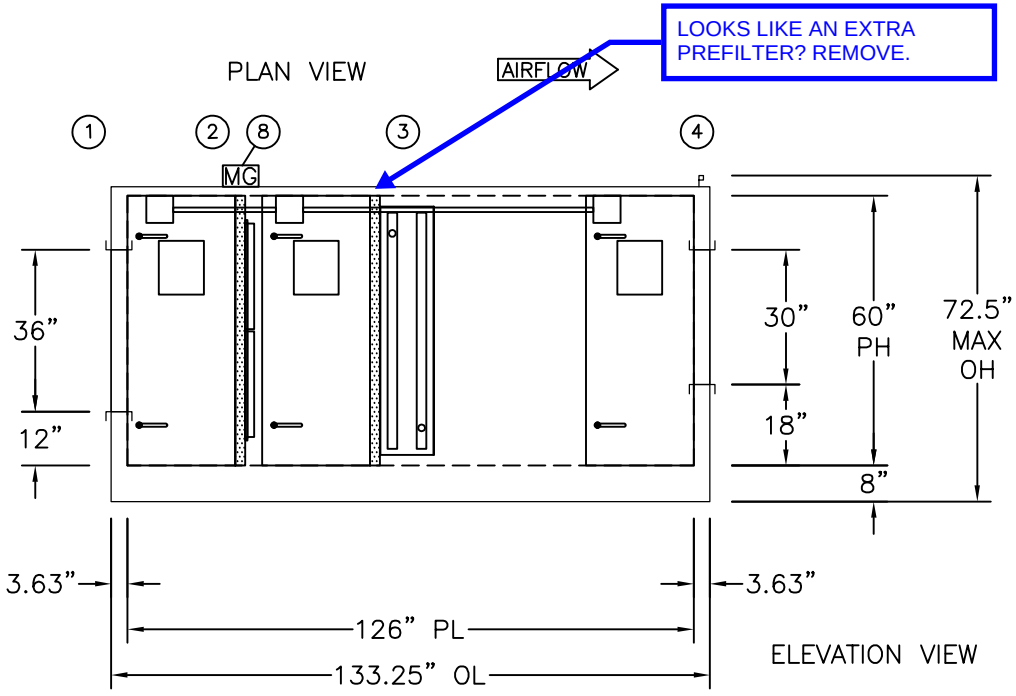
Submitted dimensions are slightly wider and shorter than plans depict. Coordinate size of housekeeping pad accordingly.

Unit weight is nearly 2x the basis of design. Clarify if acceptable.



PLAN VIEW

LOOKS LIKE AN EXTRA PREFILTER? REMOVE.



ELEVATION VIEW

SUPPLY: 25,500 CFM

APPROXIMATE UNIT SHIPPING WEIGHT 5,500 LB

INDOOR

ClimateCraft

Date: 10/22/2024

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Unit Data

Standard Air Handler	Roof Curb Not Provided	ETL Listed	Indoor Unit

Cabinet Data

External skin	16 Ga, Prepainted Galvanized Steel
Color/Finish	Standard ClimateCraft Sky Grey
Roof type	Flat paneled roof
Roof frame	None
Base	8" x 2" x 3/16" wall tubular carbon steel
Base insulation	Spray foam
Recessed floor	No
Subfloor liner	None
Curb Notched Base	No
Removable lifting lugs	No

Door Accessories

Door Thickness	2"
Door Window	10" x 12" All doors
Latches per Door	Dual
Door Hinges	Die cast aluminum
Test Ports	None
Safety Catch	None
Tie Back Chain	None
Field Pressure Test Doors	None
Extra hinge	None
Double gasket	None

Interior Materials	Unit Construction Global	Alternate Construction by Section Alternate Section
Wall Insulation Wall Liner	2" Foam, R 13.2 20 Ga Galv, Solid	
Roof Insulation Roof Liner	2" Foam, R 13.2 20 Ga Galv, Solid	
Floor Floor Construction	Aluminum, Smooth - Thermal Break Not Welded	
Airseal Facesheet Airseal Frame Airseal Type	20 Ga 304SS Stainless 2" Single Facing	

Notes:

- **No drain pans provided.**
- **No floor drains provided.**
- **Stainless steel exterior hardware.**

Shipping Data

Shipping Method	Ship in single piece; no splits provided. Unit bagged for shipment.

Notes:

Coils

Options	Heating	
Manufacturer	ClimateCraft	
Type	5/8" OD Hot Water	
Coil Vents	Internal - 1/4" MPT w/ Cap	
Coil Drains	Internal - 1/4" MPT w/ Cap	
# of Feeders/Circuits	N/A (Non-DX Coil)	
Coil Coating	Not provided	

Notes:

- **The coil specifications, data, and optional features are indicated on the coil data sheets.**
- **Drain pan and drain type material can be referenced in the Interior Materials data table.**

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Filter

Filter Rack #1		Pre-Filter		
Bank type	Universal Holding Frames	Filter type	Pleated	
Rack construction	Stainless - Solid	Filter efficiency	MERV 8	
Access	Upstream access	Media length	2	ins
Size	2Hx4.5W	Qty	8	Full 24x24
Filter gauge	Magnehelic		2	Half 12x24
Gauge range	0"-4"	Num media sets	2	

Notes:

Electrical

Voltage	120V, 1 phase 60hz	Lights	LED A-Shape 10W Bulbs
Motor Wiring	No motor wiring provided	Light Power	Separate 115 Volt lighting power required
Variable Frequency Drives	No drives provided	Wiring Method, Lights	Aluminum MC Cable
Power Panel	None	Wiring Method, Power	EMT Galv. / Flexible Metal Conduit
Incoming Motor Power	No Motor	Wiring Method, Controls	EMT Galv. / Flexible Metal Conduit

Notes:

- **See the unit drawing for location of electrical components.**

Unit Tests

Cabinet strength design criteria	L/200 @ maximum section pressure
No factory testing is included	

Notes:

ClimateCraft

Date: 10/18/2024

Static Pressure Analysis

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

UNIT AIR SUMMARY		
Supply airflow	cfm	25,500
Air density	lb/ft³	0.075
Altitude	ft	0

UPDATE TO 300'

SUPPLY STATIC PRESSURE ANALYSIS		
Description	**Face Velocity (ft/min)**	**SPD (in WC)**
Outside air opening	1,000	0.09
Pre-filter (initial)	708	0.55
Pre-filter (extra)	708	0.23
Heating coil	654	0.95
Supply air opening	1,360	0.18
Total static pressure		**2.00**

REMOVE EXTRA FILTER.

ClimateCraft

Date: 10/18/2024

Coil Performance Data

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

UPDATE TO 300'

HOT WATER HEATING COIL(S) - HW01

Coil is NOT certified by AHRI.
Version: 4.01.6 MFG: ClimateCraft, Inc.

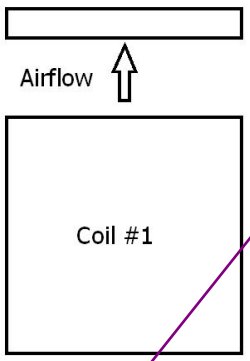
Operating Conditions			Air Conditions			Fluid Conditions		
Airflow:	25,500	ACFM	Entering air (DB):	75.0	°F	Fluid:	Propylene	
Elevation:	0.0	ft	Leaving air (DB):	87.1	°F	Concentration:	30	%
Air pressure:	14.696	psia	Face velocity:	654	ft/min	Entering temp:	95.5	°F
Air density:	0.074	lb/ft³	Air pressure drop:	0.95	in WC	Leaving temp:	83.9	°F
						Flow rate:	60.00	gpm
						Pressure drop:	13.84	ft WC
							6.0	psid
						Fluid velocity:	2.10	ft/sec

Total Coil Bank Ratings			Coil Data			Coil Options	
Total capacity:	328,303	Btu/hr	Face area:	39.0	ft²	Tube material:	Copper
Coil is not certified by AHRI because:			Finned height:	52.50	ins	Tube thickness:	0.035 ins
Coil is not certified with Propylene Glycol			Finned width:	107.00	ins	Fin type:	V-Waffle
			Rows:	6		Fin material:	Aluminum
			Fins/inch:	12		Fin thickness:	0.0075 ins
			Serpentine:	1		Casing material:	304 SS
			Dry weight (Ea.):	1,046	lb	Connections:	Red Brass MPT
			Wet weight (Ea.):	1,270	lb	Coating:	None
			Approx. coil fluid volume (Ea.):	27	gal	Vent & drain:	Internal - 1/4" MPT w/ Cap
						UV Light:	Not provided

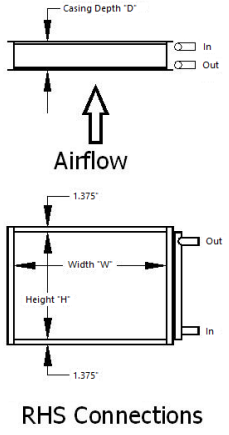
Individual Coil Ratings

Coil Tag(s)	Model Number	Capacity Btu/hr	Airflow cfm	Flow gpm	No. of circuits	Dimensions			Connection	
						H(ins)	L(ins)	D(ins)	Size(ins)	Style
1	58WC52.5x107-06-12-AW	328,303	25,500	60.00	35	52.50	107.00	12.00	1.50	RHS

Coil Bank Layout



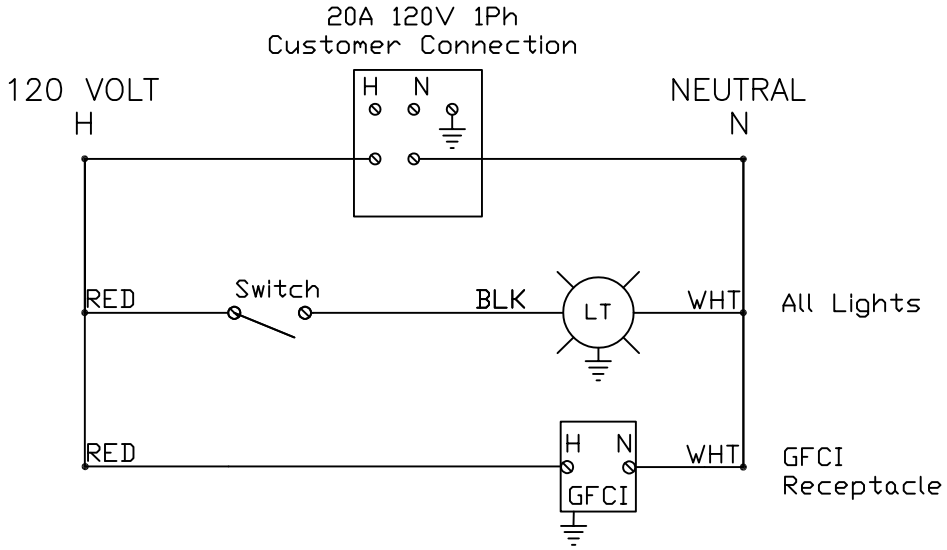
Coil Drawing



Confirm data achieves winter and summer conditions.

Water pressure drop is nearly double the design condition.

20A, 120V
1Ph/60Hz By Others



Customer supplied 120V power circuit must include a ground fault interrupt device as well as over current protection.

Caution: All customer supplied power must be shut off to the unit before servicing electrical system.

Caution: Only replace light bulb with LED 10W, 120V.

The number of devices drawn on this diagram is for illustration purposes only. Refer to the BOM for quantities.

Device locations are shown on the plan view drawing.

120V wiring is #12 THHN.

Refer to unit data sheet for conduit type.

One or more circuits may be provided.

Wire colors are representative and may be changed.

Circuit 1			
Quantity	Description		Amp Draw
1	Switch		0.0000
1	GFCI Receptacle		12
3	Vapor Proof Lights W/LED		0.249000
		Total Amp Draw	12.2490

ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

JOB		SN	BY	REV
UAMS – Center for Animal Models of Infection and Disease		300036	JF	A
TAG	SHEET #	DATE	MODEL NO.	
HRU–2		10/08/2024	CAH60X120E	

UAMS - Center for Animal Models of Infection and Disease

Model #	CAH60X120E	Serial #	30036	Tag	HRU-2	MFG Date	TBD

Volts	120	Phase	1~	Hz	60 `

Circuit Qty	Motor HP	Motor FLA	Motor Tag

CAUTION: More than 1 disconnect is required to disconnect power from this equipment!

Separate circuits are identified above. Multiples of the same circuit are listed on the same line. A separate 115 volt lighting circuit is also required

Short-circuit current: NA kA rms symmetrical, NA V maximum

Electric Heat (Kw)	NA		Max Coil (psig/kPa)	300.0	2068.5
Input Amps	NA		Max Oper. Steam Press. (psig/kPa)	NA	NA
			Max Coil Water (psig/kPa)	300.0	2068.5
			Refrigerant Max Charge (lbs/kg)	NA	NA
For Outdoor Use			HW Coil Max Inlet Temp (F/C)	200.0	93.3
For Installation in locations not accessible to the general public			Refrigerant Type		NA
Max Discharge Air Temp (F/C)	100.0	37.8	Max Ext. Static Press (in. w.g./kPa)	NA	NA

ClimateCraft

Oklahoma City

Use Copper Conductor Only
Made in USA
Patents: www.climatecraft.com\patents

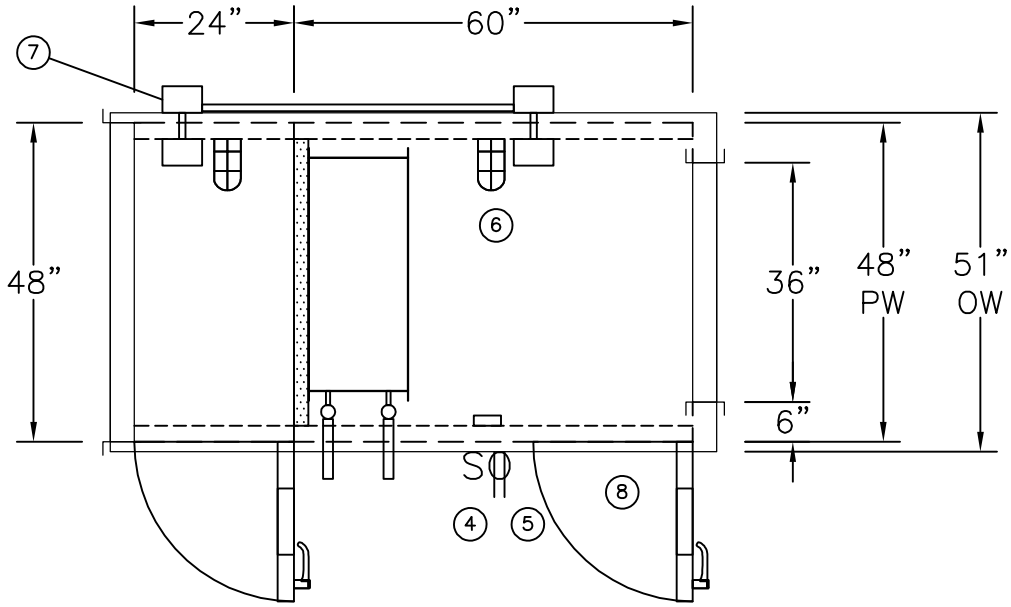
ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

JOB	SN
UAMS – Center for Animal Models of Infection and Disease	300037
TAG	SHEET #
HRU–5	
DATE	BY
10/08/2024	JF
MODEL NO.	REV
CAH30X48E	A

1. O.A. OPENING
2. H.W. COILS – HW01
3. S.A. OPENING
4. LIGHT SWITCH
5. GFI OUTLET
6. SERVICE LIGHT (TYP OF 3)
7. 6" X 6" J–BOX INSIDE & OUTSIDE EACH ACCESS SECTION WITH 1" CONNECTING CONDUIT ON THE OUTSIDE OF THE UNIT
8. ACCESS DOOR 30" X 24" W/SAFETY CATCH (TYP OF 2)

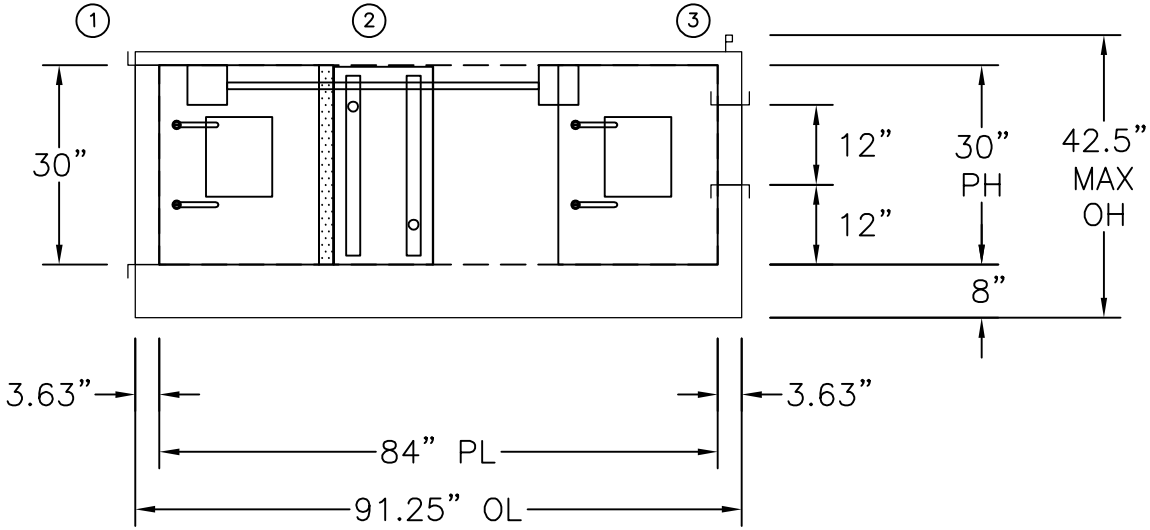
Confirm unit weight is acceptable

Confirm submitted CFM is acceptable.



PLAN VIEW

AIRFLOW



ELEVATION VIEW

SUPPLY: 3,320 CFM

APPROXIMATE UNIT SHIPPING WEIGHT 1,900 LB

INDOOR

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Unit Data

Standard Air Handler	Roof Curb Not Provided	ETL Listed	Indoor Unit

Cabinet Data

External skin	16 Ga, Prepainted Galvanized Steel
Color/Finish	Standard ClimateCraft Sky Grey
Roof type	Flat paneled roof
Roof frame	None
Base	8" x 2" x 3/16" wall tubular carbon steel
Base insulation	Spray foam
Recessed floor	No
Subfloor liner	None
Curb Notched Base	No
Removable lifting lugs	No

Door Accessories

Door Thickness	2"
Door Window	10" x 12" All doors
Latches per Door	Dual
Door Hinges	Die cast aluminum
Test Ports	None
Safety Catch	None
Tie Back Chain	None
Field Pressure Test Doors	None
Extra hinge	None
Double gasket	None

Interior Materials	Unit Construction Global	Alternate Construction by Section Alternate Section
Wall Insulation Wall Liner	2" Foam, R 13.2 20 Ga 304SS, Solid	
Roof Insulation Roof Liner	2" Foam, R 13.2 20 Ga 304SS, Solid	
Floor Floor Construction	16 Ga 304SS - Thermal Break Not Welded	
Airseal Facesheet Airseal Frame Airseal Type	20 Ga 304SS Stainless 2" Single Facing	

Notes:

- **No drain pans provided.**
- **No floor drains provided.**
- **Stainless steel exterior hardware.**

Shipping Data

Shipping Method	Ship in single piece; no splits provided. Unit bagged for shipment.

Notes:

Coils

Options	Heating	
Manufacturer	ClimateCraft	
Type	5/8" OD Hot Water	
Coil Vents	Internal - 1/4" MPT w/ Cap	
Coil Drains	Internal - 1/4" MPT w/ Cap	
# of Feeders/Circuits	N/A (Non-DX Coil)	
Coil Coating	Electrofin	

Notes:

- **The coil specifications, data, and optional features are indicated on the coil data sheets.**
- **Drain pan and drain type material can be referenced in the Interior Materials data table.**

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Electrical

Voltage	120V, 1 phase 60hz	Lights	LED A-Shape 10W Bulbs
Motor Wiring	No motor wiring provided	Light Power	Separate 115 Volt lighting power required
Variable Frequency Drives	No drives provided	Wiring Method, Lights	Aluminum MC Cable
Power Panel	None	Wiring Method, Power	EMT Galv. / Flexible Metal Conduit
Incoming Motor Power	No Motors	Wiring Method, Controls	EMT Galv. / Flexible Metal Conduit

Notes:

- **See the unit drawing for location of electrical components.**

Unit Tests

Cabinet strength design criteria	L/200 @ maximum section pressure
No factory testing is included	

Notes:

ClimateCraft

Date: 10/18/2024

Static Pressure Analysis

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

UNIT AIR SUMMARY		
Supply airflow	cfm	3,320
Air density	lb/ft³	0.075
Altitude	ft	0

SUPPLY STATIC PRESSURE ANALYSIS

Description	Face Velocity (ft/min)	SPD (in WC)
Outside air opening	332	0.01
Heating coil	506	0.82
Supply air opening	1,107	0.12
Total static pressure		**0.95**

ClimateCraft

Date: 10/18/2024

Coil Performance Data

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

HOT WATER HEATING COIL(S) - HW01

Coil is NOT certified by AHRI.
Version: 4.01.6 MFG: ClimateCraft, Inc.

Operating Conditions

Airflow:	3,320	ACFM
Elevation:	0.0	ft
Air pressure:	14.696	psia
Air density:	0.074	lb/ft³

Air Conditions

Entering air (DB):	75.0	°F
Leaving air (DB):	87.0	°F
Face velocity:	506	ft/min
Air pressure drop:	0.82	in WC

Fluid Conditions

Fluid:	Propylene	
Concentration:	30	%
Entering temp:	89.1	°F
Leaving temp:	86.1	°F
Flow rate:	30.00	gpm
Pressure drop:	5.07	ft WC
	2.2	psid
Fluid velocity:	2.04	ft/sec

Total Coil Bank Ratings

Total capacity: 42,390 Btu/hr
Coil is not certified by AHRI because:
Coil is not certified with Propylene Glycol

Coil Data

Face area:	6.6	ft²
Finned height:	27.00	ins
Finned width:	35.00	ins
Rows:	8	
Fins/inch:	12	
Serpentine:	1	
Dry weight (Ea.):	277	lb
Wet weight (Ea.):	333	lb
Approx. coil fluid volume (Ea.):	7	gal

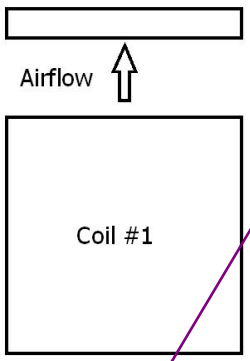
Coil Options

Tube material:	Copper
Tube thickness:	0.035 ins
Fin type:	V-Waffle
Fin material:	Aluminum
Fin thickness:	0.0075 ins
Casing material:	304 SS
Connections:	Red Brass MPT
Coating:	Electrofin
Vent & drain:	Internal - 1/4" MPT w/ Cap
UV Light:	Not provided

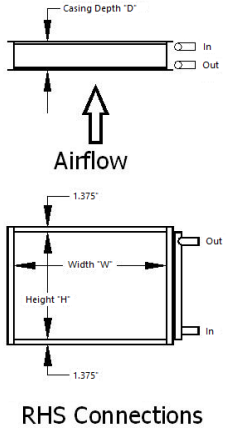
Individual Coil Ratings

Coil Tag(s)	Model Number	Capacity Btu/hr	Airflow cfm	Flow gpm	No. of circuits	Dimensions			Connection	
						H(ins)	L(ins)	D(ins)	Size(ins)	Style
1	58WC27x035-08-12-AW	42,390	3,320	30.00	18	27.00	35.00	15.00	1.50	RHS

Coil Bank Layout



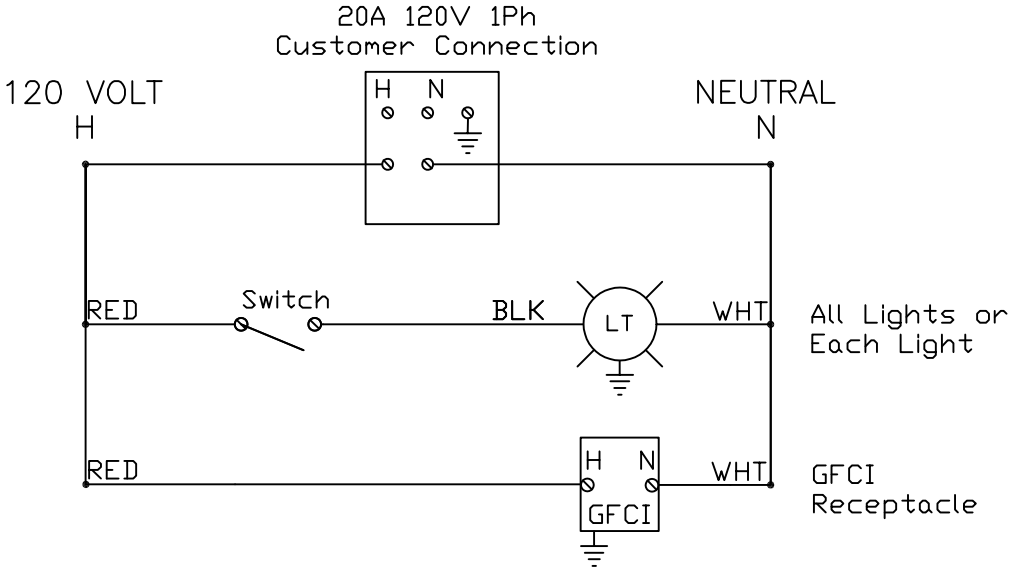
Coil Drawing



RHS Connections

Confirm performance is acceptable in winter conditions.

20A, 120V
1Ph/60Hz By Others



Customer supplied 120V power circuit must include a ground fault interrupt device as well as over current protection.

Caution: All customer supplied power must be shut off to the unit before servicing electrical system.

Caution: Only replace light bulb with LED 10W, 120V.

The number of devices drawn on this diagram is for illustration purposes only. Refer to the BOM for quantities.

Device locations are shown on the plan view drawing.

120V wiring is #12 THHN.

Refer to unit data sheet for conduit type.

One or more circuits may be provided.

Wire colors are representative and may be changed.

Circuit 1			
Quantity	Description		Amp Draw
1	Switch		0.0000
1	GFCI Receptacle		12
2	Vapor Proof Lights W/LED		0.166000
		Total Amp Draw	12.1660

ClimateCraft
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Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

JOB		SN	BY	REV
UAMS – Center for Animal Models of Infection and Disease		300037	JF	A
TAG	SHEET #	DATE	MODEL NO.	
HRU–5		10/08/2024	CAH30X48E	

UAMS - Center for Animal Models of Infection and Disease

Model #	CAH30X48E	Serial #	30037	Tag	HRU-5	MFG Date	TBD

Volts	120	Phase	1~	Hz	60 `

Circuit Qty	Motor HP	Motor FLA	Motor Tag

CAUTION: More than 1 disconnect is required to disconnect power from this equipment!

Separate circuits are identified above. Multiples of the same circuit are listed on the same line. A separate 115 volt lighting circuit is also required

Short-circuit current: NA kA rms symmetrical, NA V maximum

Electric Heat (Kw)	NA		Max Coil (psig/kPa)	300.0	2068.5
Input Amps	NA		Max Oper. Steam Press. (psig/kPa)	NA	NA
			Max Coil Water (psig/kPa)	300.0	2068.5
			Refrigerant Max Charge (lbs/kg)	NA	NA
For Outdoor Use			HW Coil Max Inlet Temp (F/C)	200.0	93.3
For Installation in locations not accessible to the general public			Refrigerant Type		NA
Max Discharge Air Temp (F/C)	100.0	37.8	Max Ext. Static Press (in. w.g./kPa)	NA	NA

ClimateCraft

Oklahoma City

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This document details the standard construction of ClimateCraft custom air handlers. It is intended to be used in conjunction with the unit data sheets and component data sheets to describe the construction specifications of all equipment. The unit data sheets and the component data sheets together with component cut sheets and unit drawings, detail each specific unit. Together, they make up the submittal data for the ClimateCraft air handlers on the project.

Exterior Cabinet Construction
The exterior of ClimateCraft units are made from prefabricated roll formed panels that incorporate a patented thermal break system. They are fastened on 6" centers with 5/16" - 18 stainless steel bolts. All panel fasteners are accessible from the outside of the unit. No sheet metal screws are used on the unit to secure the structural panels. The panels are sealed with specially extruded EPDM gasket along all four sides to prevent cabinet leakage.

The roll formed panels are fabricated from 16 gauge material. The type of material is detailed on each unit's product datasheet and can be one of the following exterior materials.

16 gauge pre-painted galvanized steel
Base material is 16 gauge galvanized steel conforming to the requirements of ASTM-653. The material is pre-coated with a polyester ceramic paint system. This system passes an ASTM B-117 salt spray resistance test of 3000 hours and an ASTM G-23 accelerated weathering test of 3,000 hours. The paint color is "ClimateCraft Sky Grey".

Indoor units have a flat roof with a 1-1/2" standing seam.

Wall and Roof Insulation
Insulation is thermally and acoustically rated. The fire and smoke ratings meet NFPA 90A and 90B requirements. The insulation type used can be found in the "Cabinet" section of the unit data sheet. One or more panel thicknesses as detailed in the construction section of the unit data sheet can be used. The R value of the panels used are as follows:

Foam Insulation	R Value = 6.6 / inch

Interior Liners
The interior liners are a one-piece liner. The liners are fastened to the exterior panels through a thermally isolating material. The unit data sheet details the types of liners used in each section. The liners used can be one of the following materials:

20 gauge type 304 stainless steel
Type 304L stainless steel sheet conforms to ASTM A-240 with a 2-B finish.

Floor
The unit floor can be varied from section to section and the material and method of fastening is detailed by section in the unit data sheets. The floor materials options are as follows:

10 gauge aluminum
Type 1100 aluminum sheet produced to UNS A91100 with 2-B smooth finish.

The floors are fastened to the base with #12 self-drilling sheet metal screws driven into the base through pre-punched holes to insure uniformity. The screws are plated steel for galvanized steel and aluminum floors and are type 410 stainless steel on stainless steel floors. 1/8" thick EPDM gasket is applied between the floor sheets the base to provide a thermal break.

Structural Base
The perimeter of each base is fabricated from electrically welded structural steel tubing. The tubing is 3/16" thick (1/4" thick for seismically rated units) high strength carbon steel and is pre-painted at the mill with a weldable steel primer. The tube height is detailed in the unit data sheets. The perimeter tubing is drilled and tapped with 5/16" - 18 threads on 6" centers to accept steel bolts to fasten the unit panels to the base. The tubing is continuously welded together at the corners and the open ends are seal welded shut with a steel plate.

Formed "C" channels made of 12 gauge hot rolled pickled and oiled carbon steel are used as structural cross members and are fully welded into the perimeter frame. The cross members are placed on a maximum of 24" centers. The cross members are 4" deep.

5/8" thick by 8" wide steel plates are welded between cross members to distribute the weight of the fan assemblies to the structural base. The unit serial number is marked on the base for permanent identification. Lifting lugs are welded to the perimeter tubes. The lugs can be used to tie the unit down to the pad or roof curb for seismic restraint.

The welded base assembly is cleaned using a multi-step cleaning process to remove all dirt and oil, primed using a phenolic primer, and finished with a 2-part epoxy paint. The underside of the base is coated with a two component, closed cell, rigid polyurethane foam. A minimum 2" of insulation is provided.

Subfloor Options
When chosen a subfloor liner is fastened to the underside of the base and is constructed from one of the following materials: 20 gauge G90 galvanized steel.

Unit Splits (Refer to the unit data sheet to see which option applies to the specific unit)

Option 1: "No unit splits are provided"
The unit will ship as a single piece as shown on the drawings and individual sections cannot be separated.

Doors
Doors shall be 2" thick, double wall construction with R-6.6/inch polyurethane foam insulation. Doors shall open inward or outward as shown on the unit drawings. Outward swing doors which are installed in positive pressure sections shall be provided with a safety catch. Doors shall be constructed of minimum 0.125" thick, 6063-T5 extruded aluminum framework. Each door shall be mounted with fully adjustable die-cast aluminum hinges. All doors and mounting frames shall incorporate a thermal break design and the doors shall seal to a replaceable extruded EPDM sponge rubber gasket.

The door latch assembly shall consist of a roller cam compression arm with a chrome plated steel inner handle and glass/fiber/nylon composite outer handle. Tool operated locks are provided on each fan section access door. All doors have a minimum of two latches.

The door includes dual pane viewing windows with clear and wire reinforced safety glass. The windows are replaceable without disassembling the door. The windows are sealed and gasketed to prevent condensation. The unit data sheet details the sections that contain windows. All windows are resistant to UVC transmission.

The size, location and swing of each door is detailed on the unit drawings. Door sizes listed on the drawings are a nominal door size. Actual door clearance dimensions are approximately 3" less in the width and height.

Coils
All hot-water coils are constructed in accordance with ARI. 5/8" OD copper tubes are mechanically expanded into die formed fins. The tubes are arranged in a triangular pattern and the fins are patterned to augment heat transfer with a minimum air pressure drop. The coil data sheets detail fin and tube material and size. All water coils have seamless copper headers and threaded red brass connections. Each coil is tested under clear water at 350 psig.

The casing of all coils will be 16 gauge type 304 stainless steel as indicated on the coil data sheet. The casing consists of a C-channel tube sheet on either end with a 1 1/2" flanges. A 1 3/8" stacking flange is used on the top and bottom. On coils with finned widths greater than 42" an intermediate tube sheet is used to reinforce the coil casing. Multiple tube sheets are used to keep the maximum unsupported coil width to 42".

A coil data sheet is provided for each coil bank in all air handlers. The data sheets detail coil performance and optional construction supplied on each coil.

Filter Racks
Filter holding frames are of heavy-duty construction designed for industrial applications. Holding frames applied in medium efficiency filter applications are either upstream or downstream accessible. Holding frames applied in high efficiency filter applications are upstream accessible only. Holding frames are constructed from galvanized steel or optional type 304 stainless steel as specified in the unit data sheet.

They are equipped with polyurethane foam gaskets, fasteners and filter centering dimples. The in-line depth is 2.75" in order to effect adequate bearing surface for built-up filter banks. Filter fasteners are capable of being installed without the requirement of tools, nuts or bolts. The holding frame rack is designed to accommodate standard size filters with the application of the appropriate type fastener. The filter rack is designed to use standard 24" x 24" and 12" x 24" filters only. Headered filters of any depth may be used with 1", 2", or 4" non-headered pre-filters. 16 gauge stiffening angles are used between each column of filters.

Dwyer "Magnehelic" filter gauge options when chosen are installed where shown to monitor the air pressure drop of any filter bank. The gauges are factory mounted into a 16 gauge steel housing that mounts to the unit exterior using the bolts of one of the external standing seam flanges. Special air sensing tube assemblies are attached to the skin of the unit with self drilling sheet metal screws that come with an integral rubber washer. The sensing tube is inserted through a predrilled hole and the back of the plate is gasketed to eliminate air and water leakage. The air sensing assembly includes a barbed fitting on the exterior and vinyl tubing connects the sensing tubes to the filter gauge.

The unit data sheet details the type of filters and filter rack used along with the optional equipment and construction.

Electrical
The unit voltage is indicated on the unit data sheet. A weatherproof plastic nameplate is provided on all units giving the electrical rating information of the unit and all electrical components.

Power Circuit Conduit
The following is a detailed list of possible power circuit conduit types provided on all factory-built units.

- **EMT and Flexible Metal Conduit** - Power circuits are wired with EMT thin wall galvanized steel conduit. The wire is type THHN sized for the connected load. At each air seal and wall penetration, the conduit is sealed after assembly to prevent air and moisture migration. The final connection to the fan motors is through a short length of flexible conduit to allow for the movement of the spring isolated fan assemblies.

Lighting
The internal lights are in 100 watt vapor proof safety fixtures. The fixtures are die cast aluminum with a glass globe protected with a die cast safety cage. The lights are 10 watt LED non-dimmable bulbs equivalent to a 60 watt incandescent bulb. A combination 20 amp light switch and 115V outlet mounted in a die cast aluminum box controls lights and provides convenience power. The lighting power wiring diagram details the lighting control circuit.

Lighting wiring conduit types are detailed in the submittal with the following options.

- **Aluminum MC Cable** - The lights are wired with MC aluminum armor-clad cable. The cable consists of color coded 12 gauge, type THHN, stranded wiring. It is protected by a continuous

wrap of aluminum flexible conduit. The MC cable is air tight, and air and moisture cannot migrate through the conduit from section to section as with EMT or rigid conduit.

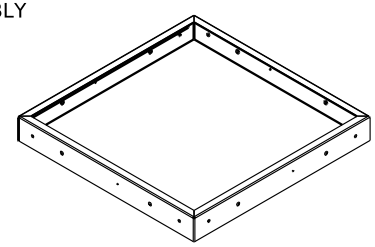
Controls
Controls are to be wired and installed, the following list details the possible options provided.

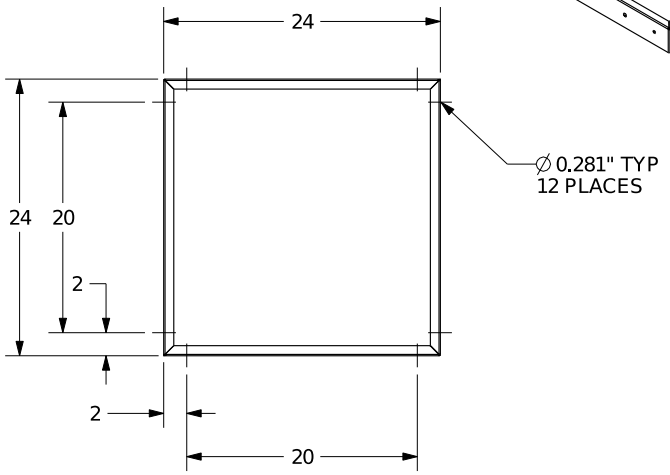
- **EMT or Flexible Metal Conduit** - The controls are wired with EMT thin wall galvanized steel conduit or flexible metal conduit. The wiring is stranded, 18 gauge, type THHN. At each air seal and wall penetration, the conduit is sealed after assembly to prevent air and moisture migration.

ETL
All factory-built units, unless stated otherwise in the submittal, are ETL listed. They have been examined by ETL and found to comply with UL safety standard 1995. The unit will bear the ETL listing mark.

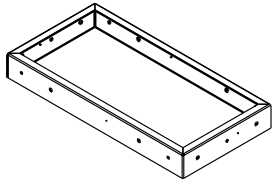
Testing
All factory assembled units undergo a functional run test. Power is applied to the unit and all circuits are run and checked for proper function. All fan motors are run and checked for rotation, operating speed, and balance after fan assembly.

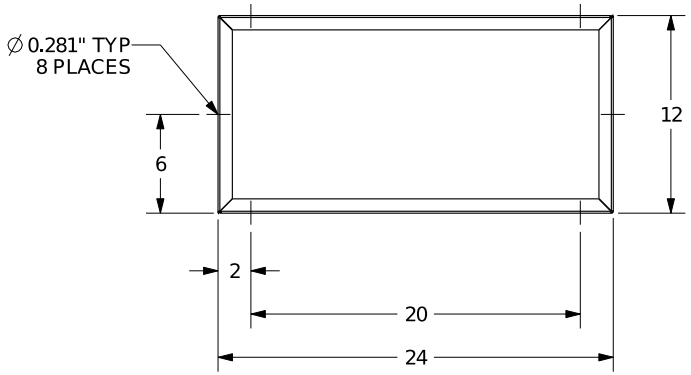
CLC 24" x 24" FILTER FRAME ASSEMBLY





CLC 24" x 12" FILTER FRAME ASSEMBLY

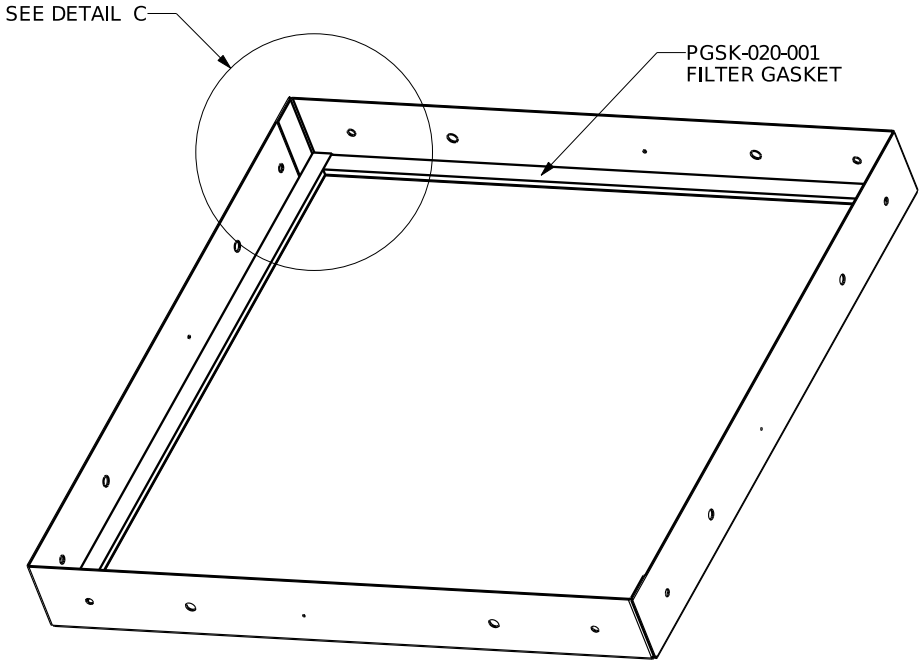


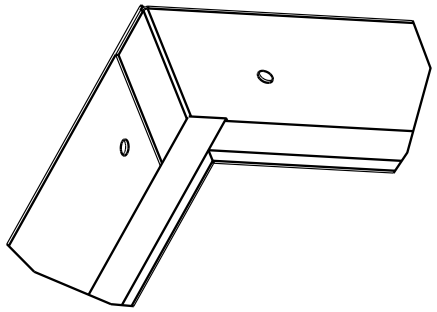


REV	DESCRIPTION	ECN #	BY	DATE	THIRD ANGLE PROJECTION	TOLERANCES	MANUFACTURING DRAWING	CLC FILTER FRAMES TYPE 8 FRAME	
A	INITIAL RELEASE		AJH	03/03/10		UNLESS OTHERWISE SPECIFIED .XXX ± .015 .XX ± .030 .X ± .060 ANG ± 1°	ClimateCraft P.O. BOX 1538, 1427 N.W. THIRD OKLAHOMA CITY, OK 73101-1538 PHONE (405) 415-9230 FAX (405) 415-9231	DRAWING # M100-282	APPR: RMW / KCO
B	REVISION		AJH	03/17/14				BY: AJH DATE: 03/03/10	SIZE: B
C	UPDATE FOR OUTSIDE VENDOR	0624	MDA	01/04/18				UNITS IN INCHES UNLESS OTHERWISE SPECIFIED	SHEET: 1 OF 3

FILTER GASKET INSTALLATION DETAILS

NOTES:
1. INSTALL PSA BACKED FILTER GASKET AS SHOWN
   WITHOUT CORNER OVERLAP
2. LINE GASKET UP WITH INSIDE FLANGE EDGE





DETAIL C
SCALE 0.500

REV	DESCRIPTION	ECN #	BY	DATE
A	INITIAL RELEASE		AJ H	0303/10
B	REVISION		AJ H	03/17/14
C	UPDATE FOR OUTSIDE VENDOR	0624	MDA	01/04/18

THIRD ANGLE PROJECTION

TOLERANCES: UNLESS OTHERWISE SPECIFIED
.XXX ± .015
.XX ± .030
.X ± .060
ANG ± 1°

MANUFACTURING DRAWING

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OKLAHOMA CITY, OK 73101-1538
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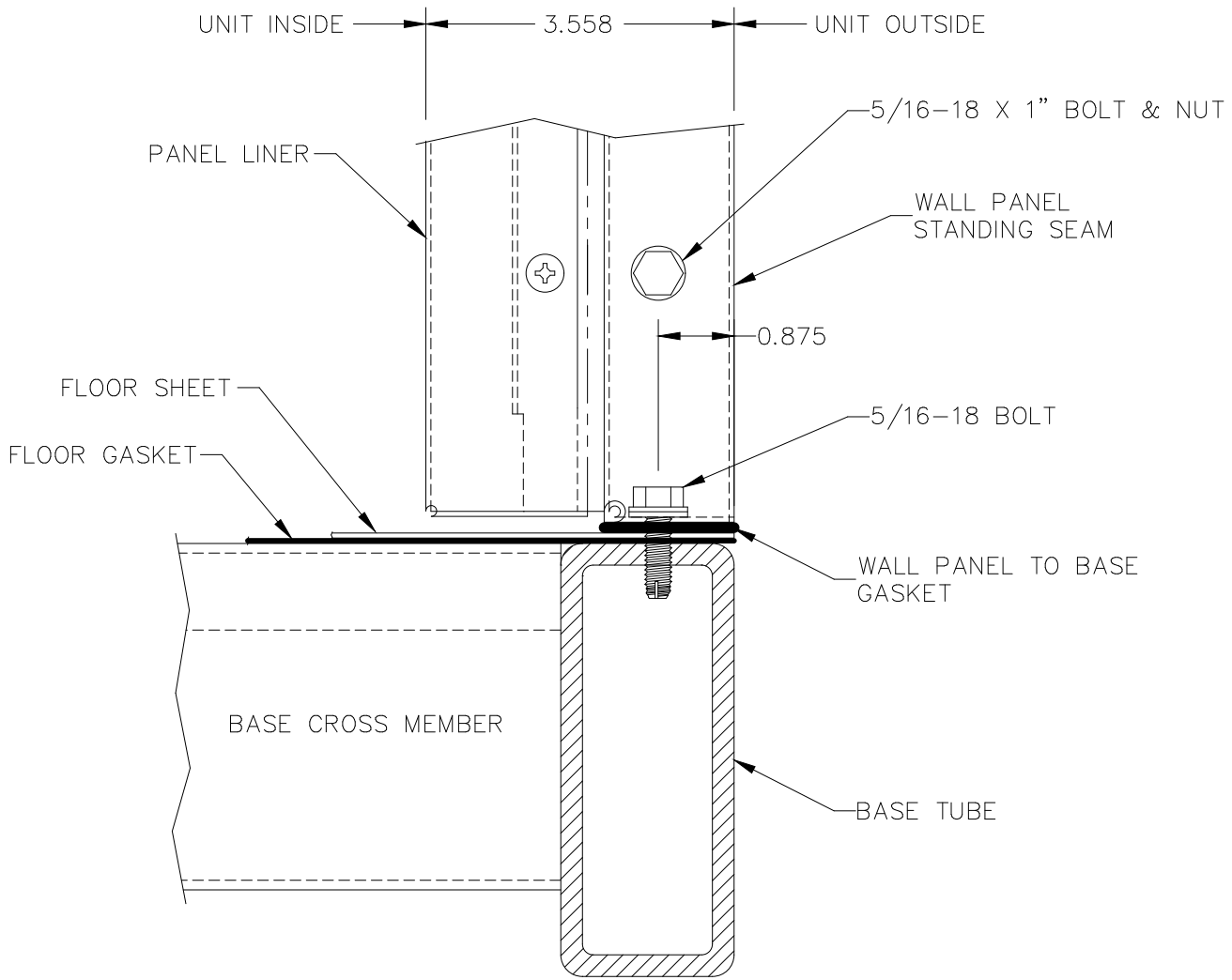
CLC FILTER FRAMES
TYPE 8 FRAME

DRAWING # M100-282 | APPR: RMW / KCO
BY: AJ H | DATE: 03/03/10 | SIZE: B
UNITS IN INCHES UNLESS OTHERWISE SPECIFIED | SHEET: 2 OF 3



LOWER CORNER
ELEVATION VIEW

2" WALL INSULATION

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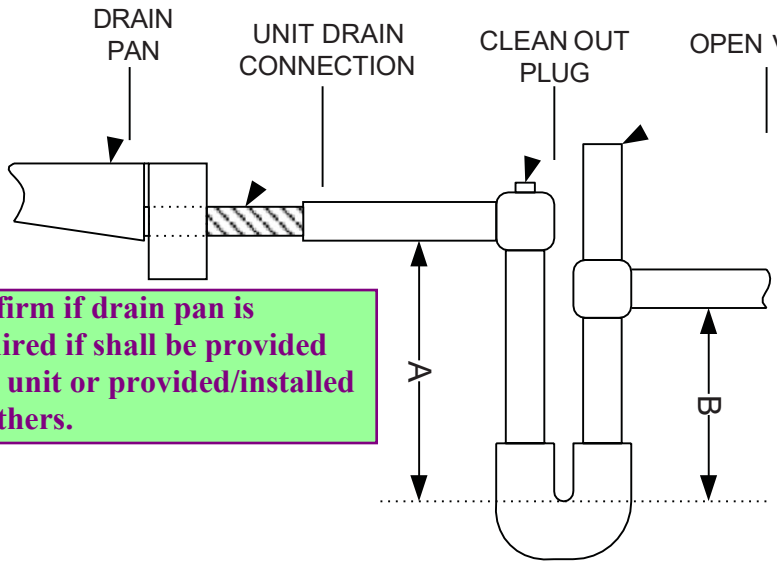
Condensate Drain

Static pressure in the drain pan section will be negative if the cooling coil is in a draw through application. Static pressure will not allow the drain pan to empty if a properly plumbed trap is not used. Cooling coils and drain pans in a blow through or positive pressure section also need to be properly trapped to prevent air from blowing through the drain.

The following trap sizes are required as a minimum for proper operation of the air handling unit. On startup, it may be necessary to fill the trap manually. If the air handling unit is exposed to freezing conditions during winter months, an antifreeze solution should be placed in the trap or the trap should be drained and plugged.

NEGATIVE INTERNAL STATIC PRESSURE COIL SECTION (DRAW-THROUGH APPLICATION)



Confirm if drain pan is required if shall be provided with unit or provided/installed by others.

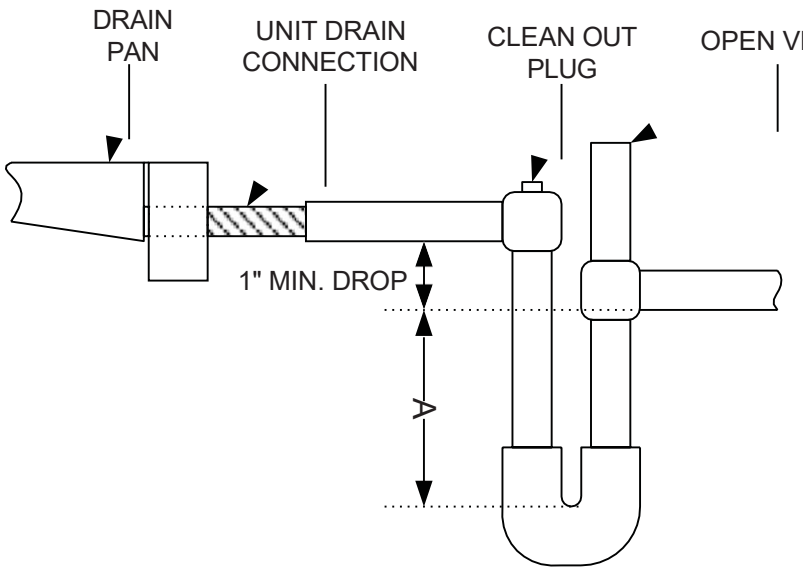
A=Negative Internal Static Pressure in Drain Pan Section (in w.g.)+2

B=(Negative Internal Static Pressure in Drain Pan Section/2)+1

Example:
Neg SP in Drain Pan Section=3.6 in/w.g.

A=3.6+2=5.6"
B=(3.6/2)+1=2.8"

POSITIVE INTERNAL STATIC PRESSURE COIL SECTION (BLOW-THROUGH APPLICATION)

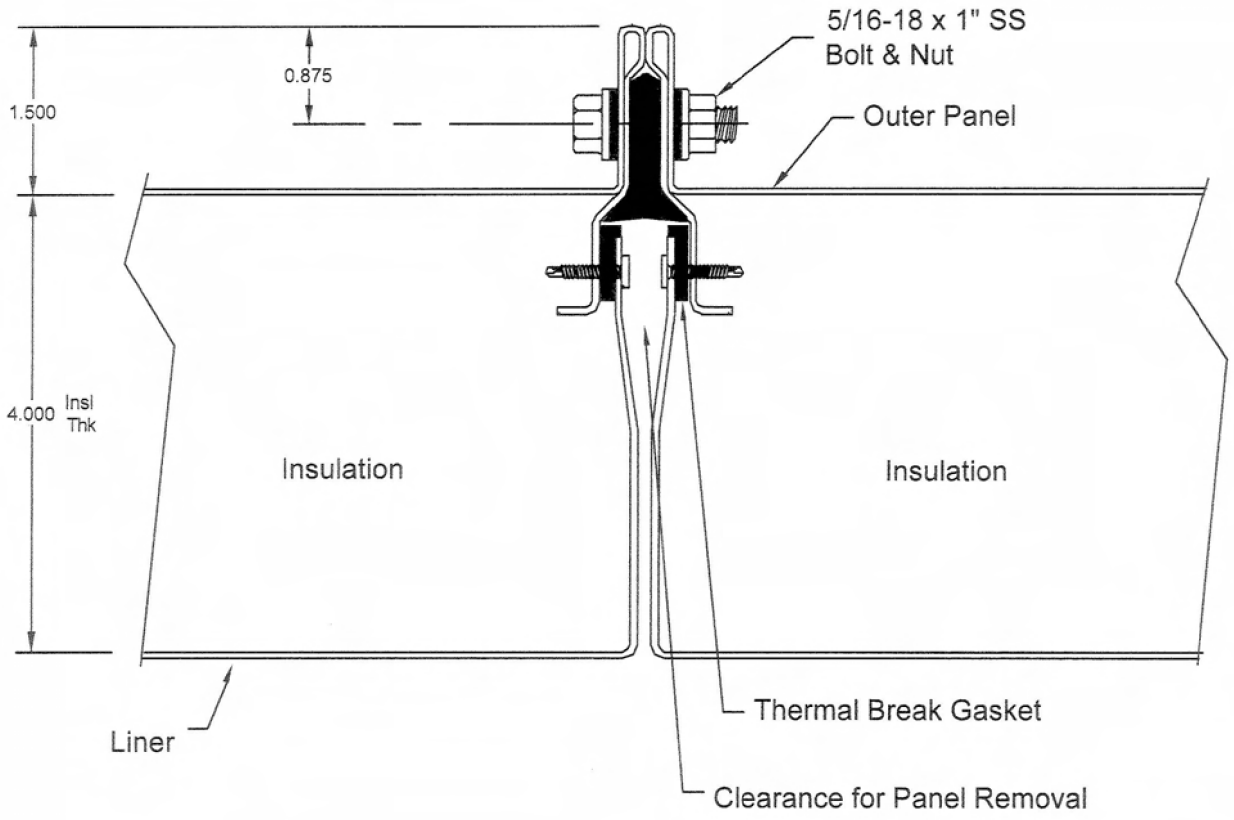


A=Positive Internal Static Pressure in Drain Pan Section (in w.g.)+1

Example:
Pos SP in Drain Pan Section=3.6 in/w.g.

A=3.6+1=4.6"

Total Trap Dimension=4.6+1=5.6"



Panel Joint Detail

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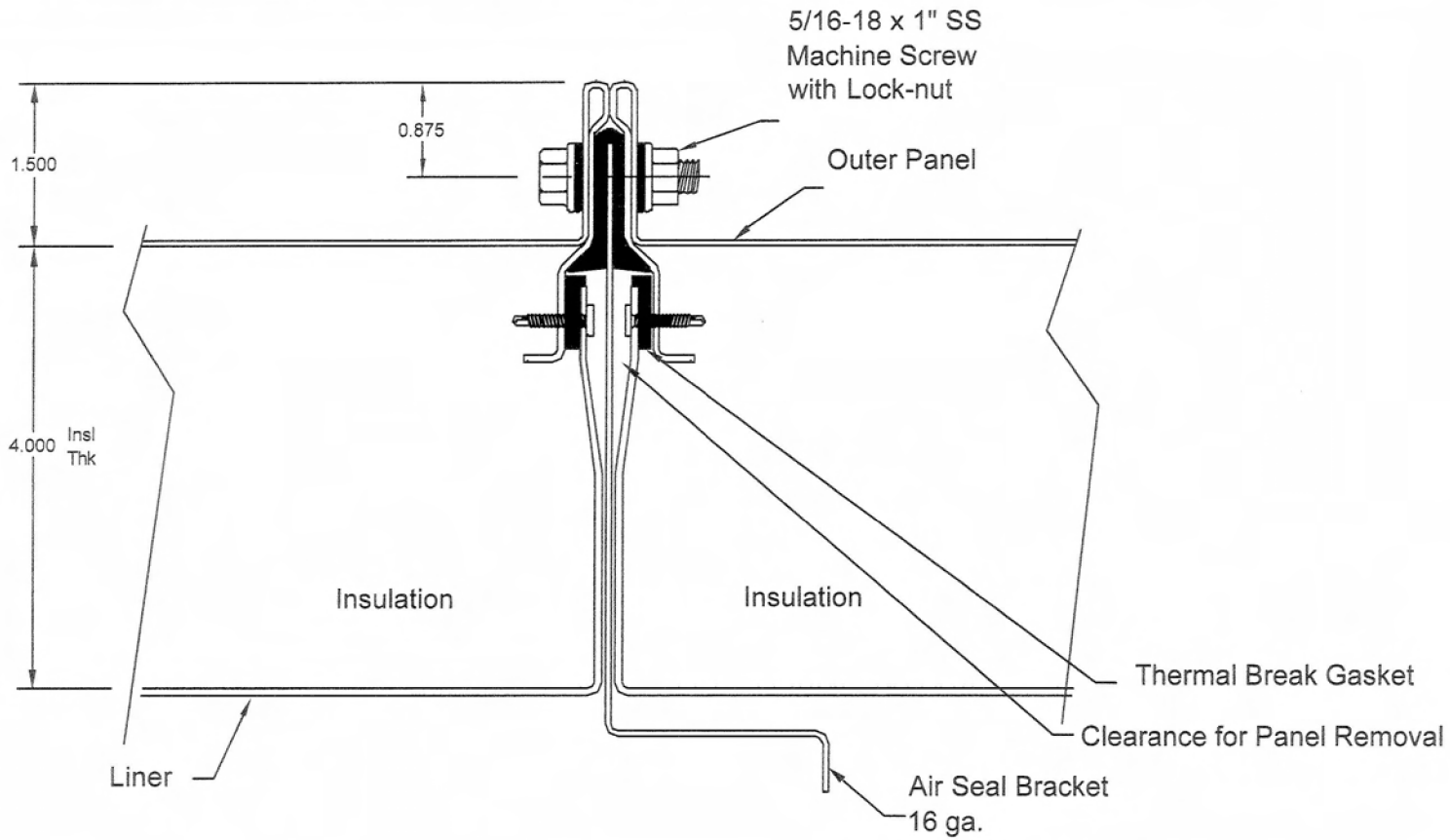
	.XX	±.030			REV: L DATE: 1-17-06
	.X	±.060		DWG NO: M100-001	SIZE: B Sht3of 4
	ANG	±1°			



Air Seal Joint Detail

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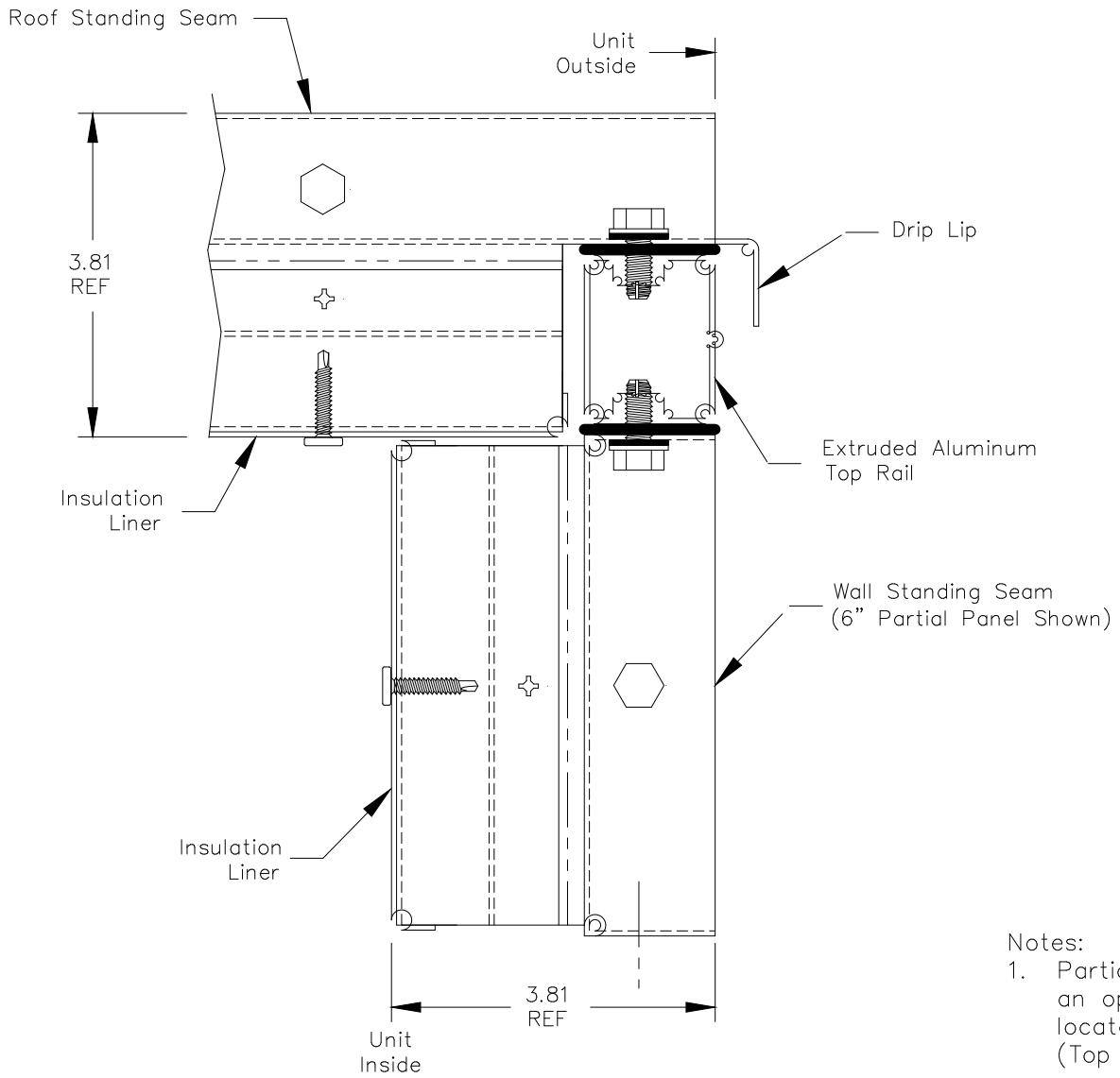
			DWG NO M100-001	SIZE B	Sht4of 4



SECTION VIEW
THRU TOP CORNER

Notes:
1. Partial panel used to create an opening in wall and is located at top & bottom. (Top Partial Panel shown.)

2" INSULATION

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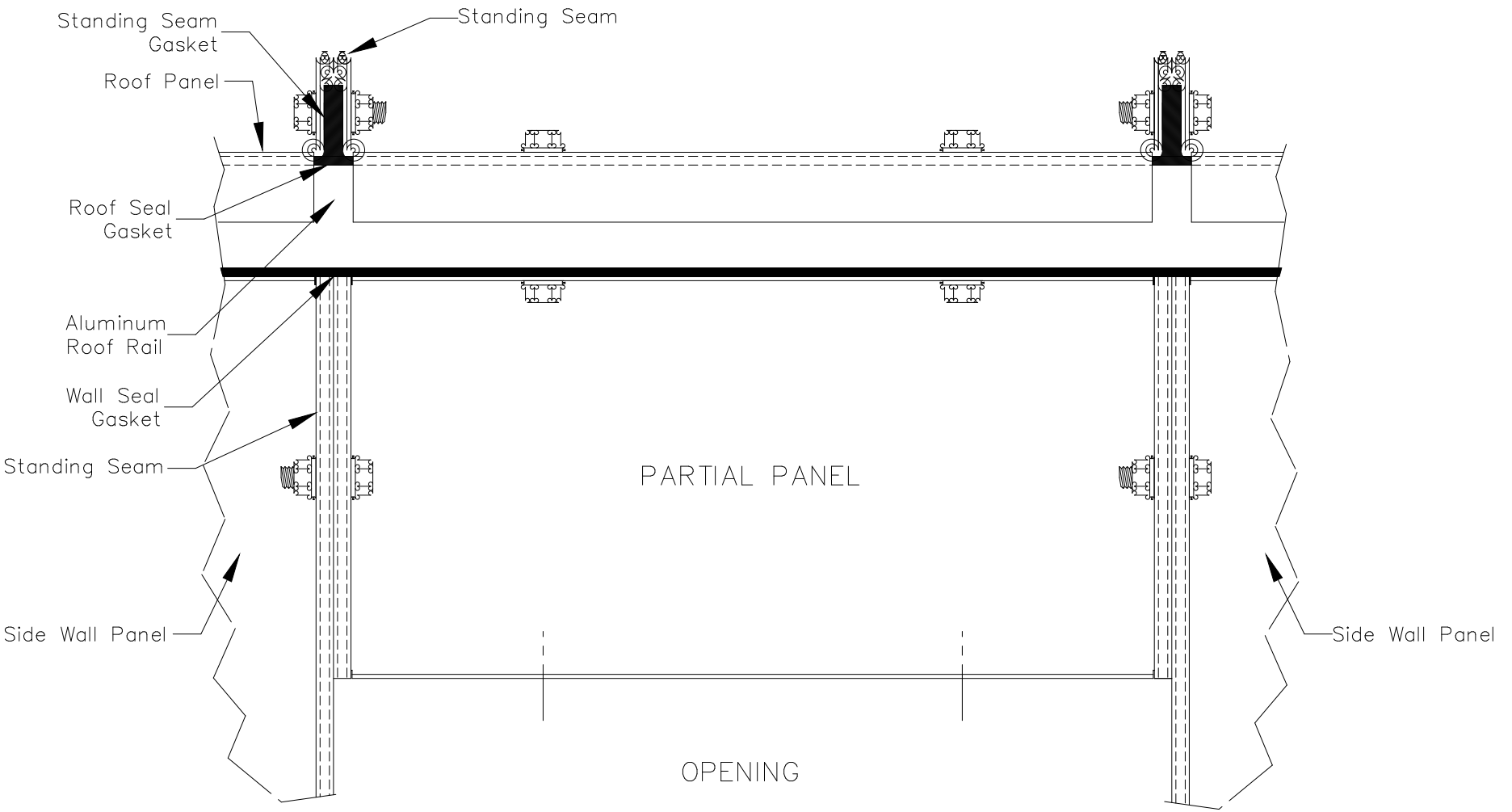

Notes:
1. Partial panel used to create an opening in wall and is located at top & bottom. (Top Partial Panel shown.)

FRONT VIEW
(SIDE 1)

2" ROOF & WALL PANELS SHOWN

STANDARD MANUFACTURING DRAWING	TOLERANCES		TITLE	BY	DATE
WITHOUT THE EXPRESS WRITTEN PERMISSION OF ClimateCraft Inc. DO NOT REPRODUCE OR DISCLOSE THE CONTENTS OF THIS DRAWING THIS DRAWING AND IT'S CONTENTS ARE THE PROPERTY OF ClimateCraft Inc.	.XXX	.015	AHU PARTIAL PANEL DETAIL	RKW	10-26-98
	.XX	.030		REV E	DATE 03-21-03
	.X	.060			
	ANG	1	DWG NO M100-005	SIZE A	Sht 4 of 4

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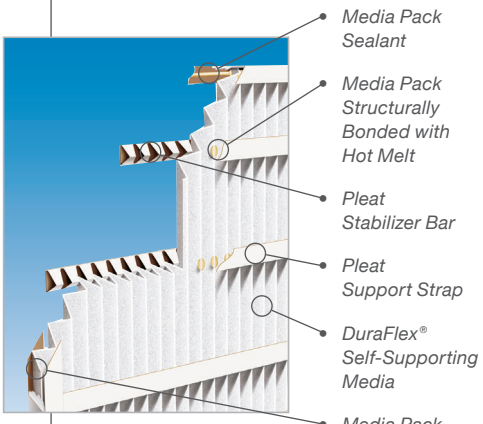
THE WORLD LEADER IN CLEAN AIR SOLUTIONS

PerfectPleat® SC M8

(Standard Capacity MERV 8)

EXTENDED SURFACE PLEATED PANEL FILTERS

- Mechanical efficiency – does not rely on electret charge technology
- Self-supporting DuraFlex® media made from virgin fiber – no wire support needed
- Consistent media with controlled fiber size and blend
- Available in 2″ and 4″ models
- Environmentally friendly – no dies, no metal, fully incinerable
- Patented media, filter design, and manufacturing process. Patents covered under one or more of the following: US 6398839 B2; US 6254653 B1; US 6159318; US 6165242; US 6387140 B1



PerfectPleat® SC M8 2″ Filter Construction

PerfectPleat SC M8 filters are designed to consistently increase efficiency throughout the service life of the filter. They have an initial MERV 8 rating respectively, but the efficiency increases significantly when dust loading begins. PerfectPleat SC M8 filters have distinctive self-supporting characteristics that allow a pleating pattern, which promotes airflow and maximizes Dust Holding Capacity (DHC). The PerfectPleat SC M8 filter is best suited for standard capacity pleated panel filter applications, where pleated filters are currently in use. They can also be used to upgrade applications using panel filters.

Superior Design and Construction

The perimeter frame is constructed from the highest wet-strength 28 pt. beverage carrier board, securely bonded to the media pack. Support straps on the air entering side are used in combination with uniquely designed pleat stabilizers on the air leaving side of the 2″ model to provide additional strength. The support straps and pleat stabilizers ensure integrity against turbulent airflow. The 2″ filter resists crushing and abuse and provides excellent lateral stability for installation in side access systems.

The 4″ model utilizes a two piece die cut frame with integral pleat spacers on the air leaving side. Pleat spacing is controlled by straps bonded to the air entering side and the multiple rows of pleat spacers on the air leaving side. The pleat spacers also ensure the pleats remain open during use, maximizing filter life.

DuraFlex® Media—Patented Media Design

Uniform size virgin fibers are assembled in closely controlled blends to create a media that is both self-supporting and consistent in performance. When pleated, DuraFlex media will hold its shape without the wire support characteristic of conventional pleated filters. That means no potential for the formation of rust and safer handling. With the superior resiliency of DuraFlex media and no need for wire support, PerfectPleat SC M8 filters can sustain significant abuse and maintain their shape and pleat spacing. The absence of wire also makes the filter totally incinerable, which can simplify disposal.

AAF | Flanders®

PerfectPleat® SC M8 Filters

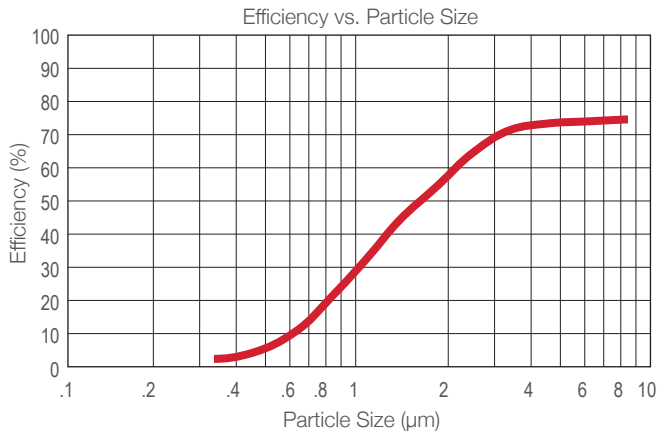
Performance Data

Filter	Pleats Per Linear Foot	Rated Initial Resistance (in. w.g.)			Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits
		300 FPM	500 FPM	625 FPM			
2″ PerfectPleat SC M8	10	.13	.24	.33	1.0	8	150°F (66°C)
4″ PerfectPleat SC M8	9	.11	.23	.35	1.0	8	200°F (93°C)

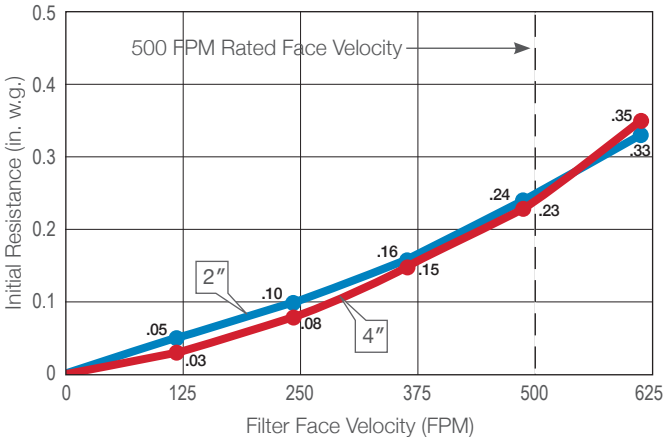
All performance data based on ASHRAE Standard 52.2. Performance tolerance conforms to Section 6.4 of ANSI/AHRI Standard 850-2013.

***Underwriters Laboratories Classification** – PerfectPleat filters are UL Classified. Testing was performed according to UL Standard 900.*

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



Product Information – Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow (SCFM)			Pleats Per Filter
		300 FPM	500 FPM	625 FPM	
10 x 20 x 2	9½ x 19½ x 1¾	400	700	850	8
12 x 20 x 2	11½ x 19½ x 1¾	500	850	1050	10
12 x 24 x 2	11⅜ x 23⅜ x 1¾	600	1000	1250	10
14 x 25 x 2	13½ x 24½ x 1¾	750	1200	1500	11
15 x 20 x 2	14½ x 19½ x 1¾	650	1050	1300	12
15 x 25 x 2	14½ x 24½ x 1¾	800	1300	1650	12
16 x 16 x 2	15½ x 15½ x 1¾	550	900	1100	13
16 x 20 x 2	15½ x 19½ x 1¾	650	1100	1400	13
16 x 24 x 2	15⅜ x 23⅜ x 1¾	800	1350	1650	13
16 x 25 x 2	15½ x 24½ x 1¾	850	1400	1750	13
18 x 24 x 2	17⅜ x 23⅜ x 1¾	900	1500	1900	15
18 x 25 x 2	17½ x 24½ x 1¾	950	1550	1950	15
20 x 20 x 2	19½ x 19½ x 1¾	850	1400	1750	17
20 x 24 x 2	19⅜ x 23⅜ x 1¾	1000	1650	2100	17
20 x 25 x 2	19½ x 24½ x 1¾	1050	1750	2150	17
24 x 24 x 2	23⅜ x 23⅜ x 1¾	1200	2000	2500	20
25 x 25 x 2	24½ x 24½ x 1¾	1300	2150	2700	21
12 x 24 x 4	11⅜ x 23⅜ x 3¾	600	1000	1250	8
16 x 20 x 4	15⅜ x 19⅜ x 3¾	650	1100	1400	11
16 x 25 x 4	15⅜ x 24⅜ x 3¾	850	1400	1750	11
18 x 24 x 4	17⅜ x 23⅜ x 3¾	900	1500	1875	12
20 x 20 x 4	19⅜ x 19¾ x 3¾	850	1400	1750	14
20 x 25 x 4	19⅜ x 24⅜ x 3¾	1050	1750	2150	14
24 x 20 x 4	23⅜ x 19⅜ x 3¾	1000	1650	2100	14
24 x 24 x 4	23⅜ x 23⅜ x 3¾	1200	2000	2500	17
25 x 29 x 4	24⅜ x 28⅜ x 3¾	1500	2500	3150	21

Energy savings may be realized by operating the PerfectPleat SC M8 filters to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost Of Ownership analysis for your specific application.

AAF Flanders®

9920 Corporate Campus Drive, Suite 2200, Louisville, KY 40223-5690
888.223.2003 Fax 888.223.6500 | aafintl.com

ISO Certified Firm AFP-1-202C 01/17

Dwyer

SERIES 2000

MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES

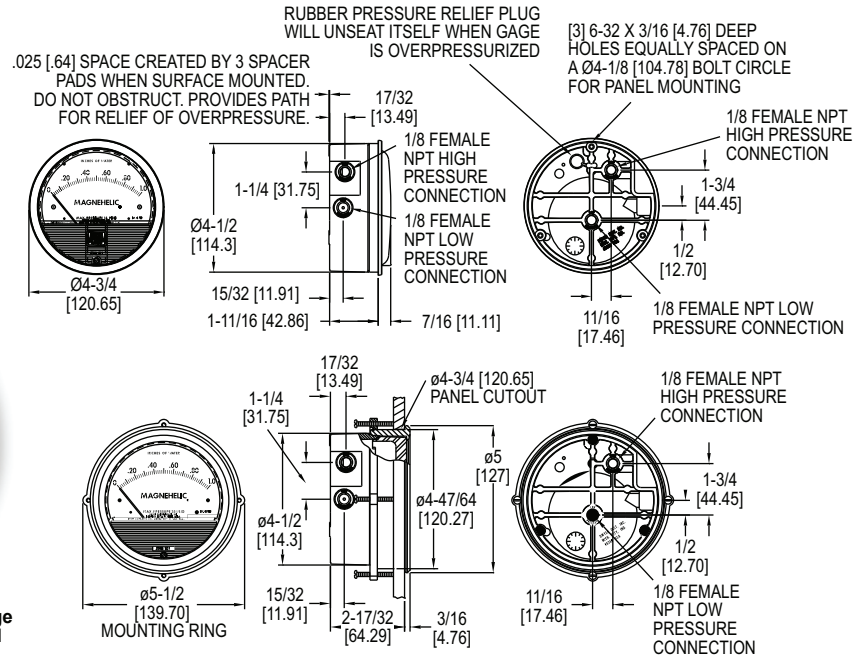
Indicate Positive, Negative or Differential, Accurate within 1%

CALIBRATION SERVICES AVAILABLE

5 YEAR LIMITED WARRANTY

Standard Magnehelic® gage

High Accuracy Magnehelic® gage Shown with optional -SS bezel



Select the **Series 2000 Magnehelic® Differential Pressure Gages** for a versatile low differential pressure gage with a wide choice of 81 models and 27 options to choose from. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates air or non-corrosive gas pressures--either positive, negative (vacuum) or differential. The design resists shock, vibration, over-pressures and is weatherproof to IP67.
Select the –HA High Accuracy Magnehelic® gage option for an accuracy within 1% of full-scale. Also included with the –HA option at no extra cost are a mirrored scale overlay and a 6 point calibration certificate.

BENEFITS/FEATURES

- Easy to read gage through undistorted plastic face permits viewing from far away
- Patented design provides quick response to pressure changes means no delay in assessing critical situations
- Durable and rugged housing and high-quality components combine to provide long-service life and minimized down-time
- High accuracy option is twice as accurate as the standard Magnehelic® gage

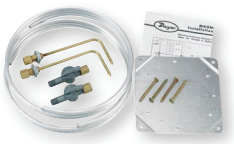
APPLICATIONS

- Filter monitoring
- Air velocity with Dwyer® pitot tube
- Blower vacuum monitoring
- Fan pressure indication
- Duct, room or building pressures
- Clean room positive pressure indication

ACCESSORIES

Model	Description
A-432	Portable kit; combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder
A-605	Air filter gage accessory kit; adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing, two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves
A-605B	Air filter gage accessory kit; air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange
A-605C	Air filter gage accessory kit; air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange

A-432



A-605

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available).
Note: May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% (-HA model ±1) of FS (±3% (-HA ±1.5%) on -0, -100PA, -125PA, -10MM and ±4% (-HA ±2%) on -00, -60PA, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Enclosure Rating: IP67.
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.❶
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adaptor, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Compliance: Meets the technical requirements of EU Directive 2011/65/EU (RoHS II). **Note:** -SP models not RoHS approved.

*Low temperature models available as special options.

Note: For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

USA: California Proposition 65
⚠**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

❶**Over Protection Note: See page 21 (Series 2000)**

Dwyer

SERIES 2000

MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES

Indicate Positive, Negative or Differential, Accurate within 1%

5 YEAR LIMITED WARRANTY

CALIBRATION SERVICES AVAILABLE

Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

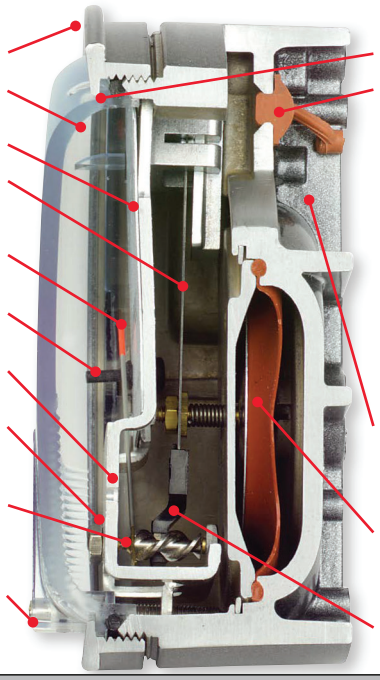
Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.



O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.
The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings of any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

MODEL CHART

Model	Range, Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range, PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30
Model	**Range, CM of Water**
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

Model	Range, MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10
Model	**Range, Pa**
2000-60NPA†••	10-0-50
2000-30PA†••	0-30
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

Model	Range, in w.c./ Velocity F.P.M.
2000-00AV†••	0-.25/300-2000
2000-0AV†•	0-.50/500-2800
2001AV	0-1.0/500-4000
2002AV	0-2.0/1000-5600
2005AV	0-5.0/2000-8800
2010AV	0-10/2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

†These ranges calibrated for vertical scale position. • Accuracy ±3%. •• Accuracy ±4%. *MP option standard. **HP option standard.

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® gage that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h).
Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure.
Example: 0.5 in w.c. = 16,000 CFM.

ACCESSORIES

Model	Description
A-135	Rubber gasket for panel mounting
A-310A	3-way vent valves. In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage
A-321	Safety relief valve
A-401	Plastic carry case
A-448	3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface

A-310A

USA: California Proposition 65
⚠**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

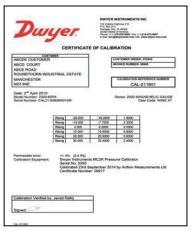
Dwyer

HIGH ACCURACY MAGNEHELIC® DIFFERENTIAL PRESSURE GAGE

CALIBRATION SERVICES AVAILABLE

5 YEAR LIMITED WARRANTY

- Twice as accurate as the standard Magnehelic® gage
- Mirrored scale overlay eliminates parallax error
- IP67 weatherproof housing
- Optional brushed SS bezel



6-point calibration certificate included

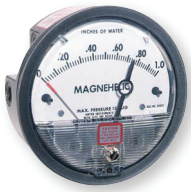
OPTIONS - HIGH ACCURACY MAGNEHELIC® GAGE	
To order add suffix:	**Description**
-HA	High accuracy Magnehelic® gage. Accuracy within 1% and weatherproof. Also includes mirrored scale overlay and a six point calibration certificate
-SS	Corrosion resistant brushed 304 stainless steel bezel

Accuracy Specifications: See page 20 (Series 2000)

ADDITIONAL GAGE OPTIONS

OPTIONS - OTHER OPTIONAL BEZELS	
To order add suffix:	**Description**
-CB	Chrome bezel option: A chrome plated aluminum bezel for an aesthetically pleasing finish when mounting on metal surfaces such as control panels.
-SB	Stainless steel bezel option: 304 stainless steel electro polished Ra 16 finished bezel.
-SS	Corrosion resistant brushed 304 stainless steel bezel

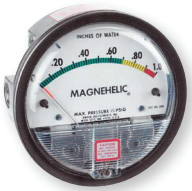
LED set point indicator



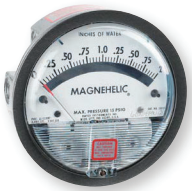
Adjustable signal flag

OPTIONS - LED SET POINT INDICATOR	
To order add suffix:	**Description**
-SP	Bright red LED on right scale shows when set point is reached. Field adjustable from gage face, unit operates on 12-24 VDC. Set point indicator option comes with medium pressure (MP) bezel.
Note: 4-13/16″ hole for flush mounting.	

OPTIONS - ADJUSTABLE SIGNAL FLAG	
To order add suffix:	**Description**
-ASF	Integral with plastic gage cover. Available for most models except those with medium or high pressure construction. Can be ordered with gage or separate.



Transparent overlay



Mirrored scale overlay

OPTIONS - TRANSPARENT OVERLAYS	
To order add suffix:	**Description**
-G	Green (to highlight and emphasize critical pressures)
-R	Red (to highlight and emphasize critical pressures)
-Y	Yellow (to highlight and emphasize critical pressures)

OPTIONS - MIRRORED SCALE OVERLAY	
To order add suffix:	**Description**
-M	A mirrored scale overlay is also available to assist in reducing parallax error.

Integrated mounting plate

OPTIONS - INTEGRATED MOUNTING PLATE	
To order add suffix:	**Description**
-AHU1	Furnished with attached surface mounting plate
-AHU2	Furnished with attached surface mounting plate and including A-481 installer kit (2 plastic static pressure tips and 7´of PVC tubing)

OPTIONS - FOR HIGH STATE PRESSURE APPLICATIONS	
To order add suffix:	**Description**
-HP	High pressure option: for pressures to 80 psig
-MP	Medium pressure option: for pressures to 35 psig

OPTIONS	
To order add suffix:	**Description**
-FC	Factory calibration certificate
-LT	Low temperatures to -20°F (-28°C)
-NIST	NIST traceable calibration certificate

USA: California Proposition 65
⚠**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

MAGNEHELIC® GAGE MOUNTING ACCESSORIES

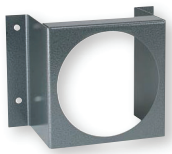

A-610


A-369

Pressure reference port


A-464

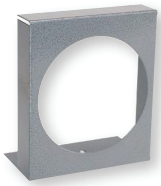

A-464-SS


A-299


A-286


A-300


A-368


A-371

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Complete mounting and connection fittings plus instructions are furnished with each instrument. A 4-9/16″ hole is required for flush panel mounting.

Flush mounting is easily accomplished with the new A-300 Flush Mounting bracket. This bracket provides a solution to quickly and conveniently flush mount the Magnehelic® gage. The A-300 is ideal for mounting the Magnehelic® gage on control panel doors.

The A-368 is a simple bracket for quickly surface mounting the Magnehelic® gage. After securing the Magnehelic® gage to the A-368 bracket, mount the bracket on any flat surface.

The A-369 allows the Magnehelic® gage to be easily carried to locations where pressure readings need to be taken. The A-369 can stand on its own or hang on a nail or hook.

ACCESSORIES	
Model	**Description**
A-286	Magnehelic® gage panel mounting flange
A-299	Mounting bracket, flush mount for Magnehelic® gage, bracket is then surface mounted, steel with gray hammerloid epoxy finish
A-300	Flush mounting bracket
A-368	Surface mounting plate, aluminum, for Magnehelic® gage
A-369	Stand-hang bracket, aluminum, for Magnehelic® gage
A-371	Surface mounting bracket, use with medium pressure (-MP) or high pressure (-HP) models only
A-464-SS	Stainless steel flush mount kit for Magnehelic® gage
A-464	Flush mount kit for Magnehelic® gage
A-610	Pipe mounting kit for installing on 1-1/4″ to 2″ horizontal or vertical pipe

SERIES A-320

INSTRUMENT ENCLOSURES

Protects Various Instruments


A-320-A1


A-320-B1


A-320-BC


A-320-A-SS


A-320-B-SS

The **Series A-320 Instrument Enclosures** protect instruments in all applications. The enclosures, available in plastic and stainless steel, fit a variety of gages including the Series 605 transmitter, DM-2000, 3000MR/MRS and DH3. All models include silicone tubing, Banjo fittings, and threaded pressure connections pre-installed. The threaded pressure connections allow the user to easily change the connection type through the use of fittings or adapters. This modification can be implemented to allow connection to a wide variety of plastic or metal tubing.

SPECIFICATIONS
Housing Material: ABS plastic or 304 SS.
Process Connection: 1/8″ female NPT (-SS models: 1/8″ BSPT).
Enclosure Rating: Plastic models: IP66.
Weight: A-320-A1: 1.1 lb (0.5 kg); A-320-B1: 1.4 lb (0.65 kg); A-320-BC: 1.4 lb (0.65 kg); A-320-A-SS: 2.3 lb (1.05kg); A-320-B-SS: 3.0 lb (1.35 kg).

MODEL CHART	
Model	**Description**
A-320-A1	2000 Magnehelic® gage
A-320-B1*	3000MR/MRS Photohelic® switch/gage, Series 605 Magnehelic® differential pressure transmitter, DH3 Digihelic® pressure controller, 2000 Magnehelic® gage with medium and high pressure options
A-320-BC	2000 Magnehelic® gage, DM-1000 DigiMag® digital differential pressure gage, DM-2000 differential pressure transmitter, instruments with backwards compatible bezel option
A-320-A-SS	2000 Magnehelic® gage
A-320-B-SS	2000 Magnehelic® gage, DM-2000 differential pressure transmitter
*For DH3 to fit on A-320-B1 the casing on the electrical plug must be removed.	

ACCESSORIES	
Model	**Description**
A-339-SS	1/8″ male BSPT to 3/16″ hose barb

UNIT RELEASE FORM

1427 NW 3rd St, Oklahoma City, OK 73106 PH: (405) 415-9230 Fax: (405) 415-9231

Date:

To: ClimateCraft Inside Sales Department Fax: (405) 415-9231
Email: release@climatecraft.com

From: Harrison Energy Partners (Rep Firm)
(Rep Name

Job Name: UAMS - Center for Animal Models of Infection and Disease

I authorize the release of the following units into your production schedule for shipment by the requested dates as noted

SERIAL NUMBER	UNIT TAG	REQUESTED SHIP DATE
300036	HRU-2	
300037	HRU-5	

Signed:

NOTE: If you are providing customer furnished parts for these units, ClimateCraft will send a no cost purchase order to your office with instructions regarding shipment, delivery date and tagging. Parts should arrive at ClimateCraft no later than 30-days prior to the scheduled ship date of the unit. Ship dates may be affected if problems arise during the credit approval process.

VERBAL MESSAGES, NOTATIONS ON PURCHASE ORDERS, ETC. ARE NOT CONSIDERED VALID FORMS OF RELEASE. THIS SHEET, ALONG WITH APPROVED SUBMITTALS AND AN UP TO DATE PURCHASE ORDER, MUST EITHER BE E-MAILED OR FAXED TO CLIMATECRAFT AND ACKNOWLEDGED IN ORDER TO ENSURE A SPACE IN THE PRODUCTION SCHEDULE

Bernhard Cx Group

Bernhard

Commissioning Review of Submittal Data for Construction

This submittal has been reviewed by the Commissioning Provider for general conformance related to the commissioning requirements in the contract documents and Owner's Project Requirements document. This review is not intended to verify overall equipment compliance of the design intent and no design direction shall be inferred or implied.
The Designer of Record shall verify overall compliance of the design intent according to the contract documents.

[X] Reviewed with Comments 12/18/24

[ ] Reviewed with No Comments

Commissioning review comments are enclosed.

[ ] REVIEWED [ ] REVIEWED AND NOTED

[X] REVISE AND RESUBMIT [ ] REJECTED

Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication process and techniques of construction; coordinating their work with that of all other trades; and performing their work in a safe and satisfactory manner.

CLARK & ENERSEN

By csharp Date 01/08/2025

CLARK & ENERSEN:

1. INCLUDE FACTORY INSTALLED SS DRAIN PANS ON BOTH UNITS PER HRU COIL SECTION REMARKS

2. ADJUST UNIT PERFORMANCE TO 300' ELEVATION

3. PROVIDE SUMMER AND WINTER HEAT RECOVERY COIL PERFORMANCE DATA, FOR BOTH HRU AND AHU HEAT RECOVERY COILS.

USE THE FOLLOWING CFMS FOR HEAT RECOVERY PERFORMANCE:
AH-2: 26,000 CFM SUPPLY
HRU-2: 25,500 CFM EXHAUST

AH-5A/5B: 3,225 CFM SUPPLY
HRU-5: 3,320 CFM EXHAUST

4. HRU-2 COIL WPD TOO HIGH PER HRU SCHEDULE.

5. CONFIRMED HRU WEIGHTS.

6. CONFIRM COIL CONNECTION HANDING PER PLAN.

CDI CONTRACTORS

CDI Contractors, LLC
3000 Cantrell Road
Little Rock, Arkansas 72202
501 / 666-4300

Transmittal

No 2024.11.25-3

PROJECT: UAMS- CAMID

DATE: Nov 25, 2024

To: UAMS
4301 W MARKHAM ST. SLOT 545
LITTLE ROCK AR 72205
US

RE: 23 73 13 - Air Handling Units

ATTN: TAMARA BARRON

JOB: 240147

WE ARE SENDING:		SUBMITTED FOR:		ACTION TAKEN:	
☐	Shop Drawings	☑	Approval	☐	Approved as Submitted
☐	Letter	☐	Your Use	☐	Approved as Noted
☐	Prints	☐	As Requested	☐	Returned After Loan
☐	Change Order	☐	Review and Comment	☐	Resubmit
☐	Plans			☐	Submit
☐	Samples	SENT VIA:		☐	Returned
☐	Specifications	☐	Attached ☐ Separate Cover	☐	Returned for Corrections
☐	Other:			☑	Due Dec 09, 2024
☑	Submittal:			☐	Other:

Line	Item	Package	Code	Rev.	QTY	Date	Description	Status
1	Submittal		237313-04	1		Nov 25, 2024	PD:HRU-2	Submitted
2	Submittal		237313-06	1		Nov 25, 2024	PD:HRU-5	Submitted

REMARKS:

CC:
CLARK & ENERSEN, Mark Huettner

Signed: _____
MATTHEW HUGHES

CDI CONTRACTORS, LLC

☑ **APPROVED AS NOTED** ☐ **REJECTED**
☐ **APPROVED** ☐ **REVISE**

BY hughem **DATE** 11/25/2024

SUBMITTAL# 237313-01 **SPEC** 237313

This submittal has been reviewed for compliance with the contract documents. Approval does not relieve the subcontractor/supplier of the responsibility for conformance to the quality standards as set forth in the contract document, nor does it relieve the responsibility for field verification of all conditions relating to this contract.

Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
Fax 501-834-5416

Date: 11/20/2024
Return Request: 11/30/2024
Project: UAMS (CAMID)
Supplier: Harrison Energy
Manufacturer: Climate Craft
Submittal: Air Handling Units
Submittal Number: 23 73 13-02
Drawing # and Installation: Mechanical Drawings

ARCHITECT
Clark Kenersen
2020 Baltimore Avenue, Suite 300
Kansas City, MO 64108
816-474-8237

ENGINEER
Clark Kenersen
2020 Baltimore Avenue, Suite 300
Kansas City, MO 64108
816-474-8237

GENERAL CONTRACTOR
CDI Contractirs
3000 Cantrell Rd.
Little Rock, AR 72202
501-666-4300

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

CSUSA PROJECT NO.
22-6069
sean@comfortar.com

Submittal

Harrison
Energy Partners

Prepared For:
Clark & Enerson

Date:
November 1, 2024

Sold To:
Comfort Systems USA

Job Name:
UAMS CAMID

Harrison Energy Partners is pleased to provide the enclosed submittal for your review and approval.

Qty.	Product Summary
2	ClimateCraft Air Handling Units

Josh Robinson | Sales Engineer
Harrison Energy Partners
1501 Westpark Drive, Suite 9
Little Rock, AR 72204-2457
Ph. 501-539-0633

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Heat Recovery Units

Tag	Qty.	Description	Model Number
HRU-2	1	Indoor Air Handling Unit	ClimateCraft CAH60
HRU-5	1	Indoor Air Handling Unit	ClimateCraft CAH30

- Double wall construction with 2” R13 insulation
- ASHRAE leakage class 6
- Access sections with view ports and lights as required
- Stainless steel drain pans in humidifier and cooling coil sections
- 8” base rail
    - Stainless steel interior liner – HRU-5 only
    - Intake section
    - Filter section – HRU-2 only
    - Heat recovery coil section
    - Discharge plenum

ClimateCraft
1427 NW 3rd St
Oklahoma City. OK 73106
Ph: (405) 415-9230 Fax: (405) 415-9231

Date: 10/18/2024

To: Harrison Energy Partners

Attention: Jake Skinner

Job Name: UAMS - Center for Animal Models of Infection and Disease

SERIAL NO	UNIT TAG	MODEL NO
300036	HRU-2	CAH60X120E
300037	HRU-5	CAH30X48E

Issue Level: A	10/18/2024
Initial Submittal	

Please see below submittal for the referenced job.

X	**For Approval. One set of approved submittals must be returned prior to fabrication.**
	For Record Only.

Please call if you have any questions.

Sincerely,
Jeremy Faszold
Application Engineer
ClimateCraft - Ext 50168

ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

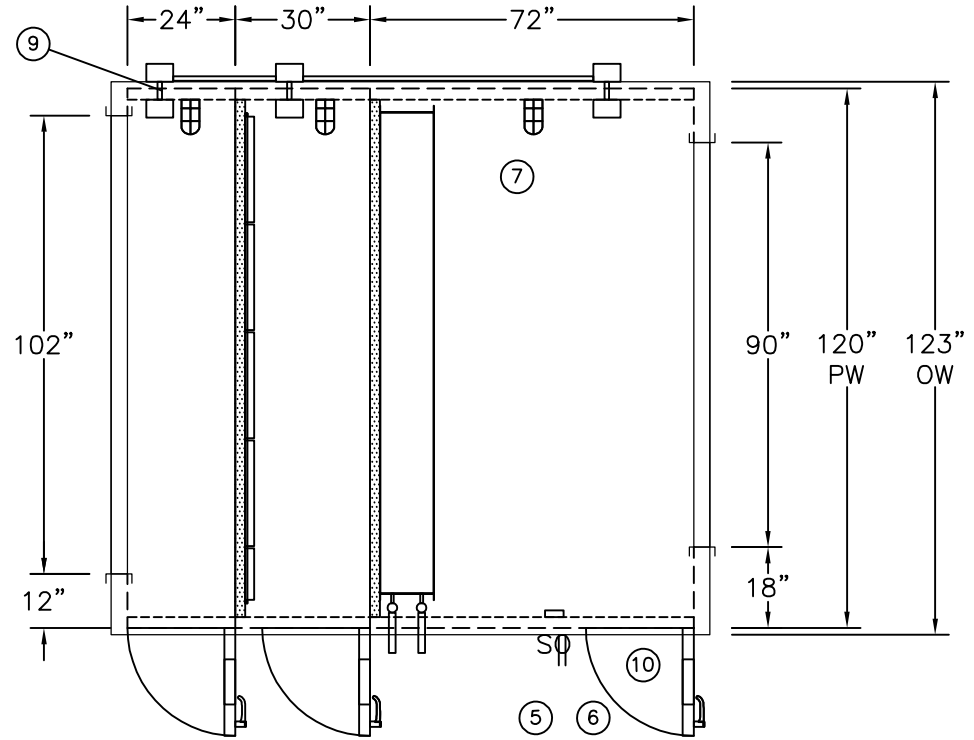
JOB	TAG	SHEET #	SN	DATE	BY	MODEL NO.	REV
UAMS – Center for Animal Models of Infection and Disease	HRU–2		300036	10/08/2024	JF	CAH60X120E	A

1. O.A. OPENING
2. FILTERS, 2" – MERV8
3. H.W. COILS – HW01
4. S.A. OPENING
5. LIGHT SWITCH
6. GFI OUTLET
7. SERVICE LIGHT (TYP OF 3)
8. MAGNEHELIC GAUGE
9. 6" X 6" J–BOX INSIDE & OUTSIDE EACH ACCESS SECTION WITH 1" CONNECTING CONDUIT ON THE OUTSIDE OF THE UNIT
10. ACCESS DOOR 60" X 24" W/SAFETY CATCH (TYP OF 3)

LH coil connections is shown on plans. Submitted is RH. Consider swapping the access doors to LH also for ease of accessibility.

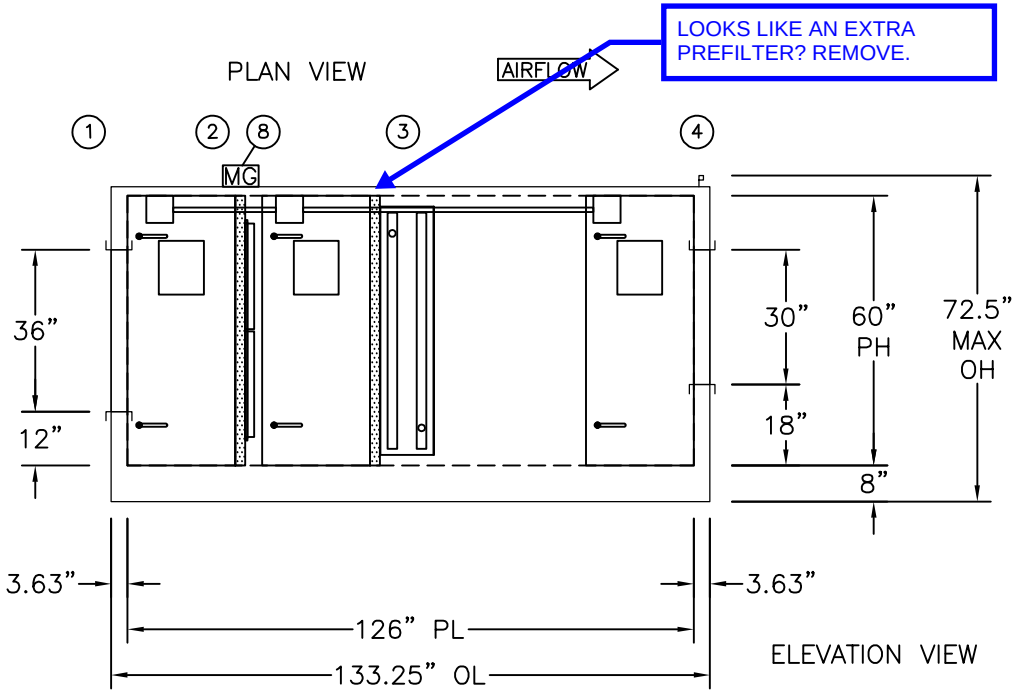
Submitted dimensions are slightly wider and shorter than plans depict. Coordinate size of housekeeping pad accordingly.

Unit weight is nearly 2x the basis of design. Clarify if acceptable.



PLAN VIEW

LOOKS LIKE AN EXTRA PREFILTER? REMOVE.



ELEVATION VIEW

SUPPLY: 25,500 CFM

APPROXIMATE UNIT SHIPPING WEIGHT 5,500 LB

INDOOR

ClimateCraft

Date: 10/22/2024

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Unit Data

Standard Air Handler	Roof Curb Not Provided	ETL Listed	Indoor Unit

Cabinet Data

External skin	16 Ga, Prepainted Galvanized Steel
Color/Finish	Standard ClimateCraft Sky Grey
Roof type	Flat paneled roof
Roof frame	None
Base	8" x 2" x 3/16" wall tubular carbon steel
Base insulation	Spray foam
Recessed floor	No
Subfloor liner	None
Curb Notched Base	No
Removable lifting lugs	No

Door Accessories

Door Thickness	2"
Door Window	10" x 12" All doors
Latches per Door	Dual
Door Hinges	Die cast aluminum
Test Ports	None
Safety Catch	None
Tie Back Chain	None
Field Pressure Test Doors	None
Extra hinge	None
Double gasket	None

Interior Materials	Unit Construction Global	Alternate Construction by Section Alternate Section
Wall Insulation Wall Liner	2" Foam, R 13.2 20 Ga Galv, Solid	
Roof Insulation Roof Liner	2" Foam, R 13.2 20 Ga Galv, Solid	
Floor Floor Construction	Aluminum, Smooth - Thermal Break Not Welded	
Airseal Facesheet Airseal Frame Airseal Type	20 Ga 304SS Stainless 2" Single Facing	

Notes:

- **No drain pans provided.**
- **No floor drains provided.**
- **Stainless steel exterior hardware.**

Shipping Data

Shipping Method	Ship in single piece; no splits provided. Unit bagged for shipment.

Notes:

Coils

Options	Heating	
Manufacturer	ClimateCraft	
Type	5/8" OD Hot Water	
Coil Vents	Internal - 1/4" MPT w/ Cap	
Coil Drains	Internal - 1/4" MPT w/ Cap	
# of Feeders/Circuits	N/A (Non-DX Coil)	
Coil Coating	Not provided	

Notes:

- **The coil specifications, data, and optional features are indicated on the coil data sheets.**
- **Drain pan and drain type material can be referenced in the Interior Materials data table.**

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Filter

Filter Rack #1		Pre-Filter		
Bank type	Universal Holding Frames	Filter type	Pleated	
Rack construction	Stainless - Solid	Filter efficiency	MERV 8	
Access	Upstream access	Media length	2	ins
Size	2Hx4.5W	Qty	8	Full 24x24
Filter gauge	Magnehelic		2	Half 12x24
Gauge range	0"-4"	Num media sets	2	

Notes:

Electrical

Voltage	120V, 1 phase 60hz	Lights	LED A-Shape 10W Bulbs
Motor Wiring	No motor wiring provided	Light Power	Separate 115 Volt lighting power required
Variable Frequency Drives	No drives provided	Wiring Method, Lights	Aluminum MC Cable
Power Panel	None	Wiring Method, Power	EMT Galv. / Flexible Metal Conduit
Incoming Motor Power	No Motor	Wiring Method, Controls	EMT Galv. / Flexible Metal Conduit

Notes:

- **See the unit drawing for location of electrical components.**

Unit Tests

Cabinet strength design criteria	L/200 @ maximum section pressure
No factory testing is included	

Notes:

ClimateCraft

Date: 10/18/2024

Static Pressure Analysis

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

UNIT AIR SUMMARY		
Supply airflow	cfm	25,500
Air density	lb/ft³	0.075
Altitude	ft	0

UPDATE TO 300'

SUPPLY STATIC PRESSURE ANALYSIS		
Description	**Face Velocity (ft/min)**	**SPD (in WC)**
Outside air opening	1,000	0.09
Pre-filter (initial)	708	0.55
Pre-filter (extra)	708	0.23
Heating coil	654	0.95
Supply air opening	1,360	0.18
Total static pressure		**2.00**

REMOVE EXTRA FILTER.

ClimateCraft

Date: 10/18/2024

Coil Performance Data

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-2
Revision: A

Serial Number: 300036
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

UPDATE TO 300'

HOT WATER HEATING COIL(S) - HW01

Coil is NOT certified by AHRI.
Version: 4.01.6 MFG: ClimateCraft, Inc.

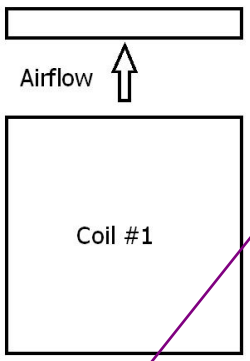
Operating Conditions			Air Conditions			Fluid Conditions		
Airflow:	25,500	ACFM	Entering air (DB):	75.0	°F	Fluid:	Propylene	
Elevation:	0.0	ft	Leaving air (DB):	87.1	°F	Concentration:	30	%
Air pressure:	14.696	psia	Face velocity:	654	ft/min	Entering temp:	95.5	°F
Air density:	0.074	lb/ft³	Air pressure drop:	0.95	in WC	Leaving temp:	83.9	°F
						Flow rate:	60.00	gpm
						Pressure drop:	13.84	ft WC
							6.0	psid
						Fluid velocity:	2.10	ft/sec

Total Coil Bank Ratings			Coil Data			Coil Options	
Total capacity:	328,303	Btu/hr	Face area:	39.0	ft²	Tube material:	Copper
Coil is not certified by AHRI because:			Finned height:	52.50	ins	Tube thickness:	0.035 ins
Coil is not certified with Propylene Glycol			Finned width:	107.00	ins	Fin type:	V-Waffle
			Rows:	6		Fin material:	Aluminum
			Fins/inch:	12		Fin thickness:	0.0075 ins
			Serpentine:	1		Casing material:	304 SS
			Dry weight (Ea.):	1,046	lb	Connections:	Red Brass MPT
			Wet weight (Ea.):	1,270	lb	Coating:	None
			Approx. coil fluid volume (Ea.):	27	gal	Vent & drain:	Internal - 1/4" MPT w/ Cap
						UV Light:	Not provided

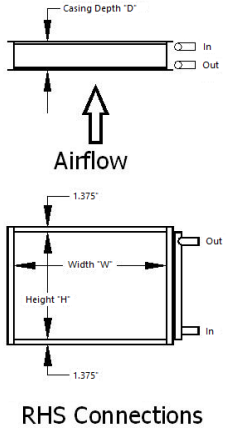
Individual Coil Ratings

Coil Tag(s)	Model Number	Capacity Btu/hr	Airflow cfm	Flow gpm	No. of circuits	Dimensions			Connection	
						H(ins)	L(ins)	D(ins)	Size(ins)	Style
1	58WC52.5x107-06-12-AW	328,303	25,500	60.00	35	52.50	107.00	12.00	1.50	RHS

Coil Bank Layout



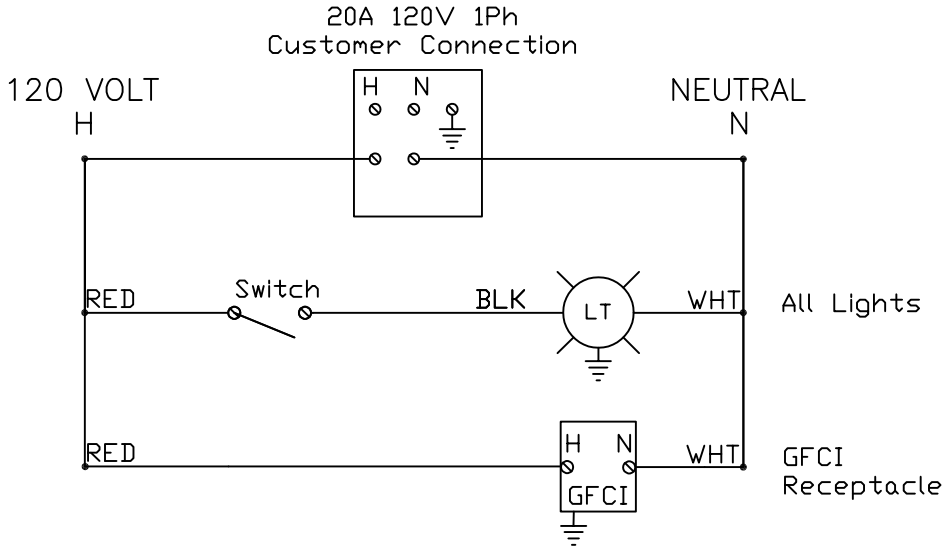
Coil Drawing



Confirm data achieves winter and summer conditions.

Water pressure drop is nearly double the design condition.

20A, 120V
1Ph/60Hz By Others



Customer supplied 120V power circuit must include a ground fault interrupt device as well as over current protection.

Caution: All customer supplied power must be shut off to the unit before servicing electrical system.

Caution: Only replace light bulb with LED 10W, 120V.

The number of devices drawn on this diagram is for illustration purposes only. Refer to the BOM for quantities.

Device locations are shown on the plan view drawing.

120V wiring is #12 THHN.

Refer to unit data sheet for conduit type.

One or more circuits may be provided.

Wire colors are representative and may be changed.

Circuit 1			
Quantity	Description		Amp Draw
1	Switch		0.0000
1	GFCI Receptacle		12
3	Vapor Proof Lights W/LED		0.249000
		Total Amp Draw	12.2490

ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

JOB		SN	BY	REV
UAMS – Center for Animal Models of Infection and Disease		300036	JF	A
TAG	SHEET #	DATE	MODEL NO.	
HRU–2		10/08/2024	CAH60X120E	

UAMS - Center for Animal Models of Infection and Disease

Model #	CAH60X120E	Serial #	30036	Tag	HRU-2	MFG Date	TBD

Volts	120	Phase	1~	Hz	60 `

Circuit Qty	Motor HP	Motor FLA	Motor Tag

CAUTION: More than 1 disconnect is required to disconnect power from this equipment!

Separate circuits are identified above. Multiples of the same circuit are listed on the same line. A separate 115 volt lighting circuit is also required

Short-circuit current: NA kA rms symmetrical, NA V maximum

Electric Heat (Kw)	NA		Max Coil (psig/kPa)	300.0	2068.5
Input Amps	NA		Max Oper. Steam Press. (psig/kPa)	NA	NA
			Max Coil Water (psig/kPa)	300.0	2068.5
			Refrigerant Max Charge (lbs/kg)	NA	NA
For Outdoor Use			HW Coil Max Inlet Temp (F/C)	200.0	93.3
For Installation in locations not accessible to the general public			Refrigerant Type		NA
Max Discharge Air Temp (F/C)	100.0	37.8	Max Ext. Static Press (in. w.g./kPa)	NA	NA

ClimateCraft

Oklahoma City

Use Copper Conductor Only
Made in USA
Patents: www.climatecraft.com\patents

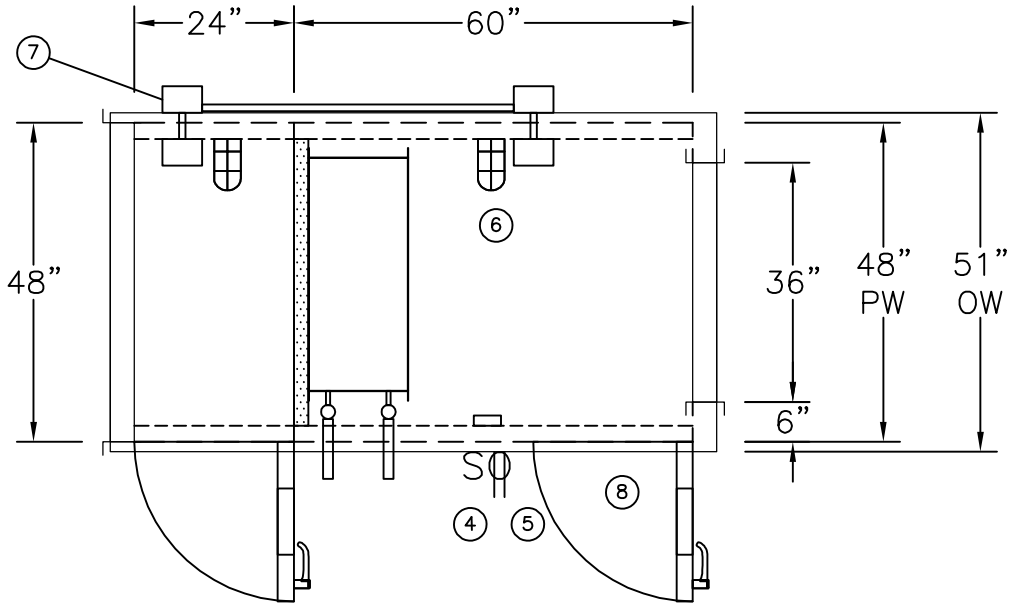
ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

JOB	SN
UAMS – Center for Animal Models of Infection and Disease	300037
TAG	SHEET #
HRU–5	
DATE	BY
10/08/2024	JF
MODEL NO.	REV
CAH30X48E	A

1. O.A. OPENING
2. H.W. COILS – HW01
3. S.A. OPENING
4. LIGHT SWITCH
5. GFI OUTLET
6. SERVICE LIGHT (TYP OF 3)
7. 6" X 6" J–BOX INSIDE & OUTSIDE EACH ACCESS SECTION WITH 1" CONNECTING CONDUIT ON THE OUTSIDE OF THE UNIT
8. ACCESS DOOR 30" X 24" W/SAFETY CATCH (TYP OF 2)

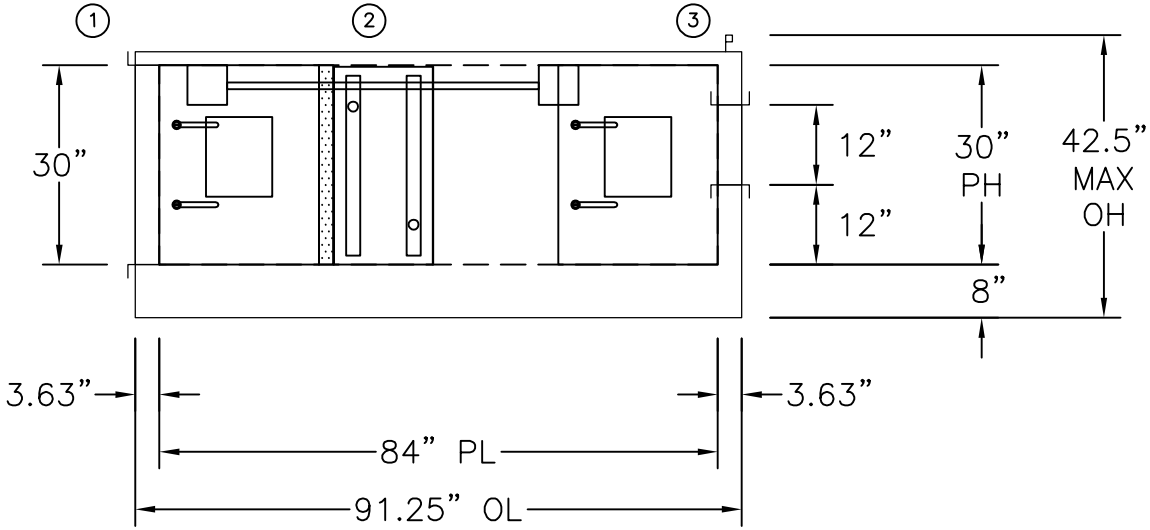
Confirm unit weight is acceptable

Confirm submitted CFM is acceptable.



PLAN VIEW

AIRFLOW



ELEVATION VIEW

SUPPLY: 3,320 CFM

APPROXIMATE UNIT SHIPPING WEIGHT 1,900 LB

INDOOR

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Unit Data

Standard Air Handler	Roof Curb Not Provided	ETL Listed	Indoor Unit

Cabinet Data

External skin	16 Ga, Prepainted Galvanized Steel
Color/Finish	Standard ClimateCraft Sky Grey
Roof type	Flat paneled roof
Roof frame	None
Base	8" x 2" x 3/16" wall tubular carbon steel
Base insulation	Spray foam
Recessed floor	No
Subfloor liner	None
Curb Notched Base	No
Removable lifting lugs	No

Door Accessories

Door Thickness	2"
Door Window	10" x 12" All doors
Latches per Door	Dual
Door Hinges	Die cast aluminum
Test Ports	None
Safety Catch	None
Tie Back Chain	None
Field Pressure Test Doors	None
Extra hinge	None
Double gasket	None

Interior Materials	Unit Construction Global	Alternate Construction by Section Alternate Section
Wall Insulation Wall Liner	2" Foam, R 13.2 20 Ga 304SS, Solid	
Roof Insulation Roof Liner	2" Foam, R 13.2 20 Ga 304SS, Solid	
Floor Floor Construction	16 Ga 304SS - Thermal Break Not Welded	
Airseal Facesheet Airseal Frame Airseal Type	20 Ga 304SS Stainless 2" Single Facing	

Notes:

- **No drain pans provided.**
- **No floor drains provided.**
- **Stainless steel exterior hardware.**

Shipping Data

Shipping Method	Ship in single piece; no splits provided. Unit bagged for shipment.

Notes:

Coils

Options	Heating	
Manufacturer	ClimateCraft	
Type	5/8" OD Hot Water	
Coil Vents	Internal - 1/4" MPT w/ Cap	
Coil Drains	Internal - 1/4" MPT w/ Cap	
# of Feeders/Circuits	N/A (Non-DX Coil)	
Coil Coating	Electrofin	

Notes:

- **The coil specifications, data, and optional features are indicated on the coil data sheets.**
- **Drain pan and drain type material can be referenced in the Interior Materials data table.**

Design Summary

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

Electrical

Voltage	120V, 1 phase 60hz	Lights	LED A-Shape 10W Bulbs
Motor Wiring	No motor wiring provided	Light Power	Separate 115 Volt lighting power required
Variable Frequency Drives	No drives provided	Wiring Method, Lights	Aluminum MC Cable
Power Panel	None	Wiring Method, Power	EMT Galv. / Flexible Metal Conduit
Incoming Motor Power	No Motors	Wiring Method, Controls	EMT Galv. / Flexible Metal Conduit

Notes:

- **See the unit drawing for location of electrical components.**

Unit Tests

Cabinet strength design criteria	L/200 @ maximum section pressure
No factory testing is included	

Notes:

ClimateCraft

Date: 10/18/2024

Static Pressure Analysis

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

UNIT AIR SUMMARY		
Supply airflow	cfm	3,320
Air density	lb/ft³	0.075
Altitude	ft	0

SUPPLY STATIC PRESSURE ANALYSIS

Description	Face Velocity (ft/min)	SPD (in WC)
Outside air opening	332	0.01
Heating coil	506	0.82
Supply air opening	1,107	0.12
Total static pressure		**0.95**

ClimateCraft

Date: 10/18/2024

Coil Performance Data

Project name: UAMS - Center for Animal Models of Infection and Disease
Unit Tag: HRU-5
Revision: A

Serial Number: 300037
Application Engineer: Jeremy Faszold
V7.0.385.0 (24-Sep-2024) / V7.0.385.0 (24-Sep-2024)

HOT WATER HEATING COIL(S) - HW01

Coil is NOT certified by AHRI.
Version: 4.01.6 MFG: ClimateCraft, Inc.

Operating Conditions

Airflow:	3,320	ACFM
Elevation:	0.0	ft
Air pressure:	14.696	psia
Air density:	0.074	lb/ft³

Air Conditions

Entering air (DB):	75.0	°F
Leaving air (DB):	87.0	°F
Face velocity:	506	ft/min
Air pressure drop:	0.82	in WC

Fluid Conditions

Fluid:	Propylene	
Concentration:	30	%
Entering temp:	89.1	°F
Leaving temp:	86.1	°F
Flow rate:	30.00	gpm
Pressure drop:	5.07	ft WC
	2.2	psid
Fluid velocity:	2.04	ft/sec

Total Coil Bank Ratings

Total capacity: 42,390 Btu/hr
Coil is not certified by AHRI because:
Coil is not certified with Propylene Glycol

Coil Data

Face area:	6.6	ft²
Finned height:	27.00	ins
Finned width:	35.00	ins
Rows:	8	
Fins/inch:	12	
Serpentine:	1	
Dry weight (Ea.):	277	lb
Wet weight (Ea.):	333	lb
Approx. coil fluid volume (Ea.):	7	gal

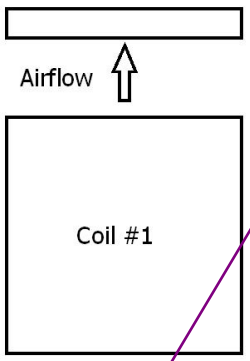
Coil Options

Tube material:	Copper
Tube thickness:	0.035 ins
Fin type:	V-Waffle
Fin material:	Aluminum
Fin thickness:	0.0075 ins
Casing material:	304 SS
Connections:	Red Brass MPT
Coating:	Electrofin
Vent & drain:	Internal - 1/4" MPT w/ Cap
UV Light:	Not provided

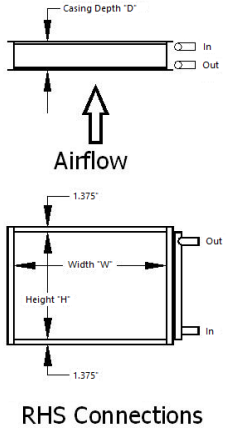
Individual Coil Ratings

Coil Tag(s)	Model Number	Capacity Btu/hr	Airflow cfm	Flow gpm	No. of circuits	Dimensions			Connection	
						H(ins)	L(ins)	D(ins)	Size(ins)	Style
1	58WC27x035-08-12-AW	42,390	3,320	30.00	18	27.00	35.00	15.00	1.50	RHS

Coil Bank Layout



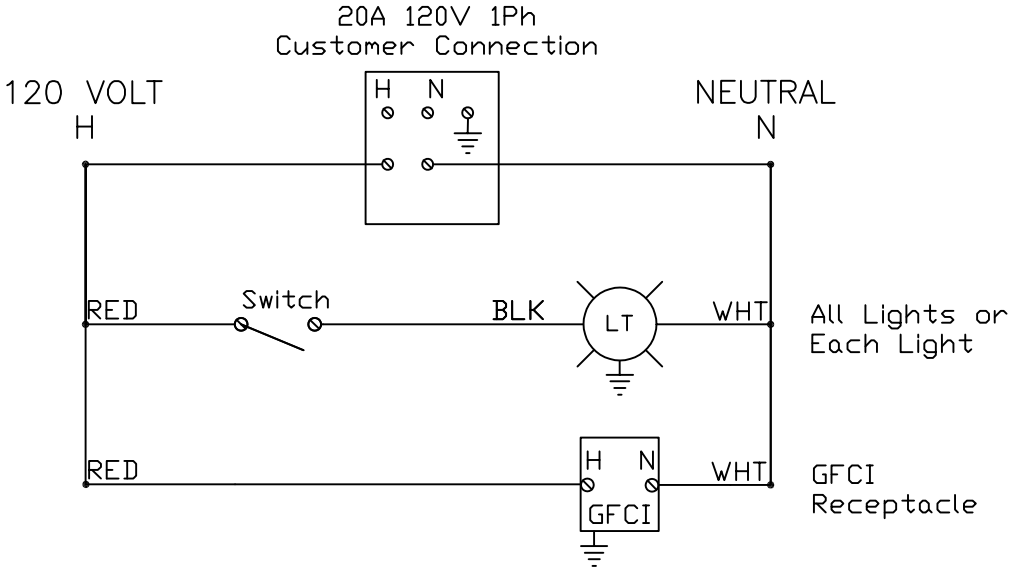
Coil Drawing



RHS Connections

Confirm performance is acceptable in winter conditions.

20A, 120V
1Ph/60Hz By Others



Customer supplied 120V power circuit must include a ground fault interrupt device as well as over current protection.

Caution: All customer supplied power must be shut off to the unit before servicing electrical system.

Caution: Only replace light bulb with LED 10W, 120V.

The number of devices drawn on this diagram is for illustration purposes only. Refer to the BOM for quantities.

Device locations are shown on the plan view drawing.

120V wiring is #12 THHN.

Refer to unit data sheet for conduit type.

One or more circuits may be provided.

Wire colors are representative and may be changed.

Circuit 1			
Quantity	Description		Amp Draw
1	Switch		0.0000
1	GFCI Receptacle		12
2	Vapor Proof Lights W/LED		0.166000
		Total Amp Draw	12.1660

ClimateCraft
1427 NW 3rd St
Oklahoma City, OK 73106
PHONE (405) 415-9230 - FAX (405) 415-9231
www.climatecraft.com

JOB		SN	BY	REV
UAMS – Center for Animal Models of Infection and Disease		300037	JF	A
TAG	SHEET #	DATE	MODEL NO.	
HRU–5		10/08/2024	CAH30X48E	

UAMS - Center for Animal Models of Infection and Disease

Model #	CAH30X48E	Serial #	30037	Tag	HRU-5	MFG Date	TBD

Volts	120	Phase	1~	Hz	60 `

Circuit Qty	Motor HP	Motor FLA	Motor Tag

CAUTION: More than 1 disconnect is required to disconnect power from this equipment!

Separate circuits are identified above. Multiples of the same circuit are listed on the same line. A separate 115 volt lighting circuit is also required

Short-circuit current: NA kA rms symmetrical, NA V maximum

Electric Heat (Kw)	NA		Max Coil (psig/kPa)	300.0	2068.5
Input Amps	NA		Max Oper. Steam Press. (psig/kPa)	NA	NA
			Max Coil Water (psig/kPa)	300.0	2068.5
			Refrigerant Max Charge (lbs/kg)	NA	NA
For Outdoor Use			HW Coil Max Inlet Temp (F/C)	200.0	93.3
For Installation in locations not accessible to the general public			Refrigerant Type		NA
Max Discharge Air Temp (F/C)	100.0	37.8	Max Ext. Static Press (in. w.g./kPa)	NA	NA

ClimateCraft

Oklahoma City

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Made in USA
Patents: www.climatecraft.com\patents

This document details the standard construction of ClimateCraft custom air handlers. It is intended to be used in conjunction with the unit data sheets and component data sheets to describe the construction specifications of all equipment. The unit data sheets and the component data sheets together with component cut sheets and unit drawings, detail each specific unit. Together, they make up the submittal data for the ClimateCraft air handlers on the project.

Exterior Cabinet Construction
The exterior of ClimateCraft units are made from prefabricated roll formed panels that incorporate a patented thermal break system. They are fastened on 6" centers with 5/16" - 18 stainless steel bolts. All panel fasteners are accessible from the outside of the unit. No sheet metal screws are used on the unit to secure the structural panels. The panels are sealed with specially extruded EPDM gasket along all four sides to prevent cabinet leakage.

The roll formed panels are fabricated from 16 gauge material. The type of material is detailed on each unit's product datasheet and can be one of the following exterior materials.

16 gauge pre-painted galvanized steel
Base material is 16 gauge galvanized steel conforming to the requirements of ASTM-653. The material is pre-coated with a polyester ceramic paint system. This system passes an ASTM B-117 salt spray resistance test of 3000 hours and an ASTM G-23 accelerated weathering test of 3,000 hours. The paint color is "ClimateCraft Sky Grey".

Indoor units have a flat roof with a 1-1/2" standing seam.

Wall and Roof Insulation
Insulation is thermally and acoustically rated. The fire and smoke ratings meet NFPA 90A and 90B requirements. The insulation type used can be found in the "Cabinet" section of the unit data sheet. One or more panel thicknesses as detailed in the construction section of the unit data sheet can be used. The R value of the panels used are as follows:

Foam Insulation	R Value = 6.6 / inch

Interior Liners
The interior liners are a one-piece liner. The liners are fastened to the exterior panels through a thermally isolating material. The unit data sheet details the types of liners used in each section. The liners used can be one of the following materials:

20 gauge type 304 stainless steel
Type 304L stainless steel sheet conforms to ASTM A-240 with a 2-B finish.

Floor
The unit floor can be varied from section to section and the material and method of fastening is detailed by section in the unit data sheets. The floor materials options are as follows:

10 gauge aluminum
Type 1100 aluminum sheet produced to UNS A91100 with 2-B smooth finish.

The floors are fastened to the base with #12 self-drilling sheet metal screws driven into the base through pre-punched holes to insure uniformity. The screws are plated steel for galvanized steel and aluminum floors and are type 410 stainless steel on stainless steel floors. 1/8" thick EPDM gasket is applied between the floor sheets the base to provide a thermal break.

Structural Base
The perimeter of each base is fabricated from electrically welded structural steel tubing. The tubing is 3/16" thick (1/4" thick for seismically rated units) high strength carbon steel and is pre-painted at the mill with a weldable steel primer. The tube height is detailed in the unit data sheets. The perimeter tubing is drilled and tapped with 5/16" - 18 threads on 6" centers to accept steel bolts to fasten the unit panels to the base. The tubing is continuously welded together at the corners and the open ends are seal welded shut with a steel plate.

Formed "C" channels made of 12 gauge hot rolled pickled and oiled carbon steel are used as structural cross members and are fully welded into the perimeter frame. The cross members are placed on a maximum of 24" centers. The cross members are 4" deep.

5/8" thick by 8" wide steel plates are welded between cross members to distribute the weight of the fan assemblies to the structural base. The unit serial number is marked on the base for permanent identification. Lifting lugs are welded to the perimeter tubes. The lugs can be used to tie the unit down to the pad or roof curb for seismic restraint.

The welded base assembly is cleaned using a multi-step cleaning process to remove all dirt and oil, primed using a phenolic primer, and finished with a 2-part epoxy paint. The underside of the base is coated with a two component, closed cell, rigid polyurethane foam. A minimum 2" of insulation is provided.

Subfloor Options
When chosen a subfloor liner is fastened to the underside of the base and is constructed from one of the following materials: 20 gauge G90 galvanized steel.

Unit Splits (Refer to the unit data sheet to see which option applies to the specific unit)

Option 1: "No unit splits are provided"
The unit will ship as a single piece as shown on the drawings and individual sections cannot be separated.

Doors
Doors shall be 2" thick, double wall construction with R-6.6/inch polyurethane foam insulation. Doors shall open inward or outward as shown on the unit drawings. Outward swing doors which are installed in positive pressure sections shall be provided with a safety catch. Doors shall be constructed of minimum 0.125" thick, 6063-T5 extruded aluminum framework. Each door shall be mounted with fully adjustable die-cast aluminum hinges. All doors and mounting frames shall incorporate a thermal break design and the doors shall seal to a replaceable extruded EPDM sponge rubber gasket.

The door latch assembly shall consist of a roller cam compression arm with a chrome plated steel inner handle and glass/fiber/nylon composite outer handle. Tool operated locks are provided on each fan section access door. All doors have a minimum of two latches.

The door includes dual pane viewing windows with clear and wire reinforced safety glass. The windows are replaceable without disassembling the door. The windows are sealed and gasketed to prevent condensation. The unit data sheet details the sections that contain windows. All windows are resistant to UVC transmission.

The size, location and swing of each door is detailed on the unit drawings. Door sizes listed on the drawings are a nominal door size. Actual door clearance dimensions are approximately 3" less in the width and height.

Coils
All hot-water coils are constructed in accordance with ARI. 5/8" OD copper tubes are mechanically expanded into die formed fins. The tubes are arranged in a triangular pattern and the fins are patterned to augment heat transfer with a minimum air pressure drop. The coil data sheets detail fin and tube material and size. All water coils have seamless copper headers and threaded red brass connections. Each coil is tested under clear water at 350 psig.

The casing of all coils will be 16 gauge type 304 stainless steel as indicated on the coil data sheet. The casing consists of a C-channel tube sheet on either end with a 1 1/2" flanges. A 1 3/8" stacking flange is used on the top and bottom. On coils with finned widths greater than 42" an intermediate tube sheet is used to reinforce the coil casing. Multiple tube sheets are used to keep the maximum unsupported coil width to 42".

A coil data sheet is provided for each coil bank in all air handlers. The data sheets detail coil performance and optional construction supplied on each coil.

Filter Racks
Filter holding frames are of heavy-duty construction designed for industrial applications. Holding frames applied in medium efficiency filter applications are either upstream or downstream accessible. Holding frames applied in high efficiency filter applications are upstream accessible only. Holding frames are constructed from galvanized steel or optional type 304 stainless steel as specified in the unit data sheet.

They are equipped with polyurethane foam gaskets, fasteners and filter centering dimples. The in-line depth is 2.75" in order to effect adequate bearing surface for built-up filter banks. Filter fasteners are capable of being installed without the requirement of tools, nuts or bolts. The holding frame rack is designed to accommodate standard size filters with the application of the appropriate type fastener. The filter rack is designed to use standard 24" x 24" and 12" x 24" filters only. Headered filters of any depth may be used with 1", 2", or 4" non-headered pre-filters. 16 gauge stiffening angles are used between each column of filters.

Dwyer "Magnehelic" filter gauge options when chosen are installed where shown to monitor the air pressure drop of any filter bank. The gauges are factory mounted into a 16 gauge steel housing that mounts to the unit exterior using the bolts of one of the external standing seam flanges. Special air sensing tube assemblies are attached to the skin of the unit with self drilling sheet metal screws that come with an integral rubber washer. The sensing tube is inserted through a predrilled hole and the back of the plate is gasketed to eliminate air and water leakage. The air sensing assembly includes a barbed fitting on the exterior and vinyl tubing connects the sensing tubes to the filter gauge.

The unit data sheet details the type of filters and filter rack used along with the optional equipment and construction.

Electrical
The unit voltage is indicated on the unit data sheet. A weatherproof plastic nameplate is provided on all units giving the electrical rating information of the unit and all electrical components.

Power Circuit Conduit
The following is a detailed list of possible power circuit conduit types provided on all factory-built units.

- **EMT and Flexible Metal Conduit** - Power circuits are wired with EMT thin wall galvanized steel conduit. The wire is type THHN sized for the connected load. At each air seal and wall penetration, the conduit is sealed after assembly to prevent air and moisture migration. The final connection to the fan motors is through a short length of flexible conduit to allow for the movement of the spring isolated fan assemblies.

Lighting
The internal lights are in 100 watt vapor proof safety fixtures. The fixtures are die cast aluminum with a glass globe protected with a die cast safety cage. The lights are 10 watt LED non-dimmable bulbs equivalent to a 60 watt incandescent bulb. A combination 20 amp light switch and 115V outlet mounted in a die cast aluminum box controls lights and provides convenience power. The lighting power wiring diagram details the lighting control circuit.

Lighting wiring conduit types are detailed in the submittal with the following options.

- **Aluminum MC Cable** - The lights are wired with MC aluminum armor-clad cable. The cable consists of color coded 12 gauge, type THHN, stranded wiring. It is protected by a continuous

wrap of aluminum flexible conduit. The MC cable is air tight, and air and moisture cannot migrate through the conduit from section to section as with EMT or rigid conduit.

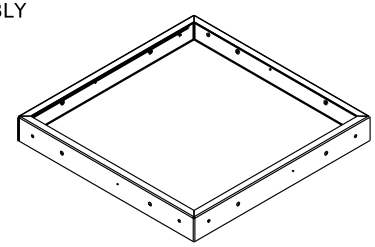
Controls
Controls are to be wired and installed, the following list details the possible options provided.

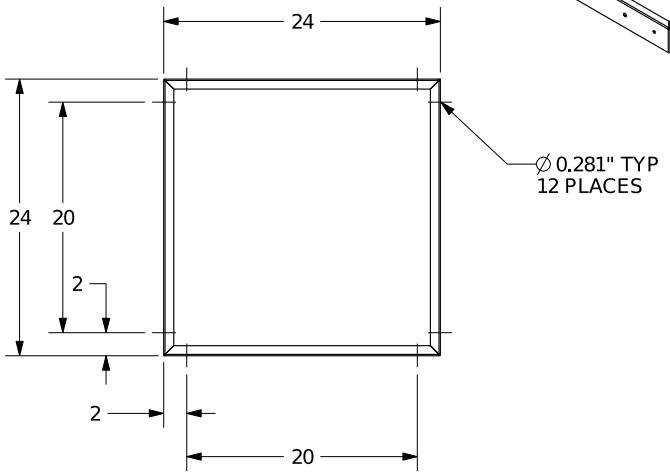
- **EMT or Flexible Metal Conduit** - The controls are wired with EMT thin wall galvanized steel conduit or flexible metal conduit. The wiring is stranded, 18 gauge, type THHN. At each air seal and wall penetration, the conduit is sealed after assembly to prevent air and moisture migration.

ETL
All factory-built units, unless stated otherwise in the submittal, are ETL listed. They have been examined by ETL and found to comply with UL safety standard 1995. The unit will bear the ETL listing mark.

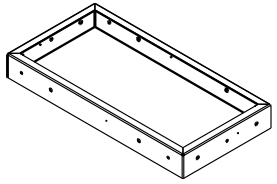
Testing
All factory assembled units undergo a functional run test. Power is applied to the unit and all circuits are run and checked for proper function. All fan motors are run and checked for rotation, operating speed, and balance after fan assembly.

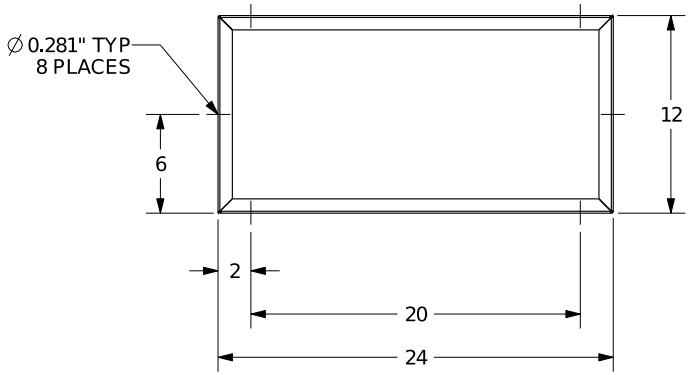
CLC 24" x 24" FILTER FRAME ASSEMBLY





CLC 24" x 12" FILTER FRAME ASSEMBLY

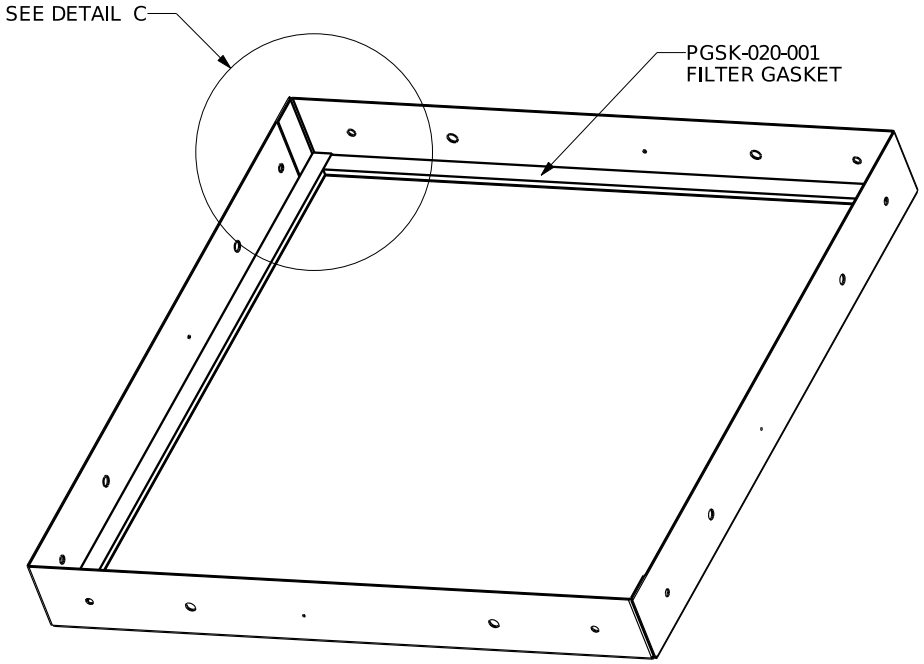


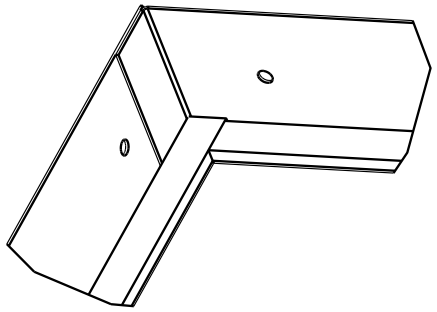


REV	DESCRIPTION	ECN #	BY	DATE	THIRD ANGLE PROJECTION	TOLERANCES	MANUFACTURING DRAWING	CLC FILTER FRAMES TYPE 8 FRAME	
A	INITIAL RELEASE		AJH	03/03/10		UNLESS OTHERWISE SPECIFIED .XXX ± .015 .XX ± .030 .X ± .060 ANG ± 1°	ClimateCraft P.O. BOX 1538, 1427 N.W. THIRD OKLAHOMA CITY, OK 73101-1538 PHONE (405) 415-9230 FAX (405) 415-9231	DRAWING # M100-282	APPR: RMW / KCO
B	REVISION		AJH	03/17/14				BY: AJH DATE: 03/03/10	SIZE: B
C	UPDATE FOR OUTSIDE VENDOR	0624	MDA	01/04/18				UNITS IN INCHES UNLESS OTHERWISE SPECIFIED	SHEET: 1 OF 3

FILTER GASKET INSTALLATION DETAILS

NOTES:
1. INSTALL PSA BACKED FILTER GASKET AS SHOWN
   WITHOUT CORNER OVERLAP
2. LINE GASKET UP WITH INSIDE FLANGE EDGE





DETAIL C
SCALE 0.500

REV	DESCRIPTION	ECN #	BY	DATE
A	INITIAL RELEASE		AJ H	0303/10
B	REVISION		AJ H	03/17/14
C	UPDATE FOR OUTSIDE VENDOR	0624	MDA	01/04/18

THIRD ANGLE PROJECTION

TOLERANCES: UNLESS OTHERWISE SPECIFIED
.XXX ± .015
.XX ± .030
.X ± .060
ANG ± 1°

MANUFACTURING DRAWING

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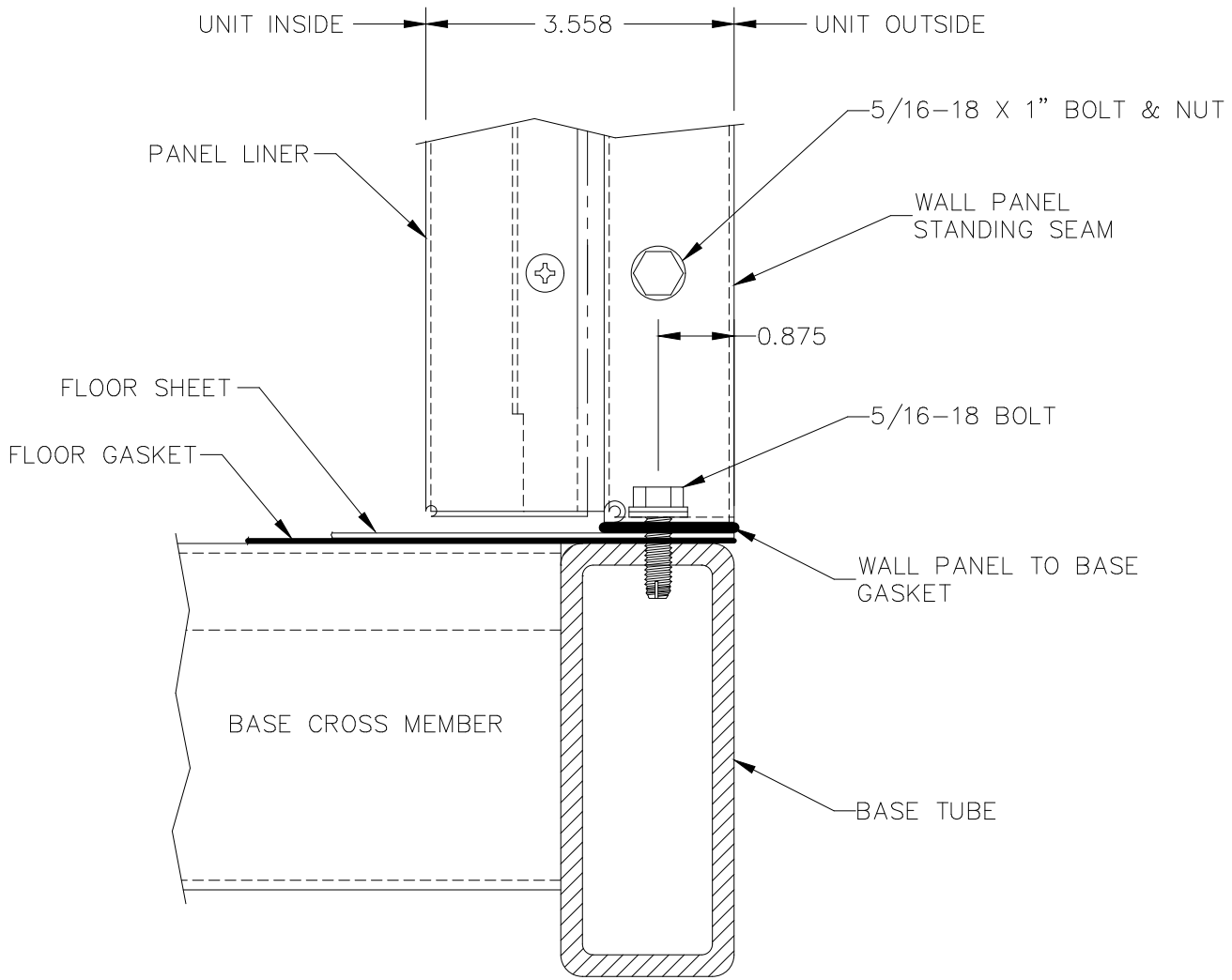
P.O. BOX 1538, 1427 N.W. THIRD
OKLAHOMA CITY, OK 73101-1538
PHONE (405) 415-9230
FAX (405) 415-9231

CLC FILTER FRAMES
TYPE 8 FRAME

DRAWING # M100-282 | APPR: RMW / KCO
BY: AJ H | DATE: 03/03/10 | SIZE: B
UNITS IN INCHES UNLESS OTHERWISE SPECIFIED | SHEET: 2 OF 3



LOWER CORNER
ELEVATION VIEW

2" WALL INSULATION

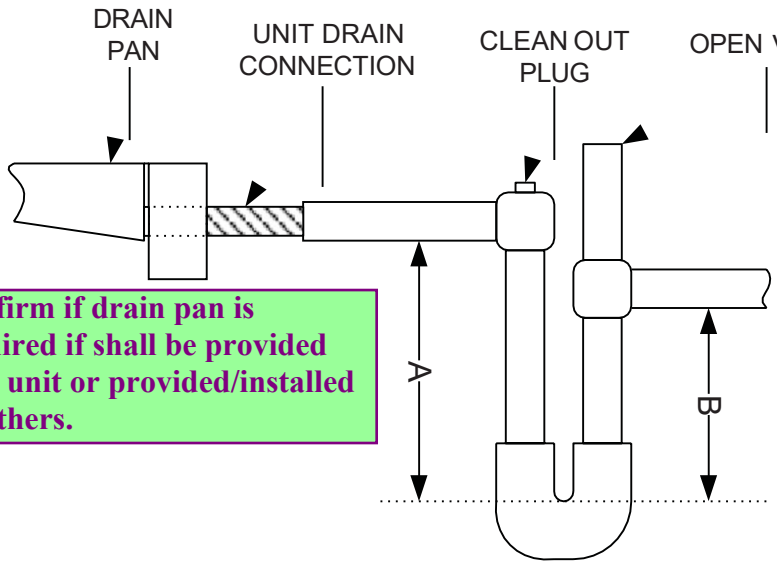
STANDARD MANUFACTURING DRAWING WITHOUT THE EXPRESS WRITTEN PERMISSION OF ClimateCraft Inc. DO NOT REPRODUCE OR DISCLOSE THE CONTENTS OF THIS DRAWING THIS DRAWING AND IT'S CONTENTS ARE THE PROPERTY OF ClimateCraft Inc.	TOLERANCES .XXX .015 .XX .030 .X .060 ANG 1	ClimateCraft PO BOX 1538, 1427 N.W. THIRD OKLAHOMA CITY, OK 73101-1538 PHONE (405) 415-9230 - FAX (405) 415-9231	TITLE AHU BASE JOINT DETAIL DWG NO M100-006	BY RKW REV D SIZE A	DATE 10-26-98 DATE 03-21-03 Sht 2 of 4

Condensate Drain

Static pressure in the drain pan section will be negative if the cooling coil is in a draw through application. Static pressure will not allow the drain pan to empty if a properly plumbed trap is not used. Cooling coils and drain pans in a blow through or positive pressure section also need to be properly trapped to prevent air from blowing through the drain.

The following trap sizes are required as a minimum for proper operation of the air handling unit. On startup, it may be necessary to fill the trap manually. If the air handling unit is exposed to freezing conditions during winter months, an antifreeze solution should be placed in the trap or the trap should be drained and plugged.

NEGATIVE INTERNAL STATIC PRESSURE COIL SECTION (DRAW-THROUGH APPLICATION)



Confirm if drain pan is required if shall be provided with unit or provided/installed by others.

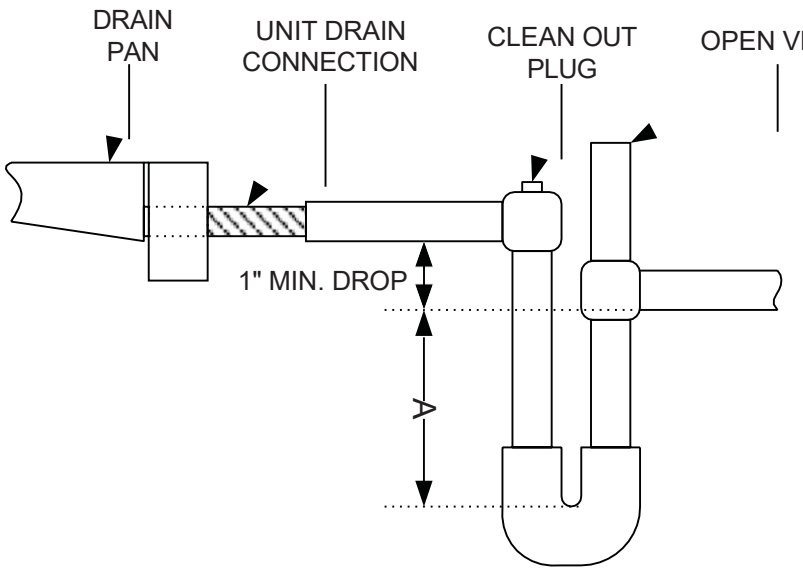
A=Negative Internal Static Pressure in Drain Pan Section (in w.g.)+2

B=(Negative Internal Static Pressure in Drain Pan Section/2)+1

Example:
Neg SP in Drain Pan Section=3.6 in/w.g.

A=3.6+2=5.6"
B=(3.6/2)+1=2.8"

POSITIVE INTERNAL STATIC PRESSURE COIL SECTION (BLOW-THROUGH APPLICATION)

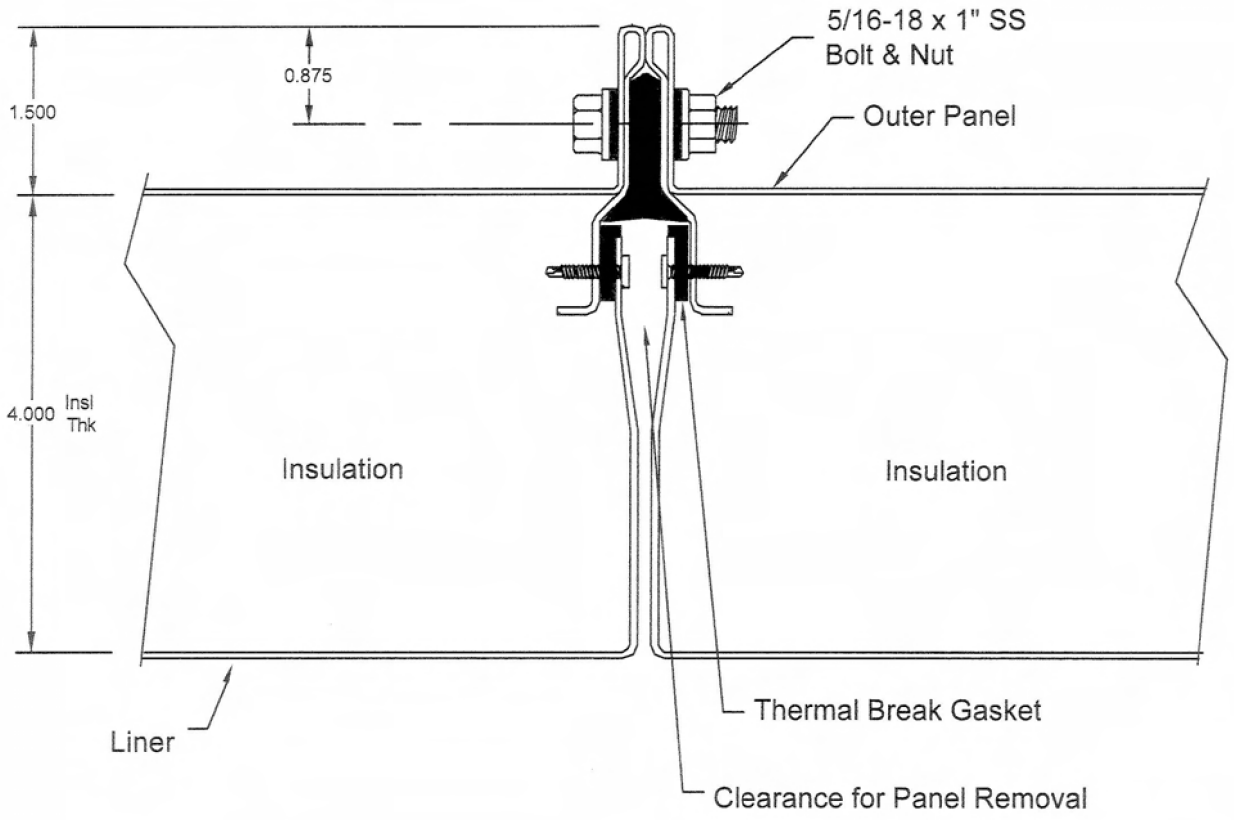


A=Positive Internal Static Pressure in Drain Pan Section (in w.g.)+1

Example:
Pos SP in Drain Pan Section=3.6 in/w.g.

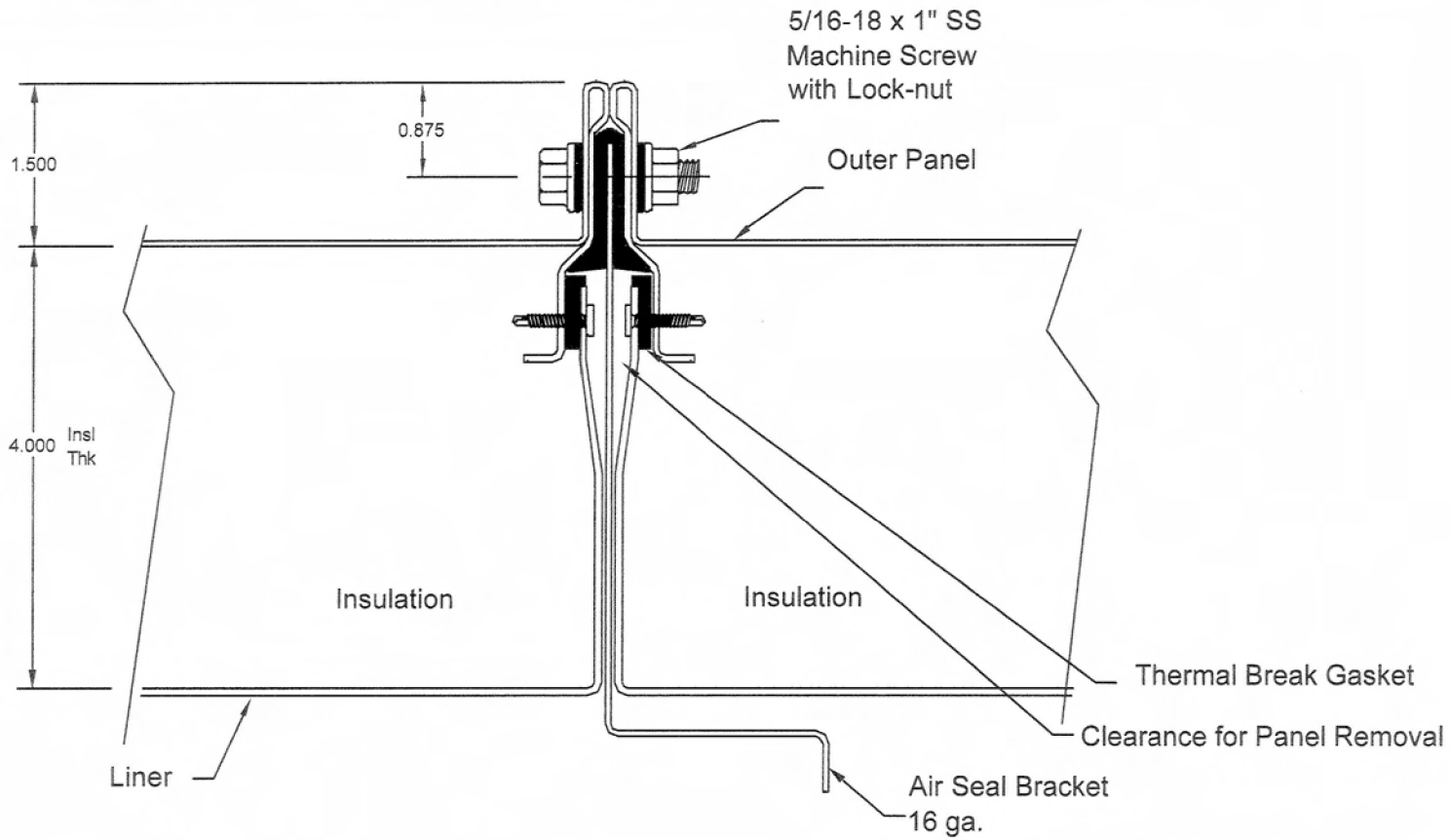
A=3.6+1=4.6"

Total Trap Dimension=4.6+1=5.6"



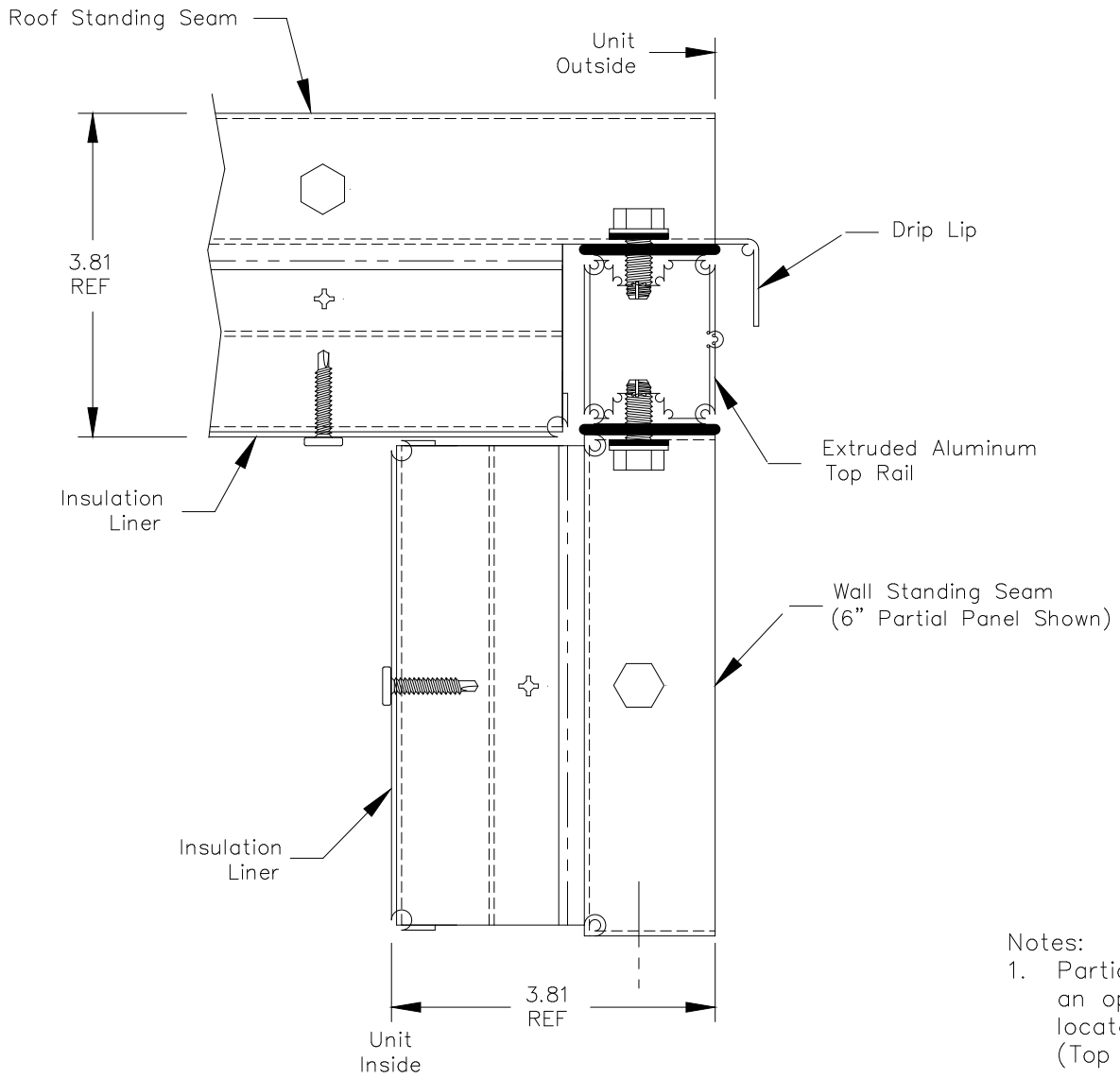
Panel Joint Detail

STANDARD MANUFACTURING DRAWING	TOLERANCES				
THIS DRAWING AND IT'S CONTENTS ARE THE PROPERTY OF ClimateCraft Inc. DO NOT REPRODUCE OR DISCLOSE THE CONTENTS OF THIS DRAWING WITHOUT THE EXPRESS WRITTEN PERMISSION OF ClimateCraft Inc.	.XXX	±.015	ClimateCraft PO BOX 1508 1427 N.W. THIRD OKLAHOMA CITY, OK 73101-1508 PHONE (405) 415-9200 – FAX (405) 415-9531	TITLE: AHU PANEL ROLL FORMED JOINT	BY: WPM DATE: 2/5/97
	.XX	±.030			REV: L DATE: 1-17-06
	.X	±.060		DWG NO: M100-001	SIZE: B Sht3of 4
	ANG	±1°			



Air Seal Joint Detail

STANDARD MANUFACTURING DRAWING	TOLERANCES		TITLE	BY	DATE
THIS DRAWING AND IT'S CONTENTS ARE THE PROPERTY OF ClimateCraft Inc. DO NOT REPRODUCE OR DISCLOSE THE CONTENTS OF THIS DRAWING WITHOUT THE EXPRESS WRITTEN PERMISSION OF ClimateCraft Inc.	.XXX ±.015 .XX ±.030 .X ±.060 ANG ±1°	ClimateCraft PO BOX 1538 1127 N.W. THIRD OKLAHOMA CITY, OK 73101-1538 PHONE (405) 815-9200 - FAX (405) 815-9121	AHU PANEL ROLL FORMED JOINT	WPM REV L	2/5/97 1-17-06
			DWG NO M100-001	SIZE B	Sht4of 4

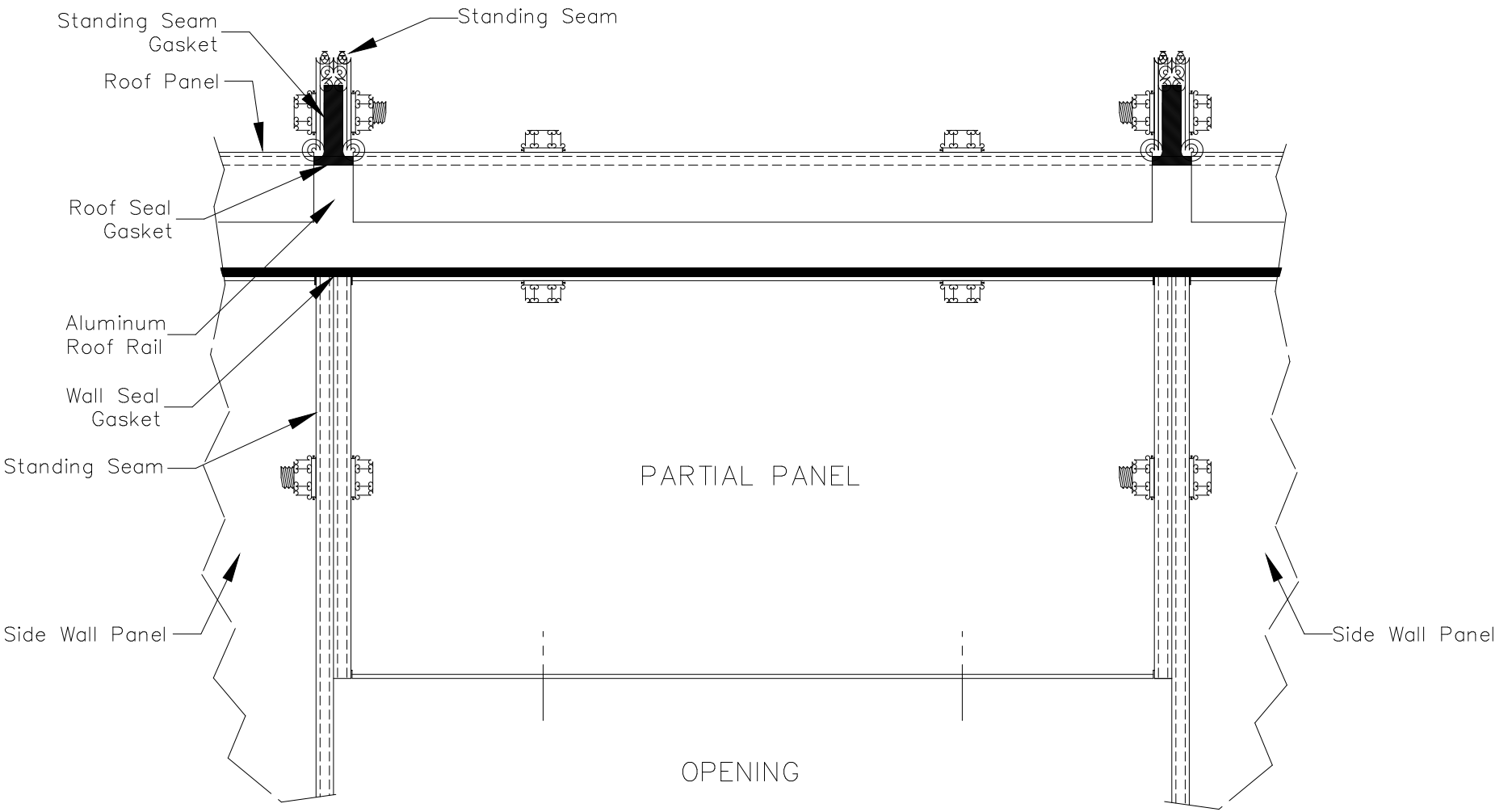


SECTION VIEW
THRU TOP CORNER

Notes:
1. Partial panel used to create an opening in wall and is located at top & bottom. (Top Partial Panel shown.)

2" INSULATION

STANDARD MANUFACTURING DRAWING WITHOUT THE EXPRESS WRITTEN PERMISSION OF ClimateCraft Inc. DO NOT REPRODUCE OR DISCLOSE THE CONTENTS OF THIS DRAWING THIS DRAWING AND IT'S CONTENTS ARE THE PROPERTY OF ClimateCraft Inc.	TOLERANCES .XXX .015 .XX .030 .X .060 ANG 1	ClimateCraft PO BOX 1538, 1427 N.W. THIRD OKLAHOMA CITY, OK 73101-1538 PHONE (405) 415-9230 - FAX (405) 415-9231	TITLE AHU PARTIAL PANEL DETAIL DWG NO M100-005	BY RKW REV E SIZE A	DATE 10-26-98 DATE 03-21-03 Sht 1 of 4



Notes:
1. Partial panel used to create an opening in wall and is located at top & bottom. (Top Partial Panel shown.)

FRONT VIEW
(SIDE 1)

2" ROOF & WALL PANELS SHOWN

STANDARD MANUFACTURING DRAWING	TOLERANCES		TITLE	BY	DATE
WITHOUT THE EXPRESS WRITTEN PERMISSION OF ClimateCraft Inc. DO NOT REPRODUCE OR DISCLOSE THE CONTENTS OF THIS DRAWING THIS DRAWING AND IT'S CONTENTS ARE THE PROPERTY OF ClimateCraft Inc.	.XXX	.015	AHU PARTIAL PANEL DETAIL	RKW	10-26-98
	.XX	.030		REV E	DATE 03-21-03
	.X	.060			
	ANG	1	DWG NO M100-005	SIZE A	Sht 4 of 4

ClimateCraft
PO BOX 1538, 1427 N.W. THIRD
OKLAHOMA CITY, OK 73101-1538
PHONE (405) 415-9230 - FAX (405) 415-9231

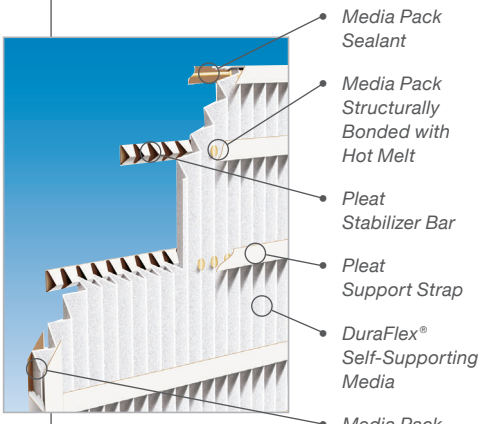
THE WORLD LEADER IN CLEAN AIR SOLUTIONS

PerfectPleat® SC M8

(Standard Capacity MERV 8)

EXTENDED SURFACE PLEATED PANEL FILTERS

- Mechanical efficiency – does not rely on electret charge technology
- Self-supporting DuraFlex® media made from virgin fiber – no wire support needed
- Consistent media with controlled fiber size and blend
- Available in 2″ and 4″ models
- Environmentally friendly – no dies, no metal, fully incinerable
- Patented media, filter design, and manufacturing process. Patents covered under one or more of the following: US 6398839 B2; US 6254653 B1; US 6159318; US 6165242; US 6387140 B1



PerfectPleat® SC M8 2″ Filter Construction

PerfectPleat SC M8 filters are designed to consistently increase efficiency throughout the service life of the filter. They have an initial MERV 8 rating respectively, but the efficiency increases significantly when dust loading begins. PerfectPleat SC M8 filters have distinctive self-supporting characteristics that allow a pleating pattern, which promotes airflow and maximizes Dust Holding Capacity (DHC). The PerfectPleat SC M8 filter is best suited for standard capacity pleated panel filter applications, where pleated filters are currently in use. They can also be used to upgrade applications using panel filters.

Superior Design and Construction

The perimeter frame is constructed from the highest wet-strength 28 pt. beverage carrier board, securely bonded to the media pack. Support straps on the air entering side are used in combination with uniquely designed pleat stabilizers on the air leaving side of the 2″ model to provide additional strength. The support straps and pleat stabilizers ensure integrity against turbulent airflow. The 2″ filter resists crushing and abuse and provides excellent lateral stability for installation in side access systems.

The 4″ model utilizes a two piece die cut frame with integral pleat spacers on the air leaving side. Pleat spacing is controlled by straps bonded to the air entering side and the multiple rows of pleat spacers on the air leaving side. The pleat spacers also ensure the pleats remain open during use, maximizing filter life.

DuraFlex® Media—Patented Media Design

Uniform size virgin fibers are assembled in closely controlled blends to create a media that is both self-supporting and consistent in performance. When pleated, DuraFlex media will hold its shape without the wire support characteristic of conventional pleated filters. That means no potential for the formation of rust and safer handling. With the superior resiliency of DuraFlex media and no need for wire support, PerfectPleat SC M8 filters can sustain significant abuse and maintain their shape and pleat spacing. The absence of wire also makes the filter totally incinerable, which can simplify disposal.

AAF | Flanders®

PerfectPleat® SC M8 Filters

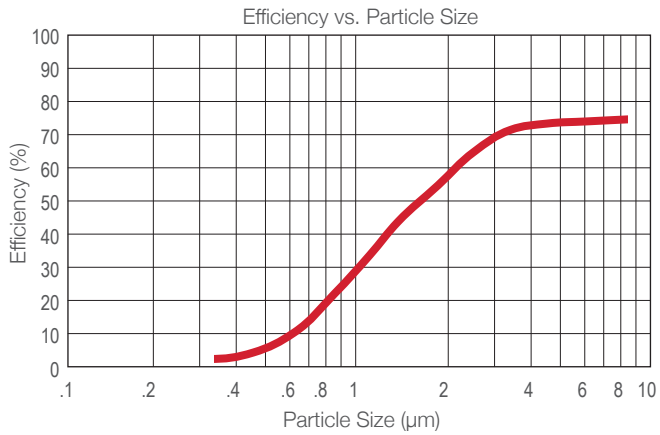
Performance Data

Filter	Pleats Per Linear Foot	Rated Initial Resistance (in. w.g.)			Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits
		300 FPM	500 FPM	625 FPM			
2″ PerfectPleat SC M8	10	.13	.24	.33	1.0	8	150°F (66°C)
4″ PerfectPleat SC M8	9	.11	.23	.35	1.0	8	200°F (93°C)

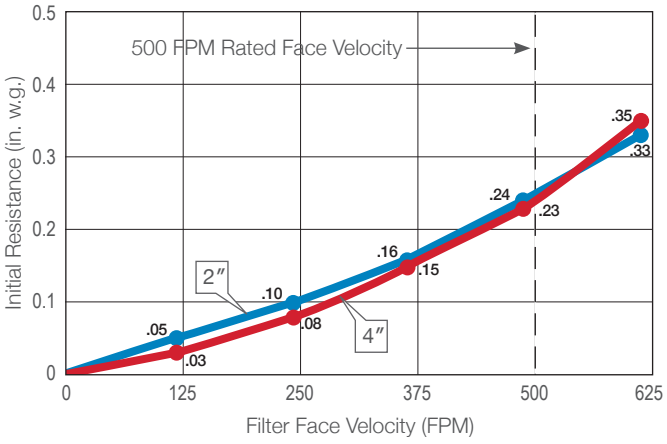
All performance data based on ASHRAE Standard 52.2. Performance tolerance conforms to Section 6.4 of ANSI/AHRI Standard 850-2013.

***Underwriters Laboratories Classification** – PerfectPleat filters are UL Classified. Testing was performed according to UL Standard 900.*

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



Product Information – Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow (SCFM)			Pleats Per Filter
		300 FPM	500 FPM	625 FPM	
10 x 20 x 2	9½ x 19½ x 1¾	400	700	850	8
12 x 20 x 2	11½ x 19½ x 1¾	500	850	1050	10
12 x 24 x 2	11⅜ x 23⅜ x 1¾	600	1000	1250	10
14 x 25 x 2	13½ x 24½ x 1¾	750	1200	1500	11
15 x 20 x 2	14½ x 19½ x 1¾	650	1050	1300	12
15 x 25 x 2	14½ x 24½ x 1¾	800	1300	1650	12
16 x 16 x 2	15½ x 15½ x 1¾	550	900	1100	13
16 x 20 x 2	15½ x 19½ x 1¾	650	1100	1400	13
16 x 24 x 2	15⅜ x 23⅜ x 1¾	800	1350	1650	13
16 x 25 x 2	15½ x 24½ x 1¾	850	1400	1750	13
18 x 24 x 2	17⅜ x 23⅜ x 1¾	900	1500	1900	15
18 x 25 x 2	17½ x 24½ x 1¾	950	1550	1950	15
20 x 20 x 2	19½ x 19½ x 1¾	850	1400	1750	17
20 x 24 x 2	19⅜ x 23⅜ x 1¾	1000	1650	2100	17
20 x 25 x 2	19½ x 24½ x 1¾	1050	1750	2150	17
24 x 24 x 2	23⅜ x 23⅜ x 1¾	1200	2000	2500	20
25 x 25 x 2	24½ x 24½ x 1¾	1300	2150	2700	21
12 x 24 x 4	11⅜ x 23⅜ x 3¾	600	1000	1250	8
16 x 20 x 4	15⅜ x 19⅜ x 3¾	650	1100	1400	11
16 x 25 x 4	15⅜ x 24⅜ x 3¾	850	1400	1750	11
18 x 24 x 4	17⅜ x 23⅜ x 3¾	900	1500	1875	12
20 x 20 x 4	19⅜ x 19¾ x 3¾	850	1400	1750	14
20 x 25 x 4	19⅜ x 24⅜ x 3¾	1050	1750	2150	14
24 x 20 x 4	23⅜ x 19⅜ x 3¾	1000	1650	2100	14
24 x 24 x 4	23⅜ x 23⅜ x 3¾	1200	2000	2500	17
25 x 29 x 4	24⅜ x 28⅜ x 3¾	1500	2500	3150	21

Energy savings may be realized by operating the PerfectPleat SC M8 filters to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost Of Ownership analysis for your specific application.

AAF Flanders®

9920 Corporate Campus Drive, Suite 2200, Louisville, KY 40223-5690
888.223.2003 Fax 888.223.6500 | aafintl.com

ISO Certified Firm AFP-1-202C 01/17

Dwyer

SERIES 2000

MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES

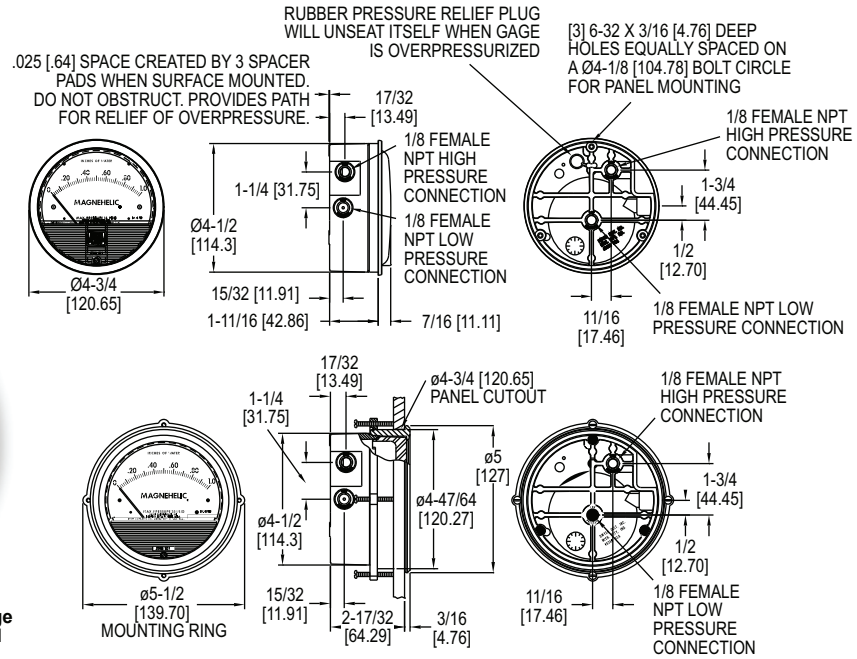
Indicate Positive, Negative or Differential, Accurate within 1%

CALIBRATION SERVICES AVAILABLE

5 YEAR LIMITED WARRANTY

Standard Magnehelic® gage

High Accuracy Magnehelic® gage Shown with optional -SS bezel



Select the **Series 2000 Magnehelic® Differential Pressure Gages** for a versatile low differential pressure gage with a wide choice of 81 models and 27 options to choose from. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates air or non-corrosive gas pressures--either positive, negative (vacuum) or differential. The design resists shock, vibration, over-pressures and is weatherproof to IP67.
Select the –HA High Accuracy Magnehelic® gage option for an accuracy within 1% of full-scale. Also included with the –HA option at no extra cost are a mirrored scale overlay and a 6 point calibration certificate.

BENEFITS/FEATURES

- Easy to read gage through undistorted plastic face permits viewing from far away
- Patented design provides quick response to pressure changes means no delay in assessing critical situations
- Durable and rugged housing and high-quality components combine to provide long-service life and minimized down-time
- High accuracy option is twice as accurate as the standard Magnehelic® gage

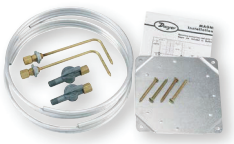
APPLICATIONS

- Filter monitoring
- Air velocity with Dwyer® pitot tube
- Blower vacuum monitoring
- Fan pressure indication
- Duct, room or building pressures
- Clean room positive pressure indication

ACCESSORIES

Model	Description
A-432	Portable kit; combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder
A-605	Air filter gage accessory kit; adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing, two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves
A-605B	Air filter gage accessory kit; air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange
A-605C	Air filter gage accessory kit; air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange

A-432



A-605

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available).
Note: May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% (-HA model ±1) of FS (±3% (-HA ±1.5%) on -0, -100PA, -125PA, -10MM and ±4% (-HA ±2%) on -00, -60PA, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Enclosure Rating: IP67.
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.❶
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adaptor, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Compliance: Meets the technical requirements of EU Directive 2011/65/EU (RoHS II). **Note:** -SP models not RoHS approved.

*Low temperature models available as special options.

Note: For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

USA: California Proposition 65
⚠**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

❶**Over Protection Note: See page 21 (Series 2000)**

Dwyer

SERIES 2000

MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES

Indicate Positive, Negative or Differential, Accurate within 1%

5 YEAR LIMITED WARRANTY

CALIBRATION SERVICES AVAILABLE

Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

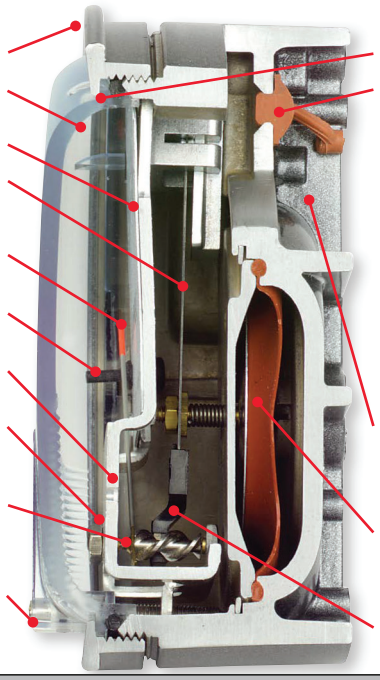
Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.



O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.
The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings of any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

MODEL CHART

Model	Range, Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range, PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30
Model	**Range, CM of Water**
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

Model	Range, MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10
Model	**Range, Pa**
2000-60NPA†••	10-0-50
2000-30PA†••	0-30
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

Model	Range, in w.c./ Velocity F.P.M.
2000-00AV†••	0-.25/300-2000
2000-0AV†•	0-.50/500-2800
2001AV	0-1.0/500-4000
2002AV	0-2.0/1000-5600
2005AV	0-5.0/2000-8800
2010AV	0-10/2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

†These ranges calibrated for vertical scale position. • Accuracy ±3%. •• Accuracy ±4%. *MP option standard. **HP option standard.

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® gage that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h).
Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure.
Example: 0.5 in w.c. = 16,000 CFM.

ACCESSORIES

Model	Description
A-135	Rubber gasket for panel mounting
A-310A	3-way vent valves. In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage
A-321	Safety relief valve
A-401	Plastic carry case
A-448	3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface

A-310A

USA: California Proposition 65
⚠**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

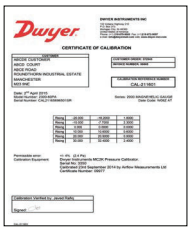
Dwyer

HIGH ACCURACY MAGNEHELIC® DIFFERENTIAL PRESSURE GAGE

CALIBRATION SERVICES AVAILABLE

5 YEAR LIMITED WARRANTY

- Twice as accurate as the standard Magnehelic® gage
- Mirrored scale overlay eliminates parallax error
- IP67 weatherproof housing
- Optional brushed SS bezel



6-point calibration certificate included

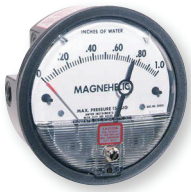
OPTIONS - HIGH ACCURACY MAGNEHELIC® GAGE	
To order add suffix:	**Description**
-HA	High accuracy Magnehelic® gage. Accuracy within 1% and weatherproof. Also includes mirrored scale overlay and a six point calibration certificate
-SS	Corrosion resistant brushed 304 stainless steel bezel

Accuracy Specifications: See page 20 (Series 2000)

ADDITIONAL GAGE OPTIONS

OPTIONS - OTHER OPTIONAL BEZELS	
To order add suffix:	**Description**
-CB	Chrome bezel option: A chrome plated aluminum bezel for an aesthetically pleasing finish when mounting on metal surfaces such as control panels.
-SB	Stainless steel bezel option: 304 stainless steel electro polished Ra 16 finished bezel.
-SS	Corrosion resistant brushed 304 stainless steel bezel

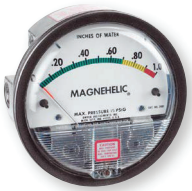
LED set point indicator



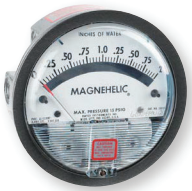
Adjustable signal flag

OPTIONS - LED SET POINT INDICATOR	
To order add suffix:	**Description**
-SP	Bright red LED on right scale shows when set point is reached. Field adjustable from gage face, unit operates on 12-24 VDC. Set point indicator option comes with medium pressure (MP) bezel.
Note: 4-13/16″ hole for flush mounting.	

OPTIONS - ADJUSTABLE SIGNAL FLAG	
To order add suffix:	**Description**
-ASF	Integral with plastic gage cover. Available for most models except those with medium or high pressure construction. Can be ordered with gage or separate.



Transparent overlay



Mirrored scale overlay

OPTIONS - TRANSPARENT OVERLAYS	
To order add suffix:	**Description**
-G	Green (to highlight and emphasize critical pressures)
-R	Red (to highlight and emphasize critical pressures)
-Y	Yellow (to highlight and emphasize critical pressures)

OPTIONS - MIRRORED SCALE OVERLAY	
To order add suffix:	**Description**
-M	A mirrored scale overlay is also available to assist in reducing parallax error.

Integrated mounting plate

OPTIONS - INTEGRATED MOUNTING PLATE	
To order add suffix:	**Description**
-AHU1	Furnished with attached surface mounting plate
-AHU2	Furnished with attached surface mounting plate and including A-481 installer kit (2 plastic static pressure tips and 7´of PVC tubing)

OPTIONS - FOR HIGH STATE PRESSURE APPLICATIONS	
To order add suffix:	**Description**
-HP	High pressure option: for pressures to 80 psig
-MP	Medium pressure option: for pressures to 35 psig

OPTIONS	
To order add suffix:	**Description**
-FC	Factory calibration certificate
-LT	Low temperatures to -20°F (-28°C)
-NIST	NIST traceable calibration certificate

USA: California Proposition 65
⚠**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

MAGNEHELIC® GAGE MOUNTING ACCESSORIES

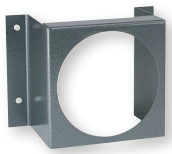

A-610


A-369

Pressure reference port


A-464

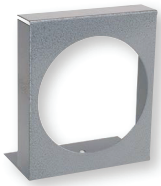

A-464-SS


A-299


A-286


A-300


A-368


A-371

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Complete mounting and connection fittings plus instructions are furnished with each instrument. A 4-9/16″ hole is required for flush panel mounting.

Flush mounting is easily accomplished with the new A-300 Flush Mounting bracket. This bracket provides a solution to quickly and conveniently flush mount the Magnehelic® gage. The A-300 is ideal for mounting the Magnehelic® gage on control panel doors.

The A-368 is a simple bracket for quickly surface mounting the Magnehelic® gage. After securing the Magnehelic® gage to the A-368 bracket, mount the bracket on any flat surface.

The A-369 allows the Magnehelic® gage to be easily carried to locations where pressure readings need to be taken. The A-369 can stand on its own or hang on a nail or hook.

ACCESSORIES	
Model	**Description**
A-286	Magnehelic® gage panel mounting flange
A-299	Mounting bracket, flush mount for Magnehelic® gage, bracket is then surface mounted, steel with gray hammerloid epoxy finish
A-300	Flush mounting bracket
A-368	Surface mounting plate, aluminum, for Magnehelic® gage
A-369	Stand-hang bracket, aluminum, for Magnehelic® gage
A-371	Surface mounting bracket, use with medium pressure (-MP) or high pressure (-HP) models only
A-464-SS	Stainless steel flush mount kit for Magnehelic® gage
A-464	Flush mount kit for Magnehelic® gage
A-610	Pipe mounting kit for installing on 1-1/4″ to 2″ horizontal or vertical pipe

SERIES A-320

INSTRUMENT ENCLOSURES

Protects Various Instruments


A-320-A1


A-320-B1


A-320-BC


A-320-A-SS


A-320-B-SS

The **Series A-320 Instrument Enclosures** protect instruments in all applications. The enclosures, available in plastic and stainless steel, fit a variety of gages including the Series 605 transmitter, DM-2000, 3000MR/MRS and DH3. All models include silicone tubing, Banjo fittings, and threaded pressure connections pre-installed. The threaded pressure connections allow the user to easily change the connection type through the use of fittings or adapters. This modification can be implemented to allow connection to a wide variety of plastic or metal tubing.

SPECIFICATIONS
Housing Material: ABS plastic or 304 SS.
Process Connection: 1/8″ female NPT (-SS models: 1/8″ BSPT).
Enclosure Rating: Plastic models: IP66.
Weight: A-320-A1: 1.1 lb (0.5 kg); A-320-B1: 1.4 lb (0.65 kg); A-320-BC: 1.4 lb (0.65 kg); A-320-A-SS: 2.3 lb (1.05kg); A-320-B-SS: 3.0 lb (1.35 kg).

MODEL CHART	
Model	**Description**
A-320-A1	2000 Magnehelic® gage
A-320-B1*	3000MR/MRS Photohelic® switch/gage, Series 605 Magnehelic® differential pressure transmitter, DH3 Digihelic® pressure controller, 2000 Magnehelic® gage with medium and high pressure options
A-320-BC	2000 Magnehelic® gage, DM-1000 DigiMag® digital differential pressure gage, DM-2000 differential pressure transmitter, instruments with backwards compatible bezel option
A-320-A-SS	2000 Magnehelic® gage
A-320-B-SS	2000 Magnehelic® gage, DM-2000 differential pressure transmitter
*For DH3 to fit on A-320-B1 the casing on the electrical plug must be removed.	

ACCESSORIES	
Model	**Description**
A-339-SS	1/8″ male BSPT to 3/16″ hose barb

UNIT RELEASE FORM

1427 NW 3rd St, Oklahoma City, OK 73106 PH: (405) 415-9230 Fax: (405) 415-9231

Date:

To: ClimateCraft Inside Sales Department Fax: (405) 415-9231
Email: release@climatecraft.com

From: Harrison Energy Partners (Rep Firm)
(Rep Name

Job Name: UAMS - Center for Animal Models of Infection and Disease

I authorize the release of the following units into your production schedule for shipment by the requested dates as noted

SERIAL NUMBER	UNIT TAG	REQUESTED SHIP DATE
300036	HRU-2	
300037	HRU-5	

Signed:

NOTE: If you are providing customer furnished parts for these units, ClimateCraft will send a no cost purchase order to your office with instructions regarding shipment, delivery date and tagging. Parts should arrive at ClimateCraft no later than 30-days prior to the scheduled ship date of the unit. Ship dates may be affected if problems arise during the credit approval process.

VERBAL MESSAGES, NOTATIONS ON PURCHASE ORDERS, ETC. ARE NOT CONSIDERED VALID FORMS OF RELEASE. THIS SHEET, ALONG WITH APPROVED SUBMITTALS AND AN UP TO DATE PURCHASE ORDER, MUST EITHER BE E-MAILED OR FAXED TO CLIMATECRAFT AND ACKNOWLEDGED IN ORDER TO ENSURE A SPACE IN THE PRODUCTION SCHEDULE