

Quality People. Building Solutions.

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Date: 5/5/2022

Return Request: 5/15/2022

Project: EJ Towbin Healthcare Center

Supplier: Powers of Arkansas

Manufacturer: Titus

Submittal: Terminal Air Units Re-Submittal #1

Submittal Number: 23 00 00-01

Drawing # and Installation: Mechanical Drawings

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MECHANICAL SUBCONTRACTOR

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Notes:

CSUSA PROJECT NO.

22-873

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9924 Landers Rd.
No. Little Rock, AR 72117



IOM

PRODUCT	Vav Boxes
MANUFACTURER	Titus
JOB NAME	Eugene J. Towbin Bed Spaces
LOCATION	North Little Rock, AR
ENGINEER	Insight Engineering, PLLC
CONTRACTOR	Comfort Systems
DATE	10/3/2023
SUBMITTED BY	Courtney Michael

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SINGLE DUCT TERMINAL



IMPORTANT! READ BEFORE PROCEEDING!


GENERAL SAFETY GUIDELINES


This equipment is a relatively complicated apparatus. During installation, operation maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, UV, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.


This document is intended for use by owner-authorized operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.


Safety Symbols

The following symbols are used in this document to alert the reader to areas of potential hazard:

	danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
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	caution identifies a hazard which could lead to damage to the machine, damage to other equipment and or environmental pollution. Usually an instruction will be given, together with a brief explanation.
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	warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
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	note is used to highlight additional information which may be helpful to you.
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CHANGEABILITY OF THIS DOCUMENT

In complying with Titus' policy for continuous product improvement, the information contained in this document is subject to change without notice. Titus makes no commitment to update or provide current information automatically to the manual owner. Updated manuals, if applicable, can be obtained by contacting the nearest Titus office or accessing the Titus website.

Operating/service personnel maintain responsibility for the applicability of these documents to the equipment. If there is any question regarding the applicability of these documents, the technician should verify whether the equipment has been modified and if current literature is available from the owner of the equipment prior to performing any work on the unit.

CHANGE BARS

Revisions made to this document are indicated with a line along the left or right hand column in the area the revision was made. These revisions are to technical information and any other changes in spelling, grammar or formatting are not included.

IOM SINGLE DUCT TERMINAL

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Section 1

Receiving Inspection

After unpacking the terminal, check it for shipping damage. If any shipping damage is found, report it immediately to the delivering carrier. Store units in a clean, dry location prior to installation.

Also, inspect damper rotation of the unit by rotating the damper by hand to check for free movement, and ensure there is no damage or binding of the damper. If controls are connected to the damper, release the manual clutch (most controls are equipped with this) and rotate the damper by hand. If there is any restriction to the rotation of the damper, contact your Titus rep and inform them of this issue.



Do not use the flow sensor, connecting tubing, or damper shaft linkage as a handle to lift or move assembly. Damage to the flow sensor or controls may result.

Supporting the Assembly

Assembly Many basic single duct terminals are light enough to be supported by the duct work itself. Where heavier accessory modules, such as DDC controls, coils, attenuators, or multiple outlets are included, the terminal should be supported directly. Straps screwed directly into the side of the terminal, threaded rod through the optional hanger brackets (see Figure 1), or the method prescribed for the rectangular duct on the job specifications may be used.

Important: If equipped with pneumatic controls, the terminal must be mounted right side up. It must be level within + or -10 degrees of horizontal, both parallel to the air flow and at the right angle of air flow. The control side of the terminal is labeled with an arrow indicating UP. The first letter of the model number (P) indicates pneumatic controls. Most electronic units (A-analog controls and D-digital controls) can be installed in any orientation. Check with the local TITUS representative for verification.

Duct Connections

Slip each inlet duct over the inlet collar of the terminal. Fasten and seal the connection by the method prescribed by the job specification.

The diameter of the inlet duct "D" in inches must be equal to the listed size of the terminal; e.g. a duct that actually measures 8 inches must be fitted to a size 8 terminal. The inlet collar of the terminal is made 1/8 inch smaller than listed size in order to fit inside the duct (see Figure 1).



Do not insert duct work inside the inlet collar of the assembly. Inlet duct should be installed in accordance with SMACNA guidelines.

The outlet end of the terminal is designed for use with slip and drive duct connections. A rectangular duct the size of the terminal outlet should be attached.

Inspect the Aerocross inlet flow sensor for shipping damage, and ensure that the high (green) and low (red) tubes are attached. Provide at least 1½ times the inlet duct diameter of straight duct for optimum control accuracy. For more information on our Aerocross, see the Aerocross Flow Sensor Application Guide.

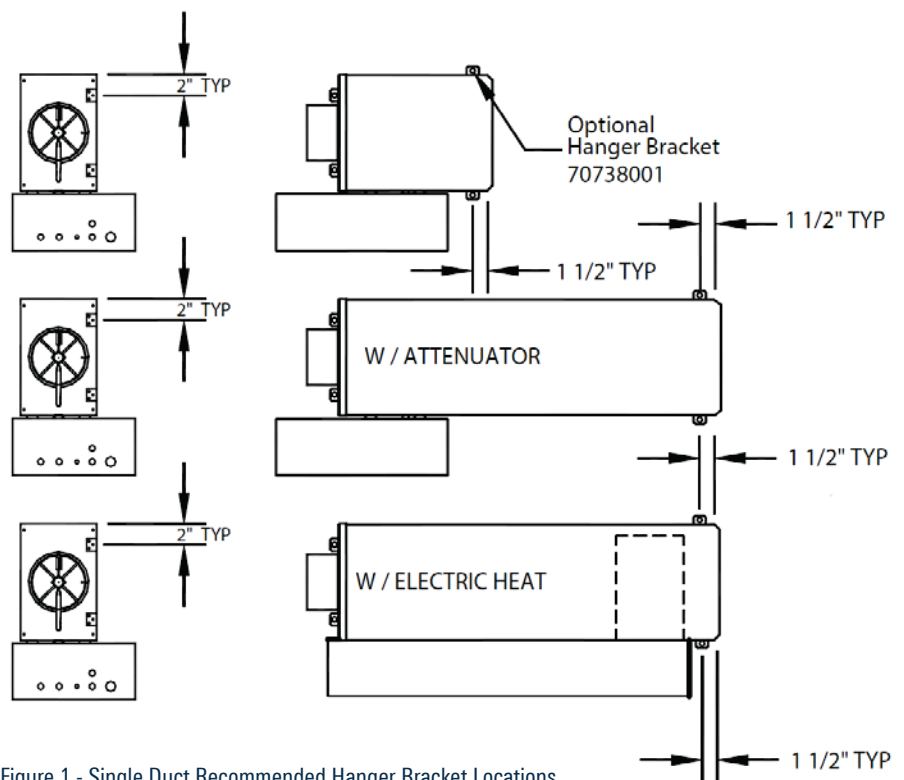


Figure 1 - Single Duct Recommended Hanger Bracket Locations

IOM

SINGLE DUCT TERMINAL

Section 1 - General Information

Field Wiring

All field wiring must comply with the local codes and with the National Electrical Code (ANSI/NFPA 70-1981). Electrical, control and piping diagrams are shown on the exterior labeling or on the diagram on the inside of control enclosure cover. All electric heaters if provided by TITUS are balanced by kW per stage. The installing electrician should rotate these heater stages by phase in order to help balance the building electric load.

Control Start-up, Operation

Detailed information regarding power, accessory and communications connections, start-up and operating procedures for the controls provided by TITUS are available from your local TITUS representative. For specific information on controls by other manufacturers, contact that manufacturer's local branch or dealer.

Important: Units with digital controllers may incorporate specific communication addresses based on Building Management Systems Architecture, and original engineering drawings. Installing the terminal in a different location than noted on unit label may result in excessive start-up labor.

Calibration Instructions

For Pneumatic Controls, see PNEU-IOM: Operations Manual for Pneumatic Controls.

For Analog Controls: Titus TA1, see ANA-IOM: Analog Controller Calibration.

For Digital Controls:
see control manufacturer's manualReplacement

Description	Part Number
Primary Damper Assembly	
Size 4-5-6"	31171301
Size 7"	31171302
Size 8"	31171303
Size 9"	31171304
Size 10"	31171305
Size 12"	31171306
Size 14"	31171307
Size 16"	31171308

Damper Shaft Extension	
Short Stub all sizes	70300301
Long Ext. Sz. 4-6, 14, 16	70300302
Long Ext. Sz. 7-12	70300303
Shaft Bearing - All	70324901

Control Tube	
Red Stripe 1/4" O.D.	61510035
Green Stripe 1/4" O.D.	61510234
Red Stripe 3/8" O.D.	61510279
Green Stripe 3/8" O.D.	61510280
Yellow Stripe 1/4" O.D.	61510260
White Stripe 1/4" O.D.	61510261
Blue Stripe 1/4" O.D.	61510262

Tees for sensor taps	
Plastic 1/4"	42150011
Plastic 3/8"	42150020

Plugs for tees	
1/4"	42160081
3/8"	10015601

AeroCross™ Multipoint Velocity Sensors	
Size 4"	3151520001
Size 5"	3151520001
Size 6"	3151520002
Size 7"	3151520003
Size 8"	3151520004
Size 9"	3151520005
Size 10"	3151520006
Size 12"	3151520007
Size 14"	3151520008
Size 16"	3151520009
Size 24" x 16"	3151520009

Table 1 - Replacement Parts

Notes



605 Shiloh Rd
Plano TX 75074
ofc: 972.212.4800
fax: 972.212.4884



STANDARD LIMITED WARRANTY ENGINEERED SYSTEMS EQUIPMENT

SERVICE POLICY

Supersedes:

Form AHU-Warranty-01

POLICY STATEMENT

Johnson Controls (JCI) warrants all equipment and associated factory supplied materials or start-up services performed by Johnson Controls in connection therewith, against defects in workmanship and material for a period of eighteen (18) months from date of shipment, or twelve (12) months from date of start up, whichever occurs first. Subject to the exclusions listed below, Johnson Controls, at its option, will repair or replace, FOB point of shipment, such products or components as it finds defective.

Except for reciprocating replacement compressors, which Johnson Controls warrants for a period of twelve (12) months from date of shipment, Johnson Controls warrants Johnson Controls reconditioned or replacement materials, or installation or start-up services performed by Johnson Controls in connection therewith, against defects in workmanship and material for a period of (90) days from date of shipment.

The above represents the minimum warranty policy Titus will extend to customers. Additional product specific coverage is provided as outlined in related warranty policies. No warranty repairs or replacements will be made until payment for all equipment, materials, or components has been received by Titus.

EXCLUSIONS:

Unless specifically agreed to in the contract documents, this warranty does not include the following costs and expenses:

1. Labor to remove or reinstall any equipment, materials or components.
2. Shipping, handling or transportation charges, including cranes, safety walks or other safety requirements specific to jobsites.
3. Cost of refrigerant.
4. Freight damage.
5. Field applied coatings added to any surface or heat exchanger.
6. Rental Chillers.

ALL WARRANTIES ARE VOID IF:

1. Equipment is used with refrigerants, oil, additives, or antifreeze agents other than those authorized by supplying factory.
2. Equipment is used with any material or any equipment such as evaporators, tubing, other low side equipment or refrigerant controls not approved by supplying factory.
3. Equipment has been damaged by freezing because it was not properly protected during cold weather or damaged by fire or any other conditions not ordinarily encountered.
4. Equipment is not installed, operated, maintained and serviced in accordance with instructions issued by Johnson Controls.
5. Equipment is damaged due to dirt, air, moisture, or other foreign matter entering the refrigerant system.
6. Equipment is not properly stored, protected, or inspected by the customer during the period from date of shipment to date of initial start-up.
7. Field coating of coil has occurred.
8. Equipment is damaged due to acts of god, abuse, including shipping damage, neglect, sabotage, or acts of terrorists.
9. Equipment has modifications carried out that have an effect on the original design of the product without such work being authorized by the factory. Any on site design changes or unit modification/replacement shall be authorized in advance by the factory.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESS OR IMPLIED IN LAW OR IN FACT, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTIES CONTAINED HEREIN SET FORTH BUYER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A DEFECT IN WORKMANSHIP OR MATERIALS. IN NO EVENT SHALL JOHNSON CONTROLS' LIABILITY FOR DIRECT OR COMPENSATORY DAMAGES EXCEED THE PAYMENTS RECEIVED BY JOHNSON CONTROLS FROM BUYER FOR THE MATERIAL OR EQUIPMENT INVOLVED, NOR SHALL JOHNSON CONTROLS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. THESE LIMITATIONS ON LIABILITY AND DAMAGES SHALL APPLY UNDER ALL THEORIES OF LIABILITY OR CAUSES OF ACTION, INCLUDING BUT NOT LIMITED TO, CONTRACT, WARRANTY, TORT, (INCLUDING NEGLIGENCE) OR STRICT LIABILITY. THE ABOVE LIMITATIONS SHALL INURE TO THE BENEFIT OF JOHNSON CONTROLS SUPPLIERS AND SUBCONTRACTORS.

605 Shiloh Rd. | Plano, Texas 75074 | ofc: 972.212.4800 | fax: 972.212.4884 | web: www.titus-hvac.com

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RE-SUBMITTAL

PRODUCT	Vav Boxes
MANUFACTURER	Titus
JOB NAME	Eugene J. Towbin Bed Spaces
LOCATION	North Little Rock, AR
ENGINEER	Insight Engineering, PLLC
CONTRACTOR	Comfort Systems
DATE	5/3/2022
SUBMITTED BY	Courtney Michael

Single Duct Terminal Unit Schedule

Tag	AHU Tag	Room	Model	Size		CFM		Static Pressure			NC Levels		Hot Water Heat Coil											Unit Information
				Unit	Outlet	Max	Min	Inlet	Down	Min	Rad	Dis	CFM	MBH	EAT	EWT	LAT	APd	GPM	LWT	WPd	Rows	FPI	Hand
3H-101			DESV	5E	12x10	250	150	1	0.25	0.1	18	31	150	7.4	55	140	100.7	0.07	0.8	121.1	0.17	2-RH	12	RH
3H-111			DESV	1E	16x15	975	425	1	0.25	0.2	23	27	425	20.3	55	140	99	0.19	2	119.4	0.38	2-RH	12	RH
3H-102			DESV	5E	12x10	325	250	1	0.25	0.15	25	31	250	10.7	55	140	94.6	0.1	1.1	120.2	0.27	2-RH	12	RH
3H-141			DESV	5E	12x10	325	250	1	0.25	0.15	25	31	250	10.7	55	140	94.6	0.1	1.1	120.2	0.27	2-RH	12	RH
3H-102A			DESV	8E	14x12.5	875	425	1	0.25	0.26	25	27	425	20.5	55	140	99.5	0.23	2.1	123.9	0.33	2-RH	10	RH
3H-143			DESV	1E	16x15	1025	475	1	0.25	0.22	23	28	475	22	55	140	97.7	0.21	2.2	119.7	0.41	2-RH	12	RH
3H-148			DESV	04	12x8	200	200	1	0.25	0.14	27	34	200	9.7	55	140	99.7	0.06	10	138	9.65	2-RH	10	RH
3H-147			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-151			DESV	5E	12x10	200	200	1	0.25	0.07	18	28	200	9	55	140	96.4	0.05	0.9	119.7	0.21	2-RH	12	RH
3H-152			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-153			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-129			DESV	8E	14x12.5	625	625	1	0.25	0.16	22	28	625	18.9	55	140	82.9	0.14	1.8	118.6	0.3	2-RH	10	RH
3H-113			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-119			DESV	6E	12x10	400	225	1	0.25	0.21	24	25	225	10.3	55	140	97.2	0.08	1	119	0.13	2-RH	12	RH
3H-173			DESV	5E	12x10	275	225	1	0.25	0.12	23	32	225	9.9	55	140	95.4	0.08	1	119.9	0.24	2-RH	12	RH
3H-174			DESV	5E	12x10	275	225	1	0.25	0.12	23	32	225	9.9	55	140	95.4	0.08	1	119.9	0.24	2-RH	12	RH
3H-169			DESV	5E	12x10	275	225	1	0.25	0.12	23	32	225	9.9	55	140	95.4	0.08	1	119.9	0.24	2-RH	12	RH
3H-121			DESV	5E	12x10	275	225	1	0.25	0.12	23	32	225	9.9	55	140	95.4	0.08	1	119.9	0.24	2-RH	12	RH
3H-206			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-207			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-208			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-190			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-191			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-128-1			DESV	6E	12x10	400	400	1	0.25	0.21	24	25	400	15.5	55	140	90.6	0.08	1.4	117.6	0.22	2-RH	12	RH
3H-128-2			DESV	6E	12x10	375	375	1	0.25	0.18	23	25	375	15	55	140	91.9	0.07	1.4	118.2	0.22	2-RH	12	RH
3H-192			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	10.9	55	140	91.4	0.08	1	117.9	0.24	2-RH	12	RH
3H-193			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-175			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-177			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-179			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-181			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-182			DESV	5E	12x10	275	275	1	0.25	0.12	23	32	275	11.6	55	140	93.7	0.08	1.2	120.4	0.3	2-RH	12	RH
3H-139			DESV	04	12x8	100	55	1	0.25	0.04	14	27	55	2.6	55	140	98.2	0.02	0.2	113.8	0.01	2-RH	10	RH
3H-144			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-135			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-160			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-159			DESV	5E	12x10	250	250	1	0.25	0.1	22	31	250	10.7	55	140	94.6	0.07	1.1	120.2	0.27	2-RH	12	RH
3H-158			DESV	5E	12x10	300	300	1	0.25	0.13	24	29	300	12	55	140	92	0.09	1.2	119.6	0.3	2-RH	12	RH

- Notes: 1. Selections are based on Titus as Manufacturer.
 2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
 3. All NC levels determined using AHRI 885-2008 Appendix E.
 4. All airflow, pressure losses and heating performance values have been corrected for altitude.

*The results of this program are only an aid to the designer, and are not a substitute for professional design services.
 Titus accepts no liability for the adequacy of any resulting design or installation.
 All data subject to change without notice.*

Single Duct Terminal Unit Schedule

Tag	AHU Tag	Room	Model	Size		CFM		Static Pressure			NC Levels		Electric Heat Coil						Electrical		Unit Information
				Unit	Outlet	Max	Min	Inlet	Down	Min	Rad.	Disch.	CFM	KW	Volts/Ph.	Steps	EAT	LAT	MCA	MOP	Hand
3H-120			DESV	04	12x8	125	125	1	0.25	0.03	18	29	0		/		0	0	0.0	0	RH
3H-189			DESV	05	12x8	300	300	1	0.25	0.04	25	29	0		/		0	0	0.0	0	RH

- Notes:
1. Selections are based on Titus as Manufacturer.
 2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
 3. All NC levels determined using AHRI 885-2008 Appendix E.
 4. All airflow, pressure losses and heating performance values have been corrected for altitude.
 5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
 6. In the "Steps" column, code "S" denotes a modulating SCR heater.
 7. The minimum supply circuit ampacity (MCA) and maximum overcurrent protection (MOP) ratings were calculated in accordance with UL standards based on motor and electric coil full load current ratings.

"SUBMITTALS HAVE BEEN CHANGED TO TITUS. TO MEET SCHEDULED CAPACITIES, BOX SIZES HAVE BEEN BUMPED UP, BUT INLET SIZE IS THE SAME. THAT IS WHY THERE IS AN "E" NEXT TO THE INLET SIZE. HIGH CAPACITY COILS WITH 12 FINS PER INCH HAVE BEEN USED IN LIEU OF STANDARD 10 FINS PER INCH.

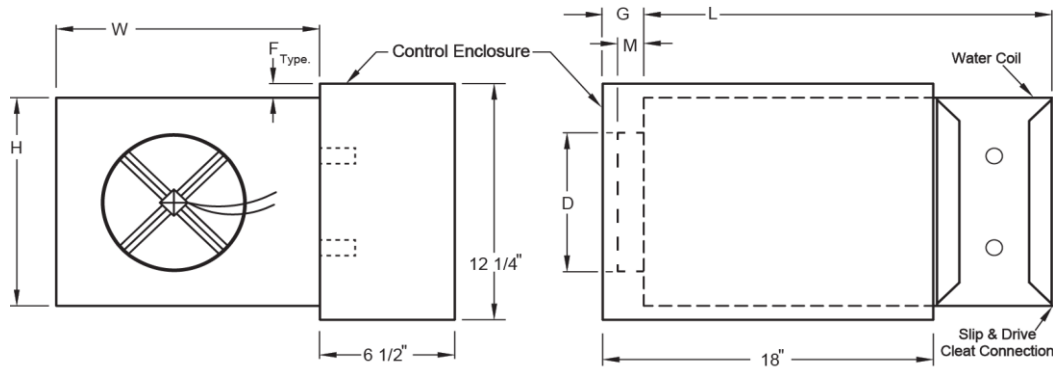
I AM CONFIDENT THE HEATING CFM FOR 3H-102A IS INCORRECT. WHEN USING 875 FOR THE HEATING CFM, THE LAT IS EXTREMELY LOW THIS IS CONSISTENT WITH SEVERAL OTHER MANUFACTURERS. I BELIEVE THE HEATING CFM FOR THIS SHOULD BE HALF. PLEASE VERIFY THIS. THE INLET SIZE ALSO NEEDED TO BE CHANGED TO 10" TO HELP MEET CAPACITY**

DESV

Single Duct Terminal Unit, Direct Digital Control, Pressure Independent

Main Product **DESV-1**

DESV



Right Hand Unit with Right Hand HWC Connections shown

Air Inlet (D) is 1/8" smaller than its Nom. Inlet.
 All dimensions are in inches.

Unit-Size	CFM Range	Nom. Inlet	F	G	W	H	M	L
5E	0 - 350	5" Dia.	2 1/8"	7 3/8"	12"	10"	5 3/8"	20 1/2"
1E	0 - 1400	10" Dia.	-	5 3/8"	16"	15"	3 3/8"	20 1/2"
04	0 - 225	4" Dia.	2 1/8"	7 3/8"	12"	8"	5 3/8"	20 1/2"
8E	0 - 900	8" Dia.	1 1/8"	7 3/8"	14"	12 1/2"	3 3/8"	20 1/2"
6E	0 - 500	6" Dia.	2 1/8"	7 3/8"	12"	10"	3 3/8"	20 1/2"

General Description **DESV-1**

- Heavy gauge steel housing. Mechanically sealed and gasketed, leak resistant construction.
- Less than 2% of nominal CFM at 1.5" sp wg.
- Dual density internal insulation, treated to resist air erosion. Meets requirements of NFPA 90A and UL 181.
- Rectangular discharge opening is designed for slip and drive cleat duct connection.
- Multipoint center averaging inlet velocity sensor.
- Digital control packages can be factory mounted by Titus.
- Choice of right hand or left hand control location.
- Model DESV can be installed horizontally, vertically, or at any angle. Operation is not affected by position.
- Gauge tees for CFM measurement.

Project VA-3H-BED SPACES
 Architect
 Engineer
 Contractor
 Designation



Date 05/03/2022
 Office Powers of Arkansas
 Preparer Courtney Michael
 Version 2014.0.527

Option Schedule **DESV-1**

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
1	1	3H-101	5E	250	150
2	1	3H-111	1E	975	425
3	1	3H-102	5E	325	250
4	1	3H-141	5E	325	250
6	1	3H-143	1E	1025	475
8	1	3H-147	5E	250	250
9	1	3H-151	5E	200	200
10	1	3H-152	5E	250	250
11	1	3H-153	5E	250	250
13	1	3H-113	5E	275	275
14	1	3H-119	6E	400	225
16	1	3H-173	5E	275	225
17	1	3H-174	5E	275	225
18	1	3H-169	5E	275	225
19	1	3H-121	5E	275	225
20	1	3H-206	5E	275	275

<p>SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION L - 1/2" EcoShield (Foil Face) CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS</p>	<p>UNIT ACC3 0 -NONE UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL U12 -2 ROW RH HIGH CAPACITY ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE</p>
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ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
7	1	3H-148	04	200	200
12	1	3H-129	8E	625	625

<p>SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION L - 1/2" EcoShield (Foil Face) CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS</p>	<p>UNIT ACC3 0 -NONE UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL W12 -2 ROW RH ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE</p>
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Project VA-3H-BED SPACES
 Architect
 Engineer
 Contractor
 Designation



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Option Schedule (continued) DESV-1

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
21	1	3H-207	5E	275	275
22	1	3H-208	5E	275	275
23	1	3H-190	5E	275	275
24	1	3H-191	5E	275	275
25	1	3H-128-1	6E	400	400
26	1	3H-128-2	6E	375	375
27	1	3H-192	5E	275	275
29	1	3H-193	5E	275	275
30	1	3H-175	5E	275	275
31	1	3H-177	5E	275	275
32	1	3H-179	5E	275	275
33	1	3H-181	5E	275	275
34	1	3H-182	5E	275	275
36	1	3H-144	5E	250	250
37	1	3H-135	5E	250	250
38	1	3H-160	5E	250	250
39	1	3H-159	5E	250	250
40	1	3H-158	5E	300	300

<p>SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION L - 1/2" EcoShield (Foil Face) CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS</p>	<p>UNIT ACC3 J -120/24V X-FORMER UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL U12 -2 ROW RH HIGH CAPACITY ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE</p>
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ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
35	1	3H-139	04	100	55

<p>SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION L - 1/2" EcoShield (Foil Face) CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS</p>	<p>UNIT ACC3 J -120/24V X-FORMER UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL W12 -2 ROW RH ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE</p>
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Project VA-3H-BED SPACES
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Accessories

DESV-1

Selected Liner: 1/2" EcoShield Insulation (Foil Face)

Insulation Characteristics:

Material: Foil Face Natural Fiber Duct Liner

Thickness: 1/2 inch

R-Value: 2.0 ft² °F h/Btu @ 75°F

Density: 3.0 lbs/ft³

Flame Spread: less than 25

Smoke Density: less than 50

Mold Growth: None

Code Compliances:

NFPA 90A & 90B - Appliances

NFPA 255 - Flame / Smoke Spread (25/50)

UL 723 - Flame / Smoke Spread (25/50)

ASTM C 411 - Operating Temperature Limits

ASTM E84 - Flame / Smoke Spread (25/50)

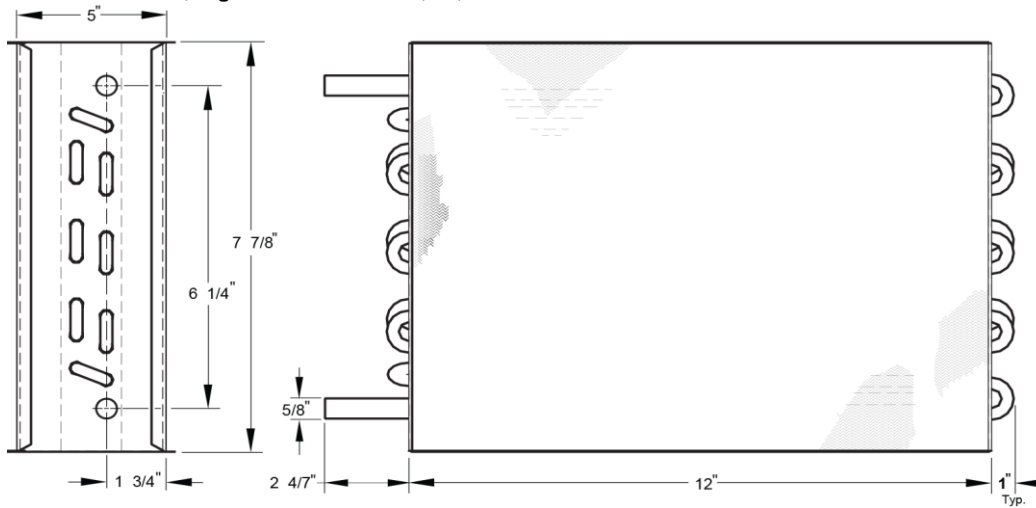
ASTM C 1071 - Maximum Air Velocity

ASTM C 739 - Corrosion Resistance

ASTM G 21 - Fungi Resistance

ASTM G 22 - Bacteria Resistance

ESV Hot Water Reheat: 2-Row, Right Hand for size 04, 05, & 06



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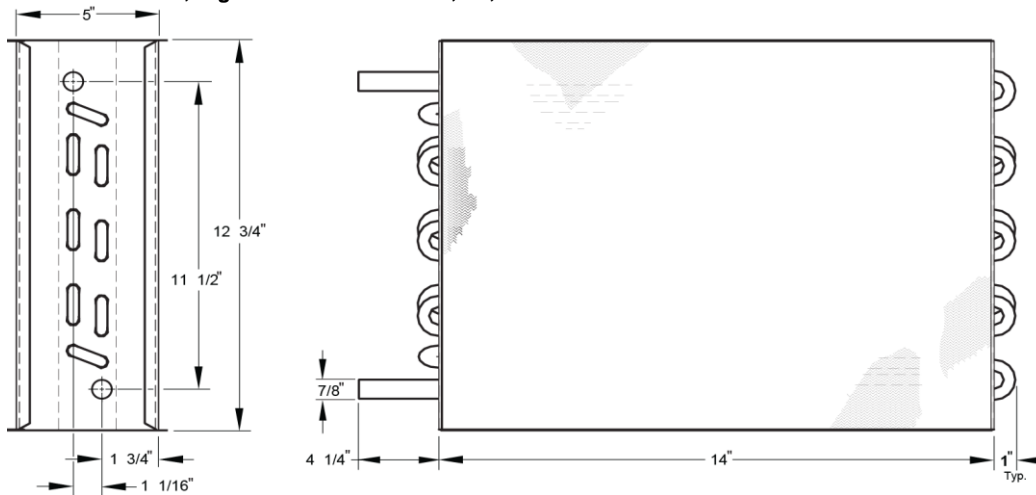
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Accessories (continued) DESV-1

- Coil tubing is 1/2" diameter 0.016" thick copper.
- Coil connection tubing is 0.032" thick copper.
- Aluminum plate fins, 10 per inch.
- Casing is 20 Gauge galvanized steel.
- Copper male solder connections.
- Connection is slip and drive to duct work down stream of terminal.
- Leak tested to 450 PSIG.
- Maximum working pressure, 360 PSIG
- Maximum 200 degree F water
- Coils rated and certified to AHRI Standard 410

Water Weight (lbs.)	Water Volume (gal)
1.26	0.15

ESV Hot Water Reheat: 2-Row, Right Hand for size 09 10, 7E, & 8E



- Coil tubing is 1/2" diameter 0.016" thick copper.
- Coil connection tubing is 0.032" thick copper.
- Aluminum plate fins, 10 per inch.
- Casing is 20 Gauge galvanized steel.
- Copper male solder connections.
- Connection is slip and drive to duct work down stream of terminal.
- Leak tested to 450 PSIG.
- Maximum working pressure, 360 PSIG
- Maximum 200 degree F water
- Coils rated and certified to AHRI Standard 410

Water Weight (lbs.)	Water Volume (gal)
2.32	0.28

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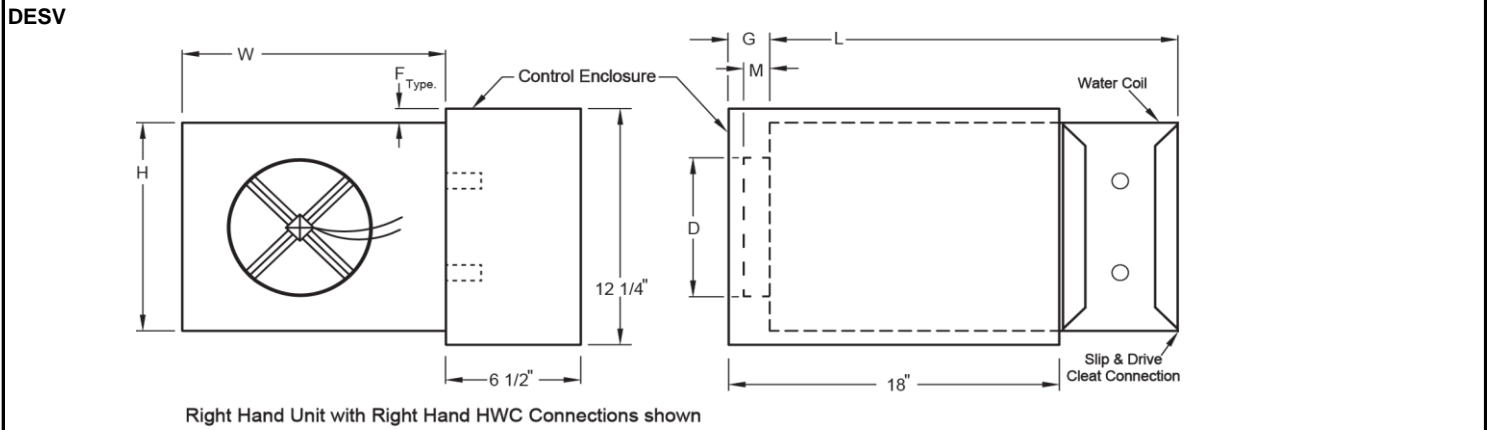


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DESV

Single Duct Terminal Unit, Direct Digital Control, Pressure Independent

Main Product **DESV-1 (2)**



Air Inlet (D) is 1/8" smaller than its Nom. Inlet.
 All dimensions are in inches.

Unit-Size	CFM Range	Nom. Inlet	F	G	W	H	M	L
1E	0 - 1400	10" Dia.	-	5 3/8"	16"	15"	3 3/8"	20 1/2"

General Description **DESV-1 (2)**

- Heavy gauge steel housing. Mechanically sealed and gasketed, leak resistant construction.
- Less than 2% of nominal CFM at 1.5" sp wg.
- Dual density internal insulation, treated to resist air erosion. Meets requirements of NFPA 90A and UL 181.
- Rectangular discharge opening is designed for slip and drive cleat duct connection.
- Multipoint center averaging inlet velocity sensor.
- Digital control packages can be factory mounted by Titus.
- Choice of right hand or left hand control location.
- Model DESV can be installed horizontally, vertically, or at any angle. Operation is not affected by position.
- Gauge tees for CFM measurement.

Option Schedule **DESV-1 (2)**

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
5	1	3H-102A	1E	875	425

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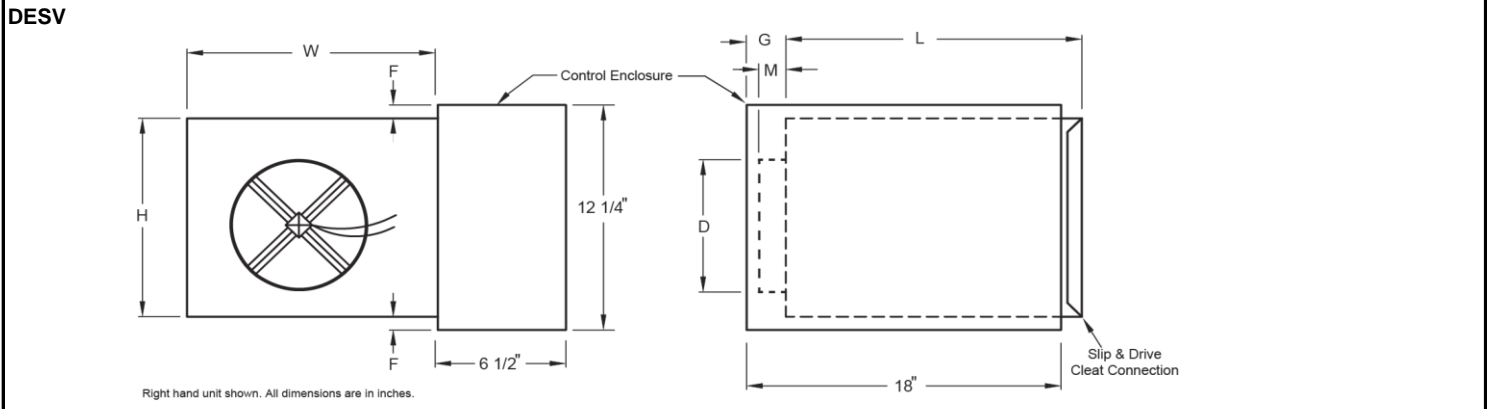
Option Schedule (continued)	DESV-1 (2)
SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION 0 - 1/2" Fiberglass CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS	UNIT ACC3 0 -NONE UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL U12 -2 ROW RH HIGH CAPACITY ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE

Accessories	DESV-1 (2)
Selected Liner: 1/2" Fiberglass Insulation Insulation Characteristics: Material: Dual Density Fiberglass Thickness: 1/2 inch R-Value: 1.9 ft2 °F h/Btu @ 75°F Density: 1.5 lbs/ft3 with 4.0 lbs/ft3 face Flame Spread: less than 25 Smoke Density: less than 50 Mold Growth: None Code Compliances: NFPA 90A & 90B - Appliances NFPA 255 - Flame / Smoke Spread (25/50) UL 181 - Air Erosion UL 181 - Mold Growth and Humidity UL 723 - Flame / Smoke Spread (25/50) ASTM E84 - Flame / Smoke Spread (25/50) ASTM C 1071 - Maximum Air Velocity	

DESV

Single Duct Terminal Unit, Direct Digital Control, Pressure Independent

Main Product **DESV-1 (3)**



Air Inlet (D) is 1/8" smaller than its Nom. Inlet.
 All dimensions are in inches.

Unit-Size	CFM Range	Nom. Inlet	F	G	W	H	M	L
04	0 - 225	4" Dia.	2 1/8"	7 3/8"	12"	8"	5 3/8"	15 1/2"
05	0 - 350	5" Dia.	2 1/8"	7 3/8"	12"	8"	5 3/8"	15 1/2"

General Description **DESV-1 (3)**

- Heavy gauge steel housing. Mechanically sealed and gasketed, leak resistant construction. Less than 2% of nominal CFM at 1.5" sp wg.
- Dual density internal insulation, treated to resist air erosion. Meets requirements of NFPA 90A and UL 181.
- Rectangular discharge opening is designed for slip and drive cleat duct connection.
- Multipoint center averaging inlet velocity sensor.
- Digital control packages can be factory mounted by Titus.
- Choice of right hand or left hand control location.
- Model DESV can be installed horizontally, vertically, or at any angle. Operation is not affected by position.
- Gauge tees for CFM measurement.

Option Schedule **DESV-1 (3)**

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
15	1	3H-120	04	125	125

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Option Schedule (continued) DESV-1 (3)

<p> SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION L - 1/2" EcoShield (Foil Face) CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS </p>	<p> UNIT ACC3 0 -NONE UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL 000 -NONE ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE </p>
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ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
28	1	3H-189	05	300	300

<p> SENSOR CODE 3 - AEROCROSS UNIT CONFIG 0 -BASIC LINER OPTION L - 1/2" EcoShield (Foil Face) CASING CONFIG 0R -STD 22GA RH DIGITAL CONTROLLER 0000 -NONE ACTUATOR TYPE 0000 -NONE CONTROL ACC1 00 -NONE CONTROL ACC2 00 -NONE CONTROL ACC3 00 -NONE UNIT ACC1 B -HANGER BRACKET UNIT ACC2 E -METAL CTRL ENCLOS </p>	<p> UNIT ACC3 J -120/24V X-FORMER UNIT ACC4 0 -NONE UNIT ACC5 0 -NONE WATER COIL 000 -NONE ELECTRIC HEAT TYPE 000 -NONE KW 0 ELEC COIL ACC1 0 -NONE ELEC COIL ACC2 0 -NONE ELEC COIL ACC3 0 -NONE ELEC COIL ACC4 0 -NONE </p>
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Accessories	DESV-1 (3)
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Selected Liner: 1/2" EcoShield Insulation (Foil Face)

Insulation Characteristics:

Material: Foil Face Natural Fiber Duct Liner

Thickness: 1/2 inch

R-Value: 2.0 ft² °F h/Btu @ 75°F

Density: 3.0 lbs/ft³

Flame Spread: less than 25

Smoke Density: less than 50

Mold Growth: None

Code Compliances:

NFPA 90A & 90B - Appliances

NFPA 255 - Flame / Smoke Spread (25/50)

UL 723 - Flame / Smoke Spread (25/50)

ASTM C 411 - Operating Temperature Limits

ASTM E84 - Flame / Smoke Spread (25/50)

ASTM C 1071 - Maximum Air Velocity

ASTM C 739 - Corrosion Resistance

ASTM G 21 - Fungi Resistance

ASTM G 22 - Bacteria Resistance