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Date: 09/28/2026
Return Request: Normal
Project: EBBING F35 SAPF
Supplier: Comfort Systems USA
Manufacturer: Titus
Submittal: VAV – Single Duct
Submittal Number: 23 30 00-2.11.3.1
Drawing # and Installation: Mechanical

ARCHITECT

Burns and McDonnell
Kansas City, MO 64114

ENGINEER

Byron Edward K. Fonseca

GENERAL CONTRACTOR

BL Harbert International

MECHANICAL SUBCONTRACTOR

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NOTES:

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CSUSA PROJECT NO.
26-5039

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SUBMITTAL

F-35: Special Access Program Facility - Variable Volume, Single Duct Terminal Units

Submittal

LOCATION	Fort Smith, Arkansas
DATE	September 9, 2026
PRODUCTS	Variable Volume, Single Duct Terminal Units - VAV-101-223 - Titus HVAC Register - Other Spec - Other Schedule - Other IOM - Other

TABLE OF CONTENTS

Submittal	Products	Manufacturer	Spec #	Page
1	Variable Volume, Single Duct Terminal Units - VAV-101-223	Titus HVAC	23 30 00	3
2	Register	Other		18
3	Spec	Other		22
4	Schedule	Other		24
5	IOM	Other		26

Submittal

JOB NAME	F-35: Special Access Program Facility - Variable Volume, Single Duct Terminal Units
PRODUCT	Variable Volume, Single Duct Terminal Units - VAV-101-223
MANUFACTURER	Titus HVAC
LOCATION	Fort Smith, Arkansas
DATE	September 9, 2026
SPECIFICATION	23 30 00
ENGINEER	US Army Corp of Engineers
CONTRACTOR	Comfort Systems USA
SUBMITTED BY	Joey Smith

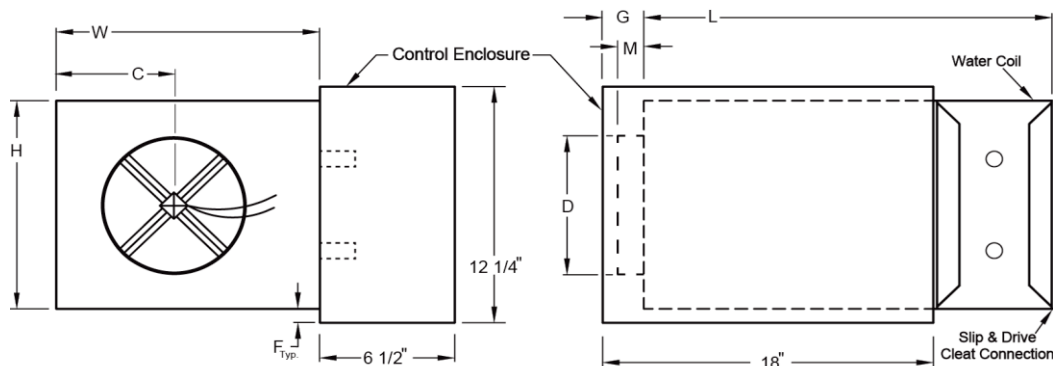
DESV

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
06	0 - 500	6" Dia.	2 1/8"	7 3/8"	12"	8"	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"
08	0 - 900	8" Dia.	1 1/8"	7 3/8"	12"	10"	3 3/8"	20 1/2"
10	0 - 1400	10" Dia.	-	5 3/8"	14"	12 1/2"	3 3/8"	20 1/2"

General Description

DESV-1

- Standard construction uses G40 22-gauge galvanized steel housing, and optional construction uses G40 20-gauge galvanized 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.
- Model DESV without coils can be installed horizontally, vertically, or at any angle. Operation is not affected by position. For units with coils, consult technical support.
- Gauge tees for CFM measurement.

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Version 2014.0.608

Option Schedule						DESV-1
ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM	
1	1	VAV-101	06	310	65	
2	1	VAV-102	04	160	30	
16	1	VAV-116	04	135	30	
18	1	VAV-118	06	180	65	
19	1	VAV-119	04	165	30	
21	1	VAV-121	04	135	30	
23	1	VAV-123	06	185	65	
24	1	VAV-124	04	165	30	
26	1	VAV-126	04	170	30	
27	1	VAV-127	06	185	65	
29	1	VAV-129	04	140	30	
30	1	VAV-130	04	135	135	
42	1	VAV-211	08	490	125	
49	1	VAV-218	04	170	30	

SENSOR CODE 3 - AEROCROSS
UNIT CONFIG 0 -BASIC
LINER OPTION M - 1" 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

UNIT ACC3 J -120/24V X-FORMER
UNIT ACC4 D -TOGGLE DISC SW.
UNIT ACC5 0 -NONE
WATER COIL W11 -1 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

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Option Schedule (continued)

DESV-1

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
3	1	VAV-103	06	360	65
4	1	VAV-104	04	165	30
5	1	VAV-105	04	145	30
6	1	VAV-106	06	300	65
7	1	VAV-107	06	310	65
8	1	VAV-108	08	530	125
9	1	VAV-109	08	550	550
10	1	VAV-110	04	140	30
11	1	VAV-111	06	370	65
13	1	VAV-113	08	640	125
15	1	VAV-115	08	550	125
17	1	VAV-117	06	280	65
20	1	VAV-120	08	550	125
22	1	VAV-122	06	240	65
25	1	VAV-125	08	560	125
28	1	VAV-128	06	280	65
32	1	VAV-202	04	140	30
33	1	VAV-203	06	230	65
35	1	VAV-205	04	150	30
36	1	VAV-206	06	250	65
37	1	VAV-207	04	175	30
38	1	VAV-208	06	220	65
40	1	VAV-210A	10	750	210
41	1	VAV-210B	10	750	210
44	1	VAV-213	04	145	30
45	1	VAV-214	04	145	30
48	1	VAV-217	06	340	65
50	1	VAV-219	04	165	30
51	1	VAV-220	04	165	30
52	1	VAV-221	04	165	30
53	1	VAV-222	04	145	30

SENSOR CODE 3 - AEROCROSS

UNIT CONFIG 0 -BASIC

LINER OPTION M - 1" 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

UNIT ACC3 J -120/24V X-FORMER

UNIT ACC4 D -TOGGLE DISC SW.

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

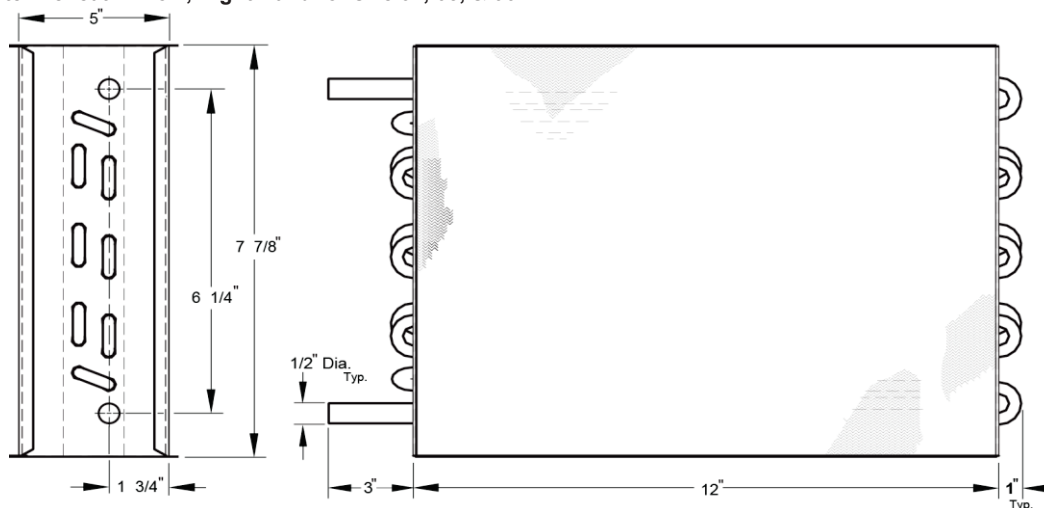
ELEC COIL ACC3 0 -NONE

ELEC COIL ACC4 0 -NONE

Accessories

DES-1

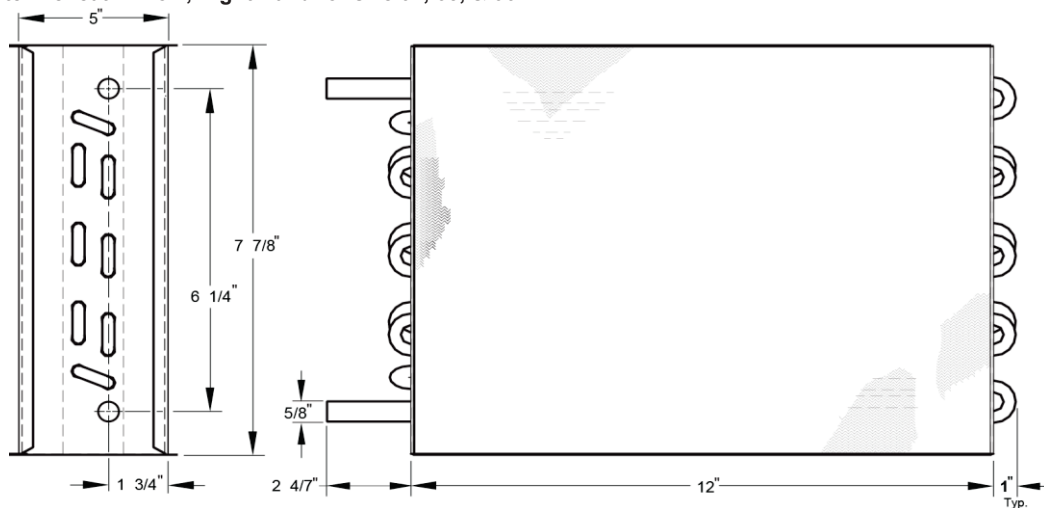
ESV Hot Water Reheat: 1-Row, Right Hand for size 04, 05, & 06



- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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)
0.59	0.07

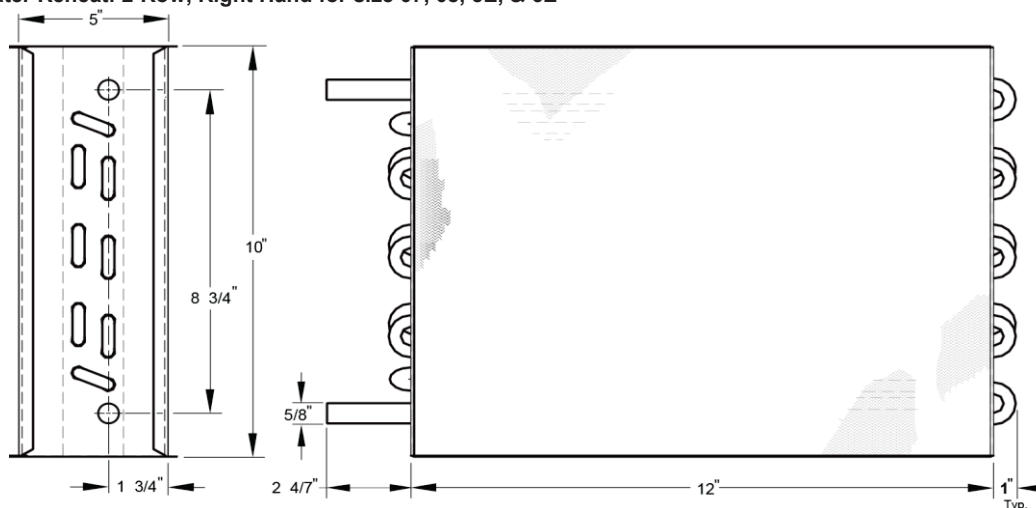
ESV Hot Water Reheat: 2-Row, Right Hand for size 04, 05, & 06



- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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 07, 08, 5E, & 6E



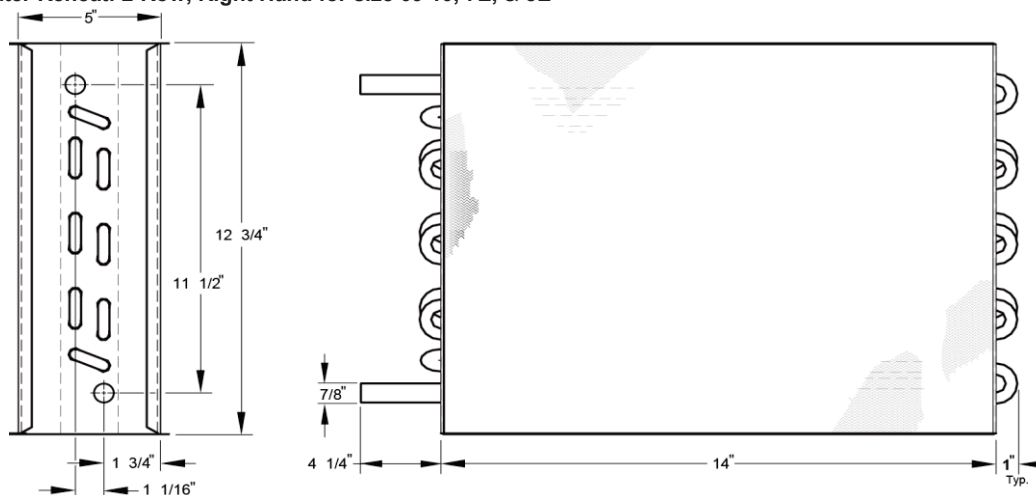
- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 10 per inch.
- Casing is 20 Gauge galvanized steel.
- Copper male solder connections.
- Connection is slip and drive to duct work down stream of terminal.
- Leak 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)
1.82	0.22

Accessories (continued)

DES-1

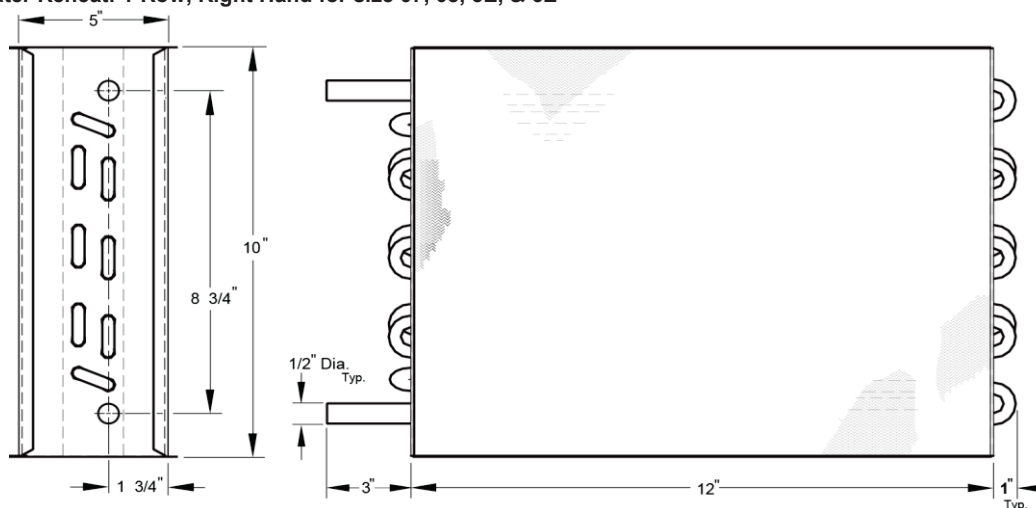
ESV Hot Water Reheat: 2-Row, Right Hand for size 09 10, 7E, & 8E



- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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

ESV Hot Water Reheat: 1-Row, Right Hand for size 07, 08, 5E, & 6E



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Accessories (continued)

DESV-1

- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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 Weigth (lbs)	Water Volume (gal)
.77	.09

DESV

Single Duct Terminal Unit, Direct Digital Control, Pressure Independent

Main Product

DESV-1 (2)

DESV

The diagram illustrates the dimensions and components of the DESV unit. The front view (left) shows a square unit with a circular air inlet in the center, marked with an 'X'. Dimensions include width (W), height (H), and a central offset (C). The side view (right) shows the unit's profile with a control enclosure, a water coil, and a slip & drive cleat connection. Dimensions include depth (D), control enclosure width (6 1/2"), total depth (12 1/4"), and side view dimensions (G, M, L, 18").

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	C	W	H	M	G	L
06	0 - 500	6" Dia.	2 1/8"	22 3/4"	12"	8"	3 3/8"	6 1/2"	7 3/8"
08	0 - 900	8" Dia.	1 1/8"	22 3/4"	12"	10"	3 3/8"	6"	7 3/8"
10	0 - 1400	10" Dia.	-	22 3/4"	14"	12 1/2"	3 3/8"	7"	5 3/8"

General Description	DESV-1 (2)
- Standard construction uses G40 22-gauge galvanized steel housing, and optional construction uses G40 20-gauge galvanized 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. - Model DESV without coils can be installed horizontally, vertically, or at any angle. Operation is not affected by position. For units with coils, consult technical support. - Gauge tees for CFM measurement.	

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Option Schedule

DESV-1 (2)

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
12	1	VAV-112	06	270	65
31	1	VAV-201	10	810	210
34	1	VAV-204	08	620	125
39	1	VAV-209	08	450	125
43	1	VAV-212	08	580	580
46	1	VAV-215	06	325	65
47	1	VAV-216	08	690	125
54	1	VAV-223	06	295	65

SENSOR CODE 3 - AEROCROSS

UNIT CONFIG 0 -BASIC

LINER OPTION M - 1" 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

UNIT ACC3 J -120/24V X-FORMER

UNIT ACC4 D -TOGGLE DISC SW.

UNIT ACC5 0 -NONE

WATER COIL W13 -3 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

ID	Quantity	Tag	UNIT SIZE	MAX PRIMARY CFM	MIN PRIMARY CFM
14	1	VAV-114	08	410	125

SENSOR CODE 3 - AEROCROSS

UNIT CONFIG 0 -BASIC

LINER OPTION M - 1" 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

UNIT ACC3 J -120/24V X-FORMER

UNIT ACC4 D -TOGGLE DISC SW.

UNIT ACC5 0 -NONE

WATER COIL W14 -4 ROW RH

ELECTRIC HEAT TYPE 000 -NONE

KW 0

ELEC COIL ACC1 0 -NONE

ELEC COIL ACC2 0 -NONE

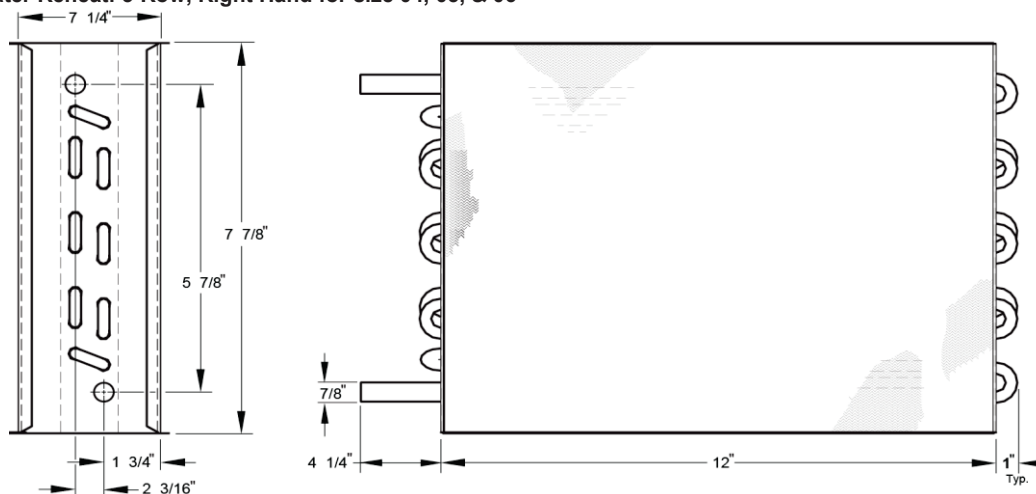
ELEC COIL ACC3 0 -NONE

ELEC COIL ACC4 0 -NONE

Accessories

DESV-1 (2)

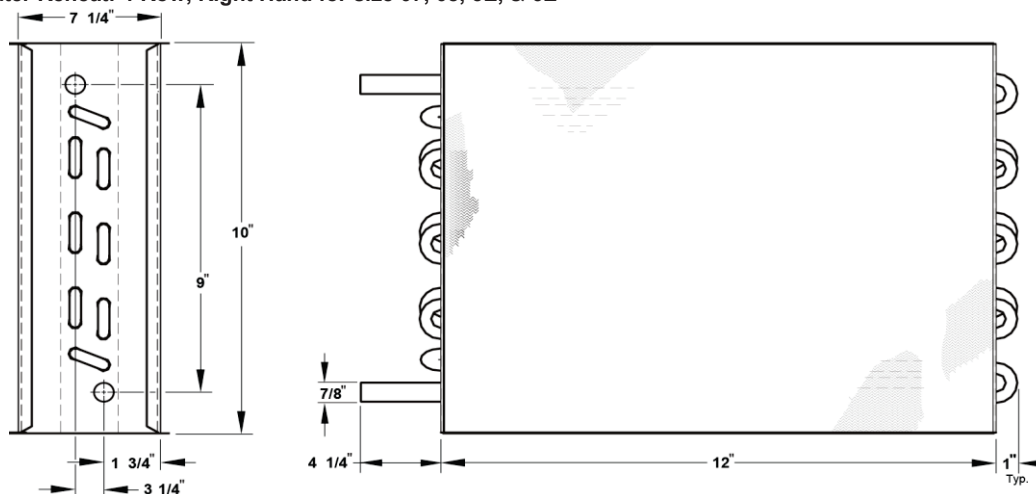
ESV Hot Water Reheat: 3-Row, Right Hand for size 04, 05, & 06



- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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)
1.93	0.23

ESV Hot Water Reheat: 4-Row, Right Hand for size 07, 08, 5E, & 6E



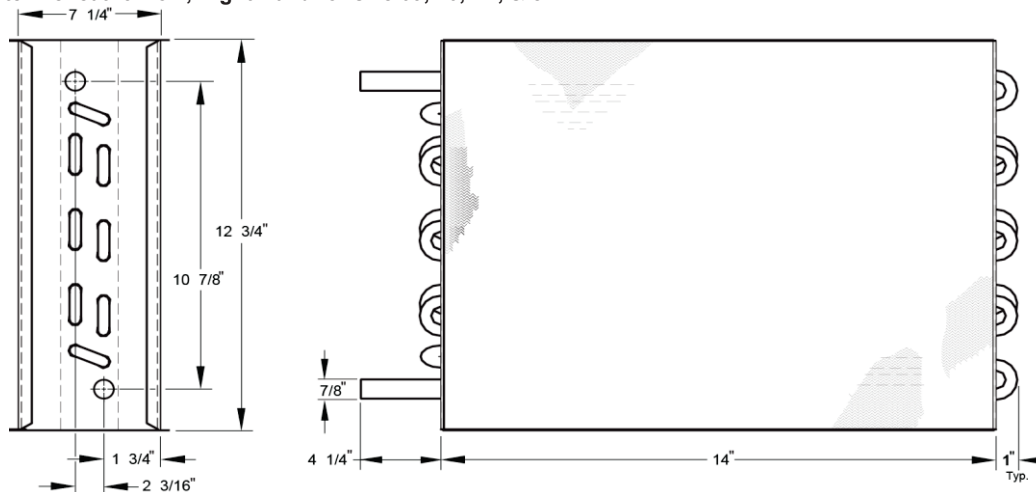
Accessories (continued)

DESV-1 (2)

- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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)
3.92	0.48

ESV Hot Water Reheat: 3-Row, Right Hand for size 09, 10, 7E, & 8E



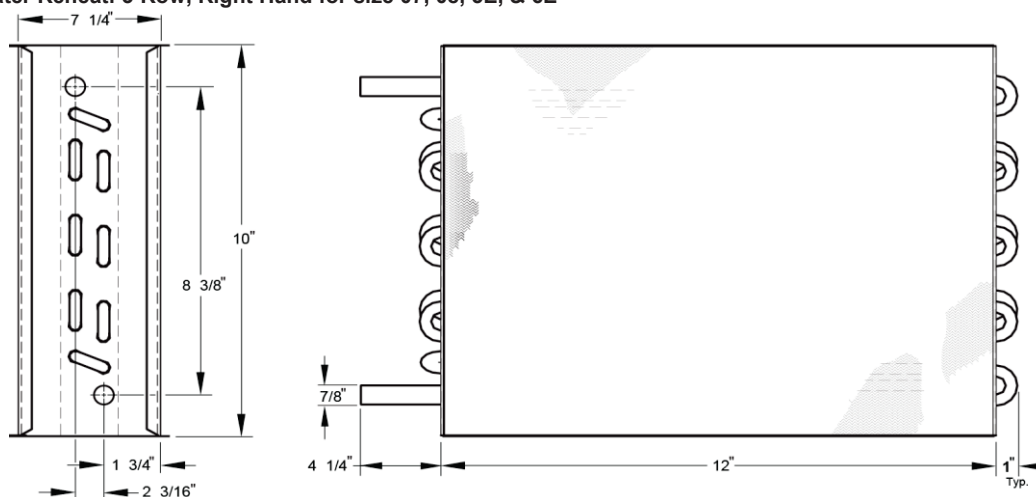
- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 10 per inch.
- Casing is 20 Gauge galvanized steel.
- Copper male solder connections.
- Connection is slip and drive to duct work down stream of terminal.
- Leak 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)
3.47	0.42

Accessories (continued)

DESV-1 (2)

ESV Hot Water Reheat: 3-Row, Right Hand for size 07, 08, 5E, & 6E



- Coil tubing is 1/2" OD with a 0.016" thick copper wall.
- Coil connection tubing has a 0.032" thick copper wall.
- Aluminum plate fins are 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)
3.92	0.48

Single Duct Terminal Unit Schedule																									
F-35 Special Access Program Facility																									
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	
VAV-101	AHU-101		DESV	06	12x8	310	65	1	0.25	0.15	15	23	65	2.6	55	150	91.8	0.07	0.4	136.1	0.12	1-RH	10	RH	
VAV-102	AHU-101		DESV	04	12x8	160	30	1	0.25	0.07	17	32	65	2.6	55	150	91.8	0.02	0.4	136.1	0.12	1-RH	10	RH	
VAV-103	AHU-101		DESV	06	12x8	360	65	1	0.25	0.27	17	23	220	8.2	55	150	89.1	0.17	0.8	128.2	0.12	2-RH	10	RH	
VAV-104	AHU-101		DESV	04	12x8	165	30	1	0.25	0.1	17	32	130	6.4	55	150	99.9	0.05	0.8	133.1	0.12	2-RH	10	RH	
VAV-105	AHU-101		DESV	04	12x8	145	30	1	0.25	0.08	14	31	110	5.8	55	150	103.4	0.04	0.8	134.6	0.12	2-RH	10	RH	
VAV-106	AHU-101		DESV	06	12x8	300	65	1	0.25	0.19	15	22	230	8.4	55	150	88.2	0.12	0.8	127.8	0.12	2-RH	10	RH	
VAV-107	AHU-101		DESV	06	12x8	310	65	1	0.25	0.21	15	22	170	7.3	55	150	94.3	0.13	0.8	130.6	0.12	2-RH	10	RH	
VAV-108	AHU-101		DESV	08	12x10	530	125	1	0.25	0.2	17	27	150	7.7	55	150	101.6	0.19	0.8	129.7	0.16	2-RH	10	RH	
VAV-109	AHU-101		DESV	08	12x10	550	550	1	0.25	0.22	18	27	550	13	55	150	76.6	0.21	0.8	115.6	0.16	2-RH	10	RH	
VAV-110	AHU-101		DESV	04	12x8	140	30	1	0.25	0.08	14	31	95	5.4	55	150	106.4	0.04	0.8	135.8	0.12	2-RH	10	RH	
VAV-111	AHU-101		DESV	06	12x8	370	65	1	0.25	0.28	17	23	130	6.4	55	150	99.9	0.17	0.8	133.1	0.12	2-RH	10	RH	
VAV-112	AHU-101		DESV	06	12x8	270	65	1	0.25	0.22	13	23	240	12	55	150	100.6	0.16	0.8	118.2	0.18	3-RH	10	RH	
VAV-113	AHU-101		DESV	08	12x10	640	125	1	0.25	0.28	19	28	255	9.9	55	150	90.5	0.26	0.8	123.7	0.16	2-RH	10	RH	
VAV-114	AHU-101		DESV	08	12x10	410	125	1	0.25	0.27	14	24	405	21.9	55	150	104.4	0.26	1.5	120.9	0.16	4-RH	10	RH	
VAV-115	AHU-101		DESV	08	12x10	550	125	1	0.25	0.22	18	27	145	7.5	55	150	102.3	0.21	0.8	130.1	0.16	2-RH	10	RH	
VAV-116	AHU-101		DESV	04	12x8	135	30	1	0.25	0.05	13	31	65	2.6	55	150	91.8	0.02	0.4	136.1	0.12	1-RH	10	RH	
VAV-117	AHU-101		DESV	06	12x8	280	65	1	0.25	0.17	14	24	235	8.5	55	150	88	0.11	0.8	127.8	0.12	2-RH	10	RH	
VAV-118	AHU-101		DESV	06	12x8	180	65	1	0.25	0.06	10	20	85	3.1	55	150	88	0.03	0.4	135.3	0.14	1-RH	10	RH	
VAV-119	AHU-101		DESV	04	12x8	165	30	1	0.25	0.07	17	32	80	2.9	55	150	88.1	0.02	0.4	134.6	0.12	1-RH	10	RH	
VAV-120	AHU-101		DESV	08	12x10	550	125	1	0.25	0.22	18	27	150	7.7	55	150	101.6	0.21	0.8	129.7	0.16	2-RH	10	RH	
VAV-121	AHU-101		DESV	04	12x8	135	30	1	0.25	0.05	13	31	65	2.6	55	150	91.8	0.02	0.4	136.1	0.12	1-RH	10	RH	
VAV-122	AHU-101		DESV	06	12x8	240	65	1	0.25	0.14	13	23	105	5.7	55	150	104.3	0.09	0.8	135	0.12	2-RH	10	RH	
VAV-123	AHU-101		DESV	06	12x8	185	65	1	0.25	0.06	10	20	85	3.1	55	150	88	0.03	0.4	135.3	0.14	1-RH	10	RH	
VAV-124	AHU-101		DESV	04	12x8	165	30	1	0.25	0.07	17	32	90	3.3	55	150	88	0.02	0.5	136.2	0.16	1-RH	10	RH	
VAV-125	AHU-101		DESV	08	12x10	560	125	1	0.25	0.22	18	27	150	7.7	55	150	101.6	0.21	0.8	129.7	0.16	2-RH	10	RH	
VAV-126	AHU-101		DESV	04	12x8	170	30	1	0.25	0.09	18	33	90	3.3	55	150	88	0.03	0.5	136.2	0.16	1-RH	10	RH	
VAV-127	AHU-101		DESV	06	12x8	185	65	1	0.25	0.06	10	20	90	3.3	55	150	88	0.03	0.5	136.2	0.16	1-RH	10	RH	
VAV-128	AHU-101		DESV	06	12x8	280	65	1	0.25	0.17	14	24	235	8.5	55	150	88	0.11	0.8	127.8	0.12	2-RH	10	RH	
VAV-129	AHU-101		DESV	04	12x8	140	30	1	0.25	0.06	14	31	65	2.6	55	150	91.8	0.02	0.4	136.1	0.12	1-RH	10	RH	
VAV-130	AHU-101		DESV	04	12x8	135	135	1	0.25	0.05	13	31	135	3.7	55	150	79.7	0.02	0.4	130.7	0.12	1-RH	10	RH	
VAV-201	AHU-102		DESV	10	14x12.5	810	210	1	0.25	0.34	18	24	510	24.2	55	150	98.3	0.33	1.5	117.9	0.18	3-RH	10	RH	
VAV-202	AHU-102		DESV	04	12x8	140	30	1	0.25	0.08	14	31	105	5.7	55	150	104.3	0.04	0.8	135	0.12	2-RH	10	RH	
VAV-203	AHU-102		DESV	06	12x8	230	65	1	0.25	0.12	13	23	200	7.9	55	150	91	0.08	0.8	129.1	0.12	2-RH	10	RH	
VAV-204	AHU-102		DESV	08	12x10	620	125	1	0.25	0.41	18	27	360	16.9	55	150	97.9	0.39	1.2	120.1	0.16	3-RH	10	RH	
VAV-205	AHU-102		DESV	04	12x8	150	30	1	0.25	0.08	15	32	110	5.8	55	150	103.4	0.04	0.8	134.6	0.12	2-RH	10	RH	
VAV-206	AHU-102		DESV	06	12x8	250	65	1	0.25	0.14	13	23	175	7.4	55	150	93.7	0.09	0.8	130.3	0.12	2-RH	10	RH	
VAV-207	AHU-102		DESV	04	12x8	175	30	1	0.25	0.11	18	33	130	6.4	55	150	99.9	0.05	0.8	133.1	0.12	2-RH	10	RH	
VAV-208	AHU-102		DESV	06	12x8	220	65	1	0.25	0.12	11	22	145	6.8	55	150	97.6	0.08	0.8	132.1	0.12	2-RH	10	RH	
VAV-209	AHU-102		DESV	08	12x10	450	125	1	0.25	0.24	15	25	335	16.5	55	150	100	0.23	1.2	120.8	0.16	3-RH	10	RH	
VAV-210A	AHU-102		DESV	10	14x12.5	750	210	1	0.25	0.2	18	24	350	14.2	55	150	91.9	0.19	1.2	125	0.16	2-RH	10	RH	
VAV-210B	AHU-102		DESV	10	14x12.5	750	210	1	0.25	0.2	18	24	350	14.2	55	150	91.9	0.19	1.2	125	0.16	2-RH	10	RH	

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																									
F-35 Special Access Program Facility																									
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	
VAV-211	AHU-102		DESV	08	12x10	490	125	1	0.25	0.1	17	27	125	4	55	150	84.5	0.09	0.4	128.6	0.16	1-RH	10	RH	
VAV-212	AHU-102		DESV	08	12x10	580	580	1	0.25	0.36	18	27	580	19.4	55	150	85.5	0.35	1.2	115.8	0.16	3-RH	10	RH	
VAV-213	AHU-102		DESV	04	12x8	145	30	1	0.25	0.08	14	31	120	6.1	55	150	101.5	0.04	0.8	133.8	0.12	2-RH	10	RH	
VAV-214	AHU-102		DESV	04	12x8	145	30	1	0.25	0.08	14	31	120	6.1	55	150	101.5	0.04	0.8	133.8	0.12	2-RH	10	RH	
VAV-215	AHU-102		DESV	06	12x8	325	65	1	0.25	0.29	14	22	240	12	55	150	100.6	0.21	0.8	118.2	0.18	3-RH	10	RH	
VAV-216	AHU-102		DESV	08	12x10	690	125	1	0.25	0.49	19	28	435	17.9	55	150	92.6	0.47	1.2	118.3	0.16	3-RH	10	RH	
VAV-217	AHU-102		DESV	06	12x8	340	65	1	0.25	0.24	15	23	215	8.1	55	150	89.6	0.15	0.8	128.4	0.12	2-RH	10	RH	
VAV-218	AHU-102		DESV	04	12x8	170	30	1	0.25	0.09	18	33	65	2.6	55	150	91.8	0.03	0.4	136.1	0.12	1-RH	10	RH	
VAV-219	AHU-102		DESV	04	12x8	165	30	1	0.25	0.1	17	32	110	5.8	55	150	103.4	0.05	0.8	134.6	0.12	2-RH	10	RH	
VAV-220	AHU-102		DESV	04	12x8	165	30	1	0.25	0.1	17	32	110	5.8	55	150	103.4	0.05	0.8	134.6	0.12	2-RH	10	RH	
VAV-221	AHU-102		DESV	04	12x8	165	30	1	0.25	0.1	17	32	110	5.8	55	150	103.4	0.05	0.8	134.6	0.12	2-RH	10	RH	
VAV-222	AHU-102		DESV	04	12x8	145	30	1	0.25	0.08	14	31	120	6.1	55	150	101.5	0.04	0.8	133.8	0.12	2-RH	10	RH	
VAV-223	AHU-102		DESV	06	12x8	295	65	1	0.25	0.25	14	24	245	12.1	55	150	100	0.18	0.8	117.9	0.18	3-RH	10	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. Water pressure drop (WPd) units is in ft. water.

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.

Submittal

JOB NAME	F-35: Special Access Program Facility - Variable Volume, Single Duct Terminal Units
PRODUCT	Register
MANUFACTURER	Other
LOCATION	Fort Smith, Arkansas
DATE	September 9, 2026
ENGINEER	US Army Corp of Engineers
CONTRACTOR	Comfort Systems USA
SUBMITTED BY	Joey Smith

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Ebbing ANGB Special Access Program Facility

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION REVIEW WORK	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 21 23	Equipment Data	2.2.4	G												
			Training Period	3.5.2	G												
			SD-06 Test Reports														
			Field Quality Control	3.3													
			SD-07 Certificates														
			Manufacturer's Representative	1.3.1													
			SD-10 Operation and Maintenance Data														
			Operation and Maintenance Manuals	3.5.1	G												
			Training	3.5.2	G												
		23 30 00	SD-02 Shop Drawings														
			Detail Drawings	1.4.4	G												
			SD-03 Product Data														
			Insulated Nonmetallic Flexible Duct Runouts	2.8.1.1													
			Duct Connectors	2.8.1.1													
			Duct Access Doors	2.8.2	G												
			Fire Dampers	2.8.3													
			Manual Balancing Dampers	2.8.4	G												
			Sound Attenuation Equipment	2.8.6													
			Acoustical Duct Liner	2.8.6.2													
			Diffusers	2.8.7.1													
			Registers and Grilles	2.8.7.2													
			In-Line Centrifugal Fans	2.9.1.1													
			Air Handling Units	2.10	G												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Ebbing ANGB Special Access Program Facility

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 30 00	Room Fan-Coil Units	2.11.1	G												
			Variable Volume, Single Duct	2.11.3.1	G												
			Terminal Units														
			Variable Volume, Single Duct, Fan-Powered Terminal Units	2.11.3.2	G												
			Reheat Units	2.11.3.3	G												
			Energy Recovery Devices	2.12	G												
			Test Procedures	1.4.5													
			Diagrams	1.2.1.2	G												
			Indoor Air Quality for Duct Sealants	2.8.1	S												
			SD-06 Test Reports														
			Performance Tests	3.11	G												
			Damper Acceptance Test	3.9	G												
			SD-07 Certificates														
			Ozone Depleting Substances Technician Certification	1.4.3													
			SD-08 Manufacturer's Instructions														
			Manufacturer's Installation Instructions	3.2													
			Operation and Maintenance Training	3.13.2													
			SD-10 Operation and Maintenance Data														
			Operation and Maintenance Manuals	3.13.1	G												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR												
Ebbing ANGB Special Access Program Facility																		
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	
Page 21 of 38		23 30 00	Fire Dampers	2.8.3	G													
			Manual Balancing Dampers	2.8.4	G													
			Air Handling Units	2.10	G													
			Room Fan-Coil Units	2.11.1	G													
			Variable Volume, Single Duct Terminal Units	2.11.3.1	G													
			Variable Volume, Single Duct, Fan-Powered Terminal Units	2.11.3.2	G													
			Reheat Units	2.11.3.3	G													
			Energy Recovery Devices	2.12	G													
			SD-11 Closeout Submittals															
			Indoor Air Quality During Construction	3.12	S													
		23 52 00	SD-02 Shop Drawings															
			Detail Drawings	1.5														
			SD-03 Product Data															
			Materials and Equipment	2.1.1														
			Spare Parts	1.5														
			Water Treatment System	2.10														
			Boiler Water Treatment	2.10														
			Heating System Tests	3.7														
			Welding	1.3														
			Qualifications	3.7														
			Field Instructions	3.9														
			Tests	3.7														
			SD-06 Test Reports															

Submittal

JOB NAME	F-35: Special Access Program Facility - Variable Volume, Single Duct Terminal Units
PRODUCT	Spec
MANUFACTURER	Other
LOCATION	Fort Smith, Arkansas
DATE	September 9, 2026
ENGINEER	US Army Corp of Engineers
CONTRACTOR	Comfort Systems USA
SUBMITTED BY	Joey Smith

velocity across the inlet. Obtain flow measurement within plus or minus 5 percent of rated airflow with 1.5 diameters of straight duct upstream of unit and inlet static variation of 0.5 to 5.0 inches water gauge. Supply flow measuring taps for field balancing airflows.

- e. Attach a flow chart to each unit. Base acoustic performance of the terminal units upon units tested according to AHRI 880 I-P with the calculations prepared in accordance with AHRI 885. Provide sound power level as indicated. Show discharge sound power for minimum and 1-1/2 inches water gauge inlet static pressure. Provide acoustical lining according to NFPA 90A.
- f. Provide unit that incorporates single point electrical connection with electrical disconnect. Provide electrical components that are UL or ETL listed, installed in accordance with NFPA 70 and mounted in control box.

2.11.3.1 Variable Volume, Single Duct Terminal Units

Provide variable volume, single duct, terminal units with a calibrated air volume sensing device, air valve or damper, actuator, and accessory relays. Provide units that control air volume to within plus or minus 5 percent of each air set point volume as determined by the thermostat with variations in inlet pressures from 3/4 to 6 inch water gauge. Provide units with an internal resistance not exceeding 0.4 inch water gauge at maximum flow range. Provide external differential pressure taps separate from the control pressure taps for air flow measurement with a 0 to 1 inch water gauge range.

2.11.3.2 Variable Volume, Single Duct, Fan-Powered Terminal Units

Provide variable volume, single duct, fan-powered terminal units with a calibrated air volume sensing device, air valve or damper, actuator, fan and motor, and accessory relays. Provide units that have recirculating air inlet equipped with filter frame. Provide UL listed throwaway one inch thick fiberglass filters, standard dust-holding capacity. Provide units that control primary air volume to within plus or minus 5 percent of each air set point as determined by the thermostat with variations in inlet pressure from 3/4 to 6 inch water gauge. Provide unit fan that is centrifugal, direct-driven, double-inlet type with forward curved blades. Provide either single speed with speed controller or three-speed, permanently lubricated, high efficiency permanent split-capacitor type fan motor with thermal overload protection. Isolate fan/motor assembly from the casing to minimize vibration transmission. Provide factory furnished fan control that is wired into the unit control system. Provide a factory-mounted pressure switch to operate the unit fan whenever pressure exists at the unit primary air inlet or when the control system fan operates.

2.11.3.3 Reheat Units

2.11.3.3.1 Hot Water Coils

Provide fin-and-tube type hot-water coils constructed of seamless copper tubes and copper or aluminum fins mechanically bonded or soldered to the tubes. Provide headers that are constructed of cast iron, welded steel or copper. Provide casing and tube support sheets that are 16 gauge, galvanized steel, formed to provide structural strength. Provide tubes that are correctly circuited for proper water velocity without excessive

Submittal

JOB NAME	F-35: Special Access Program Facility - Variable Volume, Single Duct Terminal Units
PRODUCT	Schedule
MANUFACTURER	Other
LOCATION	Fort Smith, Arkansas
DATE	September 9, 2026
ENGINEER	US Army Corp of Engineers
CONTRACTOR	Comfort Systems USA
SUBMITTED BY	Joey Smith

VARIABLE AIR VOLUME TERMINAL UNIT SCHEDULE (VAV)

TAG	AHU CONNECTION	ROOM SERVED	NECK SIZE (IN)	TYPE	CASING TYPE	MAX AIRFLOW (CFM)	MIN. AIRFLOW (CFM)	ALTITUDE (FT)	HEATING COIL										MIN INLET PRESSUE (IN W.C.)	SOUND LEVEL (dBA)	ELECTRICAL			
									CAPACITY (MBH)	HEATING AIRFLOW (CFM)	AIRSIDE		PRESSURE DROP (IN W.C.)	FLOW (GPM)	WATERSIDE		PRESSURE DROP (FT W.C.)	ROWS			FPI	VOLTS	PHASE	NOTES
											EAT (DEG . F)	LAT (DEG . F)			DEG. F)	DEG. F)								
VAV-101	AHU-101	105 - STEP DESK	6	SINGLE DUCT	STANDARD	310	65	449	2.3	65	55	88	0.2	0.5	150	140.9	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-102	AHU-101	106 - CORRIDOR	4	SINGLE DUCT	STANDARD	160	30	449	2.3	65	55	88	0.2	0.5	150	140.9	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-103	AHU-101	107 - SCHEDULE & TRAINING	6	SINGLE DUCT	STANDARD	360	65	449	7.8	220	55	88	0.2	0.7	150	127.8	1	2-RH	10	1	30	120	1	1,2,3
VAV-104	AHU-101	108 - DO	4	SINGLE DUCT	STANDARD	165	30	449	4.6	130	55	88	0.2	0.7	150	137	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-105	AHU-101	109 - SARM	4	SINGLE DUCT	STANDARD	145	30	449	4.1	110	55	90	0.2	0.5	150	133.5	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-106	AHU-101	110 - SARM ADMIN	6	SINGLE DUCT	STANDARD	300	65	449	8.1	230	55	88	0.2	0.7	150	123	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-107	AHU-101	111 - STAN/EVAL	6	SINGLE DUCT	STANDARD	310	65	449	6.0	170	55	88	0.2	0.5	150	126	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-108	AHU-101	112 - AFE MAINTENANCE	8	SINGLE DUCT	STANDARD	530	125	449	5.3	150	55	88	0.2	0.6	150	132.5	1	1-RH	12	1	30	120	1	1,2,3,4
VAV-109	AHU-101	116 - PILOT LOCKER ROOM	8	SINGLE DUCT	STANDARD	550	550	449	11.6	550	55	75	0.2	0.7	150	116.5	1	1-RH	12	1	30	120	1	1,2,3,4
VAV-110	AHU-101	121 - HALL, 122 - CORRIDOR	4	SINGLE DUCT	STANDARD	140	30	449	3.4	95	55	88	0.2	0.5	150	136.5	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-111	AHU-101	124 - CORRIDOR, 125 - BREAK	6	SINGLE DUCT	STANDARD	370	65	449	4.6	130	55	88	0.2	0.6	150	134.8	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-112	AHU-101	126 - MAINT DEBRIEF	6	SINGLE DUCT	STANDARD	270	65	449	9.0	240	55	90	0.2	0.8	150	124.5	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-113	AHU-101	131 - MAN TRAP, 135 SECURITY	8	SINGLE DUCT	STANDARD	640	125	449	9.0	255	55	88	0.2	0.6	150	120	2	1-RH	10	1	30	120	1	1,2,3,4
VAV-114	AHU-101	132 - CORRIDOR	8	SINGLE DUCT	STANDARD	410	125	449	17.3	405	55	95	0.2	1.1	150	118.5	1	1-RH	10	1	30	120	1	1,2,3
VAV-115	AHU-101	141 - MAN TRAP, 142 - VAULT 1 MISSION PLANNING	8	SINGLE DUCT	STANDARD	550	125	449	5.1	145	55	88	0.2	0.5	150	129.5	1	1-RH	12	1	30	120	1	1,2,3,4
VAV-116	AHU-101	143 - VAULT 1 ALIS/ODIN ADMIN	4	SINGLE DUCT	STANDARD	135	30	449	2.3	65	55	88	0.2	0.5	150	140.8	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-117	AHU-101	145 - VAULT 1 LG BRIEF	6	SINGLE DUCT	STANDARD	280	65	449	8.3	235	55	88	0.2	0.8	150	129.3	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-118	AHU-101	146 - VAULT 1 SM BRIEF	6	SINGLE DUCT	STANDARD	180	65	449	3.0	85	55	88	0.2	0.5	150	138	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-119	AHU-101	147 - VAULT 1 SM BRIEF	4	SINGLE DUCT	STANDARD	165	30	449	2.8	80	55	88	0.2	0.5	150	138.8	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-120	AHU-101	151 - MAN TRAP 2, 152 - VAULT 2 MISSION PLANNING	8	SINGLE DUCT	STANDARD	550	125	449	5.3	150	55	88	0.2	0.6	150	132.5	1	1-RH	12	1	30	120	1	1,2,3,4
VAV-121	AHU-101	153 - VAULT 2 ALIS/ODIN ADMIN	4	SINGLE DUCT	STANDARD	135	30	449	2.4	65	55	90	0.2	0.5	150	140.2	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-122	AHU-101	155 - VAULT 2 LG BRIEF	6	SINGLE DUCT	STANDARD	240	65	449	3.7	105	55	88	0.2	0.5	150	135.3	1	1-RH	12	1	30	120	1	1,2,3,4
VAV-123	AHU-101	156 - VAULT 2 SM BRIEF	6	SINGLE DUCT	STANDARD	185	65	449	3.0	85	55	88	0.2	0.5	150	138	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-124	AHU-101	157 - VAULT 2 SM BRIEF	4	SINGLE DUCT	STANDARD	165	30	449	3.2	90	55	88	0.2	0.5	150	137.3	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-125	AHU-101	161 - MAN TRAP 3, 162 - VAULT 3 MISSION	8	SINGLE DUCT	STANDARD	560	125	449	5.3	150	55	88	0.2	0.6	150	132.5	1	2-RH	12	1	30	120	1	1,2,3,4
VAV-126	AHU-101	163 - VAULT 3 SM BRIEF	4	SINGLE DUCT	STANDARD	170	30	449	3.2	90	55	88	0.2	0.5	150	137.3	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-127	AHU-101	164 - VAULT 3 SM BRIEF	6	SINGLE DUCT	STANDARD	185	65	449	3.2	90	55	88	0.2	0.5	150	137.3	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-128	AHU-101	165 - VAULT 3 SM BRIEF	6	SINGLE DUCT	STANDARD	280	65	449	8.3	235	55	88	0.2	0.8	150	129.4	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-129	AHU-101	166 - VAULT 3 ALIS/ODIN	4	SINGLE DUCT	STANDARD	140	30	449	2.3	65	55	88	0.2	0.5	150	140.8	1	1-RH	10	1	30	120	1	1,2,3,4
VAV-130	AHU-101	129 - PRINT/COPY	4	SINGLE DUCT	STANDARD	135	135	449	2.9	135	55	75	0.2	0.5	150	138.4	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-201	AHU-102	202 - COMMAND SUPPORT STAFF	10	SINGLE DUCT	STANDARD	810	210	449	18.0	510	55	88	0.25	1.4	150	124.3	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-202	AHU-102	203 - APC/RA	4	SINGLE DUCT	STANDARD	140	30	449	3.7	105	55	88	0.2	0.5	150	135.3	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-203	AHU-102	204 - SQUADRON COMMANDER	6	SINGLE DUCT	STANDARD	230	65	449	7.1	200	55	88	0.2	0.7	150	129.8	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-204	AHU-102	205 - CONFERENCE ROOM	8	SINGLE DUCT	STANDARD	620	125	449	12.7	360	55	88	0.25	1.0	150	124.5	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-205	AHU-102	206 - IMSO	4	SINGLE DUCT	STANDARD	150	30	449	3.9	110	55	88	0.2	0.5	150	134.4	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-206	AHU-102	207 - SNR M-1	6	SINGLE DUCT	STANDARD	250	65	449	6.2	175	55	88	0.2	0.5	150	125.3	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-207	AHU-102	208 - SNR M-2	4	SINGLE DUCT	STANDARD	175	30	449	4.6	130	55	88	0.2	0.6	150	134.8	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-208	AHU-102	209 - SNR M-3	6	SINGLE DUCT	STANDARD	220	65	449	5.1	145	55	88	0.2	0.5	150	129.6	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-209	AHU-102	212 & 213 - COPY & STUDENT COLLAB	8	SINGLE DUCT	STANDARD	450	125	449	11.8	335	55	88	0.2	0.9	150	123.8	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-210A	AHU-102	214 - LARGE BRIEFING	10	SINGLE DUCT	STANDARD	750	210	449	12.3	350	55	88	0.35	1.0	150	125.4	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-210B	AHU-102	214 - LARGE BRIEFING	10	SINGLE DUCT	STANDARD	750	210	449	12.3	350	55	88	0.35	1.0	150	125.4	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-211	AHU-102	215 - AV	8	SINGLE DUCT	STANDARD	490	125	449	2.8	125	55	76	0.2	0.5	150	138.8	1	1-RH	12	1	30	120	1	1,2,3,4
VAV-212	AHU-102	217 - STUDENT LOCKERS	8	SINGLE DUCT	STANDARD	580	580	449	15.5	580	55	80	0.35	1.0	150	119	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-213	AHU-102	226 - IP M-1	4	SINGLE DUCT	STANDARD	145	30	449	4.2	120	55	88	0.2	0.6	150	136	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-214	AHU-102	227 - IP M-2	4	SINGLE DUCT	STANDARD	145	30	449	4.2	120	55	88	0.2	0.6	150	136	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-215	AHU-102	211 - RA	6	SINGLE DUCT	STANDARD	325	65	449	8.5	240	55	88	0.2	0.8	150	128.8	1	2-RH	10	1	30	120	1	1,2,3,4
VAV-216	AHU-102	229 - BREAKROOM	8	SINGLE DUCT	STANDARD	690	125	449	15.3	4														

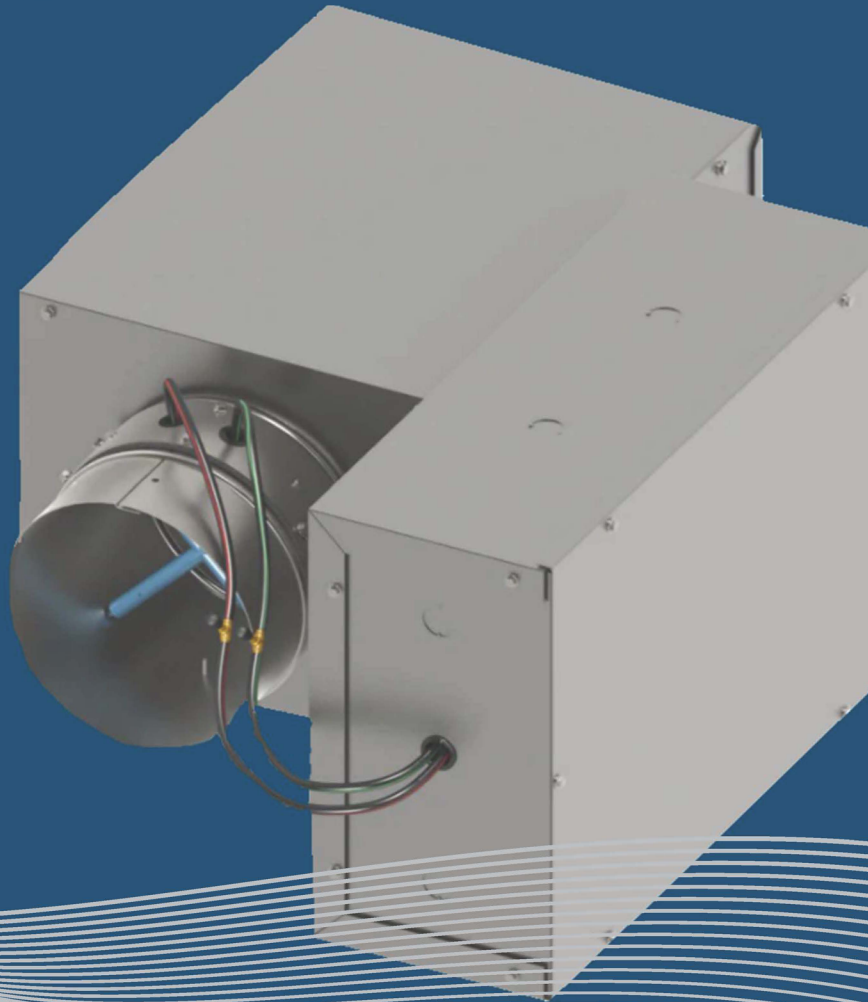
NOTES:

1. OPERATING FLUID IS WATER.
2. PROVIDE SINGLE POINT 120V ELECTRICAL CONNECTION AND DISCONNECT SWITCH.
3. PROVIDE CONTROL POWER TRANSFORMER (IF REQUIRED).
4. MINIMUM INLET STATIC PRESSURE INCLUDES PRESSURE DORP ACROSS THE VAV BOX. A PRESSURE DROP OF 0.25 IN W.C. IS ASSUMED IN THE LOW PRESSURE DUCT DOWNSTREAM OF VAV BOX.

FAN POWERED VARIABLE AIR VOLUME TERMINAL UNIT SCHEDULE (FPVAV)

Submittal

JOB NAME	F-35: Special Access Program Facility - Variable Volume, Single Duct Terminal Units
PRODUCT	IOM
MANUFACTURER	Other
LOCATION	Fort Smith, Arkansas
DATE	September 9, 2026
ENGINEER	US Army Corp of Engineers
CONTRACTOR	Comfort Systems USA
SUBMITTED BY	Joey Smith



INSTALLATION & OPERATION MANUAL

Single Duct Terminal Unit

ESV, ESV-Q

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.		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.
	warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.		note is used to highlight additional information which may be helpful to you.

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

Table Of Contents

GENERAL SAFETY GUIDELINES	2
SAFETY SYMBOLS	2
CHANGEABILITY OF THIS DOCUMENT	3
TABLE OF CONTENTS	4
TITUS TERMINAL UNIT SETUP GUIDE.	5

Section 1

RECEIVING INSPECTION	7
SUPPORTING THE ASSEMBLY	7
INSTALLATION OF SEISMIC MODELS	7
DUCT CONNECTIONS	8
FIELD WIRING	9
CONTROL START-UP, OPERATION	9
CALIBRATION INSTRUCTIONS.	9
REPLACEMENT PARTS.	9
LIMITED WARRANTY	10

Titus Terminal Unit Setup Guide

PROJECT INFORMATION:

Job Name	
Order Number	

UNIT INFORMATION:

Model Number (M/N)	
Serial Number (S/N)	
Unit Size	
Unit ID	
Serving Area	
Control Type	
Thermostat ID/Location	
Accessories	☐ Water Coil ☐ Heat Kit ☐ Sensor Package ☐ Other:
Hot Water Coil Rows	

ELECTRICAL INFORMATION:

Power Supply (V/Ph/Hz)	
Nameplate Amps	
Measured Amps	
kW Rating of Heat Kit	_____ kW

INSTALLATION INFORMATION:

Date Installed	
Date of Start-Up	
Technician Name/Initials	

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SINGLE DUCT TERMINAL

GENERAL ASSEMBLY & INSTALLATION

- ☐ Unit arrived in good condition, free of damage
- ☐ Remove all shipping materials and hardware
- ☐ Confirm all Components arrived and installed per manufacturer guidelines
- ☐ Accessories and controls properly configured
- ☐ Unit is securely mounted, level, and aligned
- ☐ Electrical supply matches unit specifications
- ☐ Access to unit and service panels is unobstructed
- ☐ Overcurrent protection verified (if applicable)
- ☐ Service disconnect switch installed and operational (if applicable)
- ☐ All components meet local code requirements
- ☐ Unit protected from debris and contaminants

AIRFLOW & DUCTING

- ☐ Duct connections are sealed and leak-free
- ☐ Static pressure at primary air inlet meets minimum required levels
- ☐ Downstream equipment is installed and calibrated
- ☐ Downstream duct pressure supports safe unit operation
- ☐ Return air path is clear and unobstructed (if applicable)
- ☐ Return air filter is clean and properly installed (if applicable)

CONTROLS & CALIBRATION

- ☐ Thermostat(s) are functional and accurately calibrated (if applicable)

WATER COIL (IF APPLICABLE)

- ☐ Coil fins are intact and undamaged
- ☐ No signs of leakage in the water system
- ☐ Fluid system is fully vented and free of air pockets

ELECTRIC HEATING (IF APPLICABLE)

- ☐ Coil surfaces are clean and free from debris
- ☐ Adequate space is available for door access
- ☐ Airflow meets or exceeds 70 cfm per kW

Notes

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

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 t 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

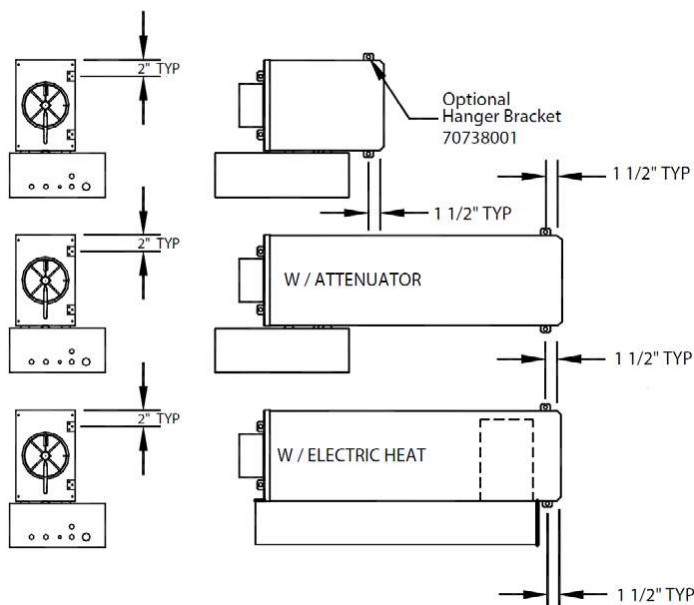


FIGURE 1 - SINGLE DUCT RECOMMENDED HANGER BRACKET LOCATIONS

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.

INSTALLATION OF SEISMIC MODELS

Terminal units that are used in buildings subject to seismic activity have been certified to be installed as outlined below. This will ensure the unit's structural integrity and functionality. Seismic installation makes use of threaded rods, cables for lateral bracing, and struts for added support. These and other installation parts are supplied by others.

Install the seismic terminal unit as shown in Figure 2, as described in these details:

- Suspend the unit with four 1/2" ASTM-A307 rods, with HRSA (VMC) Spring and Elastomeric Angularity Hangers.
- Use four SB-250 (VMC) 1/4" Seismic Cable Kits for lateral bracing and SRBC-1 (VMC) Rod Stiffening Clamps (three per rod).
 - Attach the SB-250's to structure using 5/8" hardware
 - Fasten the SRBC-1's to L1x1x1/4 ASTM-A36 angle
- Each rod should be double-nutted to 1-5/8" 12 ga strut fastened to the bottom of the unit with #12 screws at min 6" O.C. – and double-nutted to 1-5/8" 12 ga strut fastened to the top with the factory-mounted 2"x2"x10 ga A36 angle bracket attached to the side-top-corner of the unit with six #12 screws.
 - Use shims to fill the gap between the top bracket and the strut
 - Place brackets on common side for rectangular attachment pattern

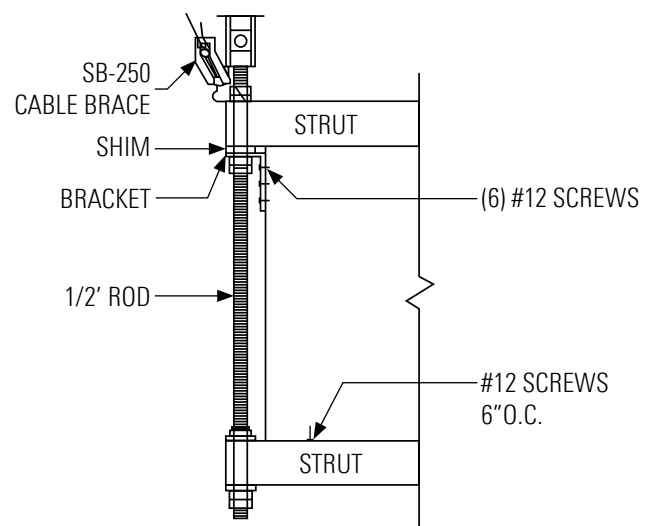


FIGURE 2

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SINGLE DUCT TERMINAL

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 (red) and low (green) 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.

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 the control manufacturer's manual for replacement

TABLE1 - REPLACEMENT PARTS

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

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SINGLE DUCT TERMINAL

Limited Warranty

Unless otherwise expressly stated in TITUS's published specifications for the Goods, TITUS warrants that Goods are free from defects in material and workmanship, except for services which are warranted to be performed in a competent and diligent manner in accordance with any mutually agreed specifications. The foregoing warranty shall apply for eighteen (18) months from the date of shipment from TITUS's facility, except for services for which the warranty shall apply for ninety (90) days from the date of performance (the "Warranty Period"). Provided Buyer informs TITUS in writing of any breach of warranty prior to the expiration of the applicable Warranty Period, TITUS shall, as its sole obligation and Buyer's sole and exclusive remedy for any breach of this warranty, repair or replace/re-perform the Goods which gave rise to the breach or, at TITUS' option, refund the amounts paid by Buyer for the Goods which gave rise to the breach. Any repair, replacement or re-performance by TITUS hereunder shall not extend the applicable Warranty Period. The parties shall mutually agree on the specifications of any test to determine the presence of a defect. Unless otherwise agreed upon by TITUS in writing, Buyer shall bear the costs of access,

de-installation, re-installation and transportation of Goods to TITUS and back to Buyer. These warranties and remedies are conditioned upon (a) the proper storage, installation, operation, and maintenance of the Goods and conformance with the proper operation instruction manuals provided by TITUS or its suppliers or subcontractors, (b) Buyer keeping proper records of operation and maintenance during the applicable Warranty Period and providing TITUS access to those records, and (c) modification or repair of the Goods only as authorized by TITUS. TITUS does not warrant the Goods or any repaired or replacement parts against normal wear and tear or damage caused by misuse, accident, or use against the instructions of TITUS. Any modification or repair of any of the Goods not authorized by TITUS shall render the warranty null and void. EXCEPT AS EXPRESSLY SET FORTH HEREIN, TITUS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY DISCLAIMED TO THE EXTENT PERMITTED BY APPLICABLE LAW.

Notes



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