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Titus
Redefine your comfort zone.™

vav retrofit terminals

retrofit

energy solutions

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external round duct series

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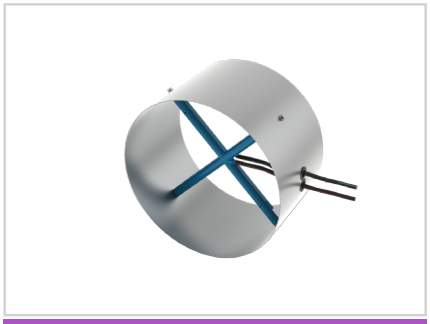
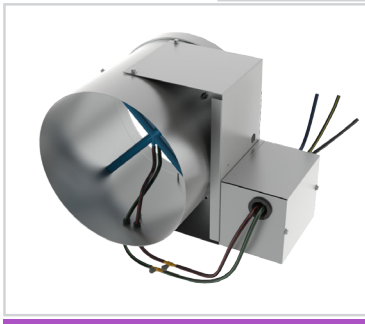


EXX

VARIABLE AIR VOLUME

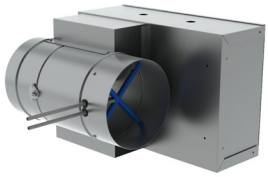
- Converts older constant volume systems into modern energy efficient variable air volume systems
- Flow measurement taps included for easy balancing connections
- Simple & easy installation



ECX

VARIABLE AIR VOLUME

- Converts older constant volume systems into modern energy efficient variable air volume systems
- Flow measurement taps included for easy balancing connections
- Simple & easy installation
- Metal cover protects pneumatic velocity controller



ECV

VARIABLE AIR VOLUME

- Converts older constant volume systems into modern energy efficient variable air volume systems
- Flow measurement taps included for easy balancing connections
- Simple & easy installation
- Metal cover protects velocity controller
- Variety of control options available

slide-in series

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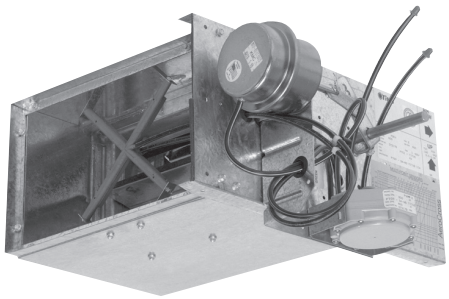


QCV

VARIABLE AIR VOLUME

- Converts older constant volume systems into modern energy efficient variable air volume systems
- Low installation costs
- Available in a variety of sizes
- The casing can be configured to mount on either the right or left side of the existing duct
- Variety of velocity control options available

Overview – External Round Duct Series

FEATURES AND BENEFITS

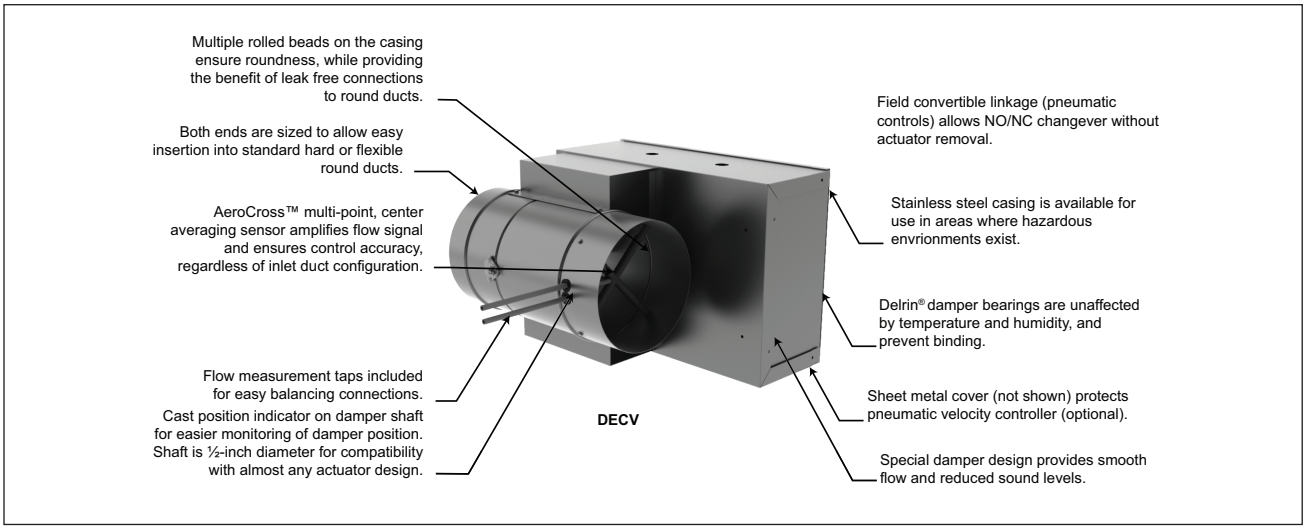
Titus External Round Retrofit Terminals can upgrade those old existing HVAC systems to current standards of energy efficiency and comfort!

External round retrofit terminals are designed to easily convert the old system powered or constant volume systems to more energy efficient variable volume systems. They may also be used in newly designed systems as air measuring devices and exhaust control valves.

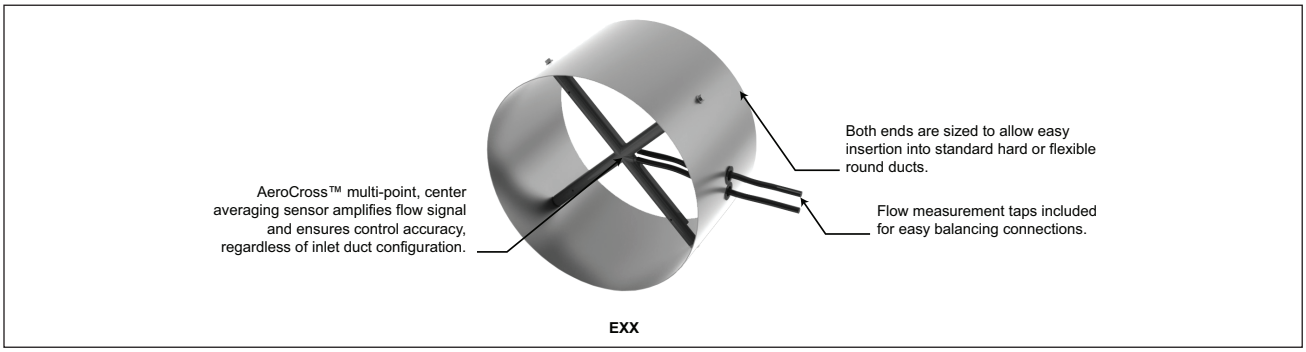
With Titus external round retrofit terminals, you never have to worry about a lengthy conversion process. Compact and light weight, these units install quickly in cramped spaces, supported only by the existing ductwork. The simple cylindrical casing matches standard round duct at both inlet and outlet.

ECV Series and PECX units can be inserted in branch ducts where no control units have been before. They may also be used to replace older units or added to the inlets of existing units that are entirely or partly deactivated.

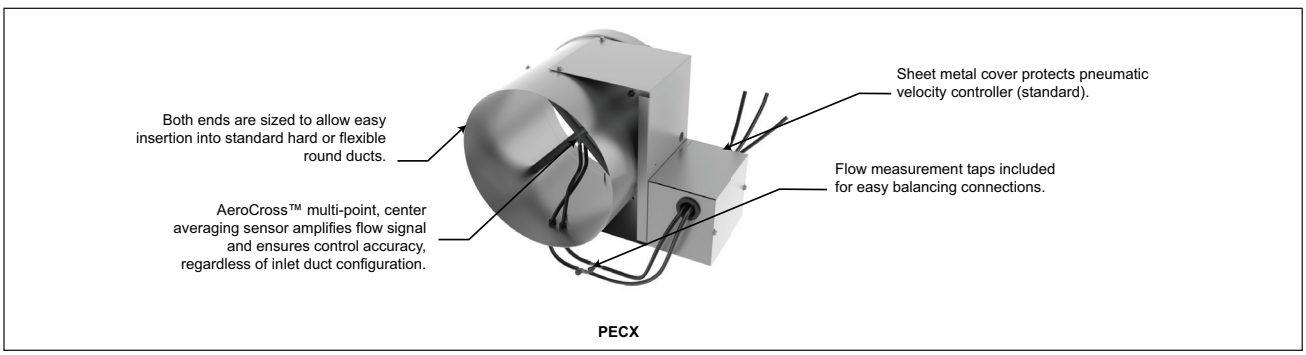
The ECV Series terminals are available from Titus with pneumatic, electric, analog electronic or direct digital controls (DDCs). Flexibility in application makes selecting Titus external round terminals the simple solution for any retrofit project.



DECV



EXX



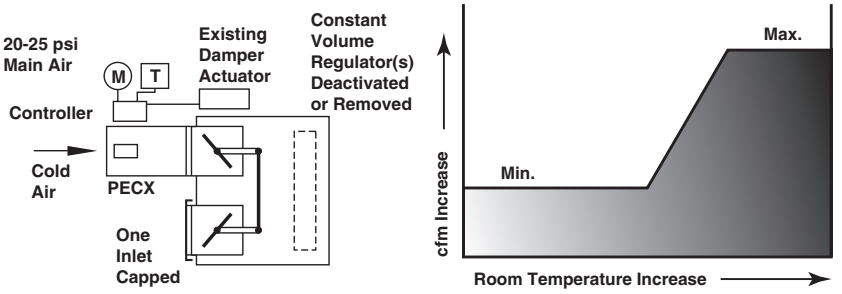
PECX

EXISTING PNEUMATIC DUAL DUCT UNIT: CONVERTING TO SINGLE DUCT VAV

One inlet is capped off. Constant volume regulators are removed. Titus PECX is installed on cooling inlet of existing unit. Existing thermostat and damper actuator now connect to controller on PECX.

Unit now provides pressure independent variable air volume, cooling (or heating) only, regardless of whether existing thermostat is direct acting or reverse acting, or whether damper is normally open or normally closed.

Converting Existing Pneumatic Dual Duct to Single Duct VAV



EXISTING PNEUMATIC DUAL DUCT: CONVERTING TO DUAL DUCT VAV; TWO EXISTING DAMPER ACTUATORS

(Option 1)

Existing constant volume regulators are retained and used. Cooling inlet is left as is. PECX is installed on heating inlet. Existing room thermostat is connected to both existing cooling damper actuator and to the Titus controller on the PECX, which controls existing heating damper actuator.

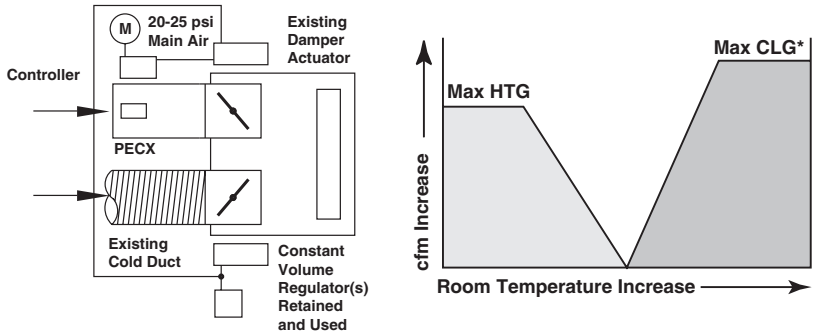
This conversion provides variable air volume without wasteful simultaneous heating and cooling. Heating control is pressure independent; cooling is pressure dependent. Maximum cooling cfm is limited by existing constant volume regulators. Maximum heating cfm (less than cooling) is limited by adjustment of PECX. A mixing minimum airflow can be obtained with a start point adjustment using the Titus II Controller.

(Option 2)

For pressure independent control of both heating and cooling, constant volume regulators are deactivated or removed. PECXs are installed on both heating and cooling inlets.

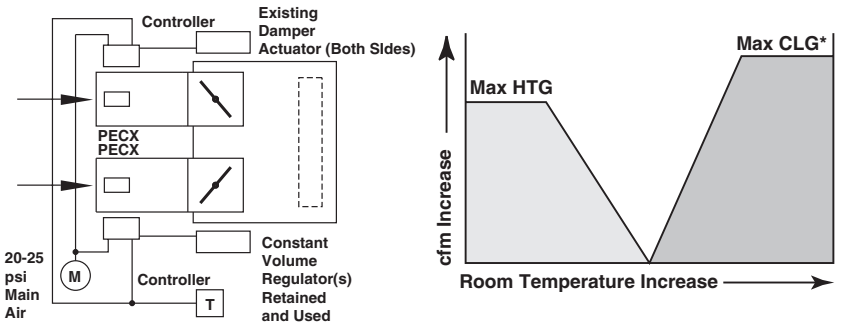
Existing room thermostat is connected to Titus controllers on both PECXs, which control both existing damper actuators. A mixing minimum airflow can be obtained with a start point adjustment using the Titus II Controller.

Converting Existing Pneumatic Dual Duct to Single Duct VAV (Option 1)



* Max CLG is determined by existing constant volume regulator setting

Converting Existing Pneumatic Dual Duct to Single Duct VAV (Option 2)



* Max CLG is determined by existing constant volume regulator setting

EXISTING PNEUMATIC DUAL DUCT: CONVERTING TO DUAL DUCT VAV; SINGLE EXISTING DAMPER ACTUATOR WITH INTERLINKED DAMPERS

Constant volume regulators are deactivated or removed. PECX is installed on heating inlet, PECV on cooling. Existing thermostat is connected to both PECX and PECV. PECX controls existing damper actuator. PECV has its own damper and is set either normally open or normally closed to match action of existing cooling damper. Controllers are set either direct acting or reverse acting to match existing thermostat. VAV control is pressure independent for both heating and cooling. A mixing minimum airflow can be obtained with a start point adjustment using the Titus II Controller.

EXISTING PNEUMATIC DUAL DUCT: CONVERTING TO DUAL DUCT VAV; EXISTING DAMPER AND ACTUATOR NOT USED (EXCESSIVE OLD VALVE LEAKAGE)

Constant volume regulators and dampers are blocked open or removed. A PECV is installed on each inlet. Existing thermostat is connected to both PECVs.

Each PECV has its own damper and is set either normally open or closed to match desired control sequence. Controls are set either direct or reverse acting to match thermostat. VAV control is pressure independent. Leakage problem of old assembly is now overcome with new dampers. Digital controls can be substituted for pneumatic controls.

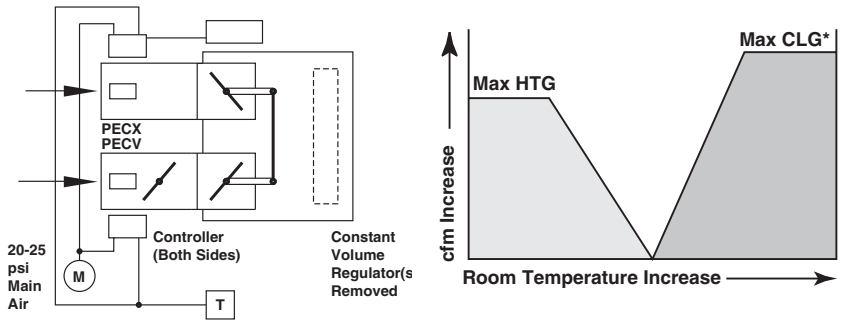
CONVERTING SINGLE DUCT CONSTANT VOLUME TO VAV

Constant Volume Regulator(s) is blocked fully open or removed. If some heating is still required, retain the coil. If not, remove or deactivate. Install PECV on inlet of box to provide VAV with or without reheat. Controls are now pressure independent. Digital controls can be substituted for the pneumatic controls described previously.

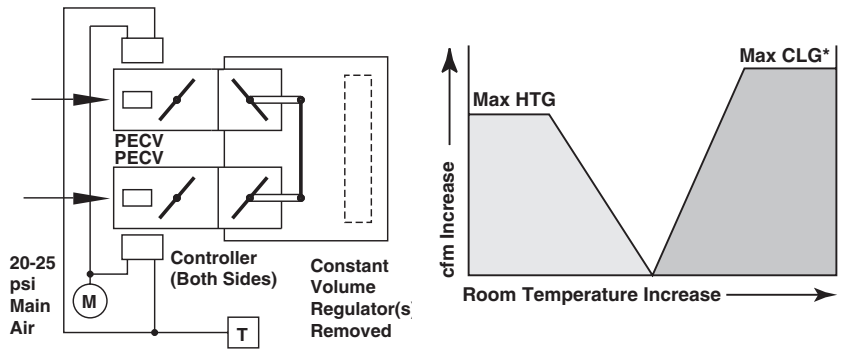
RETROFIT OLD SYSTEM POWERED HIGH PRESSURE VAV BOXES

Pneumatic, analog or digital controls can be used with an ECV assembly to retrofit existing system powered units to operate at lower static pressure. Perimeter zones of cooling and heating can be controlled with one thermostat, avoiding simultaneous heating and cooling.

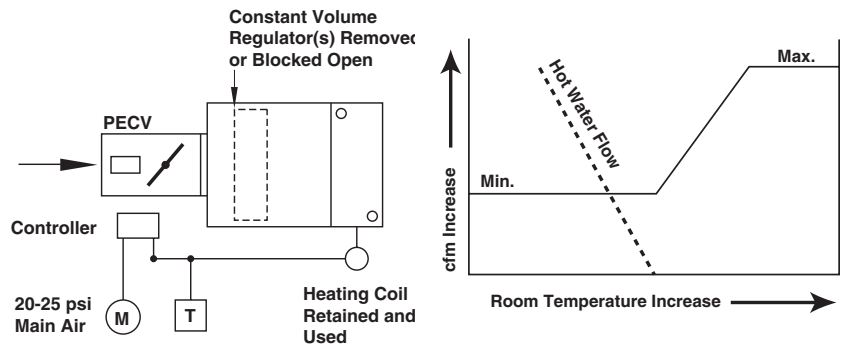
Converting Pneumatic Dual Duct to Dual Duct VAV with Single Existing Damper Actuator with Interlink Dampers



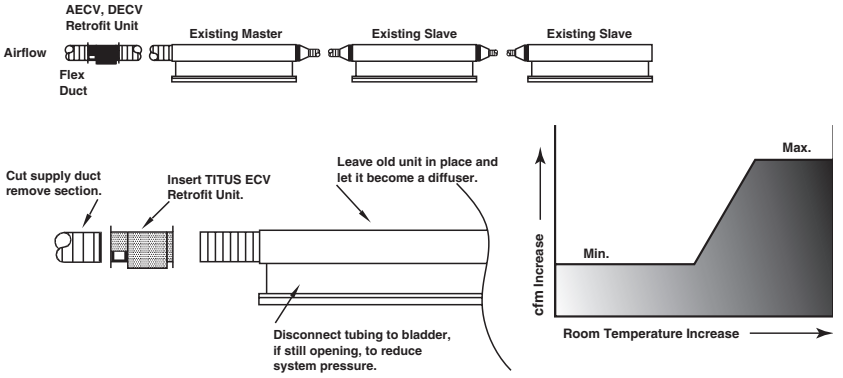
Converting Pneumatic Dual Duct VAV with Existing Damper and Actuator Not Used



Converting Single Duct Constant Volume to VAV



Retrofitting Old System Powered High Pressure VAV Boxes

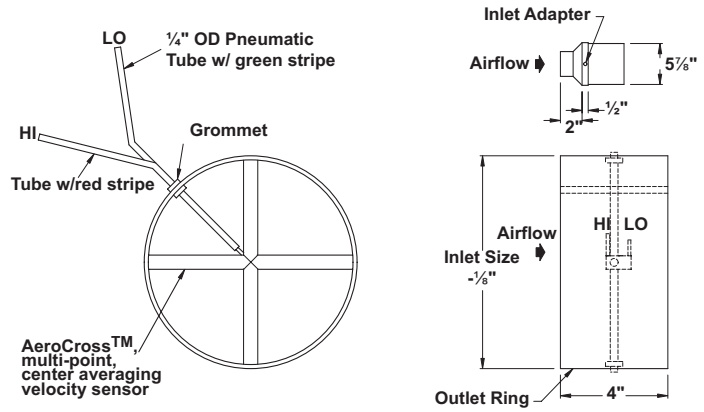


Available Models:
EXX, PECX and
ECV Series

Note: Units are not insulated

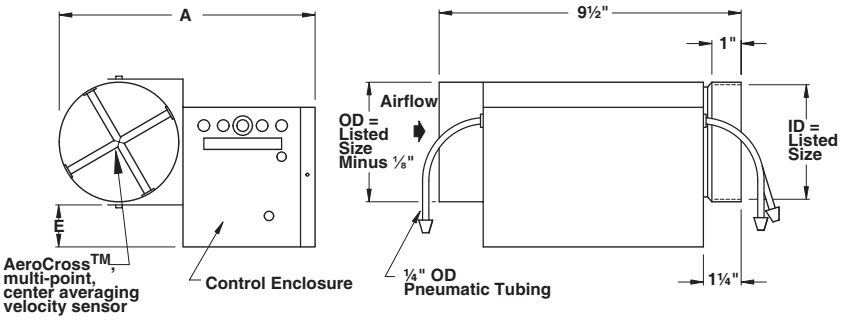
Inlet Size	Total cfm Range
4	0-225
5	0-350
6	0-500
7	0-650
8	0-900
9	0-1050
10	0-1400
12	0-2000
14	0-3000
16	0-4000
18	0-5200

EXX



Size	cfm Range	A	E
4	0-225	8	2¾
5	0-350	9	2¾
6	0-500	10	2¾
7	0-650	11	2¼
8	0-900	12	1¾
9	0-1050	13	1¼
10	0-1400	14	¾
12	0-2000	16	0
14	0-3000	18	0
16	0-4000	20	0

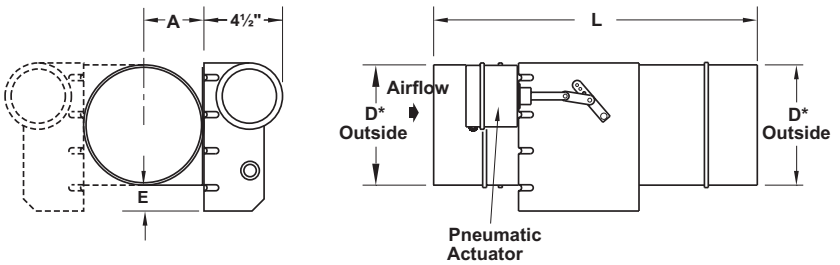
PECX



Note: Right hand control location, as shown, is standard on all models. Left hand is optional.

Size	cfm Range	A	D*	E	L
4	0-225	3 9/16	3 7/8	2 1/8	20
5	0-350	3 9/16	4 7/8	2 1/8	20
6	0-500	3 9/16	5 7/8	2 1/8	16
7	0-650	4 1/16	6 7/8	1 5/8	16
8	0-900	4 9/16	7 7/8	1 1/8	16
9	0-1050	5 1/16	8 7/8	5/8	20
10	0-1400	5 9/16	9 7/8	1/8	20
12	0-2000	6 9/16	11 7/8	0	20
14	0-3000	7 9/16	13 7/8	0	24
16	0-4000	8 9/16	15 7/8	0	24

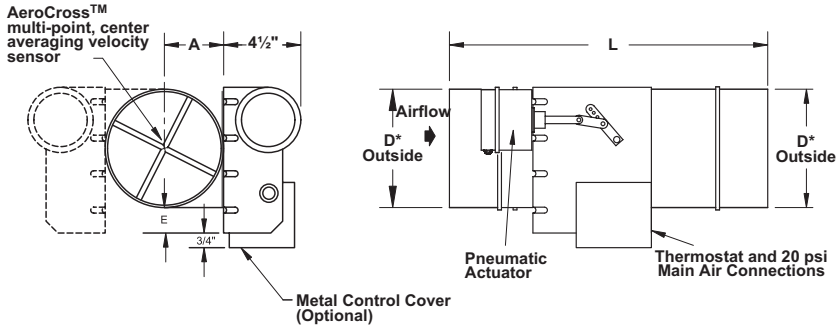
PECV / Pressure Dependant



Note: Right hand control location, as shown, is standard on all models. Left hand is optional.

Size	cfm Range	A	D*	E	L
4	0-225	3 9/16	3 7/8	2 1/8	20
5	0-350	3 9/16	4 7/8	2 1/8	20
6	0-500	3 9/16	5 7/8	2 1/8	16
7	0-650	4 1/16	6 7/8	1 5/8	16
8	0-900	4 9/16	7 7/8	1 1/8	16
9	0-1050	5 1/16	8 7/8	5/8	20
10	0-1400	5 9/16	9 7/8	1/8	20
12	0-2000	6 9/16	11 7/8	0	20
14	0-3000	7 9/16	13 7/8	0	24
16	0-4000	8 9/16	15 7/8	0	24

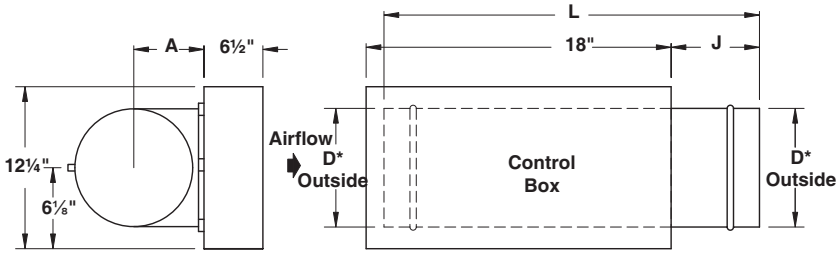
PECV / Pressure Independant



Note: Right hand control location, as shown, is standard on all models. Left hand is optional.

Size	cfm Range	A	D*	J	L
4	0-225	3 9/16	3 7/8	4	20
5	0-350	3 9/16	4 7/8	4	20
6	0-500	3 9/16	5 7/8	2	16
7	0-650	4 1/16	6 7/8	2	16
8	0-900	4 9/16	7 7/8	2	16
9	0-1050	5 1/16	8 7/8	4	20
10	0-1400	5 9/16	9 7/8	4	20
12	0-2000	6 9/16	11 7/8	4	20
14	0-3000	7 9/16	13 7/8	6	24
16	0-4000	8 9/16	15 7/8	6	24

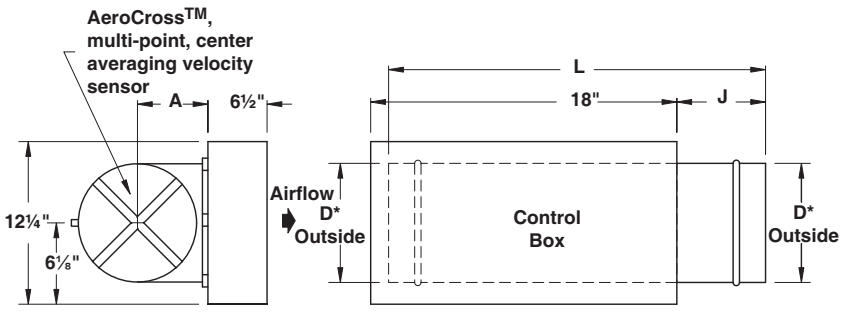
EECV



Note: Right hand control location, as shown, is standard on all models. Left hand is optional.

Size	cfm Range	A	D*	J	L
4	0-225	3 9/16	3 7/8	4	20
5	0-350	3 9/16	4 7/8	4	20
6	0-500	3 9/16	5 7/8	2	16
7	0-650	4 1/16	6 7/8	2	16
8	0-900	4 9/16	7 7/8	2	16
9	0-1050	5 1/16	8 7/8	4	20
10	0-1400	5 9/16	9 7/8	4	20
12	0-2000	6 9/16	11 7/8	4	20
14	0-3000	7 9/16	13 7/8	6	24
16	0-4000	8 9/16	15 7/8	6	24

AECV

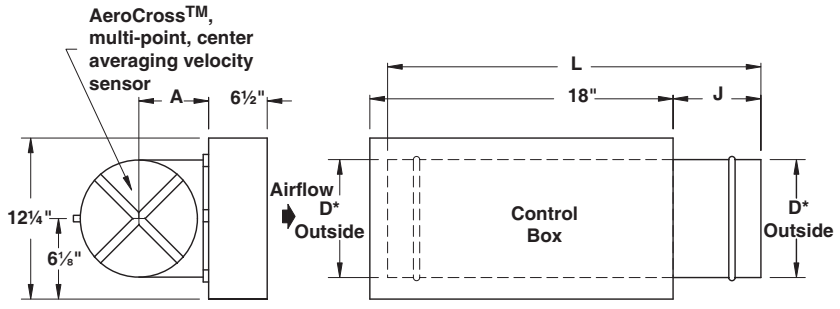


Note: Right hand control location, as shown, is standard on all models. Left hand is optional.

Size	cfm Range	A	D*	J	L
4	0-225	3 9/16	3 7/8	4	20
5	0-350	3 9/16	4 7/8	4	20
6	0-500	3 9/16	5 7/8	2	16
7	0-650	4 1/16	6 7/8	2	16
8	0-900	4 9/16	7 7/8	2	16
9	0-1050	5 1/16	8 7/8	4	20
10	0-1400	5 9/16	9 7/8	4	20
12	0-2000	6 9/16	11 7/8	4	20
14	0-3000	7 9/16	13 7/8	6	24
16	0-4000	8 9/16	15 7/8	6	24

Note: Units are not insulated. Sizes 4 and 5 built with the same casing as Size 6, with a duct adapter added to each end to accommodate the smaller duct size.

DECV



Note: Right hand control location, as shown, is standard on all models. Left hand is optional.

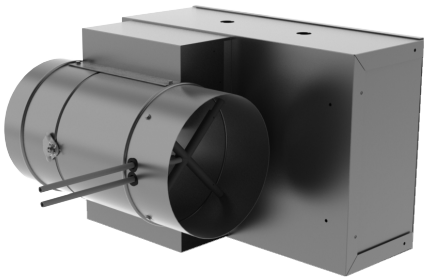
EXTERNAL ROUND DUCT RETROFIT TERMINAL UNITS

RECOMMENDED CFM RANGES

Available Models:

- PECV / Pneumatic
- EECV / Electric
- AECV / Analog Electronic
- DECV / Digital Electronic

Available in stainless steel for exhaust applications. Straight tube design.



Inlet Size	Total cfm Range	cfm Ranges of Minimum and Maximum Settings							
		PECV Pneumatic Titus II Controller		PECV Pneumatic Titus I Controller		AECV Analog Electronic TA1 Controller		DECV Typical Digital Controller	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
4	0-225	50-210	90-225	65-210	90-225	50-225	50-225	30-225	30-225
5	0-350	70-300	125-350	90-300	125-350	70-350	70-350	40-350	40-350
6	0-500	80-345	145-500	100-345	145-500	80-500	80-500	45-500	45-500
7	0-650	120-515	210-650	150-515	210-650	120-650	120-650	70-650	70-650
8	0-900	160-700	285-900	205-700	285-900	160-900	160-900	90-900	90-900
9	0-1050	205-900	370-1050	260-900	370-1050	205-1050	205-1050	120-1050	120-1050
10	0-1400	250-1110	455-1400	325-1110	455-1400	250-1400	250-1400	145-1400	145-1400
12	0-2000	330-1460	600-2000	425-1460	600-2000	330-2000	330-2000	190-2000	190-2000
14	0-3000	525-2335	955-3000	675-2335	955-3000	525-3000	525-3000	300-3000	300-3000
16	0-4000	665-2970	1215-4000	860-2970	1215-4000	665-4000	665-4000	385-4000	385-4000

Note: On pressure dependent units, minimum cfm is always zero, and there is no maximum. On controls mounted by Titus but supplied by others, Factory Mounting Authorization (FMA) these values are guidelines only. Controls mounted on an FMA basis are calibrated in the field.

PECV, AECV, DECV, EECV / RADIATED SOUND POWER LEVELS

Inlet Size	cfm	Min. ΔPs	Sound Power Octave Bands																									
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
04	100	0.07	29	20	21	24	28	20	-	34	26	27	30	33	26	-	37	30	31	33	36	29	-	40	33	34	36	39	32	-
	125	0.12	34	26	27	30	33	26	-	40	33	33	35	39	31	-	43	36	37	39	42	35	12	45	39	40	41	44	37	14
	150	0.17	39	31	32	34	38	30	-	44	38	38	40	43	36	13	47	41	42	44	46	39	16	49	44	44	46	48	42	18
	175	0.23	42	36	36	38	41	34	11	48	42	42	44	47	40	17	51	46	46	48	50	43	20	53	48	49	50	52	45	23
	200	0.30	46	39	39	42	44	37	14	51	46	46	48	50	43	20	54	49	49	51	53	46	24	56	52	52	53	55	49	26
05	150	0.07	30	21	22	25	29	22	-	36	28	29	30	35	28	-	39	31	32	34	38	31	-	41	34	35	36	40	33	10
	200	0.12	37	29	30	32	36	29	-	43	35	36	38	41	35	11	46	39	40	41	45	38	15	48	42	43	44	47	40	17
	250	0.19	43	35	36	38	41	35	11	48	42	42	44	47	40	17	51	45	46	47	50	43	20	53	48	49	50	52	45	23
	300	0.27	47	40	41	43	46	39	16	52	47	47	49	51	45	21	56	50	51	52	54	48	25	58	53	54	54	56	50	28
	350	0.37	51	44	45	47	49	43	19	56	51	51	53	55	48	26	59	55	55	56	58	51	30	61	57	58	58	60	54	33
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	350	0.12	44	37	37	38	42	36	12	49	43	44	44	47	41	17	52	46	47	47	50	44	21	54	49	50	50	52	47	24
	400	0.16	47	40	41	42	45	39	15	52	46	47	48	50	45	21	55	50	51	51	53	48	25	57	52	53	53	55	50	28
	450	0.20	50	44	44	45	48	42	18	55	50	50	51	53	48	24	58	53	54	54	56	51	28	60	56	56	57	58	53	31
	500	0.25	52	47	47	48	50	45	20	58	53	53	54	56	50	27	60	56	57	57	59	53	31	63	59	59	59	61	56	34
07	450	0.11	44	36	37	38	41	36	11	49	42	43	44	47	42	17	52	46	47	47	50	45	21	54	48	50	49	52	47	24
	500	0.13	47	39	40	40	44	39	14	52	45	46	46	49	44	20	55	49	50	50	52	47	24	57	51	52	52	55	50	27
	550	0.16	49	42	42	43	46	41	16	54	48	49	49	51	47	23	57	51	52	52	55	50	27	59	54	55	55	57	52	30
	600	0.19	51	44	45	45	48	43	18	56	50	51	51	53	49	25	59	54	55	54	57	52	29	61	56	57	57	59	54	32
	650	0.22	53	46	47	47	50	45	21	58	52	53	53	55	51	28	61	56	57	56	58	54	32	63	58	59	59	61	56	34
08	600	0.11	46	38	39	39	43	38	13	51	44	45	45	48	44	19	54	48	49	48	51	47	23	56	50	51	51	53	49	26
	650	0.13	48	40	41	41	45	40	15	53	46	47	47	50	46	21	56	50	51	50	53	49	25	58	53	53	53	55	51	28
	700	0.15	50	42	43	43	47	42	17	55	49	49	49	52	47	23	58	52	53	52	55	51	27	60	55	55	55	57	53	30
	750	0.17	51	44	45	45	48	44	18	56	50	51	51	53	49	25	59	54	54	54	56	52	29	61	57	57	56	59	55	32
	800	0.20	53	46	46	47	50	45	20	58	52	52	52	55	51	27	61	56	56	56	58	54	31	63	58	59	58	60	56	34
09	800	0.12	49	40	42	41	45	40	15	54	47	48	47	51	46	22	57	50	51	50	54	49	26	59	53	54	53	56	52	28
	850	0.14	50	42	43	42	47	42	17	55	48	49	48	52	48	24	58	52	53	52	55	51	27	60	55	55	54	57	53	30
	900	0.16	51	44	45	44	48	43	19	56	50	51	50	53	49	25	59	54	54	53	56	52	29	61	56	57	56	59	55	32
	950	0.17	53	45	46	45	49	45	20	58	51	52	51	55	50	27	61	55	56	55	58	54	31	63	58	58	57	60	56	33
	1000	0.19	54	47	48	46	51	46	22	59	53	54	52	56	52	28	62	56	57	56	59	55	32	64	59	60	59	61	57	35
10	900	0.10	47	39	40	39	44	39	14	52	45	46	45	49	45	20	55	49	49	48	52	48	24	58	51	52	50	54	51	26
	1000	0.13	50	42	42	41	46	42	16	55	48	48	47	51	47	23	58	52	52	51	54	51	27	60	54	55	53	57	53	29
	1100	0.16	52	45	45	44	48	44	18	57	51	51	50	54	50	25	60	54	55	53	57	53	29	62	57	57	56	59	55	32
	1200	0.18	54	47	47	46	50	46	21	59	53	53	52	55	52	28	62	57	57	55	59	55	32	64	59	59	58	61	58	34
	1300	0.22	56	49	49	48	52	48	23	61	55	55	54	57	54	30	64	59	59	58	60	57	34	66	61	61	60	63	60	37
12	1200	0.09	47	38	39	38	42	39	12	52	44	45	44	47	44	19	55	48	49	47	50	48	23	57	50	51	50	53	50	26
	1400	0.12	51	43	43	42	46	43	17	56	49	49	48	51	48	23	59	52	53	51	54	51	27	61	54	55	54	56	54	30
	1600	0.16	54	46	47	46	49	46	20	59	52	53	51	54	51	27	62	56	56	55	57	55	31	64	58	59	57	59	57	34
	1800	0.20	57	50	50	49	52	49	24	62	55	56	55	57	54	31	65	59	59	58	60	58	34	67	61	62	60	62	60	37
	2000	0.25	60	52	52	51	55	51	27	65	58	59	57	60	57	34	68	62	62	61	63	60	38	70	64	65	63	65	63	40
14	1500	0.07	47	37	38	37	42	39	12	52	44	44	43	47	44	18	55	47	48	46	50	48	22	57	50	50	48	52	50	25
	1800	0.11	51	42	43	42	46	43	16	56	49	49	47	52	49	23	59	52	53	51	54	52	27	61	55	55	53	57	54	30
	2100	0.15	55	47	47	46	50	47	21	60	53	53	52	55	53	27	63	56	57	55	58	56	31	65	59	59	57	60	58	34
	2400	0.19	58	50	50	49	53	50	25	63	56	57	55	58	56	31	66	60	60	58	61	59	35	68	62	63	61	63	61	38
	2700	0.24	61	53	53	52	56	53	28	66	59	60	58	61	59	35	69	63	63	62	64	62	39	71	66	66	64	66	64	42
16	2000	0.08	49	39	39	38	44	41	14	54	45	46	44	49	46	19	56	49	49	47	52	49	23	58	51	52	50	54	52	26
	2400	0.11	53	44	44	43	48	45	18	58	50	50	49	53	51	25	61	54	54	52	56	54	29	63	56	56	55	58	56	31
	2800	0.15	57	48	48	47	52	49	22	62	54	54	53	57	55	29	64	58	58	56	59	58	33	66	60	61	59	62	60	36
	3200	0.19	60	52	52	50	55	52	26	65	58	58	56	60	58	33	68	62	62	60	63	61	37	70	64	64	62	65	63	40
	3600	0.24	63	55	55	54	57	55	30	67	61	61	59	62	61	36	70	65	65	63	65	64	40	72	67	67	65	67	66	43

- Radiated sound is the noise transmitted through the unit casing
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10

PECV, AECV, DECV, EECV / DISCHARGE SOUND POWER LEVELS

Inlet Size	cfm	Min. ΔPs	Sound Power Octave Bands																										
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
04	100	0.07	65	51	46	45	35	35	**21**	75	60	53	51	38	40	**34**	82	66	57	54	40	42	**42**	86	70	60	57	41	44	**48**
	125	0.11	64	52	48	46	38	38	**20**	75	61	55	52	41	43	**34**	81	67	59	56	43	45	**42**	85	71	62	58	44	47	**47**
	150	0.17	64	53	49	47	41	41	**20**	74	62	56	53	44	45	**33**	81	68	60	57	46	48	**41**	85	71	63	60	47	50	**47**
	175	0.22	64	53	50	48	44	43	**19**	74	63	57	54	47	47	**33**	80	68	61	58	49	50	**40**	84	72	64	60	50	52	**46**
	200	0.29	63	54	51	49	46	44	**19**	74	63	58	55	49	49	**32**	80	69	62	59	51	51	**40**	84	73	65	61	52	53	**46**
05	150	0.07	71	53	49	46	36	39	**28**	81	62	56	52	39	43	**41**	87	67	60	56	41	46	**49**	91	71	63	58	42	48	**54**
	200	0.12	70	55	51	48	41	43	**27**	80	64	58	54	44	47	**40**	86	69	62	58	46	50	**48**	90	73	65	60	47	52	**54**
	250	0.19	69	56	53	50	45	46	**27**	80	65	59	56	47	50	**40**	86	70	63	59	49	53	**47**	90	74	66	62	50	55	**53**
	300	0.27	69	57	54	52	47	49	**22**	79	66	61	57	50	53	**36**	85	71	65	61	52	55	**43**	89	75	67	63	53	57	**43**
	350	0.37	69	58	55	53	50	51	**22**	79	67	62	59	53	55	**35**	85	72	66	62	55	58	**43**	89	76	68	64	56	59	**43**
06	300	0.09	74	59	54	52	43	37	**29**	80	67	61	56	50	44	**37**	84	71	65	59	54	47	**41**	86	74	68	61	56	50	**44**
	350	0.12	75	60	55	53	44	38	**30**	81	68	62	58	51	45	**38**	85	72	66	61	55	49	**43**	88	75	69	63	58	51	**46**
	400	0.16	76	61	55	55	46	39	**32**	83	69	63	60	52	46	**40**	86	73	67	62	56	50	**44**	89	76	70	64	59	52	**48**
	450	0.20	78	62	56	56	47	40	**33**	84	69	63	61	53	47	**41**	87	74	68	64	57	50	**46**	90	77	71	66	60	53	**49**
	500	0.25	78	63	57	58	47	41	**34**	85	70	64	62	54	47	**42**	88	75	68	65	58	51	**47**	91	78	71	67	61	54	**50**
07	450	0.11	75	62	57	55	46	41	**31**	82	69	64	60	53	48	**39**	85	73	68	63	57	51	**43**	88	76	71	65	59	54	**47**
	500	0.13	76	62	57	56	47	42	**32**	83	70	65	61	54	48	**40**	86	74	69	64	57	52	**45**	89	77	72	66	60	55	**48**
	550	0.16	77	63	58	58	48	43	**33**	83	71	65	62	54	49	**41**	87	75	69	65	58	53	**46**	90	78	72	67	61	56	**49**
	600	0.19	78	64	58	59	49	43	**34**	84	71	66	63	55	50	**42**	88	76	70	66	59	54	**46**	90	79	73	68	62	56	**50**
	650	0.22	78	64	59	59	49	44	**35**	85	72	66	64	56	50	**43**	88	76	70	67	60	54	**47**	91	79	73	69	62	57	**51**
08	600	0.10	76	63	58	57	48	44	**32**	82	70	65	62	55	50	**40**	86	75	70	65	59	54	**44**	88	78	73	67	61	57	**47**
	650	0.12	77	63	59	58	49	45	**33**	83	71	66	63	55	51	**40**	87	75	70	66	59	55	**45**	89	78	73	68	62	58	**48**
	700	0.14	78	64	59	59	50	45	**33**	84	71	66	64	56	52	**41**	87	76	70	66	60	55	**46**	90	79	73	68	62	58	**49**
	750	0.16	78	64	59	60	50	46	**31**	84	71	67	64	57	52	**39**	88	76	71	67	60	56	**44**	90	79	74	69	63	59	**47**
	800	0.19	79	64	60	60	51	46	**32**	85	72	67	65	57	53	**40**	88	76	71	68	61	56	**44**	91	79	74	70	64	59	**48**
09	800	0.12	77	64	60	58	51	47	**30**	83	71	68	63	57	53	**38**	87	75	72	66	61	57	**43**	89	78	75	68	64	60	**46**
	850	0.14	78	64	60	59	51	47	**31**	84	71	68	64	58	54	**39**	87	76	72	66	62	58	**43**	90	79	75	68	64	60	**46**
	900	0.16	78	64	61	60	52	48	**31**	84	72	68	64	58	54	**39**	88	76	73	67	62	58	**44**	90	79	76	69	65	61	**47**
	950	0.17	79	65	61	60	52	48	**32**	85	72	69	65	59	55	**40**	88	77	73	68	63	59	**44**	91	80	76	70	65	61	**48**
	1000	0.19	79	65	61	61	53	49	**33**	85	73	69	66	59	55	**40**	89	77	73	68	63	59	**45**	91	80	76	70	66	62	**48**
10	900	0.10	76	64	60	59	51	49	**29**	82	72	67	63	58	55	**36**	86	76	72	66	61	59	**41**	88	79	75	68	64	61	**44**
	1000	0.13	77	65	61	60	52	49	**30**	83	72	68	65	58	56	**38**	86	77	72	67	62	59	**42**	89	80	75	69	65	62	**45**
	1100	0.16	77	65	61	61	53	50	**31**	84	73	69	66	59	56	**39**	87	77	73	69	63	60	**43**	90	80	76	70	66	63	**46**
	1200	0.18	78	66	62	62	53	51	**32**	84	73	69	67	60	57	**39**	88	78	73	70	64	61	**44**	90	81	76	71	67	63	**47**
	1300	0.22	79	66	62	63	54	51	**32**	85	74	70	68	61	58	**40**	88	78	74	70	64	61	**45**	91	81	77	72	67	64	**48**
12	1200	0.09	68	58	56	55	55	51	**18**	73	63	60	59	59	56	**25**	76	66	63	61	61	59	**29**	78	68	64	62	62	61	**31**
	1400	0.12	70	60	58	57	57	53	**21**	75	65	62	61	61	58	**28**	78	68	65	63	63	61	**32**	80	70	67	64	64	63	**34**
	1600	0.16	72	62	60	59	59	54	**24**	77	67	64	63	63	59	**30**	80	70	67	65	65	62	**34**	82	72	69	66	66	64	**37**
	1800	0.20	74	64	62	61	61	56	**26**	79	69	66	64	64	60	**32**	82	72	68	66	66	63	**36**	84	74	70	68	68	65	**39**
	2000	0.25	75	66	63	62	63	57	**28**	80	71	67	66	66	61	**34**	83	74	70	68	68	64	**38**	85	76	72	69	69	66	**41**
14	1500	0.07	67	57	56	56	56	55	**18**	73	62	60	59	59	59	**25**	76	65	63	62	62	62	**29**	78	67	65	63	63	64	**31**
	1800	0.11	70	60	58	58	58	57	**21**	75	65	63	62	62	62	**28**	78	68	65	64	64	64	**32**	81	70	67	66	66	66	**35**
	2100	0.15	72	63	60	61	61	59	**24**	78	68	65	64	64	63	**31**	81	71	67	66	66	66	**35**	83	73	69	68	68	68	**38**
	2400	0.19	74	65	62	62	62	61	**26**	79	70	66	66	66	65	**33**	83	73	69	68	68	68	**37**	85	75	71	70	70	70	**40**
	2700	0.24	76	67	64	64	64	62	**28**	81	72	68	68	68	67	**35**	84	75	71	70	70	69	**39**	86	77	72	71	72	71	**42**
16	2000	0.08	63	59	59	58	58	58	**22**	70	64	63	61	62	62	**26**	74	67	66	64	64	65	**29**	77	69	68	65	65	67	**30**
	2400	0.11	64	62	62	61	61	60	**24**	71	67	66	64	64	65	**28**	75	70	68	66	66	67	**31**	78	72	70	68	68	69	**33**
	2800	0.15	65	65	64	63	63	62	**26**	72	70	68	66	67	67	**30**	76	73	71	68	69	69	**33**	79	75	72	70	70	71	**35**
	3200	0.19	65	67	66	65	65	64	**27**	73	72	70	68	69	68	**32**	77	75	73	70	71	71	**35**	80	77	74	72	72	73	**37**
	3600	0.24	66	69	67	67	67	65	**29**	73	74	72	70	70	70	**33**	77	77	74	72	72	72	**37**	80	79	76	74	74	74	**39**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10

Overview – QCV Slide–In Series

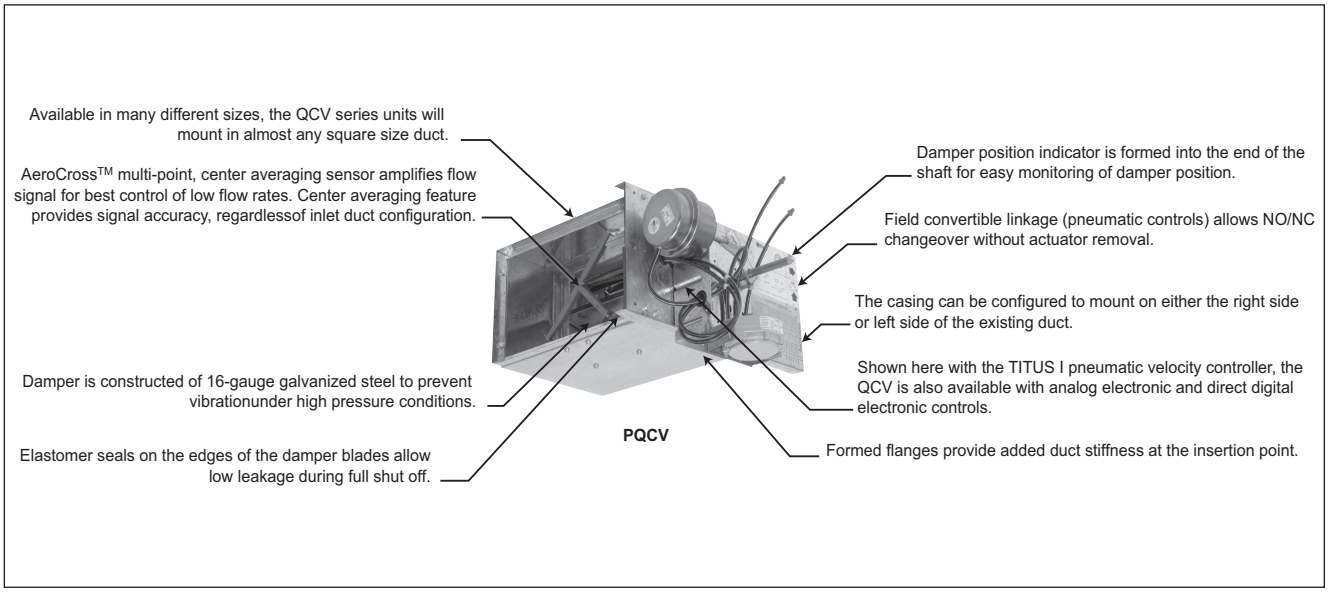
FEATURES AND BENEFITS

Titus Slide-In Retrofit Terminals convert those old constant volume systems to modern and energy efficient variable air volume.

Slide-in retrofit terminals are designed to transform inefficient constant volume systems to present day variable volume systems with very low installation costs. The resulting performance of a system incorporating Titus QCV series terminals approaches that of a VAV system using ESV series single duct terminals.

With the simple installation method, conversion costs are minimized. The installer simply cuts a rectangular hole in the side of the duct, cuts away the insulation (if present), slides the unit into the duct, and screws the mounting plate to the side of the duct.

Take a look at many of the unique features of a Titus QCV series retrofit terminal!



LOW PRESSURE, CONSTANT VOLUME REHEAT SYSTEM

Cold air from the central air handler is distributed through the original duct system. The QCV retrofit terminals convert the system to variable air volume operation.

Each QCV terminal is signaled by a direct acting thermostat. In the pneumatic example shown in the diagram, the pressure independent minimum airflow is set at a thermostat output pressure of 8 psi or less, while the maximum is set at 13 psi or greater.

The existing reheat coil in each zone is actuated on a fall in room temperature as the thermostat output decreases from 8 to 3 psi.

MULTI-ZONE SYSTEM

Hot or cold air from the central multi-zone air handler is distributed through the original zone ducts. The QCV retrofit terminals convert the system to variable air volume operation.

The multi-zone dampers provide a mixed airflow temperature of air at minimum airflow. The PQCV valves provide VAV and pressure independent flow. Very little work is required to convert a multi-zone pressure dependent set of zones to an energy saving series of VAV zones. Each zone now has fixed maximum and minimum airflow without system hunting.

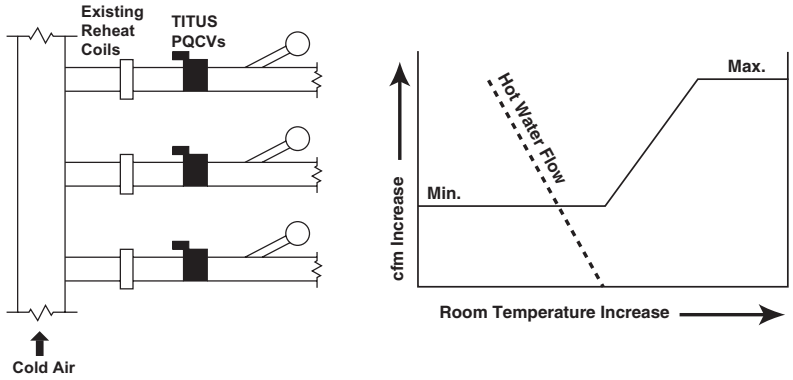
DUAL DUCT SYSTEM

Hot and cold air from the central air handler is distributed through the original supply ducts and terminals. The QCV retrofit terminals convert the system to variable air volume operation.

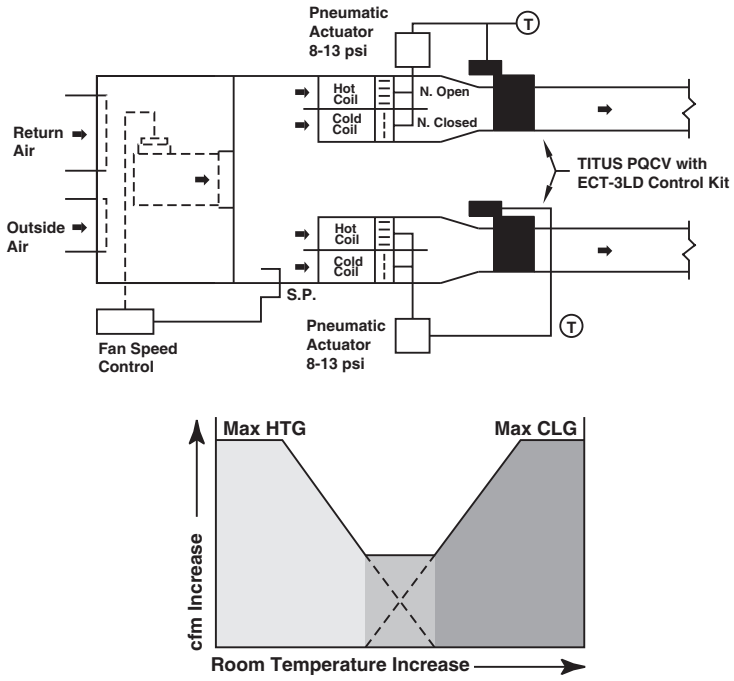
The mechanical constant volume regulator is removed from each existing terminal, while a QCV is installed in the discharge duct. A direct acting thermostat controls both the PQCV and the modulating splitter damper in the existing terminal.

On a rise in room temperature, the PQCV reduces the hot airflow. At the minimum airflow setting, the damper in the existing unit, which in this example has an 8 to 13 psi actuator, begins to modulate and mixing occurs. A further temperature rise increases the cold airflow to the maximum. Since the total air volume is reduced, the fan may need to be slowed down.

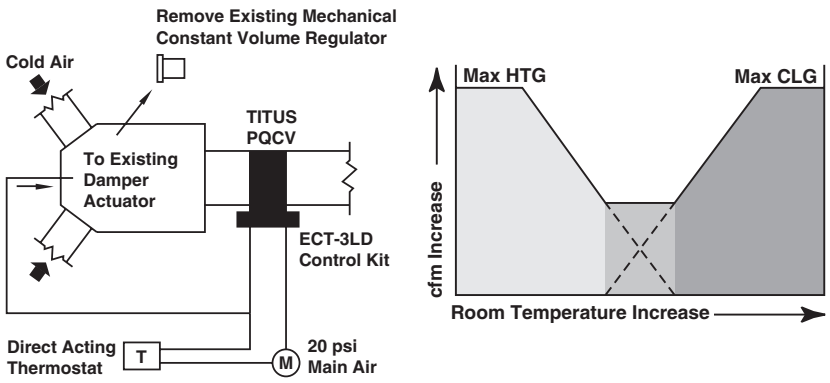
Low Pressure, Constant volume Reheat System Example



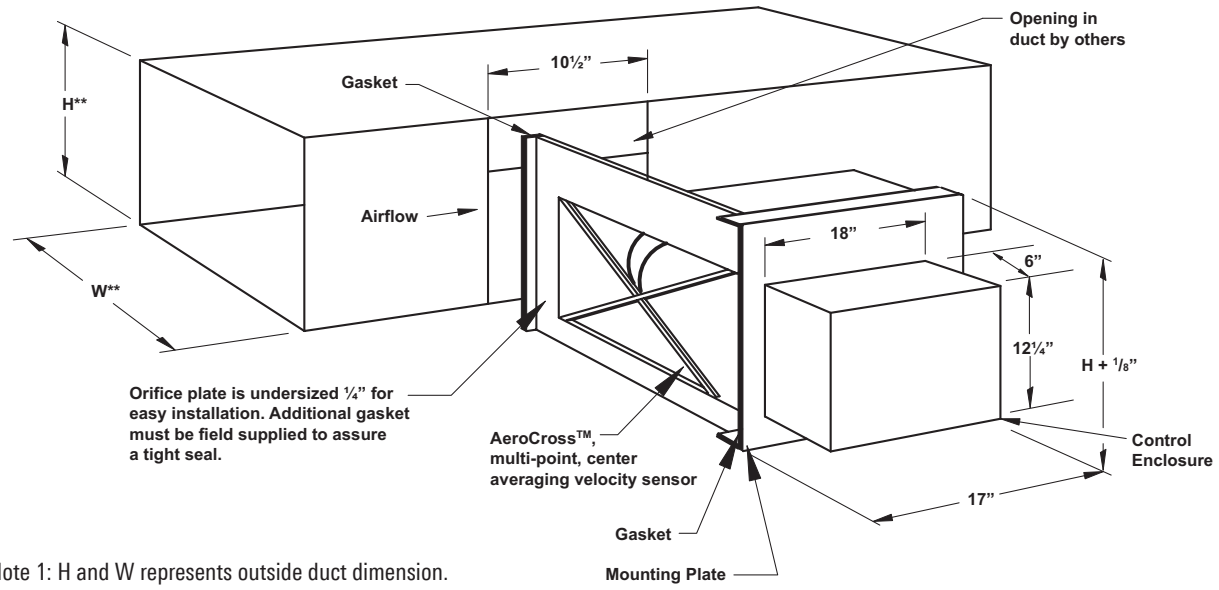
Multi-Zone System Example



Dual Duct System Example



Available Model:
QCV Series



Note 1: H and W represents outside duct dimension.

Note 2: Analog/digital (AQCV/DQCV) shown. Contact your Titus representative for control enclosure location and dimensions. Available with pneumatic controls.

QCV SERIES / AVAILABLE DUCT SIZES*

Unit/ Damper Size	cfm Range	Max cfm Range	Available Duct Sizes* Width W	Height H
A (5x5)	0 to 200	100 to 200	5, 6, 8, 10, 12 6, 8, 10, 12 6, 8, 10, 12	5 6 8
B (6x6)	0 to 300	150 to 300	6, 8, 10, 12, 14 8, 10, 12, 14 8, 10, 12, 14	6 8 10
C (8x6)	0 to 400	20 to 400	8, 10, 12, 14, 16 8, 10, 12, 14, 16 8, 10, 12, 14, 16	6 8 10
D (10x8)	0 to 700	350 to 700	10, 12, 14, 16, 18 10, 12, 14, 16, 18 10, 12, 14, 16, 18 10, 12, 14, 16, 18	8 10 12 14
E (14x8)	0 to 1000	500 to 1000	14, 16, 18, 20, 22, 24 14, 16, 18, 20, 22, 24 14, 16, 18, 20, 22, 24	8 10 12
F (18x6)	0 to 1000	500 to 1000	18, 20, 22, 24, 26 18, 20, 22, 24, 26 18, 20, 22, 24, 26	6 8 10
G (12x10)	0 to 1100	600 to 1100	12, 14, 16, 18, 20, 22 12, 14, 16, 18, 20, 22 12, 14, 16, 18, 20, 22	10 12 14
H (18x10)	0 to 1900	800 to 1900	18, 20, 22, 24, 26, 28, 30 18, 20, 22, 24, 26, 28, 30 18, 20, 22, 24, 26, 28, 30	10 12 14

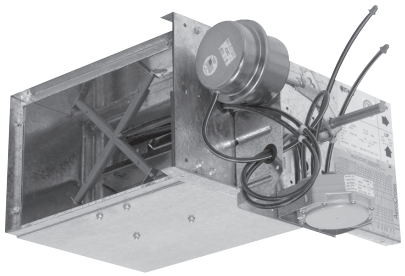
Unit/ Damper Size	cfm Range	Max cfm Range	Available Duct Sizes* Width W	Height H
J (18x12)	0 to 2400	1000 to 2400	18, 20, 22, 24, 26, 28 18, 20, 22, 24, 26, 28 18, 20, 22, 24, 26, 28	12 14 16
K (20x14)	0 to 3800	1350 to 3800	20, 22, 24, 26, 28, 30 20, 22, 24, 26, 28, 30 20, 22, 24, 26, 28, 30	14 16 18
L (30x12)	0 to 5400	1800 to 5400	30, 32, 34, 36 30, 32, 34, 36 30, 32, 34, 36	12 14 16
M (22x16)	0 to 5400	1750 to 5400	22, 24, 26, 28, 30, 32, 34, 36 22, 24, 26, 28, 30, 32, 34, 36 22, 24, 26, 28, 30, 32, 34, 36	16 18 20
N (24x18)	0 to 6700	2300 to 6700	24, 26, 28, 30, 32, 34, 36 24, 26, 28, 30, 32, 34, 36 24, 26, 28, 30, 32, 34, 36 24, 26, 28, 30, 32, 34, 36	18 20 24 26
P (30x20)	0 to 10000	4000 to 10000	30, 32, 34, 36, 38, 40, 42, 44, 46 30, 32, 34, 36, 38, 40, 42, 44, 46 30, 32, 34, 36, 38, 40, 42, 44, 46	20 24 26
R (40x20)	0 to 15000	5000 to 15000	40, 42, 44, 46, 48, 50, 52 40, 42, 44, 46, 48, 50, 52 40, 42, 44, 46, 48, 50, 52	20 24 26

* This is only a sampling of sizes available for the QCV Series. Any duct size larger than the damper size can be built.

Note 1: The cfm Range column shows ranges from lowest minimum setting to highest maximum setting for pneumatic controls.

Note 2: The column, Max cfm Range shows the range of maximum cfm settings, for pneumatic controls.

SLIDE-IN RETROFIT TERMINAL UNITS



RECOMMENDED CFM RANGES

Available Models:

PQCV / Pneumatic
AQCV / Analog Electronic
DQCV / Digital Electronic

Inlet Size	Damper Size	Total cfm Range	cfm Ranges of Minimum and Maximum Settings					
			PQCV Pneumatic TITUS II Controller		AQCV Analog Electronic Controller		DQCV Typical Digital Controller	
			Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
A	5 x 5	0-200	55-200	100-200	55-200	55-200	35-200	35-200
B	6 x 6	0-300	85-300	150-300	85-300	85-300	50-300	50-300
C	8 x 6	0-400	110-400	200-400	110-400	110-400	65-400	65-400
D	10 x 8	0-700	185-700	330-700	185-700	185-700	105-700	105-700
E	14 x 8	0-1000	270-1000	485-1000	270-1000	270-1000	155-1000	155-1000
F	18 x 6	0-1000	255-1000	465-1000	255-1000	255-1000	150-1000	150-1000
G	12 x 10	0-1100	290-1100	530-1100	290-1100	290-1100	170-1100	170-1100
H	18 x 10	0-1900	455-1900	830-1900	455-1900	455-1900	265-1900	265-1900
J	18 x 12	0-2400	525-2350	960-2400	525-2400	525-2400	305-2400	305-2400
K	20 x 14	0-3800	760-3390	1385-3800	760-3800	760-3800	440-3800	440-3800
L	30 x 12	0-5400	970-4320	1765-5400	970-5400	970-5400	560-5400	560-5400
M	22 x 16	0-5400	1015-4525	1850-5400	1015-5400	1015-5400	585-5400	585-5400
N	24 x 18	0-6700	1285-5740	2345-6700	1285-6700	1285-6700	745-6700	745-6700
P	30 x 20	0-10000	1945-8690	3550-10000	1945-10000	1945-10000	1125-10000	1125-10000
R	40 x 20	0-15000	2860-12775	5215-15000	2860-15000	2860-15000	1650-15000	1650-15000

- Total cfm range refers to the overall range of adjustment of the pneumatic velocity controller, from the lowest MIN setting to the highest MAX setting
- Minimum cfm range refers to the range of adjustment of the MIN setting of the pneumatic velocity controller
- Maximum cfm range refers to the range of adjustment of the MAX setting of the pneumatic velocity controller

PQCV, AQCV, DQCV, EQCV / RADIATED SOUND PERFORMANCE

Inlet Size	cfm	Min ΔPs	Octave Band Sound Power, Lw																										
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A (5 x 5)	75	0.06	50	48	34	26	24	24	**16**	57	58	47	37	35	33	**27**	61	64	55	43	41	38	**34**	63	68	60	48	46	42	**39**
	100	0.10	51	48	34	26	24	25	**16**	58	58	47	37	35	34	**28**	62	64	55	43	41	39	**34**	65	68	60	48	46	43	**39**
	125	0.16	52	48	35	26	24	26	**16**	59	58	48	37	35	35	**28**	63	64	55	43	41	41	**34**	66	68	61	48	46	44	**39**
	150	0.23	53	48	35	26	24	27	**16**	60	58	48	37	35	36	**28**	64	64	55	43	41	41	**35**	67	68	61	48	46	45	**39**
	200	0.40	55	48	35	26	24	29	**16**	61	58	48	37	35	38	**28**	65	64	56	43	41	43	**35**	68	69	61	48	46	47	**40**
B (6 x 6)	100	0.04	49	48	34	25	23	23	**16**	56	58	47	36	34	32	**27**	60	64	54	43	41	37	**34**	63	68	60	47	45	41	**39**
	150	0.10	51	48	34	25	23	25	**16**	58	58	47	36	34	34	**28**	62	64	55	43	41	39	**35**	65	68	60	47	45	43	**39**
	200	0.18	53	48	34	25	23	27	**16**	60	58	48	36	34	36	**28**	63	64	55	43	41	41	**35**	66	69	61	47	45	45	**40**
	250	0.28	54	48	35	25	23	28	**16**	61	58	48	36	34	37	**28**	65	64	55	43	41	42	**35**	67	69	61	47	45	46	**40**
	325	0.47	55	48	35	25	23	29	**16**	62	59	48	36	34	38	**28**	66	64	56	43	41	43	**35**	69	69	61	47	45	47	**40**
C (8 x 6)	150	0.04	51	49	34	26	23	25	**17**	57	59	47	37	34	33	**28**	61	65	55	43	40	38	**35**	64	69	60	48	45	42	**40**
	250	0.10	53	49	35	25	23	27	**17**	60	59	48	36	34	36	**28**	63	65	56	43	40	41	**35**	66	69	61	48	45	44	**40**
	350	0.20	55	49	36	25	23	29	**17**	61	59	49	36	34	37	**28**	65	65	56	43	40	43	**35**	68	69	62	47	45	46	**40**
	450	0.33	56	49	37	25	23	30	**17**	63	59	49	36	34	39	**28**	66	65	57	43	40	44	**35**	69	69	62	47	45	47	**40**
	550	0.49	57	49	37	25	23	31	**18**	64	59	50	36	34	40	**28**	67	65	57	42	40	45	**35**	70	69	63	47	45	48	**40**
D (10 x 8)	200	0.05	45	46	29	22	19	19	**13**	52	56	42	34	31	28	**25**	56	62	50	41	38	33	**32**	59	66	56	46	43	37	**37**
	300	0.11	48	46	30	23	20	22	**13**	55	57	44	35	32	31	**26**	59	63	52	42	39	36	**33**	62	67	58	47	44	40	**38**
	400	0.20	50	47	32	23	21	24	**14**	57	57	46	35	32	33	**26**	61	63	54	42	39	39	**33**	64	68	59	47	44	42	**39**
	500	0.31	52	47	33	23	21	26	**14**	59	58	47	35	33	35	**27**	63	64	55	42	40	40	**34**	66	68	60	47	44	44	**39**
	600	0.44	53	47	34	23	21	27	**15**	60	58	47	35	33	36	**27**	64	64	55	42	40	42	**34**	67	68	61	47	45	46	**39**
E (14 x 8)	500	0.14	52	49	35	26	24	26	**17**	58	59	48	37	34	35	**28**	62	64	55	43	40	40	**35**	65	68	60	48	45	43	**39**
	625	0.22	54	50	36	26	24	28	**17**	60	59	49	37	34	36	**28**	63	65	56	43	41	41	**35**	66	69	61	48	45	44	**40**
	750	0.32	55	50	37	26	24	29	**18**	61	59	49	37	35	37	**29**	65	65	57	43	41	42	**35**	67	69	62	48	45	46	**40**
	875	0.43	56	50	37	26	24	30	**18**	62	60	50	37	35	38	**29**	66	65	57	43	41	43	**36**	68	69	62	48	45	47	**40**
	950	0.51	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	63	60	50	37	35	39	**29**	66	65	57	43	41	44	**36**	69	69	63	48	46	47	**40**
F (18 x 6)	500	0.16	51	48	34	25	23	26	**16**	58	58	47	36	34	34	**27**	62	64	54	43	40	39	**34**	64	68	60	47	44	43	**39**
	625	0.24	53	49	35	25	23	27	**16**	59	59	48	36	34	36	**28**	63	64	55	43	40	41	**35**	66	68	61	48	45	44	**39**
	750	0.35	54	49	36	25	23	28	**17**	61	59	49	36	34	37	**28**	65	65	56	43	41	42	**35**	67	69	61	48	45	46	**40**
	875	0.48	55	49	36	25	24	29	**17**	62	59	49	37	34	38	**29**	66	65	57	43	41	43	**35**	68	69	62	48	45	47	**40**
	950	0.56	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	62	59	50	37	35	38	**29**	66	65	57	43	41	44	**36**	69	69	62	48	45	47	**40**
G (12 x 10)	500	0.12	50	48	32	24	22	24	**15**	56	57	45	35	33	32	**27**	60	63	53	42	39	37	**33**	63	67	59	47	44	41	**38**
	650	0.21	52	48	34	24	22	26	**16**	58	58	47	36	33	34	**27**	62	64	54	42	40	40	**34**	65	68	60	47	44	43	**39**
	800	0.31	53	49	35	25	23	27	**16**	60	59	48	36	34	36	**28**	64	64	56	43	40	41	**35**	67	68	61	47	45	45	**39**
	950	0.44	55	49	36	25	23	29	**17**	61	59	49	36	34	38	**28**	65	65	57	43	41	43	**35**	68	69	62	48	45	46	**40**
	1100	0.59	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	63	59	50	37	34	39	**29**	66	65	57	43	41	44	**36**	69	69	63	48	46	47	**40**
H (18 x 10)	700	0.08	53	51	38	28	26	28	**19**	59	60	49	38	35	35	**29**	62	65	56	44	41	39	**35**	64	69	60	48	45	43	**40**
	1000	0.17	55	52	39	29	26	30	**20**	61	61	50	38	36	37	**30**	64	66	57	44	42	42	**36**	67	69	62	48	46	45	**40**
	1300	0.29	57	52	40	29	27	31	**20**	62	61	51	39	36	39	**31**	66	66	58	44	42	43	**37**	68	70	63	48	46	46	**41**
	1600	0.44	58	53	41	29	27	33	**21**	64	61	52	39	37	40	**31**	67	66	59	45	42	45	**37**	69	70	63	49	46	48	**41**
	1900	0.62	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	65	62	53	39	37	41	**31**	68	67	59	45	43	46	**37**	70	70	64	49	47	49	**42**
J (18 x 12)	1000	0.10	55	53	40	29	27	29	**21**	60	61	50	38	36	36	**31**	63	66	57	44	41	40	**36**	65	69	61	48	45	43	**40**
	1300	0.17	57	54	41	30	28	31	**22**	62	62	52	39	37	38	**31**	65	66	58	44	42	42	**37**	67	70	62	48	46	45	**41**
	1600	0.26	58	54	42	30	28	33	**23**	63	62	53	39	37	40	**32**	66	67	59	45	43	44	**37**	68	70	63	49	46	47	**41**
	1900	0.37	59	55	43	31	29	34	**23**	64	63	53	40	38	41	**33**	67	67	60	45	43	45	**38**	70	70	64	49	47	48	**42**
	2200	0.50	60	55	43	31	29	35	**24**	65	63	54	40	38	42	**33**	68	68	60	46	43	46	**38**	71	71	65	50	47	49	**42**
K (20 x 14)	2000	0.17	59	57	45	33	31	31	**26**	64	64	54	41	39	38	**34**	67	68	60	46	43	43	**38**	68	70	64	49	47	46	**42**
	2400	0.24	61	58	46	33	32	31	**27**	65	64	55	42	39	39	**35**	68	68	61	46	44	43	**39**	70	71	65	50	47	46	**43**
	2800	0.32	62	58	47	34	32	32	**27**	67	65	56	42	40	39	**35**	69	69	62	47	45	44	**40**	71	72	66	50	48	47	**43**
	3200	0.42	63	59	48	35	33	32	**28**	68	65	57	43	41	40	**36**	70	69	63	48	46	44	**40**	72	72	66	51	49	47	**44**
	3600	0.53	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	69	66	58	43	41	40	**36**	71	70	63	48	46	45	**41**	73	72	67	52	49	48	**44**
L (30 x 12)	2800	0.08	63	62	55	41	38	35	**32**	66	67	63	47	44	41	**38**	69	70	68	51	48	45	**43**	70	72	71	54	51	47	**47**
	3450	0.12	64	62	55	41	38	36	**32**	68	68	63	48	44	42	**39**	70	71	68	51	48	45	**44**	71	73	71	54	51	47	**47**
	4100	0.17	66	63	56	41	38	36	**33**	69	68	64	48	44	42	**39**	71	71	68	52	48	45	**44**	73	73	72	54	50	48	**48**
	4750	0.23	67	64	56	41	37	36	**34**	70	69	64	48	44	42	**40**	72	72	69	52	48	46	**45**	74	74	72	54	50	48	**48**
	5400	0.29	68	64	56	42	37	36	**34**	71	69	64	48	44	42	**40**	73	72	69	52	48	46	**45**	75	74	72	55	50	48	**49**
M (22 x 16)	2800	0.11	63	60	53	38	38	34	**30**	66	66	62	45	44	40	**37**	68	69	67	50	48	44	**43**	70	71	71	53	51	46	**47**
	3450	0.16	65	61	54	39	39	35	**31**	68	67	62	46	45	41	**38**	70	70	68	50	48	45	**43**	72	72	71	53	51	47	**47**
	4100	0.23	66	62	54	39	39	36	**32**	70	68	63	47	45	42	**38**	72	71	68	51	49	45	**44**	73	73	72	54	51	48	**48**
	4750	0.31	67	63	54	40	39	36	**33**	71	68	63	47	45	43	**39**	73	71	68	52	49	46	**44**	75	74	72	55	52	49	**48**
	5400	0.40	68	63	54	40	39	37	**33**	72	69	63	48	46	43	**40**	74	72	68	52	49	47	**44**	76	74	72	55	52	49	**48**
N (24 x 18)	3000	0.06	62	61	54	38	37	34	**30**	65	66	62	45	43	40	**37**	67	69	67	49	47	43	**43**	69	71	70	52	49	46	**46**
	3925	0.11	64	62	54	39	38	34	**32**	68	67	63	46	44	41	**38**	70	70	67	50	47	44	**43**	71	72	71	53	50	47	**47**
	4850	0.16	66	63	55	40	38	35	**32**	69	68	63	47	44	41	**39**	71	71	68	51	48	45	**44**	73	73	71	54	50	47	**48**
	5775	0.23	67	63	55	41	38	36	**33**	70	68	64	48	44	42	**39**	72	71	68	52	48	45	**44**	74	74	72	55	50	48	**48**
	6700	0.31	68	64	56	42	39	36	**34**	72	69	64	49	45	42	**40**	74	72	69	53	48	46	**45**	75	74	72	56	51	48	**48**
P (30 x 20)	3600	0.05	61	59	53	38	36	32	**29**	64	65	61	45	43	39	**36**	67	68	66	49	46	43	**42**	68	70	69	52	49	45	**45**
	5200	0.10	63	60	54	38	37	33	**30**	67	66	62	45	43	40	**37**	69	69	67	49	47	43	**42**	71	72	70	52	49	46	**46**
	6800	0.17	65	61	55	38	37	34	**31**	69	67	63	46	43	40	**38**	71	70	67	50	47	44	**43**	72	72	71	53	50	47	**47**
	8400	0.25	66	62	55	39	37	34	**32**	70	68	63	46	43	41	**38**	72	71	68	50	47	44	**44**	74	73	71	53	50	47	**47**
	10000	0.36	67	63	55	39	37	35	**33**	71	68	63	46	44	41	**39**	73	71	68	50	47	45	**44**	75	74	72	53	50	48	**48**
R (40 x 20)	7000	0.10	64	61	54	41	38	34	**31**	67	66	62	47	44	40	**37**	69	69	67	50	47	44	**42**	71	72	70	53	50	46	**46**
	9000	0.16	65	62	55	41	38	34	**32**	69	67	63	47	44	41	**38**	71	70	67	51	47	44	**43**	73	72	71	53	50	47	**47**
	11000	0.24	67	63	55	42	38	35	**33**	70	68	63	48	44	41	**39**	72	71	68	51	48	44	**43**	74	73	71	53	50	47	**47**
	13000	0.34	68	63	55	42	39	35	**33**	71	68	63	48	44	41	**39**	73	71	68	51	48	45	**44**	75	73	71	54	50	47	**47**
	15000	0.45	69	63	56	42	39	35	**34**	72	69	64	48	44	41	**40**	74	72	68	52	48	45	**44**	76	74	72	54	50	47	**48**

RADIATED

- Radiated sound is the noise transmitted through the duct wall
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10

PQCV, AQCV, DQCV, EQCV / DISCHARGE SOUND PERFORMANCE

Inlet Size	cfm	Min ΔPs	Octave Band Sound Power, Lw																										
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A (5 x 5)	75	0.06	74	57	45	33	35	26	**33**	82	67	56	42	45	34	**44**	87	74	63	47	51	39	**50**	90	78	68	51	55	42	**54**
	100	0.10	75	57	45	35	36	26	**35**	83	67	57	44	46	35	**45**	88	73	63	49	52	40	**51**	91	78	68	53	56	43	**55**
	125	0.16	76	56	45	36	36	27	**36**	84	67	57	45	46	35	**46**	89	73	64	50	52	40	**52**	92	77	68	54	56	44	**56**
	150	0.23	77	56	46	37	36	27	**36**	85	67	57	46	47	36	**46**	89	73	64	51	53	41	**52**	93	77	69	55	57	44	**57**
	200	0.40	78	56	46	38	37	28	**37**	86	66	57	47	47	37	**48**	90	72	64	52	53	42	**54**	93	77	69	56	57	45	**58**
B (6 x 6)	100	0.04	73	55	46	32	35	24	**30**	80	66	58	41	45	33	**40**	85	72	66	46	51	38	**46**	88	77	71	50	55	42	**51**
	150	0.10	74	55	46	34	36	25	**32**	82	66	58	43	46	34	**42**	86	72	66	48	52	39	**48**	90	76	71	52	56	43	**52**
	200	0.18	75	54	46	35	37	26	**33**	83	65	58	45	47	35	**43**	87	71	66	50	52	40	**49**	91	76	71	54	57	44	**54**
	250	0.28	76	54	46	37	37	27	**34**	84	65	58	46	47	36	**44**	88	71	66	51	53	41	**50**	91	76	71	55	57	44	**55**
	325	0.47	77	54	46	38	37	28	**32**	84	65	58	47	48	36	**42**	89	71	66	53	53	41	**48**	92	75	71	56	58	45	**52**
C (8 x 6)	150	0.04	73	55	46	33	36	25	**30**	80	65	59	42	46	34	**40**	85	72	66	47	52	39	**46**	88	76	71	51	56	42	**50**
	250	0.10	74	54	46	36	37	27	**33**	82	65	58	44	47	35	**42**	86	71	66	50	53	40	**48**	90	75	71	53	57	44	**52**
	350	0.20	75	54	46	37	38	28	**30**	83	64	58	46	47	36	**40**	87	70	65	51	53	41	**46**	91	75	71	55	57	45	**50**
	450	0.33	76	54	46	39	38	28	**31**	84	64	58	48	48	37	**41**	88	70	65	53	54	42	**47**	92	75	70	56	58	45	**51**
	550	0.49	77	53	46	40	38	29	**32**	85	64	58	49	48	37	**42**	89	70	65	54	54	42	**48**	92	74	70	57	58	46	**52**
D (10 x 8)	200	0.05	66	51	41	26	32	21	**22**	74	62	54	36	42	30	**33**	79	68	62	41	48	35	**39**	82	73	68	45	52	39	**43**
	300	0.11	68	51	42	30	33	23	**21**	76	62	55	39	44	32	**32**	81	68	63	45	50	37	**38**	84	73	68	49	54	41	**42**
	400	0.20	70	51	42	32	34	24	**23**	78	62	56	42	45	33	**34**	83	68	63	47	51	38	**40**	86	73	69	51	55	42	**44**
	500	0.31	71	51	43	34	35	25	**25**	79	62	56	43	46	34	**35**	84	69	64	49	52	40	**41**	87	73	69	53	56	43	**46**
	600	0.44	72	51	43	35	36	26	**26**	80	62	56	45	46	35	**36**	85	69	64	50	52	40	**42**	88	73	70	54	57	44	**47**
E (14 x 8)	500	0.14	71	53	45	34	37	26	**24**	78	63	57	43	46	35	**34**	82	69	64	48	52	39	**39**	85	73	69	51	56	43	**43**
	625	0.22	72	53	46	36	38	27	**26**	79	63	58	44	47	35	**35**	83	69	65	49	53	40	**41**	86	73	70	53	56	44	**44**
	750	0.32	73	53	46	37	38	28	**24**	80	63	58	46	48	36	**34**	84	69	65	51	53	41	**39**	87	73	70	54	57	45	**43**
	875	0.43	73	53	46	38	39	28	**25**	81	63	58	47	48	37	**35**	85	69	65	52	54	42	**40**	88	73	70	55	58	45	**44**
	950	0.51	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	81	63	58	47	48	37	**35**	85	69	65	52	54	42	**41**	88	73	70	56	58	45	**45**
F (18 x 6)	500	0.16	70	52	44	34	36	25	**23**	78	62	56	42	46	34	**33**	82	68	64	48	51	39	**39**	85	73	69	51	56	43	**43**
	625	0.24	71	52	44	35	37	26	**25**	79	62	57	44	47	35	**35**	83	69	64	49	52	40	**40**	86	73	69	53	56	44	**44**
	750	0.35	72	52	45	36	37	27	**23**	80	62	57	45	47	36	**33**	84	69	65	50	53	41	**39**	87	73	70	54	57	44	**43**
	875	0.48	73	52	45	38	38	28	**24**	80	62	58	46	48	36	**34**	85	69	65	51	53	41	**40**	88	73	70	55	57	45	**44**
	950	0.56	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	81	63	58	47	48	37	**35**	85	69	65	52	54	42	**41**	88	73	70	56	58	45	**45**
G (12 x 10)	500	0.12	68	51	43	32	35	24	**22**	76	62	56	40	45	33	**31**	80	68	63	46	50	38	**37**	83	72	68	49	54	42	**41**
	650	0.21	70	51	44	34	36	25	**24**	77	62	56	43	46	34	**33**	82	68	64	48	51	39	**39**	85	72	69	52	56	43	**43**
	800	0.31	71	51	44	36	37	26	**23**	79	62	57	45	47	35	**32**	83	68	64	50	52	40	**38**	86	73	69	53	56	44	**42**
	950	0.44	72	52	45	37	38	27	**24**	80	62	57	46	47	36	**34**	84	68	65	51	53	41	**40**	87	73	70	55	57	45	**44**
	1100	0.59	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	81	62	58	47	48	37	**35**	85	68	65	52	54	42	**41**	88	73	70	56	58	46	**45**
H (18 x 10)	700	0.08	70	54	47	36	39	27	**23**	77	63	58	43	47	35	**32**	81	69	65	48	52	39	**37**	83	72	69	51	56	43	**41**
	1000	0.17	72	54	48	38	40	29	**24**	79	63	59	46	48	37	**33**	82	69	66	50	53	41	**36**	85	73	70	53	57	44	**42**
	1300	0.29	73	54	48	40	41	30	**25**	80	64	60	47	49	38	**34**	84	69	66	52	54	42	**39**	87	73	71	55	58	45	**43**
	1600	0.44	74	54	49	41	41	31	**26**	81	64	60	49	50	38	**35**	85	69	66	53	55	43	**40**	88	73	71	56	58	46	**44**
	1900	0.62	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	82	64	60	50	50	39	**36**	86	69	67	54	55	44	**41**	89	73	71	57	59	47	**46**
J (18 x 12)	1000	0.10	71	56	50	38	41	28	**23**	78	64	60	45	49	36	**31**	81	69	66	49	53	40	**35**	84	72	70	52	56	43	**39**
	1300	0.17	73	56	50	40	42	30	**25**	79	64	60	47	50	37	**33**	83	69	66	51	54	41	**37**	85	73	71	54	57	44	**41**
	1600	0.26	74	56	51	42	43	31	**26**	80	65	61	48	51	38	**34**	84	69	67	52	55	42	**39**	86	73	71	55	58	45	**42**
	1900	0.37	75	57	51	43	44	31	**28**	81	65	61	50	51	39	**35**	85	70	67	54	56	43	**40**	87	73	72	57	59	46	**43**
	2200	0.50	76	57	52	44	44	32	**29**	82	65	62	51	52	39	**37**	86	70	68	55	56	44	**41**	88	73	72	58	60	47	**44**
K (20 x 14)	2000	0.17	75	59	54	42	44	32	**27**	81	66	63	49	51	39	**34**	84	70	68	52	55	42	**39**	86	73	71	55	58	45	**42**
	2400	0.24	76	59	54	43	44	33	**28**	81	66	63	49	51	40	**36**	85	71	68	53	55	44	**40**	87	74	72	56	59	46	**43**
	2800	0.32	77	60	55	44	44	34	**29**	82	67	64	50	51	41	**37**	85	71	69	54	56	44	**41**	88	74	72	57	59	47	**44**
	3200	0.42	77	60	55	44	44	35	**30**	83	67	64	51	51	41	**37**	86	71	69	55	56	45	**41**	88	74	73	57	59	48	**44**
	3600	0.53	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	83	67	65	51	51	42	**38**	87	71	70	55	56	46	**42**	89	74	73	58	59	49	**45**
L (30 x 12)	2800	0.08	78	63	59	46	48	36	**32**	82	68	66	51	54	41	**38**	85	72	70	54	57	44	**41**	87	74	72	56	59	46	**43**
	3450	0.12	79	64	61	47	49	37	**33**	83	69	67	52	54	43	**39**	86	72	71	55	58	46	**42**	88	74	74	57	60	48	**44**
	4100	0.17	80	64	61	48	49	38	**34**	84	69	68	53	55	44	**40**	87	73	72	56	58	47	**43**	88	75	74	58	60	49	**45**
	4750	0.23	81	65	62	49	50	39	**35**	85	70	69	54	55	45	**41**	87	73	73	57	58	48	**44**	89	75	75	59	61	50	**46**
	5400	0.29	81	65	63	49	50	40	**36**	86	70	69	54	56	45	**42**	88	73	73	57	59	48	**45**	90	76	76	59	61	51	**47**
M (22 x 16)	2800	0.11	78	62	58	46	48	35	**32**	82	68	65	51	53	41	**37**	85	71	69	54	57	44	**41**	87	74	72	56	59	46	**43**
	3450	0.16	80	62	59	47	48	36	**34**	84	68	66	52	54	42	**39**	86	72	70	55	57	45	**43**	88	74	73	57	60	48	**45**
	4100	0.23	81	63	60	49	49	37	**36**	85	69	67	54	55	43	**41**	88	72	71	57	58	46	**44**	89	75	74	59	61	49	**47**
	4750	0.31	82	63	61	50	50	38	**37**	86	69	68	55	55	44	**42**	89	73	72	58	59	47	**46**	90	75	75	60	61	50	**48**
	5400	0.40	83	64	62	51	50	39	**38**	87	70	69	56	56	45	**44**	90	73	73	59	59	48	**47**	91	75	76	61	62	50	**49**
N (24 x 18)	3000	0.06	77	62	59	45	47	35	**30**	81	68	65	50	53	40	**36**	84	71	69	53	57	43	**39**	86	73	72	55	59	45	**41**
	3925	0.11	79	63	60	46	48	36	**32**	83	69	67	51	54	42	**37**	85	72	70	55	57	45	**40**	87	74	73	57	59	47	**43**
	4850	0.16	80	64	61	47	48	38	**33**	84	69	68	53	54	43	**39**	86	72	72	56	58	46	**42**	88	75	74	58	60	49	**44**
	5775	0.23	80	64	62	48	49	39	**34**	85	70	69	54	54	44	**40**	87	73	73	57	58	47	**43**	89	75	75	59	60	50	**45**
	6700	0.31	81	65	63	49	49	40	**35**	85	70	70	54	55	45	**41**	88	73	73	57	58	48	**44**	89	76	76	59	61	51	**46**
P (30 x 20)	3600	0.05	76	62	57	44	46	33	**28**	80	67	64	50	52	38	**33**	82	70	67	53	56	42	**36**	84	73	70	55	59	44	**40**
	5200	0.10	77	63	60	46	47	35	**30**	81	68	66	51	53	40	**35**	84	71	70	54	57	44	**38**	86	73	72	56	59	46	**42**
	6800	0.17	78	63	61	47	47	36	**31**	83	69	67	52	53	42	**37**	85	72	71	55	57	45	**40**	87	74	74	57	59	48	**43**
	8400	0.25	79	64	62	47	48	38	**32**	84	69	69	53	54	43	**38**	86	72	72	56	57	46	**41**	88	75	75	58	60	49	**44**
	10000	0.36	80	64	63	48	48	38	**33**	84	70	70	53	54	44	**39**	87	73	73	56	57	47	**42**	89	75	76	58	60	50	**46**
R (40 x 20)	7000	0.10	77	62	60	45	46	33	**30**	81	68	66	50	52	39	**35**	83	71	69	54	56	43	**38**	85	73	72	56	59	45	**40**
	9000	0.16	78	63	61	46	46	34	**31**	82	68	67	51	53	41	**36**	84	71	71	54	57	44	**39**	86	74	73	57	59	47	**42**
	11000	0.24	78	63	62	47	47	36	**32**	83	69	68	52	53	42	**37**	85	72	72	55	57	46	**40**	87	74	75	57	59	48	**43**
	13000	0.34	79	64	63	47	47	37	**33**	83	69	69	52	53	43	**38**	86	72	73	56	57	47	**41**	87	74	76	58	60	49	**43**
	15000	0.45	80	64	64	48	47	38	**33**	84	69	70	53	54	44	**39**	86	72	74	56	57	48	**42**	88	75	76	58	60	50	**44**

DISCHARGE

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10

Notes

Notes

Icons

contributes toward energy savings by reducing operating costs of air distribution devices

energy solutions

for use in retrofitting older products into modern designs & systems

retrofit