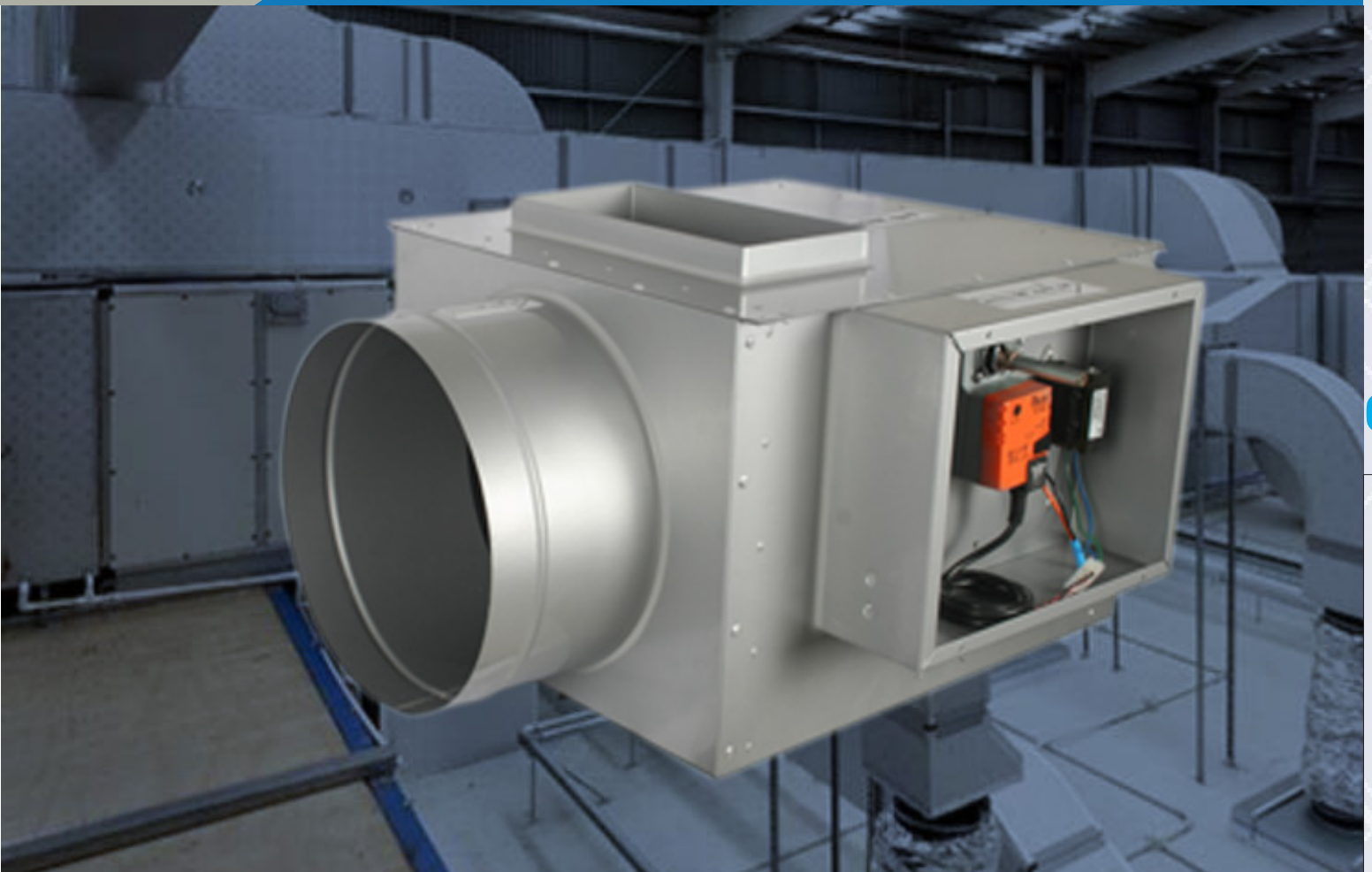


# BYPASS TERMINAL UNIT

We Care For The Air You Breathe



GHA

## Bypass Terminal Unit Index

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## BYPASS TERMINAL UNITS (BPTU)

### DESCRIPTION

FLOWTECH Bypass Terminal Units handles constant supply of primary air through its inlet and uses a diverting damper to bypass part of supply air into the plenum return. The damper is directly controlled by room thermostat in the occupied space to provide the volume of air required to meet the thermal demand. The pressure requirement through the supply air path to the conditioned space is set with an inlet balancing damper. A second manual balancing damper in the bypass is field adjusted to match the resistance in the discharge duct in order to maintain minimum airflow to the space. Although variable air volume to the space in operation varies, the total airflow of the fan remains constant, so the fan power associated energy cost is not reduced. Therefore, bypass units are not energy efficient.

### FEATURES

The housing of VAV is made of Galvanized sheet steel of thickness 0.9 (21g)

Damper blade is single thickness 1.5mm Galvanized plate with full round gasket for air tight operation for high pressure systems.

The damper blade is having a precision die cast zinc alloy shaft which rotates in self lubricating brass bushes, resulting to an extremely low friction for damper operation.

Variable Air Volume units are designed to ensure airtight operations with low leakage factor of 2% of total air volume at 750Pa inlet static pressure as per international standards DW 144 Class C.

Internal walls of VAV are lined with 25mm thick, density 24 kg/m<sup>3</sup> acoustic liner made of mineral fiber and edges are coated with adhesive or concealed with metal stiffener to seal loose fiber.

Tight closure of damper with gasket, ensure low leakage with less than 2% of total air volume at 750Pa maximum static pressure meeting international standards for erosion, casing leakage rate to Class 2 in accordance with DIN24194 and fire hazard classification 25/50 as per ASTM E 84 & UL723.

Rectangular discharge opening is designed for slip and drive cleat connection. Flanged or other end connection is optional.



### MATERIAL SPECIFICATIONS

#### Casing

0.9 mm galvanized steel sheet Double Skin available as optional

#### Damper Blade

1.5 mm galvanized steel sheet

#### Acoustic Insulation

25mm thick, 24kg/m<sup>3</sup> with black tissue facing meeting UL 181 std.

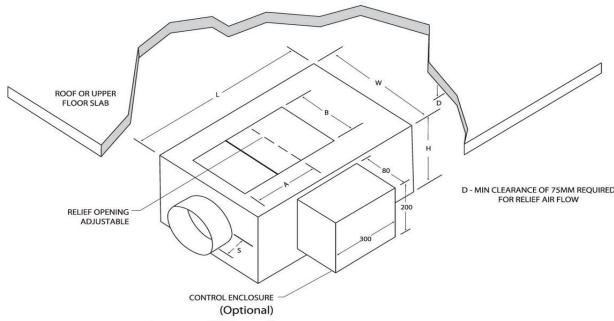
#### Bushes

Brass bush size 12mm round type

*Powder coating available as optional*

*\*Material Specifications subject to change as per customer's demand.*

**ENGINEERING FEATURES**



VAV terminals are suitable for Variable Air Volume supplies with options in Pneumatic, Electrical Control or Automated Control Systems (ACS) to suit most of the various applications on controls.

Pneumatic Control Systems are becoming obsolete. The VAV damper is opened and closed by a controller sending air pressure to an actuator connected to the VAV damper.

ACS works the same as electric except there is an automated system set up in the building that gets information from all the VAV and air handlers, display it in text and graphics form. VAV unit provides energy saving by maintaining constant room temperature with low-pressure drops and Variable Air Volume supplies, for the low and medium pressure package air handling or air conditioning systems.

VAV systems are usually designed with diversity factor which means that the main air handler design airflow is less than the sum of the total airflow of all the VAV. This is a common design because not all of the VAV in a building will be in full load during standard operation. The unit ranges are suitable for either bypass or temperature dependent applications with a capability of handling induct pressure up to 750Pa.

Electrical Control System simply sends a signal from the thermostat in volts to an electrically operated actuator connected to the VAV damper.

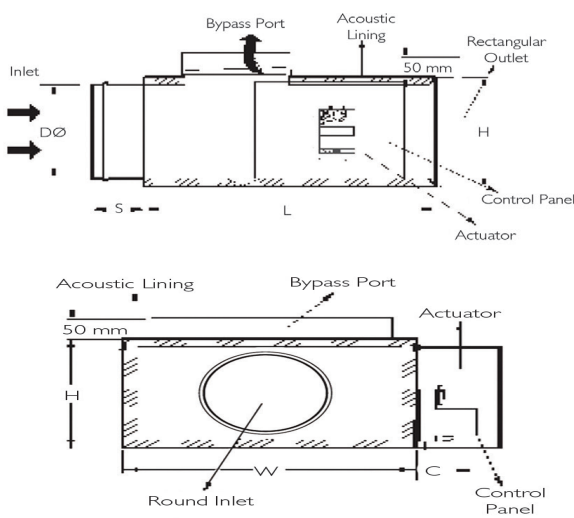
VAVs are designed to produce low NC levels with minimum pressure drop for the main system static. Units are supplied with bypass port dampers to divert the excess air flow to return duct.

Air flow capacity ranges from 24 - 1900 LPS with minimum inlet static pressure of 20Pa. A minimum air volume of 20% can be set if required. Design air volume varies from factory set to specified value within  $\pm 5\%$  of set point.

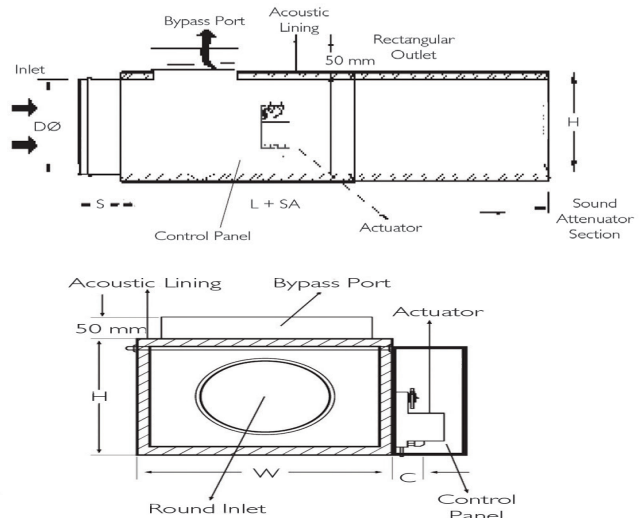
FLOWTECH VAV is easy to install with any air conditioning units in buildings or offices and can easily relocate as interiors require.

FLOWTECH manufacture Zero-Maintenance VAV, quick opening access panels can be provided for easy inspection and service as optional.

**BYPASS TYPE VAV DIMENSIONAL DATA**



**BYPASS TYPE VAV WITH SOUND ATTENUATOR DIMENSIONAL DATA**



Model	Air Flow Range (LPS)	Air Flow Range (CFM)	Inlet $\varnothing(D)$ in mm	Length (L) in mm	Width (W) in mm	Height (H) in mm	L+SA in mm	Spigot (S) in mm	Control Panel Depth (D) in mm
BPTU-15	24 - 212	50 - 450	150 $\varnothing$	400	350	250	1000	150	100
BPTU-20	189 - 378	400 - 800	200 $\varnothing$	450	400	300	1050	150	100
BPTU-25	330 - 614	700 - 1300	250 $\varnothing$	500	450	350	1100	150	100
BPTU-30	566 - 944	1200 - 2000	300 $\varnothing$	550	500	400	1150	200	100
BPTU-35	661 - 1180	1400 - 2500	350 $\varnothing$	600	550	450	1200	200	100
BPTU-40	944 - 1888	2000 - 4000	400 $\varnothing$	650	600	500	1250	200	100

Right hand control panel as Standard, Left hand control panel available as Optional.

## BYPASS TYPE VAV SELECTION TABLE

Model	Flow (CFM)	Flow (LPS)	Δ Pt Basic Unit		Δ Pt w/ Attenuator		Discharge NC				Radiated NC			
			Pa	in W.G	Pa	in W.G	1.0 in wg	2.0 in wg	4.0 in wg	6.0 in wg	1.0 in wg	2.0 in wg	4.0 in wg	6.0 in wg
							250 Pa	500 Pa	1000 Pa	1500 Pa	250 Pa	500 Pa	1000 Pa	1500 Pa
BPTU-15	50	24	2	0.008	3	0.012	-	-	-	-	-	-	-	-
	150	71	7	0.028	8	0.032	-	-	-	-	-	-	-	23
	250	118	19	0.076	21	0.084	-	-	-	21	-	-	24	26
	300	142	27	0.108	30	0.120	-	-	-	21	-	-	24	26
	400	189	50	0.201	55	0.221	-	-	-	23	-	-	25	30
450	212	61	0.245	67	0.269	X	-	-	21	X	21	26	30	
BPTU-20	400	189	9	0.036	13	0.052	-	-	-	-	-	-	25	28
	500	236	17	0.068	23	0.092	-	-	-	-	-	21	26	30
	600	283	25	0.100	33	0.132	-	-	-	-	-	22	28	32
	700	331	37	0.149	48	0.193	-	-	-	-	-	23	30	33
	800	378	50	0.201	65	0.261	X	-	-	21	X	24	31	34
BPTU-25	700	331	20	0.080	27	0.108	-	-	-	-	-	-	26	30
	800	378	26	0.104	35	0.141	-	-	-	-	-	21	27	31
	900	425	32	0.128	43	0.173	-	-	-	-	-	21	28	32
	1000	472	41	0.165	54	0.217	-	-	-	-	-	22	28	33
	1100	519	50	0.201	66	0.265	-	-	-	-	-	23	30	34
	1200	567	59	0.237	78	0.313	X	-	-	-	X	24	31	34
	1300	614	68	0.273	91	0.365	X	-	-	21	X	24	31	35
BPTU-30	1200	567	28	0.112	35	0.141	-	-	24	28	-	24	31	35
	1400	661	38	0.153	47	0.189	-	20	26	30	21	25	33	37
	1600	755	50	0.201	62	0.249	-	21	27	32	22	26	34	38
	1800	850	62	0.249	77	0.309	-	23	30	33	25	28	35	38
	2000	944	74	0.297	93	0.373	X	21	28	32	X	29	35	39
BPTU-35	1400	661	22	0.088	28	0.112	-	-	24	26	-	25	32	36
	1600	755	29	0.116	37	0.149	-	20	25	28	21	26	33	37
	1800	850	37	0.149	47	0.189	-	21	26	30	22	27	33	37
	2000	944	46	0.185	58	0.233	-	23	27	31	24	27	34	38
	2200	1039	54	0.217	69	0.277	X	24	28	32	X	28	35	38
	2400	1133	64	0.257	82	0.329	X	24	28	31	X	30	36	39
	2500	1180	68	0.273	87	0.349	X	25	29	31	X	30	36	39
BPTU-40	2000	944	25	0.100	31	0.124	-	24	28	32	24	28	32	35
	2500	1180	40	0.161	49	0.197	23	27	32	36	28	30	35	38
	3000	1416	57	0.229	70	0.281	25	30	34	38	30	33	37	40
	3500	1653	73	0.293	91	0.365	X	31	34	38	X	35	39	42
	4000	1889	89	0.357	113	0.454	X	33	37	39	X	38	40	44

### PERFORMANCE NOTES

- Units obtained in accordance with AHRI Standard 880-2011 and ASHRAE Standard 130-1996.
- Airflow is given in litres / sec (LPS) and cubic feet / min (CFM)
- Blank spaces "-" indicate NC's less than 20
- "X" indicate minimum static pressure of unit exceeds the minimum operating pressure across the unit.
- Minimum static pressure is the pressure loss for the bare unit only at the tabulated flow.
- Pressure given in Pascals, Pa and inches of water gauge, in.wg.
- NC levels are calculated based on typical attenuation values outlined in Appendix E, AHRI Standard 885-2008, "A Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets."

### RADIATED SOUND

based on a 5/8" mineral fiber tile ceiling per AHRI 885-2008 typical attenuation values:

Total Deductions	Octave Band Mid Frequency, Hz					
	125	250	500	1000	2000	4000
All Sizes	18	19	20	26	31	36

### DISCHARGE SOUND

based on environmental effect, end reflection, flex duct effect, space effect, sound power division and lined duct effect.

Total Deductions	Octave Band Mid Frequency, Hz					
	125	250	500	1000	2000	4000
< 400 CFM	24	28	39	53	59	40
400 - 800 CFM	27	29	40	51	53	39
> 800 CFM	29	30	41	51	52	39

## DISCHARGE SOUND POWER LEVELS

Model	Airflow		Sound Power Levels, LW dB, re 10 <sup>-12</sup> Watts																			
			250 Pa (1.0" W.G) Octave Band					500 Pa (2.0" W.G) Octave Band					1000 Pa (4.0" W.G) Octave Band					1500 Pa (6.0" W.G) Octave Band				
	LPS	CFM	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
BPTU-15	24	50	45	40	35	30	21	47	44	40	36	27	50	49	45	42	33	51	51	49	45	36
	71	150	50	47	42	35	26	52	51	47	41	32	56	56	53	47	38	56	59	56	50	42
	118	250	52	50	45	38	29	55	55	50	43	35	57	59	56	49	41	59	62	59	53	44
	142	300	55	49	45	37	352	56	54	51	43	38	61	59	56	49	45	63	62	60	52	48
	189	400	57	50	46	39	34	60	56	52	45	40	64	60	58	50	46	65	63	61	54	50
212	450	X	X	X	X	X	61	56	52	45	40	65	61	58	51	46	67	64	62	54	50	
BPTU-20	189	400	52	48	42	35	28	55	50	47	40	33	57	53	51	46	38	58	54	53	49	41
	236	500	55	40	44	36	30	57	53	48	42	35	59	55	53	47	40	61	57	55	51	43
	283	600	57	52	46	37	31	59	55	50	43	36	62	57	54	49	41	63	59	56	52	44
	330	700	59	54	47	38	32	61	56	51	44	37	63	59	55	50	42	65	60	58	53	45
	378	800	60	55	48	39	33	63	58	52	45	38	65	60	53	51	43	65	62	59	54	46
BPTU-25	330	700	52	46	44	33	30	57	50	49	41	36	62	54	54	49	42	65	56	57	53	46
	378	800	53	47	45	34	30	58	51	50	41	36	63	55	55	49	43	66	57	58	54	46
	425	900	54	48	46	34	30	59	52	51	42	37	64	56	56	49	43	67	58	59	54	47
	472	1000	55	49	47	34	31	60	53	52	42	37	65	57	57	50	43	68	59	60	54	47
	519	1100	56	50	47	34	31	61	54	52	42	37	66	58	58	50	43	69	60	61	54	47
	566	1200	X	X	X	X	X	61	55	53	42	37	66	59	58	50	44	69	61	61	54	47
	613	1300	X	X	X	X	X	62	55	54	42	38	67	59	59	50	44	70	62	62	55	48
BPTU-30	566	1200	60	54	50	42	38	63	59	57	49	42	66	64	63	56	46	68	68	67	60	48
	661	1400	62	55	51	43	39	65	61	58	50	43	68	66	64	57	47	70	69	68	61	49
	755	1600	64	57	52	44	40	67	62	58	51	44	70	67	65	57	48	72	71	69	61	51
	849	1800	66	58	53	45	51	69	63	59	51	45	71	69	66	58	49	73	72	70	62	52
BPTU-35	661	1400	64	56	53	45	43	67	60	59	51	48	70	64	64	57	53	71	66	68	61	56
	755	1600	65	57	54	45	44	68	61	60	52	49	71	65	65	58	54	73	68	69	62	57
	849	1800	66	58	55	46	45	68	62	61	53	50	72	66	66	83	55	74	69	70	63	58
	944	2000	68	59	56	47	46	71	63	61	53	51	73	67	67	60	56	75	70	70	63	59
	1038	2200	69	60	56	48	47	72	64	62	54	52	74	68	68	60	57	76	71	71	64	60
	1133	2400	X	X	X	X	X	72	65	63	54	52	75	69	68	61	57	77	72	72	65	60
	1180	2500	X	X	X	X	X	73	66	63	55	53	76	70	69	61	58	77	72	72	65	61
BPTU-40	944	2000	68	60	57	40	46	71	64	62	56	51	74	68	67	62	57	75	71	70	65	60
	1180	2500	71	63	60	52	47	74	67	65	58	53	76	71	70	64	58	78	74	73	67	61
	1416	3000	73	65	63	53	49	76	69	68	59	54	79	73	73	65	60	80	76	75	68	63
	1652	3500	X	X	X	X	X	78	71	69	60	55	80	75	74	66	61	82	78	77	70	64
	1888	4000	X	X	X	X	X	79	73	71	62	56	82	77	76	67	62	83	79	79	71	65

### PERFORMANCE NOTES

- Units tested in accordance with AHRI Standard 880-2011 and ASHRAE Standard 130-1996.
- Airflow is given in liters per sec (LPS) and cubic feet per min. (CFM)
- Pressure is given in Pascals, Pa; and inches of water gauge, in.wg.
- Blank spaces "-" indicate sound power levels less than 20.
- "X" indicates minimum static pressure of unit exceeds ΔP across unit.

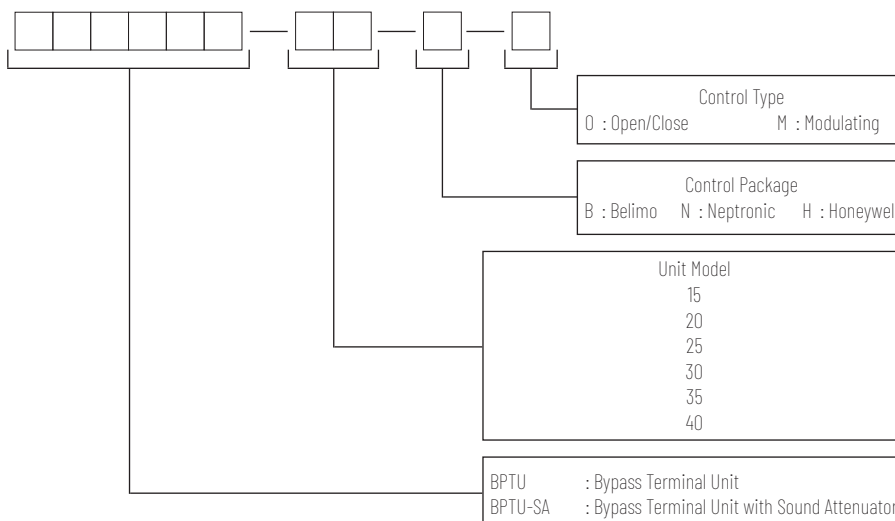
**RADIATED SOUND POWER LEVELS**

Model	Airflow		Sound Power Levels, LW dB, re 10 <sup>-12</sup> Watts																					
			250 Pa (1.0" W.G) Octave Band						500 Pa (2.0" W.G) Octave Band						1000 Pa (4.0" W.G) Octave Band						1500 Pa (6.0" W.G) Octave Band			
	LPS	CFM	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6		
BPTU-15	24	50	43	35	28	25	25	45	40	34	31	31	48	45	39	37	37	50	48	43	41	40		
	71	150	47	42	35	29	27	49	47	40	35	34	52	51	46	41	40	54	54	49	45	43		
	118	250	48	45	37	31	29	51	50	43	37	35	54	55	49	43	41	55	57	52	47	45		
	142	300	52	45	39	33	31	55	50	44	39	37	58	54	50	45	43	60	56	53	48	47		
	189	400	56	47	40	34	32	58	51	43	40	38	60	55	51	46	44	62	58	56	49	47		
	212	450	x	x	x	x	x	59	52	46	40	38	61	56	52	46	44	63	58	55	50	48		
BPTU-20	189	400	48	41	40	33	31	50	44	46	39	36	53	48	51	44	41	54	50	54	48	44		
	236	500	50	43	42	34	32	53	47	47	40	37	55	50	52	46	42	56	52	55	49	45		
	283	600	52	45	43	35	33	55	48	48	41	38	57	52	54	47	42	58	54	57	50	45		
	330	700	54	47	44	36	34	57	50	49	42	38	59	53	55	48	43	60	55	58	51	46		
	378	800	56	48	45	37	37	58	51	50	43	39	60	55	56	48	44	62	57	59	52	46		
	330	700	51	42	39	32	33	55	47	46	39	39	59	51	52	48	45	62	54	55	51	48		
BPTU-25	378	800	52	43	40	32	33	56	48	47	40	39	60	52	53	47	45	63	55	56	51	48		
	425	900	53	44	41	32	33	57	49	47	40	39	61	53	54	47	45	64	56	57	52	48		
	472	1000	54	45	42	33	34	58	49	48	40	39	62	54	54	48	45	65	57	58	52	47		
	519	1100	56	45	43	33	34	59	50	49	40	39	63	55	55	48	45	66	57	59	52	49		
	566	1200	x	x	x	x	x	60	51	50	41	40	64	55	56	48	45	66	58	59	52	49		
	613	1300	x	x	x	x	x	60	51	50	41	40	65	56	56	48	45	67	58	60	53	49		
BPTU-30	566	1200	57	48	43	36	35	60	53	50	42	40	63	58	56	49	45	65	61	60	53	47		
	661	1400	59	49	44	37	36	62	54	51	43	41	65	59	58	50	46	66	62	62	53	48		
	755	1600	60	51	45	37	36	63	56	52	44	41	66	61	59	50	46	68	64	63	54	48		
	849	1800	62	52	46	38	37	64	57	53	44	42	67	62	60	51	46	69	65	63	55	49		
	661	1400	57	51	44	36	34	60	56	51	43	40	63	61	57	50	46	65	63	61	54	50		
	BPTU-35	755	1600	59	52	45	37	34	61	57	51	44	41	64	62	58	51	47	66	65	62	55	50	
849		1800	60	53	46	37	35	62	58	52	44	41	65	63	58	51	47	67	65	62	55	50		
944		2000	61	54	46	38	35	63	58	53	44	41	66	63	59	51	47	68	66	63	55	51		
1038		2200	61	54	47	38	35	64	59	53	45	41	67	64	60	52	47	69	67	63	56	51		
1133		2400	x	x	x	x	x	65	60	54	45	41	68	65	60	52	47	70	68	64	56	61		
1180		2500	x	x	x	x	x	66	60	54	45	41	68	65	60	52	47	70	68	64	56	51		
BPTU-40	944	2000	61	52	46	39	38	64	56	52	46	44	66	60	57	52	50	68	62	60	56	54		
	1180	2500	64	55	49	41	40	66	59	57	47	46	69	62	60	54	52	70	64	63	57	55		
	1416	3000	66	57	51	42	41	68	61	56	48	47	71	64	62	55	53	72	67	65	58	56		
	1652	3500	x	x	x	x	x	70	62	58	49	48	73	66	63	56	54	74	68	67	59	58		
	1888	4000	x	x	x	x	x	72	64	59	50	49	74	68	65	57	55	76	70	68	60	58		

**PERFORMANCE NOTES**

- Units tested in accordance with AHRI Standard 880-2011 and ASHRAE Standard 130-1996.
- Airflow is given in liters per sec (LPS) and cubic feet per min. (CFM)
- Pressure is given in Pascals, Pa; and inches of water gauge, in.wg.
- Blank spaces "-" indicate sound power levels less than 20.
- "x" indicates minimum static pressure of unit exceeds ΔP across unit.
- Data is not certified by ARI.

**ORDERING SYSTEM**



**ORDERING EXAMPLE**

**BPTU-20-B-M**  
Refers to Bypass Terminal Unit, Unit Model 20 with Belimo Actuator, Modulating Type