

TUB Series Bypass Terminal Units



Features

- 0.8 mm galvanized steel casing with round or rectangular inlets and square or rectangular outlets with slip and drive connections
- Can be used with pneumatic, electronic analog or direct digital controller
- Precise size of coated galvanized steel damper plate for 45° rotation: perfect air proof
- Leakage less than 1% of maximum air flow at 1 kPa static inlet pressure
- 20 mm fiberglass heat insulation layer with antiseptic treatment, conforming to UL 1181 and NFPA 90A standards
- Size range of 4" to 24" with capacities from 100 to 10,803 CFM, tested to meet ANSI/ASHRAE Standard 130-1996 and ARI Standard 880-98

General

The TUB Series bypass box is a single duct pressure dependent air terminal unit. Its basic unit consists of a bypass type damper and a supply air damper. Box can be ordered as box alone or with standard factory mounted actuator. Other accessories including electric heater, hot water coils and various type of temperature controller are available for ordering as options.

Operation

The terminal delivers conditioned air to the space during periods of maximum cooling requirements (as determined and signaled by the room controller). As cooling demand reduces, the supply damper is modulated to bypass the excessive amount of conditioned air to the ceiling plenum. The resultant is a variable volume air supply to the space while a relatively constant volume of air is maintained across central system components.

Common Applications

Bypass terminals are used primarily with packaged air conditioning equipment where zoning is desired but relatively constant air flows across certain system components (i.e. coils, fans) are required.

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Specifications

Product Model Numbers	Refer to Table 1	
Standard Air Flow	100 to 5,000 CFM in 11 sizes	
End Connections	Refer to dimensions in Table 2	
Leakage	Box casing: < 1% of maximum air flow Damper: < 1% of maximum air flow	
Operating Air Temperature Limits	-5°C to 50°C	
Mounting	Ceiling	
Construction Materials	Casing	0.8 mm galvanized steel sheet
	Damper	Galvanized steel
	Damper shaft	Steel
	Damper Bearing	Self lubricate type
	Damper Seal	EVA
	Multi-point air flow sensor	Aluminum
	Insulation	25 mm thick Fiberglass with 56 kg/m³ core density
Optional Hot Water Reheat Coil	1-row and 2-row coils	
Optional Electric Re-heater	1.5 kW	

Table 1 - TUB Series Bypass Terminal Unit Selection Table

Product Series	Terminal Type	Duct Connection	Inlet/Primary Pressure	Inlet Size (Inches)	Optional Actuator and Control Type	Re-Heat Type
TUB	TU = standard single duct BU = Bypass single duct	L= Left-hand Type* (standard) R= Right-hand Type*	D= Dependent	04	N = Bare Box A3 = Box with 3-wire floating actuator A4 = Box with 0-10 VDC input actuator	00 = No heater W1 = 1-row Hot water coil W2 = 2-row hot water coils E/1500 = 230 VAC 1Φ 1.5 kW electric heater
				05		
				06		
				07		
				08		
				09		
				10		
				12		
				14		
				16		
				18		

* Left-hand type: When facing the air outlet, the control box is on the left side.

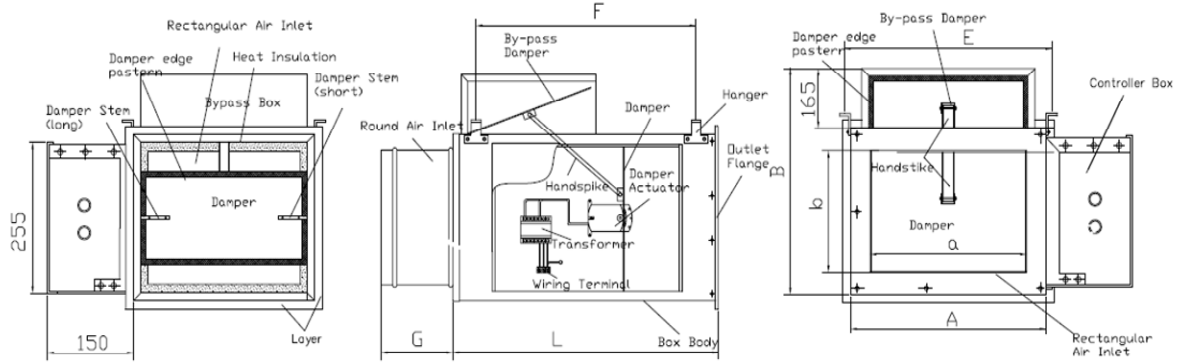
Right-hand type: When facing the air outlet, the control box is on the right side.

Terminal Unit Selection Example:

10" bypass single-duct box with left-hand connection, pressure dependent inlet air, with floating input actuator only and 1-row hot water coil
= TUB-BU-L-D-10-A3-W1

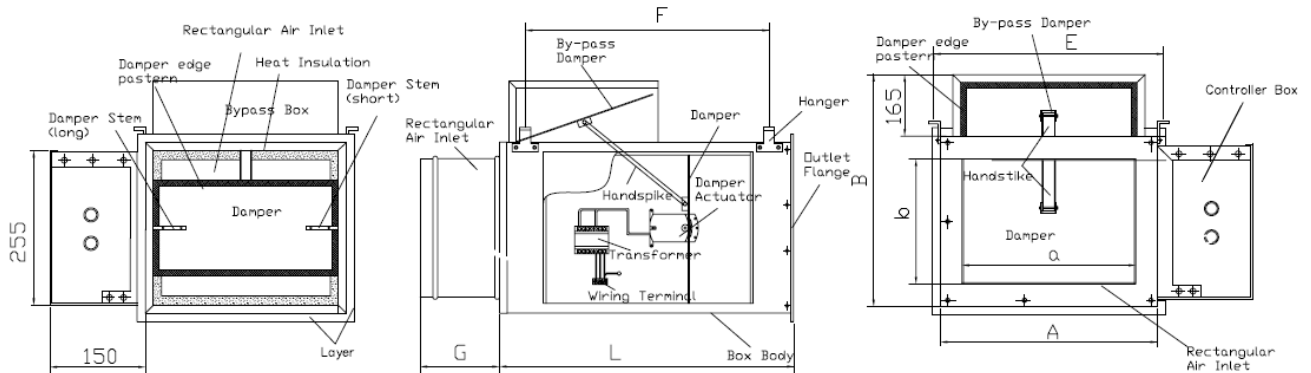
*The performance specifications above are nominal and subject to tolerances and application variables of generally acceptable industry standards.
The manufacturer shall not be liable for damages resulting from misapplication or misuse of its products.*

Table 2 - TUB Series Bypass Terminal Unit Dimensions



MODEL	AIR FLOW (CFM)		DIMENSIONS (mm)						
	MIN	MAX	A	B	E	F	L	G	ØD
#04	50	200	212	406	249	432	553	100	99
#05	70	400	212	406	249				124
#06	100	550	212	406	249				149
#07	125	800	264	427	301				175
#08	200	1000	264	427	301				200
#09	380	1400	314	491	351				226
#10	400	1600	314	491	351				251

Note: For the 4" to 10" bypass boxes, it has a round air inlet and a square air outlet.



MODEL	AIR FLOW (CFM)		DIMENSIONS (mm)						
	MIN	MAX	A	B	E	F	L	G	a×b (Rectangular)
#12	700	2100	428	491	465	432	553	100	353×251
#14	800	3000	510	491	547	432	553	100	435×251
#16	1000	4000	624	491	661	432	553	100	508×251
#18	1300	5000	711	491	748	503	624	100	650×251

Note: For the 12" to 18" bypass boxes, it has a rectangular air inlet and a rectangular air outlet.

Table 3: Single Duct Terminal Units - Radiated Sound Power Level Details

			125 Pa (0.5"W.G.)														250 Pa (1.0"W.G.)														500 Pa (2.0"W.G.)														750 Pa (3.0"W.G.)													
Unit Size	Air Flow		Octave Band														Octave Band														Octave Band														Octave Band													
	CFM	l/s	2	3	4	5	6	7								2	3	4	5	6	7								2	3	4	5	6	7								2	3	4	5	6	7											
4"	60	28	44	34	27	22	--	--								45	38	31	26	24	22								47	38	34	30	29	26								48	39	36	32	32	29											
	120	57	48	40	34	27	23	--								50	42	37	32	28	24								51	44	41	36	32	28								52	46	43	38	35	31											
	160	76	51	45	38	31	25	21								52	47	42	35	30	26								54	49	45	40	35	30								55	50	47	42	37	33											
	200	94	53	48	41	34	26	22								55	50	45	38	31	27								58	52	48	42	36	31								57	53	50	46	39	34											
5"	100	47	47	35	29	23	--	--								49	38	33	27	23	20								51	41	37	32	29	27								52	42	39	34	33	31											
	200	94	54	41	34	28	22	--								56	44	38	32	28	24								58	47	42	37	34	31								59	49	44	39	37	35											
	300	142	58	46	38	31	25	--								60	49	42	36	31	26								62	51	46	40	37	33								63	53	48	43	40	37											
	400	189	62	49	41	34	28	21								64	52	45	38	33	28								66	55	48	43	39	35								67	56	51	45	42	39											
6"	100	47	47	35	31	25	20	--								50	38	36	29	26	22								53	43	38	34	32	28								55	45	40	37	36	32											
	200	94	50	40	36	29	24	--								54	44	39	34	30	25								57	48	43	38	36	31								59	50	45	41	39	35											
	300	142	53	43	39	32	26	20								56	47	43	37	32	26								60	51	46	41	38	33								62	53	49	44	42	36											
	400	189	55	45	42	34	28	22								58	49	45	39	34	28								62	53	49	43	40	34								64	56	51	46	43	38											
7"	600	283	57	48	44	36	29	23								60	51	47	41	35	29								64	55	51	45	42	35								66	58	53	48	45	39											
	200	94	50	37	31	28	22	--								52	42	37	32	26	20								54	47	42	36	30	26								56	50	46	38	33	29											
	350	165	53	41	34	31	25	--								56	45	40	35	29	24								58	50	46	39	34	29								59	53	49	41	36	32											
	500	236	56	43	36	34	28	21								58	48	42	37	32	26								60	53	48	41	36	31								62	56	51	44	39	34											
8"	650	307	58	45	38	35	30	23								60	50	44	39	34	28								62	55	50	43	38	33								64	68	53	45	41	36											
	800	378	60	47	40	37	31	24								62	52	46	41	36	29								64	57	51	45	40	34								65	60	55	47	42	37											
	200	94	53	41	34	29	25	24								57	46	40	35	31	32								60	51	46	40	37	40								62	54	49	43	41	44											
	400	189	56	44	36	31	26	25								59	49	42	37	32	32								62	54	48	42	39	40								64	56	51	45	42	45											
9"	600	283	57	46	38	33	27	25								60	51	43	38	33	33								64	56	49	43	40	41								66	58	53	47	43	46											
	800	378	58	47	39	34	28	25								62	52	45	39	34	33								65	57	51	45	41	41								67	60	54	48	44	46											
	1000	472	60	49	40	35	29	26								63	54	46	41	35	34								67	58	52	46	41	42								69	62	55	49	45	46											
	300	142	50	37	32	27	21	--								54	45	39	33	28	26								57	52	46	40	34	33								59	56	50	44	38	37											
10"	550	260	51	40	34	30	23	19								55	47	41	36	30	27								58	55	48	43	36	34								61	58	53	46	40	38											
	800	378	52	41	35	31	24	20								56	48	42	37	31	27								59	56	49	44	37	35								62	60	54	47	41	38											
	1050	495	53	42	36	32	25	21								57	49	43	38	32	28								61	57	50	45	38	36								63	61	55	48	42	39											
	1300	613	55	44	38	33	27	22								58	51	45	40	33	29								62	58	52	46	39	38								64	63	56	50	43	39											
12"	400	189	50	39	32	26	23	22								53	46	38	32	27	27								57	52	46	37	32	33								59	56	50	41	35	36											
	700	330	52	42	35	29	25	23								55	48	42	34	30	29								59	54	48	40	35	34								61	59	52	43	38	38											
	1000	472	53	43	37	31	27	24								57	50	44	37	32	30								61	56	50	42	37	35								63	60	54	45	39	39											
	1300	613	55	45	39	33	29	25								58	51	45	38	33	31								62	57	52	44	38	36								64	61	56	47	41	40											
14"	1600	755	56	46	40	34	30	26								59	52	47	40	35	32								63	58	53	45	40	37								66	62	57	48	42	40											
	700	330	49	44	37	31	24	20								53	49	43	37	29	25								58	55	50	42	34	30								60	58	53	45	37	33											
	1100	519	52	45	39	34	27	22								56	51	45	40	32	27								61	57	52	45	37	32								63	60	55	48	40	36											
	1500	708	54	47	41	36	30	24								59	52	47	42	35	29								63	58	53	47	40	34								65	61	57	50	43	37											
16"	1900	897	56	48	42	38	32	25								61	53	48	43	37	31								65	59	54	49	42	36								67	62	58	52	45	39											
	2300	1085	58	49	43	40	34	27								62	54	49	46	39	32								66	60	55	50	44	37								69	63	59	53	47	40											
	800	378	52	44	35	30	22	--								56	50	40	35	28	22								59	55	46	40	33	28								62	59	48	43	38	31											
	1400	661	58	47	41	34	28	22								60	53	46	40	33	28								64	59	51	45	38	33								66	62	55	48	41	36											
18"	2000	944	59	49	45	38	32	26								63	55	51	43	37	31								66	61	56	48	42	37								69	65	59	51	45	40											
	2600	1227	61	51	49	40	36	29								65	57	54	46	40	34								68	63	59	51	45	40								71	66	62	54	48	43											
	3200	1510	63	52	51	42	38	31								67	58	57	48	43	36								71	64	62	53	48	42								73	68	65	56	51	45											
	1000	472	54	46	39	34	29	25								58	52	44	39	34	30								61	57	48	44	39	35								64	60	51	47	41	37											
16"	1640	774	57	48	44	38	33	28								61	54	49	43	38	33								64	60	53	47	43	38								67	63	56	50	45	41											
	2280	1076	58	50	48	41	37	31								63	56	53	45	41	36								67	61	57	50	46	41								69	66	60	53	48	44											
	2920	1378	61	52	51	43	39	33								66	57	56	47	44	38								69	63	60	52	48	43								71	68	63	55	51	46											
	3560	1680	63	53	54	45	41	35								67	58	58	49	46	40								70	64	63	54	50	46								73	68	66	57	53	48											
18"	4200	1982	64	54	56	46	43	37								68	60	61	51	48	42								72	65	65	56	52	47								74	69	68	58	55	50											

Table 4: Single Duct Terminal Units - Outlet Sound Power Level Details

			125 Pa (0.5"W.G.)														250 Pa (1.0"W.G.)														500 Pa (2.0"W.G.)														750 Pa (3.0"W.G.)													
Unit Size	Air Flow		Octave Band														Octave Band														Octave Band														Octave Band													
	CFM	l/s	2	3	4	5	6	7								2	3	4	5	6	7								2	3	4	5	6	7								2	3	4	5	6	7											
4"	60	28	48	44	40	37	35	29								50	47	45	41	41	37								51	49	49	48	47	44								52	50	52	49	51	49											
	120	57	56	52	46	43	40	33								57	54	51	47	46	41								59	56	54	52	52	48								58	58	58	56	55	52											
	160	76	61	57	50	46	42	36								62	59	54	51	48	43								64	62	59	56	54	51								64	63	62	58	58	56											
	200	94	64	61	53	49	44	38								66	63	57	54	50	45								67	66	62	59	56	52								68	67	64	61	60	57											
5"	100	47	48	43	42	38	37	32								51	47	47	43	41	39								54	53	52	48	47	46								55	53	52	51	53	51											
	200	94	55	50	47	43	40	35								57	53	52	48	47	42								60	57	56	53	52	50								62	60	58	56	56	54											
	300	142	59	54	50	46	42	37								61	58	55	51	49	45								64	62	60	55	54	52								66	64	63	58	58	56											
	400	189	62	57	53	49	44	38								65	61	58	54	50	48								67	65	62	59	56	53								68	67	66	61	60	58											
6"	100	47	47	43	37	36	34	27								51	48	44	42	41	35								56	53	49	48	47	43								57	56	50	51	50	47											
	200	94	52	48	41	41	37	30								55	53	47	46	44	38								59	58	53	52	50	45								62	61	58	55	54	50											
	300	142	54	52	46	44	39	32								58	57	51	49	46	40								62	60	56	55	52	47								66	65	60	58	56	52											
	400	189	57	55	48	46	41	33								61	60	54	52	47	41								66	65	59	57	54	49								67	68	63	61	57	53											
7"	600	283	58	57	51	48	42	35								63	62	56	54	49	42								67	65	62	59	55	50								69	70	66	62	59	54											
	200	94	51	49	41	41	38	34								55	55	48	47	44	41								60	59	55	52	51	48								63	61	59	56	55	52											
	350	165	54	53	45	44	40	36								58	58	52	48	46	43								64	62	59	55	53	50								67	64	63	59	57	54											
	500	236	57	55	48	46	41	37								60	61	55	51	48	46								66	64	61	57	54	52								70	66	65	61	58	56											
8"	650	307	59	58	50	47	42	39								62	60	57	53	49	46								68	66	64	59	55	53								72	68	66	62	59	57											
	800	378	60	59	52	49	43	40								64	63	59	54	50	47								70	67	65	60	56	54								74	70	69	64	60	58											
	200	94	53	51	44	42	39	35								57	56	51	48	45	42								63	61	58	54	52	49								66	64	62	57	56	54											
	400	189	55	53	46	44	40	36								59	58	53	50	47	43								66	63	60	56	53	51								68	66	64	58	57	55											
9"	600	283	57	54	48	46	41	37								61	60	55	51	47	44								67	65	62	57	54	52								70	67	66	61	58	56											
	800	378	58	56	50	47	42	38								62	60	57	53	48	45								68	66	64	59	55	53								72	68	68	62	59	57											
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	300	142	56	52	45	44	40	37								60	59	54	51	48	46								67	64	62	59	56	53								71	67	67	62	60	57											
10"	550	260	58	54	47	46	42	39								63	61	56	53	50	47								69	67	64	61	57	55								74	69	68	66	62	58											
	800	378	59	55	48	47	43	40								64	63	57	54	51	48								68	70	65	62	58	56								70	75	70	66	63	60											
	1050	495	60	56	49	48	43	40								64	63	57	55	51	48								71	69	66	62	58	56								75	71	71	67	63	60											
	1300	613	62	56	50	49	44	41								66	64	59	57	51	49								72	70	67	64	59	57								76	73	72	68	64	61											
12"	400	189	55	51	48	47	44	40								59	57	55	52	51	48								64	63	61	57	57	55								67	66	65	59	61	59											
	700	330	57	53	50	49	45	41								61	59	57	54	52	49								66	65	63	59	58	56								70	68	67	62	62	61											
	1000	472	59	56	52	51	46	42								63	61	58	56	53	50								68	67	65	61	59	57								71	70	69	64	63	62											
	1300	613	61	56	53	52	47	43								65	63	60	57	53	50								69	68	66	62	60	58								73	72	70	65	64	62											
14"	1600	755	62	57	54	54	47	44								66	64	61	58	54	51								71	70	67	63	61	59								74	73	71	66	64	63											
	700	330	56	55	52	48	44	40								61	60	58	54	51	47								68	66	64	60	57	53								72	68	68	64	61	57											
	1100	519	59	57	53	50	46	42								64	63	60	56	52	48								70	68	66	62	58	55								73	72	70	66	63	59											
	1500	708	61	57	55	51	47	43								67	64	61	57	54	50								72	71	68	64	61	57								75	74	71	67	65	60											
16"	1900	897	63	58	56	53	48	45								68	65	62	58	55	51								74	71	69	65	62	58								77	75	72	69	66	62											
	2300	1085	66	59	57	54	50	46								70	65	63	60	56	52								75	72	70	66	63	59								78	76	73	70	67	63											
	800	378	56	53	48	46	42	38								62	60	54	53	49	45								68	67	60	59	56	51								72	70	65	63	59	55											
	1400	661	59	55	52	49	46	41								65	63	58	55	52	48								72	70	64	62	59	55								75	74	68	66	62	58											
18"	2000	944	62	57	56	50	48	43								68	65	62	57	54	50								74	72	66	64	61	57								78	76	71	68	65	61											
	2600	1227	64	59	58	52	49	45								70	66	64	58	56	52								76	73	70	66	62	59								80	78	74	70	66	63											
	3200	1510	66	60	60	53	51	47								71	67	66	60	57	53								78	75	72	67	64	60								82	79	76	71	68	64											
	1000	472	59	53	51	48	45	40								65	60	57	55	52	47								71	67	62	62	59	54								75	71	66	65	63	58											
20"	1640	774	62	56	55	50	47	42								68	63	60	57	54	49								75	70	66	64	61	56								78	74	69	68	65	60											
	2280	1076	64	58	58	51	49	44								71	65	63	58	56	51								77	72	68	65	62	58								81	76	72	69	66	62											
	2920	1378	66	59	57	53	50	46								73	66	65	60	57	53								79	73	71	67	64	59								83	77	75	71	68	64											
	3560	1680	66	61	60	54	51	47								74	67	65	61	58	54								81	74	73	68	65	61								84	78	77	72	68	65											
22"	4200	1982	70	62	60	55	52	48								76	68	66	62	58	55								82	75	75	69	66	62								86	79	78	73	70	66											
	1200																																																									