

TOPAIRE

air conditioner



water-cooled packaged

50 Hz

TWCPS-B SERIES
TWCPR-B SERIES

New Features:

- Compact Design
- Tandem Compressors
- Single Large Diameter Blower Wheel
- Single Side Return

WATER-COOLED PACKAGE UNITS

GENERAL DESCRIPTION

The TWCPs/R series with new features is suitable for hotel, office, hospital, factory and supermarket applications. The low noise and compact series are completely leak tested, evacuated, dehydrated and precharged with refrigerant so that it is ready for connection when reached the site.

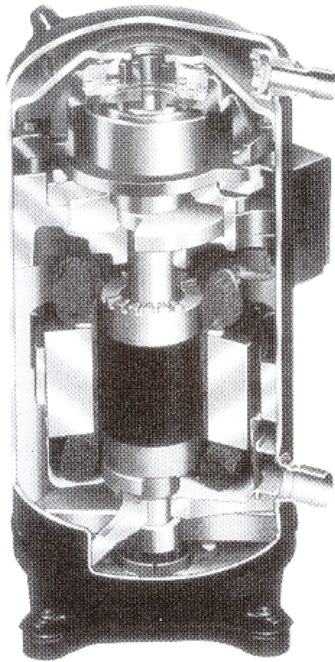
Scroll Compressor(s) (TWCPs Series)

Reliability

- * No contact scroll design that minimizes friction, increases volumetric efficiency and reduces vibration, thus longer service life.
- * Suction gas cooled motor.

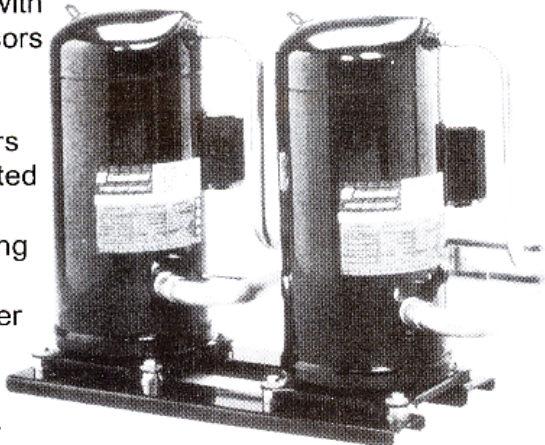
Low Power Consumption:

- * High EER.
- * No crankcase heater required.



Tandem Compressor (TWCPs 445B to 1520B)

For model with 3 compressors system and above, two compressors are connected in tandem, thus reducing the number of condenser water inlet/outlet connection.



Large Reciprocating Compressor (TWCPs 540B to 1280B)

- * A combination of 2 to 4 reciprocating compressors to reduce the condenser piping connection. Also, this will reduce the quantity of electrical starter components.

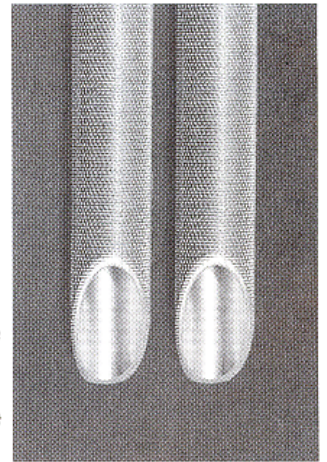
Multiple Compressor

(TWCPs 220B to 1520B & TWCPs 540B to 1280B)

- * By cycling off compressor(s) operation to match building load, no energy is being wasted when room load requires lesser cooling capacity.
- * No total shut down when servicing or repairing a faulty compressor.

Cleanable Shell and Tube Condenser

- * Multiple 3/4" O.D. copper finned tubes with 25 to 30% more surface area ensure better heat transfer.
- * Integral subcooling circuit to maximize efficiency.
- * Provided with fusible plug for safety purpose.
- * Leak and pressure tested to 450 psig.



Fully Leak Tested Refrigerant Circuit

- * Leak and pressure tested at 450 psig.
- * Pressure ports are provided on the discharge, liquid and suction line.
- * Evacuated, dehydrated and charged with refrigerant.

Safety Components

- * High-low pressure cutout to protect compressor from high discharge pressure and system leakage.
- * Liquid line sight glass and filter drier for refrigerant line components.

Efficient Evaporator Coil

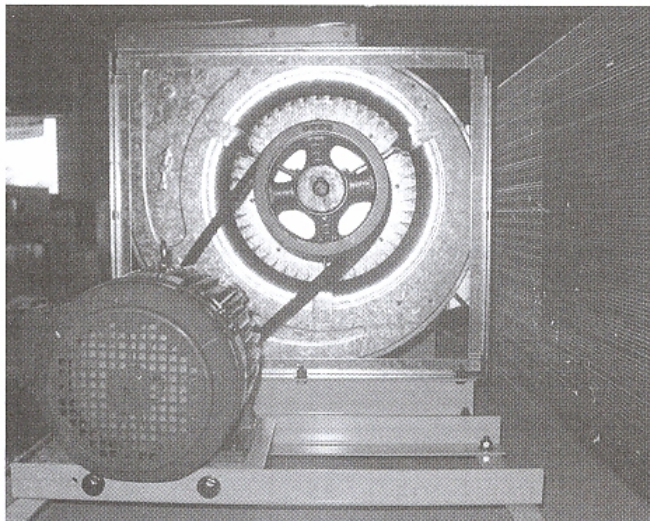
- * Independent thermal expansion valve with external equalizer for better refrigerant control and wider load condition.
- * Leak and pressure tested to 450 psig
- * Evacuated, dehydrated and charged with refrigerant.

WATER-COOLED PACKAGE UNITS

Drive Package and Blowers

(TWCP S 125B to 1520B & TWCP R 540B to 1280B)

- * Belt driven drive package offers flexibility on various air flow rate and various static pressure applications.
- * Single large diameter double inlet double width blowers (AMCA certified) reduce the noise level and eliminates the need for common transition and eliminates air unbalance.



Casing

- * Constructed of electro galvanized steel sheet and insulated with 1/2" thick x 1 1/2 lb per cu.ft linacoustic fiberglass.

- * Aesthetically coated with epoxy-acrylic electro deposition paint to provide excellent finish, weatherability and corrosion resistance.
- * Removable panels on the left and right hand side of the unit to provide access to critical parts and components.

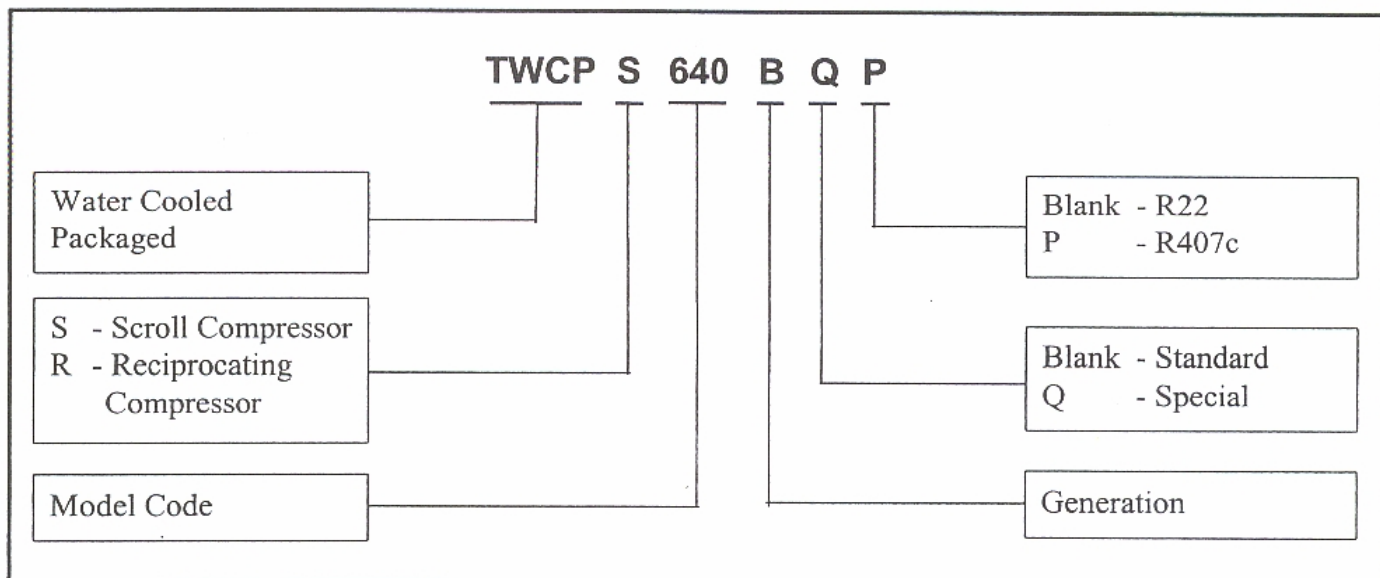
Filters

Side loading 1" thick filters - from both sides-thus eliminates unnecessary duct opening at site.

Optional Accessories Features

- * Factory wired starters
 - DOL for compressors and fan motors.
 - Auto-transformer for compressors.
- * Suction stop valve(s), discharge stop valve(s) and liquid stop valve(s).
- * External spring vibration isolators for blower fan and drive assembly.
- * Thermostat.
- * Hydrophilic aluminium fins, copper fins or tinned coated copper fins for better corrosion resistance.
- * Hot gas by pass for low load conditions.
- * Decorative discharge plenum.
- * Hot water heating coils.
- * Electric heaters.
- * R407C refrigerant instead of R22.

NOMENCLATURE



SYSTEM COOLING CAPACITY

PERFORMANCE DATA

MODEL	STD CAPACITY MBH	AIR ON EVAP.		WATER TEMPERATURE OFF CONDENSER - °F								
		CFM	WB TEMP. °F	80			95			110		
				TOTAL MBH¹	SENS MBH²	KW³	TOTAL MBH¹	SENS MBH²	KW³	TOTAL MBH¹	SENS MBH²	KW³
TWCPS 68B	68	2000	72	76.5	40.7	3.2	72.1	38.3	3.5	65.1	34.6	3.6
			67	73.0	54.1	3.1	68.0	50.4	3.4	64.4	47.8	3.6
			62	66.6	66.6	3.1	61.5	61.5	3.3	58.8	58.8	3.5
			57	58.8	58.8	3.1	54.4	54.4	3.3	51.7	51.7	3.5
TWCPS 81B	81	2400	72	91.1	44.3	3.8	85.8	41.4	4.1	74.5	39.3	4.2
			67	86.9	56.4	3.6	81.0	54.2	4.0	76.8	52.6	4.1
			62	79.3	67.8	3.6	73.3	65.3	3.9	70.0	63.5	4.1
			57	70.0	70.0	3.5	64.8	64.8	3.9	61.5	61.5	4.1
TWCPS 95B	95	2800	72	106.9	57.0	4.7	100.7	53.6	5.1	90.9	50.7	5.3
			67	101.9	75.8	4.5	95.0	70.8	5.0	90.1	67.0	5.2
			62	93.1	92.4	4.5	87.1	86.6	4.8	82.2	82.2	5.1
			57	82.3	82.3	4.4	76.1	76.1	4.8	72.2	72.2	5.1
TWCPS 125B	125	3800	72	140.7	75.4	6.2	132.5	71.0	6.7	125.0	67.0	7.0
			67	134.1	99.6	5.9	125.0	92.8	6.5	118.4	87.9	6.8
			62	122.4	121.3	5.9	114.6	113.6	6.4	108.1	108.1	6.7
			57	108.1	108.1	5.8	100.3	100.3	6.4	95.0	95.0	6.7
TWCPS 145B	145	4000	72	163.2	76.9	10.3	153.7	72.4	11.0	145.0	68.3	11.6
			67	155.6	101.5	9.7	145.0	94.6	10.7	137.3	89.6	11.1
			62	142.0	123.7	9.7	132.9	115.8	10.6	125.4	110.2	11.0
			57	125.4	110.2	9.5	116.3	102.2	10.6	110.2	96.8	11.0
TWCPS 160B	160	4200	72	179.9	102.7	8.0	169.5	96.7	8.6	159.9	91.1	8.9
			67	171.6	139.1	7.8	160.0	129.6	8.4	151.7	122.9	8.8
			62	156.6	156.6	7.7	146.7	146.7	8.2	138.3	138.3	8.6
			57	138.3	138.3	7.4	127.9	127.9	8.2	121.6	121.6	8.6
TWCPS 190B	190	5800	72	213.7	84.5	9.2	201.4	107.2	9.9	190.0	101.1	10.2
			67	203.8	150.1	8.7	190.0	139.9	9.6	180.1	132.6	10.0
			62	186.0	182.6	8.7	174.1	171.0	9.3	164.3	164.3	9.9
			57	163.6	163.6	8.5	152.3	152.3	9.3	144.4	144.4	9.9
TWCPS 220B	220	6400	72	248.8	144.6	10.9	234.5	136.3	11.9	220.0	127.8	12.2
			67	233.4	192.9	10.4	220.0	181.8	11.5	206.6	170.7	12.0
			62	215.6	215.6	10.4	204.4	204.4	11.1	178.0	178.0	11.9
			57	195.6	195.6	10.2	173.4	173.4	11.1	170.0	170.0	11.9
TWCPS 250B	250	6800	72	281.2	148.5	12.4	264.9	139.8	13.5	249.9	131.9	13.8
			67	265.2	194.7	11.8	250.0	183.5	13.0	236.9	174.0	13.6
			62	244.6	230.2	11.8	228.3	228.3	12.6	216.2	216.2	13.5
			57	222.1	222.1	11.6	200.4	200.4	12.6	189.9	189.9	13.5
TWCPS 285B	285	7800	72	320.2	160.8	14.1	301.6	151.5	15.0	283.0	142.2	15.9
			67	300.2	206.3	14.0	285.0	194.5	14.9	265.9	182.7	15.8
			62	277.3	248.5	13.8	263.0	235.7	14.8	245.9	220.3	15.7
			57	251.6	251.6	13.7	237.3	237.3	14.7	230.0	230.0	15.6
TWCPS 320B	320	8400	72	362.1	180.8	15.9	341.1	170.3	17.2	320.1	159.9	17.7
			67	343.5	230.3	15.1	320.0	217.0	16.7	300.7	203.9	17.5
			62	313.4	275.8	15.1	297.5	261.3	16.2	278.1	244.6	17.2
			57	284.5	284.5	14.9	268.4	268.4	16.2	260.0	260.0	17.2
TWCPS 380B	380	10500	72	427.4	221.9	18.2	405.9	209.1	19.7	380.0	197.4	20.3
			67	407.7	292.5	17.3	380.0	272.6	19.1	360.2	258.5	20.0
			62	371.9	353.9	17.3	348.4	331.6	18.5	328.6	312.8	19.7
			57	328.6	328.6	17.0	318.5	318.5	18.5	308.0	308.0	19.7
TWCPS 445B	445	11500	72	481.3	242.2	22.0	453.4	228.1	23.4	425.4	214.0	24.8
			67	451.2	362.9	21.9	445.0	292.3	23.2	399.6	274.6	24.7
			62	416.8	375.0	21.5	395.3	355.6	23.1	369.5	332.4	24.5
			57	378.2	378.2	21.4	356.7	356.7	22.8	350.0	350.0	24.4
TWCPS 480B	480	13500	72	543.0	271.5	23.8	511.4	255.8	25.3	479.9	240.0	26.8
			67	509.0	344.6	23.6	480.0	325.1	25.1	450.8	305.4	26.7
			62	470.2	414.3	23.2	445.9	393.0	24.9	416.9	367.3	26.5
			57	426.6	426.6	23.0	402.4	402.4	24.7	396.0	396.0	26.3
TWCPS 510B	510	14500	72	577.0	288.5	25.0	543.5	271.8	26.5	510.0	255.0	28.1
			67	540.9	366.2	24.7	510.0	345.5	26.3	479.1	324.5	28.0
			62	499.7	440.3	24.4	473.9	417.6	26.1	443.0	390.3	27.8
			57	453.3	453.3	24.1	427.6	427.6	25.9	420.0	420.0	27.6
TWCPR 540B	540	15500	72	611.2	309.9	33.0	575.4	291.8	35.1	540.0	273.8	37.2
			67	572.7	379.8	32.8	540.0	374.1	34.8	507.3	351.4	37.1
			62	529.1	479.5	32.3	501.8	409.1	34.5	469.1	399.6	36.8
			57	480.0	480.0	32.0	452.8	452.8	34.3	448.3	448.3	36.5

Notes: 1.) Ratings are gross capacities. For net capacities, deduct evaporator blower motor heat.
2.) At 80°F (26.6°C) DB air on evaporator.
3.) Compressor KW input.

SYSTEM COOLING CAPACITY

PERFORMANCE DATA

MODEL	STD CAPACITY MBH	AIR ON EVAP.		WATER TEMPERATURE OFF CONDENSER - °F								
		CFM	WB TEMP. °F	80			95			110		
				TOTAL MBH¹	SENS MBH²	KW³	TOTAL MBH¹	SENS MBH²	KW³	TOTAL MBH¹	SENS MBH²	KW³
TWCPS 570B	570	15500	72	645.0	324.0	27.2	607.6	305.2	28.9	570.1	286.3	30.7
			67	604.7	414.4	27.0	570.0	397.4	28.7	535.5	367.1	30.6
			62	558.6	500.5	26.6	529.8	474.7	28.5	495.2	443.7	30.4
			57	506.8	506.8	26.4	478.0	478.0	28.3	470.0	470.0	30.1
TWCPS 640B	640	17000	72	724.0	360.4	31.7	682.0	339.5	33.6	640.0	318.6	35.8
			67	678.8	455.8	31.5	640.0	429.7	33.4	601.2	403.7	35.5
			62	627.1	550.1	31.0	594.8	521.8	33.2	556.0	487.8	35.3
			57	568.9	568.9	30.7	536.6	536.6	32.9	530.0	530.0	35.1
TWCPR 640B	640	17000	72	724.4	367.4	41.3	682.0	345.9	43.9	640.0	324.6	46.6
			67	678.8	450.2	41.1	640.0	443.5	43.6	601.2	416.6	46.5
			62	627.1	568.5	40.5	594.7	485.0	43.3	555.9	473.7	46.1
			57	568.9	568.9	40.1	536.6	536.6	43.0	531.3	531.3	45.8
TWCPS 700B	700	18000	72	792.2	396.0	34.0	746.2	372.9	36.1	700.2	350.0	38.3
			67	742.7	503.2	33.6	700.0	474.5	35.8	657.8	445.6	38.1
			62	686.0	605.0	33.2	650.7	573.9	35.6	608.3	536.4	37.9
			57	622.4	622.4	32.9	587.0	587.0	35.3	581.0	581.0	37.6
TWCPS 760B	760	20000	72	859.7	429.7	36.3	809.7	404.7	38.5	759.9	379.8	40.9
			67	806.0	546.0	35.9	760.0	514.9	38.2	713.8	483.6	40.7
			62	744.5	656.6	35.4	706.2	622.8	37.9	660.1	582.2	40.4
			57	675.5	675.5	35.1	637.0	637.0	37.7	630.0	630.0	40.1
TWCPS 800B	800	22000	72	905.0	452.3	39.6	852.4	426.0	42.0	799.9	399.9	44.7
			67	848.4	574.8	39.2	800.0	542.0	41.8	751.4	509.1	44.4
			62	783.7	691.2	38.7	743.4	655.6	41.4	694.9	612.8	44.1
			57	711.1	711.1	38.4	670.6	670.6	41.1	665.0	665.0	43.8
TWCPR 810B	810	22000	72	916.8	464.9	49.5	863.2	437.7	52.6	810.0	410.8	55.8
			67	859.1	569.7	49.2	810.0	561.2	52.2	760.9	527.1	55.6
			62	793.6	719.4	48.4	752.7	613.7	51.8	703.6	599.5	55.2
			57	720.0	720.0	48.0	679.1	679.1	51.5	672.5	672.5	54.8
TWCPS 860B	860	24000	72	973.3	554.0	42.1	916.3	521.5	44.8	859.9	489.4	47.6
			67	912.1	678.8	41.9	860.0	668.6	44.4	807.8	627.9	47.4
			62	842.5	857.0	41.2	799.1	731.1	44.1	746.9	684.3	47.0
			57	764.3	864.4	40.9	721.0	815.4	43.8	715.1	808.7	46.7
TWCPS 950B	950	26000	72	1075.3	546.8	45.5	1012.3	514.8	48.4	950.0	483.1	51.4
			67	1007.6	670.0	45.2	950.0	660.0	48.0	892.4	619.9	51.2
			62	930.8	846.0	44.6	882.8	721.7	47.6	825.2	705.0	50.8
			57	844.4	853.3	44.2	796.5	804.9	47.3	788.7	797.0	50.4
TWCPR 960B	960	26000	72	1086.6	550.9	62.0	1023.0	518.7	65.9	960.0	486.8	70.0
			67	1018.2	675.1	61.6	960.0	665.0	65.4	901.8	624.6	69.7
			62	940.6	852.4	60.7	892.1	727.2	64.9	833.9	710.3	69.2
			57	853.3	853.3	60.2	804.9	804.9	64.5	797.0	797.0	68.7
TWCPR 1080B	1080	26000	72	1222.4	619.9	66.0	1150.9	583.6	70.2	1080.0	547.7	74.5
			67	1145.5	759.5	65.6	1080.0	748.2	69.6	1014.5	702.7	74.2
			62	1058.2	959.1	64.6	1003.6	818.1	69.0	938.1	799.2	73.6
			57	960.0	960.0	64.0	905.5	905.5	68.6	896.6	896.6	73.1
TWCPS 1140B	1140	28000	72	1290.9	649.6	54.4	1215.3	611.6	57.8	1140.5	573.9	61.3
			67	1209.6	796.0	54.1	1140.0	784.1	57.4	1071.3	736.4	61.1
			62	1117.4	1005.0	53.2	1059.8	857.4	56.9	990.7	840.0	60.7
			57	1013.7	1013.7	52.8	956.2	956.2	56.5	950.0	950.0	60.2
TWCPR 1180B	1180	28000	72	1335.6	677.4	74.3	1257.4	637.7	79.0	1180.0	598.5	83.9
			67	1251.5	830.0	73.9	1180.0	817.6	78.4	1108.5	767.9	83.6
			62	1156.2	1048.0	72.8	1096.5	894.0	77.8	1025.0	873.3	82.9
			57	1048.8	1048.8	72.1	989.4	989.4	77.3	979.6	979.6	82.3
TWCPR 1280B	1280	32000	72	1448.8	734.9	82.7	1364.0	691.9	87.9	1280.0	649.3	93.3
			67	1357.6	900.4	82.2	1280.0	887.0	87.2	1202.4	833.1	92.9
			62	1254.1	1137.0	80.9	1189.5	969.9	86.5	1111.9	947.5	92.2
			57	1137.7	1137.7	80.2	1073.2	1073.2	86.0	1062.7	1062.7	91.6
TWCPS 1340B	1340	32000	72	1516.9	763.3	65.7	1428.1	718.7	69.7	1340.2	674.4	74.0
			67	1421.4	935.3	65.2	1340.0	921.4	69.2	1258.9	865.4	73.7
			62	1313.1	1181.0	64.2	1245.4	1007.5	68.7	1164.1	997.0	73.2
			57	1191.2	1191.2	63.7	1123.6	1123.6	68.2	1110.0	1110.0	72.7
TWCPS 1520B	1520	36000	72	1720.1	865.6	72.5	1619.4	814.9	77.0	1519.7	764.7	81.8
			67	1611.8	1060.6	72.1	1520.0	1044.8	76.5	1427.5	981.3	81.4
			62	1489.0	1339.2	71.0	1412.2	1142.5	75.9	1320.1	1104.0	80.9
			57	1350.8	1350.8	70.4	1274.2	1274.2	75.4	1204.0	1204.0	80.3

Notes: 1.) Ratings are gross capacities. For net capacities, deduct evaporator blower motor heat.
2.) At 80°F (26.6°C) DB air on evaporator.
3.) Compressor KW input.

BLOWER PERFORMANCE

Available External Static Pressure - IWG - For Accessories And Duct System Static Resistance (Allowance Made For Wet Coil And Filters)

RPM	CFM										FAN MODEL
	ESP	BHP	ESP	BHP	ESP	BHP	ESP	BHP	ESP	BHP	
TWCPS 125B											
800 900 1000 1100	2900		3200		3500		3800		4100		12 x 12 (inch)
	0.48	0.96	0.42	1.11	0.34	1.27	0.25	1.46	0.12	1.65	
	0.77	1.17	0.71	1.34	0.64	1.51	0.57	1.72	0.47	1.92	
	1.07	1.39	1.03	1.58	0.96	1.78	0.90	2.00	0.81	2.25	
1.35	1.63	1.36	1.86	1.32	2.09	1.25	2.32	1.17	2.59		
TWCPS 145B											
900 1000 1100 1200	3100		3400		3700		4000		4300		12 x 12 (inch)
	0.73	1.26	0.67	1.45	0.60	1.65	0.51	1.86	0.40	2.09	
	1.06	1.51	0.99	1.72	0.92	1.93	0.84	2.17	0.76	2.43	
	1.36	1.80	1.35	2.01	1.28	2.25	1.20	2.51	1.13	2.79	
1.65	2.08	1.68	2.35	1.68	2.61	1.59	2.88	1.52	3.19		
TWCPS 160B											
900 1000 1100 1200	3300		3600		3900		4200		4500		12 x 12 (inch)
	0.68	1.39	0.61	1.58	0.54	1.78	0.45	2.01	0.31	2.25	
	1.00	1.65	0.94	1.86	0.88	2.09	0.79	2.32	0.69	2.60	
	1.36	1.93	1.30	2.18	1.24	2.43	1.16	2.68	1.06	2.99	
1.67	2.25	1.68	2.51	1.63	2.80	1.55	3.08	1.46	3.39		
TWCPS 190B											
800 900 1000 1100	5000		5400		5800		6200		6600		15 x 15 (inch)
	0.86	2.18	0.82	2.47	0.75	2.76	0.50	3.11	0.09	3.50	
	1.25	2.60	1.20	2.91	1.16	3.26	1.11	3.63	1.02	3.99	
	1.66	3.06	1.63	3.40	1.59	3.82	1.53	4.21	1.49	4.65	
2.12	3.66	2.09	3.99	2.06	4.41	2.02	4.86	1.96	5.32		
TWCPS 220B											
850 900 1000 1100	5600		6000		6400		6800		7200		15 x 15 (inch)
	1.01	2.85	0.95	3.16	0.81	3.51	0.40	3.94	-	-	
	1.20	3.10	1.16	3.44	1.08	3.81	0.93	4.19	0.49	4.69	
	1.64	3.62	1.58	3.99	1.53	4.42	1.49	4.88	1.40	5.33	
2.10	4.19	2.07	4.61	2.00	5.09	1.96	5.59	1.91	6.11		
TWCPS 250B											
850 900 1000 1100	5600		6000		6400		6800		7200		15 x 15 (inch)
	0.99	2.85	0.94	3.16	0.80	3.51	0.38	3.94	-	-	
	1.18	3.10	1.15	3.44	1.07	3.81	0.91	4.19	0.47	4.69	
	1.62	3.62	1.57	3.99	1.52	4.42	1.47	4.88	1.38	5.33	
2.08	4.19	2.06	4.61	1.99	5.09	1.94	5.59	1.89	6.11		
TWCPS 285B											
800 900 1000 1100	6200		6800		7400		8000		8600		18 x 13 (inch)
	1.56	3.63	1.45	4.13	1.34	4.62	1.23	5.16	0.85	5.79	
	2.13	4.41	2.09	5.01	1.98	5.57	1.85	6.26	1.73	6.89	
	2.76	5.27	2.72	5.94	2.68	6.69	2.57	7.37	2.42	8.19	
3.41	6.20	3.42	6.99	3.36	7.77	3.32	8.71	3.22	9.55		
TWCPS 320B											
850 900 1000 1100	6600		7200		7800		8400		8800		18 x 13 (inch)
	1.78	4.37	1.66	4.92	1.54	5.51	1.49	4.92	1.50	5.13	
	2.09	4.82	1.99	5.36	1.86	6.03	1.75	6.66	1.66	7.12	
	2.71	5.71	2.67	6.46	2.58	7.16	2.46	7.91	2.36	8.46	
3.40	6.71	3.36	7.54	3.31	8.42	3.25	9.29	3.16	9.81		
TWCPS 380B											
700 750 800 850	7600		8400		9200		10000		10800		18 x 18 (inch)
	0.87	3.54	0.77	4.14	0.56	4.80	0.23	5.47	-	-	
	1.12	3.93	1.03	4.57	0.90	5.25	0.63	6.02	0.28	6.82	
	1.38	4.33	1.30	4.98	1.17	5.75	1.02	6.58	0.71	7.48	
1.65	4.80	1.58	5.52	1.47	6.31	1.33	7.20	1.12	8.12		
TWCPS 445B											
700 750 800 850	8600		9400		10200		11000		11800		18 x 18 (inch)
	0.79	4.27	0.54	4.94	0.25	5.68	-	-	-	-	
	1.06	4.73	0.91	5.44	0.62	6.22	0.29	7.06	0.03	7.97	
	1.33	5.20	1.19	5.96	1.02	6.79	0.70	7.71	0.38	8.68	
1.61	5.71	1.49	6.53	1.37	7.41	1.12	8.35	0.79	9.38		
TWCPS 480B											
550 650 750 850	8000		9500		11000		12500		14000		500 x 500 (mm)
	0.65	2.64	0.52	3.35	0.35	4.19	0.12	5.09	-	-	
	1.13	3.58	1.03	4.41	0.88	5.37	0.71	6.49	0.45	7.75	
	1.65	4.70	1.59	5.65	1.47	6.78	1.32	8.09	1.11	9.55	
2.18	6.00	2.20	7.10	2.12	8.44	1.99	9.92	1.81	11.58		

Note: Data shown for Class 1 fan construction.

BLOWER PERFORMANCE

Available External Static Pressure - IWG - For Accessories And Duct System Static Resistance (Allowance Made For Wet Coil And Filters)

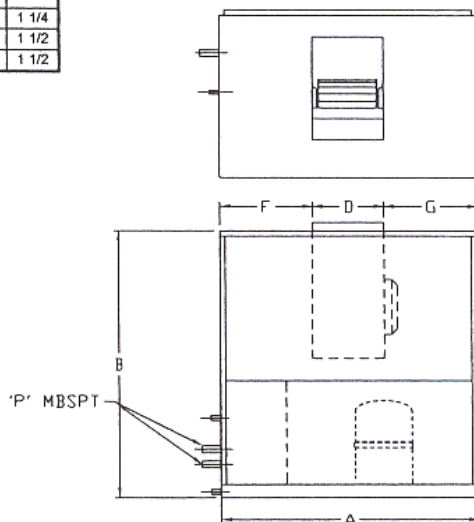
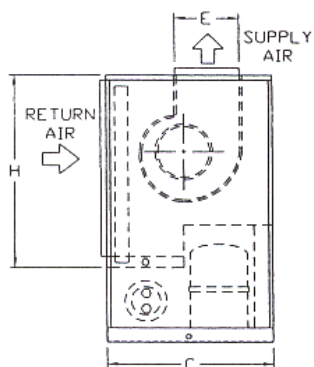
RPM	CFM										FAN MODEL
	ESP	BHP	ESP	BHP	ESP	BHP	ESP	BHP	ESP	BHP	
TWCPs 510B											
	10000		11500		13000		14500		16000		560 x 560 (mm)
500	0.67	3.34	0.57	4.03	0.42	4.78	0.25	5.67	0.05	6.62	
600	1.23	4.64	1.15	5.45	1.03	6.41	0.90	7.48	0.70	8.59	
700	1.80	6.28	1.80	7.21	1.73	8.33	1.60	9.58	1.44	10.92	
800	2.43	8.35	2.44	9.41	2.45	10.65	2.39	12.15	2.26	13.74	
TWCPs 570B & TWCPR 540B											
	11000		13500		15000		15800		16500		560 x 560 (mm)
550	0.86	4.48	0.64	5.90	0.45	6.89	0.33	7.41	0.23	7.91	
650	1.46	6.00	1.30	7.73	1.13	8.86	1.04	9.58	0.95	10.17	
700	1.76	6.91	1.65	8.76	1.49	10.00	1.40	10.75	1.32	11.35	
800	2.41	9.03	2.40	11.16	2.31	12.57	2.23	13.55	2.16	14.30	
TWCPs 640B & TWCPR 640B											
	14600		15400		16200		17000		17800		560 x 560 (mm)
550	0.63	6.61	0.53	7.10	0.45	7.75	0.34	8.32	0.23	8.96	
650	1.30	8.58	1.23	9.18	1.14	9.89	1.05	10.61	0.95	11.40	
700	1.67	9.66	1.59	10.39	1.52	11.08	1.43	11.91	1.34	12.69	
750	2.06	10.93	1.99	11.67	1.92	12.46	1.84	13.33	1.76	14.15	
TWCPs 700B											
	15600		16400		17200		18000		18800		560 x 560 (mm)
550	0.56	7.26	0.46	7.88	0.35	8.47	0.24	9.11	0.12	9.80	
600	0.90	8.27	0.80	8.95	0.69	9.57	0.60	10.33	0.48	11.04	
650	1.26	9.39	1.16	10.06	1.07	10.81	0.95	11.54	0.85	12.35	
700	1.64	10.64	1.54	11.23	1.47	12.17	1.37	12.92	1.27	13.87	
TWCPs 760B											
	13000		15000		17000		19000		21000		630 x 630 (mm)
500	0.95	5.49	0.84	6.54	0.69	7.87	0.37	9.43	-	-	
550	1.29	6.58	1.19	7.72	1.05	9.11	0.87	10.68	0.48	12.64	
600	1.64	7.73	1.56	9.09	1.43	10.56	1.27	12.15	1.06	14.19	
650	1.99	8.98	1.95	10.55	1.83	12.15	1.69	13.91	1.52	15.95	
TWCPs 800B & TWCPR 810B											
	15000		17000		19000		21000		23000		630 x 630 (mm)
550	1.34	7.72	1.25	9.11	1.13	10.69	0.78	12.64	0.16	14.74	
600	1.71	9.09	1.62	10.52	1.53	12.19	1.36	14.19	0.95	16.50	
640	2.02	10.25	1.95	11.82	1.85	13.49	1.73	15.62	1.50	18.00	
680	2.34	11.40	2.29	13.21	2.19	15.02	2.08	17.14	1.93	19.62	
TWCPs 860B											
	17000		19000		21000		23000		25000		710 x 710 (mm)
400	0.72	5.88	0.62	6.86	0.50	8.08	0.23	9.39	-	-	
450	1.08	7.18	1.01	8.31	0.90	9.55	0.76	10.97	0.57	12.64	
500	1.45	8.58	1.42	9.96	1.32	11.28	1.20	12.85	1.08	14.58	
600	2.25	12.17	2.26	13.61	2.23	15.42	2.15	17.29	2.07	19.32	
TWCPs 950B & TWCPR 960B, 1080B											
	19000		21000		23000		25000		27000		710 x 710 (mm)
450	0.94	8.31	0.82	9.55	0.67	10.97	0.45	12.62	-	-	
500	1.34	9.92	1.24	11.28	1.11	12.85	0.97	14.58	0.78	16.47	
600	2.19	13.61	2.15	15.42	2.06	17.29	1.96	19.32	1.81	21.53	
650	2.65	15.93	2.63	17.65	2.57	19.86	2.49	22.10	2.36	24.46	
TWCPs 1140B & TWCPR 1180B											
	20000		22000		24000		26000		28000		TWIN 560 x 560 (mm)
500	0.60	6.74	0.52	7.64	0.43	8.62	0.34	9.76	0.22	10.89	
600	1.12	9.33	1.07	10.39	1.00	11.62	0.91	12.90	0.82	14.36	
700	1.65	12.50	1.66	13.74	1.62	15.28	1.57	16.82	1.48	18.44	
800	2.24	16.48	2.26	17.94	2.27	19.71	2.25	21.35	2.21	23.36	
TWCPs 1340B & TWCPR 1280B											
	25000		27000		29000		31000		33000		TWIN 560 x 560 (mm)
500	0.42	9.15	0.31	10.22	0.20	11.43	0.08	12.82	-	-	
600	0.98	12.23	0.91	13.59	0.80	15.03	0.68	16.63	0.55	18.24	
700	1.63	15.93	1.56	17.67	1.47	19.30	1.38	21.16	1.25	23.05	
800	2.30	20.41	2.26	22.36	2.22	24.19	2.13	26.53	2.03	28.66	
TWCPs 1520B											
	28000		30000		32000		34000		36000		TWIN 560 x 560 (mm)
500	0.16	10.89	0.06	12.15	-	-	-	-	-	-	
600	0.75	14.31	0.67	15.83	0.52	17.39	0.38	19.20	0.23	20.98	
700	1.41	18.37	1.34	20.27	1.23	22.08	1.09	24.13	0.95	26.32	
800	2.14	23.28	2.09	25.42	1.98	27.46	1.85	29.84	1.75	32.19	

Note: Data shown for Class 1 fan construction.

DIMENSIONAL DATA

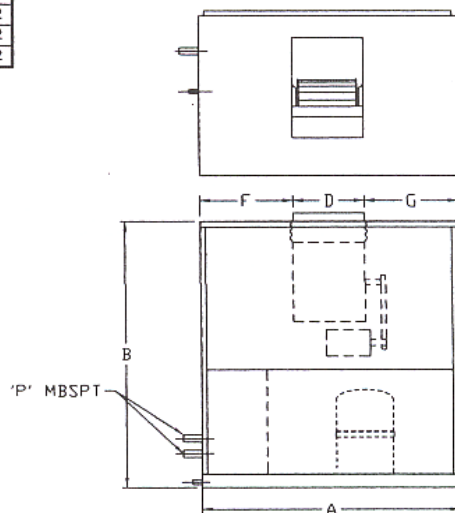
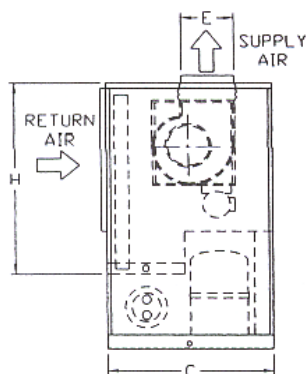
TWCPS 68B, 81B, 95B

MODEL	A	B	C	D	E	F	G	H	P
TWCPS 68B	47	50	30	11 3/4	10 3/8	17 5/8	17 5/8	35	1 1/4
TWCPS 81B	47	50	30	15 1/2	13 1/2	15 3/4	15 3/4	35	1 1/2
TWCPS 95B	47	50	30	15 1/2	13 1/2	15 3/4	15 3/4	35	1 1/2



TWCPS 125B, 145B, 160B

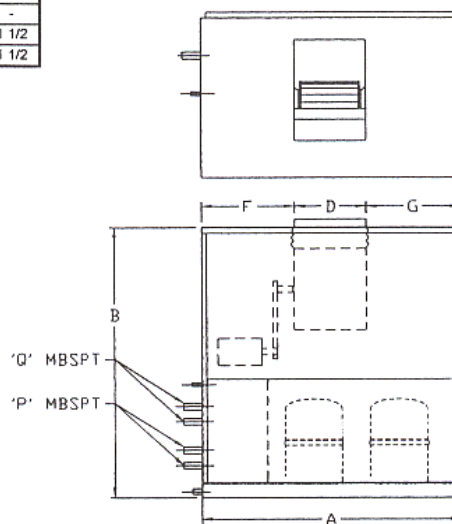
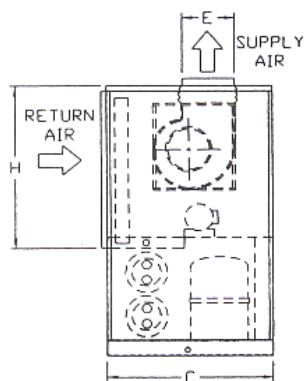
MODEL	A	B	C	D	E	F	G	H	P
TWCPS 125B	58 1/2	63	30	15 1/2	13 1/2	21 1/2	21 1/2	42	1 1/2
TWCPS 145B	58 1/2	63	30	15 1/2	13 1/2	21 1/2	21 1/2	42	1 1/2
TWCPS 160B	58 1/2	63	30	15 1/2	13 1/2	21 1/2	21 1/2	42	1 1/2



TWCPS 190B, 220B, 250B

MODEL	A	B	C	D	E	F	G	H	P	Q
TWCPS 190B	76	62	38	18 1/2	16	28 3/4	28 3/4	38	2	-
TWCPS 220B	76	62	38	18 1/2	16	28 3/4	28 3/4	38	1 1/2	1 1/2
TWCPS 250B	76	62	38	18 1/2	16	28 3/4	28 3/4	38	1 1/2	1 1/2

Note: TWCPS 190B is single compressor.

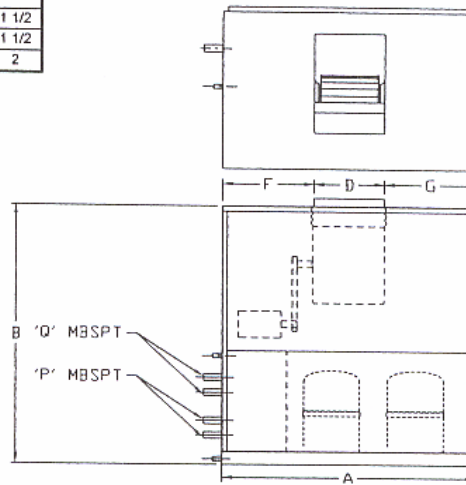
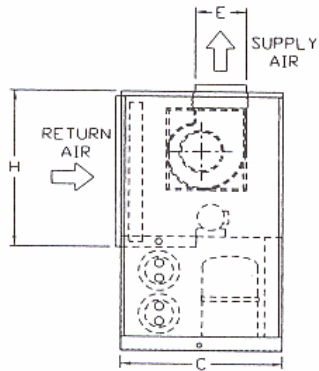


NOTE: ALL DIMENSIONAL ARE IN INCHES.

DIMENSIONAL DATA

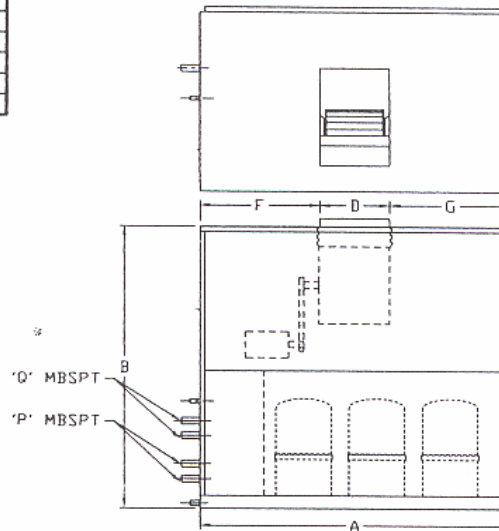
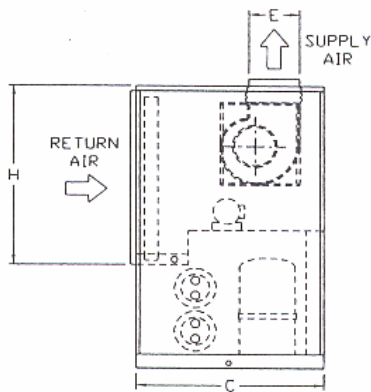
TWCPS 285B, 320B, 380B

MODEL	A	B	C	D	E	F	G	H	P	Q
TWCPS 285B	76	68	41 1/2	17	19	30	29	47	1 1/2	1 1/2
TWCPS 320B	76	68	41 1/2	17	19	30	29	47	1 1/2	1 1/2
TWCPS 380B	76	68	41 1/2	22	19	30	24	47	2	2



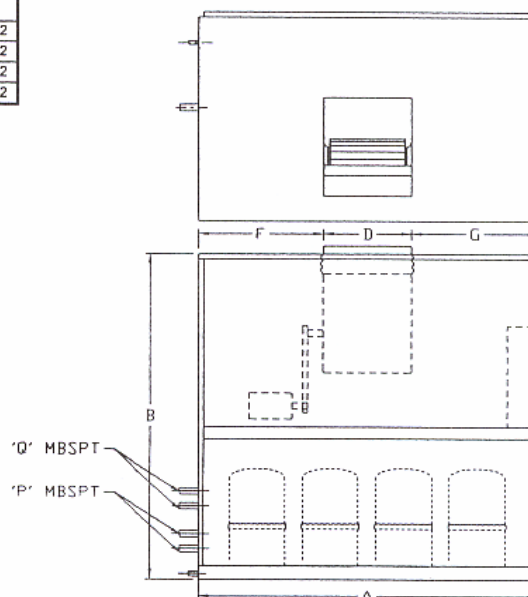
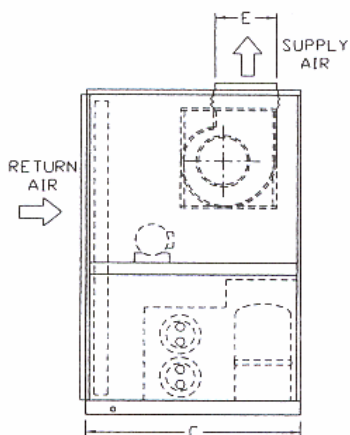
TWCPS 445B, 480B, 510B, 570B & TWCPR 540B

MODEL	A	B	C	D	E	F	G	H	P	Q
TWCPS 445B	84	78	52	22	19	30	32	62	2 1/2	1 1/2
TWCPS 480B	84	78	52	25 1/4	25 1/4	30	28 3/4	62	2 1/2	1 1/2
TWCPS 510B	84	78	52	28 1/4	28 1/4	30	25 3/4	62	2 1/2	2
TWCPS 570B	84	78	52	28 1/4	28 1/4	30	25 3/4	62	2 1/2	2
TWCPR 540B	84	78	52	28 1/4	28 1/4	30	25 3/4	62	2	2



TWCPS 640B, 700B, 760B & TWCPR 640B

MODEL	A	B	C	D	E	F	G	P	Q
TWCPS 640B	90	84	64	28 1/4	28 1/4	34	27 3/4	2 1/2	2 1/2
TWCPS 700B	90	84	64	28 1/4	28 1/4	34	27 3/4	2 1/2	2 1/2
TWCPS 760B	90	84	64	31 1/2	31 1/2	34	24 1/2	2 1/2	2 1/2
TWCPR 640B	90	84	64	28 1/4	28 1/4	34	27 3/4	2 1/2	2 1/2



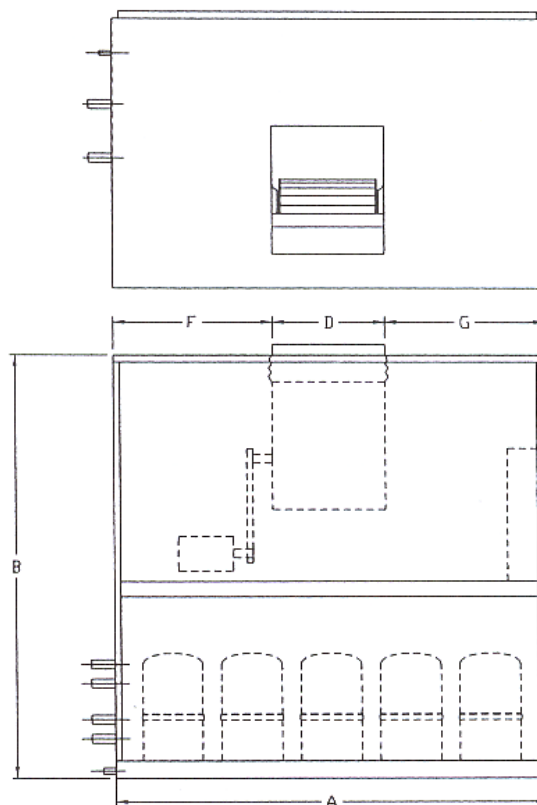
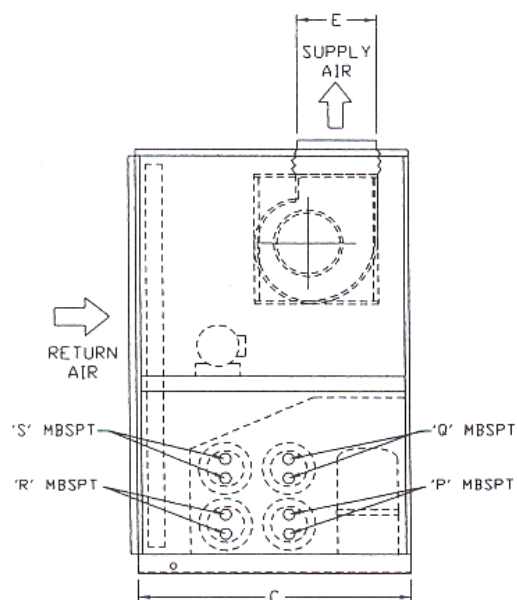
NOTE: ALL DIMENSIONAL ARE IN INCHES.

DIMENSIONAL DATA

TWCPS 800B, 860B, 950B & TWCPR 810B, 960B, 1080B

MODEL	A	B	C	D	E	F	G	P	Q	R	S
TWCPS 800B	108	92	72	31 1/2	31 1/2	38 1/4	38 1/4	2 1/2	2 1/2	1 1/2	-
TWCPS 860B	108	92	72	35 1/2	35 1/2	38 1/4	34 1/4	2 1/2	2 1/2	1 1/2	-
TWCPS 950B	108	92	72	35 1/2	35 1/2	38 1/4	34 1/4	2 1/2	2 1/2	2	-
TWCPR 810B	108	92	72	31 1/2	31 1/2	38 1/4	38 1/4	2	2	2	-
TWCPR 960B	108	92	72	35 1/2	35 1/2	38 1/4	34 1/4	2 1/2	2 1/2	2 1/2	-
TWCPR 1080B	108	92	72	35 1/2	35 1/2	38 1/4	34 1/4	2	2	2	2

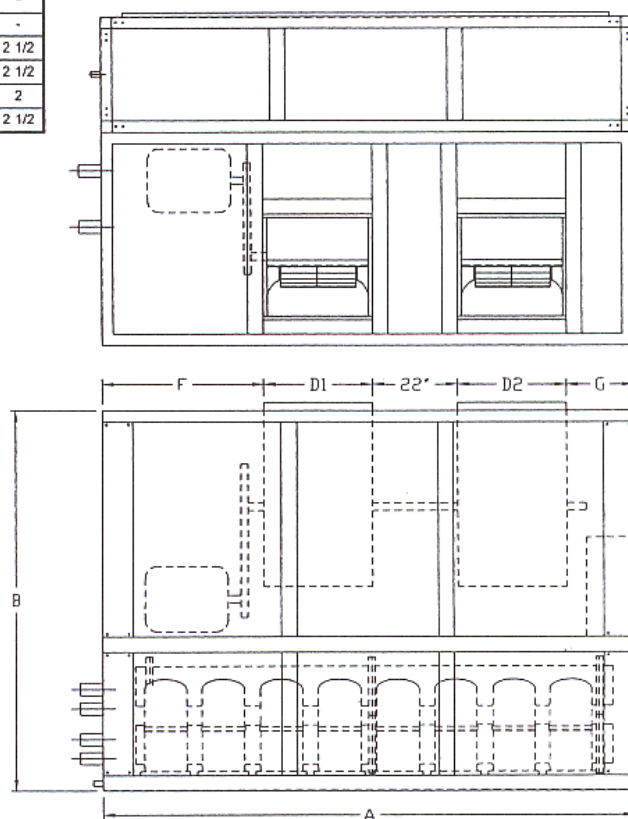
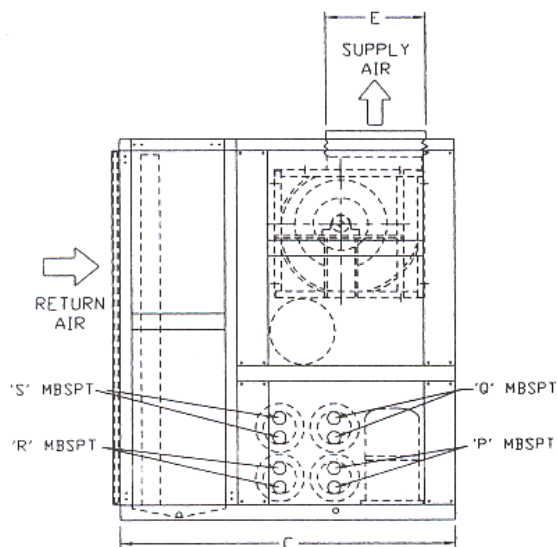
Note: Number of compressor to refer to physical data.



TWCPS 1140B, 1340B, 1520B & TWCPR 1180B, 1280B

MODEL	A	B	C	D1	D2	E	F	G	P	Q	R	S
TWCPS 1140B	142	100	86	28 1/4	28 1/4	28 1/8	42	21 1/2	2 1/2	2 1/2	2 1/2	-
TWCPS 1340B	142	100	86	28 1/4	28 1/4	28 1/8	42	21 1/2	2 1/2	2 1/2	2 1/2	2 1/2
TWCPS 1520B	142	100	86	28 1/4	28 1/4	28 1/8	42	21 1/2	2 1/2	2 1/2	2 1/2	2 1/2
TWCPR 1180B	142	100	86	28 1/4	28 1/4	28 1/8	42	21 1/2	2 1/2	2 1/2	2	2
TWCPR 1280B	142	100	86	28 1/4	28 1/4	28 1/8	42	21 1/2	2 1/2	2 1/2	2 1/2	2 1/2

Note: Number of compressor to refer to physical data.



NOTE: ALL DIMENSIONAL ARE IN INCHES.

PHYSICAL DATA

MODEL	COMPRESSOR				COND. -	BLOWER SECTION						EVAPORATOR COIL		FILTERS CHARGE		R-22	APPROX. OPERATING WEIGHT (LBS)
	QTY	MCC EA.	LRA EA.	NRA EA.		MIN- MAX USGPM	QTY	DIA x WIDTH (INCH)	MAX HP	FLA	LRA						
TWCPS 68B	1	1x14.0	1x74.0	1x6.8	7 24	1	9x9	1	-	-	-	3	4.7	4	16x16	1x8.3	635
TWCPS 81B	1	1x17.0	1x101.0	1x8.8	8 29	1	12x12	1	-	-	-	3	5.0	4	16x16	1x9.9	762
TWCPS 95B	1	1x23.0	1x95.0	1x10.0	9 33	1	12x12	1	-	-	-	3	5.8	4	16x16	1x12.3	840
TWCPS 125B	1	1x26.9	1x125.0	1x12.8	13 44	1	12x12	4	6.4	41.7	2250 4125	3	7.5	4	16x20	1x17.6	1350
TWCPS 145B	1	1x27.5	1x125.0	1x16.2	15 51	1	12x12	4	6.4	41.7	2380 4355	4	7.9	4	16x20	1x16.0	1368
TWCPS 160B	1	1x34.0	1x167.0	1x16.3	16 56	1	12x12	4	6.4	41.7	2380 4355	4	7.9	4	16x20	1x23.8	1397
TWCPS 190B	1	1x37.0	1x198.0	1x20.0	19 67	1	15x15	7.5	11.3	77.5	3970 7270	3	13.2	2 4	16x20 16x25	1x25.3	1750
TWCPS 220B	2	1x23.0 1x26.9	1x95.0 1x125.0	1x10.0 1x12.8	22 76	1	15x15	7.5	11.3	77.5	4600 8440	3	15.4	2 4	16x20 16x25	1x13.3 1x17.6	1880
TWCPS 250B	2	2x26.9	2x125.0	2x12.8	25 88	1	15x15	7.5	11.3	77.5	4960 9090	3	16.5	1 2 1 2	16x20 16x25 20x20 20x25	2x17.6	1980
TWCPS 285B	2	1x26.9 1x34.0	1x125.0 1x167.0	1x12.8 1x16.3	29 100	1	18x13	15	21.5	145.4	6020 11040	3	20.1	2 1 2	20x25 20x20 25x25	1x17.6 1x23.8	2375
TWCPS 320B	2	2x34.0	2x167.0	2x16.3	32 112	1	18x13	15	21.5	145.4	6375 11690	3	21.3	2 1 2	20x25 20x20 25x25	2x23.8	2700
TWCPS 380B	2	2x37.0	2x198.0	2x20.0	38 133	1	18x18	15	21.5	145.4	6375 11690	4	21.3	2 1 2	20x25 20x20 25x25	2x25.3	3150
TWCPS 445B	3	2x34.0 1x27.5	2x167.0 1x125.0	2x16.3 1x16.2	45 156	1	18x18	20	29.2	199.5	7080 13000	4	23.6	6	25x25	1x17.6 2x23.8	3372
TWCPS 480B	3	3x34.0	3x167.0	3x16.3	48 168	1	20x20	20	29.2	199.5	9000 16500	3	30	9	20x25	3x23.8	4264
TWCPS 510	3	2x34.0 1x37.0	2x167.0 1x198.0	2x16.3 1x20.0	51 178	1	22x22	20	29.2	199.5	9000 16500	3	30	9	20x25	2x23.8 1x25.3	4264
TWCPR 540B	2	2x56.0	2x190	2x32.4	54 189	1	22x22	20	29.2	199.5	9000 16500	4	30	9	20x25	2x29.5	4200
TWCPS 570B	3	3x37.0	3x198.0	3x20.0	57 200	1	22x22	20	29.2	199.5	9000 16500	4	30	9	20x25	3x25.3	4640
TWCPS 640B	4	4x34.0	4x167.0	4x16.3	64 224	1	22x22	30	41.2	274.6	10800 19800	4	36	12	20x25	4x23.8	6260
TWCPR 640B	2	2x69.0	2x215	2x38.6	64 224	1	22x22	30	41.2	274.6	10800 19800	4	36	12	20x25	2x35.0	6200
TWCPS 700B	4	2x34.0 2x37.0	2x167.0 2x198.0	2x16.3 2x20.0	70 245	1	22x22	30	41.2	274.6	11500 21200	4	48.6	12	20x25	2x23.8 2x25.3	6300
TWCPS 760B	4	4x37.0	4x198.0	4x20.0	76 266	1	22x22	30	41.2	274.6	12200 32340	4	40.6	12	20x25	4x25.3	6521
TWCPS 800B	5	5x34.0	5x167.0	5x16.3	80 280	1	25x25	40	55.6	375.2	16150 29620	3	53.9	4 4 8	16x25 20x25 25x25	5x23.8	6972
TWCPR 810B	3	3x56.0	3x190	3x32.4	80 280	1	25x25	40	55.6	375.2	16150 29620	3	53.9	4 4 8	16x25 20x25 25x25	3x29.5	6800
TWCPS 860B	5	2x37.0 3x34.0	2x198.0 3x167.0	2x20.0 3x16.3	89 312	1	28x28	40	55.6	375.2	16150 29620	3	53.9	4 4 8	16x25 20x25 25x25	3x23.8 2x25.3	7480
TWCPS 950B	5	5x37.0	5x198.0	5x20.0	96 336	1	28x28	40	55.6	375.2	16150 29620	4	53.9	4 4 8	16x25 20x25 25x25	5x25.3	7750
TWCPR 960B	3	3x69.0	3x215	3x38.6	96 336	1	28x28	40	55.6	375.2	16150 29620	4	53.9	4 4 8	16x25 20x25 25x25	3x35.0	7200
TWCPR 1080B	4	4x56.0	4x190	4x32.4	108 378	1	28x28	40	55.6	375.2	16150 29620	4	53.9	4 4 8	16x25 20x25 25x25	4x29.5	8000
TWCPS 1140B	6	6x37.0	6x198.0	6x20.0	114 399	2	22x22	50	67.4	464.6	20000 36770	4	66.8	2 9 9	20x20 20x25 25x25	6x25.3	8790
TWCPR 1180B	4	2x56.0 2x69.0	2x190 2x215	2x32.4 2x38.6	118 413	2	22x22	50	67.4	464.6	20000 36770	4	66.8	2 9 9	20x20 20x25 25x25	2x29.5 2x35.0	8800
TWCPR 1280B	4	4x69.0	4x215	4x38.6	128 448	2	22x22	50	67.4	464.6	21200 38870	4	70.7	2 9 9	20x20 20x25 25x25	4x35.0	9200
TWCPS 1340B	8	2x37.0 6x34.0	2x198.0 6x167.0	2x20.0 6x16.3	134 469	2	22x22	50	67.4	464.6	21200 38870	4	70.7	2 9 9	20x20 20x25 25x25	6x23.8 2x25.3	9122
TWCPS 1520B	8	8x37.0	8x198.0	8x20.0	152 532	2	22x22	50	67.4	464.6	21200 38870	5	70.7	2 9 9	20x20 20x25 25x25	8x25.3	9240

* Condenser type: Cleanable shell and tubes.

- Notes:
- 1.) LRA = Locked rotor ampere.
 - 2.) NRA = Nominal running ampere.
 - 3.) FLA = Full load ampere.
 - 4.) MCC = Maximum continuous current.
 - 5.) All rating are based on 400V-3-50Hz.

- 6.) Minimum-maximum voltage is 360V-440V.
- 7.) For other power supply requirements, please contact the Dunham-Bush sales office.
- 8.) Blower for model TWCPS 68B to 95B as direct driven.
- 9.) Filter is one inch thick.

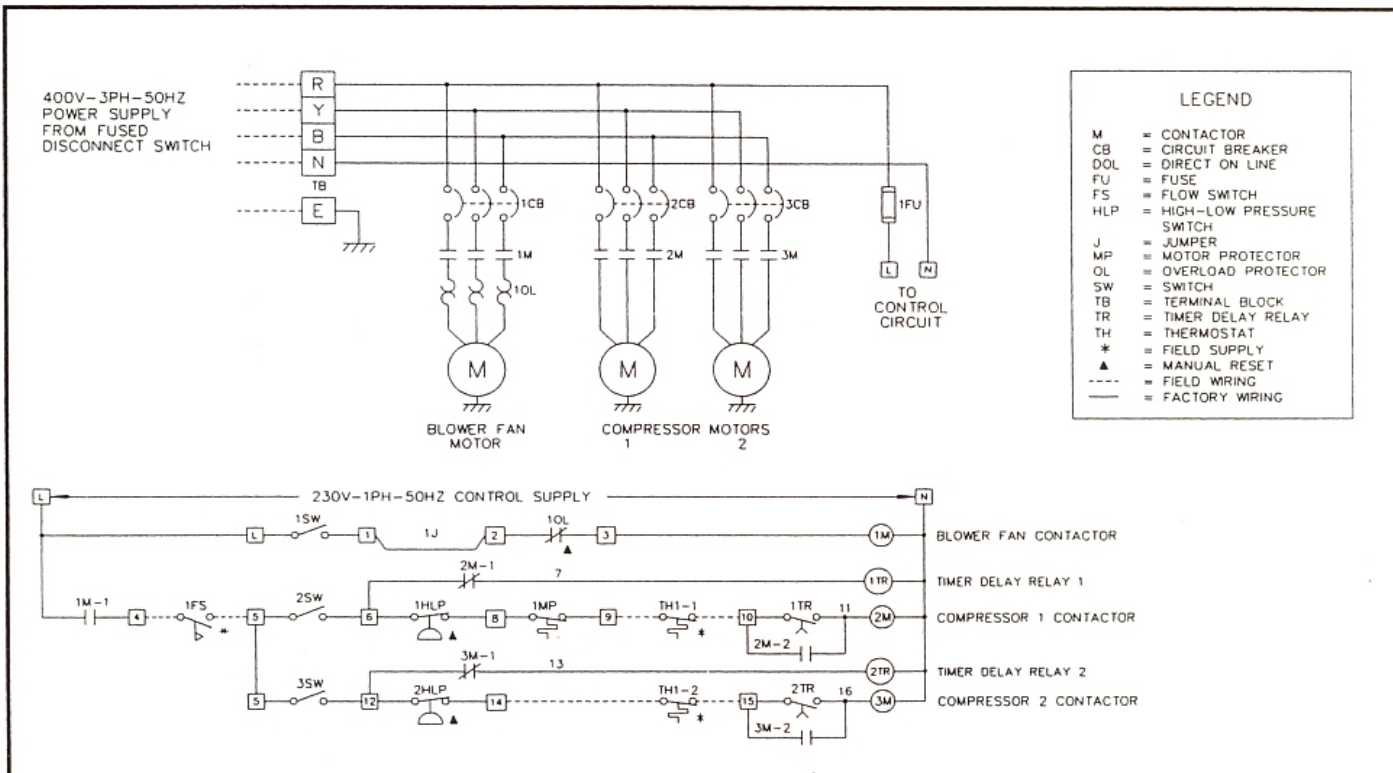
WATER-COOLED PACKAGE AIR CONDITIONERS - CEILING HORIZONTAL BLOW

MODEL		TWCP-CH																	
		18	24	28	32	35	46	56	68	81	95	125	145	160	190	220	250	285	
Cooling Capacity	Btu/ hr	18,000	24,000	28,000	32,000	35,000	46,000	56,000	68,000	81,000	95,000	125,000	145,000	160,000	190,000	220,000	250,000	285,000	
	Kcal/ hr	4,536	6,048	7,056	8,065	8,821	11,593	14,113	17,137	20,413	23,942	31,502	36,542	40,323	47,883	55,444	63,004	71,825	
Compressor	Type	Reciprocating/ Hermetic								Scroll/ Hermetic									
	Power Supply	240 V / 1 Ph / 50 Hz						415 V / 3 Ph / 50 Hz											
	Nominal Run Amp	5.9	7.8	9.6	10.9	4.8	5.6	6.8	6.5	8.6	10.2	7.8	9.6	10.9	4.8	5.6	6.8	6.5	
	Starting Amp	37	46	58	70	41	42	55	74	86	98	46	58	70	41	42	55	74	
	R22 Charge(lbs)	4.8	5.17	5.5	5.72	5.83	6.27	7.26	8.4	8.8	12.3	5.17	5.5	5.72	5.83	6.27	7.26	8.4	
Condenser	Type	Cleanable Shell and Tubes																	
	Water Flow (USGPM)	4.5	6	7	8	8.75	11.5	14	17	21	23.75	31.25	36.25	40	47.5	55	62.5	71.25	
	Water Connection Size (in)	7/8	7/8	7/8	7/8	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2	2	
Evaporator Coil	Type	Aluminium Wave Fin/ Copper Tubes																	
	Rows/Fins per inch	3/12	3/12	3/12	3/12	3/12	3/12	4/12	4/12	3/12	3/12	3/12	3/12	4/12	4/12	4/12	3/12	4/12	
	Face Area (ft2)	1.7	2.2	2.4	3	3	4	4	5.3	5.3	7.1	9.17	9.3	9.17	10.1	12.1	15.4	15.4	
	Refrigerant Control	Capillary Tube							Thermal Expansion Valve										
Evaporator Fan	Type	Centrifugal																	
	Drive	Direct Drive							Belt Drive										
	Fan motor Hp	0.25	0.25	0.25	0.33	0.33	0.5	0.5	0.75	1.5	1.5	2	3	3	4	5	5.5	7.5	
	Full Load Current (Amp)	1.5	1.5	1.5	1.7	1.7	1.6	1.6	1.7	2.7	2.7	2.7	3.39	4.65	6.15	7.7	7.7	10.9	
	Quantity	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Nominal Air Flow (CFM)	650	800	1,000	1,250	1,500	1,750	1,900	2,100	2,500	3,400	4,000	4,400	4,400	5,400	6,200	7,400	8,600	
	External Static (in. wg)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	1.2	1.2	1.2	1.2	
Dimensions	Width(inch)	46	46	46	46	46	46	46	76	76	68	72	72	72	90	90	108	108	
	Depth(inch)	30	30	30	30	30	30	30	38	38	54	54	54	67 1/2	72	72	72	72	
	Height(inch)	20	20	20	20	20	20	20	62	62	34 1/2	36	36	36	31	35	35	35	
	Weight(kg)	100	114	127	150	177	200	218	296	364	422	465	659	680	791	899	1,018	1,120	
Filter	Type	1 "Washable Filter								2 "Washable Filter									
	Quantity & Size (in)	1 (20 x 25)				2 (20 x 16)			1 (20 x 20)		1 (25 x 16)		2 (25 x 20)			2 (20 x 25)		2 (20 x 25)	
									1 (16 x 20)		2 (25 x 20)					1 (16 x 25)		2 (16 x 25)	

Specification are subject to change without prior notice. Note: 1) The cooling capacity is base on 80°FDB/67°FWB air coil temperature and 95°F condenser leaving water temperature
2) Rating are gross capacity, deducted fan motor heat for net capacity

ELECTRICAL

TYPICAL WIRING DIAGRAM



CORRECTION FACTORS

To correct for variation in air flow, use this multiplier.

AIR FLOW VARIATION	TOTAL CAPACITY	SENSIBLE CAPACITY
0.8	0.960	0.900
0.9	0.980	0.950
1.0	1.000	1.000
1.1	1.015	1.045
1.2	1.025	1.090

To correct for altitude, use this multiplier.

ALTITUDE ABOVE SEA LEVEL - FT	COOLING CAPACITY
0	1.00
2000	0.98
3000	0.97
4000	0.96
5000	0.95
6000	0.93
7000	0.92

To correct sensible capacity for varying dry bulb.

DRY BULB	WET BULB			
	57	62	67	72
75	0.84	0.81	0.78	0.74
80	1.00	1.00	1.00	1.00
85	1.16	1.18	1.21	1.26

NOTE: IF THE CAPACITY AFTER MULTIPLYING THE SENSIBLE WITH THE CORRECTION FACTOR EXCEED THE TOTAL CAPACITY, THEN THE SENSIBLE MUST BE EQUAL TO THE TOTAL.

MANUFACTURER RESERVES THE RIGHT TO CHANGE SPECIFICATION OR DESIGN AT ANY TIME WITHOUT PRIOR NOTICE.

TOPAIRE
air conditioner



DUNHAM-BUSH INDUSTRIES SDN BHD



MS ISO 9001 : 2000 REG.NO AR0409

Jan 2005