



# SARMAAFARIN

## Single-Package Cooling Units

A wide range of condenser less models  
in nominal 7½ to 36 ton capacities



Certificate No.: Dbi - 2002011  
ISO 9001: 2000



**Commercial or industrial applications**  
**Single or multiple unit systems**  
**Duct work or free blow arrangement**

**دستگاه های پکیج**

**با کندانسور مجزای هوایی**

**50BBS**

Cooling Capacities:  
82,000 to 433,000 Btuh  
50 Hertz

# Compact, self-contained units that offer complete flexibility to your building design

From SSI excellence in engineering comes a line of cooling units that can meet your toughest building requirements... whether new construction or renovation. No matter where you place them, in the conditioned space or in an equipment room, they'll deliver unparalleled performance from 82000 to 433000 Btuh. Whether you choose the 50BBS condenser less model (for remote condenser), you'll get a packaged that can cool, heat, dehumidify, filter and efficiently... at full or partial load.

All units are designed for dust systems in stores, offices and factories. The 008 thru 024 sizes use an accessory plenum and grille for free-blow applications.

And installation is easy-versatility in unit location gives you a wide range of options. Factory installed piping and pre wired electrical center simplify field connections. The 016 thru 044 units can be installed for either vertical or horizontal air discharge. These units also contain built in circuit breakers which means you don't have to be

concerned with field-supplied current protective devices. The Weather Armor cabinet surrounds an all-welded steel frame providing strength, rigidity and durability... an attractive installation that complements any environment.

Convenient servicing-these single-package cooling units are designed so that inspection, service and repair can be accomplished with little waste of time. Easy to remove panels provide complete access to internal components and controls. Precision parts have minimum wear surfaces and heavy gauge galvanized steel, double protected with rugged, baked enamel finish.

Lifetime economy time tested and reliable, these packages offer significant cost savings with their quick and simple installation, efficient cooling and sub cooling operation, and reduced service and maintenance requirements.

## Quality engineered features assure outstanding performance

- **Copeland ZR Series compressors** from the ZR scroll in the smallest unit, Copeland compressors deliver quiet, reliable high cooling capacity at low cost.

- **Capacity control** at partial loads is ensured by multiple refrigeration systems (sizes 012 to 044).

**Crankcase heaters** remain on during compressor off cycle to prevent dilution of oil by refrigerant... thus preventing flooded starts.

- **Compressor motor protection** assured on all units by use of quick sensing elements that prevent trouble before it starts.

- **QT fans** move large volumes of indoor air quietly and at a lower rpm than most comparable fans. Compact housing and specially designed discharge give fans superior air handling capability.

- **Evaporator coils** - Space saving slab type provide high heat transfer efficiency with large face area; fins are mechanically bonded to seamless copper tubing.

- **Pre-wired electrical control center** contains all control devices. Terminal block provides for a single field power connection.

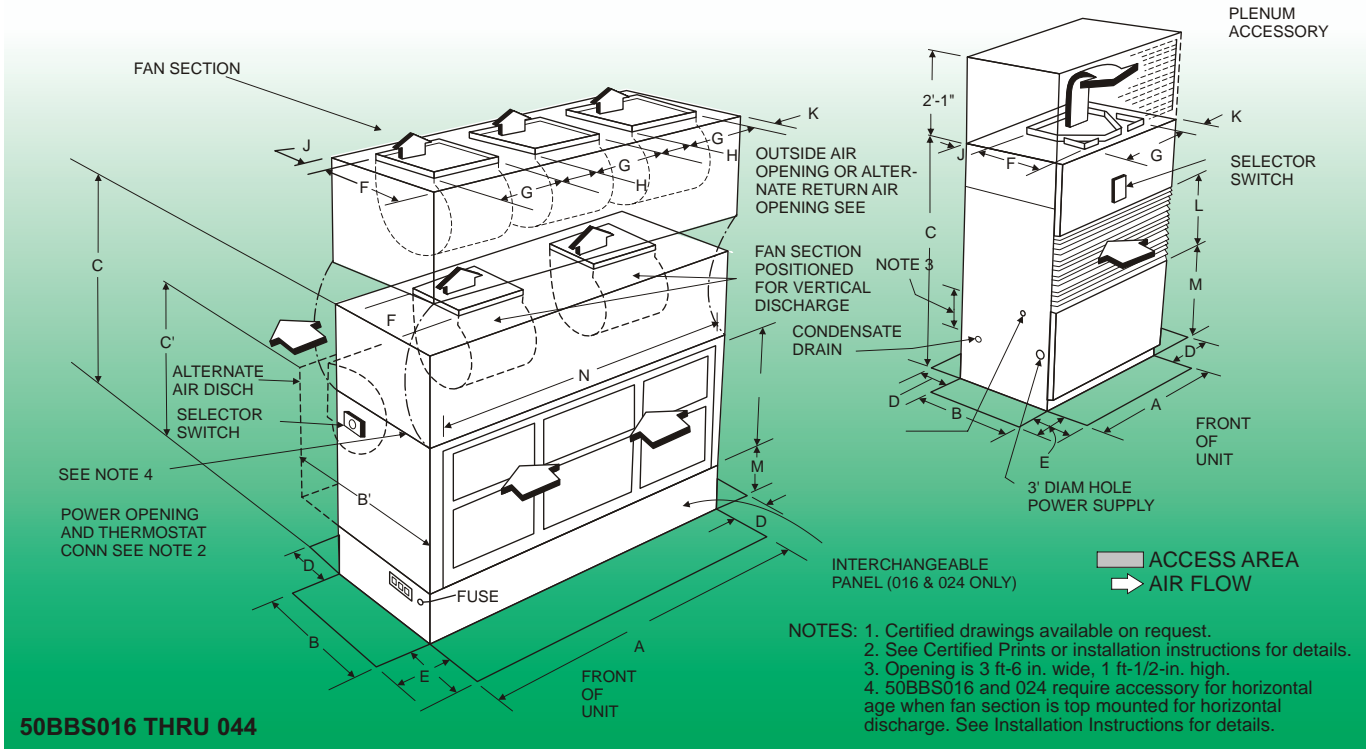
### Accessories

- **Heating coils** - Hot water coils are provided for easy piping connection in the field.

- **Air inlet grille** - (016 and 024) adds an attractive touch to the front of the base unit when duct work is not used.

Covers the filter opening with a decorative, easily attached expanded metal assembly.

# Dimensions



UNIT 50BBS		008, 012	016	024	028	034	044
<b>DIMENSIONS (ft-in.)</b>							
Length	A	4-0		6-8		7-9 <sup>1</sup> / <sub>4</sub>	10-6 <sup>3</sup> / <sub>8</sub>
Width	B	2-6 <sup>1</sup> / <sub>8</sub>		2-5 <sup>1</sup> / <sub>4</sub>		2-11 <sup>1</sup> / <sub>4</sub>	3-10 <sup>1</sup> / <sub>4</sub>
Width*	B'	-		4-4 <sup>5</sup> / <sub>8</sub>		5-4 <sup>1</sup> / <sub>8</sub>	6-4 <sup>5</sup> / <sub>8</sub>
Height	C	6-8		7-1 <sup>1</sup> / <sub>2</sub>		8-3 <sup>1</sup> / <sub>8</sub>	9-1 <sup>1</sup> / <sub>8</sub>
Height*	C'	-		5-2 <sup>1</sup> / <sub>2</sub>		5-10 <sup>1</sup> / <sub>4</sub>	6-6 <sup>5</sup> / <sub>8</sub>
	D	1-0		2-0		2-0	2-0
	E	2-0		3-0		3-0	2-6
	F	1-7 <sup>3</sup> / <sub>8</sub>		1-7 <sup>1</sup> / <sub>4</sub>		1-8 <sup>7</sup> / <sub>8</sub>	1-8 <sup>7</sup> / <sub>8</sub>
	G	1-5 <sup>1</sup> / <sub>4</sub>		1-5 <sup>1</sup> / <sub>4</sub>		1-8 <sup>7</sup> / <sub>8</sub>	1-8 <sup>7</sup> / <sub>8</sub>
	H	-		1-4 <sup>1</sup> / <sub>8</sub>		1-7 <sup>7</sup> / <sub>8</sub>	2-7 <sup>1</sup> / <sub>2</sub>
	J	0-1 <sup>1</sup> / <sub>4</sub>		0-0 <sup>5</sup> / <sub>8</sub>		0-2 <sup>3</sup> / <sub>8</sub>	0-3
	K	0-11 <sup>7</sup> / <sub>8</sub>		1-7		1-4	2-2 <sup>5</sup> / <sub>8</sub>
	L	1-11 <sup>1</sup> / <sub>4</sub>		2-10 <sup>1</sup> / <sub>4</sub>		3-2 <sup>1</sup> / <sub>4</sub>	3-10
	M	2-5 <sup>3</sup> / <sub>8</sub>		1-11 <sup>1</sup> / <sub>2</sub>		2-1 <sup>1</sup> / <sub>8</sub>	2-2 <sup>1</sup> / <sub>2</sub>
	N	-		6-3 <sup>3</sup> / <sub>4</sub>		7-4 <sup>1</sup> / <sub>4</sub>	10-0
<b>CONNECTIONS</b>		No. ... Size (In.)					
Hot Gas Line		1.. <sup>3</sup> / <sub>4</sub> ODF	1..1 <sup>1</sup> / <sub>8</sub> ODM	2.. <sup>7</sup> / <sub>8</sub> ODM	1..1 <sup>1</sup> / <sub>8</sub> ODS	2..1 <sup>1</sup> / <sub>8</sub> ODS	2..1 <sup>1</sup> / <sub>8</sub> ODM
Liquid Line		1.. <sup>5</sup> / <sub>8</sub> ODF	1.. <sup>5</sup> / <sub>8</sub> ODM	2.. <sup>5</sup> / <sub>8</sub> ODM	1.. <sup>7</sup> / <sub>8</sub> ODS	2.. <sup>5</sup> / <sub>8</sub> ODS	1.. <sup>7</sup> / <sub>8</sub> ODM
Condensate		1.. <sup>3</sup> / <sub>4</sub> FPT	1..1 FPT	1..1 FPT	2.. <sup>5</sup> / <sub>8</sub> ODS	2.. <sup>5</sup> / <sub>8</sub> ODS	3.. <sup>5</sup> / <sub>8</sub> ODM
					1..1 <sup>1</sup> / <sub>4</sub> MPT	1..1 <sup>1</sup> / <sub>4</sub> MPT	1..1 <sup>1</sup> / <sub>2</sub> MPT
<b>HEATING COIL CONN.</b>							
Steam 1-row	Inlet	1..1 <sup>1</sup> / <sub>4</sub>	1..1 <sup>1</sup> / <sub>4</sub>	1..1 <sup>1</sup> / <sub>4</sub>	2..1 <sup>1</sup> / <sub>2</sub>	2..1 <sup>1</sup> / <sub>2</sub>	2..2 <sup>1</sup> / <sub>2</sub>
	Outlet	1..1 <sup>1</sup> / <sub>4</sub>	1..1 <sup>1</sup> / <sub>4</sub>	1..1 <sup>1</sup> / <sub>4</sub>	2..1 <sup>1</sup> / <sub>4</sub>	2..1 <sup>1</sup> / <sub>4</sub>	2..1 <sup>1</sup> / <sub>2</sub>
Hot Water Arrangement Vertical	Inlet	1..1 <sup>1</sup> / <sub>4</sub>	2..1 <sup>1</sup> / <sub>2</sub>	2..1 <sup>1</sup> / <sub>2</sub>	2..1 <sup>1</sup> / <sub>2</sub>	2..1 <sup>1</sup> / <sub>2</sub>	3..1 <sup>1</sup> / <sub>2</sub>
	Outlet		Location of Steam or Hot Water Connections ‡				
		Left	Right	Right	Left or Right	Left or Right	

Shaded values are for System 2. \* With fan section relocated for horizontal discharge.

‡ 'Left' and 'Right' are sides determined when facing return air opening on front of unit.

# Physical data

UNIT 50BBS	008	012	016	024	028	034	044
<b>OPER WT (lb)</b>	640*	800*	1230*	1230*	2100	2200	2750
<b>OPER CHG (lb)</b>							
Sys 1	8	5	8	7	15	15	15
Sys 2	-	5	8	7	12	15	15
Sys 3	-	-	-	-	-	-	11
<b>COMPRESSOR</b>	<b>ZR</b>						
Sys 1	94	61	94	125	190	190	190
Sys 2	-	61	94	125	125	190	190
Sys 3	-	-	-	-	-	-	125
Cap. Steps	1	2	2	2	2	2	3
<b>EVAP FAN</b>							
Nom Cfm	3000	4000	6000	8000	10000	12000	16000
Range Cfm	2250-	3000-	4500-	6000-	7500-	9000-	12000-
Nom Motor Hp	3750	5000	7500	10000	12500	15000	20000
Nom Motor Hp	1.0	2.0	2.0	3.0	5.0	5.0	7.5
<b>EVAP COILS</b>							
Rows	3	3	3	4	4	4	4
Fins/in.	13	13	13	11	11	11	11
Face (sq ft)	7.31	8.54	16.90	18.04	22.6	26.9	36.5
<b>FILTERS, Type**</b>	Low Vel	Low Vel	Low Vel	Low Vel	Low Vel	Low Vel	Low Vel
No. .. Size (in.)	4..16x20x1	4..16x20x1	3..16x25x1 3..20x25x1	3..16x25x1 3..20x25x1	6..25x20x2 2..16x20x2	6..25x20x2 2..16x20x2	11..25x20x2

\* Add 140 lb for plenum.

\*\* Filters shown are supplied with unit. Field-supplied 2-in. filters will fit 008 thru 024 units.

† Does not include charge for matching air-cooled condenser or connecting piping used with 50BBS units.

All 50BBS units are shipped with holding charge.

## Selection procedure (with example)

### I Determine job requirements.

Given:	50BBS
Cooling Load (TC/Btuh)	198,000
(SHC/Btuh)	159,000
Heating Load (Btuh)	472,000
Hot water available at conditions in Heating Coil Ratings table.	
Evap Air Quantity (cfm)	8,000
Refrigerant Cond Temp	130 F
Evap Entering Air Conditions wb	67 F
db	80 F
External Static Pressure (in. wg)	.7
Fouling Factor	-

### II Select unit or units based on cooling requirements.

For 50BBS024, enter Cooling Capacities table No. 4 at 8,000 cfm and 130 F condensing temperature. At 67 F evaporator air ewb temperature, TC is 198,000 Btuh and SHC is 159,000 Btuh, which satisfy requirements. Thus the 50BBS024 are capable of fulfilling specified load requirements.

### III Select coil for the heating load.

From the heating Coil Rating table for a 50BBS024 unit 8,000 cfm and 472,000 Btuh, choose a 2-row hot water coil with 500,000 Btuh heating capacity.

### IV Find the static pressure loss of the heating coil.

Enter Static Pressure Loss of Heating Coils and Accessories table at unit size (50BBS024) and air quantity (8,000cfm). In column under 2-row Hot Water read the loss (.08).

### V Determine fan rpm and help bhp required.

The given external static pressure is 0.7 The static pressure thru the heating coil is .08 (from step IV). The adjusted static pressure is  $.7 + .08 = .78$ . Use 0.8 for value of external static pressure.

Enter Evaporator Fan Performance table with the unit size (50BBS024) and air quantity (8,000 cfm). Under external static pressure (.8) read fan rpm and brake horsepower required (808 rpm and 3.0 bhp).

### VI Find fan speed range and maximum allowable bhp.

Enter Maximum Allowable Brake Horsepower with Standard Motor table at the unit size and note the horsepower is 3 hp heating; 3.4 cooling. In FSR column in Standard Fan Motors and Drives table, read the fan rpm range (700-875). Rpm 808 is included in this range.

### VII Determine air-cooled condenser requirements.

Enter Cooling Capacity table for 50BBS024 at 130 F condensing temperature and 67 F evaporator air ewb at 8,000 cfm. THR is 252,000 Btuh. Select air-cooled condenser which meets or exceeds these requirements.

# Performance data

No.	UNIT	NOM CFM	NOM TC
1	50BBS008	3,000	74,000
2	50BBS012	4,000	100,000
3	50BBS016	6,000	156,000
4	50BBS024	8,000	203,000
5	50BBS028	10,000	253,000
6	50BBS034	12,000	307,000
7	50BBS044	16,000	406,000

## COOLING CAPACITIES INDEX

- Most selection are based on 30 F  $\Delta t$ . Selections using over 40 F  $\Delta t$  are not recommended.
- Operation of 50BBS008 and 012 units above 155 F condensing temperature and 50BBS016 thru above 144 F condensing temperature, is not recommended as it may cause nuisance tripping of the high pressure switch.
- Direct interpolation is permissible. Do not extrapolate.

### SHC CORRECTION FACTOR

- SHC is based on 80 F db temperature of air entering evaporator coil.

Below 80 F db, subtract (corr factor x cfm) from SHC.

Above 80 F db, add (corr factor x cfm) to SHC.

Bypass Factor	Entering Air Dry-Bulb Temp (F)					
	79	78	77	76	75	under 75
	81	82	83	84	85	over 85
	<b>Correction Factor</b>					
.10	.97	1.95	2.92	3.89	4.86	use formula shown below
.20	.86	1.73	2.59	3.46	4.32	
.30	.76	1.51	2.27	3.03	3.78	

Interpolation is permissible.

$$\text{Correction Factor} = 1.08 \times (1 - \text{BF}) \times (\text{db} - 80).$$

- Gross capacities do not include deduction for indoor fan motor heat.
- Ratings for 50BBS units are based on 15 F of sub cooling.

UNIT 50BBS	LOWER COIL (% Unit Cap.)	UPPER COIL (% Unit Cap.)
008	100	-
012	100	-
016	100	-
024	50	50
028	40	60
034	50	50
044	25	37.5

Duplicate these values for middle coil 044 only.

## COOLING CAPACITIES

Cond Temp (F)		50BBS008								
		Air Ent Evap. - Cfm/BF								
		2250/.19			3000/.25			3750/.29		
		Temp Air Ent Evap - Ewb (F)								
		72	67	62	72	67	62	72	67	62
110	TC	84	77	69	87	80	73	90	83	76
	SHC	44	54	62	49	60	71	52	66	76
	KW	6.5	6.3	6.1	6.5	6.4	6.2	6.5	6.5	6.3
	THR	103	95	87	106	99	91	109	102	94
120	TC	78	72	66	82	76	69	85	77	71
	SHC	42	51	60	46	57	69	50	63	71
	KW	7.0	6.8	6.5	7.1	6.9	6.7	7.1	7.0	6.8
	THR	96	92	85	103	96	88	106	97	91
130	TC	74	69	62	78	71	65	80	74	67
	SHC	40	49	57	44	55	65	48	61	67
	KW	7.6	7.3	7.1	7.7	7.4	7.1	7.7	7.5	7.2
	THR	96	90	83	100	92	86	102	96	88
140	TC	69	64	58	72	67	61	74	69	62
	SHC	38	47	55	42	54	61	46	59	62
	KW	8.1	7.8	7.5	8.2	7.9	7.7	8.3	8.0	7.7
	THR	92	87	80	96	90	83	98	92	84
145	TC	68	61	56	69	64	58	71	65	60
	SHC	37	46	55	41	52	58	45	58	60
	KW	8.4	8.1	7.8	8.5	8.2	7.9	8.7	8.3	8.0
	THR	92	84	79	94	88	81	96	89	83

Cond Temp (F)		50BBS012								
		Air Ent Evap. - Cfm/BF								
		3000/.23			4000/.28			5000/.33		
		Temp Air Ent Evap - Ewb (F)								
		72	67	62	72	67	62	72	67	62
110	TC	111	102	93	118	108	99	121	111	102
	SHC	59	71	83	65	80	95	69	86	102
	KW	7.8	7.7	7.5	7.9	7.8	7.7	8.0	7.8	7.7
	THR	134	124	115	141	131	121	144	134	124
120	TC	107	98	89	112	102	93	116	106	97
	SHC	57	70	81	62	78	92	67	85	97
	KW	8.7	8.4	8.2	8.8	8.6	8.3	8.8	8.6	8.4
	THR	132	122	113	138	127	117	142	131	121
130	TC	101	93	85	107	97	89	109	101	92
	SHC	55	67	78	60	75	89	65	83	92
	KW	9.5	9.2	8.9	9.6	9.4	9.0	9.7	9.4	9.2
	THR	129	120	110	135	124	115	137	128	119
140	TC	97	88	80	101	93	85	104	94	86
	SHC	53	65	76	58	72	85	62	80	86
	KW	10.2	9.9	9.5	10.4	10.0	9.7	10.5	10.1	9.8
	THR	127	117	108	131	122	113	134	123	114
145	TC	93	85	78	98	89	82	101	92	84
	SHC	52	63	74	56	71	82	61	79	84
	KW	10.6	10.3	9.8	10.8	10.5	9.9	10.9	10.5	10.2
	THR	124	115	106	129	119	111	133	122	114



# Cooling capacities

3		50BBS016								
		Air Ent Evap. - Cfm/BF								
		4500/.15			6000/.19			7500/.22		
		Temp Air Ent Evap - Ewb (F)								
Cond Temp (F)		72	67	62	72	67	62	72	67	62
110	TC	176	160	145	185	169	154	191	175	160
	SHC	91	112	132	106	128	154	110	142	160
	KW	12.9	12.6	12.2	13.1	12.8	12.4	13.2	12.9	12.6
	THR	213	197	180	223	206	190	229	212	197
120	TC	168	153	138	177	161	147	183	167	152
	SHC	88	109	129	98	125	147	107	139	152
	KW	14.0	13.6	13.2	14.2	13.9	13.4	14.3	14.0	13.6
	THR	209	192	176	218	201	186	224	208	191
130	TC	158	143	129	166	151	137	171	156	142
	SHC	84	105	125	94	120	137	103	134	142
	KW	15.2	14.7	14.1	15.5	15	14.5	15.6	15.1	14.6
	THR	202	186	170	211	195	179	216	200	184
140	TC	150	137	123	157	144	130	162	148	134
	SHC	81	102	122	91	117	130	100	128	134
	KW	16.2	15.6	15.0	16.5	16.2	15.4	16.7	16.2	15.6
	THR	197	182	167	205	191	175	210	195	179
145	TC	146	132	119	153	139	126	157	143	130
	SHC	80	100	119	89	115	126	98	130	130
	KW	16.7	16.1	15.5	17.0	16.4	15.7	17.2	16.6	16.0
	THR	194	179	164	202	187	172	201	191	176

4		50BBS024								
		Air Ent Evap. - Cfm/BF								
		6000/.15			8000/.18			10,000/.21		
		Temp Air Ent Evap - Ewb (F)								
Cond Temp (F)		72	67	62	72	67	62	72	67	62
110	TC	227	206	187	239	217	198	247	225	205
	SHC	119	146	174	132	168	198	144	187	205
	KW	15.6	15.4	15.0	15.7	15.6	15.2	15.8	15.6	15.3
	THR	272	251	231	285	262	242	293	270	249
120	TC	216	197	178	227	207	189	234	214	198
	SHC	115	143	170	128	163	189	140	182	198
	KW	17.3	16.7	16.3	17.5	17.1	16.6	17.7	17.2	16.7
	THR	266	245	225	278	257	237	285	258	243
130	TC	207	188	170	217	198	179	224	204	185
	SHC	11	139	166	124	159	179	136	178	185
	KW	19.0	18.4	17.7	19.1	18.7	18.0	19.3	18.8	18.3
	THR	262	241	221	272	252	231	280	259	238
140	TC	197	178	161	206	187	169	212	193	175
	SHC	107	134	161	120	155	169	132	174	175
	KW	20.4	19.7	18.9	20.7	20.1	19.4	21.0	20.2	19.6
	THR	256	235	216	266	245	225	273	252	232
145	TC	191	174	156	200	182	164	206	188	170
	SHC	105	132	156	118	153	164	130	172	170
	KW	21.3	20.5	19.6	21.6	20.9	20.1	21.8	21.1	20.2
	THR	253	233	213	263	243	222	269	249	229

5		50BBS024								
		Air Ent Evap. - Cfm/BF								
		7500/.15			10,000/.18			12,500/.21		
		Temp Air Ent Evap - Ewb (F)								
Cond Temp (F)		72	67	62	72	67	62	72	67	62
110	TC	286	260	235	302	275	250	312	285	259
	SHC	150	185	218	167	211	250	182	235	259
	KW	20.7	20.1	19.6	21.0	20.5	20.0	21.2	20.7	20.1
	THR	346	318	292	363	334	308	373	345	317
120	TC	273	248	224	287	261	237	297	270	246
	SHC	144	179	212	161	205	237	176	229	246
	KW	22.5	21.9	21.3	22.9	22.3	21.6	23.1	22.5	21.8
	THR	338	312	286	353	326	300	364	335	309
130	TC	257	233	210	270	245	222	278	253	229
	SHC	138	172	206	155	198	222	169	222	229
	KW	24.6	23.7	22.8	24.9	24.1	23.2	25.2	24.4	23.6
	THR	328	302	276	342	315	289	351	324	297
140	TC	244	221	199	255	232	210	263	239	216
	SHC	133	167	199	149	193	210	164	217	216
	KW	26.3	25.2	24.3	26.7	25.8	24.8	27.0	26.0	25.2
	THR	320	294	269	332	307	282	341	314	289
145	TC	337	314	292	353	325	302	354	331	309
	SHC	130	164	192	146	190	202	161	214	220
	KW	27.1	26.0	25.0	27.6	26.5	25.5	27.9	26.9	25.8
	THR	316	289	265	328	302	276	335	309	284

6		50BBS034								
		Air Ent Evap. - Cfm/BF								
		9000/.15			12,000/.18			15,000/.21		
		Temp Air Ent Evap - Ewb (F)								
Cond Temp (F)		72	67	62	72	67	62	72	67	62
110	TC	347	315	285	366	334	303	378	345	314
	SHC	181	223	263	201	234	268	219	283	314
	KW	25.8	25.1	24.2	26.1	25.5	24.7	26.4	25.7	25.0
	THR	422	388	355	442	408	375	455	420	387
120	TC	331	301	272	348	318	288	360	328	299
	SHC	174	216	257	194	248	288	231	276	299
	KW	28.0	27.1	26.1	28.3	27.5	26.7	28.6	27.9	27.0
	THR	412	380	348	430	398	365	443	409	377
130	TC	310	281	253	325	296	268	335	305	277
	SHC	166	207	247	186	238	268	204	267	277
	KW	30.2	29.2	28.0	30.7	29.7	28.6	31.0	30.0	29.0
	THR	398	366	334	414	382	351	425	392	361
140	TC	295	267	241	308	281	254	316	289	262
	SHC	160	201	241	179	232	254	197	260	262
	KW	32.2	31.0	29.8	32.7	31.6	30.5	33.1	32.0	30.9
	THR	388	357	327	403	373	342	412	382	352
145	TC	286	258	232	298	271	245	307	280	253
	SHC	157	198	232	176	228	245	194	257	253
	KW	33.2	31.9	30.5	33.7	32.4	31.2	34.1	32.8	31.5
	THR	382	351	320	396	365	335	406	375	344

7		50BBS044								
		Air Ent Evap. - Cfm/BF								
		12,000/.14			16,000/.18			20,000/.21		
		Temp Air Ent Evap - Ewb (F)								
Cond Temp (F)		72	67	62	72	67	62	72	67	62
110	TC	456	416	377	479	438	388	494	453	413
	SHC	239	295	349	265	337	388	289	377	413
	KW	33.6	32.7	31.6	33.9	33.2	32.3	34.2	33.5	32.7
	THR	553	511	469	577	534	493	593	550	508
120	TC	436	398	360	458	418	311	472	432	394
	SHC	231	287	341	257	325	311	281	367	394
	KW	36.4	35.4	34.3	37.0	36.0	35.0	37.2	36.3	35.4
	THR	542	501	460	565	522	483	580	537	497
130	TC	412	374	339	431	393	357	440	405	369
	SHC	221	277	331	247	318	357	270	356	369
	KW	39.7	38.3	36.8	40.4	39.0	37.7	40.6	39.5	38.2
	THR	527	485	446	548	506	466	558	520	480
140	TC	392	356	322	409	374	339	421	385	350
	SHC	214	269	322	239	310	339	263	348	350
	KW	42.4	40.9	39.3	43.1	41.7	40.2	43.6	42.0	40.6
	THR	515	475	436	534	495	456	547	507	468
145	TC	381	346	312	398	363	328	408	373	338
	SHC	210	265	312	235	306	328	259	343	338
	KW	43.7	42.1	40.5	44.5	42.8	41.2	45.0	43.4	41.7
	THR	508	468	429	527	487	447	539	499	459

## LEGENED

- BF - Bypass Factor
- Ewb - Entering Wet - Bulb
- KW - Compressor Motor Power Input (kilowatts)
- SHC - Sensible Heat Capacity (1000 Btuh)
- TC - Total Capacity (1000 Btuh)
- THR - Total Heat Rejection (1000 Btuh)

UNIT 50BBS	AIR CFM	2-ROW HOT WATER†			
		TC	LAT	Gpm	PD
008	2250	172	65		
	3000	211	77		
	3750	239	87		
012	3000	211	104		
	4000	247	127		
	5000				
016	4500	17			
	6000	21			
	7500	24			
024	6000	21			
	8000	25			
	10000	28			
028	7500	36			
	10000	43			
	12500	49			
034	9000	41			
	12000	50			
	15000	58			
044	12000	58			
	16000	69			
	20000	79			

Values in italics also apply to 2-row NF steam.

**LAT** - Leaving Air Temperature (F)

**PD** - Pressure Drop (ft of water)

**TC** - Total Capacity (1000 Btuh)

† 2-row hot water coil rating based on 200 F entering water temperature, 20 F water temperature drop, 60 F entering air.

**NOTES:**

1. Maximum allowable leaving air temperature 140 F.
2. Maximum operating limits for heating coils are 200 psig and 400 F.
3. To obtain capacities other than those given above, multiply the Btuh value from the Heating Coil table by the proper value from the Heating Capacity Factor table.

4. Formulas:

$$\text{Final temp (F)} = \text{ent db (F)} + \frac{\text{Btuh}}{1.08 \times \text{cfm}}$$

$$\text{Gpm} = \frac{\text{Btuh}}{500 \times \text{water temp drop (F)}}$$

5. Reduced air flow (dirty filters, loose or broken fan belt, etc.) over coil during cooling cycle may result in freeze - up of nearby heating coil on 50BBS units. Since units normally require a low pressure switch cut out setting at about 5 F, use of a freeze up thermostat is recommended if heating coil is not drained or filled with an antifreeze solution.

**HOT WATER COIL**

Water Temp Drop (F)	Entering Water Temp (F)	Entering Air Temperature (F)				
		40	50	60	70	80
10	180	1.15	.70	.87	.42	
	200	1.35	.91	1.07	.64	
	220	1.54	1.12	1.26	.85	
20	180	.98	.96	.70		
	200	1.18	1.16	.90		
	220					
30	180	.88	.61	.60		
	200	1.09	.85	.81		
	220	1.28	1.03	1.01		

## Evaporator fan performance

UNIT 50BBS	CFM																		
		0		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
<b>008</b>	2,250	<b>400</b>	.20	500	.25	571	.31	643	.52	<b>714</b>	.75	<b>767</b>	.92	<b>822</b>	1.13	<b>873</b>	1.36	-	-
	3,000	500	.30	580	.40	647	.66	<b>717</b>	.87	<b>777</b>	1.09	<b>826</b>	1.33	<b>876</b>	1.61	<b>924</b>	1.89	-	-
	3,750	595	.61	665	.85	<b>730</b>	1.10	<b>789</b>	1.38	<b>837</b>	1.68	<b>887</b>	1.97	<b>933</b>	2.31	-	-	-	-
<b>012</b>	3,000	<b>470</b>	.18	<b>555</b>	.38	627	.60	700	.82	759	1.04	<b>814</b>	1.29	<b>865</b>	1.51	<b>915</b>	1.81	<b>961</b>	2.09
	4,000	<b>593</b>	.71	670	.90	731	1.22	789	1.47	<b>836</b>	1.80	<b>885</b>	2.10	<b>932</b>	2.43	<b>986</b>	2.79	<b>1035</b>	3.21
	5,000	730	1.46	770	1.80	<b>828</b>	2.16	<b>875</b>	2.52	<b>918</b>	2.92	<b>968</b>	3.35	<b>1021</b>	3.77	-	-	-	-
<b>016</b>	4,500	<b>388</b>	.13	<b>468</b>	.40	560	.70	615	.90	<b>690</b>	1.20	<b>758</b>	1.50	<b>820</b>	1.70	<b>872</b>	1.90	<b>925</b>	2.30
	5,500	<b>440</b>	.45	<b>515</b>	.75	588	1.10	<b>664</b>	1.30	<b>726</b>	1.60	<b>790</b>	1.80	<b>846</b>	2.20	<b>900</b>	2.40	<b>948</b>	2.70
	6,500	<b>500</b>	.93	566	1.25	645	1.50	<b>705</b>	1.80	<b>768</b>	2.10	<b>828</b>	2.40	<b>880</b>	2.80	<b>930</b>	3.10	<b>975</b>	3.30
	7,500	566	1.50	600	1.80	<b>698</b>	2.20	<b>762</b>	2.50	<b>820</b>	2.90	<b>872</b>	3.20	<b>940</b>	3.50	<b>970</b>	3.70	<b>1015</b>	3.90
<b>024</b>	6,000	-	-	<b>530</b>	1.10	<b>610</b>	1.40	666	1.60	742	1.80	<b>805</b>	2.10	<b>860</b>	2.40	<b>910</b>	2.70	<b>955</b>	3.00
	7,000	<b>490</b>	1.30	<b>570</b>	1.50	<b>640</b>	1.80	710	1.90	770	2.30	<b>830</b>	2.70	<b>885</b>	3.00	<b>935</b>	3.30	<b>985</b>	3.60
	8,000	<b>550</b>	1.70	<b>620</b>	1.90	690	2.30	750	2.70	<b>808</b>	3.00	<b>868</b>	3.30	<b>918</b>	3.60	<b>964</b>	3.90	<b>1015</b>	4.30
	9,000	<b>610</b>	2.30	680	2.70	737	3.10	795	3.40	<b>848</b>	3.70	<b>905</b>	4.00	<b>952</b>	4.40	<b>1000</b>	4.90	<b>1050</b>	5.50
	10,000	670	3.20	730	3.50	782	3.80	<b>835</b>	4.20	<b>890</b>	4.60	<b>942</b>	5.10	<b>990</b>	5.60	<b>1040</b>	6.20	<b>1090</b>	7.00
<b>028</b>	7,500	<b>435</b>	1.00	<b>480</b>	1.30	<b>535</b>	1.60	<b>598</b>	1.80	655	2.30	710	2.70	<b>760</b>	3.20	<b>800</b>	3.60	<b>850</b>	4.10
	8,500	<b>475</b>	1.50	<b>523</b>	1.80	<b>580</b>	2.10	635	2.50	689	2.80	740	3.40	<b>785</b>	3.80	<b>833</b>	4.30	<b>880</b>	4.80
	9,500	<b>515</b>	2.00	<b>565</b>	2.40	<b>615</b>	2.70	668	3.10	720	3.60	<b>770</b>	4.10	<b>813</b>	4.50	<b>860</b>	5.00	<b>905</b>	5.80
	10,500	<b>555</b>	2.60	<b>600</b>	2.90	650	3.30	703	3.80	<b>752</b>	4.30	<b>798</b>	4.80	<b>842</b>	5.40	<b>888</b>	6.00	<b>928</b>	6.60
	11,500	<b>590</b>	3.20	635	3.60	692	4.10	740	4.60	<b>785</b>	5.10	<b>828</b>	5.70	<b>872</b>	6.30	<b>915</b>	6.80	<b>955</b>	7.40
	12,500	<b>630</b>	3.90	687	4.50	732	5.00	<b>765</b>	5.50	<b>818</b>	6.00	<b>860</b>	6.60	<b>905</b>	7.30	<b>943</b>	7.70	<b>1000</b>	8.00
<b>034</b>	9,000	<b>490</b>	1.00	<b>530</b>	1.30	<b>565</b>	1.50	<b>625</b>	2.40	<b>670</b>	3.00	724	3.50	775	4.00	827	4.60	<b>872</b>	5.10
	11,000	<b>500</b>	2.10	<b>595</b>	2.80	<b>645</b>	3.40	<b>685</b>	3.80	730	4.40	780	4.80	830	5.40	<b>875</b>	6.00	<b>914</b>	6.60
	13,000	<b>640</b>	4.00	<b>680</b>	4.50	730	5.00	750	5.50	795	6.00	840	6.70	<b>888</b>	7.30	<b>920</b>	7.90	<b>962</b>	8.40
	15,000	730	6.10	770	7.00	815	7.50	830	8.10	<b>865</b>	8.60	<b>900</b>	9.10	<b>945</b>	9.60	-	-	-	-
<b>044</b>	12,000	<b>461</b>	2.60	<b>505</b>	3.00	<b>541</b>	3.40	<b>597</b>	3.80	<b>643</b>	4.40	691	5.00	735	5.70	775	6.30	<b>815</b>	7.00
	14,000	<b>521</b>	3.90	<b>567</b>	4.40	<b>615</b>	4.90	659	5.50	706	6.20	740	6.90	785	7.50	823	8.20	<b>860</b>	8.80
	16,000	<b>581</b>	5.30	<b>627</b>	6.00	675	6.90	720	7.50	755	8.20	<b>790</b>	9.00	<b>830</b>	9.50	867	10.2	<b>905</b>	10.8
	18,000	641	7.60	690	8.30	730	9.00	765	9.80	<b>802</b>	10.5	<b>835</b>	11.1	<b>875</b>	12.0	915	12.2	<b>955</b>	13.2
	20,000	701	10.0	750	10.80	774	11.5	<b>805</b>	12.2	<b>848</b>	12.5	<b>885</b>	13.3	<b>915</b>	14.5	950	14.8	<b>985</b>	15.5

Shaded values indicate other than standard motor is required for cooling. Do not exceed nominal horsepower when heating coil is applied.

NOTE:

1. Values in *italics* indicate other than standard drive is required.
2. Fan performance is based on wet coil, clean filters and deducted casing losses.
3. Maximum fan speed is 1100 rpm.

### MAXIMUM ALLOWABLE BRAKE HORSEPOWER WITH LISTED MOTOR

UNIT 50BBS	008	012 016	024	028 034	044
HEATING*	1.0	2.0	3.0	5.0	7.5
COOLING	1.4	2.7	3.4	5.7	8.4

\* With accessory heating coil(s) in unit.

### FAN MOTORS AND DRIVES

UNIT 50BBS	HP	FAN MOTOR (1425 Rpm)		FAN	
		NEMA Frame Size	PDR (in.)	PPD	FSR (Rpm)
<b>008</b>	1	56	2.4-3.4	7.0	488-692
<b>012</b>	2	56*	2.4-3.4	6.0	570-809
<b>016</b>	2	56*	4.3-5.3	11.4	538-662
<b>024</b>	3	184	4.5-5.5	10.0	652-797
<b>028</b>	5	215	5.5-6.5	12.4	632-747
<b>034</b>	5	215	5.5-6.5	11.0	712-844
<b>044</b>	7.5	213	7.0-8.4	15.4	647-777

FSR - Fan Speed Range (Rpm)  
 PDR - Pitch Diameter Range (in.) of adjustable motor pulley.  
 PPD - Pulley Pitch Diameter (in.)

\*Special 56 motor frame interchangeable with 145T.



# Performance data (cont)

## SELECTION DATA FOR OTHER FAN MOTORS AND DRIVES

UNIT 50BBS	NEMA FRAME SIZE*	HP	CENTER LINE DISTANCE (in)		FAN SHAFT DIAM (in)
			Max	Min	
008, 012	184,145T	2	10.2	6.8	$\frac{3}{4}$
	182T,213	3	10.2	6.8	
016, 024	184,145T	2	11.8	9.4	1
	213,182T	3	11.8	8.4	
	184T,215	5	11.8	8.4	
028, 034	182T,213	3	34.4	28.8	$1\frac{15}{16}$
	184T,215	5	34.4	28.8	
	254U,213T	$7\frac{1}{2}$	33.3	29.8	
	256U,215T	10	33.3	29.8	
044	254U,213T	$7\frac{1}{2}$	14.3	10.1	$1\frac{15}{16}$
	256U,215T	10	14.3	10.1	

\* Range of motor sizes unit will accept.

NOTE: Motors and drives other than those furnished with unit must be purchased locally.

## STATIC PRESSURE LOSS OF HEATING COILS AND ACCESSORIES (in. wg)

UNIT 50BBS	AIR QTY	COILS	ACCESSORIES	
		1-Row* Hot Water	Disch Grille & Plenum	Inlet Grille†
008	2250	.04	.09	.01
	3000	.08	.16	.02
	3750	.12	.24	.03
012	3000	.08	.16	.02
	4000	.14	.28	.02
	5000	.21	.43	.03
016	4500	.04	.18	.02
	6000	.06	.31	.03
	7500	.09	.48	.05
024	6000	.05	.31	.03
	8000	.08	.54	.06
	10000	.11	.82	.08
028	7500	.08	-	-
	10000	.13	-	-
	12500	.18	-	-
034	9000	.08	-	-
	12000	.13	-	-
	15000	.18	-	-
044	12000	.07	-	-
	16000	.11	-	-
	20000	.16	-	-

† Inlet grille is factory supplied on 50BBS008, 012 units.

# Electrical Data

UNIT 50BBS	VOLT/PH/HZ	VOLT-AGE RANGE		COMPERESSOR NO. 1		COMPERESSOR NO. 2		INDOOR FAN MOTOR		POWER SUPPLY	
		Min	Max	FLA	LRA	FLA	LRA	Hp	FLA	Min Wire Amps	Max Fuse Amps
008	400-3-50	342	457	15.6	95	-	-	1	2.00	20	30
012	400-3-50	342	457	11	65.5	11	65.5	2	3.40	30	40
016	400-3-50	342	457	15.6	95	15.6	95	2	4.20	43	45
024	400-3-50	342	457	19.6	118	19.6	118	3	4.6	50	60
028	400-3-50	342	457	40.1	174	19.6	118	5	7.7	75	80
034	400-3-50	342	457	40.1	174	40.1	174	5	7.7	95	110
044	400-3-50	342	457	40.1	174	19.6	118	7½	11.3	119	130

FLA - Full load Amps      LRA - Locked Rotor Amps

## Control sequence

**All units** - indoor air fan operations whenever unit power is on and selector switch is at "cool". When a crankcase heater is part of the unit, it is energized whenever unit power is on but shuts off when compressor starts.

When a Time Guard time is part of the controls, it delays the restart of a compressor for a minimum period of about 5 minutes after shutdown for any reason (satisfield thermostat, open protection device or power failure). Timers on multiple compressor units are set so that only one compressor at a time can start.

**Units 50BBS008** - Thermostat starts and stops compressor as required.

**Units 50BBS012** - Step 1 of thermostat starts and stops compressor as required. Step 2 of thermostat opens the liquid line solenoid and de-energizes (closes) the compressor capacity control solenoid valve on call for additional capacity. When step 2 of thermostat is satisfied, the liquid line solenoid valve closes and compressor capacity control valve is energized unload compressor.

**Units 50BBS016** - Operation is similar to units 50BBS012 except step 2 of thermostat operates a liquid line solenoid only. The suction - pressure operated

capacity control unloader loads and unloads the compressor in response to charges in suction pressure.

**Units 50BBS024, 028, 034** - Step 1 of thermostat operates compressor No. 2. Step 2 of thermostat operates compressor No. 1.

**Unit 50BBS044** - Step 1 of compressor starts compressor No. 3 and then after 4 seconds No. 2. Step 2 of thermostat starts compressor No. 1.

# Electrical data (cont)

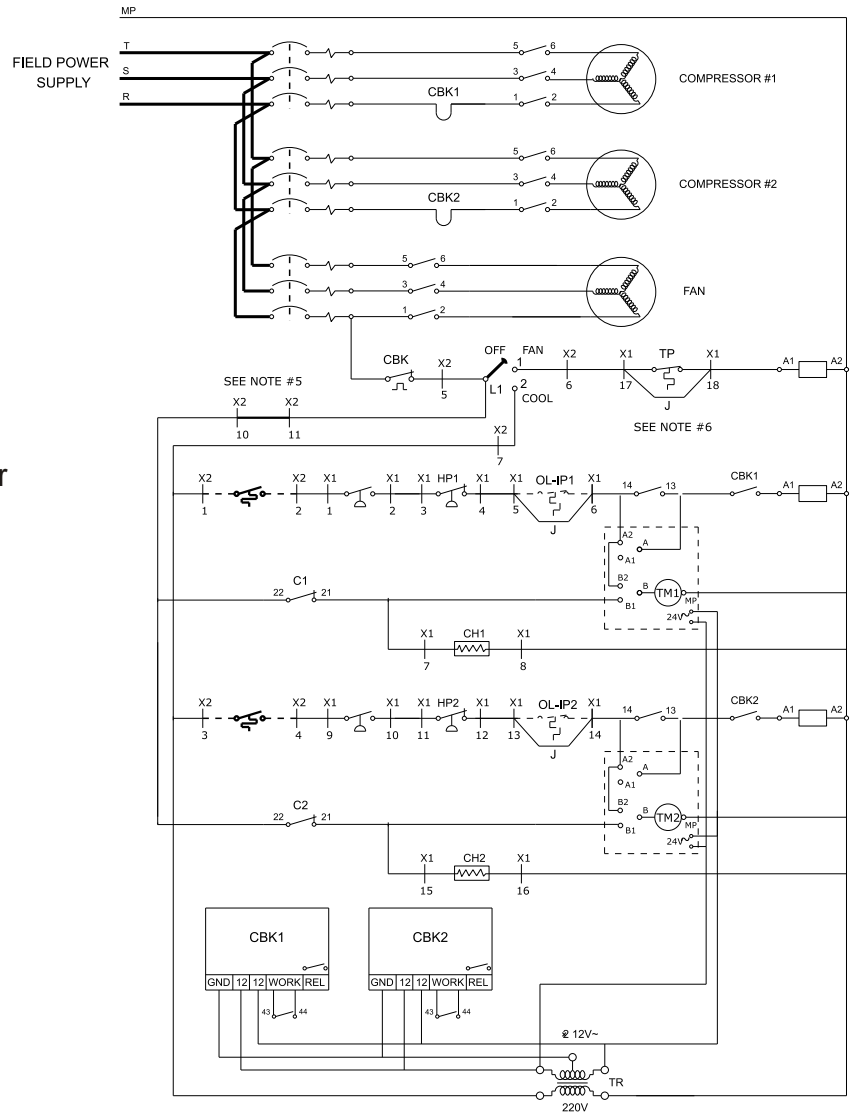
## LEGEND FOR WIRING SCHEMATICS

C	- Compressor Contactor
CBK	- Circuit Breaker
CCB	- Control Circuit Breaker
CCH	- Crankcase Heater
or	
CH	- Capacity Control Solenoid
CCS	- Capacity Control Solenoid
CMP	- Compressor Motor Protector
CR	- Control Relay
F	- Fan Contactor
FCB	- Fan Circuit Breaker
FC CTR	- Fan Control Center
FU	- Fuse
HP	- High Pressurestat
HR	- Holding Relay
IFC	- Indoor Fan Contactor
IFM	- Indoor Fan Motor
IP	- Internal Protector
IT	- Internal Thermostat
J	- Jumper
LLS	- Liquid Line Solenoid
LP	- Low Pressurestat
OFC	- Outdoor Fan Contactor
OPS	- Oil Pressure Switch
RB	- Reset Button
T	- Thermostat
TB	- Terminal Board
TC	- Thermostat, Cooling
TM	- Timer
TR	- Timer Relay

## NOTES FOR WIRING SCHEMATICS

1. For specific unit diagrams see 50BBS wiring book.
2. All 50BBS units have crankcase heaters.
3. Thermostat field-supplied on 50BBS016 thru 044 units.
4. Field-supplied fused disconnect switch required for 008 and 012 units. Circuit breakers are factory supplied on all other units.
5. All units have 230-volt control circuit.

## SCHEMATIC DIAGRAM





**Sanaye Sarmaafarin Iran**

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سهروردی شمالی، خیابان خرمشهر، شماره ۱۹۴، تهران - ۱۵۳۳۷، صندوق پستی ۱۳۱۴۵-۱۷۹۹ تلفن: ۸۸۷۶۲۰۳۸ فاکس: ۸۸۷۶۲۰۳۳