Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

MODEL:
W42A1D, W48A1D, W60A1D

MODEL FEATURES

This model provides a unique dehumidification circuit for periods of low outdoor ambient temperature and high indoor humidity conditions.

Refer to Specification Sheet S3397 for the standard features of the base units and this Manual for electrical data.

SPECIAL FEATURES

DEHUMIDIFICATION CIRCUIT

The dehumidification circuit incorporates an independent heat exchanger coil in the supply air stream. This coil reheats the supply air after it passes over the cooling coil without requiring the electric resistance heater to be used for reheat purposes. This results in very high mechanical dehumidification capability from the air conditioner on demand without using electric resistance reheat.

The dehumidification refrigerant reheat circuit is controlled by a 3-way valve directing the refrigerant gas to the normal condenser during periods when standard air conditioning is required. During periods of time of low ambient temperature (approximately 65° to 75° outdoor) and high indoor humidity, a humidistat senses the need for mechanical dehumidification. It then energizes both the compressor circuit and the 3-way valve, thus directing the hot refrigerant discharge gas into a separate desuperheating condenser circuit, which reheats the conditioned air before it is delivered to the room. The refrigerant gas is then routed from the desuperheating condenser to the system condenser for further heat transfer. An orifice inserted between the reheat coil return line and suction line will prevent liquid from accumulating in the reheat coil when it is inactive. This drain does not affect the normal operation of the system. A check valve is located in the reheat coil return line. It has a soft spring to hold the ball on the seat. This will make the method of checking the ball freedom, with a magnet, difficult. Refer to Page 3 for the location of the check valve and drain back orifice. When the humidistat is satisfied, the system automatically switches back to normal A/C mode and either continues to operate or turns off based on the signal from the wall thermostat. The result is separate humidity control at minimum operating cost.

SEQUENCE OF DEHUMIDIFICATION OPERATION

Dehumidification is controlled through a humidistat and is independent of the thermostat. On a call for dehumidification mode of operation, the compressor and 3-way valve of the unit are energized through circuit R - 3 to provide dehumidification. Dehumidification will continue until the humidistat is satisfied.

Any time there is a call for cooling mode or operation through circuit R - Y, the dehumidification mode will cancel and the system will return to cooling operation.

Any time there is a call for heating mode of operation through circuit R - W1, the dehumidification mode will cancel and the system will return to heating operation.

W42A1D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Airflow	Approximate Supply Air	Mode
DB/WB	% RH	DB	Total	Sensible	Latent	S/T	Lbs.	CFM	DB/WB	A/C vs Dehum
65/63	90	65	47,300	20,000	27,300	0.42	25.75	1400	52.2 / 51.7	A/C
65/63	90	65		(-4,200)	25,000	-0-	23.58	1400	67.7 / 58.3	Dehum
75/62.5	50	75	42,600	34,000	8,600	0.80	8.11	1400	52.9 / 51.9	A/C
75/62.5	50	75	13,200	6,300	6,900	0.48	6.51	1400	70.8 / 59.3	Dehum
75/65.5	60	75	45,700	29,700	16,000	0.65	15.09	1400	55.6 / 54.8	A/C
75/65.5	60	75	16,900	2,600	14,300	0.15	13.49	1400	73.2 / 61.9	Dehum
75/68	70	75	48,300	25,900	22,400	0.54	21.13	1400	58.0 / 57.4	A/C
75/68	70	75		(-500)	20,100	-0-	18.96	1400	75.2 / 63.9	Dehum
80/67	50	95	41,000	32,900	8,100	0.79	7.64	1400	58.6 / 57.6	A/C
80/67	50	95		(-1,300)	5,700	-0-	5.38	1400	80.8 / 66.0	Dehum

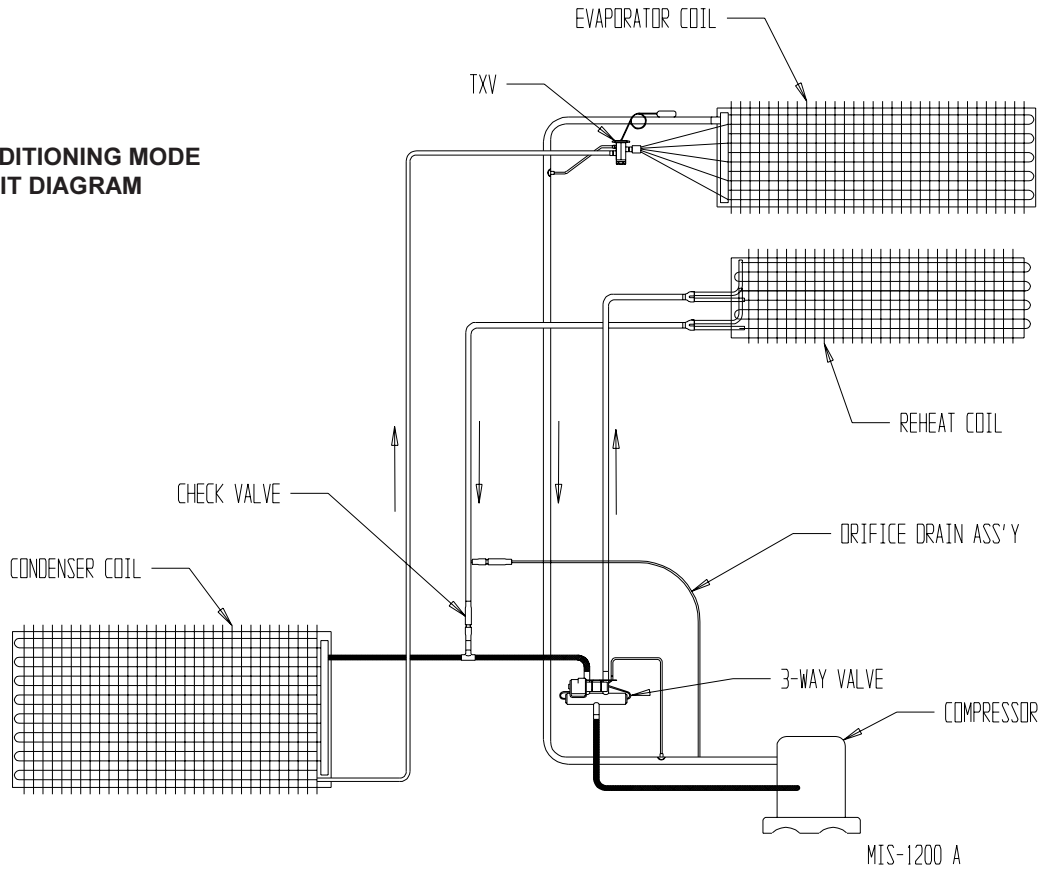
W48A1D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Airflow	Approximate Supply Air	Mode
DB/WB	% RH	DB	Total	Sensible	Latent	S/T	Lbs.	CFM	DB/WB	A/C vs Dehum
65/63	90	65	52,600	22,300	30,300	0.42	28.58	1550	51.9 / 51.5	A/C
65/63	90	65		(-2,900)	27,500	-0-	25.94	1550	66.7 / 58.0	Dehum
75/62.5	50	75	48,900	38,700	10,200	0.79	9.62	1550	52.3 / 51.4	A/C
75/62.5	50	75	16,900	8,900	8,000	0.53	7.55	1550	69.7 / 58.9	Dehum
75/65.5	60	75	52,500	33,800	18,700	0.64	17.64	1550	55.1 / 54.3	A/C
75/65.5	60	75	21,000	4,400	16,600	0.21	15.66	1550	72.3 / 61.3	Dehum
75/68	70	75	54,900	29,400	25,500	0.54	24.05	1550	57.5 / 56.9	A/C
75/68	70	75	23,500	900	22,600	0.04	21.32	1550	74.4 / 63.6	Dehum
80/67	50	95	47,500	36,700	10,800	0.77	10.19	1550	58.3 / 57.3	A/C
80/67	50	95	7,000	400	6,600	0.06	6.23	1550	79.8 / 65.5	Dehum

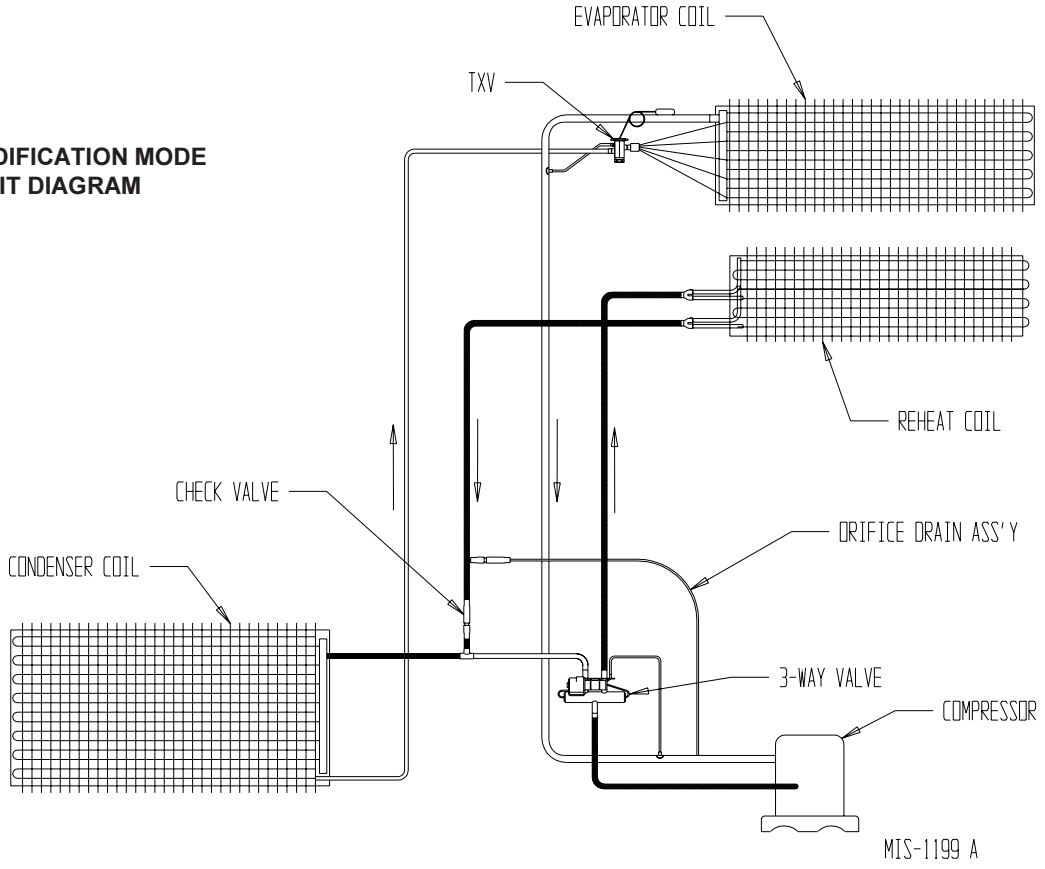
W60A1D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Airflow	Approximate Supply Air	Mode
DB/WB	% RH	DB	Total	Sensible	Latent	S/T	Lbs.	CFM	DB/WB	A/C vs Dehum
65/63	90	65	62,100	26,500	35,600	0.43	33.58	1700	50.2 / 49.9	A/C
65/63	90	65		(-3,500)	34,200	-0-	32.26	1700	66.9 / 57.0	Dehum
75/62.5	50	75	57,000	42,800	14,200	0.75	13.39	1700	51.3 / 50.2	A/C
75/62.5	50	75	22,600	8,400	14,200	0.37	13.40	1700	70.8 / 58.1	Dehum
75/65.5	60	75	60,700	37,600	23,100	0.62	21.79	1700	54.2/ 53.4	A/C
75/65.5	60	75	26,500	4,000	22,500	.15	21.22	1700	72.8 / 60.6	Dehum
75/68	70	75	63,800	33,000	30,800	0.52	29.06	1700	56.5 / 55.9	A/C
75/68	70	75	28,700	500	28,200	.02	26.60	1700	74.8 / 62.5	Dehum
80/67	50	95	55,000	41,200	13,800	0.75	13.01	1700	57.4 / 56.4	A/C
80/67	50	95		(-900)	12,800	-0-	12.07	1700	80.5 / 64.9	Dehum

AIR CONDITIONING MODE
CIRCUIT DIAGRAM



DEHUMIDIFICATION MODE
CIRCUIT DIAGRAM



DEHUMIDIFICATION RELAY LOGIC BOARD

24V Terminal Block Connections		G	Y	3	W1	A	W2	Outputs From Board		
Inputs to Board		G	Y	D	W2	A1		G1	TWV	YO
Cooling Mode	Unoccupied	X	X					X		X
Cooling Mode	Occupied	X	X			X		X		X
Cooling Mode ①	w / Dehum	X	X	X				X		X
1st Stage Heating	Unoccupied				X			X		
1st Stage Heating	Occupied				X	X		X		
1st Stage Heating ②	w / Dehum			X	X			X		
2nd Stage Heating	Unoccupied				X		X	X		
2nd Stage Heating	Occupied				X	X	X	X		
2nd Stage Heating	w / Dehum			X	X		X	X		
Dehumidification	Unoccupied			X				③	③	③
Dehumidification	Occupied			X		X		X	X	X

① Cooling takes precedence over dehumidification. A cooling call cancels dehumidification.

② First stage heating cancels dehumidification.

③ If jumper on RLB is set to "1-2 full-time dehumidification", outputs will energize. This is the factory default setting. If jumper is set to "2-3 occupied dehumidification only", outputs will be off.

Electrical Specifications

Model	Rated Volts and Phase	No. Field Power Circuits	Single Circuit				Dual Circuit							
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire	③ Minimum Circuit Ampacity		① Maximum External Fuse or Ckt. Brkr.		② Field Power Wire Size		② Ground Wire Size	
							Ckt A	Ckt B	Ckt A	Ckt B	Ckt A	Ckt B	Ckt A	Ckt B
W42A1DA00, A0Z	230/208-1	1	33	50	8	10								
A05		1	33	50	8	10								
A10		1	59	60	6	10								
W42A1DB00, B0Z	230/208-3	1	25	35	8	10								
B09		1	34	35	8	10								
B18		2	N/A	N/A	N/A	8	34	28	35	30	8	10	10	10
W42A1DC00, C0Z	460-3	1	13	15	14	14								
C09		1	18	20	12	12								
W48A1DA00, A0Z	230/208-1	1	37	50	8	10								
A05		1	37	50	8	10								
A10		1	59	60	6	10								
W48A1DB00, B0Z	230/208-3	1	29	40	8	10								
B09		1	34	40	8	10								
B15		1	53	60	6	10								
B18		2	N/A	N/A	N/A	N/A	34	28	40	30	8	10	10	10
W48A1DC00, C0Z	460-3	1	14	20	12	12								
C09		1	18	20	12	12								
W60A1DA00, A0Z	230/208-1	1	41	60	8	10								
A05		1	41	60	8	10								
A10		1	59	60	6	10								
W60A1DB00, B0Z	230/208-3	1	28	40	8	10								
B09		1	34	40	8	10								
B15		1	53	60	6	10								
B18		2	N/A	N/A	N/A	N/A	34	28	40	30	8	10	10	10
W60A1DC00, C0Z	460-3	1	15	20	12	12								
C09		1	18	20	12	12								

① Maximum size of the time delay fuse or HACR type circuit breaker for protection of field wiring conductors.

② Based on 75C copper wire. All wiring must conform to the National Electrical Code and all local codes.

③ These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electrical code (latest version), Article 310 for power conductor sizing.

Caution: When more than one field power circuit is run through one conduit, the conductors must be derated. Pay special attention to note 8 of Table 310 regarding Ampacity Adjustment Factors when more than three (3) current carrying conductors are in a raceway.

IMPORTANT: While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.