MODELS:
QA241D, QA301D, QA361D
QA421D, QA481D, QA601D

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

MODEL FEATURES

This model provides a unique dehumidification circuit for periods of high indoor humidity conditions. Additionally an "energy recovery ventilator" may be provided to allow for outside ventilation air requirements by eliminating excessive sensible and latent loads as a result of the increased ventilation requirement.

Refer to specification sheet S3361 for the standard features of the base unit. Electrical data for the dehumidification models is identical to the electrical data for the standard QA models.

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. A small capillary tube 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. Refer to Page 2 for the location of the check valve and drain back capillary. 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.

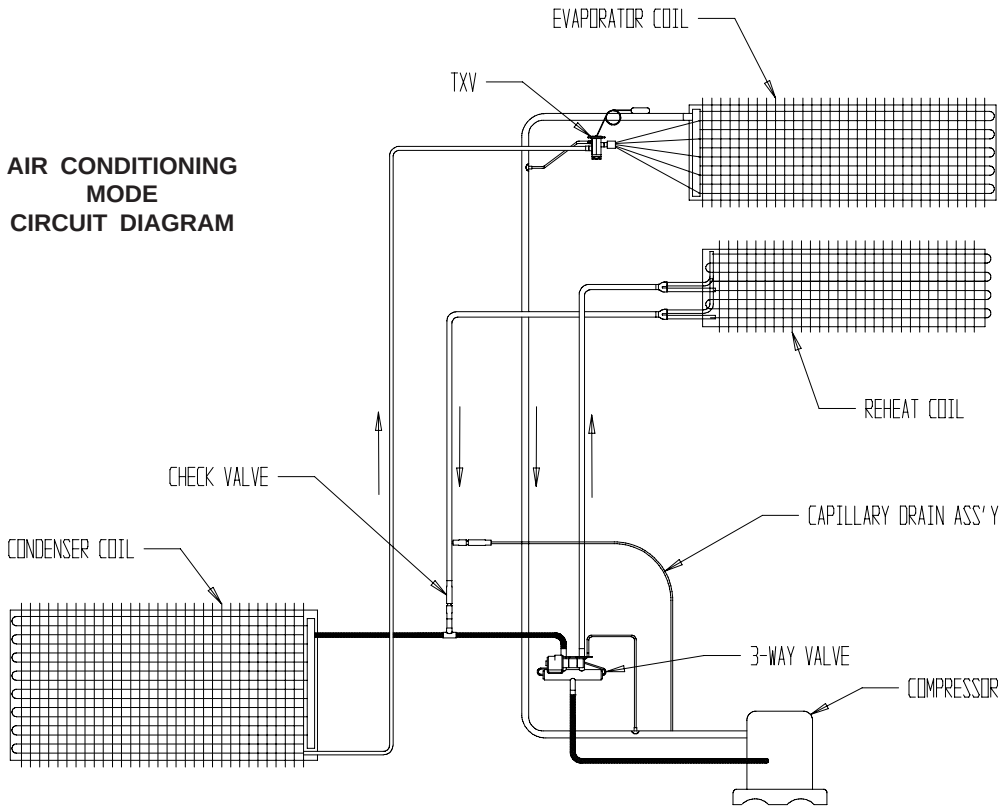
SEQUENCE OF DEHUMIDIFICATION OPERATION

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 4 - 5 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.

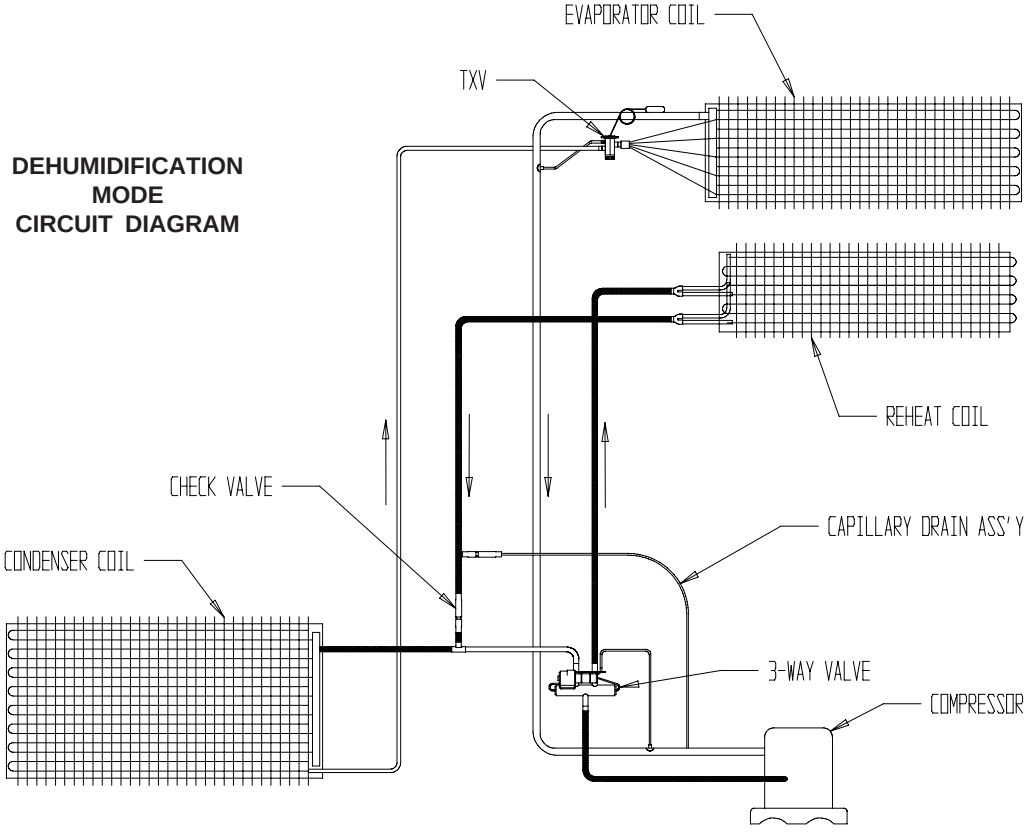
Any time there is a call for heating mode of operation through circuit R - W2 the dehumidification mode will cancel and the system will return to heating operation.

AIR CONDITIONING MODE CIRCUIT DIAGRAM



MIS-1200

DEHUMIDIFICATION MODE CIRCUIT DIAGRAM



MIS-1199

QA241D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Air Flow	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	24,800	10,400	14,400	0.42	13.40	800	53.1 / 52.4	A/C
65/63	90	65	12,700	200	12,500	0.02	11.60	500	64.6 / 54.6	Dehum
75/62.5	50	75	23,300	17,300	6,000	0.74	5.50	800	55.2 / 52.4	A/C
75/62.5	50	75	9,700	3,200	6,500	0.33	6.00	500	69.1 / 56.0	Dehum
75/65.5	60	75	24,700	15,100	9,600	0.61	8.90	800	57.7 / 55.4	A/C
75/65.5	60	75	11,400	2,100	9,300	0.18	8.60	500	71.2 / 58.4	Dehum
75/68	70	75	25,900	13,400	12,500	0.52	11.60	800	59.7 / 58.0	A/C
75/68	70	75	13,000	1,100	11,900	0.08	11.00	500	73.0 / 60.3	Dehum
80/67	50	95	23,800	16,900	6,900	0.71	6.40	800	60.8 / 57.7	A/C
80/67	50	95	7,300	200	7,100	0.03	6.60	500	79.6 / 62.7	Dehum

QA301D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Air Flow	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	32,000	13,300	18,700	0.42	17.30	1000	52.9 / 52.0	A/C
65/63	90	65	15,700	(200)	15,900	- 0 -	14.80	700	65.3 / 55.7	Dehum
75/62.5	50	75	29,400	21,800	7,600	0.74	7.00	1000	55.1 / 52.3	A/C
75/62.5	50	75	12,000	3,900	8,100	0.33	7.50	700	69.9 / 56.9	Dehum
75/65.5	60	75	31,900	19,500	12,400	0.61	11.50	1000	57.2 / 55.1	A/C
75/65.5	60	75	14,100	2,200	11,900	0.16	11.00	700	72.1 / 59.3	Dehum
75/68	70	75	33,900	17,300	16,600	0.51	15.30	1000	59.2 / 57.5	A/C
75/68	70	75	15,700	900	14,800	0.06	13.70	700	73.8 / 61.4	Dehum
80/67	50	95	28,900	20,500	8,400	0.71	7.80	1000	61.3 / 58.0	A/C
80/67	50	95	8,700	100	8,600	0.01	8.00	700	79.9 / 63.4	Dehum

Values shown in ( ) are BTUH of heat available at these conditions

QA361D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Air Flow	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	38,700	15,300	23,400	0.40	21.70	1000	51.0 / 49.4	A/C
65/63	90	65	16,500	(3,800)	20,300	- 0 -	18.80	850	69.1 / 56.7	Dehum
75/62.5	50	75	35,500	26,200	9,300	0.74	8.60	1000	51.0 / 49.8	A/C
75/62.5	50	75	11,000	1,000	10,000	0.09	9.30	850	73.9 / 58.3	Dehum
75/65.5	60	75	37,400	22,600	14,800	0.60	13.70	1000	54.3 / 53.0	A/C
75/65.5	60	75	13,500	(1,000)	14,500	- 0 -	13.40	850	76.1 / 60.7	Dehum
75/68	70	75	39,500	19,900	19,600	0.50	18.20	1000	57.1 / 55.6	A/C
75/68	70	75	15,800	(2,700)	18,500	- 0 -	17.10	850	77.9 / 62.7	Dehum
80/67	50	95	34,900	25,000	9,900	0.72	9.20	1200	61.0 / 57.9	A/C
80/67	50	95	34,400	22,900	11,500	0.67	10.60	1000	59.1 / 56.0	A/C
80/67	50	95	6,400	(4,300)	10,700	- 0 -	9.90	850	84.6 / 64.9	Dehum

Values shown in ( ) are BTUH of heat available at these conditions

QA421D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Air Flow	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	42,500	17,300	25,200	0.41	23.30	1000	49.1 / 47.8	A/C
65/63	90	65	18,000	(4,300)	22,300	- 0 -	20.60	850	69.7 / 56.2	Dehum
75/62.5	50	75	41,000	26,600	14,400	0.65	13.30	1000	50.7 / 47.7	A/C
75/62.5	50	75	14,800	600	14,200	0.04	13.10	850	74.3 / 56.8	Dehum
75/65.5	60	75	43,100	23,600	19,500	0.55	18.10	1000	53.4 / 50.9	A/C
75/65.5	60	75	16,000	(1,500)	17,500	- 0 -	16.20	850	76.6 / 59.7	Dehum
75/68	70	75	44,900	21,100	23,800	0.47	22.10	1000	55.7 / 53.6	A/C
75/68	70	75	18,300	(3,300)	21,600	- 0 -	20.00	850	78.6 / 61.8	Dehum
80/67	50	95	41,600	28,000	13,600	0.67	12.60	1200	61.0 / 56.9	A/C
80/67	50	95	40,200	25,000	15,200	0.62	14.10	1000	57.2 / 54.0	A/C
80/67	50	95	8,600	(4,700)	13,300	- 0 -	12.30	850	85.0 / 64.1	Dehum

Values shown in ( ) are BTUH of heat available at these conditions

QA481D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Air Flow	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	47,500	20,400	27,100	0.43	25.00	1100	48.0 / 47.5	A/C
65/63	90	65	17,200	(5,700)	22,900	- 0 -	21.20	850	71.4 / 56.5	Dehum
75/62.5	50	75	45,100	29,600	15,500	0.66	14.30	1100	50.4 / 47.7	A/C
75/62.5	50	75	12,800	(800)	13,600	- 0 -	12.60	850	75.9 / 57.6	Dehum
75/65.5	60	75	48,200	26,900	21,300	0.56	19.80	1100	52.6 / 50.6	A/C
75/65.5	60	75	15,700	(3,100)	18,800	- 0 -	17.40	850	78.3 / 57.9	Dehum
75/68	70	75	50,900	24,400	26,500	0.48	24.60	1100	54.7 / 53.1	A/C
75/68	70	75	28,200	4,900	23,300	0.17	21.60	850	69.8 / 54.8	Dehum
80/67	50	95	48,200	31,500	16,700	0.65	15.40	1400	59.4 / 56.0	A/C
80/67	50	95	46,200	28,300	17,900	0.61	16.60	1100	56.5 / 53.3	A/C
80/67	50	95	8,300	(6,500)	14,800	- 0 -	13.70	850	82.1 / 62.7	Dehum

Values shown in ( ) are BTUH of heat available at these conditions

QA601D Application Performance Data

Indoor Conditions		Outdoor Conditions	System Capacity				Pounds of Water/Hour	Evaporator Air Flow	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	54,100	23,000	31,100	0.43	28.80	1550	51.5 / 50.9	A/C
65/63	90	65	29,600	1,900	27,700	0.06	25.70	1250	63.6 / 55.2	Dehum
75/62.5	50	75	51,900	36,500	15,400	0.70	14.30	1550	53.5 / 50.7	A/C
75/62.5	50	75	24,600	10,000	14,600	0.41	9.30	1250	67.7 / 55.9	Dehum
75/65.5	60	75	54,800	31,900	22,900	0.58	21.20	1550	56.2 / 53.8	A/C
75/65.5	60	75	26,600	7,300	19,300	0.27	17.90	1250	69.7 / 58.9	Dehum
75/68	70	75	56,900	28,200	28,700	0.50	26.60	1550	58.4 / 56.6	A/C
75/68	70	75	29,200	4,900	24,300	0.17	29.50	1250	71.4 / 61.1	Dehum
80/67	50	95	52,100	35,400	16,700	0.68	15.50	1550	59.2 / 56.3	A/C
80/67	50	95	47,300	30,100	17,200	0.64	16.00	1250	58.0 / 54.8	A/C
80/67	50	95	20,400	5,400	15,000	0.26	13.90	1250	76.0 / 62.2	Dehum