Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

MODELS:

Q24H2D, Q30H2D, Q36H2D
Q42H2D, Q48H2D, Q60H2D

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 S3407 for the standard features of the base unit Q**H2D Q-Tec. Electrical data for the Q**H dehumidification Q-Tec models is identical to the electrical data for the standard QH models.

SPECIAL FEATURES

DEHUMIDIFICATION CIRCUIT

The dehumidification circuit incorporates an independent heat exchanger coil in the supply air stream in addition to the standard evaporator coil. This coil reheats the supply air after it passes over the cooling coil, and is sized to nominally match the sensible cooling capacity of the evaporator coil. Extended run times in dehumidification mode can be achieved using waste heat from the refrigeration cycle to achieve the reheat process, while at the same time large amounts of moisture can be extracted from the passing air stream. Models that also have electric heaters installed have the electric heat inhibited during dehumidification mode, although it remains available for additional reheat during certain conditions. See below for specific operating sequences, and see attached tables for performance on sensible and latent capacities, water removal ratings, and supply air delivery conditions.

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.

DEHUMIDIFICATION SEQUENCE OF 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 that feeds the reheat coil are energized through circuit 4-5. Dehumidification will continue until the humidistat is satisfied.

If the room temperature falls below 1st stage heating setpoint, electric heat will be energized by the room thermostat and cycle to maintain room temperature.

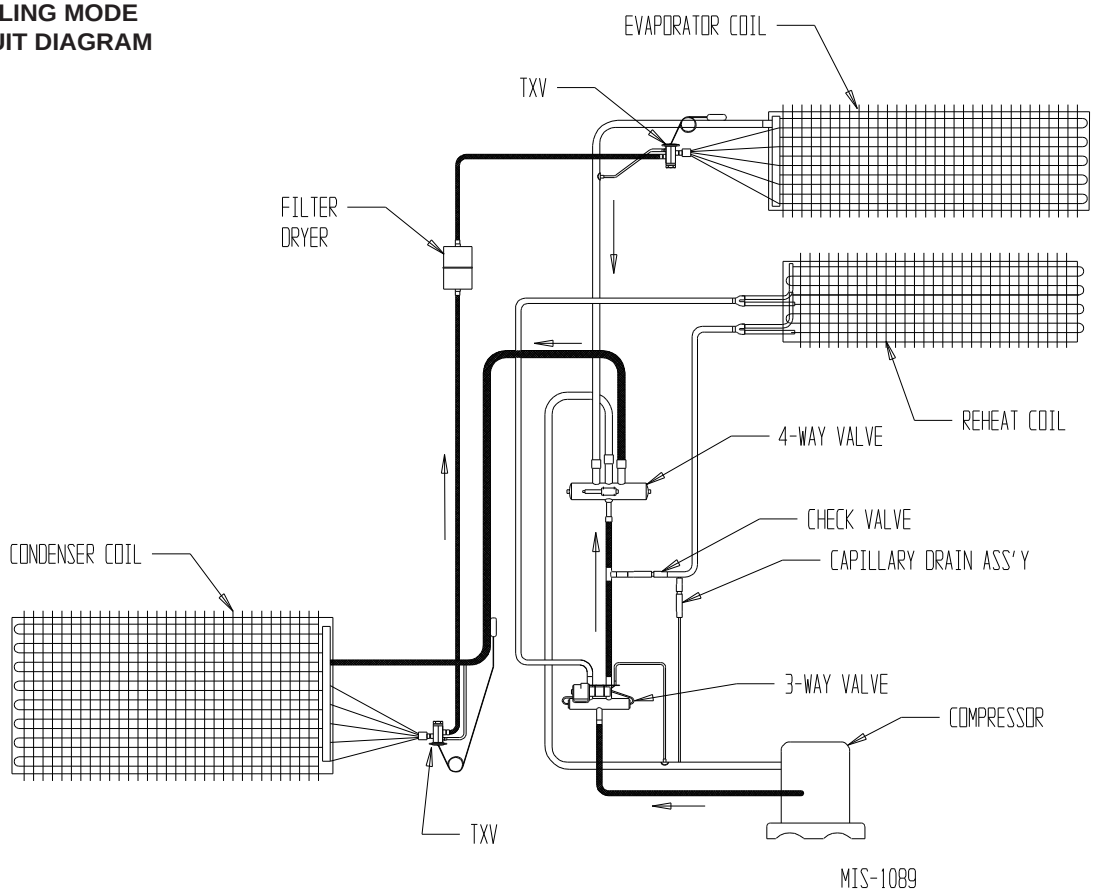
If 2nd stage heating setpoint is reached, dehumidification cycle is de-energized and heat pump heating is energized.

If the mixed (return and ventilation, if used) temperature (measured at the internal filter location) drops below 65°F during dehumidification cycle, electric heat will cycle to help maintain room temperature to the 65°F condition. **Note:** On installations with ventilation package installed and controlled from the O1 terminal on Bard 24V terminal strip, this feature is inhibited anytime the O1 terminal is energized.

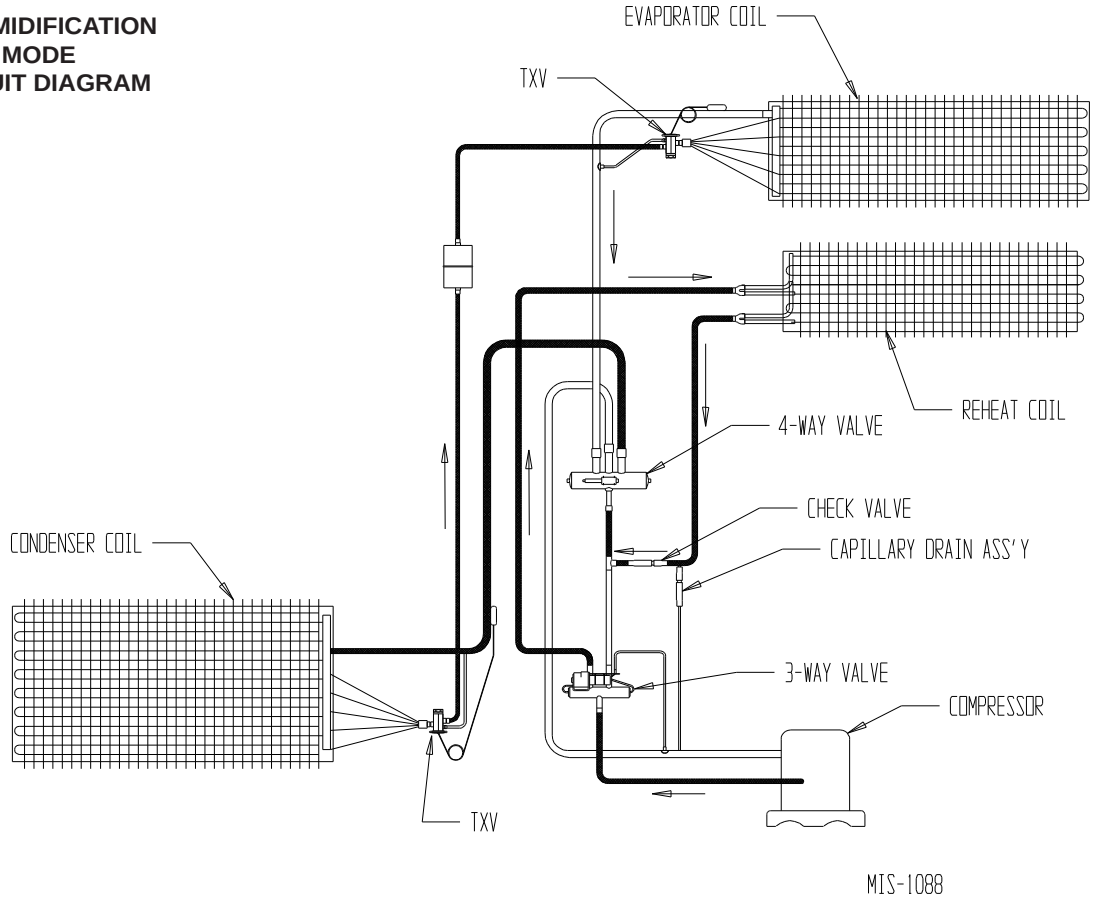
If the unit is operating in heat pump mode and there is a call for dehumidification, the dehumidification mode takes precedence over the heat pump heating mode. The unit will not return to heating mode until 2nd stage heating is called for.

Anytime there is a R-Y call for cooling, dehumidification is canceled and the unit will operate in the cooling mode until satisfied. If dehumidification call is still present when cooling call is satisfied, the unit will continue to operate and revert to dehumidification mode.

COOLING MODE
CIRCUIT DIAGRAM



DEHUMIDIFICATION
MODE
CIRCUIT DIAGRAM



Q24H2D 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	27,200	11,200	16,000	0.41	15.10	800	52.4 / 51.8	A/C
65/63	90	65	15,200	500	14,700	0.03	13.91	800	64.4 / 57.1	Dehum
75/62.5	50	75	25,100	18,400	6,700	0.73	6.30	800	54.5 / 51.6	A/C
75/62.5	50	75	10,700	5,200	5,500	0.49	5.15	800	69.1 / 58.1	Dehum
75/65.5	60	75	26,700	16,300	10,400	0.61	9.88	800	56.8 / 54.7	A/C
75/65.5	60	75	12,900	3,700	9,200	0.29	8.68	800	70.9 / 60.6	Dehum
75/68	70	75	28,200	14,400	13,800	0.51	12.98	800	59.0 / 57.4	A/C
75/68	70	75	14,600	2,200	12,400	0.15	11.67	800	72.6 /57.3	Dehum
80/67	50	95	25,000	17,800	7,200	0.71	6.82	800	60.3 / 57.3	A/C
80/67	50	95	8,000	2,000	6,000	0.25	5.68	800	77.8 / 64.0	Dehum

Rated CFM 800

Q30H2D 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	34,000	14,000	20,000	0.41	18.84	1000	51.4 / 50.6	A/C
65/63	90	65	20,400	1,300	19,100	0.06	18.06	1000	63.8 / 56.0	Dehum
75/62.5	50	75	31,700	22,900	8,800	0.72	8.35	1000	52.8 / 50.7	A/C
75/62.5	50	75	15,600	7,300	8,300	0.46	7.88	1000	72.0 / 62.0	Dehum
75/65.5	60	75	33,700	20,300	13,400	0.60	12.58	1000	55.5 / 53.7	A/C
75/65.5	60	75	17,400	5,000	12,400	0.29	11.73	1000	70.1 / 59.8	Dehum
75/68	70	75	35,500	17,800	17,700	0.50	16.65	1000	57.9 / 56.5	A/C
75/68	70	75	19,500	3,000	16,500	0.15	15.57	1000	72.1 / 62.1	Dehum
80/67	50	95	29,800	21,800	8,000	0.73	7.54	1000	58.9 / 56.5	A/C
80/67	50	95	10,900	2,300	8,600	0.21	8.13	1000	77.7 / 63.5	Dehum

Rated CFM 1000

Q36H2D 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	38,400	16,200	21,700	0.42	20.99	1000	49.8 / 49.2	A/C
65/63	90	65	17,400	-2,800	20,200	-0-	19.04	1000	67.7 / 57.4	Dehum
75/62.5	50	75	36,000	24,800	11,200	0.69	10.55	1000	51.4 / 49.1	A/C
75/62.5	50	75	11,800	2,200	9,600	0.18	9.13	1000	72.9 / 58.6	Dehum
75/65.5	60	75	38,000	21,900	16,100	0.58	15.16	1000	54.3 / 52.4	A/C
75/65.5	60	75	14,300	-5,300	19,600	-0-	18.47	1000	75.0 / 61.1	Dehum
75/68	70	75	39,600	19,400	20,200	0.49	19.08	1000	56.6 / 55.1	A/C
75/68	70	75	16,500	-2,100	18,500	-0-	17.47	1000	77.0 / 63.3	Dehum
80/67	50	95	35,600	26,200	9,400	0.72	9.22	1200	59.6 / 57.3	A/C
80/67	50	95	35,000	23,500	11,500	0.67	10.84	1000	57.8 / 55.4	A/C
80/67	50	95	6,300	-3,700	10,000	-0-	9.45	1000	83.6 / 65.2	Dehum

Rated CFM 1200. Shipped from the factory on optional CFM of 1000.

Q42H2D 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	42,200	17,700	24,500	0.41	23.18	1000	50.2 / 49.4	A/C
65/63	90	65	20,000	-2,900	22,900	-0-	21.58	1000	67.5 / 57.4	Dehum
75/62.5	50	75	39,000	27,000	12,000	0.69	11.26	1000	52.2 / 49.8	A/C
75/62.5	50	75	12,200	2,900	9,300	0.24	8.78	1000	72.6 / 58.8	Dehum
75/65.5	60	75	41,500	23,900	17,600	0.57	16.66	1000	54.9 / 52.9	A/C
75/65.5	60	75	16,300	200	16,100	0.01	15.20	1000	74.7 / 61.0	Dehum
75/68	70	75	43,200	21,300	21,900	0.49	20.68	1000	57.1 / 55.4	A/C
75/68	70	75	18,600	-1,800	20,400	-0-	19.21	1000	76.6 / 63.1	Dehum
80/67	50	95	39,000	27,700	11,300	0.72	10.26	1200	60.2 / 57.3	A/C
80/67	50	95	37,900	25,500	12,400	0.67	11.66	1000	58.5 / 55.9	
80/67	50	95	7,300	-3,500	10,800	-0-	10.23	1000	83.0 / 65.1	Dehum

Rated CFM 1200. Shipped from the factory on optional CFM of 1000.

Q48H2D 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	50,800	21,100	29,700	0.42	28.00	1250	49.7 / 48.9	A/C
65/63	90	65	23,200	-4,700	27,900	-0-	26.37	1250	68.6 / 57.2	Dehum
75/62.5	50	75	47,100	32,800	14,300	0.70	13.47	1250	51.2 / 49.1	A/C
75/62.5	50	75	16,300	3,000	13,300	.18	12.52	1250	72.8 / 58.3	Dehum
75/65.5	60	75	50,000	29,000	21,000	0.58	19.74	1250	54.0 / 52.2	A/C
75/65.5	60	75	19,300	-0-	19,300	-0-	18.32	1250	75.1 / 60.8	Dehum
75/68	70	75	52,300	25,600	27,700	0.49	25.11	1250	56.4 / 54.9	A/C
75/68	70	75	21,200	-2,700	23,900	-0-	22.56	1250	77.4 / 63.0	Dehum
80/67	50	95	45,000	32,600	12,400	0.70	13.29	1400	59.4 / 56.8	A/C
80/67	50	95	44,000	30,600	16,000	0.67	14.45	1250	57.7 / 55.2	
80/67	50	95	6,700	-5,500	11,200	-0-	10.62	1250	83.4 / 65.5	Dehum

Rated CFM 1400. Shipped from the factory on optional CFM of 1100.

Q60H2D 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	57,100	24,300	32,800	0.42	30.98	1250	47.9 / 47.3	A/C
65/63	90	65	37,100	6,300	30,800	0.17	29.06	1250	60.6 / 53.2	Dehum
75/62.5	50	75	51,800	34,900	16,900	0.67	15.91	1250	62.5 / 50.2	A/C
75/62.5	50	75	31,000	16,000	15,000	0.52	14.16	1250	64.3 / 54.2	Dehum
75/65.5	60	75	55,500	31,200	24,200	0.56	22.86	1250	52.8 / 51.1	A/C
75/65.5	60	75	34,100	11,300	22,800	0.33	21.50	1250	67.0 / 57.0	Dehum
75/68	70	75	59,100	28,200	30,900	0.48	29.10	1250	54.9 / 53.5	A/C
75/68	70	75	37,400	7,900	29,500	0.21	27.79	1250	69.4 / 59.5	Dehum
80/67	50	95	53,000	36,000	17,000	0.69	15.43	1550	58.7 / 56.1	A/C
80/67	50	95	52,900	34,000	18,900	0.64	17.93	1250	56.0 / 53.6	A/C
80/67	50	95	26,200	8,800	17,400	0.34	16.38	1250	73.7 / 60.8	Dehum

Rated CFM 1550. Shipped from the factory on optional CFM of 1250.

Electrical Specifications – Dehumidification Models

MODEL	Rated Volts & 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. Breaker		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
Q24H2DA0Z	230/208-1	1	22	30	10	10								
A05		1	47	50	8	10								
A10		1 or 2	72	80	4	8	22	50	30	50	10	8	10	10
Q24H2DB0Z	230/208-3	1	17	20	12	12								
B06		1	35	35	8	10								
B09		1	44	45	8	10								
Q24H2DC0Z	460-3	1	10	15	14	14								
C06		1	19	20	12	12								
C09		1	23	25	10	10								
Q30H2DA0Z	230/208-1	1	25	35	8	10								
A05		1	50	50	8	10								
A10		1 or 2	75	80	4	8	25	50	30	50	10	8	10	10
Q30H2DB0Z	230/208-3	1	18	25	10	10								
B06		1	37	40	8	10								
B09		1	45	45	8	10								
B12		1	55	60	6	10								
Q30H2DC0Z	460-3	1	12	15	14	14								
C06		1	21	25	10	10								
C09		1	25	25	10	10								
C12		1	30	30	10	10								
Q36H2DA0Z	230/208-1	1	31	45	8	10								
A05		1	56	60	6	10								
A10		1 or 2	81	90	4	8	31	50	45	50	8	8	10	10
④ A15		1 or 2	83	90	4	8	33	50	45	50	8	8	10	10
Q36H2DB0Z	230/208-3	1	25	30	10	10								
B06		1	43	50	8	10								
B09		1	52	60	6	10								
⑤ B15		1	53	60	6	10								
Q36H2DC0Z	460-3	1	12	15	14	14								
C06		1	21	25	10	10								
C09		1	26	30	10	10								
⑤ C15		1	27	30	10	10								
Q42H2DA0Z	230/208-1	1	34	50	8	10								
A05		1	59	60	6	10								
A10		1 or 2	84	90	4	8	34	50	45	50	8	8	10	10
④ A15		1 or 2	84	90	4	8	34	50	45	50	8	8	10	10
Q42H2DB0Z	230/208-3	1	25	35	8	10								
B06		1	43	50	8	10								
B09		1	52	60	6	10								
⑤ B15		1	53	60	6	10								
Q42H2DC0Z	460-3	1	13	15	14	14								
C06		1	22	25	10	10								
C09		1	26	30	10	10								
⑤ C15		1	27	30	10	10								
Q48H2DA0Z	230/208-1	1	38	50	8	10								
A05		1 or 2	63	70	6	8	38	25	50	25	8	10	10	10
A10		1 or 2	88	90	3	8	38	50	50	50	8	8	10	10
④ A15		1 or 2	88	90	3	8	38	50	50	50	8	8	10	10
Q48H2DB0Z	230/208-3	1	29	40	8	10								
B06		1	47	50	8	10								
B09		1	56	60	6	10								
⑤ B15		1	56	60	6	10								
Q48H2DC0Z	460-3	1	15	20	12	12								
C06		1	24	25	10	10								
C09		1	28	30	10	10								
⑤ C15		1	28	30	10	10								
Q60H2DA0Z	230/208-1	1	45	60	8	10								
A05		1 or 2	70	90	4	8	45	25	60	25	8	10	10	10
A10		1 or 2	95	100	3	8	45	50	60	50	8	8	10	10
⑤ A15		1 or 2	95	100	3	8	45	50	60	50	8	8	10	10
Q60H2DB0Z	230/208-3	1	31	45	8	10								
B09		1	58	60	6	10								
⑤ B15		1	58	60	6	10								
Q60H2DC0Z	460-3	1	17	25	10	10								
C09		1	31	35	8	10								
⑤ C15		1	31	35	8	10								

① Maximum size of the time delay fuse or HACR type circuit breaker for protection of field wiring conductors.
② Based on 75°C 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 Electric Code (latest revision), article 310 for power conductor sizing.
Caution: When more than one field power conductor 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 conductors are in a raceway.
④ Maximum KW that can operate with heat pump on is 10KW. Other 5KW energizes during emergency heat only.
⑤ Maximum KW that can operate with heat pump on is 9KW. Other 6KW energizes during emergency heat only.
NOTE: Reference Specification Sheet S3407 for dehumidification model performance information.