



Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

MODELS: **I30H1D, I36H1D, I42H1D,** **I48H1D, I60H1D**

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 S3451 for the standard features of the base unit I**H1D I-TEC. Electrical data for the I-TEC dehumidification models is identical to the electrical data for the standard I-TEC models.

SPECIAL FEATURES

DEHUMIDIFICATION CIRCUIT

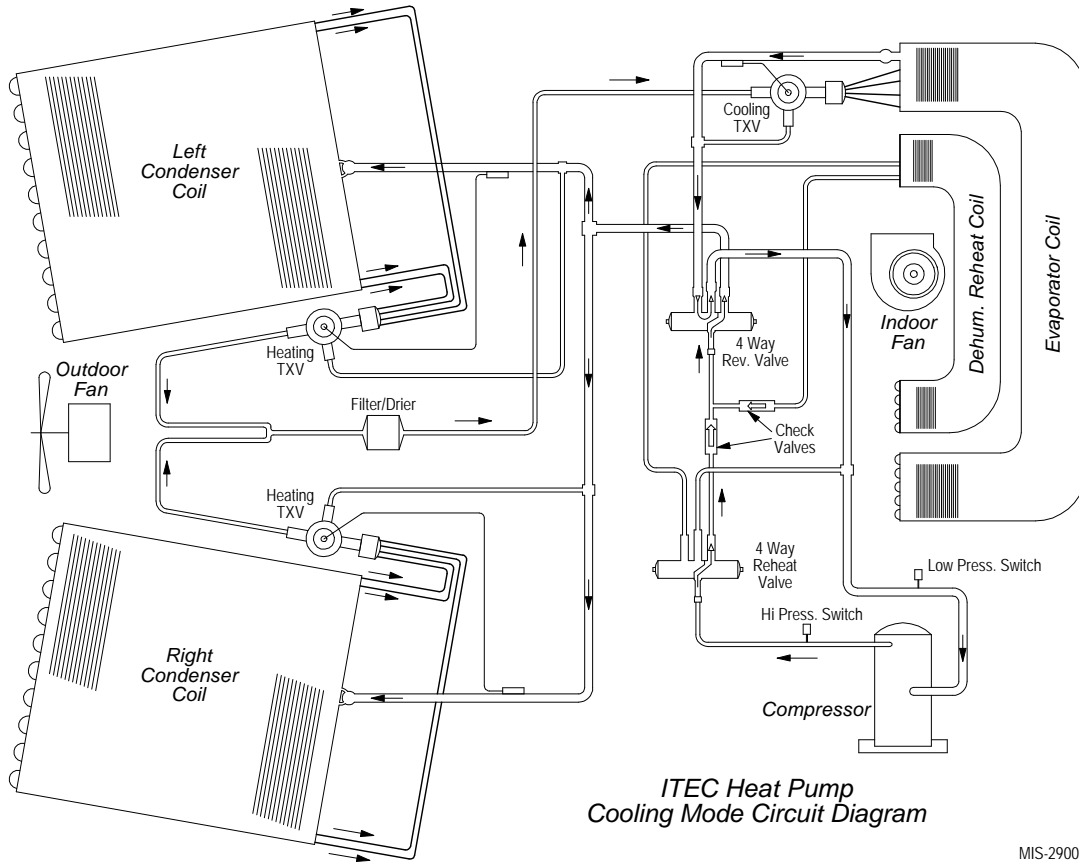
The dehumidification circuit incorporates an independent heat exchanger coil in the supply air stream in addition to the standard evaporator coil. This coil reheats the supply air after it passes over the cooling coil, and is sized to nominally match the sensible cooling capacity of the evaporator coil. 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. 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 4-way reheat 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 4-way reheat 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 outdoor coils for further heat transfer. 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

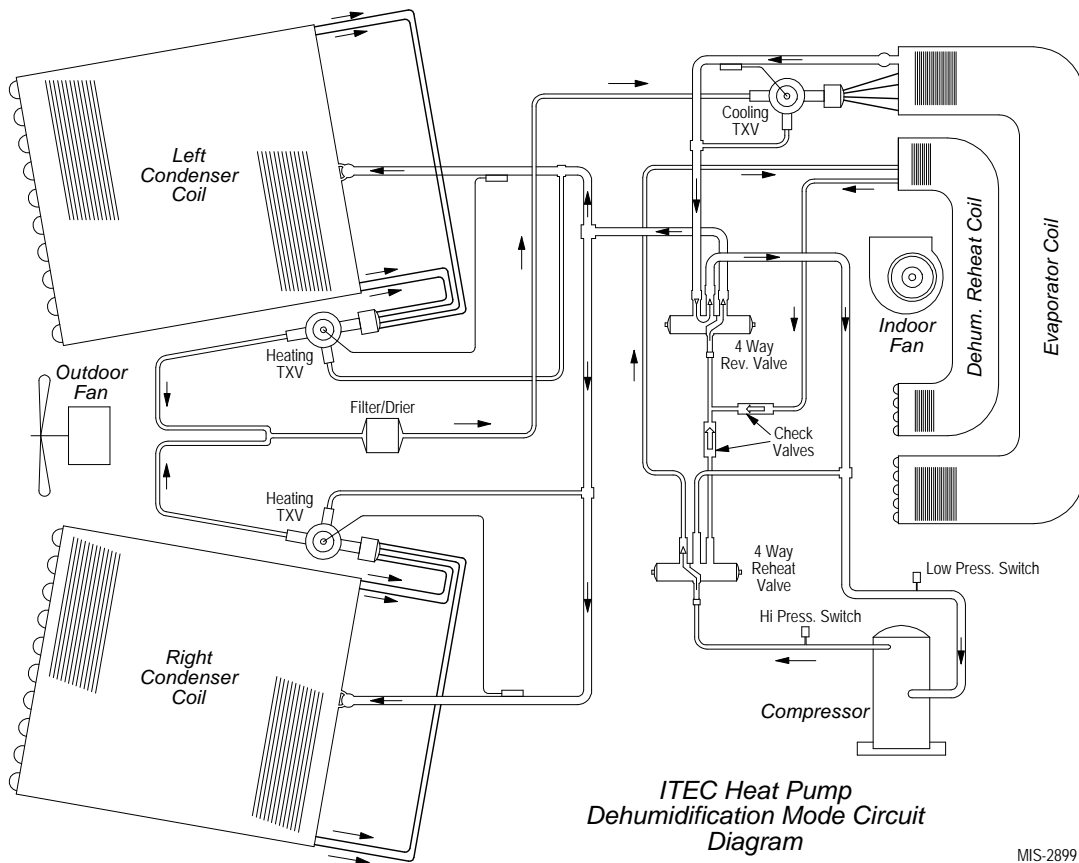
Dehumidification is controlled through a humidistat and is independent of the thermostat. On a call for dehumidification mode of operation, the compressor will operate at full load (capacity) and 4-way reheat valve that feeds the reheat coil is energized through “D” terminal. Dehumidification will continue until the humidistat is satisfied.

Anytime there is a R-Y call for cooling, dehumidification is canceled and the unit will operate in the cooling mode at part load for Stage 1 cooling (can shift to full load if 2nd Stage cooling required) until satisfied. If dehumidification call is still present when cooling call is satisfied, the unit will continue to operate and revert to dehumidification mode with compressor at full level.



**ITEC Heat Pump
Cooling Mode Circuit Diagram**

MIS-2900



**ITEC Heat Pump
Dehumidification Mode Circuit
Diagram**

MIS-2899

I30H1D APPLICATION PERFORMANCE DATA

| Indoor Conditions °F | | Outdoor Conditions °F | 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 | 31,375 | 13,550 | 17,825 | 43.2% | 16.8 | 850 | 50.7 | 50.3 | A/C |
| 65/63 | 90 | 65 | 15,025 | (1,150) | 16,175 | N/A | 15.3 | 850 | 66.3 | 57.3 | Dehum |
| 75/62.5 | 50 | 75 | 28,125 | 21,600 | 6,525 | 76.8% | 6.2 | 850 | 52.0 | 51.0 | A/C |
| 75/62.5 | 50 | 75 | 8,900 | 3,650 | 5,250 | N/A | 5.0 | 850 | 71.1 | 58.9 | Dehum |
| 75/65.5 | 60 | 75 | 30,700 | 19,250 | 11,450 | 62.7% | 10.8 | 850 | 54.5 | 53.5 | A/C |
| 75/65.5 | 60 | 75 | 11,400 | 1,775 | 9,625 | N/A | 9.1 | 850 | 73.1 | 61.4 | Dehum |
| 75/68 | 70 | 75 | 32,100 | 16,725 | 15,375 | 52.1% | 14.5 | 850 | 57.1 | 56.2 | A/C |
| 75/68 | 70 | 75 | 13,150 | (100) | 13,250 | N/A | 12.5 | 850 | 75.1 | 63.6 | Dehum |
| 80/67 | 50 | 95 | 27,575 | 20,375 | 7,200 | 73.9% | 6.8 | 850 | 58.1 | 56.7 | A/C |
| 80/67 | 50 | 95 | 2,625 | (2,975) | 5,600 | N/A | 5.3 | 850 | 83.3 | 66.0 | Dehum |

I36H1D APPLICATION PERFORMANCE DATA

| Indoor Conditions °F | | Outdoor Conditions °F | 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 | 39,550 | 16,550 | 23,000 | 41.8% | 21.7 | 1150 | 51.7 | 51.2 | A/C |
| 65/63 | 90 | 65 | 17,950 | (925) | 18,875 | N/A | 17.8 | 1150 | 65.7 | 57.9 | Dehum |
| 75/62.5 | 50 | 75 | 36,775 | 27,750 | 9,025 | 75.5 | 8.5 | 1150 | 52.8 | 51.3 | A/C |
| 75/62.5 | 50 | 75 | 11,000 | 5,025 | 5,975 | 45.7% | 5.6 | 1150 | 70.9 | 59.3 | Dehum |
| 75/65.5 | 60 | 75 | 39,675 | 24,175 | 15,500 | 60.9% | 14.6 | 1150 | 55.6 | 54.3 | A/C |
| 75/65.5 | 60 | 75 | 13,000 | 3,075 | 9,925 | 23.7% | 9.4 | 1150 | 72.5 | 62.0 | Dehum |
| 75/68 | 70 | 75 | 41,625 | 21,300 | 20,325 | 51.2% | 19.2 | 1150 | 57.9 | 56.8 | A/C |
| 75/68 | 70 | 75 | 15,900 | 1,050 | 14,850 | 6.6% | 14.0 | 1150 | 74.1 | 64.0 | Dehum |
| 80/67 | 50 | 95 | 34,225 | 25,625 | 8,600 | 74.9% | 8.1 | 1150 | 59.3 | 57.5 | A/C |
| 80/67 | 50 | 95 | 7,625 | 2,575 | 5,050 | 33.8% | 4.8 | 1150 | 82.8 | 66.7 | Dehum |

I42H1D APPLICATION PERFORMANCE DATA

| Indoor Conditions °F | | Outdoor Conditions °F | 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 | 47,475 | 18,875 | 28,600 | 39.8% | 27.0 | 1300 | 52.0 | 51.5 | A/C |
| 65/63 | 90 | 65 | 20,175 | (1,925) | 22,100 | N/A | 20.8 | 1300 | 66.3 | 58.2 | Dehum |
| 75/62.5 | 50 | 75 | 42,775 | 31,675 | 11,100 | 74.1% | 10.5 | 1300 | 52.7 | 51.0 | A/C |
| 75/62.5 | 50 | 75 | 11,950 | 5,075 | 6,875 | 42.5% | 6.5 | 1300 | 71.3 | 59.5 | Dehum |
| 75/65.5 | 60 | 75 | 45,750 | 27,750 | 18,000 | 60.7% | 17.0 | 1300 | 55.4 | 54.0 | A/C |
| 75/65.5 | 60 | 75 | 15,325 | 2,625 | 12,700 | 17.1% | 12.0 | 1300 | 73.1 | 62.0 | Dehum |
| 75/68 | 70 | 75 | 48,075 | 24,300 | 23,775 | 50.5% | 22.4 | 1300 | 57.8 | 56.7 | A/C |
| 75/68 | 70 | 75 | 17,675 | 250 | 17,425 | 1.4% | 16.4 | 1300 | 74.8 | 64.2 | Dehum |
| 80/67 | 50 | 95 | 40,375 | 29,575 | 10,800 | 73.3% | 10.2 | 1300 | 59.2 | 57.2 | A/C |
| 80/67 | 50 | 95 | 325 | (3,900) | 4,225 | N/A | 4.0 | 1300 | 82.8 | 66.8 | Dehum |

I48H1D APPLICATION PERFORMANCE DATA

| Indoor Conditions °F | | Outdoor Conditions °F | 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 | 53,525 | 22,500 | 31,025 | 42.0% | 29.3 | 1550 | 51.1 | 50.6 | A/C |
| 65/63 | 90 | 65 | 20,575 | (4,925) | 25,500 | N/A | 24.1 | 1550 | 68.0 | 58.6 | Dehum |
| 75/62.5 | 50 | 75 | 50,350 | 38,125 | 12,225 | 75.7% | 11.5 | 1550 | 51.5 | 50.5 | A/C |
| 75/62.5 | 50 | 75 | 12,800 | 3,575 | 9,225 | N/A | 8.7 | 1550 | 72.7 | 59.7 | Dehum |
| 75/65.5 | 60 | 75 | 53,750 | 32,975 | 20,775 | 61.3% | 19.6 | 1550 | 54.6 | 53.7 | A/C |
| 75/65.5 | 60 | 75 | 15,825 | 850 | 14,975 | N/A | 14.1 | 1550 | 74.4 | 62.3 | Dehum |
| 75/68 | 70 | 75 | 55,600 | 28,750 | 26,850 | 51.7% | 25.3 | 1550 | 57.2 | 56.4 | A/C |
| 75/68 | 70 | 75 | 17,500 | (1,875) | 19,375 | N/A | 18.3 | 1550 | 76.1 | 64.7 | Dehum |
| 80/67 | 50 | 95 | 49,250 | 36,350 | 12,900 | 73.8% | 12.2 | 1550 | 57.6 | 56.4 | A/C |
| 80/67 | 50 | 95 | (850) | (7,300) | 6,450 | N/A | 6.1 | 1550 | 84.6 | 67.2 | Dehum |

I60H1D APPLICATION PERFORMANCE DATA

| Indoor Conditions °F | | Outdoor Conditions °F | 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 | 61,000 | 25,925 | 35,075 | 42.5% | 33.1 | 1750 | 51.4 | 50.6 | A/C |
| 65/63 | 90 | 65 | 18,325 | (6,475) | 24,800 | N/A | 23.4 | 1750 | 68.6 | 59.6 | Dehum |
| 75/62.5 | 50 | 75 | 58,425 | 44,475 | 13,950 | 76.1% | 13.2 | 1750 | 52.1 | 50.8 | A/C |
| 75/62.5 | 50 | 75 | 9,100 | 525 | 8,575 | N/A | 8.1 | 1750 | 74.8 | 60.8 | Dehum |
| 75/65.5 | 60 | 75 | 62,000 | 38,625 | 23,375 | 62.3% | 22.1 | 1750 | 55.0 | 53.9 | A/C |
| 75/65.5 | 60 | 75 | 12,150 | (1,700) | 13,850 | N/A | 13.1 | 1750 | 76.0 | 63.4 | Dehum |
| 75/68 | 70 | 75 | 65,150 | 33,550 | 31,600 | 51.5% | 29.8 | 1750 | 57.6 | 56.5 | A/C |
| 75/68 | 70 | 75 | 14,950 | (4,575) | 19,525 | N/A | 18.4 | 1750 | 77.4 | 65.5 | Dehum |
| 80/67 | 50 | 95 | 56,450 | 42,050 | 14,400 | 74.5% | 13.6 | 1750 | 58.1 | 56.7 | A/C |
| 80/67 | 50 | 95 | (3,750) | (10,550) | 6,800 | N/A | 6.4 | 1750 | 85.6 | 67.5 | Dehum |

DEHUMIDIFICATION RELAY LOGIC BOARD

| | Inputs to Board | | | | | | | | | | Outputs From Board | | | | | | | |
|---------------------|-----------------|---|---|----|----|----|---|-----|---|----|--------------------|----|----|---|---|----|-----|---|
| | G | Y | B | W2 | E1 | A1 | D | RAT | L | G1 | BK | YO | RV | W | E | A2 | TWV | L |
| Cooling Mode | X | X | | | | | | | | | | X | | | | | | |
| Cooling Mode | X | X | | | X | | | | | | | X | | | | | | |
| Cooling Mode | X | X | | | | X | | | | | | X | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 1st Stage Heating * | X | X | | | | | | | | | | X | | | | | | |
| 1st Stage Heating * | X | X | | | X | | | | | | | X | | | | | | |
| 1st Stage Heating * | X | X | | | | X | | | | | | X | | | | | X | |
| | | | | | | | | | | | | | | | | | | |
| 2nd Stage Heating * | X | X | | | | | | | | | | X | | | | | | |
| 2nd Stage Heating * | X | X | | | X | | | | | | | X | | | | | | |
| 2nd Stage Heating * | X | X | | | | X | | | | | | X | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| Dehumidification | | | | | | | X | | | | | X | | | | | X | |
| Dehumidification | | | | | X | | X | | | | | X | | | | | X | |

* IH Heat Pump Models Only

NOTE: Cooling takes precedence over dehumidification. A cooling call cancels dehumidification.