Supplemental Instructions

Models:

S26H1D, S31H1D, S38H1D, S43H1D, S49H1D, S61H1D

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 S3416 for the standard features of the base unit. Electrical data for the dehumidification models is different than the electrical data for the standard S**H1 models. Refer to page 7 for the electrical data.

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 page 2 for specific operating sequences, and see the 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 drain orifice is inserted between the reheat coil return line and suction line to 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 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.

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Manual: 7960-593B
Supersedes: 7960-593A
Date: 1-5-16

Dehumidification Sequence of Operation

Dehumidification is controlled through the thermostat (if capable) or through a separate humidistat. On a call for dehumidification mode of operation, the compressor and 3-way valve that feeds the reheat coil are energized through circuit R-W3. 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.

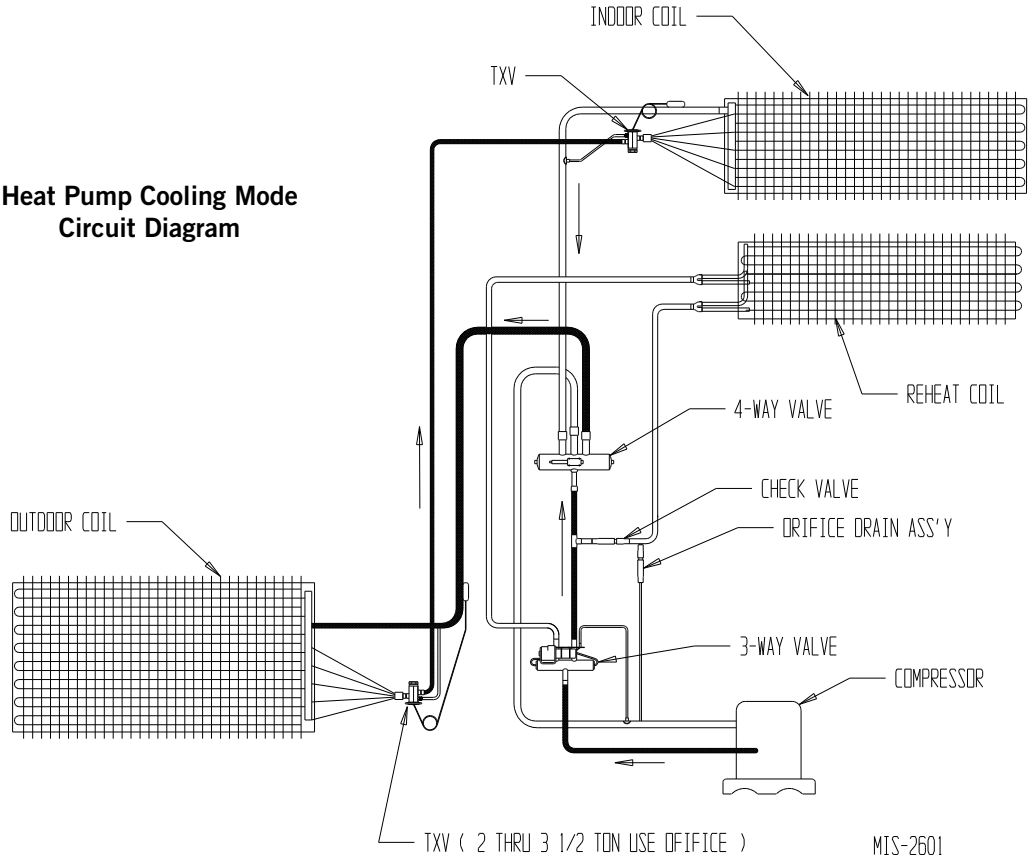
If 2nd stage heating setpoint is reached, dehumidification cycle is de-energized and heat pump heating is energized.

If the mixed air (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.

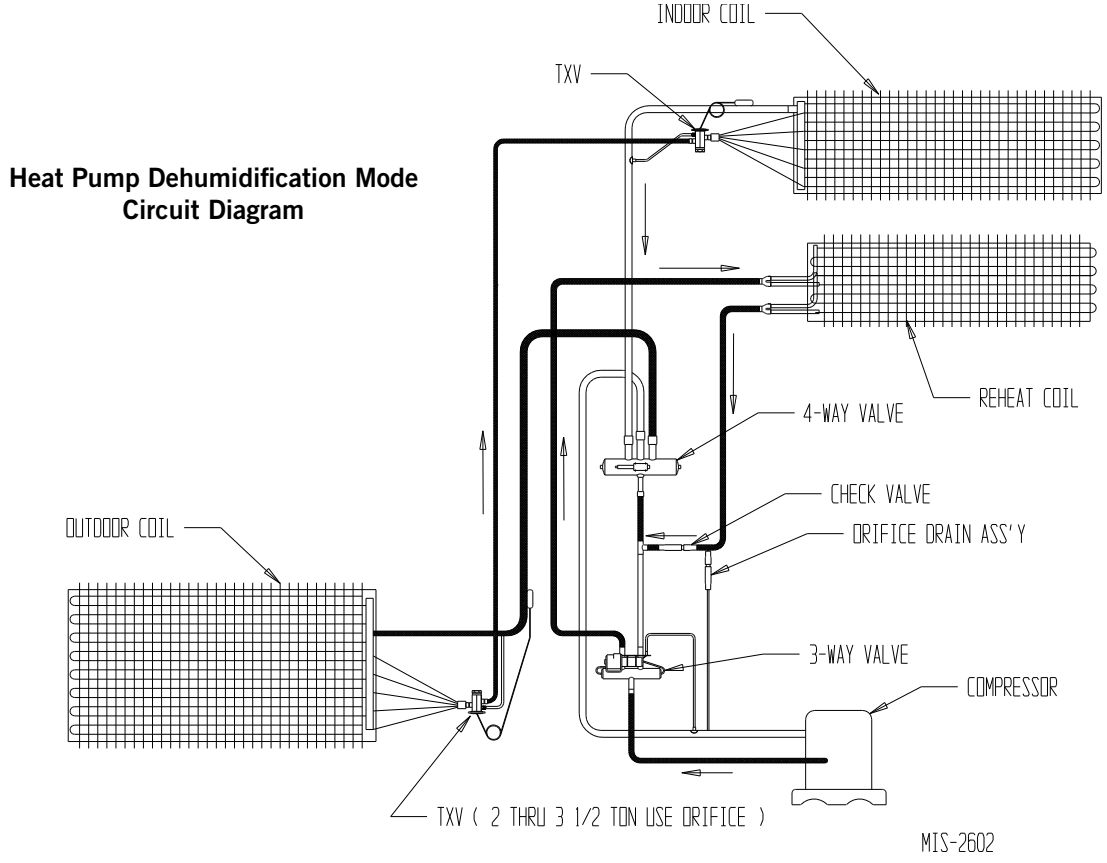
If emergency heat is called for along with a call for dehumidification, the electric heat will not energize unless the return air thermostat drops below 65°F.

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

Heat Pump Cooling Mode Circuit Diagram



Heat Pump Dehumidification Mode Circuit Diagram



S26H1D 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	28,251	11,734	16,517	0.42	15.58	800	51.7 / 50.7	A/C
65/63	90	65	14,072	(-1,146)	15,218	-0.08	14.36	800	66.3 / 57.3	Dehum
75/62.5	50	75	26,053	19,255	6,798	0.74	6.41	800	53.2 / 51.1	A/C
75/62.5	50	75	9,007	3,374	5,633	0.37	5.31	800	71.2 / 58.8	Dehum
75/65.5	60	75	28,204	17,207	10,997	0.61	10.37	800	55.6 / 53.9	A/C
75/65.5	60	75	11,173	1,935	9,238	0.17	8.72	800	72.8 / 61.2	Dehum
75/68	70	75	29,806	14,952	14,854	0.50	14.01	800	57.8 / 56.5	A/C
75/68	70	75	13,599	513	13,086	0.04	12.35	800	74.4 / 63.2	Dehum
80/67	50	95	25,259	18,077	7,182	0.72	6.78	800	59.6 / 57.2	A/C
80/67	50	95	1,709	(-2,749)	4,458	-1.61	4.21	800	83.2 / 66.3	Dehum

S31H1D 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	33,776	14,388	19,388	0.43	18.29	800	49.0 / 48.4	A/C
65/63	90	65	16,416	(-955)	17,371	-0.06	16.39	800	66.2 / 56.5	Dehum
75/62.5	50	75	30,792	21,774	9,018	0.71	8.51	800	50.4 / 48.9	A/C
75/62.5	50	75	11,091	3,417	7,674	0.31	7.24	800	71.1 / 58.0	Dehum
75/65.5	60	75	32,832	19,330	13,502	0.59	12.74	800	53.0 / 51.7	A/C
75/65.5	60	75	13,749	1,786	11,963	0.13	11.29	800	73.0 / 60.2	Dehum
75/68	70	75	34,904	17,292	17,612	0.50	16.62	800	55.2 / 54.2	A/C
75/68	70	75	15,477	163	15,314	0.01	14.45	800	74.9 / 62.5	Dehum
80/67	50	95	30,146	20,133	10,013	0.67	9.45	800	56.2 / 54.5	A/C
80/67	50	95	5,726	(-2,295)	8,021	-0.40	7.57	800	82.6 / 64.9	Dehum

S38H1D 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	43,890	18,417	25,473	0.42	24.03	1100	49.8 / 49.3	A/C
65/63	90	65	21,542	(-2,129)	23,671	-0.10	22.33	1100	66.8 / 56.7	Dehum
75/62.5	50	75	39,738	29,684	10,054	0.75	9.48	1100	62.5 / 50.7	A/C
75/62.5	50	75	14,834	5,768	9,066	0.39	8.55	1100	70.2 / 58.1	Dehum
75/65.5	60	75	43,191	26,502	16,689	0.61	15.74	1100	53.3 / 52.5	A/C
75/65.5	60	75	17,766	2,871	14,895	0.16	14.05	1100	72.7 / 60.6	Dehum
75/68	70	75	45,834	23,390	22,444	0.51	21.17	1100	55.8 / 55.0	A/C
75/68	70	75	20,248	273	19,975	0.01	18.84	1100	74.8 / 62.8	Dehum
80/67	50	95	38,172	27,724	10,448	0.73	9.86	1100	56.8 / 55.7	A/C
80/67	50	95	4,545	(-1,570)	6,115	-0.35	5.77	1100	81.3 / 65.7	Dehum

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

S43H1D 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	48,763	20,914	27,849	0.43	26.27	1250	49.9 / 49.4	A/C
65/63	90	65	26,525	(-612)	27,137	-0.02	25.60	1250	65.6 / 57.2	Dehum
75/62.5	50	75	44,513	33,094	11,419	0.74	10.77	1250	50.7 / 49.7	A/C
75/62.5	50	75	17,860	7,686	10,174	0.43	9.60	1250	69.3 / 57.7	Dehum
75/65.5	60	75	47,938	29,365	18,573	0.61	17.52	1250	53.5 / 52.6	A/C
75/65.5	60	75	21,664	4,529	17,135	0.21	16.17	1250	71.7 / 60.1	Dehum
75/68	70	75	50,345	25,837	24,508	0.51	23.12	1250	56.0 / 55.2	A/C
75/68	70	75	25,029	1,667	23,362	0.07	22.04	1250	73.8 / 62.2	Dehum
80/67	50	95	42,695	31,302	11,393	0.73	10.75	1250	57.1 / 56.0	A/C
80/67	50	95	8,863	(-255)	9,118	-0.03	8.60	1250	80.2 / 65.0	Dehum

S49H1D 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	52,439	22,196	30,243	0.42	28.53	1400	50.5 / 49.9	A/C
65/63	90	65	27,565	(-1,084)	28,649	-0.04	27.03	1400	65.9 / 56.7	Dehum
75/62.5	50	75	49,881	36,912	12,969	0.74	12.23	1400	50.9 / 49.8	A/C
75/62.5	50	75	19,994	8,311	11,683	0.42	11.02	1400	69.4 / 57.8	Dehum
75/65.5	60	75	52,915	32,538	20,377	0.61	19.22	1400	53.7 / 52.8	A/C
75/65.5	60	75	23,403	4,886	18,517	0.21	17.47	1400	71.8 / 60.3	Dehum
75/68	70	75	55,471	28,618	26,853	0.52	25.33	1400	56.3 / 55.5	A/C
75/68	70	75	26,489	1,861	24,628	0.07	23.23	1400	73.8 / 62.4	Dehum
80/67	50	95	47,735	34,996	12,739	0.73	12.02	1400	57.1 / 55.9	A/C
80/67	50	95	11,634	700	10,934	0.06	10.32	1400	79.5 / 64.5	Dehum

S61H1D 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	65,363	27,927	37,436	0.43	35.32	1450	47.5 / 47.0	A/C
65/63	90	65	35,121	(-1,253)	36,374	-0.04	34.32	1450	65.8 / 55.1	Dehum
75/62.5	50	75	60,382	42,614	17,768	0.71	16.76	1450	48.4 / 47.4	A/C
75/62.5	50	75	25,778	8,723	17,055	0.34	16.09	1450	69.5 / 56.7	Dehum
75/65.5	60	75	64,508	37,887	26,621	0.59	25.11	1450	51.4 / 50.5	A/C
75/65.5	60	75	30,297	5,060	25,237	0.17	23.81	1450	71.9 / 59.1	Dehum
75/68	70	75	67,580	34,029	33,551	0.50	31.65	1450	53.8 / 53.1	A/C
75/68	70	75	33,839	1,563	32,276	0.05	30.45	1450	74.1 / 61.2	Dehum
80/67	50	95	58,720	40,074	18,646	0.68	17.59	1450	55.0 / 53.9	A/C
80/67	50	95	16,900	(-3,099)	16,931	0	15.97	1450	80.0 / 63.6	Dehum

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

TABLE 1
Dehumidification Relay Logic Board

	Inputs to Board									Outputs From Board								
	G	Y	B	W2	E1	A1	D	RAT	L	G1	BK	YO	WV	W	E	A2	TWV	L
Cooling Mode Unoccupied	X	X								X	X	X						
Cooling Mode Occupied	X	X				X				X	X	X				X		
Cooling Mode w/Dehum.	X	X					X			X	X	X						
1st Stage Heating Unoccupied	X	X	X							X	X	X	X					
1st Stage Heating Occupied						X				X	X	X	X			X		
1st Stage Heating w/Dehum.	X	X	X				X			X	X	X		X			X	
2nd Stage Heating Unoccupied	X	X	X	X						X	X	X	X	X				
2nd Stage Heating Occupied	X	X	X	X		X				X	X	X	X	X		X		
2nd Stage Heating w/Dehum.	X	X	X	X			X			X	X	X	X	X				
Emergency Heat Unoccupied				X	X					X	X		X	X	X			
Emergency Heat Occupied				X	X	X				X	X		X	X	X	X		
Emergency Heat w/Dehum.				X	X		X			X		X			X		X	
Dehumidification Unoccupied							X			X		X					X	
Dehumidification Occupied							X	X		X	X	X		X			X	

TABLE 2
Electrical Specifications

MODEL	Rated Volts, HZ & Phase	No. of Field Power Circuits	Single Circuit				Dual Circuit											
			Minimum Circuit Ampacity ①	Maximum External Fuse or Ckt. Brkr. ②	Field Power Wire Size ③	Ground Wire ③	Minimum Circuit Ampacity ①			Maximum External Fuse or Ckt. Breaker ②			Field Power Wire Size ③			Ground Wire Size ③		
							Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C
S26H1DA00, A0Z	230/208-60-1	1	23	30	10	10												
DA04		1	44	50	8	10												
④ DA08		1	47	50	8	10												
S26H1DB00, B0Z	230/208-60-3	1	17	20	12	12												
DB06		1	35	40	8	10												
S26H1DC00, C0Z	460-60-3	1	10	15	14	14												
DC06		1	19	20	12	12												
S31H1DA00, A0Z	230/208-60-1	1	27	35	8	10												
DA04		1	48	50	8	10												
④ DA08		1	48	50	8	10												
S31H1DB00, B0Z	230/208-60-3	1	19	25	10	10												
DB06		1	37	40	8	10												
S31H1DC00, C0Z	460-60-3	1	10	15	14	14												
DC06		1	19	20	12	12												
S38H1DA00, A0Z	230/208-60-1	1	34	45	8	10												
DA05		1	59	60	6	10												
DA08		1 or 2	75	80	4	8	34	42		45	45		8	8		10	10	
DA10		1 or 2	85	90	4	8	34	52		45	60		8	6		10	10	
⑤ DA15		1 or 2	87	90	3	8	35	52		45	60		8	6		10	10	
S38H1DB00, B0Z	230/208-60-3	1	26	35	8	10												
DB06		1	44	50	8	10												
DB09		1	54	60	6	10												
⑥ DB15		1	54	60	6	10												
S38H1DC0Z	460-60-3	1	14	15	14	14												
DC06		1	23	25	10	10												
DC09		1	28	30	10	10												
⑥ DC15		1	28	30	10	10												
S43H1DA00, A0Z	230/208-60-1	1	34	50	8	10												
DA04		1	55	60	6	10												
DA05		1 or 2	60	70	6	8	34	26		50	30		8	10		10	10	
DA08		1 or 2	76	80	4	8	34	42		50	45		8	8		10	10	
DA10		1 or 2	86	90	3	8	34	52		50	60		8	6		10	10	
⑤ DA15		1 or 2	87	90	3	8	35	52		50	60		8	6		10	10	
S43H1DB00, B0Z	230/208-60-3	1	27	35	8	10												
DB06		1	45	50	8	10												
DB09		1	54	60	6	10												
⑥ DB15		1	54	60	6	10												
S43H1DC0Z	460-60-3	1	14	20	12	12												
DC06		1	23	25	10	10												
DC09		1	27	30	10	10												
⑥ DC15		1	28	30	10	10												
S49H1DA00, A0Z	230/208-60-1	1	39	50	8	10												
DA05		1 or 2	65	70	6	8	39	26		50	30		8	10		10	10	
DA08		1 or 2	80	90	4	8	39	42		50	45		8	8		10	10	
DA10		1 or 2	91	100	3	8	39	52		50	60		8	6		10	10	
⑤ DA15		1 or 2	91	100	3	8	39	52		50	60		8	6		10	10	
S49H1DB00, B0Z	230/208-60-3	1	29	40	8	10												
DB06		1	47	50	8	10												
DB09		1	57	60	6	10												
⑥ DB15		1	57	60	6	10												
S49H1DC0Z	460-60-3	1	15	20	12	12												
DC06		1	24	25	10	10												
DC09		1	28	30	10	10												
⑥ DC15		1	28	30	10	10												
S61H1DA00, A0Z	230/208-60-1	1	44	60	8	10												
DA05		1 or 2	70	80	4	8	44	26		60	30		8	10		10	10	
DA10		1 or 2	96	100	3	8	44	52		60	60		8	6		10	10	
DA15		1 or 2	96	100	3	8	44	52		60	60		8	6		10	10	
⑤ DA20		1 or 3	113	125	2	6	44	52	26	60	60	30	6	6	10	10	10	10
S61H1DB00, B0Z	230/208-60-3	1	30	40	8	10												
DB09		1	57	60	6	10												
⑥ DB15		1	57	60	6	10												
S61H1DC0Z	460-60-3	1	16	20	12	12												
DC09		1	30	30	10	10												
⑥ DC15		1	30	30	10	10												

① 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 conductors are in a raceway.

② Maximum size of the time delay fuse or circuit breaker for protection of field wiring conductors.

③ Based on 75°C copper wire. All wiring must conform to the National Electrical Code and all local codes.

④ Maximum KW that can operate with the heat pump on is 4KW.

⑤ Maximum KW that can operate with the heat pump on is 10KW.

⑥ Maximum KW that can operate with the heat pump on is 9KW.

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.*