

Rittling Unit Heater



Installation, Operation and Maintenance

Heating

Cooling

Fresh Air

Clean Air



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IMPORTANT: Submittal documentation, specific to each project, supersedes the general guidelines contained within this manual.

Steam performance data

Table A: High motor speed

Standard conditions of 2 lb steam and 60 °F entering air

Model number	BTU/hr	Sq. ft. EDR	Air data						
			Sound class	Maximum mounting height (ft.)	Heat spread at max. height (ft.)	CFM	Outlet velocity	Leaving air temperature (°F)	Condensate lb/hr
Horizontal air delivery									
RH-18	18,000	75	II	9	17	400	510	102	18
RH-24	24,000	100	II	9	18	450	580	109	25
RH-33	33,000	138	II	10	20	630	510	109	35
RH-47	47,000	196	III	12	25	730	600	120	49
RH-63	63,000	263	III	14	29	1120	605	112	66
RH-86	86,000	358	III	15	31	1340	730	119	89
RH-108	108,000	450	III	15	32	1550	625	125	111
RH-121	121,000	504	III	16	33	1775	715	123	126
RH-165	165,000	688	IV	17	34	2500	750	121	170
RH-193	193,000	804	IV	18	37	2900	870	122	200
RH-258	258,000	1075	V	19	40	3900	920	121	267
RH-290	290,000	1208	V	20	44	4300	1010	122	300
RH-340	340,000	1417	V	20	46	5130	965	121	352
Vertical air delivery									
RV-42	42,000	175	II	11	17	950	779	103	43
RV-59	59,000	246	II	13	20	1150	943	111	61
RV-78	78,000	325	II	14	22	1550	992	110	81
RV-95	95,000	396	II	16	24	1775	1136	113	99
RV-139	139,000	579	III	18	27	2500	1284	116	144
RV-161	161,000	671	III	21	31	2900	1490	115	167
RV-193	193,000	804	IV	23	34	3900	1643	109	200
RV-212	212,000	883	IV	25	37	4300	1812	109	219
RV-247	247,000	1029	IV	26	39	5130	1805	107	256
RV-279	279,000	1163	V	30	45	5800	2040	107	288
RV-333	333,000	1388	V	30	45	6600	1968	110	345
RV-385	385,000	1604	VI	30	45	7860	1930	106	398
RV-500	500,000	2083	VI	37	56	10790	2490	103	518
RV-610	610,000	2542	VI	36	54	12350	2345	106	631

Table B: Reduced motor speed

Standard conditions of 2 lb steam and 60 °F entering air

Model number	BTU/hr	Sq. ft. EDR	Air data						
			Sound class	Maximum mounting height (ft.)	Heat spread at max. height (ft.)	CFM	Outlet velocity	Leaving air temperature (°F)	Condensate lb/hr
Horizontal air delivery									
RH-18	14,800	62	I	9	12	310	395	104	15
RH-24	19,700	82	I	9	13	350	455	112	21
RH-33	27,100	113	I	10	14	490	395	111	29
RH-47	38,500	161	II	12	18	565	465	123	40
RH-63	51,700	216	II	14	21	870	470	115	54
RH-86	70,500	294	II	15	22	1040	570	123	73
RH-108	88,600	369	II	15	23	1240	500	126	91
RH-121	99,200	413	II	16	23	1415	570	125	103
RH-165	135,300	564	III	17	24	1990	600	123	139
RH-193	158,300	659	III	18	26	2310	695	123	164

Notes

- Data for horizontal air delivery units is based upon horizontal louvers open 30°
- Data for vertical air delivery units is based upon no deflectors installed

Hot water performance data

Table C: High motor speed

Standard conditions of 200 °F entering water, 60 °F entering air, and 20 °F water temperature drop

Model number	BTU/hr	Water data			Air data							
		GPM	Pressure drop (ft. of water)	Min./max. GPM	Sound class	Maximum mounting height (ft.)		Heat spread at max. height		CFM	Outlet velocity (FPM)	Leaving air temp. (°F)
Horizontal air delivery												
RH-18	13,000	1.3	0.49	0.2/5.0	II	9		18		400	500	90
RH-24	17,300	1.7	0.83	0.2/5.0	II	10		20		450	570	96
RH-33	24,500	2.5	0.12	0.6/10.0	II	11		22		630	495	96
RH-47	33,800	3.4	0.21	0.6/10.0	III	13		26		730	580	103
RH-63	46,500	4.7	0.47	0.6/15.0	III	15		30		1120	590	98
RH-86	61,900	6.2	0.79	0.6/15.0	III	16		31		1340	710	103
RH-108	81,000	8.1	0.85	0.5/20.0	III	16		33		1550	605	108
RH-121	90,000	9.0	1.04	0.5/20.0	III	17		36		1775	690	107
RH-165	133,000	13.3	2.48	0.5/30.0	IV	18		38		2500	735	109
RH-193	156,000	15.6	3.35	0.5/30.0	IV	19		40		2900	850	110
RH-258	198,000	19.8	3.54	0.6/40.0	V	20		42		3900	895	107
RH-290	224,000	22.4	4.45	0.6/40.0	V	21		46		4300	990	108
RH-340	273,000	27.3	3.24	1.3/50.0	V	22		50		5130	945	109
Vertical air delivery												
RV-42	30,500	3.1	0.09	0.5/10.0	II	11	15	17	11	950	776	91
RV-59	44,300	4.5	0.18	0.5/15.0	II	14	19	21	15	1150	940	97
RV-78	58,500	6.0	0.43	0.5/20.0	II	15	21	23	16	1550	990	96
RV-95	71,000	7.2	0.61	0.5/25.0	II	17	23	25	17	1775	1132	99
RV-139	111,000	11.3	0.84	1.3/30.0	III	18	25	28	19	2500	1281	103
RV-161	128,800	13.1	1.11	1.3/40.0	III	22	30	33	21	2900	1488	103
RV-193	142,700	14.5	0.81	1.5/50.0	IV	24	33	36	24	3900	1640	95
RV-212	159,000	16.1	0.98	1.5/60.0	IV	25	35	37	25	4300	1809	96
RV-247	197,000	19.9	1.65	1.5/60.0	IV	27	36	40	27	5130	1803	97
RV-279	220,000	22.2	2.01	1.5/75.0	V	31	39	47	31	5800	2037	97
RV-333	265,000	26.7	1.27	2.2/75.0	V	30	38	46	30	6600	1966	99
RV-385	308,000	31.1	1.68	2.2/75.0	VI	33	40	49	33	7860	1928	97
RV-500	403,000	40.9	2.32	2.9/100.0	VI	40	48	60	40	10790	2487	94
RV-610	459,000	46.3	2.42	3.4/100.0	VI	39	47	58	40	12350	2343	97

Table D: Reduced motor speed

Standard conditions of 200 °F entering water and 60 °F entering air

Model number	BTU/hr	Water data			Air data					
		GPM	Pressure drop (ft. of water)	Min./max. GPM	Sound class	Maximum mounting height (ft.)	Heat spread at max. height	CFM	Outlet velocity (FPM)	Leaving air temp. (°F)
Horizontal air delivery										
RH-18	10,660	1.3	0.49	0.2/5.0	I	9	13	310	390	92
RH-24	14,186	1.7	0.83	0.2/5.0	I	10	14	350	450	98
RH-33	20,090	2.5	0.12	0.6/10.0	I	11	16	490	390	98
RH-47	27,716	3.4	0.21	0.6/10.0	II	13	18	565	455	105
RH-63	38,130	4.7	0.47	0.6/15.0	II	15	21	870	460	101
RH-86	50,758	6.2	0.79	0.6/15.0	II	16	22	1040	550	105
RH-108	66,420	8.1	0.85	0.5/20.0	II	16	23	1240	485	110
RH-121	73,800	9.0	1.04	0.5/20.0	II	17	26	1415	555	108
RH-165	109,060	13.3	2.48	0.5/30.0	III	18	27	1990	590	111
RH-193	127,920	15.6	3.35	0.5/30.0	III	19	28	2310	680	111

Notes

- Data for horizontal air delivery units is based upon horizontal louvers open 30°
- Data for vertical air delivery units is based upon no deflectors installed

Model identification and power code

- * Explosion proof motors are suitable for Class I, Div. 1 and Div. 2, Group C & D; Class II, Div. 1 and Div. 2, Groups F & G. The explosion proof units may not be used with a fluid temperature in excess of 329 °F and still maintain their explosion proof rating for National Electric Code ignition temperature rating T3B for grain dust. Class I, Group D Motors are for operations in areas containing gasoline, petroleum, naphtha, benzene, butane, propane, alcohol, acetone, lacquer solvent or natural gas. Class II, Group F motors are for operations in areas containing carbon black, coal or coke dust. Class II, Group G motors are for operations in areas containing flour, starch or grain dust. Class III motors are for operations in areas containing easily ignitable fibers and flyings.
- ** Three-phase motors require field supplied motor overload protection to be rated in compliance with the applicable installation code, as specified by the authority having jurisdiction.

Figure A
Model number designation

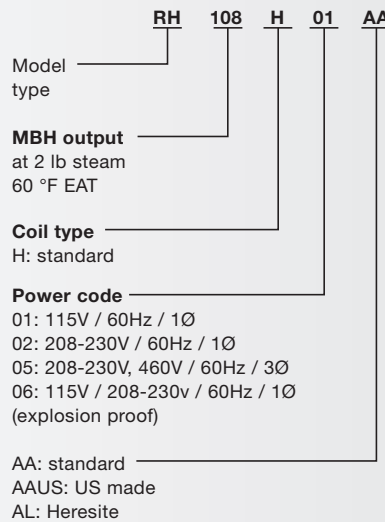


Figure B
Serial number designation

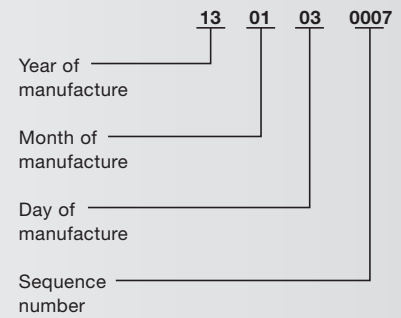


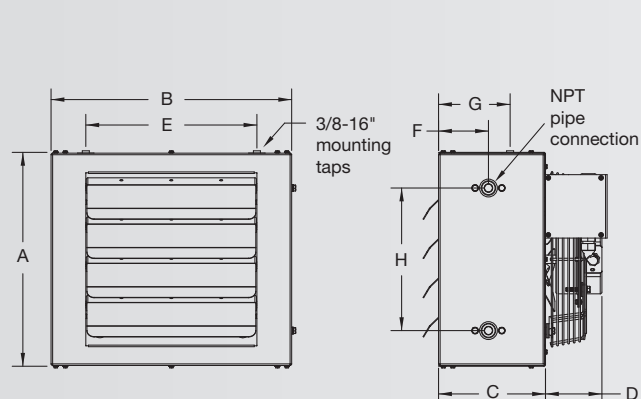
Table E: Motor data

Model number	Voltage, motor type and power code							
	115/60/1 and 208-230/60/1		115/60/1	208-230/60/1	230/460/60/3**		115/208-230/60/1*	
	Motor HP	Approximate RPM	Totally enclosed with thermal overload		Motor HP	Totally enclosed	Explosion proof motor HP	Explosion proof with thermal overload
			01 Amps	02 Amps		05 Amps		06 Amps
RH-18	1/30	1550	0.70	0.22	N/A	N/A	1/4	4.8/2.3-2.4
RH-24	1/30	1550	0.70	0.22	N/A	N/A	1/4	4.8/2.3-2.4
RH-33	1/15	1550	0.72	0.50	N/A	N/A	1/4	4.8/2.3-2.4
RH-47	1/15	1550	0.72	0.50	N/A	N/A	1/4	4.8/2.3-2.4
RH-63	1/10	1550	1.30	0.59	1/3	1.4/0.7	1/4	4.8/2.3-2.4
RH-86	1/10	1550	1.30	0.59	1/3	1.4/0.7	1/4	4.8/2.3-2.4
RH-108	1/8	1075	1.58	0.80	1/2	2.2/1.1	1/4	6.8/3.1-3.4
RH-121	1/8	1075	1.58	0.80	1/2	2.2/1.1	1/4	6.8/3.1-3.4
RH-165	1/4	1075	2.65	1.40	1/2	2.2/1.1	1/4	6.8/3.1-3.4
RH-193	1/4	1075	2.75	1.40	1/2	2.2/1.1	1/4	6.8/3.1-3.4
RH-258	1/3	1075	3.60	2.00	1/2	2.2/1.1	1/3	7.8/3.6-3.9
RH-290	1/2	1075	4.68	2.20	1/2	2.2/1.1	1/2	9.6/4.7-4.8
RH-340	1/2	1075	4.68	2.20	1/2	2.2/1.1	1/2	9.6/4.7-4.8
RV-42	1/10	1550	1.30	0.59	1/3	1.4/0.7	1/4	4.8/2.3-2.4
RV-59	1/10	1550	1.30	0.59	1/3	1.4/0.7	1/4	4.8/2.3-2.4
RV-78	1/6	1550	2.20	1.10	1/3	1.4/0.7	1/4	4.8/2.3-2.4
RV-95	1/6	1550	2.20	1.10	1/3	1.4/0.7	1/4	4.8/2.3-2.4
RV-139	1/4	1075	2.75	1.40	1/2	2.2/1.1	1/3	6.6/3.1-3.3
RV-161	1/4	1075	2.75	1.40	1/2	2.2/1.1	1/3	6.6/3.1-3.3
RV-193	1/2	900	4.68	2.20	1/2	2.2/1.1	1/2	9.6/4.7-4.8
RV-212	1/2	1075	4.68	2.20	1/2	2.2/1.1	1/2	9.6/4.7-4.8
RV-247	5/8	900	5.85	3.40	1	4.2/2.1	1/2	9.6/4.7-4.8
RV-279	5/8	1075	5.85	3.40	1	4.2/2.1	1/2	9.6/4.7-4.8
RV-333	1	1075	8.95	4.50	1	4.2/2.1	-	--
RV-385	1	1140	--	--	1	4.2/2.1	-	--
RV-500	1-1/2	1140	--	--	1-1/2	5.0/2.5	-	--
RV-610	2	1200	--	--	2	6.8/3.4	-	--

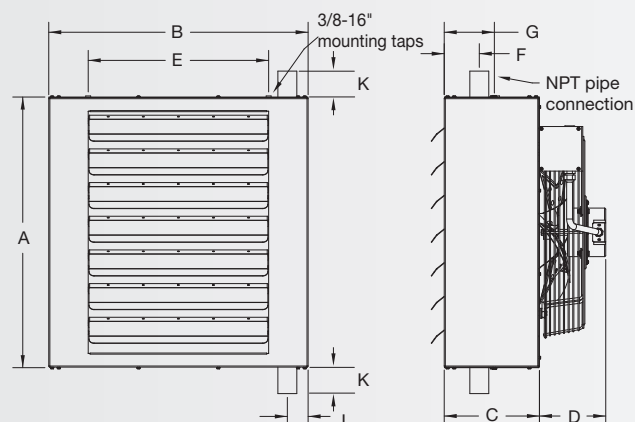
Dimensions and data

RH models

RH-18 through RH-86



RH-108 through RH-340



Dimensional data

Model	A	B	C	D	E	F	G	H	J	K	NPT connections	Fan diameter	Approximate shipping weight (lb)
RH-18	15	16-7/8	7-1/2	4-1/2	12	3-1/2	5	10	-	-	3/4	9	37
RH-24	15	16-7/8	7-1/2	4-1/2	12	3-1/2	5	10	-	-	3/4	9	39
RH-33	19	19-3/4	7-1/2	4-3/4	12	3-1/2	5	14	-	-	3/4	12	48
RH-47	19	19-3/4	7-1/2	4-3/4	12	3-1/2	5	14	-	-	3/4	12	50
RH-63	19	25-3/4	8-1/2	4-3/4	18	3-1/2	5	14	-	-	3/4	14	61
RH-86	19	25-3/4	8-1/2	4-3/4	18	3-1/2	5	14	-	-	3/4	14	63
RH-108	27	25-7/8	9-1/2	6-1/4	18	3-1/2	5-1/4	-	2	3	1-1/2	18	88
RH-121	27	25-7/8	9-1/2	6-1/4	18	3-1/2	5-1/4	-	2	3	1-1/2	18	90
RH-165	27	31-7/8	10	6-1/4	24-7/8	3-1/2	6-1/4	-	2	3	1-1/2	20	110
RH-193	27	31-7/8	10	8-3/8	24-7/8	3-1/2	6-1/4	-	2	3	1-1/2	20	115
RH-258	33	40-13/16	11	8-3/8	32-7/8	3-1/2	6-1/4	-	2-1/4	3	2	22	162
RH-290	33	40-13/16	11	8-3/8	32-7/8	3-1/2	6-1/4	-	2-1/4	3	2	22	164
RH-340	39	40-13/16	12	8-3/8	32-7/8	3-1/2	7-1/4	-	2-1/4	3	2	24	210

Note:

- Dimensions in inches unless otherwise noted

Maximum mounting height

Model	200 °F EWT and 60 °F EAT		2 lb steam and 60 °F EAT	
	Height	Spread	Height	Spread
RH-18	9'	18'	9'	17'
RH-24	10'	20'	9'	18'
RH-33	11'	22'	10'	20'
RH-47	13'	26'	12'	25'
RH-63	15'	30'	14'	29'
RH-86	16'	31'	15'	31'
RH-108	16'	33'	15'	32'
RH-121	17'	36'	16'	33'
RH-165	18'	38'	17'	34'
RH-193	19'	40'	18'	37'
RH-258	20'	42'	19'	40'
RH-290	21'	46'	20'	44'
RH-340	22'	50'	20'	46'

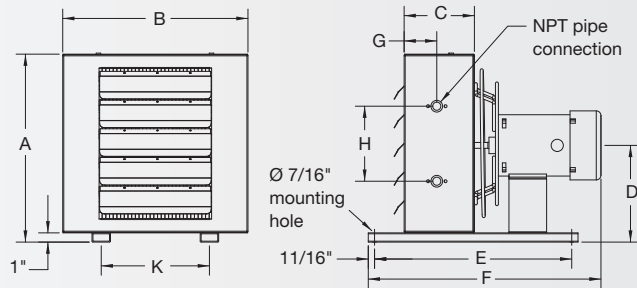
Notes:

- All dimensions in inches
- RH-18 through RH-86 have side female NPT pipe connections
- RH-108 through RH-340 have top and bottom male NPT pipe connections
- Units should be mounted a minimum of 5" from wall

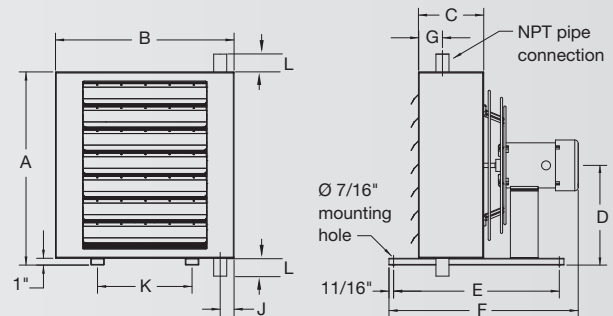
Dimensions and data

RH models with explosion proof motor

RH-18 through RH-86



RH-108 through RH-340



Dimensional data

Model	A	B	C	D	E	F	G	H	J	K	L	NPT connections	Fan diameter	Approximate shipping weight (lb)
RH-18	16	16-7/8	7-1/2	8-1/2	21-1/2	24-7/8	3-1/2	10	—	13-1/8	—	3/4	9	64
RH-24	16	16-7/8	7-1/2	8-1/2	21-1/2	24-7/8	3-1/2	10	—	13-1/8	—	3/4	9	66
RH-33	20	19-3/4	7-1/2	10-1/2	21-1/2	24-7/8	3-1/2	14	—	11-7/8	—	3/4	12	75
RH-47	20	19-3/4	7-1/2	10-1/2	21-1/2	24-7/8	3-1/2	14	—	11-7/8	—	3/4	12	77
RH-63	20	25-3/4	8-1/2	10-1/2	22-11/16	25-3/4	3-1/2	14	—	15-7/16	—	3/4	14	88
RH-86	20	25-3/4	8-1/2	10-1/2	22-11/16	25-3/4	3-1/2	14	—	15-7/16	—	3/4	14	90
RH-108	28	25-7/8	9-1/2	14-1/2	23-7/16	27-7/16	3-1/2	—	2	14	3	1-1/2	18	118
RH-121	28	25-7/8	9-1/2	14-1/2	23-7/16	27-7/16	3-1/2	—	2	14	3	1-1/2	18	120
RH-165	28	31-7/8	10	14-1/2	24-5/8	28-7/16	3-1/2	—	2	20-1/16	3	1-1/2	20	140
RH-193	28	31-7/8	10	14-1/2	24-5/8	28-7/16	3-1/2	—	2	20-1/16	3	1-1/2	20	145
RH-258	34	40-13/16	11	17-1/2	26-5/8	29-11/16	3-1/2	—	2-1/4	23-9/16	3	2	22	195
RH-290	34	40-13/16	11	17-1/2	26-5/8	29-11/16	3-1/2	—	2-1/4	23-9/16	3	2	22	205
RH-340	40	40-13/16	12	20-1/2	28-3/16	31-3/16	3-1/2	—	2-1/4	27	3	2	24	251

Note:

- Dimensions in inches unless otherwise noted

Maximum mounting height

Model	200 °F EWT and 60 °F EAT		2 lb steam and 60 °F EAT	
	Height	Spread	Height	Spread
RH-18	9'	18'	9'	17'
RH-24	10'	20'	9'	18'
RH-33	11'	22'	10'	20'
RH-47	13'	26'	12'	25'
RH-63	15'	30'	14'	29'
RH-86	16'	31'	15'	31'
RH-108	16'	33'	15'	32'
RH-121	17'	36'	16'	33'
RH-165	18'	38'	17'	34'
RH-193	19'	40'	18'	37'
RH-258	20'	42'	19'	40'
RH-290	21'	46'	20'	44'
RH-340	22'	50'	20'	46'

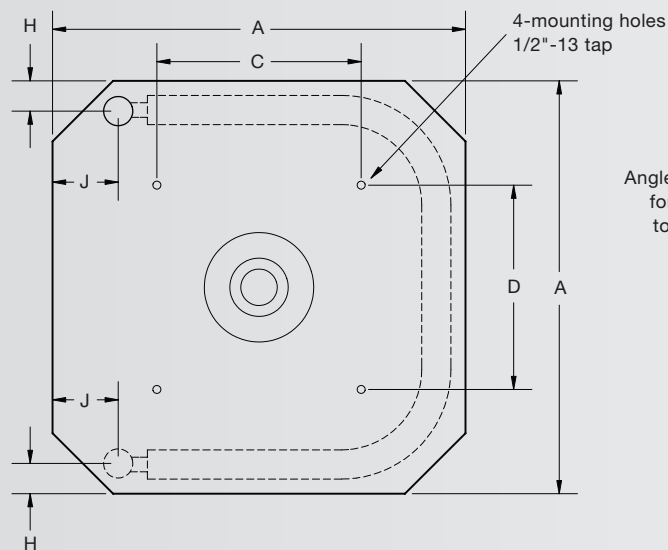
Notes:

- All dimensions in inches
- RH-18 through RH-86 have side female NPT pipe connections
- RH-108 through RH-340 have top and bottom male NPT pipe connections
- Units should be mounted a minimum of 5" from wall

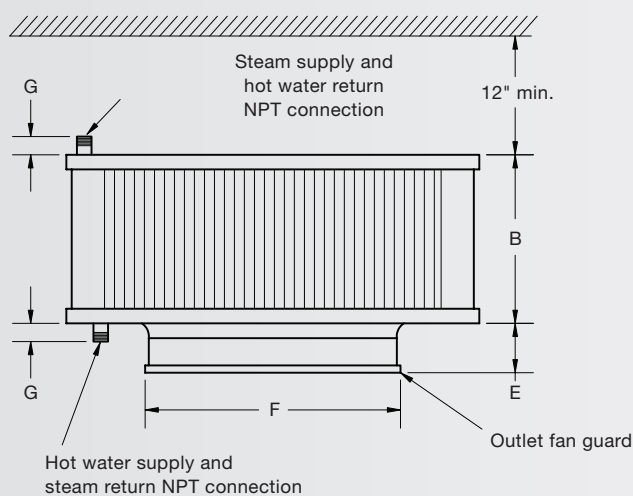
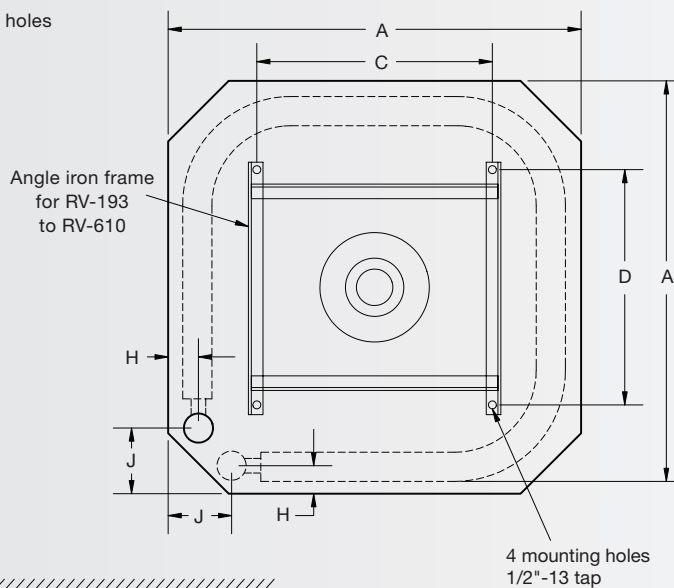
Dimensions and data

Model RV

RV-42, RV-59



RV-78 through RV-610



Dimensional data

Model	A	B	C	D	E	F	G	H	J	Male NPT connections	Fan diameter	Approx. shipping weight lb
RV-42/RV-59	23	6-3/8	12	12	3-1/8	15	2-3/4	1-7/8	3-1/4	1-1/2	13-3/4	65
RV-78/RV-95	25	6-3/8	13	13	3-1/8	17	2-3/4	1-7/8	3-1/4	1-1/2	15-3/4	76
RV-139/RV-161	25	10-3/8	14-7/16	14-7/16	3-1/8	18-7/8	2-3/4	2	3-1/4	1-1/2	17-3/4	118
RV-193/RV-212	30	12-3/8	19	17	4	20-7/8	2-3/4	2	3-5/8	2	19-3/4	157
RV-247/RV-279	35	12-3/8	20	18	4	22-7/8	2-3/4	2	3-5/8	2	21-3/4	185
RV-333/RV-385	35	18-3/8	21	21	4	24-3/4	2-3/4	2-1/2	4-1/2	2-1/2	23-3/4	220
RV-500	43	18-3/8	14	14	4	28-3/4	2-3/4	2-1/2	4-1/2	2-1/2	27-3/4	285
RV-610	43	18-3/8	14	14	4	30-3/4	2-3/4	2-1/2	4-1/2	2-1/2	29-3/4	331

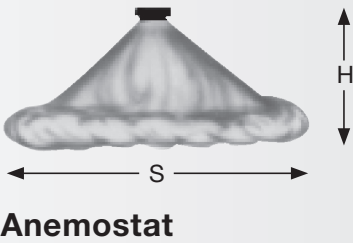
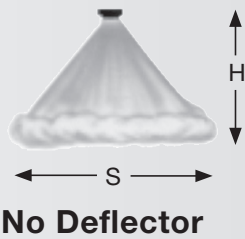
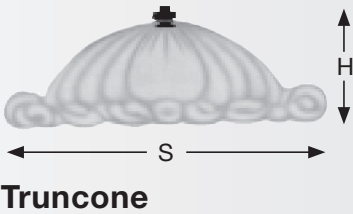
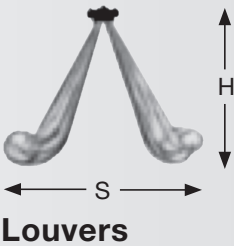
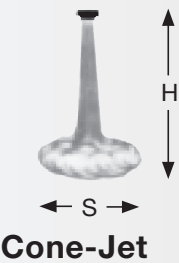
Notes:

- All dimensions in inches
- RH-18 through RH-86 have side female NPT pipe connections
- RH-108 through RH-340 have top and bottom male NPT pipe connections
- Units should be mounted a minimum of 5" from wall

Options

Field installed options for vertical models

Option	Description
Cone-jet	The cone-jet allows the unit's discharged air to be adjusted from a direct high velocity stream to a broadened stream that can cover a larger area
Truncone	The truncone allows for a broad air stream covering a larger area than possible with a cone-jet
One-way louver	The one-way louver allows for a one directional discharge of air
Two-way louver	The two-way louver allows for a bi-directional discharge of air
3-cone anemostat	The 3-cone anemostat allows for an even air stream covering a larger area than possible with the truncone
4-cone anemostat	The 4-cone anemostat allows for an even air stream covering a larger area than possible with the 3-cone anemostat



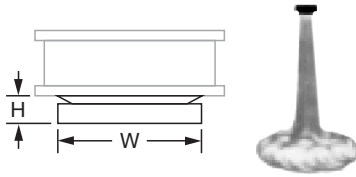
Vertical air outlet accessories

No deflector



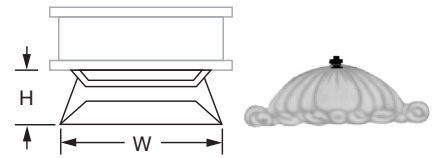
Model number	Mounting maximums	
	Height	Spread
RV-42	11'	17'
RV-59	13'	20'
RV-78	14'	22'
RV-95	16'	24'
RV-139	18'	27'
RV-161	21'	31'
RV-193	23'	34'
RV-212	25'	37'
RV-247	26'	39'
RV-279	30'	45'
RV-333	30'	45'
RV-385	30'	45'
RV-500	37'	56'
RV-610	36'	54'

Cone jet



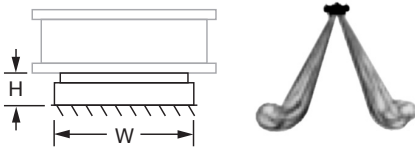
Model number	Accessory dimensions		Mounting maximums	
	Height	Width	Height	Spread
RV-42	6-1/2"	16-1/2"	15'	11'
RV-59			18'	13'
RV-78			19'	14'
RV-95	6-1/2"	18-1/2"	21'	16'
RV-139			24'	18'
RV-161			28'	21'
RV-193	8"	20-1/2"	31'	23'
RV-212			33'	25'
RV-247			34'	26'
RV-279	9"	24-1/2"	37'	30'
RV-333			37'	30'
RV-385			36'	30'
RV-500	10"	30-1/2"	44'	37'
RV-610			43'	36'

Truncone



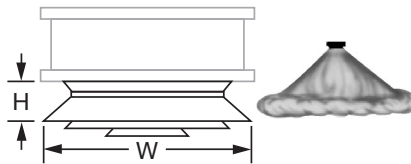
Model number	Accessory dimensions		Mounting maximums	
	Height	Width	Height	Spread
RV-42	10"	25"	8'	19'
RV-59			9'	25'
RV-78			11'	26'
RV-95	10"	25"	11'	26'
RV-139			13'	32'
RV-161			14'	35'
RV-193	12"	29"	16'	39'
RV-212			16'	39'
RV-247			17'	46'
RV-279	14"	33"	18'	53'
RV-333			17'	53'
RV-385			17'	53'
RV-500	18"	37"	19'	65'
RV-610	18"	39"	19'	63'

Louvers



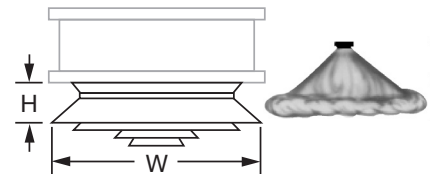
Model number	Accessory dimensions		Mounting maximums	
	Height	Width	Height	Spread
RV-42	6-1/2"	16-1/2"	13'	11'
RV-59			16'	14'
RV-78			17'	15'
RV-95	6-1/2"	18-1/2"	17'	15'
RV-139			21'	18'
RV-161			23'	20'
RV-193	8"	22-1/2"	25'	22'
RV-212			25'	22'
RV-247			30'	26'
RV-279	9"	24-1/2"	35'	30'
RV-333			35'	30'
RV-385			35'	30'
RV-500	10"	30-1/2"	42'	37'
RV-610			41'	41'

3-cone anemostat



Model number	Accessory dimensions		Mounting maximums	
	Height	Width	Height	Spread
RV-42	G/2"	22-1/2"	8'	22'
RV-59			9'	28'
RV-78			11'	30'
RV-95	G/2"	24-1/2"	11'	30'
RV-139			13'	36'
RV-161			14'	40'
RV-193	14"	28-1/2"	16'	44'
RV-212			16'	44'
RV-247			17'	52'
RV-279	15"	30-1/2"	18'	60'
RV-333			17'	60'
RV-385			17'	60'
RV-500	16"	36-1/2"	19'	74'
RV-610	16"	38-1/2"	—	—

4-cone anemostat



Model number	Accessory dimensions		Mounting maximums	
	Height	Width	Height	Spread
RV-42	14"	25"	8'	28'
RV-59			8'	35'
RV-78			8'	30'
RV-95	14"	27"	8'	30'
RV-139			9'	45'
RV-161			10'	50'
RV-193	1/2"	31"	12'	55'
RV-212			12'	55'
RV-247			13'	65'
RV-279	16-1/2"	33"	13'	75'
RV-333			13'	75'
RV-385			13'	75'
RV-500	1A/2"	39"	13'	93'
RV-610	1A/2"	41"	—	—

Notes:

- Data shown for standard 2lb steam and 60 °F EWT conditions. For louvers or cone jet, data shown for deflectors in fully-opened position.
- For mounting height and spread for hot water, multiply the value above by 1.06 to approximate the mounting height and spread at 200 °F EWT.
- For entering water temperature other than 200 °F, multiply the value above by 1.06 and then multiply by the correction factor in Table L.

General information

This installation and start-up instructions literature is for horizontal and vertical steam/hot water Unit Heaters. Unit Heaters are hydronic terminal units designed for year-round heating. Your equipment is initially protected under the Zehnder Rittling standard 2-year warranty provided the steps outlined in this manual for initial inspection, installation, periodic maintenance and normal every day operation of the equipment are followed. This manual should be thoroughly reviewed prior to the installation, start-up or maintenance of the equipment. If any questions arise, please contact your local Zehnder Rittling sales representative or the factory before proceeding any further.

The copper coils are warranted for operation at steam up to 150 psig or hot water pressures up to 220 psig, and/or temperatures up to 375 °F. National Electric Code (NEC) or Canadian Electric Code (CEC) ignition temperature rating T3B for grain dust.

There are a multitude of options and accessories available with the equipment covered in this manual. For more specific details on the included options and accessories, refer to the order acknowledgment, approved submittals and catalogs.

⚠ DANGER

Do not remove outlet fan guard from Model RV units.

Receiving

Upon delivery, examine the shipment against the bill of lading to make sure all of the units have been received and then check each unit carefully for shipping damage. Any damage should be reported to the freight carrier and a claim should be filed with them. Ensure the shipping company makes proper notation of any shortages or damage on all copies of the freight bill. Concealed damage not discovered during unloading must be reported to the shipping company within 15 days of receipt of the shipment.

All units are shipped F.O.B. factory. Therefore, Zehnder Rittling is not responsible for damage during transit. It is the responsibility of the installing contractor to inspect and verify that the units shipped were in fact the correct model number, voltage, etc. Any discrepancies should be reported to the local Sales Representative for immediate resolution prior to unpackaging and installation. The factory should be notified of any warranty repairs required in writing before any corrective

action is taken. The factory must be fully informed of the expected costs before the work is begun. Zehnder Rittling is not responsible for any repairs or alterations made by the purchaser without Zehnder Rittling's written consent and will not accept any back charges associated with these repairs or alterations. The return of damaged equipment will not be accepted without written authorization from Zehnder Rittling.

A unit that has received a written Return Goods Authorization will be inspected by Zehnder Rittling upon receipt. Any damage, missing parts, reworking or repackaging resulting from prior installation will constitute just cause for Zehnder Rittling to issue partial credit.

Several components are shipped loose for field installation and to offer added protection during shipment and job site storage. These items may include; thermostat, aquastat, disconnect, vertical air outlet accessories, etc.

Safety considerations

The installation of Unit Heaters and all associated components, parts and accessories which make up the installation, shall be in accordance with the regulations of all authorities having jurisdiction and must conform to all applicable codes. Only trained and qualified service personnel using good judgment and safe practices should install, repair and/or service air conditioning equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in the literature, tags and labels attached to the equipment and all other safety precautions that may apply.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other hazardous conditions which may cause serious personal injury and/or property damage. Consult a qualified installer, service agency, or your sales representative for information or assistance.

The equipment must always be properly supported by rigging and lifting equipment. Any temporary supports used during installation or maintenance must be designed to adequately hold the equipment in place until equipment is permanently fastened and set in its final location. All supports must meet applicable local codes and ordinances.

All fastening devices must be designed to mechanically hold the assembly in place without the ability to loosen or break away due to system operation or vibration.

All power must be disconnected and locked out before any installation or service is performed to avoid electrocution or shock. More than one power source may be supplied to a unit. Power to remote mounted units may not be supplied through the unit.

Never use bulky or loose fitting clothing when working on any mechanical equipment. Gloves should always be worn for protection against heat, sharp edges and all other possible hazards. Safety glasses should always be worn, especially when drilling, cutting or working with chemicals.

Never pressurize equipment beyond specified pressures as shown on unit rating plate. Always pressure test with an inert fluid such as water or dry nitrogen to avoid possible damage or injury in the event of a leak or component failure during testing.

Always protect adjacent flammable material when welding or soldering. Use a suitable heat shield material to contain sparks or drops of solder. Have a fire extinguisher readily available. Please follow standard safe practices regarding the handling, installing or servicing of mechanical equipment.

Read these instructions thoroughly and follow all warnings or cautions attached to the equipment. Consult local building codes and the National Electrical Code(NEC) for special installation requirements.

Understand the signal words: danger, warning and caution.

⚠ DANGER

Identifies the most serious hazards which will result in severe personal injury or death.

⚠ WARNING

Signifies hazards that could result in personal injury or death.

⚠ CAUTION

Used to identify unsafe practices, which would result in minor personal injury or product and property damage.

The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service or operation of the equipment. The installation of Unit Heaters and all associated components, parts and accessories shall be in accordance with the regulations of all authorities having jurisdiction and must conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with all applicable codes and regulations.

Unpacking and preparation

All units are carefully inspected at the factory throughout the entire fabrication and assembly processes under Zehnder Rittling's stringent quality assurance program. All major components and subassemblies such as motor, fan, coil, controls and paint quality are carefully tested for proper operation, visually inspected and verified for full compliance with factory standards.

Each unit is carefully packaged in a polyethylene plastic bag for surface protection, placed in a cardboard container with polystyrene foam for shipment to avoid damage during normal handling in the shipment process. It is the sole responsibility of the customer to provide the protection necessary to prevent vandalism and weather deterioration of the equipment. Under no condition should the units be left unprotected from the elements. If the equipment is not needed immediately at the job site, it should be left in its shipping carton and stored in a clean, dry area of the building or in a warehouse. Do not remove any equipment from its shipping package until it is needed for installation. The equipment is NOT suitable for outdoor installations.

After determining the condition of the cardboard container exterior, carefully remove each unit from the container and inspect for hidden damage. At this time, check that all shipped loose items such as wall mounted thermostats, aquastats, etc., are accounted for and placed in a safe area. Any hidden damage should be recorded and immediately reported to

the carrier and a claim should be filed. In the event a claim for shipping damage is filed, the unit, cardboard container, and all packing must be kept for physical inspection by the freight carrier.

Once the equipment is properly positioned on the job site, cover the units with either a shipping carton, vinyl film, or an equivalent protective covering. Cap open ends of piping that is stored on a job site. Take special care to prevent foreign materials from entering the units in areas where painting, dry walling, or spraying of fireproof material, etc., has not yet been completed as these materials may accumulate on the motor and fan blades. Foreign material that accumulates within the units can prevent proper start-up, necessitate costly clean-up operations, or result in immediate or premature component failure. Before installing any of the system components, be sure to examine each pipe, fitting and valve, and remove any dirt or foreign material found in or on these components. All manufacturer's warranties are void if foreign material is allowed to be deposited on the motor or fan blades of any unit. Some job conditions may require some form of temporary unit covering during construction.

⚠ CAUTION

DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes (e.g., attics, garages, rooftops, etc.). Corrosive conditions and high temperature or humidity can significantly reduce system performance, reliability and overall service life.

Handling and installation

While all equipment is designed for durability and fabricated with heavy gauge materials and may present a robust appearance, great care must be taken to assure that no undue force is applied to the coil, piping, or other delicate components such as control boards during handling. Gloves should be worn when handling finished, painted units and should never be set down on unclean, hard surfaces. Failure to follow these instructions may lead to scratching or gouging of the finished surface.

Although Zehnder Rittling does not become involved with the design and selection of support methods and/or components, it should be recognized that unacceptable operating characteristics and/or performance may result from poorly implemented unit support. Additionally, proper clearance must be provided for service and removal of the equipment.

Anchoring the equipment in place is accomplished by using the mounting points provided, and positioning the unit on a LEVEL plane.

Unit suspension

Horizontal delivery units, Model RH series

All horizontal delivery units have two tapped holes (3/8"-16) in the top for unit suspension. Piping support hangers or clamps are recommended and should be placed as close to the Unit Heater as possible. For other models, independent suspension can be made with threaded rods, pipes, or ceiling hanger brackets.

Vertical delivery units, Model RV series

Models RV-42 through RV-161 have 4 tapped holes (1/2"-13) on the top surface for unit suspension. Suspension can be made with threaded rods, pipes, or ceiling hanger brackets. Models RV-193 through RV-610 have angle-iron frame mounting brackets for heavy-duty installation with applicable hardware.

Rubber-in-shear or spring vibration isolators, supplied by others, can be used for proper suspension and vibration isolation.

The type of mounting device is a matter of choice, however the mounting point should always be that provided in the cabinet.

⚠ WARNING

Improper mounting could result in the unit falling from its position, causing personal injury or even death.

Mounting height

Do not install unit above recommended maximum mounting heights or below the minimum height of eight feet. The height at which Unit Heaters are installed is critical. Maximum mounting heights for all units are listed below. Maximum mounting heights for Model RV is given for units with or without air diffusion accessories. Locate horizontal delivery Unit Heaters so air streams of individual units wipe the exposed walls of the building with either parallel or angular flow without blowing directly against the walls. Heaters should be spaced so the air stream from one supports the air stream from another heater. Locate vertical delivery Unit Heaters in the center area of the space to be heated, using horizontal delivery Unit

Heaters along the walls where heat loss is usually greatest.

After mounting the unit, it is then ready for the various service connections such as water and electrical. At this time it should be verified that the proper types of services are actually provided to the unit. On those units requiring hot water, the proper line size and water temperature should be available to the unit.

On units with steam heating coils, the proper line sizing and routing should be verified. The maximum steam pressure should never exceed 150 psig. The drain piping and steam trap, supplied by others, should be sized and routed to allow for proper condensate flow.

The electrical service to the unit should be compared to the unit nameplate to verify compatibility. The routing and sizing of all piping, and the type and sizing of all wiring and other electrical components such as circuit breakers, disconnect switches, etc., should be determined by the individual job requirements and should not be based on the size and/or type of connection(s) provided on the equipment. Verify the electrical conductor size is suitable for the distance to the equipment connection and will support the equipment electrical load. All installations should be made in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

Handling and installation

Special precautions

- Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage. All units must be wired strictly in accordance with wiring diagram furnished with unit.
- Units should not be installed in atmospheres where corrosive fumes or sprays are present.
- Units with power codes 01, 02 or 05 must not be installed in potentially explosive or flammable atmospheres.
- Be sure no obstructions block air intake or air discharge of Unit Heater.
- Do not install unit above recommended maximum mounting heights or below the minimum height of eight feet.

Exposed unit touch-up and repainting

All units will be furnished with an epoxy powder coated paint finish. Small scratches in the finish may be repaired with touch-up spray paint available from the factory.

⚠ CAUTION

Proper safety procedures should be followed regarding ventilation and personal safety equipment when using spray paint. Follow the manufacturer's directions for the products being used.

To repaint the factory powder coat finish, prepare the surface by lightly sanding with #280 grit sand paper or #000 or #0000 fine steel wool. The surface may also be wiped with a liquid surface etch cleaning product. These items should be available at most paint product stores. It should be noted that the more care taken during this process, the more effective it will be.

After this preparation is finished, the factory finish should provide excellent adhesion for a variety of air dried top coats. Enamel will give a more durable, higher gloss finish, while latex will not adhere as well and will give a dull, softer finish. Top coats involving an exothermic chemical process between two components such as epoxies and urethanes should be avoided.

All standard colors including primer can be painted over. If the installing contractor chooses not to paint over the primer color, the factory cannot match primer color on future orders, potentially causing color match issues in the field.

Factory touch-up spray paint may require a number of light coats to isolate the factory finish from the quick drying touch-up paint.

Hot water connections

Submittals and product literature detailing unit operation, controls and connections should be thoroughly reviewed before beginning the connection of the heating medium to the unit.

Piping installation Horizontal and Vertical Unit Heaters

Refer to the ASHRAE Guide and Specialty Manufacturer for selection of filter, piping traps and other specialty sizing. Piping is typical for Unit Heaters.

After the connections are completed, the system should be tested for leaks. Since some components are not designed to hold pressure with a gas, hydronic

systems should be tested with water. Test pressure must not exceed 250 psig. Pressure testing should be completed prior to sheet rocking, finished floors, painting, caulking, etc.

⚠ CAUTION

All water coils must be protected from freezing after initial filling with water. Even if the system is drained, unit coils may still hold enough water to cause damage when exposed to temperatures below freezing.

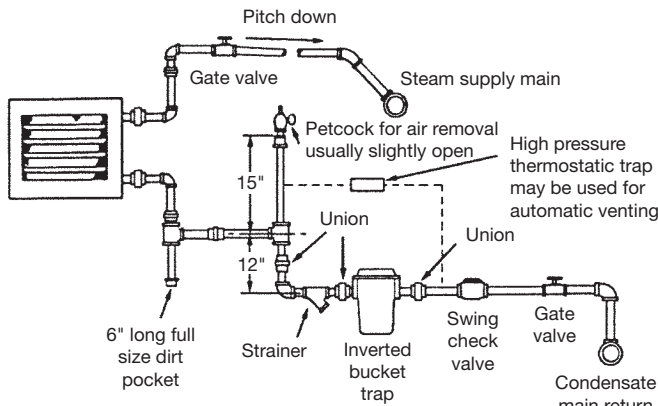
In the event that leaking or defective components are discovered, the Zehnder Rittling Sales Representative must be notified before any repairs are attempted. All leaks should be repaired before proceeding with the installation.

After system integrity has been established, it is recommended that the piping be insulated in accordance with the project specifications. This is the responsibility of the installing or the insulation contractor. Zehnder Rittling will not accept any charges associated with re-insulating piping if the installing contractor failed to establish system integrity prior to insulating.

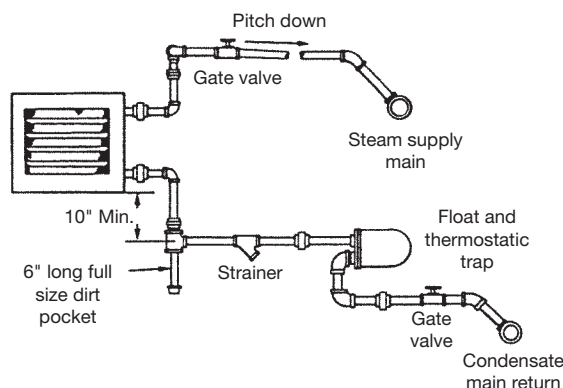
⚠ CAUTION

Only make piping connections using two pipe wrenches. One wrench is used as a "back-up" while the other wrench is used for applying force necessary to tighten the fitting.

Steam systems

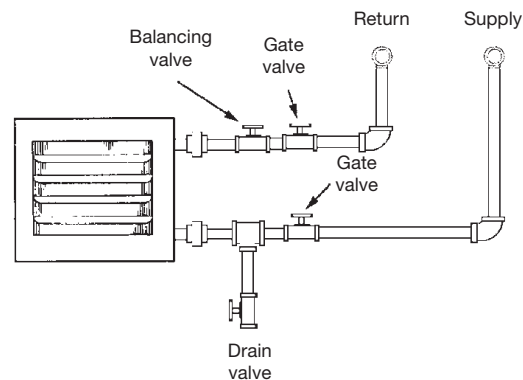


Unit Heater connection for high pressure steam

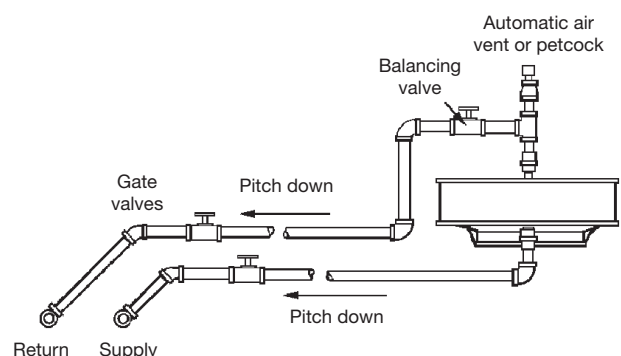


Unit Heater connection for low pressure steam:
Open gravity or vacuum return system

Hot water systems



Horizontal Unit Heater connected to overhead hot water mains



Vertical Unit Heater connected to lower hot water mains

Electrical connections

The unit serial tag lists the unit electrical characteristics such as the required supply voltage, motor amperage and required circuit ampacities. The unit wiring diagram shows all unit and field wiring. The installer must be familiar with the wiring diagram before beginning any wiring as the wiring can change from project to project.

⚠ WARNING

Electrical shock can cause personal injury or death. When installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Thermostat “OFF” should not be used for disconnect purposes.

All field wiring connecting to this type of unit must be by 105 °F rated copper conductor and should be in accordance with the National Electrical Code and any applicable local codes. Branch circuit fusing and electrical disconnect means, if required, must be furnished and installed by others. All unit-mounted control components are factory wired to the junction control box. Remote-mounted control components are shipped loose for field installation and wiring and are to be wired in strict accordance with the wiring diagram. Failure to do so could result in personal injury or damage to components and will void the manufacturer warranty.

Wiring instructions

Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage. All units must be wired strictly in accordance with wiring diagram.

All wiring must be done in accordance with the National Electric Code and applicable local codes. In Canada, wiring must confirm to the Canadian Electric Code. It is recommended that all wiring be adequately grounded.

Electric wiring must be sized to carry the full load amp draw of the motor, starter and any controls that are used with the Unit Heater. All units with power code 05 (polyphase motors) must be provided with suitable overcurrent protection in circuit supplying heater at installation. Overcurrent protectors should be sized based on motor current rating shown on the unit serial plate, and applicable National Electric Code procedures.

All units should be installed with an electrical junction box. Junction boxes are either integral to the motor or to be attached to the unit casing. Units with explosion-proof motors have an explosion-proof junction box attached to the motors. Any damage to or failure of Zehnder Rittling units caused by incorrect wiring of the units is not covered by Zehnder Rittling’s standard warranty.

Overload protection

A change in line voltage higher or lower than motor nameplate rating may cause overheating and serious motor damage. Check plant voltage conditions. A separate manual starter with thermal overload protection device is recommended for those units that do not have motors with built in overload protection.

All wiring connections should be checked prior to start-up to ensure connections have not come loose during shipment or installation, minimizing problems during start-up.

The fan motor should never be controlled by any wiring or device

other than the factory supplied switch or thermostat/switch combination without factory authorization.

Consult the factory wiring diagram when installing an aquastat. The switch should always be installed upstream of the control valve on a pipe that will have constant flow regardless of the control valve position, allowing a true water temperature reading at all times. A bleed bypass may be required to guarantee proper aquastat operation.

The applicable wiring diagram ships with each unit and must be strictly followed.

All field wiring should be done in accordance with governing codes and ordinances. Any modification of the unit wiring without factory authorization will void the warranty and nullify any agency listings.

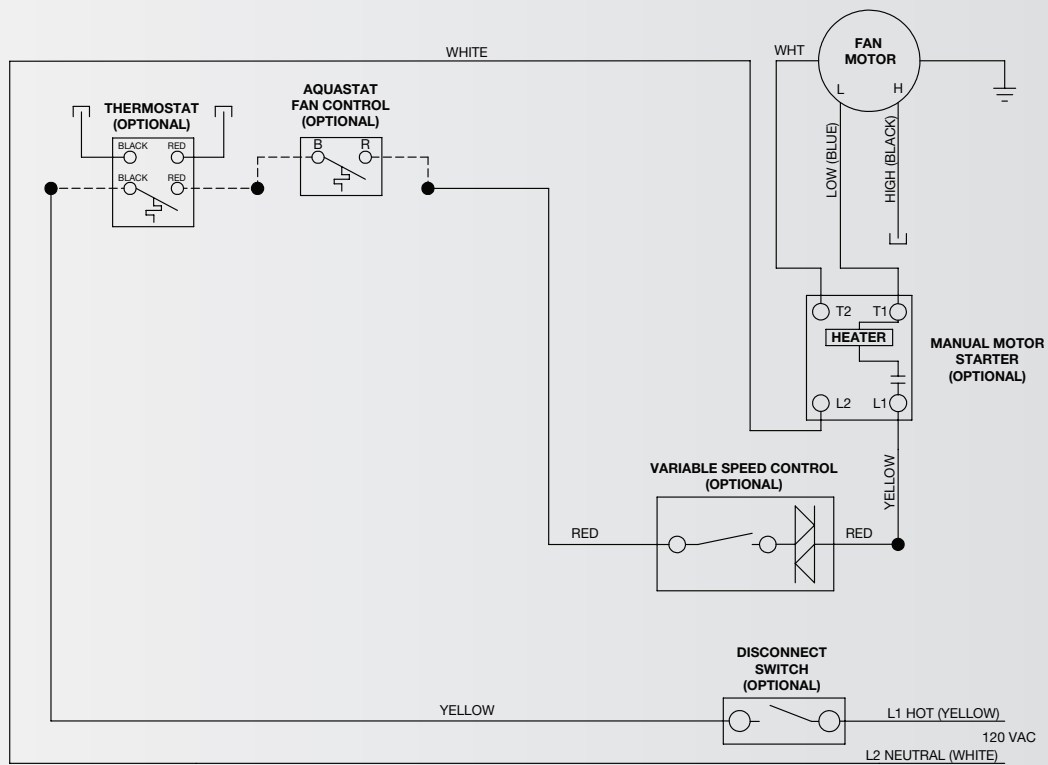
Zehnder Rittling assumes no responsibility for any damages and/or injuries from improper field installation and/or wiring.

Installer’s responsibility

Installer please note: This equipment has been test fired and inspected. It has been shipped free from defects from our factory. However, during shipment and installation problems such as loose wires, leaks or loose fasteners may occur. It is the Installer’s responsibility to inspect and correct any problems that may be found.

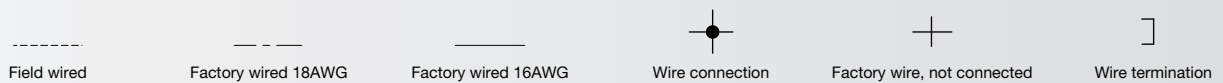
Wiring schematic

120V



NOTES:

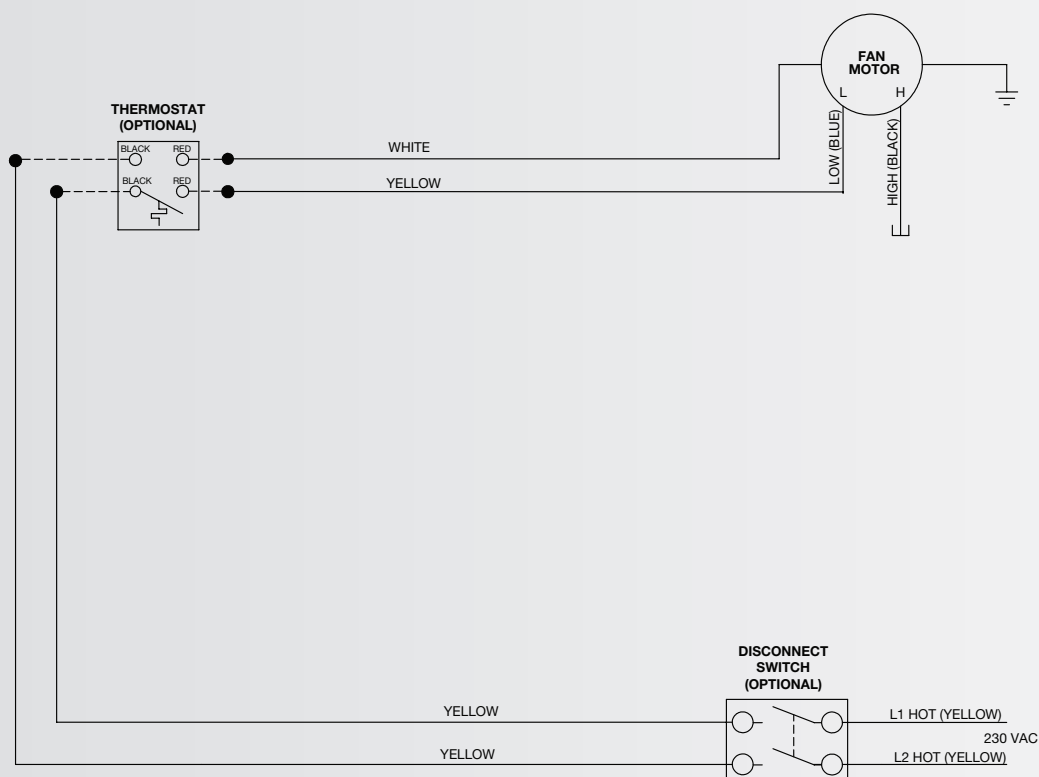
- COMPLETE THE WIRING IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.
- WIRING DIAGRAM IS FOR TYPICAL APPLICATION. IF OTHER CONTROLS ARE SPECIFIED WIRING MAY DIFFER FROM WHAT IS SHOWN.



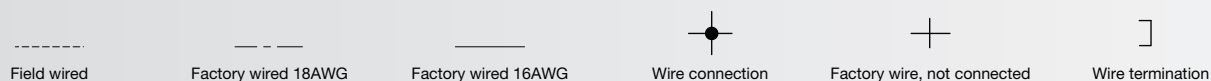
CAUTION: Not following proper wiring procedure can cause injury or death

Wiring schematic

208-230V



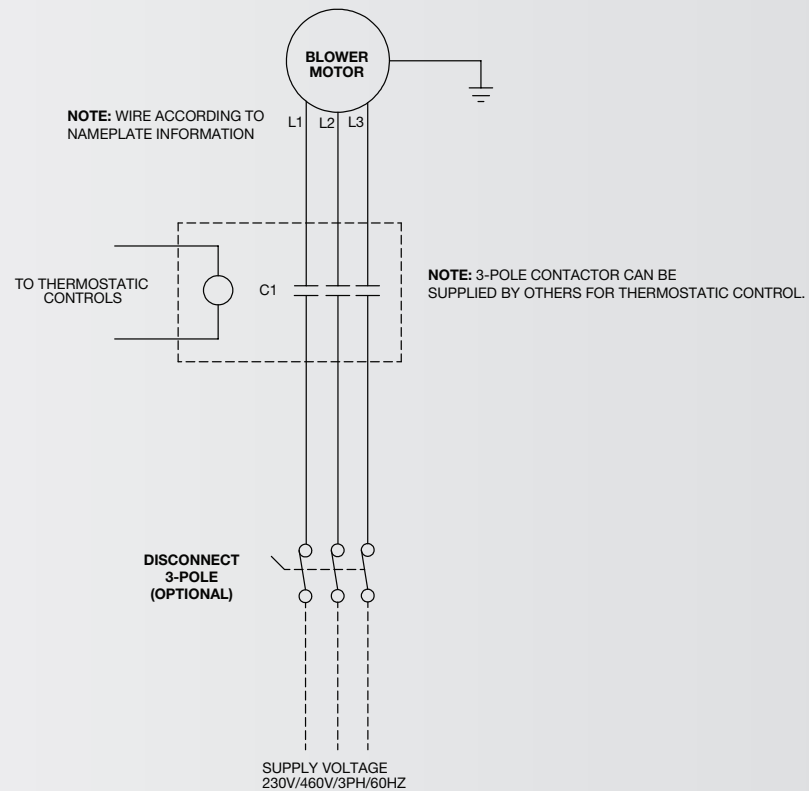
- NOTES:**
- COMPLETE THE WIRING IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.
 - WIRING DIAGRAM IS FOR TYPICAL APPLICATION. IF OTHER CONTROLS ARE SPECIFIED WIRING MAY DIFFER FROM WHAT IS SHOWN.



CAUTION: Not following proper wiring procedure can cause injury or death

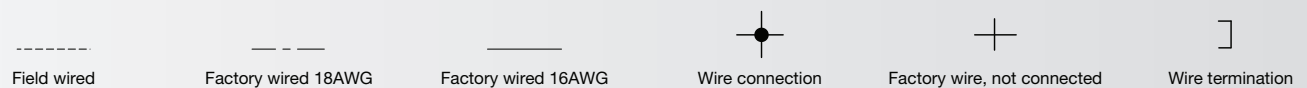
Wiring schematic

230V/460V/3Ph



NOTES:

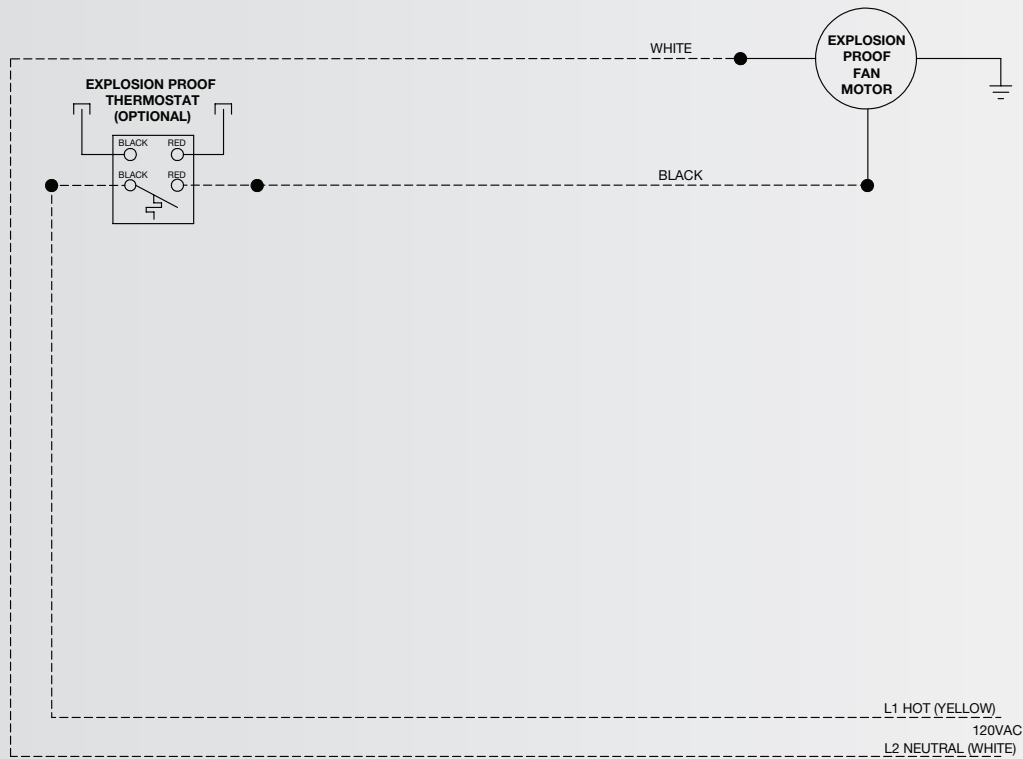
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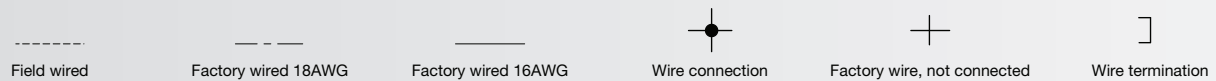
Wiring schematic

Explosion proof motor, 120V



NOTES:

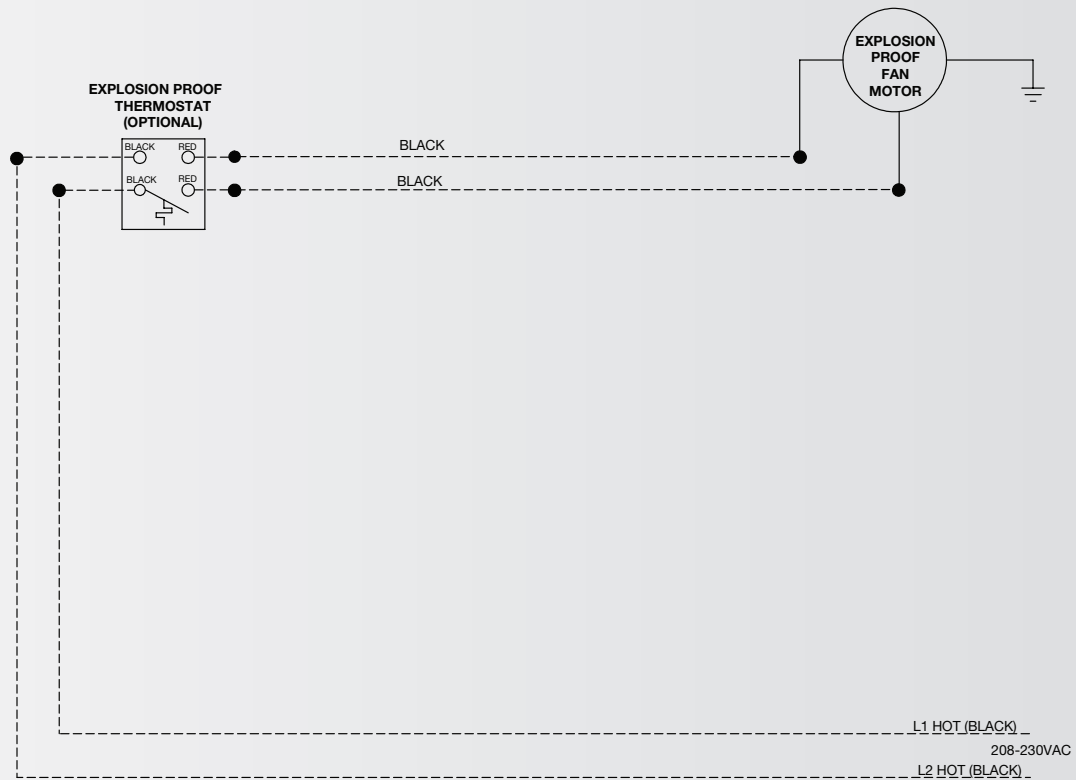
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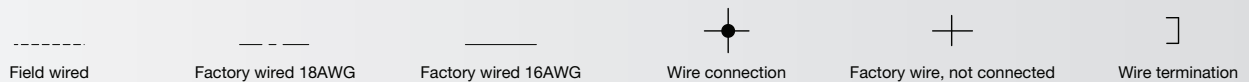
Wiring schematic

Explosion proof motor, 208-230V



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Start-up general

Before beginning any start-up, the start-up personnel should take the time to familiarize themselves with the unit, options, accessories and control sequence to fully understand how the unit should operate properly under normal conditions. All personnel should have a good working knowledge of general start-up procedures.

The building must be completely finished before attempting to start-up the equipment, including doors, windows and insulation. All internal doors and walls should be in place. The entire building should be as complete as possible before beginning any system balancing.

The initial step is to visually inspect all of the equipment and piping. Ensure that all systems are properly installed and supported and that all construction debris or foreign objects have been removed from the equipment.

Each unit should be checked for:

- Free blower wheel operation
- Loose wires

Heating system

Prior to the water system start-up and balancing, the hot water system should be thoroughly flushed to clean out dirt and debris which may have accumulated in the piping during construction. During this procedure, all unit service valves must be in the closed position. This will prevent any foreign material from entering the unit's heat exchanger and clogging valves and metering devices. Strainers should be installed in the piping mains to prevent this material from entering the units during normal operation.

During system filling, air venting should be done using field provided system vents.

⚠ CAUTION

Inspect the entire system for potential air traps and independently vent those areas as required. In addition, some systems may require repeated venting over time to fully eliminate air in the system.

Water treatment

Proper water treatment is a specialized industry and therefore it is recommended to consult an expert in this field to analyze the water for compliance with the water quality parameters listed below and to specify the appropriate water treatment program. The expert may recommend rust inhibitors, scaling preventative, antimicrobial growth agents or algae preventatives. Anti-freeze solutions, glycols, may also be used to lower the freezing point.

All Zehnder Rittling water coils are constructed of copper tubes, steel headers and/or brass threaded connections. It is the end user's responsibility to ensure that any of the water delivery components are compatible with the treated water.

Failure to provide proper water quality will void the Unit Heater's warranty.

Water content	Required concentration
Sulphate	< 200 ppm
pH	7.0 – 8.5
Chlorides	< 200 ppm
Nitrate	< 100 ppm
Iron	< 4.5 mg/L
Ammonia	< 2.0 mg/L
Manganese	< 0.1 mg/L
Dissolved solids	< 1000 mg/L
Calcium carbonate hardness	300 – 500 ppm
Calcium carbonate alkalinity	300 – 500 ppm
Particulate quantity	< 10 ppm
Particulate size	800 micron max

Water system balancing

A complete knowledge of the hydronic system, including its components and controls, is essential to proper water system balancing and should only be completed by a qualified expert. The system must be complete, and all components must be in operating condition before beginning the water system balancing procedures.

Each hydronic system has different operating conditions depending on the devices and controls installed for the particular application. The actual balancing technique may vary from one system to another.

After the proper system operation is established, the appropriate operating conditions such as water temperatures, flow rates and pressure drops should be recorded for future reference.

Before and during water system balancing, conditions may exist due to incorrect system pressures which may result in noticeable water noise or undesired valve operation. After the entire system is balanced, these conditions will not exist on properly designed systems. If any of these conditions persist, recheck the system for air that may not have been properly vented during start-up.

Controls operation

Before proper control operation can be verified, all other systems must be operating properly. The correct water and air temperatures must be present to determine if the control function is operating to design. Some controls and features are designed to not operate under certain conditions.

A wide range of controls, electrical options and accessories may be used

with the units covered in this manual. Review the approved project submittals or order acknowledgment for detailed information regarding each individual unit and its controls. Since controls may vary from one unit to another, care should be taken to identify the controls being used with each individual unit and its proper control sequence.

Operation

Prior to operation

- Check all electrical connections to assure they are secure
- Check rigidity of unit mounting. Tighten all fasteners, if necessary.
- Inspect piping, strainers, traps, fittings, etc.

Initial start-up

- Set thermostat to lowest position.
- Turn on power supply to unit.
- Open return gate valve and then open supply gate valve to unit.
- Raise thermostat setting to desired position.
- Adjust louvers (if provided) for desired heat distribution.
- To ensure proper sequence of operation, cycle unit and off a few times by raising and lowering thermostat setting.
- Check for proper rotation of fan. All fans must rotate in a counterclockwise direction when viewed from the back (RH) of the Unit Heater.

Normal operation and periodic maintenance

General

Each unit on a project will have its own unique operating environment and conditions which dictate a maintenance schedule for that unit that may be different from other equipment on the project. A formal regular maintenance schedule and an individual unit log should be established and maintained. Following this schedule will help maximize the performance and service life of each unit on the project.

The safety considerations listed in the front of this manual should be followed during any service and maintenance operations.

For more detailed service information consult your Sales Representative or the factory.

▲ WARNING

Disconnect power supply from the unit before servicing.

Inspect regularly

Under average conditions, it is recommended that Unit Heaters be inspected before every heating season, more often in locations where air is contaminated with corrosive fumes, dust, soot or oil spray. Check for dirty, clogged coils, excessive vibration and loose connections. Inspect piping, strainers, traps, fittings, etc.

Motor/fan assembly

The type of fan operation is determined by the control components and their method of wiring. This may vary from unit to unit. Refer to the wiring diagram for that unit's individual operating characteristics.

All motors have permanently lubricated bearings so no further

field lubrication is ever required.

If the motor/fan assembly ever requires more extensive service such as motor or fan blade replacement, the entire assembly can be removed from the unit.

Dirt and dust should not be allowed to accumulate on the fan blade. Failure to keep this clean may result in an unbalanced condition which can lead to a damaged fan blade or motor. The fan may be cleaned periodically using a brush and vacuum cleaner, taking care not to dislodge the factory applied balancing weights on the blades. Clean the fan at every inspection. Any fan or motor that is not properly maintained will not be covered under the manufacturer's warranty.

Casings

■ Cleaning

Periodic cleaning of casings is recommended to remove dirt, grease and corrosive substances that may injure finish. Rusted or corroded spots should be cleaned and repainted.

■ General inspection

Tighten fan guard and motor bracket. Check fan for proper clearance, free rotation and firm connection to shaft. When servicing is complete, tag unit to indicate date of inspection and cleaning.

Coil

Coils may be cleaned by removing the motor/fan assembly, providing access to the air entry side of the coil. Brush the entire finned surface with a soft bristled brush, brushing parallel to the fins, taking care not to damage the fins. Brushing should be followed by cleaning with a vacuum cleaner. Compressed air can also be used by blowing air through the coil

fins from the leaving air side, again followed by vacuuming. If fins are damaged during the cleaning process, a fin comb can be used to straighten the fins. For a deeper cleaning, spray the finned surface with a mild alkali cleaning solution and rinse thoroughly. Failure to maintain a clean coil surface will result in reduced airflow, reduced performance and increased power consumption. Clean the coil at every inspection.

Internal corrosion safeguards

Provide controlled water treatment – don't use excess of boiler compounds. Contact your boiler compound supplier for proper usage or the services of a water treatment laboratory. Periodic internal flushing of the coils is recommended in areas where water supply is suspected of causing scale. Use an alkaline-chelant solution and introduce it at the main pump of the hydronic system. Flush thoroughly.

▲ WARNING

Using inorganic or mineral acids such as muriatic (hydrochloric) acid, even though inhibited, may lead to severe damage, including corrosion and leakage.

De-aerate boiler feed-water (particularly if large amount of new water is used). Ensure rapid continuous and adequate condensate drainage by properly sized and installed traps and piping. Check traps for sticking. Clean strainers ahead of traps. (When traps don't work, condensate accumulates in Unit Heater coil; water hammer results.) Adequately vent each unit. Use low-pressure steam when possible.

Normal operation and periodic maintenance

Electrical wiring & controls

Electrical operation of each unit is determined by the components and wiring of the unit. This may vary from unit to unit. Refer to the wiring diagram for the actual type and number of controls provided on each unit.

The integrity of all electrical connections should be verified at least twice during the first year of operation. Afterwards, all controls should be inspected regularly for proper operation. Some components may experience erratic operation or failure due to age. Thermostats may become clogged with dust/lint, and should be periodically inspected and cleaned to provide reliable operation.

When replacing any electrical components such as fuses, contactors, relays or transformers, use only the exact type, size and voltage component as furnished from the factory. Any deviation from this could result in personnel injury or damage to the unit and will void the manufacturer's warranty. All repair work should be done in such a way as to maintain the equipment in compliance with governing local and national codes, ordinances and safety testing agency listings.

Replacement parts

Factory replacement parts should be used wherever possible to maintain unit performance, it's normal operating characteristics and its safety testing agency listings.

Replacement parts may be purchased through the local Zehnder Rittling Sales Representative.

Contact the local Sales representative or factory before attempting any unit modifications. Any modifications not authorized by the factory could result in personnel injury, damage to the unit, and will void the manufacturer's warranty.

When ordering parts, the following information should be supplied to ensure proper part identification:

- Complete unit model number
- Unit serial number
- Complete part description including any identifying numbers on the part

On warranty replacements, it is often necessary to return the faulty component to receive credit. Contact the local Sales Representative who will get authorization from the factory including an RGA (Returned Goods Authorization) to be used when sending components back for inspection. Any returned components sent back to the factory without the proper RGA attached will cancel any outstanding credit.

Equipment start-up checklist

Receiving and inspection

- Unit received undamaged
- Unit received complete as ordered
- Unit structural support is complete and correct

Handling and installation

- Mounting grommets/isolators are used
- Unit mounted level and square
- Proper access is provided for unit and accessories
- Proper overcurrent protection is provided
- Proper service switch/disconnect is provided
- Proper hot water line sizes to unit
- All services to unit in code compliance
- Unit protected from dirt and foreign matter

Heating connections

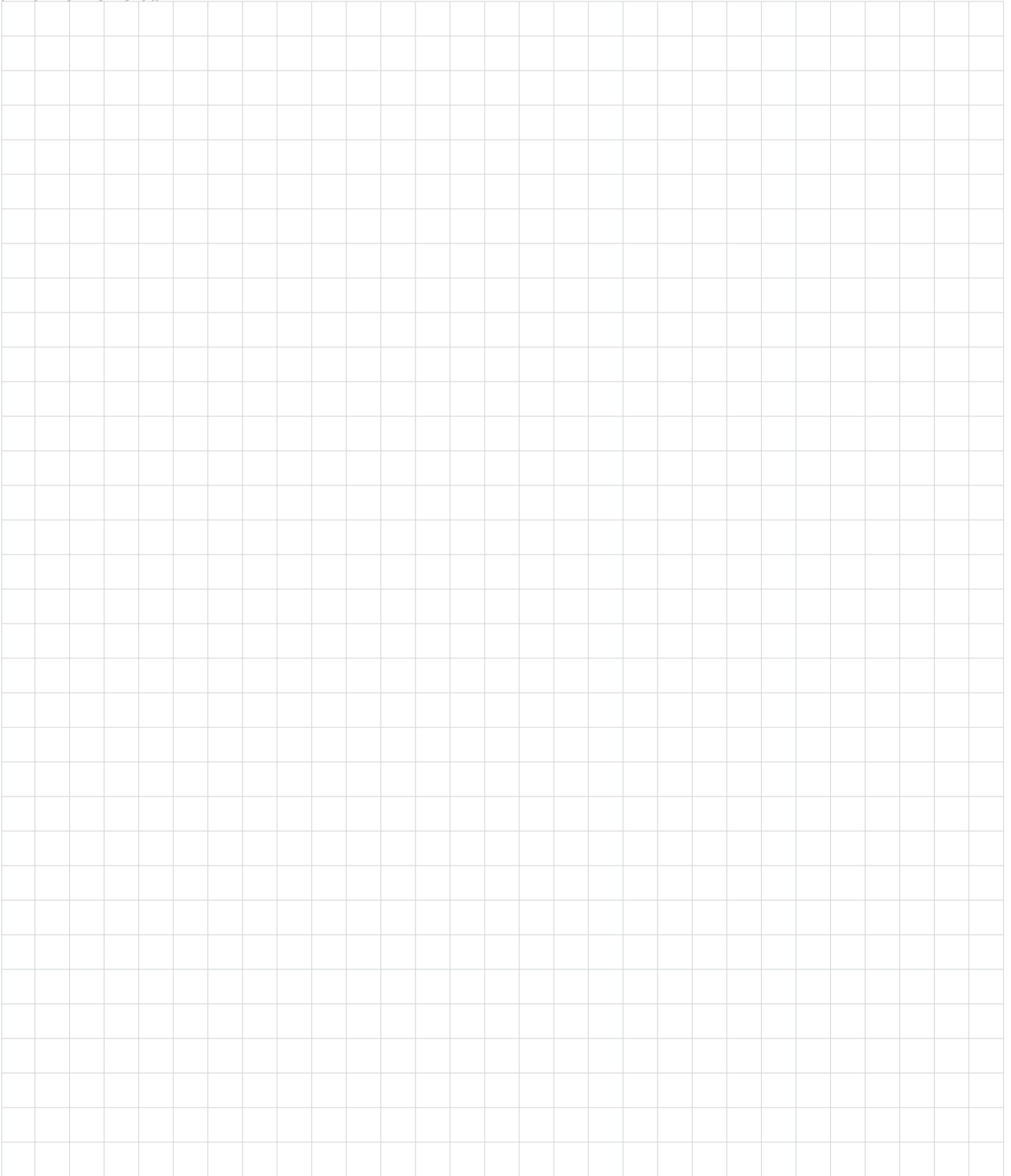
- Connect field piping to unit
- Pressure test all piping for leaks
- Insulate all piping, as required

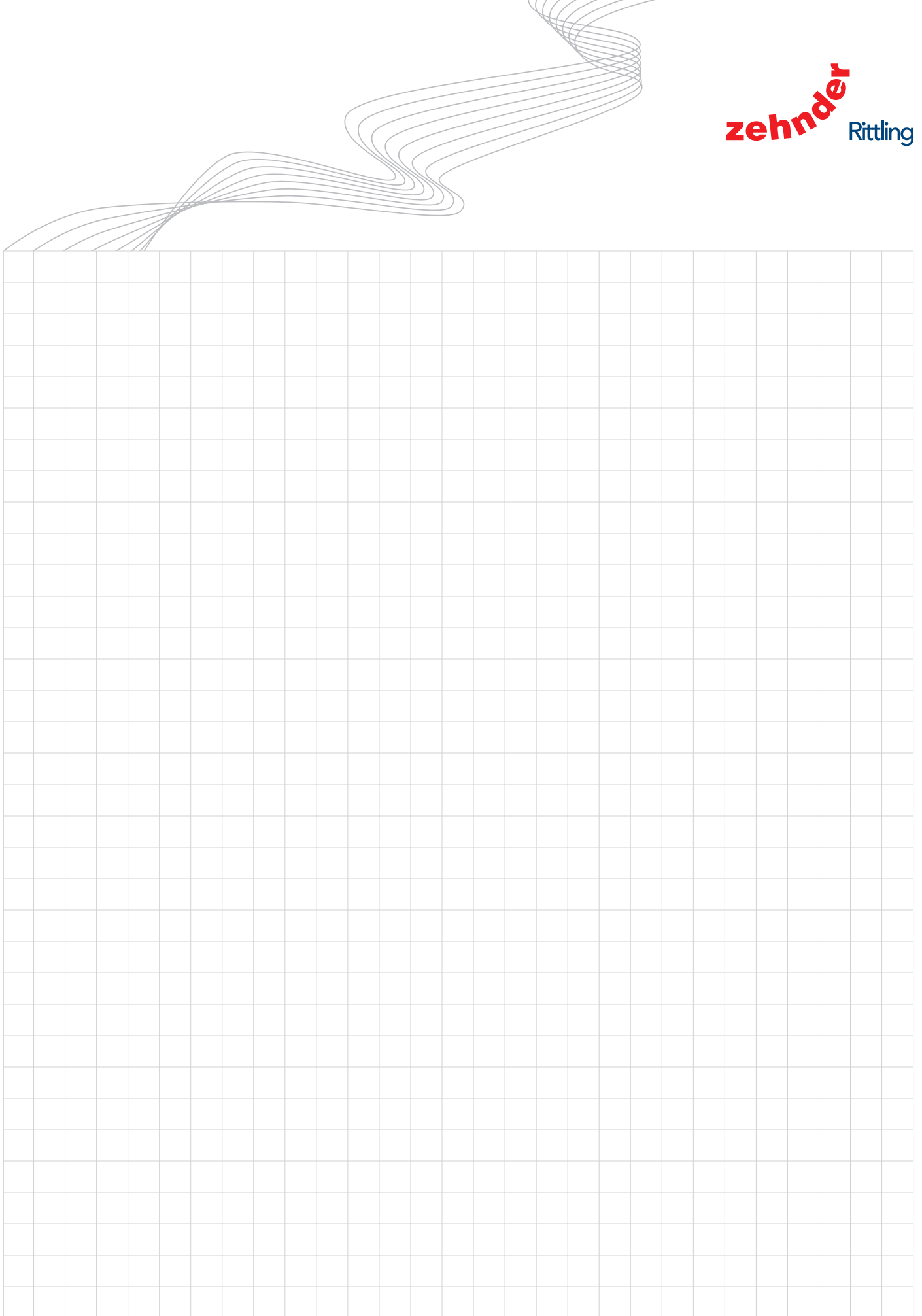
Electrical connections

- Refer to unit wiring diagram
- Connect incoming power service
- Install and connect "shipped loose" components

Unit start-up

- General visual inspection and system inspection
- Check for free and proper fan rotation
- Record electrical supply voltage and amperage draw
- Check all wiring for secure connections
- Close all unit isolation valves
- Flush water systems
- After system has been flushed, ensure all isolation valves are open







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