

SK-23-0244 - Global Impact STEM Academy



572 E. Leffel Lane
Springfield, Ohio 45505
United States

Marker, Inc.
2011 Riverside Dr
Columbus, Ohio 43221
United States
(614) 754-8349

Title
Unit Heaters - Projection Heaters

Submittal Manager
Andrew Burson

Spec Section
23 82 39 - Unit Heaters

Type
Other

Number **Rev**
23 82 39-1 0

Description

A. Provide the following: 1. Hot water projection unit heaters 2. Hot Water Cabinet Unit Heaters

Contractor's Stamp

MARKER Reviewed Reviewed As Noted
 Rejected Revise & Resubmit

Andrew Burson 1.3.2024

By _____ Date .

This review is only for general conformance of the project and general compliance. Corrections or comments made during this review does not relieve the Vendor from compliance with the requirements of the plans and specifications. Vendor is responsible for all dimensions and fabrication to be confirmed and correlated at the job site.

Architect's Stamp

WSA

NO EXCEPTIONS REJECTED
 EXCEPTIONS NOTED SUBMIT SPECIFIED ITEM
 REVISE AND RESUBMIT NOT REVIEWED

Approval is only for general conformance with the design concept of the Project and the information given in the Contract Documents. Contractor is responsible that dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication process or to the means and methods of construction; coordination of the work of all trades; and performing all work in a safe and satisfactory manner. This approval does not modify Contractor's duty to comply with the Contract Documents.

Aleah Springer 01/10/2023

WSA STUDIO DATE

Engineer's Stamp

APPROVED FURNISH AS CORRECTED
 REJECTED REVISE AND RESUBMIT
 SUBMIT SPECIFIED ITEM

This review was performed only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Modifications or comments made on the shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item does not include approval of the assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences, and procedures of construction; coordination of the work of all trades; and for performing all work in a safe and satisfactory manner.

HAWA INCORPORATED
CONSULTING ENGINEERS

Date 01/09/24 By TSK



SUBMITTAL DATA

Project: Global Impact STEM Academy
Bid Category : HVAC
Project No.: E1152
TP Tab No.: 252
Construction Manager: Marker
Architect/Engineer: WSA/HAWA
Submittal For: Unit Heaters
Specification #: 23 82 39
Manufacturer: Rittling
Supplier: Spears Mechanical Systems

AE to choose CUH Color. Sample can be provide if required.

The attached submittal data has been reviewed by TP Mechanical Contractors for compliance with the Architect/Engineer's specifications and plan schedule for this project.

In order to maintain the project schedule, we request that this submittal be returned to TP Mechanical Contractors **within 7 days.**

NOTE: Material cannot be released without Architect/Engineer's approval of submittal.

(Please place stamp of approval here)

<u> X </u>	PRODUCT DATA
<u> </u>	DRAWINGS
<u>12/28/23</u>	DATE SUBMITTED
<u> </u>	DATE RESUBMITTED
T. P. MECHANICAL CONTRACTORS	
BY	<u> Bridget Ellis </u>
<p>This drawing or brochure has been checked to quality or proper components only. Approval of this drawing or brochure shall not relieve the supplier of responsibility for accuracy or dimensions of full compliance with plans and specifications and purchase order.</p>	



RITTLING HOT WATER CABINET UNIT HEATERS
SPEC SECTION: 23 82 39

JOB: GLOBAL IMPACT STEM ACADEMY
570 E. LEFFEL LN.
SPRINGFIELD, OHIO 45505

ENGINEER: HAWA
980 OLD HENDERSON RD
COLUMBUS, OHIO 43220

FOR: TP MECHANICAL CONTRACTORS
2130 FRANKLIN ROAD
COLUMBUS, OHIO 43209

BY: SPEARS MECHANICAL SYSTEMS, INC.
123 WEST NATIONAL ROAD
ENGLEWOOD, OHIO 45322

DATE: DECEMBER 19, 2023

HOT WATER CABINET UNIT HEATERS SCHEDULE

<u>QTY</u>	<u>TAG</u>	<u>MODEL</u>	<u>VOLTS</u>
1	CUH-1	RFRC-430-02	115v/1ph
1	CUH-2	RFRC-420-02	115v/1ph

Remarks:

1. Horizontal fully recessed ceiling mounted type w/ recess trim kit (model RFRC-420)
2. Horizontally fully concealed ceiling mounted type w/ return and supply duct collars (model RFRC-430)
3. Heavy Ga steel construction w/ powder coat finish (standard color selected by Architect)
4. PSC motor w/ thermal overload protection (high static motor on CUH-1)
5. Hot water heating coil w/ manual air vent
6. 1" throwaway filter (one set included)
7. Unit mounted disconnect (factory installed)
8. 3-speed switch (field installed)

Qty	Coil Config	Unit Voltage	Inlet/Outlet	Motor
1	4-row	120/60/1	DUCT IN, DUCT OUT	PSC HS

General Information

Air Flow:	265	CFM
Fan Speed:	High	
ESP:	0.15	in. H2O
Altitude:	0	Feet
Filter:	1" throwaway filter	

Motors

Motor Voltage	Motor Desc	HP (ea.)	FLA (ea.)
120/60/1	HIGH-STATIC	1/12	1.05

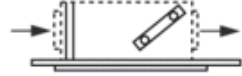
Hot Water Heat

Capacity:	15.2	MBH
Entering Air Temperature:	60.0	°F
Leaving Air Temperature:	112.1	°F
Fluid Flow:	1.0	GPM
Entering Fluid Temperature:	140.0	°F
Leaving Fluid Temperature:	109.1	°F
Fluid ΔT:	30.9	°F
Fluid Pressure Drop:	0.6	ft. H2O
Fluid Type:	Water	
Glycol %:	0	
Rows / FPI:	/12	

Unit Information

Shipping Weight*:	0	lbs.
Unit Length:	38.2	inches
Unit Width:	10	inches
Unit Height:	24	inches

* Weight is base unit only, does not include any options or accessories selected



RFRC-430 - RECESSED, B
DUCT IN, FRONT DUCT (

Panel schedule on E602 calls out a 15 amp double pole. Engineer to confirm acceptable

PANEL SCHEDULE WILL BE CHANGED TO (2) 20 AMP/SINGLE POLE CIRCUIT BREAKERS AND ONE CIRCUIT BREAKER WILL SERVE CUH-1 AND THE OTHER WILL BE A SPARE.

Motor size to be 1/20 HP per schedule. Engineer to confirm if acceptable.

THIS IS ACCEPTABLE.

Qty	Coil Config	Unit Voltage	Inlet/Outlet	Motor
1	4-row	120/60/1	LVR IN, LVR OUT	PSC STD

General Information

Air Flow:	220	CFM
Fan Speed:	High	
ESP:	0	in. H2O
Altitude:	0	Feet
Filter:	1" throwaway filter	

Motors

Motor Voltage	Motor Desc	HP (ea.)	FLA (ea.)
120/60/1	STANDARD	1/30	0.6

Hot Water Heat

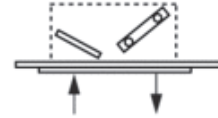
Capacity:	13.4	MBH
Entering Air Temperature:	60.0	°F
Leaving Air Temperature:	115.4	°F
Fluid Flow:	0.9	GPM
Entering Fluid Temperature:	140.0	°F
Leaving Fluid Temperature:	109.7	°F
Fluid ΔT:	30.3	°F
Fluid Pressure Drop:	0.5	ft. H2O
Fluid Type:	Water	
Glycol %:	0	
Rows / FPI:	/12	

Unit Information

Shipping Weight*:	0	lbs.
Unit Length:	38.2	inches
Unit Width:	10	inches
Unit Height:	24	inches

* Weight is base unit only, does not include any options or accessories selected

Panel schedule on E602 calls out a 20 amp single pole. Engineer to confirm acceptable



RFRC-420 - RECESSED, BOTTOM IN, BOTTOM OUT

THIS IS ACCEPTABLE.

Motor size to be 1/30 HP per schedule. Engineer to confirm if acceptable.

THIS IS ACCEPTABLE.

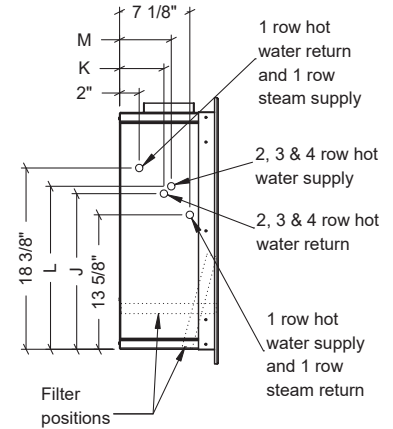
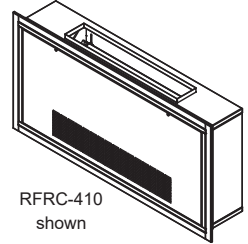
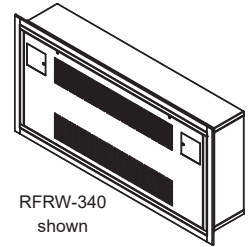
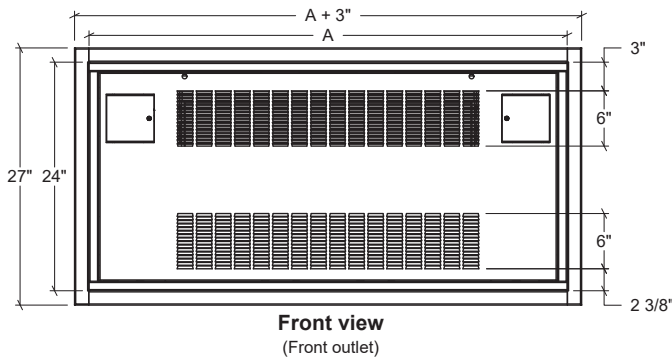
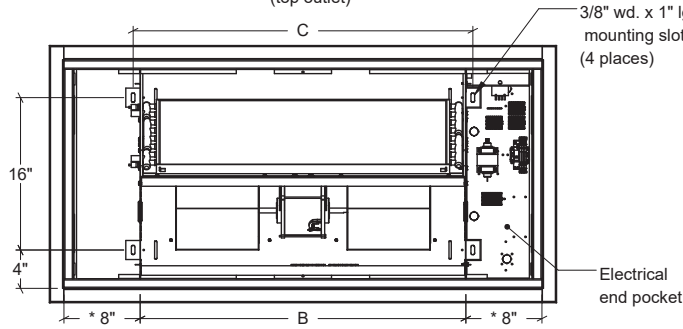
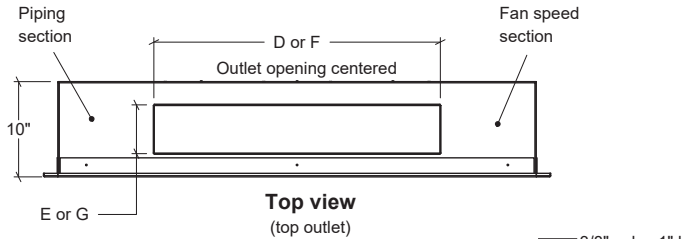
Rittling Cabinet Unit Heater

Submittal Data



Dimensions and data

Models RRW, RFRW, RRC, RFRC, RRWI & RFRWI



Dimensional data

Unit size	A			B	C	Louvers		Duct opening		H		
	Std.	6" Ext.	6" Ext. x2			D	E	F	G	Std.	6" Ext.	6" Ext. x2
02	38-3/16	44-3/16	50-3/16	22-3/16	24	20	6	18-3/8	5-1/8	41-3/16	47-3/16	53-3/16
03	44-3/16	50-3/16	56-3/16	28-3/16	30	26	6	24-3/16	5-1/8	47-3/16	53-3/16	59-3/16
04	50-3/16	56-3/16	62-3/16	34-3/16	36	32	6	30-3/16	5-1/8	53-3/16	59-3/16	65-3/16
06	62-3/16	68-3/16	74-3/16	46-3/16	48	44	6	42-3/16	5-1/8	65-3/16	71-3/16	77-3/16
08	68-3/16	74-3/16	80-3/16	52-3/16	54	50	6	48-3/16	5-1/8	71-3/16	77-3/16	83-3/16
10	76-3/16	82-3/16	88-3/16	60-3/16	62	58	6	56-3/16	5-1/8	79-3/16	85-3/16	91-3/16
12	86-3/16	92-3/16	98-3/16	70-3/16	72	68	6	66-3/16	5-1/8	89-3/16	95-3/16	101-3/16

Coil	J	K	L	M	N	P	R	T
2 Row	15-3/4	4-7/16	16-9/16	5-3/16	7-7/16	5-3/16	8-1/4	4-7/16
3 Row	16-9/16	3-1/16	17-1/8	4-13/16	6-1/8	4-13/16	4-13/16	3-1/16
4 Row	16-9/16	3-1/16	17-1/8	4-13/16	6-1/8	4-13/16	4-13/16	3-1/16

Notes:

- 1 and 2 row coil supply and return 1/2" nominal (5/8" OD) all sizes
- Unit shown with left hand piping connections and right hand electrical connections as standard
- Right hand piping connections with left hand electrical connections available as an option
- Piping hand determined when facing the air outlet
- All listed dimensions are approximate and are subject to change without notice
- Modifications to the product specifications must be accepted by Zehnder at its base office
- See www.zehnder-rittling.com for any recent updates or changes

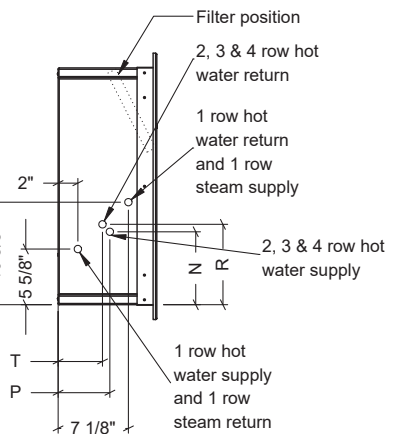


Table A: Standard ratings and specifications

Specifications	02	03	04	06	08	10	12
Coil	FPI	12	12	12	12	12	12
	Face area, ft2	1.25	1.67	2.08	2.92	3.33	4.58
	Coil connections	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu
Blower	Quantity	1	1	2	2	1, 2	4
	Diameter	5.7"	5.7"	5.7"	5.7"	5.7"	5.7"
	Width	7.5"	10.4"	7.5"	10.4"	7.5", 10.4"	7.5"
Filter	Number	1	1	1	1	1	1
	Length, in.	22	28	34	46	52	60
	Width, in. - standard	9.75	9.75	9.75	9.75	9.75	9.75
	Width, in. - floor with inlet grille	7.25	7.25	7.25	7.25	7.25	7.25
	Rating	Merv 4	Merv 4	Merv 4	Merv 4	Merv 4	Merv 4
Cabinet size	Thickness, in.	1	1	1	1	1	1
	Length, in.	38.2	44.2	50.2	62.2	68.2	76.2
	Width, in.	10	10	10	10	10	10
	Height, in. - wall/ceiling	24	24	24	24	24	24
	Height, in. - flat top floor	26.5	26.5	26.5	26.5	26.5	26.5
Height, in. - slope top floor	29.25	29.25	29.25	29.25	29.25	29.25	
Shipping weight, lbs.	85	100	115	140	155	170	195

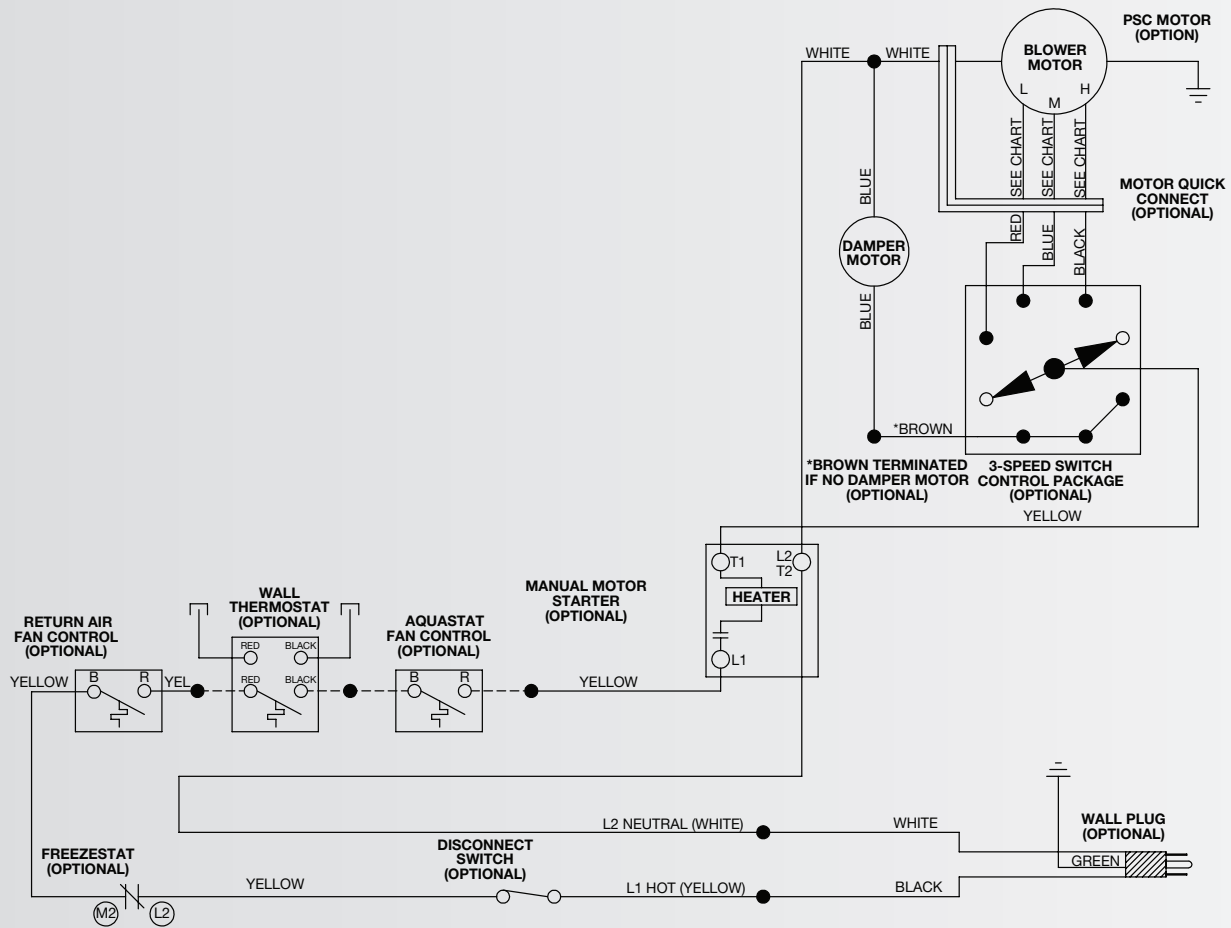
Notes

- Airflows for floor mounted units with 1-row coil. Please check with factory for adjusted outputs on other models
- Heating capacity based on inlet air 60 °F DB, 200°F entering water or 2 psig steam, 180°F leaving water, standard motor at high fan speed
- Pressure drop (PD) shown in feet of water
- Overall length for fully and partially recessed units is length +3", adding in the trim kit. Wall rough-in hole dimension to be length +1/2" by 24-1/2" minimum. Maximum opening to be length by +2" by 26".



Wiring schematic

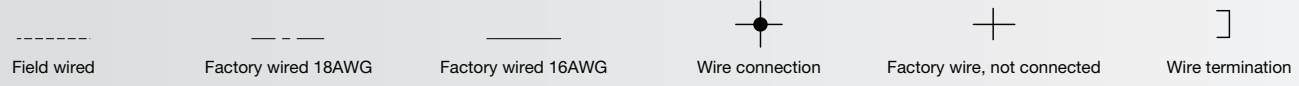
120V



NOTE: FOR HIGH STATIC MOTORS USE THE FOLLOWING 3 SPEED SWITCH WIRING CONFIGURATION:
RED/LOW - BLUE/MED - BLACK/HIGH

- 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.
 - MODELS RC, RRC, RFRC UNITS GET 3 SPEED SWITCHES SHIPPED LOOSE FOR FIELD WIRING.

SIZE	MOTOR SIZES	HIGH	MEDIUM	LOW
02	12W	BLACK	BLUE	RED
03	12W	BLACK	RED	YELLOW
04	30W	BLACK	BLUE	RED
06	50W	BLACK	RED	YELLOW
08	50W, 25W	BLACK	RED	YELLOW
10	(2) 30W	BLACK	BLUE	RED
12	(2) 50W	BLACK	RED	YELLOW



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

Disconnect switch Cabinet Unit Heater

120V, 15A

Single pole switch with grounded terminals, has a thermoplastic toggle and frame. It has a smooth, quiet toggle action and is made with high-impact resistant construction.

Features

- Side wire #12 and #14 AWG
- Push wire #14 AWG
- Tri-drive ground, terminal, and mounting screws
- Easy-access green hex head ground screw

Specifications

General

- Type: toggle
- Number of poles: 1-way
- Special features: self-grounding

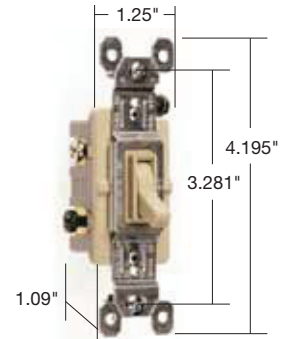
3rd party compliance

- CSA listing info: C22.2 111
- CSA standard: yes

- UL listing no: 20
- UL Standard: yes
- U N SPS C: 39121406

Technical information

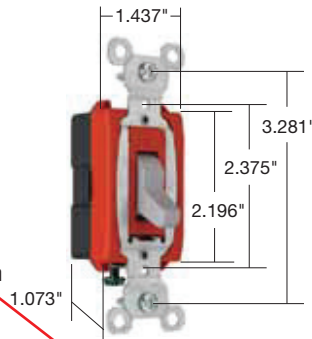
- Amps: 15 Amp
- Volts: 120VAC



208/230/277V, 30A

Features

- One-piece nickel-plated brass strap for superior corrosion-resistance
- Cam control and spring actuator for positive “makes and breaks” with a minimum of arcing
- Heavy-duty bumpers for quiet, smooth operation
- Oversized silver-alloy contacts for long life and better heat dissipation
- Heavy-duty, brass alloy, one-piece contact arm virtually eliminates contact bounce
- Auto-ground clip assures positive ground
- Glass-reinforced nylon back body for durability & strength
- Side and external screw-pressure-plate back wire with #14 – #10 AWG copper or copper-clad wire
- Grounding terminal is standard with screw-pressure-plate back wire



3rd party compliance

- UL Listed, File Number E140597, Standard UL20, General Use Snap Switches
- Federal Specification WS896
- cULus Listed, File Number LR17446, Standard CSA-C22.2 No. 111, General Use Snap Switches
- Conforms to NEMA WD-1 and WD-6

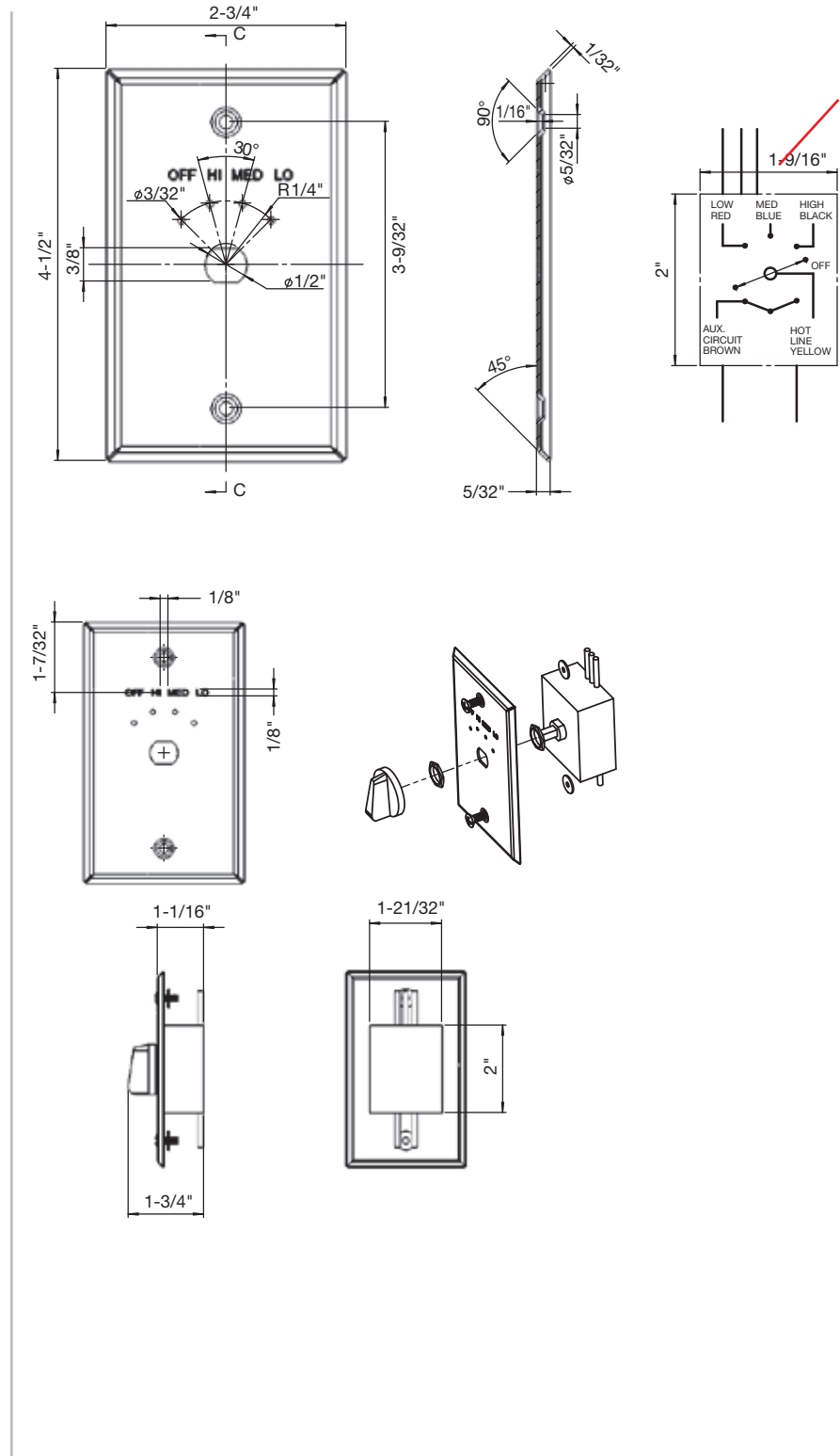
Performance

Electrical	
Dielectric withstand voltage	1500V minimum
Maximum working voltage	277VAC
Overload minimum	4.8 times rated current for 100 cycles
Temperature rise	30 °C maximum at rated current
Maximum continuous current	277VAC
Endurance	50,000 cycles min., resistive, inductive, tungsten filament lamp load (fed spec)
Mechanical	
Terminal accommodations	#14 AWG – #10 AWG
Environmental	
Flammability	UL94 V2
Operating temperature	Max. continuous +115 °C, min. -40 °C

3-speed switch

Specifications

- Main contacts rated current and voltage: 10A 125 Vac, 5A 277 Vac
- Auxiliary contacts rated current and voltage: 0.5A 277 Vac
- Insulation resistance: > 1000MΩ
- Contact resistance: <40M_(t)



Mechanical Specifications

General

- Furnish and install Cabinet Unit Heaters where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for heating and air delivery. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-95.

Construction

- All unit chassis shall be fabricated of 20-gauge galvanized steel panels. [Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A.]
- All exposed units shall have exterior front, top and end panels fabricated of not less than 16-gauge cold rolled steel [14-gauge steel]. The front panel shall be attached with tamper-proof Allen-head quarter turn fasteners to allow for easy removal and access for service. The front panel shall be hinged providing full swing through 90° including removable safety chain(s) to prevent the panel from swinging fully open accidentally (RC, RFRC, RRC). Side panels shall be removable for access to controls and piping within the end pockets, if required. End pockets shall be no less than 8" [extended end pockets shall be no less than 14"] in width, located on both sides of the unit.
- [Provide a grille in the return air opening (RF, RFI, RS, RSI).]
- All exposed units shall include a recessed stamped louver discharge grille. Louver discharge grille shall be reverse stamped, leaving a

Flush-mounted, quarter-turn tamper-resistant fasteners included as standard



smooth exterior surface. [Provide an architectural aluminum double deflection discharge grille with a powder coated paint finish to match cabinet color. Liquid coat paint shall not be acceptable.] [Provide an architectural aluminum bar grille.]

- Louvered panel shall be supplied with two flush, hinged access doors with slotted cam-lock fasteners. [tamper-proof Allen-head security quarter turn fasteners.]
- Recessed units shall be provided with a wall/ceiling seal assembly. The assembly shall provide a finished appearance to the wall/ceiling.
- All ducted units shall have a minimum 1" duct collar on the discharge or return.
 - ◆ Option: Adjustable leveling legs, two on each base leg, shall be provided where indicated on drawings or schedules (RF, RFI, RS, RSI).

Painted finish

- All painted cabinet exterior panels shall be finished with a standard ivory epoxy powder coat paint. Optional colors can be selected from the Zehnder Rittling Color Chart. Liquid coat paint shall not be acceptable.
- Custom colors are also available with the submission of a color chip for color match.

Power

- Units shall not exceed scheduled power consumption.

Fan and motor

- Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel for corrosion resistance. Motors shall be permanent split-capacitor [electronically commutated high-efficiency, programmable brushless DC], totally enclosed, tap wound for 3-speed, permanently lubricated sleeve bearing, type with automatic reset integral thermal overload protection. High static motors are available for ducted applications. Shaded pole motors are not acceptable. Single speed motors are not acceptable. Prior to shipping, all motors shall be assembled, factory tested and installed in the unit
- The fan/motor assembly shall be removable and serviceable through the front panel. Each fan/motor assembly shall be fastened by no more than 4 screws. [The motors shall have quick connects to allow service and removal without the need for tools.]

Mechanical Specifications

Coils

- All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have $\frac{5}{8}$ " OD, $\frac{1}{2}$ " nominal seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and aluminum fin. Minimum copper tube thickness shall be 0.016".
- Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.0045". Lanced fins shall not be acceptable.
- All coils shall be tested at 350 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall be circuited for counter flow to maximize unit efficiency.
- All water coils shall be designed to connect with $\frac{1}{2}$ " nominal pipe connections.
- Coil casing shall be fabricated from galvanized steel [stainless steel].
- Steam coils shall be standard single tube steam type suitable for temperatures above 35°F and 15 PSIG steam pressure.
- All water coils shall be provided with a manual air vent [automatic air vent] fitting to allow for coil venting.

Filters

- All units shall be furnished with a minimum 1" nominal glass fiber throwaway [1" pleated MERV 4] [1" cleanable aluminum mesh] filter.
- Filters shall be tight fitting to prevent air bypass.
- Filters shall be easily removable from the return air opening without the need for tools, unless there is an inlet louvered return provided.

Electrical

- Units shall be furnished with single point power connection. Provide an electrical control board for motor and other electrical terminations using spade connectors. Provide a 3-speed fan control switch with off, high, medium and low speeds.
 - ◆ Option: Provide 24 VAC fan relays with 40 VA transformer as integral part of control board. Fan relays designed to operate in conjunction with factory provided [field provided] 24 V thermostat. Fan relays designed to accept 120, 208, 220, 230, or 277 V input power. Relays shall operate with generic non-digital [digital, non-programmable] [digital, programmable] thermostat designed to control up to three independently energized fan speeds.
 - ◆ Option: Provide a line voltage wall thermostat, shipped loose for remote mounting. Adjustable setpoint dial included.
 - ◆ Option: Provide a remote bulb return air thermostat mounted in the end pocket with remote bulb temperature sensor within the air stream, regulating room air temperature by measuring the return air temperature. Adjustable setpoint dial included.
 - ◆ Option: Provide a line voltage aquastat, shipped loose for remote mounting on the incoming supply piping. Adjustable setpoint dial included.
 - ◆ Option: Provide a line voltage freezestat for coil protection. Adjustable setpoint included.
 - ◆ Option: Provide a service disconnect switch to isolate power from the unit during maintenance.
 - ◆ Option: Provide a manual motor

starter to provide overload protection for the motor.

- ◆ Option: Provide a power supply cord to enable powering of unit from wall outlet.
- Primary internal wiring and testing shall be conducted at the factory. All units shall be shipped with wiring diagrams.

Piping packages

- Provide a standard factory assembled valve piping package to consist of a 2 or 3-way, on/off, motorized electric control valve and two ball isolation valves.
- Control valves shall be piped normally closed to the coil. Control valves shall be wired to junction box or unit mounted thermostat, when provided, through quick connects to allow service and replacement of valves. Maximum entering water temperature on the control valve shall be 200°F, and maximum operating pressure shall be 300 PSIG.
 - ◆ Option: Unions shall be provided to allow easy removal of piping package from unit without the need for brazing or cutting pipe.
 - ◆ Option: Provide 3-wire floating point modulating control valve (fail-in-place), in lieu of standard 2-position control valve with factory assembled valve piping package.
 - ◆ Option: Provide proportional 0-10 VDC modulating control valve, in lieu of standard 2-position control valve with factory assembled valve piping package.
 - ◆ Option: Provide high pressure close-off actuator for 2 or 3-way on/off control valve. Maximum close-off pressure is 75 PSIG.
 - ◆ Option: Provide an adjustable flow control device for each piping package.

Mechanical Specifications

- ◆ Option: Provide a fixed flow control device for each piping package.
- ◆ Option: Provide pressure-temperature ports (P/T) for each piping package to allow measurement across the coil.
- Piping packages shall be completely factory assembled including interconnecting pipe, factory tested for leaks and shipped loose for field installation.
- ◆ Option: Piping package will be shipped factory installed.

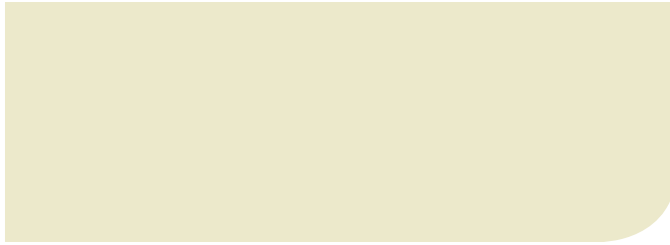
Outside air damper

- Provide a manual [two position motorized] outside air single blade damper integral to the unit. [A synchronous motor interlocked with the fan shall open the outside air damper automatically when the fan starts. If there is a loss in power or the blower stops, the damper shall return to a closed position.]
- ◆ Option: Provide aluminum outside air wall box with integral insect screen and weep holes for field installation.

Units shall be manufactured in accordance with ISO 9001:2008 standards established and maintained by Zehnder Rittling.

Standard Colors

Color to be Selected



Ivory



Gray



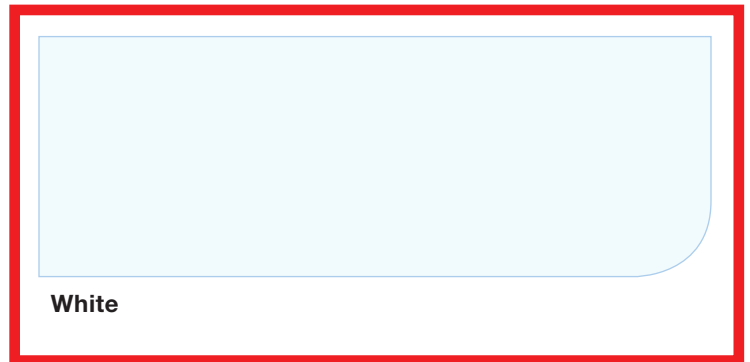
Beige



Dark Gray



Bronze



White

Pricing for standard colors varies by product and color, refer to price lists for detailed information.

Notes

- Slight color variation may exist between actual finish and color chips. All colors are supplied in semi-gloss.
- Variation in color and gloss may occur in the manufacturing process.
- Custom color matching is available at additional cost. Metallic colors are not available.
- All products with a prime finish must have a field-applied topcoat for a consistent color.





RITTLING HOT WATER UNIT HEATERS
SPEC SECTION: 23 82 39

JOB: GLOBAL IMPACT STEM ACADEMY
570 E. LEFFEL LN.
SPRINGFIELD, OHIO 45505

ENGINEER: HAWA
980 OLD HENDERSON RD
COLUMBUS, OHIO 43220

FOR: TP MECHANICAL CONTRACTORS
2130 FRANKLIN ROAD
COLUMBUS, OHIO 43209

BY: SPEARS MECHANICAL SYSTEMS, INC.
123 WEST NATIONAL ROAD
ENGLEWOOD, OHIO 45322

DATE: DECEMBER 19, 2023

HOT WATER UNIT HEATERS SCHEDULE

<u>QTY</u>	<u>TAG</u>	<u>MODEL</u>	<u>VOLTS</u>
3	UH-1	RH-33	115v/1ph
1	UH-2	RH-165	115v/1ph

Remarks:

1. Horizontal type
2. Heavy gauge casing w/ baked-on enamel paint.
3. Standard finger proof OSHA rated steel rod constructed fan guard included\
4. Hot water coil.
5. Adjustable discharge louvers w/ 4-way air diffusers

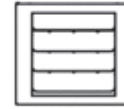
Qty	Coil Config	Unit Voltage
1	Hot Water	120/60/1



Panel schedule on E602 calls out a 20 amp single pole. Engineer to confirm acceptable

General Information

Air Flow:	630	CFM
Fan Speed:	High	
Altitude:	0	Feet



THIS IS ACCEPTABLE.

HORIZONTAL UNIT HEATERS

Motors

Motor Voltage	HP (ea.)	FLA (ea.)
115/60/1	1/15	0.72

HP to be 1/30. Engineer to confirm if acceptable.

THIS IS ACCEPTABLE.

Hot Water Heat

Capacity:	16.7	MBH
Entering Air Temperature:	60.0	°F
Leaving Air Temperature:	84.0	°F
Fluid Flow:	5.0	GPM
Entering Fluid Temperature:	140.0	°F
Leaving Fluid Temperature:	133.3	°F
Fluid ΔT:	6.7	°F
Fluid Pressure Drop:	0.5	ft. H2O
Fluid Type:	Water	
Glycol %:	0	
FPI:	12	

Unit Information

Shipping Weight*:	48.0	lbs.
Unit Length:	12.3	inches
Unit Width:	19.8	inches
Unit Height:	19	inches

* Weight is base unit only, does not include any options or accessories selected



Model RH-165

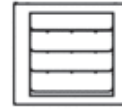
Project: Global Impact Stem Academy
Tag: UH-2

Qty	Coil Config	Unit Voltage
1	Hot Water	120/60/1

Panel schedule on E602 calls out a 20 amp single pole. Engineer to confirm acceptable

General Information

Air Flow:	2500	CFM
Fan Speed:	High	
Altitude:	0	Feet



THIS IS ACCEPTABLE.

HORIZONTAL UNIT HEATERS

Motors

Motor Voltage	HP (ea.)	FLA (ea.)
115/60/1	1/4	2.65

Capacity to be 81 as well as HP to be 1/8. Engineer to confirm acceptable.

THIS IS ACCEPTABLE.

Hot Water Heat

Capacity:	76.9	MBH
Entering Air Temperature:	60.0	°F
Leaving Air Temperature:	87.8	°F
Fluid Flow:	8.1	GPM
Entering Fluid Temperature:	140.0	°F
Leaving Fluid Temperature:	121.0	°F
Fluid ΔT:	19.0	°F
Fluid Pressure Drop:	0.9	ft. H2O
Fluid Type:	Water	
Glycol %:	0	
FPI:	12	

Unit Information

Shipping Weight*:	110.0	lbs.
Unit Length:	16.3	inches
Unit Width:	31.9	inches
Unit Height:	27	inches

* Weight is base unit only, does not include any options or accessories selected

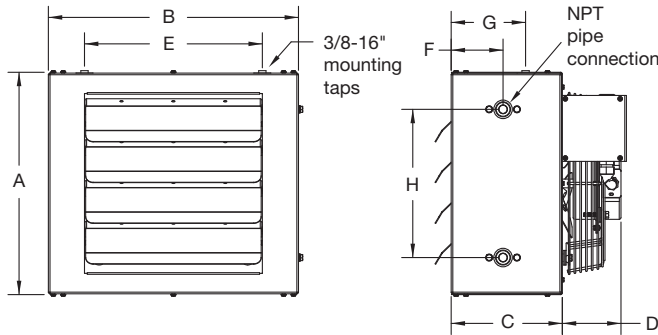
The results reported herein are based on testing by Zehnder Rittling. Variations in the installation and operational environment may alter performance. Zehnder Rittling disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. Continuous research and development may result in a change to an appliances design and specifications, which Zehnder Rittling may change without notice

Rittling Unit Heater Submittal Data

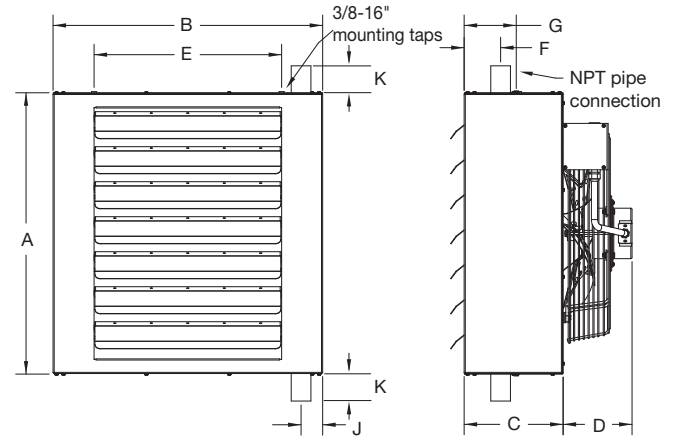


Dimensions and data: Model RH

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

Notes:

- All dimensions in inches unless otherwise noted
- 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

Maximum mounting height

Model	200 °F EWT and 60 °F EAT		2 lbs. 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'

Revised February 15, 2014. Zehnder Rittling periodically makes changes to the design and/or specifications of its products. As a result, the design and specifications of each product at the time of order may be different than as described herein. Please contact Zehnder Rittling's Sales Support staff at 716-827-6510 for specific information on current design and specifications. Designs, specifications and other information contained herein are not express warranties, which are only as expressly set forth by Zehnder Rittling in its terms and conditions of sale. The latest version of this document is available at www.zehnder-rittling.com.

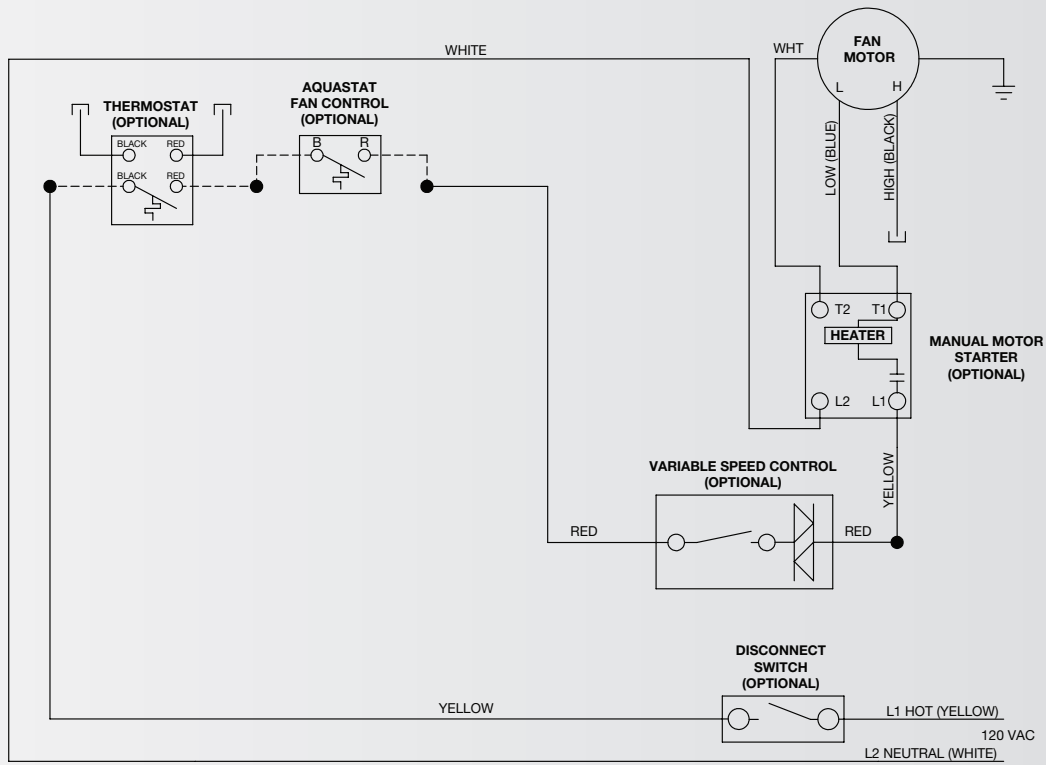
Zehnder Rittling · 100 Rittling Blvd. · Buffalo, NY USA 14220

T 716-827-6510 · F 716-218-2805 · sales@zehnder-rittling.com · www.zehnder-rittling.com

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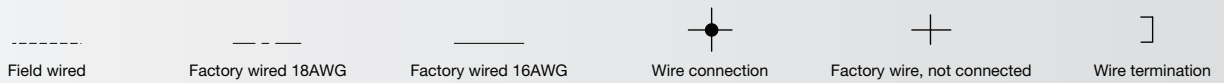
Wiring schematic

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

Mechanical specifications

General

Furnish and install Rittling Unit Heaters where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for heating and air delivery. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-95.

Construction

All units shall have panels fabricated of not less than 18-gauge cold rolled steel and consist of top/back and side halves. Both halves are joined on top and back with hex head screws. Top casing is furnished with threaded hanger connections for suspension of unit. Fan venture is die-formed on back half.

Casing on all vertical units are top and bottom pieces joined by corners and additional hardware. Top casing is furnished with threaded hanger connections for suspension of unit.

Units shall be equipped with horizontal, individually adjustable louvers (RH). [Vertical louvers for four-way air control shall be included (RH).]

- Option: Provide a [cone-jet] [truncone] [one-way louver] [two-way louver] [3-cone anemostat] [4-cone anemostat] to provide specific air throw pattern on vertical Rittling Unit Heater.
- Option: Provide a pipe hanging kit that allows the unit to be hung from threaded pipe in lieu of threaded hanger rod.

Painted finish

All painted cabinet exterior panels shall be finished with a standard textured gray epoxy powder coat paint.

Power

Units shall not exceed scheduled power consumption.

Motor

Motors shall be two speed, permanent split-capacitor, totally enclosed, permanently lubricated bearing type with automatic reset integral thermal overload protection (3-phase motors require field supplied motor overload protection), designed to handle up to 104°F maximum constant ambient temperature. Shaded pole motors are not acceptable. Single speed motors are not acceptable.

[Explosion proof motors have an enclosure designed and constructed to withstand an explosion of a specified gas or vapor which may occur within the motor and to prevent the ignition of this gas or vapor surrounding the unit. Explosion proof motor is suitable for Class I, Div I&II, Groups C&D and Class II, Div I&II, Groups F&G. The explosion proof motors may not be used with a fluid temperature in excess of 329°F and still maintain the explosion proof rating for NEC ignition temperature rating T3B for grain dust. All explosion proof motors are shelf mounted.

- Option: Provide a solid state variable speed controller.

Fan

Fans shall have non-conducting, spark-proof aluminum blades, with a steel hub. Each fan blade is balanced and designed specifically for the unit in which it is installed to assure maximum air delivery and quiet operation.

Fan guard

Fan guard shall be finger-proof, constructed of welded steel rod and finished with a standard black epoxy powder coat paint. Units mounted below 8 feet from the floor must be equipped with an OSHA fan guard to meet ETL and OSHA requirements.

Coils

Heating coil is designed for either two-pipe steam or hot water heating system. Coils shall have ½" nominal diameter seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and integral collar of the aluminum fin. Minimum copper tube thickness shall be 0.028".

Fins shall be die-formed and have a high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.010". Lanced fins shall not be acceptable. Fins are continuous across width and depth of coil and are vertically oriented to resist collection of dirt and foreign particles.

Coils are of non-ferrous construction and serpentine design for RH-18 and RH-24. All other units incorporate brazed steel header tubes. RH-18 through RH-86 units have ¾" female threaded NPT, brass header connections while all other units have male threaded NPT connections.

All coils shall be tested at 275 PSIG air pressure under water, and rated for a maximum 220 PSIG water or 150 PSIG steam and 375°F. Coils have CRN pressure vessel certification for Ontario and Quebec provinces.

Mechanical specifications

Electrical

Units shall be furnished with single point power connection. Provide an electrical junction box for motor and other electrical terminations.

- Option: Provide an explosion proof wall thermostat, shipped loose for remote mounting.
- Option: Provide a line voltage wall thermostat, shipped loose for remote mounting. Adjustable setpoint dial included.
- Option: Provide a clear, plastic locking thermostat guard, shipped loose for remote mounting.
- Option: Provide a service disconnect switch to isolate power from the unit during maintenance.
- Option: Provide a manual motor starter to provide overload protection for the motor.
- Option: Provide a line voltage aquastat, shipped loose for remote mounting on the incoming supply piping. Adjustable setpoint dial included.