

BTR series

BETWEEN-THE-RAIL UNIT COOLER

engineering data
and specifications



EFFICIENT COIL DESIGN

Maximum heat transfer is achieved by staggered 3/4" OD tubes in the direction of air flow. Turbo-Spacers are located between tubes to provide nominal 4 FPI spacing and improve fin efficiency by turbulating the air flow.

FAN AND MOTOR

- Motors, with internal overload protection, are factory wired to stainless steel NEMA 1 junction boxes located on the top of the casing. All fan motors can be cycled with one contactor.
- Fan guard conform to UL requirements and have a 10-15 mil fluidic bath coating of black vinyl PVC for corrosion resistance.

BTR 20, 30, 40 and 50 Series

- 18" diameter propeller fans with plastic blades and aluminum hubs.

Single phase 50-60 Hertz 115 or 208-230 volts, 1/6 hp, single speed 1100 RPM-tapped winding capacitor start motor.

BTR 11, 21, 31 and 41 Series

- 30" diameter propeller fans with plastic blades and aluminum hubs.

Three phase 50-60 Hertz, 208-230, 380, 460 or 575 volts, 1/2 hp totally enclosed (TEAO), one speed 1140 RPM.

HOUSING

- Corrosion resistant stainless steel is used for the outer casing.
- Extended housing height used for water defrost, water wash, hot gas reheat and hinged panels.

DRAIN PAN

Designed for full coverage, stainless steel drain pan and closed cell insulated stainless steel cover is shipped loose. SGS's exclusive stainless steel "coil-less waffle" design is provided for hot gas heated drain pan requirements. The entire pan surface is in contact with hot gas, eliminating cold spots and assuring instant warm-up.

Hot gas pans are provided with closed cell insulation between the pan and stainless steel cover. Drain pan needs to be piped in series with the evaporator coil. A pan to coil check valve is usually required (supplied by others or optionally shipped loose).

AIR DEFROST

above 36°F room temperature

- Air defrost coil with an unheated stainless steel drain pan.
- Stainless steel drain pan cover with closed cell insulation.

HOT GAS DEFROST COIL ONLY

above 32°F room temperature

- Hot gas defrost for the coil with unheated stainless drain pan.
- For stainless steel and aluminum tube coils with direct expansion applications, hot gas defrost coils are supplied with a separate hot gas inlet header, which bypasses the capillaries for rapid defrost.

HOT GAS DEFROST UNIT

below 32°F room temperature

- The unique "waffle" (SGS exclusive) stainless steel drain pan allows for the fastest hot gas defrost available. The design assures maximum pan heat in a minimum time.
- Drain pan provided with closed cell insulation between the pan and stainless steel cover.
- For stainless steel and aluminum tube coils with direct expansion applications, hot gas defrost coils are supplied with a separate hot gas inlet header, which bypasses the capillaries for rapid defrost.

ELECTRIC DEFROST COIL ONLY

above 32°F room temperature

- Electrical defrost heaters factory wired for 208-230/460/3/60 voltage to a common terminal block with fan delay and temperature terminations thermostat.
- Available models listed are limited 2 or 3 fans, 4 or 6 rows and can be used for any coil tube material.
- Tubular heaters are located under the coil face, between coil and drain pan, and efficiently defrost the coil from the bottom to the top. Drain pan is not heated.

BTR Electric Defrost

Model	Total kW		Total Amps	
	208/230V	208V	230V	460V
24 and 26	4.8	13.9	12.1	6.0
34 and 36	7.2	20.9	18.1	9.0

- Remote electrical panels are available to defrost up to 3 units at one time. Included are NEMA 1 enclosure, main disconnect, 115V control transformer, contactors, 3 pilot lights, ON/OFF switch and time clock.

WATER DEFROST

above 25°F room temperature

Water Defrost spray headers are available for all models.

- Minimum operating supply water pressure is 5 PSI and minimum water temperature is 65°F.
- Unit heights are increased 5.25".
- Drain pan connection is FPT and horizontal. Drain pan is not insulated.

Flow Rates Required for Water Defrost

Model	gpm
20	18
30	27
40	36
50	45
11	12
21	24
31	36
41	48

ACCESSORIES

- Thermostatic Expansion Valve (TEV).
- Electrical defrost control panels (shipped loose).
- Hot gas defrost check valve (shipped loose).

OPTIONS

- Single phase 50-60 Hertz 115, 208-230, 1/2 hp totally enclosed (TEAO), single speed 1075 RPM available for Series 11-41.
- Three phase 60 Hertz 208/230, 460 volts, 1/2 hp totally enclosed (TEAO), two speed 1140/850 RPM available for Series 11-41.
- Three phase 60 Hertz 208-230, 460 volts, 1/2 hp totally enclosed (TEAO), 1140 RPM inverter ready wash-down duty motor available for Series 11-41.
- Electric heat tape 115V or 230V single phase on the interior of the insulated drain pan cover.
- Hot gas reheat (8 rows total maximum).
- The coil fully dipped and dried with a corrosion resistant coating.
- Variable fin spacing - 2/4 FPI. Bottom two rows have 2 FPI, remainder 4 FPI (6 or 8 row depth models only).
- NEMA 4X factory mounted non-fused disconnect switch.
- Hinged side panels used for easy access to the coil.
- Water wash-down models with insulated stainless steel drain pan.
- Pan to coil check valve for Hot Gas Defrost unit (shipped loose).
- Thermostatic Expansion Valve (shipped loose or factory mounted, if copper tubes).
- Removable side panels for easy coil access.

BTR Unit Coolers are ideally suited for carcass chill and holding coolers, assembly and shipping docks; boning, cutting and packaging rooms; sausage kitchens and any space above 15°F, where people work.

TEV for DXA must be externally equalized and the discharge tube removed, except for models using a single refrigeration circuit requiring a TEV with the discharge tube.

AIR DISTRIBUTION

- Air distribution is four ways at the ceiling level. Air throw radius is 20 to 30 feet. The umbrella effect minimizes drafts.
- It is best to locate units in the center of the bays or on column lines so that the discharge path is not compromised by piping, walls or other structural interference.

FAN MOTOR DATA

- Fan motor nameplate amps are total for the unit. Motors have internal over-heat protection, wired in parallel and cycled with one contactor.
- NEC limits total parallel motor ampacity to 15.0 amps for 208 through 600 volts and 20.0 amps at 125 volts or less. Higher capacity models for 115/1/60V can be provided when more than one parallel motor circuit is used.

- Ampacity will increase as room temperature is lowered (8% at 32°F; 18% at -10° F) due to denser air. As the air temperature lowers TEAO motor capability increases at a faster rate than the imposed fan load.
- Single phase 1/6 hp units can be controlled with manual 2-speed starters. Relays or contactors, used with automatic defrost should be arranged to cycle motors and restart motors on the high speed winding.
- Three phase 1/2 hp units with single-speed motors can be controlled with conventional contactors. Two-speed motors are six lead, two winding type, protected with internal overheat protectors. Normal starting methods can be used.
- When factory wired to one common junction box, motors are factory wired for proper rotation.
- Direct expansion halocarbon systems should have liquid line solenoid valves interlocked with the motor contactor so they are de-energized when unit cooler fans are off. This is not required when compressors are protected with suction traps.

Motor Data											
Horsepower	Volts	Phase	Hertz	RPM HI/LO	Speed	FLA each	Full Load Amps (FLA)Total				
BTR 11-41							1 Fan	2 Fan	3 Fan	4 Fan	5 Fan
1/2	115	1	50/60	1075	1	7.80	7.80	15.60	1 x 7.80 1 x 15.6	1 x 15.6	
1/2	208/230	1	50/60	1075	1	3.90	3.90	7.80	11.70	15.60	
1/2	208/230	3	50/60	1140	1	1.96	1.96	3.92	5.88	7.84	
1/2	380	3	50/60	1140	1	1.10	1.10	2.20	3.30	4.40	
1/2	460	3	50/60	1140	1	0.98	0.98	1.96	2.94	2.94	
1/2	575	3	60	1140	1	0.76	0.76	1.52	2.28	3.04	
1/2	208/230	3	50/60	1140/850	2	1.90	1.90	3.80	5.70	7.60	
1/2	460	3	50/60	1175/850	2	0.87	0.87	1.74	2.61	3.48	
BTR 20-50											
1/6	115	1	50/60	1110	1	2.82*		5.64	8.46	11.28	14.10
1/6	208/230	1	50/60	1110	1	1.42*		2.84	4.26	5.68	7.10

COIL

- BTR Series propeller fan units are modular in design in 1 through 4 fans, Series 11-41 and 2 to 5 fans for Series 20-50.
- Units are designed for medium suction temperatures 20°F to 40°F and from 2 to 15 nominal tons.
- Maximum heat transfer is achieved by staggered 3/4" OD tubes in the direction of air flow. Turbo-Spacers are located between tubes to provide additional air turbulence.
- Each coil is tested underwater with 350 PSIG air.

MATERIAL OF CONSTRUCTION

- Stainless steel tubes/aluminum fins.
- Aluminum tubes/aluminum fins
- Copper tube/aluminum fins.

RATING DATA

- Each coil is engineered for maximum efficiency for its specific design application.
- Capacity listed is BTUH/°F TD sensible heat removal from the wet, dry or frosted coil. Ratings are valid for TDs 20°F or less, SST 20° F to 40° F.
- Wet coil heat transfer is more efficient than frosted resulting in higher ratings.
- Wet coil applications are for room temperatures above 32° F. All face velocities are below 600 FPM.

TEMPERATURE DIFFERENCE (TD)

- Temperature difference (TD) is the difference between return air temperature or room air and coil saturated refrigerant temperature.

50 Hz Electrical Power	0.88
For 2/4 Variable Fin Spacing	
6 Row Models	0.85
8 Row Models	0.89

- Rated capacity is multiplied by the TD to determine total sensible heat capacity in BTUH.

SOUND LEVEL

- Sound Level represents the relative sound pressure in decibels on the "A" scale, when measured six feet horizontally from the unit.
- Actual sound level measured in the field is dependent upon unit location, room size, height and surface hardness of walls, ceiling and product.

REFRIGERANT FEEDS

Recirculated coils have liquid feed orifices to feed the coil evenly and reduce hot gas blow-by during defrost.

Units operating with an overfeed system must provide liquid at 5 PSI above saturated suction pressure and the liquid temperature within 30°F of saturated suction temperature.

- **RT** - Recirculated top feed is recommended for air, water or electric defrost. Refrigerant oil flows downhill to the suction header. This application is not recommended for hot gas defrost units.
- **RB** - Recirculated bottom feed is recommended for hot gas defrost applications. Hot gas condensate and oil flow downhill, back-flowing through the liquid feed orifices which restrict gas blow-by.

Condensate is relieved through the liquid header. Defrost condensate relief devices must be located below the liquid connection. A float drainer should be used in series piped units only (standard configuration); unrelieved vapor will prevent complete and proper defrost cycles.

- **DX** - Direct expansion coils are circuited to have a minimum pressure drop and maintain refrigerant velocity for oil return. Direct expansion coils employ distributors and capillaries to feed each circuit. TEVs must be externally equalized and, on ammonia applications, the discharge tubes must be removed. If a unit does not have a distributor do not remove the TEV discharge tube.

Ammonia TEV applications are not recommended for suction temperatures below 0°F or With TO selections less than 12°F. If sub-cooled liquid is used, it must be specified to assure proper coil circuiting.

- **FL** - Flooded coils are circuited to minimize internal losses while maintaining minimum surge drum operating level. When closed coupled, the liquid level in the drum should be four inches or more above the coil. Flooded coil ratings are the same as recirculated ratings.
- **B** - Coils can be circuited for water or brine (single-phase) refrigerants. Factory engineering is required for proper unit selection. Provide required capacity, brine type, brine concentration, room temperature, entering brine temperature and gpm for selection.

LOW HUMIDITY APPLICATIONS

- Low relative humidity conditions in medium temperature spaces have been achieved with high TD coil designs coupled with variable air volume or reheat to maintain space temperature.

SINGLE-PHASE MOTOR AIR VOLUME CONTROL

- Two speed controlled by 2 stage thermostat.
- Contact factory for control panel details.

THREE-PHASE MOTOR AIR VOLUME CONTROL

- Volume control is achieved by cycling some single-speed fans in one or more units as room temperature drops. Coil surface under off-fan continues to refrigerate dehumidifying air by convection. Soft coil frost must be removed with normal hot gas cycle or by restarting fans for air defrost cycles. Motors will be wired to individual junction boxes.
- Factory mounted line voltage thermostat with sensing bulb in an operating fan return air stream, cycles fans. Allows automatic fan cycling with single-speed motors using one or three pole contactor to control one or more units. A 5°F change in return air temperature is required. Recommended for 35°-55°F docks or work spaces with liquid Recirculated feeds. Arrange for defrost as above.

REHEAT

- Hot Gas Reheat employing 2 rows of surface available for all units and located on the fan side of the unit; 8 rows total maximum.
- An air gap between fins separates them from the refrigerant surface. Unit height remains the same for total rows required. Contact factory for cooling capacity.
- Coil frosting requires defrost cycles to be manual or automatically scheduled in accordance with space operations, such as after clean-up cycles.

DRAIN PAN COVER HEATING

- In rooms that may have humidity condensate dripping from the drain pan cover a heat tape is available to warm the cover.
- The electric heat tape is affixed to the inside of the pan cover with the tail out the side of the pan.
- 115/1 and 230/1 voltages.

Drain Pan Heat Tape Full Load Amps (FLA)				
Model	Total Watts	Amps		Max Fuse Size
		115V	230V	
20	580	5.04	2.52	15.00
30	800	6.96	3.48	15.00
40	1020	8.87	4.43	15.00
50	1240	10.78	5.39	15.00
11	760	6.61	3.30	15.00
21	1280	11.13	5.57	15.00
31	1800	15.65	7.83	20.00
41	2320	20.17	10.09	20.00

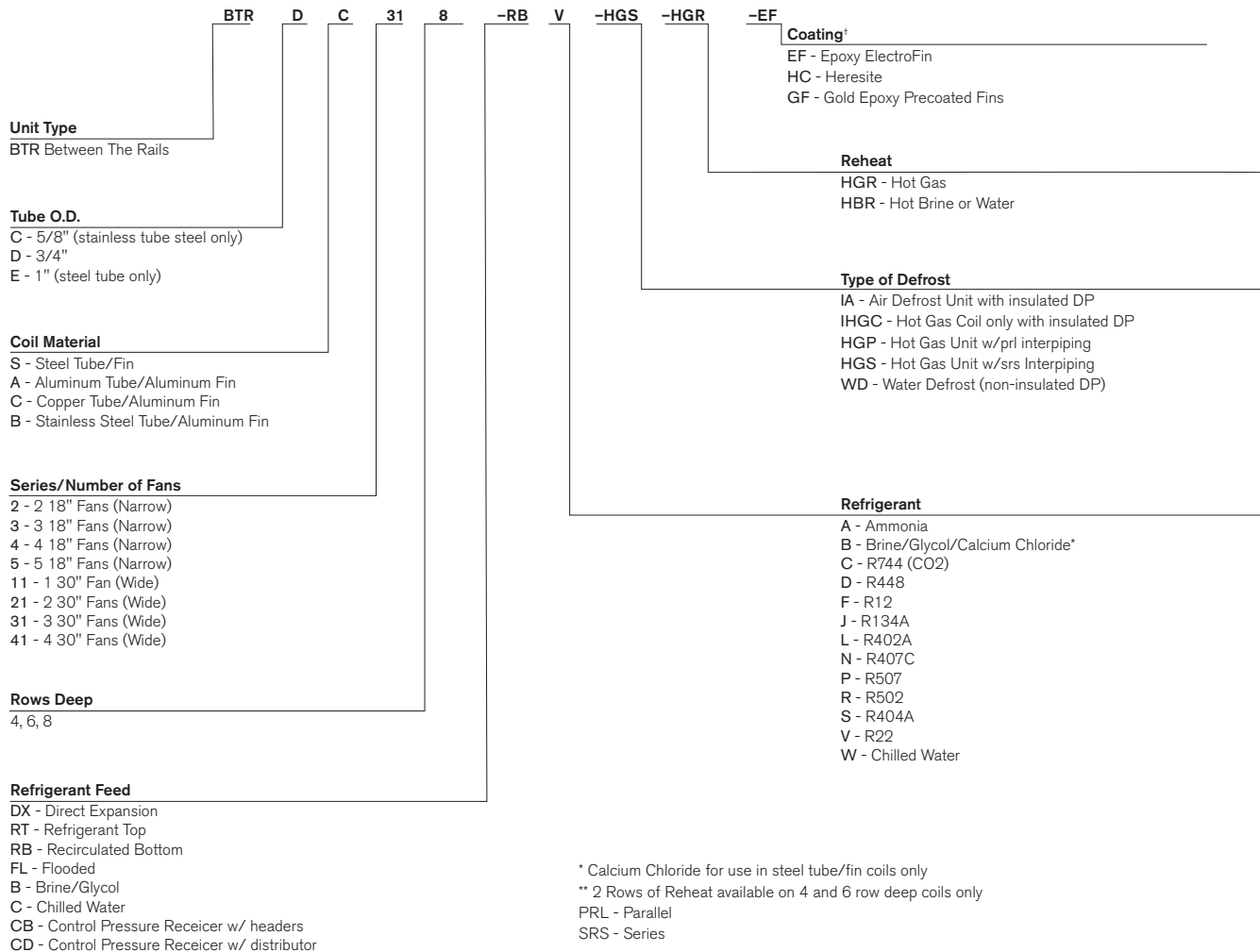
THERMOSTATIC EXPANSION VALVE (TEV)

- Thermostatic Expansion Valve must be externally equalized.

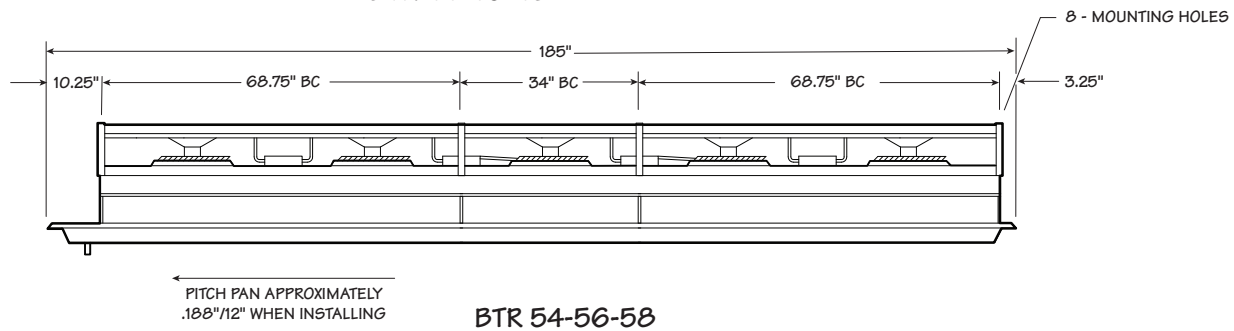
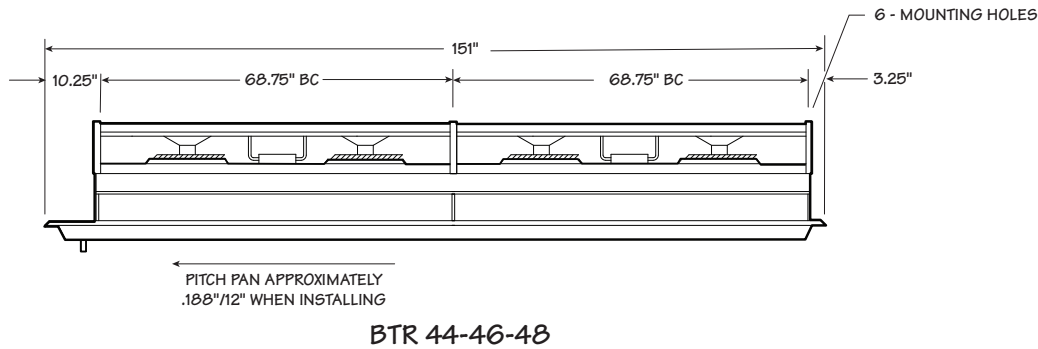
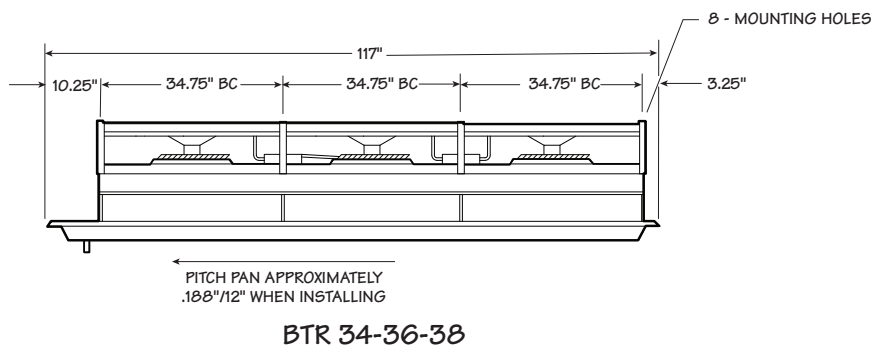
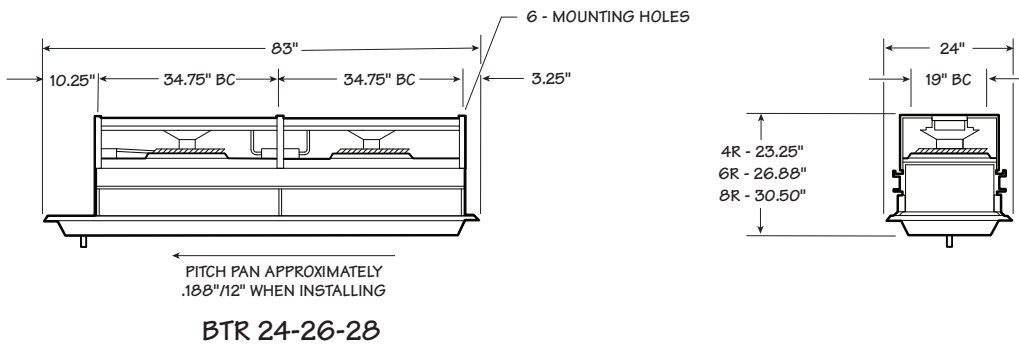
ORDERING INFORMATION - PLEASE SPECIFY

- Quantity and complete model number
- SST-Saturated Suction Temperature
- Room temperature
- Fan motor voltage
- Heater voltage (if applicable)
- Control voltage (if applicable)
- Manufacture commences with order approval

Model Key



BTR 24 - 58

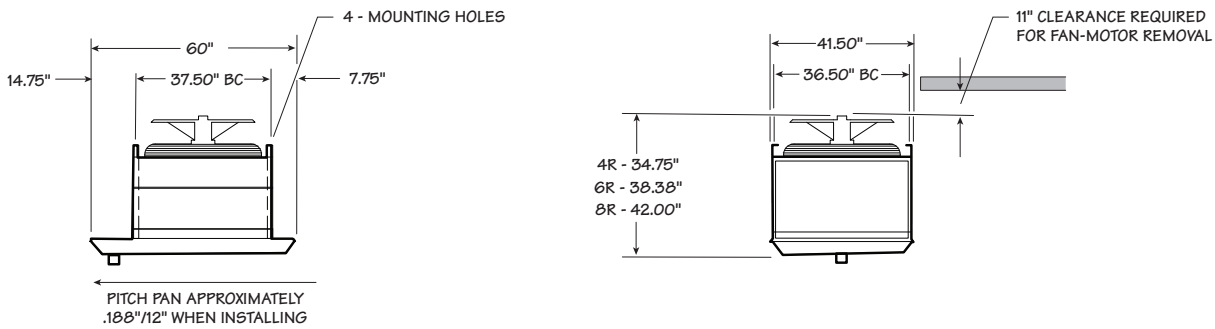


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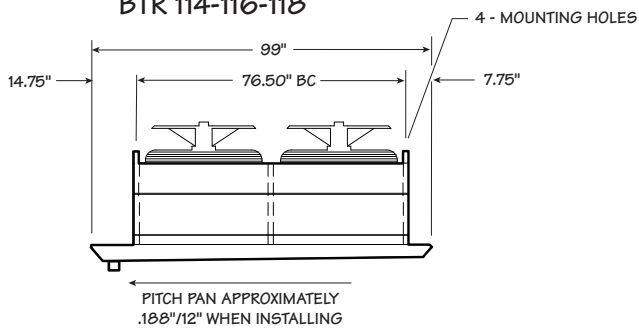
- BC (bolt hole center/hanger).
- Height increases 5 1/4" due to water defrost and extended height side panels.
- Hanger holes are 5/8" diameter for 1/2" diameter threaded rod.
- Main power connections available at any junction box.

Model	TR	CFM
BTR-2	1.6-3.0	2800-4000
BTR-3	2.4-4.6	4200-6000
BTR-4	3.3-6.1	5600-7980
BTR-5	4.1-7.7	7000-10020

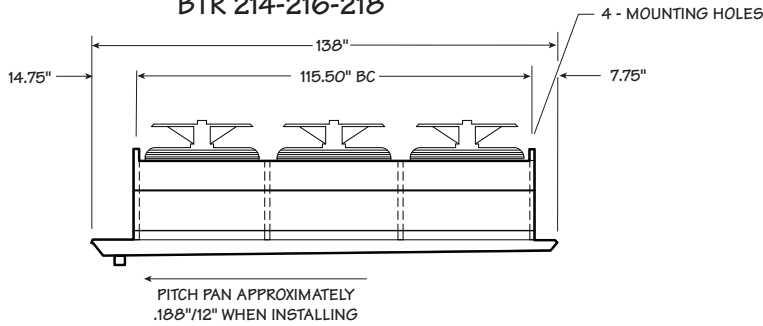
BTR 114-418



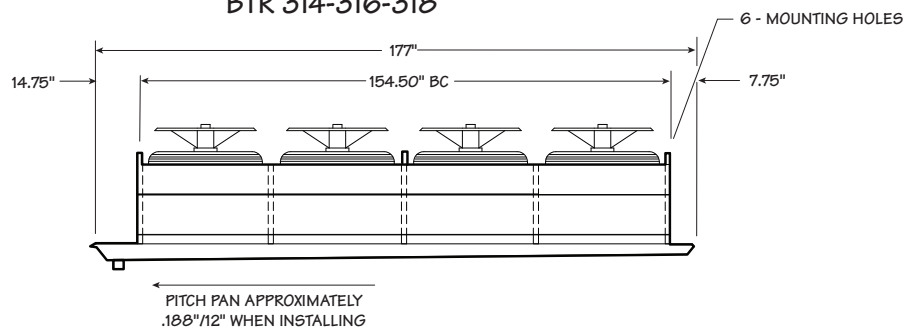
BTR 114-116-118



BTR 214-216-218



BTR 314-316-318



BTR 414-416-418

For primary layout only, do not use for construction.

- BC (bolt hole center/hanger).
- Height increases 5 1/4" due to water defrost and extended height side panels.
- Hanger holes are 5/8" diameter for 1/2" diameter threaded rod.
- Main power connections available at any junction box.

Model	TR	CFM
BTR-11	1.9-3.8	4050-6000
BTR-21	3.9-7.6	8550-12000
BTR-31	5.9-11.5	12150-18000
BTR-41	7.9-15.2	16200-24000

