



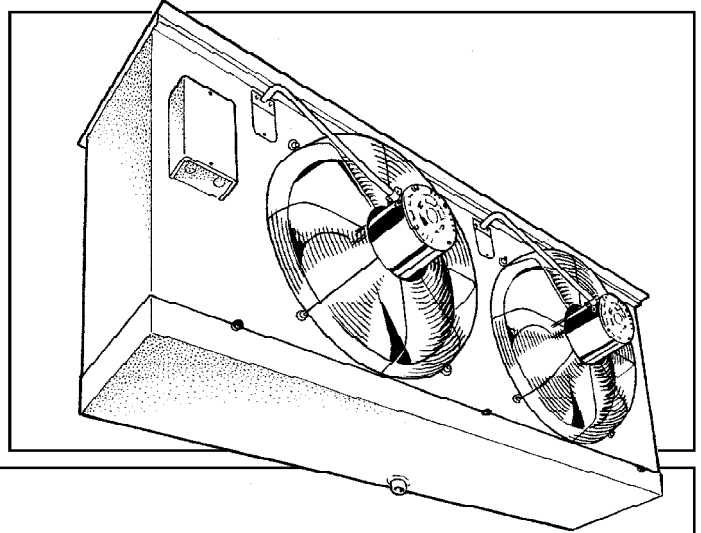
TUH HEAT RECLAIM UNIT HEATERS

SPECIFICATIONS INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR REFRIGERATION SYSTEMS

ELECTRICAL POWER:

115/1/60, 208-230/1/60, 208-230/3/60,
460/3/60, 575/3/60

BULLETIN: T90-TUH-PDI-10
1064634



- Designed for Supermarkets, Convenience Stores, Restaurants, Refrigerated warehouses, arenas/curling rinks and institutions.
- Reclaims waste heat for use in shipping/receiving areas, storage, preparation and work areas.
- Heavy gauge all aluminum cabinet with plated and non-ferrous corrosion resistant fasteners throughout.
- Cleanable, durable textured aluminum cabinet.
- Thermally protected and permanently lubricated fan motor for long life and dependability.
- Compact size maximizes usable storage space.
- Stainless steel and nylon hardware eliminates rusting and stripping of fasteners.
- Corrosion resistant white polycarbonate fan guard.

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TUH HEAT RECLAIM UNIT HEATERS

FEATURES

CABINET - Heavy gauge all aluminum construction for long life and minimum weight. Plated and non-ferrous corrosion resistant fasteners used throughout. Electrical connection box and all refrigerant connections on outside of cabinet.

COIL - Heat reclaim coil fabricated from 5/8" (16mm) O.D. copper tube mechanically expanded to provide a secure bond with rippled aluminum plate fins for optimum heat transfer. Coil circuited for minimum pressure drop and drainability to prevent logging of oil and liquid refrigerant. Coil assembly leak tested at 300 psig, dehydrated and sealed.

NUMBER OF COIL CIRCUITS - Standard models are supplied with two equal circuits. Other arrangements of two or three circuits are available.

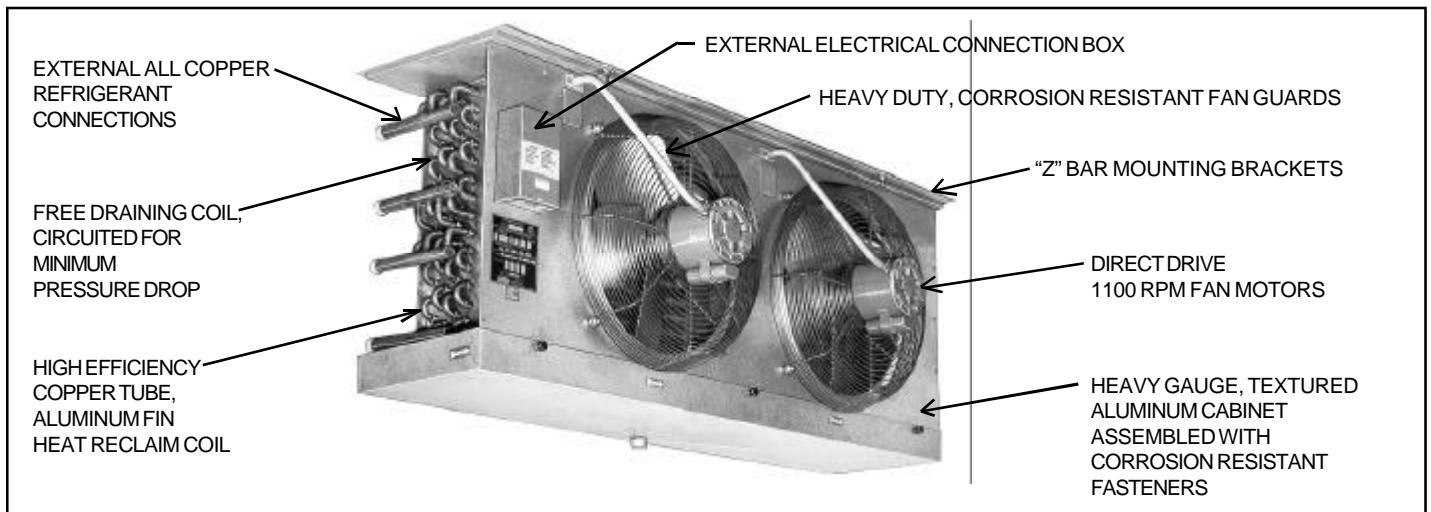
FANS - Aluminum fans. Die formed venturi fan discharge provides quiet, efficient operation with maximum air throw.

MOTORS - Permanently lubricated, totally enclosed motors feature thermal protection and current overload sensors for maximum life and dependability. Direct drive arrangement eases service and allows operation of the unit in case of partial motor failure. Available for 575/3/60, 460/3/60, 208/3/60, 208-230/1/60 or 115/1/60 entering electrical service.

FAN GUARD/MOTOR MOUNTS - Heavy gauge steel wire fan guard/motor mounts are zinc plated for corrosion protection.

WIRING - Moisture and fungus resistant wiring harness. All electrical connections at one location.

INSTALLATION FEATURES - "Z" bar mounting brackets with mounting holes on 8" (203mm) centers allows installation to varied joist centers or ceiling panel lengths. External electrical connection box and refrigeration connections simplify installation.



SYSTEM DESIGN

TUH Heat reclaim units may be used in series or parallel with an outside condenser.

Parallel piping is used when the heat reclaim system is to recover 100% of the system total heat of rejection. A three-way valve in the discharge line directs the refrigerant flow either to the outside condenser or to the heat reclaim unit. See Fig. 1

Series piping is used when the amount of heat to be recovered is less than the total heat of rejection. A three-way valve controls refrigerant flow. A by-pass arrangement with a balancing globe valve, is used to prevent excessive refrigerant pressure drop in the heat reclaim unit. See Fig. 2.

Check valves prevent refrigerant back flow to the coil not in use.

Figure 1 - TUH Heat Reclaim Unit piping arrangement when total heat of rejection does not exceed capacity of heat reclaim unit.

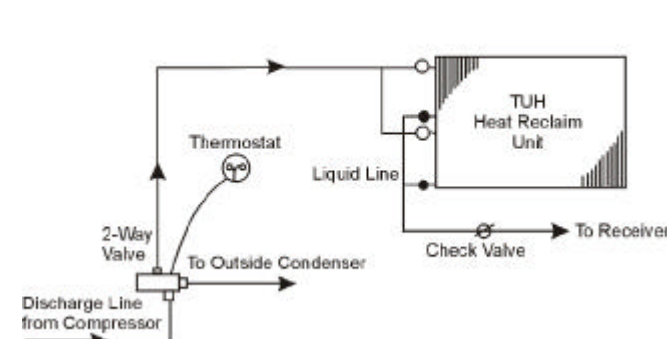
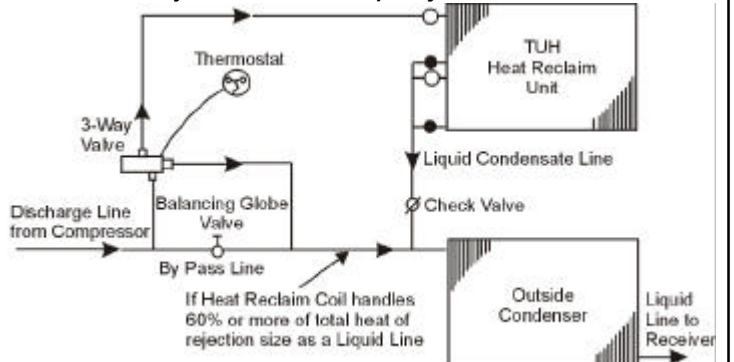


Figure 2 - TUH Heat Reclaim Unit piping arrangement when total heat of rejection exceeds capacity of heat reclaim unit.



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CIRCUITING ARRANGEMENT

Each TUH Heat Reclaim Unit has a total of 16 "face tubes". Five (5) different circuiting arrangements are available, consisting of various combinations of 4, 6, 8, 10 and 12 tube circuits, totalling 16 tubes.

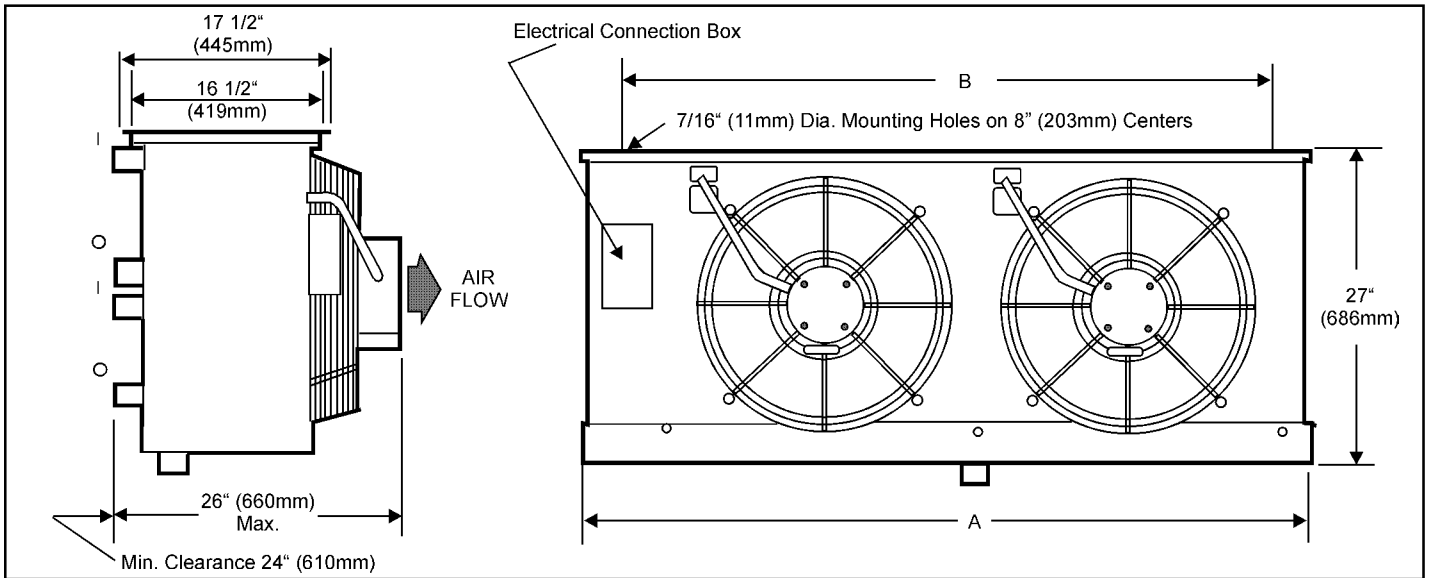
- (1) 2 - 8 face tube circuits (standard models)
- (2) 1 - 6 face tube circuit and 1 - 10 face tube circuit
- (3) 1 - 4 face tube circuit and 1 - 12 face tube circuit
- (4) 1 - 4 face tube circuits and 2 - 6 face tube circuits
- (5) 2 - 4 face tube circuits and 1 - 8 face tube circuit

No other combinations are available.

TUH MODEL		TUH2-23	TUH2-30	TUH3-35	TUH3-45
HEAT RECLAIM CAPACITY PER CIRCUIT - MBH (kW) R-22 ⁽¹⁾					
4 FACE TUBE CIRCUIT	20°F (11°C) T.D. ⁽²⁾	14.3 (4.2)	17.8 (5.2)	21.4 (6.3)	26.6 (7.8)
	30°F (17°C) T.D. ⁽²⁾	21.5 (6.3)	26.7 (7.8)	32.1 (9.4)	39.8 (11.7)
	40°F (22°C) T.D. ⁽²⁾	28.6 (8.4)	35.5 (10.4)	42.8 (12.5)	53.1 (15.6)
	50°F (28°C) T.D. ⁽²⁾	35.8 (10.5)	44.4 (13.0)	53.5 (15.7)	66.4 (19.4)
6 FACE TUBE CIRCUIT	20°F (11°C) T.D. ⁽²⁾	21.5 (6.3)	26.6 (7.8)	32.1 (9.4)	39.8 (11.7)
	30°F (17°C) T.D. ⁽²⁾	32.2 (9.4)	40.0 (11.7)	48.2 (14.1)	59.7 (17.5)
	40°F (22°C) T.D. ⁽²⁾	42.9 (12.6)	53.3 (15.6)	64.1 (18.8)	79.6 (23.3)
	50°F (28°C) T.D. ⁽²⁾	53.7 (15.7)	66.6 (19.5)	80.2 (23.5)	99.5 (29.1)
8 FACE TUBE CIRCUIT	20°F (11°C) T.D. ⁽²⁾	26.8 (8.4)	35.5 (10.4)	42.8 (12.5)	53.1 (15.6)
	30°F (17°C) T.D. ⁽²⁾	42.9 (12.6)	53.3 (15.6)	64.2 (18.8)	79.6 (23.3)
	40°F (22°C) T.D. ⁽²⁾	57.2 (16.8)	71.0 (20.8)	85.5 (25.0)	106.1 (31.1)
	50°F (28°C) T.D. ⁽²⁾	71.6 (21.0)	88.8 (26.0)	106.9 (31.3)	132.7 (38.9)
10 FACE TUBE CIRCUIT	20°F (11°C) T.D. ⁽²⁾	35.8 (10.5)	44.4 (13.0)	53.5 (15.7)	66.4 (19.4)
	30°F (17°C) T.D. ⁽²⁾	53.6 (15.7)	66.6 (19.5)	80.3 (23.5)	99.5 (29.1)
	40°F (22°C) T.D. ⁽²⁾	71.5 (20.9)	88.8 (26.0)	106.9 (31.3)	132.6 (38.8)
	50°F (28°C) T.D. ⁽²⁾	89.5 (26.2)	111.0 (32.5)	133.6 (39.1)	165.9 (48.6)
12 FACE TUBE CIRCUIT	20°F (11°C) T.D. ⁽²⁾	42.9 (12.6)	53.3 (15.6)	64.2 (18.8)	79.7 (23.3)
	30°F (17°C) T.D. ⁽²⁾	64.4 (18.9)	80.0 (23.4)	96.3 (28.2)	119.4 (35.0)
	40°F (22°C) T.D. ⁽²⁾	85.8 (25.1)	106.5 (31.2)	128.3 (37.6)	159.2 (46.6)
	50°F (28°C) T.D. ⁽²⁾	107.4 (31.5)	133.2 (39.0)	160.4 (47.0)	199.1 (58.3)
CONNECTION SIZES - O.D.S. - IN. (MM)					
4 FACE TUBE CIRCUIT	INLET	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)
	OUTLET	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)
6 FACE TUBE CIRCUIT	INLET	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)
	OUTLET	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)
8 FACE TUBE CIRCUIT	INLET	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)	1 3/8 (35.0)
	OUTLET	1 1/8 (28.5)	1 1/8 (28.5)	1 1/8 (28.5)	1 3/8 (35.0)
10 FACE TUBE CIRCUIT	INLET	1 1/8 (28.5)	1 1/8 (28.5)	1 3/8 (35.0)	1 3/8 (35.0)
	OUTLET	1 1/8 (28.5)	1 1/8 (28.5)	1 3/8 (35.0)	1 3/8 (35.0)
12 FACE TUBE CIRCUIT	INLET	1 1/8 (28.5)	1 3/8 (35.0)	1 3/8 (35.0)	1 5/8 (41.0)
	OUTLET	1 1/8 (28.5)	1 3/8 (35.0)	1 3/8 (35.0)	1 5/8 (41.0)

NOTES: • For R12 use R22 ratings x .95. For R502, use R22 ratings x 0.98
 • TD = Condensing temperature minus entering air temperature

DIMENSIONAL DATA



TUH MODEL		TUH2-23		TUH2-30		TUH3-35		TUH3-45			
DIMENSIONAL DATA											
Overall Length	-A	In.	64 1/4		64 1/4		90 1/4		90 1/4		
		mm	1632		1632		2292		2292		
Outside Hanger Holes	-B	In.	56		56		80		80		
		mm	1422		1422		2032		2032		
Connection Sizes (O.D.S.) Standard Model	Inlet	In.	1 1/8		1 1/8		1 1/8		1 3/8		
		mm	28.5		28.5		28.5		35		
	Outlet	In.	1 1/8		1 1/8		1 1/8		1 3/8		
		mm	28.5		28.5		28.5		35		
Shipping Volume			Cu. Ft.	43.3		43.3		58.7		58.7	
			Cu. m	1.22		1.22		1.66		1.66	
Shipping Weight			Cu. Ft.	239		279		330		397	
			Cu. m	108		127		150		180	
ELECTRICAL DATA											
Fan Motors (1100 RPM)	Qty. & HP		2 - 1/4		2 - 1/4		3 - 1/4		3 - 1/4		
	Qty. & W		2 - 186		2 - 186		3 - 186		3 - 186		
Total FLA	575/3/60		0.92		0.92		1.38		1.38		
	460/3/60		1.04		1.04		1.56		1.56		
	208/230/3/60		2.80		2.80		4.20		4.20		
	208/230/1/60		2.80		2.80		4.20		4.20		
	115/1/60		5.60		5.60		8.40		8.40		
APPLICATION DATA											
Refrigerant Charge Per Face Tube R-22, R-502 ⁽¹⁾	Normal	lb.	9.8		14.6		14.3		21.5		
		kg	4.44		6.62		6.49		9.75		
	Limitrol	lb.	65.3		97.4		95.1		143.3		
		kg	29.6		44.2		43.1		69.0		
Air Flow	CFM		5000		4800		7500		7200		
	L/S		2360		2265		3540		3395		

NOTE: For R12 use R22 charge x 1.11



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