



TRANE™

RTHA Screw Compressor Liquid Chillers

- Water cooled, packaged liquid chillers, with nominal cooling capacities from 260 to 900 kW.
- Chlorine-free refrigerant HFC 134 a.
- Trane accessible-hermetic screw compressor, direct drive, with integral oil separator and full economizer cycle.
- Liquid refrigerant-cooled motor.
- Latest design heat exchangers with most advanced heat transfer surfaces.
- Microprocessor-based control and protection system.
- Unit mounted motor starter.
- Fully factory run tested before shipment.
- Designed and manufactured in accordance with the Trane Quality Management System, approved to BS 5750, Part 1.



HFC
134a
ODP = 0



B20 CA 007 E

Liquid Chillers, water cooled, with Trane screw compressor.
Series RTHA. 260 to 900 kW. Refrigerant 134a.

The TRANE RTHA : The most advanced liquid chiller on the market featuring a modern, hermetic TRANE screw compressor and the safe, environmentally acceptable alternative refrigerant R 134a.

The new Trane screw compressor is the first large capacity, accessible-hermetic helical rotary compressor, specifically designed and optimized for comfort and process water chiller applications. It is not an adaptation or industrial refrigeration of rotary air compression technology.

Helical rotary compressor technology is already proven in many industrial applications, in particular in low temperature refrigeration, air and gas compression.

Recent advancements in computer modeling and compressor design, as well as in machining technology now allow Trane to produce screw compressors which meet the highest efficiency and reliability requirements and exceed the performance of the best centrifugal and reciprocating chillers today.

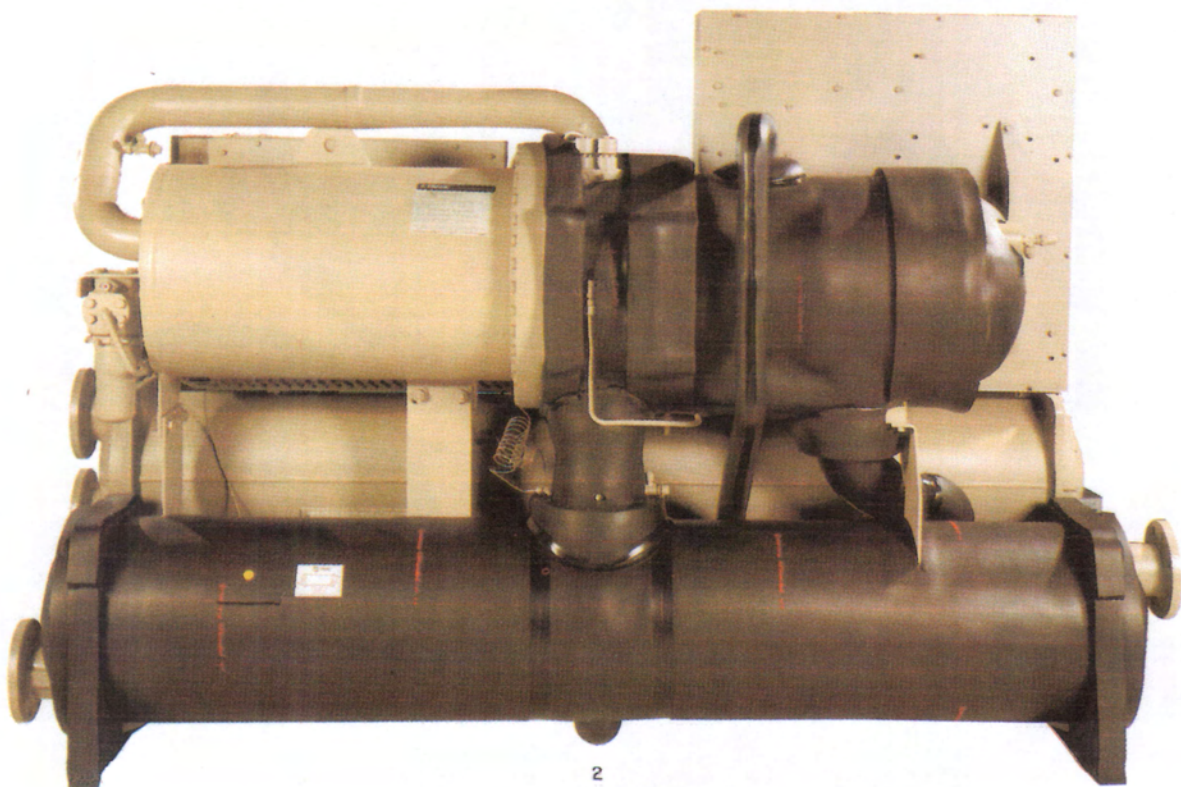
Trane has invested 15 years of research, development and testing to perfect the screw compressor design, optimizing efficiency and reliability.

The new RTHA liquid chiller has been designed around the new Trane screw compressor and

incorporates the latest advancements in heat exchange and microprocessor-based control technology, providing its future owners the best overall system value in the market.

The RTHA is a truly industrial product, reliable and efficient, built to the highest standards. It combines the advantages of existing reciprocating and centrifugal chiller designs, but avoids their weaknesses.

The RTHA represents an entirely new generation of chillers, different and better, which already today meets the requirements of the next decades.



The Trane RTHA :

Unmatched energy efficiency and reliability, ease of installation and utilization.

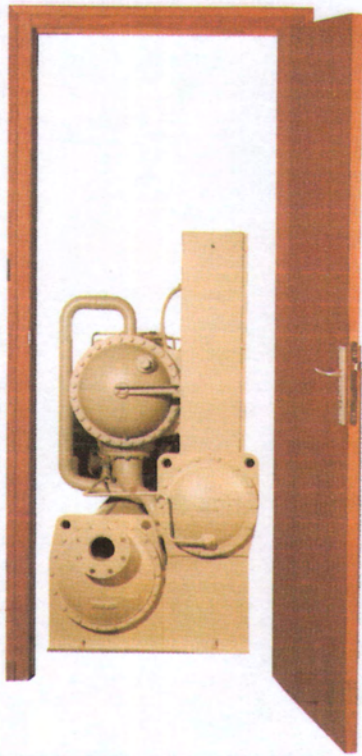
Energy efficiency

- **Excellent Energy efficiency of the RTHA** resulting in energy costs lower than any comparable chiller. Part load efficiencies are unmatched by any other manufacturer.
- **Precise rotor tip clearances**
Reduces the leakage between high and low pressure cavities during compression. Achieved with the latest manufacturing and machining technology and automated electronic checking of parts during the production process.
- **Optimized rotor profiles**
Rotors and unloader valves are unique designs, computer optimized for the pressure ratios typical for chiller applications both at full load and part load.
- **Direct drive**
The motor drives directly the male rotor, eliminating losses from speed changing gear assemblies.
- **Economizer cycle**
Full flow, in-line economizer cycle improves cycle efficiency an average of four percent and is comparable to the economizer cycle of the Trane two-stage centrifugal chillers.
- **Advanced heat transfer surfaces**
Condenser and evaporator design and tube surfaces represent the latest heat transfer technology for increased efficiency.

Reliability

- **Rugged Helical Rotary Compressor**
Simple design with only two rotating compressor parts. Fewer moving parts means higher reliability. No valves, no highly stressed parts. The compressor housing and rotors are ruggedly constructed.
- **Direct Drive Low Speed Compressor**
Direct drive means no maintenance or service problems associated with gear boxes. Lower speed means inherently higher reliability.
- **Premium Class 5 Bearings**
Rotor and motor bearings are premium class 5 grade commonly used only for applications such as machine tool spindles and aircraft jet engines.

- **Patented Oil Separator**
Part of the new Trane technology is a Trane patented oil separator system that captures the oil leaving the compressor discharge and keeps the oil where it should be : in the compressor.
- **Liquid Refrigerant Cooled Motor**
This proven feature of Trane centrifugal chillers keeps the motor uniformly cooled at a lower temperature. Lower temperatures mean longer motor life.
- **Fixed Orifice Refrigerant Metering**
Refrigerant metering system with



calibrated orifice plates with no moving parts to fail.

- **Microprocessor Controls**
The state-of-the-art microprocessor controls offer a higher level of protection than non-electronic controls. Over 35 parameters are monitored to prevent problems from becoming failures.
- **Years of Research and Testing**
Trane has put more than 15 years to research into helical rotary compressors. The new Trane screw compressor has undergone thousands of hours of testing, much of it at severe operating conditions beyond the normal air conditioning application. The result is a proven, reliable chiller.

Ease of installation

- **Exceptionally compact design**
Requires up to 40 % less floor space to install. Most RTHA units fit through standard size doors and are thus particularly well suited for replacement and renovation projects.
- **Unit mounted starter**
Simplifies installation on site and places the responsibility for the starter and the power wiring with the chiller manufacturer.
- **Full factory run test**
Virtually eliminates start-up problems on site. Unit arrives on site thoroughly run tested at the factory, with its full charge of refrigerant and oil.

User-friendly controls

- **Microprocessor-based control system**
controls, optimizes and monitors chiller operation. The programmed control logic anticipates and corrects potential operational problems and maintains the chiller in operation where traditional systems would shut down the machine.
- **Easy to use operator interface,**
displays all control parameters, operating and diagnostic codes and provides chiller operating status information. In case of a problem the system provides detailed diagnostic information in addition to the latest operating status data.
- **System control panel**
The optional, programmable system control panel SCP optimizes the control of a 2- or 3- chiller installation including pumps and cooling towers. It provides sophisticated control strategies including 7-day scheduling of set points and current limitation and accepts analog inputs from a building management system.
- **Serial communication interface**
This optional interface allows the integration of the RTHA chiller into a higher level building automation system and offers the possibility of binary transmission of operating commands via a RS 232 serial communication link.

HFC 134a :

A new non-flammable, non-toxic, chlorine-free refrigerant with zero ozone depletion potential.

HFC 134a is a hydrofluorocarbon which does not contain chlorine and thus does not contribute to the depletion of the stratospheric ozone.

HFC 134a is very well suited to replace CFC 12 but also HCFC 22 in most liquid chiller applications, in particular for centrifugal, screw and scroll compressor comfort cooling and process chillers.

A good cycle efficiency and favorable heat transfer characteristics lead to an overall system efficiency of HFC 134a equal or better than the efficiency of current design CFC 12 and HCFC 22 equipment.

HFC 134a is listed in the European EINECS-inventory of approved chemical compounds for which no further toxicity testing is required by the regulation.

The voluntary toxicity testing programme which includes HFC 134a (PAFT 1), a cooperative research effort of the 15 leading chemicals companies in the world, was undertaken to facilitate and accelerate the phase out of CFC's.

The PAFT programme on HFC 134a is now complete.

All results show that HFC 134a will be at least as safe as CFC 12 which has an excellent record, including in medical applications.

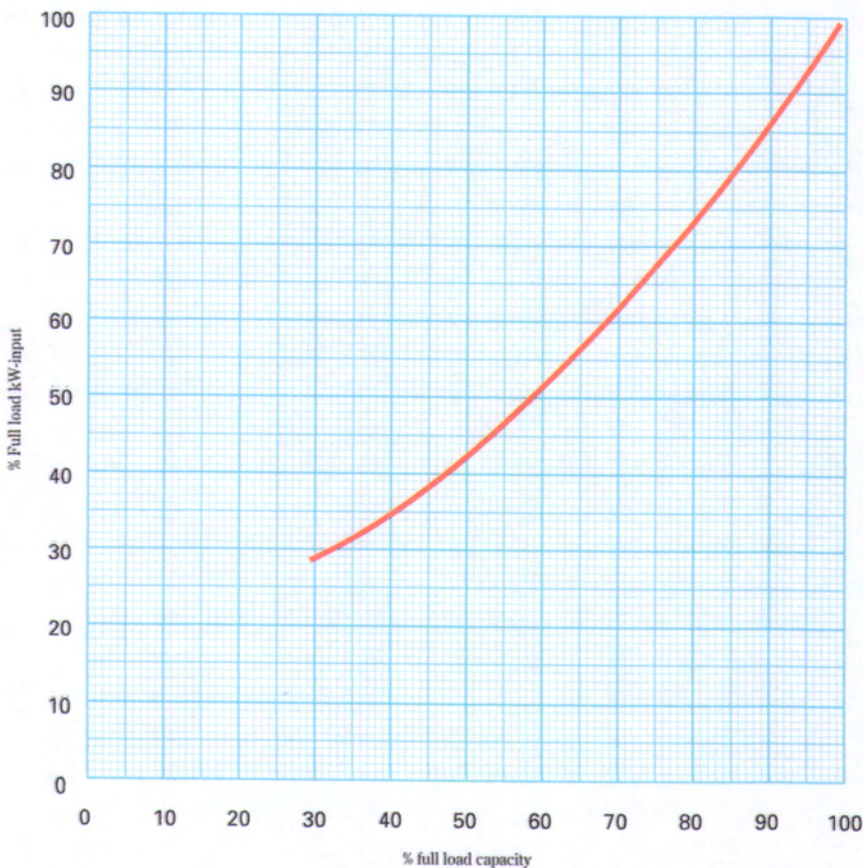
All PAFT members have set the recommended occupational exposure limit for HFC 134a at 1000 ppm, the same as for CFC 12, the highest level that is ever assigned to any industrial chemical. This OEL-level confirms the extremely low toxicity of this refrigerant (the OEL of HCFC 22 is 500 ppm).

Extensive research and development efforts in TRANE's corporate R+D laboratories were necessary to adapt the proven RTHA chiller design to the environmentally acceptable refrigerant HFC 134a and to optimize its performance.

Suitable lubricants and sealing materials had to be identified, screened and extensively tested and their compatibility established.

The result of this R+D programme is an advanced chiller design which combines a proven mechanical concept, high efficiency, unmatched reliability and a safe, environmentally-acceptable refrigerant.

Part load performance



Part load chiller operation is normally associated with reduced condenser water temperatures. At part load operation, the heat rejected to the cooling tower is less than at full load operation.

Also, part load operation is typically associated with reduced outside wet bulb temperatures, resulting in improved cooling tower performance. The net result of less heat rejection and lower wet bulb temperature is cooler condenser water entering the chiller and improved unit performance. A representative load line which takes into account condenser water relief per ARI Standard 550 (1,4°C per 10% unloading) is shown on this page. The specific unit part load performance depends on the specific operating conditions and the heat exchangers.

The RTHA can unload and operate at part load down to 30% of full load depending on the operating conditions. The anti-recycle timeout period of max. 5 minutes however allows the machine to also operate at part load conditions well below 30% of full load.

General data

Model	RTHA	130		150		180		215		255		300		380		450	
Version	(5)	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa
Nominal capacity (1)	(kW)	262	274	304	317	360	378	408	426	531	557	611	638	738	777	862	903
Power input (1)	(kW)	48	47	56	54	68	67	75	73	95	93	105	103	141	137	162	158
Maximum motor kW rating (2) 415V	(kW)	84		94		113		128		173		173		251		251	
Maximum load amps (3)	(A)	131		148		180		203		271		271		400		400	
Starting amps (4)	(A)	217		263		320		369		542		542		982		982	
Control power	(VA)	1200		1200		1200		1200		1600		1600		1600		1600	
Evaporator water content	(litre)	64	83	64	83	64	83	72	95	87	114	102	132	125	163	144	185
Condenser water content	(litre)	42	55	42	55	49	64	57	76	72	95	83	110	102	132	117	151
R134a Operating charge	(kg)	110	145	110	145	110	145	110	145	150	205	150	205	195	260	195	260
Oil operating charge	(litre)	17.5	17.5	17.5	17.5	21	21	22.5	22.5	32.5	32.5	35	35	35	35	37.5	37.5
Unit operating weight	(kg)	2700	3000	2700	3000	2740	3030	2740	3030	4280	4730	4280	4730	5930	6430	5930	6430
Unit shipping weight	(kg)	2800	3100	2800	3100	2900	3200	2900	3200	4500	5000	4500	5000	6000	6500	6000	6500

Notes :

- (1) At 13/7° C evaporator, 27/32° C condenser. Fouling factor = 0.044 m² k/kW. Evaporator = 3 passes, Condenser = 2 passes. Refrigerant 134a.
- (2) Maximum motor kW rating based on maximum load amps allowed. 415/3/50.
- (3) Maximum load amps allowed. 415/3/50.
- (4) Starting amps, star-delta starting mode. 415/3/50.
- (5) SEa = Standard efficiency (short shells). HEa = High efficiency (long shells).

Dimensions

Model	RTHA	130		150		180		215		255		300		380		450	
Version	(2)	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa	SEa	HEa
Length	(mm)	2713	3475	2713	3475	2713	3475	2713	3475	2759	3521	2759	3521	2924	3542	2924	3542
Width	(mm)	932	932	932	932	909	909	909	909	1199	1199	1199	1199	1315	1315	1315	1315
Height	(mm)	1763	1763	1763	1763	1785	1785	1785	1785	2018	2018	2018	2018	2360	2360	2360	2360
Clearance (1)	(mm)	2400	3100	2400	3100	2400	3100	2400	3100	2400	3100	2400	3100	2400	3100	2400	3100
Connexion sizes	(mm)																
Evaporator	2 pass	125	125	125	125	125	125	125	125	150	150	150	150	150	150	150	150
	3 pass	100	100	100	100	100	100	100	100	125	125	125	125	125	125	125	125
	4 pass	100	100	100	100	100	100	100	100	125	125	125	125	125	125	125	125
Condenser	2 pass	100	100	100	100	100	100	100	100	125	125	125	125	150	150	150	150

Notes :

- (1) Tube removal clearance at either end of the machine
- (2) Heat exchanger size : SEa = Standard efficiency (short shells). HEa = High efficiency (long shells).
- (3) Dimensions are approximate. Certified drawings available upon request.

Mechanical specifications

Trane series RTHA packaged rotary liquid chiller, consisting of an accessible hermetic, direct drive screw compressor, condenser, evaporator, microprocessor-based controls and a unit-mounted compressor motor starter, factory run tested and ready for operation. Refrigerant R 134 a.

Compressor - Motor Assembly

Trane screw compressor, accessible-hermetic, direct drive, 2950 rpm. Separately-housed, pressure-lubricated rolling element bearing groups at each end of both rotors. Continuous capacity control by use of a slide valve in the rotor section of the compressor, positioned by hydraulic action. Integral economizer with no moving parts. Squirrel-cage two-pole induction motor, liquid refrigerant cooled. Patented design oil separator, integral part of the compressor assembly, assures exceptionally low oil circulation rate and contains the full operating oil charge of the system.

Lubrication system

Circulation of the oil used for bearing lubrication and compressor oil injection by differential pressure without mechanical oil pump. Oil supply circuit including oil filter, solenoid valves, and flow switch.

Evaporator - condenser assembly

Shell-and-tube type, cleanable heat exchangers, with the refrigerant inside the shell, the water inside the tubes. Carbon steel shells with steel tube sheets welded to each end. Intermediate tube supports. Evaporator and condenser tubes are individually replaceable, externally finned, internally enhanced, seamlesscopper, mechanically expanded into tube sheets.

Cast iron or fabricated steel, removable water boxes with flanged water connections. Maximum water side working pressure 1.05 MPa (standard) or 2.1 MPa (optional). Evaporator factory insulated with closed-cell insulation material.

Refrigerant expansion system

Two-stage multiple orifice refrigerant metering system with no moving parts. In-line, full-flow economizer.

Control panel

Unit mounted, microprocessor-based control and protection system ensuring all control and safety functions for fully automatic operation, in particular :

- Leaving chilled water, PID-type temperature control, incl. four-position selector :
Load-Unload-Hold-Automatic.
- Automatic shutdown protection with manual reset for low evaporator refrigerant pressure and temperature, high condenser refrigerant pressure, high compressor discharge temperature, motor current overload, phase reversal and low oil flow.
- Automatic shutdown protection with automatic reset for low line voltage, loss of chilled water flow and loss of condenser water flow.
- Automatic shutdown protection in the event of low evaporator refrigerant temperature high condenser refrigerant pressure, motor current overload, motor current setpoint limit.
- Menu-driven display of control parameters, operating and diagnostic codes.
- Chiller operating status indicating LED'S.
- Suction and discharge pressure gauges.

Starter panel

Unit mounted starter panel, protection class IP 42. Panel door mechanically interlocked with disconnect switch. Panel contains star-delta, closed transition type motor starter, disconnect switch with fuses, 3-phase current transformer for motor overload protection. Ammeter and voltmeter located on the panel door.

Factory run test

Pressure and leak test of individual components and after unit assembly. Complete factory run test at contract conditions to verify unit performance and operating and safety control system.

Shipment

Units ship fully assembled and wired ready for operation after field connection of power supply, electric interlocks and system water piping. Refrigerant and oil operating charges are supplied inside the unit.

Quality assurance

The Quality Management System applied by Trane has been subject to independent third party assessment and approval to BS 5750 Part 1, I.S.O. 9001, and N.EN. 2646. The products described in this catalogue are designed, manufactured, and tested in accordance with the approved system requirements as defined in the Trane Quality Manual.

Trane reserves the right to alter any information without prior notice.

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