Tyler

Via Hand Delivery

March 9, 2001

Mr. Bob Eller
Compliance Project Manager
California Energy Commission
1516 9th Street, MS3000
Sacramento, CA 95814-5504

Subject: Larkspur Energy Facility Application for Certification
Request for Information on Chiller Performance Specifications
Docket No. 01-EP-1

Dear Mr. Eller:

Please find attached information on Chiller Performance Specifications requested by Energy Commission staff.

Thank you very much for your time and support of this project. Please contact me at (713) 374-3914 if you have any questions regarding this submittal.

Sincerely,

Mark Turner
Project Development Manager
Wildflower Energy LP

INTERGEN
NORTH AMERICA

Construction & Operations Dept.
909 Fannin, Suite 2222
Houston, Texas 77010

Phone: 713-374-3900
Fax: 713-374-3970

FACSIMILE

TO: **Mark Turner**

FAX: (916) 679-2900
FAX2: (858) 320-1550

FROM: **William Kelsey**
Construction & Ops

FAX: (713) 374-3970
PHONE: (832) 397-5807

DATE: 3/8/01

PAGES: 15

RE:

Message:

YK MILLENNIUM CHILLER PERFORMANCE SPECIFICATION

Unit Tag	Qty.	Model No.	Capacity (tons)	Volts/Ph/Hz	Refrigerant
YK2000	1	YKTFTBJ4-DJES	2000	4160/3/60	R-134A

Unit Data	Evaporator	Condenser
EWT (deg F.)	54.55	86.00
LWT (deg F.)	40.00	100.41
Flow Rate (gpm)	3300.0	4000.0
Pressure Drop (ft)	28.1	17.0
Fluid Type (%)	WATER	WATER
Circuit # of Passes	2	2
Fouling Factor (ft² °F hr / Btu)	0.00010	0.00025
Tube No. / Description:	181 - 0.025" Enhanced Copper	230 - 0.025" Enhanced Copper
Design Working Pressure(psig)	150	150
Entering Water Nozzle @ Location:	J	T
Leaving Water Nozzle @ Location:	K	U
Water Box Weight, ea (lbs):	624	520
Cover Plate Weight, ea (lbs):	N/A	N/A
Return Head Weight (lbs):	487	384
Water Weight (lbs):	2917	3809

Performance Data	
KW	1438
KW/Ton	0.719
NPLV (1)	0.618
Shaft HP	1852

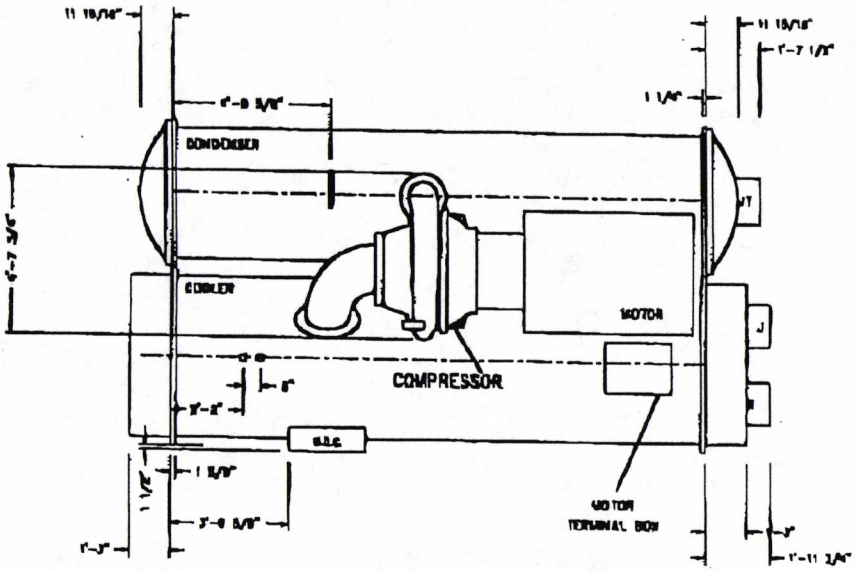
Electrical Data	
FLA	224
LRA	1736
Inrush Amps	1736
Oil Pump Volts	460/3/60
Oil Pump FLA	3.6
Min Circuit Amps	280
Max Fuse/Breaker	500
Type Starter: Across-The-Line	

Other	
Operating Wt. (lbs)	57216
Refrigerant Wt. (lbs)	3995
Oil Charge (gal)	20
Motor Wt. (lbs)	7900
Compressor Wt. (lbs)	5000
Starter Wt. (lbs)	
Shipping Wt.	50490

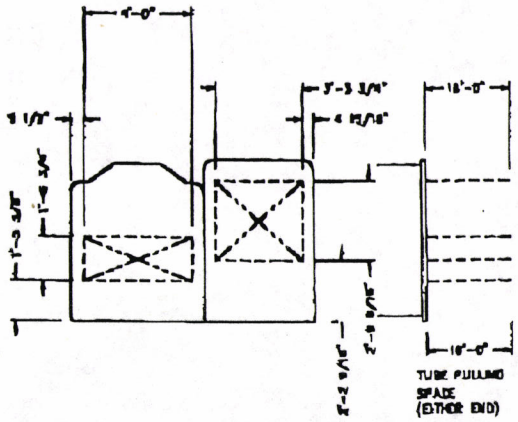
Notes:

(1) Chiller IPLV/NPLV value calculated to ARI Standard 550/590-98 equation.

Project Name: OJP Southport Skid	Sold To:
Location: .	Cust. Purch. Order No.:
Engineer:	York Contract No.:
Contractor:	Date: Revision Date:

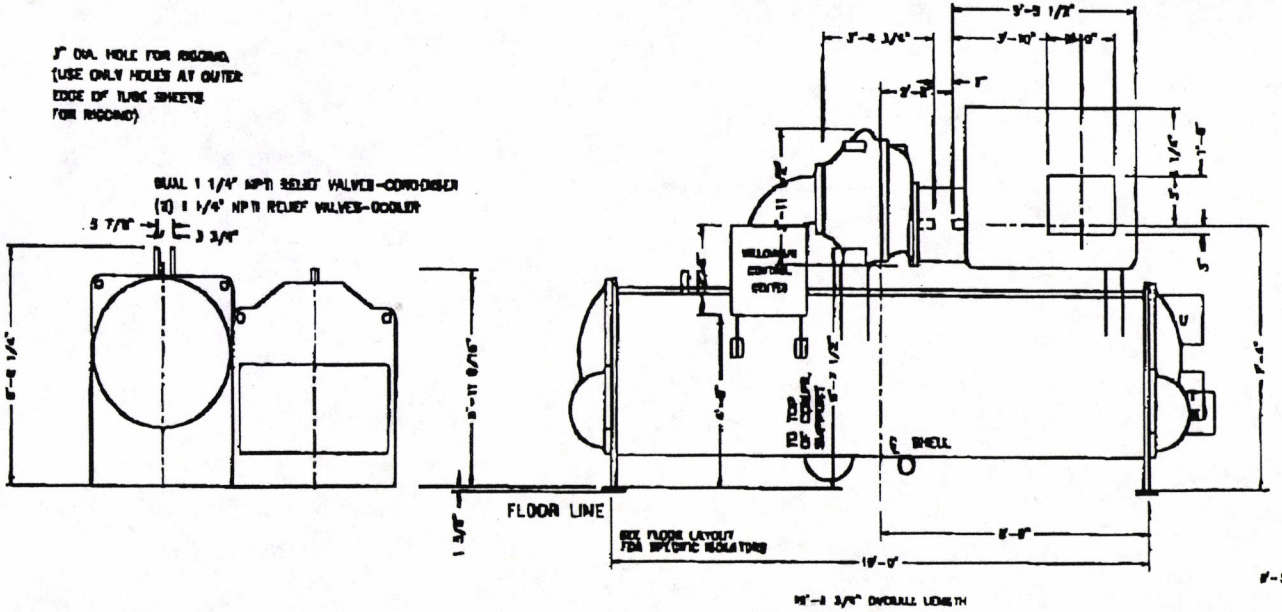


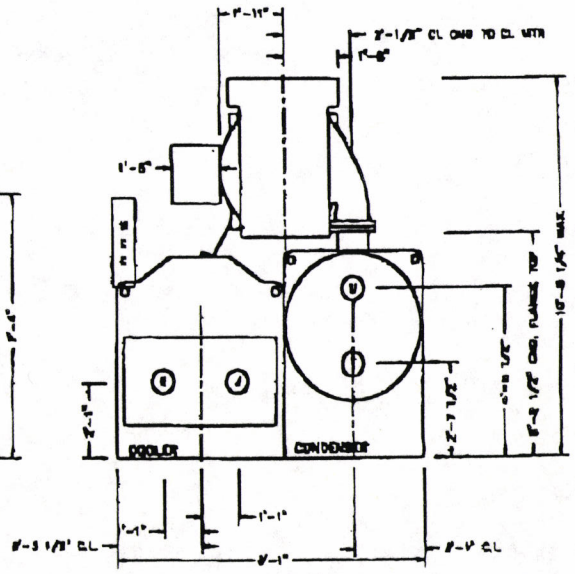
– NOZZLE LEGEND –
COOLER IN "J" 2 PASS 14" DIA (150 PSIG DWP)
COOLER OUT "K" 2 PASS 14" DIA (150 PSIG DWP)
CONDENSER IN "T" 2 PASS 16" DIA (150 PSIG DWP)
CONDENSER OUT "U" 2 PASS 16" DIA (150 PSIG DWP)



3" DIA. HOLE FOR RIGGING (USE ONLY HOLES AT OUTER EDGE OF TUBE SHEETS FOR RIGGING)

DUAL 1 1/4" NPTI RELIEF VALVES–CONDENSER
(2) 1 1/4" NPTI RELIEF VALVES–COOLER





SHIPPING WT.: 50480 LBS, OPERATING WT. 57216 LBS, LOAD PER ISOLATOR 14304 LBS

PRODUCT DRAWING

MILLENNIUM LIQUID CHILLER
MODEL YK YF TB J4 – OJ E
NOT FOR CONSTRUCTION

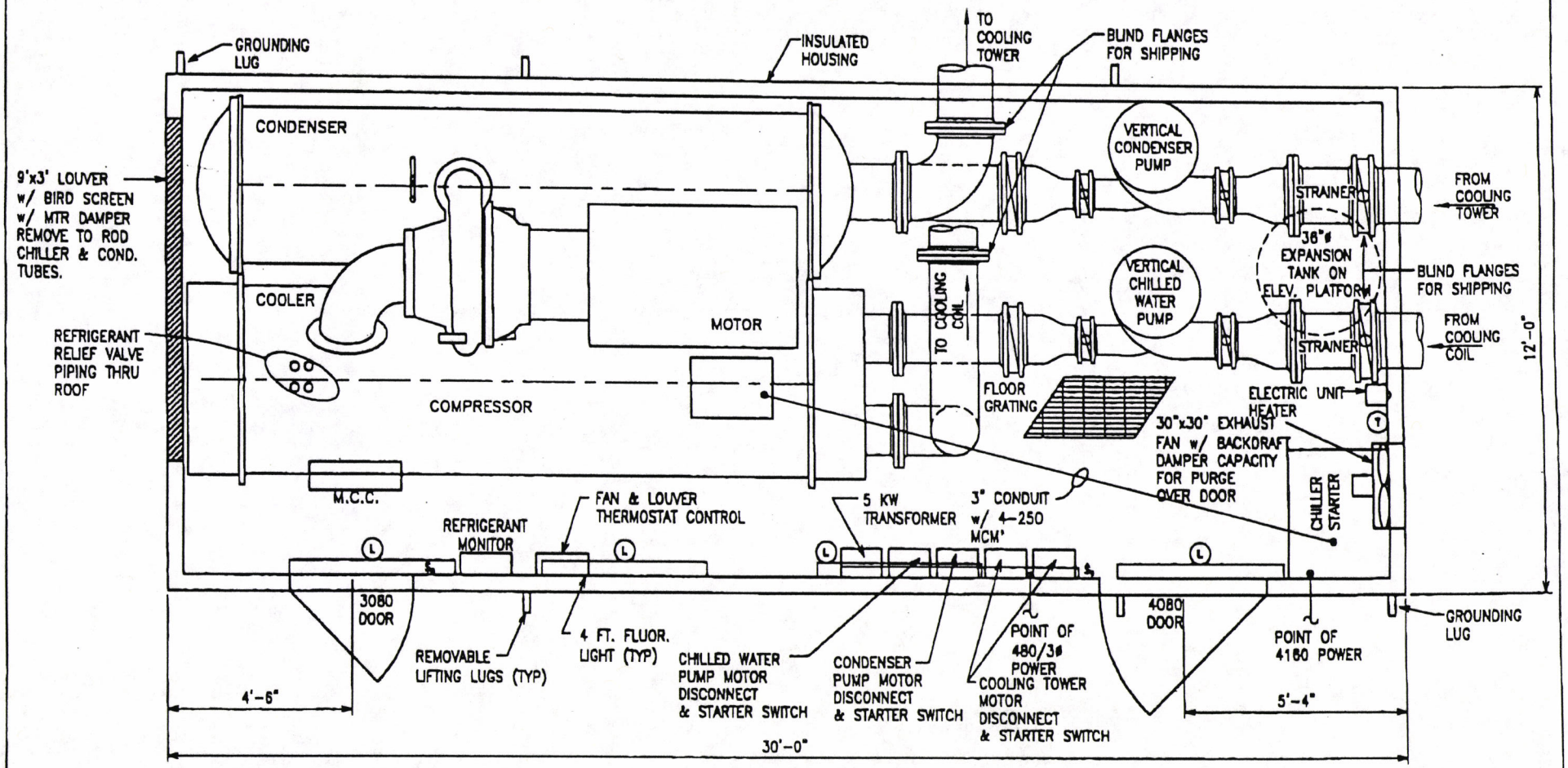
Project Name: OJP Southport Skid
Location: ,
Engineer:
Contractor:
For: REFERENCE

Sold To:
Cust Purch Order#:
York Contract#:

UNIT TAG: YK2000

Date:
Rev Date:
Form: 160.49-PA2
Dwg. Lev.: 1/95
Dwg. Scale: NTS

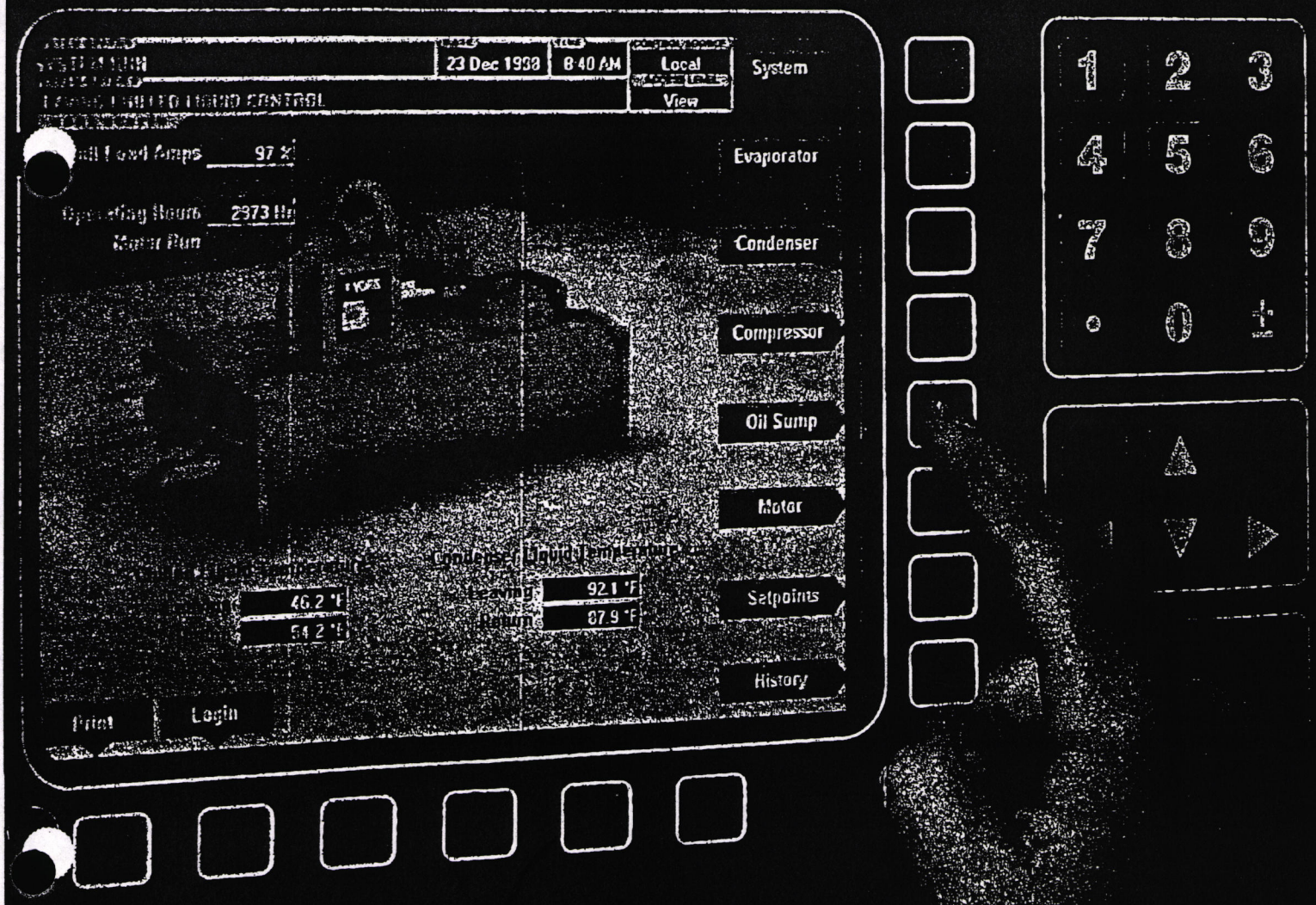
YORK


GROUNDING LUG
INSULATED HOUSING
TO COOLING TOWER
BLIND FLANGES FOR SHIPPING
CONDENSER
9'x3' LOUVER w/ BIRD SCREEN w/ MTR DAMPER REMOVE TO ROD CHILLER & COND. TUBES.
COOLER
MOTOR
REFRIGERANT RELIEF VALVE PIPING THRU ROOF
COMPRESSOR
M.C.C.
VERTICAL CONDENSER PUMP
STRAINER
FROM COOLING TOWER
36"ø EXPANSION TANK ON ELEV. PLATFORM
VERTICAL CHILLED WATER PUMP
TO COOLING COIL
BLIND FLANGES FOR SHIPPING
FROM COOLING COIL
STRAINER
FLOOR GRATING
ELECTRIC UNIT HEATER
30"x30" EXHAUST FAN w/ BACKDRAFT DAMPER CAPACITY FOR PURGE OVER DOOR
CHILLER STARTER
12'-0"
FAN & LOUVER THERMOSTAT CONTROL
5 KW TRANSFORMER
3" CONDUIT w/ 4-250 MCM'
REFRIGERANT MONITOR
3080 DOOR
4080 DOOR
GROUNDING LUG
REMOVABLE LIFTING LUGS (TYP)
4 FT. FLUOR. LIGHT (TYP)
CHILLED WATER PUMP MOTOR DISCONNECT & STARTER SWITCH
CONDENSER PUMP MOTOR DISCONNECT & STARTER SWITCH
POINT OF 480/3ø POWER
COOLING TOWER MOTOR DISCONNECT & STARTER SWITCH
POINT OF 4160 POWER
4'-6"
5'-4"
30'-0"

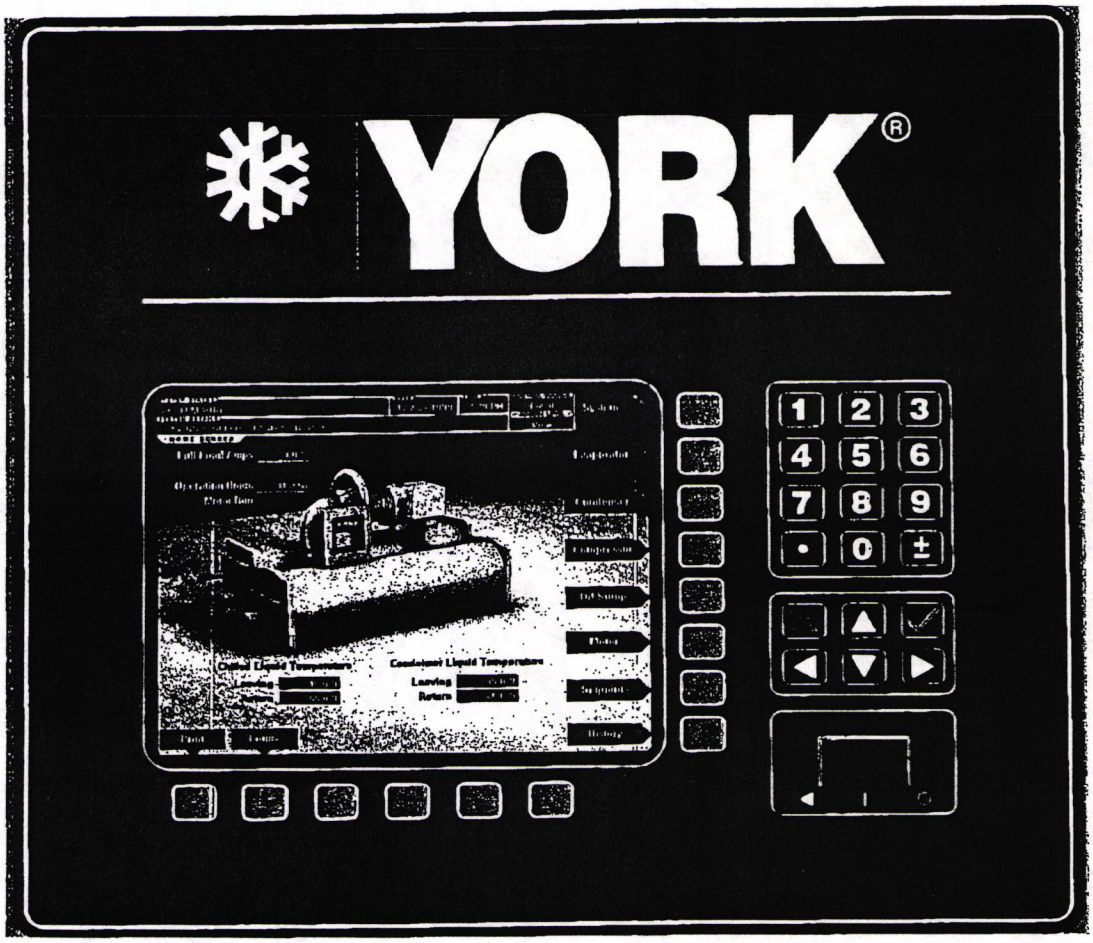
FLOOR PLAN

YORK® *Millennium*™ Centrifugal Chillers

with Graphic Control Center



Graphic Control Center for crystal-clear chiller operation



See why the YORK® Graphic Control Center is easier to use

YORK has always pioneered powerful, yet simpler chiller control. We were the first to apply microprocessor-based, plain-language-display control panels to centrifugal liquid chillers.

Now, YORK centrifugal chillers feature the full-screen, full color, YORK® Graphic Control Center.

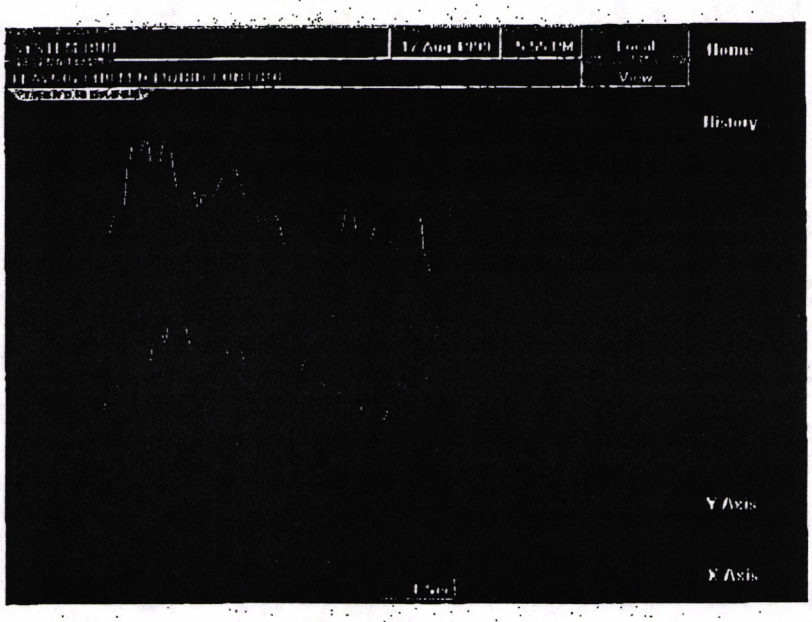
It's an advanced, microprocessor control panel that sets the standard by presenting more data in the most user-friendly way possible. You still get the code-free, plain-language data you're accustomed to from a YORK microprocessor control panel. But now it's even easier to read, thanks to a large, full-color screen using advanced active-matrix display technology.

This larger display shows even more data per screen with far less button pushing. And that makes it much quicker and easier to operate your chiller.

To facilitate a higher level of monitoring and control, data outputs are shown in association with illustrations of the appropriate chiller components—a layout that minimizes user confusion. Plus, a "navigation bar" quickly guides you to the level of information you need. For convenience, all data can be displayed in English or several other languages, as well as English or metric units.

Enjoy the advantage of cursor navigation and keyboard input

With the Graphic Control Center, data input is foolproof. A dedicated keypad for numerical input minimizes keystroke errors. Cursor controls for screen navigation make it easy to access all input, control, and monitoring functions.



On-screen trend analysis

The YORK Graphic Control Center full-screen, full color display allows on-board trending of up to six different values, selected from over 100 items, directly at the chiller control panel. The values and sampling interval are all user selectable via the Graphic Control Center. This flexibility allows the operator to select parameters that are critical for their operation, and do trending without a BAS interface and separate monitor.

Get the message – graphically and quickly

Thanks to the large, active-matrix screen, detailed logs can be read directly from the Graphic Control Center. Instead of keystroke after keystroke to gather sufficient data from a small, monochrome LCD screen, a single button can reveal an array of chiller information that is quickly seen on a single screen. Data output is provided in precise,digital form. Valuable operator time is freed for other important activities.

Advanced data logging

For convenience, a printer can be easily connected to the control center without interfacing through a BAS system. A printed log can be obtained automatically, at predetermined time intervals, without an operator interface. In addition, service technicians can use a portable printer to download information for troubleshooting and repair. All this can also be done while connected to a BAS system.

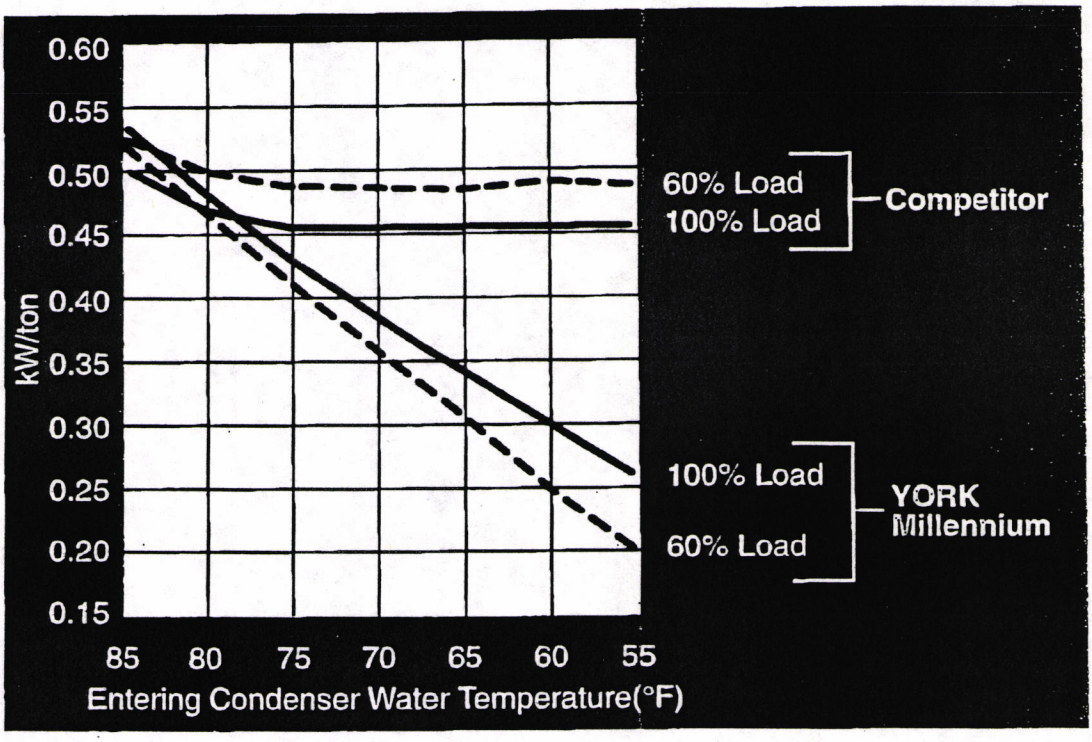
BAS compatible and Y2K compliant

Energy savings and ease of use can be fully realized when the HVAC system is an integrated part of the BAS system. The YORK Graphic Control Center is designed to communicate with most existing control systems on the market today, as well as BACnet and LonMark systems.

Four control options available through security access code

You can rest assured that along with state-of-the-art control, the Graphic Control Center provides advanced levels of security. Setpoints are protected by a user-selectable security access code. A "Remote" mode allows a BAS to implement sophisticated control strategies as a first priority. A "Local" mode provides full control at the chiller control panel. "Operator" opens control software to your commands. And "Service" gives qualified service personnel exclusive access to special functions.

Advanced chiller technology boosts energy savings up to 75%



Only real-world energy performance matters

No competitive centrifugal chiller matches the YORK® Millennium™ variable-speed centrifugal chillers where it really counts—in real-world energy performance. Real-world energy performance is the combined performance at all operating conditions. Since chillers operate nearly 99% of the time at off-design conditions, off-design performance is the major factor in the energy-savings equation.

With YORK Millennium chillers, you can count on maximum energy efficiency—and unprecedented energy savings—for all load conditions. An exclusive adaptive capacity-control technique combines YORK electronic variable-speed drive with pre-rotation-vane operation. The result is an average 30% annual energy savings compared to a fixed-speed machine. And at light loads, the savings can reach up to 75%!

These savings are possible because YORK Millennium chillers reduce energy-usage ratios to a new low. Most of today's energy-efficient chillers operate with energy-usage ratios of 0.60 to 0.50 kw/TR. But YORK Millennium chillers operate at 0.40, 0.30 and even 0.20 kw/TR at off-design conditions, where a chiller operates nearly 99% of the time.

The bottom line is unmatched energy savings, month after month, year after year, over the chiller's entire life.

Your YORK representative can perform a simple computer analysis to show how much a Millennium chiller can reduce your energy bills.

Adaptive Capacity Control meets your conditions

Millennium chiller energy savings can be realized regardless of your operating parameters or your refrigerant. That's because Millennium chillers incorporate an advanced Adaptive Capacity Control that optimizes motor speed and pre-rotation-vane position without predetermined settings. It closely examines critical operating parameters, then determines the most efficient way to operate. It also lets you optimize your savings when using intelligent control strategies, such as chilled-water reset.

Adaptive Capacity Control logic also accommodates the characteristics of the refrigerant you're using today – and whatever you may use tomorrow.

Optimize your plant's energy savings

One way to realize Millennium chiller efficiency in a multiple-chiller application is to spread the base load among several chillers operating at part load. This defies conventional chiller operating practice of minimizing the number of chillers operating for best energy performance. As shown in the graph on page 6, Millennium chiller efficiency at 60% load is better than 100% load for the same ECWT. Multiple machine operation reduces equipment cycling, and provides quicker response to load changes, in addition to saving energy.

Automatic power factor correction

The Millennium chiller automatically corrects the power factor to 0.95 or better, at all operating conditions. Many utilities require power factor correction, or charge penalties for lower power factors. This is avoided with the YORK Millennium chiller.

Engineering smarter energy consumption

For the rest of this century and into the next, smart energy use will be more richly rewarded than ever before. That's why Millennium chillers are engineered to reduce energy consumption at design and off-design conditions.

One way a Millennium chiller saves energy is by using entering condenser water temperature (ECWT) as low as 55°F to reduce compressor workload—unlike competitive chillers that require a minimum ECWT of up to 75°F for reliable operation. In addition, advanced compressor and heat exchanger designs excel at off-design conditions as well as standard design conditions. The result is total energy savings with a Millennium chiller.

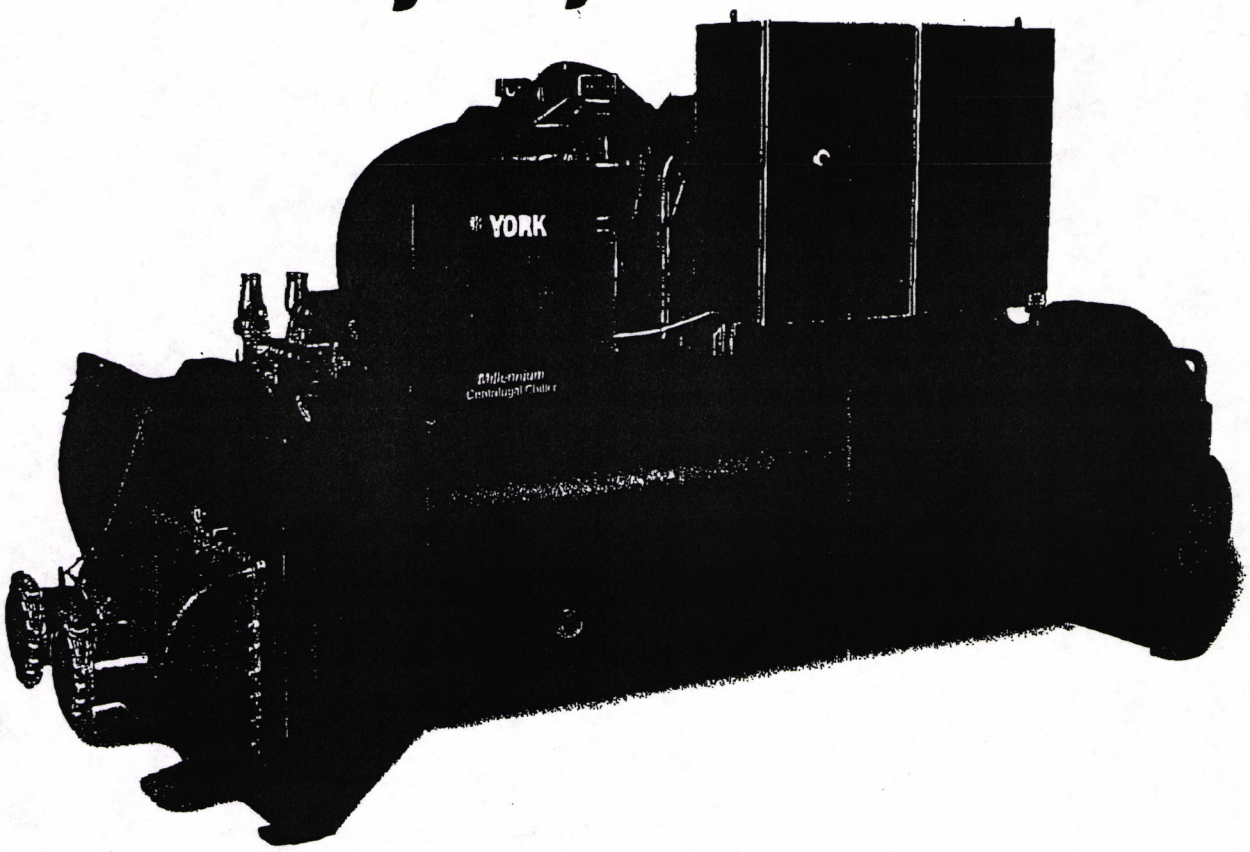
ARI, ASME, ISO

The performance of YORK Millennium electric-motor-driven centrifugal chillers rated up to 2000 tons has been certified to the Air Conditioning and Refrigeration Institute (ARI) as complying with the certification sections of ARI Standard 550/590 –1998. Pressure vessels are constructed to meet ASME or other applicable code requirements. These independent bodies provide third-party verification of performance and construction.

All Millennium chillers are manufactured in plants registered as ISO 9002 facilities, demonstrating YORK's commitment to meet your needs with technology that's truly "World Class."

Manufactured in ISO-Certified Facility

Highly engineered components save energy in many ways

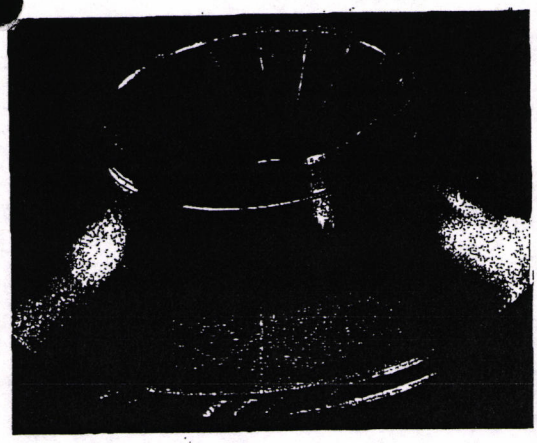


Extract more energy savings from colder tower water

Anytime the differential between evaporator pressure and condenser pressure can be reduced, the compressor does less work, which saves more energy. One major way to reduce this differential is to lower the entering-condenser-water temperature (ECWT). Unlike competitive chillers that require higher minimum ECWTs of up to 75°F, the YORK Millennium chiller can utilize 55°F ECWT. While there is a small increase in cooling-tower-fan energy consumption, it is insignificant compared to the chiller energy savings. The lower ECWT lowers the pressure differential and the compressor workload. And that leads to dramatic energy savings over the chiller's lifetime.

High-efficiency heat exchangers

Once again, YORK takes the lead in advancing heat-exchanger efficiency. Millennium chillers use the latest tube-surface and shell designs and materials to attain new levels of thermal transfer in a compact shell. Enhancements in water-side and refrigerant-side design minimize both energy consumption and tube fouling.



Single-stage compressor—a proven efficiency performer

In thousands of installations worldwide, YORK single-stage compressors realize significant energy reductions. High-strength aluminum impellers feature backward-curved vanes for high efficiency.

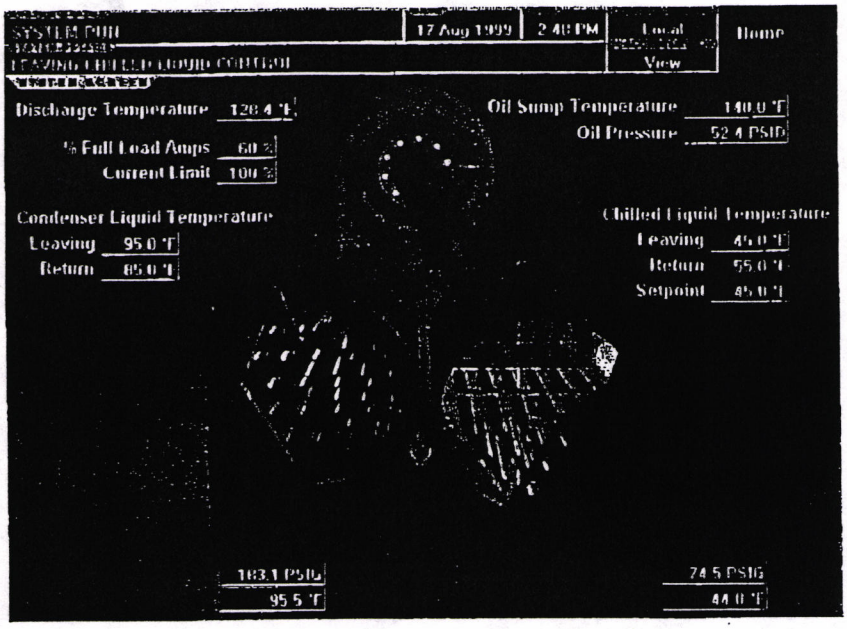
Powerful Graphic Control Center saves energy

The Millennium Control Center uses digital microprocessor power to save you energy. A setting of just 1°F below the design chilled water temperature can increase chiller energy consumption by as much as 3%, wasting thousands of kilowatt hours and dollars each year.

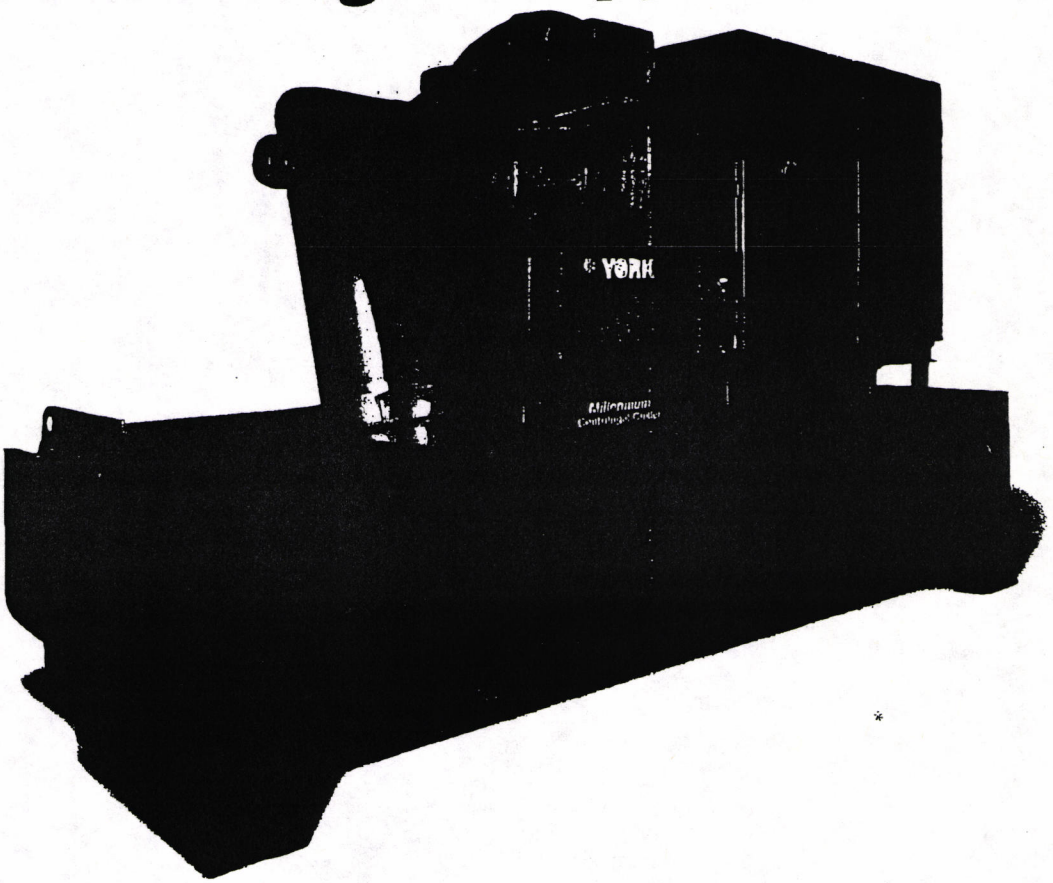
The digital precision of the Graphic Control Center lets you set chilled water temperature to a resolution of ± 0.1°F. As a result, you eliminate the energy wasted by drifting a degree or more from the setpoint.

Open-motor design eliminates hermetic motor energy losses

Compared to hermetic refrigerant-cooled drives, the energy consumption of the YORK Millennium chiller is less. That's because the Millennium air-cooled motor does not reject heat into the chiller system, eliminating the need for additional kW to handle the cooling load added by the motor.



Flexible design provides wide range of application



More choices to fit your needs

The YORK Millennium line of centrifugal chillers offers the broadest range of capacities, performance, and refrigerants in the industry. And it provides the most advanced chiller technology to meet rapidly changing conditions.

In answer to environmental and refrigerant phase-out concerns, Millennium chillers are available in capacities from 150 to 2100 TR with a wide range of refrigerant choices.

With HFC-134a, you get a zero-ozone-depletion, positive-pressure refrigerant in a chiller featuring outstanding efficiency, especially at high capacities.

HCFC-123 chiller options offer high efficiency with a low ozone-depletion and global-warming-potential refrigerant in the industry's most reliable, open-drive design.

HCFC-22 continues to provide a proven, efficient, and economical refrigerant in chillers employed in demanding air-conditioning applications.In any case, a Millennium chiller's compatibility with future refrigerants is assured. That's because YORK uses an open-motor design that is proven in governmental, commercial, and industrial applications to allow quick and economical changeovers to alternative refrigerants.

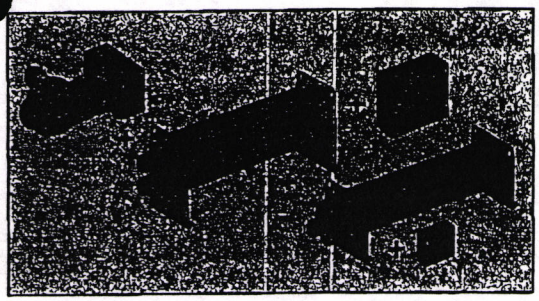
The Millennium chiller line is also available with a natural-gas-powered driveline to tap the inherent environmental, energy, and cost benefits of this abundant resource. Process or utility-supplied steam is another possible power source. With so many energy alternatives to choose from, you may also realize utility rebates and demand-side-management strategies to save even more money.

Factory Packaging cuts installation costs

YORK Millennium chillers are designed to keep installation costs low. The unit is shipped completely packaged, requiring minimal piping and wiring to complete the installation.

The variable-speed drive eliminates costly field installation, because it is factory-mounted, wired, and tested. Solid-state components are verified and control logic is burned-in and ready to operate, minimizing troubleshooting at start-up. Power for the chiller motor, variable-speed drive, oil pump, and control center is supplied through a single-point connection. Tie-ins with chilled-water and condenser-water pumps can easily be accomplished through connections on the control center.

Control wiring to the chilled-water flow switch and pump interlocks complete the installation. All Millennium chillers use refrigerant-cooled oil coolers, completely installed at the factory. All performance ratings include this cooling requirement, and the need for field-installed water piping, with the associated valves and hardware, is eliminated.



Flexible packaging for tight fits

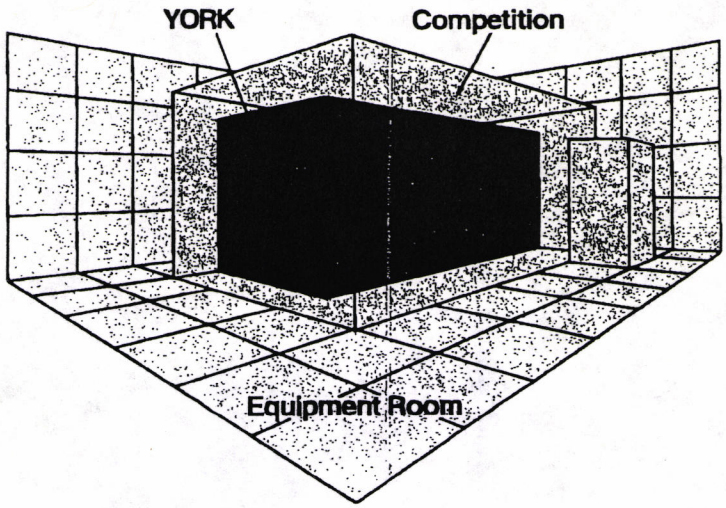
If access to the installation site is restricted, the YORK Millennium chiller can be shipped with the driveline and variable-speed drive separate from the heat exchangers. Where space is even tighter, the evaporator and condenser shells can also be shipped separately. Virtually all installations can be accommodated without the need for costly and time-consuming modifications to the building structure.

Quieter operation that's worth hearing

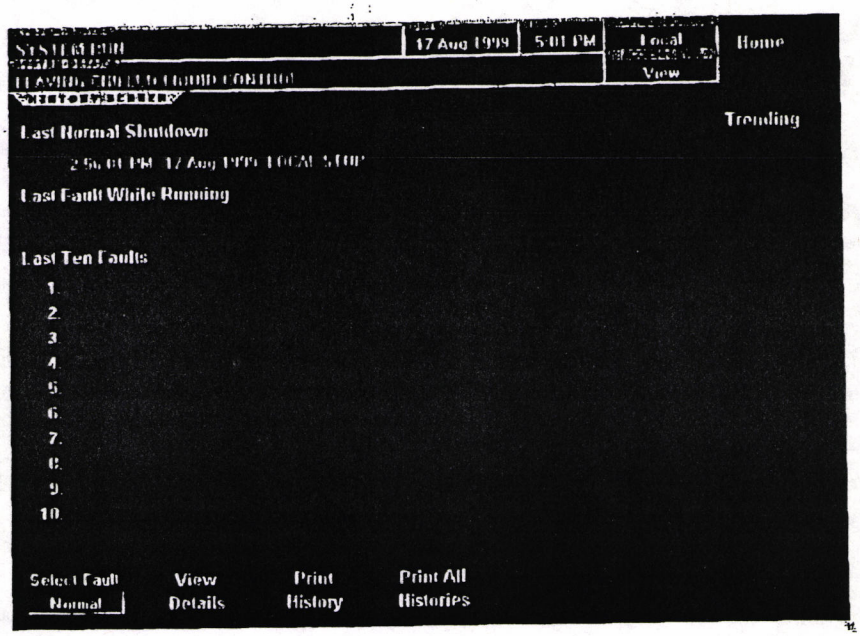
The Millennium variable-speed drive significantly reduces chiller noise by reducing the speed of the impeller and motor. That makes a good case for installing a Millennium chiller anywhere noise is an issue.

Small footprint saves floor space

Millennium chillers incorporate the latest space-saving electronic design. Variable-speed-drive electronics, power components, and controls are all packaged in one compact, unit-mounted cabinet. As a result, a YORK Millennium chiller gives you more accessible floor space than any competitor.



Advanced YORK technology keeps your maintenance costs low



Control Center keeps you on track

The Graphic Control Center provides complete information on your chiller's operating condition.

Safety-shutdown information includes day, time, and cause of shutdown and type of restart required — In English or several other languages. Color coding of fault messages allows easy determination of chiller status. Yellow messages are shut-downs with automatic restart with no operator intervention required. Red messages are displayed for shut-downs requiring manual restart, alerting an operator that a system check may be required. A software test button even allows you to verify the status of each electronic circuit board in the panel.

The Trending Screen shows changes in motor current, oil temperature and pressure, refrigerant pressures, or water temperatures, which can be valuable indications of developing problems. This capability gives you ample time to take corrective measures before any expensive downtime is incurred.

With the graphic control center, you can see when to schedule routine maintenance in advance of actual need.

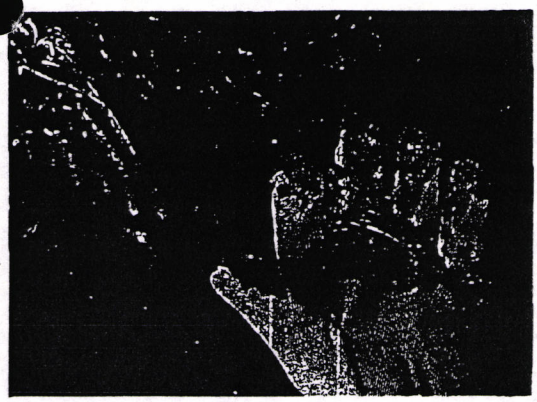
Open drive is reliable ... and easy to maintain

The hallmark of a YORK centrifugal chiller is the open-motor design—a proven configuration that continues on Millennium chillers. Why? On hermetic designs, motor burnout can cause catastrophic damage. The refrigerant becomes contaminated, requiring the entire system to be cleaned and the refrigerant replaced.

The air-cooled Millennium motor eliminates this risk. Refrigerant never comes in contact with the motor, preventing contamination of the rest of the chiller. As a result, downtime due to motor burnout is dramatically reduced.

Extended motor life

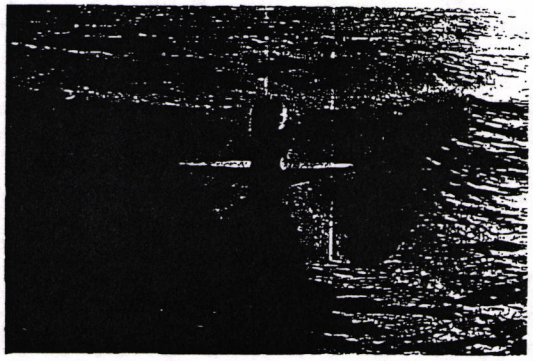
During start-up, a conventional chiller experiences driveline shock from high torque caused by inrush currents exceeding 300% of the Full Load Amps (FLA).



This leads to accelerated driveline wear. The Millennium chiller starts "softly," never letting the inrush current exceed the 100% FLA. By limiting the inrush, the motor windings do not rub together, which extends the life of the insulation, contributing to longer motor life and less chiller downtime. Lower inrush also reduces torque stresses on the motor and compressor driveline.

This low starting current and integral power monitoring make the Millennium chiller ideally suited for use with emergency generators.

The Millennium drive also protects the motor from the destructive effects of power variations. All of these factors help extend the life of the chiller.

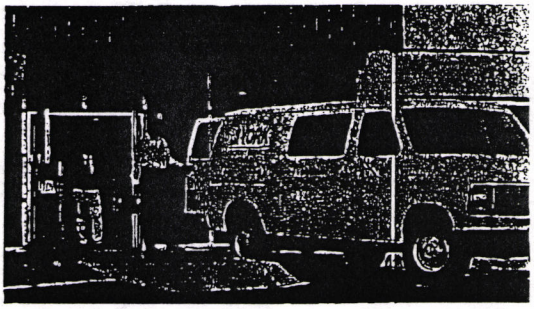


Single-stage compressor handles demanding applications

Only the most reliable compressor design is good enough for the new Millennium chiller. That's why YORK uses a single-stage compressor with few moving parts and a straightforward, efficient design. YORK single-stage compressors have a long record of success in hospitals, chemical plants, naval vessels, and in many other applications where minimal downtime is a crucial concern.

Proven compressor design minimizes maintenance

The YORK compressor design includes features to minimize maintenance requirements. For example, the investment cast, shrouded impellers don't require the high maintenance and tight tolerances of unshrouded designs. The single-stage YORK design uses proven aluminum journal bearings and single helical gears — the same gears used in demanding military environments and a key reason why a Millennium compressor does not need periodic teardown.



Single-source responsibility

With competitive variable-speed chillers, service can require shipping components to off-site facilities. With YORK, if any problem occurs, one call to YORK Service takes care of it all. That's because the worldwide corps of YORK factory-trained and factory-certified technicians is near you to help. In the unlikely event that replacement parts are needed, a complete stock is available from YORK.

No need to reprogram if power fails

The chiller operating system is a non-volatile EPROM, so no power backup is required. A factory-supplied lithium battery (11 years rated life) ensures safe storage of program setpoints without external power to the panel. As a result, restarts follow the parameters you established before power was interrupted.

UL reliability

YORK Millennium chillers are approved for listing by Underwriter's Laboratories for the United States and Canada. This recognition of safety and reliability is your assurance of trouble-free performance in day-to-day operation.