

# ***YORK<sup>®</sup> Millennium<sup>®</sup> Air-Cooled Rotary Screw Chillers***





# New features bring operating costs to new lows



produces CO<sub>2</sub> — a greenhouse gas that contributes to global warming. The environmental implications of chiller energy efficiency are reflected in proposed standards, such as ASHRAE 90.1. Millennium<sup>®</sup> air-cooled screw chillers address these energy concerns in two ways. Screw chillers provide inherent energy savings, since the unit continuously modulates down from 100% to 10% capacity to precisely match the load and minimize energy use. Plus, performance gains achieved with the latest Millennium compressors, motors, controls, coils, heat exchangers, and fans provide unmatched efficiency whether the unit is operating at full or part loads.

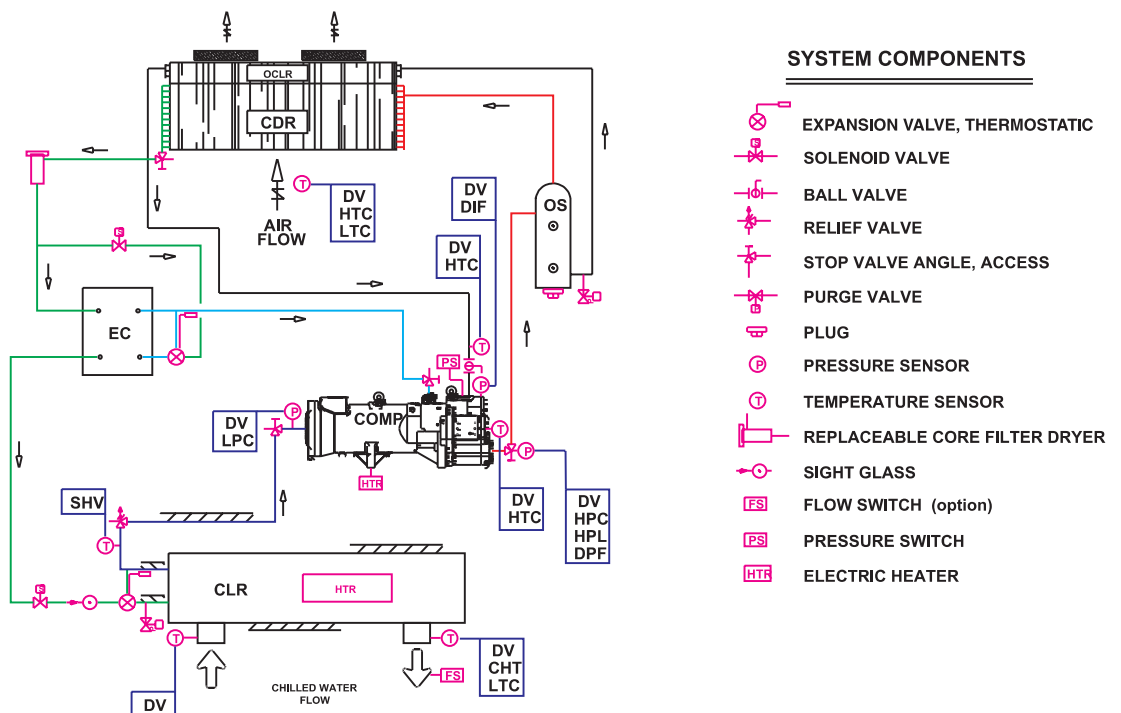
## Lower kW/ton saves energy — and the planet

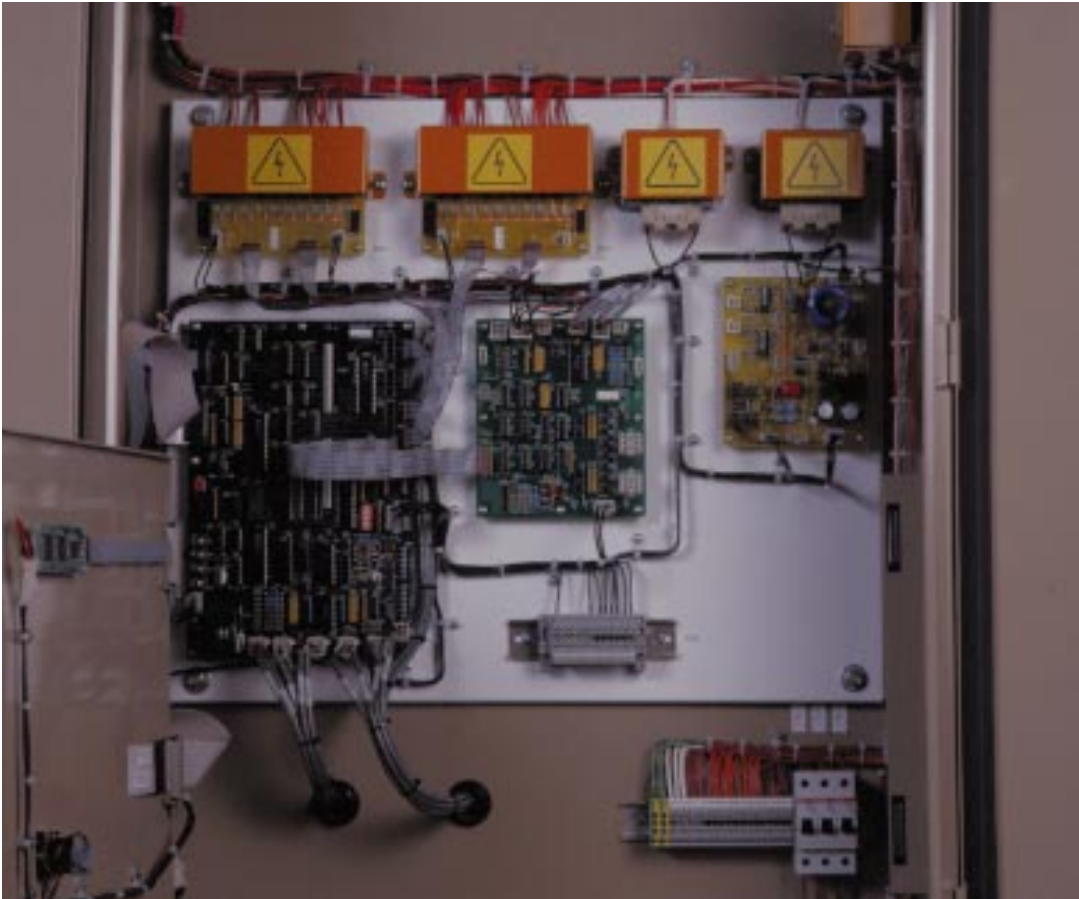
Energy efficiency is doubly critical these days, since electric consumption is costly both financially and environmentally. Burning fossil fuels to generate electricity

## Fuzzy Logic control saves energy

There's a lot of energy wasted in traditional go, no-go chiller capacity control. That's why YORK incorporates "fuzzy logic" in our YORK<sup>®</sup> Millennium air-cooled screw chiller controls. Fuzzy logic allows the control system to monitor several key variables, then track where the chiller has

*This system diagram showing one circuit depicts a proven design providing unsurpassed efficiency thanks to carefully matched components.*





been operating, where it is currently, and then accurately predict where it will need to perform. As a result, more factors are accounted for to provide tighter, more stable, chilled water temperature control. There is less “hunting” than old-style controls, thereby improving real-world system efficiency.

### **Microprocessor-controlled compressor capacity**

Anytime you can precisely match your chiller’s capacity to your exact building load, you reduce wasted energy consumption. The Millennium air-cooled screw chiller does just that by using a unique microprocessor-controlled, output-pressure-regulating capacity control valve to command compressor capacity

independently of control valve input pressure. This design overcomes the weakness of poor slide valve control found in other air cooled screw chillers. YORK’s capacity control design optimizes compressor and chiller efficiency by providing unusually stable operation throughout the entire operating range.

### **Verified capacities**

With Millennium air-cooled chillers, you can eliminate energy and capacity concerns with independent, third-party verification. For example, performance of 60 Hz models up to 200 tons are certified in accordance with ARI 550 and 590. Models above 200 tons are rated in accordance with ARI 550, even though they are beyond the scope of the certification program



# *Go with the leading compressor technology for outstanding reliability*



## **Latest design from a company known for advancing screw chiller technology**

YORK engineers teamed up with experts from Frick—the YORK company recognized as the industrial-refrigeration, screw-compressor experts—to produce a new design optimized expressly for air-cooled chillers. The result? Outstanding reliability and performance whether your

chiller runs continuously or on demand. In day-to-day operation, this tough compressor is designed to perform over the entire chiller service life without any regularly scheduled maintenance of the internal moving components.

To maintain the highest quality, the compressors are built in our new, dedicated compressor plant in Roanoke, Virginia. State-of-the-art manufacturing processes permit precise tolerance control, resulting in unmatched compressor performance.

## **High-efficiency compressor motors**

The electric motors used in YORK® Millennium® air-cooled chillers are specially designed to handle high current and torque demands with outstanding efficiency. No gears are used. The direct-drive motor incorporates heavy-duty magnet wire for exceptional reliability.

## Internal mufflers for quiet operation

If noise is an issue, it's good to know that your YORK unit incorporates acoustically tuned, internal mufflers. The mufflers are factory designed to match the compressor's harmonic frequencies to minimize noise at its source, while optimizing gas flow for maximum performance.

## Integral, 0.5-micron oil filtration for enhanced reliability

A compressor must have clean oil to ensure reliable operation and long life. The YORK air-cooled screw-compressor oil filter utilizes an advanced filtration media that catches particles down to 0.5 microns. The oil pressure drop across the oil filter is monitored by the microprocessor. Should dirt or debris from service residue clog the filter, the unit microprocessor will initiate protective control steps and announce a service alarm to change the filter.

## Reliable rolling element bearings

Reliable screw-chiller performance literally rides on durable bearings. That's why YORK uses rolling-element bearings rated in excess of 50,000 hours L10 life under design conditions.

## Enhanced motor reliability

Motor failure is usually caused by problems external to the chiller itself—low

voltage, high voltage, phase imbalance, phase reversal, single phasing, or voltage spikes. In the YORK Millennium screw chiller, reliable electronic current-monitoring sensors verify each of the three phases of the compressor motor power wiring. With three sensors to trip a motor shutdown, most if not all serious motor damage can be eliminated.

Temperature and current sensors also assure maximum motor reliability. Even if dangerous power conditions should cause the motors to begin to overheat, the condition would be quickly detected by three strategically imbedded thermistors, any one of which will shut down the compressor to prevent motor damage.

## ISO 9002, UL, cUL, NEC, ASME

You don't have to take our word on air-cooled reliability. That's because YORK units are designed and manufactured in accordance with ASHRAE-15 Safety Code for Mechanical Refrigeration. They are also listed by Underwriter's Laboratories and Canadian U.L. Pressure vessels are constructed to meet ASME code requirements. Electrical design conforms to NEC requirements.

For international markets, YORK products offer conformance to various codes, including TÜV, CODAP, ISPEL, CE Mark, and UDT for vessels, VDE and IEC for electrical, as well as DIN and NF standards.



*High-efficiency motors with heavy-duty magnet wire for exceptional reliability*



# *Control chiller operation at the touch of a finger tip*



*Access vital information with a finger's touch*

## **The simplicity of the Millennium Control Center**

Long considered the best electronic control panel in the industry, the YORK® Millennium® Control Center has always provided outstanding electronic chiller control. Now, YORK engineers have improved this technology to provide even greater control and reliability. Not only do you have access to performance information from one easy-to-read display, you also get data previously unobtainable without time-consuming analysis.

Digital technology provides infinitely more precise readings than gauges or meters. Like all similarly equipped YORK chillers with microprocessor controls, your Millennium air-cooled screw machine can

easily interface with the YORK ISN building automation and plant control systems. Connection with other common building automation communication systems (such as LonMark and BACnet) is simple using the onboard 485- or 232-port and YorkTalk Translator.

## **Fuzzy Logic water temperature control**

The improved Millennium Control Center uses Fuzzy Logic to eliminate energy waste resulting from a less than ideal match between chiller performance and system duty. Precise chiller control has never been more accurate—or more flexible. With YORK Fuzzy Logic controls, you get much more precise chilled water

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S M T W T F* S
HOLIDAY NOTED BY *
```

```
SYS#1 COMP RUNNING
SYS#2 NO COOL LOAD
```

```
SYS#1 LOW OIL PRESS
SYS#2 COMP RUNNING
```

```
OUTSIDE AMBIENT AIR
= 89.0 DEGF
```

```
SYS#1 COMP RUNNING
SYS#2 NO COOL LOAD
```

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- ENGLISH UNITS
READOUT
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temperature control with less “hunting” than old-style systems. The system monitors the leaving chilled water temperature to track where it’s been, where it is, how fast it’s moving, and accurately adjusts chiller operation in anticipation of expected performance.

### Daily/holiday scheduling

With more information about chiller operation available, routine maintenance can be accurately scheduled well in advance of actual need. And with advance information on the nature of the maintenance required, you can confidently schedule routine service whenever it’s most convenient for day-to-day building operation.

### Informative display readouts in plain English, Spanish, French, or German

All monitoring and control parameters can be easily read on the large, illuminated alphanumeric display. You’ll never have to worry about interpreting special reference codes or struggling to read imprecise gauge increments. The Control Center displays messages in plain English (or Spanish, French, or German) with numeric data available in a choice of International System of Units, on English units, for example, temperature readouts in Fahrenheit or Celsius.

### Data logging has never been easier

The Millennium Control Center’s comprehensive monitoring capabilities dramatically simplifies log reading and recording. All data needed for accurate, detailed logs can be gathered directly from the display panel. Instead of moving from thermometer to thermometer and gauge to gauge, chiller status can be accessed from one station. Valuable operator time is freed for other important activities. Or better still, a printer can be connected to the panel to obtain up-to-the-minute operating data. A printed log also can be obtained automatically without involving an operator if the unit should shut down on a fault.





# Get the flexibility that fits your application exactly



*ISN compatibility adds building automation controls capability*

## Handles capacity and power requirements

Available in a range of capacities from 90 through 430 tons, YORK air-cooled screw chillers are also available in 50 Hz and 60 Hz voltages to match your power requirements.

## Wide range of ambient temperatures

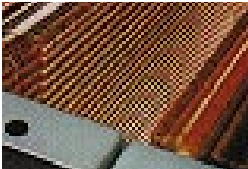
YORK air-cooled screw chillers are designed for a wide ambient temperature range of 0°F through 125°F. Electrical enclosures meet NEMA 3R/12 (rain tight/dust tight) requirements.

## Low inrush current

To minimize peak inrush current, you can specify across-the-line or Star(WYE)-Delta starters to reduce inrush current supplied to your equipment to about one third of that required for across-the-line compressor start.

## Corrosion-resistant fins

Choose your type of corrosion-resistant coils—with aluminum, Black-Epoxy, Baked Phenolic, or copper fins—to meet your particular operating requirements for saltmist, or industrial environments.



*Condenser coil available in aluminum, Black-Fin Epoxy, Baked Phenolic, or copper fin*

## Environmentally acceptable refrigerants

With YORK air-cooled screw chillers, you get the proven performance of HCFC-22 with a 0.05 ozone depletion potential. Plus, you get future flexibility to convert your chiller to a refrigerant with zero ozone depletion potential by recharging with the HCFC-22 alternative, HFC-407C, whenever you desire. Your machine can be provided with HCFC-22 and POE oil, making it fully compatible to receive a charge of HFC-407C with no required lubricant change.

## Building automation system compatible

With the Millennium® Control Center, your YORK chiller is compatible with the YORK®

Integrated Systems Network™, or “ISN™.” This capability not only ties together a range of compatible YORK HVAC equipment, it uses an open protocol that’s compatible with a wide range of controls. Supported controls include YORK, LonMark, BACnet, and nearly 20 competitive building automation systems. No other screw chiller offers this degree of system integration or flexibility.

## Designed for outdoor durability

No matter the environment, the Millennium air-cooled screw chiller’s all-weather durability is right at home in the harsh outdoors. It is designed for the cold, rain, and snow of North American and European climates, as well as the hot, dusty conditions of the Middle-East and humid equatorial climates. All the exposed compressor and fan power wiring is enclosed in liquid-tight conduits for reliability.

## Designed for low acoustics with ultra-quiet options

Every Millennium machine is equipped with compressors and fans incorporating the latest technology to optimize performance, which also results in a very good sound profile even on the basic machine. For applications that are especially sensitive to sound, the unit can be provided with sound attenuation options to reduce emitted fan and/or compressor noise.



*Compressor motor start in Across-the-Line or Star (WYE) Delta (shown)*



# *Gain access with an open design that's simple to maintain*



*Easy access to major service components*

## **Easy access to critical components**

Proper maintenance pays big dividends by enhancing efficiency and extending service life. YORK Millennium series chillers are designed to minimize required maintenance, which translates into a low life-cycle cost. No scheduled maintenance is required on the hermetic

refrigerant circuits. Should service be required, the machine's features and functions minimize down time and maximize the effectiveness of service personnel. Oil and refrigerant filters, compressors and motors, suction screens, sight glasses, and filter driers are all fully accessible and can be serviced quickly.

## **Versatile power supplies**

You can choose two separate power supplies, or specify a single power supply for both compressors depending on customer and jobsite service requirements. In either case, exposed unit wiring is run in seal-tight conduit to protect against water and dirt infiltration.

## **Useful data available in two formats**

All maintenance-related data can be read from the LCD display panel, allowing convenient on-site assessment of chiller status to aid service diagnosing. Or a printer can be connected to the panel to obtain a printed log to record operating conditions, alarms, and other relevant data.

## **Balanced compressor wear**

To let you balance wear and tear between each compressor, the Millennium Control Center keeps track of compressor runtime and startups. The microprocessor will automatically switch the lead and lag compressors based on comparing the actual running time of each compressor.

## **Alarm contacts**

Wiring in an alarm is easy, because the Millennium Control Center incorporates contacts as a standard feature.

## **Manual override/off-hours service mode**

To facilitate off-hours servicing, a manual override is included that allows maintenance personnel to operate the chiller independently. A service mode allows each device to be individually controlled for service trouble shooting. Holiday scheduling can be conveniently programmed to accommodate changes in operating hours and personnel.

## **Operating data**

The Millennium Control Center provides you with all the operating data you need on your chiller's running condition. Percent motor currents, oil temperature and pressures, refrigerant pressures and temperatures, and water temperatures provide valuable indicators of any developing problems to let you take action before serious problems occur.

## **Shutdown fault data**

If an emergency shutdown should ever occur, the Millennium Control Center speeds troubleshooting and reduces downtime. A first-out display preserves all readings that exist at that instant. A "shutdown record display" stores the cause and time of the last six shutdowns, letting maintenance personnel print out the date,

time, fault, and all related data for review.



*Get a printed log with a compact PC-compatible printer*



# Shrink your installation costs and space requirements



## Compact design, lower weight, less installed electrical service cost

Installation and special application requirements account for a significant portion of the total chiller cost. That's why YORK® Millennium® units are engineered to minimize on-site preparation and to adapt to your exact installation needs. A rugged, steel-truss frame results in a unit that is strong and light, yet withstands the wear and tear of situating the unit on site.

The entire unit takes up one of the smallest footprints in the industry. As a result, you can use a smaller pad, reducing the cost of pouring the pad and giving you more space for other equipment. The compact design and lower weight help minimize overseas shipping costs, too.

The excellent energy efficiency of the Millennium line contributes to an extremely low circuit ampacity required for the machine's electrical service, which reduces wiring and related costs.



## Meets local code requirements

60 Hz Millennium screw chillers are constructed to meet NEC, ASHRAE/ANSI, and ASME code safety standards, and are U.L. and C.U.L. listed to assure personnel safety and protection. 50 Hz models are available to meet a variety of applicable global codes, such as TÜV, IEC, EN, C.E., and many others.

## Choose from many affordable options

**Network capability:** Tie your chiller into a network or building automation system to monitor efficiency and detect possible trouble early.

**Power supplies:** Choose one power supply for each compressor, or one for the entire chiller.

**Condenser coils:** Choose corrosion-resistant copper, phenolic coating, or Black Epoxy Fins

**Tamper-Proof Kits:** Choose from several types to protect against vandalism and reduce the risk of accidental injury.

**Disconnect switch:** Choose circuit breaking or non-fused types as required.

**Unit isolators:** Choose from 2-inch, seismic-spring-type; resilient, cross-ribbed, Neoprene pad; or standard, 1-inch deflection isolators to suit application.

**Sound reduction:** Choose noise-reduction devices (compressor sound enclosures, low RPM fans) for sound-level sensitive jobs.

**Flanges:** While the standard water connections can be connected via welding or Victaulic® coupling, optional flanges are available.

**Remote panel:** Choose optional remote control capability through simple serial connections at the Control Center.



Get more control in more places thanks to Remote Control connected to the Control Center



***Ice storage capability:*** Take advantage of thermal storage to save energy by load shifting.

***Multiple unit sequence:*** Meet load requirements more efficiently by lead/lag sequencing of multiple chillers.

*External disconnect switch for easy accessibility*



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