



*Case Study:*  
**Toshiba Medical  
Systems Corp.**



## Overview

Established in Japan in 1948, Toshiba Medical Systems Corp. is a leading global company in the medical equipment industry. Now a part of Canon, Inc., Toshiba Medical is known for its world-class innovations and technological capabilities. Its broad product portfolio includes cutting-edge medical X-ray computed tomography (CT), magnetic resonance imaging (MRI) systems, and diagnostic ultrasound and nuclear medical systems.

Disappointed with the level of downtime from their previous chiller supplier, Toshiba Medical approached us. They were looking for exceptionally reliable year-round medical chillers for their 1.5T and 3.0T MRI scanners operating in several hundred medical facilities throughout the United States. They expected our solutions to live up to Toshiba Medical's long-standing and trusted brand reputation, and we were up for the challenge.





## Challenges

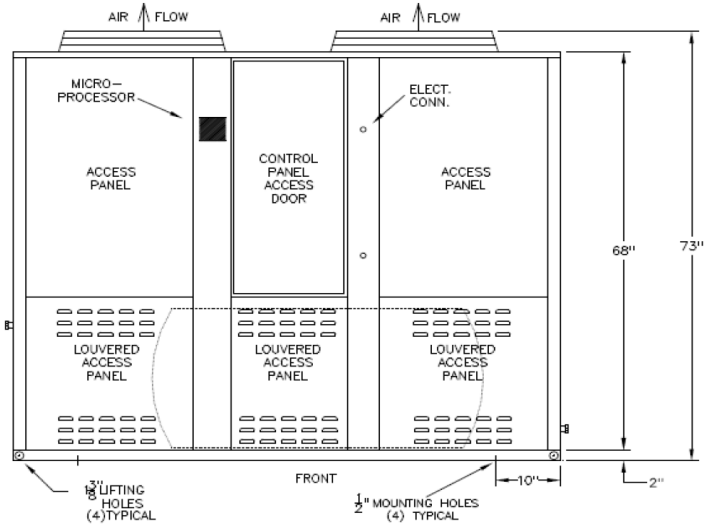
Many medical facilities using Toshiba Medical's MRIs included hospitals and imaging centers that required the scanners to operate on demand – 24 hours a day, 7 days a week, 365 days a year. When their previous medical chillers' starting temperature was too hot, they couldn't adequately cool the MRIs, rendering the scanners unusable and reducing the quality of care. The downtime they experienced was also financially costly, with loss estimates upwards of \$5,000 per scan. As such, our central challenge was to design a robust medical chiller solution that maximized uptime, getting as close to 100% as possible.

The second challenge we encountered was Toshiba Medical's request for medical chillers that would operate reliably within a broad ambient temperature range. With its customers' medical facilities located across the country in varying climates, from extreme cold to extreme hot, they wanted a one spec-solution that could handle temperatures as low as -40° F and as high as 125° F, requiring extra considerations.



## Solutions

**Drake designed and manufactured the following two air-cooled medical chillers to accommodate both sizes of Toshiba Medical's MRI machines:**



### 1. 1.5T MRI: 8 HP Single Circuit Scroll Packaged Air-Cooled Chiller with Tank (PACT70S)

- Length: 34"
- Width: 80"
- Height: 67"
- Weight: 1,100 lbs.
- Tank capacity: 60 gallons
- Fluid connections: 1-1/4" FPT

### 2. 3.0T MRI: 20 HP Dual Circuit Scroll Packaged Air-Cooled Chiller with Tank (PACT180D)

- Length: 85"
- Width: 40"
- Height: 78-1/4"
- Weight: 2,100 lbs.
- Tank capacity: 135 gallons
- Fluid connections: 1-1/2" FPT

To help Toshiba Medical maximize uptime, we engineered these solutions using robust and reliable USA-made components, eliminating the reliance on time-consuming overseas parts shipments. Local and regional wholesalers and contractors can quickly replace and repair parts with limited downtime.





## Solutions



These factory-tested single circuit medical chillers featured an industry-leading and long-lasting Copeland scroll compressor. We fully insulated the corrosion-resistant stainless steel bronzed plate evaporator and customized it to suit Toshiba Medical's requirements. To prevent damage to the compressor caused by cold refrigerant on startup, we incorporated a compressor crankcase heater. To further protect the compressor, we also included a suction accumulator that prevents liquid from entering the compressor, or liquid flood back. The water flow switch protects against process fluid freezing caused by pump failure, and the hot gas bypass helps prevent evaporator freeze-ups while also lending greater capacity control.

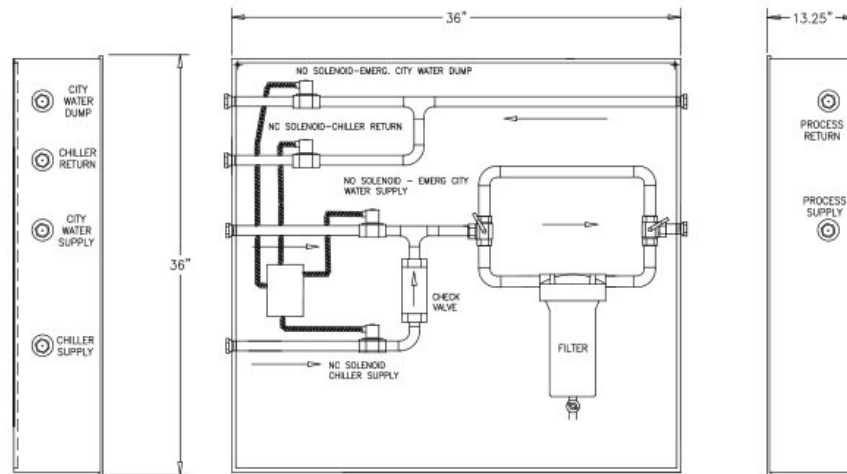
### **Additional standard features of these medical chillers included:**

- Painted galvanized steel metal cabinet for a professional appearance
- Insulated process fluid lines to maximize thermal efficiency
- Stainless steel storage tank with closed-cell insulation
- Phase monitors that offer compressor electrical protection
- A full refrigerant charge that made installation more efficient and hassle-free
- Open-source microprocessor for systems control





## Solutions



**Beyond the standard features, we also customized medical chillers for Toshiba Medical with additional uptime enhancements, including:**

- **Manifold add-ons** – We designed a whole medical chiller system that could use its cooling capacity to deliver chilled fluid to the magnet and other load generating equipment in one location, including a helium compressor and a custom refrigeration unit.
- **Auto-changeover redundant pumps** – If one of the medical chillers' pumps fails, the system automatically switches over to the other pump, reducing downtime and maximizing performance.
- **Heat load customizations** – When medical facilities use Toshiba Medical's MRI machines to scan, the heat load varies greatly. It's at 100% load during the scan and may lower to 10% when the machine is not running. We customized the medical chillers for the 3.0T MRIs with two refrigeration circuits and a digital scroll compressor to accommodate the load variation and reduce downtime.

- **Custom controls** – We also tailored Toshiba Medical's medical chillers to maximize uptime through customized programming for greater application control. We configured their systems to send system failure email alerts to our team and a local service technician in each of Toshiba Medical's customer regions to resolve the issue as soon as possible.

To address the second challenge of accommodating Toshiba Medical's broad ambient temperature range specification, we took a two-pronged approach. First, we oversized the air-cooled copper tube/aluminum fin condenser to ensure it could handle the high ambient temperature of 125°F. Next, we accounted for the low ambient temperature requirement of -40°F by including a liquid receiver to accommodate the larger condenser medical chillers for the 3.0T MRI machines.



## Results

With Toshiba Medical's reputation on the line, we designed and manufactured robust solutions worthy of their brand name. After testing our medical chillers' performance, Toshiba Medical concluded that our systems resulted in an exceptionally high 99.4% uptime rate, meeting and exceeding their expectations. The USA-made parts, manifold add-ons, auto-changeover redundant pumps, heat load accommodations, custom controls, and other customizations set our medical chillers apart from the competition.

Without concerns over excessive downtime, the medical facilities using Toshiba Medical's MRI machines can better care for their patients, knowing that the scanners will work when they're needed the most. Without having to turn patients away due to downtime, they also financially benefit from our high-performance medical chillers that help keep their machines running strong across the USA.

Throughout our 8-year plus relationship, we provided medical chillers for Toshiba Medical 1.5T and 3.0T MRIs for more than 400 hospitals, imaging centers, and other facilities throughout the country.





We hope you found this information helpful. If you have further questions about what chiller is right for you, please contact us at [drakechillers.com](http://drakechillers.com) or call us at: **888-289-7299**.