

# Cooling Systems for Radio Base Transceiver Stations

**D**ispersing the heat generated by radio base transceiver stations (BTS) is a pressing issue as service providers adopt increasingly powerful systems. DENSO supplies high-efficiency, cost-competitive cooling systems for radio BTS of different sizes.

## In the marketplace

A huge market has emerged for systems to cool the equipment that resides under radio BTS antennas. Mobile phone service providers around the world are installing tens of thousands of radio BTS a year, and the



Heat-exchanger unit

pace of installation is increasing 30% annually. Heat output from the radio BTS equipment is rising as service providers install increasingly powerful systems. It will triple with the next-generation systems slated for installation worldwide under the International Mobile Telecommunications 2000 standards.

Mobile phone service providers traditionally have used conventional air conditioners to cool their radio BTS equipment. But the heat generated by the new equipment will require specialized cooling systems to disperse effectively and economically. Specialized cooling systems for radio BTS include heat exchangers—boiling refrigerant type for large installations and air-to-air type for small ones—and, for large installations, air conditioners.

We at DENSO have installed cooling systems at radio BTS in Japan since 1996. We now supply cooling systems to the largest service providers in Japan and, through Lucent Technologies, to U.S. service providers. Our market share in heat exchangers for radio BTS in Japan is 95%.

## In comparison with competitors

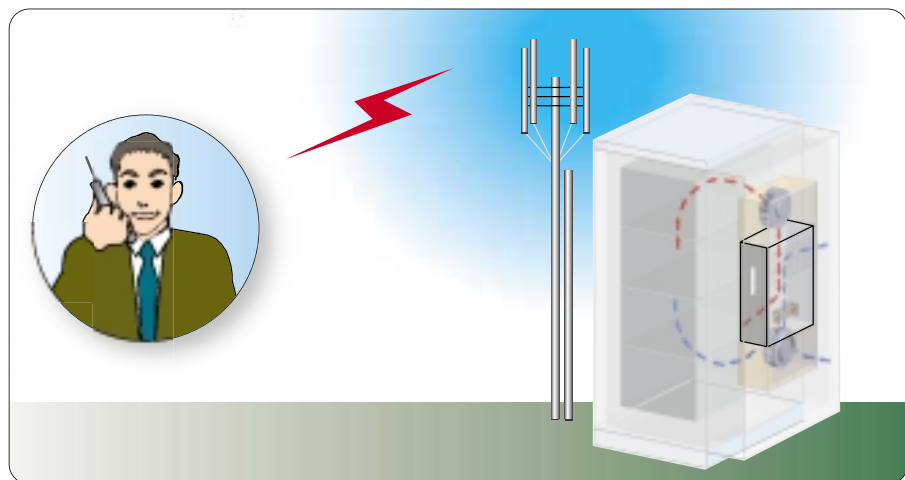
DENSO is the world leader in car air conditioners, and our cooling systems for radio BTS benefit from our advances in heat-exchange technology. For example, cooling efficiency with our air-to-air heat exchangers, which use no refrigerant, is 40% higher than with conventional air countercurrent coolers.

## Issues and outlook

Cost—including installation, operation, and maintenance—is an overriding consideration for mobile phone service providers in choosing cooling systems. We continue to position our systems as industry leaders in cost-competitiveness by simplifying designs, minimizing energy consumption, and streamlining maintenance through our advanced heat-management technology.

## Technical highlights

Our boiling refrigerant heat exchangers use natural circulation of an ozone-safe refrigerant through two tubes between an upper unit and lower unit. Our air-to-air heat exchangers feature a unique fin configuration to reduce air pressure loss and raise thermal transfer efficiency. Our air conditioners contain the indoor and outdoor units in a single, integrated package. That reduces installation cost 70% and allows for conducting all maintenance from the outside of the radio BTS.



■ A cellular base station equipped with a DENSO cooling system