

# Portable Spot Air Conditioners: Determining Total Cost of Ownership

## *A Guide for Facility Managers and HVAC Contractors*

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Since their introduction in the 1980s, commercial portable spot air conditioners, sometimes called spot coolers, have grown steadily in popularity.

Today, spot air conditioners are used as an efficient, cost-effective solution in a wide variety of commercial and industrial applications.

As with any type of equipment, being able to compare the total cost of ownership of one brand with another is essential.

This guide considers the many factors that go into the total cost of ownership, and gives buyers information to help them make a wise purchasing decision.

### **Portable Spot Air Conditioners Defined: Commercial vs. Consumer Grade**

Commercial portable spot air conditioners were originally developed to meet the cooling needs of employees working on factory assembly lines. This solved the problem of how to cool specific locations in a facility without the expense of cooling the entire building.

Later, the use of spot air conditioners was expanded to cooling not only people, but also equipment and manufacturing processes.

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Unlike consumer units — even “professional-grade” ones sold in hardware outlets — commercial spot air conditioners are required to withstand the rigors of high-demand usage, sometimes in 24-hour, seven-day-a-week operation, for up to 10 years or more.

Consumer units are less expensive, but they usually have lower cooling capacities than commercial units, are not as reliable, and have a much shorter service life.

In this guide, the term “spot air conditioners” refers only to commercial units.

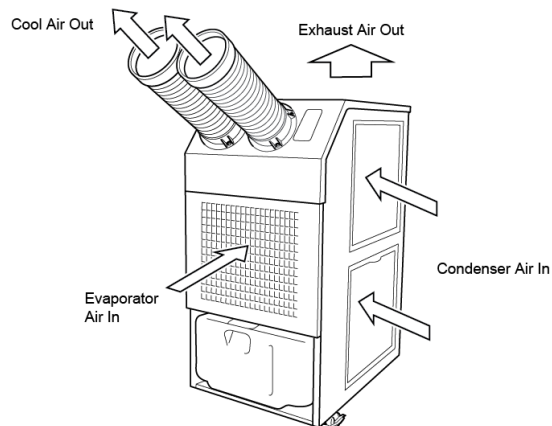
### **How Portable Spot Air Conditioners Work**

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***Portable spot air conditioners are compact, self-contained units.***

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Portable spot air conditioners are compact, self-contained units that combine a compressor, condenser and evaporator in a single cabinet. Refrigerant flows through copper tubing from the compressor to the condenser, and then to the evaporator.



A fan blows over the evaporator, pushing out cold air, while a second fan blows over the condenser, pushing out hot exhaust air.

For applications in offices or other settings where appearance is a factor, models are available with attractive exterior designs that let them blend into their surroundings.

The most important benefit of portable spot air conditioners is how quick and easy it is to install them. In most cases,

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installation consists of no more than rolling a unit in and positioning the cold-air and exhaust ducts.

In many applications, the exhaust air is allowed to dissipate into the ambient air.

In others, a flexible or semirigid duct can be attached to the top of the unit to direct the exhaust air upward toward the ceiling or, if there is a drop ceiling, into the crawl space above it.

In addition to cooling, spot air conditioners are very efficient at removing excess moisture from the air.

The condensed moisture, or condensate, collects in a drain pan that is emptied by means of a gravity-fed tube, or in a condensation tank that can be emptied either manually, or automatically by a pump.

To eliminate the need to empty the drain pan or condensation tank, some portable spot air conditioners spray the condensate onto the unit's condenser coil. The condensate then evaporates into the warm exhaust air, which becomes humid.

This design is generally acceptable for home or other applications where the exhaust air is directed to the outside atmosphere through a window, wall or the roof.

As previously mentioned, however, in most commercial applications, the exhaust air is directed into the crawl space above a drop ceiling, or otherwise upward toward the ceiling.

In such cases, the warm, humid exhaust air creates an environment that is conducive to mold forming on the ceiling tiles or inside the crawl space, and therefore this type of design should be avoided.

### **Cost of Ownership Starts with Product Selection**

In determining total cost of ownership, the ease and accuracy of correct product selection is often not taken into consideration.

With air conditioning equipment, determining the cooling load required and selecting the correct model for a particular application plays a critical role in the total cost of ownership.

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***Correct product selection plays a critical role in the overall cost of ownership.***

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First, there is the cost of time spent in the selection process, which is not always insignificant.

Most importantly, however, if the required cooling load is miscalculated, or other application-specific factors such as the available electrical voltage are not taken into account, the result can be an air conditioner that is either too large or too small, or otherwise doesn't fit the application.

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***If the unit is too large, the extra cost is a complete waste.***

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If the unit is too large, the extra cost is a complete waste. If it's too small or unsuitable for other reasons, a supplemental or replacement unit will have to be purchased, substantially adding to the overall equipment cost.

To help in the selection process, some manufacturers offer online product information and interactive product-selection tools.

The completeness and accuracy of the information and the ease of access to it, as well as the ease of use and effectiveness of the product-selection tools, vary from manufacturer to manufacturer.

For more complicated applications, some manufacturers also offer free advice from their in-house engineering staff, which can save a great deal of time and money.

### **Installation**

As previously mentioned, portable spot air conditioners usually require almost no installation beyond plugging them in and turning them on.

Even in cases where the exhaust air needs to be directed into the space above a drop ceiling, the procedure is simple and straightforward.

To make things as easy as possible, however, some manufacturers offer step-by-step installation videos that can prevent costly mistakes and save valuable time.

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### **Operating Costs**

The only operating cost for spot air conditioners is energy consumption in the form of electricity, and for a given cooling capacity, there is virtually no difference in electricity usage between different brands.

Some lower-priced brands, however, may have inaccurate capacity ratings that are below their stated values.

If an air conditioner's cooling capacity is underrated, the unit will be forced to stay on longer to achieve the required cooling level, and the resulting increase in electricity usage over a period of time can be considerable.

Even worse, since the unit's motor will have to work harder than necessary, its service life will be shortened and it will need to be replaced prematurely, significantly increasing the cost of ownership.

### **Maintenance and Repair Costs**

Aside from periodic filter cleaning, a well-built portable spot air conditioner should require no maintenance and be able to give many years of reliable, trouble-free service.

The difference between well-built units and only adequately or poorly built ones, however, can be substantial.

Some of the possible failure points include:

- Motors shorting out or otherwise breaking down
- Side panels buckling
- Fan housings coming loose
- Refrigeration unit or refrigerant pipes leaking
- Casters breaking
- Drain pans becoming corroded and subsequently leaking

Any of these types of failures can be costly to repair, but even more important, they can cause equipment downtime and interruption of business operations — which can sometimes be more costly than the repairs themselves.

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***Well-built spot air conditioners require almost no maintenance — but poorly built ones are prone to many different types of failure.***

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Preventing downtime in the first place by choosing a ruggedly designed, highly durable unit is therefore the most important factor in reducing total cost of ownership.

### **Warranty and Service Support**

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*The best industry warranties cover both parts and labor for up to three years.*

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Even with the highest-quality spot air conditioners, repairs may become necessary, so it is important to consider the length and type of warranty offered, as well as service support.

Some industry warranties limit their coverage for labor to a shorter period than for parts, which can prove costly to the user.

The best manufacturers, however, cover both parts and labor for the entire length of the warranty, in some cases up to three years.

In addition, some manufacturers require that a unit needing repair be returned to the dealer or factory, while others offer repair at the customer's site, saving the time and the cost of transporting or shipping the equipment and renting a replacement.

For out-of-warranty repairs, some manufacturers provide free telephone access to their engineering team for troubleshooting, often eliminating the time and expense of a service call.

The distance of the dealer or service-center location from the customer's site, and whether or not critical spare parts are locally stocked, are other time- and cost-saving factors to take into account.

### **Buying Tips: What to Look for in a Portable Spot Air Conditioner**

When choosing a portable spot air conditioner, here are some important things to look for.

**Quality of manufacturing:** Regardless of the application, an air conditioner must first of all be reliable. Look for a system that is built to the highest quality standards.

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***Fully enclosed fan motors prevent corrosion and electrical shorts.***

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1. Check to see if the fan motors are fully enclosed in protective housings to prevent dust from building up.

Dust that accumulates on the motors can absorb moisture, leading to corrosion or electrical shorts.

2. Pay special attention to the refrigeration unit itself. Is it hermetically sealed, or does it have service valves, which are prone to leaks?

Also, are the refrigerant pipes connected by reducers and expanders, or by pinching and brazing?

Pinching and brazing restricts the flow of the refrigerant, reducing cooling efficiency and long-term performance.

In addition, the connections created with this method are weaker and more subject to leakage caused by vibration-caused stress cracks.

3. Examine the casters for their durability. Are they securely attached to the frame by a mounting plate and heavy-duty bolts, or only by the caster stem?

The stem is a weak point that can bend and cause a caster to malfunction if it goes over a rough or uneven surface.

4. Look at the sheet-metal panels to see if they have stress-relief notches at the bends.

Also, are the panels attached to the frame at load-bearing points by machine screws and weld nuts, or by lighter-duty sheet-metal screws?

Is the weight of the fan housing supported by a sturdy interior frame, or only by a lighter cover panel?

5. Check the drain pan to see if it is fully insulated, not just powder-coated.

This ensures that moisture will not come into contact with the metal surface of the pan, protecting it from corrosion and possible leaks.

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Quality-oriented details such as these are indicators of high-quality equipment that is designed and manufactured with long-term reliability in mind — the key to lower total cost of ownership.

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*Look for an established manufacturer who will stand behind their product.*

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**Established manufacturer:** Look for a company that has established itself for many years in the industry and stands out as a leading manufacturer of air-conditioning equipment.

This is a good sign that the company will be around to support their equipment well into the future.

**Broad distribution base:** Also look for a company with a broad distribution base and a large number of dealers who will support and service their equipment throughout North America and globally, no matter where the units may be installed.

### **About MovinCool**

MovinCool is a brand of DENSO Corporation. As one of the world's principal suppliers of advanced automotive technology, systems and components, DENSO is also the world's largest manufacturer of spot air conditioners.

In the 1980s, DENSO pioneered the concept of workspace spot cooling to meet its own factory needs in Japan.

Since then, the MovinCool line of spot air conditioners has been extended to accommodate many different applications, including:

- Industrial
- IT server rooms and data centers
- Healthcare
- Outdoor events
- Offices and schools
- Moisture removal

Within the air-conditioning industry, MovinCool has a reputation for the highest quality, highest reliability and longest equipment life.

This enviable position is a result of MovinCool's origins in the intensely competitive automotive sector.



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Because MovinCool is manufactured by DENSO, every component in a MovinCool spot air conditioner must meet the company's rigorous quality criteria.

The DENSO Design Standard for spot air conditioners consists of 50 different tests, including:

- A three-axis vibration test
- Exposure to extremely hot and cold temperatures in a thermal shock chamber
- Exposure to eight different types of dust particulates.

With such attention to quality and reliability, it should not be surprising that dealers who specialize in portable spot air conditioners — and who stand to lose significant profit if they have to replace a unit once it is installed — consistently say they prefer MovinCool above all other brands.

For more information, visit MovinCool's website at [www.movincool.com](http://www.movincool.com).