

Other Installation, Maintenance, and Repair Occupations

Coin, Vending, and Amusement Machine Servicers and Repairers

(O*NET 49-9091.00)

Significant Points

- Most workers learn their skills on the job.
- Opportunities should be good for persons with some knowledge of electronics.

Nature of the Work

Coin, vending, and amusement machines are a familiar sight in offices, convenience stores, arcades, or casinos. These coin-operated machines give out change, dispense refreshments, test our senses, and spit out lottery tickets nearly everywhere we turn. Coin, vending, and amusement machine servicers and repairers install, service, and stock these machines and keep them in good working order.

Vending machine servicers, often called route drivers, visit machines that dispense soft drinks, candy and snacks, and other items. They collect money from the machines, restock merchandise, and change labels to indicate new selections. They also keep the machines clean and appealing.

Vending machine repairers, often called mechanics or technicians, make sure machines operate correctly. When checking complicated electrical and electronic machines, such as beverage dispensers, they make sure that the machines mix drinks properly and that refrigeration and heating units work correctly. On the relatively simple gravity-operated machines, servicers check keypads, motors, and merchandise chutes. They also test coin, bill, and change-making mechanisms.

When installing machines, vending machine repairers make the necessary water and electrical connections and check the machines for proper operation. They also make sure installation complies with local plumbing and electrical codes. Because many vending machines dispense food, these workers, along with vending machine servicers, must comply with State and local public health and sanitation standards.

Amusement machine servicers and repairers work on jukeboxes, video games, pinball machines, and slot machines. They make sure that the various levers, joysticks, and mechanisms function properly, so that the games remain fair and the jukebox selections are accurate. They update selections, repair or replace malfunctioning parts, and rebuild existing equipment. Those who work in the gaming industry must adhere to strict guidelines, because Federal and State agencies regulate many gaming machines.

Preventive maintenance—avoiding trouble before it starts—is a major job of repairers. For example, they periodically clean refrigeration condensers, lubricate mechanical parts, and adjust machines to perform properly.

If a machine breaks down, vending and amusement machine repairers inspect it for obvious problems, such as loose electrical wires, malfunctions of the coin mechanism or bill validator, and leaks. When servicing electronic machines, repairers test them with hand-held diagnostic computers that determine the extent and location of any problem. Repairers may only have to replace a circuit board or other component to fix the problem. However, if

the problem cannot be readily located, these workers refer to technical manuals and wiring diagrams and use testing devices, such as electrical circuit testers, to find defective parts. Repairers decide if they must replace a part and whether they can fix the malfunction onsite, or if they have to send the machine to the repair shop.

In the repair shop, vending and amusement machine repairers use power tools, such as grinding wheels, saws, and drills, as well as voltmeters, ohmmeters, oscilloscopes, and other testing equipment. They also use ordinary repair tools, such as screwdrivers, pliers, and wrenches.

Vending machine servicers and repairers employed by small companies may both fill and fix machines on a regular basis. These combination servicers-repairers stock machines, collect money, fill coin and currency changers, and repair machines when necessary.

Servicers and repairers also do some paperwork, such as filing reports, preparing repair cost estimates, ordering parts, and keeping daily records of merchandise distributed and money collected. However, new machines with computerized inventory controls reduce the paperwork that a servicer must complete.



An amusement machine repairer adjusts a pinball machine for an arcade.

Working Conditions

Some vending and amusement machine repairers work primarily in company repair shops, but many spend substantial time on the road visiting machines wherever they have been placed. Repairers generally work a total of 40 hours a week. However, vending and amusement machines operate around the clock, so repairers may be on call to work at night and on weekends and holidays.

Vending and amusement machine repair shops generally are quiet, well-lighted, and have adequate workspace. However, when servicing machines on location, the work may be done where pedestrian traffic is heavy, such as in busy supermarkets, industrial complexes, offices, casinos, or arcades. Repair work is relatively safe, although servicers and repairers must take care to avoid hazards such as electrical shocks and cuts from sharp tools and other metal objects. They also must follow safe work procedures, especially when moving heavy vending and amusement machines.

Employment

Coin, vending, and amusement machine servicers and repairers held about 37,000 jobs in 2000. Most repairers work for vending companies that sell food and other items through machines. Others work for soft drink bottling companies that have their own coin-operated machines. A growing number of servicers and repairers work for amusement establishments that own video games, pinball machines, jukeboxes, slot machines, and similar types of amusement equipment. Although vending and amusement machine servicers and repairers are employed throughout the country, most are located in areas with large populations and, thus, many vending and amusement machines.

Training, Other Qualifications, and Advancement

Most workers learn their skills on the job. New workers are trained to fill and fix machines informally on the job by observing, working with, and receiving instruction from experienced repairers. Employers normally prefer to hire high school graduates; high school or vocational school courses in electricity, refrigeration, and machine repair are an advantage in qualifying for entry-level jobs. Employers usually require applicants to demonstrate mechanical ability, either through work experience or by scoring well on mechanical aptitude tests.

Because coin, vending, and amusement machine servicers and repairers sometimes handle thousands of dollars in merchandise and cash, employers hire persons who seem to have a record of honesty. Also, the ability to deal tactfully with people is important because the servicers and repairers play a significant role in relaying customer requests and concerns. A driver's license and a good driving record are essential for most vending and amusement machine servicer and repairer jobs. Some employers require their servicers to be bonded.

As electronics become more prevalent in vending and amusement machines, employers will increasingly prefer applicants who have some training in electronics. Technologically advanced machines with features such as multilevel pricing, inventory control, and scrolling messages use electronics and microchip computers extensively. Some vocational high schools and junior colleges offer 1- to 2-year training programs in basic electronics.

Beginners start training with simple jobs, such as cleaning or stocking machines. They then learn to rebuild machines by removing defective parts, and repairing, adjusting, and testing the machines. Next, they accompany an experienced repairer on service calls, and finally make visits on their own. This learning process takes from 6 months to 2 years, depending on the individual's abilities, previous education, types of machines serviced, and quality of instruction.

The National Automatic Merchandising Association has a self-study technicians training program for vending machine repairers. Repairers use manuals for instruction in subjects such as customer relations, safety, electronics, and schematic reading. Upon completion of the program, repairers must pass a written test to become certified as a technician or journeyman.

To learn about new machines, repairers and servicers sometimes attend training sessions sponsored by manufacturers and machine distributors that may last from a few days to several weeks. Both trainees and experienced workers sometimes take evening courses in basic electricity, electronics, microwave ovens, refrigeration, and other related subjects to stay on top of new techniques and equipment. Skilled servicers and repairers may be promoted to supervisory jobs or go into business for themselves.

Job Outlook

Job openings for coin, vending, and amusement machine servicers and repairers will arise from employment growth and from the need to replace experienced workers who transfer to other occupations or leave the labor force. Opportunities should be good for persons with some knowledge of electronics, because electronic circuitry is an important component of vending and amusement machines. If firms cannot find trained or experienced workers for these jobs, they are likely to train qualified route drivers or hire inexperienced people who have acquired some mechanical, electrical, or electronics training by taking high school or vocational courses.

Employment of coin, vending, and amusement machine servicers and repairers is expected to grow about as fast as the average for all occupations through the year 2010 because of the increasing number of vending and amusement machines in operation. Establishments are likely to install additional vending machines in industrial plants, hospitals, stores, and schools to meet the public demand for inexpensive snacks and other food items. Also, there is an increased need for vending machines in businesses with few employees. The range of products dispensed by the machines is expected to increase, as vending machines continue to become increasingly automated and begin to incorporate microwave ovens, mini refrigerators, and freezers. In addition, casinos, arcades, and other amusement establishments are an increasing source of entertainment. Also, State and multistate lotteries are increasingly using coin-operated machines to sell scratch-off tickets in grocery stores and other public places. Furthermore, circuit boards in many vending machines must be either replaced or reprogrammed so that the machines can accept the new \$5 and \$10 bills, increasing the need for servicers and repairers.

Improved technology in newer machines will moderate employment growth because these machines require maintenance less frequently than do older ones. These new machines will need repairing and restocking less often, and contain computers that record sales and inventory data, reducing the amount of time-consuming paperwork. The Internet is beginning to play a large role in the monitoring of vending machines from remote locations. Additionally, some new machines use wireless data transmitters to signal the vending machine company when the machine needs restocking or repairing. This allows servicers and repairers to be dispatched only when needed, instead of having to check each machine on a regular schedule.

Earnings

Median hourly earnings of coin, vending, and amusement machine servicers and repairers were \$12.33 in 2000. The middle 50 percent earned between \$9.18 and \$15.78 an hour. The lowest 10 percent earned less than \$7.06 an hour, and the highest 10 percent earned more than \$19.51 an hour. Median hourly earnings of coin, vending, and amusement machine servicers and repairers were

\$11.24 and \$10.49 in miscellaneous amusement and recreation services and nonstore retailers, respectively, in 2000. Typically, States with some form of legalized gaming have the highest wages.

Most coin, vending, and amusement machine servicers and repairers work 8 hours a day, 5 days a week, and receive premium pay for overtime. Some union contracts stipulate higher pay for nightwork and for emergency repair jobs on weekends and holidays than for regular hours. Some vending machine repairers and servicers are members of the International Brotherhood of Teamsters.

Related Occupations

Other workers who repair equipment with electrical and electronic components include electrical and electronics installers and repairers; electronic home-entertainment equipment installers and repairers; heating, air-conditioning, and refrigeration mechanics and installers; and home appliance repairers.

Sources of Additional Information

Information on job opportunities in this field can be obtained from local vending machine firms and local offices of your State employment service. For general information on vending machine repair, write to:

- National Automatic Merchandising Association, 20 N. Wacker Dr., Suite 3500, Chicago, IL 60606-3102. Internet: <http://www.vending.org>
- Automatic Merchandiser Vending Group, Cygnus Business Media, P.O. Box 803, 1233 Janesville Ave., Fort Atkinson, WI 53538-0803. Internet: <http://www.amonline.com>

Heating, Air-Conditioning, and Refrigeration Mechanics and Installers

(O*NET 49-9021.01, 49-9021.02)

Significant Points

- Opportunities should be very good for mechanics and installers with technical school or formal apprenticeship training.
- Mechanics and installers need a basic understanding of microelectronics because they increasingly install and service equipment with electronic controls.

Nature of the Work

What would those living in Chicago do without heating, those in Miami do without air-conditioning, or blood banks all over the country do without refrigeration? Heating and air-conditioning systems control the temperature, humidity, and the total air quality in residential, commercial, industrial, and other buildings. Refrigeration systems make it possible to store and transport food, medicine, and other perishable items. *Heating, air-conditioning, and refrigeration mechanics and installers*—also called *technicians*—install, maintain, and repair such systems.

Heating, air-conditioning, and refrigeration systems consist of many mechanical, electrical, and electronic components such as motors, compressors, pumps, fans, ducts, pipes, thermostats, and switches. In central heating systems, for example, a furnace heats air that is distributed throughout the building via a system of metal or fiberglass ducts. Technicians must be able to maintain, diagnose, and correct problems throughout the entire system. To do this, they adjust system controls to recommended settings and test

the performance of the entire system using special tools and test equipment.

Although they are trained to do both, technicians often specialize in either installation or maintenance and repair. Some specialize in one type of equipment—for example, oil burners, solar panels, or commercial refrigerators. Technicians may work for large or small contracting companies or directly for a manufacturer or wholesaler. Those working for smaller operations tend to do both installation and servicing, and work with heating, cooling, and refrigeration equipment.

Heating and air-conditioning mechanics install, service, and repair heating and air-conditioning systems in both residences and commercial establishments. *Furnace installers*, also called *heating equipment technicians*, follow blueprints or other specifications to install oil, gas, electric, solid-fuel, and multiple-fuel heating systems. *Air-conditioning mechanics* install and service central air-conditioning systems. After putting the equipment in place, they install fuel and water supply lines, air ducts and vents, pumps, and other components. They may connect electrical wiring and controls and check the unit for proper operation. To ensure the proper functioning of the system, furnace installers often use combustion test equipment such as carbon dioxide and oxygen testers.

After a furnace has been installed, heating equipment technicians often perform routine maintenance and repairwork to keep the system operating efficiently. During the fall and winter, for example, when the system is used most, they service and adjust burners and blowers. If the system is not operating properly, they check the thermostat, burner nozzles, controls, or other parts to diagnose and then correct the problem.

During the summer, when the heating system is not being used, heating equipment technicians do maintenance work, such as replacing filters, ducts, and other parts of the system that may accumulate dust and impurities during the operating season. During the winter, air-conditioning mechanics inspect the systems and do required maintenance, such as overhauling compressors.

Refrigeration mechanics install, service, and repair industrial and commercial refrigerating systems and a variety of refrigeration equipment. They follow blueprints, design specifications, and manufacturers' instructions to install motors, compressors, condensing units, evaporators, piping, and other components. They connect this equipment to the ductwork, refrigerant lines, and electrical power source. After making the connections, they charge the system with refrigerant, check it for proper operation, and program control systems.

When heating, air-conditioning, and refrigeration mechanics service equipment, they must use care to conserve, recover, and recycle chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) refrigerants used in air-conditioning and refrigeration systems. The release of CFCs and HCFCs contributes to the depletion of the stratospheric ozone layer, which protects plant and animal life from ultraviolet radiation. Technicians conserve the refrigerant by making sure that there are no leaks in the system; they recover it by venting the refrigerant into proper cylinders; and they recycle it for reuse with special filter-dryers.

Heating, air-conditioning, and refrigeration mechanics and installers are adept at using a variety of tools, including hammers, wrenches, metal snips, electric drills, pipe cutters and benders, measurement gauges, and acetylene torches, to work with refrigerant lines and air ducts. They use voltmeters, thermometers, pressure gauges, manometers, and other testing devices to check air flow, refrigerant pressure, electrical circuits, burners, and other components.

New technology, in the form of cellular "Web" phones that allow technicians to tap into the Internet, may soon affect the way technicians diagnose problems. Computer hardware and software have