

Central-System Pipes Are Large, Runs Long. Unit-System Pipes Small, Runs Short

of the two types of air systems for a plant using 1000 cfm at 100 psi. On a typical job, this air is needed in four areas: 300 cfm in assembly room, 300 cfm in sandblast and paint, 200 cfm in testing, 100 cfm in shipping—and 100 cfm for day maintenance work.

Looking over the table you see that the typical unit system has lower initial cost. And there are other advantages—detailed below.

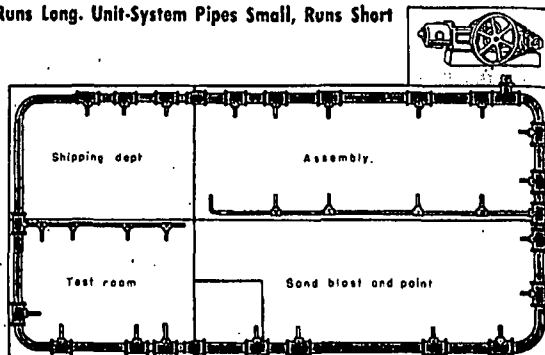
Less Pressure Drop. Load centers use small wires, high voltage for power transmission to substations. Since compressors in the unit system are close to the load, small pipes with short runs transmit air with low pressure loss.

Pressure drop in air lines is a function of pipe length, diameter, air quantity handled, inlet pressure, and pipe restrictions like bends, valves and other fittings. Short runs with few bends and fittings have low pressure loss.

Feeding air outlets radially from a compressor in the department area permits sizing pipe for air quantity needed at the outlets. Pipe can be run and compressor located so there's minimum pressure loss. Tools and other air-operated equipment perform better with less power waste, pressure drop being power loss.

Less Engineering. With load-center equipment, factory-engineered packages serve as substations. All that is needed is a flat mounting surface, and leads to and from substation.

Likewise, in unit system for air dis-



3 CENTRAL-DISTRIBUTION system has one or more big air compressors to supply air through a loop main that runs to all departments. Main is large, has long run

tribution, most compressor builders can now supply units from fractional to 150 hp. Relatively little engineering and planning are needed for installation. Among the items not needed for unit systems are specially built compressor rooms with inlet ducts and filters, costly foundations to bedrock to cut vibration, extensive electrical systems, special water pumps and coolers.

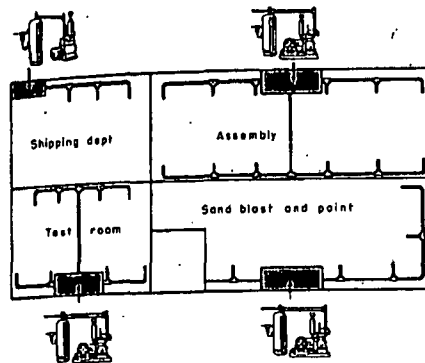
Selection. To pick a packaged unit all you need do is figure compressor capacity required and then find a suitable unit in the manufacturer's catalog. When it arrives compressor is grouted and bolted to present plant floor.

When motor, receiver and other equip-

ment are on hand, only the bare unit-compressor is purchased. If no equipment is on hand the complete installation including motor starter, aftercooler and moisture separator may be purchased. Package includes all necessary parts, hooked up and mounted on a common base and ready to be connected to air and electric lines, Fig. 1. Maintenance crew easily installs unit, saving money.

If, at a later date, you ever want to move packaged compressors, this is easy, Fig. 2. Lift trucks or other materials-handling equipment transport compressor.

Purchasing Facts. With distributors throughout the world handling packaged



4 UNIT-DISTRIBUTION system has one or more packaged compressors spotted in plant areas using air. Mains are small, runs short. Portable is for maintenance

units, you can quickly and easily obtain units from fractional through 150 hp. Where you must increase compressor capacity in a hurry, you can find one of these units in a matter of hours, instead of months needed for custom-built jobs. And the price quoted is what you pay, except for the small additional cost of grout and piping.

Financing. Load centers for electrical distribution grow with the plant, more units being added as demand increases. The same is true of unit system for air distribution.

Many older plants outgrow their original compressor installation. To expand: (1) A larger centrally located

compressor may be ordered. (2) Other large-capacity units may be installed with existing units. (3) Or package units may be scattered in areas needing more air. Most plants now choose method 3 for reasons we've already given.

Another important reason for using package units is that it is easier to sell plant management on small expenditures for package compressors than on complete replacement or capacity sufficient to handle unknown future growth. It's more sensible, from a management standpoint to add needed capacity in small segments than to add large capacity for some future dream.

An excellent example of this occurred during World War II. Starting with only a bank of machine tools and one 105-cfm compressor early in the war, an aircraft-parts manufacturer saw his load grow to where he needed seventeen 105-cfm compressors. After the war when business slackened off he shut down sections of his plant in the same way he had increased their capacity. When his business was almost completely gone, and while looking for other items to produce, he sold most of his machine tools and compressors. The latter sold quickly because moving them to another plant was extremely easy.

Had this manufacturer tried to install a single compressor at the start to take care of his maximum needs, he might not have been able to finance it. Also, he'd have a white elephant on his hands when business slackened. This is not an isolated case; other manufacturers use the same plan.

Think of unit compressors as "building blocks" added to plant as air needs increase. This avoids investment for compressors larger than needed at the moment.

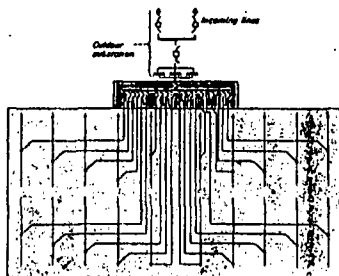
Salvage Value. Electrical-equipment manufacturers realized the importance of equipment that could be used over again when introducing load-center systems. High salvage value is important where plant expansion or contraction is easily affected by war, business cycles, market changes, inflation, etc.

Unit system of air distribution has same high salvage value. This is both outside the plant, as with the aircraft-parts manufacturer, and within the plant where demands may change. Inside a plant you can easily shift a compressor from one department to another at low cost. Frequently, portable compressors may be used to supplement installed capacity during peak loads.

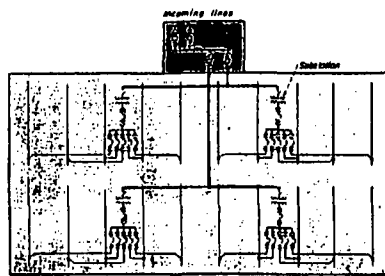
Portables have become an important part of unit systems in many plants. They prevent maintenance crews from "robbing" air from production lines while doing work during the day. Portable close to job eliminates costly piping or hose runs, doesn't affect shop-floor or maintenance-tool pressure. These compressors have saved many engineers a costly shutdown. In some plants, banks of portables have been rented to keep a shop going while repairs were made to a large central-system compressor.

Portables are now available as self-propelled (tractor-compressor) units that provide maintenance department with an air compressor and tractor. A few of the devices you can hook to tractor include snowplows, winches, booms. (Continued on page 210)

Electrical-Distribution Systems Closely Resemble Those for Compressed Air



5 OLD-TYPE electrical distribution system has a single substation with long secondary feeders. The cost is high



6 NEW-TYPE electrical distribution system uses load-center packaged transformers, has short run lengths, low costs

Comparison of Unit and Central Distribution Systems

Unit System		Central System	
Compressors¹		Compressor²	
Two 315-cfm stationary	\$12,476	One 1061-cfm stationary	\$18,872
One 210-cfm stationary	3,840		
One 105-cfm stationary	2,529		
One 105-cfm portable	3,370		
Foundations		Foundation	
Total for all stationary units listed above	100	15 cu yd @ \$65.00 per yd excavated, formed, poured	975
Erection		Erection	
Total for all stationary units listed above	240	10 days' work for four men @ \$30 per day per man	1,200
Piping		Piping	
2-in. mains and 1-in. feeders	600	6- and 4-in. mains with 1-in. feeders	6,000
Total	\$23,155	Total	\$27,047

¹Includes compressor, motor, aftercooler, moisture separator, traps, air receiver, motor starter and air-receiver fittings for each installation.

²Includes compressor, synchronous motor, exciter, motor-generator for exciter, motor starter, aftercooler, moisture separator, trap, air receiver and fittings.