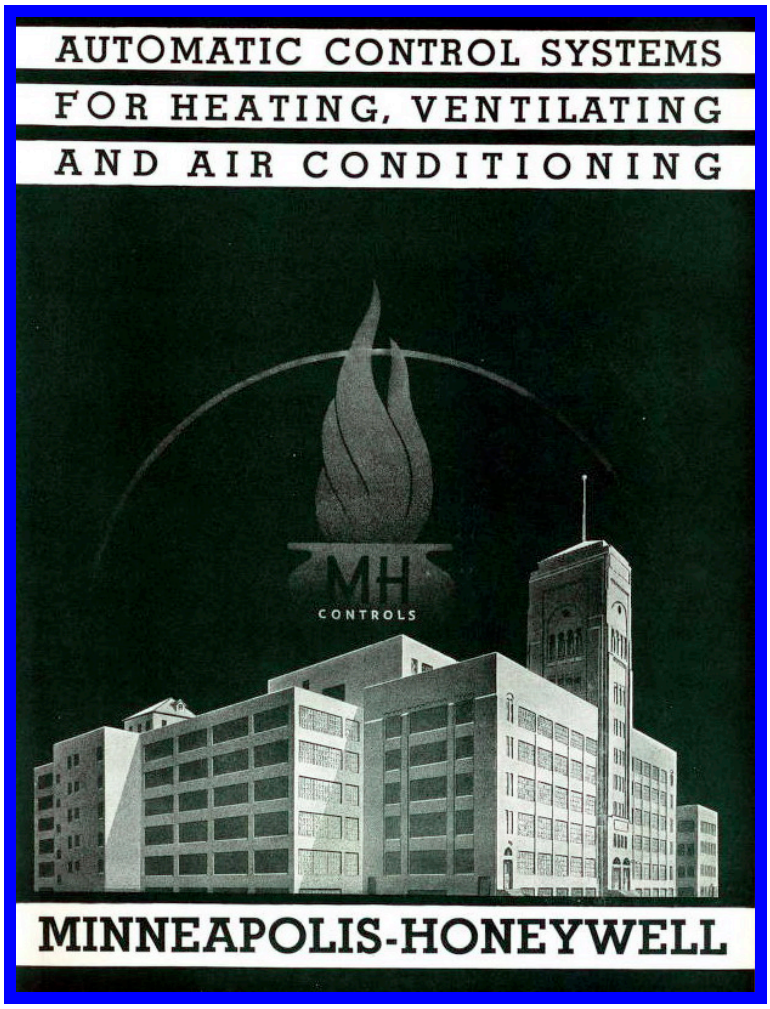
Automatic Controls 1400-1985

Minneapolis-Honeywell



MINNEAPOLIS

Honeywell

Control manual

FOR

HEATING · VENTILATING

AIR CONDITIONING

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY · MINNEAPOLIS

CONTROL MANUAL

for

HEATING, VENTILATING

and

AIR CONDITIONING

AUTOMATIC CONTROLS MH

Price $1.00 per copy

Printed in U. S. A.

MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS

For Heating, Ventilating and Air Conditioning


AUTOMATIC CONTROLS
MH
MINNEAPOLIS

Install Automatic Heating

and Air Conditioning . . . .

BUT

don't overlook the controls

that make it automatic

H O N E Y W E L L

M·H BASIC CONTROLS

MINNEAPOLIS-HONEYWELL

BASIC AUTOMATIC HEATING CONTROLS

● Automatic heating can be accomplished only if the burner, regardless of the type of fuel used, is equipped with automatic controls. These controls should consist of a thermostat to stabilize room temperature, a limit control to restrict the temperature of the furnace or boiler at a given point, a primary control to operate the burner in the case of oil or coal firing, and a valve in the case of gas heating. Such controls, of course, are necessary for the operation of your burner and are required by most local ordinances. They represent the minimum equipment with which Automatic Heating can be properly installed.

Even if this minimum equipment is all that you require, insist upon Minneapolis-Honeywell Controls, for they insure the best performance from your system and make sure that proper controls will be available for future equipment if you make additions or changes later. Minneapolis-Honeywell Automatic Controls are accepted as standard by the majority of manufacturers, and are available for all types of oil, gas, or coal burners, as well as kindred equipment. The Minneapolis-Honeywell line is complete in itself.

In order to make list prices of Automatic Heating units attractive, most dealers supply only standard equipment, which includes a plain type thermostat such as the Aeratherm. There are, however, several additional or optional controls you should know about. You probably will want more than the very minimum of controls, especially in view of the fact that complete automatic control will give much more comfort, convenience and economy, and will actually cost but little more.

THE ACRATHERM

MINNEAPOLIS-HONEYWELL

THE ACRATHERM • A REVOLUTIONARY ROOM TEMPERATURE CONTROL EMPLOYING THE APPROVED PRINCIPLE OF "HEAT ACCELERATION"

● Every automatic heating plant must have a thermostat, but only the M-H Acratherm will give you the perfection of temperature control you should have. It will probably cost you little, if any, more than a conventional type. The Acratherm is a new type of thermostat recently developed by Minneapolis-Honeywell engineers. It is the Minneapolis-Honeywell version of a plain type thermostat, yet has many distinct and revolutionary advantages. Because the greater majority of burners are supplied with M-H Controls, the chances are your dealer will figure the Acratherm in his original price. If some other plain type thermostat is substituted, the following facts will show you why it is wise to insist upon the Acratherm or one of the other Minneapolis-Honeywell Thermostats employing the Acratherm principle.

The Acratherm does what other thermostats strive to do; it provides stabilized heat. By means of its "accelerator", it actually senses temperature changes before they occur and speeds up the heating system to meet them. It literally irons out temperature fluctuations in any modern heating system by automatically adjusting the length and number of burner operations to supply heat in response to the changes in outside weather. Short frequent burner operations in cold weather, and less frequent operations in mild weather, produce stabilized heat. No thermostat without the Acratherm "Accelerator" can do this.

The Acratherm also eliminates the condition known to heating engineers as "Cold 70" which is due to air stratification as a result of intermittent firing. When heat is not supplied constantly enough to cause circulation within the room, there is a tendency for warm air to rise to the ceiling and cold air to settle on the floor, and even though the ordinary room thermostat is satisfied, a chilly feeling prevails. But the Acratherm, because it provides short frequent burner operations, keeps the air within the room circulating and temperatures even at all times.

When you install Automatic Heating insist that it is Acratherm controlled, as the Acratherm is probably Minneapolis-Honeywell's greatest single contribution to the automatic heating industry.

CLOCK CONTROLS

MINNEAPOLIS-HONEYWELL

LOWERED NIGHT TEMPERATURE AND FUEL ECONOMY

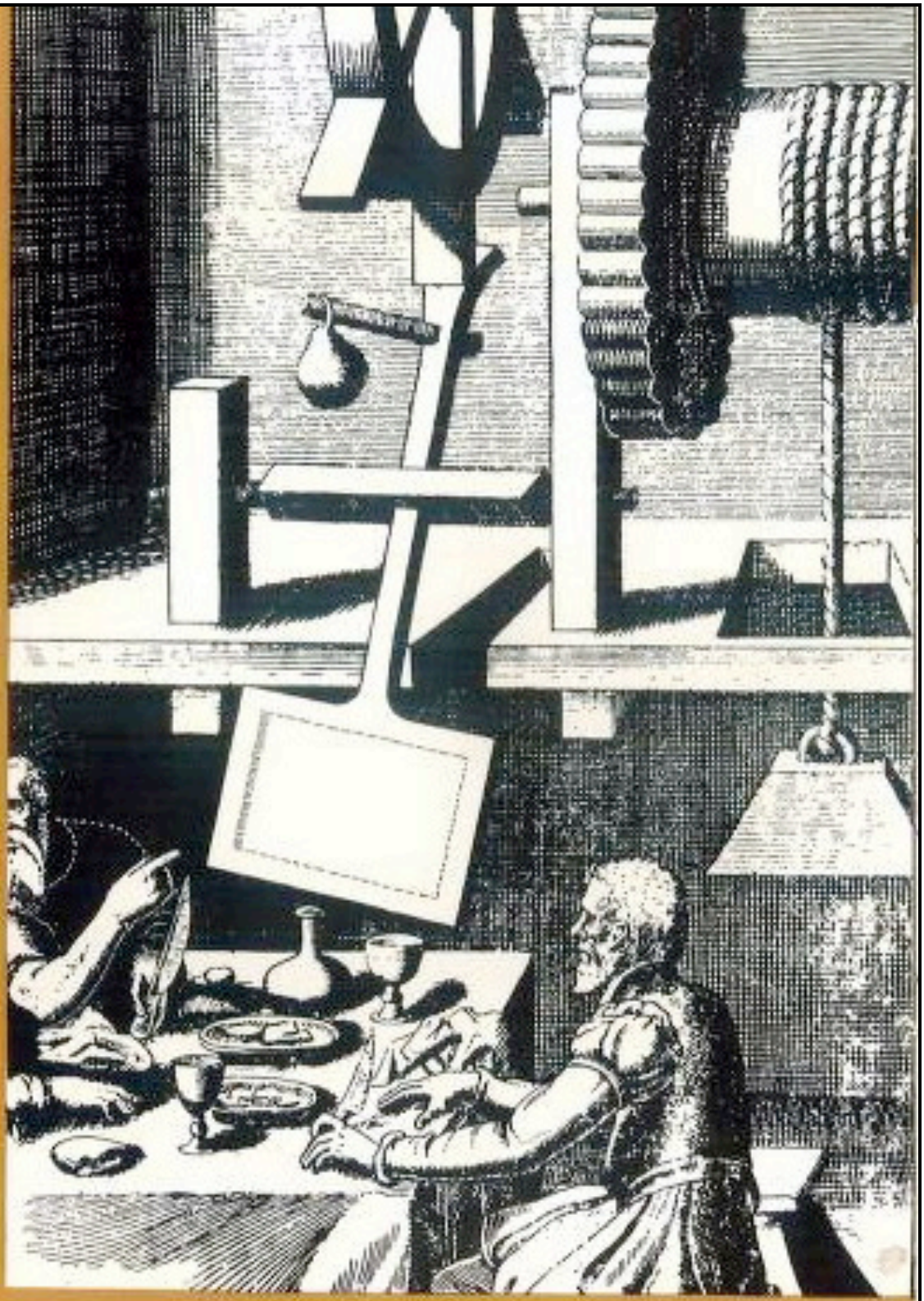
● It is an established fact that reducing temperature at night and during periods when heat is not needed, can save you from 10 to 30% in fuel costs. To make this lowering of temperature practical, Minneapolis-Honeywell originated and pioneered "Clock Control". It has been proved through exhaustive tests that fuel is saved at the rate of 3.2% per degree of lowered temperature . . . in other words — if your temperature control point is lowered 10° during the night or when temperature at the higher point is not needed, 32% of the fuel normally consumed during those hours will be saved. Lowered night temperature can be automatically accomplished at small cost to you. The M-H Chronotherm or the Da-Nite Acratherm provides "stabilized heat" as does the plain Acratherm, but offers, the additional advantages of lowered night temperature.

THE CHRONOTHERM

● The Minneapolis-Honeywell Chronotherm is the finest thermostat in the Minneapolis-Honeywell line, and is the ace of all thermostats. In addition to providing the same Stabilized Heat as the Acratherm, it is equipped with an accurate and dependable, self-starting, electric clock. It automatically lowers temperature at night and raises the temperature in the morning at any given time before you arise. The Chronotherm is completely automatic. Its added cost is more than compensated for, by the comfort and economy it provides. In fact, you can't afford to be without the Chronotherm in your home.

THE DA-NITE ACRATHERM

● The Da-Nite Acratherm provides the same exclusive control qualities as the plain Acratherm and the Chronotherm, but requires manual attention to provide night temperature shut-down. It is a less expensive way to accomplish lowered night temperature. At night when you retire or at any time when heat is not needed — if you are away for the day — a twist of the fingers reduces the temperature to a fuel saving level for the length of time you designate. When this period has elapsed, the Da-Nite Acratherm automatically restores the comfortable temperature you desire. This means that your home is always comfortable in the morning when you arise, yet you have saved fuel at the rate of 3.2% for every degree you have lowered the temperature at night or during your absence.



AIR CONDITIONING IS NOT NEW

Early device to ventilate a room by a mechanically operated fan . . . Engraving after Boeckler, 1659

AIR CONDITIONING

● Probably no individual subject in the building field is more widely discussed and yet less understood than Air Conditioning. This is true because of the vast difference in opinion as to what Air Conditioning actually is.

In reality Air Conditioning, or to be explicit, year 'round Air Conditioning, consists of six important factors, namely: Heating, Cooling, Humidifying, Dehumidifying, Circulating and Cleaning . . . all under Automatic Control.

Air Conditioning thus means much more than summer cooling and winter humidifying. It has long passed the luxury stage and is not only desirable but necessary, because it produces untold indoor comfort throughout the year, and is a vital factor in maintaining health and comfort as well as keeping furnishings and buildings in good condition. And, as is the case with Automatic Heating, true Air Conditioning cannot exist without Automatic Control.

It is not necessary, however, that complete year 'round Air Conditioning be installed at one time. This can be undertaken step by step. Additions can be made from time to time, but unless the control system for your equipment is such that you can obtain additional controls which will match up with your original installation, you will not have a coordinated system capable of producing the best results. In this respect Minneapolis-Honeywell can serve you to best advantage, because the Minneapolis-Honeywell line is complete in itself, and M-H controls are designed to work together.

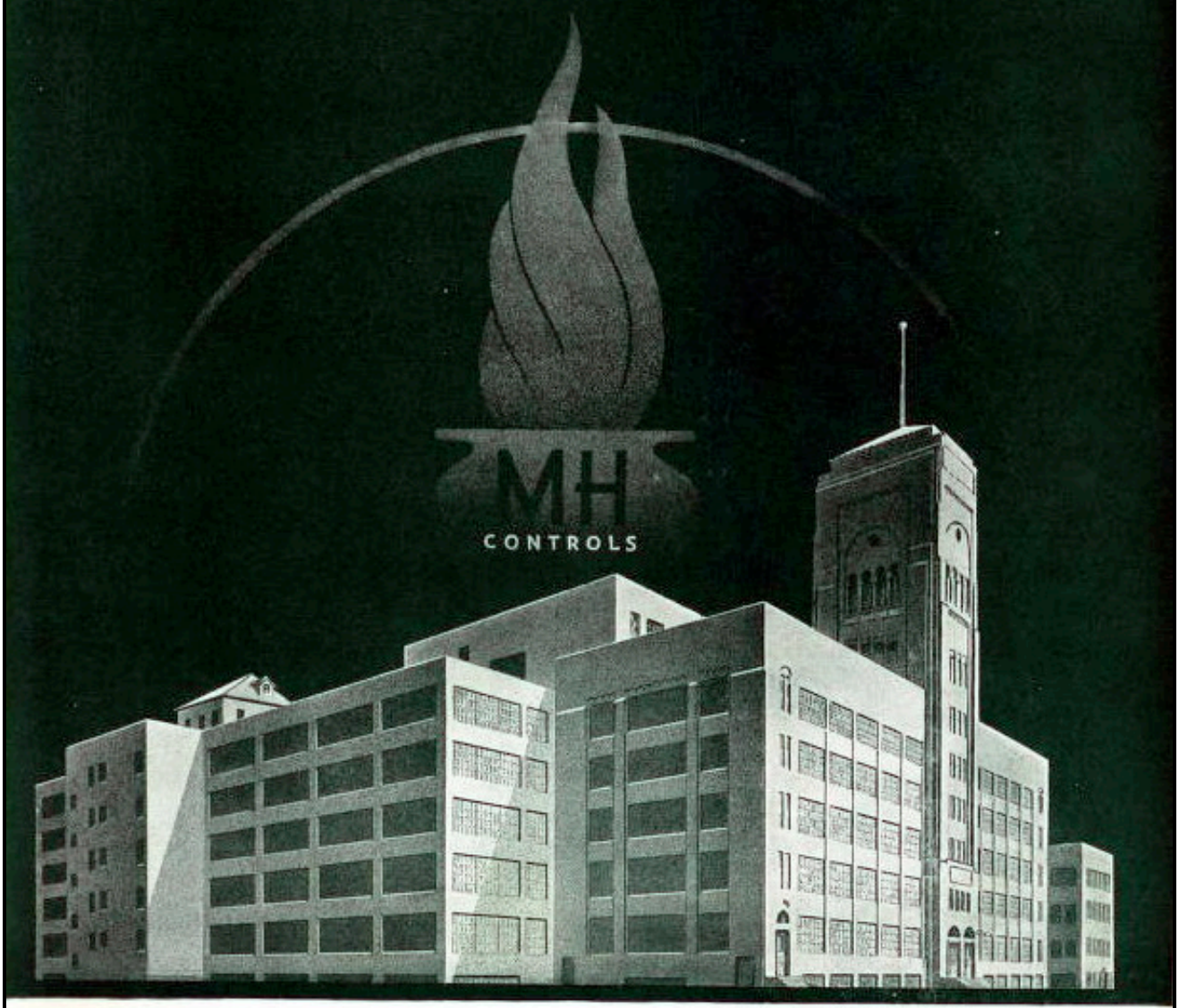
The importance of Automatic Control cannot be too strongly emphasized. Properly applied, it insures the most satisfactory results that the conditioning system is capable of producing. It is, therefore, important that the possibilities of Air Conditioning and Automatic Control be broadly understood and considered when selecting various types of Air Conditioning equipment.

MINNEAPOLIS-HONEYWELL

AUTOMATIC ★ ★ ★ ★ ★ ★ ★ ★ ★ CONTROLS

For Heating, Ventilating and Air Conditioning

AUTOMATIC CONTROL SYSTEMS FOR HEATING, VENTILATING AND AIR CONDITIONING



MINNEAPOLIS-HONEYWELL

SUMMER AIR CONDITIONING

During the summer air conditioning cycle the air must be cooled, dehumidified, cleaned and circulated. In establishing and maintaining a proper relationship between these factors, automatic control offers the assurance of continued efficiency and satisfaction.

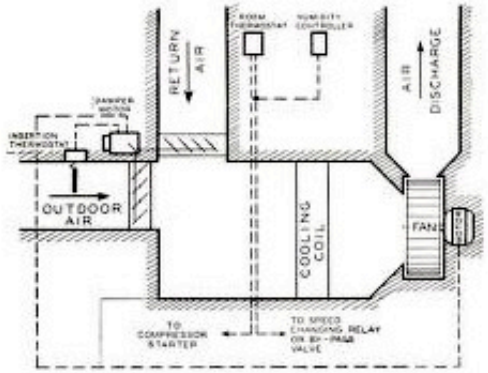
Here are a few typical questions that should be considered when specifying an air conditioning system for summer cooling.

1. **Is the system controlled to maintain optimum comfort conditions or an arbitrary temperature level?**
   Control from a single thermostat may give a constant dry bulb temperature without providing a constant comfort condition. The American Society of Heating & Ventilating Engineers, after exhaustive tests, has published data showing that the sensation of comfort does not follow constant temperature alone, but varies also with relative humidity and air motion. These tests show further that the feeling of comfort during the cooling cycle will vary with outside temperatures. It becomes necessary therefore to automatically re-adjust inside temperature control schedules in response to fluctuations of inside relative humidity and outside dry bulb temperatures. Minneapolis-Honeywell offers as standard equipment, control units to accomplish these functions. The relation between inside and outside temperature schedules may be set at any ratio desired, depending upon the type of building, duration of occupancy, and geographical location.

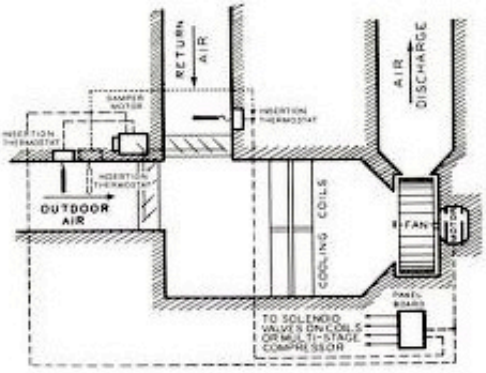
2. **Will the system take advantage of outside air when conditions are favorable?**
   At night and during the intermediate seasons, outdoor air will frequently be available at temperatures which will permit its use directly for cooling purposes. A well designed temperature control system will take advantage of this condition and will consequently effect a marked reduction in operating cost.

3. **Will your client get the most out of the system you design?**
   Without Automatic Control it is impossible to get the most out of any air conditioning system. The design of modern equipment provides inherent means for accurate regulation of factors which in the past have been neglected entirely, or left to chance. Precision control makes it possible to utilize engineering developments to their greatest advantage.

The Minneapolis-Honeywell control engineer in your locality is thoroughly qualified to analyze the equipment which you have specified and recommend the right system of control. The Minneapolis-Honeywell Regulator Company has prepared a number of standard systems of control. These standard systems are designed to provide dependable operation at a minimum installation and maintenance cost. Following are illustrations of two of these standard systems. If your arrangement is different, there is an M-H SYSTEM for you.



The above illustrates a direct expansion central fan system for cooling. The compressor is controlled by a thermostat and a relative humidity control which operates to effect a change in coil temperature, and a change in the ratio of sensible latent heat removal. Upon demand for cooling, the compressor operates at low speed or on a single stage, but if the humidity rises too high, or upon a call for additional sensible cooling from the thermostat, the controls operate to shift the compressor to the high speed in order to operate at greatest capacity and lowest coil temperature.



The above diagram illustrates a central fan conditioner, using a bank of four direct expansion coils for cooling. The coils are brought on in sequence as the cooling requirements of the space increase. The outdoor damper remains closed to a minimum except when outdoor air can be used for cooling. This system is also used for the control of multi-stage compressors, in which event a circuit is provided which protects the compressor motors in the event of power failure.

ALL-YEAR SYSTEMS

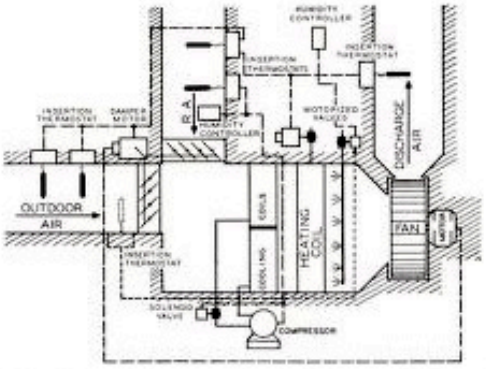
The all-year system combines the functions of both summer air conditioning and winter air conditioning, and in so doing gives rise to specific problems in the control of the system. These problems must be carefully considered when the system is designed.

1. Will the system provide automatic change-over from cooling to heating cycles?

Too frequently the change-over from cooling to heating, or from heating to cooling requires somewhat complicated manual changes and adjustments. In the modern air conditioning system, such methods are not tolerable. During the in-between seasons of the year, spring and fall, the system may be required to operate one day on the heating cycle and the next day on the cooling cycle. Very frequently such changes may be necessary several times during a single day's operation. Where many complicated changes in adjustment must be made manually, dissatisfaction will result.

The Minneapolis-Honeywell Regulator Company has made available standard systems of control which are applicable to the type of air conditioning system which you are designing. All of these standard systems provide changeover from the heating to the cooling cycle as an automatic function requiring no manual attention whatsoever. Thus the owner of the system is assured continuous comfort conditions throughout the year.

Shown below is one example of a Minneapolis-Honeywell standard control system for all-year operation. For an automatic control system designed to take care of your particular air conditioning layout, consult your Minneapolis-Honeywell engineer.



The above diagram illustrates a year-round central fan conditioning system using direct expansion refrigeration for cooling and operating as a warm air system in winter. The system provides for completely automatic changeover between heating and cooling cycles. On either the heating or cooling cycles, the system provides for taking full advantage of all the economies available in the operation of the system, and provides within the limits of the system, independent control of both temperature and humidity, summer and winter.

COMMERCIAL SPACE HEATING

The advantages of CENTRALIZED RESPONSIBILITY for the design, installation and maintenance of commercial space heating control and temperature indication systems cannot be over-emphasized.

It is certain that control as it enters into any part of the building or its mechanical equipment should be the responsibility of a single manufacturer, if confusion is to be avoided and your client's interests protected.

Minneapolis-Honeywell offers to accept the entire responsibility for the controls and instruments to be used in any building that you design.

UNIT VENTILATORS

The unit ventilator which is a self-contained unit provides the functions of heating, cleaning, and ventilating, and presents a very definite control problem. These functions must be coordinated to provide uniform temperatures and necessary ventilation.

Minneapolis-Honeywell can provide either PNEUMATIC or ELECTRIC systems of control for unit ventilators and has had wide experience in the use of both types. The size and type of installation determines which system of control will be preferable for for any particular job. Minneapolis-Honeywell is in a position to exercise unbiased judgment in recommending automatic controls or control systems for unit ventilator installations.