

Automatic Flow Regulator

AutoFlow[®]



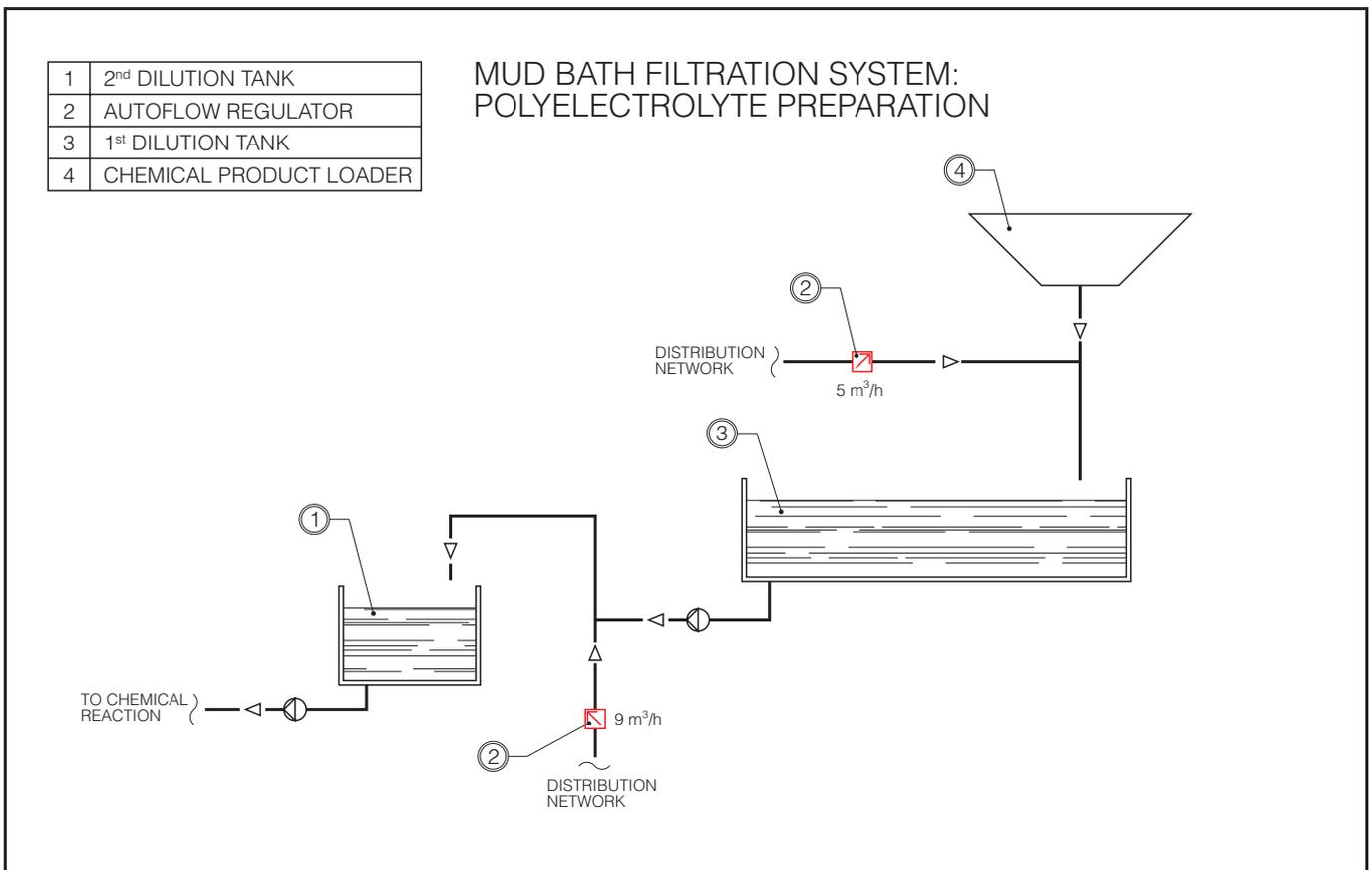
AUTOFLOW APPLICATIONS N° 1

Mud bath filtration system

Mud bath filtration systems require the chemical preparation of the polyelectrolyte necessary for the sedimentation process. The polyelectrolyte is prepared by progressively diluting the dry product in water fed from the distribution system. There are two points of dilution that require accurate control of the concentration because high variations will prevent the correct results from the chemical reaction. To maintain a **constant flow rate during the dilution process, N° 2 Autoflow automatic flow regulators were**

used on the supply water distribution system. In this case, all pressure variations that can appear in the network are absorbed by the device and the designed flow rate is always guaranteed.

AUTOFLOW installed: n° 2 series 125 2" with :
 Flow rate: 5 m³/h and 9 m³/h
 Δp Range: 14 ÷ 220 kPa.
 Achieved installations: n° 3



PLACE OF INSTALLATION: MOSCOW

DESIGN: G. DIEFENBACH (BG)

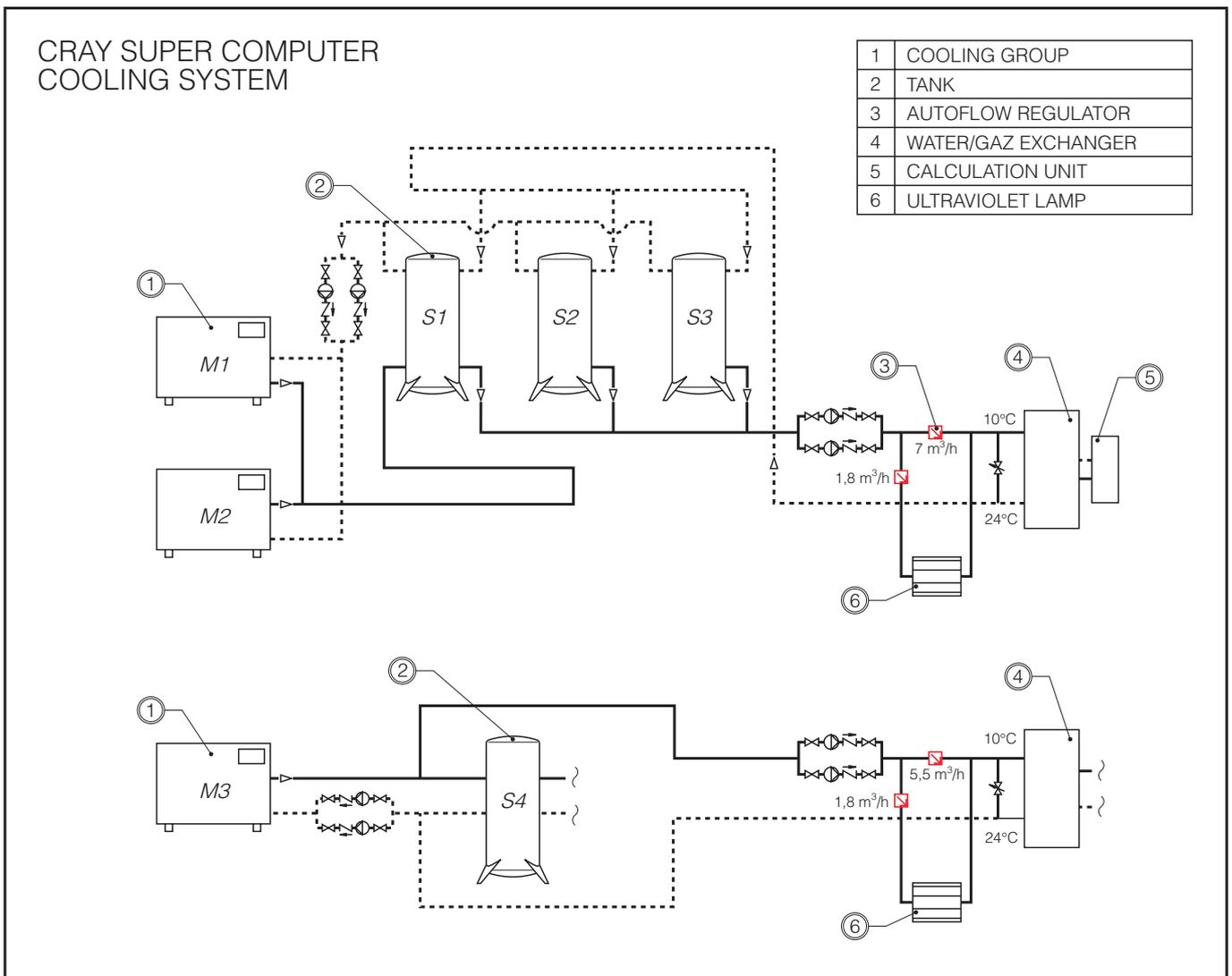
AUTOFLOW APPLICATIONS N° 2

Cray Super Computer cooling system

The Super Computer, Cray (able to do one billion operations per second and worth 25 million dollars) is used for the analysis and forecasting of weather at the Weather Report Center in Moscow. The delicate electronic circuitry inside the calculation unit needs to be constantly cooled. This is done by directly connecting the N°2 water/gas exchangers of the machine to a closed circuit refrigerated water source which is prepared with cooling groups. This installation has to supply every water/gas exchanger with a flow rate of 9 m³/h and a 7.5 m³/h of refrigerated water at 10 Deg. C. As the water passes through the heat exchanger, it increases 14 Deg. C. The supply water for this machine has specific characteristics of purity and certain values of hardness. To accomplish this, the installation has a system of filtration and water softening. To eliminate any possible bacteria, there is an ultraviolet lamp system in parallel with the principal line that must

be supplied with a flow rate of 1.8 m³/h. For optimum heat exchange and operation of the computer, a **nominal flow rate** must be guaranteed **to each heat exchanger**. Also, the ultraviolet lamp system requires a specific constant nominal flow rate. To solve these problems, **Autoflow automatic flow regulators were installed in the hydraulic circuit. Using the Autoflow regulators, the system provides the nominal flow rate conditions which have been selected even when the modulating control valves change set points.** As a result, all flow parameters of the computer and the systems components - cooling groups, pumping systems and the ultraviolet system are guaranteed to operate at optimum efficiency.

AUTOFLOW installed: n° 4 series 120 1 1/4", 2" with:
 Flow rate: 1.8, 5.5 and 7 m³/h
 Δp Range: 14 ÷ 220 kPa.



PLACE OF INSTALLATION: METEO CENTER (MOSCA)
 DESIGN: STC (FO)

AUTOFLOW APPLICATIONS N° 3

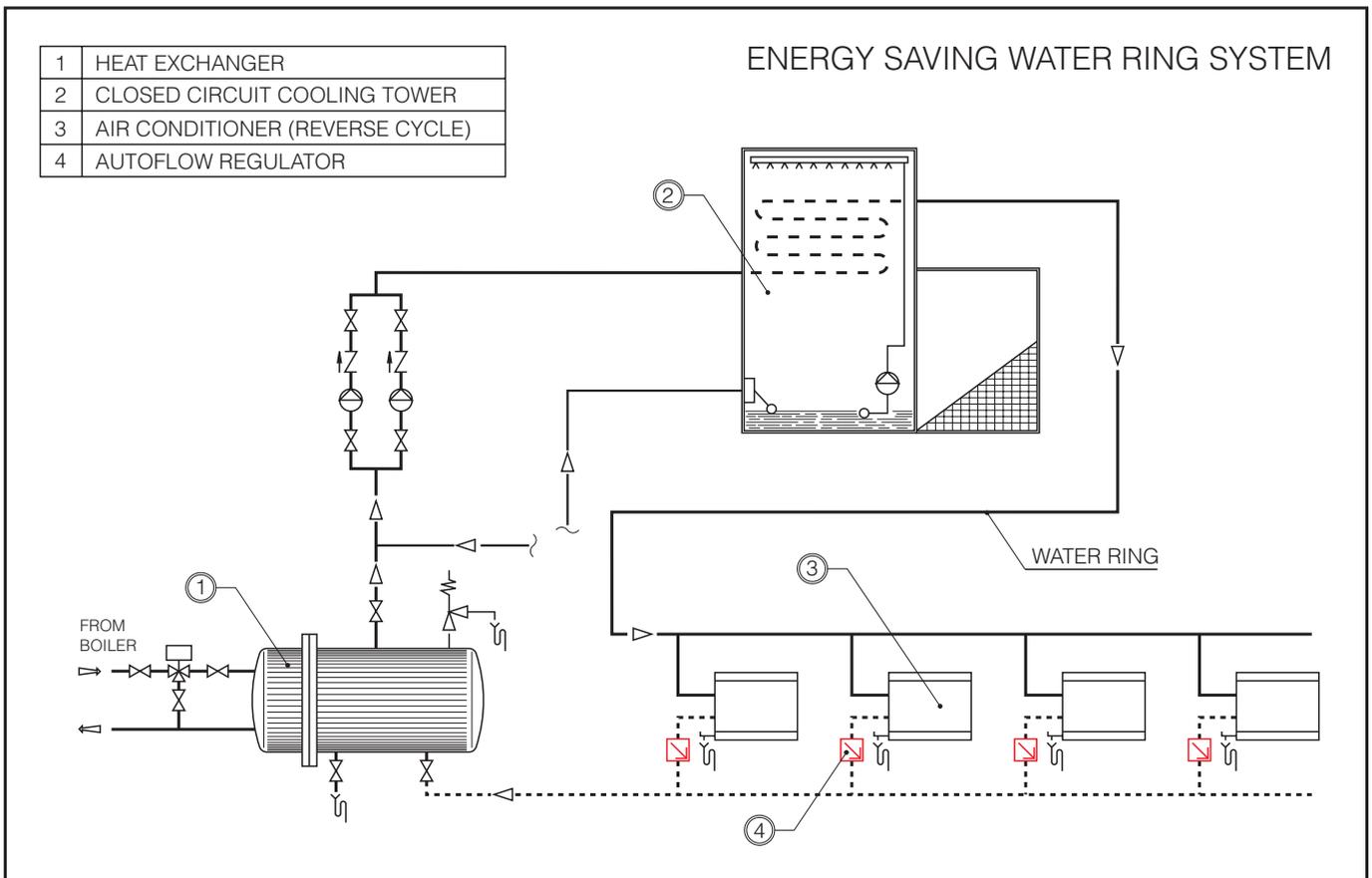
Energy saving water ring system

This installation is for air conditioning the Brindisi hospital. The system has an installed capacity of 100,000 frig/h and 130,000 kcal/h. In every room to be conditioned, there is one or more Delchi air conditioners with reversible air/water heat pump with a total of N° 54 units installed. These units are connected to a direct return piping network which contains a heat source and a closed circuit cooling tower. These self contained air conditioners have the option to operate in summer or winter, using the reverse cycle. They have a direct expansion coil that works as an evaporator in the cooling mode and as a condenser in the heating mode. Water flows through the other heat exchangers which becomes a condenser in the cooling mode and an evaporator in the heating mode. The user has the ability to operate the module ON/OFF or to choose any desired temperature. The heating or cooling cycle is automatic to provide the correct selected temperature.

Given the building size and various exposures of its walls, the heat loads can be different from room to room. It may be required to heat some rooms and cool others at the same time. Water ring systems represent sort of an energy bank to which each unit can

either add or subtract energy. The system automatically transfers energy from areas where there is too much heat to areas which have a lack of heat. In full load conditions in summer or winter, the evaporating cooling tower or the heat exchanger would respectively provide cooling or heating for the water ring system. Good temperature in this loop is kept between 15 and 32 Deg. C year round. In this type of system, it is essential to control the flow rate to each conditioner. Flow rate variations over 20% can cause large decreases in heating and cooling capacity and sometimes the units cannot heat and cool as designed. **For dynamic and continuous balancing, the Autoflow device has been installed in the return pipe of each container. The Autoflow regulator keeps a constant flow rate of 0,4 m³/h in the conditioner no matter what the operation of the unit.** Using automatic balancing, it has been possible to install a direct return hydronic circuit at large savings in the initial cost. Also, the cost of balancing has been minimized because the Autoflow device automatically controls the nominal flow rate in each circuit.

AUTOFLOW installed: n° 54 series 125 1/2" with:
 Flow rate: 0.4 m³/h
 Δp Range: 14 ÷ 220 kPa.



PLACE OF INSTALLATION: BRINDISI HOSPITAL
DESIGN: POLICARBO (MI)

AUTOFLOW APPLICATIONS N° 4

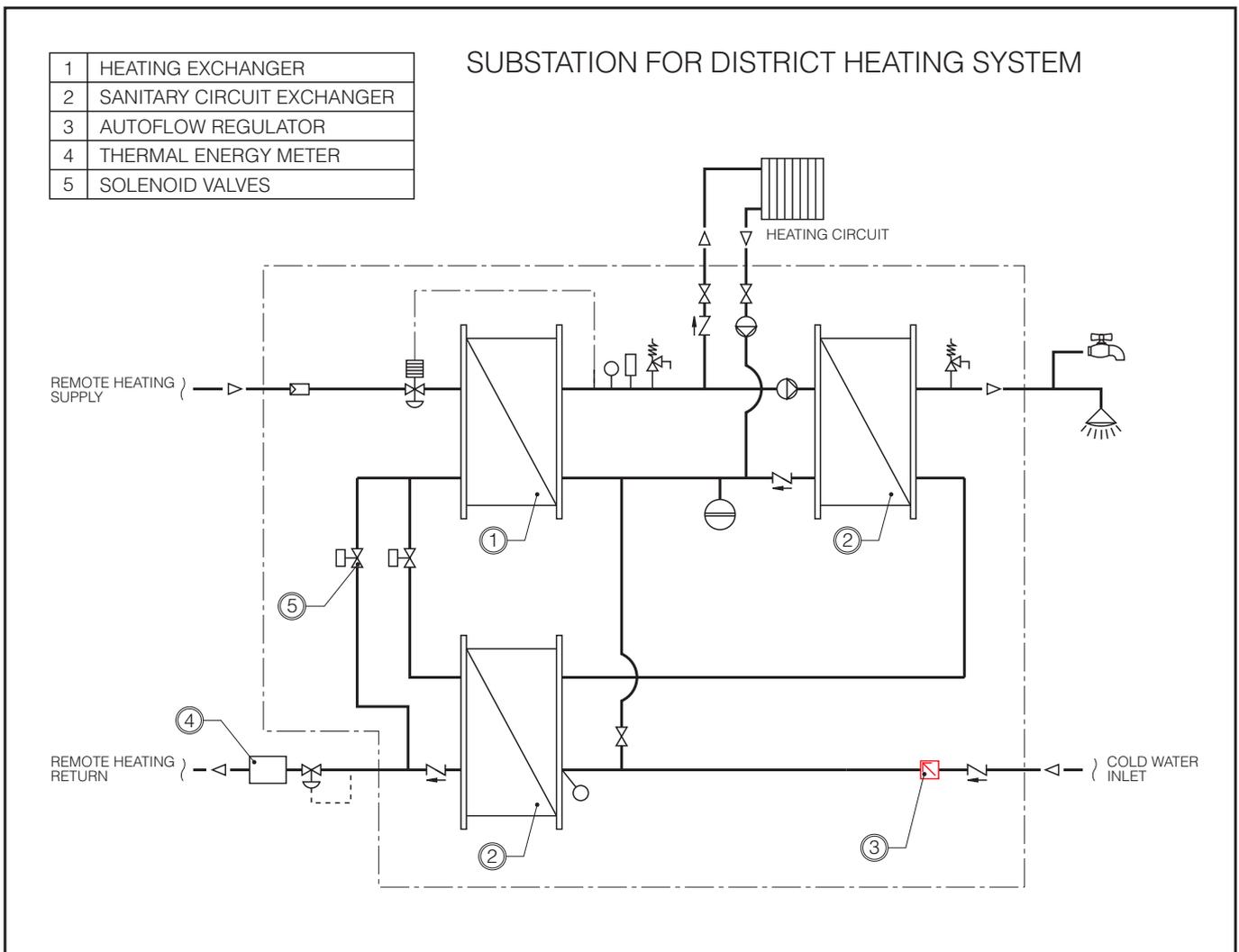
Consumer substation for district heating system

Heating installations that are connected to remote distribution heating networks need a substation in which the heat from the network is transferred to the secondary consumer through heat exchangers. The company, Techno Systems, designs and manufactures preassembled completed modules for the production of heating and sanitary hot water using plate heat exchangers that are arranged in series and parallel.

The particular RSP model, with the use of a third exchanger for the sanitary circuit improves the utilization of the heating capacity of the district heating by lowering as much as possible, the return water temperature. Using this approach, the system produces the maximum sanitary water in both summer and winter. **In order to limit the heat energy supplied to the fluid and furnish to the**

consumer, the heat exchangers must work with the flow rate limited to predetermined nominal value. In this case, it is possible to optimize the flow rate and to accurately control the water supplied to the consumer. **Autoflow automatic flow regulators have been installed in each module at each water inlet from the distribution system to the sanitary circuit exchanger.** Possible pressure changes in the distribution network are absorbed by the device that also ensures the flow rate stays at the nominal value. As the distribution network pressures are high, the Autoflow units have been selected with the high pressure control range.

AUTOFLOW installed: n° 90 (1 for each module) series 125 1/2" with:
 Flow rate: 0.56 m³/h
 Δp Range: 35 ÷ 410 kPa.



PLACE OF INSTALLATION: Various
DESIGN: TECHNO SYSTEM (FI)
CONSTRUCTION: TECHNO SYSTEM (FI)

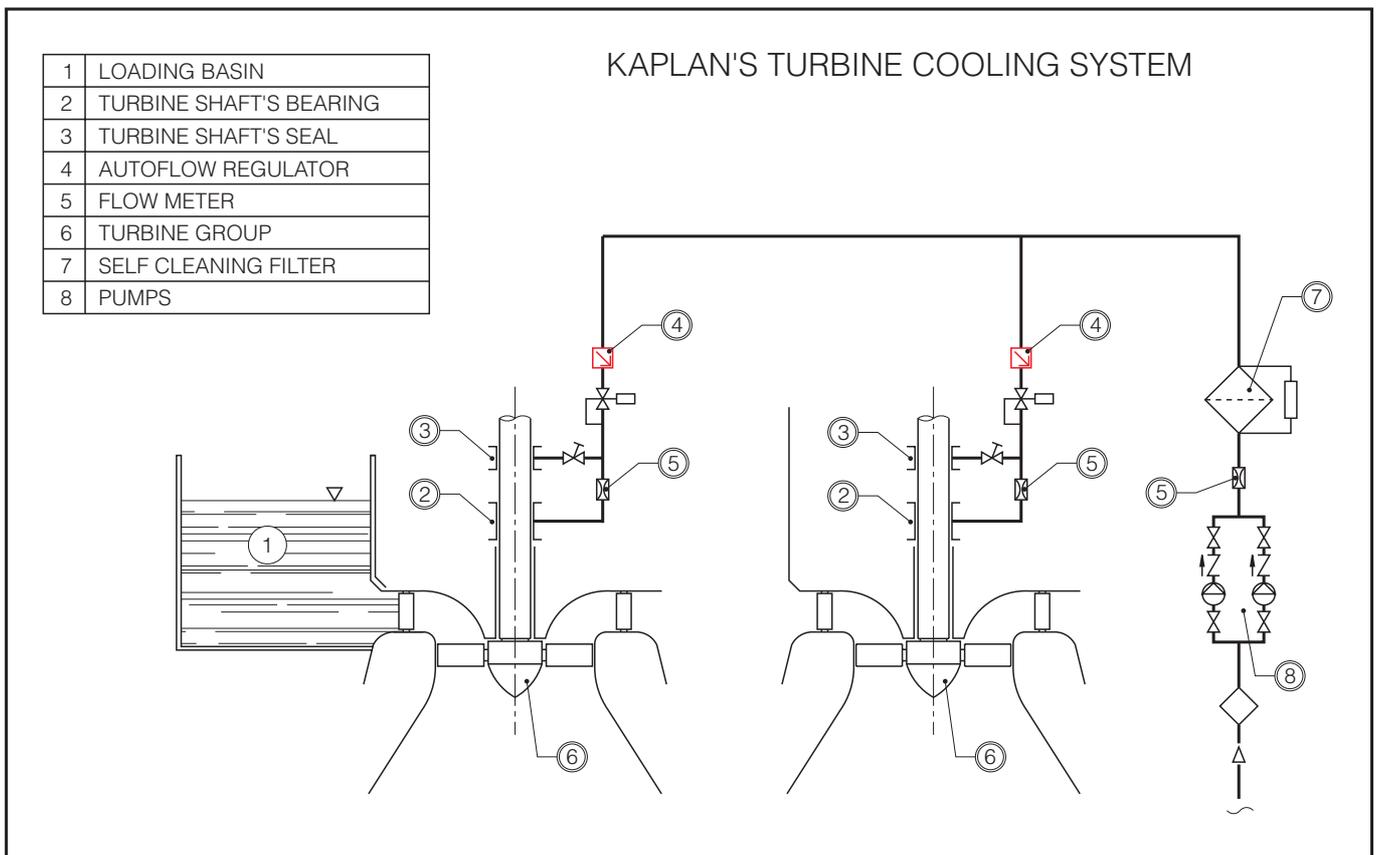
AUTOFLOW APPLICATIONS N° 5

Kaplan's Turbine cooling system

The hydroelectrical power station in Farigliano is owned by the company, Edison S.p.A., and produces electrical energy to supply the company's plants. The maximum nominal power produced by the system is 6 MW, this power is obtained by using two Kaplan turbines, each producing 3 MW. The Kaplan turbine is a hydraulic machine with a vertical rotation axis. It receives water by way of an elevated basin which is then fit downward through a distributor whereby the water transfers its energy to the turbine. The turbine wheel has veins which can vary their angle; by varying this angle, the power produced by the machine can match the load. The shaft that transmits the motion from the wheel to the generator rotates in a **water bearing**. This bearing is fitted with water inlet orifices and many other small orifices arranged to cover the external surface of the shaft. There is a thin layer of water between the shaft and bearing seat that is used to support the radial force of the shaft by holding it in a central position and, thus, limiting friction created during rotation. The bearing manufacturer requires that the bearing be **supplied with a constant flow rate** of 5.5 m³/h with pressure conditions exceeding the pressure drop of the system, the bearing and the head of water that supplies the wheel. The water flow rate is set by the manufacturer in order to

guarantee correct cooling of the bearing and, therefore, correct operation of the turbine. The manufacturer also requires the water to have a maximum of 100 µm. In this system, the water is taken from the basin and passed through 2 basket filters and one self-cleaning filter of 500 µm. The water is then delivered to the pumps with the same pressure as the basin and leaves the pumps with a 6 bar pressure and 11 m³/h. After the pumps, the water passes through a 100 µm filter and is delivered to N° 2 Autoflow regulators which divide the quantity of water between the N° 2 turbines at 5.5 m³/h. Each turbine uses this water for two different operations; the bearing and the shaft's seal whose flow rate is controlled by a manual balancing valve. To improve this control, flow rate meters with optical readout are placed on the principal branch and on the bearing connections. **The Autoflow automatic flow regulator guarantees a constant flow rate at each turbine even when the running conditions of the systems vary; i.e., the basin head or the machine load vary during the backflushing of the self cleaning filter. Also, it automatically controls the flow rate at each turbine even if the other unit is shut down for maintenance.**

AUTOFLOW installed: n° 2 series 120 2" with:
 Flow rate: 5.5 m³/h
 Δp Range: 14 ÷ 220 kPa.



PLACE OF INSTALLATION: Centrale EDISON FARIGLIANO (CN)
DESIGN: Officine SAVIGLIANO (TO)

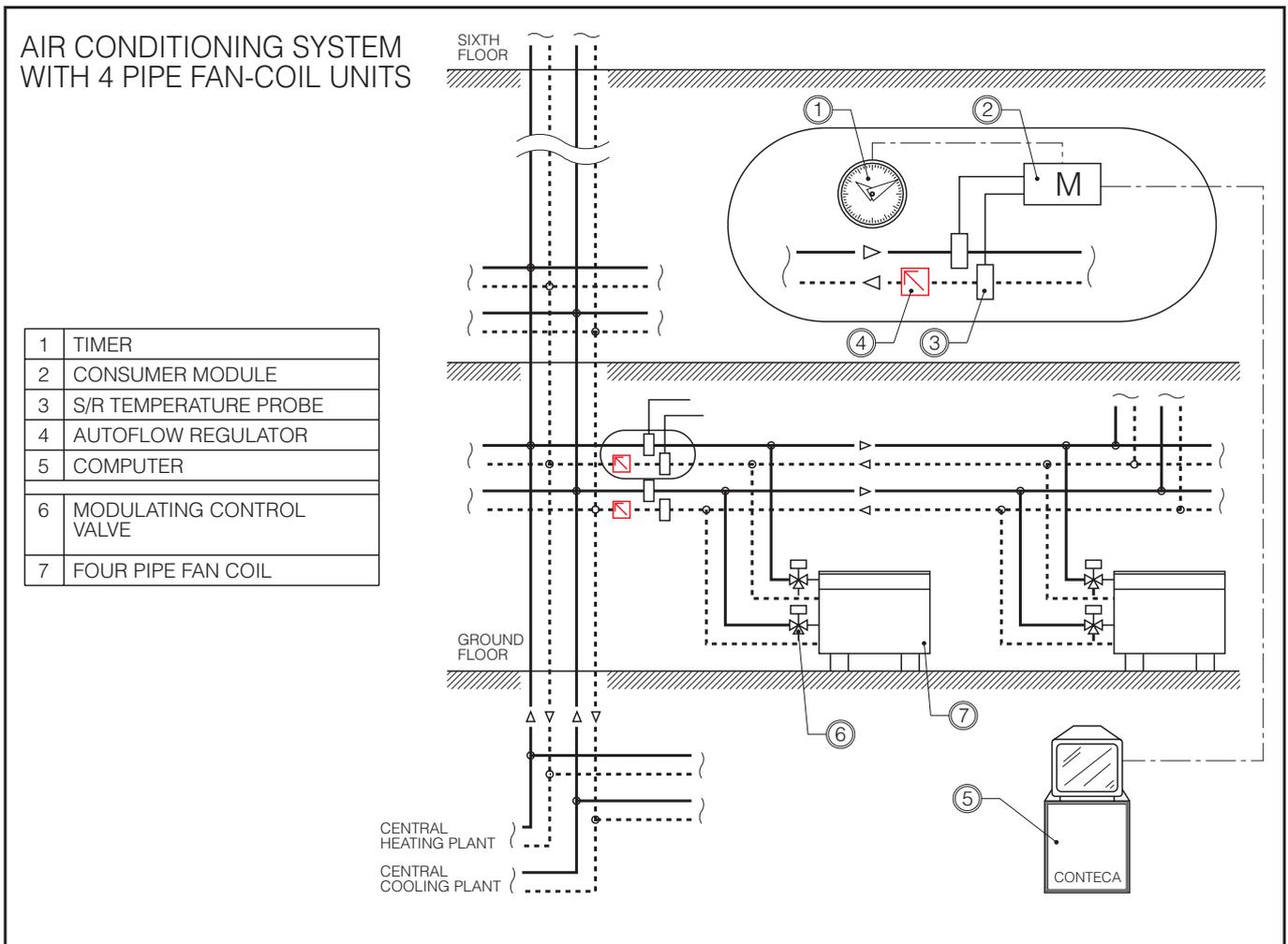
AUTOFLOW APPLICATIONS N° 6

Air conditioning system with 4 pipe Fan-coil units

This system was installed in a 6 floor office building in Lissone. The system has a total capacity of 250,000 kcal/h and of 125,000 frig/h. The exterior architecture of the building consists of large glazed surfaces, so it permits high heat load variations between different spaces. During intermediate seasons, it may be necessary to heat some rooms and cool others simultaneously. A 4 pipe fan coil system was chosen to deal with these conditions. A 4 pipe distribution system supplies the terminals with hot and cold fluid simultaneously. The control of each space is independent and allows the user to have heating and cooling regardless of the season. This building also has the need to calculate the energy consumption of each consumer at his office. The Caleffi system, **Conteca**, allows **calculation of the heating and cooling energy that is supplied to the consumer** by measuring the flow rate and temperature differences between supply and return. The figures that are obtained by a central computer are then processed and shows past energy consumption by the consumer. **The automatic flow control regulator, Autoflow, was used in the system to**

balance the system automatically and to control the flow rate of the Conteca system. The various areas of the building were therefore supplied with constant flow rate no matter what the position of the modulating control valves on each terminal. In fact, 3-way modulating control valves in the middle position between 100% flow to the consumer and 100% flow back to the system, can cause flow rate increases compared to the design value. These increases are highest when the valve is at its mid-point and sometimes up to 50% over the normal nominal value. **The Autoflow, being a constant regulator, avoids these increases in flow no matter what the position of the 3-way valve.** Also, each zone is supplied with a constant flow rate and the consumption of heating and cooling energy in the winter and summer can easily be calculated, using a direct type energy meter.

AUTOFLOW installed: n° 54 series 125 1 1/4", 1 1/2" with:
 Flow rate: various
 Δp Range: 14 ÷ 220 kPa.



PLACE OF INSTALLATION: Building of offices LISSONE 2000 (MI)
DESIGN: Ing. P. COLOMBO LISSONE (MI)

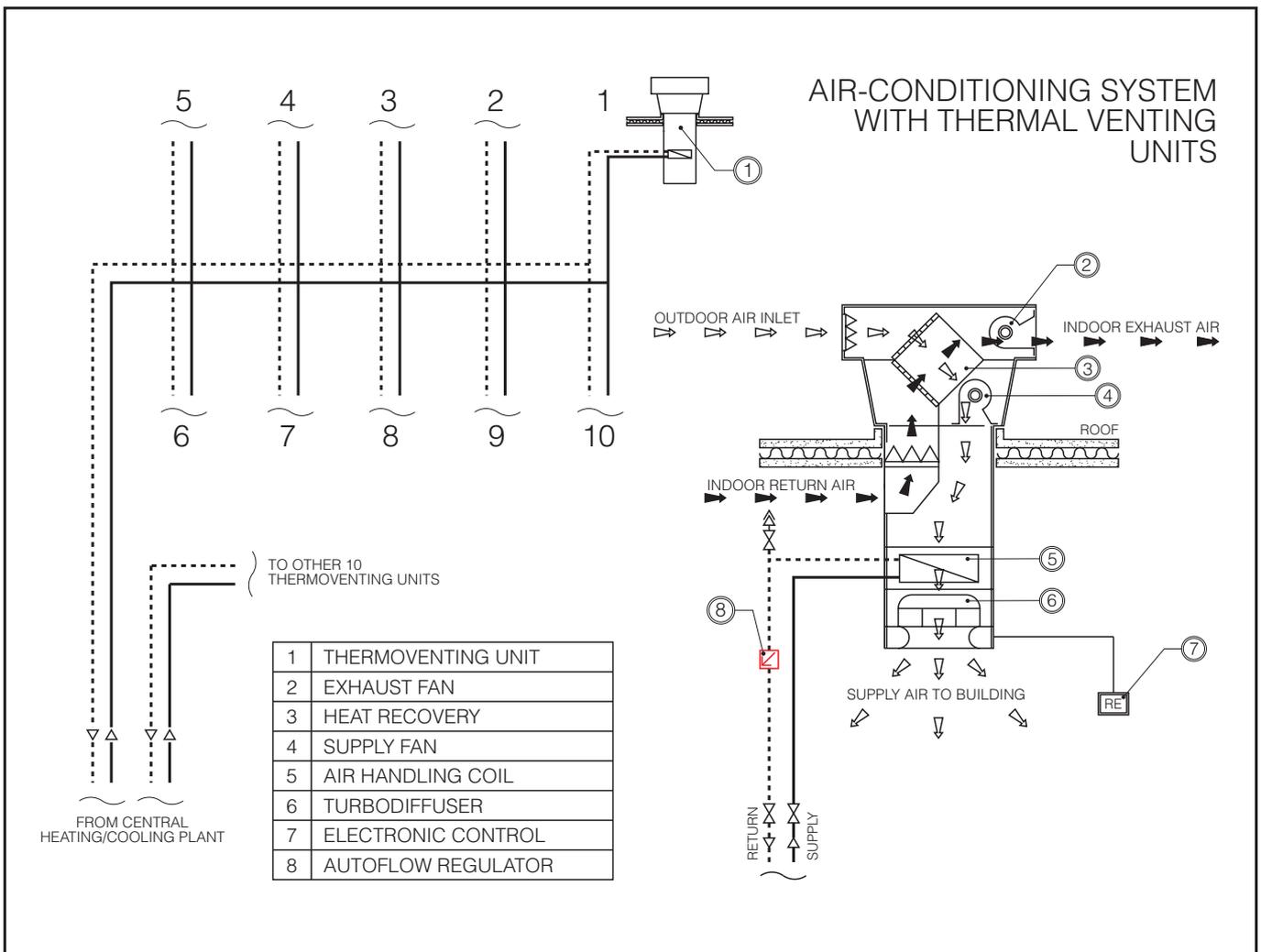
AUTOFLOW APPLICATIONS N° 7

Air-conditioning system with thermal venting units

This installation is for air-conditioning an industrial building owned by Asea Brown Boveri Sace, a producer of electrical components. The building has 10,000 m² surface and a conditioned space of 70,000 m³. Totally, the system has an installed capacity of 2,200,000 kcal/h. For the shape of the building and the particular construction with energy considerations and indoor air quality as a criteria, an all air-conditioning system was chosen. **N°20 Hoval thermoventing units have been installed on the roof.** This makes it possible to air-condition each zone of the building independently, reducing stratification of the air and allowing heating or air-conditioning with proper distribution. All exhaust air uses a sensible heat recovery for preheating or precooling incoming air. Depending on the required conditions and indoor air quality, electronic controls automatically adjust the position of the dampers, adopting the best combination of bypass, exhaust, and fresh air for that particular environment. Each unit has a heat

exchanger supplied from the water pipe network. **For optimum performance, each coil must be supplied with 5.5 m³/h design flow rate. The manufacturer recommended that the system be hydraulically balanced very accurately and recommended a flow control device at each coil. The Autoflow automatic flow regulator guarantees the design flow to each machine and maintains these design conditions for all heating and cooling requirements and regulation of 3-way mixing valves, even with some of the machines shut off for service.** For the machines left operating, the flow rate will always remain constant, absorbing any pressure fluctuations. In this system, **the operating cost was held to a minimum** due to the choice of the thermal venting units and the guaranteed nominal flow rate determined by the Autoflow regulators.

AUTOFLOW installed: n° 20 series 125 1/2" with:
 Flow rate: 5.5 m³/h
 Δp Range: 14 ÷ 220 kPa.



PLACE OF INSTALLATION: Factory A.B.B. Sace (BG)
DESIGN: Ing. FALETTI / LANDI Elettroimpianti (BG)

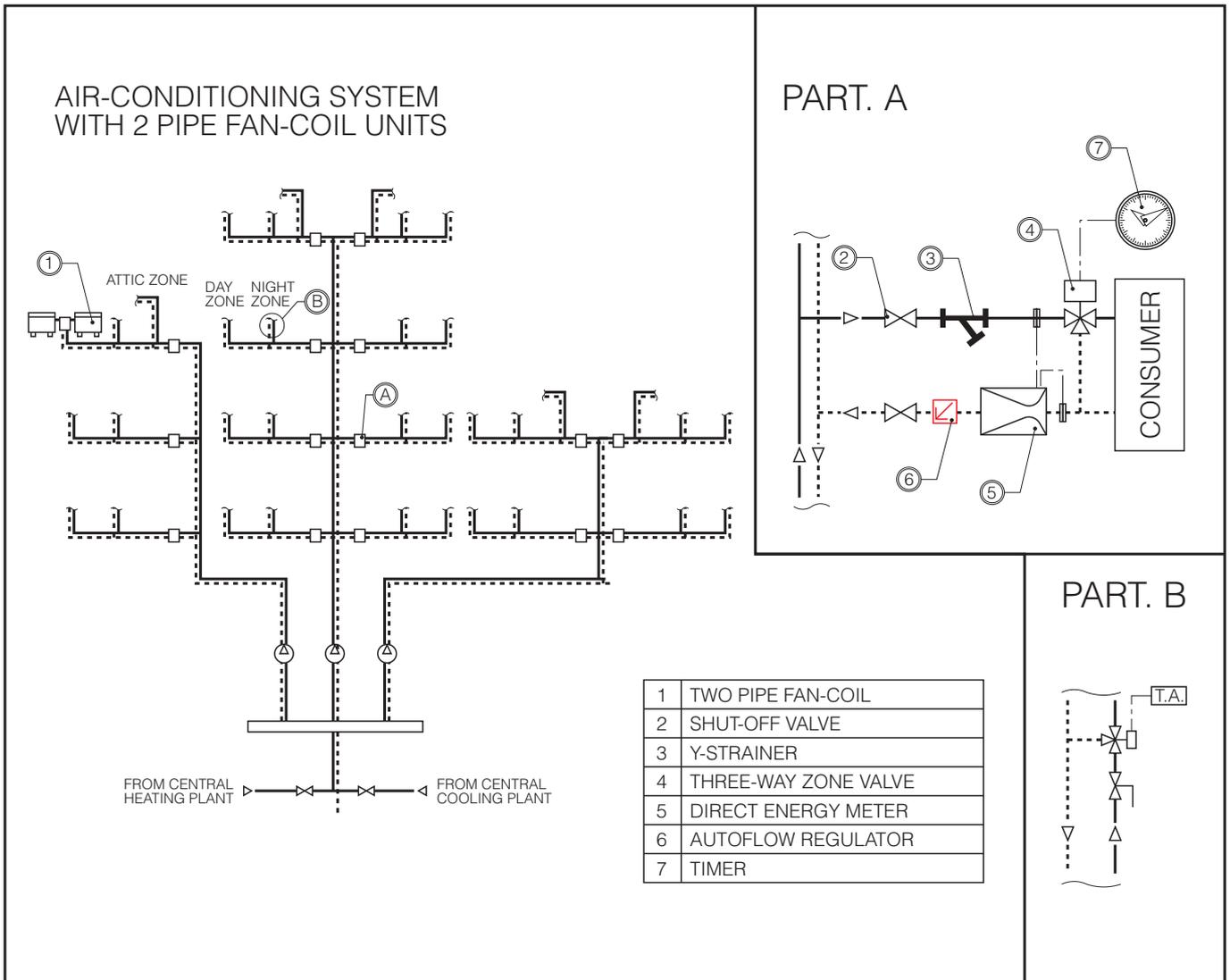
AUTOFLOW APPLICATIONS N° 8

Air-conditioning system with 2 pipe Fan-coil units

This installation is for an air-conditioning system in a residential complex in Vicenza, consisting of N° 3 buildings with a total of N° 13 apartments. Totally, the system has an installed capacity of 300,000 kcal/h and 100,000 frig/h. A two pipe fan coil system was selected for the apartments, offering both heating in the winter and cooling in the summer. Each fan coil is supplied with hot water at a compensating temperature in the winter and with chilled water at a fixed temperature in the summer. This type of system allows lower installation costs than a four pipe system but offers an appreciable comfort level. A central heating and cooling plant supplies heated and cooled fluid directly to a 3-way ON/OFF valve and a consumer selected heating and cooling energy meter. **An Autoflow regulator is installed in the zone return piping.**

A constant flow rate to the zone is guaranteed with the 3-way valves open to the user, or closed to the bypass without balancing the bypass. In the zone supply piping, a strainer version of the Autoflow device has been installed to provide only clean water to the fan coil units and controls. Using the Autoflow regulator, it is possible to make a real constant flow circuit and provide optimum conditions for 3-way mixing valves in the central heating plant. From the energy saving point of view, it has been possible to use the same heating and cooling energy meters, temperature controls and automatic flow devices.

AUTOFLOW installed: n° 26 series 125 1 1/4", 1 1/2" with:
 Flow rate: various
 Δp Range: 14 ÷ 220 kPa.



PLACE OF INSTALLATION: CENTRAL PARK RESIDENCE (VI)
DESIGN: ENERGY IMPIANTI di BENEDETTI P. (VI)