DISTRICT HEATING SUBSTATIONS

AMARC DHS DESIGNS AND MANUFACTURES A COMPLETE RANGE OF PRODUCTS TO SATISFY ALL NEEDS OF DISTRICT HEATING AND COOLING.
The company was established in 1998, under the name of Amarc tecnologie, its aim being to harness the considerable experience gained in the industrial heating and process control industry since 1950, and to consolidate and turn this expertise into reproducible scientific and technological principles.

During this time, the company partnered leading Italian and foreign companies in developing research projects, up to the construction and installation of components, machines and plants, which also involved the registration of some international patents.

More recently, the company became involved, for some applications, in district heating - a technology which was barely known or developed, at least in Italy. After several years of testing and operations, the company decided to invest heavily in this sector, and above all in technical product and production process development, as well as in automatic control and supervision systems.

A tribute to the origins of our industry that our company has greatly contributed to develop in Italy offering reliable products of high quality, technology and design setting the standard in the domestic and foreign markets.

The cover shows an image of New York, where, at the end of 1800, was installed the first district heating network.
Today Amarc DHS (District Heating Substations) engineers, manufactures and installs district heating substations, with a product portfolio of over 300 models, featuring standard district heating substations with a capacity from 10 to 6,000 kW, as well as remote cooling stations with a capacity from 50 to 2,500 kW, plus optionals and accessories, for one of Europe's most extensive ranges in the industry:

- **User Satellites Units** for central heating systems
- **Single living unit wall substations** from 10 to 40 kW.
- **Wall Substations** from 10 to 150 kW.
- **Base Substations** for hot and superheated water certified CE/PED, from 50 to 6,000 kW.
- **Drainage Bag filters** for secondary circuit and district heating network from 15 to 40 m³/h, from PN10 to PN25, for hot and superheated water, max135°C.
- **Management System** to optimize district heating plant, remote setting, telemetering and telecontrol for user substation.
- **Remote control** and hardware tools for communication network specific for district heating plants.

More than 10 years of experience in the industry have created a management and optimisation computer system that can integrate network and substation requirements and functions in one software application, which can make all the difference in terms of profitability for district heating systems.
SAT BASE | SAT PLUS | SAT DESIGN | SAT INCASSO

- 18÷35 kW for heating and 10÷50 kW for domestic hot water (DHW).
- Versions: base, plus, incasso and design.
- Equipped with ultrasonic heat meter compliant with EN 1434/MID, setting and security organs.
- Connected to district heating substation and boilers.
- PN 10 for 1° circuit.
- Individual setting and accounting management.
- Production of instantaneous domestic hot water.
- Ready for setting, telemetering and remote control.
- Remote control with thermostat.
- Streamlined and thrifty versions.
- Small dimension.

ULTRA COMPACT USER SATELLITES

MONO BASE | MONO PLUS | MONO DESIGN | MONO INCASSO

- 18÷40 kW for heating and 10÷50 kW for domestic hot water (DHW).
- Versions: base, plus, incasso and design.
- Equipped with ultrasonic heat meter compliant with EN 1434/MID, setting and security organs.
- PN 25 for 1° circuit.
- For hot and superheated water network.
- For heating and domestic hot water.
- Automatic group load.
- Remote control with thermostat.
- Big expansion vase.
- Certified CE/PED.
- Ready for setting, telemetering and remote control.
- Setting for flow rate limitation, power and return temperature.
- Regulation of fixed-point temperature or compensated outdoor temperature.
- 10÷60 kW for heating in standard configuration and max 180 kW for domestic hot water (DHW).
- Equipped with ultrasonic heat meter compliant with EN 1434/MID, setting and security organs.
- PN 25 for 1° circuit.
- For hot and superheated water network.
- For heating or domestic hot water.
- Customizable.
- Certified CE/PED.
- Ultra compact dimension.
- Ready for setting, telemetering and remote control.
- Setting for flow rate limitation, power and return temperature.
- Regulation of fixed-point temperature or compensated outdoor temperature.
- Easy to upkeep.

- 30÷150 kW for heating in standard configuration and max 180 kW for domestic hot water (DHW).
- Equipped with ultrasonic heat meter compliant with EN 1434/MID, setting and security organs.
- PN 25 for 1° circuit.
- For hot and superheated water network.
- For heating and/or domestic hot water.
- Customizable.
- Certified CE/PED.
- Compact dimension.
- Ready for setting, telemetering and remote control.
- Setting for flow rate limitation, power and return temperature.
- Regulation of fixed-point temperature or compensated outdoor temperature.
- Easy to upkeep.
**BRAZED HEAT EXCHANGER BASE SUBSTATIONS**

- 50÷5,000 kW for heating in standard configuration.
- Equipped with ultrasonic heat meter compliant with EN 1434/MID, setting and security organs.
- PN 25 for 1° circuit.
- Version with double heat exchanger (max 5,000 kW).
- For hot and superheated water network.
- Version for cooling, heating or DHW.
- Customizable.
- Certified CE/PED.
- Small dimension.
- Designed for disassembly.
- Ready for setting, telemetering and remote control.
- Setting for flow rate limitation, power and return temperature.
- Regulation of fixed-point temperature or compensated outdoor temperature.

**GASKETED PLATE HEAT EXCHANGER BASE SUBSTATIONS**

- 50÷6,000 kW for heating in standard configuration.
- Equipped with ultrasonic heat meter compliant with EN 1434/MID, setting and security organs.
- PN 25 for 1° circuit.
- Version with double heat exchanger (max 6,000 kW).
- For hot and superheated water network.
- Version for cooling, heating or DHW.
- Customizable.
- Certified CE/PED.
- Small dimension.
- Designed for disassembly.
- Ready for setting, telemetering and remote control.
- Setting for flow rate limitation, power and return temperature.
- Regulation of fixed-point temperature or compensated outdoor temperature.
DISTRICT COOLING NETWORK BASE SUBSTATIONS

- 50÷2,500 kW with brazed and gasketed plate exchanger.
- Equipped with cooling meter, setting and security organs.
- PN 25 for 1" circuit.
- Version with double exchanger (max 2500 kW).
- For district cooling network.
- Customizable.
- Certified CE/PED.
- Small dimension.
- Designed for disassembly.
- Ready for setting, telemetering and remote control.
- Setting for flow rate limitation, power and return temperature.
- Regulation of fixed-point temperature or compensated outdoor temperature.

BAG FILTERS

- 1" and 2" circuit easy to be cleaned.
- Temporary or permanent installation.
- Work to make efficient the heat exchanger and reduce costs.
- 15÷40 m³/h.
- PN 10÷PN 25.
- For hot and superheated water network. Max 135°C.
- 4 filtration levels (Super Soft, Soft, Medium, Hard) minimum 0.5 micron.
- Measuring system to manage pressure and stoppage.
- Remote signal for maximum dirt level.
- Certified CE/PED.
- Volume: 20-55-80 liter
- In/out: DN65-DN80-DN100

COLOGNO C-S

- 50 ÷ 2,500 kW
- 15 - 25 - 40 m³/h
- 50÷1650-2100
- 1800-3050
- 870-1900
AVD500

- Programmable PID regulator.
- Daily and weekly schedule with time slots setting.
- Perpetual calendar with automatic management of summer time clock change (BST) and leap year.
- 20 typologies of schemes already preloaded.
- Setting with compensation criterion base on external temperature.
- Possibility to activate antifreeze, antilimestone, antilegionella functions.
- Suitable for many type of thermal probes.
- Contemporary management of flow rate limit, power and temperature at 1° circuit.
- Management of circulator and single or tween pump.
- Ready for remote control via Meter-Bus.

LIBEROS00

- Management system to manage, set and optimize district heating system.
- Automatic telemeter of thermal energy use.
- Substations remote control.
- Monitoring Δp in significant points.
- By-pass valve management and control.
- Pumping units management and optimization for district heating power plant.
- Management and monitoring alarms.
- Continuous monitoring of network parameters, data storage and trend management.
- Invoice with customized forms.
**TYPICAL OPERATING CONDITIONS FOR DISTRICT HEATING SUBSTATION**

<table>
<thead>
<tr>
<th></th>
<th>HOT WATER</th>
<th>SUPERHEATED WATER</th>
<th>COOLING</th>
<th>DIRECT D.H.W.</th>
<th>INDIRECT D.H.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY CIRCUIT</td>
<td>90/65°C</td>
<td>115/65°C</td>
<td>7/11°C</td>
<td>85/55°C</td>
<td>85/55°C</td>
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<tr>
<td>THERMAL PROJECT</td>
<td></td>
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<tr>
<td>SECONDARY CIRCUIT</td>
<td>60/75°C</td>
<td>60/75°C</td>
<td>14/8°C</td>
<td>25/50°C</td>
<td>30/55°C</td>
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<tr>
<td>THERMAL PROJECT</td>
<td></td>
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</tr>
<tr>
<td>LOSS OF LOAD (Δp) AT NOMINAL CONDITION 1° AND 2° CIRCUIT</td>
<td>&lt; 10 w.c.m. (1°)</td>
<td>&lt; 10 w.c.m. (1°)</td>
<td>&lt; 15 w.c.m. (1°)</td>
<td>&lt; 10 w.c.m. (1°)</td>
<td>&lt; 10 w.c.m. (1°)</td>
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<tr>
<td></td>
<td>&lt; 3 w.c.m. (2°)</td>
<td>&lt; 3 w.c.m. (2°)</td>
<td>&lt; 6 w.c.m. (2°)</td>
<td>&lt; 3 w.c.m. (2°)</td>
<td>&lt; 3 w.c.m. (2°)</td>
</tr>
</tbody>
</table>

**ALL AMARC DHS SUBSTATIONS ARE DESIGNED AND BUILT BASED ON DIFFERENT NEED LIKE TRANSPORTATION, ASSEMBLING AND INSTALLATION.**
The functional diagram of the management system so as outlined below represents the consolidation of over 10 years of experience in the design, implementation and management of district heating plants. Using a standard design and construction facilitates all the operations related to the implementation of district heating systems like the cost of investment and the speed of embodiment, the operating cost and the certification process. It's still possible to integrate existing plants or change functionality based on specific customer needs.

Thermal cogeneration systems (also independent and inhomogeneous) applicable in the later stages

Thermal storage system that also serves as hydraulic separator, using the physical phenomenon of stratification, uses the energy produced at different temperatures.

Expansion system with pressurized storage tank with optimized capacity

Thermoregulation of network temperature independent from storage temperature

Pumping system able to modulate based on ΔP values through inverter with compensated set-point in network high deficit points

FUNCTIONAL DIAGRAM OF A DISTRICT HEATING SYSTEM
Remote control system and telemetering for district heating substations

District heating substations (for apartment building) instead of boilers for new power plants.

District heating substations (for apartment building) instead of boilers for new power plants for direct DHW

District heating substation with user satellite units with individual accounting and thermoregulation

District heating substations (for apartment building) instead of boilers for new power plants for indirect DHW

Absorbers for individual cooling systems or cooling substations for networks with 4 pipes.

District heating substations (for one flat only) 15-120 kW for heating and/or DHW.
Typical diagram for district heating system of apartment building with user satellites unit

- Electric power cabinet and data concentrator
- Software telemetering and remote control
- Optical fiber or cable network
- Apartment 1
  - Thermostat
  - Distribution network
- Apartment 2
  - Thermostat
  - Distribution network
- Apartment 3
  - Thermostat
  - Distribution network
- By-pass valve
- Remote control thermostat
- Digital regulator
- External probe
- Aqueduct
- Cold water
- M-Bus network
- Modem

TYPICAL DIAGRAM SAT

TYPICAL DIAGRAM SAT MIDI
TYPICAL DIAGRAM FOR DISTRICT HEATING SYSTEM OF APARTMENT BUILDING WITH USER SUBSTATIONS

- Thermal power plant
- House filter (compulsory)
- Electric power cabinet and data concentrator
- Modem (optical fiber or cable network)

SOFTWARE TELEMETRY AND REMOTE CONTROL

- External probe
- Regulator
- Remote control thermostat
- Y-filter (suggested)

TYPICAL DIAGRAM MONO SUBSTATION

TYPICAL DIAGRAM SST MONO COMBI SUBSTATION
TYPICAL DIAGRAM FOR DISTRICT HEATING SYSTEM WITH METER BOXES

SOFTWARE
TELEMETERING AND
REMOTE CONTROL

ELECTRIC POWER CABINET
AND DATA CONCENTRATOR

MODEM (OPTICAL FIBER OR CABLE NETWORK)

METER BOX DIAGRAM (CC1)

DHW Substation

DHW

Aqueduct

Thermal power plant

HEATING Substation

Fill valve

by-pass valve

Apartment n

THERMOSTAT

Apartment 3

THERMOSTAT

Apartment 2

THERMOSTAT

Apartment 1

THERMOSTAT

Amarc DHS reserves the right to change this document without notice.