



# SE<sup>2</sup>MASTER

The unique, freely configurable controller for the cost-effective operation of hybrid energy generation stations. The modular and scalable solution can also quickly be configured for complex systems and expanded at any time. This even includes control of heating networks with several energy stations.

More than ever, combined heat and power generation plays a central role in climate protection and energy supply. Increasingly more efficient decentralised generation facilities ensure the secure supply of heating, cooling and electricity. The growing complexity resulting from constantly changing requirements, specifications and possibilities demands intelligent solutions with foresight.

Intelligent storage management is the key to the cost-effective and safe operation of energy stations. It ensures that the various producers are used optimally at all times, which significantly reduces resource consumption. In the future, standardized processes, simple handling, faster project cycles, and scalable

systems that are finely coordinated will be the decisive factors for economic success in the sustainable energy industry. It is also essential that remote control and remote maintenance can be performed.

With the experience and expertise gained from more than 25 years of energy engineering, a higher-level energy station control system has been developed that is far-sighted in regard to future requirements and which has already proven itself in practice in numerous applications – the SE<sup>2</sup>MASTER.

## HIGHLIGHTS

- Up to 12 producer units
- Storage management
- Integrated grid control
- Feed-in regulation for up to 3 heating networks
- Dynamic grid compensation (unsuitable point control)
- Optimization of energy flows
- Remote access and control
- Automatic control system connection
- Interface to virtual power plants



## THE DIGITALIZATION OF HYBRID ENERGY STATIONS COMPLETELY THOUGHT OUT.

The SE<sup>2</sup>MASTER is the freely configurable solution for the superordinate control of energy stations for local and district heating systems in neighborhoods, hospitals, swimming baths, and in the industrial sector. Production units such as CHPs, heat pumps and boilers, as well as storage systems, pumps and valves, are perfectly matched to each other. And, like the instruments in a large orchestra, they play together harmoniously.

### CONFIGURABLE

Simple configuration replaces the typical individual programming of the controller. In this way, the planned system components are implemented intuitively. Time and therefore cost savings are guaranteed, and the implementation risk is significantly reduced.

### MODULAR

The modularity of the system control is designed in such a way that, with the help of the option selection, only required components are enhanced. This makes the system scalable for a wide range of system sizes, and it can be expanded as required.

### ECONOMICAL

It combines cost and energy efficiency with the greatest possible flexibility. Coordinated generator, storage and heat distribution management ensures optimal operation. Heat losses and electricity requirements are noticeably minimized.

### STANDARDIZED

The use of robust controllers and components in the industrial standard, as well as a vendor-neutral, internationally standardized programming environment, open up new possibilities while also creating future security.

### CONTINUOUS

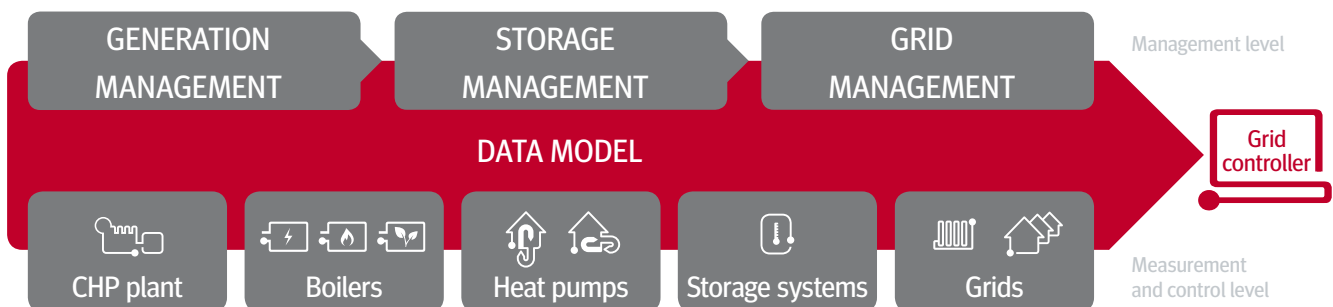
Whether regarding heat transfer, control technology or virtual power plants – the coordinated structures within our products ensure supply security. The graphic touch surface offers excellent operating comfort and a clear presentation of the entire system.

### SUSTAINABLE

Maximum use of energy sources with maximum production efficiency – thanks to the seamless integration of the most diverse producers and energy storage systems – makes it possible at all times to achieve the optimal balance between energy generation and energy consumption.

## KEEPING ENERGY FLOWS FIRMLY UNDER CONTROL

The modules at the measurement and control level control and monitor all conceivable producers, storage systems and consumers, and can be expanded as needed. All existing energy flows are brought together while also taking into account the hydraulic circuits. At the core is our intelligent energy storage system management for decoupling generation and consumption. In this way, all producers can be operated optimally according to heating requirement and operating strategies. All data is available at all times via standard interfaces – the AVAT grid control technology, for example, can automatically import the entire configuration of the SE<sup>2</sup>MASTER. This greatly reduces the effort in visualizing all connected energy stations.

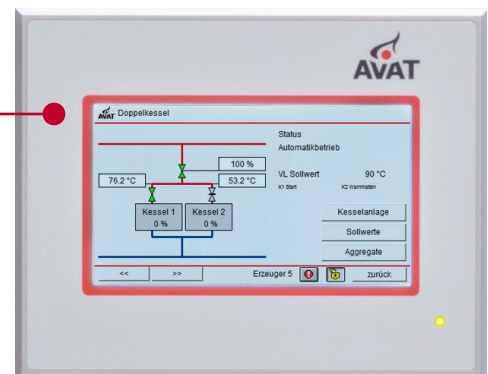


### INTEGRATED GRID CONTROL

With the "Cluster" option, several energy stations can feed into a common heating network. The control level assumes responsibility for managing the energy flows in order to optimize the energy network. If the connection to the grid control system fails, the respective energy stations are controlled autonomously, since supply security always has the highest priority.

## USE & MONITORING

- All settings via color touch panel
- Direct control and regulation of individual producers and units
- Detailed visualizations of the hydraulic diagram
- Representation of actual values, trend curves and error messages
- Setting parameters, target and limit values
- Administration of access permission for customers and service
- Configuration and software updates per USB or Ethernet
- Optional access via web browser or grid control system

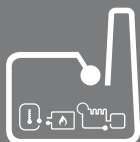


### Our comprehensive energy supply concept

The homogeneous communication infrastructure, coordinated interfaces and a uniform control concept ensure highly efficient and cost-effective operation, as well as maximum supply security in decentralized energy systems.



Local substations



Energy station



Control technology



Energy management



Virtual power plants

## TECHNICAL DATA & OPTIONS

DESCRIPTION	SE <sup>2</sup> MASTER
Product number	2 000 500
Scope of delivery	<ul style="list-style-type: none"> <li>• Technical documentation / operating manual / circuit diagram (EPLAN)</li> <li>• Pre-configured for installation in the existing cabinet or including a new switch cabinet</li> <li>• Connection cable and plug connections for the power supply</li> </ul>
<b>BASIC PACKAGE</b>	
Producers	max. 12 (CHPs, boiler, heat pump, etc.)
Heating networks / heating circuits	max. 3
Unsuitable points	max. 5
M-Bus meters	max. 60
Operation terminal	4.3" graphics-capable WQVGA touch panel (TFT 480x270 with backlighting) freely configurable for generation and distribution
Power supply	DC 24 V +/- 10%
Current consumption / power consumption	3 A / 60 W (typical)
Interfaces	1 x LAN / 1 x CAN / 3 x M-Bus
Digital inputs	16 standard 24 V / 10k ohm (optional 32 / 48 / 64 / 80)
Analog inputs	16 standard 0-10 V or PT 1000 (optional 32 / 48 / 64 / 80)
Analog outputs	16 standard 0-10 V (optional 32 / 48 / 64)
Relay outputs	<ul style="list-style-type: none"> <li>• Standard 16 (optional 32 / 48 / 64) with manual operation level</li> <li>• Switching voltage max. 250 V / switching current max. 5 A</li> <li>• Sum current max. 12 A per 16 outputs / relay state via LED display</li> <li>• Higher switching performance and additional relay outputs through additional relay level</li> </ul>
Software	<ul style="list-style-type: none"> <li>• Data acquisition and control of the connected units and appliances</li> <li>• Freely configurable messages and measurements</li> <li>• Communication (M-Bus to meters, Modbus-TCP, differential pressure to the local substation)</li> </ul>
<b>OPTIONS</b>	
Hardware	<ul style="list-style-type: none"> <li>• Hardware wired in the switch cabinet</li> <li>• Manual operation level in the switch cabinet door</li> <li>• Electricity signals for target or measured values</li> <li>• Expansion up to 20 M-Bus meters</li> <li>• Expansion up to 60 M-Bus meters</li> <li>• Additional unsuitable point</li> </ul>
Software	<ul style="list-style-type: none"> <li>• Interface M-Bus electricity meter</li> <li>• Interface M-Bus water meter</li> <li>• Interface M-Bus gas meter</li> <li>• Interface impulse meter, incl. hardware</li> <li>• Combustion emergency stop</li> <li>• Network control function (cluster)</li> </ul>
Remote access	<ul style="list-style-type: none"> <li>• AVAT VPN-ROUTER including configuration</li> <li>• Switch cabinet switch 8x</li> </ul>

### STRONG PARTNER

Intelligent, coherent solutions for decentralised energy systems. From the initial consultation to the complete concept, energy engineering, switch cabinet construction, commissioning and subsequent support and maintenance. Our highly qualified employees, who work together in interdisciplinary teams, ensure economically attractive and smart solutions.

- Economic efficiency analysis for partial renovation or the complete modernization of existing systems
- Assessment of the hydraulic and system technology, design of the e-measurement and control and superordinate control and systems
- Holistic control of your system, independent of location and time, through secure remote maintenance with access management
- Comprehensive service package, from project planning, to training and commissioning, to service
- 2nd level support provided by our project engineers