

Helen Optimal Heating

TECHNICAL DESCRIPTION OF THE PRODUCT

Contents

1.	PRODUCT DESCRIPTION.....	2
2.	TECHNICAL REQUIREMENTS FOR DEPLOYMENT.....	3
3.	INSTALLATION AND DEPLOYMENT	4
3.1.	INSTALLATION AND PROGRAMMING	4
3.1.1.	INSTALLATION-RELATED PASSWORD MANAGEMENT	4
3.2.	DEPLOYMENT	4
3.3.	MONITORING AND LEARNING PERIOD.....	5
3.4.	CONTROL	5
3.5.	PROPERTY MAINTENANCE	5
3.6.	PROPERTY RENOVATION ACTIONS.....	6
3.7.	FAULTS	6

1. PRODUCT DESCRIPTION

Optimal Heating is an innovative and smart heating product that is designed to bring energy and cost savings to properties that use district heating. Its smart system is able to adjust heating in real time, responding to energy consumption caused by both buildings and changing weather. Thanks to this, the operations of the heating system are energy-efficient and able to adapt to dynamically changing conditions, such as temperature changes and different peak loads.

Optimal Heating is equipped with advanced analytics tools and uses Internet of Things (IoT) technology, which makes it possible to maximise energy savings and optimise heat production and consumption. It can monitor the property's temperatures and adjust heating as needed, ensuring a consistent and comfortable indoor climate without unnecessary energy loss.

The solution gives the energy company the opportunity to create virtual heat storages that integrate with the district heating network and enable more efficient system utilisation. These virtual storages work like traditional heat storages, but offer the added advantage of enabling the control of the heating level of multiple buildings simultaneously, which brings flexibility and efficiency to energy management.

Optimal Heating also stands out in terms of its environmental friendliness as it relies on renewable energy, such as renewable electricity and sustainable bioenergy. This helps reduce CO₂ emissions and offers customers a more sustainable and economical way to heat their properties.

For customers, Optimal Heating offers ease of use as the service is automated and does not require daily adjustments or changes from its users. This ensures that features such as temperature control and energy optimisation benefit any user without them having to worry about manual control of settings.

Overall, Optimal Heating is an efficient, user-friendly and environmentally sustainable solution for heating control. It has proven its ability to provide significant savings and its deployment has already been shown to reduce the property's heat consumption. This means financial benefits for the customers over a long term as well as a positive impact on our environment.

2. TECHNICAL REQUIREMENTS FOR DEPLOYMENT

The Optimal Heating product can be deployed if the controller of the property's heat distribution centre is compatible with the control programming. The following connection options are currently available:

Connection options:

1. New unit controller for heating connected via an interface converter
 2. Existing unit controller connected via an interface converter
 3. Existing programmable controller with additional programming to be done
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1. The site has a unit controller that does not have a direct connection solution:
As the connection method, we dismantle the old controller and install a new one. A router is installed at the site. The new controller is compatible with Helen's control as is.
 2. We connect to an existing unit controller with a protocol interface converter:
As the connection method, we introduce a protocol interface converter in connection with the controller and connect it to the unit controller. A router is installed at the site. By combining a protocol converter and a controller, the controller is controlled.
 3. As the connection method, we program our own control to the existing controller. A router is installed at the site. Appropriate functions are programmed for the controller.

3. INSTALLATION AND DEPLOYMENT

Installation and deployment are begun once the customer has received the contract confirmation for the product change. The contract confirmation is created once Helen has verified the customer's technical compatibility. The exact installation and programming contents depend on the heat distribution centre controller and the technical details of the property.

In general, the installation and deployment phases are the following:

- Installation and programming of automation related to heat control
- Monitoring and learning period
- Deployment

3.1. INSTALLATION AND PROGRAMMING

The installation of Optimal Heating starts with the integration of hardware and software into the existing heating system. During the installation phase, experts ensure that all components work seamlessly together and the system is thoroughly tested before deployment.

3.1.1. INSTALLATION-RELATED PASSWORD MANAGEMENT

In order for Helen to be able to carry out programming at the site, information about the existing controller and automation password and usernames is needed. If the customer does not know the required passwords and usernames, Helen is entitled to find out the password and the username. Without passwords and usernames, programming work cannot be carried out and the customer does not get the Optimal Heating product in their use.

After the installation and programming work has been completed, Helen informs the customer of the passwords it has used. It is recommended that the controller and automation passwords are changed by the customer.

Helen has the right to store the passwords of the devices or systems it has installed, such as the protocol converter and the router. The same applies to backups.

3.2. DEPLOYMENT

The deployment of the Optimal Heating product does not require any action from the customer.

Deployment takes place after installation and programming.

The control of the Optimal Heating product can be deployed after the necessary installation and programming actions have been carried out and the algorithm has been allowed to go through a monitoring and learning period.

3.3. MONITORING AND LEARNING PERIOD

The deployment of the Optimal Heating product control requires a learning period of two (2) weeks. The learning period must be carried out during the heating season.

3.4. CONTROL

Optimal Heating is a smart software solution, the purpose of which is to optimise heat consumption in buildings that are part of a district heating system. The programme uses AI and machine learning to create thermodynamic models that predict and control indoor temperature to improve energy consumption and indoor climate comfort.

Optimal Heating uses model-based control that predicts process behaviour and optimises control actions. This makes it possible to reduce energy consumption while meeting comfort requirements. The programme enables district heating optimisation according to several targets, such as comfort, energy savings, peak power optimisation and virtual heat storage management.

A virtual heat storage combines the flexibility of multiple buildings, which allows heat to be stored and discharged according to production optimisation.

The programme can significantly reduce peak power consumption without sacrificing living comfort by shifting energy consumption to a cheaper time.

In terms of security, Optimal Heating is cloud-based and uses a modular service architecture, including several information security measures, such as multi-factor authentication and VPN connections.

3.5. PROPERTY MAINTENANCE

Ordinary maintenance actions can be carried out in the property, such as:

- Radiator network adjustment actions
- Filling the radiator network
- Summer shutdowns
- Replacement of valves, pumps, actuators, sensors or other components
- Replacement or maintenance of expansion vessels

Immediately when the property's maintenance actions are known, a notification must be made of them.

Without a notification, ordinary maintenance actions can be carried out in the property that do not affect the heating system or heating energy consumption.

3.6. PROPERTY RENOVATION ACTIONS

If renovation actions are being considered in the property that affect the use of heating, such as:

- Roof renovation
- Facade renovation
- Window renovation
- Hybrid heating systems
- Replacing the heating system

The notification must be made immediately when the housing company knows the content and timing of the renovation actions.

Without a notification, renovations actions can be carried out in the property that do not affect the heating system or heating energy consumption.

3.7. FAULTS

If there are faults or malfunctions in the property's heat distribution or heating energy or power control, Helen's control switches off.

When Helen's control switches off, the property's heat control goes back to the property's own original control logic.