



**smart
vatten®**

**OMNI
HVAC DESIGN GUIDELINES**

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1 HVAC DESIGN GUIDELINES

1.1 Space-specific water metering and leakage detection

The Smartvatten Omni system is a wireless system for metering hot and cold domestic water. The system also alerts of possible leaks.

The system comprises of

- wireless self-powered water meters
- mains-powered 4G base stations
- optionally
 - wireless displays
 - condition sensors (temperature/humidity)
 - leak sensors
 - smoke detectors.

The water meters do not require electrical connections and the meters or the displays do not require cabling. The pre-configured base station requires an electrical socket. The number of base stations needed (one or more) depends on the installation site. The number of base stations needed is verified by the system provider.



Note! If there are less than 15 water meters/measuring points on the premises and there is no need for optional equipment, the system can be implemented without base stations. In this case Smartvatten NB-IoT water meters are used. They are equipped with a SIM card, so they are directly connected to a network. The water meters have a clear digital screen, and water consumption can also be monitored through the Smartvatten HUB service using a smart phone, a tablet, or a computer. The water consumption can also be monitored using the Smartvatten Omni displays.

The water meter delivery packages and the meter units themselves are numbered at the factory in accordance with the space numbering on the site, and whether they are for hot or cold water lines.

The water consumption data of the Smartvatten Omni system can be utilized in the following ways:

- Water consumption data and leakage data can be monitored through the graphic interface of the Smartvatten HUB service using a smart phone, a tablet or a computer.
- Water consumption data can be transferred to other systems (e.g. property management software or billing systems) using transfer files.
- Water consumption and leakage data can be transferred to other systems (e.g. Enerkey, Hausvise, eTalkkari, Talotohtori 2.0, Granlund Manager, Leanheat ja Visma Tampuuri) using APIs.
- The Smartvatten Omni system sends leakage alarms by email or text message.

According to the water meter manufacturer, the service life of the meter and its battery is 16 years.

The water meters have a warranty of up to 5 years according to the service package. If the water meter is faulty, it is replaced with a new one. The customer is responsible for maintaining the equipment.

1.2 Installing water meters

The size of the water meter is 80mm x 75mm x 70mm.

1. Place the water meter freely in the space (protection class IP68). You can also place the meter with the display facing downwards or sideways. However, make sure that users and maintenance personnel can check the consumption data on the screen when needed.
2. No straight pipe sections before or after the meter are required.
3. Place the meters so that they are easy to service. Make sure that their installation must meet the regulations for fire safety and electrical installations.

4. If you place the devices inside a casing or suspended ceiling, install a service hatch measuring at least 500 x 500 mm in the location of the devices.
5. It is recommended to install a valve before and after the meter for maintenance and warranty replacements. This way the meter can be easily replaced by closing the valves.
6. If you suspect there are impurities, such as sediment in the pipelines, we recommend installing a sediment filter. The sediment filter is included in the delivery.

1.3 Finishing water meter installation

Air trapped inside the pipes is released in the follow-up inspection after the installation.

1. Perform the follow-up inspection upon commissioning.
2. Run enough water through the pipes to flush out the air from the pipelines.
3. The water meter starts to function automatically after the air has been flushed from the pipes. Before this there is a triangle with an exclamation mark on the screen of the meter. This means that the meter has not yet identified water pressure in the pipes.
4. When the meter is functioning properly, the screen shows the water consumption, as well as the speed of hourly consumption. The screen is updated every 10 seconds.
5. The meter starts remote transmission of data when the water consumption is over 10 liters. The data transmission includes hourly consumption and leakage alarms.

1.4 Data transmission

Space-specific meters transmit hourly consumption data. The data transmission package includes data from the past 24 hours, so if a package is lost, the system can read the missing hours from the following packages.

1.5 Connection quality

The LoRa radio frequency network is specifically designed for data transmission of IoT devices. The radio communication works on spread spectrum technology on EU868 (863–870/873 MHz) frequency area in Europe. The device can change its frequency (power and bandwidth adjustment) as it adapts to the network. LoRa enables extremely far-reaching connections and nodes that function on minimum power. After installation the devices are connected to the network in a couple of hours, but adapting to the network may take a few days.

NB-IoT (Narrowband Internet of Things) is a cellular-based communication standard specifically designed for the Internet of Things. It is energy efficient, allowing devices to operate on a single battery for several years, and provides deep signal penetration that reaches challenging locations like underground facilities or thick-walled interiors.

1.6 Information security

Water consumption and leakage data of the water meters is transmitted through a reliable LoRa network. Transmission through the LoRa standard is encrypted: each device has two AES-128 level encryption keys, on the network level and the application level.

NB-IoT information security is built on proven 3GPP cellular standards, providing a robust framework that includes SIM-based mutual authentication and carrier-grade encryption (AES). Operating on licensed spectrum significantly reduces the risk of signal interference or hijacking compared to unlicensed networks.

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