

# H2O Customer Portal - Event Based Notifications

## Overview

The H2O Customer Portal can automatically notify utility customers in the case of various “meter data events” that are detected through the analysis of both meter readings and “Infocodes” that are raised by the Kamstrup smart meters.

Through integration with the utility’s Kamstrup Advanced Metering Infrastructure (AMI) system, the H2O system receives meter reads and Infocodes on an hourly basis. It is important to understand that the smart meters themselves have their own wireless communication link with an AMI “collector” and that the collector passes data through a “back haul” link to the Kamstrup cloud platform where the data is aggregated and then delivered to H2O hourly. The wireless link between the meters and the collector, and the back-haul link have their own schedules and latency expectations which may be affected by weather conditions and other factors. Under normal conditions, the data received by H2O each hour is likely several hours old (and maybe older). It is also not uncommon for “gaps” to occur in the time series data; these are typically the result of intermittent problems in the wireless communication phase of the data life cycle.

When H2O receives reads and Infocodes on an hourly basis, it evaluates the data for each meter. Active Infocodes are compared to a list of active alerts in either the system default settings, or the customer’s customized settings (if they have activated the Customer Portal app and modified their settings.) If the settings indicate an email, SMS or phone call should be sent, the system generates the appropriate notification and places it in the outbound message queue. If “auto send” is enabled in the system settings, then a send task will be initiated. If the current time is within the configured allowable messaging window, the message will be sent immediately. If the current time is outside the allowable messaging window, the send task will be scheduled for the following morning when the messaging window opens.

## Notification Types

*Burst Infocode Active* is triggered by the Kamstrup “Burst” Infocode. This is detected by the firmware on the meter if the water flow has exceeded a pre-programmed limit for a minimum of 30 minutes. The pre-programmed limit is configured at the factory and can be modified by the utility in the field. A typical setting for this limit is > 20% of max-flow for 30 minutes. For a 5/8 meter with a max-flow rate of 25GPM this means that water flowing at more than 5GPM for more than 30 minutes will trigger the Infocode. It is likely that every run of an irrigation system, even one using high efficiency drip lines, will trigger this Infocode. See *Abnormal Usage Alert* below for an alternative.

*Leak Infocode Active* is triggered by the Kamstrup “Leak” Infocode. This is detected by the firmware on the meter “...if the water has not been stagnant in the meter during the past 24 hours.” Again, this is based on a configurable parameter with possible settings being 0.1%, 0.25%, 0.5%, 1% and 2% of the meter max-flow rate. Thus, the most sensitive setting of 0.1% on a 5/8 meter would mean that a continuous flow rate of 0.025 gallons (or about 3.33 ounces) per minute for 24 hours will trigger the Infocode. It is important to note that this is measuring the *flow rate* through the meter, and will only be triggered if water is flowing *continuously* above the threshold for 24 hours. Contrast this with the behavior of the *Continuous Flow Alert* described below.

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*Low Ambient Temp Infocode Active* is triggered by the Kamstrup “Low Ambient” Infocode which is a measure of the air temperature inside the meter housing. When the temperature reaches a configurable threshold, the Infocode is raised. The threshold temperature setting is configurable (by the utility) with the following options: OFF, 37 °F and 43 °F.

*Low Water Temp Infocode Active* is triggered by the Kamstrup “Low Media” Infocode which is a measure of the water temperature inside the meter. When the temperature reaches a configurable threshold, the Infocode is raised. The threshold temperature setting is configurable (by the utility) with the following options: OFF, 37 °F and 43 °F.

*Continuous Flow Alert* is triggered by an algorithm which runs in the H2O cloud platform whenever new meter readings are received for a meter. The most recent readings are evaluated and if the recorded hourly usage exceeds a customer-configurable threshold for a customer-configurable number of consecutive hours, the alert is raised. Note that gaps in the hourly data will prevent this alert from firing. Also note that, unlike the *Leak Infocode* which measures *flow rate*, this alert is evaluating *hourly usage*. It is unlikely that a given customer will want to use both *Leak Infocode Active* and *Continuous Flow* at the same time. *Continuous Flow* can act as a substitute for *Leak Infocode Active* when a given customer knows they have continuous usage and want to set their own alert threshold, as the threshold for the *Leak Infocode* can only be set by the utility.

*Restriction Violation Alert* is triggered by a business rules module in the H2O cloud platform which compares the recent hourly usage to water use restriction rules that are in effect, based on the utility’s current drought stage setting. When statistically significant water usage is detected during an hour of the day that is outside allowable outdoor water usage hours, this alert is raised. It is important to understand that this algorithm cannot definitively “know” that any water use is either compliant or non-compliant with usage restrictions; it is only an indicator that water usage *may* be out of compliance with current usage restrictions. This alert provides a convenient mechanism for the utility to remind customers of restrictions that are in effect.

*Abnormal Usage Alert* is triggered by an algorithm that runs in the H2O cloud platform whenever new meter readings are received. This algorithm identifies periods (hours) of statistically significant water usage and builds a profile (for each meter) of when these reoccur. This allows the algorithm to effectively “learn” the customer’s irrigation controller program. Hours of repeat high usage will be ignored, but high usage during non-repeat periods will trigger the alert. The intent of this alert is to notify the customer of abnormally high usage, but not send “false positives” whenever the irrigation system runs. Compare this behavior to the *Burst Infocode* that will fire on every irrigation system cycle. It is expected the customers with irrigation systems will turn *Burst Infocode Active* to the “off” setting and Abnormal Usage Alert “on.”

*Usage Trend Alert* is triggered by an algorithm that runs in the H2O cloud platform once daily in the early morning hours. This model predicts the meter’s usage through the end of period and alerts if that usage is predicted to exceed a customer-defined threshold setting.