WATER-INSIGHT

Application Notes

Rev 01.

AN17 - IPC Valve Control

In general terms the main job of the IPC is to switch a valve on and off at certain times of day. This document aims to explain how this activity is implemented inside the IPC. Firstly some terminology is explained and then details will be given to explain the events and actions that occur to achieve the valve switching.

The INC has an internal **clock** that maintains the current date and time, but which also keeps track of which day it is in the **cycle**. The cycle is the period of time over which a schedule operates. Think of the cycle as being a period of time just like a week, only it doesn't have to be seven days long. It must be specified during the configuration process and can be any number of days between 1 and 16 long. The IPC has to be told how long the cycle is by sending it a timeset message. Here is an example of an IPC Time/Date value including the cycle information:

10/02/2015 12:30:00 and it's the 2nd day of a 3 day cycle

A **schedule** is a list of time values generated by software for each IPC. The schedule defines when the IPC will turn its valve on and off each cycle in general way. Below is an example of the information contained in a schedule.

Day of the cycle	Valve On Time	Valve Off Time
1	8:00	8:30
3	14:30	15:00
4	20:00	20:30

The **alarm table** is a list of date and time values that the IPC calculates which are used during the currently running cycle. The IPC uses these date and time values to set alarms in its internal clock. Here is an example of the information contained in the alarm table.

Current Alarm index	Valve On Date/Time	Valve Off Date/Time
	10/02/2015 08:00:00	10/02/2015 08:00:00
Next alarm ->	12/02/2015 14:30:00	12/02/2015 15:00:00
	13/02/2015 20:00:00	13/02/2015 20:30:00

Next the concept of **events** will be introduced. Events are specific things that can happen inside the IPC. When an event occurs the IPC will perform a defined **action** corresponding to the type of event. The following lists the events related to controlling the valve.

Event	Actions

The clock says its midnight.	Increment the current day of the cycle. If the current day was the last day of the cycle then also: • Reset the current day of the cycle back to 1. • Calculate the alarm table Time/Date values for the current (new) cycle. • Find the next Valve On alarm time in the alarm table based on the date and time now and set the current alarm index to this entry. • Set Valve On and Valve Off alarms and increment the current alarm index.

Event	**Actions**
The clock "Valve On alarm" activates	Open the valve.

Event	**Actions**
The clock "Valve Off alarm" activates.	Close the valve. Set Valve On and Valve Off alarms and increment the current alarm index.

Event	**Actions**
The radio receives a schedule message for this IPC.	Store the schedule to memory. Calculate the alarm table Time/Date values for the current (new) cycle. Find the next Valve On alarm time in the alarm table based on the date and time now and set the current alarm index to this entry. Set Valve On and Valve Off alarms and increment the current alarm index.

Event	**Actions**
The radio receives a time set message for this IPC.	Update the clock time and date values including the cycle length and current day of the cycle.

Event	**Actions**
The radio receives a manual on command for this IPC.	Open the valve.

Event	**Actions**
The radio receives a manual off message for this IPC.	Close the valve.