

Application Note

Rev 02

AN54 – IPC Troubleshooting Guide using an EP3

Introduction

This document provides a checklist to identify the current state and resolve common issues with an IPC which is not behaving as expected.

Familiarity with EP3 use is assumed, please refer to the EP3 User Guide as required.

Preparation

Firstly, generate an SD card for the current system configuration

- Export from scheduling application
- Export from IMS
- Provided by agent or Water-Insight •

Identify IPCs of interest

- Reported status in IMS (a report can be generated if desired)
- Known behaviour

Prepare EP3

- Check that batteries are not nearing flat and ensure you have spare batteries
- Latest EP3 firmware is installed (v5.x or later)
- Set the EP3 time to match the site time Sites with INC – use same time as INC
- Sites without INC request status from several IPCs to gauge current site time
- Load podlist and schedules from SD card •

Investigate each IPC in turn

If the site is on IMS, you can use a smart phone to help guide you to the IPC locations.

- 1. Visual checks
 - Confirm solar panel is clean
 - Solenoid wires are connected correctly
 - . Storage magnet is not installed
 - No physical damage to IPC
- 2. Check serial number of IPC matches that in podlist(EP3)
 - If not refer to **Replacing an IPC in the Field**
- 3. Check if IPC is in hibernation LED flashes briefly every 10s
 - Refer to Effect of Battery Charge % on IPC Behaviour
- 4. Briefly place a magnet on the IPC magnet label
 - Confirm LED starts flashing quickly (entered bootloader mode)
 - If LED does not start flashing the battery may be completely flat For IPCs with field replaceable batteries see Replacing an IPC Battery For IPCs without field replaceable batteries, return to Water-Insight for service
 - If you have a spare IPC available see Replacing an IPC in the Field
- 5. Send a Status request wait for the LED to stop flashing first
 - Confirm the IPC responds, check the battery charge %, schedule matches and time is correct

 If IPC was in hibernation, you will have ~20s after the LED stops flashing to get a status response

If the charge % is unexpectedly low, you may wish to replace the battery or replace/service the IPC

- 6. If IPC does not respond to a status request, but did respond to magnet (fast flashing LED)
 - First check the firmware version is as required for your site
 - Refer to Discovering IPC firmware version and IPC Firmware Upgrade using the EP3
- 7. Confirm channel and/or FarmID (V5) are set correctly
 - Refer to How to discover radio channel of IPC and Changing the radio channel and/or FarmID
 - This is only likely to occur if the IPC has been replaced at some stage and has not communicated since
- 8. Check Solenoid Operation
 - Perform manual ON and OFF commands and confirm sprinkler starts/stops (if water available) or solenoid clicks (no water available)

Solenoid Operation

An IPC controls a valve by passing current through the solenoid in one direction to turn the valve ON and in the opposite direction to turn the valve OFF, so the correct connection of the solenoid wires to the IPC is critical.

- When an IPCs internal clock matches it's scheduled on/off time (or if a manual on/off command is issued) it will send a **pulse** to the solenoid in the appropriate direction for an open/close operation.
 - There is no feedback of whether the solenoid plunger has moved or any indication the valve has actually operated as intended.
- At midnight (IPC time) all schedules are recalculated and solenoids are attempted to be switched to match intended scheduling
- After a timeset (e.g. global timeset to site) IPCs recalculate their schedule and solenoids are attempted to be switched to match intended scheduling (v5 firmware and above only)
- Valve ON (open) solenoid plunger is pulled in; bonnet drain orifice is open
- Valve OFF (closed) solenoid plunger is pushed out; bonnet drain orifice is closed

Quick Solenoid Check

To determine the correct solenoid wiring perform the following test:

- De-Power the IPC by installing the power ON/OFF Magnet in the shipping position (i.e. <u>not</u> the end marked with the label "magnet" this end is for putting the unit into a special programming mode)
- 2. Connect the IPC to the solenoid in use.
- 3. Apply water at operating pressure to the solenoid valve.
- 4. Remove the ON/OFF magnet from the IPC.
- 5. The IPC will power up, then after 10 seconds the IPC will turn the solenoid valve OFF.
- 6. If the solenoid turns ON then the solenoid connecting wires to the IPC need to be reversed.=

Unexpected Valve Behaviour

Query the IPC for its Status

If the valve state reports as **OFF** (but valve is still **ON**) then the IPC **has tried** to turn the valve off

- At the time of the off signal (pulse), for some reason the solenoid could not move the solenoid plunger
- Solenoid is wired incorrectly
- Some other physical reason for valve not turning off

If the valve state reports as ON, but is scheduled to be OFF

The IPC has not tried to turn the valve off

This could be because

- The IPC internal time is not as expected (confirmed in the status reply), so has not reached the scheduled off time
- IPC schedule is not as expected reports as wrong in the status reply
 The comparison is against the schedule the has been loaded in the EP3
- A manual ON command has been issued

Actions

If an IPC needs replacing, has a flat battery or if the charge % is unexpectedly low

- If you have a spare IPC available see *Replacing an IPC in the Field*
- For IPCs with field replaceable batteries see *IPC Battery Replacement*
- For IPCs without field replaceable batteries, return to Water-Insight for service

For more information email support@waterinsight.co.nz