AVK UK NEEDLE VALVE AND CONTROLLER SOLVES FLOW AND LEVEL ISSUES AT IRISH RESERVOIR

Pipe bursts are a major headache for water utilities, and in this case study, AVK Smart Water provided solutions to a long-term overflow problem, worsened by bursts on an old cast iron main.

The two-fold issue was at Lahard Reservoir, near Killarney, County Kerry, part of the Province of Munster, in the South West of Ireland.

County Kerry has a population of around 150,000, and Killarney, which is also the second largest town in the county, has a population of around 15,000.

At Lahard Reservoir, there has been a long-term overflow problem, compounded by bursts on the old cast iron main feeding it. The original control method consisted of an old-fashioned ball float valve.

However, as water entered the reservoir the float valve would bounce up and down and never fully close. This 'bounce' caused ripples to feed back into the cast iron supply pipe causing mains bursts.

Hydraulic control valves had been tried, but they were unable to control the level in the reservoir because of low differential pressures. Effectively, there was insufficient energy to close the valve.

AVK Smart Water's solution combined a PMD (Pressure Management Device) working in tandem with an AVK Series 872 needle valve. The needle valve is incredibly sensitive to changes in flow compared to other valve types and can open over a range of 4% to 96% of its opening. The PMD provides modulating control.

Pictured above, is the kiosk containing needle valve, actuator and controller (PMD) and the data display monitor, pictured below

What is a Needle Valve?

A needle valve enables engineers to finely control and regulate water flow and pressure. The precision is achieved through the fine movement of the shaft. They can be used in many different applications with a need for flow or pressure regulation.

What is a Pressure Management Device?

PMDs automatically open and close the valve that it is fitted to, enabling control the flow at required times. PMDs can be managed locally or remotely.

In combination, the PMD and needle valve ensure that the reservoir holds a level in line with the outlet flow. This means the reservoir inlet flow never needs to shut off thereby eliminating the 'bounce' which had caused so many problems in the past.

Since the two-fold solution of a PMD and needle valve have been installed there have been no further pipe bursts and the reservoir no longer overflows. The PMD will allow remote control via Modbus or IoT SIM card and it is planned to activate this feature in the near future.

The work was undertaken in close consultation with the local council. The council arranged for a power supply to the reservoir which enabled the PMD and 220V actuator to operate.

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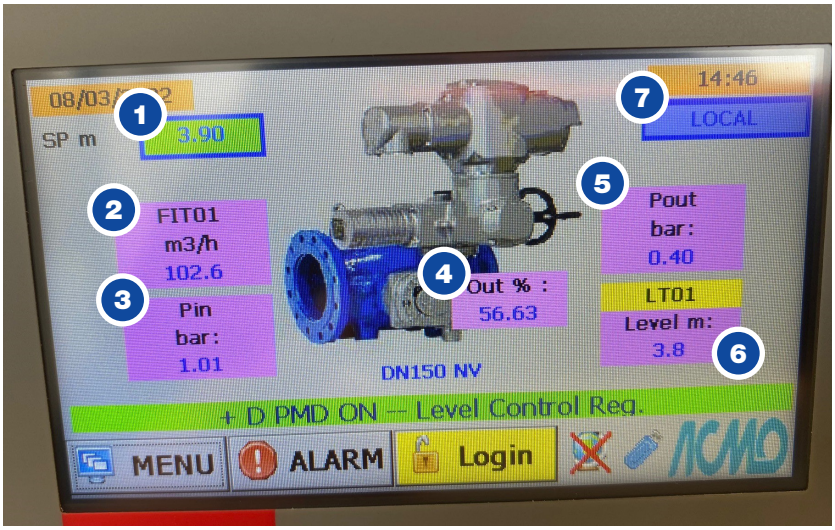
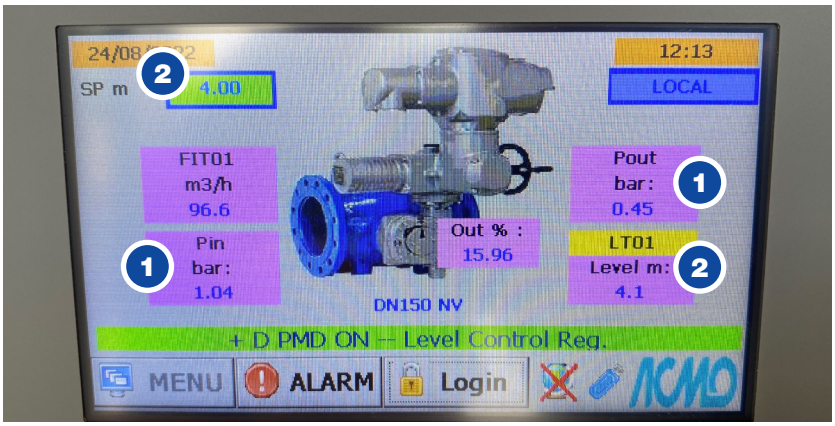


Key for the screen above: (picture shows reservoir level low - valve opening)

1. *This is customer input, where they have set the reservoir level. In this case is it set at 3.9 metres*
2. *This is telling us the water flow currently passing through the flow meter*
3. *This is the current inlet pressure in the pipe line, reading here at 1.01*
4. *This indicates how much the valve is open. In this case it is 57%*
5. *This detail relays the downstream pressure in the pipe line. Here it reads at 0.4 bar*
6. *This is the information received from the reservoir as to what the actual level of the reservoir is. Here we can see it is very close to the set point at 3.8 metres*
7. *The blue box, top right, indicates the system is set to 'local' operation. This can also be changed to 'remote' to enable the customer access from a control centre, if required*



Key for the screen above: (picture shows reservoir level high - valve closing)

1. *Pictured above, bottom left, there is a reading of 1.04, top right, reading of 0.45, the differential pressure is 0.59 - which is exceptionally low. A typical hydraulic valve has between 1 - 1.5 bar differential pressure, which is why a needle valve was the solution to this particular issue at Lahard Reservoir.*

2. *Pictured, top left green box - this indicates the set point for the reservoir. The control will tell the valve to start to close. Pictured bottom right, there is a reading of 4.1 metres, very close to the customer's preference. The valve then receives a signal to modulate to the close position to decrease the level within the reservoir.*

DAVID HURLEY
DIRECTOR OF AVK UK SMART WATER:

The PMD was recommended together with a needle valve, this was the only solution to ensure the reservoir would control and never close due to PMD's modulating level control power.

"The reservoir now fills in-line with the outlet flow and this means the reservoir inlet flow will never close. The flows have such a huge range and low inlet pressure but this is no problem for a needle valve which can operate between 4 per cent and 96 per cent opening lift without any risk of instability or cavitation.

"AVK can offer every type of control valve to suit any needs. We are unique in that we are not restricted to a certain family of valves and therefore can offer the best solution. With the additional benefit of the plug and play PMD, AVK control valves have the simple controller unit to control pressure, flow, level, and combinations of all three required. There really is no need to go anywhere else!

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