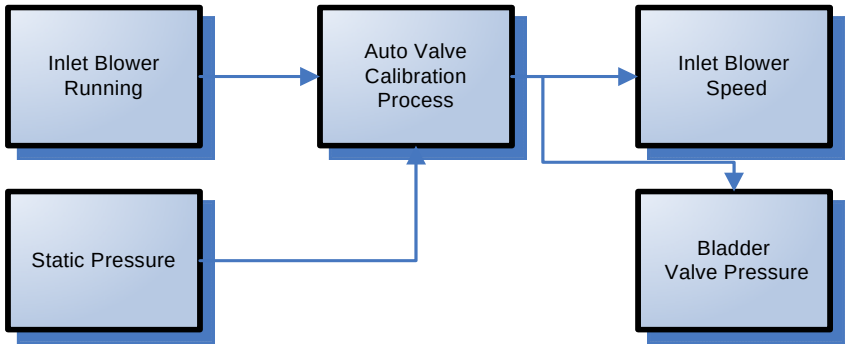
Auto Valve Calibration Fault Recovery

The automatic valve calibration (AVC) process provides an automated method of calibrating the flow control valve used in the IBC system. The process can be configured to operate on a schedule to self-calibrate. The self-calibrate process can record faults during the process that are reported to the operator in a simple Go / No Go format. If the process ran properly, a yellow smile face is displayed. If there was an issue, the frown face (shown right) is displayed. By touching the frown face, the fault display shows and the error 33:Auto AVC Failed; Run Manually error occurs.

This document describes the steps maintenance personnel should follow to recover from this error. AVC functional description is covered for those not familiar with the system.

AVC Functional Description

The diagram below shows the connections between the AVC process and the field devices. The blocks on the left are inputs, the blocks on the right are outputs.



Inputs

The AVC process requires that the inlet blower be stopped before the calibration process can begin.

Inlet Blower Running

Once the inlet blower is started, the drive must signal that the drive is indeed running. The inlet blower uses a dry contact relay or a sinking digital output to send the signal to

the IBC system sinking digital input. The drive output must be programmed for running.

Static Pressure Signal Presence

Once the inlet blower is running, the system checks the static pressure transducer to make sure it is providing at least a 4 milliamp signal. The signal range is 4-20 milliamps, so a signal less than 3.9 milliamps indicates a possible problem with the transducer or the wiring.

Static Pressure Signal Value

Once the inlet blower is running and the Static Pressure signal is present, the system then looks for the signal to rise with the inlet blower speed. If the signal does not rise, it will report a fault. If the signal value is not stable after the inlet blower speed has reached the calibration speed (see Inlet Blower Speed), the system will report a fault.

Outputs

Inlet Blower Speed

The system ramps the inlet blower speed up to the configured blower speed. Normally this value is 70%, but it can also be within the range of 40-70%. Pressures lower than 70% can be used if the operations always require lower pressures. Also, lower pressures require less time to calibrate and use less energy during the calibration process when compared to calibrating at 70%. There is no need to calibrate at a speed higher than 70%.

Bladder Valve Pressure

After the inlet blower speed has been ramped, the AVC system increases the pressure to the bladder valve. If there is no corresponding drop in static pressure over time, this will trigger another fault.

Resolving the AVC Fault 33

The first thing to note is that the AVC Fault 33 is not typically a critical fault that prevents the machine from operating. When this fault occurs, the system simply resumes operation with the previous calibration values. This allows the operator continue running the line. The purpose of the indication is to get the attention of the maintenance personnel so they can plan time to investigate and resolve the issue at a convenient time. In the mean time, the system will retry the AVC calibration process each time the inlet blower is started. Repeated calibration attempts have no negative effect on the operation of the line. It does take about 60 seconds for the AVC process to complete, so it essentially delays startup by no more than a minute each time it retries the process. The retry process will occur at each startup until the issue causing the fault is resolved. In the event that you have observable bubble stability or overblow or underfill conditions that are not normal, that issue is likely also causing the AVC process to fail.

Summary

The steps below are a summary of required actions to resolve the problem:

1) Stop Production
2) Clear all material from around the IBC cooling hardware
3) Access the IBC Service Section – password 4095
4) Proceed to System Configuration

5) Proceed to Calibrate Valve
6) If the screen title is CALIBRATE VALVE and screen number is 103, press the icon in the lower left hand corner of the screen.
7) You should now be at the AUTO VALVE CALIBRATE screen 114.
8) Press the AUTO CAL button (or turn on the inlet blower if the touch screen does not control the blowers).
9) Wait for the process to finish.
10) Read the error codes displayed (see example screen below):
11) Review the table below to resolve the issue
12) Rerun the calibration process until the problem is resolved.

The system reports several possible error codes that helps point the maintenance personnel in the right direction. In this case, the pressure to the proportional valve was at zero. Putting it back to 2 bar corrected the issue but the other items listed could also cause a problem which is why multiple issues are sometimes listed.

Possible AVC Errors and Corrective Action

Error Number	Description	Corrective Action
0:	Inlet Pressure Not Reading	System is not sensing a signal coming from the Inlet Magnehelic. System must detect at least 3.9ma for this fault to clear.
1:	Inlet Pressure Unstable	With the inlet blower running at a steady speed the static pressure signal is too erratic to perform a valve calibration. Look at the static pressure connections both at the Magnehelic and at the ducting. There should be no leaks either at the connection point or anywhere in the hose. Plastic hose can melt if polymer or a hot metal surface touches the hose.
2:	Bladder Valve May Not Be Responding	With inlet blower running and the system increasing the pressure to the bladder valve, you should see a steady increase in pressure going to the bladder valve with two 5 second pauses. If the pressure is not increasing, check the pressure regulator and make sure you have 2 bar (28 psi) going to the proportional valve. If pressure is going increasing to the bladder valve, then review error 3, 4, 5, 8 and 10.
3:	Mislocated Inlet Pressure Sensor	The inlet pressure sensor must be located on the inlet duct after the bladder valve and before the die. If the Magnehelic pressure tap is located properly, move on to errors 4, 5, 8 and 10.
4:	Possible Clog in Supply Pipes	If polymer has flowed into the IBC inlet hardware on top of

		the die, the system will register a high static pressure regardless of the what the bladder valve does. If there was a recent bubble break or the extruders were drooling for an extended period of time, you need to remove the IBC hardware from the top of the die and make sure there is no accumulation of plastic. Note that if you found material inside the air ring, there is good chance there is material inside the inlet pipes or the hardware that sits on top of the die.
5:	Bladder Valve too large	This error can occur when there is a clog (error 4), or if there was a die change from a large die to a small die. If the die was not changed. See also error 2.
6:	Bladder Valve too small	This error can occur when there is an open duct downstream of the bladder valve or if there was a die change from a small die to a larger die. If the die was not changed, see also error 8.
7:	Poor Response, increase inlet speed	This error occurs when the inlet blower speed is too low. If the blower speed is calibrating at 70%, then the speed is sufficient. Check for inlet blower rotating the wrong direction. Check also the proportional valve regulator to make sure the pressure is not set above 28 psi. See also error 8,12
8:	No Backpressure, check Inlet Duct	This is an indication that there may be a problem with the inlet duct as there was little or no backpressure detected. Verify inlet ducting is intact

		and all leaks are repaired. One or two very small leaks will not cause this fault. See also error 15.
9:	Stop Inlet 3 min to rezero SP Sensor	This error is rare but can occur if the blower motor has not stopped rotating for at least 3 minutes before the calibration process occurs for the very first time. The system automatically zeros the Magnehelic sensor at every extended stop of the inlet blower. Do not attempt to zero the transducer built into the Magnehelic. If this error is displayed repeatedly, it may be necessary to replace the Electronic Magnehelic.
10:	Possible Opening in Inlet Duct	This error occurs when there is a very low back pressure detected by the electronic Magnehelic after the blower has reached the calibration speed. Check pressure tap connections on the ducting, Magnehelic, as well as verifying there are no major duct leaks and the inlet blower is not rotating backwards. Finally, if the problem is still occurring, double check the IBC hardware to ensure it is assembled properly. Low backpressure can occur if the inlet air is escaping directly to the outlet air path before it exits at the top of the die. Remove an outlet air duct with only the inlet blower running to see if inlet air is escaping to the outlet air path.
11:	Possible recent die change	This error occurs when the system detects a starting ratio change. This is an information message and will clear on the

		next startup. Make sure the operator turns off the inlet blower before starting for the best chance to clear the error.
12:	Prop Valve Pressure too low (2 bar)	This error occurs when the calibration process cannot pressurize the bladder valve sufficiently to complete the calibration. Verify the pressure regulator is set to 2.0 bar (28 psi). If pressure is correct and fault continues, do a leak test on the proportional valve to bladder valve connection. If leak test passes, check the bladder valve for kinked bladder hoses. It may also be necessary to replace the proportional valve.
13:	No Pressure on Inlet Magnehelic	The system is detecting the Magnehelic, but it does not detect a significant pressure signal. Check the pressure taps and hose for leaks. See also error 15.
15:	Check Magnehelics/Chk BV for Debris	This error occurs when debris has accumulated in front of the bladder valve or in the inlet duct pressure tap. Make sure both are clear. If the static pressure tap hose is opaque, consider replacing the hose.