



# PulseEight Electronic Ambient Valve

The PulseEight Electronic Ambient Valve (EAV) is used in situations where storm chokes or ambient valves offer the only choice for continuing to safely produce wells with failed safety valves. The PulseEight EAV offers the capability to continue production whilst being able to respond to incidents associated with losses of surface containment or emergency shutdowns.

The PulseEight EAV uses a pressure monitoring system and electric motor to autonomously actuate the valve based on safety critical events or a predetermined pressure pulse routine.

As wells are produced, the reservoir pressure (in most cases) begins to deplete. This reduction in well pressure happens over a period of time which can range from days to months. Unfortunately, existing ambient valves do not cope well with these changes to the flowing conditions and may require repeated testing or retrieval to ensure suitable set up. For this reason, the PulseEight EAV has individually configurable programmed parameters which take this into account.

The EAV is designed to ignore not only a declining reservoir pressure, but also the highs and lows associated with normal hydrocarbon production. The logic employed by the EAV means that the tool is constantly monitoring and is awaiting a time-based change in the production pressure regime associated with a loss of surface containment (typically occurring over a timescale of a few seconds). Alternatively, similar pressure events associated with emergency shutdowns will elicit a valve closure.

Reopening the valve couldn't be simpler; a staged application, or removal, of pressure above the tool will cause the EAV to reopen. The number, amplitude and duration of each stage is individually configurable and is designed to create sufficient complexity to prevent accidental address but also sufficient simplicity to allow production to be restarted quickly.

The EAV is deployed in the well via conventional intervention methodologies and is mounted to a lock mandrel packer, or retrievable bridge plug, via a simple threaded crossover. Installation can therefore easily take place at or around existing safety valve depth or elsewhere in the well as required for adequate control.

Unlike other systems within the PulseEight range, there is no absolute requirement for a surface acquisition unit, especially where existing pressure monitoring is already in place at the wellhead. The EAV is designed to send a single pressure pulse signal to surface at 24-hour

## Features

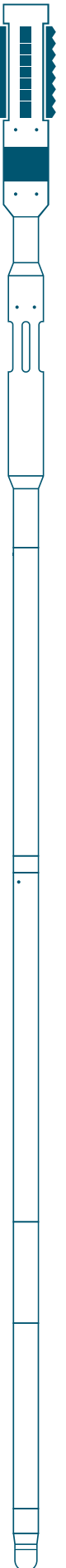
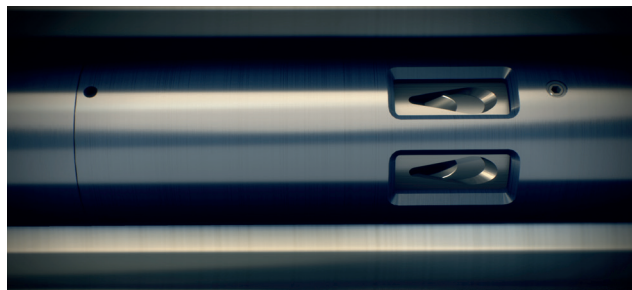
- Can be deployed in slickline
- Compatible with most lock mandrels and plugs
- Can respond to both loss of surface containment or emergency shut-down events
- No surface connection required for control

## Benefits

- Less sensitive to changes in flowing pressures
- Easily programmable parameters
- Well does not need to be balanced to re-open

intervals to confirm functionality of the system and provides a clear indication with minimal analysis required. This Vitality Pulse provides the operator with a daily confirmation of the EAV's functional capability, something not available with any safety valve or storm choke. Additionally, the Vitality Pulse can provide details on remaining battery life providing clear indications, in advance, of impending power depletion such that an intervention can be scheduled to keep the well producing for as long as possible.

Where a battery change-out has not been able to be conducted, the tool will function closed when the battery depletion exceeds a minimum energy threshold, thus leaving the well in a safe condition until an intervention can be scheduled.





### Technical Specification

OD range	2.50" - 5.00"
Max rate	30,000BPD
Max length	30.30ft
Body pressure	10,000psi
Rating static seal rating	5000psi liquid / 3000psi in gas
Unloading seal	1500psi
Rating	150°C/302°F
Max design temperature	110°C/230°F <small>*Qualified limit, can review on application basis</small>
Max operating temperature* lifetime	Up to 5 years

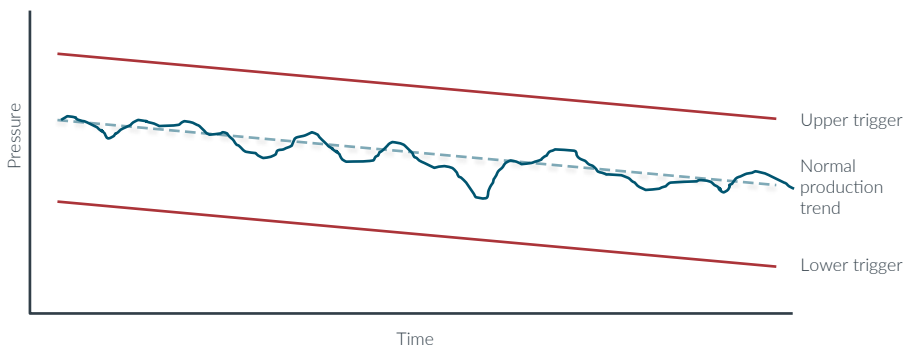


Figure 1. As EAV monitors for short-term changes in flowing pressure, normal pressure decline is ignored

PulseEight EAV is constantly monitoring flowing pressures and is engineered to ignore long-term production trends or sporadic peaks and troughs of normal production. This results in the trigger values always trending with the current flowing conditions. This prevents inadvertent actioning of the valve through everyday use, but ensures it will function closed when required. (See figure 1)

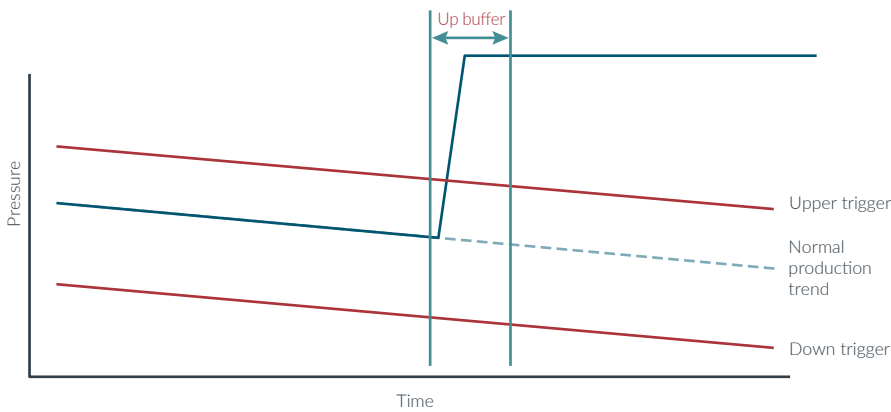


Figure 2. Rapid pressure increases within the upper time buffer (such as ESD events) will cause the tool to close

The time-based pressure changes, both up and down, allow the tool to recognise characteristics of loss of containment and emergency shutdown events. If the trigger threshold is exceeded in a rapid time frame, regardless of whether the entire buffer period has elapsed, the tool will start closing ensuring the flow is controlled in a suitable time frame. (See figures 2 and 3)

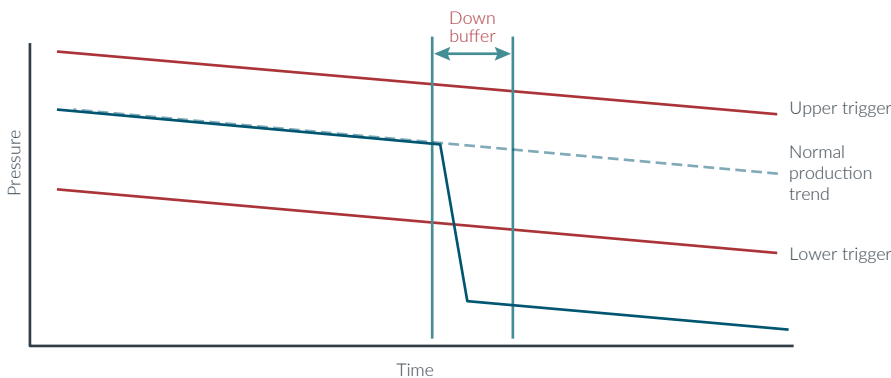


Figure 3. Rapid pressure decreases within the lower time buffer (such as loss of surface containment events) will cause the tool to close