

# PULSECLOSING

## A SAFER METHOD OF RECLOSING

*The incidence of extreme heatwaves and bushfires are predicted to double in the next 30 years. This article will detail the advantages of using PulseClosing® technology to effectively reduce the risk of fires which occur due to sparking from traditional reclosers. The loss of reclosing results in any temporary fault becoming a permanent power cut. Due to the risk of sparks during the reclosing process and the risk to network crews from bush-fires, networks will not restore power on a high fire danger day.*

The enabling technology for the advancements in distribution system protection is the concept of PulseClosing®. In the simplest of terms, PulseClosing® is the action of closing and then very quickly opening distribution switchgear contacts. The whole action takes only 3-8ms to complete and the resulting pulse is analysed to determine if a fault is still present without allowing full fault current to flow.

A key part of the technology is closing at the optimal point on the voltage waveform to achieve only a minor loop of fault current. Closing onto a faulted circuit at a voltage zero results in fully asymmetrical current with a peak current approximately 2.6 times the symmetrical RMS fault current for an X/R ratio of 17 (Figure 1). Closing just before voltage peak results in peak current approximately 1.4 times the symmetrical RMS fault current (Figure 2).

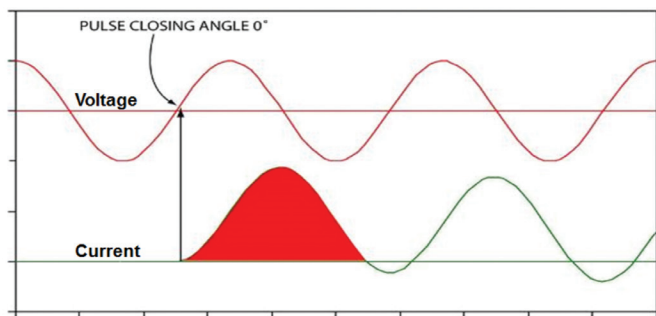


Figure 1 Closing in to a faulted circuit at a voltage zero

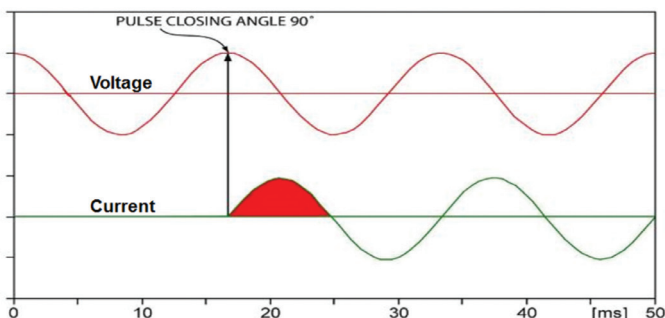


Figure 2 Closing in to a faulted circuit just before voltage peak

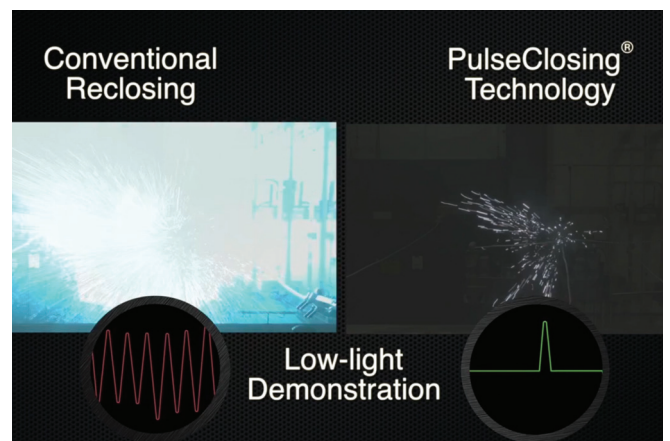
The point-on-wave closing angle for a PulseClosing® operation must generate enough current to be measured and analysed while still keeping the energy let-through into the fault as low as possible. The

timing of the chosen point-on-wave closing angle for PulseClosing® is such that the largest current occurs in the second loop of current. However, the contacts open before the major loop starts, so the system only sees a minor loop of fault current.

### REDUCE THE RISK OF SPARKING

The PulseClosing® Technology®, used by the S&C's IntelliRupter® PulseCloser® Fault Interrupter uses less than 5% of the electrical energy used in conventional reclosing to test for the continued presence of a fault on the line. By dramatically reducing the amount of energy needed to test the line, networks can restore power in a safe way that will significantly reduce the risk of sparking.

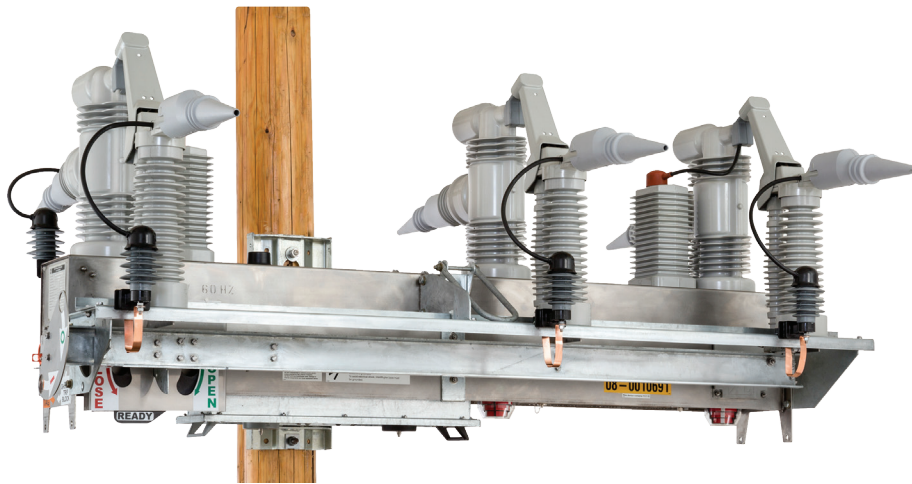
This safe approach to reclosing also has the benefit of increasing the life of network assets by preventing excess stress being repeatedly exerted on them. The PulseClosing® Technology provides a safe, reliable and cost effective fire prevention solution that allows communities to stay connected to power for longer, reducing the risk of negative health effects, due to overheating.



PulseClosing® Technology visibly uses less force when testing for faults on your system.

### PULSECLOSING® APPLICATIONS

As established in the previous sections, the essence of PulseClosing® technology is the ability to detect the presence of a fault without stressing the system or disconnecting power to customers. Applying the concept not only at the device level, but at the system level presents new ways to evaluate the use and benefits of PulseClosing®.



S&C's IntelliRupter®  
PulseCloser® Fault  
Interrupter.

### CONCLUSION

There are new tools available that give distribution engineers increased flexibility and functionality to design protection systems that achieve reliability benefits where they are needed the most. PulseClosing® technology is an innovative method to test overhead power distribution circuits for the presence or absence of a fault. It eliminates voltage sags that result from conventional reclosing. Along with these benefits PulseClosing® is also an enabling technology that allows for new and better ways to perform distribution system automation and overcurrent protection. PulseClosing® overcomes the coordination constraints of conventional recloser loop systems and

allow for an unlimited number of fault interrupting devices to be used in series. S&C Electric Company complies to the highest standards of quality ensuring the success of your solution. Work with us to ascertain the best solution to your bushfire challenges.

For more information please contact S&C  
on [SalesAustralia@sandc.com](mailto:SalesAustralia@sandc.com) or visit [sandc.com](http://sandc.com)



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