



OpreX™ Control and Safety System

## Partial Stroke Test (PST)

ProSafe-RS Safety Instrumented System

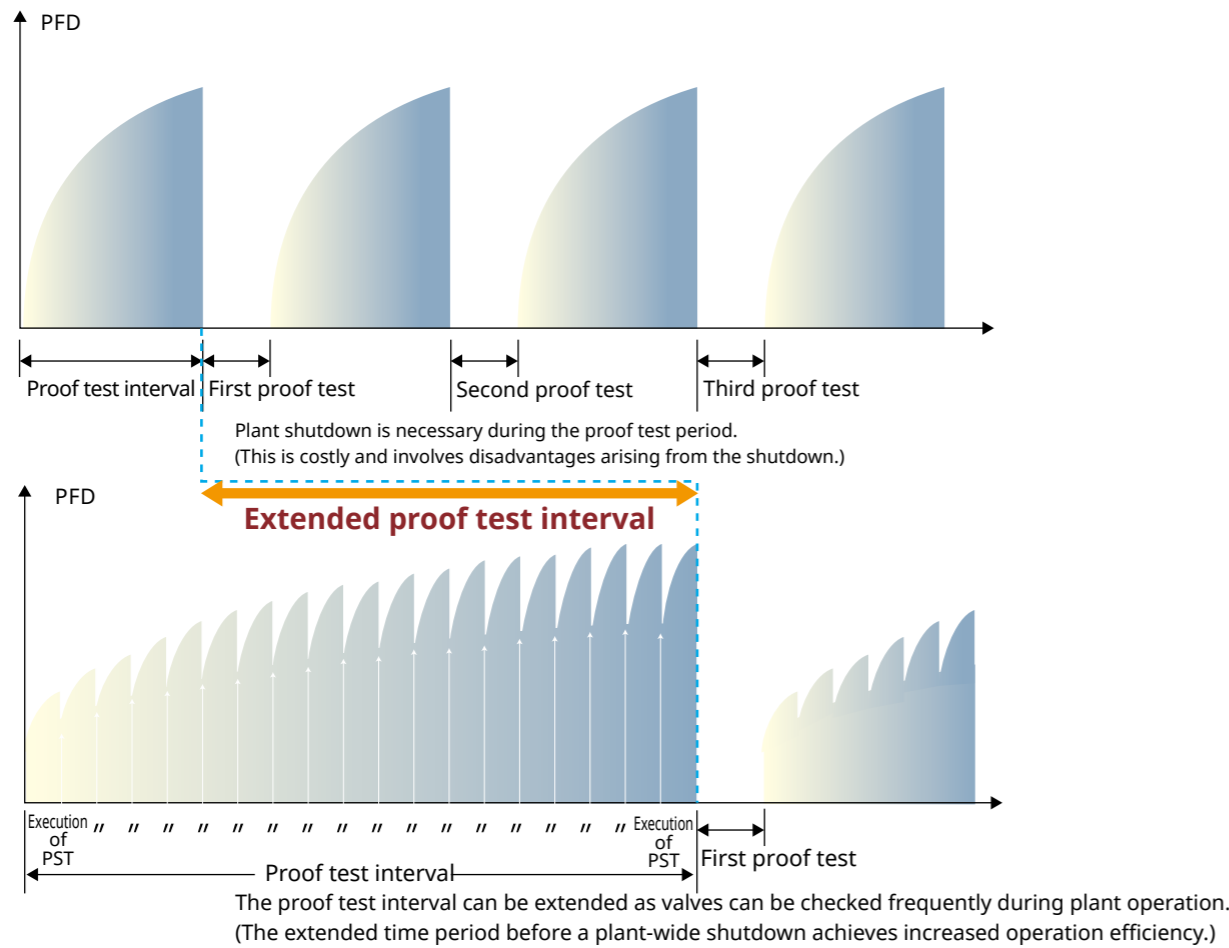
Expanding the Safety Spectrum

# Dramatically Cutting Maintenance Costs Using Partial Stroke Test (PST)

## What is PST?

Partial Stroke Test (PST) is designed to perform diagnosis by slightly closing a valve during plant operation.

In general, PST is executed on valves that perform shutdown according to safety logic engineered using a Safety Engineering PC (SENG). A safety instrumented system (SIS) performs process shutdown only when a failure occurs in the plant. It is therefore necessary to periodically test valves to ensure that they will respond to a shutdown event (hereafter, this test is referred to as a proof test). The interval at which proof tests are conducted depends basically on the valve failure rate and the allowable value of probability of failure on demand (PFD). Such a proof test is required since a PST can validate about 70% of the possible failure modes. Under normal conditions, a safety integrity level (SIL) is first determined from the relevant area in a plant; then the PFD of a safety loop is evaluated according to the SIL. Finally, a proof test interval is determined from the failure rate of the entire safety loop, including valves and the given PFD value. For this reason, the proof test interval must be maintained to ensure the validity of the safety loop.



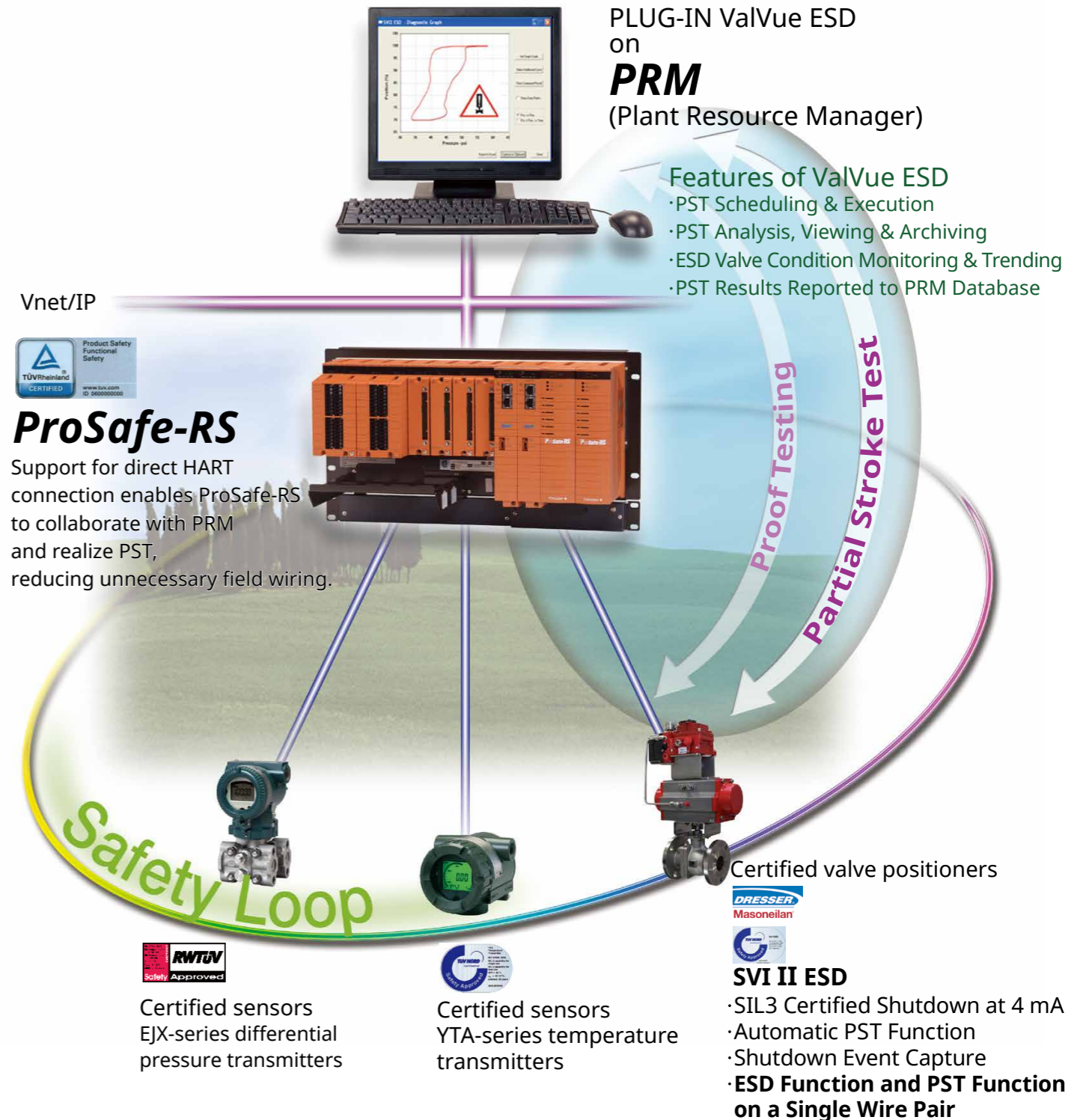
## Advantages of PST

Experts assert that most valve failures can be detected by a PST in which valves are slightly closed. Since a PST can be performed periodically while online, it can extend the proof test interval without sacrificing the PFD value. This strategy enables significant reductions in plant maintenance costs.

Note: For details on the coverage of PST-based valve diagnosis and the relation between the PST interval, proof test interval, and PFD value, refer to the vendors' manuals for the valves.

## System Configuration

- PST makes it possible to extend the proof test interval without reducing the SIL of safety loops.



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