SMITH
FLOW CONTROL LTD

SFC KEY INTERLOCKS & PROCESS MANAGEMENT SYSTEMS

APPLICATIONS PSV Interlocking

PSV SYSTEMS

Whether onshore or offshore, maintenance procedures to Safety Relief Systems on live plant cause concern in ensuring that an open path to relief is maintained at all times during the work exercise.

Most modern piping arrangements include spare relief capacity enabling continuous production while maintenance procedures are conducted on live plant eliminating the requirement to isolate and shut down the process.

Twin or multiple safety relief valve systems are usually fitted with isolation block valves upstream and downstream of each safety relief valve - it is essential to ensure that the block valves isolating the spare relief valve are opened BEFORE the block valves of the work piece relief valve are closed.

This issue is a more acute problem if the respective relief valves and isolating block valves are distant or out of sight of each other.

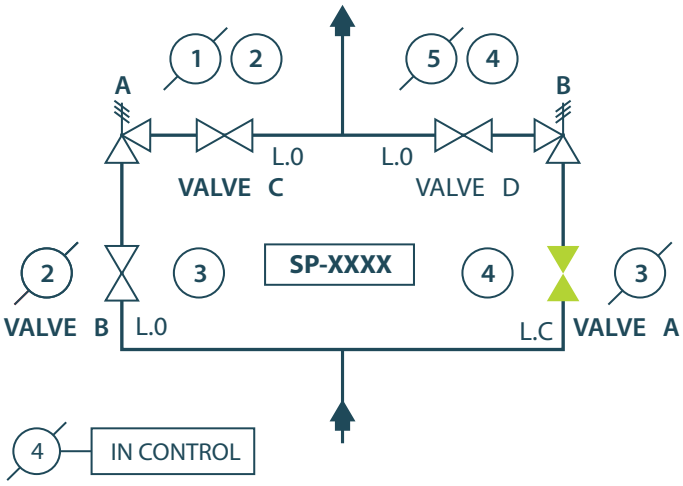
Various API and ASME codes recognise this hazard and recommend the use of interlocks to eliminate this possibility. API RP 520 (Pressure Relieving Systems for Refinery Services - Part II Section 4- Isolation Valve Requirements) and API RP 14E (Design and Installation of Offshore Production Platform Piping Systems - Para 5.8b [2] - Relief Device Piping) specifically recommend interlocks in this situation to ensure that (over) pressure protection of the vessel is not compromised. Otherwise, many leading OpCos have their own written engineering design standards that specify similar safety design requirements.

Fitting a valve interlock to the upstream and downstream isolating valves on each safety relief valve (PSV) will ensure these recommendations are implemented.

An initiating key, issued from a secure location (Control Room) commences the PSV changeover. Follow the step-by-step procedures in the diagram.

PSV INTERLOCKS

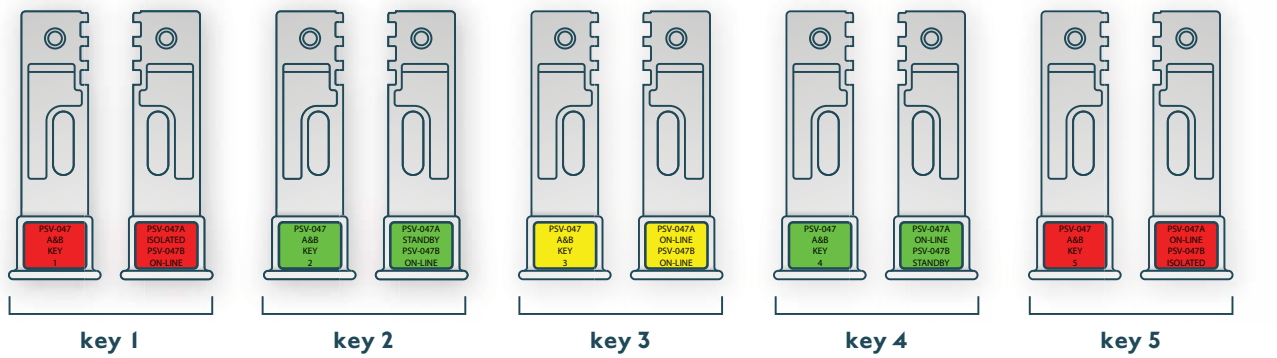
4 VALVE PSV INTERLOCK SYSTEM



KEY IN CONTROL ROOM	VALVE POSITION			
	A	B	C	D
1	OPEN	CLOSED	CLOSED	OPEN
2	OPEN	CLOSED	OPEN	OPEN
3	OPEN	OPEN	OPEN	OPEN
4	CLOSED	OPEN	OPEN	OPEN
5	CLOSED	OPEN	OPEN	CLOSED

LEGEND			
VALVE LOCKED **OPEN**		**KEY**	FREE
VALVE LOCKED **CLOSED**		**KEY**	TRAPPED

Front and Rear view of Key(s) - Example of Key Marking and Colours



Sequence of Operation:
(Starting from Normal Operating Condition)

1 Change-Over Sequence from PSV A Operational to PSV B Operational

a) Obtain Key '4' from Control.
b) Insert Key '4' into Valve A. Open Valve A. and lock open by removing Key '3'.
c) Insert Key '3' into Valve B. Close Valve B. and lock closed by removing key '2'.
d) Return key '2' to Control.
(Change -Over complete)

2 Complete Isolation of PSV A

e) Obtain Key '4' from control.
f) Insert key '4' into Valve A. Open valve A. and lock open by removing key '3'.
g) Insert '3' into Valve B. Close Valve B. and lock closed by removing key '2'.
h) Insert Key '2' into Valve C. Close Valve C. and lock closed by removing key '1'.
i) Return Key '1' to Control.
(Isolation of PSV A. complete)

3 Complete Isolation of PSV B

j) Obtain Key '4' from Control.
k) Insert key '4' into Valve D. Close Valve D. and lock closed by removing Key '5'.
l) Return Key '5' to Control.
(Isolation of PSV B. complete)

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