

# SILstroke-3



## SELF-TEST FIRST, PARTIAL STROKE TEST SECOND

### THE PROBLEM:

#### RELUCTANCE TO TEST

Historically, partial stroke testing often brought an economic penalty to the Operations Group due to the risk created by a failing the solenoid (SOV) or losing control of the ESD valve causing it to slam shut. SOV coils would often fail when re-powered due to the addition power demand for re-opening the SOV. This high power demand would short out a SOV coil that was weakened by months of high temperature operations. Even if the SOV worked correctly, a bleed-down of the ESD valve's diaphragm could occur while the technician waits for the ESD valve to make its first movement. When the ESD valve breaks free, the ESD valve could close to the extent that the process would trip. To prevent the valve from slamming shut, valve stem clamps were used. That was a costly way of testing the ESD valve, so the ESD valve was left untested.



#### THE UNTESTABLES

Beside the general reluctance to test the ESD valve; some of these ESD valves due to process design, were not located in convenience places. If the ESD valve is 70 feet in the air, buried in a pipe rack; that ESD valve is one of the "Untestables." Stem clamping such a valve for a partial stroke test would be dangerous work.

#### TODAY'S TECHNOLOGY

Manufacturers are providing three primary technologies to resolve the partial stroke testing of critical ESD valves. SILstroke-3 has advantages over the other two approaches; dual SOVs and positioners. Both the dual SOVs and positioners have dangerous failure modes.

Though the dual SOVs are 2oo2 for supplying air, the venting path is 1oo2. That means both SOVs must close to vent the ESD valve's diaphragm. Such an arrangement of SOVs actually increases the change of having a Failure on Demand. (see back for illustration)

Positioners have a dangerous failure mode due to the risk of having the nozzle of the I/P plug partially or fully. Such a plugging of the 0.3mm nozzle would cause the ESD valve to remain open or partial open with the power removed. (see back for illustration)  
Additionally, the positioner's Cv rating is <1.0 meaning it is very slow to open or close the ESD valve. For mid-size to large ESD valves, boosters and quick exhaust valves must be utilized; thereby increasing the likelihood of a dangerous failure.

## ESD APPLICATIONS

PATENTED 2oo4D SOV ARRANGEMENT

CLASS I, DIV 2, Grp A-D

FAULT TOLERANT & FAIL SAFE

SIL 3 CERTIFIED by TUV

POWER: 18 to 28VDC; 450ma

BY-PASS - SOVs A&B or C&D  
(NEVER ALL FOUR SOVs)

DUAL AIR SUPPLY PATHS

DUAL AIR VENTING PATHS

# SILstroke-3

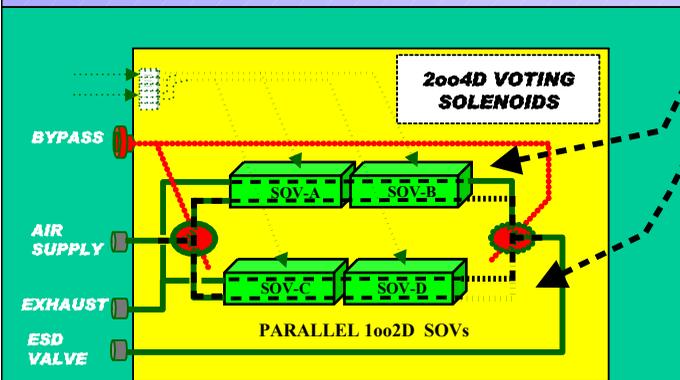


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## No Single Dangerous SOV Failure - Fault Tolerant

### SILstroke-3 OPERATIONS

SOVs in a 2oo4D arrangement masks all single failures, both dangerous and spurious. The arrangement shown below illustrates how SILstroke-3 is both a fault-tolerant and fail safe design. The parallel paths provide the fault-tolerance, and the series SOVs provide the fail safe aspect. For maintenance, the by-pass valve will by-pass the upper or lower SOV set while the other remaining set controls the ESD valve. With its parallel 1.7 Cv air paths, the SILstroke-3 solution meets the needs of small or large ESD valves.



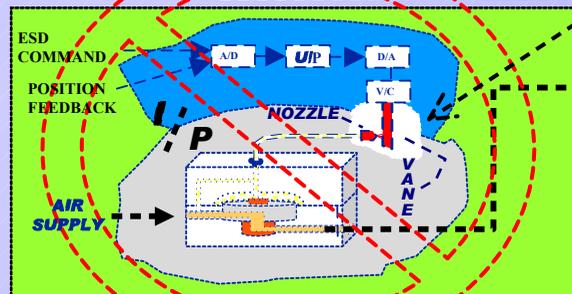
### IMPORTANT NOTICE

SILstroke-3 SOVs are arranged with - parallel 1oo2D air supplying and venting paths - whereas the 2oo2 SOVs package has a parallel (2oo2) supply path, BUT a single 1oo2 venting path - that's dangerous!

### SPECIFICATIONS

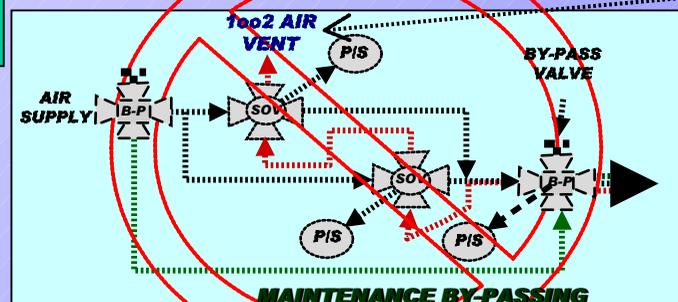
POWER: 450ma at 18 to 28VDC  
TEMPERATURE: 0 to 60°C  
AIR CONNECTIONS: 3/8"  
AIR SUPPLY - PILOT: 15 to 115 PSIG  
AIR SUPPLY - LOAD: 0 to 115PSIG  
POSITION FEEDBACK: SWITCH or ANALOG

### POSITIONER - DANGEROUS FAILURE



- PLUG NOZZLE - FALSELY OPENS VALVE
- PARTIAL STROKE OF POSITIONER (BLEED OFF ONLY TO 85%)

### 2oo2 SOV PACKAGES - DANGEROUS FAILURE



- BY-PASS - BOTH SOVs (Overrides ESD Control)