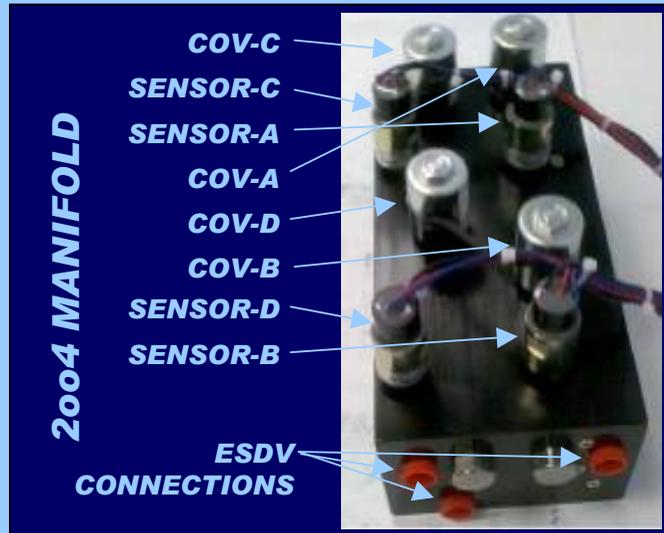# SILstroke-3H

The Only Fault-Tolerant, Fail-Safe HDV Design

The problem is: No one can make a Hydraulic Directional Valve fail safe and/or redundant. But yet there are hundreds of hydraulically operated ESDVs that have to meet the IEC 61511 or ANSI/ISA 84.00.01-2004 standards. Making the HDVs highly reliable to eradicate spurious trip and dangerous failures means two kinds of failures have to be overcome: Failed open and failed closed.

SafePlex Systems, Inc. – the designer and manufacturer of the pneumatic 2004D SILstroke-3 SOV box – has employed the same 2004D concept for its SILstroke-3H design. For the first time there can be continuous and reliable operation of a hydraulic driven ESDV, while in the presence of a failed open or failed close HDV.

The series / parallel configuration of the HDVs mitigates both the spurious trip and dangerous failure of the ESDV. All first HDV failures are transparent to the operation of the ESDV because of the series / parallel 2004D design. The series HDVs mitigate the failed open HDV, and the parallel HDVs mitigate the failed closed HDV.

SafePlex's patented 2004D design overcomes the standard HDV porting patterns that prevented the creation of any fail safe or fault tolerant designs. So why put your process at risk, or experience loss of production? Contact SafePlex for all of your high reliability ESDVs needs.

2oo4 MANIFOLD

- COV-C
- SENSOR-C
- SENSOR-A
- COV-A
- COV-D
- COV-B
- SENSOR-D
- SENSOR-B
- ESDV CONNECTIONS

ESD APPLICATIONS

PATENTED 2oo4 ARRANGEMENT
FAULT TOLERANT & FAIL SAFE
POWER: 24VDC or 120VAC
SIL 3 RATED
RATED UP TO 3,000 PSIG
3 GPM
2004 DESIGN: 18" x 24" x 12"

SILstroke-3H

SafePlex Systems, Inc.
Protection, Solutions, Services, Integrity

No Single HDV Failure - Fault Tolerant - Fail Safe

Fault Tolerant?

What is fault tolerance? It is the ability to loss one component of an operating device and still have normal operations. For the SILstroke-3 product line, it is the ability to have one failed SOV or HDV and still have full control of the ESDV.

Fault tolerant design such as the twin 2004D within the SILstroke-3H prevents any one failure of an HDV from spuriously closing the ESDV, or one HDV failure from dangerously keeping the ESDV open during a process shutdown.

Hundreds of multi-million dollars processes such as FCCUs and PEs have hydraulically operated ESDVs that are depending on one (1) HDV per ESDV to keep the process running. It is not untypical for each of these processes to experience one spurious trip per year due to a HDV failure. One client identifies that each trip costs their corporation $500,000 in losses.

Fail Safe?

Fail safe in a fault tolerant design means having a very high probability of reaching the safe state when experiencing component failures. In the case of the SILstroke-3H, the fail safe scenario does not occur until after the 1st failure. Then the fail safe question has to be asked in reference to each possible 2nd failure scenario. To completely understand the benefits of the SILstroke-3H design as it relates to 2nd failure scenarios requires an intimate knowledge of the fluid paths within the SILstroke-3H. The reason is: Many of the second HDV failures will

SILstroke-3H

2oo4 Fault Tolerant HCVs

2oo4 Fault Tolerant HCVs

ESDV

A
B

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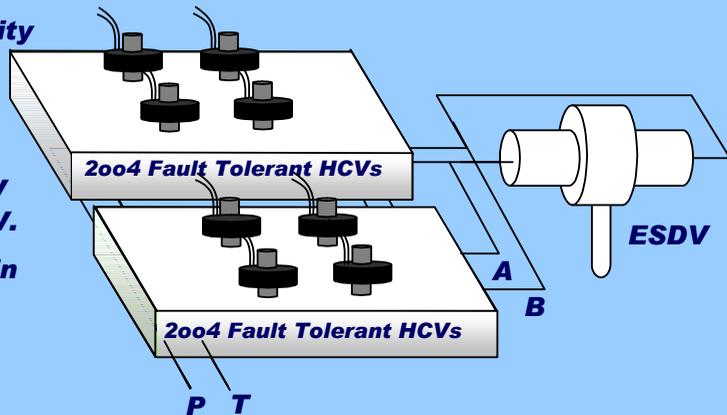
have no impact on the SILstroke-3H's performance. Please contact SafePlex Systems, Inc. when doing these 2nd failure scenario evaluations.

SIL 2 ESDV Operations?

Each ESDV is part of a safety loop called an SIF. Each SIF has a Safety Integrity Level (SIL) or performance target that it must satisfy. Most hydraulic ESDVs are in critical service, meaning most of them would have a SIL 2 rating. SIL 2 can best be explained by stating that out of 100 attempts to close the ESDV – it would operate correctly at least 99 times.

It is fair to say that it is impossible to obtain a SIL 2 rating on a single hydraulically operated ESDV with only one (1) HDV. It is also impossible to take two standard HDVs and create an arrangement (fail safe or fault tolerant) that will achieve a SIL 2 rating for the ESDV. SILstroke-3H was designed to address this situation.

Below is the contact information for resolving your hydraulic ESDV problems.