ASCO®

Redundant Control System

Introducing the all NEW RCS Configurator

Safety Instrumented Systems
Process Reliability
Process Valve Diagnostics
The Redundant Control System (RCS) is the only pilot valve system that has no single point of failure that could result in an unwanted closure of the process valve. The Redundant Control System is fit for use in SIL 3 applications with a spurious trip rate that is lower than Tri-Modular Redundant logic solvers. RCS achieves a higher level of process safety and reliability by using a redundant, fault tolerant architecture, high diagnostic coverage, and automated testing. A keyed bypass allows on-line maintenance of the RCS without process interruption. The RCS is available in a variety of constructions that provide valve diagnostics through automated, partial stroke testing.

The availability and reliability of RCS provides the most cost effective choice for process valve diagnostics and actuation.

ADVANTAGES

NO NUISANCE TRIPS

EASY ON-LINE MAINTENANCE

HIGH AVAILABILITY

AUTOMATED SOLENOID TESTING

KNOWN TECHNOLOGY

AUTOMATED PARTIAL STROKE TESTING

LOWEST COST OPTION FOR VALVE ACTUATION AND AUTOMATED TESTING
NORMAL OPEN VERSION

Operation: The normally open RCS operates like a standard normally open 3/2 solenoid operated valve.

Application: The majority of emergency vent valves are required to open in order to achieve the specified safe state for the process under control (i.e. vent off pressure). In order to prevent opening of the process valve due to loss of instrument air, the user may choose to specify the process valve as air to open spring return closed. To move the process valve to the safe state requires the solenoid valves to apply air to the process valve actuator when they are de-energized. This configuration also fulfills the requirement that the process valve will move to the specified safe state on loss of power.

NORMAL CLOSED VERSION

Operation: The normally closed RCS operates like a standard normally closed 3/2 solenoid operated valve.

Application: The majority of emergency shut down valves are required to close in order to achieve the specified safe state for the process under control (i.e. shut off flow) and they are specified “fail safe” (spring to the safe state) which requires that the solenoid operated valves vent the process valve actuator allowing the process valve to move to a specified safe state on loss of power.

DOUBLE ACTING VERSION (Available in 2oo2D operation.)

Operation: The double acting RCS operates like a 4/2 valve controlling air pressure to opposite sides of a piston type actuator.

Application: The user must determine the desired position (open or closed) for the process valve on loss of power (i.e. fail close/fail open). If the desired “fail” state for the valve is open, the normally open solenoid valve of the double acting RCS will control the air to the side of the process valve actuating cylinder that will drive the process valve shut and the normally closed solenoid operated valve of the double acting RCS will control the air to the side of the process valve actuating cylinder that will vent and allow the process valve to shut.
OPERATIONAL MODES

2oo2D MODE
In the 2oo2D mode, both solenoids must de-energize for shutdown. Pressure switches are used to individually alarm if either solenoid valve goes to the vent state when not commanded, thereby reducing the potential for spurious trips. The pressure switches are also used for signaling during automatic, on-line testing.

1oo1HS MODE
In the 1oo1HS mode, only one solenoid valve is on-line during normal operation. Any spurious trip of the on-line solenoid valve is detected by the logic solver, due to a signal being sent from an associated pressure switch. The response to the trip is to energize the second solenoid valve thereby maintaining air supply to the block valve. For functional testing, both solenoid valves are energized. Each solenoid valve is de-energized individually with pressure switch confirmation of successful venting. No bypassing is required for functional testing. With this configuration, RCS achieves the safety availability of a single solenoid valve, the reliability of a two-out-of-two voted solenoid operated valve configuration and is SIL 3 capable.

OPTIONAL FEATURES
ASCO offers many standard optional features. These features are available individually as well as in many different combinations. Special constructions containing customer specified features are also available. Please contact your ASCO representative for availability.

Some optional features automatically come with lights and/or push buttons located in pre-assigned locations for local initiation and local indication. They are as follows:

- Common alarm includes (1) green light
- Local initiation of SOV test includes (1) push button and (2) red lights
- Local initiation of partial stroke test includes (1) push button and (1) red light
- Local manual reset includes (1) red lighted push button
- Local initiation of bypass includes (1) red light

Customer Selected Lights and Push Buttons
Space for up to (4) additional customer selected lights and/or push buttons is available. The location of these lights and push buttons can be identified by placing your computer cursor on an option. This will result in this option being displayed on the cabinet view.
PRODUCT SPECIFICATIONS

GENERAL SPECIFICATIONS
Total weight: Approx. 75 lbs
Air Quality: Dry instrument air, filtered to 50 microns
Ambient Temperatures:
RCS-5R -9°F to 140°F (-23°C to 60°C)
RCS-5L 32°F to 131°F (0°C to 55°C)
RCS-5L (for extended temperatures) -13°F to 158°F (-25°C to 70°C)
Wiring: Maximum wiring size 14 awg
 Cv: 2.0 Typical for NC
Assembly Approvals: (without on-board diagnostic processor)
ATEX EEx de IIC T6 @ 60°C

ENCLOSURE
304 or 316 Stainless Steel, Fiberglass - UL Type 4, 4X, IP56

SOLENOID VALVE
Solenoid Operators: 1.4 watt (24 DC), 10.1 watt (120/60), UL listed
Class I, Division 2, Groups A,B,C, & D - Nonincendive,
Continuous duty (CSA certified) - 24 VDC

PRESSURE SWITCH (3 UNITS)
Stainless Steel Wetted Parts - FM, CSA, ATEX: EEx d IIc, CE
Electrical rating: Gold contacts (std) 1 amp suppressed resistive load; .5 amp inductive load @ 28 VDC
Silver contacts (opt) 5 amps suppressed resistive load; 3 amps inductive load @ 28 VDC

ON-BOARD DIAGNOSTIC PROCESSOR (RCS-L)
European Community (CE) Low Voltage Directive 73/23/EEC
EN 61131-2: Programmable controllers - Equipment requirements
UL 508 Listed (Industrial Control Equipment) Registration number E75310
CSA C22.2 Number 142 Certified (Process Control Equipment)
FM Class I, Division 2, Groups A,B,C, & D Hazardous Locations T4A and Class I, Zone 2 IIC, T4

SIL 3 CAPABLE
RCS in 1oo1HS and 2oo2D configurations is fit for use in SIL 3 applications per IEC 61508 for low demand mode applications. For more information, consult the RCS safety manual.

OPTIONS
Panel lights (Class I, Div. 2), and push button (Class I, Div. 2) up to a total of 12 lights and push buttons.

PNEUMATIC CONNECTIONS
Recommended piping for the inlet and outlet pneumatic connections to the RCS is 1/2” stainless steel tubing. The length of tubing between the RCS and the process valve should be kept as short as possible for the fastest response of the process valve actuator.

<table>
<thead>
<tr>
<th>Normally Closed / Normally Open</th>
<th>Double Acting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet: 1/2” NPT, 3-150 psi max.</td>
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</tr>
<tr>
<td>Pilot: 1/8” NPT, 40-150 psi max</td>
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</tr>
<tr>
<td>Process: 1/2” NPT</td>
<td>Process: (2) 1/2” NPT</td>
</tr>
<tr>
<td>Exhaust: 1/2” NPT</td>
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OPERATIONAL RELATIONSHIP OF THE RCS TO THE PROCESS VALVE

<table>
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<tr>
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<tbody>
<tr>
<td>Coils Energized (Normal)</td>
<td>Supplies air to PV</td>
<td>Exhaust PV</td>
<td>Supplies air to (C2), Exhaust (C1)</td>
</tr>
<tr>
<td>Coils De-energized (Trip)</td>
<td>Exhaust PV</td>
<td>Supplies air to PV</td>
<td>Exhaust (C2), Supplies air to (C1)</td>
</tr>
<tr>
<td>Bypass</td>
<td>Supplies air to PV</td>
<td>Exhaust PV</td>
<td>Supplies air to (C2), Exhaust (C1)</td>
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ASCO simplified the RCS product selection process with an online catalog number configurator. Once you have determined the features required, you can easily construct a catalog number by clicking on each feature required and then clicking the View Details button. A second screen appears providing the product catalog number, product attributes, and various drawings. The configurator is programmed to accept only valid constructions.

In addition to creating a catalog number, the configurator can also decipher a catalog number. Type a valid 5RC or 5LC catalog number into the window next to the Enter Catalog Number button (CAPs only). The configurator automatically highlights the appropriate construction features.

In order to use the online configurator go to: www.ascovalve.com/RCSCConfigurator