

## ASCO™ Redundant Control System (RCS)

Providing process reliability and valve diagnostics, for safety instrumented applications up to SIL 3.



BCAE

青岛秉诚自动化设备有限公司 地址:中国·青岛市重庆南路99号海尔云街甲3号楼7F 服务热线:4006-918-365 网址:http://www.ivalve.cc

# Offering Complete Functional Safety With Enhanced Reliability



The Redundant Control System (RCS) is a 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 and greatly reduces spurious trip rates. 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, on-line testing.

# The availability and reliability of RCS provides the industry's best choice for process valve diagnostics and actuation. Advantages include:

- No nuisance trips
- Easy on-line maintenance
- High availability
- Automated solenoid testing
- Known technology
- Automated partial stroke testing
- Industry's best choice for valve actuation & automated testing

BCAE Automation Solutions

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The ASCO RCS is a pilot valve system with no single point of failure that can result in unwanted closure of the process valve.

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## **RCS Solenoid Architectures**

### 2002D (with Diagnostics)

2002 architecture w/diagnostics allows for increased operational reliability and functional safety

#### Comprised of:

- Two solenoid valves mounted in 2002 configuration inside a Fiberglass, 304 or 316 stainless steel enclosure
- Comes standard with three pressure switches for diagnostic feedback/ online testing
- Optional GO™ Switches available
- Standard pneumatic maintenance bypass switch for online maintenance
- Online diagnostic testing (SOV and PST) capable
- · Easy online maintenance
- Two operational modes available based on customer driven logic either 1001HS or 2002D
- Available in Normally Closed, Normally Open, or Double Acting construction

#### 2003 Basic

2003 architecture allows for increased operational reliability and functional safety

#### Comprised of:

- Three solenoid valves mounted in 2003 configuration inside a 304 or 316 stainless steel enclosure
- No Diagnostic feedback
- · No pneumatic maintenance bypass for online maintenance
- Available in Normally Closed construction only

#### 2003D (with Diagnostics)

• 2003 architecture w/ diagnostics allows for increased operational reliability and functional safety

#### Comprised of:

- Three solenoid valves mounted in 2003 configuration inside a 316 stainless steel enclosure
- Comes standard with four GO Switches for diagnostic feedback and online testing
- Standard pneumatic maintenance bypass switch for online maintenance
- Online diagnostic testing (SOV and PST) capable
- · Easy online maintenance
- Available in Normally Closed construction only

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## **Configuration**

## **Normally Closed**

- The Normally Closed RCS operates like a standard 3-Way Normally Closed solenoid operated valve
- Used for single acting actuators
- Available for 2002D, 2003 Basic and 2003D architectures

### **Normally Open**

- The Normally Open RCS operates like a standard 3-Way Normally Open solenoid operated valve
- Used for single acting actuators
- Available for 2002D architecture only

### **Double Acting**

- The Double Acting RCS operates similarly to a 4-Way solenoid operated valve
- One solenoid valve operates as a 3/2 NC valve controlling air to one side of the actuator. The second solenoid valve operates as a 3/2 NO valve controlling air to the other side of the actuator.
- Used for double acting actuators
- User must determine desired fail-safe position of the process valve (Open or Closed)
- · Available for 2002D architecture only

**Note:** The Double Acting RCS has operational conditions where:

- A) both outlet ports (C1 &C2) are open to exhaust, allowing both sides of the actuator to vent
- B) both outlet ports (C1 &C2) supply pressure to both sides of the actuator

If the process valve can change position under either condition, the standard Double Acting RCS should not be used. Please contact us for more information on this type of application.

## **Optional Features**

#### Emerson offers many standard optional features including:

- Door mounted local interface with indicator lights and/or push buttons
- Panel mounted versions (2003 Basic only)
- 316SS valve bodies and manifold (2002D only)

Special constructions containing customer specified features may also be available – please contact your Emerson representative for more detail.

## **RCS Configurator**

We have 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 catalog number into the window next to the Enter Catalog Number button (CAPs only). The configurator automatically highlights the appropriate construction features.

**Click Here** to use the online RCS configurator.





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## **General Specifications**

• Total weight: 2002D - 75 lbs (standard unit) 2002D - 120 lbs (unit w/stainless steel internals)

2003 Basic - 65 lbs 2003D - 106 lbs

• Media: Dry instrument air

• Filtration Requirement: Dry instrument air, filtered to 40 microns maximum (5 micron particulate and .3 micron coalescing filtration recommended)

• Ambient Temperatures: -40°F to 140°F (-40°C to 60°C)

• Wiring: Maximum wiring size 14 awg

- CV: 2.0 for 2002D, 3.0 for 2003 Basic, 2.3 for 2003 Premium (Process to Exhaust Cv typical for Normally Closed constructions)
- Assembly Approvals: ATEX Ex d e mb IIC Gb

#### **Enclosure**

304 or 316 Stainless Steel, Fiberglass Type 4, 4X, IP56

## Solenoid Valve (2 or 3 Units)

- Body Material: Die-cast Aluminum (Standard); 316 Stainless Steel (optional)
- Solenoid Operators: 1.4 watt (DC), 1.8 watt (DC for 316SS construction only), 10.1 watt (AC), UL listed, CSA certified Class I, Division 2, Groups A,B,C, & D Nonincendive (DC only)
   Class I, Division 1, Groups A,B,C, & D Explosion-proof AC & DC
   CE (Emc Directive 2014/30/Eu)

#### **Pressure Switch**

- Housing Material: Aluminum (Standard); 316 Stainless Steel (optional)
- Wetted Parts: Stainless Steel
- Electrical Rating: Gold contacts (standard) 1 amp suppressed resistive load; .5 amp inductive load @ 28 VDC Silver contacts (optional) 5 amps suppressed resistive load; 3 amps inductive load @ 28 VDC
- Area classification: UL and CSA Class I, Div 2, Groups A,B,C & D; FM, CSA, ATEX: Ex d IIC, CE (PED directive 2014/68/EU)

## Proximity Switches (GO™ Switch)

- Housing Material and Wetted Parts: 316 Stainless Steel
- Switch Type: SPDT switches, hermetically sealed
- Switch Contact Rating: Silver contacts
- Resistive load: 4 Amps @ 120 VAC 3 Amps @ 24 VDC 2 Amps @ 240 VAC 1.25 Amps @ 12 VDC
- Area classification: CSA Class I, Div 2 Groups A, B, C & D; Class II, Div 2 Groups E, F & G; Class III

## SIL 3 Capable

RCS in 1001HS, 2002D and 2003 configurations are fit for use in SIL 3 applications per IEC 61508:2010 for low demand mode applications. Third party certified by Exida. For more information, consult the RCS safety manual.

#### **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.

Normally Closed / Normally Open

Inlet: 1/2" NPT, 3-150 psi max. ①
Pilot: 1/8" NPT, 40-150 psi max

Process: 1/2" NPT Exhaust: 1/2" NPT **Double Acting** 

Inlet: 1/2" NPT, 3-150 psi max. ① Pilot: 1/8" NPT, 40-150 psi max.

Process: (2) 1/2" NPT Exhaust: 1/2" NPT

① GO Switch option is 0-150 psi max.

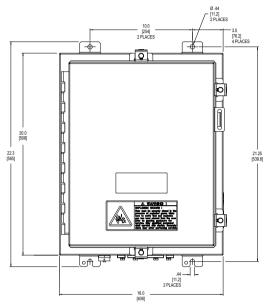
## Operational relationship of the RCS to the process valve

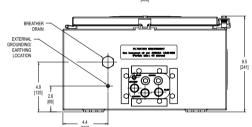
	Normally Closed	Normally Open	Double Acting
De-energize to Trip			
Coils Energized (Normal)	Supplies air to Process Valve	Exhaust Process Valve	Supplies air to (C2), Exhaust (C1)
Coils De-energized (Trip)	Exhaust Process Valve	Supplies air to Process Valve	Exhaust (C2), Supplies air to (C1)
Bypass	Supplies air to Process Valve	Exhaust Process Valve	Supplies air to (C2), Exhaust (C1)
Energize to Trip			
Coils De-energized (Normal)	Supplies air to Process Valve	Exhaust Process Valve	Supplies air to (C2), Exhaust (C1)
Coils Energized (Trip)	Exhaust Process Valve	Supplies air to Process Valve	Exhaust (C2), Supplies air to (C1)
Bypass	Supplies air to Process Valve	Exhaust Process Valve	Supplies air to (C2), Exhaust (C1)



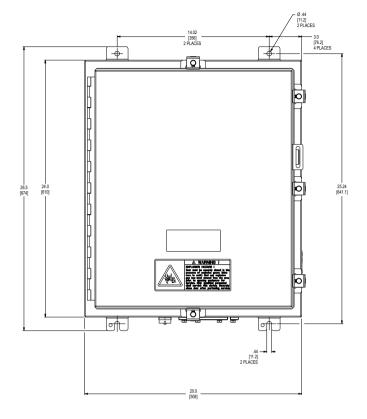
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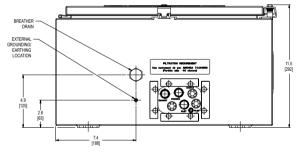
## 2002D and 2003 Basic Configuration





## 2003D Configuration





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