Bear SSR3 MK2

Solid-State Actuator Controller

The Bear SSR3 is a solid state ¼ turn actuator controller that is designed to used with Bear Actuators. Capable of driving 12 or 24 volts DC motors at 15 amps continuous with position feedback, it optimizes interfacing and control for your RTU.
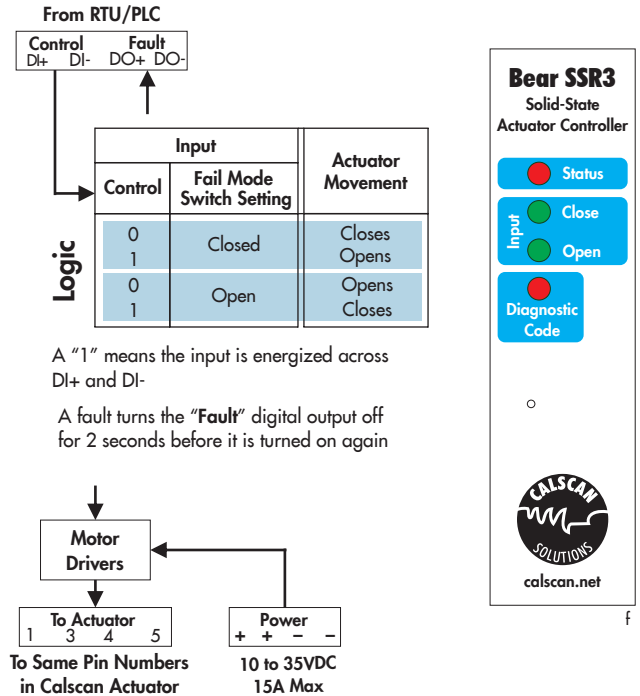
Features:
- Class I Div2 Certified
- Up to 15 Amps continuous drive capability
- Switchable to be Fail Open or Close
- Actuator Fault feedback
- Designed to work with the Bear FSC and UPS to provide true power fail safe operation
- Optional Close current limit for linear applications
- Low quiescent current for solar powered operation
- Wide 10 to 35 VDC Operating Range
- Positive or negative logic inputs and outputs
- Mounts on a 35mm DIN-rail

Typical Applications
- Separator Dump Valve control
- Pipeline

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Input		Actuator Movement
Control	Fail Mode Switch Setting	
0	Closed	Closes
1		Opens
0	Open	Opens
1		Closes

A "1" means the input is energized across DI+ and DI-

A fault turns the "**Fault**" digital output off for 2 seconds before it is turned on again

From RTU/PLC
Control DI+ DI-   Fault DO+ DO-

Logic

Motor Drivers

To Actuator
1 3 4 5
To Same Pin Numbers in Calscan Actuator

Power
+ + − −
10 to 35VDC
15A Max

Function Diagram

Bear SSR3
Solid-State Actuator Controller
- Status
- Input
  - Close
  - Open
- Diagnostic Code

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Pin Function Description

Power Pins

Actuator 1,3,4,5
Connect these pins to the same numbers inside the Bear Actuator. They provide power for the motor as well as feedback to the SSR3.

Power (+ & -)
This is 12 to 24 AWG power supply connection. Each pin can handle up to the full 15amps. Two connections are provided for both the positive and negative pins. This can be used to reduce the wire resistance in the cases where there is excessive voltage drop from a long wire run.

⚠ **Reverse voltage connection on the Power terminals without installing a external fuse will permanently damage the Bear SSR3**

Control Pins

Control DI+ and DI-
A non-energized connection will move the actuator to the failsafe position as set on the internal DIP switch.

A energized connection will move the actuator to the non failsafe position.

SSR3 Control Input

DI+

10 to 35 VDC

$10k\Omega$

DI-

Galvanically Isolated
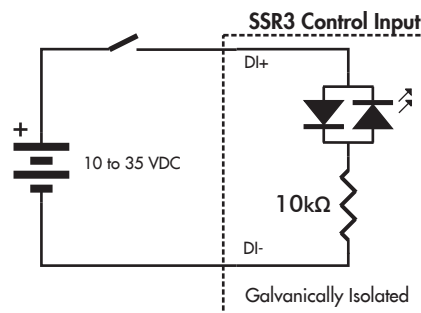
The Bear SSR3 uses galvanically isolated bidirectional optocouplers to facilitate interfacing to a separator control system.

Fault Pins

Fault DO+ and DO-
These two pins provide a feedback connection to the RTU/PLC when the valve is faulted open or closed. When there is a fault the DO+ and DO- will become turned off for 2 seconds and then back on.

The DO circuitry is optically coupled to isolate the output signal from the rest of the SSR3 circuitry. The discrete output channel is a normally-open, bidirectional solid state switch. It is protected with a automatic reset fuse with a maximum current of 50mA.

SSR3 Output

Galvanically Isolated
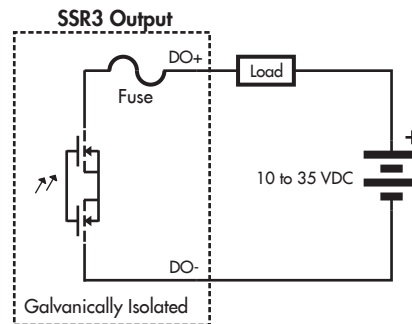
Configuration Dip Switches

Inside the SSR3 case is a Dip Switch that is configured at the factory to match selected electric actuator and valve type.

Pin 1: Fail Closed (**C**) or Fail Open (**O**)
Pin 2: Linear (**L**) or Ball (**B**) Valve
Pin 3: Dump (**D**) or Throttling (**T**) valve with 2-Wire Control fail in-position
Pin 4: Reserved set to Off

Nominal Ratings

Recommended Operating Conditions		Min	Max	Unit
DC Supply Voltage		10	35	V
Operating and Storage Temperature		-40	50	°C

Module		Min	Max	Unit
Motor Drive Current			15	A
Quicent Current	Supply = 12 V Supply = 24 V		12 8	mA

Output Signal	Min	Max	Unit
Voltage Range	0	35	V
Sinking or Sourcing Current	0	50	mA

Input Signal		Min	Max	Unit
Voltage Range Energized		10	35	V
Voltage Range Off		-0.5	0.5	V
Input Drive Current	Supply = 12 V Supply = 24 V	1 2	2 3	mA mA

Mechanical
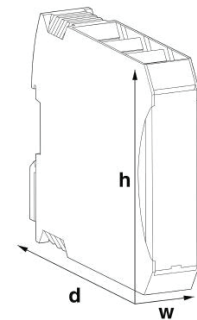
22mm wide x 99mm high x 115mm deep
35mm DIN-rail Connection
Wire Size 12 to 24 AWG and 90°C Minimum

Maintenance and Service

No serviceable parts inside the module or any module within the Bear Fail Safe System. Consult Calscan

Decoding Led's Indicators

Status

Solid Red: Operating correctly.
Off: The SSR3 is currently in fault, which one is indicted by the blinking Diagnostic Code LED

Input — **Close** / **Open**

Blinking Green: Actuator is moving to the Open or Close position
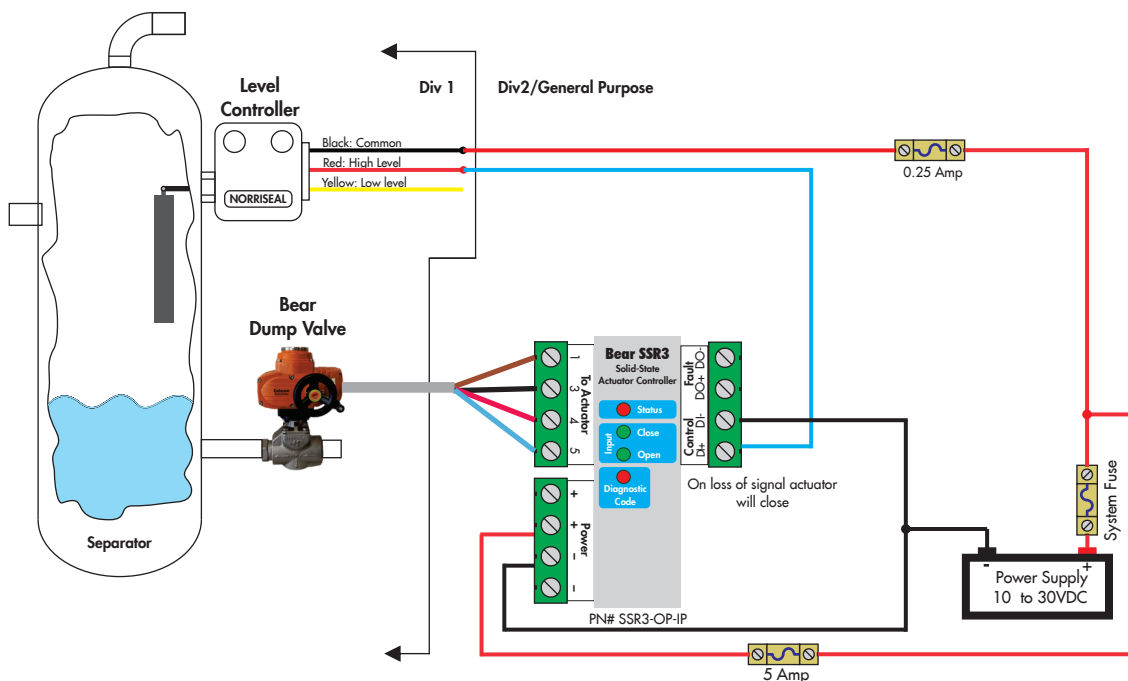Solid Green: Actuator is at the Open or Close position

Diagnostic Code

Blink		Description
Long	Short	
1	1	Close Timeout, exceeds 30sec
1	2	Close Stall, current trips before limit reached
1	3	Tight-Shutoff Timeout, exceeds 3sec after close limit reached
2	1	Open Timeout, exceeds 30sec
2	2	Open Stall, current trip

If Status indicator is Solid Red, the Diagnostic code is the last fault. If Status indicator off, the code is the current fault
It takes 2 successful actuator open/close cycles for the fault to clear

Wiring Example 1

Bear SSR3 Interfaced Directly To Norriseal Level Controller

Level Controller

Div 1   Div2/General Purpose

Black: Common
Red: High Level
Yellow: Low level

NORRISEAL

0.25 Amp

Bear Dump Valve

Bear SSR3 Solid-State Actuator Controller

To Actuator — 1 2 3 4 5

Fault DO+ DO-
Control D+ D-

Status
Close
Open
Diagnostic Code

On loss of signal actuator will close

Power + + - -

Separator

System Fuse

Power Supply 10 to 30VDC

PN# SSR3-OP-IP

5 Amp

Bear SSR3 Interfaced Directly To Ficher L2E Level Controller

Div 1 | Div2/General Purpose

White/Red: DC Supply
White/Black: Ground
Brown: Common
Blue: Low Level
Red: High Level

L2e Level Controller

Separator

Bear Dump Valve

Bear SSR3 Solid-State Actuator Controller

To Actuator 1 2 3 4 5

Status
Close
Open

Diagnostic Code

Fault DO+ DO-
Control DI+ DI-

On loss of signal actuator will close

Power + + - -

PN# SSR3-OP-IP

0.25 Amp

System Fuse

Power Supply 10 to 30VDC

5 Amp

Terminal Block Placement

Power + + - -
To Actuator 1 2 3 4 5
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CALSCAN SOLUTIONS
Diagnostic Code
Input Open Close
Status
Bear SSR3 Solid-State Actuator Controller
Fault DO+ DO-
Control DI+ DI-
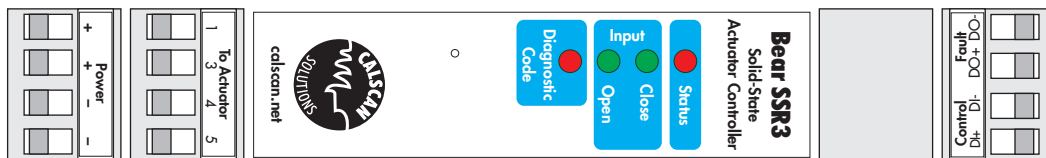
Certification

Class I, Division 2 , Groups C&D T3C
Class I Zone 2 Group IIB T3C
Ambient Temperature: -40°C ≤ Ta ≤ 50°C

Certified to CAN/CSA Std. C22.2 No. 213, 61010-1 and 61010-2-201
Conforms to UL Std. 121201, 61010-1 and 61010-2-201
This module shall be installed and DIN railed inside an approved outdoor rated enclosure

C **ETL** US
LISTED

Intertek
5019396

Ordering Information

SSR3 –

CLOSE CURRENT LIMIT
- "XX"
00 = None
xx = Current in Deciamps
Factory Set Option

All specifications subject to change without notice   rev 1v10