SERIES 6A

ELECTROPNEUMATIC POSITIONER

QUICK START GUIDE

This document is not comprehensive, and is intended to help first time users become familiar with the Bray S6A Electropneumatic Positioner. For more detailed information the Installation, Operation and Maintenance Manual is available on the Bray website.

CONTENTS

READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.
FOR THE LATEST IOM VERSION, VISIT BRAY.COM

1.0 DEFINITION OF TERMS

All information within this manual is relevant to the safe operation and proper care of your Bray valve. Please understand the following examples of information used throughout this manual.

Specific instructions for non-standard materials of construction, temperature range, etc. should be referred to the factory.

1.1 Safety Statements

To prevent unwanted consequences, standard symbols and classifications are used as shown below:

DANGER
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
Used without the safety alert symbol, indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

NOTE: Provides important information related to a procedure.

2.0 MOUNTING AND SETUP

2.1 Place the mounting bracket on the underside of the positioner. Tighten the mounting bolts and lock washers.

2.2 Position the output shaft of the positioner so that the flat (1) portion is facing upwards.

2.3 Insert the coupler over the output shaft. Ensure proper alignment of the coupler's set screw with the flat side of the shaft before tightening the set screw.

Tighten the coupler set screw with a 2.5mm Allen wrench.

2.4 Position the yellow indicator on the base of the coupler.

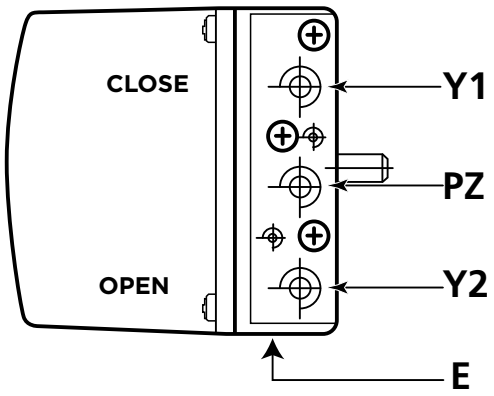
2.5 Position the positioner on the actuator and tighten the mounting screws.

Ensure that the 6A Positioner label and S92/93 Actuator label are on the same side.

2.6 Insert the pneumatic fittings on the positioner and actuator before inserting tubing into the outputs of the positioner to the inputs of the actuator.

Connection using female thread G1/4 DIN 45141 or 1/4" NPT:

- > PZ: supply air 20 psi to 101.5 psig (1.4 to 7 bar)
- > Y1: actuating pressure for single and double-acting actuators
- > Y2: actuating pressure for double-acting actuators
- > E: exhaust air outlet; remove the attenuator if required



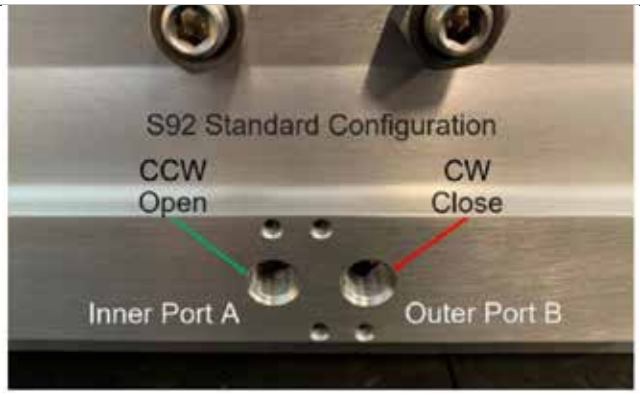
Notes:
For **double-acting S92**, follow the instructions in **Section 1.6.1** and reference the **S92/93 IOM**. For **spring-return S93**, follow the instructions in **Section 1.6.2** and reference the **S92/93 IOM**.

For **double-acting S98**, follow the instructions in **Section 1.6.3** and reference the **S98 IOM**. For **spring-return S98**, follow the instructions in **Section 1.6.4** and reference the **S98 IOM**.

2.6.1 S92 Double Acting Actuators

For double-acting actuators, connect actuating pressures Y1 or Y2 depending on the desired safety position. The three pneumatic connections will go to the following safety position in case of electrical auxiliary power supply failure:

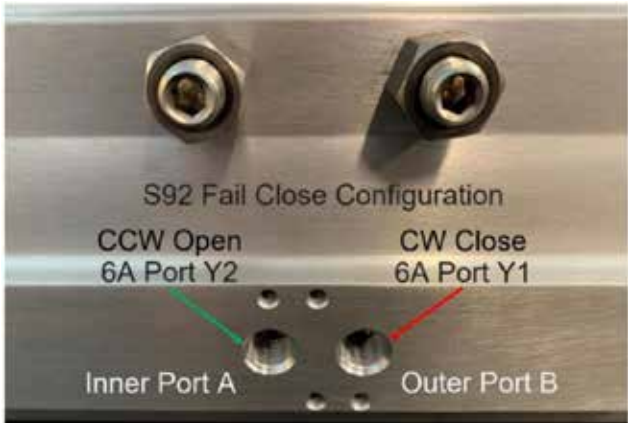
> Y1: single-acting, depressurized
> Y1: double-acting, max. actuating pressure/ supply air pressure.
> Y2 : double-acting, depressurized

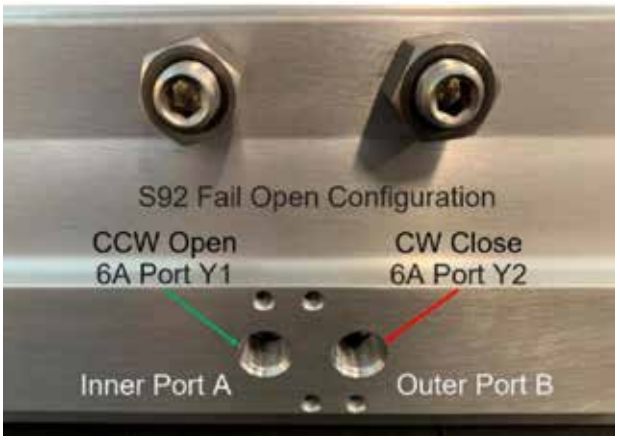


In the S92 standard configuration double-acting actuator, pressure introduced through port A (the left port when facing the ports) forces the pistons away from each other and causes the pinion to rotate in a counterclockwise direction.

Pressure introduced through port B (right port when facing the ports) is directed through an internal passage to the opposite side of the pistons, which forces the pistons together and rotates the pinion in a clockwise direction.

Normally, the clockwise rotation (pistons moving together) closes the attached valve, and the counterclockwise rotation (pistons moving apart) opens the attached valve.





Insert the pneumatic fittings on the positioner Y1 port, Y2 port and actuator before inserting tubing between the positioner and actuator.

To setup Fail - Close (N/C) operation on standard/ fail-safe positioner, professionally fabricate and connect positioner port Y1 to actuator Close port B and positioner port Y2 to actuator Open port A. This will result in Fail Close when supply air pressure is present and electrical signal is removed. For electronic Fail-Open (N/O) applications reverse 6A ports Y1 and Y2.

2.6.2 S93 Spring Return Actuator

S93 actuator's outer port B must not be connected to the 6A positioner because the outer air chamber is powered by the S93's springs. Outer port B must be connected to a breather filter.

Only the inner port A will be connected to the 6A positioner at port Y1. The piston rack to pinion orientation determines the spring fail position, see S92/S93 IOM for details.

Insert the pneumatic fittings on the positioner port Y1 and actuator inner port A before inserting tubing between these two pneumatic fittings.

Professionally fabricate and connect air line between the positioner and actuator. The tubing must not contact the actuator as this may lead to tube wear/leakage in a vibrating application.

Install breather filter on actuator outer port B, to prevent actuator damage from material ingress.

2.6.3 S98 Scotch Yoke Double Acting Actuator

In the S98 double-acting actuator, pressure induced through Port B (the right port when facing the ports) forces the piston in the pressure module away from the torque module, thus sliding the yoke to the left. Pressure introduced through Port A (left port when facing the ports) forces the piston towards the torque module, thus sliding the yoke to the right. The yoke sliding to the left opens the attached valve, and the yoke sliding to the right closes the attached valve.

Insert the pneumatic fittings on the positioner Y1 port, Y2 port and actuator before inserting tubing between the positioner and actuator.

Refer to the table below to determine the proper tubing connections between the positioner and actuator ports for standard configuration

Fail-Safe Condition	**Positioner Y1 port**	**Positioner Y2 port**
Fail Closed	Connect to actuator Port A	Connect to actuator Port B
Fail Open	Connect to actuator Port B	Connect to actuator Port A

Note: The above table is for the case of an electrical failure. Under pneumatic failure, the actuator will fail in place

2.6.4 S98 Scotch Yoke Spring Return Actuator

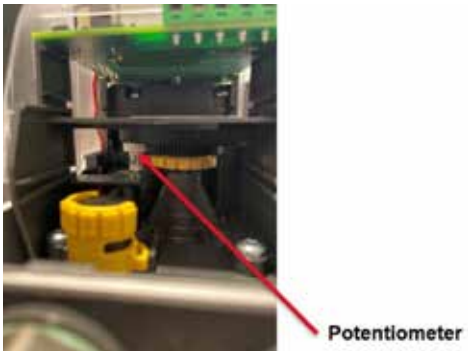
In the S98 spring-return actuator, pressure induced through Port B (the port closer to the torque module) forces the piston in the pressure module away from the torque module, thus sliding the yoke in the same direction. The port that is located further away from the torque module will be plugged. The yoke sliding to the left opens the attached valve, and the yoke sliding to the right closes the attached valve.

Note: To convert Spring Return S98 from fail-closed to fail-open, reference the S98 IOM.

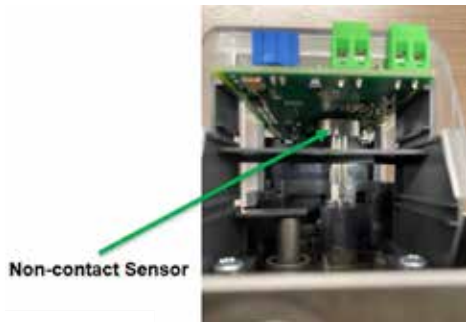
Insert the pneumatic fittings on the positioner Y1 port and actuator port B before inserting tubing between the positioner and actuator.

3.0 CALIBRATION

Follow Section 3.1 for positioner with potentiometer.



Follow Section 3.2 for positioner with non-contact sensor.



3.1 Calibration of Positioner with Potentiometer

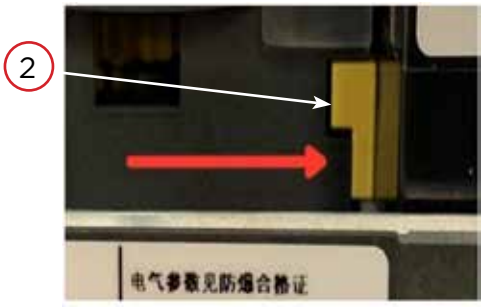
3.1.1 Remove the positioner cover by loosening the four Phillips screws.

3.1.2 Set the air supply pressure regulator to 90 +/- 5 psi and apply air pressure to the PZ port.

NOTE; If the actuator sizing pressure is lower, please regulate to the sizing pressure instead.

NOTICE
The maximum supply pressure must not exceed 101.5 psig (7 bar); exceeding this limit will cause failure of the pneumatic block.

3.1.3 Position the yellow Transmission Ratio Selector tab (2) in the 90° position by pushing it away from the labeled side of the device.



3.1.4 Adjust the yellow clutch wheel (3) on the underside of the terminals using a 4 mm wide screwdriver to the 90° position.

3.1.5 Power on the unit with a 4 to 20 mA signal.

Note: Make sure signal does not order turn-off during calibration process.

3.1.6 Press the Menu Button for >5 seconds to enter into Configuration mode.

3.1.7 Once in Configuration mode parameter is displayed in the bottom left hand corner of the positioner screen. Use the Up Button to scroll through the available options in ascending order and the Down Button to scroll through the available options in descending order. Press the Menu Button to scroll through the parameters in ascending order.

Note: To scroll through the parameters in descending order, hold down the Menu Button while using the Down Button .

3.1.8 Set the parameters listed below:

Parameter Number	Parameter Name	Desired Value	Significance
1	Type of Actuator	turn	Informing the positioner that it is installed on a part-turn actuator
2	Rotation Span	90°	Informing the positioner the angle of rotation of the shaft.
34	Deadband	Between 1-2 (%)	Increasing the deadband reduces unnecessary valve hunting
39	Tight Closing	uP do	This setting helps drive the valve to its end positions while minimizing wear on the valve, actuator, and positioner. “uP do” means the upper and lower limits are set (fully open and fully closed).
40	Tight Closing Down	5 (%)	Lower limit for tight closing; if the valve is at 5% travel or lower, the positioner drives the valve to the fully closed position
41	Tight Closing Up	Between 90-95 (%)	Upper limit for full open; if the valve is at 90-95% travel or higher, the positioner drives the valve to the fully open position.
52	Activating for Extended Diagnostics	On2	This setting allows users to activate the extended diagnostics functions; On2 indicates a two-stage message.

Refer to the table in Section 4.0 for the complete list and description of each parameter

3.1.9 Press the Menu Button to scroll to parameter 4.

Note: Parameter 3 is skipped for quarter-turn actuators.

3.1.10 Hold down the Up Button until calibration begins (>5 seconds), then release. The device will now progress through 5 “RUNS”, completing a series of checks. For more information on the calibration, please refer to the product manual.

Note: The calibration routine can take up to 15 minutes.

Note: Fail -Freeze models will have 6 “RUNS”

3.1.11 **Note:** If an error is displayed on your positioner during Run 2, the lower tolerance (down tolerance) of the adjustment wheel has been exceeded. (If no errors are displayed, skip ahead to step 3.1.12.)

3.1.11.1 Adjust the gray friction clutch adjustment wheel until the screen displays a “6” in the top right hand corner.
If the clutch wheel is difficult to turn, ensure that:

> The yellow locking wheel under the friction clutch adjustment wheel is not locked (rotate right)
> The friction clutch adjustment wheel is not near the end of travel at either the high or low end (If so, rotate in the opposite direction to allow enough rotation to complete a successful calibration).

3.1.11.2 Once the down tolerance error has been corrected, the middle character of the message line will change to an ‘O’.

Note: Before continuing with calibration, make sure the yellow locking wheel is securely tightened by inserting a 4mm flat-head screwdriver into the slot beneath the adjustment wheel and turning it to the left until you feel it click. This ensures the clutch wheel does not slip during actuation.

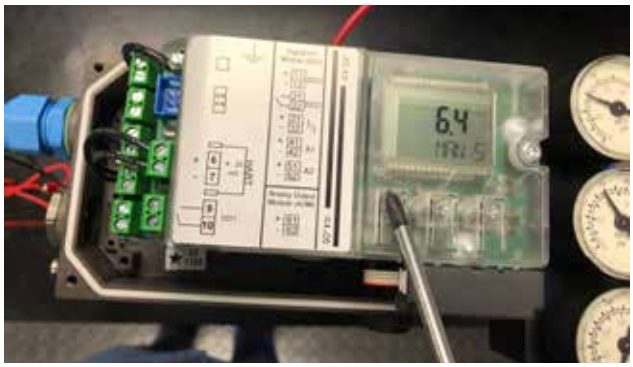
3.1.11.3 To continue calibration, press the Up Button ⚠ once and release.

3.1.12 Upon successful completion of calibration, the status line will display “FINISH”. Press the Menu Button ☜ once to exit.

3.1.13 Press the Menu Button ☜ for 5 seconds. The device will now be in ‘MANUAL’ mode.

3.1.14 Use the ▽ or ⚠ buttons to manually close or open the valve to ensure that the desired travel limits are being attained.

3.1.15 Toggle between Manual ("MAN") and 'AUTO' mode by pressing the Menu Button.



3.1.16 While in 'AUTO' mode, test the responsiveness of the device by varying the command signal from 4 mA to 20 mA.

3.2 Calibration of Positioner with Non-Contact Sensor

3.2.1 Power on the unit with a 4 to 20 mA signal.

Note: Make sure signal does not order turn-off during calibration process.

3.2.2 Press the Menu Button for >5 seconds to enter into Configuration mode.

3.2.3 Once in Configuration mode parameter is displayed in the bottom left hand corner of the positioner screen. Use the Up Button to scroll through the available options in ascending order and the Down Button to scroll through the available options in descending order. Press the Menu Button to scroll through the parameters in ascending order. To scroll through the parameters in descending order, hold down the Menu Button while using the Down Button .

3.2.4 Set the parameters listed below:

Parameter Number	Parameter Name	Desired Value	Significance
1	Type of Actuator	turn	Informing the positioner that it is installed on a part-turn actuator.
2	Rotation Span	90°	Informing the positioner the angle of rotation of the shaft.
34	Deadband	Between 1-2 (%)	Increasing the deadband reduces unnecessary valve hunting.
39	Tight Closing	uP do	This setting helps drive the valve to its end positions while minimizing wear on the valve, actuator, and positioner. “uP do” means the upper and lower limits are set (fully open and fully closed).
40	Tight Closing Down	5 (%)	Lower limit for tight closing; if the valve is at 5% travel or lower, the positioner drives the valve to the fully closed position.
41	Tight Closing Up	Between 90-95 (%)	Upper limit for full open; if the valve is at 90-95% travel or higher, the positioner drives the valve to the fully open position.
52	Activating for Extended Diagnostics	On2	This setting allows users to activate the extended diagnostics functions; On2 indicates a two-stage message.

Refer to the table in Section 4.0 for the complete list and description of each parameter.

3.2.5 Press the Menu Button to scroll to parameter 4.

Note: Parameter 3 is skipped for quarter-turn actuators.

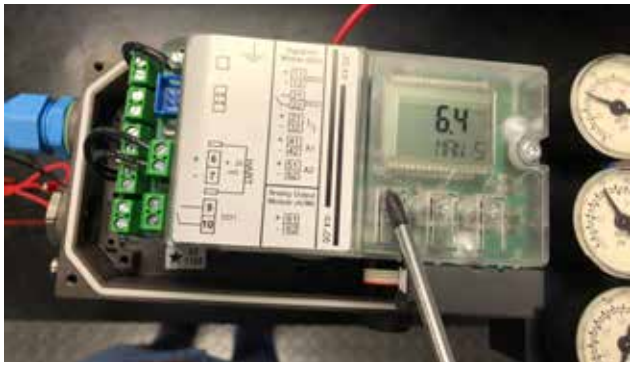
3.2.6 Hold down the Up Button until calibration begins (>5 seconds), then release. The device will now progress through 5 “RUNS”, completing a series of checks. For more information on the calibration, please refer to the product manual.

Note: The calibration routine can take up to 15 minutes.

Note: Fail -Freeze models will have 6 “RUNS”

3.2.7 Upon successful completion of calibration, the status line will display “FINISH”. Press the Menu Button once to exit.

3.2.8 Press the Menu Button for 5 seconds. The device will now be in ‘MANUAL’ mode.

3.2.9	Use the ▽ or △ buttons to manually close or open the valve to ensure that the desired travel limits are being attained.	
3.2.10	Toggle between Manual (“MAN”) and ‘AUTO’ mode by pressing the Menu Button ☜.	
3.2.11	While in ‘AUTO’ mode, test the responsiveness of the device by varying the command signal from 4 mA to 20 mA.	

4.0 PARAMETER TABLE

Parameter	Default Value	Change To	Description
1. YFCT	WAY	turn	Type of actuator
2. YAGL	33°	90°	Rated angle of rotation of feedback. Set transmission ratio selector (7) appropriately (see view of device)
3. YWAY	OFF		Stroke range (optional setting). If used, the value must correspond with the set of the leverage ratio on the actuator. Driver pin must be set to the value of the actuator travel or, if this value is not scaled, to the next larger scale value.
4. INITA	NOINI		Initialization (automatically)
5. INITM	NOINI		Initialization (manually)
6. SCUR	4 MA		Current range of setpoint (0..20mA) and (4..20mA)
7. SDIR	riSE		Setpoint direction
8. SPRA	0.0		Setpoint for start of split range
9. SPRE	100.0		Setpoint for end of split range
10. TSUP	Auto		Setpoint ramp up
11. TSDO	0		Setpoint ramp down
12. SFCT	Lin		Setpoint function; Linear, Equal-percentage 1:25, 1:33, 1:50, 1.:25, 1:33, 1:50, Freely adjustable
13. SL0	0.0 ... 100.0		Setpoint turning point at 0%
14. SL1	0.0 ... 100.0		Setpoint turning point at 5%
...	0.0 ... 100.0		...
32. SL19	0.0 ... 100.0		Setpoint turning point at 95%
33. SL20	0.0 ... 100.0		Setpoint turning point at 100%
34. DEBA	Auto	1 to 2	Deadband of controller. Increasing the deadband reduces unnecessary valve hunting
35. YA	0.0		Start of manipulated variable limiting
36. YE	100.0		End of manipulated variable limiting
37. YNRM	MPOS		Standardization of manipulated variable; To mechanical travel; To flow
38. YDIR	riSE		Direction of manipulated variable for display and feedback; Rising; Falling
39.YCLS	no	uP do	Tight closing with manipulated variable; Without; Top only; Bottom Only; Top and bottom. This setting is used to drive the valve to its end positions while reducing unnecessary wear on the valve, actuator and positioner
40. YCDO	0.5	5	Value for tight closing, bottom. Example: If the positioner is at 10% travel or lower, the actuator drives the valve to the fully closed position.
41. YCUP	99.5	90 to 95	Value for tight closing, top. Example: If the positioner is at 90% travel or higher, the actuator drives the valve to the fully open position.
42. BIN1	OFF		Function of BI 1; None; Only message; Block configuring; Block configuring and manual; Drive value to position YE; Drive valve to position YA; Block movement; Partial-Stroke-Test

Parameter	Default Value	Change To	Description
43. BIN2	OFF		Function of BI 2; None; Only message; Block configuring and manual; Drive valve to position YE; Drive valve to position YA; Block movement; Partial-Stroke-Test
44. AFCT	OFF		Alarm function; Without; A1-Min, A2=Max; A1-Min, A2=Min; A1=Max, A2=Max
45. A1	10.0		Response threshold of alarm 1
46. A2	90.0		Response threshold of alarm 2
47. FCT	normal/ inverted		on fault; Fault = not automatic; Fault + not automatic + BI; (“+” means logical OR operation)
48. TIM	Auto		Monitoring time for fault message “control deviation”
49. LIM	Auto		Response threshold for fault message “control deviation”
50. PRST	no		Preset (factory setting); “no” nothing activated; “Strt” start of factory setting after pressing key for 5s; “oCAY” display following successful factory setting CAUTION: preset results in “NO INI”
52. XDIAG	OFF	On2	Alarm for extended diagnostics; off; single-stage alarm; two-stage alarm; three-stage alarm. This setting allows users to activate the extended diagnostics functions and simultaneously the online diagnostics.

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