	Form Title: INSTALLATION AND MAINTENANCE MANUAL	Document #: MM-AD005 <small>(Form: DEF-006A-4)</small>
	Document Title: Emergency/Remote Shutdown Air Valves	Revision: 0
		Date: Oct. 26, 2023
		Page: 1 of 10


PART NUMBERS (Including, but not inclusive)

ES22PP-AABN






Table of Contents:

- 1.0 General
- 2.0 Parts List
- 3.0 Description and Intended Use
- 4.0 Installation
- 5.0 Inspection and Testing
- 6.0 Disassembly and Rebuild Instructions
- 7.0 Troubleshooting Guide


	Form Title:	Document #:
	INSTALLATION AND MAINTENANCE MANUAL	MM-AD005 <small>(Form: DEF-006A-4)</small>
		Revision:
	Document Title:	Date:
Emergency/Remote Shutdown Air Valves	Page:	2 of 10

1.0 General Maintenance Manual Guidelines

- 1.1 It is strongly recommended that this entire manual be read prior to any operation, disassembly, or assembly of this equipment.
- 1.2 Betts Industries, Inc. provides this manual as a guideline for reference only and assumes no responsibility for personal injury or property damage that may occur in conjunction with this manual. Betts Industries, Inc. cannot be held responsible for incorrect installation, operation or maintenance of this equipment. Use only genuine Betts replacement parts. Substitute parts will void all warranties and could impair the proper function making this equipment unsafe.
- 1.3 Betts Industries, Inc. recommends all equipment be placed on a regular maintenance schedule that includes the routine replacement of seals and gaskets and visual inspection for leaks and corrosion. The end user must make their own determination and set their own schedule based upon use and environment. In some cases, regulations may dictate the minimum testing frequency of items. Make sure operators are aware of all applicable codes.
- 1.4 Only trained and qualified personnel should perform maintenance on this equipment.
- 1.5 As with any maintenance work, proper safety gear must be utilized and approved procedures must be followed at all times. Examples of safety gear may include but are not limited to gloves, safety goggles, face shields, protective suits and respirators. It is the responsibility of the person/company working on this equipment to identify the hazardous products that the equipment has been exposed to and designate specific and appropriate protective gear and safety procedures.
- 1.6 Safety alert symbols are used to alert operator to potential personal injury hazards. These symbols are per ANSI Z535.5 and are listed below. Operator MUST obey all instructions that follow a safety symbol. Alerts will be used to indicate known safety concerns.

	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

A list of hazards may include but are not limited to fall hazards, pressure hazards, loaded springs, corrosive material, flammable product, pinch points. Additional concerns are possible and should be identified and avoided by the operator.

- 1.7 Product Warranty shall be void if equipment is subject to misapplication, misuse, neglect, alteration, or damage.
- 1.8 Specific design details described in this document are for reference only and are subject to change without notice. See Betts Industries, Inc. web page for the most recent revision to this document. www.bettsind.com
- 1.9  **WARNING:** This product can expose you to chemicals including Chromium (hexavalent compounds), which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to: www.P65Warnings.ca.gov
- 1.10 For additional questions or more detailed technical assistance, contact the Betts Industries, Inc. Customer Service, Sales or Engineering Department at (814) 723-1250.



Form Title:

INSTALLATION AND MAINTENANCE MANUAL

Document Title:

Emergency/Remote Shutdown Air Valves

Document #:

MM-AD005

(Form: DEF-006A-4)

Revision:

0

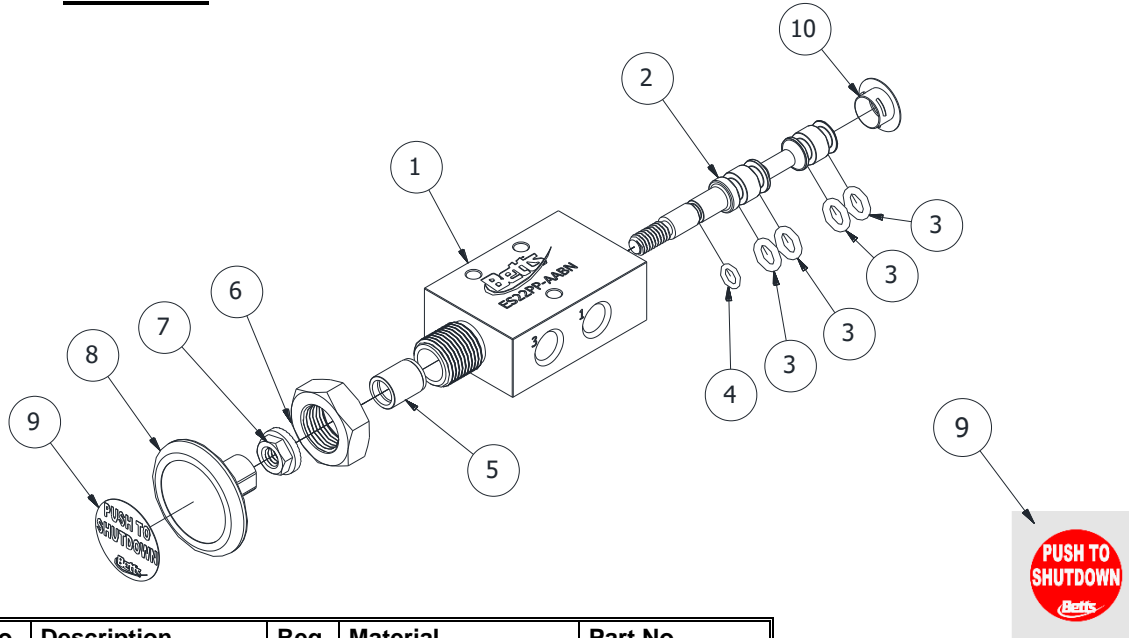
Date:

Oct. 26, 2023

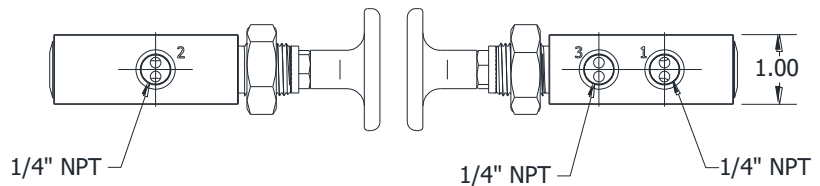
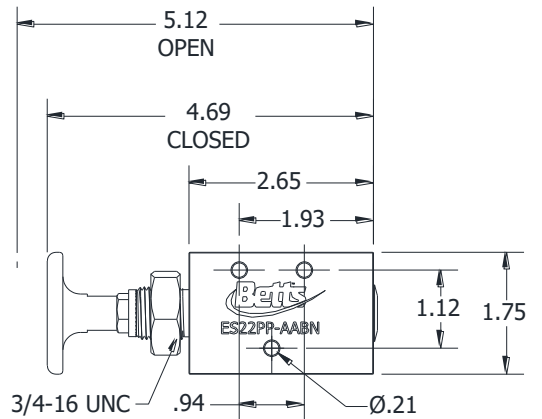
Page:


3 of 10

2.0 Parts List



No.	Description	Req.	Material	Part No.
1	Control Block	1	Anodized Aluminum	36260AA
2	Piston	1	Stainless Steel	29483SL
3	O-Ring	4	Nitrile (Buna-N)	19467BN
4	Detent O-Ring	1	Polyurethane	19507PY
5	Bushing	1	Brass	76299BR
6	Jam Nut 3/4-16	1	Stainless Steel	9Q9729
7	Flange Nut 5/16-18	1	Stainless Steel	9Q5859
8	Control Knob (Red)	1	Anodized Aluminum	76185AA-RED
9	Sticker - Shutdown	1	Vinyl	AD76276
10	End cap	1	LDPE	76327PE



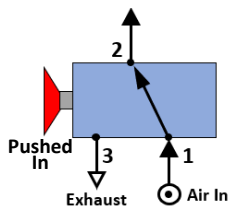
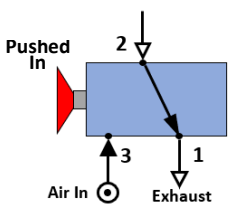
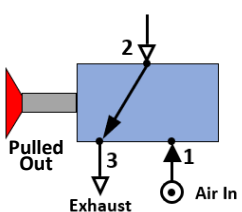
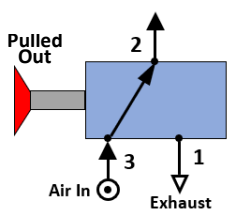
	Form Title: INSTALLATION AND MAINTENANCE MANUAL	Document #: MM-AD005 <small>(Form: DEF-006A-4)</small>
	Document Title: Emergency/Remote Shutdown Air Valves	Revision: 0
		Date: Oct. 26, 2023
		Page: 4 of 10

3.0 Description and Intended Use

The Betts' Emergency/Remote Shutdown Air Valve is a two position push/pull control valve. When plumbed and mounted correctly, it fulfills the requirements of a remotely actuated means of closure per US DOT 49CFR§178.345-11(b)(1)(i) and CSA B620-20 clause 5.6.12.3(b), (c), and (f). The Emergency/Remote Shutdown is mounted on the end of the cargo tank farthest away from the loading/unloading outlet with normal position of the valve in the pulled-out position and initiates shutdown function when the knob is pushed in. Please note, the Emergency/Remote Shutdown Valve does not provide provision for thermal activation. If required, fusible plugs should be installed in-line as needed.


The valve block is lightweight anodized aluminum. The valve includes a detent retention feature for positive click-in feel during operation. All ports are 1/4" NPT. The valve can be mounted via the through holes in the valve body or through a Ø.81" hole in a panel and secured with the 3/4" hex nut (included).

Simplified plumbing schematics are provided below for the two most common methods of operation. A detailed plumbing schematic is available upon request. Verify proper shutdown function once valve is installed and test monthly during active service.

Plumbing Option 1		Plumbing Option 2	
Emergency Shutdown provides positive air signal		Emergency Shutdown exhausts air system pressure	
<p>Knob pushed-in position: Positive air signal is sent from port 2 to compatible Air Panel or Master Control Valve which shuts down pneumatic valve system.</p>		<p>Knob pushed-in position: Port 2 exhausts air pressure from air-lines and shuts down pneumatic valve system.</p>	
<p>Knob pulled-out position: Port 2 exhausts air pressure from Air Panel or Master Control's reset ports and the cargo tank valve system is now operational.</p>		<p>Knob pulled-out position: Port 2 supplies air pressure to pneumatic valve system and the cargo tank valve system is now operational</p>	

4.0 Installation

- 4.1 Per US DOT 49CFR§178.345-11(b)(1)(i), the Emergency Shutdown Valve must be "located more than 10 feet from the loading/unloading outlet where vehicle length allows, or on the end of the cargo tank furthest away from the loading/unloading outlet."
- 4.2 Per §172.328(d) "each on-vehicle manually-activated remote shutoff device for closure of the internal self-closing stop valve must be identified by marking "Emergency Shutoff" in letters at least 0.75 inches in height, in a color that contrasts with its background, and located in an area immediately adjacent to the means of closure."
- 4.3 The valve can be mounted via the through holes in the valve body or through a Ø.81" hole in a panel and secured with the 3/4" hex nut (included). See figures 1 and 2.
- 4.4 The valve should be mounted with exhaust port facing down protected from moisture. If needed, utilize an elbow and drop tube to route the exhaust to an area free of moisture or debris.
- 4.5 If airline conditioner/antifreeze is used, it must be compatible with O-ring material.

	Form Title: INSTALLATION AND MAINTENANCE MANUAL	Document #: MM-AD005 <small>(Form: DEF-006A-4)</small>
	Document Title: Emergency/Remote Shutdown Air Valves	Revision: 0
		Date: Oct. 26, 2023
		Page: 5 of 10

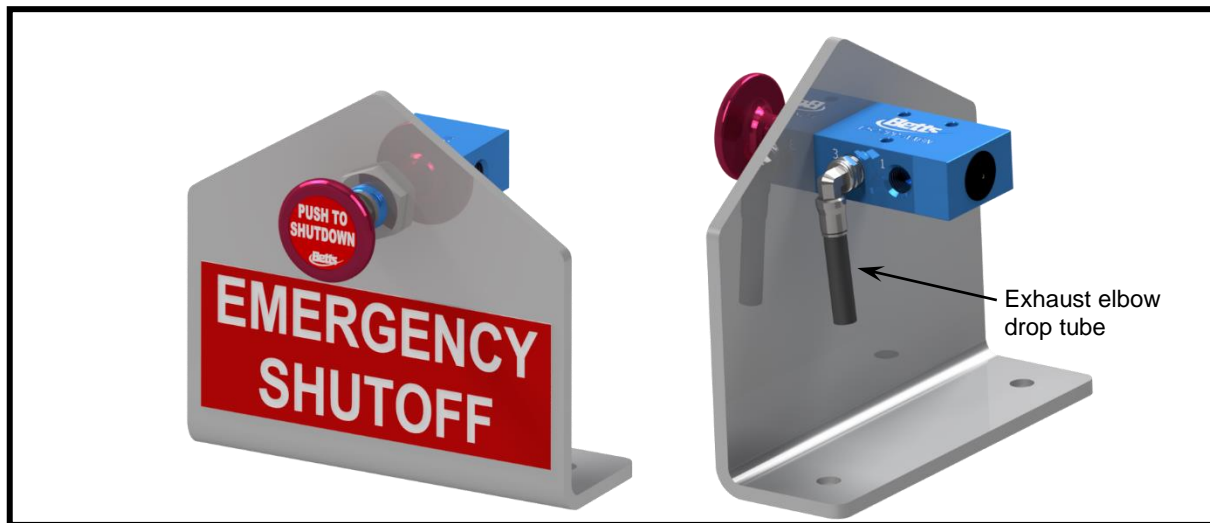


Fig. 1: Secured with Panel Nut, and drop tube to route exhaust

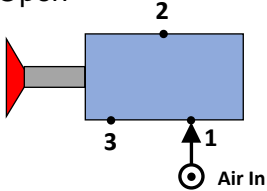
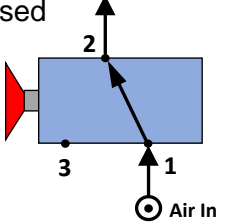
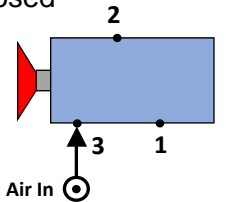
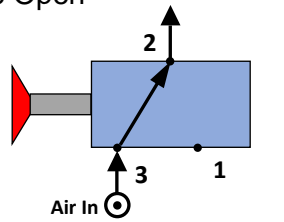


Fig. 2 : Secured with Socket Head Cap Screws through body

5.0 Inspection and Testing

5.1 Bench Test


- 5.1.1 Inspect all components for corrosion or damage and replace if necessary.
- 5.1.2 Actuate the valve twice to ensure it is functioning properly with smooth operation. Ensure that the detent bushing feature is functioning properly with click-in feel in both open and closed positions.
- 5.1.3 Check and ensure the end cap is snapped into the back of the valve and ensure that the vent hole in the cap is not plugged or blocked.
- 5.1.4 Apply line pressure of 90-125 psi to the ports shown in the table below and inspect for leaks. See Disassembly and Rebuild section for needed repairs.

Valve Port	Valve Position	Checks
1	Valve Open 	<ol style="list-style-type: none"> 1. Port 1 blocks pressure. 2. No leakage at port 2 or 3. 3. No leakage between the End Cap and the Body or out the hole in the End Cap. 4. No leakage between the stem and the front of the body.
1	Valve Closed 	<ol style="list-style-type: none"> 1. Port 2 expels pressure. 2. No leakage at port 3. 3. No leakage between the End Cap and the Body or out the hole in the End Cap. 4. No leakage between the stem and the front of the body.
3	Valve Closed 	<ol style="list-style-type: none"> 1. Port 3 blocks pressure. 2. No leakage at port 1 or 2. 3. No leakage between the End Cap and the Body or out the hole in the End Cap. 4. No leakage between the stem and the front of the body.
3	Valve Open 	<ol style="list-style-type: none"> 1. Port 2 expels pressure. 2. No leakage at port 1. 3. No leakage between the End Cap and the Body or out the hole in the End Cap. 4. No leakage between the stem and the front of the body.

5.2 **Field Testing** (*monthly testing*)

5.2.1 Visual inspection:

- 5.2.1.1 Inspect exterior of valve for corrosion or damage. Pay special attention to the area where the stem moves in and out of the bushing.
- 5.2.1.2 Inspect for any air leaking at any of the fittings, at the stem or end cap.
- 5.2.1.3 Look for leakage of fluid out of exhaust port. This could be an indication of a seal failure in one of the Emergency Valves or Air Manifold. Investigate and repair the problematic component.
- 5.2.1.4 Ensure the end cap is snapped into the back of the valve and ensure that the vent hole in the end cap is not plugged or blocked.
- 5.2.1.5 Inspect exhaust port and make sure it is unobstructed and oriented in an area that is protected from weather, debris or moisture.





	Form Title:	Document #:
	INSTALLATION AND MAINTENANCE MANUAL	MM-AD005 <small>(Form: DEF-006A-4)</small>
		Revision:
	Document Title:	Date:
Emergency/Remote Shutdown Air Valves	Page:	7 of 10

5.2.2 Operation:

- 5.2.2.1 Open and close the valve several times.
- 5.2.2.2 Feel for smooth operation with a positive “click-in” feel in both the open and closed position.

5.2.3 Functional:

- 5.2.3.1 Prior to testing the function of the Emergency/Remote Shutdown Valve make sure the cargo tank is safe to simulate a shut down. Cargo tank and piping should be empty and all end of piping stop valves and caps should be closed and in place.

 WARNING		Pressure Hazard – Cargo tank or piping may contain residual pressure and failure to safely relieve could result in sudden loss of pressure causing death or serious injury.
 WARNING		Flammable Product – Cargo tank or piping may contain product that could present risk of fire, explosion, asphyxiation or other hazards resulting in death or serious injury.


- 5.2.3.2 With Emergency Valves or Air Manifold Valves open, actuate the Emergency/Remote Shutdown Valve.

- 5.2.3.3 To satisfy 49CFR§178.345-11(b)(1), inspect Emergency Valves and Air Manifold Valves to ensure they completely closed within 30 seconds of actuating the Emergency/Remote Shutdown Valve.

- 5.2.4 Repair or replace the Emergency/Remote Shutdown Valve if it does not meet any of the monthly field testing requirements.

6.0 Disassembly and Rebuild Instructions

Tools	Use
1/2" open ended wrench Qty 2	Removing the control knob (8) and Flange Nut 5/16-18 (7) .
O-ring Pick	Removing O-rings (3)
Small flat head screwdriver	Pop off end cap (this may not be needed)
7/32" Allen Wrench	Prevent piston from spinning to remove (7) (this may not be needed)
Low temperature silicone lubricant	Lubricate O-rings (3)
Arbor Press (optional)	Only needed to remove the pressed-in bushing (5)
.495 Dia X 4" Pin (optional)	Only needed to remove the pressed-in bushing (5)
Thread lock compound	Threaded connections

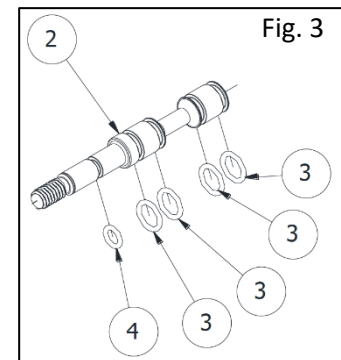
	Form Title: INSTALLATION AND MAINTENANCE MANUAL	Document #: MM-AD005 <small>(Form: DEF-006A-4)</small>
	Document Title: Emergency/Remote Shutdown Air Valves	Revision: 0
		Date: Oct. 26, 2023
		Page: 8 of 10


6.1 Disassembly

- 6.1.1 Use the two ½" open ended wrenches to remove the Control Knob **(8)** and the Flange Nut **(7)** from the piston **(2)**. If the flange nut **(7)** is spinning with the piston, use a small screwdriver to pop off the end cap **(10)**. Insert a 7/32" Allen wrench into the end of the piston to prevent it from spinning to remove the Flange Nut **(7)**.
- 6.1.2 Push the piston **(2)** through the back of the valve. If the end cap **(10)** is still on, apply enough force to pop the end cap and piston out through the back of the valve.
- 6.1.3 Remove the O-rings **(3)** from the piston. Using your fingers, squeeze the O-rings **(3)** up to be able to slide a plastic O-ring pick under the O-ring and pull it off the piston. Do not use a sharp pick which may scratch or damage the O-ring grooves on the piston. The polyurethane detent O-ring **(4)** is a split O-ring and can easily be pulled off the piston. Discard the used O-rings.
- 6.1.4 Clean and inspect the piston **(2)**. Replace if there is any wear or damage.
- 6.1.5 Clean and inspect the control block **(1)** bore. Replace if there is any wear, corrosion, or damage.
- 6.1.6 Inspect the bushing **(5)** for corrosion or damage. If it needs replaced, use the .495 diameter pin and push out the bushing **(5)** using an arbor press.

6.2 Rebuild

- 6.2.1 If the Bushing **(5)** was removed, it must be pressed into the Control Block **(1)** using an arbor press. Retaining compound is recommended but do not get compound in the bore of the bushing **(5)** and clean off all excess compound after assembly. Ensure that the bushing **(5)** starts straight and presses flush with the thread face of the control block **(1)**.
- 6.2.2 The Detent O-ring **(4)** is a white polyurethane O-ring. Use a razor blade and cut the O-ring in one spot. The cut location is not critical.
- 6.2.3 Install the split Detent O-ring **(4)** onto the Piston **(2)** in the location as shown in Fig. 3.
- 6.2.4 Install the other O-rings **(4)** onto the Piston **(2)** in the locations as shown in Fig. 3.
- 6.2.5 Lubricate all O-rings **(3)** using low temperature silicone lubricant. Ensure that O-rings are compatible with any airline conditioner/antifreeze.
- 6.2.6 Insert the piston **(2)** with all O-rings into the Control Block **(1)**. Be careful when inserting the piston to prevent any O-ring damage.
- 6.2.7 If attaching to a panel, insert the Control Block into the panel and thread on the panel Jam Nut **(6)**. Apply thread lock compound to the threads to prevent vibration from loosening the nut.
- 6.2.8 Apply thread lock compound to the piston threads and thread on the Flange nut **(7)** until it bottoms out on the piston **(2)**. Thread the control knob **(8)** down to the flange



	Form Title:	Document #:	
		INSTALLATION AND MAINTENANCE MANUAL	MM-AD005 <small>(Form: DEF-006A-4)</small>
	Document Title:		Revision:
	Emergency/Remote Shutdown Air Valves		0
		Date:	
		Oct. 26, 2023	
		Page:	
		9 of 10	


nut. Using two 1/2" open ended wrenches, tighten the flange nut **(7)** into the control knob **(8)**.



6.2.9 Insert the end cap **(10)** into the Control Block **(1)**.

6.2.10 Test the rebuilt Emergency/Remote Shutdown Valve for proper function per 5.1 Bench Test Procedure prior to installation. Verify proper shutdown function once installed.

7.0 Troubleshooting Guide

<i>Use to help diagnose potential issues that could be encountered. The list is not all inclusive and other solutions might be needed.</i>		
Problem	Potential Cause	Potential Solution
When actuated, the Emergency/Remote Shutdown Valve does not shutdown the loading/unloading outlets (emergency valves).	Emergency/Remote Shutdown Valve is not plumbed correctly.	Verify the plumbing is correct depending on how the air system on the cargo tank is designed. See schematic in section 3.0.
	Exhaust port of Emergency/Remote Shutdown Valve is plugged.	Clear exhaust port.
	Airline to Emergency/Remote Shutdown Valve is not getting air pressure.	Resolve air feed issue.
	Airline from Emergency/Remote Shutdown Valve is damaged, plugged or pinched.	Replace damaged airline.
	Master Control Valve on Air Panel is not operating properly.	Resolve Master Control Valve or Air Panel issue.
	Emergency/Remote Shutdown Valve is not operating properly.	Review entirety of troubleshooting guide and replace or rebuild Emergency/Remote Shutdown Valve as necessary.
Valve stuck open or closed. Hard to actuate.	Corroded bushing (5) or control block (1) .	Investigate reason for corrosion. Harsh cleaning solutions or incompatible airline additives should not be used. Remove and replace bushing (5) . If the bore of the control block (1) is corroded it is recommended to replace the entire valve.
	Damaged or bent piston (2) .	Replace piston (2) but also inspect bore of bushing (5) and control block (1) to see if they are also damaged.
	O-rings (3) swelled.	Investigate reason for O-Ring swelling. Incompatible airline additives should not be used. Product may be leaking into airline from one of the Emergency Valves or Air Manifold. See specific problem below: Product of cargo tank leaking from exhaust port (liquid/fumes).
	O-rings (3) damaged.	Investigate reason for O-rings (3) damage. Burrs or sharp edges inside bore should be removed without damaging sealing surface prior to replacing O-rings (3) .
	Ice or debris behind end cap (10) or in valve.	Remove ice or debris. Replace end cap (10) with a new cap. Ensure the exhaust port is facing down protected from moisture.
Continued on next page.		

	Form Title: INSTALLATION AND MAINTENANCE MANUAL	Document #: MM-AD005 <small>(Form: DEF-006A-4)</small>
	Document Title: Emergency/Remote Shutdown Air Valves	Revision: 0
		Date: Oct. 26, 2023
		Page: 10 of 10

Problem	Potential Cause	Potential Solution
Air leak from valve.	O-rings (3) swelled.	Investigate reason for O-Ring swelling. Incompatible airline additives should not be used. Product may be leaking into airline from one of the Emergency Valves or Air Manifold. See specific problem below: Product of cargo tank leaking from exhaust port (liquid/fumes).
	O-rings (3) damaged.	Investigate reason for O-rings (3) damage. Burrs or sharp edges inside bore should be removed without damaging sealing surface prior to replacing O-rings (3) .
	Bore of control block (1) damaged or dirty.	Clean and inspect bore of control block (1) . If bore is damaged replace the entire valve.
	O-ring grooves on piston (2) scratched or dirty.	Clean and inspect piston (2) . If piston (2) is damaged replace piston (2) .
	Bushing (5) has partially pulled out.	Remove and discard bushing (5) . Replace bushing following step 6.2.1.
	Flange nut (7) is not threaded down to shoulder of piston.	Apply thread lock compound to the threads of the piston (2) . Remove end cap (10) and hold piston (2) stationary with Allen wrench. Tighten flange nut (7) down to the shoulder of the piston (2) . Tighten the Control knob (8) to the flange nut and lock together.
Product of cargo tank leaking from exhaust port. (liquid/fumes)	<div style="border: 1px solid black; padding: 5px;">  WARNING  <p>Flammable Product - Cargo tank, piping or air system may contain product that could present risk of fire, explosion, asphyxiation or other hazards resulting in death or serious injury.</p> </div> <p>This could be an indication of a seal failure in one of the Emergency Valves or Air Manifold.</p>	<p>Investigate and repair the problematic component of Emergency Valve or Air Manifold.</p> <p>Flush and dry all airlines.</p> <p>The Emergency/Remote Shutdown Valve should be taken apart, cleaned and O-rings (3) replaced prior to placing back in service.</p>
Detent is not providing a positive “click-in” feel in both the open and closed position.	Detent O-ring (4) is worn.	Replace with new detent O-ring (4) . Please note, this O-ring is a split polyurethane O-ring.