



BULLETIN 372D

ENERGY-ISOLATION & EEZ-ON[®] PRODUCTS

- **L-O-X[®] Valves** • **EEZ-ON[®] Valves**
- **L-O-X[®]/EEZ-ON[®] Valves**



• **Manufacturers of Premium Pneumatic Controls since 1921** •

ROSS ASIA

• **ROSS CONTROLS**

• **ROSS EUROPA**

• **ROSS UK**

Regulations for Workplace Safety

The Occupational Safety and Health Administration (OSHA) regulation (29 CFR 1910.147) details safety requirements for the control of hazardous energy during the maintenance and servicing of machines and equipment.

WHAT DOES THE RULE REQUIRE?

In general terms, the rule requires that energy sources (pneumatic, electric, hydraulic, etc.) be shut off or disconnected while equipment is being serviced. Furthermore, the disconnected valve or switch must be locked to prevent reactivation while anyone is working on the equipment.

In the case of air-operated equipment, a lockout valve must be used to cut off the air supply to the equipment and exhaust any stored or residual downstream air. (OSHA Regulation 29 CFR 1910.147 lists a number of requirements for the control of hazardous energy sources.) In addition, ROSS L-O-X® and EEZ-ON® products assist manufacturers in complying with European regulation **EN 1037** (Safety of Machinery). For complete information, please read the entire regulations.

New ROSS L-O-X®/EEZ-ON® valve combines shut-off and soft start in one unit.



WHO IS AFFECTED BY THE RULE?

An estimated 631,000 businesses are affected by this OSHA regulation. The majority of those affected are in the manufacturing and servicing industries. Among individual workers, equipment operators and those performing service on equipment are at the greatest risk of injury. Workers involved with packaging equipment, presses, and conveyor systems are also said to be at high risk.

WHAT ARE THE BENEFITS OF THE RULE?

The Secretary of Labor says the procedures were developed to protect 39 million American workers from injury, and more than six percent of all workplace deaths can be eliminated in the affected industries. Statistics indicate that implementation of the regulation could prevent 120 deaths and 60,000 injuries annually.

HOW CAN THE RULE BE IMPLEMENTED?

The rule requires equipment to have “energy isolation devices” (to isolate the equipment from its energy sources), and that such devices be capable of being locked in the “off” position. Formal procedures must be established to de-energize the equipment, isolate it, and ensure that any stored energy (for example, air pressure trapped downstream in a system) has been dissipated. Employee training in these procedures is mandatory.

If your company uses pneumatically-controlled equipment, or if you are a manufacturer of pneumatically operated equipment, OSHA rules can have a substantial effect on your business. As an employer, compliance may involve modifications to the air control systems for equipment in your plant. As a manufacturer, the new machines or equipment you deliver should include lockout-and-exhaust devices as a part of your standard package.

Here are some key points about the control of pneumatic energy:

SHUT-OFF VALVE REQUIRED

Each piece of equipment must have a shut-off valve to isolate the equipment from its air supply and so render the equipment inoperative.

SHUT-OFF VALVE SHOULD BE LOCKABLE

The valve is lockable if it is designed to allow the use of a padlock to keep the valve in the closed position.

PRESSURIZED DOWNSTREAM AIR MUST BE RELIEVED

In addition to locking out the air supply, all downstream air must be depressurized by providing an exhaust to atmosphere. Workers must also verify isolation and de-energizing, while being certain there is no reaccumulation of pressurized air during service or maintenance activities.

“TAGOUT” MAY REPLACE “LOCKOUT” ONLY UNDER CERTAIN CIRCUMSTANCES

- (1) If energy isolation device cannot be locked out;
- (2) If employer shows that tagout provides safety equivalent to lockout. Whenever major replacement, repair, renovation, or modification of equipment is performed, or when new equipment is installed, energy isolating devices for such equipment must be designed to accept a lockout device.

ROSS L-O-X® VALVES ARE BUILT TO SATISFY THE TOUGHEST REQUIREMENTS

L-O-X® valves provide shut-off control, they are lockable, and they exhaust downstream air to atmosphere. There are several different designs to meet virtually every plant requirement.

How Users Of Pneumatic Equipment Can Comply With OSHA Rules

Here's how our famous L-O-X® valve helps...

L-O-X® is the simple and effective solution: The manual L-O-X® valve controls air flow simply by a push of its large red handle in or out. The valve is open when the handle is pulled outward and air then moves freely from inlet to outlet port. A short inward push of the handle closes the inlet to the flow of air and connects the outlet port to the exhaust port to exhaust compressed air immediately from downstream.

For your convenience, L-O-X® valves are available in pipe sizes from 1/4 to 2-1/2 inches.

If your machines aren't already equipped with L-O-X® or L-O-X®/EEZ-ON® valves, here are six good reasons why they should be:

- **Effectiveness:** A L-O-X® valve not only isolates the equipment by shutting off air supply, it exhausts stored or residual air immediately from downstream.
- **Ease of Use:** Air shutoff is simple; just push in the bright red handle! There's no turning or twisting and guessing whether the valve is completely open – it's automatic!
- **Locking protection:** L-O-X® valves are designed to allow secure lock-out upon shutdown, using standard padlocks.
- **Reliability:** Special Teflon® seals help ensure "shift-ability" even after long periods of non-use.
- **Efficiency:** Large exhaust ports provide rapid exhaust of downstream air and are threaded for silencers or remote exhaust lines.
- **User Confidence:** Three-way valve design opens the system to atmosphere during shut-down. Any leakage past the spool is exhausted faster than it can build up.

And now, with ROSS' L-O-X®/EEZ-ON® valves, you get even more value. Combining the lock-out function of ROSS' L-O-X® valve with the gradual start-up capability of the EEZ-ON®, the L-O-X®/EEZ-ON® gives you two safety-related functions in one convenient unit.



ROSS L-O-X® valves are also available for remote control and in port sizes up to 2-1/2.

ROSS EEZ-ON® Valves Also Add to Plant Safety

A ROSS EEZ-ON® valve is designed to allow a gradual buildup of downstream air pressure before opening the line to full air flow. This gradual pressure buildup allows cylinders or other work elements to move slowly and more safely into their normal working positions before full line pressure buildup is applied. The time required for full pressure buildup is adjustable.



EEZ-ON® valves are available as either 2/2 (2-port, 2-position) or 3/2 (3-port, 2-position) valves. Either type can be used in conjunction with a L-O-X® valve to supply a lockout and exhaust feature in addition to the gradual buildup of supply pressure.

The L-O-X® valve and EEZ-ON® valve functions can now also be obtained in a combined configuration — the L-O-X®/EEZ-ON® valve. In this valve, all the functions are combined in a single valve for the most compact installation possible. See page 4 for more details.



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COMBINATION L-O-X®/EEZ-ON® Valves

Combines L-O-X® Shut-off with EEZ-ON® Gradual Starts



The L-O-X®/EEZ-ON® valve combines shut-off certainty with gradual pressurization upon start-up. Special labels and adjustment screw indicates EEZ-ON® function.

The ROSS L-O-X®/EEZ-ON® valve is the newest addition to ROSS' renowned family of safety-related products. Combining two functions critical to safety concerns in any application, the ROSS L-O-X®/EEZ-ON® valve provides the shutdown and the gradual start-up (or, "soft start") capabilities today's systems require. In addition, because the L-O-X®/EEZ-ON® valve is two units in one, you eliminate the need for multiple components. And that means easier installation and less cost.

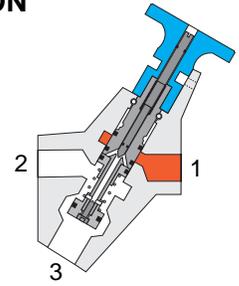
The new valve permits the gradual increase of downstream pressure in the pneumatic circuit that has just been actuated. The same unit also features a shut-off and lockout of system air to limit inadvertent actuation. For years, ROSS products have been the industry benchmark in safety-related pneumatic controls, and the tradition continues with the new L-O-X®/EEZ-ON® valve.

The exhaust port is threaded for the installation of a silencer or a line for remote exhausting. Two mounting holes are provided to simplify the installation of the L-O-X®/EEZ-ON® valve.

VALVE OPERATION

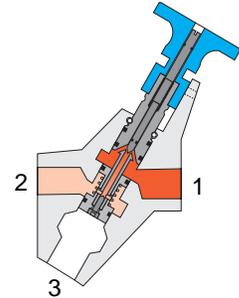
VALVE CLOSED

With a short push of the blue handle inward, the flow of supply is blocked and downstream air is exhausted via the exhaust port at the bottom of the valve. It is required by OSHA that the L-O-X®/EEZ-ON® valve be padlocked in this position to prevent the handle from being pulled outward inadvertently when potential for human injury exists or servicing machinery.



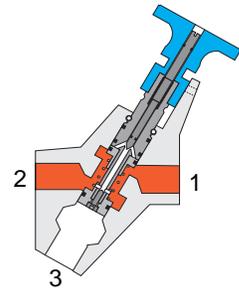
EEZ-ON® VALVE FUNCTION

With the blue handle pulled out, the adjustable needle valve (accessed through top of handle) setting determines the rate of pressure buildup.



VALVE OPEN

After the blue handle is pulled out and pressure downstream has gradually increased, the valve automatically changes to a fully open state, allowing full flow from inlet to downstream. See "Toggle Open Pressure" under standard specifications.



VALVE MODEL NUMBERS & OVERALL DIMENSIONS

Port Size		Valve Model Numbers*	Average Cv		Dimensions inches (mm)			EEZ-ON® Valve Cv**	Weight lb. (kg)
In-Out	Exhaust		1 to 2	2 to 3	A	B	C		
3/8	3/4	1523A3102	6.0	8.0	6.4 (163)	8.8 (224)	2.0 (51)	0.6	1.5 (.7)
1/2	3/4	1523A4102	7.1	8.3	6.4 (163)	8.8 (224)	2.0 (51)	0.6	1.5 (.7)
3/4	3/4	1523A5112	8.0	9.5	6.4 (163)	8.8 (224)	2.0 (51)	0.6	1.5 (.7)
3/4	1-1/4	1523A5102	12.0	10.9	7.7 (196)	10.8 (274)	2.3 (58)	3.0	3.3 (1.5)
1	1-1/4	1523A6102	13.7	12.0	7.7 (196)	10.8 (274)	2.3 (58)	3.0	3.2 (1.5)
1-1/4	1-1/4	1523A7112	16.2	12.8	7.7 (196)	10.8 (274)	2.3 (58)	3.0	3.2 (1.5)

*Can also be ordered with yellow-colored body and blue handle. For NPT thread models with yellow bodies, prefix the number with a "Y" (Y1523C3102). For G thread models with yellow bodies, substitute the center letter with an "X" (D1523X3102). **Cv from port 1 to port 2 during pressure buildup (before valve opens fully).

STANDARD SPECIFICATIONS

Ambient/Media Temperature: 40 to 175° F (4 to 80° C).

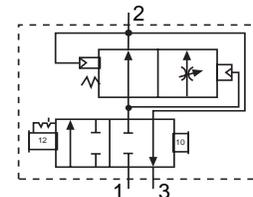
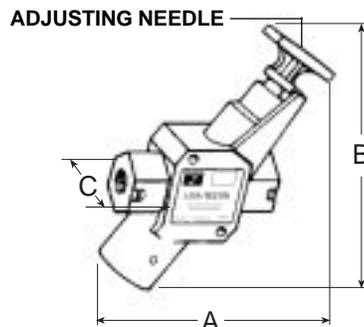
Flow Media: Filtered air; 5 micron filter recommended.

Inlet Pressure: 30 to 150 psig (2 to 10 bar).

Toggle Open Pressure = Inlet - 25 psig. If different toggle pressure is needed, contact ROSS Technical Services.

Port Threads: NPT standard. Prefix the model number with the letter "D" for parallel G threads, e.g. D1523A3102.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.



For coordinating silencers, see page 11 (model numbers 5500A5003 and 5500A7013).

Manual L-O-X[®] Valves

- The Industry Standard since 1962
- Copied, but Never Duplicated



Manual L-O-X[®] valve shown padlocked in closed position. The valve can only be locked in the closed position. The position of the red handle indicates full flow pressurizing or exhausting capability.

Following any FRL components, an energy isolation valve is usually the first valve in the line supplying compressed air to equipment. The energy isolation valve should provide a quick means of shutting off the supply of air and exhausting the downstream lines.

The ROSS manual L-O-X[®] valve has a large red operating handle for high visibility. When the handle is pulled out, there is full line pressure. A short, full inward push of the handle closes off the flow of air, and quickly exhausts the pressure in the downstream line. This action is swift and doesn't require a difficult, slow, or confusing twisting action. *NOTE: If a system requires gradual buildup of downstream pressure, see L-O-X[®]/EEZ-ON[®] valves on page 4.*

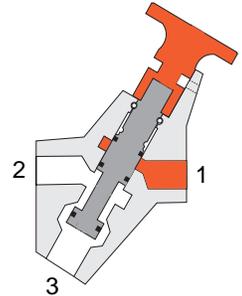
The controlling spool of the valve employs seals made of very low-friction material. These seals enable the L-O-X[®] spool to shift smoothly and easily even after being on standby for a long period of time.

The exhaust port is threaded for the installation of a silencer or a line for remote exhausting. Two mounting holes are provided to simplify the installation of the L-O-X[®] valve.

VALVE OPERATION

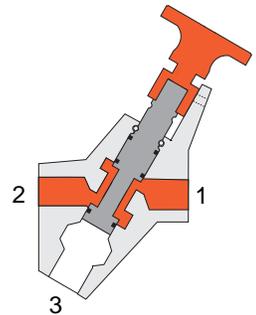
VALVE CLOSED

With a short push of the red handle inward, the flow of supply air is blocked and downstream air is exhausted via the exhaust port at the bottom of the valve. The L-O-X[®] valve should be padlocked in this position to prevent the handle from being pulled outward inadvertently where potential for human injury exists or while servicing machinery.



VALVE OPEN

When the red handle is pulled out, supply air flows freely from inlet to outlet and flow to exhaust is blocked. A detent keeps the handle in the open position. The handle is not designed to be locked in this position, thereby providing for ready shut-off when necessary.



- Reliable, Low-Cost Control
- 3/8 to 1-1/4 Ports

VALVE MODEL NUMBERS & OVERALL DIMENSIONS

Port Size		Valve Model Number*	Port Threads	Average Cv		Dimensions inches (mm)			Weight lb. (kg)
In-Out	Exhaust			1 to 2	2 to 3	A	B	C	
3/8	3/4	1523C3002	NPT	6.0	8.0	6.4 (163)	8.8 (224)	2.0 (51)	1.5 (.7)
1/2	3/4	1523C4002	NPT	7.1	8.3	6.4 (163)	8.8 (224)	2.0 (51)	1.5 (.7)
3/4	3/4	1523C5012	NPT	8.6	9.5	6.4 (163)	8.8 (224)	2.0 (51)	1.5 (.7)
3/4	1-1/4	1523C5002	NPT	13.0	12.0	7.7 (196)	10.8 (274)	2.3 (58)	2.5 (1.1)
1	1-1/4	1523C6002	NPT	13.0	14.0	7.7 (196)	10.8 (274)	2.3 (58)	2.5 (1.1)
1-1/4	1-1/4	1523C7012	NPT	20.0	14.0	7.7 (196)	10.8 (274)	2.3 (58)	2.5 (1.1)

*Can also be ordered with yellow-colored body. For NPT thread models with yellow bodies, prefix the number with a "Y" (Y1523C3002). For G thread models with yellow bodies, substitute the center letter with an "X" (D1523X3002).

STANDARD SPECIFICATIONS

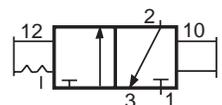
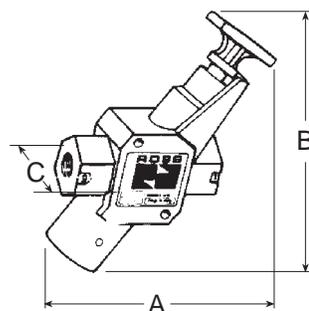
Ambient/Media Temperature: 40 to 175° F (4 to 80° C).

Flow Media: Filtered air; 5 micron filter recommended.

Inlet Pressure: 15 to 300 psig (1 to 20 bar).

Port Threads: NPT standard. Prefix the model number with the letter "D" for parallel G threads, e.g. D1523C3002.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.



For coordinating silencers, see page 11 (model numbers 5500A5003 and 5500A7013).



Manual Pilot Valves with L-O-X® Control

Port Sizes up to 2-1/2 for Larger Systems



Operated just like the smaller manual L-O-X® valves shown on page 5. The position of the red handle indicates instantaneous full flow pressurizing or exhausting capability.

Following any FRL components, an energy isolation valve is usually the first valve in the line supplying compressed air to equipment. The energy isolation valve should provide a quick means of shutting off the supply of air and exhausting the downstream lines.

The ROSS manual pilot L-O-X® valve has a large red operating handle for high visibility. A short, full inward push of the red operating handle closes off the flow of air, and exhausts the pressure in the downstream line. This action is swift and doesn't require a difficult, slow, or confusing twisting action.

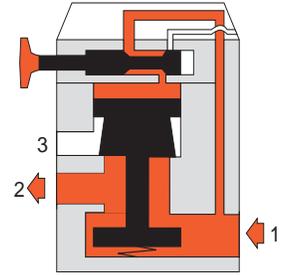
Because of the poppet construction of the main valve body, air pressure provides the forces both to open the valve and to close it. These are large forces so that quick response is ensured even after the valve has been on standby for a long time.

The exhaust port is threaded for the installation of a silencer or a line for remote exhausting.

VALVE OPERATION

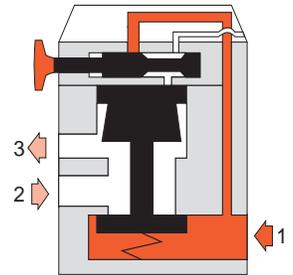
VALVE OPEN

With the red handle pulled out, pilot air flows to the top of the actuating piston, causing it to open the inlet poppet. Supply air then flows freely from inlet to outlet, and the exhaust port is blocked. A detent keeps the L-O-X® handle in the open position. The handle is designed not to be locked in the open position, thereby allowing for quick shut-off when necessary.



VALVE CLOSED

With a short push of the red handle inward the flow of supply air is blocked and downstream air is exhausted via the exhaust port. Air pressure on the inlet and exhaust poppets produces a large closing force. The L-O-X® valve should be padlocked in this position to prevent the handle from being pulled outward inadvertently when potential for human injury exists or servicing machinery.



VALVE MODEL NUMBERS & OVERALL DIMENSIONS

Port Size		Valve Model Numbers	Average Cv		Dimensions inches (mm)			Weight lb. (kg)
In-Out	Exhaust		1 to 2	2 to 3	A	B	C	
1	1-1/2	2783A6006	23.0	34.0	7.4 (187)	8.6 (218)	6.4 (162)	7.0 (3.2)
1-1/4	1-1/2	2783A7006	30.0	32.0	7.4 (187)	8.6 (218)	6.4 (162)	7.0 (3.2)
1-1/2	1-1/2	2783A8016	30.0	31.0	7.4 (187)	8.6 (218)	6.4 (162)	7.0 (3.2)
1-1/2	2-1/2	2783A8006	68.0	70.0	8.4 (213)	10.2 (259)	7.3 (168)	15.3 (6.9)
2	2-1/2	2783A9006	70.0	70.0	8.4 (213)	10.2 (259)	7.3 (168)	19.0 (8.6)
2-1/2	2-1/2	2783A9016	70.0	71.0	8.4 (213)	10.2 (259)	7.3 (168)	15.3 (6.9)

STANDARD SPECIFICATIONS

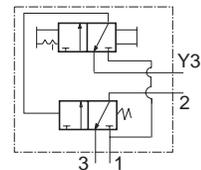
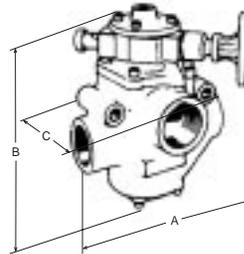
Ambient/Media Temperature: 40 to 175° F (4 to 80° C).

Flow Media: Filtered air; 5 micron filter recommended.

Inlet Pressure: Port sizes 1 to 1-1/2: 15 to 150 psig (1 to 10 bar).
Port sizes 1-1/2 to 2-1/2: 30 to 150 psig (2 to 10 bar).

Port Threads: NPT standard. Prefix the model number with the letter "D" for parallel G threads, e.g., D2783A6006.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.



For coordinating silencers, see page 11 (model numbers 5500A8001 and 5500A9002).

Solenoid Pilot Valves with L-O-X[®] Control

Remote Control in a Full Range of Valve Sizes



The position of the red handle indicates instantaneous full flow pressurizing or exhausting capability.

Following any FRL components, an energy isolation valve is usually the first valve in the line supplying compressed air to equipment. The energy isolation valve should provide a quick means of shutting off the supply of air and exhausting the downstream lines.

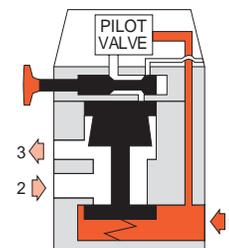
The shut-off function of the solenoid pilot L-O-X[®] valve is the same as that of the manual L-O-X[®] valves. A short, full inward push of the red operating handle closes off the flow of air, and exhausts the pressure in the downstream line. In addition, the solenoid pilot allows the air supply to be turned on or off by remote electrical control whenever the L-O-X[®] handle is in the outward position. Air flows only if the L-O-X[®] handle is outward and the solenoid pilot is energized. When the L-O-X[®] handle is pushed in, air will not flow regardless of the pilot being energized or not. As with all L-O-X[®] valves, the L-O-X[®] handle can be padlocked in the closed position. As a further precaution against inadvertent air flow, the solenoid pilot has no manual override.

Because of the poppet construction of the main valve body, air pressure provides the forces both to open the valve and to close it. These are large forces so that quick response is ensured even after the valve has been on standby for a long time.

VALVE OPERATION

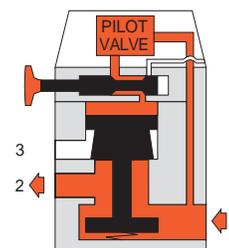
PILOT DE-ENERGIZED

With the solenoid pilot de-energized (regardless of the position of the L-O-X[®] handle) the inlet poppet remains closed. The outlet port is connected to the exhaust port so that pressure in the downstream lines is vented to atmosphere.



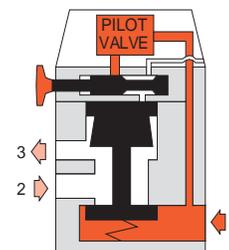
PILOT ENERGIZED

With the solenoid pilot energized and the L-O-X[®] control in the open position, air can flow from inlet to outlet port. The exhaust port is closed.



L-O-X VALVE CLOSED

With the handle pushed inward, the L-O-X[®] control is closed, and air to the valve piston is cut off. This allows the inlet poppet to be closed by its spring and the pressure of the inlet air. The outlet is connected to exhaust so downstream pressure is vented.

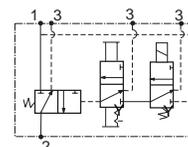
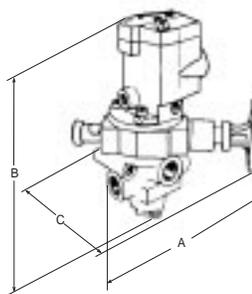


VALVE MODEL NUMBERS & OVERALL DIMENSIONS

Port Size		Valve Model Numbers	Average Cv		Dimensions inches (mm)			Weight lb. (kg)
In-Out	Exhaust		1 to 2	2 to 3	A	B	C	
1/4	1/2	2773A2072	2.5	3.1	7.1 (181)	8.4 (213)	6.5 (165)	3.5 (1.6)
3/8	1/2	2773A3072	3.6	5.3	7.1 (181)	8.4 (213)	6.5 (165)	3.5 (1.6)
1/2	1/2	2773A4082	3.3	5.3	7.1 (181)	8.4 (213)	6.5 (165)	3.5 (1.6)
1/2	1	2773A4072	10.0	13.0	7.1 (181)	9.0 (229)	6.9 (175)	4.3 (1.9)
3/4	1	2773A5072	12.0	15.0	7.1 (181)	9.0 (229)	6.9 (175)	4.3 (1.9)
1	1	2773A6082	12.0	16.0	7.1 (181)	9.0 (229)	6.9 (175)	4.3 (1.9)
1	1-1/2	2773A6072	23.0	34.0	8.1 (206)	11.8 (300)	6.9 (175)	8.0 (3.6)
1-1/4	1-1/2	2773A7072	30.0	32.0	8.1 (206)	11.8 (300)	6.9 (175)	8.0 (3.6)
1-1/2	1-1/2	2773A8082	30.0	31.0	8.1 (206)	11.8 (300)	6.9 (175)	8.0 (3.6)
1-1/2	2-1/2	2773A8072	68.0	70.0	9.3 (235)	13.8 (351)	7.3 (184)	17.5 (8.0)
2	2-1/2	2773A9072	70.0	70.0	9.3 (235)	13.8 (351)	7.3 (184)	17.5 (8.0)
2-1/2	2-1/2	2773A9082	70.0	71.0	9.3 (235)	13.8 (351)	7.3 (184)	17.5 (8.0)

STANDARD SPECIFICATIONS

- Ambient Temperature:** 40 to 120° F (4 to 50° C).
- Media Temperature:** 40 to 175° F (4 to 80° C).
- Flow Media:** Filtered air; 5 micron filter recommended.
- Inlet Pressure:** Port sizes 1/4 to 1-1/2: 15 to 150 psig (1 to 10 bar).
Port sizes 1-1/2 to 2-1/2: 30 to 150 psig (2 to 10 bar).
- Port Threads:** NPT standard. Prefix the model number with the letter "D" for parallel G threads, e.g., D2773A2072.
- NOTE:** Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.



For coordinating silencers, see page 11 (model numbers 5500A4003, 5500A6003, 5500A8001 and 5500A9002).

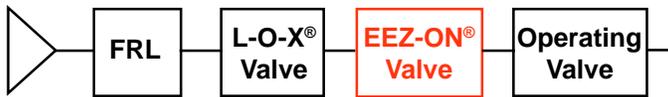
2/2 EEZ-ON® Valves

A Gradual Start-up for Pneumatic Circuits



The EEZ-ON® valve is designed to allow a gradual buildup of downstream air pressure before opening to full air flow. This gradual pressure buildup allows cylinders or other work elements to move slowly and more safely into their normal working positions before full line pressure is applied. An adjustable restriction within the EEZ-ON® valve determines the rate of downstream pressure buildup, and consequently the time delay for the full opening of the EEZ-ON® valve.

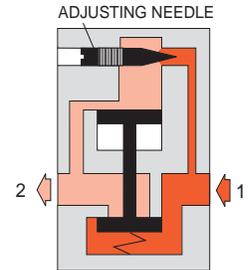
For added safety, the EEZ-ON® valve can be used in conjunction with the L-O-X® valve (see preceding pages) to provide a lockout and exhaust feature. The L-O-X® valve and EEZ-ON® valve can even be used in one combined unit (see L-O-X®/EEZ-ON® valve, pages 4 & 10).



VALVE OPERATION

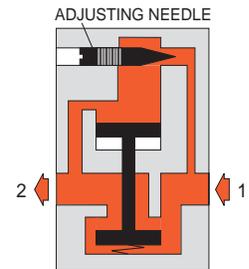
AIR PRESSURE TO INLET

When air pressure is first applied to the inlet, air flow to the piston is restricted by the adjustable needle in the delay orifice. Downstream air pressure gradually builds up at a rate determined by the setting of the adjustable needle.



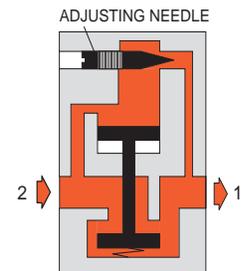
VALVE OPENS TO FULL FLOW

When downstream air pressure reaches approximately 40 to 60 percent of inlet pressure, the valve element shifts to the full open position and there is full air flow to the downstream components. This condition continues as long as inlet air pressure is present.



INLET PRESSURE REMOVED

When inlet pressure is removed, the exhausting downstream air pressure keeps the inlet poppet open until the downstream pressure drops by approximately 90 percent. The remaining pressure is exhausted via the delay orifice.

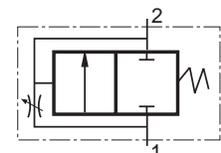
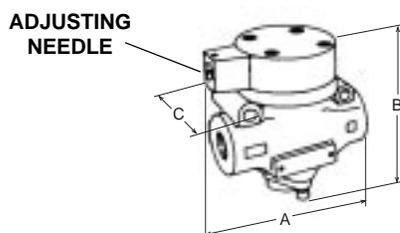


VALVE MODEL NUMBERS & OVERALL DIMENSIONS

Port Size	Valve Model Numbers	Average Cv	Dimensions inches (mm)			Weight lb. (kg)
			A	B	C	
1/4	2781A2007	2.3	3.8 (97)	3.8 (97)	3.0 (77)	1.5 (.7)
3/8	2781A3007	3.8	3.8 (97)	3.8 (97)	3.0 (77)	1.5 (.7)
1/2	2781A4017	4.0	3.8 (97)	3.8 (97)	3.0 (77)	3.0 (1.4)
1/2	2781A4007	13.0	4.6 (117)	4.5 (114)	3.0 (77)	2.3 (1.0)
3/4	2781A5007	15.0	4.6 (117)	4.5 (114)	3.0 (77)	2.3 (1.0)
1	2781A6017	16.0	4.6 (117)	4.5 (114)	3.0 (77)	2.3 (1.0)
1	2781A6007	24.0	6.6 (168)	7.6 (192)	4.1 (103)	6.0 (2.7)
1-1/4	2781A7007	29.0	6.6 (168)	7.6 (192)	4.1 (103)	6.0 (2.7)
1-1/2	2781A8017	29.0	6.6 (168)	7.6 (192)	4.1 (103)	6.0 (2.7)

STANDARD SPECIFICATIONS

- Ambient/Media Temperature:** 40 to 175° F (4 to 80° C).
- Flow Media:** Filtered air; 5 micron filter recommended.
- Inlet Pressure:** 30 to 150 psig (2 to 10 bar).



3/2 EEZ-ON® Valves

Gradual Start-up plus Remote Control and Line Exhaust



Solenoid Pilot EEZ-ON®



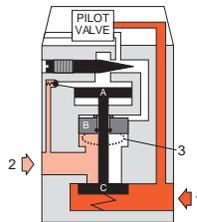
Remote Air Pilot EEZ-ON®

The 3/2 EEZ-ON® valve provides the same gradual pressure buildup as the 2/2 EEZ-ON® valves described on page 8. In addition, the 3/2 valve has an exhaust port so that downstream air is exhausted when the valve is de-energized.

VALVE OPERATION

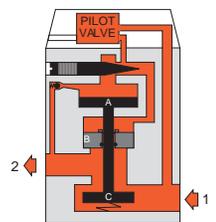
PILOT NOT ENERGIZED

Pilot air is blocked by the pilot. Any downstream pressure forces piston B (which slides on the valve stem) upward. This opens the exhaust port and vents the downstream line.



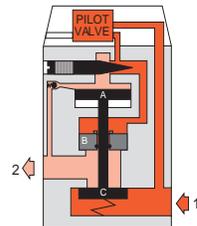
FULL PRESSURE

When the pressure on piston A reaches approximately 50 percent of inlet pressure, it is forced downward and opens inlet poppet C. Full inlet pressure now flows freely to the outlet port.



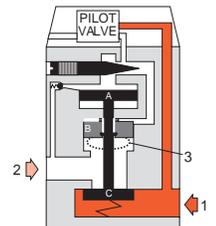
PILOT ENERGIZED

Pilot air forces piston B downward to close the exhaust port. Pilot air also flows past the adjusting needle, opens the ball check and begins slowly to pressurize the outlet line. At the same time, pressure is building up on piston A.



PILOT DE-ENERGIZED

Air above pistons A and B is exhausted through the exhaust port of the pilot valve. Air above poppet C forces sliding piston B upward so that the main exhaust port is opened and the pressurized air is exhausted.



VALVE MODEL NUMBERS & OVERALL DIMENSIONS

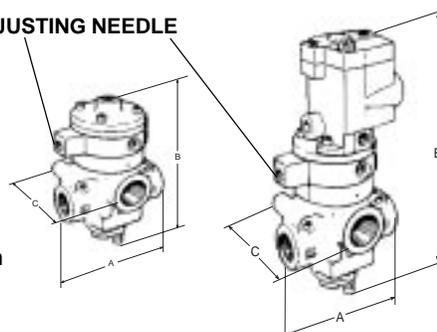
Port In-Out	Exh.	Solenoid Pilot	Dimensions inches (mm)			Remote Air Pilot	Dimensions inches (mm)			Average Cv		Weight* lb. (kg)
			A	B	C		A	B	C	1 to 2	2 to 3	
1/4	1/2	2773B2037	4.1(105)	8.8 (224)	3.1 (79)	2783B2037	4.1 (105)	5.7 (146)	3.1 (79)	2.5	3.1	4.5 (2.0)
3/8	1/2	2773B3037	4.1(105)	8.8 (224)	3.1 (79)	2783B3037	4.1 (105)	5.7 (146)	3.1 (79)	3.6	5.3	4.5 (2.0)
1/2	1/2	2773B4047	4.1(105)	8.8 (224)	3.1 (79)	2783B4047	4.1 (105)	5.7 (146)	3.1 (79)	3.3	5.3	4.5 (2.0)
1/2	1	2773B4037	4.9 (124)	9.6 (243)	3.6 (92)	2783B4037	4.9 (124)	7.1 (180)	3.6 (92)	10.0	13.0	5.0 (2.3)
3/4	1	2773B5037	4.9 (124)	9.6 (243)	3.6 (92)	2783B5037	4.9 (124)	7.1 (180)	3.6 (92)	12.0	15.0	5.0 (2.3)
1	1	2773B6047	4.9 (124)	9.6 (243)	3.6 (92)	2783B6047	4.9 (124)	7.1 (180)	3.6 (92)	12.0	16.0	5.0 (2.3)
1	1-1/2	2773A6037	6.6 (168)	10.6 (268)	4.8 (123)	2783A6037	6.6 (168)	7.4 (188)	4.8 (123)	23.0	34.0	8.8 (4.0)
1-1/4	1-1/2	2773A7037	6.6 (168)	10.6 (268)	4.8 (123)	2783A7037	6.6 (168)	7.4 (188)	4.8 (123)	30.0	32.0	8.8 (4.0)
1-1/2	1-1/2	2773A8047	6.6 (168)	10.6 (268)	4.8 (123)	2783A8047	6.6 (168)	7.4 (188)	4.8 (123)	30.0	31.0	8.8 (4.0)

* Weight given is the higher of the solenoid and internal air pilot versions (for shipping purposes).

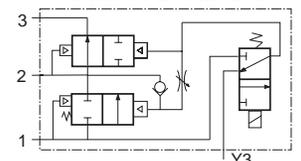
STANDARD SPECIFICATIONS

- Solenoid Pilot - Ambient Temperature:** 40 to 120° F (4 to 50° C).
- Media Temperature:** 40 to 175° F (4 to 80° C).
- Internal Air Pilot- Ambient/Media Temperature:** 40 to 175° F (4 to 80° C).
- Flow Media:** Filtered air; 5 micron filter recommended.
- Inlet Pressure:** 15 to 150 psig (1 to 10 bar).
- Port Threads:** NPT standard. Prefix the model number with the letter "D" for parallel G threads, e.g., D2773A2037.

ADJUSTING NEEDLE



Solenoid Pilot Models



For coordinating silencers, see page 11 (model numbers 5500A4003, 5500A6003, and 5500A8001).

Consolidated L-O-X®/EEZ-ON® Valves



Internal Air Pilot

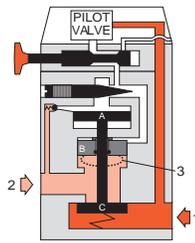


Solenoid Pilot

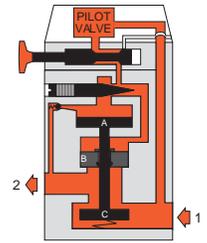
These unique valves give pneumatic circuits the soft start-up of the EEZ-ON® valves plus the lock out and exhaust capabilities of L-O-X® valves. They are available with either solenoid or air pilots. **Blue handle indicates that EEZ-ON® function is included** (L-O-X® valves with red handles do not have the EEZ-ON® function).

VALVE OPERATION

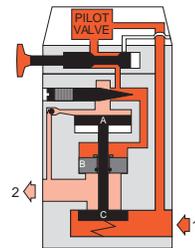
L-O-X® handle open and pilot not energized. Pilot air is blocked by the pilot. Any downstream pressure forces piston B (which slides on the valve stem) upward. This opens the exhaust port and vents the downstream line.



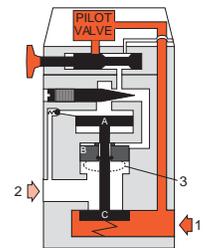
Full Pressure. When the pressure on piston A reaches approximately 50 percent of inlet pressure, it is forced downward and opens inlet poppet C. Full inlet pressure now flows freely to the outlet port.



L-O-X® handle closed and pilot energized. Pilot air forces piston B downward to close the exhaust port. Pilot air also flows past the adjusting needle, opens the ball check and begins slowly to pressurize the outlet line. At the same time, pressure is building up on piston A.



L-O-X® handle closed. At any time the L-O-X® handle can be pushed inward, thereby closing off the flow of pilot air. Pilot air above pistons A and B is then vented to atmosphere. Piston A moves upward and closes inlet poppet C. Sliding piston B also moves upward to open the exhaust port and vents the downstream line.



VALVE MODEL NUMBERS & OVERALL DIMENSIONS

Port In-Out	Exh.	Solenoid Pilot	Dimensions inches (mm)			Internal Air Pilot	Dimensions inches (mm)			Average Cv		Weight* lb. (kg)
			A	B	C		A	B	C	1 to 2	2 to 3	
1/4	1/2	2773B2075	7.1 (181)	9.9 (253)	6.5 (165)	2783B2055	7.1 (181)	6.9 (175)	6.5 (165)	2.5	3.1	5.3 (2.4)
3/8	1/2	2773B3075	7.1 (181)	9.9 (253)	6.5 (165)	2783B3055	7.1 (181)	6.9 (175)	6.5 (165)	3.6	5.3	7.0 (3.3)
1/2	1/2	2773B4085	7.1 (181)	9.9 (253)	6.5 (165)	2783B4065	7.1 (181)	6.9 (175)	6.5 (165)	3.3	5.3	5.3 (2.4)
1/2	1	2773B4075	7.1 (181)	10.6 (269)	6.9 (175)	2783B4055	7.1 (181)	7.6 (193)	6.9 (175)	10.0	13.0	6.0 (2.7)
3/4	1	2773B5075	7.1 (181)	10.6 (269)	6.9 (175)	2783B5055	7.1 (181)	7.6 (193)	6.9 (175)	12.0	15.0	6.0 (2.7)
1	1	2773B6085	7.1 (181)	10.6 (269)	6.9 (175)	2783B6065	7.1 (181)	7.6 (193)	6.9 (175)	12.0	16.0	6.0 (2.7)
1	1-1/2	2773B6075	7.4 (188)	11.6 (296)	6.9 (175)	2783A6055	7.4 (188)	11.6 (296)	6.9 (175)	23.0	34.0	9.5 (4.3)
1-1/4	1-1/2	2773B7075	7.4 (188)	11.6 (296)	6.9 (175)	2783A7055	7.4 (188)	11.6 (296)	6.9 (175)	30.0	32.0	9.5 (4.3)
1-1/2	1-1/2	2773B8085	7.4 (188)	11.6 (296)	6.9 (175)	2783A8065	7.4 (188)	11.6 (296)	6.9 (175)	30.0	31.0	9.5 (4.3)

* Weight given is the higher of either the solenoid or internal air pilot (for shipping purposes).

STANDARD SPECIFICATIONS

Solenoid Pilot Ambient Temperature: 40 to 120°F (4 to 50°C).

Media Temperature: 40 to 175°F (4 to 80°C).

Internal Air Pilot Ambient/Media Temperature: 40 to 175°F (4 to 80°C).

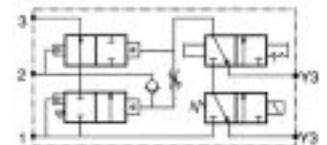
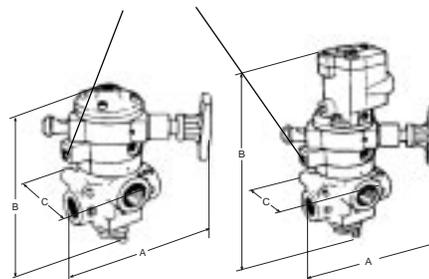
Flow Media: Filtered air; 5 micron filter recommended.

Inlet Pressure: 42 to 150 psig (2.8 to 10 bar).

Port Threads: NPT standard. Prefix the model number with the letter "D" for parallel G threads, e.g. D2773A2075.

NOTE: Per specifications and regulations, these products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

ADJUSTING NEEDLE



For coordinating silencers, see page 11 (model numbers 5500A4003, 5500A6003, 5500A8001 and 5500A9002).

Accessories

Multiple Lock-out Device

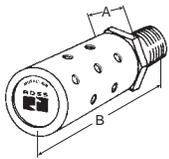


Model Number 356A30

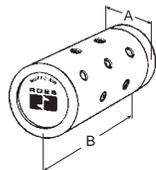
Model Numbers	Dimensions inches (mm)			Weight lb. (kg)
	Width	Length	Thickness	
5500A4003	3.0 (1.4)	3.0 (1.4)	.4 (.18)	.3 (.11)

For use with any ROSS model with L-O-X® capability.

Muffl-Air® Silencers



Male Pipe Threads
For ports 1/8"
through 1-1/4"



Female Pipe Threads
For ports 1-1/4"
through 2-1/2"

ROSS MUFFL-AIR® silencers substantially reduce exhaust noise levels yet produce little back pressure. Typical impact noise reduction is in the 20–25 db range.

Port Size*	NPT Threads	Model Numbers	Average C _v	Dimensions inches (mm)		Weight lb. (kg)
				A	B	
1/2	Male	5500A4003	7.0	1.3 (32)	3.8 (96)	.3 (.11)
3/4		5500A5003	15			1.2 (.54)
1	Male	5500A6003	18	2.0 (51)	5.6 (142)	1.1 (.51)
1-1/4		5500A7013	18			.9 (.42)
1-1/2	Female	5500A8001	38	2.5 (64)	5.9 (149)	1.2 (.54)
2-1/2	Female	5500A9002	65	4.0 (102)	6.9 (173)	1.3 (.56)

* Port sizes listed are for use with products in this bulletin. Other port sizes available; consult ROSS.

Pressure Range: 150 psig (10 bar) maximum.

CAUTIONS

PRE-INSTALLATION or SERVICE

- Before servicing a valve or other pneumatic component, be sure that the electrical supply is turned off and that the entire pneumatic system is shut off and exhausted.
- All ROSS products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any installation can be tampered with or need servicing after installation, persons responsible for the safety of others or the care of equipment must check every installation on a regular basis and perform all necessary maintenance.
- All applicable instructions should be read and complied with before using any fluid power system in order to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use.
- Each ROSS product should be used within its specification limits. In addition, use only ROSS parts to repair ROSS products. Failure to follow these directions can adversely affect the performance of the product or result in the potential for human injury.

FILTRATION and LUBRICATION

- Dirt, scale, moisture, etc. are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, *best performance will be realized if a filter is installed to clean the air supply*, thus preventing contaminants from interfering with the proper performance of the equipment. ROSS recommends a filter with a 5-micron rating for normal applications.
- All standard ROSS filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Do *not* fail to use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition, hazardous leakage, and the potential for human injury. Immediately replace a crazed, cracked, or deteriorated bowl. When bowl gets dirty, replace it or wipe it with a clean dry cloth.

- Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum base oils with oxidation inhibitors, an aniline point between 82 degrees Celsius (180 degrees Fahrenheit) and 104 degrees Celsius (220 degrees Fahrenheit), and an ISO 32, or lighter, viscosity. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure and/or human injury.

AVOID INTAKE/EXHAUST RESTRICTION

- Do not restrict the air flow in the supply line. To do so could reduce the pressure of the supply air below the minimum requirements for the valve and thereby cause erratic action.
- Do not restrict a poppet valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

ROSS expressly disclaims all warranties and responsibility for any unsatisfactory performance or injuries caused by the use of the wrong type, wrong size, or inadequately maintained silencer installed with a ROSS product.

POWER PRESSES

- Mechanical power presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve.

ENERGY ISOLATION/EMERGENCY STOP

- Per specifications and regulations, ROSS L-O-X® and L-O-X®/EEZ-ON® products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

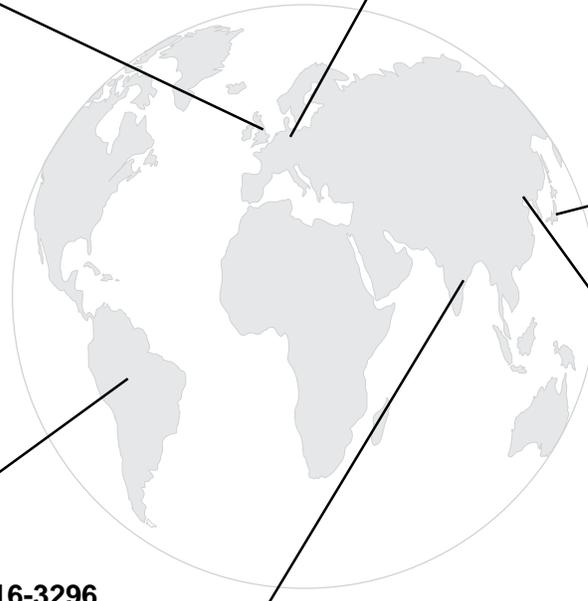


ROSS CONTROLS®
P.O. Box 7015
Troy, Michigan 48007-7015 U.S.A.
Telephone (00) 1-248-764-1800
Fax (00) 1-248-764-1850
www.rosscontrols.com
In the United States:
Customer Service- 1-800-GET-ROSS
Technical Service- 1-888-TEK-ROSS
ROSS/FLEX® Service- 1-888-ROSS-FLX

ROSS UK Ltd.
St. James Road, Brackley
Northamptonshire NN13 7XY
United Kingdom
Telephone (011) 44-1280-706668
Fax (011) 44-1280-705630

ROSS EUROPA GmbH
Robert-Bosch-Strabe 2
D-63225 Langen, Germany
Telephone (011) 49-6103-7597-0
Fax (011) 49-6103-7469-4

ROSS ASIA K.K.
10209-5 Tana, Sagamihara-shi
Kanagawa 229-1124, Japan
Telephone (011) 81-427-78-7251
Fax (011) 81-427-78-7256



ROSS CONTROLS-
BRAZIL
Sao Paulo
Telephone (011) 55-11-9916-3296

ROSS ASIA K.K.-
CHINA LIAISON OFFICE
Room 701, Taiji Building,
No. 33.1249 Street
Xikang Road
Shanghai, China
Telephone (011) 021-6298-5123
Fax (011) 021-6299-0529

ROSS UK LTD.-
INDIA LIAISON OFFICE
'B' Mount Chambers, Fourth Floor
758 Mount Road
Chennai, 600 002 India
Telephone (011) 91-44-841-3136
Fax (011) 91-44-841-3137

WARRANTY

Products manufactured by ROSS are warranted to be free of defects in material and workmanship for a period of one year from the date of purchase. ROSS' obligation under this warranty is limited to repair or replacement of the product or refund of the purchase price paid solely at the discretion of ROSS and provided such product is returned to ROSS freight prepaid and upon examination by ROSS is found to be defective. This warranty shall be void in the event that product has been subject to misuse, misapplication, improper maintenance, modification or tampering. THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND ROSS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ROSS MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT SHALL ROSS BE LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF ROSS SHALL EXTEND THE LIABILITY OF ROSS AS SET FORTH HEREIN.