



# WILLIAMS

## MILTON ROY

# MK XIIA OSCILLAMATIC CONTROLLER

Williams Instrument Incorporated is proud to announce its latest addition to its existing line of pneumatic Oscillamatic® Controllers – the MK XIIA.

### Maximum Corrosion Resistance, Minimum Maintenance

The MK XIIA combines the advantages of 316SS Stainless Steel construction for maximum corrosion resistance and the Diaphragm-Style design for minimal maintenance to provide for optimum performance



### FEATURES

- **Wide Supply Pressure Range**  
(30 – 100 psig)
- **Accuracy and Repeatability**  
(± 1.75% @ 30 PSI to ± 2% @ 45 SPM with clean, dry instrument air)
- **Versatility:** 1-45 SPM standard speed range with 10:1 turndown achieved in one setting
- **Low Maintenance:**  
Minimum internal moving parts  
Easy assembly and disassembly
- **Standard Materials of Construction:** 316SS  
(all parts exposed to Air/Gas supply)
- **Diaphragm:** Neoprene
- **Shipping Weight:** 2 lbs.
- **Dimensions:**  
Height: 4.75"  
Diameter: 2"  
Inlet & Outlet: 1/4-18 NPT

### DESIGN IMPROVEMENTS

- Compact size and lightweight
- Diaphragm design for cleaner operation and reduced maintenance
- No oil or grease is needed
- Hardened 17-4 ph Stainless Steel seats
- New bolt design for easy access to diaphragms for maintenance
- Bottom plug allows for servicing of pilot plug and lower spring
- Available with 3-15 CSM port hole upon request

### RECOMMENDED APPLICATIONS

- Corrosive Environments and Gases (onshore or offshore) and Sour Gas
- V and W Series Pneumatic Plunger Pumps
- LD and HD Series Pneumatic Diaphragm Pumps
- Retrofitting of any older style pump controller

### CONTROLLER COMPARISON

MODELS	SUPPLY PRESSURE	BODY MATERIAL	STROKES (SPM)	ELASTOMER OPTIONS	SPOOL STYLE
MK XIIA	30-100 PSI (2.0-6.9 Bar)	316 ss	1 - 45	Neoprene, Buna N, Viton®	Diaphragm
MK X	35-100 PSI (2.4-6.9 Bar)	316 ss	1 - 45	Buna/TFE, Viton®/TFE	U-Cup
MK VII	50-90 PSI (3.4-6.2 Bar)	Anodized Aluminum	1 - 45	Neoprene, Viton®	Diaphragm
MK II	25-65 PSI (1.7-4.5 Bar)	Anodized Aluminum	1 - 45	Neoprene, Viton®	Diaphragm

# MK XIIA

## OSCILLAMATIC CONTROLLER (30-100 PSI)

### PHYSICAL / FUNCTIONAL DESCRIPTION

The MK XIIA Controller operates on the same operating principal as the MK X Controller. The MK XIIA has the same upper and lower chambers, but are separated with flexible diaphragms rather than sliding seals. A capillary tube, controlled by a needle valve, transfers the supply air/gas from the lower to the upper chamber.

When the spool is in the highest position, a pilot plug closes a vent and opens the supply air/gas to the pump. When the spool is in its lowest position, the pilot plug prevents the supply air/gas from entering the pump, and opens the air/gas vent to let it exhaust the pump. The spool then returns to its highest position to repeat the process.

### GENERAL OPERATING SEQUENCE

The spool spring forces the spool upward to its highest position and unseats the top of the pilot plug from the upper seat. The exhaust spring forces the pilot plug upward and seats it on the lower seat. This blocks the air/gas exhaust port.

High-pressure air/gas passes slowly through the control passage in the controller, past the valve stem, and into the valve body upper chamber, causing pressure to build up in the chamber. Because the surface area of the upper diaphragm is much larger than that of the middle diaphragm, the downward force on the spool is greater than the upward force. This pressure pushes the spool down until the pilot plug seats itself on the upper

valve seat, shutting off the air/gas supply. As the spool continues to move down, it pushes the pilot plug until the plug is unseated from the lower valve seat and allows the air/gas to exhaust through the lower valve from both the motor cylinder and the valve body volume chamber.

When the pressure in the chamber is low enough, the spool spring starts pushing the spool upward. The exhaust spring pushes the pilot plug upward, and the controller returns to its initial position.

### MK XIIA CONTROLLER DISASSEMBLY

Refer to MK XIIA Controller Parts List. To disassemble, do the following:

- 1) Remove Red Cap
- 2) Remove (4) socket head cap screws holding the controller together using a 5/32" hex wrench. Separate upper valve body from the lower section.
- 3) Lift off and remove inner diaphragm assembly. Set aside
- 4) Lift out the spool spring.
- 5) Turn lower controller body upside down. Using a 3/16" hex wrench, unscrew bottom plug. Remove bottom plug, lower spring and pilot plug.
- 6) Return controller body as before and unscrew lower seat with a 3/16" hex wrench. Remove lower seat.
- 7) To disassemble the inner diaphragm and spool assembly, first remove outer sleeve and mid ring by sliding past the diaphragms towards the upper seat. Use a small screwdriver or hex wrench to place through the inner spacer holes, and with a 9/16" wrench unscrew the upper seat and lower diaphragm. Place the top

diaphragm, stop (and inner sleeve with screwdriver/hex wrench) into a soft jaw vice with a vee notch. Lightly clamp top diaphragm stop. Unscrew inner sleeve. Remove the mid diaphragm from the top diaphragm stop. Remove the lower diaphragm from the upper seat. Clean all metal parts. Inspect and/or replace all three diaphragms.

### MK XIIA CONTROLLER REASSEMBLY

8) To reassemble, push the mid diaphragm onto the top diaphragm stop. Push the lower diaphragm onto the upper seat. Thread the inner spacer onto these (2) diaphragm assemblies. With a screwdriver and 9/10" wrench, tighten securely, but not enough to pucker the diaphragms. Install the mid ring, counter bore first, onto the diaphragm assembly past the lower diaphragm and then the mid diaphragm. Some maneuvering of the diaphragms will be needed. Install the outer sleeve by sliding past the lower diaphragm. Insure the narrow seat on the sleeve goes against the mid diaphragm and the wider seat is against the lower diaphragm. Some maneuvering of the lower diaphragm will also be needed. The inner assembly is now complete.

9) Install the inner assembly into the lower controller body. Make sure all the capillary holes in the upper diaphragm, the mid ring and the mid diaphragm are in line with the capillary hole of the lower body. Use a small awl or hex wrench to thread together. Install (1) of the (4) body screws from the under side through the loose parts and through the top of the diaphragm. Now remove the awl and place on top of the assembly the upper control body. Insure the capillary hole is in-line with the others. Loosely thread together the (1) one body screw. Install remaining (3) screws and torque all to 28-32 inch pounds.

