Installation & Maintenance
Instructions MM-713

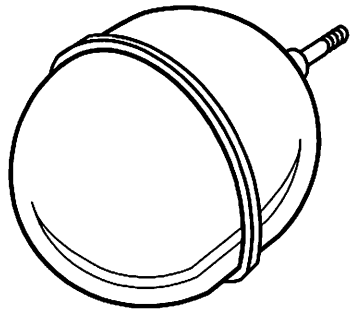
McDonnell & Miller

ITT Industries

Replacement Float

SA91-60

For Installation on Series 93/193 and Series 94/194 Pump Controller/LWCO



Replacement Float

⚠ WARNING

- **Before using this product read and understand instructions.**

- **Save these instructions for future reference.**

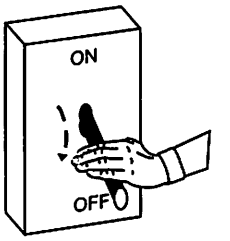
- **All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of plumbing, steam, and electrical equipment and/or systems in accordance with all applicable codes and ordinances.**

Failure to follow this warning could cause property damage, personal injury or death.

STEP 1 - Removal and Replacement Float

a. Turn power off to boiler and all controls. Allow boiler to cool to 80°F (27°C) and reduce the pressure to 0 psi (0 bar).

Drain water in the boiler to a level that is below the float chamber.

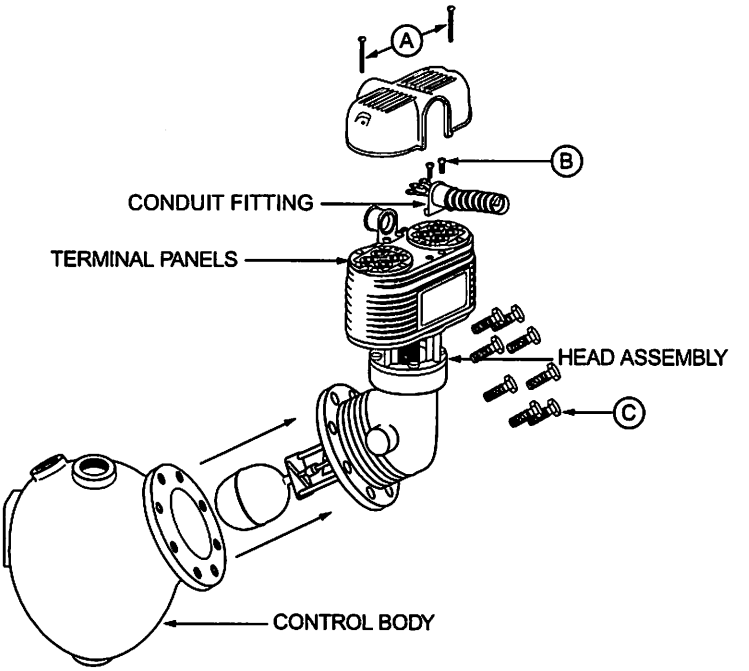


⚠ CAUTION

There may be more than one source of power to the boiler.

b. Remove Head Assembly

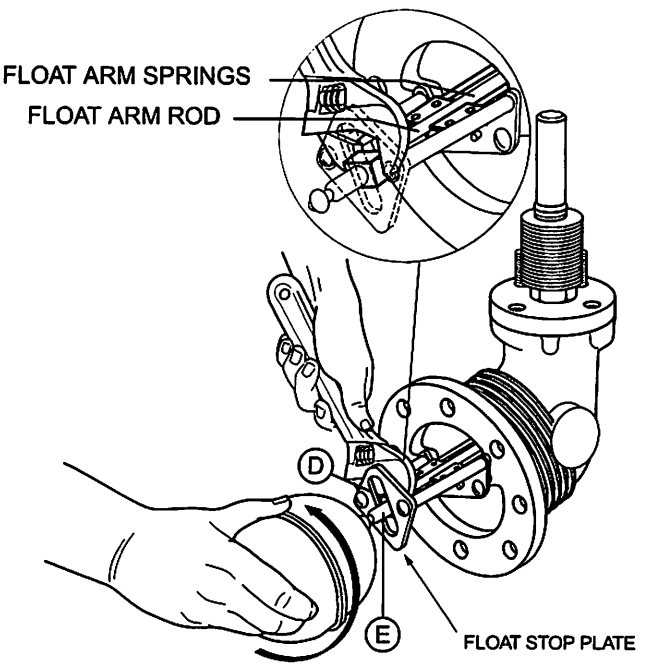
- Remove two screws (**A**) and lift off **switch cover.**
- Identify **terminal connections** for rewiring and then disconnect all wires from **terminal panels.**
- Remove two screws (**B**) and lift off **conduit fitting.** Leave wires in conduit for later reconnection.
- Remove head bolts (**C**). There are eight (8) on Series 93/193 and ten (10) on Series 94/194. Carefully remove **head assembly** from **control body.**
- Carefully place **head assembly** in vice where replacement work can be performed more conveniently.



c. Remove and Replace Float

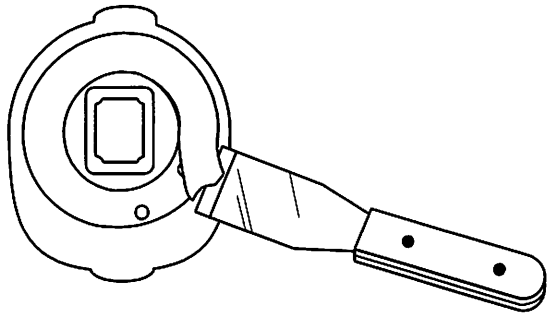
- Place open end of adjustable wrench on square section of float arm (**D**) to keep it from turning.
- Unscrew **float ball** from arm.
- Screw new **float ball** onto float arm rod (**E**), holding square section of float arm nut (**D**) with wrench and tighten securely.

IMPORTANT: Inspect condition of float arm rod and float arm springs. If these are damaged or bent, the entire head assembly will need to be replaced.



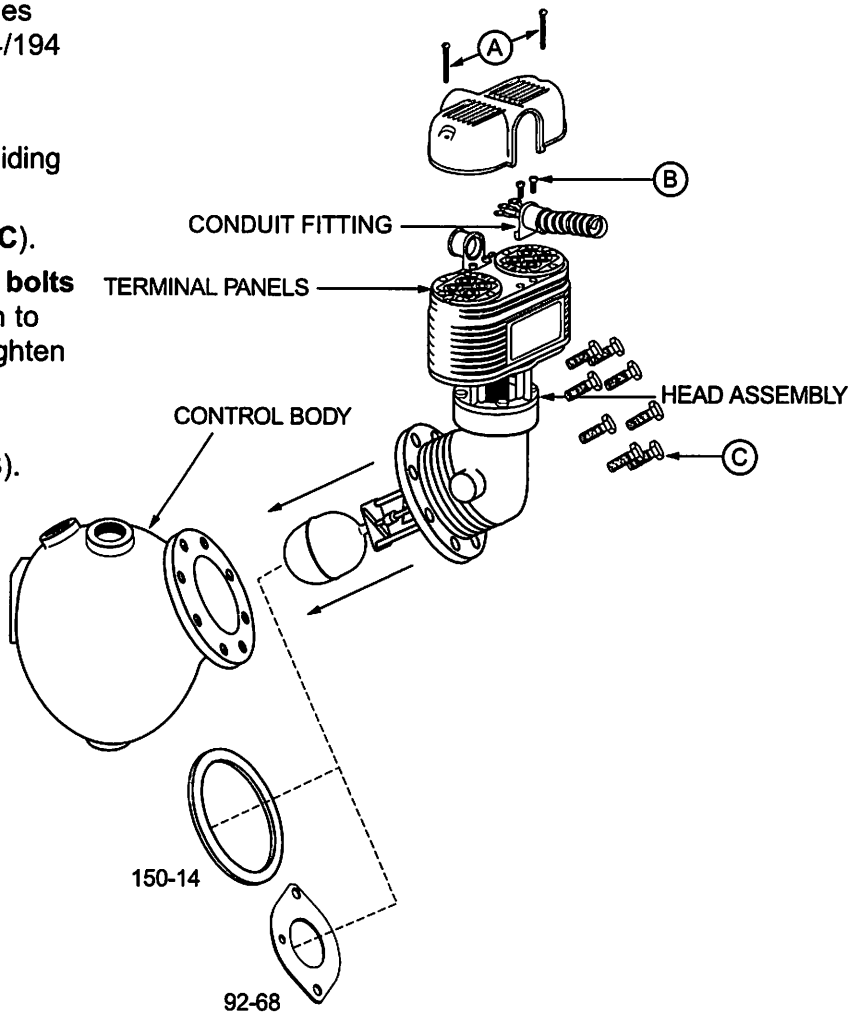
d. Prepare Flange Surfaces
Scrape and clean flange surface **on control body** and **control head.**

IMPORTANT: Care must be taken not to damage flange surfaces. Nicks, scrapes or gouges may cause the flange to leak when in service.



e. Replace Head Assembly

- Slide **flange gasket** (**150-14** for Series 93/193 units and **92-68** for Series 94/194 units) over **float ball** and **float stop plate.**
- Insert **head assembly** by carefully guiding **float ball** into **control body.**
- Align Gasket and install head bolts (**C**).
- Using a torque wrench, tighten **head bolts** in an alternating star pattern. Tighten to 14-20 ft•lbs for Series 93 models. Tighten to 17-21 ft•lbs for Series 94 models.
- Install **conduit fitting** with attached wires and secure with two screws (**B**).
- **Reconnect wiring to terminal panels** in exactly the same position as removed.
- Replace **switch cover** and fasten with two screws (**A**).



STEP 2 - Testing

– Dimensions shown are typical.
– The following testing procedure is only meant to serve as a verification of proper operating sequence.

a. Turn on power to boiler and pump circuits.
With the boiler empty, the pump should turn on (5 or 5-M switch models) or the valve open (7B or 7B-M switch models). The burner should remain off and boiler should begin to fill with water.

> **⚠ CAUTION**
> **Immediately turn off all power if the burner turns on with no water in the gauge glass. Investigate further before continuing procedure.**

b. For Automatic Reset Models
When water level in the gauge glass is approximately 1 3/8" (35mm) above the horizontal cast line, the burner should turn on.

For Manual Reset Models
When water level in the gauge glass is approximately 1 3/8" (35mm) above the horizontal cast line, press the manual reset button and the burner should turn on.

c. For 5 or 5-M Switch Models
When water level in the gauge glass is approximately 2 1/8" (54mm) above the horizontal cast line, the pump should turn off.

For 7B or 7B-M Switch Models
When water level in the gauge glass is approximately 2 11/16" (68mm) above the horizontal cast line, the valve should be closed.

> **⚠ CAUTION**
> **If pump does not turn off or valve close, turn off water supply to boiler. Investigate further before continuing procedure.**

d. With the water in the boiler at its normal level and burner on, SLOWLY open the blow-down valve until it is fully open. As the water level in the gauge glass begins to drop, verify that the following occurs.

For 5 or 5-M Switch Models
When water level drops to approximately 1 1/8" (29mm) above the horizontal cast line, the pump should turn on.
When water level drops to the horizontal cast line, the burner should turn off.

For 7B or 7B-M Switch Models
As the water level drops, the valve should begin to open.
When the water level drops to approximately 7/8" (22mm) above the horizontal cast line, the valve should be full open.
When the water level drops to the horizontal cast line, the burner should turn off.

e. Close the blow-down valve after burner turns off and restore water level to normal operating level.

f. Repeat testing procedure several times to ensure proper operation of control.

g. After testing and verification of control operation, the boiler can be returned to service.

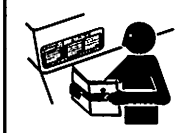
Maintenance & Replacement Instructions MM-815(C)

McDonnell & Miller

ITT Industries

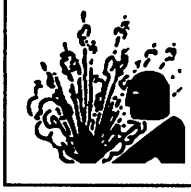
Recommended Maintenance

⚠ WARNING



- **Before using product read and understand the installation instructions.**
- **Save the installation instructions and these maintenance and replacement instructions for future reference.**

- **All work must be performed by qualified personnel trained in the proper application, installation, inspection, and maintenance of HVAC systems in accordance with all applicable codes and ordinances.**
- **To prevent electrical shock, do not touch or make contact with probe ends while the system is energized or activated.**



- **When flushing control (blow down), hot water and steam will flow out. To prevent serious personal injury, connect a drain pipe to the control opening to avoid exposure to steam discharge.**

Failure to follow this warning could cause property damage, personal injury or death.

Inspect all controls annually, and replace, repair, or clean, as needed. All chambered units are to be blown down per manufacturers instructions and local code requirements. These requirements are to be determined by the local service company, and are based on water quality and system operation variables. Refer to the installation instructions provided with the product for specific assembly and test procedures.
McDonnell & Miller products must also be maintained in accordance with the following ASME Code.

ASME Boiler and Pressure Vessel Code - Section VI Paragraph 7.07 G

Low-Water Fuel Cutoff and Water Feeder Maintenance. Low-water fuel cutoffs and water feeders should be dismantled annually, by qualified personnel, to the extent necessary to insure freedom from obstructions and proper functioning of the working parts. Inspect connecting lines to boiler for accumulation of mud, scale, etc., and clean as required. Examine all visible wiring for brittle or worn insulation and make sure electrical contacts are clean and that they function properly. Give special attention to solder joints on bellows and float when this type of control is used. Check float for evidence of collapse and check mercury bulb (where applicable) for mercury separation or discoloration. Do not attempt to repair mechanisms in the field. Complete replacement mechanisms, including necessary gaskets and installation instructions are available from the manufacturer. After reassembly, test as per 7.05H.

Recommended Replacement Intervals

IMPORTANT

- Product repairs made with non-McDonnell & Miller parts will invalidate our warranty as well as any agency recognitions. Without this recognition the product would no longer be eligible for use in listed end-use equipment and may not meet local code requirements.
- Previously used controls should never be installed on a new system. Always install new controls on a new boiler or system.
- A more frequent replacement interval may be necessary based on the condition of the unit at time of inspection. ITT McDonnell & Miller's warranty is one (1) year from date of installation or two (2) years from the date of manufacture.
- Use of water treatment can diminish product life. In such cases, components should be replaced on a more frequent basis.
- Visually inspect the inside of the float chamber during the annual inspection. Partial disassembly may be required.

Recommended Replacement Intervals (continued)

Product	Series	Recommended Maintenance	Recommended Replacement Interval (Maximum)
Low Water Cut-Offs	150, 150E, 157, 158, 159, 150S, 157S, 158S, 159S	Blow down and test daily inspect annually.	15 years
	69, 169, 269, 369, 469	Inspect and test annually.	10 years
	67, 767 70, 70-B	Blow down weekly. Inspect and test annually.	10 years
	61, 63, 64, 764	Blow down weekly. Inspect and test annually.	10 years
	42, 42S	Blow down daily. Inspect and test annually.	10 years
	93, 94, 193, 194	Blow down and test daily. Inspect and test annually.	15 years
	750, PS-800, PS-850, RB-120, RB-122	Inspect and test annually.	15 years
	RB-24	Inspect and test annually.	10 years
Water Feeders	WF2/Uni-Match®	Inspect and test annually. Replace filter annually.	10 years
	101-A	Inspect, test, and replace cartridge valve annually.	10 years
	21, 221, 25-A, 51-S, 53, 851-S, 3155	Inspect and test annually.	15 years
	47, 51, 247, 847, 551-S, 851	Blow down weekly. Inspect and replace cartridge valve annually.	10 years
Liquid Level Controls	LPC-2000, PCH, PCL, PFC, VFS	Inspect and test annually.	15 years
	18, 18-SS, 27-W, 118	Inspect and test annually.	5 years
Replacement Blow Down Valves	14-B	Inspect and test annually.	10 years
	14	Replace with 14-B blow down valve.	3 years
Replacement Probes	750-PA, PS-800, PS-850, RB-120, PCH, PCL, RB-122	Inspect annually.	10 years
Replacement Head Mechanisms for Commercial/Industrial Applications	25-A, 42, 42S, 51, 51-S, 53, 61, 63, 64, 67, 70, 93, 94, 150, 150S, 150E, 157, 157S, 193, 194	Inspect and test annually.	5 years