



Blow Down Piping

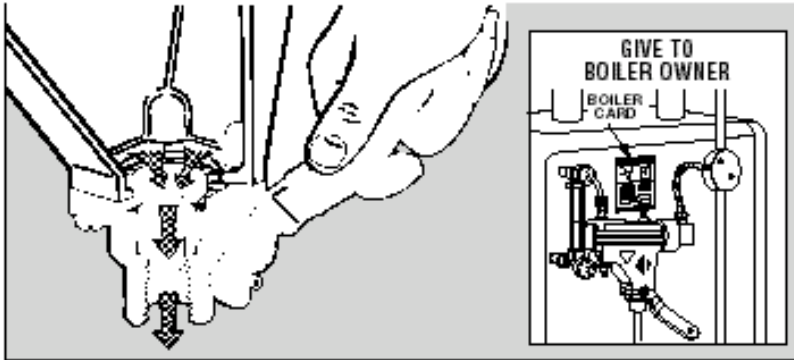
SERIES 67 AND 47 CONTROLS

Each of these controls includes a 14-B blow down valve. The valve is a full port quarter turn type which allows the control to be flushed periodically. The control should be blown down weekly during the heating season when installed on a residential boiler. The blow down should be done with the boiler operating which will not only flush out any sediment but test that the control shuts down the burner.

Aftermarket "Dirt Pocket" blow down valves should not be installed in place of or in addition to the 14-B valve. These usually consist of 'off the shelf' components that void all warranties when installed on a McDonnell & Miller control. Do not be fooled into believing that the control does not have to be blown down when a dirt pocket is installed. Sediment, rust and dirt can build up to render the float inoperative if the control is not blown down regularly.

IMPORTANT IMPORTANT

Be sure to flush your boiler water level control weekly during heating season. Failure to follow this procedure can cause the control to malfunction resulting in serious boiler damage.



The McDonnell & Miller Boiler Water Control installed on your boiler requires periodic maintenance. As boiler water circulates into the float chamber, sand, scale and other sediment may be deposited in the float chamber. While the chamber has been designed with a large accumulation bowl, it is necessary to flush the sediment from the chamber by blowing down the control so the accumulation of sediment does not interfere with the movement of the float in the control. Control must be flushed at least once a week during the heating season.

CAUTION: IF BURNER DOES NOT SHUT OFF DURING BLOW-DOWN REPLACE CONTROL IMMEDIATELY.

Continue draining water, about a pailful, from control until water is clean. Manually close valve. Recheck gauge glass. If water level has dropped significantly, add water to the boiler to restore water level.

CAUTION: PROTECT YOURSELF. WHEN FLUSHING CONTROL, HOT WATER AND STEAM WILL FLOW OUT OF THE DRAIN PIPE.

When flushing control, note water level in gauge glass, add water, if necessary, and allow it to come up to temperature. While burner is on, open blow-down valve at bottom of control by rotating the handle counter clockwise about 1/4 turn to fully open the valve. Opening the blow-down valve also checks the out-of operation. Float should drop shutting burner off, hot water and steam will flow out the drain pipe flushing away sediment.

SPECIAL FLUSHING INSTRUCTIONS FOR NEW BOILER INSTALLED IN OLD SYSTEM

Installation of new boiler may break loose a heavy accumulation of sediment and scale from old piping and radiators. It is extremely important to blow down your McDonnell & Miller Cut-off more frequently the first week.

**First Week - 2 or 3 times
Thereafter - at least once a week.**

McDonnell & Miller



Engineered for life

HANG THIS CARD AS CLOSE AS POSSIBLE TO THE CONTROL, OR REMOVE PROTECTIVE BACKING AND AFFIX CARD TO BOILER JACKET CLOSE TO CONTROL.

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The definitions given in this section are only those that apply to heating and as referenced in this catalog. It is realized that some do not define the terms for all usages, but in the interest of clearance and space this sacrifice was made.

Absolute Pressure –

Actual pressure above zero, which is the atmospheric pressure added to the gauge pressure. It is expressed as a unit pressure such as lbs. per sq. in. absolute.

Atmospheric Pressure –

The weight of a column of air, one square inch in cross section and extending from the earth to the upper level of the blanket of air surrounding the earth. This air exerts a pressure of 14.7 pounds per square inch at sea level, where water will boil at 212 degrees F. High altitudes have lower atmospheric pressure with correspondingly lower boiler point temperatures.

Blow Down Valve –

Also referred to as a blowoff valve. A valve which permits a boiler control to be flushed out, and the function of same to be checked.

Boiler –

A closed vessel in which steam is generated or in which water is heated by fire or electricity.

Boiler Crown –

The part of a boiler which forms the top of the furnace in a fire box boiler, or the equivalent surface in other types of boilers.

Boiler Feed Pump –

A pump that is governed by a control that monitors the actual boiler water level; and only adds water to the boiler when the boiler needs it. The pump controller is mounted on the boiler.

Boiler Heating Surface –

The area of the heat transmitting surfaces in contact with the water (or steam) in the boiler on one side and the fire or hot gases on the other.

Boiler Horse Power –

The equivalent evaporation of 34.5 lbs of water per hour at 212 degrees F to steam at 212 degrees F. This is equal to a heat output of 33,475 BTU per hour, which is equal to approximately 140 sq. ft. of steam radiation (EDR).

British Thermal Unit (BTU) –

The quantity of heat required to raise the temperature of 1 lb. of water 1 degree F. This is somewhat approximate but sufficiently accurate for any work discussed in this catalog.

BSPT –

British Standard Pipe Thread

Built-Ins –

A float-type control that screws directly into the boiler, such as the Series 69 and Series 70 low water cutoffs.

Condensate –

In steam heating, the water formed by cooling steam as in a radiator. The capacity of traps, pumps, etc., is sometimes expressed in lbs. of condensate they will handle per hour. One pound of condensate per hour is equal to approximately 4 sq. ft. of steam heating surface (240 BTU per hour per sq. ft.).

Condensate Pump –

A pump that is controlled by a switch mounted on the condensate tank. It adds water to the boiler when the condensate tank becomes full, whether the boiler needs water or not.

Dry Fire –

Insufficient water in a boiler to carry off the heat of combustion. It causes dry fire which results in cracked cast iron sections, and melted fire tubes.

Dry Saturated Steam –

Saturated steam containing no water in suspension.

EDR – (Equivalent Direct Radiation)

The amount of heating surface that will give off 240 BTU per hour when filled with a liquid that is heated to 215°F and surrounded by 70°F air. It may not have a direct relation to the actual surface area.

Fire Tube Boiler –

This type of boiler has the water on the external side of the tube and the heat (fire) on the internal side of the tube.

Flash (Steam) –

The rapid passing into steam of water at a high temperature when the pressure it is under is reduced so that its temperature is above that of its boiling point for the reduced pressure. For example: if hot condensate is discharged by a trap into a low pressure return or into the atmosphere, a certain percentage of the water will be immediately transformed into steam. It is also called re-evaporation.

Foaming –

A condition that occurs when an organic substance, usually oil, is floating on the surface of the water in a boiler. When the boiler is fired, a layer of foam develops on the surface of the water. This generally is indicated in the gauge glass by large swings in water level.

Freeze Up –

This refers to a structure that has lost its heating system, and the water in the piping freezes.

Furnace –

That part of a boiler or warm air heating plant in which combustion takes place. Sometimes also the complete heating unit of a warm air heating system.

Gauge Glass –

Sometimes called water glass or sight glass. It is a device that gives a visual means of the water level in a boiler. By code, all steam boilers are required to have one.

Head –

Unit pressure usually expressed ft. of water or mil-inches of water.

Heat –

That form of energy into which all other forms may be changed. Heat always flows from a body of higher temperature to a body of lower temperature. *See also: Latent Heat, Sensible Heat, Specific Heat, Total Heat, Heat of the Liquid.*

Heat of the Liquid –

The heat (BTU) contained in a liquid due to its temperature. The heat of the liquid for water is zero at 32 degrees F, and increases 1 BTU: approximately for every degree rise in temperature.

Heat Unit –

In the foot-pound-second system, the British Thermal Unit (BTU).

Heating Medium –

A substance such as water, steam, or air used to convey heat from the boiler, furnace, or other source of heat to the heating units from which the heat is dissipated.

Hot Water Heating System –

A heating system in which water is used as the medium by which heat is carried through pipes from the boiler to the heating units.

Latent Heat of Evaporation –

The heat (BTU of pound) necessary to change 1 pound of liquid into vapor without raising its temperature. In round numbers, this is equal to 960 BTU per pound of water.

Low Pressure Steam –

As defined by ASME, low pressure steam is 15 PSIG or less.

Make-Up Water –

Fresh water added to the system, by various means, to replace normal and abnormal water losses.

Manual Reset –

A control that has to have human input before the burner will come back on after a low water condition.

Maximum Differential (MD) –

A control with this designation has a greater spread between pump on and burner off.

Minimum Safe Water Level –

Also known as the minimum safe operating level. The minimum level of water in a boiler where the burner will still operate. Below this level, the burner should be off due to low water.

NPT –

National Pipe Thread

Overfiring –

A situation where the burner does not turn off, for a number of reasons. The pressure of the system rises and the safety relief valve opens.

Pilot Valve –

A valve that uses a small valve to control a large valve.

Pressure –

Force per unit area such lb. per sq. inch.

Pressure Reducing Valve –

A piece of equipment for changing the pressure of a gas or liquid from a higher to a lower one.

Priming –

When the steam leaving the boiler carries large amounts of water with it, this is called priming. Insufficient heat, water hammer, and a flooded boiler, if the system has an automatic water feeder are some of the symptoms. It is generally caused by a high water level in the boiler, and near boiler piping.

Radiator –

A heating unit located within the room to be heated and exposed to view. A radiator transfers heat by radiation to objects "it can see" and by conduction to the surrounding air which in turn is circulated by natural convection.

Sensible Heat –

Heat which only increases the temperature of objects as opposed to latent heat.

Skimming –

A procedure for cleaning the surface of the water in a boiler. This procedure should be done on all new boiler installations, and when there is a foaming condition.

Steam –

Water in the vapor phase. The vapor formed when water has been heated to its boiling point, corresponding to the pressure it is under. *See also Dry Saturated Steam, Wet Saturated Steam, Super Heated Steam.*

Steam Heating System –

A heating system in which the heating units give up their heat to the room by condensing the steam furnished to them by a boiler or other source.

Steam Pop Safety Valve (Relief Valve) –

A device to prevent over pressure in a boiler. It should be set for 15 psi on low pressure steam boilers. On high pressure boilers, it should be set at the maximum working pressure of the boiler, or lower if the boiler is not going to be operated at its maximum pressure.

Steam Trap –

A device for allowing the passage of condensate and air but preventing the passage of steam.

Supply Mains –

The pipes through which the heating medium flows from the boiler or source of supply to the run-outs and riser leading to the heating units.

Two-Pipe System (Steam or Water) –

A heating system in which one pipe is used for the supply main and another for the return main. The essential feature of a two-pipe hot water system is that each heating unit receives a direct supply of the heating medium which cannot have served a preceding heating unit.

Tube Bundle –

A single tube (pipe) formed into a tight array so as to present a large surface area in a small space.

Vacuum Heating System (Steam) –

A one or two-pipe heating system equipped with the necessary accessory apparatus to permit the pressure in the system to go below atmospheric.

Vapor –

Any substance in the gaseous state.

Vapor Heating System (Steam) –

A two-pipe heating system which operates under pressure at or near atmospheric and which returns the condensation to the boiler or receiver by gravity.

Vent Valve (Steam) –

A device for permitting air to be forced out of a heating unit or pipe and which closes against water and steam.

Vent Valve (Water) –

A device permitting air to be pushed out of a pipe or heating unit but which closes against water.

Water Tube Boilers –

This type of boiler has the water circulated through a tube bundle with the heat applied on the external side of the tube.

Wet Return (Steam) –

That part of a return main of a steam heating system which is completely filled with water of condensation.



Underwriters' Laboratories listed –
This product has been UL listed.



Factory Mutual –

This product is approved for used in an "accepted" system installation. Such installations where the product falls into one of the following categories:

- Is used for the control or prevention of property damage.
- Those items that are improperly designed would pose serious hazards.



Underwriters' Laboratories' of Canada –
This product has been UL listed.



Underwriters' Laboratories Recognized Component - US and Canada

This product is listed as a Recognized Component



CE Conformance –

- This product complies to the LVD Directive 73/23/EEC.
- This product complies to the EMC Directive 89/33/EEC depending on the application.



Canadian Standards Association –
This product meets or exceeds the Canadian Standards Association requirements.

**AGENCY LISTINGS AS OF 11/06
UNDERWRITERS' LABORATORIES**

File	UL Category Code	Description	M&M Products
MP918	MBPR	CONTROLS, LIMIT	750 & 750B series with RS Sensors, PS series, RB series, 42S, 47, 51, 51S, 53, 61, 63, 64, 67, 69, 93, 94, 150S, 247, 847C-2, WF series
MP918	MBPR2	CONTROLS, LIMIT - COMPONENT	750P, PS 800 RX2 PS 800 series with PA probe series
MP918	MBPR7	CONTROLS, LIMIT - CANADA	RB-24
MP918	MBPR8	CONTROLS, LIMIT - COMPONENT - CANADA	750B series, 750B-C probes
MH2725	MFHX	SWITCHES	AF series, FS1 series, FS4-3 series, FS5 series, FS6 series, FS7-4 series, FS8-W series
MH16430	MJAT	MISCELLANEOUS, HEATING AND HEATING-COOLING APPLIANCE ACCESSORIES	TC-4
E71944	NKPZ	MOTOR CONTROLLERS, FLOAT AND PRESSURE OPERATED	FS1-W
E33646	NMFT	MOTOR CONTROLLERS, MISCELLANEOUS	FS7-4 series
E33552	NQLX	MISCELLANEOUS MOTOR CONTROLLERS, FOR USE IN HAZARDOUS LOCATIONS	FS7-4E series, AFE-1
S864	USQT	EXTINGUISHING SYSTEM ATTACHMENTS	FS4-3F series, FS7-4F series
MP1197	YIOZ	VALVES, ELECTRICALLY OPERATED	101A

CANADIAN STANDARDS ASSOCIATION

File	CSA Class Code	Description	M&M Products
5545	3211-07	INDUSTRIAL CONTROL EQUIPMENT	42S, 47, 51, 51S, 53, 61, 63, 64, 67, 69, 93, 94, 150E, 150S, 247, AF, FS1, FS4-3, FS5, FS6, FS7-4, FS8-W, 101A, and RB series
20395	3218-05	INDUSTRIAL CONTROL EQUIPMENT - MOTOR CONTROLLERS - For HAZ. LOC.	FS7-4E Series
20955	4813-02	TEMPERATURE-INDICATING AND REGULATING EQUIPMENT	FS4-3, FS5, FS8-W, AF, 61, 64, 67 & 69 series
76645	4812-06	SIGNAL APPLIANCES	WF2-U series
76645	4813-02	TEMPERATURE-INDICATING AND REGULATING EQUIPMENT	750, 750-HW-MT-120 with RS-1- Sensor, PS 800 series

Flow switch operating controls are not electronic and are intended for continuous operations in normal pollution situations. The switch has type 1C action for micro interruptions on operations. They are independently mounted water flow operating controls which are intended for surface mounting, that make or break an electrical circuit when flow starts or stops.

Temperature Range: The maximum mounting surface temperature (T_S) and the maximum fluid temperature (T_L) allowed for the control is the maximum value as indicated in the Operation Temperature Range.

Earthing: If the internal switch does not have an "insert earthing symbol here" marked on a terminal screw the control is earthed via the pipe mounting.

Enclosure Protection Class

Nema Enclosure	Equivalent IP Rating	Flow Switch Models
Type 1 General Purpose	IP 21	All Models
Type 4X Water Proof	IP 56	FS-1W, FS6-W, FS7-4W FS8-W
Type 7 and 9 Hazardous Locations	N/A	FS7-4E

Switch Ratings

7.4 (7.4)A/120V~	3.7 (3.7)A/240~
0.3A/120V=	0.15A/240V=

CE Conformance

Refer to the specific series ranges stated below. For applications outside these ranges additional means of suppression may be required.

Refer to the Declaration of Conformity for specific standards applied (available on request).

Series AF

For applications with loads between 0.5 and 3.7 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than 5 times per minute, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

For applications with loads between 38 mA and 0.5 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than once per 5 minutes, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

Series AFE, FS1, FS5

For applications with loads between 0.5 and 3.7 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than once per 2.5 minutes, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

For applications with loads between 0.5 and 38 mA, power factors exceeding 0.65, an anticipated system switch operation rate of less than once per five minutes, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

Series FS4

For applications with loads between 14 mA and 3.7 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than 5 times per minute, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

Series FS6

For applications with loads between 38 mA and 3.7 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than once per 2.5 minutes, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

Series FS7

For applications with loads between 14 mA and 3.7 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than 5 times per minute, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

Series FS8

For applications with loads between 0.5 and 3.7 Amps, power factors exceeding 0.65, an anticipated system switch operation rate of less than once per 2.5 minutes, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

For applications with loads between 0.5 and 38 mA, power factors exceeding 0.65, an anticipated system switch operation rate of less than once per 5 minutes, and any one cycle greater than 3 seconds on and 3 seconds off, the product complies.

IMPORTANT

- 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.

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 Cut-Off and Water Feeder Maintenance. Low-water fuel cut-offs 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

Product	Series	Recommended Maintenance	Recommended Replacement Interval (Maximum)
Low Water Cut-Offs	150E,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	Blow down weekly. Inspect and test annually.	10 years
	61, 63, 64, 764	Blow down weekly. Inspect and test annually.	10 years
	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-122E	Inspect and test annually.	15 years
	RB-24S / RB-24 / RB-24A	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	PFC	Inspect and test annually.	15 years
	27-W	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, RB-122	Self cleaning probes. inspect 5 yrs.	10 years
Replacement Head Mechanisms for Commercial/Industrial Applications	25-A, 42, 42S, 51, 51-S, 53, 61, 63, 64, 67, 93, 94, 150, 150S, 150E, 157, 157S, 193, 194	Inspect and test annually.	5 years
Flow Switches	FS1, FS4-3, FS5 FS43T, FS6, FS7-4 FS8W, AF	Inspect and test annually.	10 years