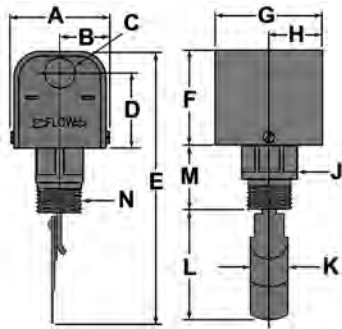


# McDonnell-Miller FS4-3 Liquid Flow Switches

## FS4-3 Series of Flow Switches



## FS4-3 Dimensions (inches)

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
7-5/16	4-15/16	4-5/8	3-9/16	1/2	2-15/16	3-3/8
<b>H</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>	<b>N</b>	
1-11/16	1-7/16	1-1/8	3-7/16	2-1/16	1 pipe	

## FLOW RATES of FS4-3 Series

Pipe Size	Switch Setting	Flow GPM	No Flow GPM
1	Minimum	6	3.6
1	Maximum	10.2	9.2
1-1/4	Minimum	9.8	5.6
1-1/4	Maximum	16.8	15
1-1/2	Minimum	12.7	23
1-1/2	Maximum	7	19.5
2	Minimum	18.8	32.8
2	Maximum	9.4	24
2-1/2	Minimum	24.3	42.4
2-1/2	Maximum	11.6	37.5
3	Minimum	30	52.1
3	Maximum	12	46.1
4	Minimum	39.7	73.5
4	Maximum	19.8	64.2
5	Minimum	58.7	115
5	Maximum	29.3	92
6	Minimum	79.2	39.6
6	Maximum	166	123

Complete FS4 Series are being REPLACED by the 251 Series.

Some FS4 Models remain available.

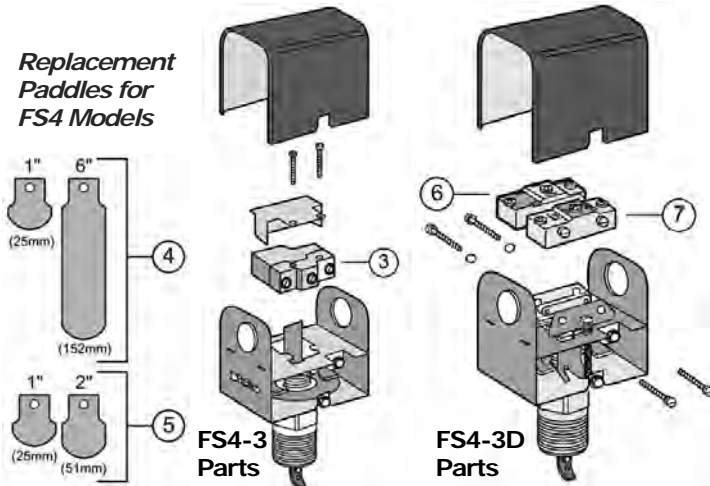
\*Discontinued FS4 Models and Replacement 251 Model Shown.

## FS4-3 Flow Switches

Model No.	Description	Order No.
FS4-3	Liquid flow switch, SPDT switch	<b>MH1145</b>
FS4-3D	with 2 SPDT switches	<b>MH1148</b>
*FS4-3F	for sprinkler service, substitute ▶	<b>MH1142</b>
*FS4-MV	for millivolt service, substitute ▶	<b>MH1142</b>
FS4-3S	stainless steel construction	<b>MH1146B</b>
FS4-3DS	SS construction w/SPDT switch	<b>MH1148A</b>
FS4-3RP	with reinforced paddle	<b>MH1146</b>
*FS4-3-5R	w/5 sec. timer delay, substitute ▶	<b>MH1142</b>
*FS4-3-20	20 sec. timer delay, substitute ▶	<b>MH1142</b>

FS4-3 Repair Parts are available . . .

## Replacement Paddles for FS4 Models

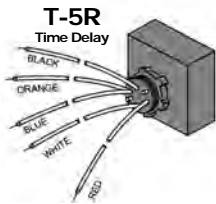


## Repair Parts for FS4-3 Series

For Model No.	Item No.	Description	Order No.
FS4-3	4	<b>Stainless Steel paddle kit:</b> 1", 2", 3" and 6" reinforced paddles.  The 6" paddle can be trimmed to fit down to 3"	<b>MI 1183A</b>
FS4-3D			
FS4-MV			
FS4-3S			
FS4-3DS			
FS4-3-5R			
FS4-3-20			
FS4-3RP			
All Models Except FS4-3D	3	SPDT switch	<b>MI 1187</b>
FS4-3D	6	SPDT switch	<b>MI 1186</b>
FS4-3D	7	SPDT switch, next to adjustment screw	<b>MI 1182</b>

## Time Delay Relays

Model	Description	Order No.
T5R	5 second delay on break, for 120 volts	<b>MH1177</b>
T5R-24V	T5R but for 24 volts	<b>MH1178</b>
T20	20 second delay on make, for 120 volts	<b>MH1180</b>
T20-24V	T20 but for 24 volts	<b>MH1181</b>
T20-24VDC	T20 but for 24 volts DC battery (direct current)	<b>MH1182</b>



## TIME DELAY RELAYS

A short time delay feature in your flow switch may be desirable to eliminate false signals caused by system pulsation and turbulence.

**No. T-5R** provides a 5-second delay in breaking (opening) the circuit.

**No. T-20** provides a 20-second delay in making (closing) the circuit.

Each model is furnished with a locknut for standard 1/2" conduit fitting, spacer washer and 10" lead wires.

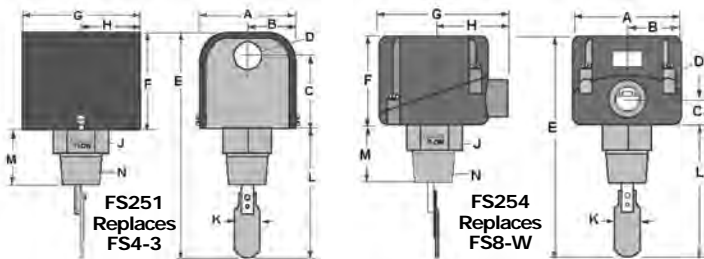


# McDonnell-Miller FS251 & FS254 Liquid Flow Switches

## FS251 Flow Switch



## FS254 Flow Switch



## FS250 Series Flow Switches REPLACE the FS4-3 and FS8W Liquid Flow Switches.

McDonnell & Miller new General-Purpose, Liquid Flow Switches, the Series FS250 - FS251 (NEMA1 version - Replaces the FS4-3), and FS254 (NEMA4 version - Replaces the FS8-W). These flow switches incorporate **Flow Adjusting Screws** & key changes to address customer expressed needs of greater reliability and lower flow sensing capabilities in a general purpose flow switch.

The flow rate at which the FS250 switches prove flow and the differentials between flow and no-flow actuation, is more consistent from switch to switch than flow switches that use a bellows as the sealing technique. Consistency in flow rate sensing provides closer equipment protection control for critical applications such as turning off boiler burners and chiller compressors when liquid flow is below required minimums.

**1, 2, 3 and 6" Stainless Steel Paddles Included!**

### FS250 Series, Dimensions (inches)

Model	A	B	C	D	E	F	G
251	3	1-1/2	2-7/32	7/8	6-3/8	2-15/16	3-3/8
254	3-1/4	1-5/8	3/4	1/2 FIP	6-3/16	2-3/4	3-7/8
Model	H	J	K	L	M	N	
251	1-11/16	1-1/2	1-1/8	3-7/16	2-1/16	1" Pipe	
254	2-1/4	1-1/2	1-1/8	3-7/16	1-7/8	1" Pipe	

### Features of the FS250 Series of Flow Switches:

- Common switching mechanism for both the FS251 and FS254
- 1" male pipe size connection, brass
- 1", 2", 3" and 6" Stainless steel paddles included
- **Sensitivity adjusting screw makes flow adjustment easy**
- Flow detection via stainless steel paddles inserted into flow stream piping
- Brass body, paddle arm and pivot shaft
- Minimum fluid temperature to 32° F; Maximum to 300° F
- Maximum pressure to 150 psi
- EPDM O-Ring seals on the pivot shaft for longer-life and durability in multiple chemical environments
- Cam actuation of electrical switch
- Easily accessible electrical connections and flow sensing adjustment screws
- Measured flow-rate sensing of 5.8 gpm in 1" pipe (2.2 fps) in horizontal pipe installations, which is 18% lower than measured flow of comparable general purpose flow switches from major competitors
- Section IV boiler ratings of 250° F & 160 psig. ■ No lead construction

### Housing materials and Switch Rating:

- FS251 – Steel base with glass reinforced polycarbonate cover (NEMA 1 Switch)
- FS254 – Cast aluminum base and cover (NEMA 4 Switch)

### 5-YEAR WARRANTY

FIVE-year limited warranty, from date of manufacture, on the Series FS250 flow switches. You can have confidence that they meet the reliability requirements you demand.

### EXTENSIVE LAB AND FIELD TESTING

The Series FS250 switches were field tested for over 18 months in numerous applications. They were also laboratory tested, at full rated pressure and temperature, achieving over 240,000 cycles with no failures.

## FS250 Ordering Guide

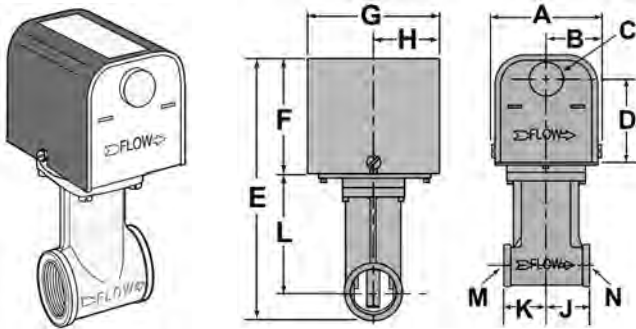
FS-250 Flow Switches		
Model No.	Description	Order No.
FS251	1" NPT, NEMA-1 switch	<b>MH1142</b>
FS254	1" NPT, NEMA-4 switch	<b>MH1142C</b>

### FLOW RATES of FS250 Series

Pipe Size	Switch Setting	Flow GPM	No Flow GPM	Max Flow GPM
1	MIN	6	3.6	27
	MAX	10.2	9.2	
1-1/4	MIN	9.8	5.6	47
	MAX	16.8	15	
1-1/2	MIN	12.7	23	63
	MAX	7	19.5	
2	MIN	18.8	32.8	105
	MAX	9.4	24	
2-1/2	MIN	24.3	42.4	149
	MAX	11.6	37.5	
3	MIN	30	52.1	230
	MAX	12	46.1	
4	MIN	39.7	73.5	397
	MAX	19.8	64.2	
5	MIN	58.7	115	654
	MAX	29.3	92	
6	MIN	79.2	39.6	900
	MAX	166	123	

# McDonnell-Miller FS4-3T Liquid Flow Switches

## FS4-3T Series of Flow Switches



### FS4-3T Dimensions (inches)

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
3	1-1/2	7/8	2-7/32	6-7/8	2-15/16	3-3/8
<b>H</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b> pipe		
1-11/16	1-5/16	1-1/8	3-1/16	3/4 or 1		

### FLOW RATES of FS4-3T

Model No.	Switch Setting	Flow GPM	No Flow GPM
FS4-3T1-3/4	Minimum	4.4	2.6
	Maximum	10.5	9.8
FS4-3T2-3/4	Minimum	3.7	2.2
	Maximum	8.9	8.3
FS4-3T3-3/4	Minimum	2	1.2
	Maximum	4.5	4.1
FS4-3T1-1	Minimum	5	3.2
	Maximum	11.5	11
FS4-3T2-1	Minimum	4.8	2.9
	Maximum	10.1	9.4
FS4-3T3-1	Minimum	2	1.2
	Maximum	4.5	4.1

### Features of the FS4-3T

- For starting or stopping electrically operated equipment
- Built-in 3/4" or 1" pipe size tee
- Sensitivity adjustment screw makes flow adjustment easy
- SPDT snap-switch
- Available for low, medium and high flow applications
- Minimum fluid temp. to 32° F; Max. 300° F.
- Maximum pressure to 150 psi.

### FS4-3T Flow Switches

Model No.	Pipe Size	Description	Order No.
FS4-3T1-3/4	3/4"	Low flow FS4-3T, 3/4" tee	<b>MH1150</b>
FS4-3T2-3/4	3/4"	Medium flow FS4-3T, 3/4" tee	<b>MH1150B</b>
FS4-3T3-3/4	3/4"	High flow FS4-3T, 3/4" tee	<b>MH1151</b>
FS4-3T1-1	1"	Low flow FS4-3T, 1" tee	<b>MH1150A</b>
FS4-3T2-1	1"	Medium flow FS4-3T, 1" tee	<b>MH1150C</b>
FS4-3T3-1	1"	High flow FS4-3T, 1" tee	<b>MH1150D</b>

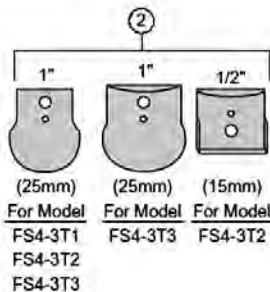
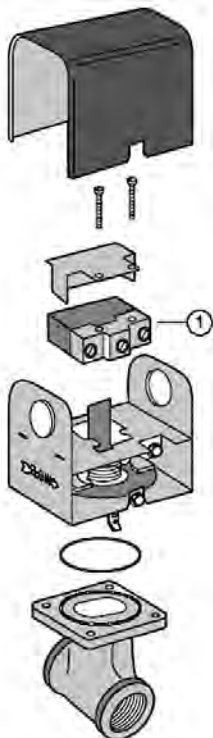
### Repair Parts for FS4-3T Series

Item No.	Description	Order No.
1	SPDT Snap-Switch	<b>MI 1187</b>
2	Paddle kit includes all 3 paddles and the O-Ring	<b>MI 1191</b>

### Time Delay Relays

T5R	5 second delay on break, for 120 volts	<b>MH1177</b>
T5R-24V	T5R but for 24 volts	<b>MH1178</b>
T20	20 second delay on make, for 120 volts	<b>MH1180</b>
T20-24V	T20 but for 24 volts	<b>MH1181</b>
T20-24VDC	T20 but for 24 volts DC battery	<b>MH1182</b>

### Model FS4-3T Repair Parts



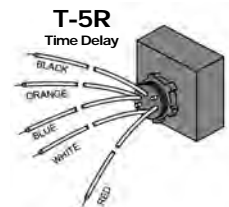
### TIME DELAY RELAYS

A short time delay feature in your flow switch may be desirable to eliminate false signals caused by system pulsation and turbulence.

**No. T-5R** provides a 5-second delay in breaking (opening) the circuit.

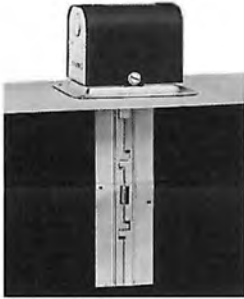
**No. T-20** provides a 20-second delay in making (closing) the circuit.

Each time delay relay is furnished with a locknut for standard 1/2" conduit fitting, spacer washer and 10" lead wires.



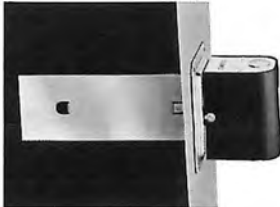
# McDonnell-Miller AF Series Air Flow Switches

## Model AF1



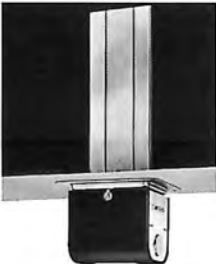
Horizontal Duct  
Top Mount

## Model AF2



Horizontal Duct  
Side Mount

## Model AF3



Horizontal Duct  
Bottom Mount

## Features of the AF Series

- Select from models **AF1, AF1-E, AF2 and AF3.**
- For general applications with medium and high velocity requirements.
- Order the appropriate top, side or bottom mount.
- Sensitivity flow adjusting screw
- Actuates at extremely low flow rates.
- SPDT mercury-free snap-switch
- Minimum air temperature to 32° F; Maximum to 300°

Flow Rates (inches) of AF Series Air Flow Switches			
Model No.	Settings	Flow FPM	No Flow FPM
AF1, 7¼" paddle	MIN	480	185
	MAX	1385	1160
AF1, 5¼" paddle	MIN	700	220
	MAX	2230	1820
AF2	MIN	300	100
	MAX	1900	500
	MIN	350	100
	MAX	1950	900
AF3, horizontal	MIN	235	175
	MAX	1445	1365
AF3-D, horizontal	MIN	295	220
	MAX	1445	1000
AF3, vertical	MIN	450	430
	MAX	1470	1395
AF3-D, vertical	MIN	560	540
	MAX	1470	1030

AF Air Flow Switches		
Model	Description	Order No.
AF1	Air flow switch complete	MH1130
AF1-S	AF1, stainless steel	MH1131
AF2	Low velocity air switch	MH1134
AF3	Lowest velocity switch	MH1135
AF3-D	AF3, two SPDT switches	MH1135A

Repair Parts for AF Series		
Item No.	Description	Order No.
1	Switch for <u>all</u> AF models	MI 1193C
2	Gasket for <u>all</u> AF models	MI 1162
3	Paddle kit for AF1	MI 1162A
3	Paddle kit for AF2	MI 1163
3	Paddle kit for AF3	MI 1163A
4	Paddle kit for AF1-S	MI 1162B

Paddle kits includes washers and screws.  
Units can be equipped with time delay relays.

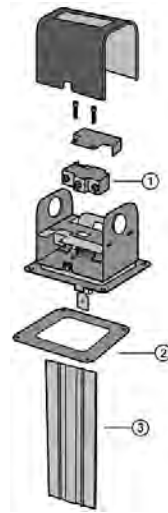
### AF1 Parts



### AF2 Parts



### AF3 Parts

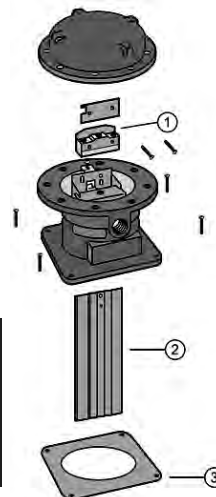


## Model AF1-E

- For hazardous environments with medium velocity requirements.
- NEMA 7 and 9 rated.
- Sensitivity flow adjusting screw
- 1/2" pipe connection
- SPDT mercury-free snap-switch
- Maximum air temp. to 300°



AF1-E Air Flow Switch		
Model	Description	Order No.
AF1-E	Air flow switch, NEMA	MH1136



Repair Parts for AF1-E		
Item No.	Description	Order No.
1	Switch	MI 1182
2	Paddle kit	MI 1164A
3	Gasket	MI 1164

Flow Rates of AF1-E			
Mounting	Settings	Flow FPM	No Flow FPM
Top	MIN	480	185
	MAX	1385	1160
Side	MIN	700	220
	MAX	2230	1820