



... the level & gas people

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ISO-9001 : 2008 CERTIFIED COMPANY

## Insertion Type Magnetic Flow Switch (Series 40HK-1)

### Introduction

AUTOMAT insertion type flapper (Vane) operated Magnetic Flow Switches are suitable for sensing flow of liquids like oil, chemical or in water lines. These Switches can either be supplied in Weather proof housing or Explosion proof housing certified by CIMFR Dhanbad.

### Principal

The flapper is magnetically linked to a pivoted Micro switch which is isolated from the process by a non-magnetic enclosing tube. As the flapper moves with an increase in flow, it drives attraction sleeve into the field of a permanent magnet located outside the enclosing tube which actuates the switch. As flow decreases, the flapper returns to a vertical position allowing the magnet and switch assembly to return to the 'No Flow' position.



Fig.1

1

### Series Description

Series 40HWP..... Flow switch in Weather Proof Enclosure certified by CIMFR Dhanbad.

Series 40H..... Flow switch in Explosion Proof & Weather Proof Enclosure certified by CIMFR Dhanbad.

### Technical Specifications

- Service : Condensate, Oil, Liquids
- Operating Pressure & Temp : Upto 25 kg/cm<sup>2</sup> @ 150°C
- Sensing Element : Flapper (Vane)
- Process Connection : 2" NPT (M)

### Material of Construction

- a) Flapper and Linkage : 316 SS
- b) Process connection : Carbon Steel / 304SS / 316SS
- c) Attraction Sleeve : 410 SS
- d) Enclosing tube : 316SS / 304SS
- e) Body : Carbon Steel / 304SS / 316SS
- f) Electric Connection : 3/4" NPT (F) Std., Others optional
- g) Setting Accuracy : ± 25%
- h) Contact Rating : Refer **3** on page 2

### Flow Rates (Water Service)

Pipe Line Size		Flow (m <sup>3</sup> /h) Increase		Flow (m <sup>3</sup> /h) Decrease	
Inches	mm	Min.	Max.	Min.	Max.
2.00	50	6.0	3.5	4.5	10.0
3.00	75	8.5	19.0	6.5	4.0
4.00	100	11.0	25.5	8.5	18.5
6.00	150	19.0	39.5	13.5	27.5
8.00	200	28.0	51.0	19.5	4.5

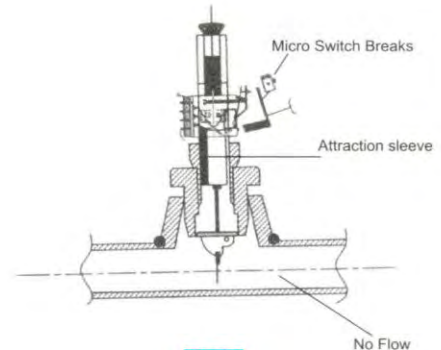


Fig.2

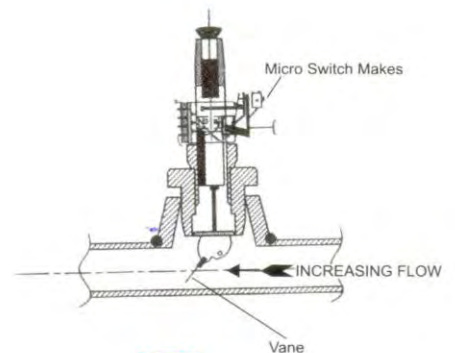


Fig.3

## 2 Model Number Description

Model No.	Process Connection	Line Size	Body Material	Rating@ 150°C
40 HK-1	A) 2" NPT	1) Upto 6" (150mm)	K) C.S.	P) 10 kg/cm <sup>2</sup>
	B) 2-1/2" 150 ASA Flange	2) 8" to 12" (200mm to 300mm)	L) 304SS	
	C) 2-1/2" 300 ASA Flange	3) 14" & above	M) 316SS	S) 25kg/cm <sup>2</sup>
	D) N.S.(Non-Std.)			

## 3 Switch and Enclosure Details

Switch Description	Rating		Contacts	Switch Enclosures	
	AC	DC		W.Proof (40 HWP)	Ex. Proof (40 H)
Type 'A' Standard Micro Switch (Silver Plated)	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	SSW SDW	SSE SDE
Type 'B' Standard Micro Switch (Gold Plated)	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	OSW ODW	OSE ODE
Type 'C' Micro Switch (Silver Plated) for Process temp of 300°C & above	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	TSW TDW	TSE TDE
Type 'D' Micro Switch Silver plated in V. Automat's Hermetically Sealed Enclosure	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	ASW ADW	ASE ADE
Type 'E' Micro Switch Gold plated in V. Automat's Hermetically Sealed Enclosure	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	BSW BDW	BSE BDE
Type 'R' Hermetically Sealed Reed Switch (Rhodium Plated)	Switching Amplifier Rating 5A, 230V AC	0.25A 230V DC	SPDT DPDT	RSW RDW	RSE RDE

## Model Number Example



**40 HWP/40HK1-A-2-K-P/SSW** - Describes a flow switch insertion type in Weather Proof Housing Having 2" NPT CS Process Connection with line size between 8" and 12" and Pressure upto 10 kg/cm<sup>2</sup>. Switch is Micro Switch SPDT.



# On-Line Magnetic Flow Switch (Series 40HK-2)

## Introduction

Automat ON LINE type plug operated Magnetic Flow Switches are suitable for sensing flow of liquids like oil, chemical, or in water lines. These switches can either be supplied in Weather proof housing or Explosion proof housing certified by CIMFR Dhanbad.

## Principle of Operation

Change in flow through Valve Body raises or lowers the plug which causes attraction sleeve to move in the enclosing tube. The increase of flow causes flow plug to lift which causes attraction sleeve to move up in the field of permanent magnet located outside the enclosing tube, which causes the switch to operate. When the flow rate drops below the rate for which the plug is calibrated, a reversal of this action takes place.

### 1 Series Description

Refer 1 on Page 1

### Technical Specifications

Service	: Condensate, Oil, Liquids
Temperature	: upto 150°C
Process Connection	: Screwed NPT or Flanged
Sensing Element	: Plug

### Material of Construction

- a) Attraction Sleeve : 410SS
- b) Enclosing Tube : 316SS / 304SS
- c) Body : CS / Bronze / 304SS / 316SS
- d) Disc & Stem : 316SS / 304SS
- e) Setting Accuracy : ± 25%
- f) Electric Connection : ¾" NPT (F) std, others optional
- g) Contact Rating : Refer 3 on Page 2

### Flow Rates (Water Service)

Pipe Size	Increasing Rate m <sup>3</sup> /hr	Decreasing Rate m <sup>3</sup> /hr
¾" NPT	0.75	0.55
1" NPT	1.25	1.02
1½ NPT	2.75	2.00
2" NPT	3.25	2.75

### 4 Model Number Description

Model No	Process	Body	Rating
40 HK-2	A) ¾"NPT	1) Bronze	J) 10kg/cm <sup>2</sup>
	B) 1"NPT	2) 316SS	
	C) 1½NPT	3) 304SS	
	D) L2"NPT	4) CS	K) 25kg/cm <sup>2</sup>

Note: Flow Switches are designed to operate at maximum temperature of 150°C. For higher temperature upto 200°C, Contact factory.

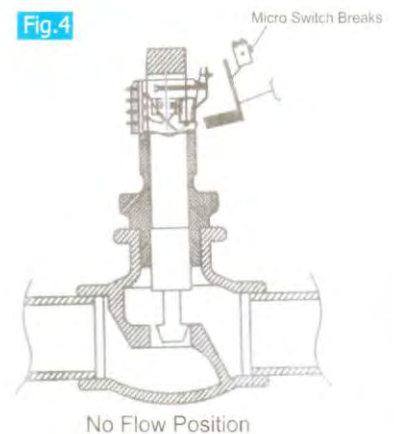
### Model Number Example

**40 HWP/40HK2-A-4-J/SDW** - Describes an on line Flow Switch in Weather Proof Housing and CS ¾" NPT body for Pressure upto 10 kg/cm<sup>2</sup>. Micro Switch is DPDT of rating 5A 230V AC

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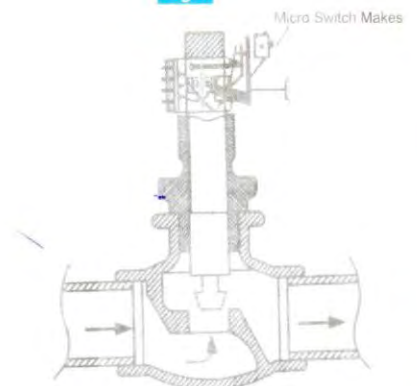


Fig.4



No Flow Position

Fig.5



Position with Flow Present

Fig.6



# Ultrasonic Flow Metering (Open Channel Flow Transmitter)

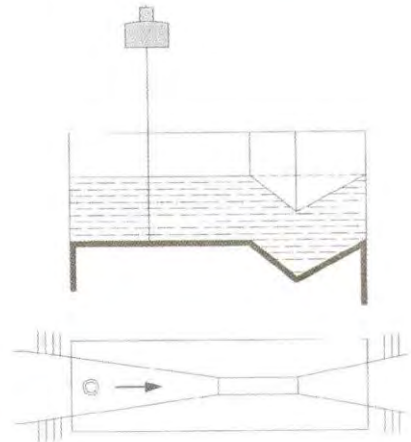
## General

Using the traditional level metering system, consisting of ULTRASONIC sensors and controllers, open channel flow metering can be performed. The metering necessitates a flume or weir through which the liquid flows and elevation of level is reached. As the relationship between the level and the flow can be defined in a mathematical formula, the flow can be computed by measuring the level and applying the relevant formula.

Applications include open channels carrying water or sewage and closed pipers, provided such pipes are free discharging, i.e. non pressurised.

## Parshall Flume

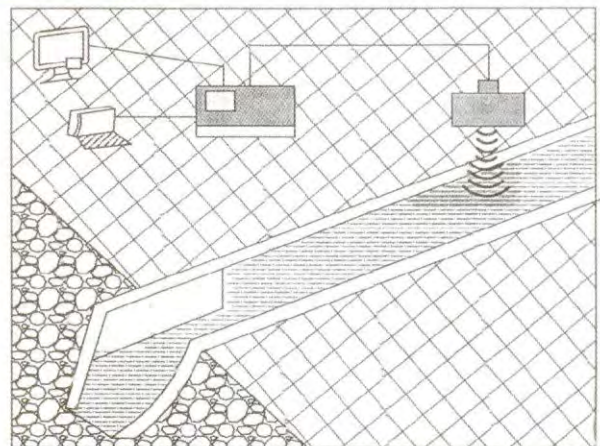
In order to offer a complete ultrasonic flow meter, Automat markets a line of Parshall flumes. To facilitate the best selection for various flow rates, the Parshall flumes cover 8 measuring range form 0.28 ltrs./sec. to 1422 ltrs./sec. The Parshall flume is an all welded construction of corrosion resistant polypropylene sheets with accuracy ensured by the high degree of percision in the manufacturing process



P = Parshall flumes sizes									
	P1	P2	P3	P4	P5	P6	P7	P8	P9
Flow(min)m <sup>3</sup> h	1.0	2.0	3.0	5.1	9.0	11.1	15.1	43.2	61.2
Flow(max)m <sup>3</sup> h	20	48	151	470	907	1640	2509	3373	5137

## Accuracy

The overall accuracy of the Automat flow metering package consisting of a Parshall flume, a sensor and a controller is primarily dependent on the installation of the flume. Therefore proper attention must be paid to the correct positioning of flume in order to ensure laminar flow. Ideally an accuracy of 1.5 to 2% can be attained.



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Specifications Subject to change without prior notice