

## Switches/Transmitters/ Indicators

Insertion Type  
(Magnetic)  
Pg-1

Insertion Type  
(Reed Switch)  
Pg-2,3

Online Type  
(Reed Switch)  
Pg-2,3

Sight Flow  
Indicator  
Pg-3

Online Type  
(Magnetic)  
Pg-4

Pendulum  
Type  
Pg-5

Ultrasonic Flow  
Transmitter  
P-6

Bulletin No.: 700

Effective : December 2001

Supersedes : August 1999

## 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 CMRI or CENELAK U.K.

### Principle of Operation

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.



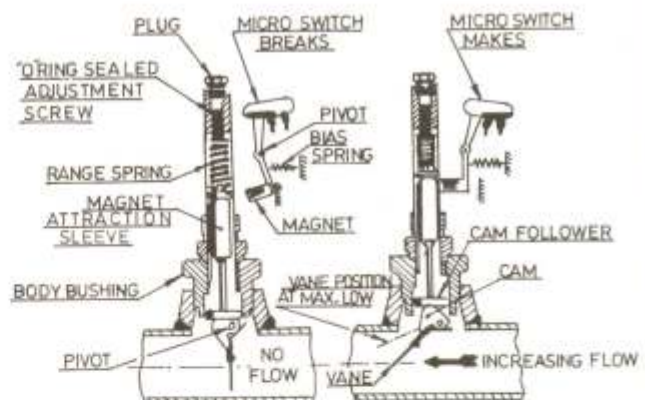
1

### Series Description

Series 40HWP.....	Flow switch in Weather Proof IP 66 Enclosure certified by CMRI as per IS 2147-1962
Series 40H.....	Flow switch in Explosion Proof & Weather Proof Enclosure certified by CMRI for groups IIA & IIB as per IS 2148-1981
Series 40HWP-40EI	Flow switch in Weather Proof Enclosure for Intrinsically safe applications and with Micro or Reed Switch certified by CMRI as per IS 5780-1980 for groups I, IIA, IIB & IIC.

### Technical Specifications

Service	Condensate, Oil, Liquids
Operating Pressure & Temp.	Upto 25 kg/cm <sup>2</sup> @ 150°C
Sensing Element	Flapper (Vane)
Process Connections	2" NPT (M)
Metallurgy	
a) Flapper and Linkage	316 SS
b) Process connection	Carbon Steel / 304SS / 316 SS
c) Attraction Sleeve	410 SS
d) Enclosing tube	316 SS
e) Body	Carbon Steel / 304SS / 316 SS
Electric Connection	3/4" NPT (F) Std., others optional
Setting Accuracy	± 25%
Contact Rating	Refer <b>3</b> 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	13.5	4.5	10.0
3.00	75	8.5	19.0	6.5	14.0
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	34.5

2

### Model Number Description

Model No.	Process Connection	Line Size	Body Material	Rating @ 150°C
40HK1	A) 2" NPT	1) Upto 6" (150mm)	K) C.S.	P) 10kg/cm <sup>2</sup>
	B) 2-1/2" 150 ASA Flange	2) 8" to 12" (200mm to 300 mm)	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 (40HWP)	Ex. Proof (40H)	Int. Safe (40HWP-40EI)
Type 'TVS' Standard Micro Switch (Silver Plated)	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	SSW SDW	SSE SDE	SSI SDI
Type 'OE' Standard Micro Switch (Gold Plated)	5A, 230V AC	0.5A, 110V DC or 0.25A, 230V DC	SPDT DPDT	OSW ODW	OSE ODE	OSI ODI
Type '1HMI' Micro Switch Hermetically Sealed (Silver Plated)	1A, 115V AC 400 Cycles	4A, 28V DC	SPDT DPDT	1HSW 1HDW	1HSE 1HDE	1HSI 1HDI
Type '3HMI' Micro Switch Hermetically Sealed (Gold Plated)	1A, 115V AC 400 Cycles	1A, 28V DC	SPDT DPDT	3HSW 3HDW	3HSE 3HDE	3HSI 3HDI
Type 'R' Hermetically Sealed Reed Switch (Rodium Plated)	5A, 230V AC	0.25A, 230V DC	SPDT DPDT	RSW RDW	RSE RDE	RSI RDI

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.

MAGNETIC FLOW SWITCH (Reed Switch Operated)

Series 40K-1 (Insertion Type) - Series 40K-2 (Online Type)

Introduction

The Reed Switch operated flow switches are supplied in model 40K-2 and 40K-1. Model 40K-2 is ON LINE Type flow switch suitable for direct mounting on pipe of size upto 1-1/2" (37.5 mm) and model 40K-1 is INSERTION TYPE flow switch for Pipe sizes of 2" onwards. Socket is supplied with flow switch for welding on pipe line. These switches are recommended for clear liquids for a maximum temperature of 70°C because of Reed Switch.

Description (Model 40K-1)

Due to presence of flow in the pipe line, the flapper is pushed forward and the flapper (through its pivoted cam) moves a magnet equipped shuttle along the unit stem to actuate the hermetically sealed Reed switch. The switch, in turn, operates a remote alarm or indicator either directly, or through a relay. The switch actuates to give FLOW/NO FLOW signal. The instrument is supplied with C.S./S.S. socket of 1 1/4" BSP which can be welded on the pipe line. The flapper & linkage are of S.S. The housing is weather proof IP 54 and setting accuracy is ± 25%.

Description (Model 40K-2)

Model 40K-2 is ON LINE type suitable for direct mounting on the pipe line. The switch consists of body and the sensing element i.e. flapper. The other end of the flapper is connected to the magnet which operates the Reed Switch. The flow switch is suitable for pipe size of 1/2", 3/4", 1" and 1 1/2" for rating of 10 kg/cm<sup>2</sup> at maximum temperature of 70° C. The switch is supplied with PVC cable of 0.5 meter length. For higher pipe size select Insertion type Flow Switch model 40K-1 or 40HK-1.

Model Number Description

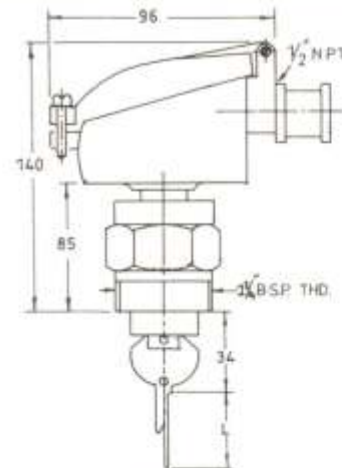
40K-1 Insertion type flow switch with Brass / 316 SS body, and 316 SS flapper and cam for line size of 2" (50mm) and above with Reed Switch. Housing is Weather Proof IP 54. Process Connection 1 1/4" BSP.

40K-2 On line type flow switch with body, flapper and linkage of Brass suitable for line size upto 1 1/2" with Reed Switch.



#### 4 Code Number Description

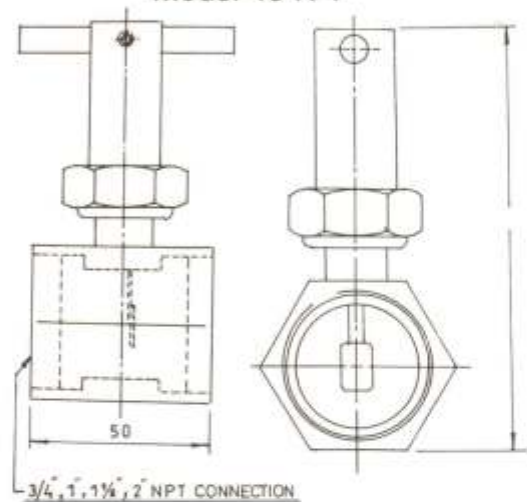
Model No.	Line Size	Contact	Material	Pressure (Max.)
40K2 (On Line Type)	1) ½" NPT 2) ¾" NPT 3) 1" NPT 4) 1½" NPT	J) SPDT Reed Switch	L) Brass	10kg/cm <sup>2</sup>
40K1 (Insertion Type)	5) 2" to 6" 6) 8" & above	K) SPDT Reed Switch	M) Brass P) 304SS S) 316SS	10kg/cm <sup>2</sup>



Model 40 K-1

#### Flow Setting (Water Service)

Model No.	Line Size	Flow Increase m <sup>3</sup> /hr	Flow Decrease m <sup>3</sup> /hr
40K2	½" NPT	0.6	0.45
	¾" NPT	0.9	0.7
	1" NPT	2.4	2.0
	1½" NPT	3.6	3.1
40K1	2" PIPE	5.0	4.2
	2½" PIPE	5.9	5.0
	3" PIPE	6.8	5.9



Model 40 K-2

#### Model No. Example

4 (Only SPDT Type 'R' Reed Switch) RSW (Refer 3 on page 2)

40K-1-5-K-P / RSW : Insertion type Flow Switch for line size between 2" & 6" with SPDT contacts, 304 SS Body & for a pressure of 10 kg/cm<sup>2</sup>

## Sight Flow Indicator Series 40S

Automat Sight Flow Indicators are designed to suit every application in the process industry. They are built to provide instantaneous indication of a liquid flowing through a pipe line.  
SIZE : 15 NB - 600 NB

#### Material of Construction

Body : Carbon Steel / Cast Steel/ AISI 304/316/Brass  
Cover Plate : Carbon Steel/Stainless Steel  
Glass : Toughened Borosilicate/Moulded  
Bolts & Nuts : High tensile steel

#### Technical Data

Operating Pressure : 0 - 3000 PSIG  
Operating temperature : 0 - 200° C

#### Process Connection

Flanged - ANSI/BS/DIN/IS  
Screwed - BSP/NPT / BSPT / BW / SW  
Type : Full View/Flapper/Rotating Wheel

#### Ordering Information

1. Size 2. Connection 3. Material of Construction 4. Working pressure 5. Service 6. Type





## 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 CMRI or CENELAC UK.

### 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 flow plug is calibrated, a reversal of this action takes place.

### 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
Metallurgy	
a) Attraction Sleeve	410 SS
b) Enclosing Tube	316 SS
c) Body	Bronze / 316 SS
d) Disc & Stem	316 SS
Setting Accuracy	± 25%
Electric Connection	¾" NPT (F) std, others optional
Contact Rating	Refer <b>3</b> on page 2

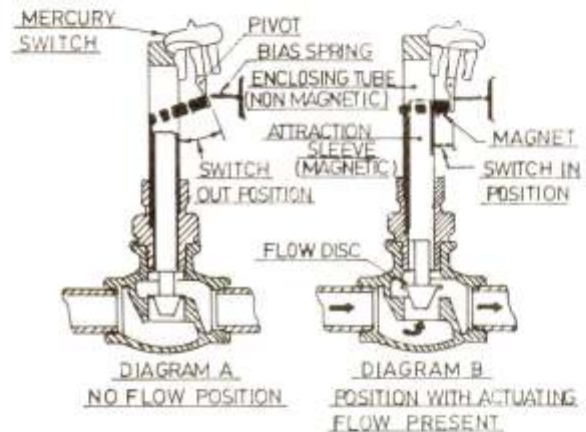


### Flow Rates (Water Service)

Pipe Size	Increasing Rate m³/hr	Decreasing Rate m³/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

### Model Number Description

Model No.	Process Connection	Body Material	Rating @ 150°C	
40 HK2	A) ¾" NPT	1) Bronze	J) 10kg/cm²	
	B) 1" NPT			
	C) 1½" NPT	2) 316SS		K) 25kg/cm²
	D) 2" NPT			



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

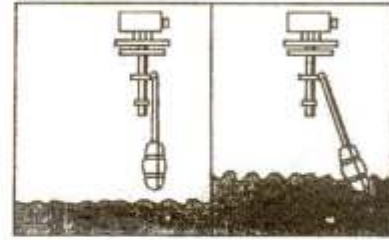
### Model Number Example

**40 HWP/40HK2-A-2-J/SDW** - Describes an on line Flow Switch in Weather Proof Housing and 316 SS ¾" NPT body for Pressure upto 10 kg/cm². Micro Switch is DPDT of rating 5A 230V AC.

## Flow / Level Pendulum Switches (Series 40H-Z4)

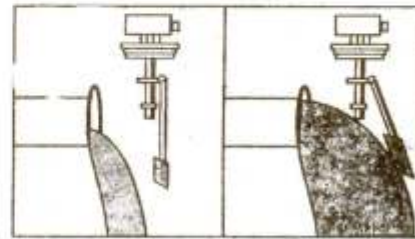
### Introduction

The Pendulum type switches series 40H-Z4 are used to detect Flow / Level of very hot debris such as hot ashes or effluents. The sensing element can be paddle for flow and float for level. The Pendulum tube encloses magnet and the stand pipe houses magnetic switch. In case of flow or level, pendulum tube moves away from stand pipe for operation of magnetic switch. The switch can be connected to transistorised relay which can be installed in the control room or any enclosure. The contact of relay changes from NO to NC or vice versa due to operation of switch.



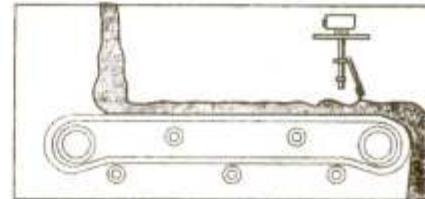
### Applications

1. Granular and powdery debris for flow or level applications.
2. Aggressive, sticky and soiled liquids for flow or level applications.
3. Flow or level of hot ashes, effluents and mud in drains and tubes can be detected.



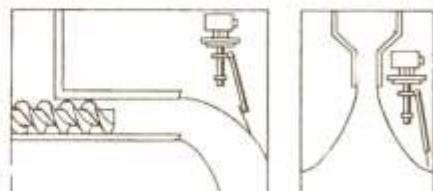
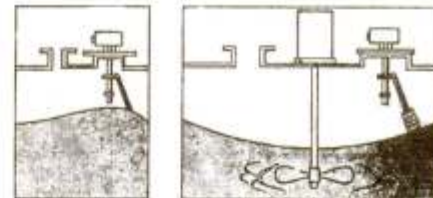
### Technical Features

1. Pendulum switches are pressure resistant water tight insensitive to temperature or flow. Level of hot debris such as hot ashes and effluents can be detected.
2. Pendulum switches are fitted with volt free magnetic switch contacts and can be connected to transistorised relay for non hazardous applications.
3. Pendulum switches can also be supplied with Intrinsically safe Barriers for hazardous applications for groups I, IIA, IIB & IIC.



### Technical Specification

1) Service	Solids, powders & liquids
2) Pressure	10 kg/cm <sup>2</sup> - 40 kg/cm <sup>2</sup>
3) Temperature	150° C Std. (Max. temp. upto 350°C with feeler rods.)
4) Process Connection	3" Flanged, others on request
5) Material	CS / 316 SS/304 SS
Sensor	Float of 57 mm Ø x 152 mm long for level sensing. Paddle of 65 mm width x 150mm long for flow sensing.
Material	316 SS
6) Stand Pipe & Pendulum Tube	316 SS
7) Feeler Rod Length	Depending upon application
Material	316 SS
8) Contact Rating	3 Amp. 230 V AC 1 NO & 1 NC Contacts
9) Protection	Weather proof / Explosion proof / Intrinsically safe





## Ultrasonic Flow Metering (Open Channel Flow Transmitter)

### General

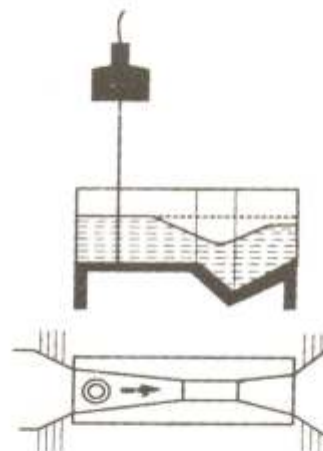
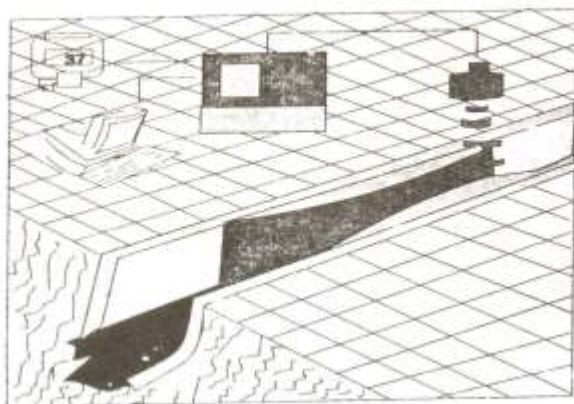
Using the traditional level metering system, consisting of ULTRASONIC sensors and controllers, open channel flow metering can be performed. The metering necessitates a flume or weir through which the liquid flows and elevation of level is reached. As the relationship between the level and the flow can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

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

### 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 ranges from 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 precision in the manufacturing process.

	P1	P2	P3	P4	P5	P6	P7	P8	P9
Q(min)m <sup>3</sup> /h	1.0	2.0	3.0	5.1	9.0	11.1	15.1	43.2	61.2
Q(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 the flume in order to ensure laminar flow. Ideally an accuracy of 1.5 to 2% can be attained.

## V. AUTOMAT & INSTRUMENTS (P) LTD.

Automat House, F-61, Okhla Industrial Area, Phase-I, New Delhi-110 020 (INDIA)

Ph. : 6816349, 6817268, 6817820, 6810307, 6810280 Fax : 91-11-6819440

E-mail : [vautomat@vsnl.com](mailto:vautomat@vsnl.com) website : [www.v-automat.com](http://www.v-automat.com)

#### BARODA

501, 5th Floor Marble Arch  
Race Course Circle,  
Opp. S.T.Div. Office, Baroda-390007  
Ph. : 332947  
Fax : 0265-332947  
E-mail : [vautomatbaroda@hotmail.com](mailto:vautomatbaroda@hotmail.com)

#### MUMBAI

101-102, Acharya  
Commercial Complex,  
Dr. C.G. Road, Chembur,  
Mumbai-400 074  
Ph. : 556712, 5570677, 5519992  
Fax : 022-5570677  
E-mail : [vaipmum@vsnl.net](mailto:vaipmum@vsnl.net)

#### EASTERN REGION

D.B.S. Executive Centre  
8, Acharya J.C. Bose Road,  
Calcutta-700017  
Ph. : 2470400, 2474990, 2477280,  
Fax : 033-2802708  
E-mail : [dbscl@vsnl.com](mailto:dbscl@vsnl.com)

#### CHENNAI

115, Nelson Chamber  
D-14, Basement, Nelson  
Manickam Road, Aminjikarai,  
Chennai-600 029  
Ph. : 3740172, 3740936  
Fax : 044-3740936  
E-mail : [vautomatchennai@mantramail.com](mailto:vautomatchennai@mantramail.com)

#### SECUNDERABAD

Shop No. 425, 3rd Floor, Bhavyas  
Padmavathi Plaza Commercial  
Complex, Bhagya Nagar Society  
Opp. KPHB Colony, Behind KPHB  
Bus Stop, Secunderabad-500 872  
Ph. : 3061784, Telefax : 040-3062151  
E-mail : [vautomat@yahoo.com](mailto:vautomat@yahoo.com)