

# DATA SHEET FOR FLOW INDICATOR NO. DS/FI - 01 - 89.

## ABBREVIATIONS

FI: Flow Indicator

TM: T-Mounting

SN: Order Specifications

RFF: Rate of Full Flow

C: Clearance

$\phi$ : Diameter of pipe on which Flow Indicator to be fitted

Fig.: Relates to Figures in Drg. CS-FI-88-01-RI.

## 1. PURPOSE OF DATA SHEET

We manufacture different models of FI as per Catalogues FI-COND-2 & FS-M. Our Indicators *are* 'made to order' type. After knowing SN as per 'How to Order' column in Cat., we communicate with Indenter if we find any problem in SN. Invariably a solution is offered and mutually acceptable SN is finalized. However, our communication relates only to problems in manufacturing of FI. We do not consider the total layout of pipe line. It is likely, therefore, that a FI working in ideal conditions on Test Pad may not work smoothly after installation because of problems in layout. This Data Sheet, supported with illustrative Drg. CS-FI-88-01-RI, is prepared to give advance information of such problems in planning stage. It can also be referred to analyse any problem after installation of FI.

## 2.. DIRECTION OF FLOW

2.1 We can set and supply FIs suitable for anyone out of 4 directions  
(Direction given considering dial in front)

Left to right (HL) .. Fig. 1A

Right to left (HR) .. Fig. 1B

Vertically up (VU) .. Fig. 1C

Vertically down (VD) .. Fig. 1D

Out of these any direction can be maintained. However, FIs set for one direction can not be used for other direction. Hence care should be taken while specifying direction of flow.

2.2 Care should be taken while laying out the pipe line so that we can supply the best suited FI to you. We have given our recommendations as far as laying of pipe line is concerned on page 2 of this data sheet in Fig.1A, 1B, 1C, 1D.

## 3. RATE OF FULL FLOW

3.1 Our FIs work smoothly on higher rate of flow. Hence position FI in a member where Max. flow is expected in pipe layout.

ILLUSTRATIONS FOR DATA SHEET-05/FI-01-98

OUR RATING:	<p>FIG. 1A.</p> <p>VERY GOOD.</p>	<p>1B.</p> <p>GOOD.</p>	<p>1C.</p> <p>VERY GOOD.</p>	<p>1D.</p> <p>POOR.</p>
-------------	-----------------------------------	-------------------------	------------------------------	-------------------------

<p>FIG. 2A.</p> <p>RECOMMENDED.</p>	<p>2B.</p> <p>RECOMMENDED.</p>	<p>FIG. 3A.</p> <p>RECOMMENDED.</p>	<p>3B.</p> <p>RECOMMENDED.</p>	<p>FIG. 4.</p> <p>RECOMMENDED.</p>	<p>FIG. 5.</p> <p>RECOMMENDED.</p>
-------------------------------------	--------------------------------	-------------------------------------	--------------------------------	------------------------------------	------------------------------------

NOTE - FIG. 2B, 3A, 3B, 4, AND FIG. 5 TAKE CARE AND KEEP 'C' SUFFICIENT TO AVOID TURBULENT FLOW NEAR SENSING VANE.

<p>FIG. 6A.</p> <p>TRY TO AVOID BUT IN UNAVOIDABLE CASES - TAKE CARE &amp; KEEP 'C' SUFFICIENT TO AVOID TURBULENT FLOW NEAR SENSING VANE.</p>	<p>FIG. 6C.</p> <p>TRY TO AVOID.</p>	<p>FIG. 6D.</p> <p>OR MODIFY PIPING AS PER FIG. 6B.</p>	<p>FIG. 7.</p> <p>NOT RECOMMENDED.</p>	<p>FIG. 8A.</p> <p>NOT RECOMMENDED.</p>	<p>FIG. 8B.</p> <p>NOT RECOMMENDED.</p>	<p>FIG. 9A.</p> <p>NOT RECOMMENDED.</p>	<p>9B.</p> <p>NOT RECOMMENDED.</p>
---	--------------------------------------	---	--	---	---	---	------------------------------------

<p>DRN</p> <p>CHD</p> <p>APP</p> <p>DATE</p> <p>SCALE</p>	<p>FLOW INDICATOR WITH SEPARATE T-MOUNTING.</p> <p>SUKRUT UDYOG</p> <p>9/1A, ERANDAWANA, PUNE-411004.</p>	<p>FLOW INDICATOR MOUNTED DIRECTLY ON PIPE LINE.</p> <p>DRG. NO. CS-FI-88-01, R1.</p>
---	---	---

3.2 While specifying RFF great care may be taken. If actual RFF is higher than calculated flow then FI does not get damaged but in case actual RFF is less than calculated flow then the pointer cannot reach the FULL FLOW mark and switch will give alarm signal. Hence specify RFF to a SAFE - LOW rate. This will avoid nuisance tripping problems and inconvenience to staff.

#### **4. RATE OF FULL FLOW AND SWITCHING**

4.1 FIs supplied with one switch are set to operate at 70% of RFF and FIs supplied with two switches are set to operate at 80% and 70% of RFF. It is possible to set switches in NO or NC condition at 100% flow (Full Flow). However, switching below 70% is difficult to achieve when rate of flow is falling. A tolerance of +/- 3% is provided on full flow and a tolerance of +/- 5% of full flow is provided on switching flow.

4.2 While specifying 100% flow, state one value only, Do not specify a range for full flow. For example, do not specify RFF as 1000 to 2000 LPM. State 1000 or 2000 LPM. The switch will operate at 70% of specified RFF. Our FIs can not be reset to different flow than specified.

4.3 Switches operating on dropping rate of flow will recover automatically only when rate of flow rises to value more than 95%. Otherwise they will remain operated.

#### **5. REMEDIES FOR LOW FLOW**

Sometimes it is not possible to set FIs because the specified RFF is very less. In such cases following modifications in pipeline are suggested.

5.1 An area reduction of nozzle can be introduced just upstream to the position of sensing vane. The reduction of bore due to nozzle increases velocity near the vane and FI works smoothly. The TM with such nozzle must be procured with FI from us and position of nozzle upstream to vane will have to be maintained (Fig. 8A).

5.2 TM can be manufactured with eccentric position of FI with respect to main pipe line. It is possible to increase the area of vane by this method which results in smooth working of FI with less flow. For this option head loss problem is not there but care has to be taken for correct orientation of TM while installing TM. For such application also TMs must be procured from us with FIs (Fig. 88).

#### **6. CHANGE IN PIPE DIAMETER**

6.1 Setting of FI and the length of vane shaft is adjusted as per the specified diameter of pipe. As a result it is normally not possible to install FI on different size of pipe than ordered. Hence care should be taken while specifying pipe dia.

6.2 In a pipe line sometimes it is necessary; to use pipe lengths of different diameters. In that case try to install FI on a reduced pipe line after the Reducer (Fig.2A). Installing FI on expanded pipe line after the expansion joint (Fig.28) is likely to create turbulence near vane thereby resulting in nuisance operation of switch.

#### **7. VALVES**

Install FI before a valve (Fig.3A). If positioning of valve upstream to FI is unavoidable, keep it as far possible to avoid effect on impinging flow on vane. (Fig. 38)

#### **8. PUMP**

To circulate liquid in pipe line different types of pumps are required to be used. Position the FI away from pump where flow becomes steady. (Fig. 5)

## 9. OPEN TO AIR DISCHARGE

In case of a horizontal pipe If the discharge of liquid after Indicator is open to Air, then keep sufficient distance between position of FI and Opening end to avoid effect on flow near vane. (Fig. SA)

For VD flows we would recommend that no such application may be planned. The Indicator is always likely to give fluctuations and the switch will give ON-OFFs thereby giving false signal. Hence avoid using Indicator in vertical member with Open to Air discharge (Fig.6C) This problem can be reduced by modifying the end of pipe as shown in Fig. 6B, 6D.

## 10. BY-PASS LINE

As far as possible install FI on main pipe line. Our FIs do not get damaged due to excess flow than specified. Hence plan them in main pipeline where bulk liquid is flowing (Fig.7).

## 11. COST REDUCTION IN T-MOUNTING

We have shown TMs required to install FI in a pipe line (Fig.9A). However, it is possible with perfect planning the use of only 'T pipe and flange for FI as shown in FIQ.9B. You can save 2 pairs of flanges at each end, hardware, gaskets etc. However, the TM has to be planned carefully so that Indicator dial is visible to the Operator.

If any problem is not covered in this Data Sheet or if any point needs further details we can reply on receiving the request.

# SUKRUT UDYOG

9/1 A, ERANOAWANE, PUNE - 411 004 (INDIA)  
PHONE: (020) 25441726, 25441514 GRAM: 'SUKRUT, PUNE