Operating Instruction RVM/U

Flow Indicator / Flow Monitor for Liquids

Content

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1. Preface
The flow monitors RVM/U prove themselves through reliability and simple handling. To use the advantages of the instrument to the full extend, please take notice of the following:

Every person in charge of commissioning and operating this instrument must have read and understand this operation instruction and specifically these safety instructions!

2. Safety Instructions
2.1. General Safety Instructions
The instructions contained in the operation instructions must be followed to ensure a safe operation of the instrument. Further, the additional legal and safety regulations for the individual application must be observed. Accordingly this applies to the use of accessories as well.

2.2. Application as Directed
The instruments type RVM/U serve as monitors for continuous flow of liquids. Any other use counts as non-directed. If not indicated otherwise, the scaling of the instruments refer to water. Special applications where intermittent loads (e.g. cyclic operation) could occur should be discussed and checked with our technical stuff.

The instruments type RVM/U must not be used as single source to avoid dangerous situations on machinery and in plants.

Machinery and plants must be constructed in a way that faulty conditions do not lead the operators into dangerous situations.

2.3. Qualified Personnel
The instruments type RVM/U must only be installed by qualified persons, who are capable of using these instruments in a professional manner. Qualified personnel are persons, who are familiar with the erection, installation, commissioning and operation of these instruments and who hold a corresponding qualification for this function.

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3. Principle of Operation
The instruments type RVM/U operate on the principle of the float type flow indicator. Through the flowing medium a float is set in motion, whose integrated magnets create a magnetic field. The position of the float is detected with the switch contact. The float is reset to the starting point by means of a spring, which allows the installation in any position in a system. The instruments are adjusted to the installation with flow from bottom to top. The weight of the float influences the measuring result, therefore a different mounting position will show discrepancies to the actual flow.

4. Installation
4.1. Process Connection
Caution! To avoid the damage of the flow monitor or the installation the following requirements must be fulfilled under any circumstances:

- Suitable process connection has to be provided.
- Connection size to be checked.
- Thread depth to be checked.
- Suitable sealing material to be used (Liquid sealing material will damage the flow monitor, if it gets inside.).
- Professional sealing.

4.2. Environment Conditions
- The flow monitor must not be used as a supporting part in a pipe construction.
- The medium must not contain any solid particles. Magnetic particles will accumulate in the magnetic float and effect the function.
- Before employment of anti-freeze and anti-corrosive check compatibility.

Warning! The following requirements must be adhered to, otherwise the function of the flow monitor will be affected or the measuring results will not be correct:

- External magnetic fields will influence the switch contact. Keep sufficient distance to magnetic fields (e.g. electric motors).
- Piping, process connections or supports made from ferromagnetic material influence the magnetic field of the flow monitor. Keep a distance of 100mm to those materials (e.g. steel).
- The accuracy is influenced by cross-section changes, branches or elbows in the piping. Provide a straightening section of 10x DN upstream and 5x DN downstream of the instrument. Never reduce the pipe diameter direct ahead of the instrument!
- With liquids ensure through suitable steps the deareation of the instrument.

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5. Electrical Connection
The switch contacts are potential free and do not need any supply.

Attention! Switch contact and unit are matched. After the exchange of a switch contact a readjustment must be made. Kindly request the relevant instruction.

Switch condition under No flow condition:

Connection: normally open

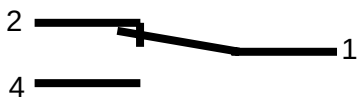
DIN 43650

M 12x1

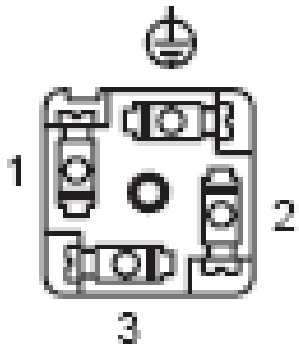
Connection: change over

DIN 43650

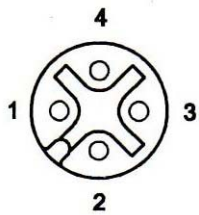
M 12x1



5.1. Standard Switch Connection
Pin-allocation of the supplied socket (DIN 43650 Form A or C). The ground-pin is not used..



M 12x1



Important instruction:
When using the socket DIN 43650, the ingress protection IP65 is only warranted in connection with a suitable cable diameter. For information on this subject please refer to page 8.

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5.2. Switch Contact with Cable
The individual cores of the cable are marked according to the above connection diagram.

5.3. Special Design
On request, specially designed switch contacts (sockets, ready-made cables) can be supplied.

5.4. EEx-proof Switch Contacts
Attention!
For the connection of EEx-proof switch units special instructions apply, which must be followed! Pay attention to the hints in the separate operation instruction for EEx-proof switch contacts!

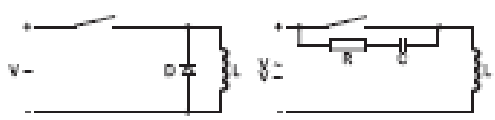
5.5. Contact Protection Arrangement
Attention!
The following requirements must be adhered to under any circumstances, otherwise the switch contact will be destroyed!

The reed-contacts employed in the switch contacts are, due to their construction, very fragile against over load. Non of the values voltage, current and wattage must be exceeded (not even for a fractional moment).
The danger of overloads exist by means of:
- inductive loads
- capacitive loads
- resistive loads

Inductive load
This kind of load will be caused by
- contactors, relais
- solenoid waves
- electric motors

Danger: Voltage peaks during switch off (up to 10 times of the normal voltage)

Preventive measure: (example)



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Capacitive Load
This kind of load will be caused by:

- extreme long leads
- capacitive consumption

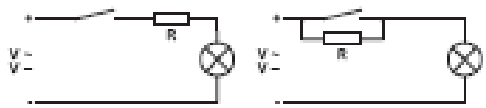
Danger: High current peaks during switch on of the switch contact (exceeding the normal current)
Preventive measure: (example)

Limiting the current by means of a resistor

Resistive Load
This kind of load will be caused by
- incandescent bulbs
- motor start up

Danger: High current peaks during switch on of the switch contact, because the filament has low resistance at low temperatures.

Preventive measure: (example)



Limiting the current by means of a resistor or heating of the filament.

Connection to SPS
For the connection to high resistance devices (like SPS) a protection circuit is not necessary.

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6. Switch Point Adjustment
- Loosen the lock screw of the switch contact.
- Shift the switch contact until the arrow on the switch contact is in coincidence with the desired switch point.
- Tighten the look screw of the switch contact.

Hints
- The adjusted switch point corresponds to the switch off point of the switch contact with decreasing flow.
- The actual switch position can be checked by means of an universal tester.
- The above description of the adjustment refers to the normally open contact.

7. Maintenance
Due to the few moving parts the instruments do not require much service.

A functional check and service on a regular base will not only increase the lifetime and reliability of the instrument, but of the entire plant.

The service intervals depend on
- the pollution of the media
- environmental conditions (e.g. vibrations)

During maintenance, at least the following points should be checked:
- operation of the switch contact
- leakage test of the instrument
- free movement of the float

It is the obligation of the user to lay down appropriate service intervals depending on the application.

Hints
- The free movement of the float and the operation of the switch contact can be checked by varying the flow and observing the switch contact status.
- In most cases a purification can be achieved by flushing the instrument with clean media. In obstinate cases (e.g. calcareous deposits) cleaning can be done with commercial purifier, as long as the purifier is not aggressive against the material of the instrument.

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8. Fault Finding Hints

The switch contact does not react:

- The switch contact is permanent in break position.
  1. No flow
     - ▶ Check for medium flow.
  2. Flow too low or switch contact adjusted to high
     - ▶ Adjust switch point to a lower flow.
     - ▶ Use instrument with different range.
  3. Incorrect reduced (pipe diameter too small)
     - ▶ Reduce according to section 4.
  4. Float got stuck (polluted)
     - ▶ Clean the instrument and ensure free movement of the float.
  5. Switch contact faulty
     - ▶ Eliminate the reason for the float (short circuit, overload)
     - ▶ Exchange switch contact, refer section 5).

- The switch contact is permanent in made position.
  1. Flow too high and switch contact adjusted too low
     - ▶ Reduce flow
     - ▶ Adjust switch contact to a higher flow
  2. Float got stuck (polluted)
     - ▶ Clean the instrument and ensure free movement of the float.
  3. Switch contact faulty
     - ▶ Eliminate the reason for the fault (short circuit, overload)
     - ▶ Exchange switch contact

- Switch point does not match with actual flow.
  1. No medium specific scale
     - ▶ Request a correction table or medium specific scale.
  2. Incorrect reduced
     - ▶ Reduce according to section 4.
  3. Instrument polluted
     - ▶ Clean the instrument.
  4. Instrument defect
     - ▶ Return instrument for repair and calibration to the manufacturer

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9. Specifications

Operating data	RVM/U-1		RVM/U-2		RVM/U-4	
Pressure: brass	PN 250 bar		PN 300 bar		PN 300 bar	
Pressure: stainless steel	PN 300 bar		PN 350 bar		PN 350 bar	
Pressure drop	0,02 – 0,4 bar		0,02 – 0,3 bar		0,02 – 0,2 bar	
Temperature max.	100°C (optional 160°C)					
Accuracy	±10% of final value					
Electrical data	SPST N.O.	SPDT	SPST N.O.	SPDT	SPST N.O.	SPDT
IP65 (plug connection DIN43650 Form A or C) IP67 (with 1m sealed in cable)	Max. 250V • 3A • 100VA	Max. 250V • 1,5A • 50VA (1)	Max. 230V • 3A • 60VA	Max. 250V • 1,5A • 50VA (1)	Max. 200V • 1A • 20VA	Max. 200V • 1A • 20VA (1)
M 12x1 plug temperature max. 85°C	not available		Max. 125V • 3A • 60VA	Max. 125V • 1,5A • 50VA	Max. 125V • 1A • 20VA	Max. 125V • 1A • 20VA
Ex Atex II 2G EEx m II T6 max. 80°C (2m sealed in cable IP67)	Max. 250V • 2A • 60VA	Max. 250V • 1A • 30VA	Max. 250V • 2A • 60VA	Max. 250V • 1A • 30VA	not available	
EEx m II T6 max. 80°C	Max. 250V • 2A • 60VA	Max. 250V • 1A • 30VA	Max. 250V • 2A • 60VA	Max. 250V • 1A • 30VA	not available	
Output signal	The contact switches off, if minimum flow is below setpoint.					
Power supply	not necessary (reed contacts)					
Cable diameter for IP65	6 – 8 mm		4 – 6,5 mm			
Grade of pollution	2 (EN 61058-1)					
Other plug types or cable lengths on request						

(1) Minimum load 3VA

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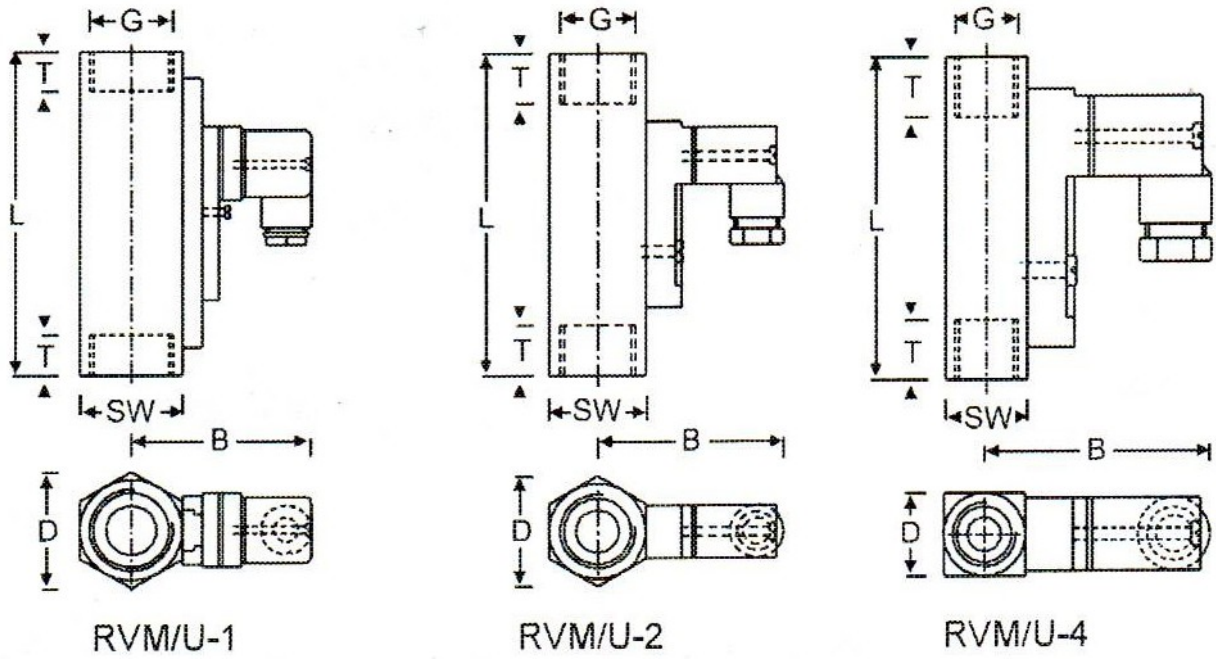
Materials	Brass	Stainless Steel
Wetted parts	Brass	1.4571
Spring (wetted parts)	1.4571	
Magnets (wetted parts)	hard-ferrite	
Seals (with reducers only)	NBR (other on request)	Viton (other on request)



	SW	D	B	G	DN	T	L
RVM/U-4	17	17	47	¼”	8	10	65
RVM/U-2	27	31	52	½”	15	14	90
RVM/U-1	41	47	76	¾” 1”	20 25	21 17	152 130

Overall dimensions in mm