

Variable area flow meter with switch contact

Viscosity-compensated, stainless steel, 300 or 350 bar

Series: S-F3FA



Overview

Product type	Variable area flow meter with adjustable switch contact
Medium	Oils and other liquids, 30 to 600 cSt (M28AD: 1 to 540 cSt)
Flow ranges	0.1 to 110 l/min over 13 models (smallest range 0.1-0.8, largest 35-110 l/min)
Connection	G 1" female thread
Body material	Stainless steel 1.4571 (M28AD: 1.4301)
Pressure rating	300 bar (≈4350 psi) (M28AD: 350 bar (≈5080 psi))
Contact	Normally open reed contact, 250 V AC, 100 VA; 250 V DC, 100 W; max. 3 A (M28AD: max. 1.5 A)

Description

This variable area flow meter shows the flow of oil on a scale and switches a contact at an adjustable set point. It combines a flow meter and a flow switch in one device, for example to monitor lubrication, hydraulic or cooling oil circuits in machines.

A spring-loaded float moves with the flow. Specially shaped measuring bores compensate for viscosity, so one scale and one set point stay valid for oils from 30 to 600 cSt (centistokes). The reed contact is potential-free and needs no power supply.

Features

- ▶ Local flow reading in l/min, no power supply needed
- ▶ Adjustable normally open contact for minimum or maximum flow monitoring
- ▶ Viscosity compensation for oils from 30 to 600 cSt, without recalibration for a change of oil or pressure
- ▶ Potential-free reed contact for direct connection to a PLC (programmable logic controller) input
- ▶ Stainless steel body rated to 300 bar
- ▶ Any mounting position, preferably with upward flow
- ▶ DIN plug connector (EN 175301-803 form A)

Technical data

Medium	Mineral oils and other liquids with a viscosity of 30 to 600 cSt (0.1-0.8 l/min version: 30 to 400 cSt; M28AD: 1 to 540 cSt)
Measuring and switching range	0.1 to 110 l/min over 13 models; each model has its own range, from 0.1-0.8 l/min (smallest) to 35-110 l/min (largest); M28AD 8-80 l/min, see models
Measuring principle	Spring-loaded float (variable area)
Accuracy	±5 % of full scale (M28AD: ±4 % of full scale at 105 cSt, plus max. ±5 % across its viscosity range)
Pressure loss	0.02 to 0.4 bar (range given for the series; M28AD: 0.15 to 1.1 bar at the rated flow)
Connection	G 1" female thread (DIN 228), wrench size 40 (M28AD: 41)
Pressure rating	300 bar (≈4350 psi) (M28AD: 350 bar (≈5080 psi))
Medium temperature	-20 to +120 °C (≈-4 to 248 °F) (M28AD: max. +100 °C (≈212 °F))
Ambient temperature	Max. +80 °C (≈176 °F)
Mounting position	Any, preferably with upward flow (M28AD: any)
Flow direction	One direction only, from the low to the high scale value (M28AD: in the direction of the arrow on the label)
Protection class	IP53 (display), IP65 (plug connector) (M28AD: IP54 display, IP65 contact)
Weight	Approx. 1.2 to 1.3 kg (M28AD: approx. 1.7 kg)

Electrical data

Contact	Reed contact, normally open (pins 1 and 2), switch point adjustable along the scale
Hysteresis	Not specified (M28AD: approx. 3.5 mm of float travel)
Switching capacity	250 V AC, 100 VA; 250 V DC, 100 W; max. 3 A (M28AD: 250 V AC/DC, 100 VA / 100 W, max. 1.5 A)
Combined limits	Voltage, current and power limits apply together: at 250 V the power limit allows about 0.4 A
Electrical connection	Angled plug connector DIN 43650 / EN 175301-803 form A, size 3, 3-pole
Wiring	Normally open contact on pins 1 and 2
Protection class	IP65 (plug connector)
Power supply	Not required (potential-free contact)

Materials

Body	Stainless steel 1.4571 (M28AD: stainless steel 1.4301)
Float	Stainless steel 1.4571 (M28AD: stainless steel 1.4301)
Spring	Stainless steel 1.4571 (M28AD: stainless steel 1.4310)
Stop rings	Stainless steel 1.4571 (M28AD: orifice of stainless steel 1.4310)
Seals	FKM
Display	Polycarbonate / stainless steel 1.4301 (M28AD: polycarbonate / nickel-plated brass)
Magnet (M28AD)	Oxide ceramic

Models

All models have a G 1" female thread and a normally open contact. Choose the model whose range includes the flow to monitor, with the set point in the middle part of the range where possible.

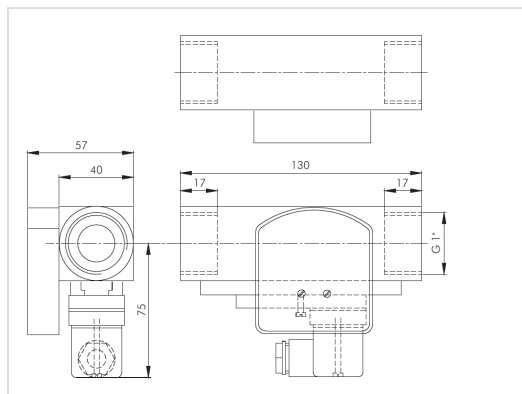
Tameson SKU	Measuring and switching range	Viscosity	Connection	Pressure rating	Weight
M285W	0.1 - 0.8 l/min	30 - 400 cSt	G 1" female	300 bar	Not specified
M28A8	0.5 - 1.5 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M285X	1 - 4 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M28A9	2 - 8 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M28AA	3 - 10 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M28AB	5 - 15 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M28AC	8 - 24 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M28AD	8 - 80 l/min	1 - 540 cSt	G 1" female	350 bar	1.7 kg
M285Y	10 - 30 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M285Z	15 - 45 l/min	30 - 600 cSt	G 1" female	300 bar	Not specified
M2862	20 - 60 l/min	30 - 600 cSt	G 1" female	300 bar	1.2 kg
M2863	30 - 90 l/min	30 - 600 cSt	G 1" female	300 bar	1.3 kg
M2864	35 - 110 l/min	30 - 600 cSt	G 1" female	300 bar	Not specified

Information

M28AD (8 to 80 l/min) has a different, heavier housing: stainless steel 1.4301, 350 bar, G 1" female thread, square body 40 × 40 mm, overall length 186.5 mm, wrench size 41, approx. 1.7 kg. The drawing and dimensions below and the standard setting procedure do not apply to it; see "Setting the M28AD switch point".

Dimensions

The drawing and dimensions apply to all models except M28AD (8-80 l/min; overall length 186.5 mm, see Model M28AD).



Dimension	Value
Overall length	130 mm
Thread	G 1" female, thread depth 17 mm
Body width (wrench size)	40 mm
Width including display	57 mm
Height, pipe axis to plug connector	75 mm
Weight	Approx. 1.2 to 1.3 kg

⚠ Warning

Do not exceed the maximum pressure (300 bar; M28AD: 350 bar) and temperature (+120 °C medium, M28AD: +100 °C; +80 °C ambient). Depressurize and drain the line before removing the device. Electrical connection work must be done by qualified personnel with the power switched off.

Installation

- 1 Check the medium**
The medium must not carry solid particles. Magnetic particles can also cause faults; fit a dirt trap with a double screen or a magnetic filter upstream.
- 2 Provide straight pipe runs**
10 × D upstream and 5 × D downstream of the device (D = nominal pipe diameter) to avoid measuring errors.
- 3 Observe the flow direction**
The flow must run from the low to the high scale value. Any mounting position; upward flow from bottom to top is preferred.
- 4 Keep distance from magnetic fields**
Do not install the device in an induction field, a strong magnetic field or closer than approx. 50 mm to iron parts.
- 5 Use suitable threads and sealant**
All threads are G threads to DIN 228. Use only matching fittings and sealant; unsuitable ones affect function and tightness.

⚠ Warning

When screwing in fittings, hold the device body against the torque with a suitable open-end wrench on the wrench flats. The screw connection must not turn against the body, or the device can leak.

Setting the switch point

An ohmmeter, continuity tester or similar is needed. Connect it to pins 1 and 2 (normally open contact).

- Removed from the pipe: slide the switch housing from the middle of the setting range towards the inlet side until the contact closes.
- Move the float with a non-magnetic object (for example a pencil) until the pointer shows the required flow (contact closed).
- Slowly slide the switch housing towards the outlet side until the contact just opens.
- Set this switch point as accurately as possible and fix the switch housing with the locking screws.
- In the installed state: slide the switch housing as in step 1, open the supply until the pointer shows the required minimum flow (contact closed), then continue with steps 3 and 4.

Setting the M28AD switch point

A continuity tester is needed, connected to pins 1 and 2 (normally open contact). The device stays installed.

1. Loosen both screws of the switch housing and slide it to the lower end of its rail.
2. Remove the cap of the plug connector and connect the continuity tester to pins 1 and 2.
3. Let the medium flow until the pointer shows the required minimum flow (contact closed).
4. Slowly slide the switch housing upwards until the contact just opens.
5. Tighten both screws and refit the plug cap. Above the set point the contact stays closed.

Electrical connection

Never exceed the electrical ratings on the switch housing, not even briefly: the reed contact is very sensitive to overload. The normally open contact is on pins 1 and 2 of the plug connector. The reed contacts are tungsten, gold or rhodium coated, so they can be connected directly to PLC inputs.

⚠ Warning

Inductive loads such as valve or relay coils can draw switch-on and switch-off currents of up to 10 times their rated current. For these loads, fit a contact protection relay (not included) or a similar device.

Maintenance

The device has only a few moving parts, so maintenance is limited to occasional cleaning. Keep solid and magnetic particles out of the medium with a dirt trap or magnetic filter upstream. Before cleaning, depressurize and drain the line.

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Document Information

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Specifications subject to change without notice. Verify current specifications before ordering.