INSTALLATION & OPERATING INSTRUCTIONS

INSTALLING THE KELCO CR22 MICROFLOW SWITCH

WARNING

Please read these installation and operating instructions fully and carefully before installing or servicing this inline flow switch. The CR22 microflow switch is a **mains voltage device**. Death or serious injury may result if this switch is not correctly installed and operated. All mains voltage electrical work must be performed by a fully qualified and licensed electrician.

The CR22 microflow switch is a compact, vertical mounting inline flow switch capable of detecting very low flows. Its main application is in detecting loss of flow in chemical metering and injection systems. The CR22 microflow switch operates on the displaced piston principle. Liquid passing through the switch lifts a precision piston. Every time the piston is lifted, a magnet within it actuates an external reed switch. The closing of the reed switch contacts provides a signal indicating flow. The CR22 can be set up to provide an on or an off signal in response to flow, or to loss of flow.

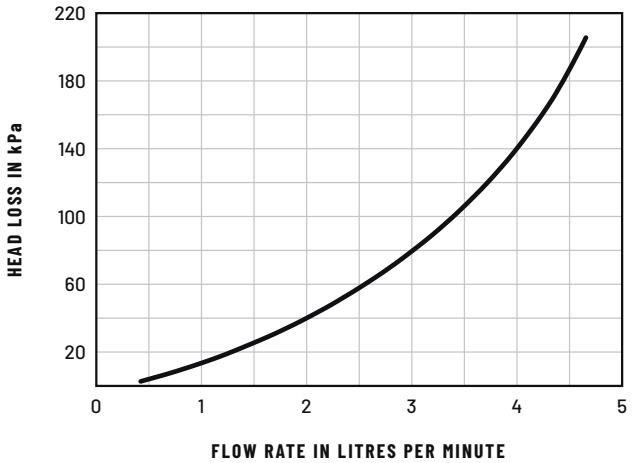
OPERATING ENVIRONMENT

The CR22 microflow switch is suitable for detecting very low flows in a wide variety of liquids. The wetted parts of the switch are made from UPVC, with Viton O-ring seals. There are no metal parts within the wet area of the switch. The CR22 can be used with a variety of chemical solutions, including most mineral salt solutions, acids and alkalis. The switch can only be used with clean liquids that are free from suspended solids larger than 30 microns and free from particulates or sludge that are attracted to magnets. Materials such as ferric solutions, organic solvents, esters and ketones in general should not be used with the CR22. In the interest of safety, the CR22 should only be used with process liquids that are at or close to ambient temperature.

Chemical Compatibility Checker ›

HEAD LOSS

The graph below shows the head loss measured across a CR22 microflow switch as a function of a continuous flow through the switch. The graph shown is for water at ambient temperature.



ADDITIONAL CONSIDERATIONS

The CR22's switching point is affected by the viscosity and specific gravity of the process liquid. In general, liquids with an SG > 1.0 or kinematic viscosity of > 1.0 will proportionally increase the sensitivity of the switch and slow down its response time; that is, such liquids will reduce the flow required to actuate the switch. The reverse effect also applies: liquids with a low SG and viscosity will make the switch less sensitive, and it will take a proportionally higher flow to reach the switch's actuation point. In this situation the delay time of the switch's response will be proportionally reduced. The CR22 is not suitable for use with highly viscous liquids or liquids containing materials that tend to crystallise.

INSTALLATION

The CR22 flow switch can be mounted in a number of different positions in a dosing system. It can be mounted directly onto the discharge valve of the pump itself, on an adjacent wall or backing board, or directly onto an injection point. Mounting the switch at an injection or discharge point rather than at the pump means the switch will indicate loss of flow for the entire system, including the pump's discharge pipework and associated valves. It is critical that the switch be installed vertically with flow passing upward through the switch body.

> **IMPORTANT**
>
> **The CR22 relies on gravity to return its internal piston to the off position when flow stops. If the switch is not installed vertically it may not turn off when flow stops.**

Two mounting clips are supplied with each switch. To use the clips, drill 2 holes 53 mm apart and screw the clips in place using 4 mm stainless screws (not supplied). The CR22 can be installed in rigid PVC pipework using the PVC pipe spigots normally supplied with it. Take great care when solvent gluing the pipe spigots and ensure no solvent or glue enters the switch body. Do not over-tighten union nuts or the inlet or outlet adaptors (parts 5 and 6). The switch is sealed by O-rings and does not require tight joints in order to seal. In particular, over-tightening the inlet adaptor may distort the switch body and cause the close fitting piston within to jam. Ensure the process liquid is clean and free from suspended solids. Purge all pipework before installing the CR22 and, if necessary, install a 30 micron filter on the inlet side of the switch. Do not install the CR22 on the suction side of a dosing system, as the flow restriction caused by the switch may cause the pump to cavitate or fail to prime.

NORMALLY ON OR NORMALLY OFF

The CR22 microflow switch can be configured to give a normally on or normally off signal. As supplied, the switch is configured as normally off, switching on in response to flow. To reverse this function, simply reverse the inlet and outlet fittings. Unscrew the inlet and outlet adaptors, parts 5 and 6, from the switch body and reassemble with the inlet adaptor fitted to the outlet end of the switch body, and the outlet adaptor fitted to the inlet end of the switch body. Note that the electrical module on the switch can be removed and reversed so the electrical cable enters the switch from either the right or left side. Reversing the electrical module does not reverse its electrical function. The electrical module is a slip fit on the switch body and can be rotated to any required position without affecting operation.

SWITCHING THRESHOLD & OUTPUT

The flow rate required to actuate the CR22 depends on the viscosity of the process fluid. For water based solutions at ambient temperature, the switching threshold is less than 500 mL per hour on a rising flow. When applied to a pulsing flow, such as from a dosing pump, the nature of the flow needs to be considered. Liquid passing through the flow switch causes its reed switch to change state, either turning it on or turning it off depending on how the switch has been set up. If the flow stops, the switch will change state after a delay. The delayed response time depends on the process liquid's viscosity. For water, the delay is typically 2 seconds.

When connected directly to a dosing pump, the flow switch will normally receive a train of pulses of liquid. If the frequency of the pulses is greater than one pulse every 2 seconds, the flow switch will provide a steady output state while ever the pulses are maintained by the pump. If, however, the pulse frequency from the pump is less than one pulse every 2 seconds, the flow switch may respond with a series of on and off signals that are directly proportional to the dosing pump's pulse frequency.

WARNING

All electrical work associated with the CR22 inline flow switch must be carried out by qualified electrical personnel, and all electrical work must conform to AS/NZS (or equivalent) standards and to local wiring rules.

OPERATING LIMITATIONS

PARAMETER	VALUE
Switching point on a slowly rising flow (water at ambient temperature)	**Less than 500 mL per hour**
Response to loss of flow (water at ambient temperature)	**2 seconds ± 15%**
Maximum recommended operating pressure (static or dynamic) at ambient temperature	**1800 kPa (260 psi)**
Minimum burst pressure at ambient temperature	**9700 kPa (1400 psi)**
Maximum process liquid temperature	**60 °C**
Minimum liquid temperature	**0 °C**
Maximum recommended continuous flow through switch	**4 litres per minute**
Liquid pH range	**1 to 14**
Maximum process liquid S.G.	**1.5**
Minimum process liquid S.G.	**0.8**
Weatherproof rating of electrical module	**IP56**

ELECTRICAL DATA

MODEL	MODULE TYPE	CONTACT CONFIGURATION	SWITCHED POWER MAXIMUM	SWITCHED VOLTAGE MAXIMUM	SWITCHED CURRENT RESISTIVE AC (RMS)	INDUCTIVE LOADS	TYPICAL APPLICATION
CR22	Dry contact reed switch	S.P.S.T. NO or NC	50 W/VA	250 VAC 200 VDC	1.5 A maximum	Not suitable	PLC, telemetry and relay logic circuits

NOTE The CR22 microflow switch uses a dry contact reed switch as the primary switching element. Reed switches are one of the most reliable mechanical devices ever devised. They offer an operating life in excess of 100 million cycles; however, care needs to be taken to ensure they are not electrically overloaded. If applied in questionable applications, suitable protection should be added to the control circuit. Details of reed switch protection circuits are on our Reed Switch Information page (button below).

Reed Switch Information ›

HAZARDOUS AREAS

The CR22 is a passive reed switch that meets the definition of simple apparatus under AS/NZS 60079.11. It is not Ex certified in its own right. It may be used in a hazardous area only as part of an intrinsically safe circuit, connected through suitably certified associated apparatus such as a Zener barrier or galvanic isolator. The design of the intrinsically safe system and its installation are the responsibility of the system designer and installer, in accordance with AS/NZS 60079.14 and AS/NZS 60079.25. Reed switch rating: 50 W/VA, 250 VAC / 200 VDC, 1.5 A maximum, resistive loads only. The associated apparatus must not exceed these limits. Where the associated apparatus monitors for line faults, end-of-line resistors must be fitted as specified by its manufacturer. The CR22 is of non-metallic construction; the installer must assess electrostatic charging risk under AS/NZS 60079.0 for the zone and gas group. The CR22 is not suitable for use in a hazardous area outside an intrinsically safe circuit.

SPARE PARTS

ITEM	QTY	DESCRIPTION	MATERIAL
1	1	Sensor head	ASA
2	1	Body	UPVC
3	1	Piston	UPVC
4	2	115 O-ring	Viton
5	1	Inlet adaptor	UPVC
6	1	Outlet adaptor	UPVC
7	2	2-114 O-ring	Viton
8	2	15 NB union nut	Polypropylene
9	2	20 NB (½") pipe spigot	UPVC
10	2 sets	12 × 9 tube adaptors	UPVC
11	2 sets	8 × 4 tube adaptors	UPVC
12	2 sets	6 × 4 tube adaptors	UPVC
13	2	Wall mounting bracket	Polypropylene

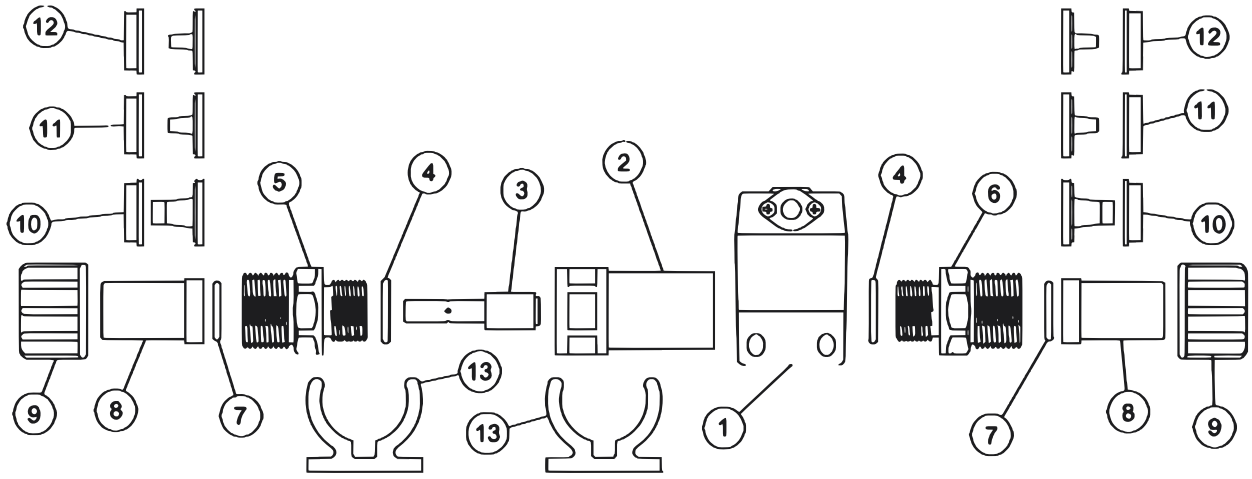


FIG. 1 CR22 exploded view – item numbers refer to the spare parts list

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