

TRAILING WIRE FLOW SWITCHES

FEATURES

- CORROSION RESISTANT BODY
- WEATHERPROOF IP56 HOUSING
- UNIQUE TRAILING STAINLESS CABLE SENSOR
- WIDELY ADJUSTABLE FLOW SENSITIVITY
- SUITS OPEN CHANNEL OR PRESSURE APPLICATIONS
- 18 BAR PRESSURE RATING
- VARIETY OF ELECTRICAL OPTIONS AVAILABLE

APPLICATIONS

- DATA LOGGING OF EFFLUENT FLOWS
- RIVER MANAGEMENT & FARM RUN OFF SYSTEMS
- CONVEYOR BELT SOLIDS DETECTION
- CONTROL & LOGGING OF INDUSTRIAL WASTE
- OPEN CHANNEL DATA ACQUISITION
- SLURRY PIPE FLOW MONITORING
- CHEMICAL PROCESS CONTROL

The Ultraswitch trailing wire flow switches are unique sensors that can be used in applications where conventional flow switches would fail. Principally intended for control of data acquisition equipment monitoring influx and effluent systems, these switches are equally useful in high velocity flows, or in any situation where liquids may contain solids or materials that would damage normal flow switches. These trailing wire switches have evolved to meet the need for flow sensors that are capable of maintenance free performance in the most arduous of environments.

Conventional flow switches use flat paddles to detect liquid movement. Such paddles are prone to damage if liquid velocity is high, or if the liquid contains solids of any appreciable size. The unique trailing stainless wire used in the switch is simply deflected by high flow rates or by impact with entrained materials. Material will not build on, or tangle around the trailing wire. With virtually no exceptions, the material being monitored will simply deflect the wire.



TECHNICAL DATA

CONSTRUCTION

Constructed from glass-reinforced polypropylene and 316 stainless steel, the trailing wire switches use flexible stainless wire to move a magnetically sprung arm that in turn actuates a dry reed switch. The reed switch and its associated components are housed in a weathertight housing above the magnetic arm. The switch body has a 25mm BSP male thread, to facilitate either bracket or pipe mounting. An M20 cable gland is provided for installing either conduit fittings or electrical flex.

Trailing wire switches can be supplied with a variety of electrical modules to suit specific requirements. In all cases, high compliance high wattage dry reed switches are used as the primary switching element. Reed switches offer major advantages over other switch types. The reed contacts are sealed in an inert atmosphere in a glass envelope where the contact resistance is virtually unaffected by external environmental factors. The reed arms move magnetically, within their elastic limits, and as such are capable of an extraordinarily long and reliable service life. The cable spring return system in the trailing wire switches uses rare earth magnets in opposition, to effect a frictionless and infinitely adjustable action.

APPLICATIONS

It is not possible to give definitive data on the actual flow rates required to actuate the switch. Every installation is unique, and many factors interact to determine exactly how the sensor will perform. Depending very much on wire length and submergence, a minimum liquid velocity of around 0.2 metres per second is required to reliably actuate the switch. In very low flow applications, the cross section of the open channel or pipe should be reduced, to increase the local velocity, sufficiently to actuate the switch. The degree of submergence of the trailing wire, and the distance from the liquid surface to the switch, the viscosity, amount and nature of entrained matter in the monitored liquid will also effect the switch's action.

The trailing wire switches are principally intended to be mounted above and clear of the surface of the liquid to be monitored. The only part of the switch in contact with the liquid should be the trailing wire. There are a number of variations of this principal that can be used to advantage. For example, the switch can be bracketed in front of an open discharge pipe, with the trailing wire displaced only when liquid flows. Equally, the switch can be screwed through an inspection cover, with the wire trailing into a partially filled pipe.

SPECIFYING SWITCHES

Our factory can supply switches configured to meet specific requirements. The trailing wire is normally supplied cut to length, and terminated, (silver soldered) to prevent fraying. Wire lengths range from 50mm to 1 metre.

Note: both the wire length and the required electrical circuit board should be specified, when ordering. As an example, the following number would define a switch, with a cable length of 200mm, and a circuit board with a single reed switch contact. TW25-B-200.

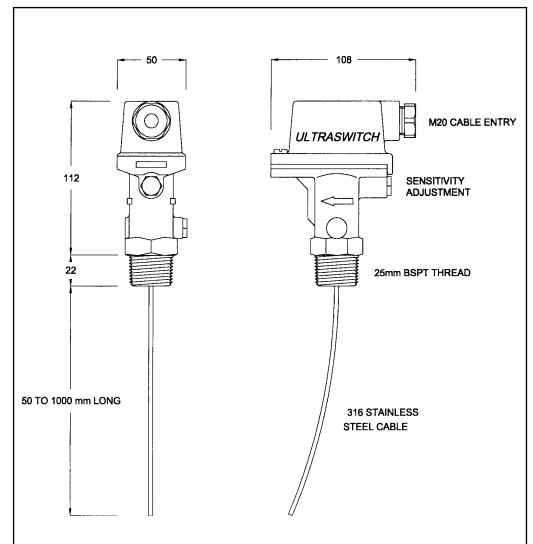
HAZARDOUS LOCATIONS

The trailing wire switches are classed as simple devices, as such, they do not require separate certification to be used in hazardous locations. Specifically, the switches do not contain any mechanism for the storage or production of electrical energy. These sensors can be used in explosion prone environments, provided they are isolated via an intrinsically safe barrier, (a zenner barrier).

ELECTRICAL DATA

Switches can be supplied with a variety of circuit boards to suit specific applications. The electrical specifications of these boards are listed below.

Circuit Board Type	Module Type	Contact Configuration	Switched Power	Switched Voltage Maximum	Switched Current Resistive AC (rms) Maximum	Inductive Loads (Power Factor 0.4)	Typical Application
FL25B	Dry Reed Switch	S.P.S.T. N.O/N.C.	40W	240V AC 200V DC	1A	Not Suitable	PLC & control circuits
FL25C	Dry Reed Switch	S.P.D.T.	40W	240V AC 200V DC	1A	Not Suitable	PLC & control circuits
FL25R	Solid State Relay (Triac)	S.P.S.T. N.O/N.C.	750W	240V AC	4A	4A at 240V AC	AC control circuits & motor control
FL25A240	Standard Relay 240V AC Coil	S.P.D.T.	2500VA at 250V AC 300VA at 30V DC	240V AC	10A	7.5A at 250V AC 5A at 30V DC	General AC or DC control
FL25A24	Standard Relay 24V AC Coil	S.P.D.T.	2500VA at 250V AC 300VA at 30V DC	240V AC	10A	7.5A at 250V AC 5A at 30V DC	General AC or DC control



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INSTALLATION AND OPERATING INSTRUCTIONS FOR TRAILING WIRE FLOW SWITCHES

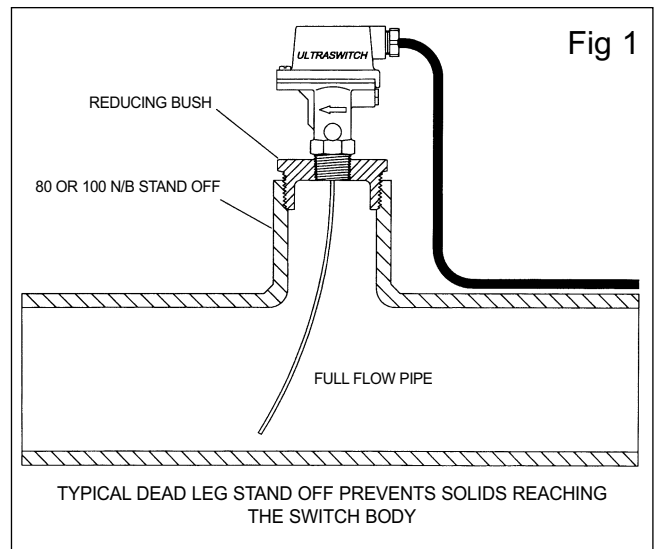
PLEASE READ THIS INSTALLATION SHEET CAREFULLY AND FULLY BEFORE ATTEMPTING TO INSTALL OR SERVICE THIS FLOW SWITCH

INTRODUCTION

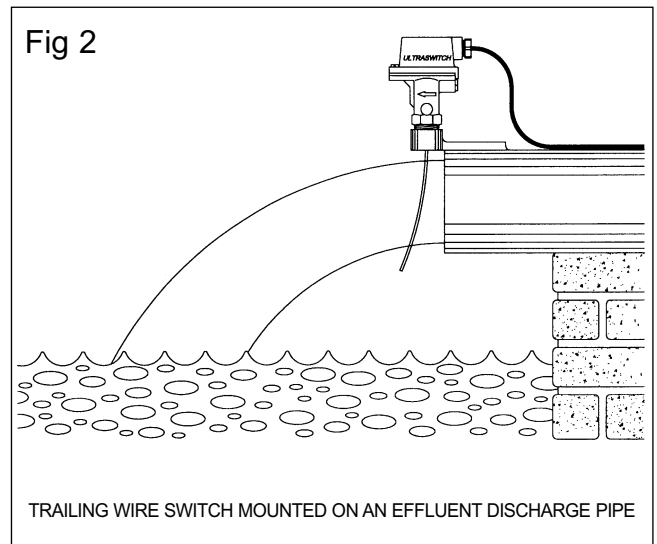
The trailing wire flow switch consists of a magnetically coupled flow switch with a flexible trailing wire sensor. Moving liquid acting against the trailing wire, and causing it to be displaced, actuates the switch. A magnetically isolated arm, attached to the top end of the trailing wire operates a reed switch inside the switch housing. Depending on which electrical module is installed in the switch, the reed switch is used to either directly provide an output, or in AC circuits, to ignite a triac, which in turn is used as the output device. Several models are also available that contain an electromechanical relay. The relay's contacts are used as the switch output. A label with the electrical rating, and type of module installed in the switch is located inside the lid.

INSTALLATION

The nature of the trailing wire switch is such that it lends itself to innovative applications. For example the switch can be used to detect solid objects moving on a conveyor belt, and as an alternative to photoelectric sensors in many dusty and dirty environments. Equally, the switch can be used to detect water flow in a river, open channel or pipe. Consider your application carefully; try to mount the switch as far above the material to be detected as possible. In liquid flow applications it will generally not be known what degree of submergence of the trailing wire will be required to work the switch. In such situations hold the switch above the moving liquid and slowly lower the end of the wire into the liquid until the switch arm swings downstream, to the on position. Observe the amount of submergence, and mount the switch accordingly. Avoid mounting the switch in situations where the trailing wire is liable to trail into valves, pumps, or any objects liable to be damaged, or to mechanically damage the wire. Avoid any location that may substantially disturb the linearity of the flow. Do not expose the switch to vibration, agitation, aeration, aspiration or cavitation. Severe stress and strain will eventually work harden the flexible trailing wire and may lead to early failure.



Where the switch is to be mounted in a full flow pipe, arrange a dead leg stand off on the top of the pipe, as depicted in Fig 1. Equally the switch could be mounted in front of an open discharge pipe, as depicted in Fig 2. The general idea is to prevent solids from entering the switch body. Any equivalent arrangement that keeps the switch body above the liquid would be equally valid.



SENSITIVITY ADJUSTMENT

There is a hexagonal plug located under the back end of the electrical housing of the switch. This plug covers an adjusting screw that allows adjustment of the amount of pre-load on the switch arm. That is, the force with which the arm attempts to return to the off position. As supplied, the adjustment screw is wound fully in. This position is the least sensitive position, as

it causes the arm, and its attached wire to be pushed toward the off position quite strongly. Using a broad bladed screwdriver, wind the adjusting screw anti-clockwise, outward, to INCREASE sensitivity to flow. As the screw is progressively wound out, its influence on the switch arm reduces. If the screw is wound fully out, it has very little or no effect on the arm, and the arm itself will increasingly behave like a pendulum, seeking its own balance point. An important point to note is that as the adjusting screw is wound out, and its influence on the arm reduces, it becomes increasingly important exactly what the orientation of the switch is. For example consider pipework that runs slightly downhill. In such a situation, the switch arm and trailing wire will automatically adopt a perpendicular position. Without the substantial repelling action of the adjustment screw, this vertical position, in relation to the slanting switch body may well hold the switch in the on position, even if the liquid being monitored is stationary.

With careful levelling of the switch, at the point where the flow switch is installed, and by judicious adjustment of the sensitivity screw, the trailing wire switch can be set to detect quite low flows.

ELECTRICAL

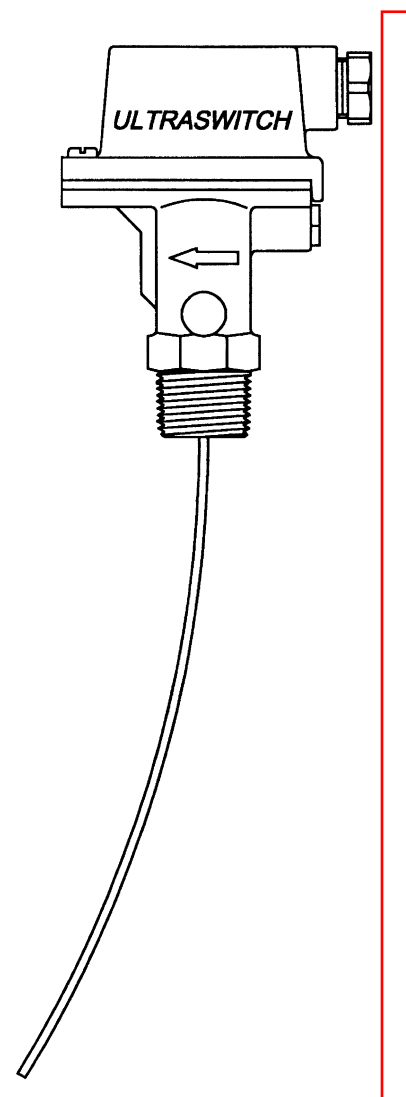
All mains voltage electrical work associated with this flow switch should be carried out by qualified persons, and must conform to relevant local codes.

The trailing wire flow switch has an M20 cable gland that accepts cable of 6 to 10mm diameter. By removing the gland nut, an M20 conduit fitting may be used. A label with the electrical rating of the specific circuit board installed in the switch is located inside the electrical enclosure lid. Where reed switches are used as the primary switch, care should be taken not to exceed their rating. Reed switches are mechanically fragile, and if exposed to inductive loads, liable to weld in the ON state. Avoid inductive or capacitive loads. Avoid laying switch cables close to other cables, in particular mains cables. If long runs of cable are involved, use either shielded wire, or select a switch

model that incorporates an inbuilt relay, and operate the control circuit at either 240 or 24V AC. Note that all single pole single throw circuit boards are reversible, to reverse the switch function, that is, convertible from normally open to normally closed, by reversing the circuit board.

HAZARDOUS LOCATIONS

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