

INSTALLING AND OPERATING TW TRAILING WIRE FLOW SWITCHES



WARNING

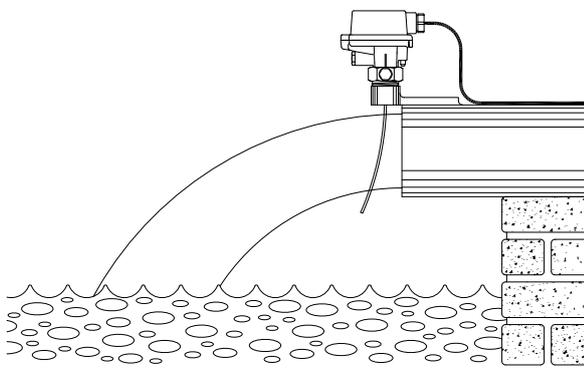
Please read these installation and operating instructions fully and carefully before installing or servicing this Flow Switch. The TW Series flow switch is mains voltage device. Death or serious injury may result if this switch is not correctly installed and operated. All electrical work must be performed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

INTRODUCTION

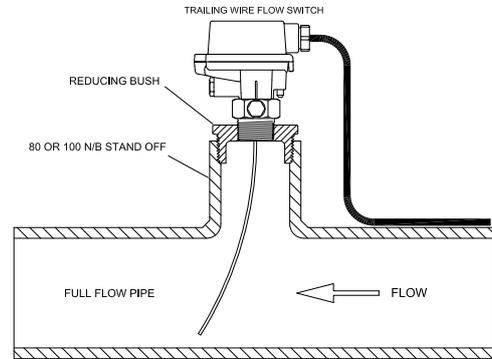
This TW Series flow switch may have been supplied in one of several available configurations. The model number of the specific switch is located inside the lid of the electrical housing on the switch. The TW Series flow switch is a heavy duty trailing wire flow switch suitable for detecting flow of liquids in pipes of any diameter from 25mm (1") upward. This flow switch has several unique features. **A)** The complete electrical assembly can be removed from the switch by undoing and removing the locking screw in the split clamp on the side of the switch's electrical housing. With the locking screw removed, the electrical housing can be pulled straight off the wet end of the switch. Removing the electrical housing allows the wet end of the switch to be unscrewed from pipework without disturbing the cable connection to the switch. This means the trailing wire sensor of the switch can be changed or inspected without the need to disturb the electrical connection to the switch. Always replace and tighten the locking screw after completing any work on the wet end of the switch. **B)** The standard version of the TW Series flow switch has a built in manual override. On the end of the switch body underneath the cable entry port is a spring loaded push button. Pressing this button actuates the switch, regardless of the state of flow. Pumping systems can be manually started by pressing this button and holding it in until flow is established. The override button can be used to test control circuits and wiring during commissioning, without the need for water in the pipework. The button is spring loaded so it can't be inadvertently left in the on position and only overrides the flow switch while it is pressed.

INSTALLATION

Select a location for the flow switch in a straight run of pipe, ideally with five pipe diameters of straight pipe either side of the switch. This will ensure a linear non-turbulent flow acts against the wire sensor of the switch. Do not install the flow switch in any location likely to expose it to turbulence, such as close to valves, pumps or pipe bends. The idea is to install the switch in a location where there is a smooth flow of liquid past the paddle, and to obtain a stable non-chattering response from the flow switch. The TW Series flow switch can be mounted in either the suction or discharge pipe of a pump, the switch will work equally well in positive or negative pressure applications.



TW TRAILING WIRE FLOW SWITCH MOUNTED ON AN OPEN EFFLUENT DISCHARGE PIPE



TYPICAL DEAD LEG STAND OFF PREVENTS SOLIDS REACHING THE SWITCH BODY

The TW Series flow switch can be installed in any required orientation except on the under side of horizontal pipes. Depending on the thread on the switch, a 20 or 25mm B.S.P. or NPT threaded socket must be provided on the piping, to fit the flow switch. This can be a tapping saddle or a pipe tee fitted with a threaded reducing bush, or a socket welded directly to the pipe. Ensure that whatever fitting is used, sufficient clearance is allowed for the free movement of the wire sensor. The TW Series flow switch can be installed in a reducing bush attached to a short stand off pipe at 90° to the main pipe. This method of mounting increases the sensitivity of the switch to low flows due to the extra leverage against the tip of a longer wire. In solids pumping applications it also reduces the likelihood of the switch becoming blocked. Whatever method is used be sure to leave extra clearance to allow for the full arc movement of the longer wire sensor. Use a suitable thread sealant and tighten the switch into the socket using the spanner flats provided on the switch body. Do not tighten the switch into its socket by twisting the electrical housing of the switch, as damage to the flow switch may result. Align the flow switch squarely to the axis of the pipe, with the direction of flow arrow on the side of the switch body parallel to the axis of the pipe, and aligned in the direction of flow. The trailing wire will not function correctly unless alignment is correct. When installing the flow switch in vertically aligned pipework, the sensitivity of the switch will be slightly increased; it will detect lower flows when flow is downward, and the sensitivity will be slightly decreased when flow is upward. This is due to the effect of gravity on the dead weight of the sensor wire itself. This effect is more noticeable in larger pipes and low flows where wire sensors may be used.

WIRE LENGTH AND FLOW SENSITIVITY

There are two methods of setting the sensitivity of the TW Series flow switch. By far the most effective method is by the correct selection of sensor wire length. For fine tuning, a sensitivity adjustment screw is provided, as shown in the accompanying drawing. As supplied by the factory, the sensitivity screw is wound fully in, and is set to least sensitivity. The adjusting screw can be wound out, and the sensitivity slightly increased. The maximum effect is achieved with the screw wound out to a point where the screw head is 4mm in from the face of the switch body. By far the best way to set the TW Series flow switch is to establish the likely flow rate in the pipe, and to order the flow switch with an appropriate sensor wire. The exact flow rates required to actuate the trailing wire will depend on many variables such as turbulence, liquid viscosity, solids content and the exact area of the sensor wire exposed to the flow. For an accurate estimation of the switching point for any given application, an online flow calculator is available at <http://www.kelco.com.au/paddle-trimming-calculator-2>

MAINTENANCE

If the TW Series flow switch is correctly installed and if the process liquid is compatible with the materials of construction of the switch then a very long maintenance free service life can be expected. Factors that may contribute to early failure of the flow switch include excess temperature, excessive pressure or electrical loads in excess of the switch's rating. The TW Series is a very simple switch to service, and all components are available as spare parts.

ELECTRICAL DATA REED SWITCH MODELS

All electrical work associated with this flow switch must be carried out by qualified persons only and must be in accordance with the relevant local codes. The TW flow switch is available in one of two basic configurations. The standard version of the flow switch is supplied with an SPDT microswitch fitted. A special reed switch version of the flow switch is also available for low power applications. The model number of the switch is located on a label inside the switch lid. The standard flow switch houses a magnetically coupled high current high voltage single pole double throw microswitch that is suitable for most general purpose control circuit applications at any voltage up to 500V AC. The special reed switch version of the TW Series houses a gas filled reed switch that provides a single pole double throw break before make action. The cable gland on the TW Series flow switch is threaded M20 and will accept standard M20 conduit bushes in addition to flexible cable. When wiring a TW Series flow switch, ensure the lid and cable gland are securely tightened and in fully exposed locations use secondary precautions such as cable drip loops to make sure no water can enter the switch housing.

ELECTRICAL DATA MICROSWITCH MODELS



WARNING

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

RATED VOLTAGE	NON INDUCTIVE LOADS				INDUCTIVE LOADS			
	RESISTIVE LOAD		LAMP LOAD		INDUCTIVE LOAD		MOTOR LOAD	
	NO	NC	NO	NC	NO	NC	NO	NC
125 VAC	15A		3A	1.5A	15A		5A	2.5A
250 VAC	15A		2.5A	1.25A	15A		3A	1.5A
500 VAC	10A		1.5A	0.75A	6A		1.5A	0.75
8 VDC	15A		3A	1.5A	15A		5A	2.5A
14 VDC	15A		3A	1.5A	10A		5A	2.5A
30 VDC	6A		3A	1.5A	5A		5A	2.5A
125 VDC	0.5A		0.5A	0.25A	0.05A		0.05A	0.05A
250 VDC	0.5A		0.5A	0.25A	0.03A		0.03A	0.03A

ELECTRICAL DATA REED SWITCH MODELS

The reed switch models are supplied with a high compliance single pole double throw reed switch suitable for all low wetting current and low voltage applications. Such applications include PLC control, signalling in telemetry systems and relay logic circuits. **Note: the reed switch models are not suitable for use with inductive loads such as contactors or high wattage relays.**

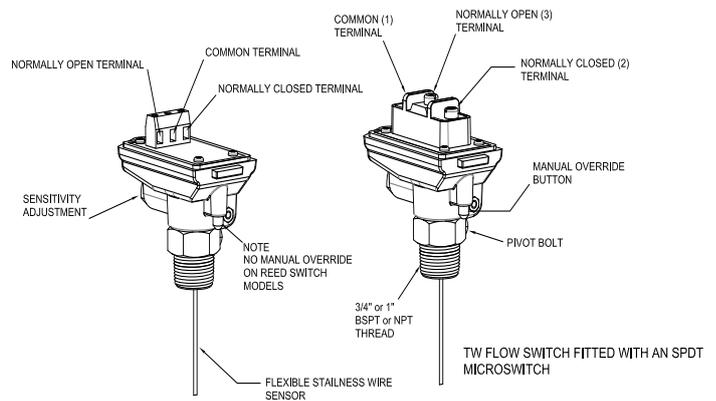
SWITCH TYPE	CONTACT	SWITCHED POWER	SWITCHED VOLTAGE MAXIMUM	SWITCHED CURRENT (RESISTIVE)	CARRY CURRENT	BREAKDOWN VOLTAGE	TYPICAL APPLICATIONS
DRY CONTACT REED SWITCH	S.P.D.T BREAK BEFORE MAKE	20W / VA MAXIMUM	140V AC 150V DC	1 AMP MAXIMUM	2 AMP MAXIMUM	200V MINIMUM	PLC, TELEMETRY & GENERAL LOW VOLTAGE CONTROL APPLICATIONS



WARNING

After installing or servicing this flow switch always replace its lid and fully tighten its lid screw. Also ensure the cable gland is fully tightened. Never leave the lid off the Flow switch for extended periods. Without its lid in place this Flow switch is not water resistant and presents a potential shock hazard. Take great care not to splash water onto the inside of the Flow switch's electrical housing when the lid is not in place. Without its lid the Flow switch is not weather or insect proof and presents a potential shock hazard that may result in death or serious injury.

COMPONENTS



TW FLOW SWITCH FITTED WITH AN SPDT REED SWITCH

OPERATING LIMITATIONS

Model	TW-S (All Poly)	TW-SS (Stainless)
Maximum operating pressure (Static or Dynamic) at ambient temperature	18 Bars (261 PSI)	200 Bars (2900 PSI)
Minimum burst pressure at ambient temperature	45 Bars (652 PSI)	500 Bars (7251 PSI)
Maximum operating temperature	60°C See note below	80°C
Minimum operating temperature	0°C	0°C
Minimum liquid S.G.	0.8	0.8
Ingress protection rating	IP67	IP67

Warning note on operating limitations: Maximum operating pressure of the Polypropylene TW-S must be linearly de-rated as operating temperature is increased so that at 60°C the maximum permissible operating pressure for the switch is not more than one Bar absolute.

HAZARDOUS APPLICATIONS

The TW Series flow switch can be used in hazardous areas. The flow switch is classed as a simple device and does not contain components capable of storing or producing an electric charge. As a simple device the TW Series can be used in hazardous applications provided an intrinsically safe barrier (a zener barrier) isolates it.

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